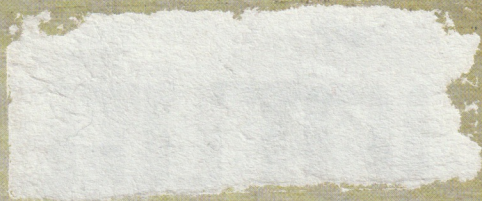
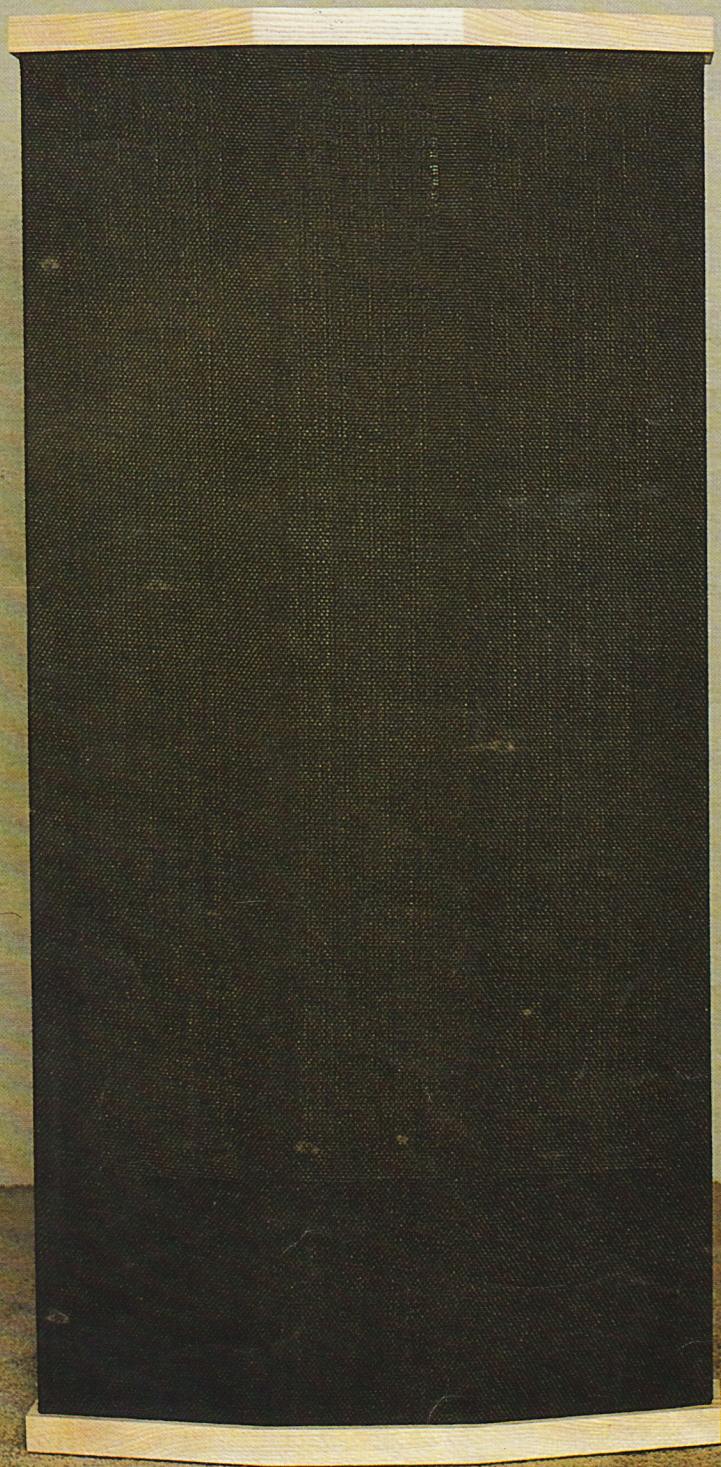


ACOUSTAT  
**the monitor**  
three



Full Range,  
Direct Drive,  
Electrostatic  
Speaker System

with: Integral  
self-contained  
Servo-Charge amplifier



# the acoustat monitor three

## A UNIQUE FULFILLMENT OF MUSICAL ACCURACY

From the time the first generation of full-range electrostatic loudspeakers was introduced, about two decades ago, it was apparent that someday this technology could yield speakers of truly superb performance.

That day has arrived with the presence of the Acoustat Monitors.

If you have heard a Monitor system, there is really very little that we need to say about its sound. However, you would probably like to know some of the reasons that its performance surpasses other speaker types and earlier generation electrostatics.

