

a.c.t. c.60

Owners Manual

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Wide Bandwidth

New challenges new opportunities, a new genre in loudspeaker design – Wide Bandwidth: The capacity to recreate the actual event relies upon a number of fundamental design objectives. Bandwidth is one of the most important concerns.

Why should this be? At its most simple, it should be reproduced because the artists through their instruments create this energy. In fact many instruments produce sound that extends well beyond 20KHz and up to 100KHz. To ignore the importance of wide bandwidth is to accept a compressed version of the recording. In order to even attempt to recreate this energy, new technologies must be invented. The laws of physics dictate that you cannot push the limits of the dynamic drive unit without severe penalties. Wilson Benesch invented the Torus to address the low frequency band. For the Ultrasonic band we adopted a patented technology from Murata of Japan. The Sphere pulses with a step response time that is significantly superior to any alternative technologies. This capability is endowed with the capacity to recreate the subtlest transient information that is quintessentially important to sound reproduction above 20 KHz.

W.B. (Wide Bandwidth) One

The latest drive unit the “W.B. One” incorporates a number of important details that have been painstakingly researched and developed within the companies C.N.C. manufacturing cell. The drive unit takes advantage of the latest Nd.Fe.B magnetic material to deliver more magnetic flux, providing for a more powerful motor system but significantly one that does not obstruct the anti-phase energy projected from the back of the cone. The new motor assembly was modified to handle the increase in flux, without any major increase in size. All the profiles retain the same curved forms, so as to cause the least turbulence in air moving behind the diaphragm. The length of the magnetic aperture has also been increased in order to increase the length of coil submerged in flux. This increase enables greater control and a more responsive reaction to the all-important transient.

The net result sees a 3dB improvement in sound pressure levels and significant improvements in signal to noise ratios. Dynamics are almost electrostatic in character, but with real slam that is only possible with the most dynamic compression and rarefaction of air. The most obvious characteristic is the freedom of delivery, isolating and defining the instruments in a sound field that extends beyond the confines of the enclosure.

Superior Performance

To its credit Wilson Benesch has remained with what is fundamentally the same tweeter for over a decade whilst our contemporaries have promoted new designs.

In our assessment these designs have all paid a high price to achieve the extra bandwidth that has been sought after in the form of uncontrolled ultrasonic resonant energy. Where we differ is in the argument that this energy is perceptible, and its hard, fatiguing and unnatural character of sound is not acceptable.

In sharp contrast to hard dome solutions, the Wilson Benesch soft dome is highly controlled, well damped and free of uncontrolled structural resonance. It is common knowledge that all materials possess a resonant signature. Woven, relatively soft multi material structures exhibit several orders of magnitude less violent resonant signatures than hard single material designs. Made from carbon, beryllium or whichever metal, all these Single material structures resonate in a very uncontrolled way.

The argument that this resonance is above 20,000 Hertz thus beyond the threshold of hearing and so unimportant is completely erroneous. When ignored the resulting sound is typically fatiguing and characterised by sounding hard and synthetic. In contrast the Wilson Benesch tweeter works exceedingly well within its limitations from 5,000 to 20,000 hertz. In contrast to hard domes the signature is often characterised as being sweet, natural or accurate. So although there might be many devices that provide a few thousand hertz extension beyond our tweeter we would argue that the price of this is too high. The distortions and loss of damping are simply unacceptable.

This Ultrasonic Generator is the third element in the journey towards high definition sound reproduction. It provides the consumer with a real alternative to the one tweeter does all approach. As with the Sub woofer, Wilson Benesch chose the alternative path in its research and development to overcome traditionally accept problems. Such methods take longer to bring to fruition but the result can be justifiably described as innovative and effective in pursuit of its goals. The Sphere has been designed to function with the greatest accuracy. It only begins to function at the point where many would claim that humans cannot perceive sound any longer, at 20,000Hz. It continues in a controlled way up to 100,000Hz well beyond that of all other tweeters. This band of sound is clearly perceptible. Like the Torus, it integrates perfectly with the Tactic drive unit. Like the Torus it opens up a new dimension in sound reproduction.

