

1972 EMPIRE GUIDE to Sound Design

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STEREO CARTRIDGES
SPEAKER SYSTEMS
TURNTABLE SYSTEMS



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1000
ZEX

EMPIRE

THE LONG PLAYERS by Empire Approved for 4 channel

Empire's top of the line cartridges, the 1000ZE/X and 999VE/X, now feature new high performance parameters designed for 4-channel capability. With even greater frequency response and compliance than ever before, these cartridges will track at forces so low they barely touch your records.

Empire cartridges are enthusiastically acclaimed by the experts; for example:

Stereo Review Magazine who tested 13 different cartridges rated the 999VE tops in lightweight tracking ability.

Hi Fi Sound Magazine called the 999VE "a real hi-fi masterpiece... a remarkable cartridge unlikely to wear out discs any more rapidly than a feather held lightly against the spinning groove."

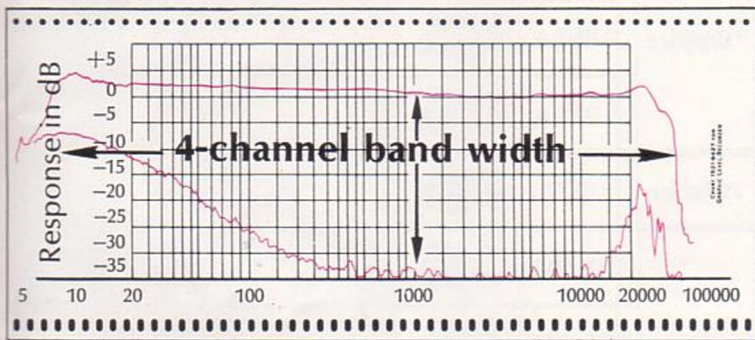
High Fidelity Magazine said of the 1000ZE "the sound is superb. The performance data among the very best."

Records and Recording Magazine stated emphatically that the 999VE stereo cartridge is "a design that encourages the hi-fi purist to clap his hands with joy."

FM Guide wrote "...using the 1000ZE. It works beautifully... giving great results."

Audio Magazine, observing a remarkable 35 dB stereo spread between left and right channels in the 999VE, said "Outstanding square waves. Tops in separation."

Popular Science Magazine picked the 999VE hands down as the cartridge for "the stereo system I wish I had" designed by Electronic Editor Ronald M. Benrey.



Frequency in cycles per second





999VE/X Professional—Recommended tracking force $\frac{1}{4}$ to $1\frac{1}{4}$ grams.

1000ZE/X Measurement Standard—Tracks as low as .1 gram in laboratory playback arms.

