

# DEFINITION Mk.IV

OWNER'S MANUAL

1 | 2012

# THANK YOU

Thank you for your purchase of the Zu Audio Definition Mk.IV loudspeaker system. Every element is designed for a lifetime of hassle-free high-performance playback. It's our intent that these loudspeakers exceed every reasonable expectation in product performance, quality, durability and customer service, for as long as you own them.

Evidence your new loudspeakers are designed for a lifetime of use is the engineered-in serviceability—in the unlikely event of needing to replace a damaged driver, or subwoofer amplifier, Definition Mk.IV is easy to service in your home using simple tools, with no exposure to safety hazards, and no real down time or the hassle of having to package and ship the entire loudspeaker back to the factory. So sit back, and enjoy!

## ZU VISION FUTURE & PAST

Impressions of new realities struggle and flow—eventual transition.... Awareness of surroundings, songs of tranquility and warning—history and intuition instruct that patterns of sound have been a fundamental constant. Observance of nature, both physical and spiritual, teach us of the endless interplay of vibrational forces.

While traveling the line of time we observe many periods of increased awakening and technological advancement but none so powerful and rapid as that of the Scientific Revolution, Enlightenment and the birth of modern physics. The dramatic increase of understanding regarding possibility, vibration and energy coincide with our collective ability to listen and express patterns of life. David Toop in his book Ocean Of Sound paints a powerful image of our modern 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."

Welcome to Zu



# **DEFINITION MK.IV (((WARNINGS)))**

## **WARNINGS**

Never leave children unattended in your playback room. Even though Definition has a wide base, care should be taken to prevent accidents from a toppled loudspeaker.

(Besides, you already know if you let them in your room uneducated and unattended they are going to bust your needle, play catch with your discs, bend your tube pins, and write their name on your new leather chair—good secondary reasons for spending time with ‘em. So hang with your kids, grand kids, and neighbor kids, listen to some great music together, teach ‘em about playback and great music. Introduce them to Lucinda Williams, The Clash, Miles, Hendrix, Beethoven, Zeppelin, Sinatra, Rush, Silver Jews, Debussy, Woody Guthrie, Deep Purple, Wagner, Black Keys, Marty Robbins, Kyuss, Spoon, Steve Earle, Sabbath, Velvet Underground, Eels, CVB, Joanna Newsome, Ry Cooder, Cash, Ryan Adams, Zappa, John Prine, The Who, Ian McKay, Zakk Wylde, Sex Pistols, Julian Cope, Alice In Chains, Legendary Pink Dots... the Stones, Charlie Parker, Hank Williams, Elvis, Beetles and Mozart.)

**WARNING: RISK OF ELECTRIC SHOCK—THERE ARE NO USER-SERVICEABLE PARTS INSIDE THE AMPLIFIER.**

The drivers and the complete subwoofer amplifier are user replaceable without risk of electric shock. Risk is only if the subwoofer amplifier is disassembled and circuits and power supply components are exposed. This requires special tools and technical skill. If the subwoofer amplifier is opened for any reason know dangerous voltages are present inside during operation and for up to ten minutes after disconnecting from AC mains. Again, the subwoofer amplifier case is sealed and requires technical knowledge and special tools to open, and should only be serviced by a qualified technician. This loudspeaker system is not intended for outdoor use, do not expose to rain or moisture.

Also, we recommend unplugging your loudspeakers, main amplifier(s) and electronics during lightning storms or when the playback system will not be used for an extended period of time.

**WARNING:** Electrocution through loudspeaker cable is possible, though very unlikely. Still, to avoid electrocution make sure your amplifying gear is switched off prior to connecting or disconnecting. This will also reduce the possibility for accidental damage to your audio amplifier.

**WARNING:** Definition Mk.IV loudspeakers are heavy. We highly recommend you have a second person or professional furniture mover assist you.

**WARNING:** Definition Mk.IV loudspeaker drive units create stray magnetic fields that extend far beyond the boundaries of the cabinet. We recommend you keep magnetically sensitive electronics and media at least four feet [1.2m] from the loudspeaker.

**WARNING:** Definition Mk.IV loudspeakers are capable of extreme sound levels, play responsibly. If caution is not exercised your hearing will be damaged. And your neighbors will either hate you or want to party with you.

# DEFINITION MK.IV UNPACKING

## UNPACKING

Definition Mk.IV features our new FlexPak foam-encapsulating shipping containers. They are extremely protective, lightweight, simple, and reusable.

**WARNING:** Consider hiring a professional furniture mover, or at least inviting a few of your buddies over to give you a hand, each speaker weighs about 165 pounds [75kg].

**CAUTION,** watch out for snaps, rivets, jewelry, and belt buckle scratching the cabinets when positioning the loudspeakers.

1. Make sure your path is clear and your room is made as open as possible. If lifting is required, lift with your legs and not your back, and with the assistance of a friend or two.
2. Lay a moving blanket, or similar, down on your floor.
3. Using a hand truck, wheel one speaker into the room and lay it on its side. The freight company usually has a hand truck on board and will likely let you borrow it for a few minutes while you wheel them inside. And tip the driver if you borrow the hand truck.

**NOTE:** UPS Freight and others are not allowed to enter your house, if you are nice they will likely wheel the speakers right up to your door, maybe lend you the hand truck for a minute while you move them into your room. But even if you give them a big tip, they are not going to lend any muscle inside your home.

4. Cut the banding wrap with a knife, and while still laying down, cut the tape securing the tabs on either end of the box. You do not need to cut the box off the speaker, be nice to your box and save the packaging.
5. Sit down in front of one of the open ends, grab the box flaps with your hands, and with your feet press the foam encapsulated speaker out the other end.
6. With the speaker still horizontal, remove one of the foam halves, then gently roll the speaker over and remove the other foam half. Leave the plastic wrap on. Careful of the lower rear portion of the speaker where the amp's knobs and switches are located.
7. With the speaker still horizontal and wrapped in plastic, confirm the ball-end footers are installed in the base. If the speakers will be standing on carpet or on a rug, peel back the plastic wrap to expose the base and feet, remove the ball-end studs and replace them with the supplied spikes.
8. Lifting the top of the speaker, pivot onto its feet.
9. Move speaker into position and then remove the plastic wrap.

# DEFINITION MK.IV PLACEMENT

## QUICK TIPS ON GETTING GREAT SOUND FROM DEFINITION MK.IV

Definition Mk.IV loudspeakers get 400 hours of factory burn-in, they will sound good right out of the box but will not give you their best for a few weeks, depending on how much play, and how cold they got in shipping, as well as what kind of music they see. If shipped in the winter months you can expect them to need the first week to warm up and start sounding good, not sure why, it just is.

Make sure you have 1/4" [6mm] or greater gap between the bottom of the loudspeakers and the floor, the down firing sub needs a bit of space, but less than you would think considering the big subwoofer behind the fluted feature.

In addition to the installed ball-end footers (for hard surface flooring) Definition Mk.IV also ship with spikes that are to be used to punch through and anchor the speaker on carpets and rugs.

## INITIAL PLACEMENT

While your initial placement for the Definition Mk.IV loudspeakers may not be the acoustic ideal, know they are not hyper-sensitive to where in your room they are placed and you should get satisfactory performance from most any position. Nevertheless, you will be rewarded if you work on setting them up for the best sound. The following details may assist you in the pursuit of tone, texture, and realistic stereophonic recreation.

Placement for left / right front: Definition Mk.IV loudspeakers should be placed to work with the natural acoustics of the room rather than fight them. The following basic points should be followed.

