Owners Manual For The

Signature SE & Signature XD

Loudspeaker System

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Owners Record

Thank you for selecting a Legacy Loudspeaker System. These handcrafted instruments will provide you with many years of listening enjoyment.

The serial number is located on the rear of the unit. Record this number in the space provided below. Refer to this when calling your dealer regarding this product.

Model: Signature SE or Signature XD
Serial No: _____
Date of purchase: _____

Register your product at https://legacyaudio.com/register

Share your Legacy speakers with the Legacy community. Post your Legacy experience and system photos at https://facebook.com/LegacyAudio
Like the page to continue receiving the latest Legacy announcements.

The Cabinetry / Our Commitment

Handcrafted
Beneath the surface of Signature's elegant exterior lies rigid MDF construction. Interlocking joinery maximizes the strength of the cabinet parts.

Each cabinet is impeccably finished on all exposed surfaces with select veneers. The exquisite finish is hand-rubbed several times to assure a patina at home with the most elegant decor.

Our Commitment
A great deal of forethought, love and satisfaction is instilled in each piece of Legacy workmanship. We take pride in getting to know many of our customers on a first name basis.

Your purchase of this product is backed by the renowned "Legacy Satisfaction Guarantee".

Warranty

Legacy Audio supports its customers and products with pride. We cheerfully warrant our loud-speaker products we manufacture from defects in materials and workmanship for a period of seven (7) years. Electronic components such as internal amplifiers and digital processors are covered for three (3)years. Please register your product with Legacy Audio. Should you require service Legacy will require a proof of purchase in order to honor the warranty - so please keep your receipt.

- The warranty applies to the original owner and is not transferable.
- The warranty applies to products purchased from an "Authorized Legacy Dealer".
- The warranty on active components such as digital processors or internal amplifiers is limited to three (3) years of coverage.
- The warranty on dealer stock will extend for a maximum of two years from invoice.

The warranty does not cover transportation costs of product to or from the customer, distributor or dealer, or related shipping damage.

Exclusions from Warranty

The following situations or conditions are not covered by the Legacy Audio warranty:

- Accidental damage, electrical abuse or associated equipment failure.
- Use inconsistent with recommended operating instructions and specifications
- Damage caused by modification or unauthorized service
- Costs associated with the removal and reinstallation of defective products. Consequential damage to other products.
- Normal wear such as fading of finishes due to sunlight.

Unpacking Your Speakers

Your new speaker system has been very carefully packaged to insure that it travels to you safely. Each speaker is protected by a double-wall outer carton with heavy V-board corner protectors. Custom fitted foam end caps are used to protect the elegant cabinetry, and a custom bag is included to provide further protection. Please save this packing for future transportation. If cartons become damaged or misplaced, new ones can be purchased from Legacy Audio.

Speaker Placement

To allow more flexibility in seating arrangements, your Legacy loudspeaker is designed for broad lateral coverage. Optimal listener position is actually about 5 to 15 degrees off the axis normal to the loudspeaker baffle. Assuming a listener distance of about ten feet, begin by placing the speakers approximately 7 feet apart and about 1 – 3 feet from the wall behind them. In most rooms this will afford a speaker position at least 2 feet or more from the side walls. The amount of recommended "toe-in" is a function of the listening angle. As the overall listening angle increases from 40 degrees, the amount of toe-in should increase. Your Legacy speaker is optimized for a flat response in the far field. Best results are obtained vertically with the listener's ear at tweeter level with the loudspeakers gently toed in toward the listener. Increasing the degree of toe-in is recommended when placement next to sidewalls is required. Placing the loudspeaker or the listener near a room boundary will generally increase low frequency impact. If you are forced to position one or both of your loudspeakers in a corner, be prepared to reduce bass output via the control switches on the rear terminal plate of each loudspeaker. You may also wish to reduce low frequency output with your preamp's bass tone control.

Hooking Up Cables

The ideal conductor would have negligible resistance, inductance and capacitance. The table below shows how a few actual speaker cables measure up.

