

**EMINENT
TECHNOLOGY
INCORPORATED**

LFT VIII

HYBRID LINEAR FIELD TRANSDUCER LOUDSPEAKER



REFERENCE MANUAL

Revised: 7/22/03

Eminent Technology, Inc. 225 East Palmer Street Tallahassee, Florida 32301

Phone: (850) 575-5655 FAX: (850) 224-5999 Email: info@eminent-tech.com

Website: www.eminent-tech.com

Extremely strong magnetic fields are present at and around this loudspeaker. Devices that are adversely affected by high levels of magnetic flux, such as television sets and pacemakers, should be kept at least three feet away from each speaker. Also, keep in mind when any ferrous objects are brought close to the speakers. Hold steel tools securely when setting up and adjusting the LFT-VIII, to prevent a hex key or screwdriver from slipping from your hand and damaging the Mylar diaphragm.

**ATTENTION:
STRONG
MAGNETIC
FIELDS**

TABLE OF CONTENTS

Installation of the LFT-VIII.....	5
Unpacking the Speakers.....	5
Speaker Assembly.....	6
Positioning the Speakers in the Listening Room.....	7
Imaging.....	7
The Tweeter Level Control.....	8
Amplifier Requirements.....	8
Bi-Wiring and Bi-Amping.....	9
Bi-Amping.....	9
Technical Description.....	10
Electrostatic Loudspeakers.....	11
Planar Magnetic Loudspeakers.....	12
Ribbon Loudspeakers.....	13
Evaluating Earlier Approaches.....	14
Electrostatics.....	14
Planar Magnetics.....	14
Ribbons.....	14
The Linear Field Transducer.....	16
Diaphragm Construction.....	16
The Magnet/Frame Structure.....	16
Panel Frequencies.....	18
General Specifications.....	19
LFT-VIII Impedance Curve.....	20
LFT-VIII Impedance Data.....	21
Crossover Information.....	22
Square Wave Performance.....	23
Frequency Response Curve.....	24
LFT-VIII Panel Specifications.....	25
Mid Range Panel Design.....	26
LFT-VIII Woofer Specifications.....	27
Additional Woofer Specifications.....	28

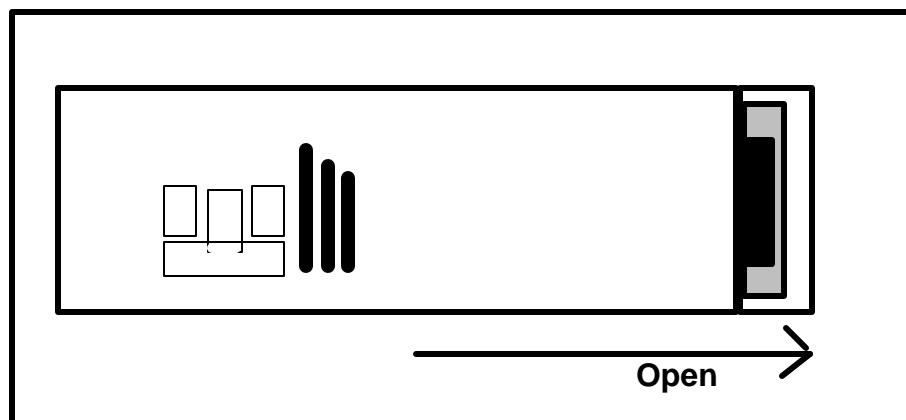
Woofers Design.....	29
Woofers Enclosure	30
Warranty	31
Appendix A – Hex Cam Spacer Installation	33
Appendix B – Tweeter Diaphragm Replacement.....	36

Installation of the LFT-VIII

A complete technical description of the LFT-VIII is included in this manual and begins on page 10. It is recommended that you become familiar with this information because an understanding of the LFT principals will assist you in the proper set up of these loudspeakers.

The LFT-VIII is shipped in 3 boxes. The larger square box contains the two woofer cabinets. The 2 long rectangular boxes contain the panels and grills. To remove the panels position the box on its side and open the end of the shipping carton. Remove the padding from the bottom and slide the speaker from the box as shown below.

Unpacking the Speakers

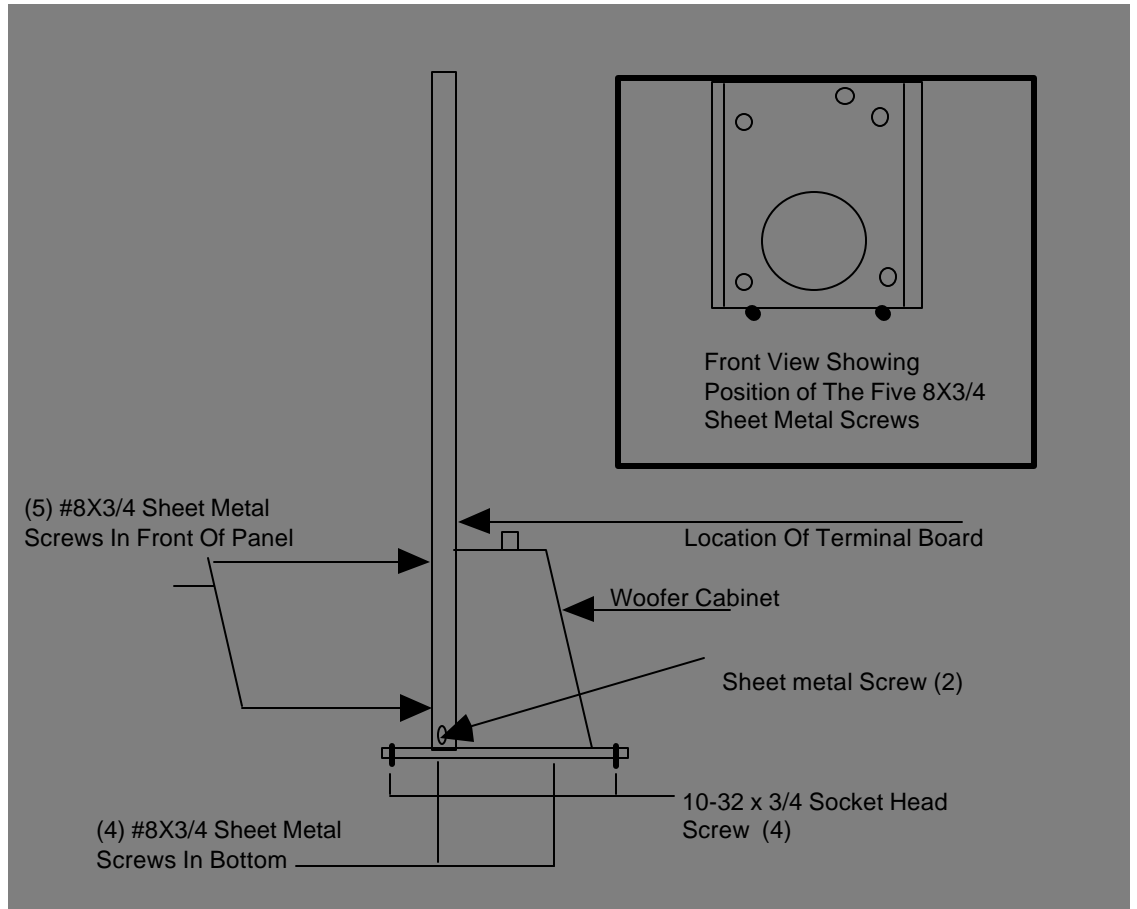


After removing the speaker from its carton it can be leaned against a wall standing up or placed with the front face of the speaker flat on the carpet. Then the bubble wrap should be removed. The wrap also holds the grill cloth (covered by a large cardboard sheet) to the speaker. After the wrap is removed these will separate from the speaker.

Do not attempt to remove or loosen hardware on the drivers themselves. The magnets are held together under great force and personal injury could result.

Speaker Assembly

Assemble the panel to each woofer cabinet as shown below. Fasten the feet to the bottom of the woofer cabinet. Use the drawing below to identify the correct hardware locations. Grill cloths snap into place with Velcro fasteners at each corner on the front and back of the speaker. Bolt the woofer box to the panel as illustrated below. Laying the speaker on its side may be helpful in assembly.



