



Owners Manual For The
Signature SE
Loudspeaker System



Table of Contents

Registration	Page
Owners Record	3
The Cabinetry / Our Commitment	4
Warranty	5
Setup	
Unpacking Your Speakers	6
Speaker Installation	7
Hooking Up Cables	8-9
Amplification	10-12
Foot Installation	13-16
Speaker Connections	17-21
Fine Tuning	22
Technology	
Designer's Notes	23
Continuing the Pursuit of Perfection	24-25
Specifications	26

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

Serial No: _____

Date of purchase: _____

Register your product at www.legacyaudio.com/register

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

The Cabinetry / Our Commitment

Handcrafted

Beneath the surface of Signature SE'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	Ω s/ft	pF/ft	μ H/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 onehalf 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.

Foot Installation



Step 1-

Carefully place your speakers on their sides



Step 2 -

Locate the cone feet set. It will be inside the foam pieces that held the speaker in the box.

Foot Installation



Step 3-

Place the insert adapter into the rubber cone.



Step 4 -

Thread the cone insert into the cabinet.

Foot Installation



Step 5-

Tighten the cone insert. If you do not want the spikes, you may stop here.



Step 6 -

Place the leveling washer onto the cone.

Foot Installation



Step 7-

Install the washer and cone onto the speaker. Adjust the cone until your speaker is level.

Foot Set Specifications

M12, 1.25mm thread size

Speaker Connections

The Terminal Plate

At the rear of each of your loudspeakers you will find a terminal plate housing two rows of jumpered binding posts. The upper row is the input to the "satellite" portion of the speaker. The lower row is the input to the "subwoofer" portion of the speaker. When left in place, the factory installed jumper bars allow the speaker to be driven with a single channel of amplification. (If biamping, or biwiring, be sure to remove the jumper bars.)



Connect each channel of your amplifier to a loudspeaker via the five-way gold binding posts provided. Dual banana plugs or gold plated spade lugs are recommended means of termination. Be sure that you observe polarity when making the connections. 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.

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 MonoBlocs) and Horizontal biamping (which does not require identical amplifiers).

Speaker Connections

1. Vertical Biamping

Vertical biamplification 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 your 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 balancer, which will also allow adjustment of subwoofer/satellite input levels.

2. Horizontal Biamping

Any two stereo amplifiers may be utilized in horizontal biamplification. 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. The biggest drawback of such a marriage of amplification is that the two amplifiers may have different input sensitivities or output polarities. Differences in the input sensitivities may be overcome by using a dual amp balancer. This unit allows independent balancing of the left subwoofer/satellite ratio and right subwoofer/satellite ratio. 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

Speaker Connections

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.*

Active Biamping

This option requires the utilization of an electronic (powered) external crossover. Active biamplification is the most appealing means of interfacing a subwoofer/satellite system due to the control possibilities offered, but can also be the most costly. An active crossover is inserted between the preamplifier outputs and the inputs of two stereo amplifiers. Vertical or horizontal biamping considerations are also applicable here. A well designed active crossover will offer the user independent high pass / low pass turnover frequencies for optimally blending the satellites with the subwoofer sections of the speaker system. Other features usually found are separate level controls for the high pass or low pass sections and a choice of inverted or non-inverted low frequency outputs (needed when strapping an amplifier to mono).

Speaker Connections

Also helpful is bass equalization and subsonic filtering. When cascading active filters with the existing passive filters within the speaker system, be sure to allow for adequate frequency overlap. For instance, if the passive crossover is set at 500 Hz, select a low pass corner frequency of 600 Hz and a high pass corner frequency of 450 Hz to prevent a suck out in the response at 500 Hz. The controlled distribution of power afforded by the active crossover results in less amplifier strain (better clarity), greater dynamics, and lower intermodulation distortion. However, a basic understanding of crossover slopes and crossover frequencies within your loudspeaker will be needed to implement the active crossover successfully.

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)

Designer's Notes (From Bill Dudleston)

My goal with the Signature SE 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. 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 cast frame 7" driver cone material was pressed from a silver/titanium/graphite composite weave and employs an additional reversion magnetic under the phase plug. The ribbon drivers are the very same used in the Legacy Focus SE (positioned at exactly the same listener height as the Focus SE) and employ planar and folded diaphragms suspended in high magnetic force field provided by neodymium. The speaker is biamp 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.

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 *weight* 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" Silver Graphite, woven diaphragm, cast frame, phase compensation plug
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:	2 pair binding posts
Impedance:	4 Ohms
Sensitivity:	92.0 dB
Recommended Amplification:	20-300 Watts
Crossover Frequency:	180, 2.8K, 8K
Dimensions (H x W x D):	48" X 12" X 13.75"
Weight:	106 pounds

CE Declaration of Conformity

Legacy Audio

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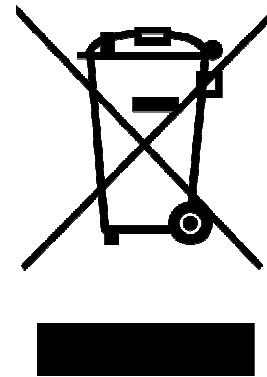
States that this product is in conformity with the with the essential requirements and other relevant provisions of:

Low Voltage Directive 2006/95/EC
EMC Directive 2004/108/EC



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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