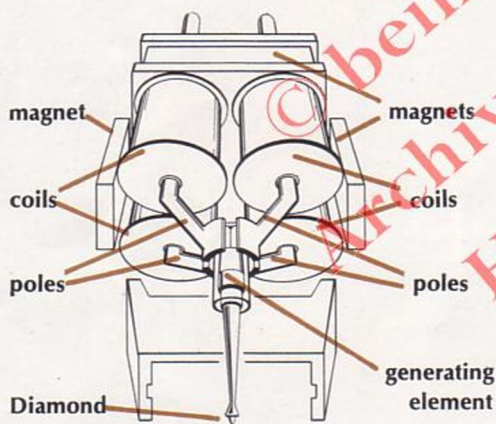
X Designates newest improved version



EMPIRE LONG PLAYING STEREO

















































Color	Model	Series	Technical specifications
	1000ZE/X	Measurement Std.	1000ZE/X tracks at 0.1 gram in laboratory playback arms. Individually adjusted for flat frequency response (± 1 dB) from 20-20,000 Hz. Separation 35 dB at 1 KHz; 25 dB or better to 20 KHz. No electrical or mechanical peaks. IM distortion at standard groove velocity does not exceed .05% at any frequency within the full spectrum. A .2 x .7 mil, hand polished diamond for extremely low mass.
	999VE/X	Professional	999VE/X stereo tracking force $\frac{1}{4}$ to $1\frac{1}{4}$ grams. Technical specifications same as 1000ZE/X with usable output to 40,000 Hz. Uses a .2 x .7 mil, hand polished miniature diamond. Recommended for high performance turntables and changers only.
	999TE/X	Deluxe	Surpassed in overall quality only by the 999VE/X and the 1000ZE/X, this cartridge combines high compliance with low tip mass for excellent tracking between $\frac{1}{2}$ and $1\frac{1}{2}$ grams. Full frequency response is 6-36 KHz, separation 35 dB, .2 x .7 mil, bi-radial hand polished elliptical diamond stylus.
	999SE/X	Deluxe	Delivers a fine frequency response of 8-32,000 Hz in top quality manual and automatic turntables and tone arms tracking at $\frac{1}{2}$ grams or less. .2 x .7 mil, bi-radial hand polished elliptical diamond stylus.

The Empire Cartridge—How It Works



Every Empire long playing cartridge is fully shielded. Four poles, four coils, and three magnets (more than any other brand) produce better balance and better hum rejection. There are no foreign noises with the Empire Cartridge. Perfectly magnetically balanced, with a signal to noise ratio of 80 dB, it features a moving magnetic element and stylus lever system .001 inch thick. The entire cartridge weighs only 7 grams—the ideal cartridge weight for modern compliance requirements.

Which Empire cartridge should you choose

AR	XA				
	810				
BSR	610				
	510				
Dual	1219				
	1218				
	1215				
Empire	598				
	498A				
	398A				
Fisher	502				
Garrard	0-100				
	SL-72B				
	SL-65B				
	SL-55B				
Miracord	770H				
	50H				
PE	2020				

CARTRIDGE IDENTIFICATION CHART

Technical specifications

Series

Model

Color

Designed to track from 3/4 to 2 grams in many of today's better changers. Will faithfully reproduce frequencies between 10-30,000 Hz, while maintaining 35 dB of channel separation. .3 x .7 mil, bi-radial hand polished elliptical diamond stylus.

Deluxe

999E/X



Perfect cartridge for popular automatic record players. Tracks 1 to 4 grams. A fine .4 x .7 mil, bi-radial elliptical diamond stylus, frequency response 12-25,000 Hz.

Popular

909E/X



A frequency response of 15-25,000 Hz. Tracked properly by record changers requiring up to 4 grams. .7 mil radius spherical diamond stylus.

Popular

909/X



With 1 1/2 to 4 gram tracking, this economy elliptical produces a frequency response from 15-25,000 Hz. .4 x .7 mil, bi-radial elliptical diamond. Great value for changers.

Economy

90EE/X



for these turntables and record changers?

				XA	AR
				810	BSR
				610	
				510	
				1219	Dual
				1218	
				1215	
				598	Empire
				498A	
				398A	
				502	Fisher
				0-100	Garrard
				SL-72B	
				SL-65B	
				SL-55B	
				770H	Miracord
				50H	
				2020	PE

The Empire 1000ZE/X Stereo Measurement Standard

The measurement standard 1000ZE/X stereo cartridge was designed to provide professional users such as recording studios, radio stations, scientific and engineering laboratories as well as serious audiophiles with the ideal standard for record playback evaluation.

With the ability to track effectively at stylus forces as low as .1 gram, the 1000ZE/X never subjects the disc whether it is a vinyl pressing or a master lacquer to any visible wear or groove deformation.

The Empire 1000ZE/X Stereo Measurement standard is recommended for professional users or serious audiophiles only.





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King of Turntables

The only turntable system designed exclusively for the new low-tracking-force cartridges that won't wear out your records.

New Troubador Model 598 exceeds every broadcast specification for professional playback equipment.



The extraordinary Troubador system features the Empire 990—world's most perfect playback arm. Built to last, with rugged precision foolproof adjustments. Arm friction measures a minute 1 milligram. Arm fully stereo balanced—front as well as rear pivots.

World's finest turntable motor, hysteresis synchronous type, self-cooling, high torque with inside-out rotor; reaches full speed in less than $\frac{1}{3}$ of a revolution and locks in on AC line frequency; maintains speed accuracy with zero error. Built-in strobe disc and pitch control.



