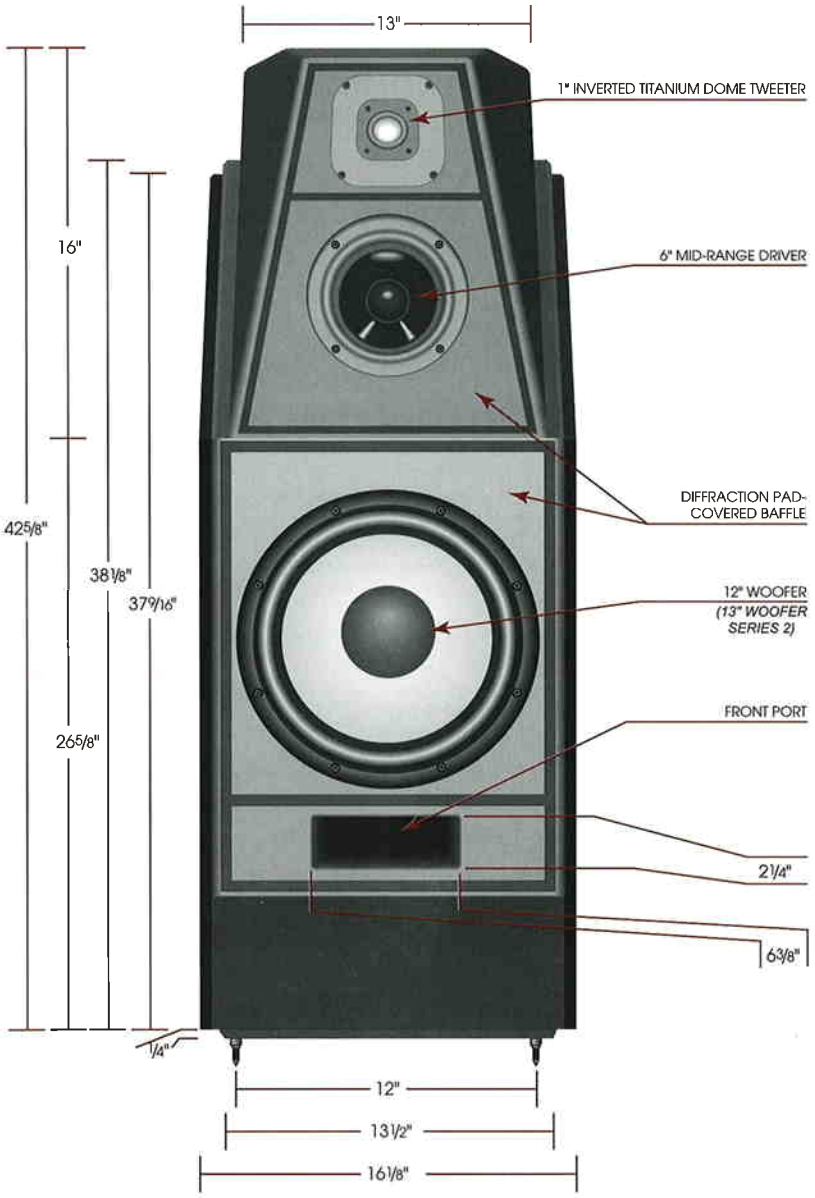
WILSON INTEGRATED TRANSDUCER TECHNOLOGY

OWNER'S MANUAL

WILSON INTEGRATED TRANSDUCER TECHNOLOGY:
COMPONENTS AND DIMENSIONS



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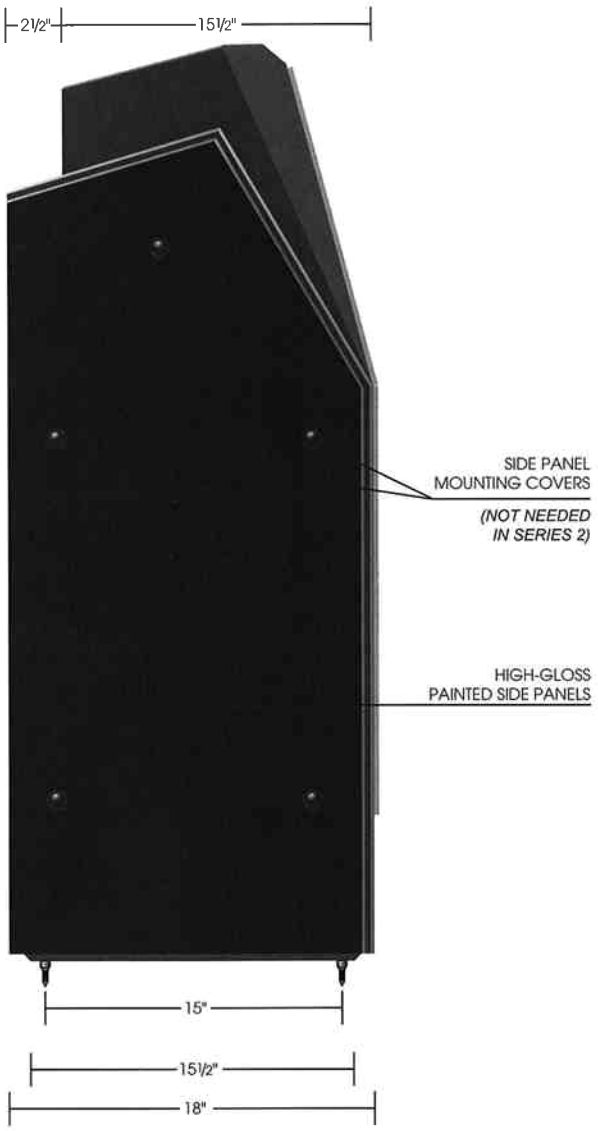

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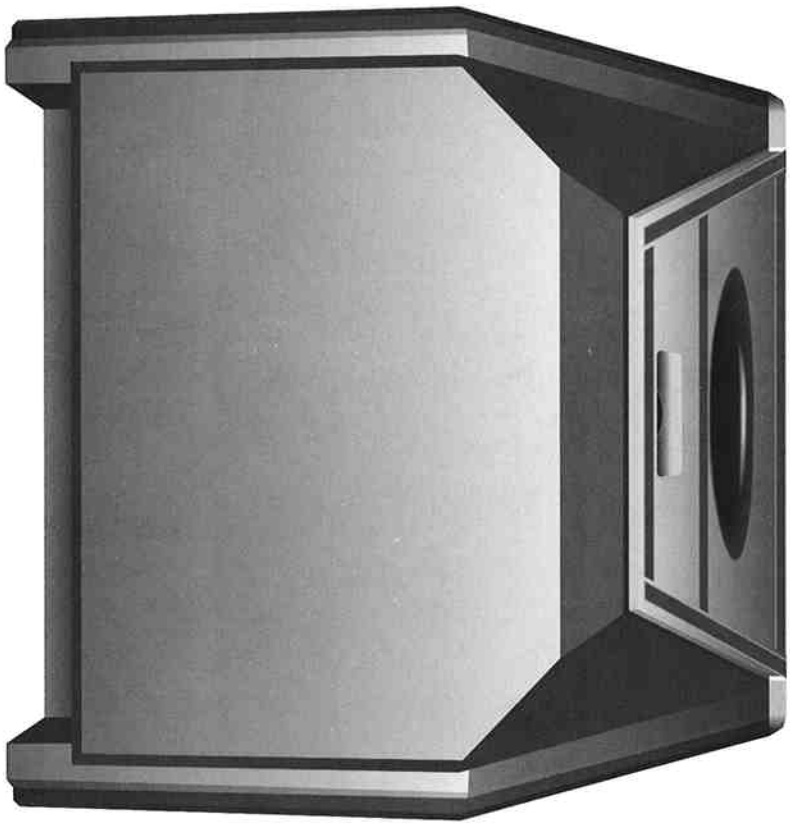

