

# **TYPE C**

# **Loudspeaker**

# **Instruction Manual**

Snell Acoustics

## INTRODUCTION

Your Type C represents the newest extension of the Snell philosophy in speaker design. Following the world class heritage of the Type A, the Type C attains excellence not only in sonic performance but in construction as well. Physically smaller and less expensive than the Type A, the Type C is Snell's latest statement in defining the leading edge of loudspeaker technology.

Component parts and craftsmanship are of the highest order. The result is a loudspeaker which represents state-of-the-art achievement in design *and* manufacturing. This is achieved through control of *all phases* of production from raw materials through the finished product by Snell Acoustics, coupled with a rare *commitment* to excellence. All products are designed, engineered, and constructed directly by company personnel, thus assuring complete integrity at all phases of the manufacturing cycle.

For example, unlike virtually *all* other speaker manufacturers, Snell Acoustics constructs its own speaker cabinets with an in-house crew of trained professional craftsmen. Through this process each unit receives individual attention resulting in a finished product exhibiting a level of quality which is simply unattainable when construction is performed elsewhere.

The Type C loudspeaker further strengthens Snell's position as a leader in the speaker industry in producing speakers which represent the highest level of quality, integrity and value.

## ROOM PLACEMENT

*IF YOU HAVE ALREADY POSITIONED YOUR SPEAKERS IN YOUR LISTENING ROOM YOU HAVE UNKNOWINGLY MADE ONE OF THE MOST IMPORTANT DECISIONS REGARDING OPTIMIZING THEIR PERFORMANCE. THE IMPORTANCE OF LOUDSPEAKER PLACEMENT IN RELATION TO THE LISTENING ENVIRONMENT/ROOM IS THE MOST CONSISTENTLY UNDERESTIMATED (AND MISUNDERSTOOD) FACTOR IN SPEAKER PERFORMANCE.*

## ALL LOUDSPEAKERS INTERACT WITH THEIR LISTENING ROOM

The effect of how they interact can be modified quite predictably (and to your liking), however, the fact *that they interact CANNOT*. Room placement, therefore, should be approached with as much care and importance as the selection of associated components. *The most discriminating selection of fine audio equipment cannot overcome the adverse effects of poor speaker positioning.*

We will offer you some proven guidelines in determining optimum speaker location, however, the precise location will be obtained in a given room by experimentation within these guidelines coupled with careful listening.

The Type C is the result of a superior design meticulously and consistently executed. Care in placement will enable you to extract the maximum amount of performance that has been carefully built into them.

If you have *any* questions regarding room placement, or need further advice, contact us directly at (617) 373-6114 and ask for *Technical Assistance*.

## PLACEMENT GUIDELINES

### ***THE THREE MOST IMPORTANT GUIDELINES THAT YOU SHOULD FOLLOW ARE:***

1. Avoid having your *listening position* within approximately a three foot radius of the *center* of the room while at the same time keeping your listening position somewhat further from the speakers than they are apart.
2. Attempt to have your *listening position* two to four feet out from the rear wall, i.e., the wall opposite the one that the speakers are placed against.
3. Place the speakers against the longest wall, especially if the shortest wall is less than twelve feet in length. If your listening room, for example, were eight feet by sixteen feet the speakers should sound clearly better/more natural located against the sixteen foot wall.

**OTHER IMPORTANT FACTORS TO BE AWARE OF:**

**AS A SPEAKER IS PLACED CLOSER TO A CORNER (IN PARTICULAR ABOUT THREE FEET OR CLOSER) THERE WILL TYPICALLY BE INCREASED BASS WHICH MAY OR MAY NOT BE DESIRABLE. ALSO, THERE WILL TYPICALLY BE INCREASED "MIDRANGE RESONANCE,"** which is usually perceived as "colorations" in the midrange frequency region. Voices are found in the low midrange through midrange frequencies and midrange resonance will result in a deterioration of clarity.

