MDM-4

MIX DOWN MONITOR

FOR NEARFIELD MONITORING*

*NFM AND NEARFIELD MONITORING ARE TRADEMARKS OF E.M. LONG ASSOCIATES

CALIBRATION STANDARD INSTRUMENTS

SPECIFICATIONS: MDM-TA3

Frequency Response	±2dB 60 Hz to 20 kHz (4π Steradians, Free Field) ±3dB 45 Hz to 20 kHz (2π Steradians, Half Space)
Match Pair Response	±.5dB
Time-Alignment™	±15 Microseconds, 200 Hz to 16 kHz
Sensitivity	82dB/Volt/Meter
Power Required	1 Watt for 91dB SPL at 1 Meter
Power Recommended	120 Watt Per Channel Amplifier Minimum
Power Handling	40 Watts Continuous, 120 Watts Instantaneous Below 1kHz 15 Watts Continuous, 40 Watts Instantaneous Above 1kHz
Distortion	Less Than 3% Harmonic or I.M., 40 Hz to 20 kHz Typically less than 1% 100 Hz to 20 kHz
Impedance	94dB SPL at 1 Meter
System Type	Time-Aligned™ 3-Way, Ported (32 Hz Tuning) -3dB at 42 Hz
Crossover	Time-Aligned™ at 1.8 kHz and 7 kHz, Bass to Port at 68 Hz
Drivers	Two BD16/102B Bass, 160MM One MD7/38 Midrange, 70MM One TD 2/3 Treble, 20 MM
Enclosure Volume	37 Liters (1.3 Cubic Feet)
Enclosure Dimensions	483MM x 406MM x 298MM 19" x 16" x 11¾"
Finish	Rosewood Laminate on A Surfaces
System Weight	16KGM NET, 19 KGM Shipping 35 LBS. NET, 42 LBS. Shipping

The MDM-TA3 is a compact, full range TIME-ALIGNED™ monitor designed for use at moderate listener distances (from four to eight feet) in small monitoring environments. Because it is designed for 2π steradian operation, mounted against or flush into a wall. It was possible to design the MDM-TA3 to have an extended low frequency response which is, typically, —3DB at 42 Hz. The 2 cm diameter treble driver makes possible, response to over 20 kHz, with excellent dispersion. The coherent output due to TIME-ALIGNMENT™, helps greatly in overcoming "acoustic noise" due to reflections and thus, the MDM-TA3 can be used at greater distances than ordinary monitors. The MDM-TA3 is a valuable tool in assessing the quality of recordings.

Each component that goes into an MDM-TA3 is thoroughly tested. Each TIME-ALIGN™ crossover is tested and must hold a tolerance of ±.25 DB. Each driver is tested using computer controlled laboratory grade acoustical measuring equipment. Since the MDM-TA3 monitors are made as mirror image pairs, the drivers which make up each pair, are held to very close tolerance and are selected as matched pairs. The response characteristic curves for each driver and complete MDM-TA3 are kept on file so that, should the need arise for replacement, components with matching characteristics may be supplied. The enclosures for the MDM-TA3 are constructed of high density, acoustically inert, particle board, and veneered on all six sides with rosewood plastic laminate. This greatly reduces enclosure coloration effects which are present in ordinary designs. The MDM-TA3 is designed for professionals.

A front mounted plate allows easy access to the three position midrange and high frequency switches. These switches can be used to adjust the monitor for original master recordings and for auditioning test pressings. Separate fuses for the bass, mid and treble drivers are also provided on this plate. It is quite easy to flush mount the MDM-TA3 since only the input connector is on the rear of the enclosure.