Empire's exclusive pneumatic suspension combines pistons and stretched springs. You can dance, jump or rock without bouncing the stylus off the record. Tracks the world's finest cartridges as low as .1 gram.

Dead center cueing control—tone arm floats down or up from a record surface bathed in light. Pick out the exact selection you want—even in a darkened room.



Stylus force dialed with calibrated clock mainspring—more accurate than any commercially available pressure gauge.

Lowest fundamental resonance of any arm, an inaudible 6 Hz. makes it impossible to induce acoustic feedback in the system even when you turn up the gain and bass.

Micrometer calibrated anti-skating adjustment can be set exactly to match any operating force for conical or elliptical styli. Eliminates uneven record or stylus wear.



Empire's exclusive Dyna Lift automatically lifts the arm off the record at the end of the music.

Customized record mat holds records by outer rim. The playing grooves never touch the mat on any size record.

12-inch turntable platter and 3-inch thick balanced drive flywheel—most massive ever used in a home system.

Flexible belt drive precision ground to $\pm .0001$ in. tolerance.

Lowest rumble of any turntable tested—90 DB (RLL). Wow and flutter an almost unmeasurable .01%.

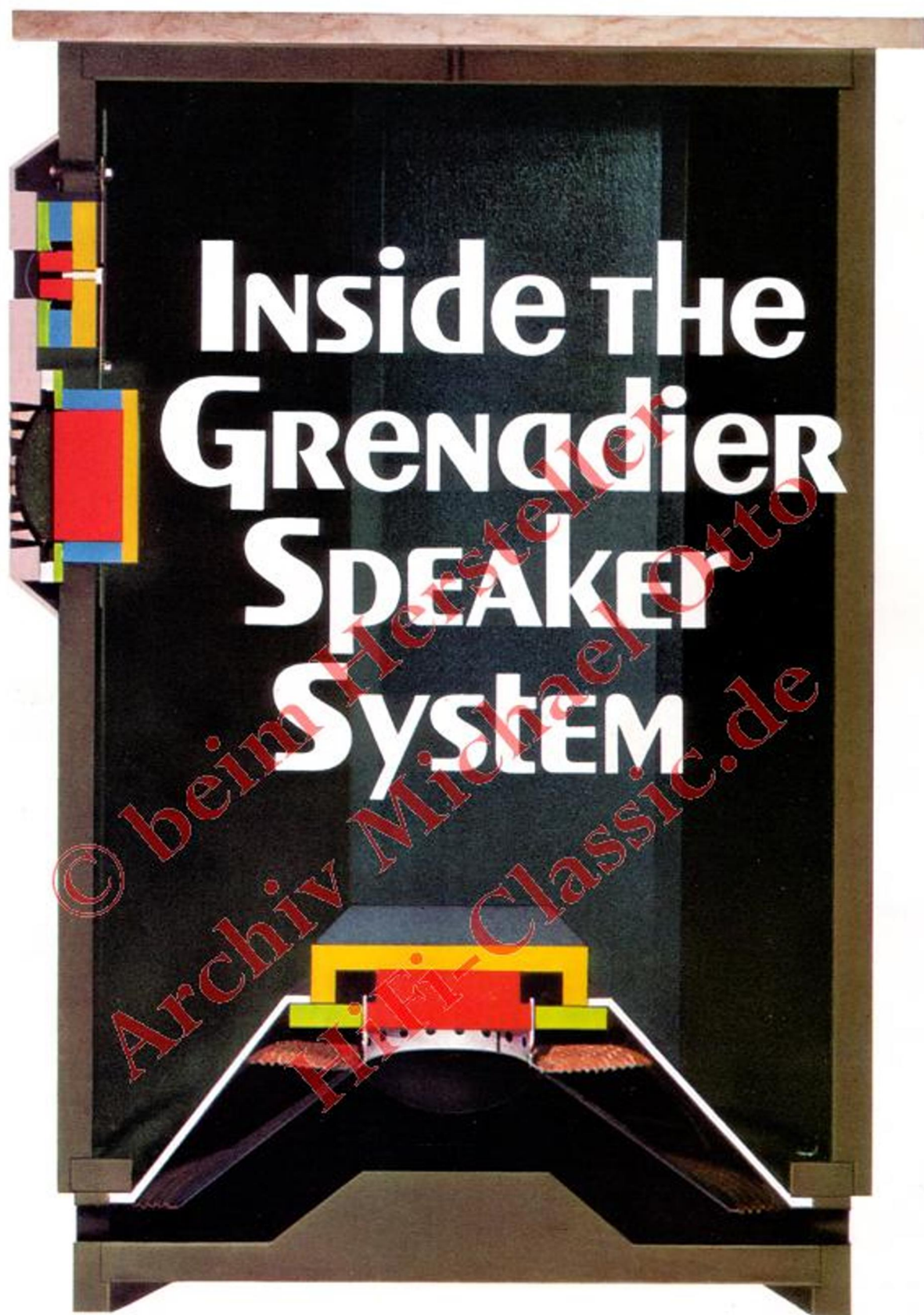
Microhoned oilite bearings and lapped chrome steel shafts machined as individually matched pairs—no production-line tolerances.