Cable	Ωs/ft	pF/ft	μH/ft
12 ga.	0.0033	24	0.21
14 ga.	0.0048	17	0.13
16 ga.	0.0079	16	0.18
18 ga.	0.0128	28	0.21

Capacitance is considered insignificant in each cable because its effect is well out of the audio bandwidth; inductance can be decreased (at the expense of increased capacitance) by keeping the conductor pair closely spaced.

How long would a cable have to be before inductance effects would impinge on the audio spectrum? Approximately 300 feet of 12 gauge would be required to establish a corner frequency of 20 kHz with an 8 Ohm loudspeaker. As you see, inductance is not a problem for most of us.

Hooking Up Cables

What about phase shift due to frequency dependent travel times down the speaker cable? Measurements show that 100 Hz waves will be delayed about 20 billionths of a second behind 10 kHz waves when traveling to the end of a 10 foot speaker cable. Since the cilia of the ear requires 25,000 times longer than this just to transmit phase information, phase shifting is obviously not the primary concern when considering speaker cables.

What about resistance? Finally we are getting somewhere. Resistance is the controlling factor of the amplifier/loudspeaker interface. Excessive resistance can cause major shifts of speaker crossover frequencies. The lower the impedance of the loudspeaker, the greater the effects of series resistance. A 20 foot run of 18 gauge cable can cause up to 10% deviations of crossover center frequencies. That same 20 feet can un-damp your damping factor and reduce your systems' output by one half decibel.

In summary, there are no perfect cables. The best way to approximate the ideal would be to keep loudspeaker leads as short as is practical.

Amplification

Ideally the loudspeaker would be among the first components selected when assembling a playback system. This would allow the user to choose an amplifier capable of delivering adequate amounts of current into the frequency dependent load presented by the loudspeaker. However, when upgrading a system, audiophiles may find themselves matching their new loudspeakers to their existing amplification. For this reason, extensive measures have been taken to ensure that each Legacy speaker system represents a smooth, non-reactive load to virtually any amplifier.

Often there is much confusion regarding amplification and loudness levels. It should be understood that the role of the amplifier goes beyond that of driving loudspeakers to a given sound pressure level. The amplifier should be able to CONTROL the loudspeakers across the entire music spectrum. This means that parameters such as damping factor (values greater than 60 are acceptable) and dynamic headroom should not be overlooked when comparing amplifiers.

Amplification

How much power will your new speakers need? That ultimately depends on your listening environment and musical tastes. As little as five watts per channel should drive them to a level satisfactory for background music. A typical 45 watt per channel receiver may fill a room with the compressed mid-band energy of "heavy metal," but seem to lack weight or control with classical recordings. Some audiophiles feel that 200 watts per channel is the bare minimum to avoid audible clipping distortion when reproducing music at "live" playback levels. Your Legacy speakers are designed to take advantage of "high-powered" amplifiers, so don't be afraid to put them through their paces.

How much is too much power? Rarely is a drive unit damaged by large doses of music power. More often than not the villain is amplifier clipping distortion. Even through decades of refinement, loudspeakers are still notoriously inefficient transducers, requiring huge amounts of power to recreate the impact of the live performance. Typically less than 1% of electrical power is converted into acoustic output. (For example, an omnidirectional transducer with an anechoic sensitivity of 90 dB @ 1w/1m has a full space efficiency of only 0.63%)

Amplification

When an amplifier is unable to fulfill your loudspeakers demands, a damaging harmonic spike may be leaked to the high frequency drivers.