With these extended bandwidth products Wilson Benesch are proving it isn't solely what the human body hears but also what it perceives that adds to the listening pleasure and the experience as a whole. This consensus has defined the development of our latest products but, most importantly, will also help focus and determine the path our design and research of loudspeakers will move in the future. Moving away from the rigid limits of 20Hz to 20,000KHz is pioneering work and although we have made great strides with these new products being the result, we feel there is still much development to be done ourselves and by the field of science in general.

Summary

The most advanced drive unit technology in the form of the Wilson Benesch One is coupled with the ground breaking Sphere, Ultrasonic Generator, equipping the C60 to produce not only the deepest most physical bass but also the sweetest highs, crisp and clear all the way up to 100kHz.

All drivers are rear mounted and principle high frequency components are mechanically clamped to inhibit resonance. The simplest of hand made point to point soldered filter elements guarantee the least possible level of phase distortion. Precision tuning of the tweeter output enables precise matching of loudspeaker to system components without additional circuits.

Torus

Though more than able to provide the ultimate wide bandwidth sound the C60, can benefit from the Torus Infrasonic sound for the lowest registers. When installed correctly with a stagger tuned Torus system the A.C.T. C60 is capable of delivering the nearest thing to the live event.

Innovation is expensive and full of risk. To do something different is potentially life threatening for any company. Because of this, it is sadly the case that many companies no longer have the infrastructure to undertake original engineering. In contrast Wilson Benesch has invested in manufacturing systems on an on going basis, and is in fact the only company in the audio world that can boast of engineering facilities in C.N.C. metal machining and carbon fibre composites under the same roof as the state of the art 3D CAD facilities. The Torus can be seen as an intellectual stepping-stone demonstrating important technical advantages that will always compare favourably with large, slow and heavily damped woofer based designs. The listening experience is the test. It can be seen that the Torus provides the perfect partner to the super fast, linear phase, Wilson Benesch loudspeakers.

THE A.C.T C60 MANUAL

To the Owner

We would like to thank you for investing in a Wilson Benesch Loudspeaker.

Please return your completed Guarantee Registration Card or use the electronic registration within six weeks of purchase. Warranty conditions can be viewed towards the back of this manual.

For electronic registration please refer to the Wilson Benesch website to take advantage of the Customer Guarantee Registration. You can access the registration area via the 'Owners Section' on the Home Page at: www.wilson-benesch.com

To the Music Connoisseur

To the cognoscenti of British high performance audio, the Wilson Benesch marque is recognised as one of the world's leading loudspeaker design and manufacturing companies. You now own a product that will deliver years of pleasure to all who come across it, within the comfort of your own home. The purchase of a Wilson Benesch loudspeaker is merely the beginning of a long relationship. The ACT C60 loudspeaker is engineered to last a lifetime and is guaranteed for 5 years from the date of purchase. (This guarantee is offered to the first owner only). The care and attention offered by the Wilson Benesch dealer network matches the quality systems that we make. Should you need further advice about cables, set-up, upgrades or any other matters relating to the systems then the dealers are more than able to respond and deal with any of these concerns.

Unpacking & Set-up Instruction

Important points before setting up:

During installation two or more people will be required as the speakers are heavy each weighing in around 56kg. Never attempt to unpack or install the speakers without assistance as this could result in damage to the product or personal injury.

Please observe normal procedures for lifting and correct posture when handling the speakers. Soft fabric gloves are recommended to prevent damage to the high quality finish. Also, it is strongly recommended that all watches and jewellery be removed prior to unpacking. Patient and careful setting up is essential to obtaining the maximum performance from this system:

Move the speaker still in its packaging to the intended listening position. For further information on positioning, see the loudspeaker positioning section. Make sure the top of the box has been fully opened and the hardware pack has been removed. The speaker is now ready to be removed from the box. Have an assistant help you lift the speaker clear of all packaging. Stand the speaker on the floor, taking care not to damage the foot.

The protective polythene bag can be slippery, so great care must be taken. Once both speakers have been stood up the bags can be removed and the packaging stored for future use. The packaging is essential for shipping the system safely.

Wilson Benesch is distributed by the world's finest distributors and dealers, should you have any problems they will be able to help and guide you. You may also contact our customer care department via email at any time.