**PLACING LARGE OBJECTS BETWEEN THE TWO SPEAKERS WILL SIGNIFICANTLY DETERIORATE STEREO IMAGING ABILITY.** This is especially evident the more solid the object is and in particular if it is at or extends above the level of the midrange drivers. Also, the closer the object is to the speaker, the greater the effect.

**IF, BY NECESSITY, YOUR LISTENING POSITION IS MUCH CLOSER TO THE LEFT SPEAKER (FOR EXAMPLE) THAN THE RIGHT, OFTEN A PREFERRED SOLUTION TO ADJUSTING THE "BALANCE" CONTROL ON YOUR ELECTRONICS IS TO AIM THE RIGHT SPEAKER (AS YOU FACE THEM) DIRECTLY AT YOU AND THEN TILT THE LEFT SPEAKER THE SAME AMOUNT IN THE DIRECTION OF THE RIGHT SPEAKER.**

**THE DESIRABLE BASIC SONIC CHARACTERISTIC OF YOUR LISTENING ROOM IS TO BE "SLIGHTLY LIVE."** How do you determine what is "slightly live" you ask? Clap your hands loudly. If there is a *faint* echo you have a "slightly live" room. If there is an obvious echo the room is *very live* and will, among other things, cause abnormal and often quite disturbing emphasis of high frequencies usually perceived as "harshness." If there is no echo whatsoever and the clap sounds "muffled" versus "crisp" the room is *very "dead"* and will among other things cause abnormal de-emphasis (or soaking up) of mid to high frequencies resulting in overall sound described as "heavy" or "droney" and a loss of detail and articulation. *Heavy* drapes are very effective at attenuating liveness. The amount of drapes can quite conveniently be adjusted by having them on a trellis rod and opening or closing them to reach the desired degree of liveness. Upholstered chairs and couches are also effective at controlling unwanted liveness in a room. On the other hand, carpeting, even heavy carpeting, has relatively little effect on absorbing all but the very highest frequencies.

***AVOID EXCESSIVE USE OF SOUND TREATMENT MATERIALS.***

There are sound absorptive products available which, when used carefully can help eliminate unwanted sonic reflections; however, most of these ***do not absorb sound equally at all frequencies*** and heavy use of them will typically "over absorb" sound in one frequency thereby causing an unintended overemphasis in others. Something to keep in mind is that a moderate amount of reverberant sound energy at all frequencies is desirable.

**DETERMINING OPTIMUM SPEAKER LOCATION**

***THE FIRST STEP IN DETERMINING THE OPTIMUM LOCATION OF YOUR SPEAKERS STARTS WITH DETERMINING THE OPTIMAL WALL TO PLACE THEM AGAINST.*** Unless your listening room is exceptionally large (the shortest wall being in excess of twenty feet) the loudspeakers should be placed against the longest wall. Loudspeakers should be placed on the shorter wall only as a last resort. Speaker placement on the "long wall" offers numerous significant advantages over short wall placement. (See below for a discussion of these.)

***BOTH SPEAKERS MUST BE PLACED ON THE SAME WALL FOR ANYTHING APPROACHING THE RECREATION OF THE "STEREOPHONIC IMAGE."***

***SPEAKERS SHOULD BE A MINIMUM OF SIX FEET APART, CENTER TO CENTER. THE SUGGESTED RANGE IS SIX TO TWELVE FEET APART DEPENDING ON ROOM SIZE AND LISTENING TASTES.***

**DO NOT PLACE ANYTHING IN BETWEEN THE TWO SPEAKERS HIGHER THAN A POINT ONE FOOT BELOW THE LEVEL OF THE MIDRANGE DRIVERS. SOLID OBJECTS BETWEEN THE MIDRANGE DRIVERS SERIOUSLY DEGRADE THE ABILITY OF THE TYPE C TO RECREATE THREE DIMENSIONAL STEREOPHONIC IMAGING.** Very few speakers possess this ability. A great deal of innovation went into the design, and care into the manufacture, of the Type Cs to enable them, when supplied with a stereo signal containing realistic imaging information, to translate this into a three dimensional sound stage.