SPECIFICATIONS: MDM-4

Frequency Response	±3dB 70 Hz to 17 kHz (4π Steradians, Free Field) ±5dB 60 Hz to 20 kHz (4 Steradians, Free Field)	Impedance	8 OHMS Nominal, 5 OHMS Minimum
		System Type	Dual Woofer, 2-Way, Ported with Velocity Control High Pass Filter
Matched Pair Response	±.5dB	Crossover	Equalizer-Filter Type at 1500 Hz
Time Offset	Less Than 100 Microseconds 200 Hz to 16 kHz	Drivers	Two BD16/102A Bass, 160 MM
			One TD7/38 Mid-High, 70 MM
Sensitivity	80dB/Volt/Meter	Enclosure Volume	27 Liters (.95 Cubic Feet)
Power Required	1 Watt for 89dB SPL at 1 Meter	Enclosure Dimensions	483MM x 330MM x 248 MM 19" x 13" x 9¾"
Power Recommended	100 Watt Per Channel Amplifier Minimum	Finish	Rosewood Laminate, Aluminum Trim, Brown Grille
Power Handling	40 Watts Continuous, 100 Watts Instantaneous Below 1 kHz 15 Watts Continuous, 40 Watts Instantaneous Above 1 kHz	System Weight	11.4 KGM. NET, 12.7 KGM Shipping 25 lbs. NET, 28 LBS Shipping
Distortion	Less Than 5% Harmonic or I.M., 60 Hz to 20 kHz Typically Less Than 1% 100 Hz to 20 kHz 94dB SPL at 1 Meter		

NFM* AND MDM-4: A NEW MONITORING METHOD AND A NEW MONITOR

A novel method of precision monitoring, NEAR FIELD MONITORING* (NFM*), is now possible thanks to the MDM-4 MIX-DOWN-MONITOR. The MDM-4 has been designed by E. M. LONG ASSOCIATES specifically for NFM* applications in radio, recording, disc cutting and record plant quality control. The new monitoring method allows the best points of both distant loudspeaker and headphone monitoring. The ability to determine phasing effects and pan positioning, which are only possible by distant loudspeaker monitoring, are retained but the room effects are all but eliminated. The MDM-4 is a full range (50Hz to 20 kHz) monitor of compact dimensions (19" wide, 13" high, 9¾" deep) which can be mounted close to a control desk, mixer, or cutting system. The MDM-4 should be mounted with about 3 feet between the inside edges of the enclosures and angled inward so that the center of each enclosure is about 3 feet from the central listening position. Room effects are thus eliminated, as they are with headphone monitoring, while the ability to move across the listening field to check phasing, comb filter effects and panning accuracy, is retained. Until now, this method of monitoring has been only partially successful by using single driver, narrow range, cube type speakers. The near field driver phasing effects of larger, full range loudspeakers has precluded their use for NFM* applications. The MDM-4 has been designed specifically for NEAR FIELD MONITORING* by causing the acoustic output of its three drivers to be blended to produce a plane wave radiation within 50 centimeters from the center of the baffle. The MDM-4 was also designed to radiate flat acoustic output under 4π steradian conditions, up and away from nearby surfaces. A novel velocity controlled sub-sonic tuning system causes a 4 fold reduction in low frequency distortion while restricting bass driver motion at sub-sonic frequencies which could cause modulation distortion and even possible damage.

Professionals expect precision in the alignment tapes, test records and electronic test instruments which are used to insure that their consoles, tape machines and associated electronic devices are capable of optimum performance. The MDM-4 MIX-DOWN-MONITOR is the first precision monitoring loudspeaker which is individually calibrated and documented for use by professionals.

Each MDM-4 is subjected to over 20 special procedures and tests to insure uniformity. The drivers used in the MDM-4 are carefully built and individually tested, using special quality control equipment developed by E.M. Long Associates. They are not standard, commercial drivers. The crossover networks are also carefully built and tested. After each system has been completely assembled it is thoroughly tested for polarity, power handling, system resonance, frequency response and impedance. It is auditioned against an MDM-4 reference standard using pink noise input. Any MDM-4 which does not pass these tests is rejected and reworked until it does pass. Each MDM-4 which passes these difficult tests is assigned a serial number. A free field, anechoic frequency response curve is then run using Bruel & Kjaer acoustic measuring equipment. This frequency response curve is then packed with the particular MDM-4.

NEAR-FIELD-MONITORING™ is monitoring in which the listener is within 1 meter of each loudspeaker; each spaced within 1 meter of the other and having a time offset of less than 100 microseconds from 200 Hz to 5000 Hz.

Although the MDM-4 MIX-DOWN-MONITOR and the MDM-TA3 TIME-ALIGN™ monitor use similar bass drivers and have certain other similarities, they are very different in important ways. This is because they are each intended for specifically different applications.