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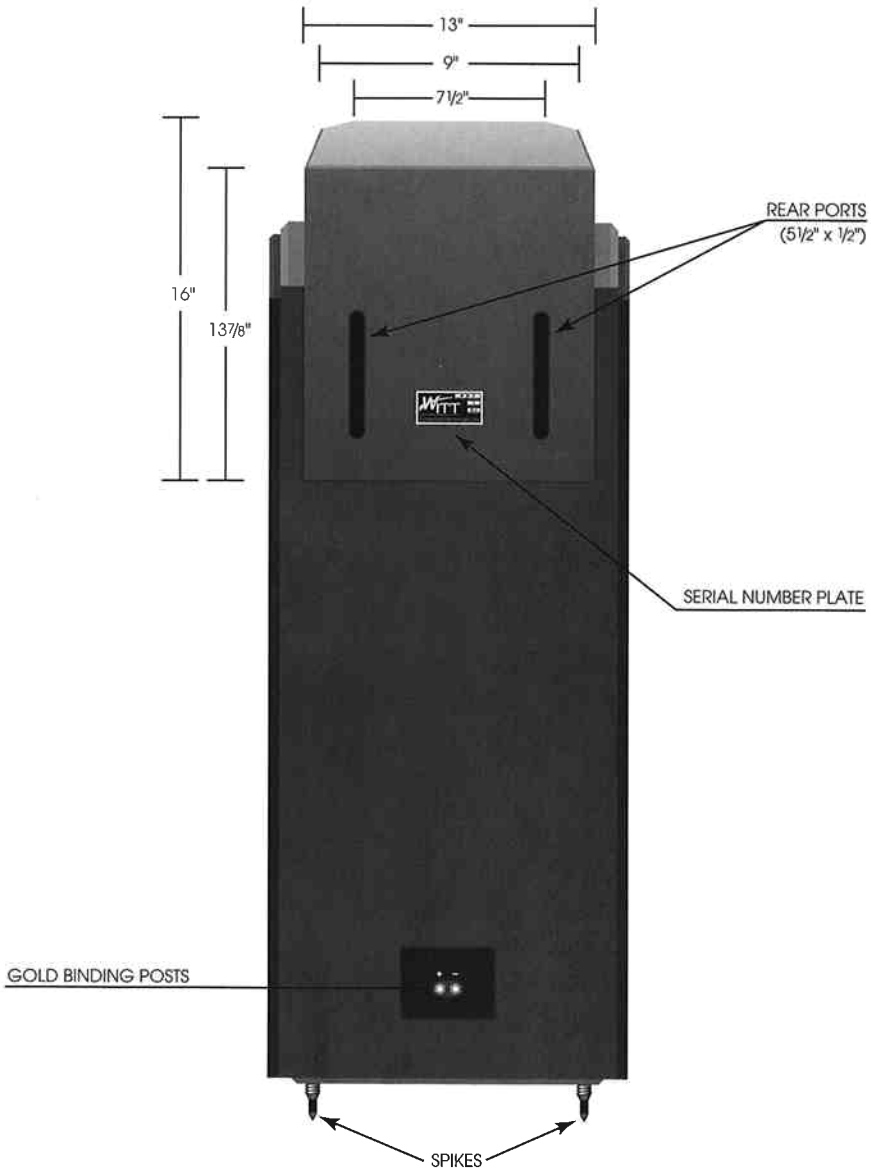
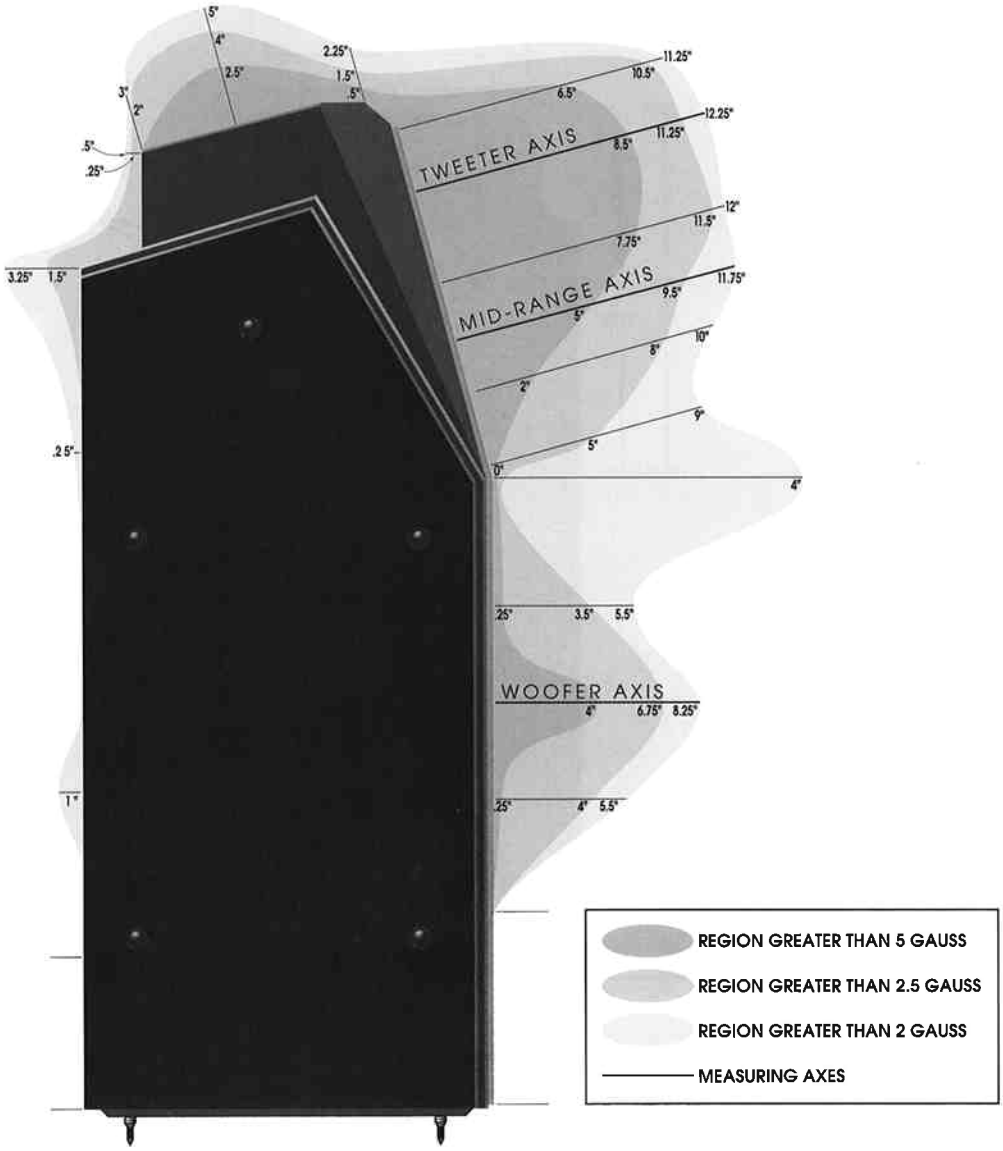


WILSON INTEGRATED TRANSDUCER TECHNOLOGY:

MAGNETIC FIELDS, SIDE VIEW



WILSON INTEGRATED TRANSDUCER TECHNOLOGY:
MAGNETIC FIELDS, TOP VIEW

WITT INTRODUCTION 1

WITT OWNER'S MANUAL

APPLICATIONS

Your WITT (Wilson Integrated Transducer Technology) precision loudspeaker has been carefully designed to provide superb, uncolored, full frequency range response in a single enclosure. Due to our very successful experience with the WATT/Puppy and X-1 Grand SLAMM systems, the WITT has sonic abilities quite similar to its predecessors.

Using enclosure, speaker driver and time alignment technologies developed for the WATT/Puppy and the X-1 Grand SLAMM the WITT is truly the thoroughbred of its class, and is well suited to carrying on the heritage of Wilson Audio speakers.

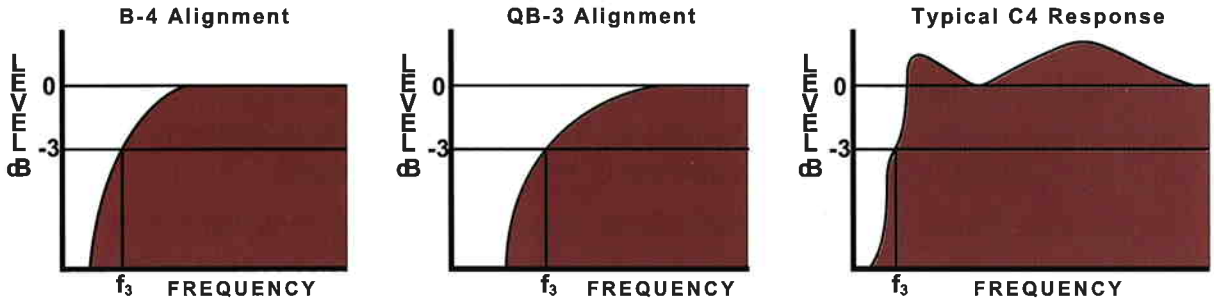
One of David Wilson's most important criteria in speaker qualification is that a speaker deliver the accuracy and dynamic demands of studio monitoring. They must also be discerning enough for critical hardware and software evaluation. Consequently, the WITT has been designed to deliver the speed, dynamics and musical accuracy to satisfy the most demanding music lovers.

