

audio record

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audi discs
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Fine sound in the making, by Fine Sound, Inc. George Piros (left) tends the Margin Control while cutting a long playing master, as Bob Fine (right) adjusts the recording level. Equipment shown includes a Fairchild tape recorder and Fairchild Model 523 Disc Recorder with Miller cutterhead specially made to Fine Sound specifications. Story on Page 2.

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The Inside Story of FINE SOUND, Inc.

by Leon A. Wortman

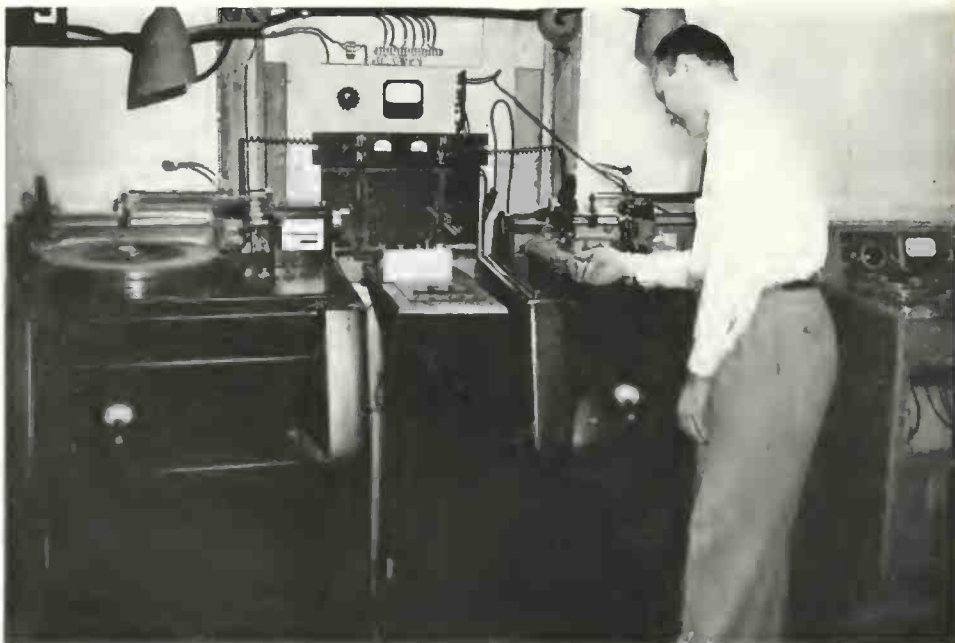
Literature and history may have their "Horatio Alger" to boast about, but the recording industry and Tomkins Cove have their "Fine Sound, Inc." Tomkins Cove is a historic small town (pop. 1500) 40 miles up the west bank of the Hudson River from Manhattan, and that's where Fine Sound, Inc. is located. "Fine" isn't a play on words or a bad pun. It's the name of the company's president, C. Robert Fine, one of the best known and most ingenious engineers in this field of recording.

Skipping a few periods of chronology and the details of the years spent as a lad shaving wax masters, inspecting styli, learning how to service and adjust equipment and make masters for a living, "Bob" Fine's career has carried him through positions as Chief Engineer of Majestic Records, and Chief Engineer of the Disc and Tape Recording Divisions of Reeves Sound Studios. In March of this year he fulfilled a normal American ambition for independence by establishing Fine Sound, Inc.

Bob's ingenuity is responsible for so many of the modern recording techniques that equipment manufacturers, inventors and recording engineers often seek his advice and opinions on new products and ideas. He developed and made practicable such techniques of recording as varying the pitch and depth of cut while actually making a lacquer master. This technique, called Margin Control, enables a fantastic and true dynamic range of audio to be actually put on the disc. In effect, Margin Control physically spreads the music grooves on forte passages to avoid over cutting and making a reduction in loudness unnecessary. Years of practice and developmental efforts with this technique enabled Bob to overcome the electro-mechanical difficulties of such an "apparently simple" answer to the problems of recording full dynamic ranges and to teach this trick-of-the-trade to his engineers George Piros and Steve Robb. In gratitude and tribute, his clients voluntarily imprint the legend "FINE MARGIN CONTROL" on their record labels and sleeves.