Instant cartridge demount and interchange.

In-line stylus-to-pivot axis. No warp, wow or cosine-distortion.

5-wire circuit eliminates ground loops.

TECHNICAL SPECIFICATIONS 3 speeds— $33\frac{1}{3}$, 45, 78 rpm • Push-button power control • Built-in 45 rpm spindle • Rumble—90 Db (RLL) • Wow and flutter .01% • Overall Dimensions (with base and dust cover): 17 $\frac{1}{2}$ " W. x 15 $\frac{1}{8}$ " D. 8" H. • Dimensions (without base and dust cover): Width 16", Depth 13 $\frac{1}{2}$ " Height above mounting surface: 3 $\frac{1}{4}$ " • Depth required below base plate 3 $\frac{1}{2}$ ". Swiss gold finish.



Historically, the shape of a musical instrument came from the requirements of the desired sound . . . thusly, the cylindrical shape of the Empire Grenadier Speaker system originated with the desire for thrilling all-around sound, and the mechanical and acoustical requirements necessary to achieve it dictated the configuration. Its shape is a function of its performance. Its performance, an achievement of design.

This unusual speaker system, free from room

standing waves, approaches acoustically flat frequency response. Sound level and tone remain constant virtually anywhere in the listening area. Its three divergent acoustic lenses achieve phenomenal stereo separation.

With the Empire Grenadier, stereo sounds like stereo in any room, in any arrangement. Superb presence and undeniable realism certainly unlike any speaker you've ever heard, emanate from a speaker unlike any you've ever seen.

Stereo is Everywhere

This unique stereo development means that you can use your Grenadiers anywhere. They need not be placed in corners or against walls. You do not have to sit where "X" marks the stereo spot. You can sit where you like, move as you wish and never lose the concert hall effect created by the one speaker system designed for complete stereophonic flexibility and fidelity.

Here's why:

EXCLUSIVE SONIC COLUMN is a totally damped and rigid speaker enclosure. There are no cabinet vibrations. The cabinet is fully braced against all modes of vibration.

THE WOOFER FACES DOWNWARD, close to the reflecting floor surface. It feeds through a front loaded horn with a full circle aperture throat. This provides 360 degrees radiation for full dispersion of sound and prevents standing waves from developing in the room.



THREE WAY SYSTEMS with massive woofer, mid range and tweeter drivers are used in all Grenadiers. The Empire Grenadiers are probably the most powerful home speakers in use today. They can each handle up to 400 watts of power per channel without burnout or overload. More than enough power to fill a large auditorium. No orchestral crescendo will ever distort or muddy the great Grenadier Sound.

LOW MASS VOICE COIL in this ultrasonic domed tweeter extends frequency response beyond audibility. A compression type mid range direct radiator creates spectacular presence and realism. Empire's patented diffraction ring type wide angle acoustic lens provides 160 degree dispersion, more than twice that of ordinary speakers.



COMPLETE SYMMETRY OF DESIGN with terminals concealed underneath. Speaker placement is not critical. Move it, turn it, aim it or bounce it. You get full sound, full separation, full stereo anywhere in your room.