The WITT is engineered to take full advantage of today's multi-channel surround formats, especially the latest full-range AC-3 (Dolby Digital) and DTS (Digital Theater Systems) formats. The WITT will provide the speed, dynamic impact, and dialog intelligibility you have come to expect in high performance home theater systems, while at the same time revealing the subtleties of a good film score in a way that is emotionally satisfying.

DESIGN CONSIDERATIONS

The WITT is designed around a massive enclosure utilizing proprietary polymer materials technology. The enclosure material exhibits excellent internal damping and a correct mechanical impedance match to the frames of the drivers. Additional mechanical tuning is provided by rigid cross-bracing.The acoustical tuning of the low frequency system is modeled after the quasi-forth order Butterworth response, *(see figure 1, next page)*, which provides linearity in the upper-bass (without the usual mid-bass hump) with superior transient performance. The crossover network uses multiple slopes to achieve acoustical phase linearity. Minimum energy/time-storage behavior in the crossover is achieved by using only the finest audio-grade propylene capacitors, OFC air-core inductors, and time coherent wire. The components are matched to better than 0.1% tolerance. The drivers were selected because of their frequency response linearity, impulse stability, and most important, their intrinsic musical quality.

WITT DESIGN CONSIDERATIONS:
THIELE & SMALL ALIGNMENTS



Commonly used in modern vented systems. Extended linear response, but at the expense of some quality of transient response and power handling.

Used in the WITT. Trades off some upper bass response to achieve superior transient response and power handling.

Sacrifices linearity, transient response and power-handling in order to achieve slight low frequency extension.

figure 1

ENCLOSURE MATERIALS TECHNOLOGY

Ideally, an enclosure material should be infinitely rigid to preserve dynamic contrasts, while at the same time it should have infinite internal damping. To satisfy the first demand, the enclosure could be made out of diamond, which would of course be prohibitively expensive! To satisfy the second demand, the ideal enclosure could be made out of rubber, but such an enclosure would exhibit very poor dynamic linearity. The baffle and side panels of your WITT loudspeaker are machined from a high-density polymer material . This material has been chosen because it provides a nearly ideal blend of rigidity, mass, and internal vibration damping and reduction of the resonant signature of the enclosure. Because of its brittleness, this material is much more demanding to work with than wood or metal.

UNPACKING

Each WITT is extremely heavy (220 lbs), so please be careful in unpacking. Also, it is advisable to have a friend assist you in the unpacking procedure.

1. Move the WITT crates to the general location where you would like them set up. With the WITT crates lying down on the floor, unscrew the wood screws that are holding the crate covers on. In one of the crates you will see a clear plastic bag with Black foam grill cloths and a brown sealed bag. Remove these items and put them aside for the moment.

2. For System I WITTs (purchased before January 1997), stand the crate up so the WITT is standing on its base and gently walk/slide the speaker out of the crate. Remove the plastic outer bag by tilting the WITT over and opening the bag at the base of the WITT. Stand the WITT up and remove the bag. For System II WITTs (purchased after 1996), stand the crate up so that the WITT is standing on its casters. Gently slide-wheel the WITT forward. Remove the plastic outer bag by opening the bag at the base of the WITT, and then sliding the bag over and off of the unit.

Note: Do not cut the bag off of the WITTs. You may mark the cabinet or damage a driving element. Additionally, you will need this bag, if and when you need to repackage the WITTs for a move to another location.

3. Carefully move the WITTs to the approximate positions that you would like them placed in for system II. Do not attempt to remove the casters until the final location has been determined *(see section 3.1 through 3.5)*.

   Note: Be careful not to touch the driving elements when you are moving your WITTs!

4. Be sure to save your shipping crates and all packing materials. If you should ever need to transport them to a new location they are specifically designed to prevent your WITTs from incurring damage.

CARE OF THE FINISH OF YOUR WITTs

Your WITT loudspeakers are hand-painted with Mirrorgloss™ paint and hand-polished to a high luster. While the paint seems quite dry to the touch, final curing and complete hardening takes place over a period of several weeks. To protect the finish of the WITTs during final manufacture, shipment, and setup in your listening room, we have installed a removable layer of protective film over the finish. We recommend that this film be left in place until the speakers are in their final location in your listening room. Once you have determined their final position, remove the film by peeling it off. Do not leave this film on indefinitely, as it may leave impressions on the paint. It is important that the delicate paint finish of the WITT be dusted carefully with the special dust cloth which has been provided with your loudspeaker. We recommend that the following procedure be observed when dusting the speakers:

A. *Blow off all loose dust.*

B. *Using the special dust cloth as a brush, gently whisk off any remaining loose dust.*

C. *Shake out the dust cloth.*

D. *Dust the finish, using linear motions in one direction parallel to the floor. Avoid using circular or vertical motions.*

Because the paint requires a period of several weeks to fully cure, we recommend that no cleaning fluids such as glass cleaners be used during this initial period of time. When the paint is fully cured, heavy finger prints and other minor smudges may be removed with a glass cleaner. Always use the special cloth. Stronger solvents are not recommended under any circumstances. Consult your dealer for further information if required. Periodic polishing may be desired over the years to maintain the high luster of the finish. We recommend a non-abrasive carnuba-based wax and soft cloth.

Note: Do not clean your WITTs immediately after removing the frisk. Wait at least 24 hours.

BREAK-IN PERIOD

All Audio equipment will sound its best after its components have been broken-in for some period of use. Wilson Audio breaks in all woofers and mid-range drivers for a 12 hour

period before they are tested and calibrated at the factory. All tweeters are tested, calibrated, and matched. In your listening room, expect 25 to 50% of break-in to be complete after two hours of playing music fairly loudly. Ninety percent of break-in is complete after 24 hours of playing. Playing a "disc repeat" overnight can accomplish this task quickly. Wilson Audio recommends chamber music for this task.

IMPEDANCE

Figure 2 (below) shows the modulus of impedance of the WITT system. Over most of the range from 200 Hz to approximately 20 kHz, the WITT may be regarded as an 8 ohm speaker. However, in the 30 Hz and 2 kHz region it should be noted that the impedance drops to approximately 5 ohms. This does not present a problem with most modern high performance amplifiers. It may, however, cause concern when using certain amplifiers with vacuum tubes in their output stage, without an output transformer.