The Acoustat Monitor series had its origin in the early 1960's with a bold assumption that it would be possible to build an electrostatic speaker of no compromise. It would be full-range; direct-drive; and have high sound pressure levels, *no* crossovers, and *no* audio transformers.

It has taken this many years to turn this dream into the Acoustat Monitors — allowing fulfillment of the electrostatic promise.

This promise has long existed because the push-pull, constant-charge electrostatic element stands alone in its ability to uniformly and linearly drive large diaphragm surfaces of almost negligible mass. Only an incredibly light conductive coating need be applied to very thin mylar diaphragms to distribute charges over the surface.

It is this unique ability that allows a *full-range-element* design with the entire surface radiating all frequencies.

All observers agree that much of the superior performance of electrostatics is due to the highly uniform force field spread over the entire diaphragm from which the sound is radiating. The result is very close to converting electricity directly to sound, as if there were no diaphragm at all! In an Acoustat

Monitor, the driven charges on the diaphragm are closer together than a single wave-length of light; and the diaphragm is only 0.65 thousandths of an inch thick (about one sixth of the thickness of this sheet of paper).

This table illustrates the difference between electrostatics and the two prevalent types of magnetic or dynamic speakers in terms of the two most important parameters for a high accuracy speaker system.

	Mass of Radiator	Uniformity of Applied Force Over Radiating Area
Dynamic (Cone)	High	Poor
Planar Magnetic	Lower	Better
Electrostatic	Lowest	Best

Compared to a planar magnetic speaker with its wires spaced at intervals and bonded to its diaphragm, an electrostatic's "intimacy of drive" is approximately 100,000 times greater. And, compared with a typical cone driver, several million times greater. All the laws of physics confirm that low mass and intimate drive will yield superior transient response, less coloration, and allow definition and detail to be reproduced *at all listening levels*.

The Monitor Three is the successor to the critically acclaimed Model X. Since the very first demonstration of the original Monitor's unparalleled performance, we have sought to produce a design bringing this level of sonic quality to the size and price range of the Model X.

The Monitor Three is the realization of this goal. Only by the most careful blending of every significant factor involved in the Monitor design, was this achievement possible.

These design factors include:

1. Use of a thin-wing array, eliminating cabinet resonances and providing new levels of openness, dispersion and appearance.
2. Inclusion of the carefully chosen 13° interpanel angles of the Monitor, for seamless frontal field, and specific imaging to a position anywhere between the speakers.
3. Incorporation of Monitor-style massive hardwood slabs to reaction-load the array, extending and smoothing low bass response.
4. Elevation of the panel array above the floor, and provision of vertical azimuth adjustment, yielding excellent dispersion and higher effective SPL.

All of these factors synergize into a startling performance improvement over the Model X.

The Acoustat Monitor series represents the finest value in audio today, not only on the basis of outstanding performance, but also because the power amplifiers are included in the package. Most other "state-of-the-art" speaker attempts cost more for the speakers alone, than does Acoustat's integrated system.

## WHY AN INTEGRAL AMPLIFIER?

In the beginning, there were tube amplifiers. Tubes are basically high impedance devices. Magnetic speakers are low impedance loads. Hence, *Step-Down* transformers were almost always present.

Along came power transistors, which could directly drive magnetic speakers. The first generation of electrostatic designers then inverted the past and put in *Step-Up* transformers to get back to the high impedance of these speakers.

Why wasn't it obvious that vacuum tubes were a much more natural and efficient match for electrostatics? Actually, this was obvious to a few different individuals involved in such research.

In the early 1960's, we built our first amplifier using the four quadrant output bridge, which was to become the mainstay of all Acoustat amplifiers.

Its immediate promise was so obvious that we have never deviated from this basic output drive connection.

Every possible advantage is gained by tailoring the amplifier to the electrostatic panels and not the other way around:

1. Output voltages can be generated by this design which are appropriate to the speaker; thus

completely eliminating the need for audio step-up transformers and crossovers.

2. Low generator impedance, compared to the load impedance, can be assured at all frequencies providing excellent panel control and damping.
3. Higher efficiency is attained, reducing amplifier power requirements.
4. Any desirable equalization required for the flattest overall response can be economically and correctly implemented.

## HOW MANY WATTS?

An interesting if unanswerable question in this case. Unanswerable because a full-range electrostatic is essentially a very large capacitor, and power cannot be measured into a capacitive load. In the laboratory, using a dummy resistive load, the Servo-Charge amplifier measures in the 100 watt range.

Because of high coupling efficiency of our high impedance amplifier to the high impedance capacitive load which the panels represent, a hundred watts becomes marvelously effective in producing shatteringly large amounts of sound pressure level and is able to do this staying well within the plate dissipation parameters of the output tubes. In an average listening room on music material heard at typical listening distances, a pair of Monitors will produce over 110 dB before amplifier clipping or over 1% total harmonic distortion of the total system occurs.