FREQUENCY RESPONSE is achieved through a unique combination of electrical and acoustic crossovers and cutoffs to avoid woofer cone breakup and mid range response dips. The woofer, mid range and tweeter combine at mathematically correct crossover frequencies for lowest distortion.

Try this simple test

We urge you to take a few moments to try this simple test. Walk around an arc in front of the Empire Grenadier Speaker. You will notice no change in sound level of bass, mid-range and highs. No matter in which area you may be located, full frequency and separation is assured by Empire's exclusive divergent acoustic lens system.

Try this test with any other brand of speaker. Some speakers will only have a narrow angle of high frequency sound propagation. Some speakers may have 2 or even 3 bands of high frequency sound. With these other speakers, slight shifts of position, turning of one's head, or even leaning to one side may cause sharp changes in the listening tone and level.





A CONCERT HALL FOR THE MUSIC LOVING PERFECTIONIST THE GRENADE 7500M

Big sound with today's integrated receivers or any fine amplifier

This is the one that will turn you on even before it makes a sound! In your choice of either Satin Walnut or Antique Oak finish, with its imported marble top, it is as favored by decorators as it is by audio critics. A perfect unity of form and function, the 7500M is the finest achievement in sound reproduction that current technology can provide! Here's why:

THE WOOFER

Facing downward within the stereo cylinder is a 15-inch high-compliance woofer built around a heavy magnet structure. Unparalleled in precise response, this low frequency driver controls a voice coil that remains within the magnetic gap during even the widest excursion bass notes. Non-linear motion is eliminated, and with it the low bass distortion that less powerful drivers create. At 450 cycles, this woofer is cut out of the system electrically, by the crossover network, and also acoustically by its impedance-matched horn. Speaker cone break-up, a prime cause of distortion in woofers allowed to reproduce higher frequencies, is totally blocked by this extraordinary double cut-off.

THE MID-RANGE

The powerful mid-range direct radiator that reproduces the "heart" of the musical spectrum utilizes the same engineering combination of magnetic power, precise voice-coil control and perfect compliance for unsurpassed linear response and clean, clear, distortion-free sound. At 5,000 cycles, the same double cut-off takes place via the cross-over network and the acoustic impedance of the Grenadier's divergent lens.

THE SUPER-TWEETER

Highs are higher and purer than ever, thanks to the new 7500M tweeter. Our ultrasonic domed tweeter is precision-engineered to give you nothing but pure, undistorted, perfectly balanced music. The 7500M Grenadier has a power-handling capacity of 100 watts per channel—the ultimate protection against distortion, burn-out and uneven response, yet its efficiency is so great that a mere 20 watts of power is sufficient to drive it to ear shattering levels.

MODEL 7500M TECHNICAL SPECIFICATIONS—Extended response: 25-20,000 Hz • **Components:** 15 inch high compliance woofer, mid-range direct radiator, ultrasonic domed tweeter, coupled to Empire's wide-angle acoustic lens • **Crossover:** 450 and 5000 Hz • **Controls:** 3 position treble response switch • **Sound dispersion:** 360° spread for lows, 160° at high frequencies • **Minimum power requirement:** 20 watts • **Maximum Power Handling Capacity:** 100 Watts, undistorted per channel • **Impedance:** 8 ohms • **Elegant pedestal enclosure:** 20 inch diameter, 26³/₄ inches high • **Finish:** Satin Walnut or Antique Oak • **Top:** imported marble or matching finish



SPEAKER SYSTEM FOR THE PERFECTIONIST WITH A BUDGET, THE GRENADIER 6000M

The "In the Round" super-compact that delivers sound no "box" can provide

The Grenadier 6000M is the only popularly priced omni-directional speaker system of its kind. To provide a Grenadier for every budget, we reduced the size of our model 6000M, **not** the quality. Despite the price, the 6000M is a complete 3-way system featuring Empire's exclusive total stereo "in the round" design, down-facing 10 inch woofer, mid-range radiator and wide-angle ultrasonic tweeter, all in an absolutely rigid, non-resonating cylindrical type cabinet. With a power-handling capacity of 75 watts per channel, it can easily handle the most powerful receivers available today. Yet it's only 18 inches in diameter and 24 $\frac{3}{8}$ inches high!