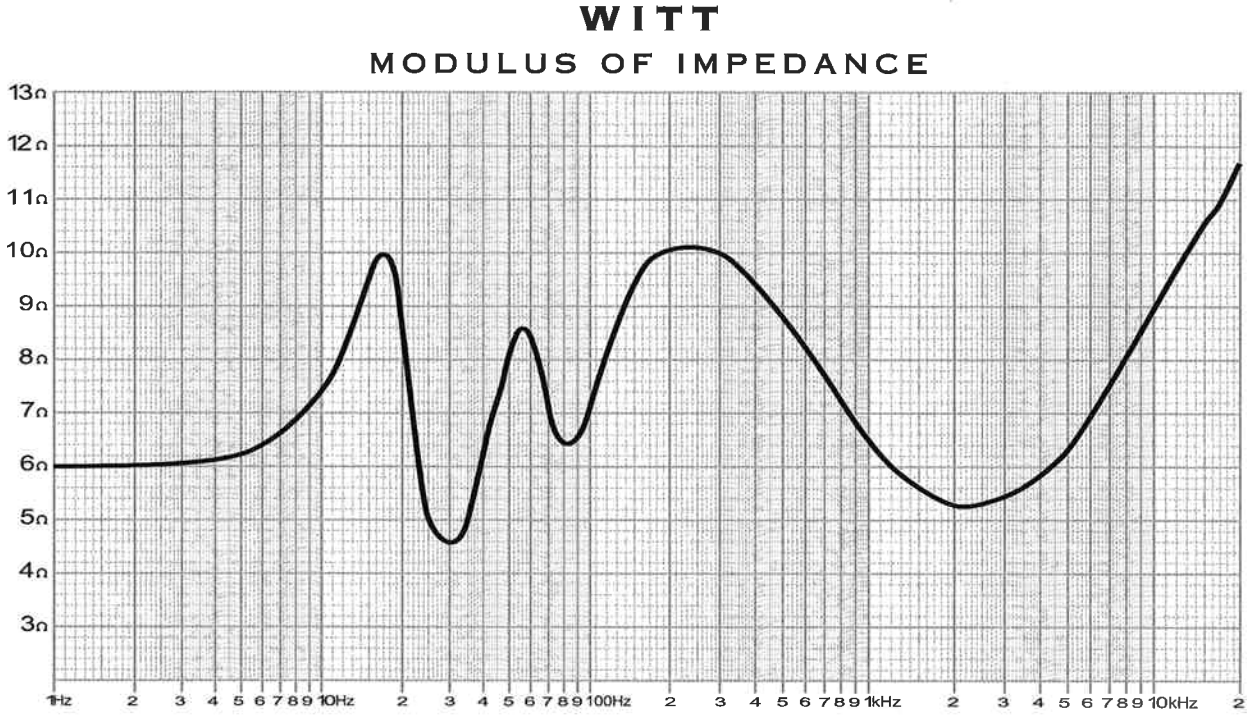


figure 2

Of course, there will be no difficulties when driving your WITTs with output transformer coupled vacuum tube amplifiers, or high performance solid state amplifiers. Contact your dealer for specific recommendations, which should be based on your listening tastes and system environment.

CONNECTION OF YOUR WITT SPEAKERS

The very high current input terminals located on the rear of your WITT loudspeaker are coded so that (+) corresponds to positive and (–) to negative, or common, or ground on the amplifier output. Be sure to connect the loudspeakers in phase with each other. We recommend the use of the very highest quality loudspeaker interface cables, particularly those designed for high frequency propagation correction and phase linearity. Beware of "zip cord" type speaker cables which will smear the sound from your WITTs, and limit their effective bandwidth. Also do not use braided litz type loudspeaker cables as they will cause an unnatural brightness to the sound, compromise sound staging performance, and may cause instability, oscillation and damage in wide bandwidth solid state amplifiers.

CONNECTION OF YOUR WITTs TO YOUR POWER AMPLIFIER

1. Turn off your power amplifier(s) and remove the AC power cord from the wall outlet.
2. Lay out your speaker cables before hooking them up to the WITTs. Make sure that there are no kinks or right-angle bends in the cable. If you need to turn corners, attempt to use a gradual curve as opposed to a severe right-angle bend.
3. Connect the negative (normally Black) end of the speaker cable to the high current speaker binding post with the engraved "—" above it.
4. Connect the positive (normally Red) end of the speaker cable to the high current speaker binding post with the engraved "+", above it.

   Note: This is a good time to check that your cables are connected properly at the amplifier. Remember: Red = "+" and Black = "—" on most cables. If your cable is not marked with Red/Black or "+"/ "—", call the cable manufacturer to find out which cables are positive and negative (some cables have optimized "+"/ "—" conductors.

5. Plug your amplifier(s) AC power cord into the wall outlet.
6. Your WITTs are now ready for final "voicing". Refer to the Room Acoustics section of this manual for an explanation of this process. once you have completed voicing the speakers, proceed with step 7 below.
7. Beginning with the top of the WITT, place the acoustically transparent grill covers over the driving elements by laying the top edge of the grill onto the velcro® strip above the tweeter. Do not stretch the grill in any way. After this is done, place the rest of the cover on the head-unit, working from top to bottom. Follow the same procedures for the woofer section of the WITT.

   Note: Always attempt to keep your pair of speaker cables the same length. This will ensure that the signals arrive at each speaker in the proper time frame, by traveling the same distance to each speaker.

TECHNICAL NOTE

If the user wishes to test the polarity of the WITT with a battery, connect the plus (+) terminal of the battery to the (+) input terminal of the WITT and the negative (-) terminal of the battery the (-) terminal of the WITT. The results of this test will show the WITT woofer to move outward. **This is the correct driver movement in response to a D.C. signal.**

ROOM ACOUSTICS 2

WITT OWNER'S MANUAL

ROOM ACOUSTICS

Final listening room setup (voicing)

Your WITT loudspeakers will give you years of music satisfaction. However, their high performance characteristics and abilities can only be fully appreciated with the proper acoustical setup.

The following section will present some guidelines on room acoustics and their interactions with loudspeakers. We will also offer some detailed suggestions on the setup of your WITTs, but we strongly suggest that you have your local Wilson dealer perform the final speaker "voicing" for you. They are specially trained in setting up Wilson loudspeakers and will ensure that you realize the full value of your purchase.

3 COMMONLY ENCOUNTERED REFLECTION PROBLEMS

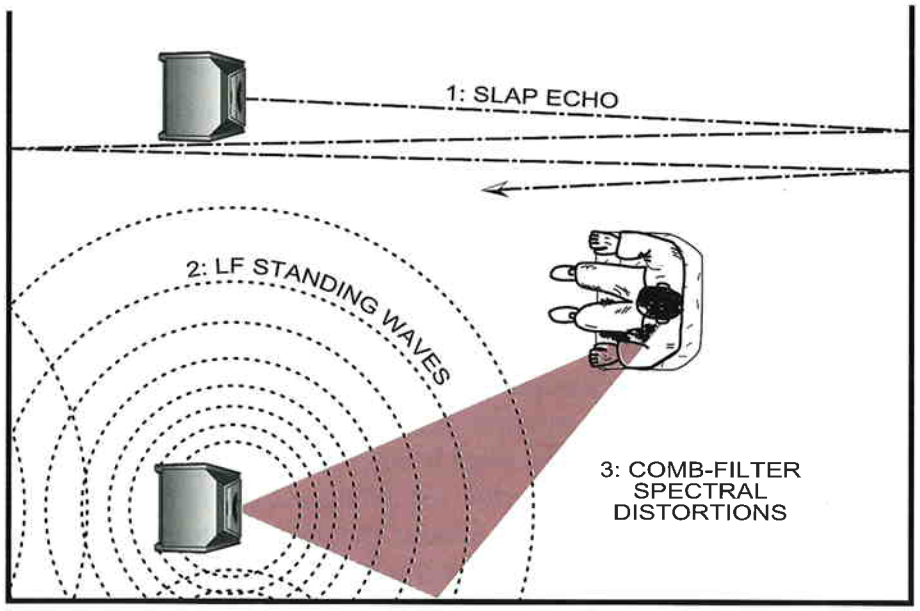


figure 6

A. REFLECTIONS

Figure 6 (previous page) illustrates the 3 most commonly encountered room reflection problems. Probably the most obnoxious form of reflection is called "slap echo." In slap echo, primarily mid-range and high frequency sounds reflect off of two parallel hard surfaces. The sound literally reverberates back and forth until it is finally dissipated over time. You can test for slap echo in any room by clapping your hands sharply in the middle of the room and listening for the characteristic sound of the echo in the mid-range. Slap echo destroys the sound quality of a stereo system primarily in two ways: by adding harshness to the upper mid-range and treble through energy time storage and by destroying the delicate phase relationships which help to establish an accurate sound stage. Non-parallel walls do not support slap echo, but rather allow the sound to diffuse.

Slap echo is a common acoustical problem in the typical domestic listening room, because most of these rooms have walls of a hard, reflective nature, usually being only occasionally interrupted by curtains or drapes. Slap echo can be controlled entirely by the application of absorptive materials such as Sonex, airduct board, or cork panels to the hard surfaces. Large ceiling to floor drapes are effective in controlling some high frequency slap echo, as is the application of carpeting to wall surfaces. In many domestic listening environments, heavy stuffed furnishings are the primary structural control to slap echo. Unfortunately, their effectiveness is not predictable. Diffusers are sometimes also used to very good subjective effect, particularly in quite large rooms. Sound absorbent materials such as described above will alter the tonal characteristic of the room by making it sound "deader," less "bright and alive" and "quieter." These changes also make the room more pleasant for conversation. Diffusers, on the other hand, tend to not change the tonal balance characteristic of the room, but make the sound smoother and more open.