- Definition loudspeakers should be equidistant for compelling stereo performance.
- Generally, Definition loudspeakers should be placed no closer than two feet [60cm] from a side wall. This distance is measured from the center axis (Y axis) of the loudspeaker and not the side.
- The angle between the speakers, measured at the central listening position, should be between 60 and 110 degrees. Wider is usually better for both stereo and home theater. But this angle is largely determined by your room and personal preference.

## LOUDSPEAKER FEET

Hard surface ball-end feet have been pre-installed in the Definition Mk.IV and carpet spikes have been included in the package. Ball-end footers are more gentle on hard surface flooring but will mar it, especially if slid. We recommend you lift and move the loudspeakers to avoid damage. For carpeted floors we recommend that you use the supplied spikes. Spikes provide increased support to the loudspeaker, allowing it to couple with the structure of the floor and not wobble about on the carpet. Carpet spikes will also reduce permanent carpet or rub impression from the loudspeaker.

# DEFINITION MK.IV TUNING

## PLACEMENT FINE TUNING | BASS

Perhaps it has been the lack of skilled engineers, maybe audiophiles at large have lacked discipline, for whatever reason the current consumer playback world is lost in its perception of acoustics and the nature of sound—much has been written in consumer magazines but little of it is genuine. Original recommended works on the subject include: Music, Physics and Engineering (formerly titled Musical Engineering) by Harry F. Olson, Science & Music by Sir James Jeans, Fundamentals Of Musical Acoustics by Arthur H. Benade, Fundamentals Of Acoustics by Lawrence E. Kinsler, Austin R. Frey, Alan B. Coppens and James V. Sanders. There are many other good sources of researched data; those mentioned represent a good cross-section.

The following technique is Zu Definition specific. It addresses the loudspeaker's relationship with the room and works for both two-channel and multi-channel setups.

How and where the loudspeakers excite a room and how a room reacts are relative to the type and source of excitation and room reactance—a function of boundaries (walls, floors, etc.); boundary properties (mass, compliance, Q, damping, texture and structure); area impedances (shape, volume); diffusion and absorption (furnishings, people, flooring, etc.); source and type of wave excitation (loudspeaker design and placement); resonators (closets, forced air ducting, hallways, etc.); even atmospheric pressure and humidity, though very minor, will influence sound. While the above are beyond the scope of this manual, the recommendations and listed books will start you down the proper acoustic path. Again, before you trust another modern work relative to playback and acoustics please research the above listed references.

With your loudspeakers positioned for visual appeal, livability and fidelity, you can now begin fine-tuning. This involves three major steps: in sequence they are bass, mids and treble. If you can't fine-tune your system within an evening or two please contact us, we're here to help.

If you have one loudspeaker that is framed with more wall space than the other, this is the loudspeaker you will fine-tune and then simply mirror the other. Select recordings with large amounts of sustained low frequency information; dramatic pipe organ and dance music work, as do test recordings that have warbled low frequency tracks (50~100Hz range). Note that steady-state sine, triangle and square wave signals prove very difficult to interpret. Bass information with some transient content will enable the listener to make fast work of fine-tuning.

With the loudspeaker playing at a moderate level, (VERY IMPORTANT—only the 'tuning loudspeaker' should be connected and '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 integrates with the room. Now move your head and ears in all directions around the vertical axis of the loudspeaker, say a few feet or so [.5m] on all sides. Listen to the fidelity of the bass, does it sound woolly and muddy right 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 this position and then listen again. Remember, moving the sound source also changes how the room reacts. You should not have to move the loudspeaker more than several times to get it right.

# DEFINITION MK.IV TUNING

## PLACEMENT FINE TUNING | MIDRANGE

Once the lower octaves are sounding good, natural and vibrant midrange and treble can then be dialed in. Before you begin, it's important to understand a few details about midrange tuning. While similar to that of bass, midrange is a task of inches [decimeters] rather than feet [meters], and upper octaves a matter of fractions of an inch [centimeters] and loudspeaker firing axis (wavefront and where they face). And while midrange and treble changes can be heard at the 'being positioned loudspeaker', it is much more helpful to have a friend do the positioning while you listen from the sweet spot/listening position. Select lighter recordings for this—singer-songwriter, folk, jazz, space-ambient, violin solos, acoustic guitar, and so on—music with good overtone color and not too heavy.

Staying with the same loudspeaker tuned for low frequencies, (remember you only tune one channel and then mirror its mate) and with your favorite light recording playing, start tuning for mids and highs. Move the speaker toward the closest wall an inch or two at a time [3~6cm]. The sweet spot observer, and possibly the person positioning the loudspeaker, should notice midrange color and presence transition from low and masked to open and intimate—that's the goal anyway. There may be several spots within the good sounding bass area that have good presence, go with the widest point (closest to the wall) for an expansive and engaging stereophonic soundscape. Don't worry about center focus, Definition Mk.IV can really throw an expansive and focused image (provided it's in the recording and passes unhindered through the electronics—there's nothing worse than some stupid whizbang technology forever synthesizing space and tone).

## PLACEMENT FINE TUNING | TREBLE

Once a midrange position is selected it's time to work on the highest octaves. This is usually as simple as rotating the Definition Mk.IV loudspeaker to face directly at the seated listener—pivoting the speaker on its front inside spike. Now listen again for soprano voice and light instrument openness and intimacy, minor placement adjustments and face angle will likely be necessary. Realize that best placement may change with speaker age, electronics upstream, and other variables. The simple guideline is if it's a bit treble rich, rotate each speaker to focus behind the main listening area a few feet—experiment. And yes, this same technique works for other Zu speakers, and most others you might be proud to own.

## ADJUSTING LOUDSPEAKER FEET & BAFFLE CANTING

Spikes for carpet, ball-end studs for hard surface floors. Once positioned and tuned-in, your last step is to level the loudspeakers by adjusting the spike or ball-end studs. Each loudspeaker should stand straight and level and all four contact points should be equally weighted. If you have a high listening position you can cant the loudspeaker back, lowering the rear feet / rasing the front feet. This rotates and elevates the stereophonic image.