All of the design parameters of the MDM-4 were specifically oriented toward producing an ideal NEAR-FIELD-MONITOR™. The acoustic output of the MDM-4 is focused very accurately to a point directly opposite from the center of the enclosure. The coherence remains relatively uniform over ±30 degrees in the horizontal plane. It is also designed to produce flat acoustical output while operating away from walls, floor and ceiling, as it is when placed over the meter deck of a recording console. Trade-offs are made by sacrificing the extreme top and bottom of the frequency range in order to achieve an extraordinarily smooth and coherent middle register, good sensitivity, power handling, and compact size.

The MDM-4 is ideal for use in producing original recordings and mixdowns. It is not an "exciting" loudspeaker. It is a valuable tool intended for professional recording engineers to allow them to hear more accurately what they are doing and therefore to help them to produce better recordings. The MDM-4 is not recommended for use at distances greater than about four to six feet from the listening position, three feet being the ideal distance. They can be used closer than three feet, if necessary, since the design distance was 50 CM or about 19 inches.

The MDM-TA3 was designed for use further back from the listening position. The TIME-ALIGNMENT™ allows the MDM-TA3 to project a very coherent acoustical output at a greater distance by overcoming the "acoustical noise" or interference caused by reflections from nearby surfaces in the listening environment. It should be used mounted on or flushed into a wall. While the treble driver of the MDM-TA3 allows the extreme high frequencies to be produced very accurately, its placement to the side of the midrange driver means the MDM-TA3 can not be used as close to the listener as the MDM-4. The MDM-TA3 is excellent as a quality monitor especially in less then ideal listening environments as are sometimes used for editing, disc cutting, or evaluating demo tapes, etc.

PARTIAL LIST OF USERS

Academy for Science, Livingston Manor, NY
Alembic, Santa Rosa, CA
Alivity Productions, Sherman Oaks, CA
Chet Atkins, Nashville, TN
Audio Media Recorders, Nashville, TN
Automatt, San Francisco, CA
Axis Sound, Atlanta, GA
Bay Sound, Oakland, CA
Calf-Celebration Recording, Ithaca, NY
Capricorn, Atlanta, GA
CFRB Radio, Toronto, Canada
Tom Collins, Nashville, TN
Compass Point Studios, Nassau, Bahamas
Cornell University, Ithaca, NY
Covenant Recordings, Salt Lake City, UT
Creative Sound, San Jose, CA
D.O.G. Percussion, Nashville, TN
Gail Davies, Nashville, TN
Disc Works, Schumberg, IL
Don Digerolamo, Los Angeles, CA
Eddy Offord, Woodstock, NY
Gene Eichelberger, Nashville, TN
Electra/Asylum Records, Nashville, TN
Fame Recording, Muscle Shoals, AL
Fantasy Records, Berkeley, CA
Donna Fargo, Nashville, TN
Victor Feldman, Los Angeles, CA
Fidelity Research of America, Ventura, CA
Filmways/Heider, San Francisco, CA
Flux Recording Studio, Santa Cruz, CA
Footprint Sound, Sherman Oaks, CA
Generation Music, Newport, OR
Gilley's Recording Studio, Pasadena, TX
Gwen Record Service, Albany, GA
Head Master, Atlanta, GA
Hedden West, Schumberg, IL
Innovonics, San Leandro, CA
John Altmann Recording, San Francisco, CA
KEZR Radio, San Jose, CA
L.S.I., Nashville, TN
Litle Bird, Lincoln City, OR
Magnetic Reference Lab, Mt. View, CA
Barbara Mandrell, Nashville, TN
Elliot Mazer, San Francisco, CA
Ronnie Milsap, Nashville, TN
Andy Morris, Los Angeles, CA
Motown Recording, Los Angeles, CA
Muscle Shoals Sound, Sheffield, AL
Ocean Way, Hollywood, CA
Pablo Cruise, Mill Valley, CA
Power Sound, Marietta, GA
Prarie Sun Recording, Cotati, CA
Producer's Workshop, Nashville, TN
Purple Shield, Baton Rouge, LA
Quadraphonic, Nashville, TN
Radio Band of America, New York City, NY
Rumbo Recorders, Canoga Park, CA
Sensa, Sunnyvalle, CA
Sonoma Recording, Cotati, CA
Sound Lab, Nashville, TN
Sound Market Recording, Chicago, IL
Soundsmith Recorders, Indianapolis, IND
Soundstage, Nashville, TN
Streeterville, Chicago, IL
Studio C, Stockton, CA
Tewksbury, Richmond, CA
Tree Studio, Nashville, TN
Triad Productions, Des Moines, IOWA
20th Century Fox, Los Angeles, CA
United Sound Systems, Detroit, MI
Unregulated Record Co., College, Alaska
Village Recorders, Los Angeles, CA
Westsound Recording, Olympia, WA
WHN Radio, New York City, NY
Woodland Sound Studio, Nashville, TN
WPCH, Atlanta, GA
WWSH Radio, Bala Cynwyo, PA
Reggy Young, Nashville, TN