The Subject of Room Acoustics

Acoustics is a complex subject and this text should be treated for what it is, a simple but informative guide. For a more in depth understanding you would need to refer to a whole range of texts on the subject. The most important outcome of this should be a greater appreciation of the role played by the room and surroundings on the overall sound of the audio system. The air contained within the room is the link between the output of the loudspeaker and your ear. How air behaves is dependant upon the attributes or character of the room. It follows that a better understanding of basic acoustics and what facets cause the most influence in the room will assist in making decisions about the way in which the room and subsequently the system can be improved.

Room types fall between two extremes. A room can be 'dead' on the one hand (full of highly energy absorbent materials and complex diffusing structures) or very 'lively' on the other (few reflective surfaces and a high proportion of very reflective, hard, non absorbent surfaces). As so often is the case a balance of materials is commonly preferable to one extreme or the other. The correct balance is the goal for the end user.

Room attributes that can be easily changed

The contents of a room will impact upon its overall acoustic character. As you would expect hard surfaces like glass and concrete tend to reflect a broad band of acoustic energy. Complimentary materials that are soft and thick in section such as heavy natural fibre curtains will tend to absorb a broad band of frequencies.

What are standing waves?

When sound waves reflect between two parallel surfaces, the distance apart being equal to half the wavelength or less, dependant upon wave size, resonance modes referred to as 'standing waves' are created. In loudspeakers with parallel walls these waves will cause distortions. The standing waves in your room will distort the frequency response of your system sympathetically boosting certain frequencies. If a certain standing wave frequency is acoustically isolated from its modal neighbours its effect is more likely to be audible and problematic. This can compromise the accuracy of any loudspeaker.

Middle & High Frequency Room Characteristics

The middle and high frequencies are affected more by room contents rather than room shape. The surfaces and how they reflect, absorb or diffuse the acoustic energy will tend to describe the 'sound' of a room. Like all energy, acoustic energy cannot be destroyed; it can only be converted into something else or reflected. The shape of the surface will determine how it is reflected and the material will determine whether it is absorbed.

All rooms have a particular sound, and to appreciate what influences are present in your particular room you should be aware of how the objects in your room will respond to sound.

Sound waves behave in the same way as light waves or 'rays' and so imagine the driver to be a floodlight.

Reflection: acoustic energy is not converted but reflected in an orderly, predictable fashion.

Diffusion: acoustic energy is dispersed in a random and/or disordered fashion.

Absorption: acoustic energy is converted into kinetic energy or heat. All or a majority of the sound energy is 'soaked up' or disposed of by the object surface or room boundary

Two Channel Loudspeaker Positioning

There are no objective criteria that can be used to state precisely where loudspeakers should be positioned. Should any individual or company suggest that there are, they should be treated with a great deal of caution. In the global scenario, our loudspeakers are driven by unique systems that are selected by the owner because of particular virtues. Every listening room is as individual and unique in character as the owner. Compound this complex picture with the combination of different equipment.

Consider the changeability of rooms; if the room is dressed with heavy curtains simply changing the curtains position can alter the whole balance of the system. The only rule is that there are no rules. Like producing good wine it is the goal that is the only guide. The owner is the pivot in this subtle balancing act.

The goal of high performance audio systems is accurate reproduction. The information, be it in groove or pit format, should be transcribed, amplified and converted back into sound energy without the additional views of the audio equipment designer being combined with that translation process.

In order to make the task of positioning the loudspeakers less complex we would like to make the following suggestions. The most valuable commodity in this process is time. Be prepared to make small changes over longer periods of time. Select four musical passages that can fulfil the following tests. They should all be stereo recordings.

- Select one with a distinctive and easily heard human voice. Spoken voice is ideal.
- Select one passage with a full orchestra like The Pines of Rome.
- Select one that is very emotional for you.
- Select one that has a strong rhythm, as is the case with dance music for example.

You should appraise the performance of the loudspeakers according to your needs based upon the tests above.

Cinema Systems

There is no industry standard for the positioning of speakers for home cinema, but there are some facts that should be considered when creating such a dedicated environment. W.B. One drive units are not shielded and should not be placed within one metre of a cathode ray tube based video display. The angle from the screen should ideally be between 110° and 130°.