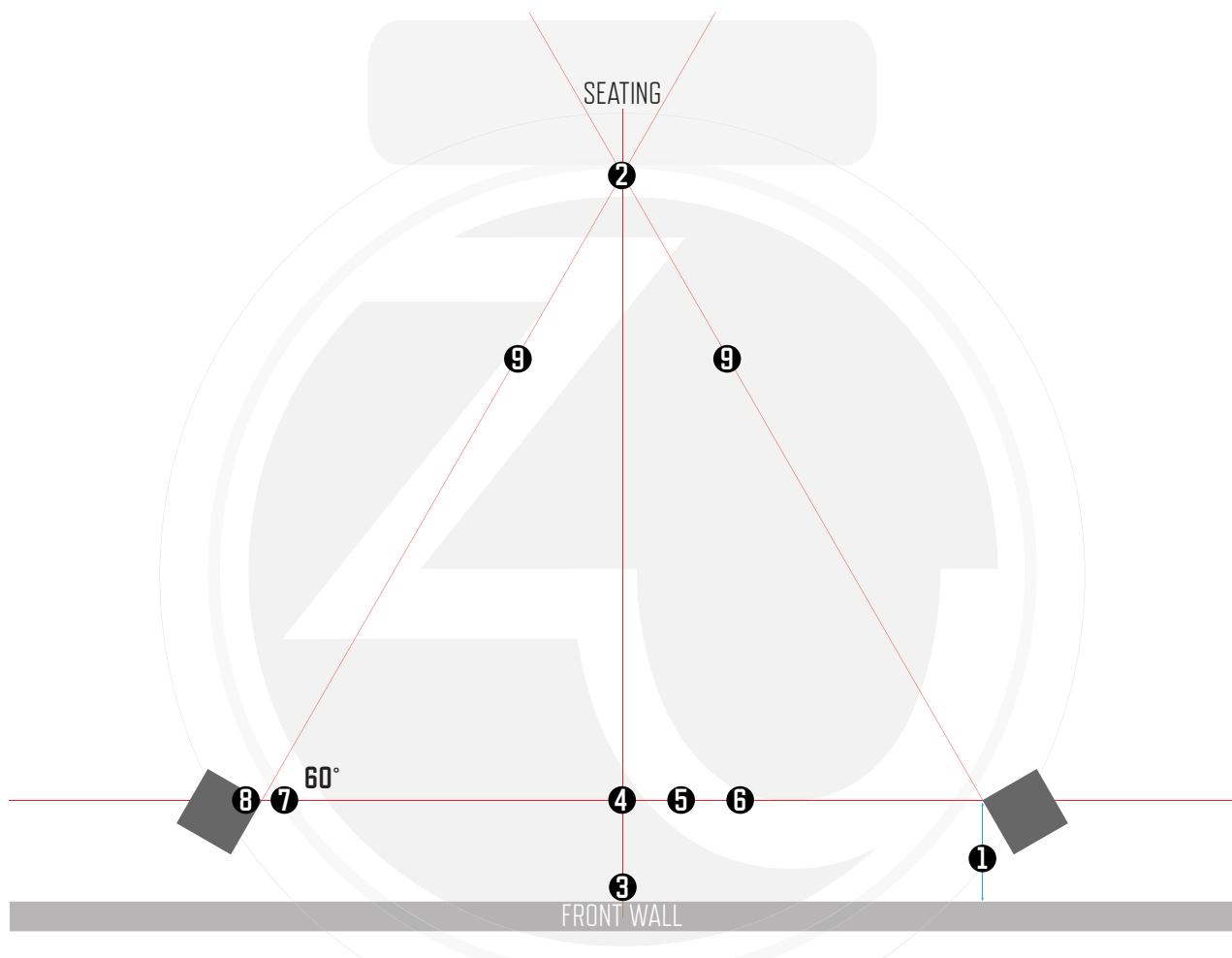
# DEFINITION MK.IV FINE TUNING

## TWO-CHANNEL STEREOHONY TUNING

Recommended tools: tape measure, masking tape, Strait-Line® intersect laser level, or similar (inexpensive and useful for leveling wall art when you aren't using it for fiddling with your hi-fi).

With the one loudspeaker now tuned and sounding good, getting convincing two-channel stereophonic effect is now simply a matter of measuring and mirroring. Don't fuss over whether or not your loudspeakers are perfectly square with the walls, or get obsessive with the room's mathematical relationship. To do so is to waste time and possibly mess things up. Trust what you've already established with your single-channel effort so forget about everything other than establishing your center plane and mirroring the other channel.

In the mono 'speaker you established two points of reference that will now establish your two-channel stereo mirror plane. Those points are your seating position and your tuned loudspeaker.



# DEFINITION MK.IV FINE TUNING

(Reference illustration—two-channel stereophonic loudspeaker setup)

- 1) Measure and note the distance from the wall behind to the positioned loudspeaker's inside forward base corner.
- 2) Sit in your center seat, mark the center spot of the floor right between your feet with a bit of masking tape.
- 3) With the Strait-Line® intersect laser level in hand, stand and walk straight ahead to the facing wall. Butt the intersect laser level up against the wall and position the laser so the side plane laser indicator runs parallel with the wall, and the center plane intersects your seating center mark.
- 4) From the wall, along the center laser mark pointing at your chair, measure the same distance as in step one, and mark with a bit of tape. These two points establish your stereo center plane.
- 5) Move the intersect laser level forward so the intersection is on that bit of masking tape nearest the wall and the center laser mark intersects your seating center mark. This should result in the orthogonal laser striking the tuned loudspeaker right on the inside front corner.
- 6) Measure and note the distance from the laser intersect to the point of laser contact (inside front base corner) on the positioned loudspeaker.
- 7) Reflect this distance on the other side of the stereo plane, marking the mirrored distance with tape.
- 8) Now place the second speaker's inside front corner on this mark and approximate the toe-in by pivoting it on this inside front corner. If fine tuning of toe-in is needed pivot either loudspeaker on the front inside corner footer only. This will keep the mirrored stereo relationship the same and you won't have to get the laser and tape measure out every time you mess with toe-in.
- 9) While you can also use lasers to adjust and ensure mirrored stereo toe-in, we recommend that initially you eyeball it based on the amount and angle of the loudspeaker's visible inside cabinet edge. Before you get "laser crazy" with toe-in we highly recommend that after you get close, by eyeballing it, you then level your loudspeakers, or start messing with firing axis (canting and elevation) for which the laser is also a very handy, sometimes essential tool.

# DEFINITION MK.IV REASONING

## ADDITIONAL DECLARATIONS ON 'THE ZU SOUND' & GETTING IT WITH DEFINITION MK.IV

Definition Mk.IV gets closer to the music by defying many of the conventions of contemporary loudspeaker design. Problems of tone, intimacy, room... and how to recreate a real sense of space and grandeur that is music, these are the things that we've tried to address with our new 'speaker. Definition Mk.IV is about realizing elegant solutions and removing over-engineered and tone-robbing modern convention, to deliver genuine expression, agility of attack and dynamic contrast, with the lush sensuality of sustain, and the space, warmth and emotion expressed within decay.

Some of the design features that make it possible include the new full-range nanotech drivers and their position on the loudspeaker. Consider that the attack of the whole musical scale emanates from the front driver array—it's only the subcontrabass, the really deep stuff, that's recreated from the user-tunable down-firing subwoofer system. Adjusting only the deep bass for great in-room timbre is the best place to solve room problems without damaging the attack. And it's the attack more than any other aspect of a waveform that gives the listener the clues to process source, direction, amplitude, character, intelligence... the light and life of music and sound. Example: a piano key is struck! The bite of the impinging hammer, initial complex string motion, and initial coupling of piano body and sound-board. The first milliseconds are very dynamic and dense with feature. To get the attack correct is solely a function of the playback system and has very little to do with the room—aside from placement. If you have changed your system to combat room modes, attack and dynamics have very likely been impaired. Why? Because most people can only pinpoint tonal problems with steady-state or semi steady-state music or signal. This is a problem because room influence on steady-state is huge, the single largest influence if included as a component of your playback system. So people usually tweak things to get the steady-state and decay tonally correct but inadvertently kill the life in the attack. This is a reason why cables as tone controls, digital room correction, parametric equalizers and the like can never fix fundamental problems when used on the system as a whole—unless of course the time axis is also programmed and correlated to harmonic structure and then set to react to any dynamic anomalies within the signal, overlaid with the signature of the room the original recording was made in and compared... (how much are real super computers going for these days?)

As a result of all the above, we think the pursuit of measured perfection, as displayed on a 'scope or graph, is a distraction, with design choices being made to serve the spec's rather than the ear; it distracts from delivering the totality of a musical performance intended not just to be heard, but to be felt. The tone, intimacy and dynamics of live music are everything to us so the measurements we conduct in the design process are just a help to guide us along the way. So, once we've got our 'speakers sounding fantastic to our ears, we become rather less interested in how they sound on paper. What we do care about, passionately, is how our 'speakers perform in the real world, surrounded by the ephemera of normal life and the reality of regular gear. At the end of the day, when we crack open a beer, slip on a record and put our feet up, the only measurements that matter are those read by our heart and soul via those appendages on the sides of our heads. So if you just want to be transported to the place and the time, to experience the creative energy, the rush of the attack, the sensual beauty of the sustain and all of those other immeasurable yet defining 'things' that make music alive, there's every chance you'll fall in love with the Definition Mk.IV every time you ask them to playback 'that' song, album, or sound.

