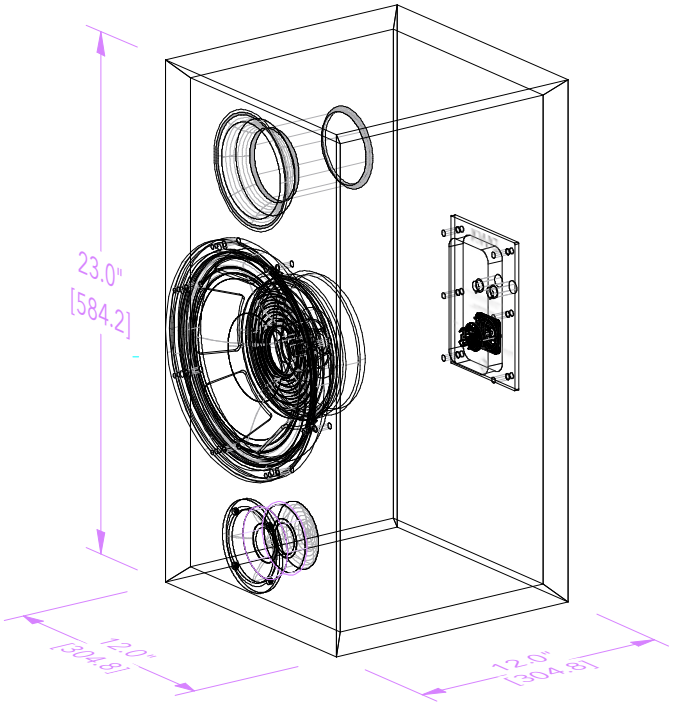

DWX

STANDARD | SUPERFLY | SUPREME

OWNERS MANUAL [2024]

WELCOME AND THANK YOU

Thank you for your purchase of DWX loudspeakers. They are designed and built for a lifetime of trouble-free high-performance playback. It's our desire to exceed your expectations in product performance, quality, durability and customer service. If we have fallen short we would sincerely appreciate knowing how we may improve. If we have exceeded them we hope you will let your family and friends know.

David Toop in his book *Ocean Of Sound* paints a powerful image of today's musical creativity, "...Starting with Debussy in 1889, is an erosion of categories, a peeling open of systems to make space for stimuli, new ideas, new now, this environment included sounds of the world—previously unheard musics and ambient sounds of all kinds, urban noise and bioacoustics... unfamiliar tuning system and structuring principles, improvisation and chance."

The quantity and qualities of music the modern world has at its fingertips is unfathomable—we want to amplify your finds and choices and extend the time you immerse yourself in them.

Thanks again, and welcome.

–Zu Audio

MANUAL INFORMATION

DWX Owner's Manual [DWX_OM-b] copyright 2000 - 2024/2/12
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Represented: Zu loudspeakers DWX, DWX Superfly, DWX Supreme.
DWX Superfly and DWX Supreme are upgraded versions of DWX.

Product version marks are absent on nameplate as Mk. I / Rev-A is first production.
Mark numbers denote significant design changes and are marketed.
Revision letters are used to denote subtle build or materials changes. Revision changes are marked on nameplate beginning with "B" and typically without marketing effort.

Products that are referred to in this document may be either trademarks and/or registered trademarks of the respective owners. Zu Audio make no claim to these trademarks.

TABLE OF CONTENTS **PAGE**

KEY POINTS

We know you're excited to get your new DWX fired up—still, we strongly recommend you study this manual—at least notice these key points:

- Remove the push-on driver covers to listen. These disks have the sticker *Remove to Groove* on them.
- Burn-in is very dramatic with DWX—please read the **Burn-In/Break-In section**.
- DWX may be used tweeter on top, tweeter on bottom; horizontally with tweeter on the outside, or tweeter on the inside. Experiment with this each time you change the hight or lean-back of the speaker.
- Information outlined in the **Room & Speaker Acoustic Tuning** section will give you the information you need to get your room and DWX playing well with each other.
- **60-day trial** period can be extended if you email us, assuming you are working with us to get the sound you are looking for. We're happy to open up additional time for burn-in and time to try amps and other equipment.
- We offer **exceptional customer service**, and the people you will talk to at Zu have a lifetime of experience and will deal honestly with you.
- **Return of Materials Authorization** (RMA) is needed if you are sending your speakers back for any reason. Failure to do so may result in refusal of the shipment. You may call or email us for an RMA number. RMAs lets us more quickly coordinate and process work.
- If your DWX are to be shipped or returned to Zu, you need to read and follow the instructions outlined in the **Unboxing** section. Failure to do so may result in damages to the finish. If you are sending them back for refund please repackaged as outlined, failure to do so will result in your liability for damages.
- We only issue return authorization after at least four weeks of daily play and an honest effort to follow our suggestions, six weeks for DWX Supreme. We expect you to read this owner's manual and give us a call if you are running into any issues—we're here to help.

INCLUDED WITH LOUDSPEAKERS

Included with each DWX loudspeakers
(1x) slip-fit hard plastic driver cover - installed

Additional Items Included In Package
(1x) finish cleaning cloth

Packaging is double-wall cardboard with closed-cell foam end-caps.

SAFETY PRECAUTIONS TERMS

Read and follow these precautions to use DWX loudspeakers safely.

Zu Audio is not liable for any failures, damages or problems caused by the use or misuse of DWX loudspeakers by the purchaser or any third party.

DANGER This mark indicates the possibility of hazardous situation, which if not avoided could result in serious injury or death.

WARNING This mark indicates the possibility of hazardous situation, which if not avoided could result in serious injury.

CAUTION This mark indicates the possibility of hazardous situation, which if not avoided may result in minor injury or property damage.

PROHIBITED This mark signifies *prohibited* action, which must not be done to use this product safely or to prevent premature wear.

REQUIRED This mark signifies *required* action, which must be done to use this product safely, to get good sound or to prevent premature wear.

DANGER - RISK OF SEVERE INJURY OR DEATH

DANGER - avoid electrocution by making sure your amplifier is powered down (or the amp's power cable is disconnected) prior to disconnecting/connecting loudspeakers.

Electrocution through touching of bare metal amplifier output posts, bare metal loudspeaker cable connectors when connected to amplifier, or bare metal loudspeaker connectors when connected to the amplifier is possible though extremely rare. Amplifiers designed to output enough power to cause electrocution while operating will generally feature touch-proof contacts such as Neutrik® speakON® connectors.

DANGER - place your loudspeakers so there is little to no chance of them falling or tipping over on someone.

DWX loudspeakers are very stable when floor standing. When used on stands or within casework, stabilizing and fall hazard mitigation must be considered in your decorating and usage design. Unless fall hazards have been mitigated, children, and especially infants and toddlers, should not be left unsupervised near DWX loudspeakers.

DANGER - DWX loudspeakers are moderately heavy at about 50 pounds packaged [23 kg] and should only be handled and moved by the physically able. Those lifting and moving the DWX loudspeaker should practice good lifting techniques (lift with your knees and not your back—and ask a friend to assist.) While not acutely at risk of death, back injuries can and often do cause chronic pain, sometimes reaching unbearable levels.

WARNING - RISK OF INJURY

WARNING - potential shock hazard exists when touching of bare metal loudspeaker and loudspeaker cable contacts. To avoid this make sure your amplifier is powered down prior to connecting or disconnecting cables to your amp or loudspeaker.

WARNING - DWX loudspeakers are capable of very high sound pressure levels, play responsibly—consider your neighbors and consider your hearing.

WARNING - again, when moving or lifting DWX loudspeakers, be careful with your back—lift with your legs, not your back, and consider asking a friend to assist you.

WARNING - the drivers of the Zu DWX loudspeaker create stray magnetic fields that extend beyond the boundaries of the cabinet. We recommend you keep magnetically sensitive electronics and media at least eight inches [20 cm] from the loudspeaker.

CAUTION - RISK OF MINOR INJURY OR PROPERTY DAMAGE

CAUTION - amplifier may be damaged if the loudspeaker outputs are shorted, i.e., the red (+) and black (–) contacts of a loudspeaker cable come in direct contact with each other while the amplifier is switched on.

CAUTION - corners are fragile, do not set or pivot your DWX loudspeaker on the corner of cabinet.

CAUTION - with wood finishes we recommend you keep the loudspeakers out of prolonged and frequent direct sunlight. How long is prolonged and frequent? Well, three hours a day of direct sunlight every day will cause some color changes after a year or two. Painted finishes will not. While we use materials and top coats with the highest levels of UV resistance and absorption, some color changes to wood finish is going to happen when sitting in direct sunlight day after day.

CAUTION - turn your audio equipment off anytime you leave your home. Yeah, yeah, solid-state electronics sound better warmed up and not being turned off every time you go out. While the risk is very low there have been house fires from all forms of electronics, including the best designed audio.

CAUTION - turn your audio equipment off and unplug the mains power cables from the wall during a lightning storm to prevent your gear from being damaged. If lightning strikes your home, or very near it, damage to your audio gear is possible even if switched off. If you are in an area or space that is more likely to be struck by lighting, and you do not want to unplug every time, we recommend you contact a professional. Wireless communications site engineers can design your system's ground and power to withstand lighting strike. Also, reaching out to your local stage, sound and lighting contractor usually proves fruitful, they may have staff, or can put you in touch with a certified sound lighting and power engineer. Oh, and don't overlook your local ham radio club, most have several members experienced in power, grounding and lightning strike mitigation.

⚠ CAUTION - RISK OF PROPERTY DAMAGE

CAUTION - do not use the tops of your loudspeakers as a bar table, condensation forming on a container will pool and may cause water damage to the finish, especially wood veneer finishes.

CAUTION - do not use solvents save water to clean DWX loudspeakers. A slightly water-damp soft cloth should be all that is needed. For dusting of the driver we recommend a can of compressed air.

CAUTION - we do not recommend storage of DWX in non-climate controlled spaces. DO NOT STORE THEM LONG TERM WRAPPED IN NON-BREATHABLE PLASTIC FILM AS THIS MAY CAUSE DAMAGE TO THE FINISH.

PROTECT - When storing your speakers, we recommend placing a clean, thin soft fabric such as felt or fleece between speaker and packaging. Tolerable long-term storage maximum temperature range is 20˚ F [-17˚ C] to 122˚ F [50˚ C] with a humidity average not to exceed 90%.

CAUTION - do not use tools to tighten binding posts, hand-tight (18 inch-pounds [2 N-m]) is all that is necessary. Applying high torque on posts may damage binding post and is not covered by warranty.

CAUTION - if smoke or an electric odor is emitted by the loudspeaker or any device, turn off all components. If you have tools and skill you may troubleshoot the problem one device at a time, working your way to the amplifier—statistically more likely to be the source of the problem. If you do not have the tools or skills call the brand of the amplifier or suspected component for assistance.

PROTECT - when not in use, specifically when there are unsupervised animals such as cats, dogs and kids abiding near your speakers, we recommend you slip-fit the protective driver covers. This will also safeguard them from foreign materials and bugs.

PROTECT - when transporting DWX, wrap them with new stretch wrap film, fine felt or fleece to protect the finish from being marred by the packaging foam. Failure to do so will result in scuffing and marring of the finish.

REMOVE - the protective driver covers that come installed on your loudspeaker to let the sound out. They don't sound good at all when covering the driver.

SERVICE - 1/8" hex-drive screws fastening the full-range driver have their threads lightly coated with calcium light (NL-1) grease and are torqued to 26 inch-pounds [3 N-m]. #1 square-drive screws fastening the tweeter assembly are only torqued to 8.8 inch-pounds [1.0 N-m]. 1/8" hex-drive screws fastening the composite wood nameplate on the standard DWX are torqued to 4.4 inch-pounds [0.5 N-m]. 1/8" hex-drive screws fastening Superfly and Supreme nameplate are torqued 18 inch-pounds [2.0 N-m].

UNBOXING / REPACKING

Save all packaging except for the polyester banding and the metal staples. All other parts are needed for repackaging. Failure to repackage as they were originally is likely to result in the loudspeakers being damaged when transported.

If speakers are sent back to Zu for refund (RMA required) they must be repackaged as originally packaged, including the protective plastic film. Exception is the banding and staples as few have convenient access to them; in place of staples secure cardboard edges with packing tape, in place of banding secure edge protectors (V-board) with packing tape. If sent back for refund and not packaged as outlined you may be liable for damages.

Remove rings, watches, belt buckles, anything that can mark or scratch the finish, or lessen your grip. Also, trade your button-up or snap shirt for a tee or pull-over.

1. Cut banding and dispose (banding is 100% polyester).
   Save the thick cardboard edge protectors (V-board) for future use.

2. With the model label facing up, lift the corner of the cardboard flap until the staple releases from the underlying cardboard. This is easily done without a tool but a heavy-duty staple lifter makes it easier. We recommend complete staple removal as you go.

   Removal of the released staples prevents the sharp edges from accidently snagging or scratching your clothing, skin, walls, floor or your new speakers. If you are careful this is safely done barehanded, just bend them straight and twist them out.

3. Slide the DWX speaker out from the main box.

4. Remove (and save) the foam end cap frames. Leave the plastic wrap covering the speaker until you get it near where you want it. The plastic wrap protects the finish while handling and dramatically increases grip. Once you get them where you want them, remove the film.

5. Remove the hard plastic driver covers. Keep them near as they make effective full-range driver guards—quickly pushing on to protect the cone from the curious. Slipping them on when you're on vacation also protects the full-range driver from bugs and dust.

DWX DESIGN OVERVIEW

There are three performance levels available in the DWX: DWX (standard), DWX *Superfly,* and DWX *Supreme*. Connector input/nameplate clearly marks each version. Differences will be detailed here and in the specifications pages.