Wilson Benesch loudspeakers use identical drive units and tweeters making it possible for a system to be created comprising of more powerful channels at the front of the room and smaller units at the rear and filling in where necessary.

The centre channel is a critical component in any quality cinema system. It handles dialogue to which the ear is very sensitive due to our familiarity with the human voice and more besides.

All Wilson Benesch loudspeakers can be classified as full range systems. Configure the subwoofer for LFE only.

Bi/Tri Amping.

The power that is delivered to your drive units will have a direct effect on the sound of your loudspeakers. You should select the best that you can afford. Separating the systems will deliver benefits that can easily be detected. We would recommend using the same model of amplifier on different drivers.

Bi/Tri Wiring

Improvements can be heard through separating the energy from each filter in the crossover. Cables vary in construction but a good quality cable should be low in impedance, inductance and capacitance. Do not use cables that act as additional crossover components. Experimentation is crucial in this situation and a cable that works well in one situation with a given amplifier may not always perform as well when one of these variables are changed.

Terminals

Wilson Benesch recommends the use of 8mm ring or spade connector cable terminations. A spanner is provided to tighten up the rhodium plated nuts. Please be careful to not over tighten the terminals as this could result in damage to the surrounding materials. The terminals will also accept banana plugs.

Spikes

The spikes are supplied installed so great care should be taken when handling these systems. By careful tests you can adjust the speaker both in terms of toe in and in terms of vertical angle. Should you wish to adjust either of these factors you should arrange for an assistant to work with you. The position of the tweeter has been designed to function best for listeners seated in conventional relaxed seating positions. If required, for other situations such as listeners on higher seating or standing, the speakers can be tilted back so as to incline the tweeter.

Magnet Precautions

The motors used in all Wilson Benesch speakers are built from the most powerful magnetic material in the world, Nd.Fe.B. Do not bring any metallic objects or sensitive electronic, electromagnetic or mechanical systems into close proximity of these devices. This includes pace makers or other critical devices. The company cannot accept responsibility for any damage or injury caused to any such systems as a result of accidental exposure. Extreme care must be taken with all Wilson Benesch Isobaric speakers as the driver motor is exposed in these systems.

Running In Time (70 hours)

Like anything of good quality a period of running in tends to see improvements in performance. The speaker cabinet requires time to settle in to its surroundings. Climatic and humidity variations will take time to adjust to and until these changes have been made the speaker will not perform at its best. The drivers require time to bed in physically and relax materially. The carbon panels actually improve in structural integrity as they age. The quality of the sound that you hear when you first use your Wilson Benesch speakers will improve quite significantly over time, though this change will not be instantly perceptible. Allow at least seventy hours of running in before making any subjective judgements of the speaker's performance.

Surface Finish

Carbon fibre is a unique material with unusual physical and visual characteristics. We like to remain truthful about the fibrous nature of the material as opposed to concealing or obscuring it. The surface finishes applied to all Wilson Benesch loudspeakers require no further attention other than the occasional dusting. Treat the driver cones with respect and they will last a decade with relative ease.

Due to the angle of the cabinet top the appearance of stains, as a result of a glass being placed on the surface for example is of course impossible. With a little care the speakers will look as good in ten years as they do today and will probably sound even better.

Other Adjustments

Under no circumstance should you make any adjustment to the system's parts. Any adjustments not described as required by the setting up procedure will nullify all guarantees.

Should there be any question regarding the performance of this system you should refer to your dealer immediately for advice and/or assistance. If in the unlikely event that the problem cannot be dealt with by your dealer do not under any circumstances return the goods to Wilson Benesch without prior agreement with the company.

Connections

This is a guide to the connections found at the base of each C60 speaker. When a single run of speaker cable is used the supplied jumpers must be placed to bridge all the negative and corresponding positive terminals. In order to assist in the fine-tuning of C60 within your chosen environment we have provided additional input options that allow for adjustment of the WB Tweeter output. When wiring the system please ensure only one of the positive tweeter connections is used at a time to achieve desired output (there should only ever be a maximum of 6 connections per speaker). The Sphere, ultrasonic generator) is fed from the unfiltered midrange input to allow for full frequency extension.