Another type of reflection phenomenon is "standing waves" *(see figure 6)*. Standing waves cause the unnatural boosting or accentuation of certain frequencies, typically in the bass, to be found at certain discreet locations in the room. A room generating severe standing waves will tend to make a loudspeaker sound one way when placed in one location and entirely different when placed in another. The effects of standing waves on a loudspeaker's performance are primarily in its tonal balance, although resolution of low-level detail, as well as sound-staging will also suffer. Standing waves are more difficult to correct than slap echo because they tend to occur at a lower frequency, whose wave length is long enough to be ineffectively controlled by absorbent materials such as Sonex. Moving speakers about slightly in the room is, for most people, their only control over standing

waves. Sometimes a change of placement of as little as two or three inches can dramatically alter the tonal balance of a small system because of standing wave problems. Fortunately, minor low frequency standing waves are well controlled by positioning ASC tube traps in the corners of the room. Very serious low frequency accentuation usually requires a custom-designed bass trap system.

Low frequency standing waves can be particularly troublesome in rooms constructed of concrete or brick. These materials trap the bass in the room, unless it is allowed to leak out of the room, through windows and doors.

In general, placement of the speaker in a corner will excite the maximal number of standing waves in a room, and is to be avoided for most direct radiator, full range loudspeaker systems. Some benefit is achieved by placing the stereo pair of loudspeakers slightly asymmetrically in the listening room so that the standing waves caused by the distance between

REFLECTIVE ACOUSTICAL COMB FILTER EFFECT

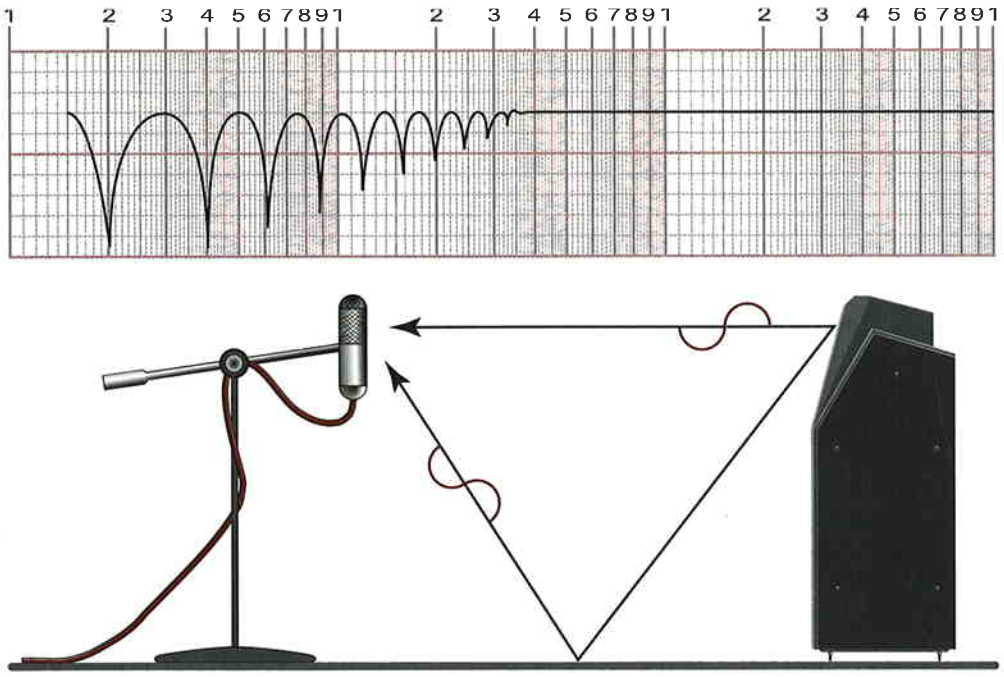


figure 7

one speaker and its adjacent walls and floors are not the same as the standing wave frequencies excited by the dimensions in the other channel.

A special type of standing wave noticeable primarily at higher frequencies and shorter wave lengths is the so-called " comb filter effect" *(see figure 7).*

Acoustical comb filtering occurs when sound from a single source, such as a loudspeaker, is directed toward a microphone or listener at a distance. The first sound to reach the microphone will be the direct sound, followed by delayed reflected sound. Because the reflected sound lags in phase relative to the direct sound, there will be cancellation at certain frequencies where the two are 180 degrees out of phase, and augmentation at other frequencies where the direct and the reflected sounds arrive in phase. Because it is a function of wave length, the comb filter effect will notch out portions of the audio spectrum at regular octave-spaced intervals. The subjective effect of comb filter effects, (such as is shown in figure 4 and figure 7) is an added roughness to the sound, a reduction of harmonic richness and a smearing of lateral sound stage image focus and placement. The side wall reflections which cause the comb filter effects are best controlled by careful speaker placement and by the placement of Sonex or air duct panels applied to that part of the wall where the reflection occurs.

B. RESONANCES

Resonances in listening rooms are generally caused by two sources: (1) the structures within the listening room and (2) the volume of the air itself in the listening room.

Structural resonances are familiar to most people as buzzes and rattles, but this type of resonance usually only occurs at extremely high volume levels, and is usually masked by the music. In many wood frame rooms, the most common type of structural resonance problem is "booming" of walls and floors. You can test for these very easily by tapping the wall with the heel of your hand or stomping on the floor. If it is a wooden floor, this is done to detect the primary spectral center of the resonance. To give you an idea of what the perfect wall would sound like, imagine rapping your hand against the side of a mountain. Structural wall resonances generally occur in the low to mid-bass frequencies and add tonal balance fullness to any system played in that room. They too are more prominent at louder levels, but their contribution to the sound of the speaker is more progressive. Rattling windows, picture frames, lamp shades, etc. can generally be silenced with small pieces of caulk or with blocks of felt. Short of actually adding additional layers of sheet rock to flimsy walls, however, there is little that can be done to eliminate wall resonances.

The volume of air in a given room will also resonate at a frequency determined by the size of the room. Larger rooms will resonate at a lower frequency than will smaller rooms. Air volume resonances, wall panel resonances, and low frequency standing waves, together, combine to form a low frequency coloration in the sound. At its worst, it is a grossly exaggerated fullness which tends to obscure detail and distort the natural tonal balance of the speaker system. Occasionally, however, there is just enough resonance to give a little added warmth to the sound... an addition some listeners prefer. Tube traps manufactured by the ASC corporation have been found to be effective in reducing some of these low frequency room colorations. Custom designed and constructed bass traps, such as perforated Helmholtz resonators, provide the greatest degree of low frequency control.

IN YOUR ROOM

In *figure 8* we see three basic shapes for most rooms: square, rectangular, and L-shaped. A perfectly square room is the most difficult room to set up speakers in because, by virtue of its shape, square rooms are the perfect medium for building and sustaining *standing waves* . *Standing waves* are pressure waves created by the interaction of sound and opposing, parallel walls, that accentuate particular frequencies. They heavily influence the music played by loudspeakers, greatly diminishing the listening experience.

Long, narrow rectangular rooms pose their own special acoustical problems for speaker setup. They have the ability to set up several *standing wave nodes* which will have different *standing wave* frequency exaggerations depending on where you are sitting. Additionally, these long rooms are often quite lean in the bass near the center of the room. Rectangular rooms are still preferred to square rooms because by having two sets of dissimilar length walls, standing waves are not as strongly reinforced and will dissipate more quickly than in a square room. In these rooms the preferred speaker position for spatial placement and midrange resolution will be on the long walls. Bass response will be reinforced by speaker placement on the short walls.

In many cases L-shaped rooms offer the best environment for speaker setup. Ideally speakers should be set up along the primary (longest) leg of the room. They should fire from the end of the leg (short wall) toward the bend, or they should be along the longest wall, with the speaker furthest to the bend being inside of the bend. In this way both speakers are firing the same distance to the back wall. The asymmetry of the walls in L-shaped rooms resists the buildup of proper speaker setup (*see figures 8a & 8b).*