DWX is a high performance yet affordable medium format monitor loudspeaker that will deliver great sound in almost any home or studio. It matches up very well with the vast majority of modern and vintage amplifiers and receivers. DWX is also designed and built to last a lifetime—cabinet materials, adhesives, driver assemblies, every component is a tested and known to be a very high quality part. Building a great sounding, value-visible, well built loudspeaker that will satisfy and amaze decade after decade is rewarding in and of itself—having others enjoy the effort furthers that sense of satisfaction. To keep DWX running their best just play them, dust them every so often, keep the rain and beverages off them, and less direct sunlight is better than more.

DWX borrows significantly from its floor-standing sibling, DW-6. It has nearly the same shove, precision and soundfield unity as DW-6 but does not dig down quite as deep. The integration of DWX's full-range driver, tweeter and front ported cabinet yields a very compelling and unified soundfield, both in the spatial and in the tonal, and affords highly flexible placement. Voices and instruments produced by DWX sound natural and real, with a touch of weight and warmth, characteristics that broaden your amplifier options as well as making your less than great recordings sound a shade or two better than they should.

The design of the DWX affords highly flexible placement. They can sit directly on the floor firing straight forward or leaned back with wedges, standoff or lean-back stands. They also sound really good using risers and stands. You can place them right next to walls, or even inset into a nook, cabinet, soffit or brought clear out into a room resting on stands. In each position they will sound different do to room interplay, but in each position when compared to other speakers of similar cost, DWX sound remarkable, clearly standing out and providing excellent sound.

All sides of the cabinet are finished, you can make the "bottom" whatever side you like. Yes, tweeter orientation will change the sound you experience and you should experiment for "best" sound. Use DWX standing up, or laying horizontally. When standing upright you can place tweeter-up or tweeter-down. When laying horizontal you can place tweeter-inside or tweeter-outside. Though DWX is kinda big for most center-speaker spaces, it's killer as a center.

The heart of the DWX is the Zu 260 full-range driver (FRD), with its less intense, undercut/dynamically damped electrodynamics giving it that characteristic detailed yet smooth and expressive sound. Acoustic cross over point between FRD and tweeter is 12k Hz—having the vast majority of the soundfield (90%) emanating from the FRD makes for a very cohesive and unified wavefront, one of the qualities appreciated by Zu loudspeaker users. All DW versions are designed and built around the critical human voice (A1, 55 Hz, through A6 and all the possible harmonics, to approximately 12k Hz).

DWX loudspeakers are on the high-efficiency end of the spectrum, are precision-matched in stereo pairs and able to recreate compellingly real sound in tone, dynamics and stereophony.

DWX is finished to a much higher level than its predecessor, Omen Bookshelf. Walnut and hickory are done to a finer/flatter surface, with inter-stage fine sanding between top coats, producing a deeper, more crafted looking wood finish. Painted finishes are also cut to a flatter surface and also feature inter-stage sanding. Results with the painted finishes resembling monolithic fine-honed stone.

DWX SUPERFLY DIFFERENCES

- Tighter Superfly-grade full-range driver matching
- Tighter Superfly-grade tweeter driver matching
- Mission Mk.II internal cable harness (in place of simple hookup wire)
- ClarityCap™ MR capacitor upgrade
- ZuB3 connection addition
- Machined aluminum connection/nameplate
- Extra 100 hours of factory burn-in

The Superfly performance additions are engineered to give the DWX Superfly noticeably improved resolution and smoothness without altering its forgiving nature and great tone. Superfly upgrade also increases connection options and functionality with the inclusion of ZuB3.

DWX Superfly features tighter matched full-range drivers. These are driver pairs that match to a very tight tolerance, both in deviation in magnitude and in impulse response—the tighter the left/right matching the more natural and satisfying the soundfield, creating stereo best described as realistic.

DWX Superfly features Mission Mk.II cable harness instead of standard Mission hookup wire for internal interconnections. This triples the conducting area reducing resistance and reactive ratios improving dynamics and resolution while also improving tone. The improved sound imparted by the Mission Mk.II internal cable complements the ClarityCap MR capacitors, also part of the package.

DWX Superfly features pair matched ClarityCap™ MR capacitors in the tweeter high-pass network. These capacitors have a very natural and resolving character, improving the "at ease" quality and yet reveal more detail and nuance.

DWX Superfly features the ZuB3 connection which is absent in the standard. Use of the Mission Mk.II loudspeaker cable internally in the DWX Superfly facilitates this. The ZuB3 is connected in parallel with five-way binding posts. This connection is via the silver plated Neutrik™ speakON™ NL8 barrel-type locking connector. This connection lets you get the most from the improved internal cable, reduces contact resistance over binding posts, and gives the best electrical pass-through matchup when using Zu loudspeaker cable. The connection also safeguards against you getting the hot/cold out of phase, short-circuiting your amp and having the connection work loose or corrode.

DWX SUPREME DIFFERENCES

DWX Supreme is wholly a performance related upgrade focused on maximum fidelity within the DWX platform. DWX Supreme builds upon the Superfly package—you still get the Superfly machined from billet nameplate and ZuB3 connection. Staying true to the DWX's forgiving nature and amazing tone, Supreme additions improve areas of nuance and resolution all while maintaining smoothness and neutrality. There's almost no drawbacks save the price and extra burn-in, the proof of these claims we think you'll find in album after album marathon listening where you find yourself totally lost in the music. This upgrade does make amplifier selection a bit more sensitive—with increased resolution comes increased scrutiny in the matchup.

DWX SUPREME DIFFERENCES OVER SUPERFLY

- Tighter Supreme-grade full-range driver matching
- Tighter Supreme-grade tweeter driver matching
- Event Mk.II internal cable harness
- Jupiter Copper™ capacitor upgrade
- Extra 200 hours of factory burn-in

DWX Supreme feature the tightest available matching on full-range drivers and tweeters. These are driver pairs that match to an extremely tight deviation tolerance in magnitude and impulse response—the tighter the left/right matching the more natural and satisfying the soundfield.

DWX Supreme gets Event Mk.II internal cable, improving resolution over Mission Mk.II cable. Event Mk.II internal cable features FEP insulation and silver based conductors, within a ZuB3 format. A combination that gives a broad and uniform characteristic impedance to the cable. Conductance is on par with Mission Mk.II but the propagation velocity is higher and the noise floor is noticeably lower. Event Mk.II internal cable harness increases the resolution of the loudspeaker system to a point where Jupiter Copper capacitors combine in mesmeric ways—DWX Supreme features these caps.

Jupiter Copper™ Caps - Jupiter Copper Foil & Paper and pure silver leadout capacitors are utilized in the tweeter high-pass network of DWX Supreme. These capacitors matchup extremely well with the Event Mk.II internal cable. The combination imparts a sense of grace and sexy magic to the whole of the sound, and once experienced it's hard to live without.

BURN-IN OVERVIEW

DWX speakers require considerable break-in and burn-in to sound their best. The changes in performance they undergo is remarkable. While there is significant heavy-handed factory break/burn-in, more is required once they are in your home. The factory break-in phase is engineered to target the full-range driver's cone—a process that is out of reach for the vast majority of users. Breaking in the membrane requires extreme levels of shear force to set the membrane into its performance profile, and there's a fine line between membrane break-in and permanent deformation. During this time other aspects are also breaking in, the drivers' suspension and also the dielectrics and electronics, but these, particularly the electronic, will continue to burn-in within typical home playback levels.

DWX (standard) receive a minimum of 100 hours of factory burn-in.
DWX Superfly receive a minimum of 200 hours of factory burn-in.
DWX Supreme receive a minimum of 300 hours of factory burn-in.

We discourage the use of any special burn-in specific program material—no special "tones" and no "demagnetizing" material.

Just play as often as you can, maybe a bit louder than normal, and selecting big full-scale recordings. The more they play the sooner they will sound their best.

Break-in is a fairly simple, straightforward, once-and-done thing (sarcasm eyes). Not funny? Likely not. The humor assumes you like audio-dad jokes and that this is not your first set of new Zu loudspeakers. Unless specified otherwise, what follows are generalizations about burn-in specifically relating to home audio direct radiating Zu loudspeakers.

Each version of DWX has a different burn-in profile. Most find DWX to sound good right out of the box, maybe a bit flat dimensionally and a little veiled or hooded, and a bit lackluster, maybe a touch woolly in the bass. Patience, they will open up and become expansive with play. The other two versions, particularly the Supreme, are a bit more complicated when it comes to their burn-in changes. DWX Supreme usually sounds a bit harsh when new. Some find them to sound strident and not so promising. Some find them amazing right out of the box. DWX Superfly sits between. In all cases users should know there is going to be significant change. The sound and enjoyment you will get from them after two to eight weeks of daily evening use is going to be night and day compared when you first get them. Also know that in the case of Supreme the changes are not going to be linear for the vast majority of listeners. And for reference, specific to DWX Supreme there's a very real chance that they will actually get worse for a period within the burn-in. This has not yet been observed with the standard or Superfly. But again, patience will reward and your new speakers will snap out of any funk they might go through while burning in.

If you are now thinking, "I've been doing this my whole life and I have never had a speaker sound worse as it was breaking in..." we again say, patience, particularly on DWX Supreme, on your part is very likely to have a very big payout. Not always, but much more than not. We too have been doing this forever, fully immersed, most every day, with thousands of customers as data points. If you have purchased DWX, listened for a week or so and then hastily concluded that they are not your sonic cup of tea give us a call or email, please let us help.

The majority of *potential* Zu owners that we talk to feel that burn-in is a thing, but that burn-in changes are not all that pronounced. We agree when applied to other brands—the vast majority of loudspeakers change very little, some so little that you wouldn't even know burn-in was a thing. But Zu DWX are not like normal speakers and the burn/break-in changes they go through is an interesting and not subtle phenomenon.

BURN-IN MAIN POINTS

Here are some points to help inform and guide your setup, tuning and burn-in expectations. Effecting the speaker's transition from sounding new to sounding full and engaging include:

- The length of time played
- Power levels and program material played
- Temperatures they might have been subject to in shipping or storage
- The unknowable relationship they might have with Schrödinger's cat

- Even though DWX's sound will change with play, we still encourage you to follow our guidance on room tuning as performance gains made there increase your enjoyment during the burn-in phase(s).

During the burn-in phase we don't recommend swapping of components without reason and method as burn-in is heavily impacting the sound.

- If you have amps and other components that are burned in and near-to-hand maybe give them a try. But for the first three weeks or so (six weeks for Supreme) we would advise against purchasing new gear to solve problems that might soon evaporate. New gear is going to also go through burn-in, and listening through burn-in on top of burn-in is rarely worth anything.

- If you do change an amp and notice a change for the better, you should also switch back to confirm that it is in fact the amp the made the difference. It could also be that the change was coincident with a burn-in related improvement, or some other change.

- Disconnecting and connecting gear can clean a dirty connection and improve sound. Even a clean contact that is not snug will reduce fidelity.

- Your brain is a component of the playback system. The act of swapping gear or feeling like you are doing work on your system has a powerful psychoacoustic effect and is likely to allow you to hear deeper into the sound.

- Burn-in changes DWX (standard) will go through lean toward the linear in how progress is noticed. Most find them to settle in to their long-term performance profile after two to three weeks of them being in your home, playing for two to four hours a day. If they are transported in the winter (if they get cold) they will take a bit longer. Or if they have sat in storage for three months or longer.

- Specific to DWX Supreme, burn-in changes during the initial ten to forty hours of in-your-home play will very likely be linear, then seem to plateau—more changes are coming. The second-phase of burn-in will be nonlinear. There is usually one very noticed transition where the day before you were listening and your system was sounding good and you were happy, or close to happy, say six weeks in, again we're talking about DWX Supreme. Then rather unexpectedly you become aware that things are sounding more open and involving, so compelling, so good.... This is the result of burn-in, mostly electrically related, seemingly quantum mechanical. This change indicates that DWX Supreme are now settling into their life-long (human life) performance profile.

- DWX Superfly's burn-in profile lies somewhere between DWX Supreme an DWX. Generally a bit closer to the DWX's profile. While FEP is not used in the Superfly upgrade, the ClarityCap™ MR capacitor does take longer than the standard IC™ polypropylene capacitor used in DWX (standard).

- Once your DWX speakers have made that very noticeable transition to sounding good, you may need to revisit how you have them placed in your room.

- Even after they are full burned in, if DWX lie dormant for three months or more they will not sound just as they did when they were removed from service and will go through a shorter phase of the burn-in phenomenon. If they were stored in the cold, or got cold, a week or two additional time should be expected. Cold - about 40º F [4º C] and below.

BURN-IN / GENERAL OBSERVATIONS

Predictive speaker qualities regarding the schedule and impact of burn-in seems to be efficiency and the extent to which speaker-level electrical filtering is employed. A speaker's sensitivity to electric power inputted and the resulting sound levels outputted is colloquially declared as *efficiency*. Extensive use of speaker-level electrical components whin a speaker's crossover (typically needed to achieve the desired sound) is *crossover complexity*.

We think the combination of very low efficiency and extensive crossover filtering are strong indicators that the design will have little change from burn-in. Conversely, DWX with its sonic design targets has resulted in a high efficiency, crossover-less design that requires extensive burn-in to sound right.