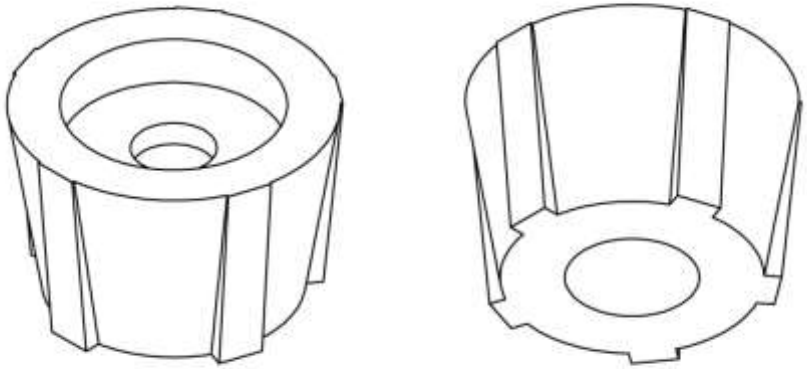
Another important point regarding loudness is that the dB scale is a logarithmic one. This means that a 150 Watt amplifier will potentially sound only twice as loud as a 15 Watt amplifier. If all of this discussion of power and loudness seems a bit abstract, consider the example below.

The average acoustical power developed by a person speaking in a conversational tone corresponds to a mere 0.00001 Watts. The power that would be developed by the entire population of the city of New York speaking at once would barely illuminate a single 100 Watt light bulb.

Installed Feet

Your speakers will come with threaded adapters and rubber cone feet installed.

Should you wish to purchase after-market products, the thread size specification for your vendor is M12, 1.25mm.



Signature SE Speaker Connections

The Terminal Plate

At the rear of each of your Signature SE loudspeakers you will find two rows of jumpered binding posts.

The positive (+) terminal of the amplifier should be connected to the positive terminal of the loudspeaker. The negative (-) terminal of the amplifier should be connected to the negative terminal of the loudspeaker.

When driving Signature SE with a single channel of amplification, you may use either set of jumpered binding posts. When bi-wiring or bi-amping, remove the jumper strips completely.

Dual banana plugs or gold plated spade lugs are recommended means of termination. Be sure you observe polarity when making the connections.

Fine Tuning

To facilitate proper set-up of your speakers in a variety of room situations, we have included several heavy duty toggle switches on the terminal plate, located on the back of the loudspeaker. All switches in the "up" position represent the "anechoic flat" position.

TREBLE Trim: - Nominally flat in the up position
- Negative 2dB at 10 kHz in the down position (shelving for brighter rooms)

BASS Trim: - Nominally flat in the up position
- Negative 2dB at 60 Hz in the down position (also raises impedance for budget receivers)

Speaker Connections

Biwiring

Biwiring allows one to minimize the cable losses between the amplifier and the loudspeaker. This is accomplished with a single stereo amplifier by running separate sets of cables to the satellite section and the subwoofer section from the same channel of amplification. When biwiring, we recommend the use of gold spade lugs or dual banana plugs. This can make the task much easier and safer than bare wire connections. Again, the major reasons for biwiring over conventional wiring are greater power transfer (improved efficiency) and tighter control over the drivers (better damping).

Passive Biamping

This option can yield even better results than biwiring due to broader distribution of power requirements. Passive biamplification allows low frequency current to be routed to a separate channel of amplification, reducing strain on the satellite amplifier and preventing subwoofer back-EMF from modulating with the upper frequencies. There are two types of passive biamplification; Vertical biamping (which requires two identical stereo amplifiers or four monoblocks) and Horizontal biamping (which does not require identical amplifiers).

Speaker Connections

1. **Vertical Bi-amping**

Vertical bi-amplification requires the dedication of a single stereo amplifier for the left speaker, and another stereo amplifier for the right speaker. This configuration improves channel separation and can improve imaging slightly. If you preamp does not have two sets of left/right outputs, you will need a pair of Y-adapters or a signal splitter, such as a dual amp balances, which will also allow adjustment of subwoofer/satellite input levels.

2. **Horizontal Bi-amping**

Any two stereo amplifiers may be utilized in horizontal bi-amplification. Many audiophiles prefer the "sweetness" of tubes on the satellite portion of the loudspeaker while favoring the "control and weight" of solid state amplifiers on the subwoofer section. Differences in the input sensitivities of different model bass and treble amplifiers may be overcome by using Wavelet II, or this amp balancer, available from Legacy.