## SERVO-CHARGE AMPLIFIER

These units are located on the base of the Monitor speakers and are of hybrid design employing solid state circuitry for all low level functions and the above described direct-drive output from high-voltage tube elements, coupling directly to the speaker panels.

The output drive tubes are high voltage pentodes which are used in a conservatively rated application. Even on the most demanding musical material it is extremely difficult to reach the maximum dissipation level of the tubes, even momentarily. Tube life in an average application has generally exceeded one year, and the replacement cost is modest as matched sets are not required.

The Servo-Charge amplifier incorporates the following features:

### "Instant-On" Relay Circuitry

This feature, which eliminates the need for any power unbillicals from the preamplifier source, consists of a unique audio-triggered automatic turn-on circuit. The amplifier is left connected to its wall outlet at all times. A very low power is left on the four vacuum tube filaments when the amplifier is not in use. This facilitates the instant turn-on when an audio signal is supplied, provides a damp-

chaser effect, and because switching power surges are eliminated, greatly extends tube life. The cost of this stand-by operation is less than 1¢ per day per speaker. After the audio signal has been removed for a period of approximately five minutes, the automatic circuitry will shut down the amplifier to the low power stand-by mode.

### Low frequency equalization

Active equalization is used for the elimination of low frequency response aberrations caused by interaction of the reflecting wall surface with the dipole radiation pattern.

During extensive 1/3 octave frequency analysis in testing the response of the system, it was verified that a phenomenon of quarter wave-length reinforcement and half wave-length cancellation takes place in the lower frequencies. This is true for *all* dipole radiators in the proximity of a reflecting wall. With typical speaker-to-rear-wall distances, the net effect of this reinforcement-cancellation phenomenon is to produce a "hump" in the response at 90-100 Hz due to quarter wave-length reinforcement, and a "dip" at 180-200 Hz because of half wave-length cancellation. The solution to this problem, which if left uncorrected, causes a "woomy" sort of upper bass enhancement and lower midrange "drop-out", was to provide specific active equalization to correct the response.

### Controls

1. High frequency balance control which adjusts, over a plus or minus 5 dB range, the response in the upper midrange and high frequency spectrum to compensate for room size, listening distance, and phono cartridge characteristics.

2. Overall gain control for left-right channel balancing, in the event that the preamplifier or other associated equipment does not have this capability.

### Safety AC Interconnect on Chassis

Because of the presence of high voltage at several points in the Servo-Charge amplifier, the AC line cord is automatically disconnected when the protective cage is removed from the top of the chassis.

The Servo-Charge amplifiers have been significantly improved in sonic qualities since the earliest units, largely through subtle *but* important component improvements. The inclusion of solid-state tube-protection devices has brought new levels of reliability to the amplifier.

Acoustat does *not* believe in planned obsolescence. Our circuit has remained basically unchanged, allowing us to maintain a tradition of making these improvements available at very reasonable cost. This policy will continue.

### PANELS

Acoustat has made significant contributions to electrostatic technology in the special design of its

electrostatic panels. These panels are completely free of any arcing problems, and further provide complete immunity from climate, temperature, and humidity factors. And, most importantly, *they cannot be damaged by overdriving*, in an Acoustat system. They are guaranteed for a period of five years.

With thousands of speakers in the field, we have yet to experience our first in-service failure, as the Servo-Charge amplifier will never produce a voltage of destructive level. We know of no other system, magnetic or electrostatic, that possesses this degree of indestructibility.

It should be pointed out that an Acoustat Monitor's electrostatic panels and the Servo-Charge amplifier are specifically designed for each other and are compatible *only* with each other.

The panels of the Acoustat Monitor are the result of years of research. Each Monitor Three contains 7.5 square feet of frontal radiating area. The total diaphragm front and back, considering the dipole radiation, of two speakers is 30 square feet.

Panel-grid construction provides a far greater openness-ratio than usual designs. Rather than the typical slot or "polka dot" perforations in sheet metal (where the diaphragm area energized is blocked by the structure) Acoustat has created grids of military-specification, tight-tolerance wire bonded to a strong plastic matrix. Each pair of Monitor Three's contains more than 1500 feet of this wire because of the fine spacing required for optimum sound production.