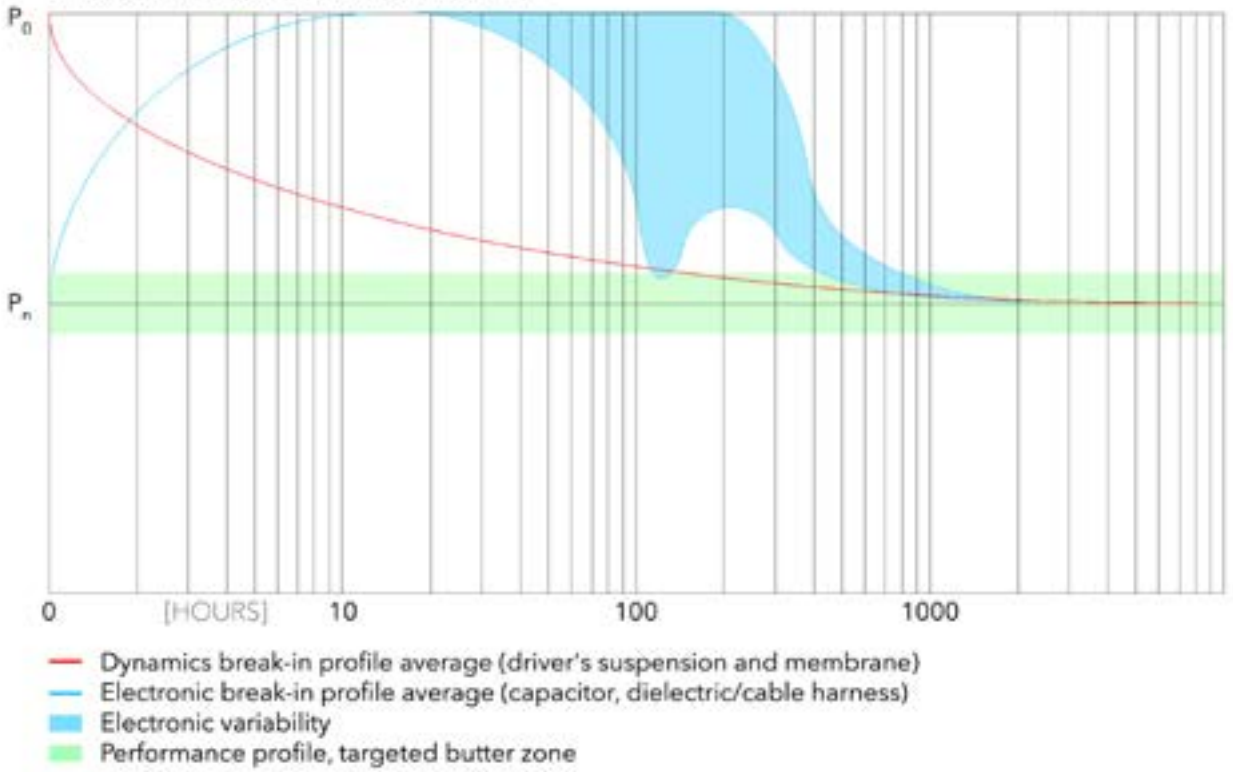
BURN-IN AND FATIGUE PROFILE

In quick conversation, Zu use the terms burn-in and break-in interchangeably, to generally refer to the changes a loudspeaker goes through on its way to reach its long-term performance profile. Technically however there is a difference between them. Burn-in is the domain of the electric and break-in is the domain of the mechanical. Understanding each is interesting and might help with expectations of the loudspeaker when new, and when returning them to service after not being used for a while.

The life of a loudspeaker can be profiled in three phases: burn-in/break-in, performance, and aging-out. All DWX loudspeakers are engineered to operate within the performance profile for a minimum of 100,000 hours of in-home use under normal living conditions and assuming loud listening levels.

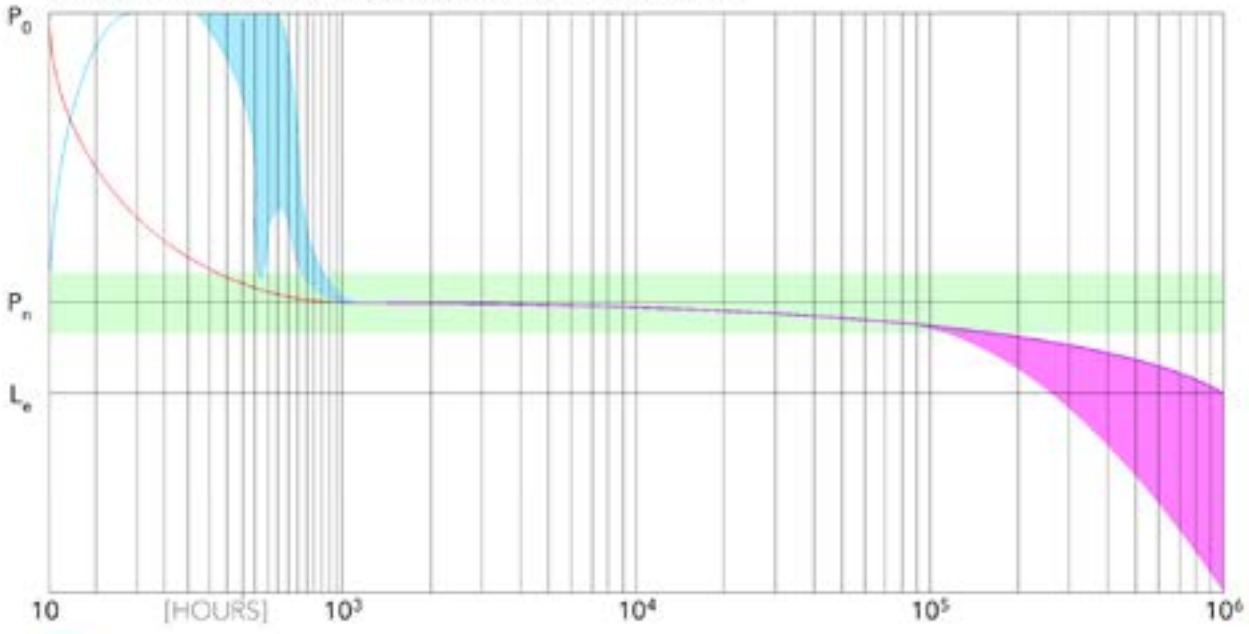
In the graphs we zoom in on the burn-in profiles of DWX, DWX Superfly and DWX Supreme. The reason for the odd burn-in profile of DWX Supreme is largely the result of the near exclusive use of FEP as a dielectric in the cable harness. The Jupiter™ Copper capacitors also take considerable time to come around and so contribute to the long burn-in schedule.

DWX ***SUPREME*** BURN/BREAK-IN PROFILE



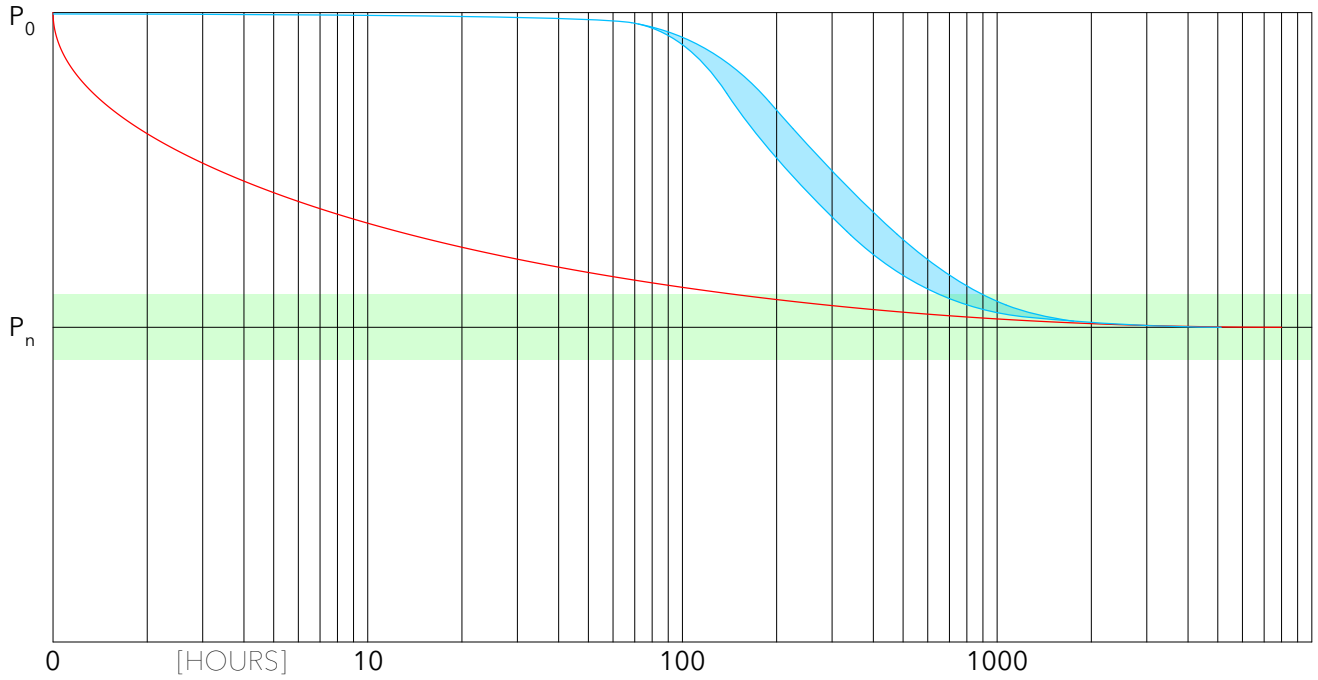
- Dynamics break-in profile average (driver's suspension and membrane)
- Electronic break-in profile average (capacitor, dielectric/cable harness)
- Electronic variability
- Performance profile, targeted butter zone

DWX ***SUPREME*** LOUDSPEAKER SYSTEM FATIGUE PROFILE



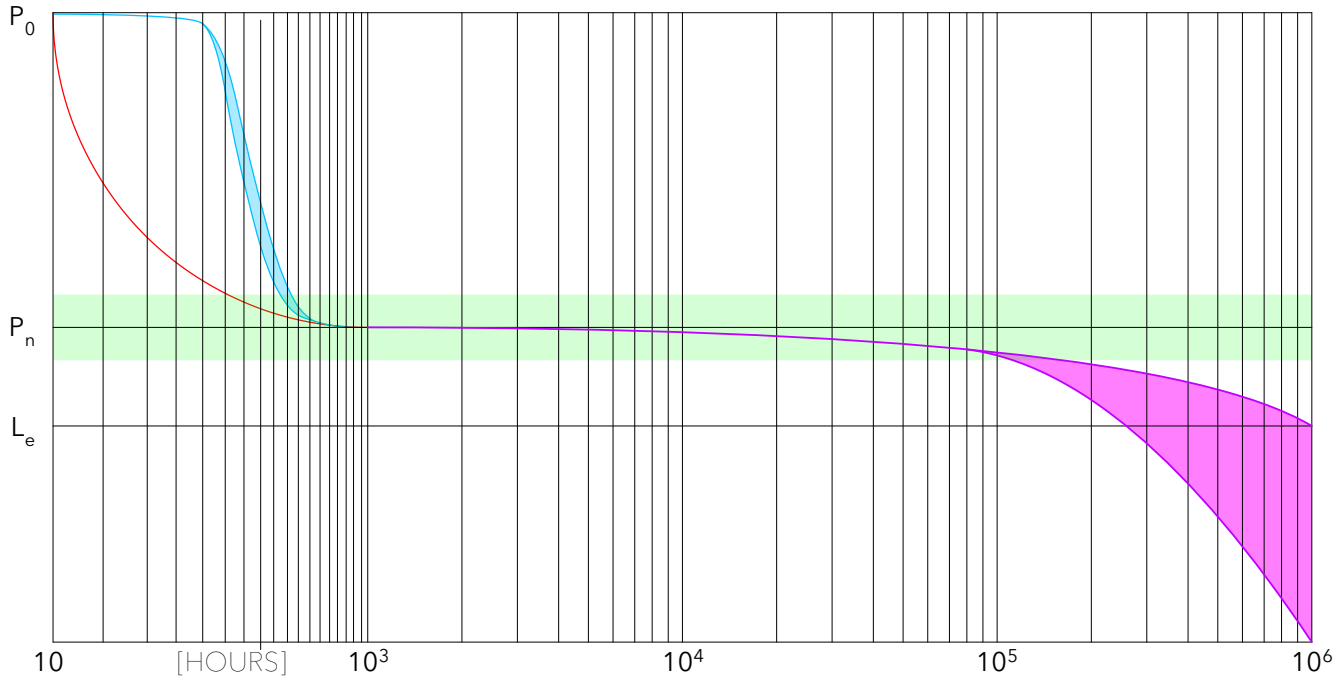
- Fatigue profile
- Variability in fade-out from performance to half life (permanent magnet fade, membrane fiber shear, suspension breakdown)

DWX ***SUPERFLY*** BURN/BREAK-IN PROFILE



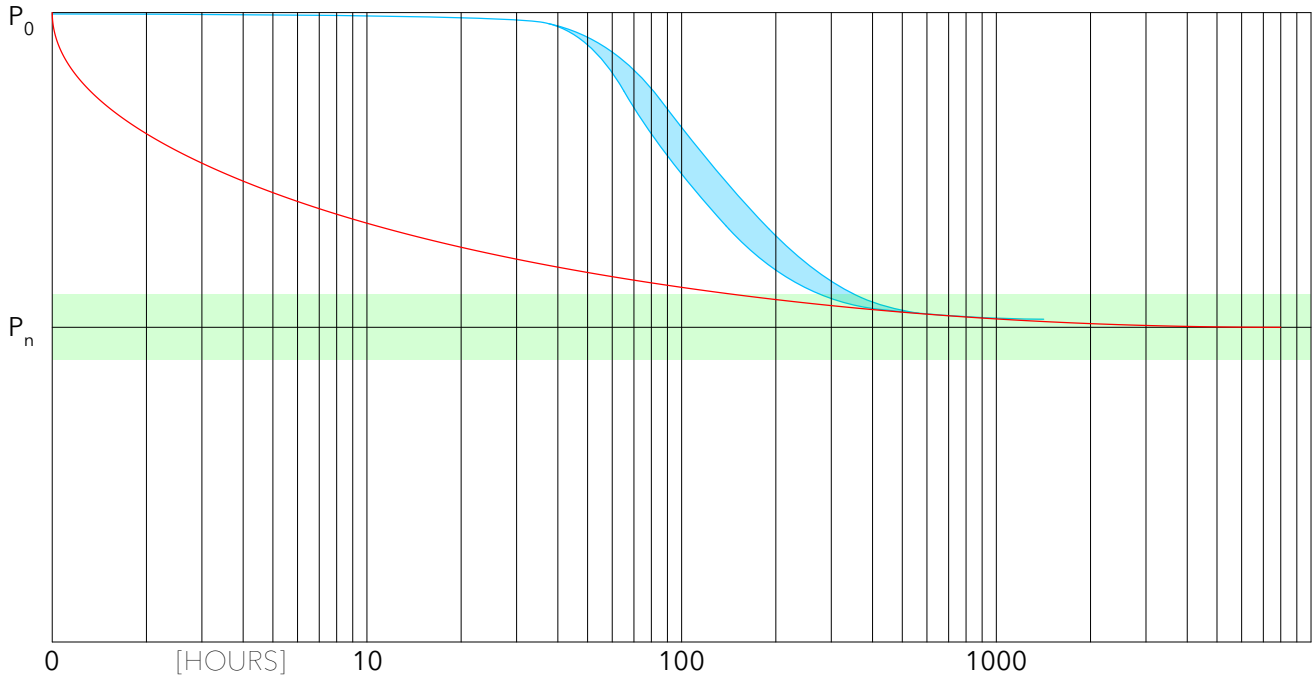
- Dynamics break-in profile average (driver's suspension and membrane)
- Electronic break-in profile average (capacitor, dielectric/cable harness)
- Electronic variability
- Performance profile, targeted butter zone