**UNDER MOST CONDITIONS PLACE SPEAKERS A MINIMUM OF THREE FEET FROM CORNERS.** As speakers are placed closer to corners two things occur:

1. Bass response increases.
2. The strength of sound reflected off of sidewalls increases, (which results typically in "midrange resonance.")

In a room, for example, where bass response is somewhat lacking, or to suit an individuals' taste for increased low bass output, it may be desirable to place speakers closer than three feet to corners (side of cabinet to wall); however, if this is done, speakers should then be toed in: aimed directly at the center of the listening position, (i.e., turned away from side walls to reduce the strength of the side wall reflections).

#### **SHORT WALL VERSUS LONG WALL PLACEMENT**

As previously mentioned, all speakers interact with their room environment and they do this in very predictable ways. What is very important to take into consideration when determining location of loudspeakers is not just *where the speakers will be*, but, just as important, **WHERE YOU WILL BE LISTENING FROM**. If the guideline for optimization of "stereo imaging" is followed, i.e., sitting somewhat further from the speakers than they are apart, and a given room is rectangular (most are), by placing a given set of speakers on the long wall your listening position will be within two to four feet of a rear wall. In a given listening room, the most even, or optimum, distribution of sound power/frequency response will be found within two to four feet of any wall, a minimum of four feet from any corner.

If the guideline for optimization of "stereo imaging" is adhered to and speakers are placed on the *short wall* your listening position invariably will be within approximately three or four feet from the *center* of the room. In a given room the *most uneven*, or *least optimum* distribution of sound power/frequency response will be found within three or four feet of the *center* of the room.

So, by placing your speakers on the long wall rather than the short wall of the typical rectangular room you will be listening from a position having the *most even* (natural) frequency response distribution rather than listening from a position with *severe* frequency response aberrations.

### ***SPEAKER PLACEMENT IN SQUARE ROOMS***

Sonically, a square room is less advantageous than a rectangular one; however, excellent sound reproduction can be obtained by careful choice of speaker/listening position locations.

All previously mentioned suggestions regarding placement/listening position should be followed. It is now even more important, however, to avoid having your listening position at or near the center of the room.

If space allows, *offset* the speakers, i.e., place them so they are *not* equidistant from the corners to their left and right.

Avoid having your preferred listening position equidistant from the walls to your left and right.

### ***SPEAKER PLACEMENT AGAINST THE SHORT WALL***

Once again we would encourage you to reconsider placing speakers on the short wall of a rectangular room, and again, the shorter the wall, the more detrimental the effects; however, if this placement cannot be avoided, then there are measures to take which will minimize the inherent negative effects of this positioning.

First of all, let's define what length we're talking about when we say "short wall": If the length of the wall that the speakers are to be placed against is less than *twenty feet*, it is a "short" wall for normal speaker placement. Special attention must be given to specific location of speakers *and* listening position.

The primary problem caused by using the short wall of a typical rectangular room is that if the basic guideline for optimization of stereo imaging is followed to determine listening position (and it should be) then your listening position will typically be very close to the *center* of the room. As previously pointed out, this is the *least desirable* position, relative to the room, to be listening from. If you move the speakers further apart in order to move the listening position *back* from the *center* of the room, two harmful things occur:

1. Your listening position is so far back in the room that you primarily hear sound *after* it has reflected off the walls and floor. You hear mostly "*reverberant*" sound and very little, if any, "direct," or "early arrival" sound from each individual speaker. The result is a substantial loss of stereophonic "imaging" because it is the the "early arrival" or "direct sound" which creates the *stereophonic* illusion of three dimensionality of

*realism*, which is what a *stereo* system is most basically all about! The optimal ratio of *direct* to *reverberant* sound is approximately 50/50. In other words, you don't want an extreme amount of one or the other.