This unit allows balancing of the bass section against the treble section. It's also a good idea to check the owner's manuals to establish if the amplifiers are inverting or non-inverting. If the two amplifiers are of opposite polarity, then you should reverse the polarity at the inputs of either the subwoofer or satellite binding posts. NOTE: This only applies to loudspeakers that incorporate the subwoofer and satellite section in a single enclosure. It does not apply towards the separate powered subwoofer/satellite configuration. You must always observe the polarity when connecting the speaker wire to a powered subwoofer.

Speaker Connections

Maximize Performance

The Signature loudspeaker may also benefit from active bi-amplification and the virtues of DSP room correction. Adding the Legacy Wavelet II processor can extend bass response, prevent excursion overload, and avoid room resonances.

The versatile Wavelet II processor can also integrate a subwoofer or stereo pair of subwoofers with the Signature. Please contact our technical staff with any questions you may have.

Signature XD Enhances Versatility Adding 650 Watts

The Legacy Signature is now available in both the standard "SE" version and the new powered "XD" version. Be careful to understand the Signature XD is not a replacement for Signature SE, but a more versatile internally amplified version, facilitating both passive and active bi-amplification. The fully passive Signature SE will continue to hold its position in the Legacy line-up. The new Signature XD version includes a high quality internal 650 watt amplifier which provides some unique performance options:

- Use this internal ICEpower amp with its 30 amp peak current capability to drive the entire speaker full range via the passive internal crossover. Merely a source and a preamplifier are required to drive Signature XD to breathtaking levels. This is a common configuration for studios and those with DAC/Preamps.

- Allocate the internal amp's 650 watts entirely to the bass section, while driving the upper section with your external amplifier. This method of passive bi-amplification minimizes current demands from the upper range amplifier and reduces the presence of back EMF from the woofers. Your amplifier will work less hard and the speaker will sound more effortless.

- Utilize an external crossover such as the Legacy Wavelet II or Wavelaunch processors. Link the woofer directly to the internal amp, eliminating the passive crossover from the path. This improves coupling with the woofers and increases drive efficiency by nearly 30%. Both the Wavelet II and Wavelaunch processors are presently available with customized settings for the Signature XD.

Signature XD Rear Panel

Connections:
Before configuring the Signature XD and making cable connections, be sure both the internal amplifiers and any external amplifiers are powered completely off.

Disconnect from AC outlet if uncertain.

Configuration: Full Range Powered

The internal amplifier will power the entire loudspeaker.

1. Set the rocker switch of SIGNATURE XD in the downward position.
2. Connect the female end (with 3 holes) of a balanced XLR cable to your Preamplifier's LEFT channel balanced output. Be sure it is pressed in fully
4. Connect the male end (with 3 pins) on the same cable to the BALANCED INPUT receptacle on the rear panel of the Left SIGNATURE XD rear panel.
5. Connect the female end of a balanced XLR cable to your Preamplifier's RIGHT channel balanced output.
6. Connect the male end of the same cable to the BALANCED INPUT receptacle on the rear panel of the RIGHT SIGNATURE XD rear panel.
7. Turn on your preamplifier, leaving it in a mute mode, or without source playing.
8. Connect the provided power cord into rear AC receptacle of both SIGNATURE XD,
9. Connect the other end of the power cords into a household AC receptacle (100-240 VAC, 50-60Hz) or power center.
10. Flip the rectangular rocker switch on the rear AC socket, PUSHING IN "I" to turn-on power to each speaker.
11. Activate the music source taking your preamp out of mute mode, raising the volume slowly to verify all connections.

Configuration: Bi-Amplification with Internal Passive Crossover

The internal amplifier will power the bass section and your external amplifier will be driving the upper range.