DWX ***SUPERFLY*** LOUDSPEAKER SYSTEM FATIGUE PROFILE



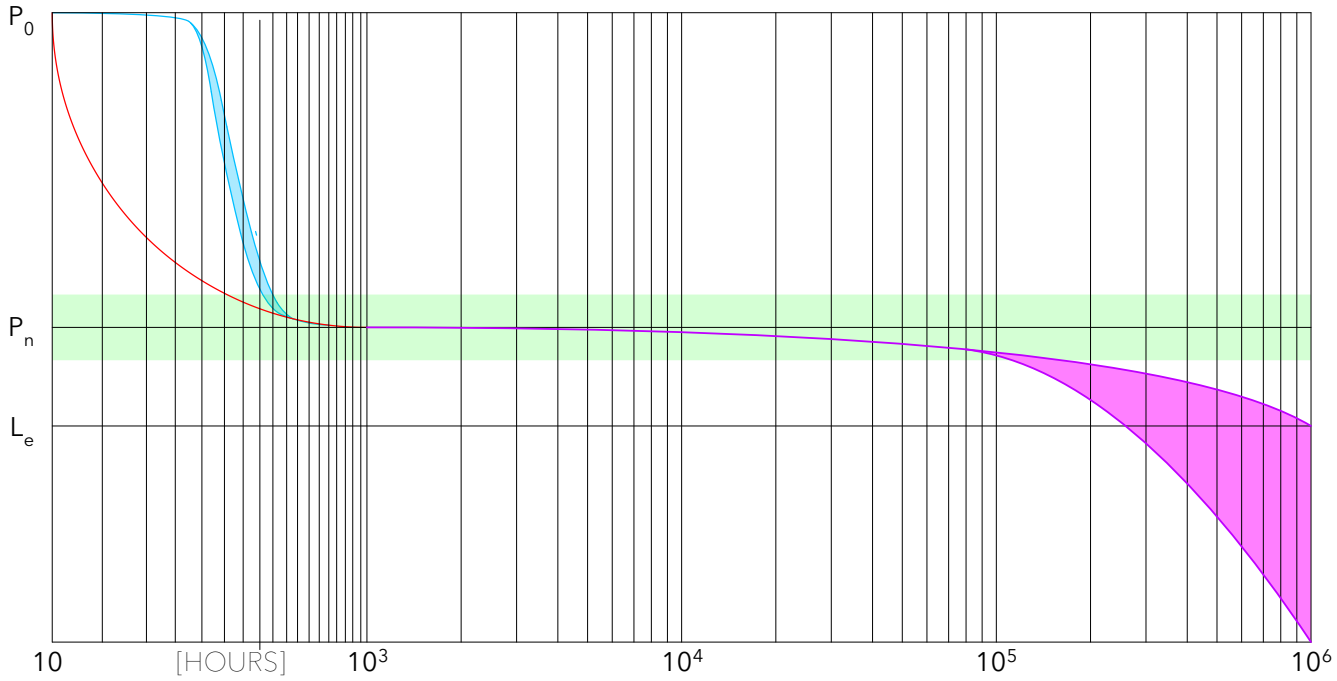
- Fatigue profile
- Variability in fade-out from performance to half life (permanent magnet fade, membrane fiber shear, suspension breakdown)

DWX BURN/BREAK-IN PROFILE



- Dynamics break-in profile average (driver's suspension and membrane)
- Electronic break-in profile average (capacitor, dielectric/cable harness)
- Electronic variability
- Performance profile, targeted butter zone

DWX LOUDSPEAKER SYSTEM FATIGUE PROFILE



- Fatigue profile
- Variability in fade-out from performance to half life (permanent magnet fade, membrane fiber shear, suspension breakdown)

INITIAL PLACEMENT

This is an overview, to get your new speakers up and running and sounding good enough. An expanded Zu speaker placement section is further in the manual.

Start with the DWX speakers placed where you've visualized them, likely flanking that rack or casework you have, and hopefully symmetrical.

As speakers go, DWX are not very sensitive to being in just the right place—bass integration may prove otherwise as that is heavily influenced by the room. Bass wavelengths are very large, and moving the speaker a few inches this way or that will not make a meaningful impact in the bass region.

- From centerline, DWX should be equidistant, with matching toe and lean-back.

- From the main listening chair (sweet spot) the angle formed by the speakers should be between 40 and 90 degrees. Wider is usually better for stereo and home theater, 60˚ (equilateral triangle) is a great starting point.

- DWX pairs are very tightly matched which is one of the reasons you can have a wider than normal stereo spread and not have the middle fall out. If the middle of the stereo soundfield collapses, scoot them in and/or mess with toe-in.

- Toe: Start with DWX speakers pointing (shining) right at the main listening chair, listen. Then splay them out so they are pointed a few feet [0.8 m] behind. Then try wider still. Then back to pointing right at you, and then try toeing them in even further, so they are pointing in front of you. Experiment and let listening be your guide. This will help you mentally map the speaker and room and listener interplay.

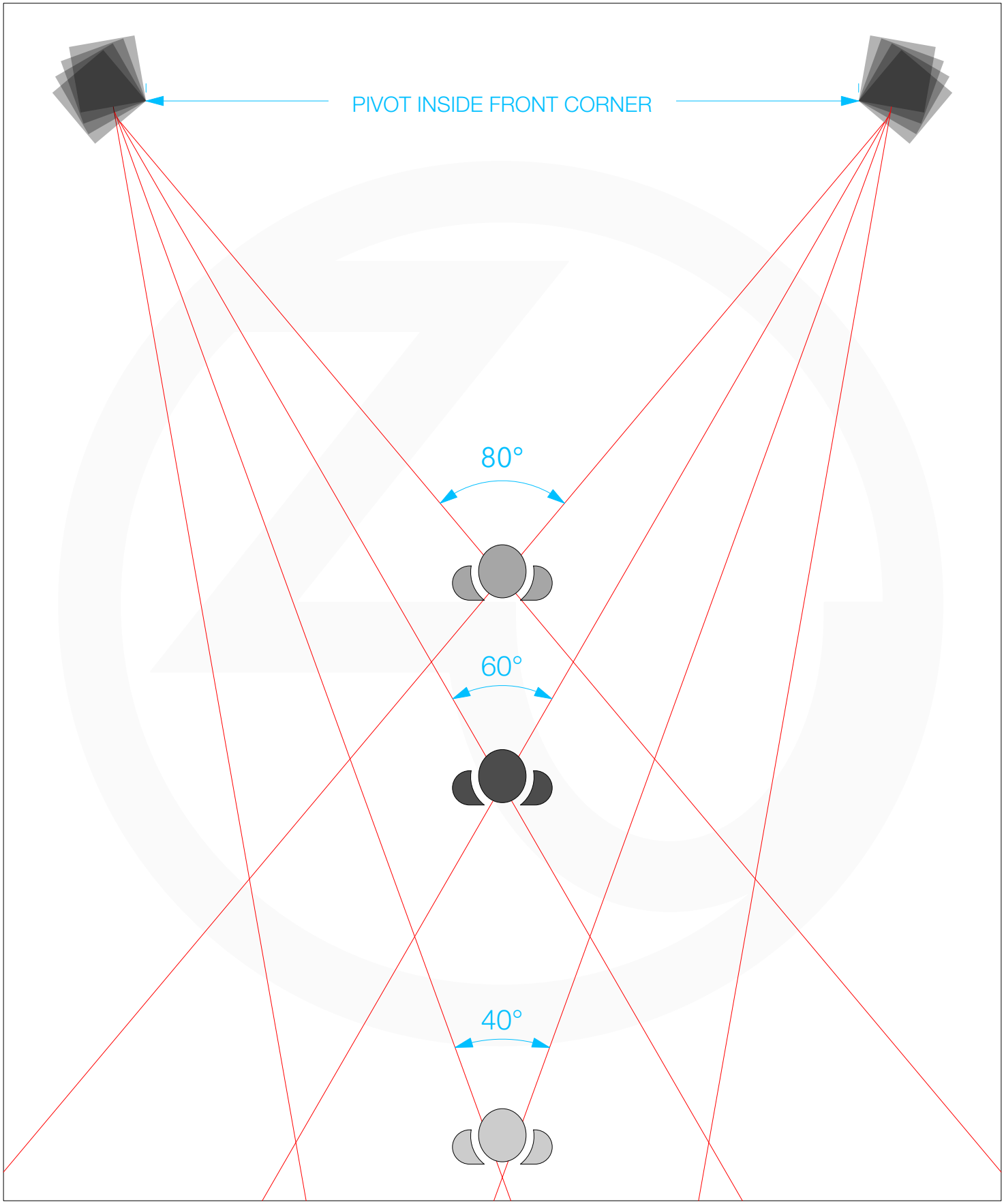
We all hear differently. Even those with functionally near-identical hearing have considerable variants in what each thinks sounds good.

- Different materials and stands will sound different, but the main driver in sound is their position within a room. We recommend you use whatever you have close to make variable height stands—cinder blocks and books, logs, foam sheet, cardboard boxes.... Once you find the height and position you like, you can then find stands that look good to you.

- If you are placing them on stands, the interface between speaker and stand may make a difference. Try coasters, cork, rubber sheeting.... You can tune your sound a bit doing this. Also note, some materials make increase the risk of your speaker falling of the stand.

  DWX do not require a gap between floor/stand and speaker bottom. You can rest them directly on the floor/stand or you can raise them up, experiment.

- Consider leaning them back, especially if you would like them to better play to very large spaces, or sound bigger and fuller when you are standing or working about. Especially true you have the DWX resting right on your floor.


PIVOT INSIDE FRONT CORNER
80°
60°
40°

- Generally, for best stereophony, DWX speakers should be placed no closer than a half foot [≈13 cm] to the side wall—that is the space between speaker and wall. But they can be placed as close as a few inches [50 cm] to the front wall (space between rear of speaker and front wall). This is general guidance, if you are putting them in casework, and you can mess with where they sit within, experiment, try all the way to the side walls, try different heights, try stuff. Trust what you think is good, is good.

- If at 60° and toed so they are pointed right at you, they are still not presenting a seamless soundfield something is wrong. The speaker cable on one of the channels might be flipped (red to black, black to red) or one of the amp channels is going sideways—time to troubleshoot. Note, there is a small chance of some odd room acoustic interaction and your system is fine. Troubleshooting this entails disconnecting one of the speakers, listening to just one, making a mental map, then doing the same to the other channel. Listening to just one speaker at a time is insightful, so much so that we developed a whole process of placement tuning around it.

CONNECTING YOUR AMP AND SPEAKERS

Turn your amp off to reduce the chance of shorting the connectors and damaging it.

DWX (standard) feature 5-way binding posts (no ZuB3).
DWX Superfly and Supreme feature posts and ZuB3 via speakON NL8 connectors.
5-way binding posts are connected in parallel with the ZuB3.

ZuB3 via speakON NL8 connectors maintains the functional EM characteristics of ZuB3 cable designs and lowers contact resistance. For best results from Superfly and Supreme versions we recommend ZuB3 terminated Zu cable. ZuB3 is an electromagnetic design—Neutrik™ speakON NL8 are connectors which facilitate ZuB3 connection through the speaker wall.

5-way binding posts used on DWX are machined from high copper content brass and have the Faston male blade machined from the same billet to keep fidelity as high as possible. They accept the following speaker cable ends:

- bare wire
- pins
- banana plugs
- 1/4" [6.3 mm] standard spades [forks] and ring lugs
- 5/16" [8 mm] oversized spades and rings
- 3/8" [10 mm] super-oversized spades and rings

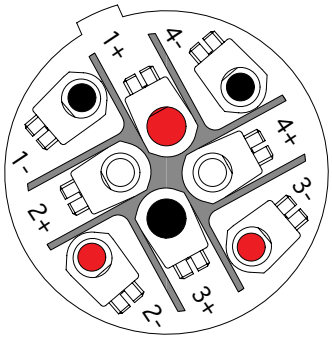
ZuB3 CONNECTOR DETAIL

FEATURES AND BENEFITS OF ZUB3 VIA SPEAKON NL8

- ZuB3 via Speakon NL8 lowers contact resistance over banana plugs or spades
- Maintains Zu speaker cable and Zu internal speaker cable's ZuB3 electromagnetic characteristics through the wall of the speaker
- Connector is a cylindrical type and houses all contacts (easy and simple interconnection)
- Connector prevents shorting of amp and removes a shock hazard
- Connector is indexed (clocked) so it ensures correct connection and phase
- Connector twist locks with "click" to provide confident user experience and ensures proper contact until disconnection is desired
- Contacts are self cleaning—if there is a question of tarnish just disconnect and reconnect to wipe contacts clean

We strongly recommend factory termination/retermination of your Zu loudspeaker cable. Nevertheless, ZuB3 via Neutrik® speakON® termination convention is outlined for your DIY reference.