Connections to Mid-Range and Tweeter Panels

After attaching the woofer cabinets to the panels, you must attach the three leads that come out of the mid-range/tweeter panel to the screw barrier terminals on top of the woofer cabinets. The small black wire (18 ga.) that comes from the tweeter panel is secured to on of the terminals marked High, Med or Low on top of the woofer cabinet. The larger diameter wires (12 ga.) will be attached to their respective terminals atop the woofer cabinet, Black to Negative, White to Positive.

Speaker placement is critical for correct imaging, frequency balance, low frequency performance, and efficiency.

The LFT-VIII speakers are a mirror image pair and should be set up with the tweeter panels to the inside.

Low frequency performance in particular can be determined by the shape of the room and the speaker's distance from the wall immediately behind them. Typically, the optimal distance between the LFT's and the rear wall is 1 to 5 feet in an average room.

The overall frequency balance of the LFT-VIII is somewhat affected by the degree to which the speakers are toed in toward the central listening position. The on-axis frequency response of the LFT-VIII is essentially flat, and it is often best to position the speakers so that the main listening position is about on axis with each speaker. Slight mid-range frequency balance changes can be obtained by pointing the speakers slightly away from the listening position. Adjusting the speakers' degree of vertical tilt with the pointed feet can also alter this balance.

Overall imaging depends primarily on the distance separating the two speakers relative to their distance from the preferred listening position; it is also affected by the degree of toe-in. We cannot accurately predict what will work best in your listening room, and can suggest only that you begin with the drawing on the previous page as a starting point or general guideline. Keep in mind that the parameters that affect frequency balance also tend to affect imaging properties, and vice versa, so it is best to adjust speaker placement in small increments and to note carefully all of the changes effected by each shift in position before proceeding further.

The Tweeter Level Control

The high frequency performance of the LFT's can be tailored with the tweeter level control. The high frequency performance of the LFT-VIII is adjusted with the tweeter level control. There are three tweeter level positions: High, Mid and Low. These levels adjust the tweeter output in approximately 3 dB increments. It is best to start with the tweeter level set to Low, position the speakers for the best overall frequency balance, and then decide if more high frequency energy is needed.

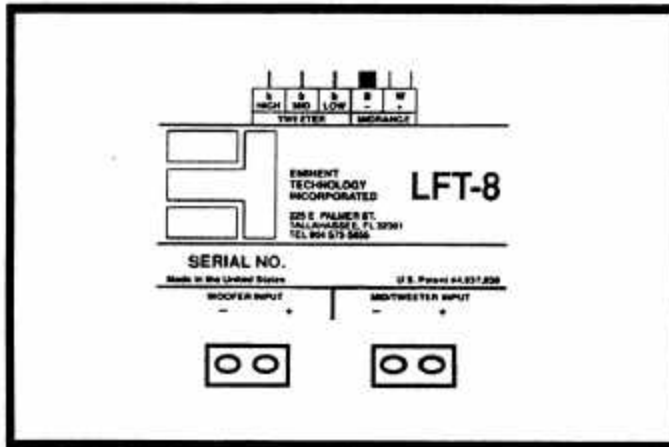
Amplifier Requirements

The LFT-VIII is wired for 8-ohm operation and is appropriate for use with most moderately powered tube and solid-state amplifiers. The efficiency is 84dB with a 2.83-volt drive (1 "8" ohm watt). The efficiency rating is lower than average. However, the LFT-VIII radiates a planar wave front, and as such, on axis its apparent efficiency at the listening position is higher than the numerical rating implies. The LFT-VIII has a minimum rating of 75 watts per side, tube or solid state. It can handle "music power" levels (short term burst) of 300 watts or more with out difficulty. The largest recommended amplifier size for the LFT-VIII is 200 watts.

The LFT-VIII does not require a high current amplifier. A receiver may be used if it has sufficient power. Tube amplifiers should be used with the 8-ohm tap.

The LFT-VIII is configured to allow bi-wiring or bi-amping with a minimum of trouble.

Bi-Wiring and Bi-Amping



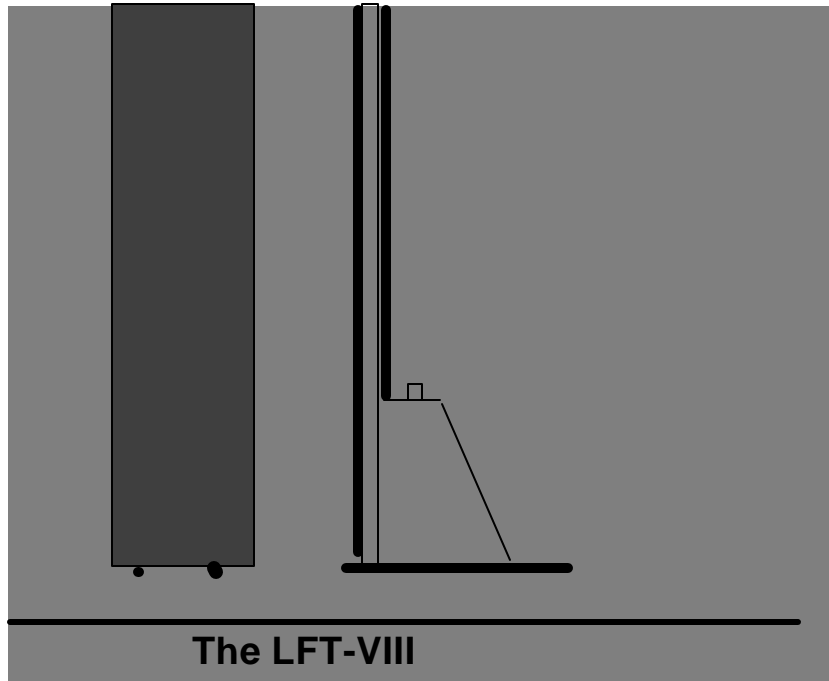
Bi-wiring simply means connecting a single stereo amplifier (or two mono amps) to a pair of speakers by using two pairs of speaker cables. Connect the hot and ground conductors of a pair of cables to the same output terminals on one channel of the amplifier; the other ends are connected to the separate woofer and mid/tweeter inputs of the LFT-VII (All speaker cables should be the same length). The effects of bi-wiring tend to be subtle; the slight improvement may be worth the relatively modest cost of an extra pair or speaker cables. Bi-wiring also permits experimenting with different types of cables for the two inputs; you may find that one type is best suited for bass performance, while another works best on the mid/treble side.

Bi-amping requires an additional stereo amplifier or pair of mono amps. You will also need some means of insuring that only the desired portion of the frequency range reaches each amplifier. The simplest way to accomplish this is with an external electronic crossover; however, this can also be done by hard-wiring low-pass and high-pass filters into the inputs of the bass/mid and treble amplifiers, respectively. For the low/ frequency amp, a 180Hz low-pass filter (6 dB/octave) is required; for the mid/treble amp, a 180Hz. high-pass filter (also 6 dB/octave) is required. If you wish to pursue this method, your dealer or the manufacturer of your amplifiers should be able to help you determine the specific parts necessary. Note that you will also need a level control on either one of the stereo amps or on the crossover, regardless of which approach you take to bi-amping. Contact Eminent Technology or refer to the schematic in the back of this manual to modify the crossover for proper speaker operation.

Bi-Amping

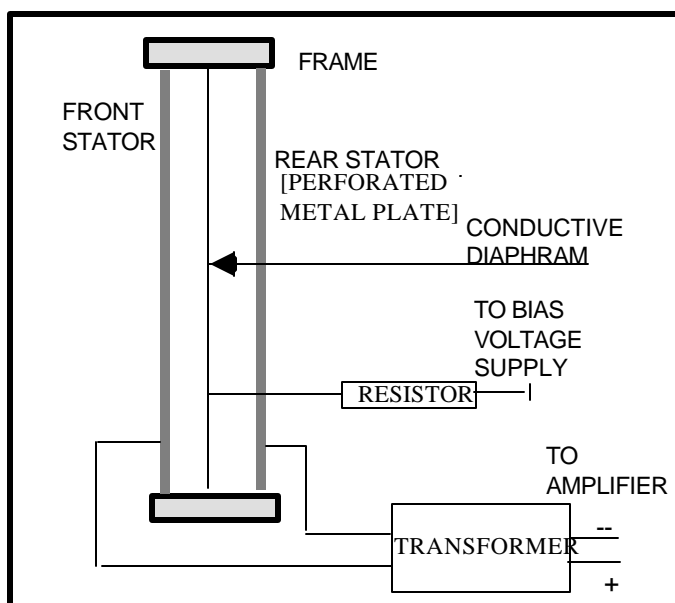
Technical Description

The Eminent Technology Linear Field Transducer is a full-range, push-pull, dynamic planar loudspeaker. In a sense, it is the magnetic equivalent of a push-pull electrostatic loudspeaker, differing in that it requires no step-up transformer or bias voltage, and that the audio signal is applied directly to its diaphragm.