FOR INFORMATION AND DEMONSTRATION

STATE	CITY	PHONE	CONTACT
Arizona	Scottsdale	602-263-9071	John Michaelson
California	Fresno	209-251-4213	Bob Martin
California	Hillsborough	415-344-1133	Brian Trankle
California	Hollywood	213-467-9375	Allen Sides
California	Oakland	415-652-1553	Jim Matthews
California	Sacramento	916-444-5491	Walter Holsting
California	San Francisco	415-285-8900	Bob Ullius
California	San Jose	408-297-7111	Ron Timmons
California	San Leandro	408-438-4273	Ted Tripp
California	Santa Cruz	408-427-0670	Richard Gellis
California	Stockton	209-477-5130	Thomas Chen
California	Upland	714-985-0701	Ron Sundell
California	Visalia	209-732-8928	Bob Tow
Florida	Ft. Lauderdale	305-771-0714	Camilla Taylor
Georgia	Smyrna	404-436-3024	Les Duncan
Illinois	Barrington	312-382-4550	Jim Wischmeyer
Iowa	Des Moines	515-243-2125	Richard Trump
Kentucky	Paducah	502-554-2722	Tom Morris
Louisiana	Baton Rouge	504-924-1001	Paul Kadair
Louisiana	Shreveport	318-865-0282	Jim Faber
Michigan	Ann Arbor	313-994-0934	Henry Root
Minnesota	Minneapolis	612-729-8305	John Borman
New Jersey	Teaneck	201-692-0010	Irv Joel
New York	Ithaca	607-272-8964	Barney Cole
New York	New York	212-674-6934	David Andrews
Ohio	Cincinnati	531-574-2551	Chuck McConnell
Pennsylvania	Pittsburg	412-471-6220	Norman Cleary
Tennessee	Nashville	615-227-5027	Denny Purcell
Tennessee	Nashville	615-383-4737	Bob Todrank
Washington	Tacoma	206-759-4701	Rob Denbrook
Wisconsin	Madison	608-257-0678	Steve Liethen
Bahamas	Nassau	809-372-8282	Richard Lee
Canada	Toronto	416-252-3761	Gordon Ballantine
Australia	Double Bay	(02)-32-5578	Robert Grunburg

TIME-ALIGN® loudspeakers truly represent a major breakthrough in loudspeaker design because they can reproduce complex transients more accurately than conventional loudspeakers. The TIME-ALIGN® trademark on a loudspeaker is your assurance that it has been designed to reproduce complex transient sounds with the same time and intensity relationships which are present in the electrical input signal to the loudspeaker.

Until the advent of TIME-ALIGN® , the principal criteria for determining the quality of a loudspeaker was its amplitude (intensity) vs. frequency response. The more "flat" the frequency response, the better. Yet, when auditioning two loudspeakers, listeners, sometimes, would prefer the loudspeaker with the less "flat" response! Obviously, a simple two dimensional amplitude vs. frequency response plot is not sufficient to determine the quality of a loudspeaker.