ZUB3 VIA SPEAKON NL8 8-POLE TERMINATION CONVENTION

Pin-outs for ZuB3 via Neutrik® speakON® 8-pole / single channel	
SPEAKER **+ (red)**	SPEAKER **– (Black)**
speakon 1+ speakon 2– speakon 3–	speakon 1– speakon 3+ speakon 4–
unused: 2+, 4+	
sp+ 1+ sp+ 2– sp+ 3– sp– 1– sp– 3+ sp– 4–	
Neutrik 8-pole speakON cable-end connectors feature pozidriv #1 setscrews	

AMPLIFICATION GUIDANCE

AMPLIFICATION MATCHING WITH DWX

An often asked question is which amp should I match up with the DWX. This is not a simple question as you need to factor in the rest of the system—room, the sound qualities you value and how loud you play, or how loud would like to be able to play. Sound levels are the easy part, and for more than 95% of DWX owners twenty good sounding watts is plenty.

Zu loudspeakers are efficient—*efficienc*y being the conversion of electrical input from the amp to the sound output of the speaker. For this reason much less electrical power is needed compared to the vast majority of home audio speakers. Lets start with how loud first:

5 - 30 watt / channel rated amps are what you need for low to moderate sound pressure levels.
30 - 100 watts for moderate to very loud sound pressure levels.
100 - 400 watts for very loud to ear damagingly loud SPLs.

Max Power: 200 watts (full bandwidth)
Max Power LLF: 400 watts RMS (80 Hz high-pass, 12 dB/octave. Assumes power is unclipped, amp rated at 500 or more watts @ 8 ohms)

WARNING - DWX loudspeakers are capable of extreme sound pressure levels, play responsibly—consider your neighbors and consider your hearing.

The amplifier/loudspeaker relationship contributes significantly to the sound of the system, we encourage you sample some amps. Start with what you have, dust off any amps or receivers you might have tucked away. Borrow some kit from your buddy, and his buddy, or befriend your local audiophile society. Try stuff, see what you like, and don't be afraid to try some old gear. Don't be too quick to judge when you swap amps, most amps need several hours or days of warm-up to sound their best. Tube amps warm up more quickly, some solid-state can take days. And if you are using stand alone amps realize that the pre-amp feeding them can have a pretty big impact on sound as well. Oh, and what you like, in your rig, with your room and your ears and brain might be totally different than others—trust yourself.

Another aspect of Zu DWX speakers to bear in mind is their lack of dynamic compression, you can just keep ramping up the volume and they just sound better and better, staying clean and in control to the point the amp gives way to distortion or your ears protest. Over the years we have found that the majority of new Zu speaker owners in our medium size range listen twice to four times louder (3 ~ 6 dB) on average than they did with their less efficient speakers. Dynamic compression in speakers is typically perceived as louder by most, and less efficiency speakers dynamically compress much more than high efficiency speakers. And also consider, as you increase the volume of the speaker you disproportionately increase the room's contribution to the sound. If you are unhappy with the sound at loud levels it could be the amp or it could be your room, or it could be that you are listening way louder than you realize and your ears are pushing back. Poor loud-level listening performance is rarely due to the DWX.

DWX and DWX Superfly have a pretty easy going nature when it comes to getting along with amps. Getting good sound from a healthy cross-section of amps is one of the remarkable qualities of these speakers. DWX Supreme is more revealing and so amp selection with DWX Supreme may take a bit more work, but its still not what we would call picky. The 12 ohm load of all three is one of the reasons they are able to play well with such a large swath of amps. 12 ohms will be less demanding on them an than an 8 ohm speaker, and much less than a 4 ohm. Another great thing about the 12 ohm load is that it affords really great sound to be realized from older amps that were designed and built for older, higher impedance speakers. Old Marantz 22xx series, the non-B versions, and old Sansui, Pioneer... these old great looking Japanese hi-fi electronics from the '60s and '70s can sound remarkable with the DWX. There are some really great sounding new electronics as well—the list is long. Know that the 12 ohm load of the DWX speaker is totally appropriate for all amplifiers unless the manufacture specifically state that the amp performs best with something like a power hungry 2 or 4 ohm speaker.

TUBES VS SOLID-STATE

We think this is just dumb, the concept and the question. *Tubes* can sound all over the map, and the same is true with solid-state. There are plenty of unbearable sounding tube amps and there are plenty of unbearable sounding solid-state. *Tubes* is just too broad a term to have any meaning, as is *solid-state* in reference to how they might sound matched up to DWX.

The speaker/amplifier relationship has a profound effect on the sound you get. The sound of the amp has a lot to do with the sound and match of the speaker, and vice versa. More regarding amplification needs to be written.

LOUDSPEAKER CABLE GUIDANCE

Connect up DWX with whatever you have. You own it, it's sitting there, and hopefully it's not some exotic fluffed up under engineered hi-fi cable—simple cable can be quite good. If you don't have something close, just use some home electrical wire, Romex 2/14 or 2/12, likely you have some in the garage or stuffed in a cupboard. No? It's not expensive and on the spool at the hardware store. Strip the ends and connect it up. Don't use the center bare ground wire, just cut it back on both ends. It doesn't matter if you use the white or the black insulated wire for the (+) or (–) just be consistent so both speakers are in phase. If you want to try Zu cable, we would be happy to have you audition them.

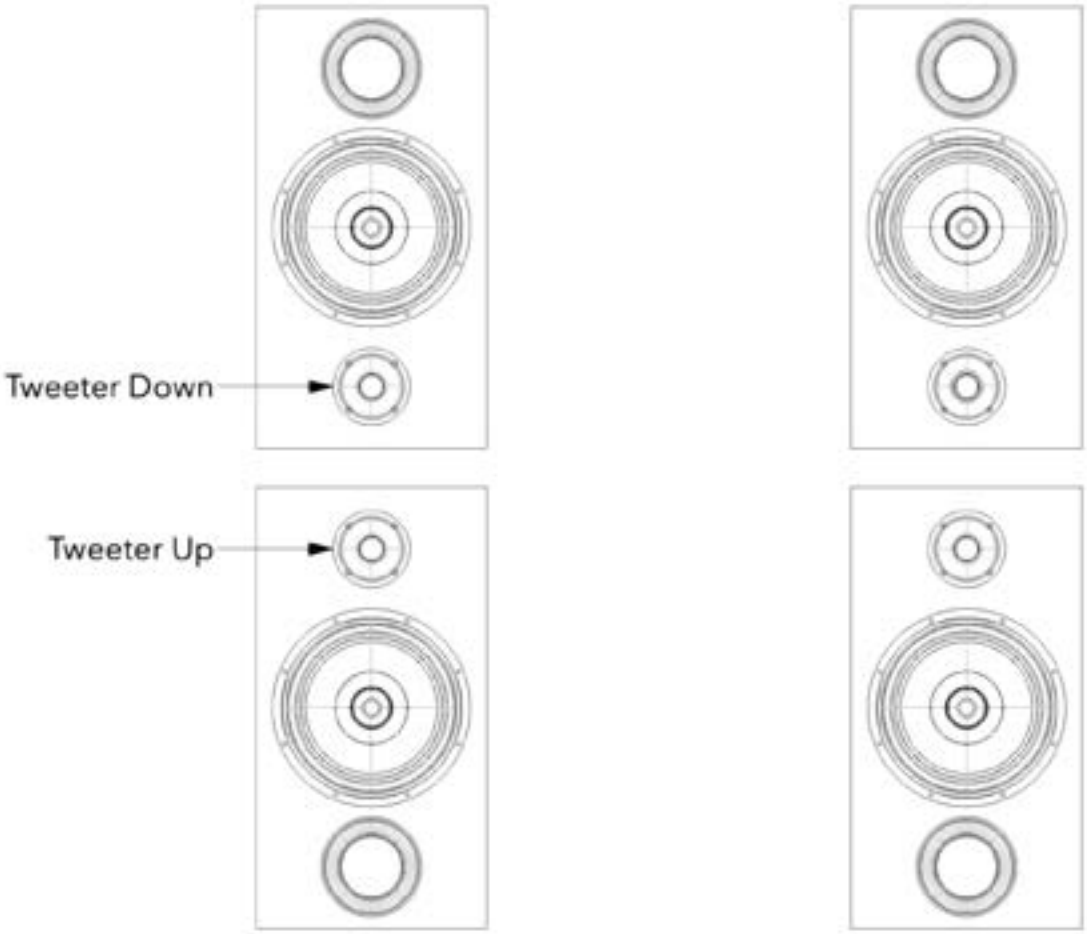
Improvements that will be noticed from quality, well engineered speaker cables which match your amplifier/loudspeaker needs include bass depth and resolution, reduced noise, harmonic structure and timbre, attack, stereophony, and ease of listening.

As different length cables of the same model will have different measures, we strongly recommend your left and right cable lengths be the same. If you have one side that has a lot of extra cable just rats-nest it under the shelf—don't coil it as that would add inductance that would not be added to the other and you reduce the quality of the stereo, particularly impacting the treble. If you would like it neat instead of a nest, you can coil it in a figure-eight pattern, doing so does not add inductance and will better preserve stereo fidelity.

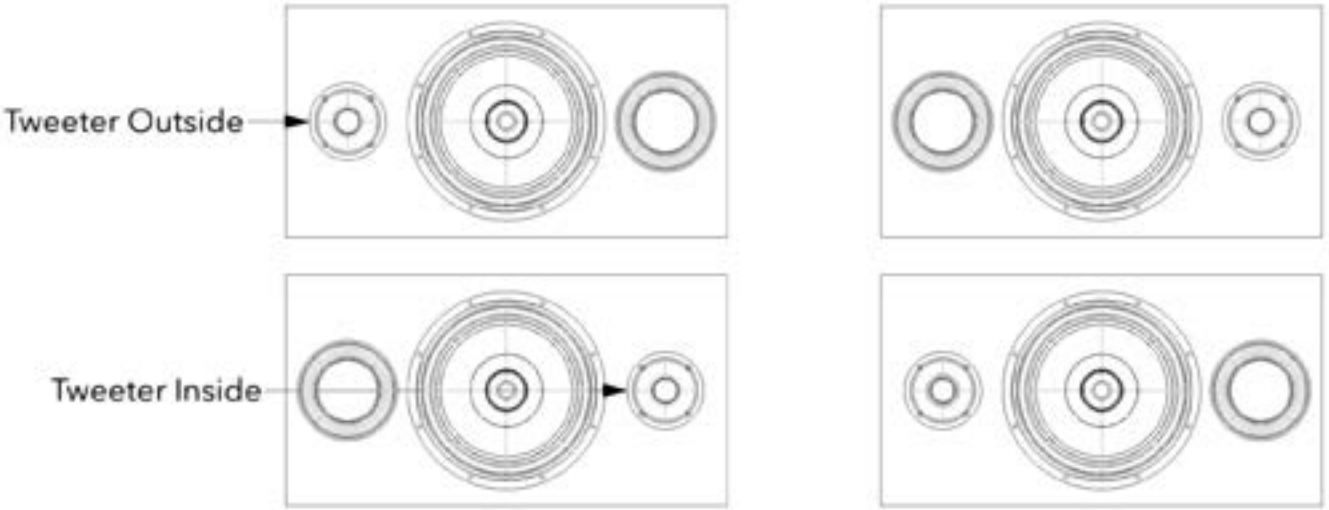
While insulation, jacket materials, pigments, conductor shape, metallurgy and structure are important, those elements should be designed to serve the primary design of the cable, the electromagnetic. The final cable EM field geometry combined with conductance largely determines measured attributes. Different cables have different measures. Connections also make a difference, usually due to contact resistance, but characteristic impedance can also play a role—yes, even in the audible bandwidth. Try some stuff, just like amps, see what works and what doesn't. Experiment.

KEY POINTS ABOUT SPEAKER CABLE FOR YOUR DWX

- Start with what you have. Owned and close at hand is a good place to begin.
- Shorter speaker cables are better than longer, but don't short yourself–having a bit of extra so you can put the speakers where they sound best within your room is a bigger factor.
- Keep the left and right speaker cable the same length. Different length cables of the same model will also have different measures and distort the stereophonic aspects of fidelity.
- Don't use cable as tone control—a common abuse in hi-fi. Doing so usually leads to frustration and further loss of fidelity. When cable affects timbre it usually affects timing, phase and so on. Timbre problems are usually solved with loudspeaker placement, and burn-in time, and better source/preamp/amp/speaker matchups.
- The speaker cable is part of the amplifier/loudspeaker relationship, and changes to the resistance, capacitance, impedance, propagation velocity, characteristic impedance... affect the sound. Those that say cables do not influence sound are wrong. They lack experience or their bias is hindering their listening, or the systems they have used them in are lacking the resolution necessary to notice the differences in the stereo.



Tweeter orientation will change the sound of DWX.
Experiment with placing tweeters up, tweeters down. If you have space, try tweeters inside and tweeters outside. Mirror your left and right speakers.



LOUDSPEAKER/ROOM TUNING

Most of what you will do in room tuning is about timbre—the frequency domain. Knowing what you can affect and what you can't, or shouldn't, will help you make quick and sound choices. Before we get into the recommended ways to room tune, we need to understand where in the note we're working. And we're going to use a piano for reference, to help keep things clear, zoned into the three main phases of a note. In the future we'll add color, when there's more time to write, read and consider.