To fully understand the strengths of the LFT design, one must first consider the design and operation of this speaker's three most notable antecedents: the push-pull electrostatic loudspeaker (ESL); the traditional, single-ended planar magnetic loudspeaker, and the ribbon loudspeaker.

The electrostatic starts with a very thin (half mil or less) diaphragm made of Mylar or a similar material, to which a light coating of mildly conductive substance such as graphite has been applied. This diaphragm is suspended on a rigid frame and sandwiched between two stationary conductive grids (usually perforated metal plates) called stators.

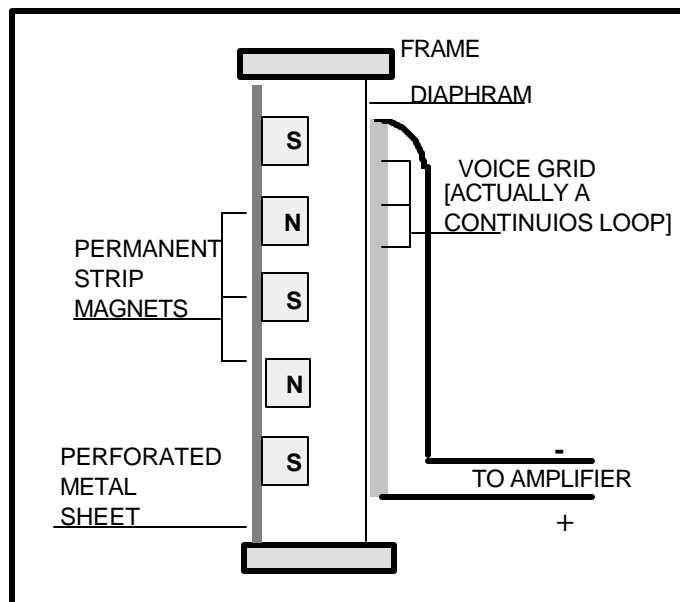


A DC charge of high voltage (in the thousands of volts) but very low current, known as the bias voltage, is applied to the conductive diaphragm and kept constant. A step-up transformer is introduced to increase the usable voltage of the amplifier's output (while simultaneously decreasing the current), and the two ends of the transformer's output coil are connected to the two stators.

As the amplifier produces a continuously varying AC voltage, (the amplified music signal), the charge on the two stators will also continuously change in synchronization with the music; and since the two stators are connected to two different ends of the transformer's output, one stator will take on a predominantly negative charge at the same time and to the same extent that the other stator takes on a predominantly positive charge. The constant-charge diaphragm will thus undergo a continuously changing state of attraction to and repulsion from the two stators as their polarization changes, and it is this motion that excites the air to the front and rear of the speaker and produces sound.

Planar Magnetic Loudspeakers

The traditional planar magnetic also starts with a thin Mylar diaphragm, one side of which is coated with adhesive and fitted with an aluminum wire voice grid, (analogous to the voice coil of a conventional cone driver). The diaphragm is held taut in a metal frame. On the front of this frame is a large sheet of perforated metal, to which rows of vertically aligned strip magnets have been fastened.



SINGLE-ENDED PLANAR MAGNETIC

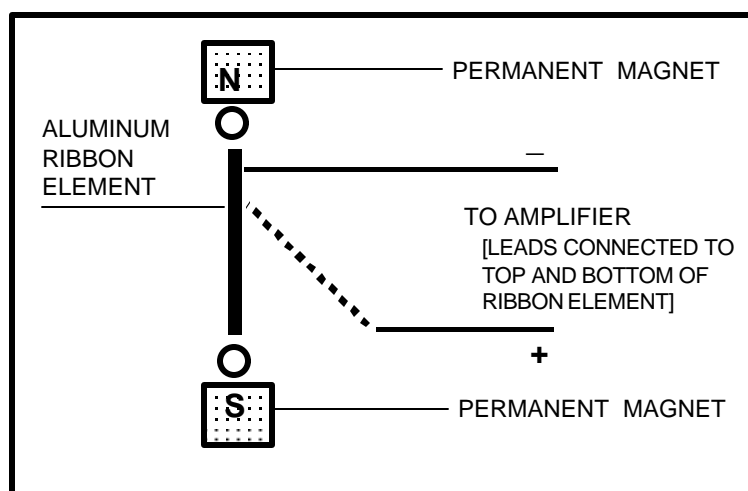
[TOP VIEW CROSS-SECTION]

Spacing exaggerated to show detail

From there, the operation of a single-ended planar magnetic loudspeaker is remarkably similar to that of a conventional cone driver: The amplifier's output is sent directly through the voice grid and, because it is suspended within a stationary magnetic field, the grid moves back and forth within that field in synchronization with the AC voltage that is the amplified music signal. Since the voice grid is permanently fastened to a taut diaphragm, the diaphragm also moves in synchronization with the music signal, exciting the air and producing sound.

The third and final antecedent to consider is the ribbon: a distinctly different sort of transducer, but one that is similar (in principle, at least) to the single-ended planar magnetic. The ribbon's primary distinction is that its "diaphragm" and "voice element" are one and the same.

A ribbon driver is based on a long, narrow strip of conductive material; in practice, thus far, all true ribbons have used a strip of very thin corrugated aluminum for this purpose. The two ends of this strip are electrically connected to the amplifier's output, and are physically anchored such that the strip is suspended within a stationary magnetic field--with said magnets positioned at the edges of the strip.



RIBBON DRIVER
[TOP VIEW CROSS-SECTION]

The operating principle is straightforward from there: the amplifier's output passes directly through the aluminum strip-- which, because it is suspended within a permanent magnetic field, moves back and forth in synchronization with the signal, producing sound.

Evaluating Earlier Approaches

Electrostatics

Not surprisingly, each of the approaches described above has its own unique set of pros and cons. The electrostatic, because its diaphragm is so thin and light, offers exceptionally good transient response and reproduction of subtle, low-level musical detail. And, because it is a true push-pull device (i.e., its diaphragm is, by design, driven from both the front and the rear), the ESL operates in a linear fashion. Typically, gross distortion results only when the driving amplifier clips into the speaker, or when, in an attempt to play the speaker louder than its design allows, its step-up transformer reaches a point of saturation.

On the negative side of the ledger, the ESL does require passing the amplified musical signal through a transformer, which can introduce its own colorations and non-linearities. Also, some ESLs are prone to a condition known as arcing: Under the conditions of stress induced by playing an ESL loudly, it is not uncommon for an electrical spark to jump between one stator and the diaphragm (a phenomenon exactly analogous to lightning), burning a minute hole in the diaphragm and, over time, ruining it.

Planar Magnetics

As for the planar magnetic, its strengths are similar to those of the ESL-- although the addition of several feet of wire and an adhesive coat make for a somewhat more massive diaphragm, limiting this design's transient capabilities by comparison. But the planar magnetic requires no step-up transformer or bias voltage supply, and it has the added benefit of being an extremely manageable load for most amplifiers. However, the most specific drawback of the traditional planar magnetic is that it is a single-ended (as opposed to push-pull) device: As the diaphragm's physical excursion increases, the voice grid moves further away from its optimal location within the permanent magnetic field (at least in one direction). Thus, at the very instant when this speaker is called upon to reproduce large-amplitude waveforms, it is least able to do so without distortion.

Ribbons

In many ways, a ribbon driver can be an excellent performer: the moving element (the "ribbon" itself) is extremely light, allowing good "speed" and transient performance as well as freedom from coloration. And there is no significant physical structure on either side of the ribbon's radiating pattern. The ribbon's main problem is not one of performance but of application: it cannot be used to reproduce low frequencies. To create a moving element large enough to generate frequencies lower than a few hundred Hz would mean moving opposing magnetic poles so far apart that they would no longer exert a sufficient magnetic field over the entire area of the ribbon.