### No Woofer, Mid-Range, or Tweeter Elements and No Crossover Networks

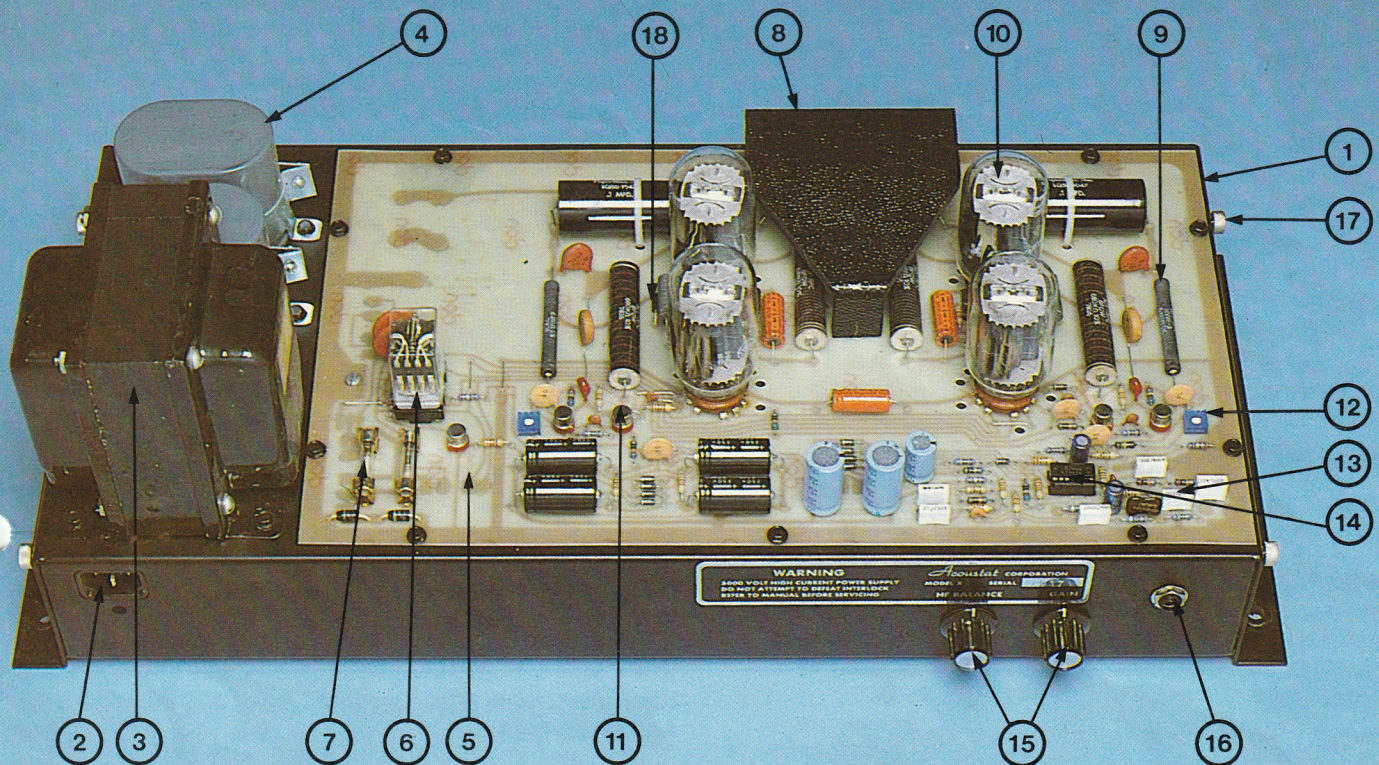
A very significant difference between the Acoustat approach and that of nearly all other electrostatics is the absence of *any* separate drivers; i.e. separate woofers, mid-range, or tweeter units. Each Monitor Three does contain three panels which are angled for horizontal dispersion, but electrically they are one, and all are driven full-range. The enormous advantage of this design is the complete elimination of cross-over networks and their attendant time-delay and phase distortion characteristics, thus producing a completely seamless sound.

Acoustat speakers remain the only crossoverless, truly full-range, direct-drive electrostatics in production today.

### PHYSICAL STRUCTURE

The winged screen panel array has been designed to be very open acoustically, and to provide high array reaction to the large mass of air it moves. This is largely the purpose of the massive hardwood slabs top and bottom. Three panels are used in a hemi-cylindrical array providing a wide horizontal listening stage. In addition, the vertical azimuth tilt is adjustable to provide optimum vertical dispersion.