ATTACK - SUSTAIN - DECAY

Before you spend a lot of time chasing the room-tune-timbre around the room, understand where in the note you're listening. Okay, piano for reference and keeping it simple but still useful—attack, sustain, decay.

When a piano key is struck, three main characteristics of a note are set in motion—attack, sustain and the decay. The attack of a struck piano note is the impinging hammer, initial string motion and moment of coupling of piano body—the first few milliseconds of the yet-to-form note. The attack contains the detail to process sound prominence—direction, amplitude, character, intelligence. Attack gets our attention, both conscience and non-conscience, and seems to be processed in the primitive part of our brain much more so than the frontal lobes. While attack is almost just an impulse, it informs much of the emotional reaction to what comes next. To really hear what is going on in the attack seems to require the dialing back of our voluntary thinking, allowing the back of our brain to lead.

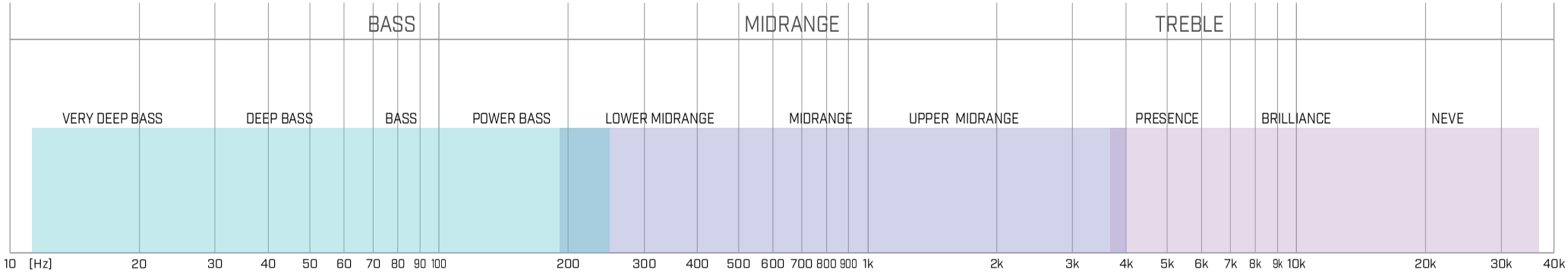
To recreate the attack is solely a function of the playback system, mostly the loudspeakers, and has little to do with the room. You might scab something together that's close to a cure but you cannot fix attack problems with room tuning. To fix or change the attack is the domain of the temporal, ideally improvements to the loudspeaker, but sometimes with dynamic compressors and other transient and timing based in-the-box processing.

ATTACK GIVING WAY TO SUSTAIN - Related to the attack but carrying into the sustain are the secondary transients, here is where the note takes form, and this is where those that can't turn off their thinking brain start to hear differences. If you have electrically equalized your system (cables included) and have not taken into consideration attack characteristics, or you've used acoustic objects in your room to unwittingly tune attack issues, your playback system is very likely sounding weird.

SUSTAIN & DECAY - The vast majority of people are highly sensitive to the sustain and decay of a note and music generally, sustain is the body that gives attack context (or is it the other way around). With steady-state or semi steady-state music or signal, the room's influence is huge. Nearly all of the musical power is contained in this region, and the room really amplifies it. In fact, most of the sound you hear is the result of the room.

FREQUENCY SPECTRUM TERMS

MUSICAL TERMS OVER FREQUENCY AS USED IN THIS MANUAL



Without realizing, people usually tweak things to get the steady-state, the sustain, tonally correct which inadvertently kills the life in the attack, and sometimes the decay. This is a reason why cables as tone control, digital room correction, parametric equalizers and the like don't fix fundamental time and dynamic range problems. When the sustain runs out of power there is the transition into the decay. How your room sounds and how the speakers work within it dominate the front-side of decay, sometimes swamping the sublets that flourish in the quiet shadows.

TUNING / PLACEMENT OF DW 6 IN YOUR HOME - ZU MONO-AND-MIRROR METHOD

The Zu Mono and Mirror speaker position tuning method is efficient, yielding excellent results without days of fiddling. With speaker placement tuning you are affecting how the wave fronts initially hit the primary listening position, and also how the room's acoustic properties affect and interplay with the sound sources, the speakers. Though the guidance is geared for 2-channel rigs, it is also useful for multi-channel as the front left/right are the foundation on which the other channels hinge. This method assumes your room and layout accommodate a symmetric left/right speaker placement. Key points are:

- Tune just one speaker, then mirror its mate
- Use mono recordings, or punch-in that mono button, you need to hear the whole of the recording
- Tune largest wavelengths first - BASS
- Tune MIDRANGE after bass has been tuned
- Tune TREBLE after the mids have been tuned

In most rooms there's one loudspeaker position that is framed with more wall space, this is the speaker you will tune. Once tuned you will simply measure and mirror the other. If your room is symmetrical start with the left.

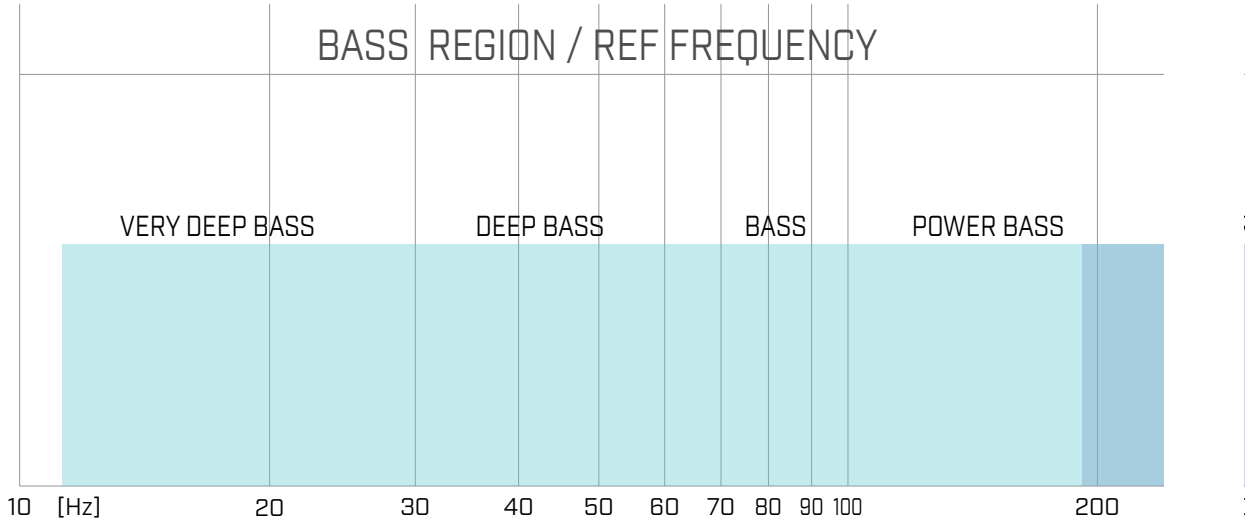
⚠ *Turn off or disconnect the speaker that is not being tuned. If disconnecting, do so on the amp-side to reduce the chance of shorting the connectors, or safeguard the speaker-side bare contacts from touching if disconnecting them at the speaker (ZuB3 connector users need not worry, you're free to hot-swap.)*

First, tune for bass. No matter how good you get the midrange and treble sounding, if you don't get the bass right there's little foundation to anchor the rest—assuming you don't exclusively listen to trumpet played in a vacuum. Bass tuning is big strokes, moving the speaker a foot or three [30 ~ 100 cm] with each position sample.

Second is tuning of midrange where you are working with smaller moves, six inches [13 cm] this way or that, then three inches [7 cm], then an inch [3 cm] or so.

Third is tuning the treble, where it's more about toe and lean-back, maybe with some subtle nudging of the position, half inches and less [≤13 mm].

Move listen, move listen... taking mental note of changes in sound. Note that moving the sound source also changes how the room reacts. You should only have to move the loudspeaker three or four times to get the bass dialed in, half dozen moves on the mids, and maybe the same for treble. If you are struggling start over with bass. If still struggling, give up on that side and try the other side. Mentally mapping the differences. Also, the devil's triangle is not a drinking game. Experiment with your speaker placement, your room, where you sit… the changes and improvements to be had are not subtle.



BASS TUNING

Select recordings with large amounts of low frequency information; dramatic pipe organ and dance music work as do test recordings that have warbled low frequency tracks (20 - 100 Hz range). But do not use test tones exclusively, your brain needs some transients for contexts to do its best work. Test tones can and often do play a role, but that steady-state sine, triangle and square-wave signal prove difficult for humans to interpret without some transient counterpoise. If you don't have time for several cuts and types of bass, select some modern disco track with a drone influence to make fast work of long wavelength (bass) tuning.

Here we go. Loudspeaker is where it is, pointing into the room perpendicular to the front wall, playing at a moderate level (only the one loudspeaker should be on); walk over and kneel down next to it. Kneeling will put your head in the seated listening horizontal plane and allow you to hear how the loudspeaker is influencing, and influenced by, the room. In nearly all rooms, the two positions, i.e., loudspeaker and sweet spot, have reciprocal acoustic properties, listening in both zones will help you better map the room/speaker relationship and resulting sound qualities.

You're kneeling next to the playing loudspeaker, now move your head to either side and back and forth of it, say a foot or two [30 ~ 100 cm] in each axis. Listen to the qualities of the bass, does it sound woolly and muddy behind the loudspeaker? Is the bass more defined a bit to the left or right? If the bass sounds better a bit to the left, move the loudspeaker to that position, and then listen again. Remember, moving the sound source also changes how the room reacts. With each move you should again move your head about. You should also walk back and sit or kneel in your listening position, listen for the changes there, swiveling your head about as you did at the speaker, listening to the broader sweet-spot zone.

You should get the bass sounding pretty good with two, three or four speaker position changes. When it sounds pretty good call it and move on to midrange tuning. Good enough in this case is usually way better than you realize. Listening to just one speaker seems to focus our hearing powers, and reveals issues in the room, loudspeaker, system, recording... that evaporate, or nearly so, when you mirror the mating speaker and light things up in stereo.

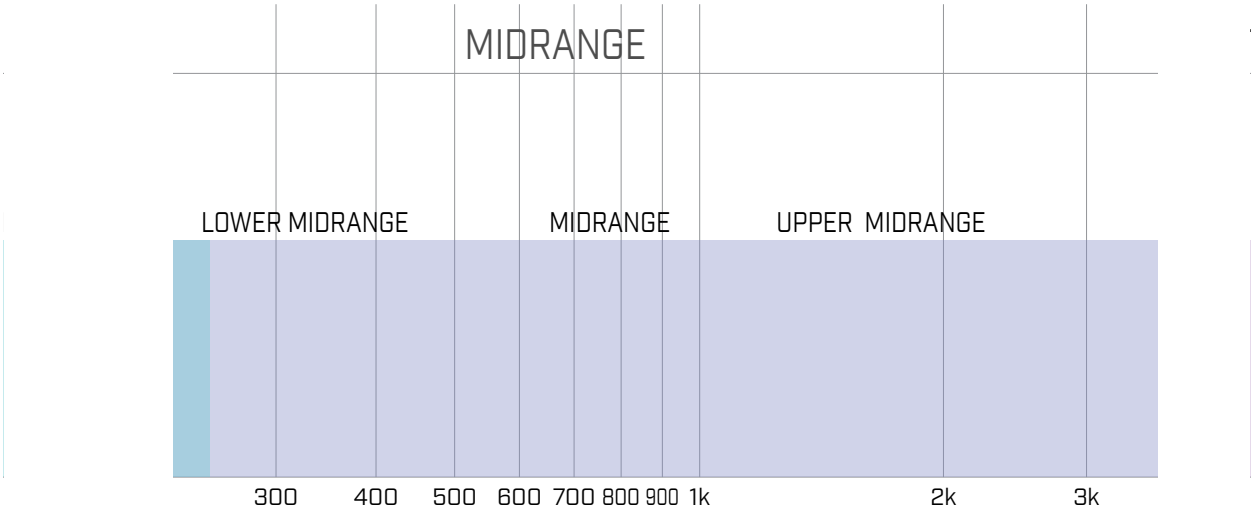
MIDRANGE TUNING

Now that the lower octaves (bass decade) are sounding good, turn your attention to getting natural and vibrant midrange. Remember midrange tuning is a dance of inches [decimeters and centimeters], somewhat similar to what we did tuning the bass but finer strokes, and we also begin messing with directivity aspects of the wavefront—the firing axis. Also different from the bass tuning is how we listen for midrange changes—while changes in midrange can be heard at the speaker it may prove useful to solicit some help. Invite a family member or friend to position the speaker while you listen at the chair. This in addition to the on-your-knees wobblehead thing. Also, your recording selection changes. To help your brain focus select cuts that are less bass heavy—jazz, singer-songwriter, violin solos, guitar, stuff with good overtone

color... bass and kick drum free. If you're more sensitive to midbass and power bass then midrange tune in two steps, first select cuts from Bootsy Collins, Mike Watt, Kim Deal, Tony Levin, Jah Wobble....

First step will be pivoting (rotate on vertical axis) the speaker. The inside-front corner is the pivot, i.e., the corner nearest the captain's chair. Staying with the same loudspeaker room-tuned for bass (you're still only playing the one speaker) and with your midrange-centric recording playing, pivot the speaker. Initial firing position is straight into the room, orthogonal the front wall. Pivot slowly moving the firing path—first straight into the room, rotating toward then right at the center chair, then falling away and finally shining down the hall or whatever. Do this a few times to help the mental map resolve and stick. Most of the time the final position is right at the listening chair give or take five, maybe ten degrees. Rotating the face of the speaker like this makes massive differences, and the dramatic arc will help you better understand the speaker and the room.