Also, when a ribbon is operated at frequencies approaching the element's own resonant frequency (which is naturally quite low, due to its high compliance), the ribbon element stretches and "bows" to a point where it is no longer within the magnetic gap. To get around either of these problems means to move the permanent magnet structure from the edges of the element to one entire side of the element, and/or to bond the element to a "host" diaphragm, such as a sheet of Mylar, and to clamp that diaphragm around its perimeter. In either case the driver is no longer a ribbon; it is, in fact, a planar magnetic. To date, no one has succeeded in creating a full range ribbon loudspeaker.

The Linear Field Transducer

Eminent Technology's Linear Field Transducer, introduced as the LFT, represents a new approach to the design and construction of a high-quality loudspeaker*. It builds on the strengths of the above designs while eliminating many of their drawbacks.

Diaphragm Construction

The construction of the LFT -8 begins by laminating a very thin sheet of aluminum foil to a half-mil-thick sheet of Mylar. A voice grid pattern, created by means of CAD (Computer-Aided Design) technology, is silk-screened onto the foil side; the remainder of the aluminum--the part not covered by ink from the silk-screening is chemically etched away, in a manner similar to the etching of traces on a printed-circuit board. The ink is then washed away, leaving a voice grid of near-perfect uniformity. This technique results in a diaphragm/voice coil grid that is still less than one mil in total thickness, and also permits relatively narrow spaces between the individual traces, so the diaphragm can be evenly driven over its entire surface.

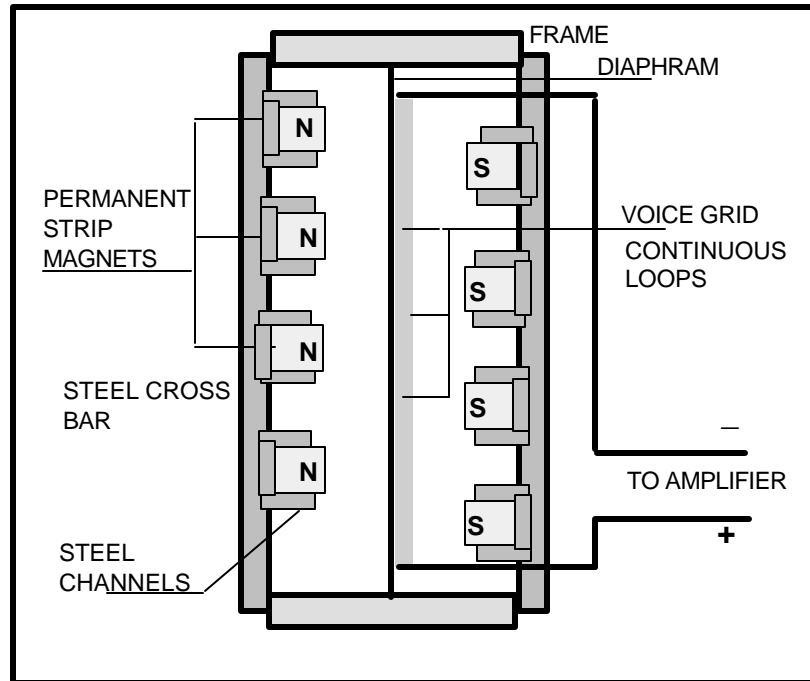
The Magnet/Frame Structure

The magnet/frame structure developed for the LFT-VIII is also unique. Eminent Technology builds its strip magnets into individual steel channels, the size and shape of which have been carefully designed to help "focus" the magnetic flux lines and concentrate the strength of the magnetic field on the appropriate area of the diaphragm/voice grid. These channels are then welded to steel crossbars, which in turn are bolted to the frame that holds the diaphragm in place.

Interestingly, one of the biggest challenges faced in creating a true push-pull dynamic speaker was not a design consideration but rather a matter of construction difficulty: to assemble a perfectly rigid structure with very powerful permanent magnets at the front and the rear, both sides opposing each other with tremendous force. It was not until Eminent Technology developed a special method for this assembly procedure that the Linear Field Transducer became a reality.

* The design and construction of the LFT is patented.

By applying such new techniques to planar loudspeaker construction, Eminent Technology has been able to eliminate many of the flaws inherent in earlier designs. The use of a welded channel-and-crossbar frame dispenses with the need for perforated sheet metal (an “off-the-shelf” material presumably used for reasons of economy and ease of manufacture.) thus greatly improving dispersion, especially at high frequencies.



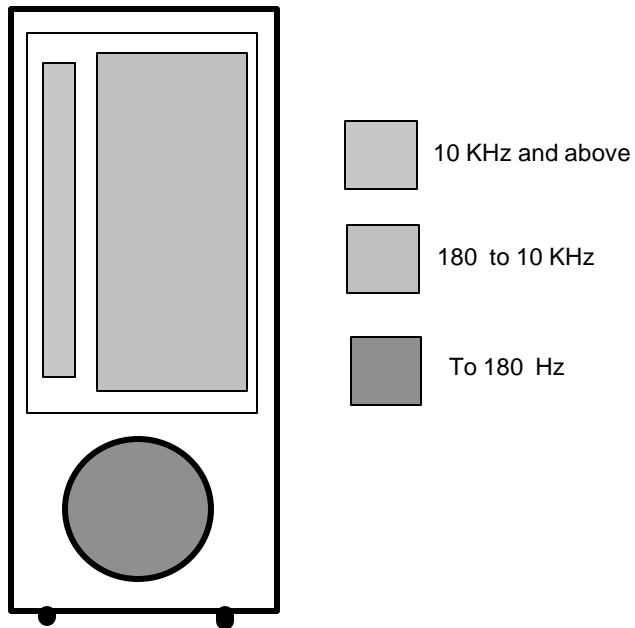
LINEAR FIELD TRANSDUCER

[TOP VIEW CROSS-SECTION]
Spacing exaggerated to show detail

Since it is now possible to have a powerful, precisely aligned magnet structure on both sides of the diaphragm, true push-pull operation has been achieved: Regardless of the degree of excursion the diaphragm undergoes, the voice element is always optimally positioned within the magnetic field. The result is extremely linear performance throughout the audible range, with a profound increase in dynamic range and an absolute minimum of distortion.

Panel
Frequencies

Each LFT-VIII has two individual driver panels and a cone type woofer. The placement of the individual drivers is shown in the following diagram.



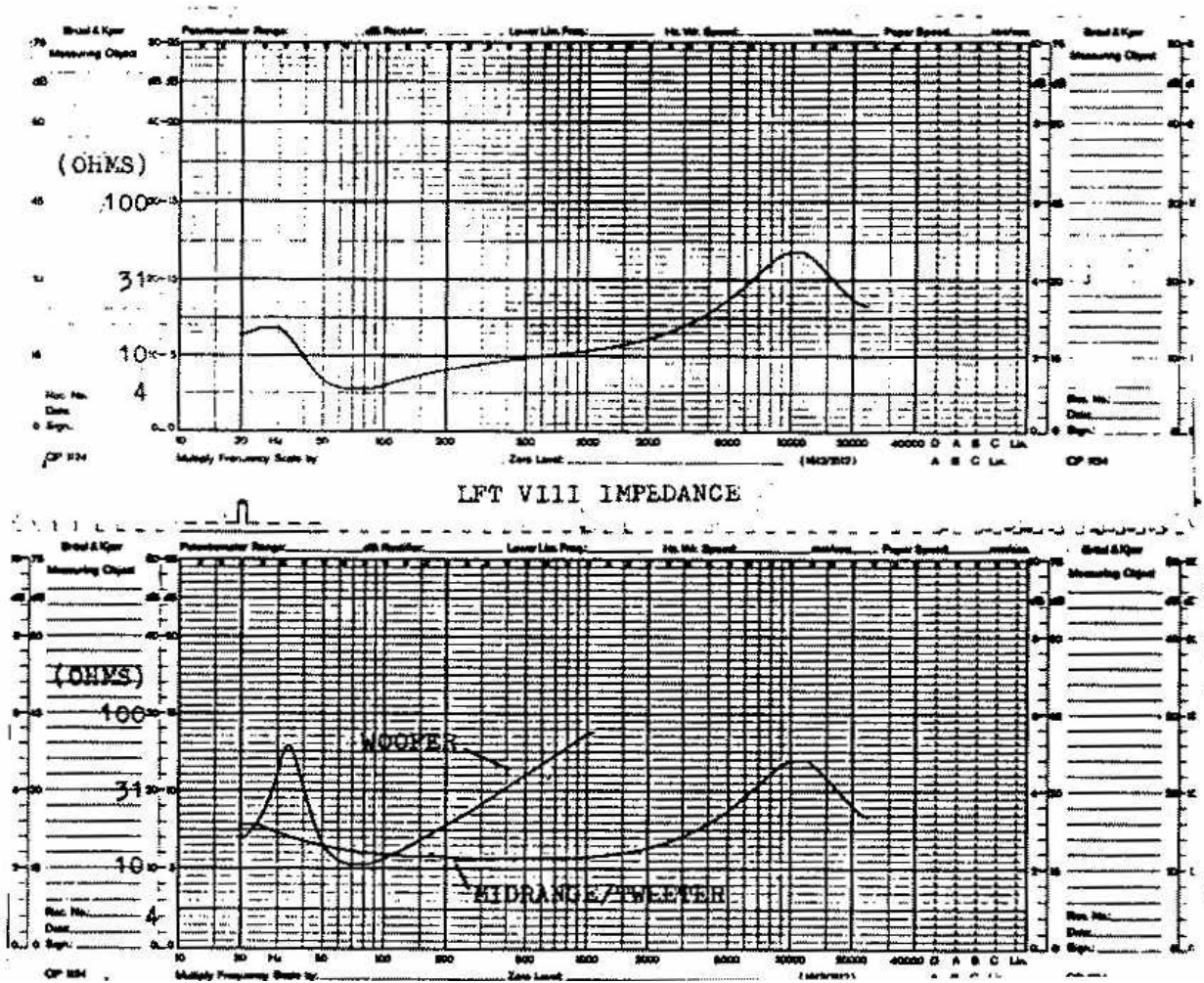
General Specifications:

Power Requirements	75 Watts minimum
Sensitivity	84 dB (pink noise, 20 - 20kHz) at 1 watt/1 meter (2.83 V)
Frequency Response	25 Hz-20 kHz \pm 4 dB (typical room)
Phase Accuracy	\pm 20 100 Hz -31 kHz
High Frequency Level	Flat, - 6dB, -12dB at 20kHz smooth roll off
Impedance	8 Ohm rating
Maximum SPL	105 dB at 1 meter
Dimensions	13" wide by 60" high by 1" thick
Shipping Weight	90.5 lbs. Each
Warranty	3 years parts, 1 year labor
Available Finishes	Oak, Walnut, Black Painted Oak

Technical information

LFT-VIII Impedance Curves

The LFT-VIII impedance is shown below. The impedance generally averages much higher than 8 ohms. This means that the speaker does not require a high current amplifier. Because of the lower than average efficiency you will still need an amplifier with a fairly high power rating (75 watts per channel or more). If an amplifier clips into the speaker it will probably be due to a voltage limitation.

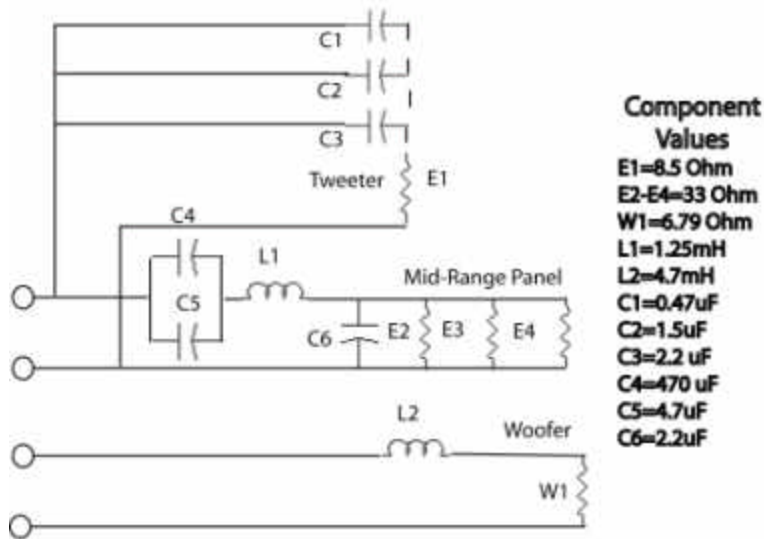


LFT-VIII Impedance Data

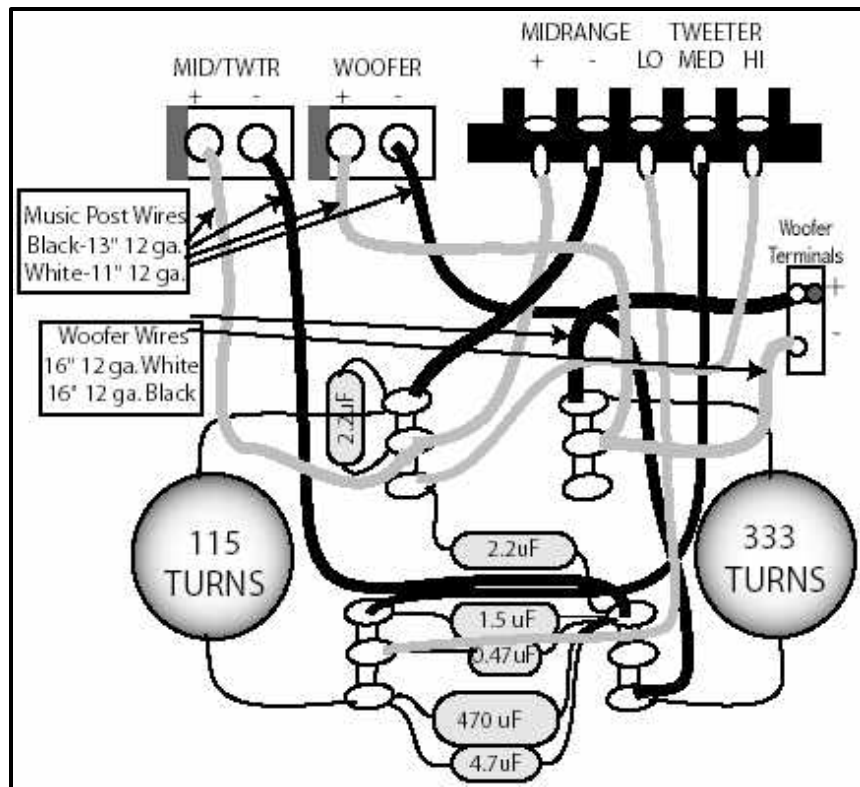
The impedance curves are shown for the woofer and mid-range/tweeter inputs separated and connected. The separate woofer curve shows an impedance peak at 35 Hz (60 ohms) and a steady rise above 100 Hz due to series inductance. The mid-range and tweeter section impedance curve shows a slight rise below 150 Hz and around 10 kHz with a drop at 20 kHz. This is due to a series capacitance and inductance with crossover frequencies at 180 Hz and 10 kHz. Without the crossover in place, both the mid-range and tweeter panels have perfectly flat impedance curves (the mid-range impedance is 11 ohms and the tweeter impedance is 7.5 ohms).

With the woofer section in parallel with the mid-range/tweeter section, the impedance curve becomes essentially flat with a minimum of about 6 ohms occurring around 100 Hz and a maximum of 20 ohms at 10 kHz. The 20-ohm peak is with the tweeter in its low output position. When the tweeter level is moved up, its maximum will drop to about 15 ohms. The speaker should be considered as an “easy” 8-ohm load having only very small reactive components.

Crossover Information



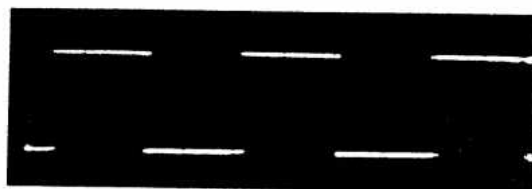
LFT-VIII Crossover Schematic



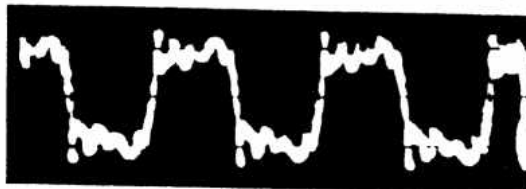
LFT-VIII Crossover Physical Layout

Square Wave Performance

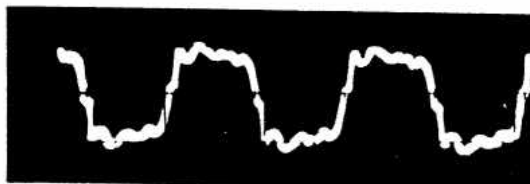
The square wave performance of the LFT-VIII is shown below at different frequencies. Measurements were made in a normal listening room, and the microphone position was optimized for each frequency. In order for a loudspeaker to reproduce a square wave, it must have good frequency response, phase response, impulse response and transient response. We only know of a handful of speakers that can reproduce square waves, and most speaker companies do not want to discuss square wave performance at all.