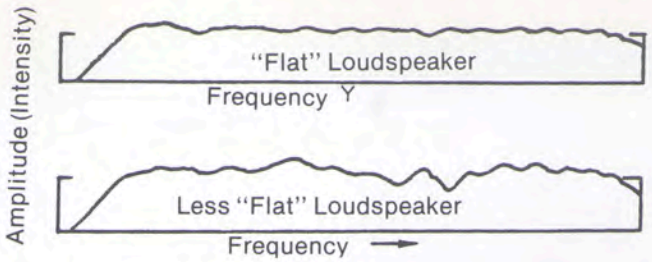
TIME-ALIGN® LOUDSPEAKERS

All transient sounds in nature have, by definition, a beginning and an end. The start of a transient sound is very important in determining both the quality of the sound and the position of its source relative to the listener. It is easy to understand why the accuracy of a loudspeaker is dependent upon its ability to reproduce both time and intensity information exactly as it appeared in the original sound.

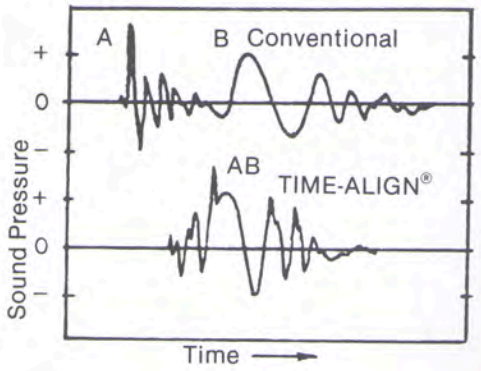
A loudspeaker designed using the propietary TIME-ALIGN® technique will reproduce both the time and intensity information present in the original sound with a degree of accuracy here-to-fore unattainable. Of course, this means a dramatic improvement in realism. In the time vs. intensity display of the sound of a "handclap", the conventional loudspeaker causes the high frequency (A) to appear before the low frequency (B) part of the signal. Realism is lost.

TIME-ALIGN® IS STATE OF THE ART

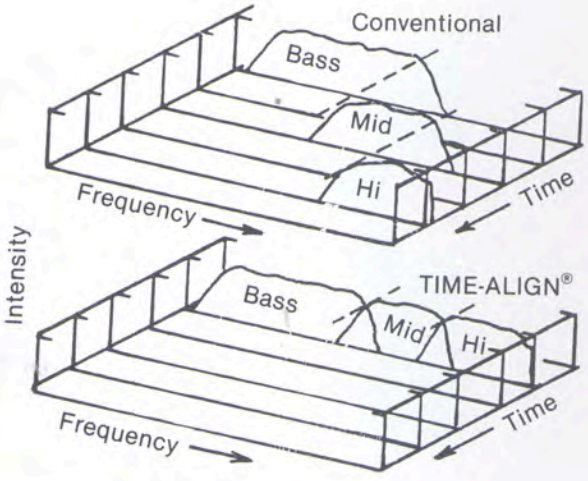
During the original research on TIME-ALIGN® it became apparent that the conventional methods of displaying amplitude (intensity) vs. frequency and intensity vs. time information were inadequate. What was needed was a display which described the three parameters of intensity, frequency and time in an inter-related way. By developing such a display, the response of a loudspeaker could be seen in a way which had never been available before. The main advantage of the proprietary TIME-ALIGN® generator and display is the ability it provides to see and correct defects in a design immediately. Such a powerful design technique has never before been available. A powerful computer controlled digital laboratory measurement system provides additional data which assures that a loudspeaker bearing the TIME-ALIGN® trademark is state-of-the-art. Recording studios around the world are now using monitors which are TIME-ALIGNED® . Professional recording engineers and performers have come to rely upon the accuracy of their TIME-ALIGNED® loudspeakers.



In some cases, listeners have chosen a less "flat" loudspeaker as sounding more realistic that a "flat" one! It seems that a simple 2-dimensional plot of amplitude vs. frequency is insufficient to describe the quality of a loudspeaker.



The sound of a handclap. In a conventional loudspeaker the high frequency overtones (A) appear before the fundamental frequency (B). With TIME-ALIGN® , both sounds (A) and (B) appear together as in nature. (Note the asymmetry which indicates correct polarity is also important for realism.)



TIME-ALIGN® assures that the sound from each driver is lined up exactly.

CALIBRATION STANDARD INSTRUMENTS
PO BOX 2727 OAKLAND, CALIFORNIA 94602 94602