By pivoting from that inside front corner, it's easy to make changes to the left and right loudspeaker at some point down the road without having to wonder, are they still mirrored? What will mess up the symmetry is if you pivot one speaker on the front inside corner and then the other from the center of the cabinet, or the outside corner. Drilling down on the desired toe (that's what we are doing here) midrange color will transition from low-presence and masked to open and intimate. Set that angle where you like it. You are pretty close to great here, but additional gains can be had by going back to nudging the speaker. Listen first (kneeling and wobbling your head) at the speaker and see if you find better sound a bit to the side or front/back from where it sits. If you can't tell kneeling next to the speaker, return to the listening chair and have your buddy move the speaker an inch or two [3 - 5 cm] left, then right, forward. back, all while keeping that same toe-in angle. If no difference, great, let your choices stand and move to treble tuning.



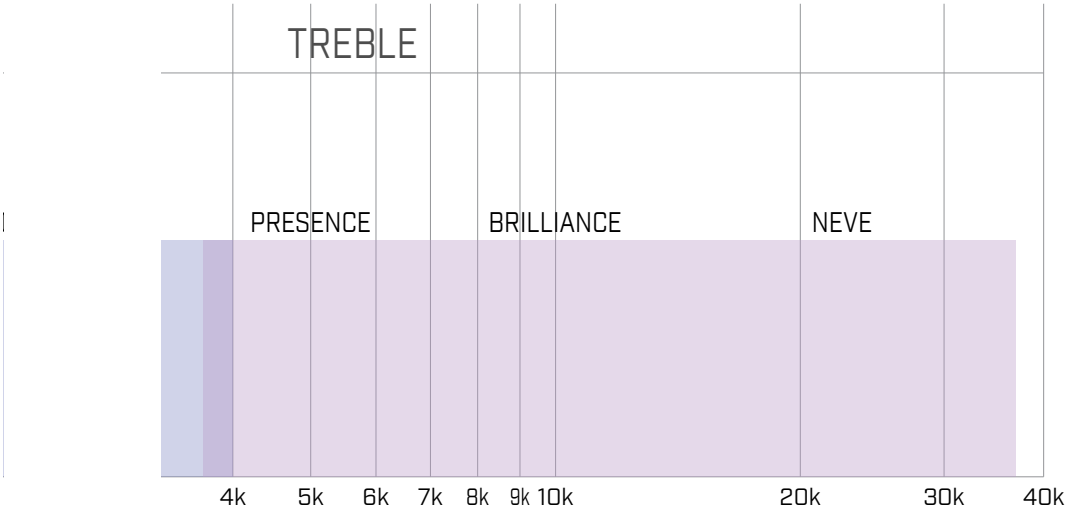
TREBLE TUNING

At this point you are done nudging the speakers position, treble tuning is mostly about the speaker's firing axis, the toe (inside corner pivoting) and cant (lean-back) and elevation (height from floor). The experience you gained with toe when tuning midrange will help you hear the more subtle aspects of treble tuning. Start with toe, try a degree or two inside of where you got midrange tuning. Then try a degree or two outside. Drill down and call it good after a handful of changes. Next you may want to try lean-back phase, for sure if you have the DWX resting right on the floor. When DWX is resting right on the floor, or low in comparison to head height of the listener, lean-back will improve intelligibility, presence and treble.

Have a friend lean the playing speaker back, hinging on the back edge. Two things are happening here. You are changing the firing axis, angling the wavefront, and you are also elevating your drivers a bit further from the floor. Okay, there are other things going on when you lean the speaker back, but these are the two primary. If you find you like the sound when the speaker is leaned back further than the say the angle that puts an inch or so [4 cm] of space between the lifted front edge and the floor or short stand or riser, you're likely to prefer the sound with them on risers, or taller risers or stands. If you start messing with risers you might need to retune for midrange.

RISERS

Measure and note the distance from that speakers inside front corner to the side wall and front wall, and measure the toe angle. Now, turn your amp off, remove the speaker cable and move the speaker out of the way. Place the butcher block you grabbed from the kitchen, approximately where the speaker was, and that cinder block you grabbed from the driveway. Then place the speaker atop the blocks. Reposition the speaker. Reconnect, and while playing have your buddy again lean the speaker back. If you find you like the sound with a lot of lean-back still, grab more blocks or thick books. Also don't forget to mess with the tweeter-up/ tweeter-down orientation. You have the idea. Once you are happy enough, mirror what you did to the playing speaker to its mate, perfectly mirrored. Now mirrored and connected, fire things up in stereo. Expect to be impressed. If not, you have an issue somewhere with your system. Make sure your speaker cables are both connected, and both in the same polarity - red to red and black to black. If that's okay and things are wonky you need to troubleshoot the rest of your system, something is not right. And lastly, materials used for risers also influence sound, but not as much as the elevation is. Get the elevation right before selecting a stand for visuals.



CARE AND MAINTENANCE

DWX are designed for in-home use. Under normal daily use in an average home you can expect a life-time (100 years) of trouble-free, high-performance playback. DWX do not require any special care aside from keeping them free of being splashed on or misted with airborne materials or impacted by falling artwork, elbows, your rough-and-tumble dog.... Occasional dusting is also recommended.

⚠ CAUTION - with wood finishes we recommend you keep the loudspeakers out of prolonged and frequent direct sunlight. How long is prolonged and frequent? Well, three hours a day of direct sunlight every day will cause some color changes after a year or two. Painted finishes will not. While we use materials and top coats with the highest levels of UV resistance and absorption, some color changes to wood finish is going to happen when sitting in direct sunlight day after day.

⚠ There are no serviceable parts such as fuses used in DWX loudspeakers. Connectors are plated and do not require cleaning or maintenance unless they are contaminated by grease, dirt, salt, or some other substance. Capacitors used in all three versions are very high quality and are good for the life of the loudspeaker. Magnets used in the driver are likewise good for life.

CABINET FINISH CARE

⚠ DWX are finished in real wood veneers or painted surfaces and all finishes are very durable. To clean and dust them we recommend a lightly water-damp clean and soft cotton or micro-fiber cloth. You are able to wipe down all surfaces of DWX save the full-range driver cone. Care of the FRD is outlined below.

⚠ Note, once a micro-fiber cloth becomes soiled it will hold grit and dirt even when washed aggressively—only use clean cloths. If you have a mirror gloss finish we recommend that you use a new micro-fiber cloth with each dusting or washed and clean soft cotton cloth. If there is excessive fingerprints and grime on the speaker you may use a window cleaner or Meguiar's Final Inspect in place of plain water, spritzing the cloth and not the loudspeaker directly.

Zu's favorite general purpose loudspeaker finish cleaner is Meguiar's Final Inspection #34, misted onto a soft cotton or new micro-fiber cloth. This is a non-bonding, silicone-free detailing fluid that has been proven safe for all finishes and materials that you are likely to have in your hi-fi rig.

⚠ While the finishes are water resistant, you should not set drinks or plants on top of your speakers without safeguarding against water-ring stains—condensation pooling at the bottom of the cup or pot will possibly cause damage.

FULL-RANGE DRIVER CARE

Remove the slip-fit plastic driver covers when using DWX speakers. Keep them near as they are effective guards, quickly slipping on to protect the cone from the curious. Also, slipping them on when you're headed out on vacation safeguards the full-range driver from bugs and dust.

To clean DWX's full-range driver we recommend just using a can of compressed air. If the cone become soiled for any reason we recommend that you call for assistance. The paper cone assembly is tougher than it looks, even so, place the push-on protective plastic disks over the drives when they are not in use to keep fingers elbows and noses (dog) from messing them up. If your cone does get impacted in a way that deforms the cone we recommend you send us photos so we can advise on how to DIY-repair the damage.

While the paper-based cone can withstand the occasional misting by basic window and surface cleaners, we recommend you prevent this from happening. Full-range driver should be protected against being spritzed by cleaners and should not be splashed on or misted. If the driver cone accumulates enough contamination, and depending on the chemistry, there is the possibility of damage to the fibers and binders and makes possible the growth of mold. In over twenty years, and with thousands of customers, we have only seen mold on a cone but one time. This instance was when the loudspeaker was used in a kitchen area, with very high humidity, temperatures and cooking-stuff occasionally flung and frequently hanging in the air.

CONNECTOR CARE

No cleaning is required of the connectors unless they have been contaminated. Top of list is animal urine. This is discussed as its own thing. For most everything else, we recommend you clean the five-way binding post with a damp cloth, cloth being spritzed with window cleaner and not the connectors. Remove the locking nuts from the binding posts to allow you to clean the connection's mating surface.

The ZuB3 connector is not likely to need any service—the contacts are inset a healthy distance and thus protected from most splashes and aerosol fallout. The connectors used to facilitate the ZuB3 interface self clean when the plug is inserted and twist-locked for service.

CLEANING ANIMAL URINE FROM CONNECTIONS

⚠ NOTE - Urine may permanently stain or damage the speaker's finish. Also, the chemical compounds in urine can corrode the connections. If the connectors of the speaker get peed on, remove the speaker cable and clean immediately. To clean urine the speaker's connectors and finish you need:

- 1x of your favorite foaming urine remover
- 2x ounces or more of distilled water in a spritz bottle
- 1x aerosol can of compressed air
- 1x aerosol can of quick dry electronics connector cleaner
  Example: CRC® QD Electronics Cleaner
- Several clean cloths or rags

1. Remove the speaker cables from the loudspeaker.

   You should clean the speaker cable too, likely this method works for whatever speaker cable brand you have but you should confirm with the brand/maker. Some designs are susceptible to water ingress, which is likely to cause issues as the cable ages. Zu cables do not have such issues.
2. Remove the nuts from the binding posts.
3. Directly, but lightly, spray your favorite foaming urine remover onto the connections including the removed nuts. The binding posts and the ZuB3 connection (Supreme and Superfly versions) are sealed and can be directly cleaned in this case. Let stand for a minute or two, but not longer than three. The foaming sprays work better for working loose and neutralizing the pee from the connections.
4. After the urine remover has sat for a few minutes, wipe clean and dry with a cloth.
5. Now directly spritz the connectors with distilled water, including the inside of the ZuB3 connector.
6. With the can of compressed air, blow the connections out to displace the distilled water and moslty dry the connectors.
7. Then immediately spray the cleaned area with quick dry electronics cleaner. This will displace any remaining moisture and give the contacts a final cleaning.

⚠ 8. Let sit for a minute or two to allow the quick dry electronics cleaner to mostly evaporate, then, using the can of compressed air, blow the connections out one last time. The reason you wait is to give it time to evaporate, so when you blow it out you don't get and of the quick dry cleaner in your eyes.
9. Reconnect and play.

RECOMMEND READING ON ACOUSTICS

Whatever the reason, the current consumer playback world is generally lost in its conception of acoustics and the nature of sound—much has been written in the hi-fi world but little of it is genuine. Here is a short list of our recommended works on the subject. If you were to read just one, Olson is your huckleberry. If you want more and you are into math, make it Kinsler.

Helmholtz, Hermann L. F., On The Sensations of Tone, 4th ed. trans. Alexander J. Ellis (Dover, 1954. Original 1885-77)

Rayleigh, J.W.S. Baron, The Theory of Sound, 2nd ed. Vol. 1 & 2, (Dover, 1945. Original 1894)

Lamb, Horace, Sir, The Dynamical Theory of Sound, 2nd ed. (Dover, 1960. Original 1925)

Jeans, James, Sir, Science & Music, (Dover. Original 1937)

Olson, Harry F., Music, Physics and Engineering (Musical Engineering), 2nd ed. (Dover, 1967. Original 1952 & 1967)

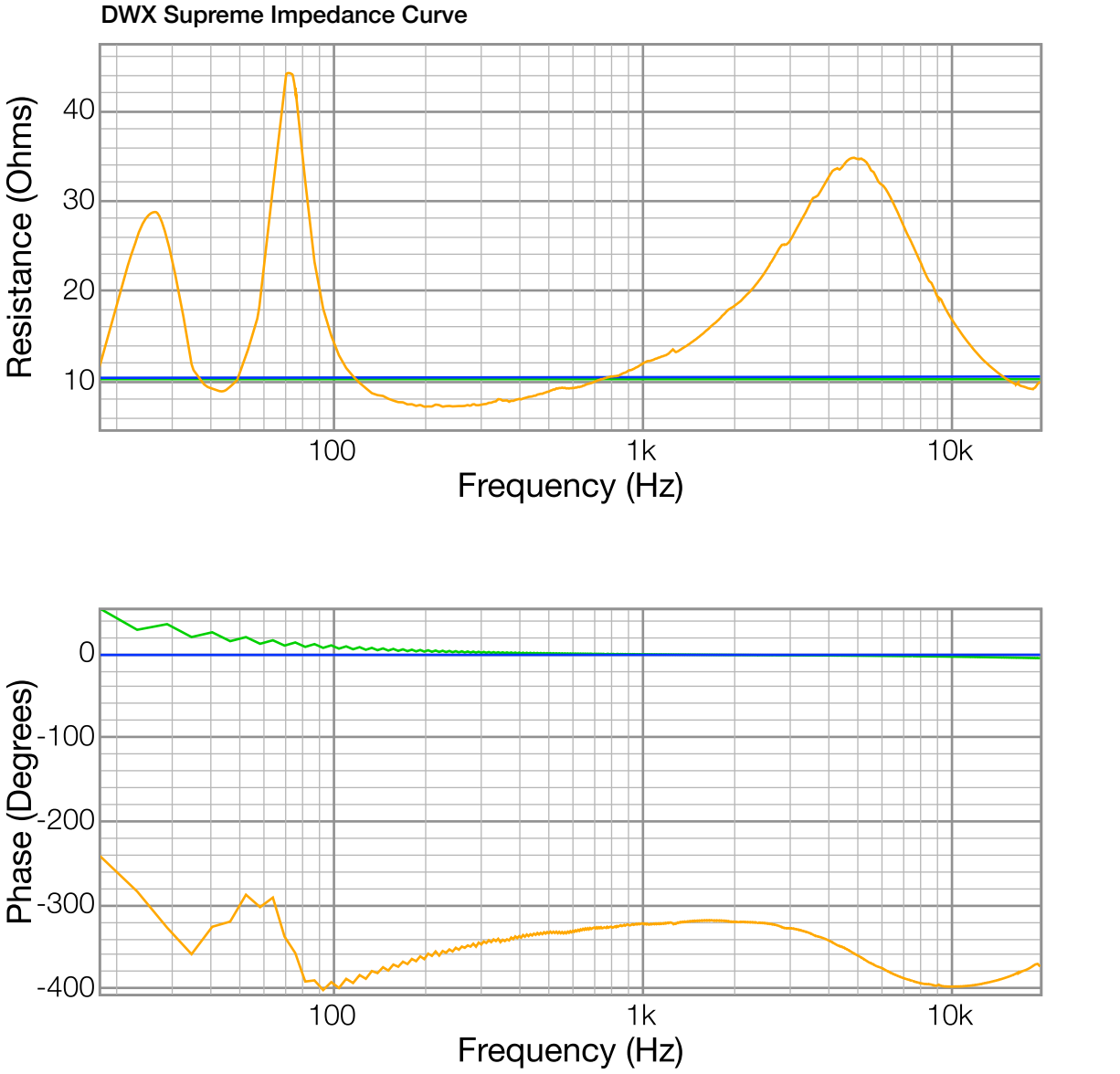
Benade, Arthur H., Fundamentals of Musical Acoustics, 2nd ed. (Dover, 1976, 1990)