# DEFINITION MK.IV INFORMATION

## LOUDSPEAKER SYSTEM OVERVIEW AND SALES COPY

Definition Mk.IV is designed to give its best performance in midsize and larger rooms, on the end of any good sounding amps, tubes or solid-state. Definition Mk.IV distills everything we've learned from creating our flagship loudspeaker, Dominance, into a loudspeaker within reach of mere mortals.

Definition Mk.IV takes from Dominance our new nanotech full-range drivers, the fabulous Radian 850 based tweeter and our Event cable. It uses our Zu-Griewe acoustics technologies for the full-range drivers, and cabinet engineering that addresses noise and framework function across all fronts: materials, structural, bonding and building technique. The resulting combinations of engineered plate, hardwoods, damping compounds and metal alloys create a wonderfully inert structure.

Old Definition's rear-firing sub-woofers are replaced with a single massively motored 12" subwoofer driver, mounted on a super rigged, machined-from-billet 2" [50mm] thick block of aluminum, firing straight down into the floor—this is powered by our new deep bass amplifier built around the highly regarded Hypex UCD 400 module. This new on-board subwoofer amplifier system is not only as good as it gets in quality power, it also provides transparent filter processing of deep bass signals, most of which are user adjustable so you can dial-out room modes without compromising the analogue integrity of the music fed from your main amplifier. These components, and the sophisticated cabinet, work together to deliver what we genuinely believe to be the state-of-the-art in any loudspeaker south of \$30k. It's hugely dynamic, massively sensitive, capable of handling high power if you really want to die young, and so wonderfully, gloriously coherent, unflappable and downright true to the gorgeousness of music that we might as well retire now and go home.

The most visible change for Definition Mk.IV is the machined aluminum plinth and subwoofer assembly. And while the cabinet size and shape look very similar to previous Definition models, the Mk.IV cabinet design solves resonance and baffle issues in a completely new way, focusing on structural and materials engineering and only using weight and mass where useful. The substructure is a 30 degree raked dual wall superstructure that solves material resonance and acoustics issues through elegant design simplicity. The baffle is the most unsound section of any loudspeaker cabinet, yet it's the portion of the cabinet with the greatest impact on fidelity. With Definition Mk.IV we use the massive tweeter assembly as a stressed member of the framework, compressing 10 pounds [4.5kg] of 1-3/4" [38mm] thick steel alloy and 1-3/4" [38mm] thick billet 6061 aluminum to constrain the cabinet core right between our two full-range drivers, exactly where all this mass and strength will do the most good. The cabinet core material is a combination of engineered and solid woods. Joints are first mitered then strong-backed. The plinth / bass assembly is bolted into the cabinet's superstructure to realize a structurally strong, well-damped cabinet without the end result weighing a ton of bricks.

# DEFINITION MK.IV INFORMATION

## POINTS OF ENGINEERING & PERFORMANCE

- Zu nanotech full-range 16 ohm drivers parallel-wired presenting an 8 ohm system impedance to the amp (32 ohm latent option for amps needing such a load e.g. OTL)
- Radian 850-based tweeter assembly (if there's better... we haven't found it)
- completely new cabinet design using expanded materials pallet
- Zu-Griewe acoustic design principles applied to internal damping
- Event B3 based cable harness
- ZuB3 interface via speakON 8-pole
- Hypex 400UcD V5 based internal bass amplifier
- user controls and parametric tuning of deep bass
- machined aluminum enclosure for electronics
- engineered for in-field serviceability

Definition Mk.IV is real high-fidelity, a sincere expression of our musical values—of what we create and build at Zu. You can see the strategic use of the mixed materials pallet, judicious use of silver in the cabling and high-pass network, and the uncompromising and intense focus given to all the drive units and the way in which they work together as a whole and interface with the cabinet—and how the whole loudspeaker system works within the room.

Like all Zu products, Definition Mk.IV is centered and weighted around the critical human voice (A1, 55Hz, through A6 and all the possible harmonics, to approximately 10kHz). Serving this critical region of tone is our nanotech 10" paper cone substrate-based full-range driver—the same developed and used in the Dominance. So with tone, texture and definition realized in the meat of the range, we've set about redefining the frequency extremes with Definition Mk.IV—in very real terms as evidenced in the driver selection, and demonstrably evident to your ears, chest, and soul.

## THIRD GENERATION ZU-GRIEWE ELECTROACOUSTICS LOADING

Zu-Griewe driver / cabinet / room loading technology as applied in Definition Mk.IV exploits the high-efficiency full-range drivers' bass performance. This affords a seamless integration of the subterranean tone and textures reproduced by the system's subwoofer.

Zu-Griewe technology was developed by Ron Griewe and Sean Casey, with its beginnings in competition two and four-cycle motorcycle engine exhaust systems for improving power output, with increased bandwidth, while reducing noise and sound pressure levels over convention. More on the Zu-Griewe tech can be found in the FAQ section.

# DEFINITION MK.IV INFORMATION

## NEW NANOTECH (ZU103ND/G1-16) FULL-RANGE 10" DRIVER

This new Zu driver delivers stunning attack, shove, resolution and bandwidth—as they should, being lifted straight from our flagship loudspeaker, Dominance. Features include a maximal motor for expanded dynamic contrast and reduced harmonic distortion; a lightweight neutrally hung voice-coil assembly featuring a paper/Kapton former; a linear in-line layup of the inner cone for best resolution of detail; a diamagnetic shorting assembly for dynamic damping of the moving mass when playing at concert levels; nanotech paper cones designed to support wide bandwidth; and a billet phase cone with concentric maximal length sequence diffusion for smooth high frequencies. All this is anchored to a heavy cast aluminum alloy frame with overbuilt bonded and riveted yoke/magnet/top-plate assembly.

In 2004 we began to experiment with cutting-edge DuPont nano-engineered coatings and solids. The initial reasons were to realize the best possible gloss finish and one that would also be far tougher. These nanotechnology engineered liquid solid ceramics, fibers and synthetic resins performed as promised—so naturally we got busy experimenting on driver applications. Here's what we've achieved: the driver's cone is a paper pulp substrate, processed with a liquid solid matrix utilizing several nanoengineered materials. Some key components and compounds include: nanosphere ceramics, synthetic epoxy, cristobalite, plus the use of amorphous fumed silica and aircraft dope. The nano materials and application process reduce weight and increase strength and propagation velocity without incurring any sacrifices in damping. The end results are stunning—our new nano-sanctified full-range drivers sound dramatically better than any previous generation Zu FRD. Expect to see a lot more of them!

We continue to watch and experiment with new fibers and mats as they are very promising, especially what's being done with buckypaper. For us however a tone-promising pulp-free combination of these new materials has not yet been identified. Nothing has proven to be as well behaved as natural fibers. There's just something about paper. Its balance of strength, propagation velocity and damping all contribute to that tone, texture and fidelity we pursue. But add the right combination of old coating technologies plus nanoengineered materials and adhesives... paper maintains its advantages well into the 21st century. For more info please see the FAQ section of ZuAudio.com

# DEFINITION MK.IV CABLE

## WIRE AND CABLE

The most common abuse in hi-fi is to use cable as a form of tone control. Doing so usually leads to frustration and further loss of fidelity. When cable affects timbre it affects timing, phase, frequency response, and so on. Avoid using cables as tone controls.