2. Moving the speakers apart on a short wall will typically put them closer than three feet to the corners resulting in abnormally strong reflections off of the side walls. These reflections when excessive cause "midrange resonance." An increase in low frequency response is another result of speakers being placed very close to corners; however, this may be desirable. Why? If, for example, you prefer additional bass response, or, for example, if your *listening position* is one which has a de-emphasis or lack of bass reproduction—such as *when listening in proximity to the center of a room*.

On the other hand, if you want to move your listening position substantially *forward* away from the center of the room while at the same time keeping your relationship to the speakers somewhat further away than they are apart (to optimize *stereo* imaging) you would move the speakers *closer together*. However, on a short wall this will typically result in the speakers being less than six feet apart and again there will be a substantial loss of the stereophonic effect due to the lack of separation of left and right channels. Also the width of the area that the stereo image is experienced in is very small. Additionally you would probably be sitting very close to the speakers which is not desirable generally.

#### **SUGGESTED SPEAKER PLACEMENT ON SHORT WALL**

Place the speakers *very close* or actually *in* the corners but *toe them in* away from the side walls so they aim *directly* at the center of the listening position. You may find it desirable to *increase* the amount of toe-in so that rather than the speakers aiming at the *center* of the listening area, they aim in a "criss-cross" fashion; that is, if you stood *behind* the speaker to your *left* you would aim it directly at a point two or three feet to the *left* of the center of the listening area. The speaker to your *right* would be toed in an equal amount so as to be aimed at a point two or three feet to the *right* of the center of the listening area, when standing *behind* the speaker.

This speaker positioning works quite well for several reasons: Placing the speakers in or very close to the corners spreads them adequately far apart on a short wall to obtain excellent stereophonic effect; acute toe-in significantly attenuates side wall reflections; and the increased bass response caused by the closeness to the corners typically offsets the natural *loss* of bass response which occurs when the listening position is at or near the *center* of the room.

Again, you should experiment with the amount of toe-in and proximity to the corner. Remember, insufficient toe-in will result in loss of clarity in midrange (colorations in voice reproduction); if the overall sound is too heavy or bassy, move the speakers away from the corners. Excessive bass response also can



be reduced by moving the speakers toward you/away from the wall behind them. This would be *preferable* to moving the speakers closer together (away from the corners) when the speakers are placed on the short wall of a *very narrow room*.

The correct relationship of left and right speaker and your preferred listening seat is important in achieving the best stereo imaging. The speakers and listener should form the base and apex of a triangle. The distance from speakers to listener should be somewhat greater than the distance between speakers. For example, if the listener is twelve feet from each speaker, the speakers should be placed seven to ten feet apart, center to center.

Optimal realism and imaging is obtained by having a clear line of sight between the listening area and the speakers.

The Type Cs are "mirror imaged." In simpler terms, there is a specific left speaker and a specific right speaker. You will notice that they are labeled "left" or "right" on the serial number tag next to the loudspeaker input terminal. Facing the speakers from your listening position, the left speaker should be on your left.

We suggest keeping the rear surface of the speakers parallel to the rear wall and in most rooms this placement will result in optimal imaging, realism and sound dispersion. In some situations you may prefer the performance of the speakers toed-in (aimed) toward the center of the listening area. This would probably occur when the speakers are abnormally far apart and/or you are very close to the speakers. (We would suggest sitting further back and/or moving the speakers closer together as the preferable solution.)

In most rooms, the back of the speakers should be placed approximately one to two feet from a wall directly behind them. The distance from the back wall will affect the bass and low midrange response. We suggest that you experiment with the placement of the speakers relative to the rear wall. Start at approximately twelve inches from the rear wall. Then move them forward and backward in about six inch increments while listening to a familiar recording, preferably one which has a vocal accompanied by one or two instruments and includes deep bass information. As the speakers are moved out into the room you should notice a subtle decrease in deep bass reproduction while at the same time voices will sound "thinner" or less "husky."