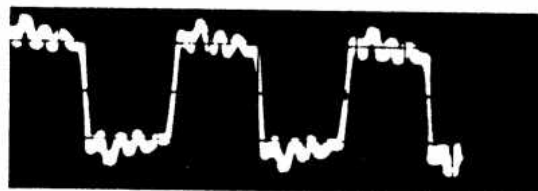
INPUT



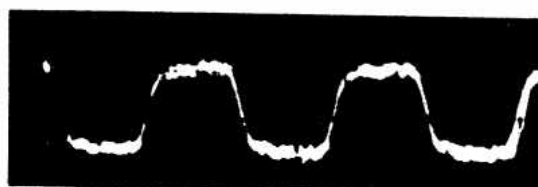
100Hz



500Hz



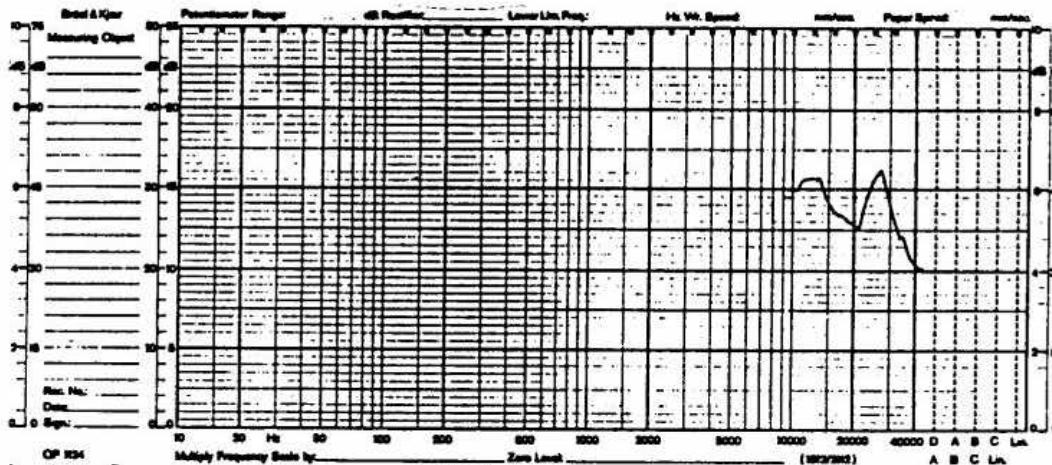
1KHz



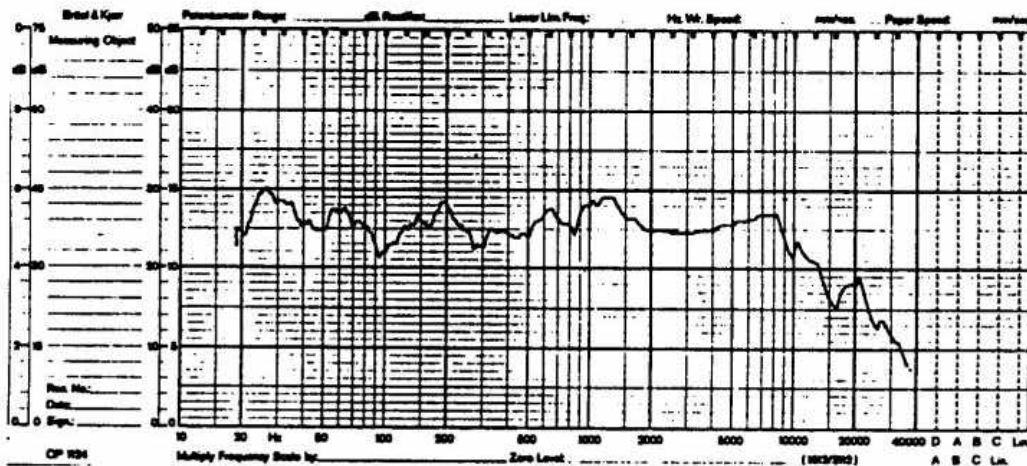
5KHz

Technical Information

Frequency Response



1/3. OCTAVE TWEETER RESPONSE
AT ONE METER



1/3 OCTAVE 3 METER ROOM RESPONSE
USING PINK NOISE

LFT-VIII Panel Specifications

Magnet Type	Ceramic 8
Mid-range Diaphragm area	126 sq in
Foil Thickness	.00033
Mylar Thickness	.0005
Laminate Adhesive Thickness	.00015
Gap Between Conductors	.03
Peak-to-Peak Diaphragm Displacement	.180
Tweeter Diaphragm area	10 sq in
Tweeter Peak to Peak Displacement	.050

Mid-Range Panel Design

Do not attempt to disassemble these panels. The steel frame is preventing the panel from collapsing on itself. Removal of the cap screws that hold the panel together will surely cause damage to the diaphragm and may pinch hands and fingers.

The mid-range panel design (shape and size) was chosen for good dispersion and bandwidth.

For a given speaker design, there is a direct trade off between maximum sound pressure level, bandwidth and efficiency. In the LFT-VIII, the mid-range panel is usable from 100 Hz to 15 kHz. However, there are problems if you use the panel over its full frequency range.

At the upper frequency limit, the panel will beam because the wavelength becomes much shorter than the panel is wide. This is also the reason the speaker sounds best within the vertical axis of the mid-range panel.

At the lower limit, the panels free air resonance is 90 Hz. This resonance is damped almost 100% with felt on the back magnet channel assembly. Around 100 Hz at high sound pressure levels, the excursion limit of the diaphragm will be exceeded and it will slap against the magnet channel. A crossover point of 180 Hz is chosen to achieve a good maximum sound pressure level and still have the mid-range panel play vocal fundamentals and mid bass which is desirable for a good blend with the woofer. Since the lower crossover frequency is 6 dB per octave, the panel still has substantial output below 100 Hz.

LFT-VIII Woofer Specifications

Box Volume	23 Liters 1403 in ³ .812 ft ³
Speaker Diameter	8 inch
Magnet weight	33 oz.
Impedance	8 Ohms
DC Resistance	6.79 Ohms
Inductance	3.89 mH
Free Air Resonance	19.65 Hz ±15%
C_{MS}	0.6570 E ⁻⁰³ M/N
M_{MS}	99.8Grams
V_{AS}	37.62 Liters
Q_{MS}	6.02
Q_{ES}	.361
Q_{TS}	.34
B₁	15.32 T-M
Z_M	121.4 Ohms

Technical Information

Additional Woofer Specifications

F_C		31.73 Hz
R_E		6.79 Ohms
F_1		23.3
F_2		46.2
Q_M	$\frac{F_c \sqrt{r_o}}{F_2 - F_1}$	3.610
Q_E	$\frac{Q_m}{r_o - 1}$	0.623
Q_T	$\frac{Q_M Q_E}{Q_M + Q_E}$	0.531

Woofers Design

The design goal for the woofer is good transient response, low Q, low cutoff frequency and minimal coloration near the crossover region.

For the cabinet size dictated by design, no available off the shelf woofers met our design requirements. Most off the shelf woofers are designed to operate over a much wider bandwidth than is desirable for the LFT-VIII. In a hybrid system of this type, it is desirable to have as low a crossover frequency as possible for the woofer. Because of these factors we chose to design our own woofer.

An eight-inch woofer was chosen because it offered the best balance between low frequency response, the size of the box and blend with the mid-range driver.

The woofer cone is purposely very heavy for an eight-inch driver (99.8 grams). Since it is Q that defines transient performance. This mass (combined with a very compliant surround and spider) gives a very low Q in a small sealed enclosure.