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World Wide Warranty

Wilson Benesch offers a 5 year conditional warranty to the end user. It is done in collaboration with our distributors.

The conditions of this warranty are:

- That Wilson Benesch receives the necessary registration details from the end user.
- That these details are received within six weeks of purchase.
- The warranty is only valid for the first owner and is not transferable.
- That it is limited to the repair of the equipment only.
- That any claim is accompanied by the necessary proof of purchase.
- That cover does not extend to damage caused by faulty or unsuitable ancillary equipment.
- That the serial number has not been altered, deleted, removed or made illegible.
- That the product has not been abused or modified in any way.
- That it was purchased originally from a Wilson Benesch authorised dealer.

If the equipment is being used in the country of purchase, you should contact the Wilson Benesch authorised dealer from whom the equipment was purchased.

If the equipment is being used outside the country of purchase, you should contact the Wilson Benesch national distributor in the country of residence who will advise where the equipment can be serviced. You can call Wilson Benesch in the UK or visit our website to get the contact details of our local distributor. To validate your warranty, you will need the original sales receipt or other proof of ownership and date of purchase. Should you have any queries regarding the product or set-up, do not hesitate to contact us.

From all at Wilson Benesch we hope you enjoy your new C60 loudspeakers.

Specification

The A.C.T. C60 is a pure thoroughbred. It is comprised of unique technologies that have been created and manufactured by high precision machinery, before being meticulously assembled by hand. These elements have been fine tuned over fifteen years to reach this level of excellence. The State of The Art materials technology is superior in performance to all alternatives. Significantly, all this has been achieved without compromising any of the timeless, quintessentially classic forms that are as sublimely beautiful today as they were in 1995. The A.C.T. loudspeaker is the product design that moved an industry forward by ending the reign of the wooden box.

The A.C.T. design has evolved over more than fifteen years. It is in every way a world class product that has been designed for agility, speed and spirit. Every detail has been drawn from the best technology available. Moreover, the A.C.T. C60 will form part of the companies 20th Anniversary Celebration in 2009. Providing, as it does, the perfect addition to the companies Wide Bandwidth Series that began with Trinity.