NOTE: Like all the Grenadiers, there's no ugly, dust catching grille cloth. The finish and the sound—is all around!

MODEL 6000M TECHNICAL SPECIFICATIONS—Frequency response: 30-20,000 Hz • Nominal impedance: 8 ohms • Diameter: 18 inches • Height: 24 $\frac{3}{8}$ inches • Finish: Satin Walnut or Antique Oak • Top: imported marble or matching finish

* Prices slightly higher West of the Rockies.

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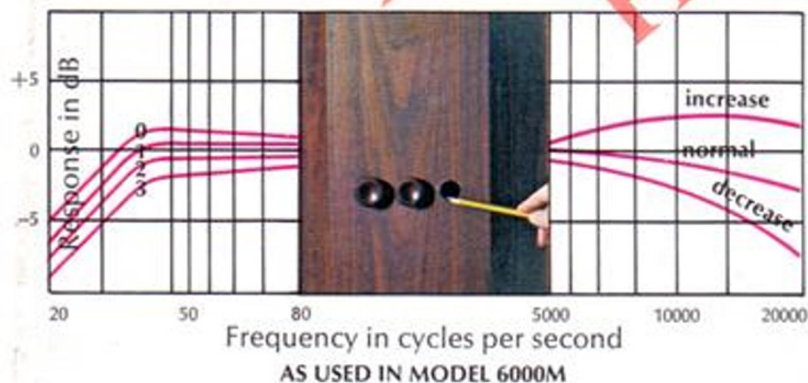
Going 4 channel?



The Empire Grenadier Speaker System provides the perfect answer for four channel sound. Four channel sound means 4 speakers in one room. It's no problem

when the speakers are functional and beautiful. Use the Grenadiers as end tables, pedestals or just speakers. They fit in any room, complement any style or decor.

AN EMPIRE EXCLUSIVE—DYNAMIC REFLEX STOP SYSTEM



BASS AND TREBLE ADJUSTMENT

The bass and treble response of your GRENADIER SPEAKER SYSTEM can be adjusted to suit your individual room acoustics.

A. A low frequency adjustment in 1 dB increments can be obtained by removing the Dynamic Reflex stops. Maximum bass as shown in curve is obtained with all stops out.

B. High frequency adjustment above or below normal response is switched without phase shift through a 3 position electronic circuit control located underneath the speaker.

LOW FREQUENCY REQUIREMENTS

1. You need more bass from your speaker:
 - a. in large rooms.
 - b. if speaker is located away from walls.
 - c. when room is heavily draped and carpeted.
2. You need less bass from your speaker:
 - a. in small rooms.
 - b. if speaker is placed against walls or in corners.
 - c. when room has hard wall surfaces.

HIGH FREQUENCY REQUIREMENTS

High frequency needs vary with individual hearing, room structure and speaker placement. The curve should be set for the sound most pleasing and natural to the listener.

The care that creates Empire quality

When you purchase any Empire product, you make an investment in precision engineering, painstaking craftsmanship, and enduring quality. We guard our unsurpassed reputation for quality by total control of the manufacturing process, from beginning to end.

Every speaker enclosure that carries the Empire label is built and hand-finished in our own woodworking plant. Our own machine shop creates the Empire-designed machine tools and precision parts which other Empire craftsmen use to make the individual components of our speakers, cartridges and playback systems.

As each Empire product is actually created, inspection and testing are virtually continuous. Diamond styli are microscopically examined and re-examined. Car-

tridges and styli must prove that they meet or exceed their individual specifications before they are packaged for shipment. Loudspeakers are optically inspected and electronically tested for precise frequency responses. Complete speaker systems are "auditioned" for sound dispersion and full fidelity in an acoustically "dead" test chamber. Turntables must pass exhaustive tests for speed accuracy and lack of "rumble."

In addition to this constant quality control, the engineers in our research and development division are perpetually engaged in "torture testing" all Empire components as they search for new ways to bring your home music system another step closer to ultimate perfection.