1. Set the top rocker switch of each SIGNATURE XD in the upward position.
2. Connect the female end (with 3 holes) of a balanced XLR cable to your Preamplifier's LEFT channel balanced output. Be sure it is pressed in fully. You may require a signal splitter (balanced Y-adapter, available from Legacy Audio) if you do not have dual outputs on your preamplifier.
4. Connect the male end (with 3 pins) of the same cable to the BALANCED INPUT receptacle on the rear panel of the Left SIGNATURE XD rear panel. Be sure it is pressed in fully.
5. Connect another cable from the same Preamplifier output (or Y-adapter) to the LEFT input of your external amplifier.
6. Connect the female end of a balanced XLR cable to your Preamplifier's RIGHT channel balanced output.
7. Connect the male end (with 3 pins) of the same cable to the BALANCED INPUT receptacle on the rear panel of the RIGHT SIGNATURE XD rear panel.
8. Connect another cable from the same Preamplifier output (or Y-adapter) to the RIGHT input of your external amplifier.
9. Connect the speaker cables from your external power amplifier's LEFT channel output to the LEFT SIGNATURE XD binding posts. The red post is positive and the black post is negative.
10. Connect the speaker cables from your external power amplifier's RIGHT channel output to the RIGHT SIGNATURE XD binding posts.
11. Turn on your preamplifier, leaving it in a mute mode, or without source playing.
12. Connect the provided power cord into rear AC receptacle of both SIGNATURE XD.
13. Connect the other end of the power cords into a household AC receptacle (100-240 VAC, 50-60Hz) or power center.
14. Flip the rectangular rocker switch on the rear AC socket, PUSHING IN "I" to turn-on power to each speaker.
15. Power on your external amplifier.
16. Activate the music source taking your preamp out of mute mode, initially raising the volume slowly to verify all connections.

Signature XD Bi-Amp Connections

Designer's Notes (From Bill Dudleston)

My goal with the Signature design was to provide a high level of musical accuracy while providing solid dynamics and extended frequency range - all in a footprint of one square foot or less. The 10" woofers were paired to reduce distortion while the sealed alignment couples to the floor boundary to further enhance extension.

Signature benefits from Legacy's recently developed 7" graphene filled carbon fiber midrange with massive magnetic structure, computer optimized copper phase-plug and shorting ring. The 7" midrange driver is mounted in a separate enclosure and filled with polyester fiber to reduce and dampen internal reflection. The cabinet walls are 1" thick to provide a rigid structure with adequate mass.

The ribbon drivers are the very same used in the Legacy Focus (positioned at exactly the same listener height as the Focus) and employ planar and folded diaphragms suspended in high magnetic force field provided by neodymium. The speaker is bi-amp capable by removing copper straps on the rear terminal plate. Switches are included to shunt 2 dB of treble and reject room emphasis in the 65-90 Hz range. Voicing has been accomplished very carefully to assure accuracy, and each pair is individually tuned before leaving the Springfield, Illinois factory.

Signature XD affords additional flexibility in amplifier configuration and room placement. The powerful 650 watts of internal amplification assures bass weight and heft. Drive the speaker system full range with its internal amplifier or divide the crossover network with the flip of a switch, allowing the upper section to be driven with an external amplifier of your choice.

Additional Notes for Signature SE Users

Owners of the Signature SE standard design (all passive crossovers without internal amplifier) have no need to feel left behind. You may upgrade to XD level performance a number of ways:

• Passively bi-amp by adding a Legacy Powerbloc2 or iV2 to the bass section of each Signature SE, while driving the upper section with your external amplifier. This method of passive bi-amplification minimizes current requirements from the upper range amplifier and reduces the presence of back EMF from the woofers.
Your amplifier will work less hard and the speaker will sound more effortless.

• OR power both top and bottom with the four channel Legacy Powerbloc4 or iV4. This assures perfect level matching to the upper and lower range.

Continuing the Pursuit of Perfection

(Legacy Air Motion Ribbons)