Timbre problems are usually solved with loudspeaker break-in and correct loudspeaker placement. If the cable has good properties relative to phase, gain, group delay, impedance, and bandwidth, it will likely convey with fidelity the transmitted emotion and color. As an aside, avoid taking other people's opinions on cable as gospel—just because a reviewer makes blanket statements about cable "sound" means little relative to your rig and your ears. So trust your own ears, they're yours for a reason. Also, bear in mind that just because you had a good sound with cable A on loudspeaker X does not mean that cable A will be a good system match for Definition Mk.IV loudspeakers.

For best stereophonic imaging you should run matched pairs of left / right cable of the same length. If tone is more your thing and stereophonic effect is not so important then length matching of left / right channels is not critical.

While insulation, jacket materials, pigments, conductor shape, metallurgy and structure are important (yep, they really are), all pale into insignificance compared to the influence of electrostatic / electromagnetic forces, virtual ground plane, and conductor relational geometry. It is the E&M model, or cable geometry, that largely determines a cable's measured attributes.

Improvements that will be noticed from well engineered cables such as ours should include: enhanced bass depth and resolution, lower system noise floor, richer harmonic structure and timbre, faster attack, greater stereophonic accuracy and an overall ease of listening—simply a lot closer to real and satisfying and a lot further from typical hi-fi animation. But this assumes you are striving for the natural. Preferences in playback are just that, and individual enjoyment really is the goal, and not some ideal of what playback should be. Yes you can strongly feel our hepcat bias, but that's just us—do what makes you happy, and hopefully it includes some Zu.

# DEFINITION MK.IV CONNECTIONS

## ZuB3 CONNECTOR INFORMATION

All connections should be made with the equipment switched off, just to be safe. Definition Mk.IV features a ZuB3 termination interface. It requires the use of ZuB3 terminated cable or the use of Zub3 to Cardas binding post adapters.

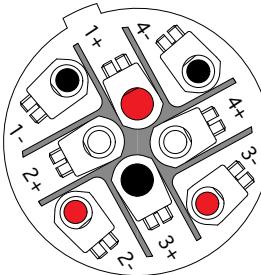
ZuB3 is a cable archetype that measures and performs differently than other cable formats (twisted pairs, coax, braids, or ribbons)—a difference we believe significantly improves performance. Zu Def-4 loudspeakers feature this cable geometry inside, and connecting Zu cable from the amplifier to the loudspeaker via ZuB3 ensures best fidelity. Reasons include:

- maintaining the cable's electric and magnetic features through the bulkhead of the speaker
- lower contact resistance (better than half the resistance of pure copper lugs and spades)
- ensured correct channel phase (SP+ to SP+ | SP- to SP-) as the connectors are indexed
- no possible short-circuiting of amplifier

ZuB3 interface connection via speakON™ 8-pole connectors maintains the electric and magnetic properties of the ZuB3 cable and lowers contact resistance over other bulkhead pass-throughs. For those that wish to use other cables we make a very high quality ZuB3 to Cardas pure copper binding post adaptor. Users that own Zu loudspeaker cables which feature our ZuB3 cable technology (Wax, Libtec, Ibis, Event) we will reterminate the cable free of charge so performance can be maximized.

NOTE: We highly recommend factory termination. However, ZuB3 via Neutrik speakON termination convention is outlined here for reference.

## ZUB3™ VIA NEUTRIK® SPEAKON™ 8-POLE TERMINATION CONVENTION

Pin-outs for ZuB3 via Neutrik speakON 8-pole / single channel	
SPEAKER +	SPEAKER -
SPEAKON 1+	SPEAKON 1-
SPEAKON 2-	SPEAKON 3+
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	

# DEFINITION MK.IV MAINTENANCE

## MAINTENANCE & CLEANING

Unless specified otherwise by the purchaser—Zu Custom Shop finishes include hand rubbed wood finishes—Zu finishes of all types are engineered for a lifetime of trouble free good looks. Just wipe ‘em down whenever you feel the need. A lightly damp microfiber cloth or chamois is recommended. Wood finishes are impregnated with a sealer and state-of-the-art conversion varnish top coats and are highly water resistant but are not waterproof. You can use any household wood finish cleaner / wax / polish you like, as well as the mentioned damp chamois or microfiber cloth.

High gloss finishes do not need any additional UV or other protection and we do not recommend wax. For serious cleaning and polishing we recommend 3M® Perfect-It™ 3000 Glaze Polish or equivalent. All our painted finishes are top shelf, super durable, waterproof, and will remain so for decades, even in direct sunlight.

Dusting of the 10" full-range drivers should only be done with hand-held compressed air as used in photograph and sensitive electronics dusting. Or, if you are careful, you can use a very soft brush or even your bare hand to dust the full-range driver—but I would stick to the compressed air. And as for the tweeter, not much you can bungle there.

No maintenance needed on the ZuB3 input connector. The Neutrik contacts are silver plated and recessed to prevent them from getting contaminated. They are also self cleaning through the contacts wiping action.

# ZU ECOLOGY

## MATERIALS, ENVIRONMENTAL REGULATIONS & DISPOSAL

All parts used within Definition Mk.IV are 100% recyclable. They do not contain any toxic material. Any Zu product or part may be sent back to Zu, free of charge, for proper re-use or disposal. Zu Definition Mk.IV loudspeakers are RoHS compliant (European Union's Directive 2002/95/EC, Restrictions of Hazardous Substances), and therefore do not contain any of the following substances: mercury (Hg), cadmium (Cd), hexavalent chromium (Cr<sup>6+</sup>), polybrominated biphenyls (PBB), or polybrominated diphenyl ether (PBDE). Additionally, Zu Definition Mk.IV loudspeakers do not contain beryllium (Be). They are classified as a lifetime life-cycle product and will most likely be in service for well over 50 years.

## ENVIRONMENTAL STATEMENT / HONEST ECOLOGY

We at Zu take pride in hard work, innovation, engineering and manufacturing know-how, and at the end of it, an honest, well built, kick-ass product. We also love to get out and enjoy life and embrace all that the world has to offer.

Zu is sincere in its search for real environmental, human and ecology-friendly manufacturing; no fluffy feel-good bullshit, just the real deal; and not because of some great googly moogly "climate change" geopolitical power play nonsense. It's simple isn't it? People like being healthy and enjoying blue skies, green hills and wildlife. We keep our impact to a minimum because we get out and enjoy nature and don't want to muck it up.

Zu makes good stuff, products that last, things you can pass down to your kids and their kids, stuff that isn't going to end up in landfills. Want to make a difference? Do a little research on your own before you fall for hype, support a cause, discriminate, or purchase a product. The people driving and building Zu believe that manufacturers and users have equal responsibility and an obligation to their respective communities. Users and producers must search for real solutions and maximize their positive impact on family, community, nature, and technology.