## CONNECTIONS TO LOUDSPEAKERS

***IMPORTANT: BEFORE CONNECTING ANYTHING, TURN OFF YOUR AMPLIFIER.***

***ALSO, IT IS A GOOD IDEA INITIALLY TO LEAVE SOME EXTRA SPEAKER WIRE SO YOU CAN EXPERIMENT WITH VARIOUS SPEAKER PLACEMENTS.***

The connectors at the rear of the speaker will accept bare wire, spade lugs or various "double" banana connectors such as the Pomona MDP. The banana connectors have the advantage of the easiest connection and removal.

The length and type of speaker cable used in your system will have an audible effect. You will achieve the best sound by using relatively short lengths of heavy gauge wire with #14 gauge being the highest (lightest) acceptable gauge. In general, the longer the length used, the greater the necessity of a lower gauge and the lower the gauge, the better the sound, with diminishing returns setting in around #10. You may wish to consider "specialty" speaker cables whose manufacturers claim better performance.

A variety of speaker cables are now available whose manufacturers claim superior performance than with "standard" wire of an identical gauge. We have verified this in some cases, and the improvements available are often more noticeable than the differences between wires of different gauges. The differences can also vary with the particular amplifier and speakers used.

We would also recommend, if possible, that short runs of speaker cable connect the power amplifier(s) and speakers and that long interconnect cables of high quality be used to connect the preamplifier and power amplifier. This will result in the power amplifier(s) being close to the speakers, which may be practically or cosmetically difficult, but if the length of the speaker cables can be reduced to a few meters, sonic advantages may be obtained. The effects of cables may sometimes be masked if the equipment is not of the highest quality.

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Be absolutely certain the two speakers are wired "in phase" with each other. All two conductor speaker cables are marked so that it is possible to distinguish between conductors by color of wire, color of insulation, or by a white strip or raised ridge along one strand. If you are using one stereo power amplifier connect one strand to the black (ground) terminal of the left channel of your amplifier and connect the other end *of that conductor* to the black terminal on the rear of your left Type C marked "input four ohms." Now, connect the remaining conductor to the *red* or *positive* terminal on the amplifier and to the *red* terminal on the rear of the speaker. Be certain to connect the right speaker to the right channel of the amplifier in exactly the same manner. As you will have noticed, there are two sets of connecting terminals on your loudspeaker. Basically these allow you the option of one of three connecting formats to your amplification source: single cable, double cables (bi-wiring) or bi-amplification.

### **SINGLE CABLE WIRING**

Using *one* cable between *each* speaker and the amplifier allows you to operate in the "single wiring" hookup mode. This would be the same as connecting a speaker which had only one speaker jack on the back of the speaker rather than two.

**NOTE:** Speaker cables should be connected in the following manner: **DO NOT REMOVE CONNECTING PIN WHICH CONNECTS THE TWO RED AND TWO BLACK LUGS ON TERMINALS.** One of the two red input terminals on each speaker should be connected to the positive (+) or "hot" amplifier output terminals. One of the two black speaker input terminals on each speaker should be connected to the negative (-) or "ground" amplifier output terminals. In the "single wiring" mode it is not important which of the two sets of black and red terminals is used. For example, if using a "banana type" connector simply insert in either *left* or *right* terminal on each speaker **assuring** positive to positive and negative to negative connections are made between speaker and amplifier. If you have chosen to use a spade lug connector be sure the lug is fitted *between* the horizontal pins that connect the red and black lugs on the speaker terminal and the tightening lug; that is, when the lug is tightened the spade must be trapped between the tightening lug and the horizontal connecting pins.

If using stripped leads on the end of your speaker cables be sure wire is wrapped around terminal post *above* connecting pins so lug tightens leads **and connecting pins** firmly.

In all modes of hookup *very tight* and *positive* connections are necessary. Be careful that the connections are very neat and that no strands from the two conductors are allowed to cross between the red and black terminals.