A second reason the cone is heavy is to prevent it from responding to mid-range signals, which would cause a poor blend with the mid-range panel. The cone material is felted paper, which is coated with a thick emulsion. This helps to mechanically roll off the woofer to prevent mid-range coloration. Without a crossover, the woofer response begins to roll off above about 500 Hz and has no usable output above 1 kHz. This allowed the crossover to be 6 dB per octave.

Since the efficiency between the mid-range and high frequency driver is slightly lower than average and bandwidth and efficiency and efficiency of a woofer system are inversely proportional, we are able to extend the low frequency performance of the woofer system.

The woofer is a true air suspension design. This means the compliance of the air in the enclosure has a much larger effect on low frequency performance than the compliance of the woofer components (spider and surround).

Technical Information

Woofer Enclosure

The design goal for the woofer enclosure is:

- (1) To be as resonance free as possible (rigid) to prevent low frequency and mid-range colorations.
- (2) To provide sufficient internal volume to give the desired frequency response.
- (3) To visually appear smaller than it is when attached to the rest of the speaker.

Research has shown that even if the resonance levels of an enclosure are 40 or more dB below the signal levels of the woofer, they will still be audible because their harmonic structure is almost always different than that of the signal coming from the woofer itself. In order for the woofer to successfully blend with a planar mid-range driver, it must be very neutral.

Eminent Technology engineers have a great deal of experience performing mode shape analysis using instrumentation on many different structures. The experience gained from this research was put into the design of the woofer enclosure. The shape of the enclosure results in only two of the six sides having the same shape. This means that the fundamental resonance of one side of the enclosure will not excite a different fundamental resonance of another side. The enclosure is internally braced with a total of five internal braces. The largest brace crosses the center of the box. Four other braces break up modes on the back and front surfaces. The box is constructed of a high-density particleboard and is then laminated.

Warranty

Eminent Technology Inc. warrants the LFT Loudspeaker to be free from defects in materials and workmanship for a period of 30 days from the date of purchase. Within that period, any failure of the LFT will be corrected without charge for parts, labor, or transportation from the factory. After this period, pending receipt of the warranty form (filled out and mailed to Eminent Technology, and postmarked no later than one month after the date of purchase), the above warranty will be extended to three years for parts and one year for labor. This warranty is transferable to subsequent owners, pending notification from the original owner, in writing, within 10 days of the personal sale.

The obligation of Eminent Technology under the terms of this warranty does not extend to:

1. Any LFT installed or operated without regard for the instructions contained in this manual.
2. Any LFT while under performance testing, or after being used in such a test, by any personnel or facility not authorized by Eminent Technology.
3. Any other component or part connected to or operated in conjunction with the LFT.
4. Any traumatic, accidental damage, or damage incurred in shipping, or defects which upon examination by Eminent Technology and in its sole opinion have been caused by abuse, neglect, improper or abnormal installation, or operation for extended periods in industrial applications.

This warranty is not applicable if any part of the LFT has been removed or taken apart, repaired, altered, or modified by anyone without prior authorization in writing from Eminent Technology, nor if the serial numbers have been defaced or rendered illegible.

If an Eminent Technology product is removed from the country in which the original consumer purchase was made, Eminent Technology dealers and distributors in other countries are not obligated by the terms of this warranty. Eminent Technology reserves the right to incorporate design refinements and changes to its products without notice or obligation. If practical, such design modifications will be made available to owners of existing units for a reasonable charge.

Under the terms of this warranty, Eminent Technology expressly does not insure for loss of use of the LFT due to failure or periods of repair. Warranty repairs will be carried out by the factory. The LFT must be returned prepaid in its original factory carton to:

Eminent Technology, Inc
225 East Palmer Street
Tallahassee, FL 32301
(850) 575-5655

EMINENT TECHNOLOGY, INC. LFT-VIII

WARRANTY FORM

Name _____

Address _____

City _____

State _____ Zip _____

Dealer Purchased From _____

Dealer Address _____

City _____

State _____ Zip _____

Date Purchased _____

Serial Number R _____ L _____

Please complete this form and return to:

Eminent Technology
225 East Palmer Street
Tallahassee, FL 32301
U. S. A.

HEX CAM SPACER INSTALLATION AND ADJUSTMENT FOR THE LFT-VIII

Tools needed:

5/32 Allen Wrench

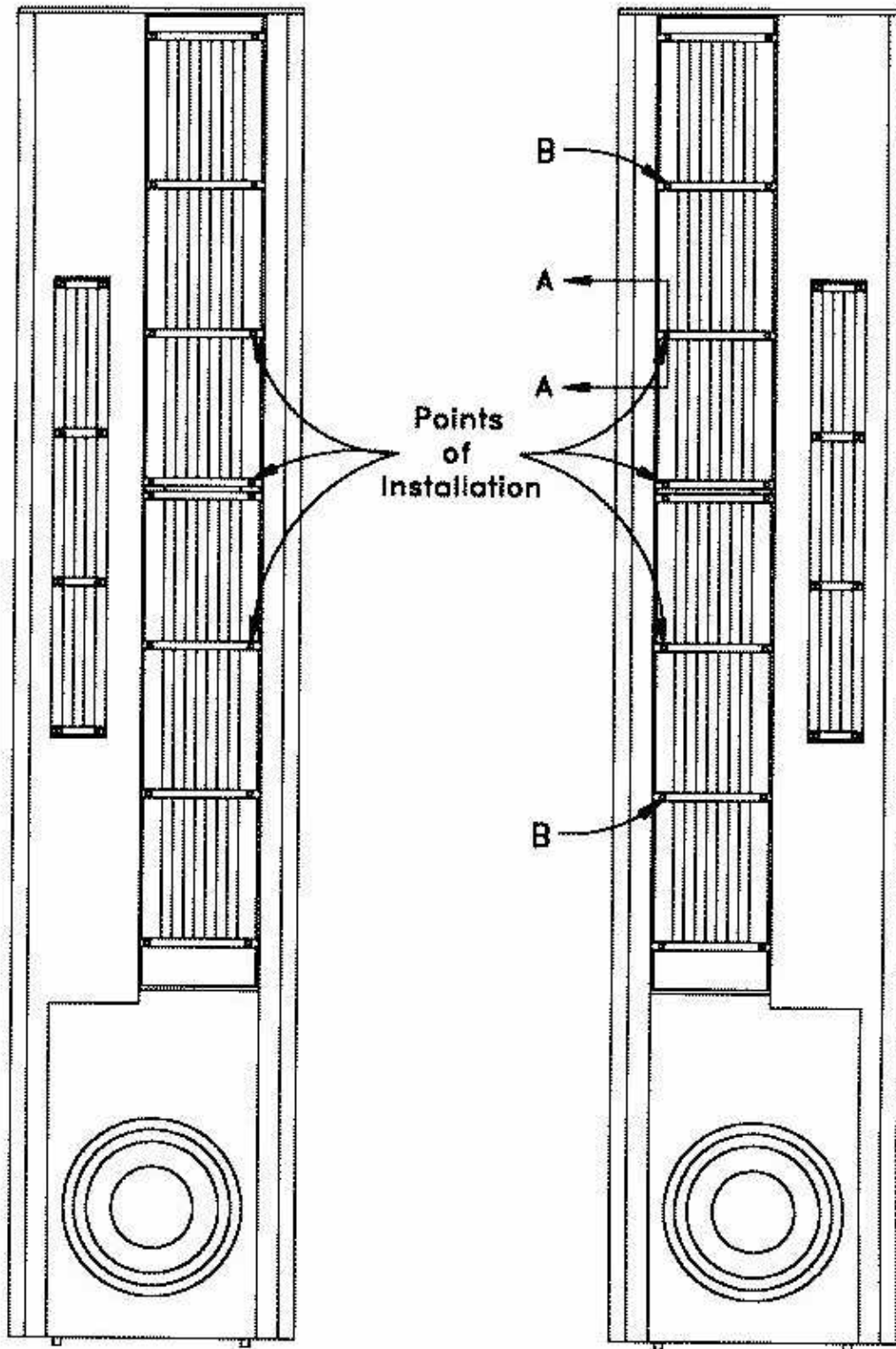
7/16 Open End Wrench (aluminum recommended)

INSTALLATION

- 1.) Remove machine screws (4) and spacers (8) at the 4 centrally located crossbars along outside edge of diaphragm frame (opposite tweeter) taking care not to damage diaphragm. Loosen machine screws at points B in Figure 1 three turns.
- 2.) Install hex cam spacers at locations shown in Figure 1 making sure cam portion fits into hole in frame. Gently prying outward on crossbar will allow clearance for hex cam spacer.
- 3.) Replace original spacers at remaining 5 locations. Replace machine screws and run down to within a couple of turns of being tight, making sure cam spacers stay in position. If screw will not thread into crossbar due to misalignment, turn hex cam spacer until alignment is reached.