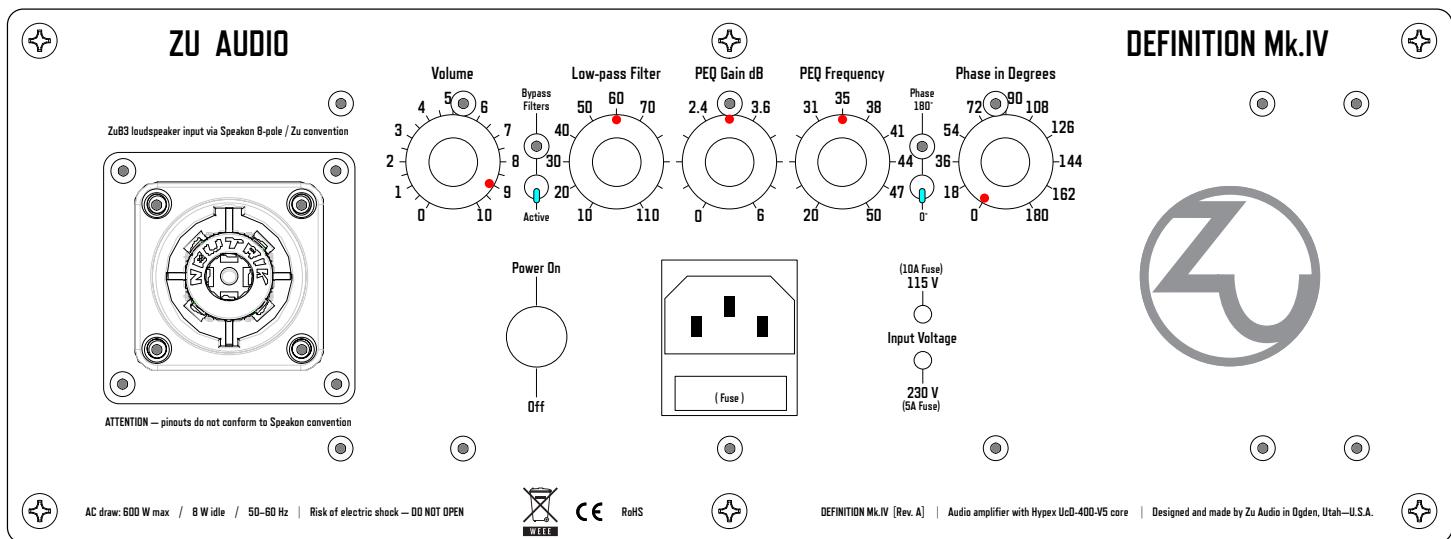
# DEFINITION MK.IV SUB-AMP SETTINGS

## SUBWOOFER AMP SETTINGS (AS SHIPPED)

Recommended starting position for user adjustable filters:

VOLUME	9	4 o'clock
LOW-PASS	60	12 o'clock
PEQ GAIN	3	12 o'clock
PEQ FREQ.	35	12 o'clock
PHASE	0	7 o'clock

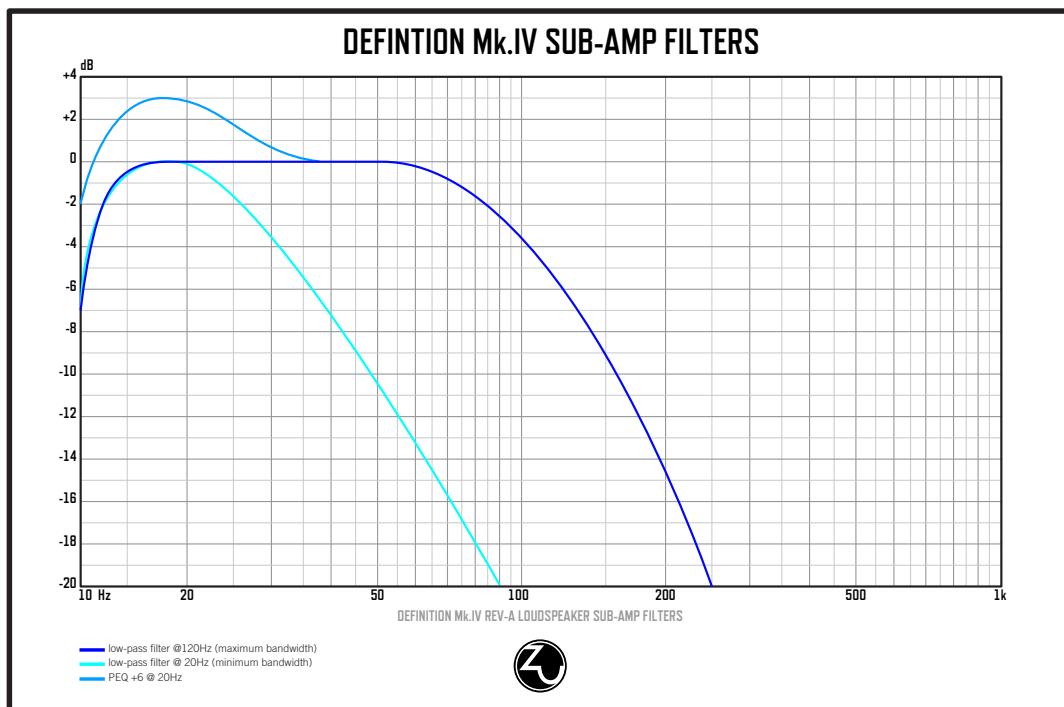
BYPASS / ACTIVE filter switch should be set to 'ACTIVE' (down)  
PHASE 0° / 180° filter switch should be set to '0°' (down)



On the following page you can see the processed signal results of the above 'as shipped' settings—charted in red.

Blue traces are user filter minimum / maximum results, for reference.

# DEFINITION MK.IV SUB-AMP SETTINGS





# DEFINITION MK.IV SPECIFICATIONS

ZU AUDIO DEFINITION MK.IV [REV-A] LOUDSPEAKER SYSTEM SPECIFICATIONS + INFORMATION

<b>Description</b>	High-efficiency, high-output, floor standing loudspeaker featuring Zu's nano-sanctified full-range high output driver, Zu-Griewe electroacoustic technology, no crossover or filters on full-range driver, complemented by the massive Radian 850 based tweeter. Deep bass is managed through a down-firing Eminence LAB-12 based subwoofer assembly complete with internal Hypex™ amplification and user adjustable filters.
<b>Production</b>	October 2011—
<b>Dimensions H x W x D</b>	49-1/16 x 12-3/4 x 12-3/4" [125 x 32.4 x 32.4cm] // footprint is 12.75" [32.4cm] square
<b>Weight</b>	150 pounds [68kg] // may vary with finish selection
<b>Packaged</b>	FlexPak foam encapsulated 56 x 21 x 21" [142 x 54 x 54cm] 165 pounds [75kg]
<b>Bandwidth</b>	14 - 20kHz
<b>Efficiency</b>	101 dB-SPL 1W, 1m
<b>Impedance</b>	8Ω, nominal full bandwidth
<b>Group Delay</b>	< 5ms
<b>Acoustic Center</b>	36" [91cm] adjustable via footers and subtle canting of loudspeaker system
<b>Horizontal Listening Window</b>	45°
<b>Vertical Listening Window</b>	15°
<b>Recommended Listening Distance</b>	8 feet [2.5m] or more
<b>Recommended Connector</b>	ZuB3 via speakON 8-pole [ZuB3 convention single channel] Zu cable featuring ZuB3 cable technology recommended
<b>Accepted Connectors Via Adapter</b>	1/4" fork spade [6.3mm], oversized 5/16" [8mm] fork spade, bare wire (banana plugs in a pinch)
<b>Internal Cabling</b>	ZuEventB3/Def4-A
<b>Conventional Solid-State Or Tube Amp Power Recommendations</b>	1 - 4 watt (average room, moderate volume) 4 - 16 watt (large room, loud listening) 16 - 64 watt (large room, concert levels) 500 watt (maximum input power)
<b>Amplification Considerations</b>	Definition Mk.IV is designed around conventional or parallel mode amps, bridged amplifiers are not recommended (black speaker negative leg [sp-] of bridged amps will see the virtual ground node of the internal bass amp)
<b>Component Tolerance</b>	drivers 0.05% pair matching, 0.01% on electrical components
<b>Tweeter Detail</b>	1x Radian 850 based dynamic tweeter // bandwidth: 12k - 20kHz (high-pass bessel @ 18kHz)
<b>High-Pass Detail</b>	1st order bessel @ 18kHz (12kHz acoustical) Mundorf Silver/Oil 1uF + Mills 10Ω 12.5W Rs + 10Ω 12.5W Rp
<b>Full-range Driver Array Detail</b>	2x Zu103/ND/G1-16 nanotech full-range driver // bandwidth: 30 - 12kHz (direct and unfiltered)
<b>Subwoofer System Detail</b>	1x Eminence LAB-12 based subwoofer, sealed // bandwidth: 12 - 80Hz (user adjustable, actively filtered)
<b>Subwoofer Amp Type</b>	internal Hypex UcD 400-V5 based, high energy toroidal transformer
<b>Subwoofer Amp Input Power</b>	115V (8A max) or 230V (4A max), 50/60Hz (transformer voltage rewire possible, inside case work) 8 watts @ idle
<b>Subwoofer Amp Chassis</b>	machined aluminum case work, rack style fitment allowing in the field service / replacement
<b>Subwoofer Amp User Adjustments</b>	Volume // Low-pass Filter Knee // Parametric EQ Gain // Parametric EQ Frequency // Phase
<b>Cabinet Spike / Feet Insert Thread</b>	composite wood plate core; hardwood, aluminum and steel superstructure and stressed members 3/8-16 TPI, 9/16" hex nut, 14mm wrench can be used
<b>Included With Loudspeaker</b>	4x hard press-on full-range driver covers, installed 8x hard surface stainless ball-end feet / 8x stainless 9/16" [14mm] jam nuts, installed 8x long carpet spikes, 1x connector cleaning kit, 1x finish cleaning cloth, 1x owners manual
<b>Loudspeaker Options</b>	ZuB3 via speakON 8-pole to Cardas patented binding posts, allowing any cable to be used, grille, custom finish work
<b>Life Expectancy</b>	100 years; cabinet, and drivers, including the Zu 10" drivers; even in direct sunlight
<b>Manufacturers Country Of Origin</b>	U.S.A. all parts and labor excluding a few components. Hypex amp modules are made in the Netherlands
<b>Compliances of Directives</b>	60065   EMC 2004/108/EC   2006/95/EC   55103   RoHS   CE   WEEE   Class-2 subwoofer amplifier
<b>Warranty &amp; Service</b>	5 years limited on cabinet and drivers; 2 years limited on subwoofer amplification—warranty does not cover misuse, abuse, components upstream from the loudspeaker system, modifications or non-factory service.