## **BI-WIRING**

Having **two** sets of input terminals on each speaker allows the operation of speaker in either the “bi-wiring” or “bi-amplified” mode. (See next section for bi-amplification.) There are distinct, audible benefits to be gained by bi-wiring or bi-amplification. Bi-wiring offers the attractiveness of being very cost effective in offering sonic improvements to your audio system at only the cost of an additional set of loudspeaker cables. When bi-wiring you should experience the following sonic improvements over single cable operations:

1. Deeper, tighter low frequency reproduction.
2. More “open” sound field.
3. Greater detail and clarity in the midrange and high frequencies.

(Bi-amplification will yield the same improvements but they will be much more apparent and dramatic with the additional improvement of **significantly greater dynamic range.**)

In bi-wiring you will use **two separate** speaker cables for **each channel** from the amplification source to each speaker, or a total of **four** speaker cables.

To start with, loosen all four lugs on each speaker and remove the horizontal connecting pins. (DO NOT dispose of these. If in the future you should choose to run your system in a single wired mode these will be necessary).

By removing the connecting pins between the red and black terminals you have severed the electrical connection between the bass frequency driver/low frequency section of crossover network; and the midrange, high frequency drivers/midrange, high frequency section of crossover network. By connecting a lead to one of the left or right set of terminals will now result in **either** the low or mid-high frequency drivers to be energized—but not both. This is the reason for now needing **two** sets of cables to **each** speaker.

**Both** speaker cables from **each** speaker are connected at the amplifier to the **same** output terminal in the bi-wiring mode. (In other words, for example, the two cables from the right speaker are **both** connected to the right output channel of the amplifier.) You will want to connect the two cables from the amplifier **to the speaker** by connecting one cable to each terminal. That is, one of the two cables consisting of a positive and negative connection from the right (for example) output terminal of the amplifier will be connected to the left vertical set of red and black terminals and the other cable will be connected to the right vertical set of red and black terminals.

## **BI-AMPLIFICATION**

Bi-amplification in addition to the sonic improvements obtained in “bi-wiring” enhances the dynamic range and overall “immediacy” of the system.

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By providing the dual set of terminals an additional step in the advancement of the state-of-the-art in home sound reproduction can be taken.

To start with you will need an additional stereo power amplifier, speaker cables and interconnect cables. It is **necessary** that both power amplifiers have **IDENTICAL** power ratings, or, that the amplifier with the **greatest** power have adjustable volume controls. (When using amplifiers of dissimilar power ratings it is extremely important to follow the set of procedures outlined below.)

**Note also**, that the connections between preamplifier and power amplifiers will be different than when using a single amplifier.

If your preamplifier has two sets of output terminals you will need to run a separate set of interconnects from the preamplifier output to the second amplifier being used.

If your preamplifier is **not** equipped with **two** sets of "output" terminals a "y" connector which splits the left and right output interconnects into **two** lefts and **two** rights will have to be used. These can be purchased at electronic supply stores such as Radio Shack or from your audio retailer.

Connect each of the **two left** channel interconnects from the preamplifier output to the left channel **input** of each of the two power amplifiers. Do the same with the **right** channel interconnects.

**Remove the horizontal "connecting pins" across the red terminals and black terminals on the speaker inputs.**

Now, run a speaker cable from the left output terminal of one of the two power amplifiers to **one** of the two input terminals (each consisting of a black and red lug) on the left speaker. Again, **insure amplifier to speaker connections are "in phase,"** that is, positive to positive, negative to negative.

Now connect the right output channel of the **same** amplifier to one of the two right speaker input terminals using the **same** terminal on both speakers; that is, as you face the input terminals on the rear of the speaker if you have connected the left channel speaker cable to the **left** set of terminals on the rear of the left speaker then you must connect the right channel speaker cable to the **left** set of terminals on the rear of the right speaker. This will insure that one amplifier drives the low frequency circuits in both speakers and the other amplifier drives the mid/high frequency circuits in both speakers.

### **BI-AMPLIFICATION WITH TWO AMPLIFIERS OF UNEQUAL POWER**

If using two power amplifiers having unequal power ratings the *more powerful* of the two *must have* gain controls enabling it to be adjusted so that its maximum output is attenuated to the maximum power of the less powerful amplifier.