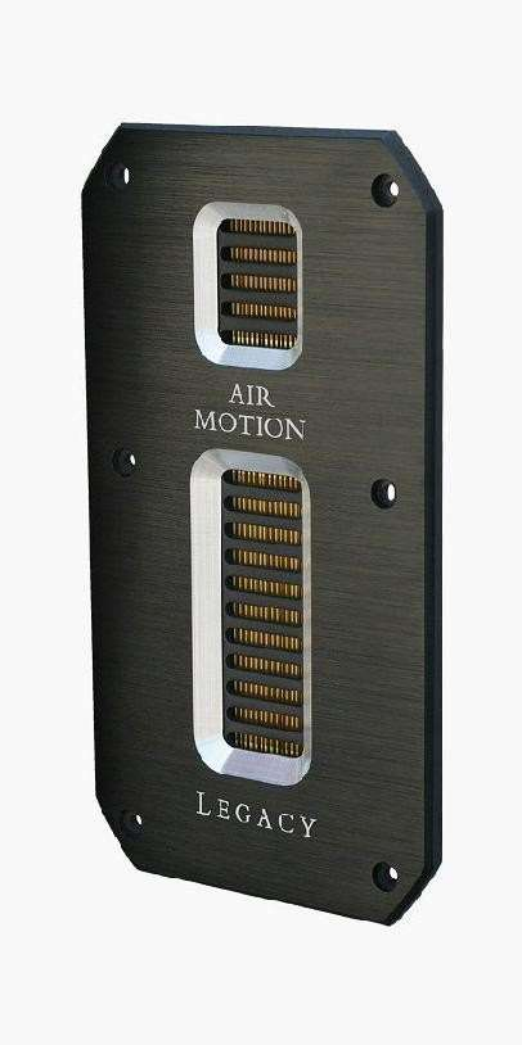
LEGACY Audio has been benefiting from low mass ribbon and leaf drivers since 1984. I have a collection of ribbon tweeters from the world over and always loved the way good ribbons reproduced the swishing sound of brushes on a snare- and the simple honesty in the reproduction of strings without imparting an edgy ringing effect found in most tweeters. There's just something right about the sound – like a C12 mic capsule. If one could increase the dynamics to natural levels and extend the range of ribbons without beaming undesirably, the benefit would be considerable musically.

I have always been a proponent of low mass, high acceleration drive elements. The acceleration capability of the drivers ultimately determines the transient or waveform tracing capability of the loudspeaker. To build a better speaker, one MUST first acknowledge that loudspeakers are dreadfully slow by nature. Their responsiveness lags the electrical waveforms settling time *by orders of magnitude* (Logically so, if one contrasts the mass of an electron to the mass of a speaker diaphragm.).

Typical of transducers (devices that convert one form of energy to another), speakers are also *extremely* inefficient -wasting more than 98% of their input power in the form of heat and out of phase motion.

For these two reasons I have been working with speaker driver motors with magnetic field strengths as high as 2 Tesla (60,000 times the field strength of our planet Earth) to overcome these limitations. With such field strength, greater levels of articulation are possible at the lower limits of a transducer. For example, the reproduction of a simple strike of a heavy anvil will reveal tones that are richer, darker and more complex than otherwise possible.

In 2006 Legacy Audio introduced our first air motion transducer; a modernized version of the AMT tweeter developed by Oskar Heil in the 1970s. Legacy's first version utilizes a folded Kapton (not mylar) diaphragm and R45 neodymium wafers instead of ceramic magnets. The result was higher efficiency and greater power handling. This translated to significant gains in dynamic range and reduced distortion. We soon adapted an existing 4" planar ribbon (the one with the round faceplate) to work in conjunction with this tweeter to facilitate the voicing of the hand-off to our 7" driver.



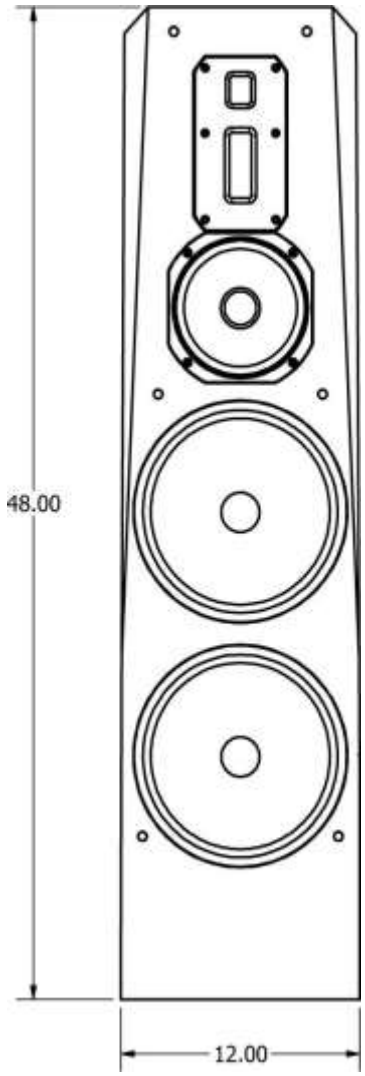
Continuing the Pursuit of Perfection
(Legacy Air Motion Ribbons)