Kinsler, Frey, Coppens, and Sanderds, Fundamentals of Acoustics, 4th ed, Wiley, 2000)

DWX LOUDSPEAKER SPECIFICATIONS

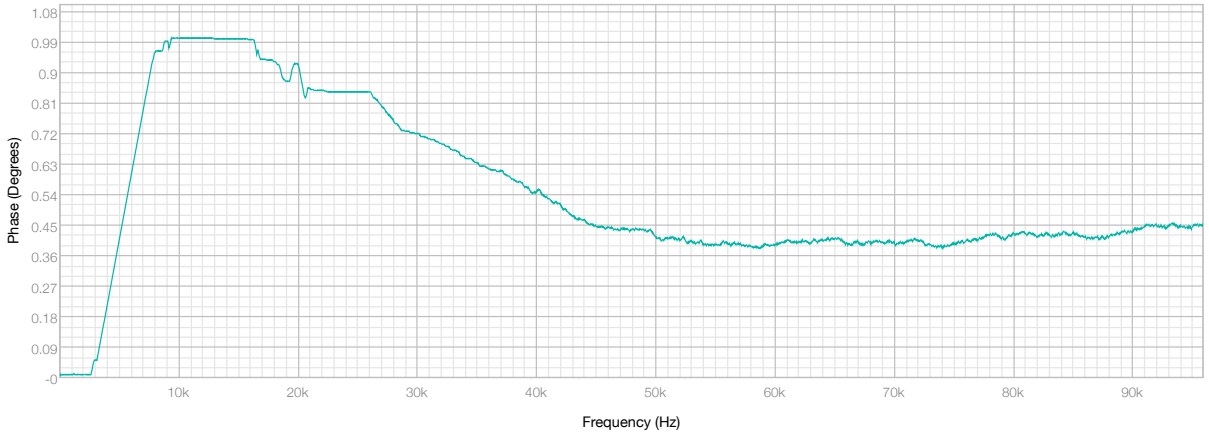
Dimensions H x W x D	12 x 12 x 23 inches [30.5 x 30.5 x 58.5 cm]
Weights & Packaged DIms	42 pound [19 kg] packaged: 50 pounds [23 kg] 17 x 18 x 28 inches [43 x 46 x 71 cm]
Bandwidth	38 - 22k Hz (typical in-room response)
Voltage Sensitivity	95 dB-SPL @ 2.8V, 1m
Impedance	12 Ω (8 Ω min, see curves)
Wavefront	virtual point source from 12k Hz and under
Max SPL Program	118 dB-Z (slow)
Horizontal Listening Window	45˚
Vertical Listening Window	45˚
Listening Distance	2 feet [50 cm] or more (closer than two feet puts you in the near-field)
Accepted Connectors	see detail on connection page
Internal Cabling	Mission hookup wire, Superfly = Mission cable, Supreme = Event cable
Full-Range Driver	Zu260FRD/ND (toleranced and matched)
Tweeter Driver	Eminence ASD-1001 (toleranced and matched)
Tweeter Lens	Zu/machined from 6061 billet
High-Pass Filter Detail	mono-pole bessel @ 18k Hz, 12k Hz acoustical
Max Power Input	200 W / 400 W (high-pass at 50 Hz, 12 dB/octave)
Recommended Amp Power	5 - 30 watts for low to moderate sound pressure levels 30 - 100 watts for moderate to very loud SPLs 100 - 500 watts for very loud to ear damagingly loud SPLs
Cabinet	real wood veneer or custom finish, composite medium density core
Life Expectancy	100 years in-home used
Compliances	RoHS | WEEE
CE Compliance	yes, if insulating boots over binding posts are installed
Manufacturers Country Of Origin	U.S.A. all parts and labor excluding just a few small parts and the ASD-1001 tweeter

DWX IMPEDANCE AND PHASE

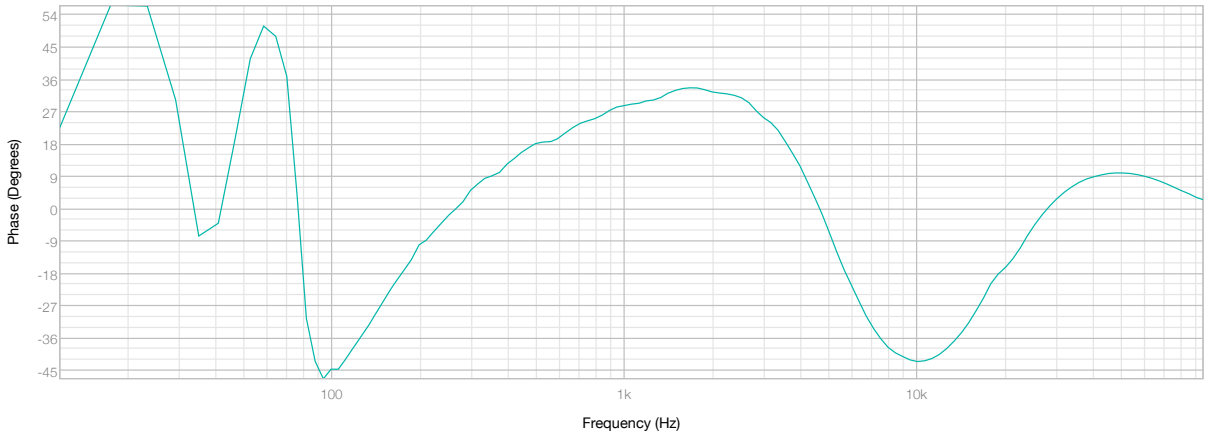


DWX PHASE AND TIME DECAY ENVELOPE

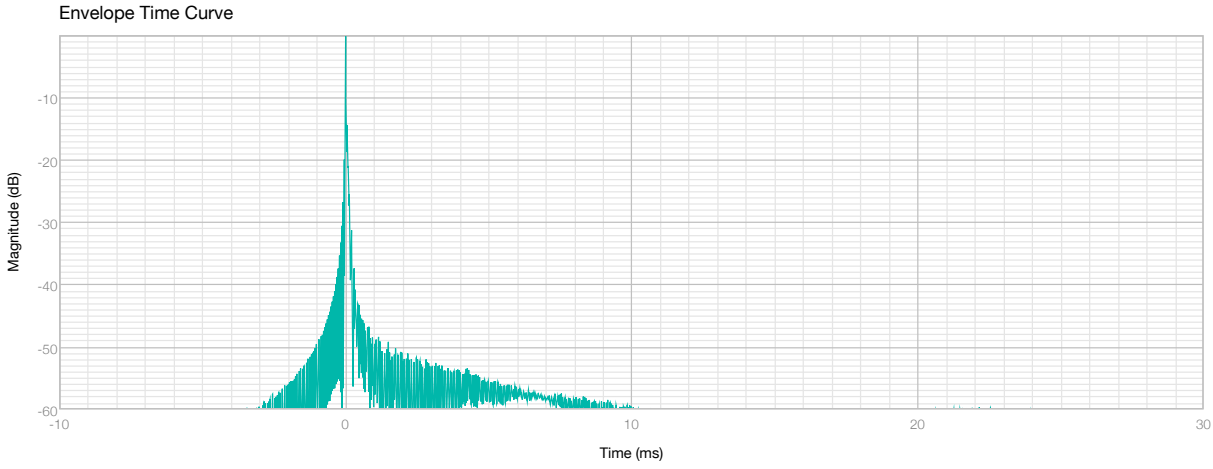
Mixed Phase Response



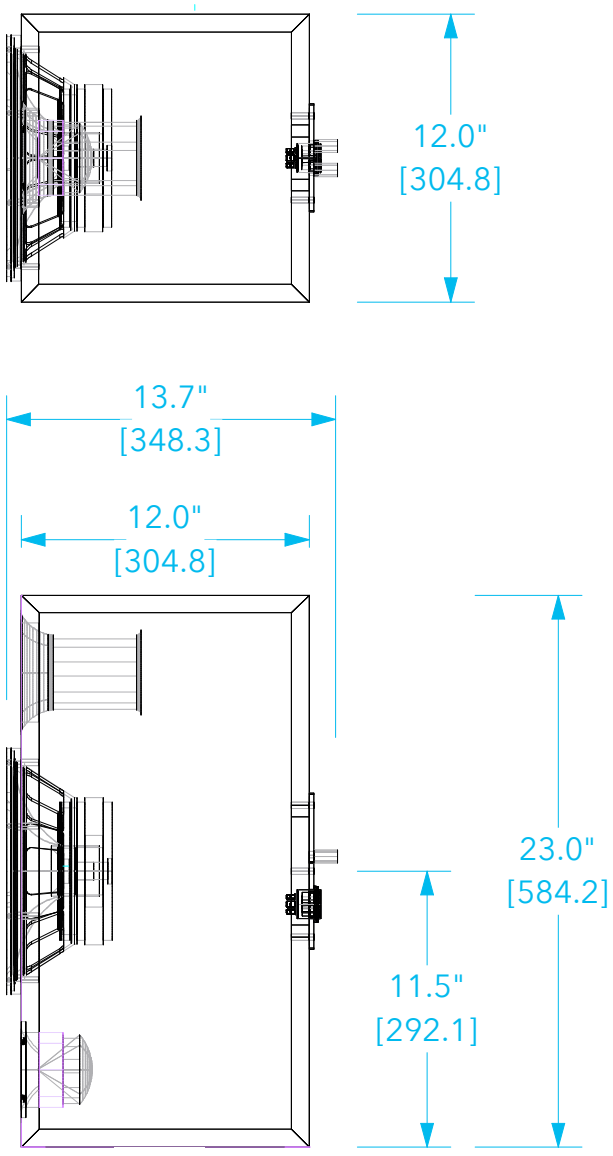
Minimum Phase Response (1/12 Octave Smoothing)



Envelope Time Curve



DWX DIMENSIONS



WARRANTY

Zu DWX loudspeakers have a five year limited warranty from the date of purchase to the original owner. If under normal home use there becomes a problem with drivers, cabinet or other parts Zu will assist in fixing or replacing the product.

For warranty eligibility the owner needs to email or call Zu to arrange support. This provides an opportunity to assist in diagnosing the problem and helps coordinate for rapid turnaround. Final warranty eligibility will be determined upon inspection of parts or product. Service options, parts availability and response times vary.

Loudspeaker service can frequently be performed by the owner, known as DIY service. In such cases Zu will provide parts and technical support. DIY service provides faster repair of product and minimizes handling costs and damage potential to both Zu and the owner. Disassembly for inspection does not void warranty but must be disclosed.

DWX loudspeakers are designed to be used in controlled environments, namely your home, office or studio. Warranty does not cover loudspeaker finish damage caused by the extremes of an uncontrolled environment, nor does it cover damage from misuse, impact and abrasion. While the highest quality UV protecting topcoat finishes are used, Zu cannot guarantee against fading and the owner should keep them out of direct sunlight.

In the highly unlikely event that a Zu product arrives dead on arrival (DOA), and after discussing it with a Zu tech who can assist in the troubleshooting, Zu will assist with DIY repair or ship another of the same product at Zu's expense and arrange for the DOA product to be collected. If after inspection it is found that the problem or situation was misrepresented, or the loudspeaker was improperly handled or used, Zu may decline the warranty claim and charge for all damaged parts, labor, shipping and handling.

Warranty does not apply to damage caused by operating the product outside the intended use, accident, another product, misuse, abuse, flood, fire, earthquake or any other external causes. Warranty does not cover damage caused by modification or service performed outside of Zu's direction. Warranty is also void if any part of the serial number has been defaced or altered.

When a product or part is exchanged the replacement becomes the property of the user and the suspect or damaged part becomes Zu's property. Parts provided by Zu must be used in products for which the warranty service is claimed.

When the shipping of a product or a part is required, repackage the complete product, or part, in its original packaging. If there are questions about packaging please call or email. Product damage caused from incorrect repackaging is not eligible for refund or warranty and the freight company may also reject your insurance claim. Until the product is back and the warranty claim is accepted, the product is still the property of the owner.

Zu will comply with all applicable domestic and foreign trade laws and regulations; the owner may be responsible for custom duties, taxes, broker fees, freight, and other charges.

ZU AUDIO
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DESIGNED AND MADE BY US