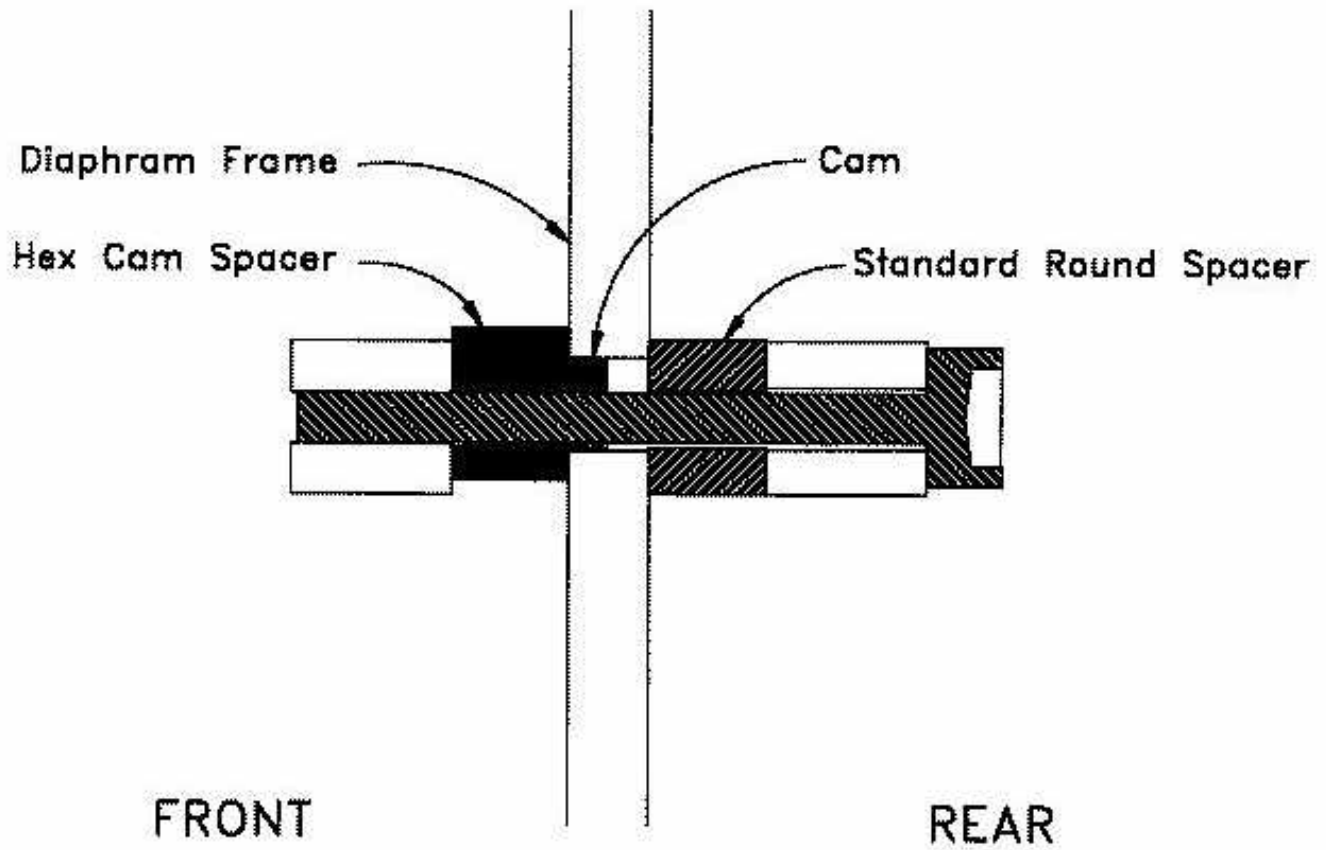
ADJUSTMENT

Loosen machine screws along outside edge of diaphragm (excluding screws at each end) approximately one turn. Lightly torque hex cam spacers. Silver line on hex cam spacer indicates high point of cam. By moving this mark towards the outside of the midrange unit, diaphragm tensioning will increase. Excessive torque will result in exceeding the elastic limit of diaphragm, which could result in tearing. Over-tensioning will also raise the resonance of the diaphragm. If wrinkles are present, adjust hex cam spacer until they are no longer evident. If wrinkles are not present, look for traces on diaphragm to move slightly outward while tensioning. Try to obtain an equal distribution of tensioning between the 3 hex cam spacers. Once this has been done, tighten all 6 screws.



FRONT VIEW

FIGURE 1



SECTION A-A

TWEETER DIAPHRAGM REPLACEMENT FOR THE LFT-VIII

Revised 5/24/2002

Removing The Tweeter Driver From The Frame and Separating Its Front and Back Channels Back Channels

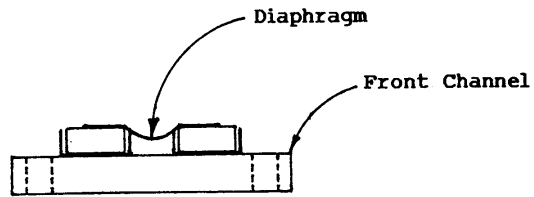
Separate the tweeter driver completely from the speaker frame. Cut the spade lug from the black tweeter wire and detach the white tweeter wire from the mid-range terminal board using a soldering iron. Remove the eight machine screws, nuts and spacers. Keep track of where each spacer is located so that it can be returned to that same location upon re-assembly. Lay the tweeter driver on a smooth, clean surface with its front assembly, facing down. Remove the four 10-32 machine screws from one end of the tweeter driver assembly. Separate back from front (approx. 1") at this end. Continue separating while removing the next three screws, taking care not to allow the front and back channels to slap together. Loosen the remaining screw at the end and pivot the top channel clear of the bottom channel. Remove the screw and separate.

Removing and Replacing The Tweeter Diaphragm

Remove the old diaphragm along with the underlying double-sided tape on both rows of magnets from "front" channel making sure all four rubber insulator squares stay intact. Check for and remove any magnet fragments from the front and back channels. Replace the double-sided tape along the entire length of the front channel assembly. Replace the diaphragm by first attaching the non-terminal end flush with either end of the front channel assembly. Next, slightly tension the diaphragm and align with the channel while pushing the diaphragm onto the double-sided tape making sure to depress the diaphragm slightly between the magnet channels as you go. Diaphragm should resemble Diagram (A). Fold and tape the over-hanging terminal end of the diaphragm as illustrated in Diagram (B).

Re-Assembling and Installing The Tweeter Driver

Re-assembly of the tweeter driver should be done in the exact reverse as it was disassembled. Re-install the tweeter driver into the speaker frame placing the spacers in their original locations. Run the black and white tweeter wires through the two lower cross bars of the midrange assembly. Attach a spade lug to the end of the black tweeter wire then insulate it with the heat shrink. Solder the white wire to the mid-range terminal board.



Cross-Section View
DIAGRAM (A)

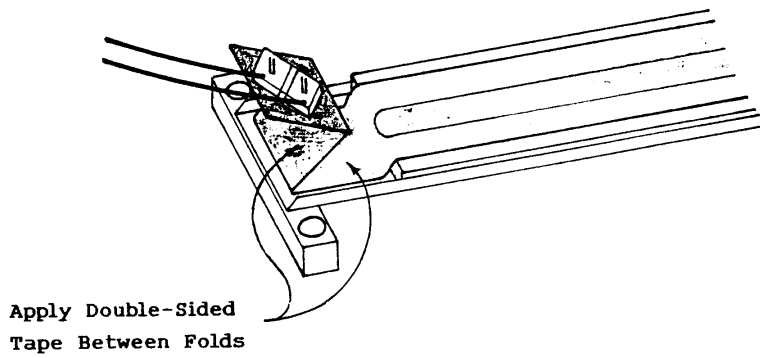


DIAGRAM (B)