We suggest contacting Snell Acoustics directly for this set up procedure through Customer Service.

## **PROPER CARE**

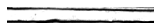
### **POWER HANDLING**

If you listen at very loud levels, we recommend that your dealer help you install an appropriate protective fuse in the speaker wire. This will avoid possible damage to the speaker if the amplifier is being played so loudly that it causes significant distortion. Do not use an amplifier rated at greater than **200** watts R.M.S. per channel into 8 ohms.

### **SUB SONIC**

Because of the careful design of its ported system, your speaker can effortlessly reproduce the lowest bass on today's best musical recordings at extremely high volume levels. However, excessive amounts of very low frequency energy can easily overtax your amplifier and your speakers. We recommend that you take the following precautions.

1. Turn down the volume control before cueing a record or flipping through the tuner dial.
2. When playing the system at high volumes, do not use excessive bass boost from the amplifier tone controls or from an external equalizer. In fact, we suggest they not be used at all. More often than not the power amplifier is not capable of supplying the amount of "boost" these controls call for, resulting in the amplifier "clipping," or becoming "unstable" and damaging the speakers.
3. An improperly set-up turntable can be a significant source of sub-sonic energy. The turntable should be set on a solid, vibration-free platform as far from the speakers as possible and especially *not* in between them. If your floor is not very solid, we suggest you mount the turntable on a solid wall. It is important for the shelf support brackets to be attached to the wall studs. Any visible wobbling of the record platter or tone arm while a person is walking (or dancing) across the floor would indicate that a more solid platform is needed. If you have difficulty eliminating turntable problems, there may be sufficient sub-sonic energy to cause problems. This would be evidenced by excessive wobbling of the woofer cone when



playing a record at high volumes. If the woofer wobbles 1/4" or more, it will be necessary to use a sub-sonic filter. Don't use it though if it noticeably affects bass; it should only reduce sub-sonic frequencies. Alternatively, if your preamplifier doesn't have an appropriate filter and if you continue to have sub-sonic problems from your turntable, you may wish to obtain a set of special sub-sonic filters from Snell Acoustics. These will effectively control most sub-sonic trouble and are simple to connect to your system.

The filters should be plugged into the "phono" inputs of your preamplifier or receiver, with the turntable cables plugged into the back of the filters. The filters should be used only if the "phono" input has a 47,000 ohms input impedance, which is the standard impedance used with almost all "phono" inputs. A "phono" input matched specifically for a moving coil cartridge would not be suitable for the filters.

The filters can be purchased from Snell Acoustics for \$20.00 a set. Contact our Customer Service Department if you wish to obtain a set of filters.

### IN CASE OF DIFFICULTY

If your system sounds faulty, but you are unable to pin down the source of difficulty, go to your Snell dealer for advice. Do not assume that it is necessarily your speakers which are at fault. For example, your stylus may be worn or defective. (You may also contact Snell Acoustics directly as previously mentioned).

Snell Acoustics performs its repair and warranty service only at its own factory or through an **authorized** dealer. If your loudspeaker needs service, take it to the store where you purchased it.

If it is not possible to return the loudspeaker to the store where you purchased it, please call or write to the Customer Service Department at Snell Acoustics, Inc., 143 Essex Street, Haverhill, Massachusetts 01830, (617) 373-6114.

We will then advise you of what action to take, and, if necessary, provide you with a return authorization number to be written on the outside of your shipping carton. A returned speaker must be shipped freight prepaid unless otherwise authorized. Since shipping is your responsibility when returning your speaker(s) we recommend that you be sure to insure them. After they have been repaired, the loudspeaker(s) will be returned to you under the conditions stated in the warranty.

Finally, be sure that if it is necessary to return the speakers that the proper packing materials are used. If you have not retained the original carton and packing materials new ones can be provided at additional cost through Snell Acoustics. We strongly suggest not throwing the original shipping cartons away—replacements are expensive.



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