COMMON ROOM SHAPES:
OPTIMUM SPEAKER PLACEMENTS

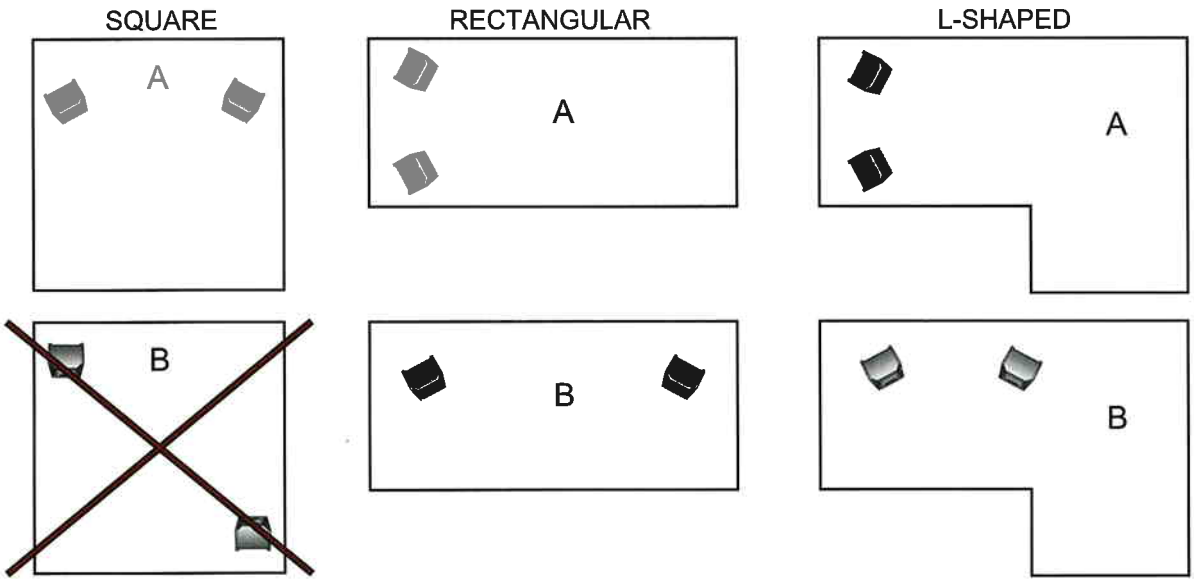


figure 8

ROOM PLACEMENT 3

WITT OWNER'S MANUAL

SPEAKER PLACEMENT vs. LISTENING POSITION

The location of your listening position is as important as the careful setup placement of your WITT speakers in your room. The listening position should ideally be no more than 1.1 to 1.25 times the distance between the tweeters on each speaker. Therefore, in a long rectangular room of 12' x 18', if the speaker tweeters are going to be 9' apart, you should be sitting 9'11" to 11'3" from your ear to its corresponding tweeter. This would be about halfway down the long axis of the room.

Many people would place the speakers on one end and sit at the other end of the room. Needless to say, this will not yield the finest sound. We would ask you to carefully consider your listening position for optimal performance. Our experience has shown that any listening position which places your head closer than 14" to a room boundary will diminish the sonic results of your listening.

SPEAKER ORIENTATION

Speaker placement and orientation are two of the most important considerations in obtaining superior sound. The first thing you need to do is eliminate the side walls as a sonic influence in your system. Speakers placed too close to the side walls will suffer from a strong primary reflection. This can cause out-of-phase cancellations, or comb filtering, which will cancel some frequencies and change the tonal balance of the music. A good place to start is with the speakers about 18" from each wall and, if you need to move them relative to the side wall, move them away from the wall, not closer.

A very important aspect of speaker placement is how far from the back wall to place the speakers. A rule of thumb is: the closer to the back wall the more pronounced the low bass energy and centering of image will be. However, this comes at a definite reduction in stage size and bloom, as well as a deterioration of upper bass quality. You must find the proper balance of these two factors, but remember, if you are partial to bass response or air and bloom, do not overcompensate your adjustments to maximize their effects. Overbalanced systems are sometimes pleasing *in the short term*, but long term satisfaction is *always* achieved through proper balance.

THE EFFECTS OF ROOM PLACEMENT

The effect of room placement of the performance of the WITT is illustrated in *figures 13, 14, and 15, and tables 4, 5, and 6.*

Figure 13 examples 1A and 1B and *table 4* compare the performance of corner situated WITTs vs WITTs which are placed out in the room away from walls, but which are not toed-in. Placement of any direct full-range radiator loudspeaker in the corner results in numerous performance compromises. In one respect, however, corner placement of the speaker excels, and that is in low frequency augmentation. Looking at the tonal balance characteristic of the corner situated WITTs we can see an elevated lower midrange through mid bass region, the expected effect of corner loading, coupled with a gradual roll-off of the upper octaves, the result of any sound absorbing materials on adjacent walls, and the off-axis listening position. The corner placed speakers are also significantly further away from the listener than the speakers in example 1B. By its very nature, sound, when traveling through air, loses low-level detail with distance. Ideally, therefore, the listener should sit as close to the speakers as is comfortable. Moving the speakers out into the room at least three feet from the rear wall, and at least two feet from the side walls, provides a fairly dramatic level of improvement of sound staging performance and overall mid and upper octave balance. But still the example shows the speakers not toed in. The WITTs are designed for maximum phase coherence and pulse replication accuracy when they are aimed directly at the listener or microphone. *Figure 14, table 5* shows the effect of toeing in the WITTs. The speakers in *example 2* are in the same general room location as the speakers in *1B*, but are toed in. When the WITTs are correctly toed in, the listener, when seated in the listening position, will just barely see the surface of the inner side panels of the WITTs. We can see that toeing in the speakers provides dramatic improvements in resolution of low level detail in the midrange as well as dramatic improvements in sound staging performance. It should be noticed that in the tonal balance curve in *table 5* and the tonal balance curve in *table 6, example B* both reveal irregularities in response in the upper bass through lower midrange which are caused by standing waves and adjacent wall comb filter effects. The performance indicated in *table 5* is very promising, and yet it is not really representative of the best performance of which the WITT is capable. Any speaker will benefit from appropriate acoustical room treatment.

Let us now go to *figure 15, table 6,* to see the benefits in performance which can be achieved by modest acoustical treatment of the room. With the speakers in the same location as in *figure 14,* we note the addition of tube traps in the corners of the listening room,

as well as foam or Sonex panels placed between and behind the speakers, against the back wall, as well as along the wall behind the listener and over to the side next to the listener. The tube traps can be seen to smooth out the performance of the upper bass and lower midrange, while at the same time not compromising low frequency extension. Slap echo is controlled by the sound absorbing panel on the wall behind the speakers in the center of the sound stage and by the two panels on the back wall behind the listener. These two room treatments, namely tube traps and judicious placement of sound absorptive panels, can elevate the sonic performance of virtually any speaker system in a typical domestic listening room.

Should the listening position be as far from the speakers as possible, even up against a back wall? *Figure 15, position B* shows the effect of being seated near a back wall, some distance from the speaker. We can see a dramatic increase in upper bass and mid bass output of the system, actually due to standing wave reinforcement near the back wall, as well as the expected high frequency roll off resulting in the longer air path of the sound to the listener.

It should be noted that, in comparison to other speaker systems, even this compromised level of sound staging performance and resolution of low level detail still represents very good performance indeed.

CASTERS

If you have System II WITTs, you will observe that Wilson Audio has mounted casters to these units. Once you have voiced your room and located an ideal placement for these speakers, you will want to remove these casters. WE STRONGLY RECOMMEND THAT YOU HAVE SOMEONE HELP YOU WITH THIS STEP.

The easiest way to remove the casters is to tilt one edge up (have someone support the speaker as you tilt it towards him, being careful not to let the speaker slide on its casters). After the speaker is tilted, loosen each castor and remove it. If the casters are too tight to remove by hand, you may use the wrench provided with your WITT speakers to loosen them.

OPTIONAL PUPPY PAWS

As an option to your WITT system are two sets of Puppy Paws, which provide acoustical isolation as well as optimal height placement for your speakers. There are three ways of assembling the Paws (without spacers, or with one or two spacers), and your choice will depend on your listening room and personal tastes. Wilson generally recommends no spacers, for simplicity and rigidity. However, the addition of spacers changes the driver-to-floor dimension, and can sometimes be used to reduce an objectionable upper-bass/lower mid-range standing wave.

ASSEMBLY:

1. Insert either the short or the long threaded bolt, depending on the desired height *(see figure 4 next page)* as far as it will go into the hole in the bottom of the WITT.
2. If desired, place the corresponding number of spacer discs *(see figure 4 next page)* over the bolt.
3. Screw the acoustical diode onto the bolt until it butts up against the spacers or WITT bottom.
4. Screw the Paw (with nut) all the way in until it reaches the bolt. Do not tighten the nut at this time.
5. Repeat steps 1 through 4 with the other three paws.
6. To provide the proper mechanical coupling between the Paws and the floor, make sure that the WITT is level by unscrewing individual spikes as needed until even contact is achieved by all four Spikes. A bubble level is often helpful in this procedure.
7. Once all adjustments have been made, tighten the bolt on the spike to the diode with the 9/16" wrench provided. DO NOT OVERTIGHTEN! "Snug" is tight enough.