The recent Aeris loudspeaker development gave me the opportunity to tool a new AMT folded ribbon tweeter to integrate with the smoothest high efficiency 8" midrange built to date. I have yet to find a driver to challenge it. This silky 8" mid has a range of 7 octaves with nary a wrinkle in the response, yet a sensitivity of 98 dB. My initiative of providing a 4" AMT that could compliment these capabilities was met with the challenge of accordion-folding sixteen square inches of Kapton into the 4" long, 1" wide chamber. Neodymium again was employed to provide the flux density required. But the solution was made even more elegant by mounting the new 4" ribbon on the same faceplate as its complementary 1" AMT ribbon super-tweeter. The results were more uniform dispersion and tremendous attack. Treble now had *weigh*t instead of tizz. A natural fullness in the treble is exhibited that reminds us why we love high-end audio so much. The effortless way it forcefully squeezes out acoustic energy is readily verified by placing ones hand over the driver faceplate and feeling the suction against your palm (nope, you won't hurt it). These new drivers may be refined, but are equally rugged.

I am fortunate to have chosen loudspeaker development as my life's work. It has utilized my chemical engineering, physics and mathematics background almost daily. It has offered moments of both humility and glory, but most gratifying is the reward of continual, stair-stepped successes even after 30 years. I sense that this is a never ending staircase to be followed for generations as we asymptotically approach unattainable perfection.

Bill Dudleston, Chief Designer, Founder of Legacy Audio

Specifications



System Type:	5 drivers, 4 way
Tweeter:	Dual Air Motion Tweeter System - 1" AMT super tweeter, silver HF wire
Midrange:	Dual Air Motion Tweeter System -4" AMT tweeter
Midwoofer:	7″ Graphene filled carbon fiber cone with cast frame
Woofer:	2 x 10" spun aluminum diaphragm, rubber surround, long throw suspension with cast frame
Low Frequency Alignment:	Sealed, Adjustable Damping
Frequency Response:	22Hz – 30 kHz
Inputs:	SE: 2 pair binding posts XD: 1 pr binding post for upper, 1 Balanced XLR for full range or bass
Impedance:	4 Ohms, XD: 10k amp input
Sensitivity:	92.0 dB
Amplification:	SE: 20 watts or greater external recommended XD: 650 Watts ICEpower internal, 10 watts min. Recommended for bi-amping upper range
Crossover Frequency:	180, 2.8K, 8K
Dimensions (H x W x D):	48″ X 12″ X 13.75″
Weight:	SE: 106 lbs, XD: 110 lbs

CE Declaration of Conformity

Legacy Audio
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Springfield, IL 62702 USA
800-283-4644
States that this product is in conformity with the essential requirements and other relevant provisions of:
Low Voltage Directive 2006/95/EC
EMC Directive 2004/108/EC

CE

All information contained in this manual is accurate to the best of our knowledge at the time of publication. In keeping with our policy of ongoing product improvement, we reserve the right to make changes to the design and features of our products without prior notice.

WEEE Compliance

Product Disposal—
Certain international, national and/or local laws and/or regulations may apply regarding the disposal of this product. For further detailed information, please contact the retailer where you purchased this product or the Legacy Audio Distributor in your country. A listing of Legacy Audio Distributors can be found on the Legacy Audio website www.legacyaudio.com
or by contacting Legacy Audio at: 3023 E. Sangamon Ave., Springfield, IL 62702, USA—Phone: +1 217 544-3178.

Notes:

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