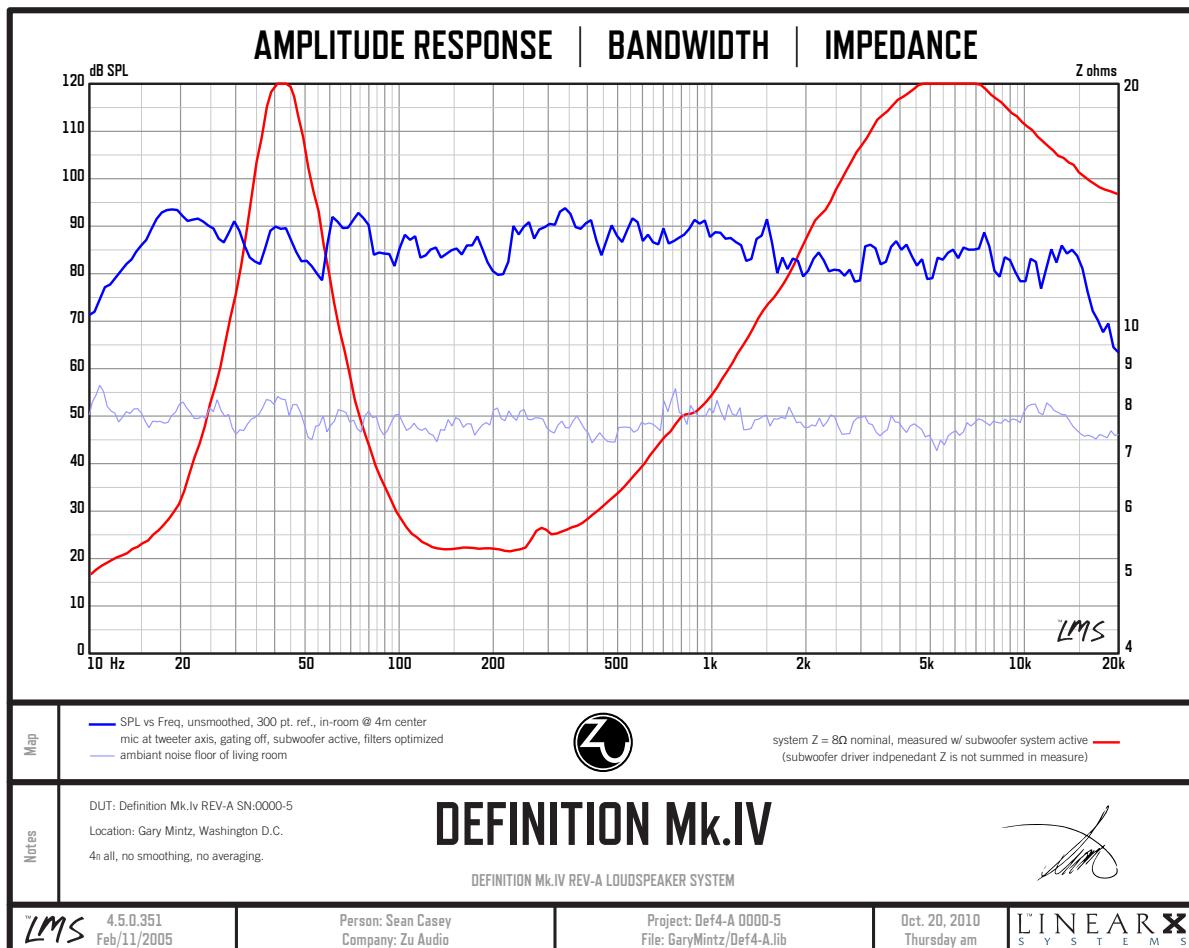


# DEFINITION MK.IV SPECIFICATIONS

## ZU AUDIO DEFINITION MK.IV [REV-A] LOUDSPEAKER SYSTEM SPECIFICATIONS + INFORMATION

<b>Subwoofer Amplifier</b>	Definition Mk.IV features a built-in subwoofer audio amplifier. It is a no compromise, state-of-the-art actively filtered subwoofer amplifier that is integrated into the Definition Mk.IV loudspeaker cabinet, visible on the rear of the loudspeaker.
<b>Subwoofer Amp Type</b>	Class D analog switching amp with heavy-duty traditional power supply. Amplifier module is Hypex DS4 UcD 400-V5.
<b>WARNINGS</b>	RISK OF ELECTRIC SHOCK—THERE ARE NO USER SERVICEABLE OR ADJUSTABLE COMPONENTS INSIDE. Dangerous voltages are present inside case during operation. DC output voltage is 50 volts up and down, 100V DC total. Also know that the case is sealed and requires technical knowledge to open and should only be serviced by a qualified technician. System is not intended for outdoor use, do not expose to rain or moisture.
<b>RECOMMENDATIONS</b>	We recommended unplugging your loudspeakers, main amplifier(s) and other regarded electronics during lightning storms or when the playback system will not be used or for an extended period of time.
<b>Safety Classification</b>	Class-2, transformer is also a class-2 double wound isolation toroidal transformer that is switched and fused.
<b>Safety Standards &amp; Compliance</b>	60065   EMC 2004/108/EC   2006/95/EC   55103   RoHS   CE   WEEE   Class-2 subwoofer amplifier
<b>Mains AC Power</b>	50/60Hz, 115 or 230 volt (transformer is 115/230V wound and factory wired for your region).
<b>Mains AC Connection</b>	C13/C14
<b>User Serviceable Fuse</b>	115V AC mains = 8A   230V AC mains = 4A  Should the fuse blow replace it with an equivalent part. A spare fuse is located within the fuse holder, located just below the power inlet and only accessible when the power cable is not plugged into the inlet. A small flat blade screwdriver is required.
<b>Power Consumption</b>	600 watt maximum // 8 watt idle
<b>Damping Factor</b>	500
<b>Self Protection</b>	output short-circuit
<b>Input Impedance</b>	500Ω
<b>Speaker Level</b>	12Hz // 24dB/octave butterworth
<b>Infrasonic Filter</b>	
<b>Adjustable Gain</b>	-110dB – 0dB
<b>Adjustable High-Pass Filter</b>	20 – 120Hz
<b>High-Pass Filter Slope &amp; Character</b>	18dB/octave linkwitz-riley
<b>PEQ Boost</b>	0 – +6dB
<b>PEQ Boost Bandwidth</b>	1/2 octave
<b>PEQ Frequency</b>	20 – 50Hz
<b>Phase</b>	0 – 180° // 180° – 360°
<b>NO BRIDGED MAIN AMPLIFIERS</b>	Definition Mk.IV presents a virtual ground node to the external main amplifiers' speaker negative (SP-) output. Bridged amplifiers will see this as a short and self protect. Do not use bridged amps to drive Definition Mk.IV loudspeakers. Standard amp types will see an easy 8 ohm load. If main amp does not say BRIDGED there's nothing to worry about.
<b>Warranty &amp; Service</b>	2-year limited. Zu recommends factory service. Removing the amplifier from loudspeaker is simple and will not expose the user to danger. Loudspeaker may still be operated without amplifier installed, and with satisfactory results. Though Zu and Hypex have designed the electronics to the highest standards of fidelity and durability, shit still happens. In the event that service is required, Zu offers an amplifier exchange program so you can quickly get your system back up and running quickly and with minimal hassle.

# DEFINITION MK.IV TESTS & MEASURES



# DEFINITION MK.IV CE CONFORMITY

## DECLARATION OF CONFORMITY

CE DIRECTIVES: 2004/108/EC | 2006/95/EC | 2002/95/EC

Zu Cable Inc. DBA Zu Audio  
Ogden Commercial Industrial Park  
3350 S. 1500 W. Ogden, Utah 84401  
USA

PRODUCT: Audio amplifier Class D

MODEL: Definition Mk.IV [rev-A] active / integrated loudspeaker subwoofer amplifier  
Serial Number 0001—

The undersigned hereby declares, on behalf of Zu Audio of Ogden, Utah, that the above-referenced product, to which this declaration relates, is in conformity with the provisions of:

- 1) Directive 2004/108/EC on Electromagnetic Compatibility (89/336/EEC)
- 2) Directive 2006/95/EC on Low Voltage Equipment Safety (73/23/EWG)
- 3) Directive 2002/95/EC on hazardous materials, RoHS, and WEEE

The Technical Construction File required by this Directive is maintained at the corporate headquarters of Zu Audio at 3350 S. 1500 W. Ogden, Utah 84401 USA.



Sean Casey  
CEO

Dated: EUROPEAN DECLARATION OF CONFORMITY

We, Zu Audio Inc. at 3350 S. 1500 W. Ogden, Ut 84401 USA Office Telephone: 801-627-1040, declare under our sole responsibility that the product

'Definition Mk.IV [rev-A] active / integrated loudspeaker subwoofer amplifier'  
Class D audio amplifier  
Serial No. 0001—

to which this declaration relates is in conformity with the following standard(s) or other normative document(s)