PUPPY PAWS:
ASSEMBLY DIAGRAM

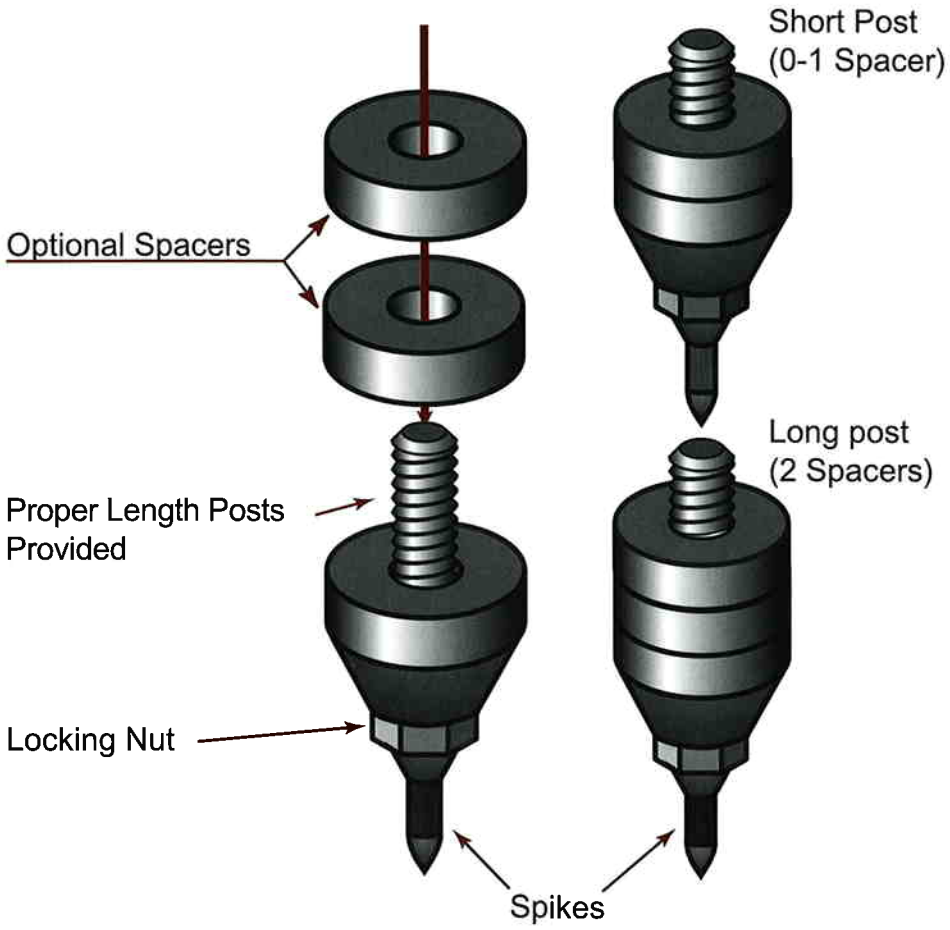


figure 4

SUMMARY & ILLUSTRATIONS 4

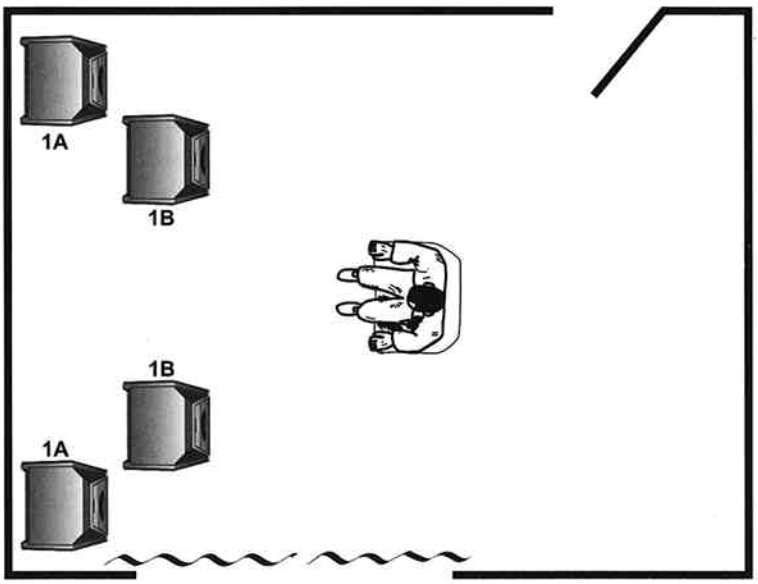
WITT OWNER'S MANUAL

SUMMARY

In summary, it is clear that, for optimal tonal balance accuracy, resolution of low level detail and sound staging performance, the WITT should be positioned at or slightly below ear level of the listener. Ideally, the speakers should not be positioned too far from the listener, if maximum resolution of low level detail is required (near-field monitoring). If possible, the speakers should be positioned out into the room, slightly asymmetrically away from side and rear walls. The speakers should be toed-in toward the listener, preferably so that the listener at his seated position can barely see the surface of the inner side panel of the WITT as he/she faces the speaker. It is recommended that a distance of 2-3 feet, and possibly more, be maintained between the WITT and the rear walls and a distance of at least 2 feet be maintained between the front panel of the WITT and reflective side walls. Use of sound absorbent materials reduce the space requirement somewhat. Experiment for each room.

By following the guidelines in this manual and your own common judgement, your new WITT speaker will provide you with a lifetime of pure music reproduction.

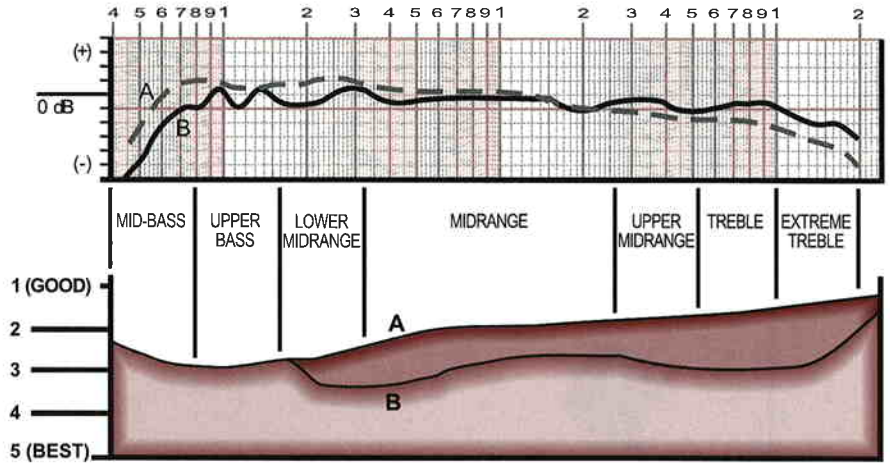
PERFORMANCE OF THE WITT:
EFFECT OF ROOM PLACEMENT



EXAMPLE 1A: Illustrates the performance of corner-situated WITTs

EXAMPLE 1B: Illustrates the performance of WATTs placed out in the room, away from walls, but not toed in.

figure 13

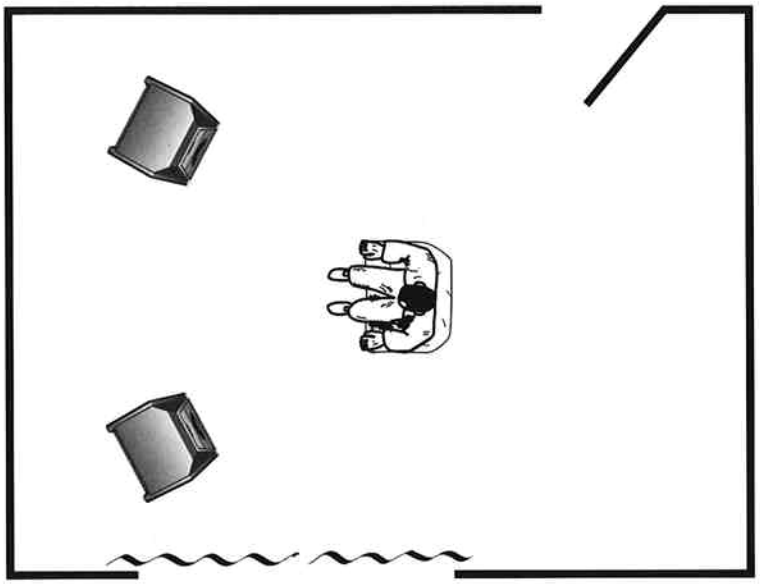


AREA	IMAGE FOCUS	IMAGE PLACEMENT	AMBIANCE
CENTER	A=2 B=3½	A=3 B=3½	A=2 B=3½
EXTREME SIDES	A=2 B=3½	A=2 B=3	A=2 B=4
REAR FIELD	A=2 B=3	A=2 B=3	A=2 B=4