# servo-charge amplifier\*



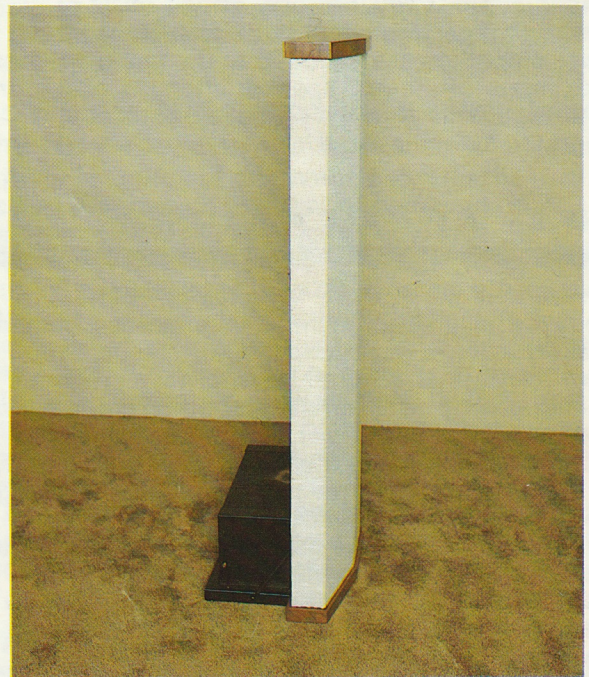
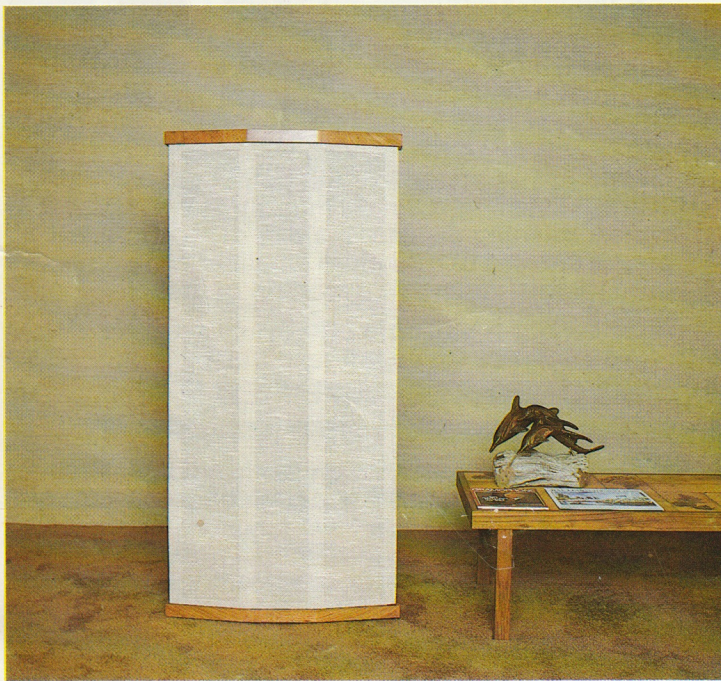
1. Heavy Duty 14 gauge steel chassis.
2. International Standard three wire safety interlock (AC).
3. Heavy duty power transformer.
4. Military grade oil filled high voltage capacitors.
5. Military grade glass-epoxy printed circuit board.
6. Automatic turn-on relay.
7. Separate fusing for high and low voltages.
8. High voltage guard with output jack assembly.
9. Military grade high voltage resistors.
10. Four quadrant tube output bridge using Schmitt-Wilkins connection.
11. High voltage transistors used in intermediate stages.
12. Centering pots for exact setup of output symmetry.
13. All 1% Metal-Film resistors in low-voltage circuitry.
14. High performance, low distortion IC for low voltage audio stages and automatic turn-on.
15. Controls for high frequency balance and gain.
16. Phone jack input from preamplifier.
17. Knurled thumbscrews facilitate easy access.
18. Rugged, solid-state tube protection devices.

\* PATENT PENDING.

# ACOUSTAT corporation

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4011  
3100  
170 cm  
67 INCH (5.58 FOOT)  
1" W INCH (1.33 FOOT)



## SPECIFICATIONS

**Frequency Response:** 30 - 20K Hz  $\pm$  3 dB

**Sound Pressure Level:** Program Material:  
110 dB @ 20' - pair in 14' x 24' room.

**Harmonic Distortion:**  
At 3 dB below full output: Less than 1% from  
30 - 20K Hz.

At average listening levels: Close to  
instrumentation residual levels

**Input Impedance:** 50K ohms

**Controls:**  
High frequency balance:  $\pm$  5 dB  
Gain:  $\pm$  6 dB

**Input Sensitivity:** 0.7 volts RMS for full output at  
1K Hz with gain control at 12 o'clock position

**Monitor Three Dimensions:**  
61" H, 28" W, 7" D (panel array)

## WARRANTY

All Acoustat products carry a five year parts  
and factory labor warranty, excluding vacuum  
tubes. See warranty statement for details.