# DEFINITION MK.IV CE CONFORMITY

## DECLARATION OF CONFORMITY

We, Zu Audio Inc. at 3350 S. 1500 W. Ogden, Ut 84401 USA Office Telephone: 801-627-1040, declare under our sole responsibility that the product

'Definition Mk.IV Subwoofer Amplifier'  
Class D audio amplifier  
Serial No. 0001—

to which this declaration relates is in conformity with the following standards or other normative documents.

- 1) Council Directive 2004/108/EC (December 15, 2004) on Electromagnetic Compatibility
- 2) Council Directive 2006/95/EC (December 12, 2006) on Low Voltage Equipment Safety;

The Technical Construction File is maintained at the corporate headquarters of Zu Audio Inc. at 3350 S. 1500 W. Ogden, Ut 84401 USA.

The authorized representative located within the Community is:

Simon Matanle (Director Sales & Mktg, Zu Audio), 12 Vernon Terrace, Brighton, BN1 3JG, UK.  
Tel +44 (0) 1273 700759

Date of issue: 2011/12/17

(Signature of authorized person)



Sean Casey  
CEO

# DEFINITION MK.IV OWNERS' MANUAL



# DEFINITION MK.IV OWNERS' MANUAL



# DEFINITION MK.IV WARRANTY

Zu products are designed and manufactured to the highest quality. However, if something does go wrong Zu will fix or replace the product free of charge. Zu Definition Mk.IV loudspeakers have a five year limited warranty from date of purchase to original owner on the loudspeaker and a two year limited warranty on the subwoofer amplifier. If under normal home use you have any problems with drivers, cable, parts, cabinet, we will fix or replace the product. Loudspeaker warranty and service can usually be performed by the user, also known as DIY service, in such cases Zu will provide full technical support. This provides faster repair of product (reducing down time is always good), minimizes handling hassle and damage potential to both Zu and you, and reduces shipping costs.

Zu loudspeaker finish warranty covers color changes in paint, finish checking, and oxidizing. Wood finishes are not guaranteed against fading and you should keep them out of direct sunlight, just like a piano. While every effort is made to ensure a perfect finish that will last a lifetime, this warranty does not cover damage from impact and abrasion, or seam / core construction visibilities in extreme high temperature / high humidity environments. Zu products are designed to be used in temperature and humidity controlled environments, namely your home or office unless otherwise stated. Warranty does not cover loudspeaker finish damage caused by the extremes of an uncontrolled environment.

If in the highly unlikely event that a Zu product arrives to you dead on arrival (D.O.A.), and after discussing it with a Zu tech, we will ship another of the same product at our expense and arrange for the D.O.A. product to be collected. If after inspection we find that you have misrepresented a returned product's condition, and that it was improperly handled or used, Zu will charge you for all damaged parts, labor, shipping and handling of the product.

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 by anyone other than a Zu representative. Cosmetic damage is also excluded from warranty, as is all product that has any part of the Zu serial number removed.

When a product or part is exchanged the replacement becomes your property 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.

## WHAT YOU CAN EXPECT IF WARRANTY SERVICE IS NEEDED

If warranty becomes necessary, you must call or email for a return of material authorization (R.M.A.) number, or to arrange for user serviceable parts. This provides opportunity to assist in diagnosing the problem and helps us to schedule for rapid turnaround in the event that parts, service or repair is needed. Upon factory inspection of parts or product, warranty eligibility will be determined. While service options, parts availability and response times will vary, we do our best to keep you happy. International customers should know that Zu will comply with all applicable export / import laws and regulations, you may be responsible for custom duties, taxes, broker fees, freight, and other charges. When shipping of product or part is required, repack the complete product, or part, in its original packaging. If you have any 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 we have the product back in the shop and sign-off that it is eligible, the product is still your property, we recommend you insure or declare the full value when shipping. We also recommend that you only ship with a freight company that has a good reputation and offers tracking and insurance for the full amount.



**ZU AUDIO**

Ogden Commercial Industrial Park  
3350 S. 1500 W.  
OGDEN, UTAH — U.S.A.

[DESIGNED AND MADE BY US]

**WWW.ZUAUDIO.COM**