1=GOOD 5=BEST

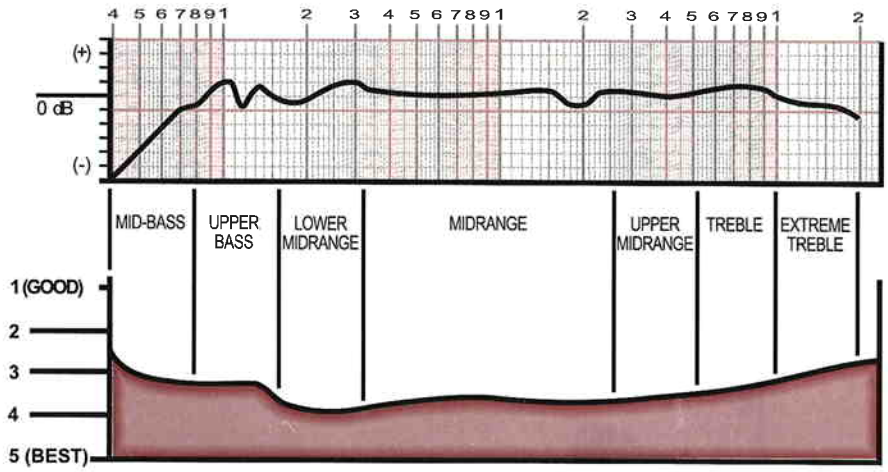
table 4

PERFORMANCE OF THE WITT:
EFFECT OF ROOM PLACEMENT



EXAMPLE 2: Illustrates the effect of toe-in on the WITTs. Units are in the same region of the room as in EXAMPLE 1B, except now are toed-in.

figure 14

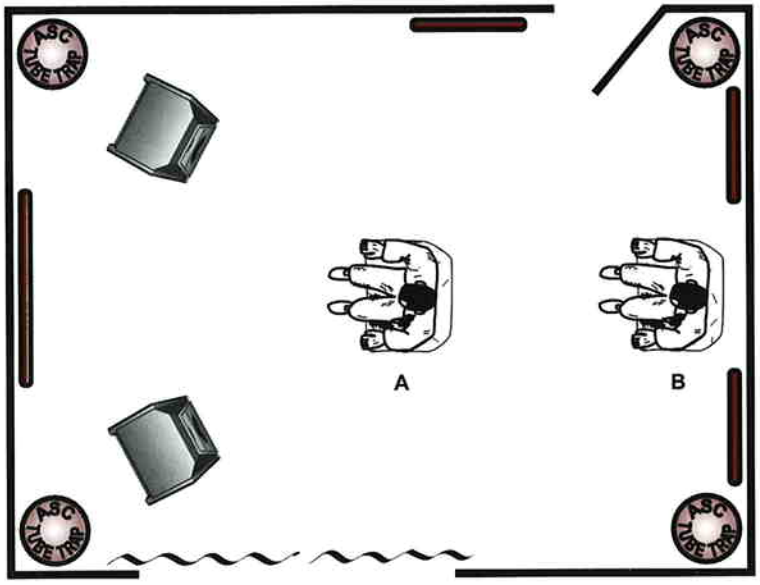


AREA	IMAGE FOCUS	IMAGE PLACEMENT	AMBIANCE
CENTER	4 1/2	4 1/2	4
EXTREME SIDES	4	3	4
REAR FIELD	4	3 1/2	4

1=GOOD 5=BEST

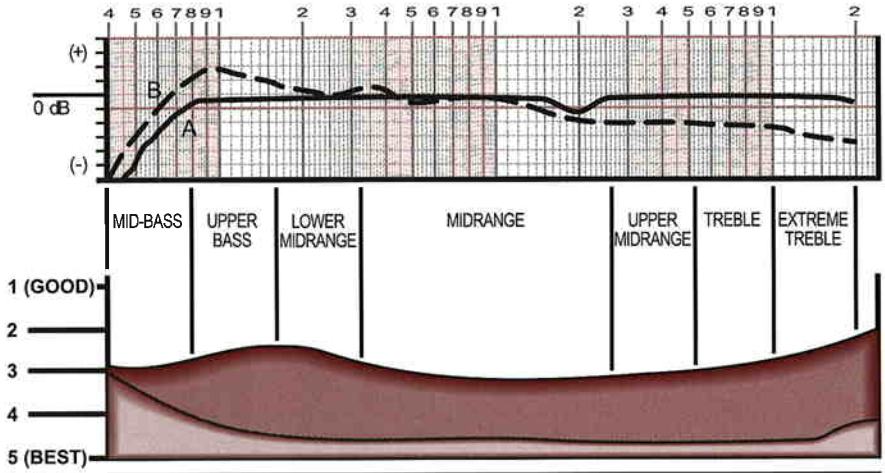
table 5

PERFORMANCE OF THE WITT:
EFFECT OF MODEST ACOUSTICAL ROOM TREATMENT



EXAMPLE 3: Compare with WITTs in EXAMPLE 2, which differ from these only in room treatment. Also, compare listening positions A and B.

figure 15



AREA	IMAGE FOCUS	IMAGE PLACEMENT	AMBIANCE
CENTER	A=5 B=4½	A=5 B=4½	A=5 B=4
EXTREME SIDES	A=5 B=3½	A=5 B=4	A=5 B=3½
REAR FIELD	A=5 B=4	A=5 B=4	A=5 B=3

1=GOOD 5=BEST

table 6

SET UP DIFFICULTIES & TROUBLESHOOTING

5

WITT OWNER'S MANUAL

SETTING UP DIFFICULTIES AND TROUBLESHOOTING

Amplifier shuts off as soon as it is turned on:

1. Check to see if your speaker cables are properly secured (no frayed ends, tight connections, no conductor contacting the amplifier chassis).

   If you find problems in your connections: Correct these problems and try again.

   If the problem persists and you have no apparent connection problems: Continue to step 2.

2. Turn the amplifier off and disconnect it from the AC wall outlet. Disconnect the preamplifier leads to the amplifier. now turn on the amplifier.

   If the problem is solved: There is something wrong with your preamplifier or interconnect. Call your dealer.

   If the problem persists: Leave the preamp leads disconnected and move to step 3.

3. Turn the amplifier off and disconnect it from the AC wall outlet. Disconnect the speaker leads at the WITTs. Turn the amplifier on.

   If the problem is solved: Call your Wilson dealer. There may be something wrong with the WITT crossover or speaker binding post internal wiring.

   If the problem persists: Move to step 4.

4. Turn the amplifier off and disconnect it from the AC wall outlet. Disconnect the speaker cable leads to the amplifier and turn the amplifier on again.

   If the problem is solved: you have a short in your speaker cables. Check for frayed ends, holes (from spike feet…, or make sure that your spade lug is not touching the chassis while it is connected to the binding post.

   If the problem persists: Call the dealer where you bought your amplifier. You appear to have a problem with this component.

There appears to be a complete lack of bass energy from my WITTs.

1. You may have your speakers wired "out-of-phase". This would cause the bass cancellation that may be occurring. Check that your speaker cables are correctly connected: see section 2.2 in this manual.

   If the problem is solved: Enjoy your music.

   If the problem persists: Move to step 2.

2. Turn the amplifier off and disconnect it from the AC wall outlet. Disconnect the speaker cable leads from the amplifier. Leave the cables connected to your WITTs. Take a AAA battery and touch one end to the free end of your speaker cable (either end. It does not matter). Now, while you are looking at the woofer element of the WITT, touch the other end of the cable to the free end of the battery. YOU SHOULD SEE MOVEMENT FROM THE WOOFER CONE. As long as you see some movement, there is nothing wrong with the wiring from the crossover to the woofer.

   If the problem persists: Attach your speaker cables to the amplifier (following the procedures laid out in section 2.2, plug in your amplifier, turn it on and move to step 3.

3. Refer to section 3.4 Speaker Placement in this manual. You appear to have a room that needs alternative speaker placement or, perhaps, room treatment. Please contact your dealer.