AN EMPIRE GUIDE to sound performance

A recommended sampling of full-frequency stereo recordings that provide a true test of perfectionist stereo-system performance.

Classical and Operatic

Bach: Organ Favorites/E. Power Biggs	Columbia	MS-6261	Hair / Original Broadway Cast	RCA Victor	LSO-1150
Bizet: Carmen/Price, Corelli, Merrill, Freni; Vienna Philharmonic, Karajan	RCA Victor	LDS-6164	Joe Cocker	A & M	4224
Brahms: Concerto #2 in B Flat Op. 83, Van Cliburn, Reiner, Chicago Sym.	RCA Victor	LSC-2581	John Barleycorn Must Die / Traffic	United Artist	5504
Carmina Burana / Phila. Sym. Orch. / Ormandy	Columbia	MS-6163	Let It Be / Beatles	Apple	34001
Dukas: The Sorcerer's Apprentice/Israel Philharmonic, Solti	London	STS-15005	Parsley Sage Rosemary & Thyme / Simon & Garfunkel	Columbia	CS-9363
Holst: The Planets/New Philharmonia Orchestra	Angel	36420	Pearl / Janis Joplin	Columbia	KC-30322
Mahler: Symphony No. 1/Boston Symphony, Leinsdorf	RCA Victor	LSC-2642	Tumbleweed Connection / Elton John	Universal	73096
Mascagni: Cavalleria Rusticana/Tebaldi, Bjoerling	RCA Victor	LSC-6050	The Turning Point / John Mayall	Polydor	244004
Prokofiev: Alexander Nevsky/Chicago Symphony, Reiner	RCA Victor	LSC-2395			
Rachmaninoff: Rhapsody on a Theme of Paganini/Op. 43/Boston Pops	RCA Victor	LSC-2678			
Schubert: Symphony No. 8 (Unfinished)/Pittsburgh Symphony, Steinberg	Command	(S) 11017			
Stravinsky: Firebird Suite/London Symphony, Stokovski	London	SPC 21026			
Tchaikovsky: 1812 Overture/Philadelphia Orchestra, Ormandy	Columbia	MS-6073			

On The Lighter Side

For the First Time/Mario Lanza	RCA Victor	LSC-2338
Oliver/Original Broadway Cast	RCA Victor	LSOD-2004
Pops Roundup/Boston Pops, Fiedler	RCA Victor	LSC-2595
That Philadelphia Sound/Philadelphia Orchestra, Ormandy	Columbia	MXZ-786
23 Glee Club Favorites/Robert Shaw Chorale	RCA Victor	LSC-2598
West Side Story/Soundtrack	Columbia	OS-2070

Jazz, Popular, Vocal and Miscellaneous

Fastest Balalaika in the West/Sasha Polinoff	Elektra	EKS-7212
The Forty Minute Raga/Ali Akbar Khan	Connoisseur Society	CS-2008
Great Songs of Love and Faith/Mahalia Jackson	Columbia	CS-8624
Hail the Conquering Nero/Peter Nero	RCA Victor	LSP-2638
In The Wind/Peter, Paul and Mary	Warner	(S) 1507
The Incredible Carlos Montoya	RCA Victor	LSP-2566
Johnny Puleo and his Harmonica Gang/Volume 2	Audio Fidelity	5859
Liza Minnelli	A & M	4141
Music from The Good, The Bad and The Ugly/Hugo Montenegro & his Orchestra	RCA Victor	LSP-3927
Non Stop Dancing '66/James Last Band	Polydor	237495
Saxes Mexicano/Claus Ogerman	RCA Victor	LSP-3640
South of the Border/Herb Alpert	A & M	(4) 108
Switched-On Bach	Columbia	MS-7194
Time Out/Dave Brubeck	Columbia	CS-8192
Trombones Unlimited	Liberty	LST-7449
The Wild Bull/Morton Subotnick	Nonesuch	H-71208

Contemporary

Abraxas/Santana	Columbia	KC-30130
Blood, Sweat & Tears	Universal	73096
Creedence Clearwater Revival	Pendulum-Fantasy	8410
Emerson, Lake & Palmer	Cotillion	SD-9040
Gold / Neil Diamond	Universal	73084

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