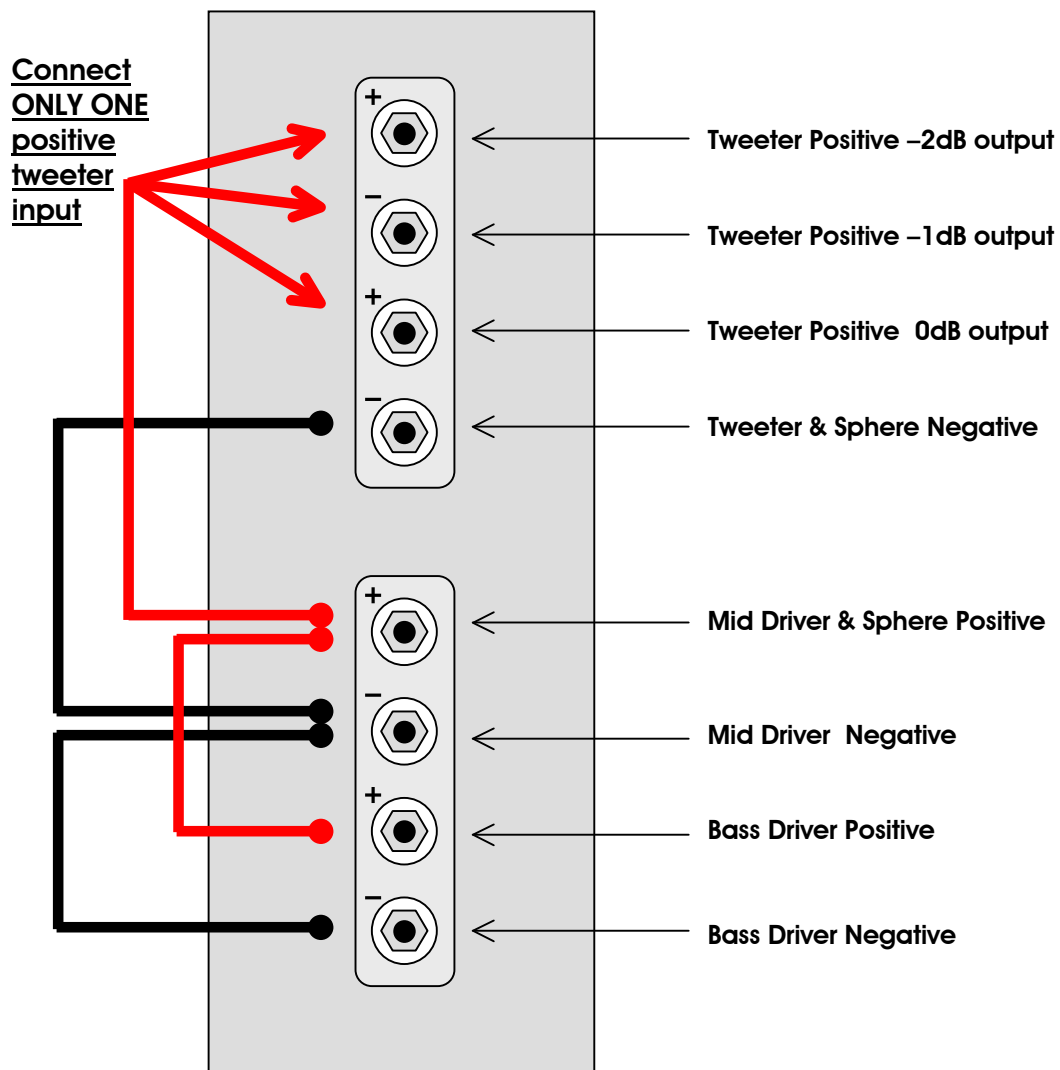
Important Notes on Terminal Connections

It is important that before connecting your Act C60 loudspeakers you refer to the following notes and diagram and not the standard markings on the Wilson Benesch terminal as the Act C60 allows for many different connection options.

Two pairs of red and black link leads are supplied with the hardware pack to allow for single wire or bi-wire setup. When connecting the Act C60 a choice must be made whether to run the tweeter at normal output, -1 dB output or -2dB output. To select the tweeter output, connect **ONLY ONE** of the top three **positive** inputs on the top terminal block as per the diagram below. The negative tweeter input must always be connected regardless of the positive tweeter output chosen.

Act C60 Terminal Connections

The red and black lines below represent the link wires connected for single wired operation



The A.C.T. C.60

Technical Specifications

Description	2.5 way, free space, ported enclosure, floor standing loudspeaker.
Drive units	1 x 170mm Wilson Benesch W.B. One Bass unit 1 x 170mm Wilson Benesch W.B. One Bass Mid unit 1 x 25mm Soft dome, hand painted silk, ultra linear Wilson Benesch specification tweeter 1 x Sphere Ultrasonic Generator, Gold plated Ceramic dome advanced tweeter
Low frequency loading	Bessel alignment of fourth order reflex. Double chamber, differential tuning
Frequency range	-6dB at 30Hz and 100kHz --3dB at 33Hz and 80kHz
Frequency response	35Hz to 80kHz +- 2dB on axis
Sensitivity	89dB spl at 1metre on axis. 2.83V input
Impedance	6 Ohms nominal, 4.3 ohms minimum
Crossover	First order bass roll-off Directly connected mid range drive unit First order tweeter roll off with user selectable inputs to adjust sensitivity by 0, 1 or 2 dB
Crossover frequencies	500Hz / 20kHz
Internal wiring	Multi stranded military specification silver plated copper with teflon jacket Platted by hand into exact lengths for each drive unit before being soldered point to point.
Input connections	Each drive unit has its' own Rhodium plated terminals. In the case of the tweeter additional terminals are provided to enable precise output levels.
Maximum spl	112dB at 1 metre
Power handling	240W peak unclipped programme
Height	1090mm
Width	230mm
Depth	370mm
Internal Volume	43.7 litre
Net Weight	56Kg
Finishes available	Polymer: Black and Regal Silver. Wood Satin: Nat Cherry, Maple, Oak Wood Gloss: Birds Eye Maple, Burr Walnut, Red Tulip, Red Birds Eye Maple Ebonized Walnut, Walnut (NB: All ACT C60 tops will be in Carbon Fibre)

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