Fine Sound's staff is also credited by many to have made the extended 45 rpm discs long before the industry talked about making them generally available. For a number of years they've been making long-playing 78's for a client who, based on the volume of repeat orders he gives to Fine Sound, must be finding that they have a profitable market.

Years ago Bob produced a 7" diameter 78 rpm disc that gave the equivalent of



Engineer George Piros, of Fine Sound Inc., keeps one eye on the stopwatch, while cutting a 78 rpm playback to check recording quality. Equipment shown includes two Fairchild disc recorders and Ampex tape recorder.

a 10" disc's playing time. The record industry has only now realized its commercial values and several of Fine Sound's clients find themselves in the fortunate position of being able to swing-over to what may be a new standard any time they give the instruction.

Bob and his crew are a resourceful group. They believe that man has harnessed the electron and the machine and they proceed to put both efficiently to work for them when the heavy pressure is on. For example, when the 7" 45-rpm disc was first introduced and the race was on among the record companies to re-release their catalogs of popular selections in the new size and speed, Bob's clients were able to convert and get into the new competition so quickly that the whole industry did a "double-take" and buzzed with admiration. What they'd done, with the cooperation of the Fairchild Recording Equipment Corporation's engineering department, was to develop a device which, attached to a group of Fairchild Disc Recorders, made them operate completely automatically — lowering the cutter to the disc, spiralling in, cutting the music grooves, spiralling out to the start of the eccentric, lifting the cutter and stopping the turntable — all automatically; only one man to load and

unload the disc recorders.

We could go on and on about the things the Fine Sound gang has done, but they find the future and the things yet undone more exciting to talk about. They are all excited, for instance, about their latest project (which should be receiving public notices about the time of this article's appearance) with the New York opening of the new Broadway drama "See The Jaguar". Fine did the extraordinary music and sound effects which are used intermittently throughout the play. The "sound", for want of a more precise description of what comes out of the multiple loudspeakers, travels around the walls, ceiling and curtain of the Cort Theatre where the play is scheduled. It actually seems to whirl around, faster and faster, stop suddenly, reverse its direction, disappears into the side wall and suddenly reappears from the roof. Those that have heard it claim it's incredible! It's all done electronically and automatically. Originally planned for release with another special project due in late 1953, they couldn't resist the temptation of introducing it in 1952, when the producers of "See The Jaguar" called on them to do what they thought would be conventional sound effects recording. You'll

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Fine Sound

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have fun trying to figure out how they achieved the effects after you hear them.

The Company's own specially built mobile-location truck, fitted with synchronous magnetic tape recorders, complete mixing equipment, 16-mm motion picture cameras and its own 10-kw power generator is kept busy to a degree which is about 200% more than the anticipated load. Each year the truck and a crew headed by Bob Fine spend about 10 weeks travelling Europe doing documentary film work and original sound recording on assignment for a humanitarian foundation and a major recording company. The rest of the year the truck travels the circuit of New York, Rochester, Chicago, Minneapolis, Detroit and other major cities. There Fine Sound does original recordings of soloists, chamber groups, and symphony orchestras for the famous Olympian Classics series of the Mercury Record Corporation. The Olympian series is recorded under the administrative direction of David Hall, Director of Mercury Classics. Incidentally, Audiodiscs are used exclusively for the lacquer master recording of the Olympian series.

After less than a year of operation, the Company is probably one of the healthiest in the industry, doing a far larger volume of business than was anticipated and expanding into new fields at least a full year ahead of schedule.

The NEW LOOK in Audiotape Packaging



Here's what the well dressed Audiotape will wear when on display in wholesale and retail stores. This five-reel package is designed for easy conversion to an attractive counter display, simply by folding the top cover on a scored center line and tucking the front flap behind the tape boxes in the package. One of these new counter display packages is now included at no extra cost in every carton of 10 or 30 reels of plastic base Audiotape in the popular 7-inch and 5-inch reel sizes.

Porpoise Palaver Put on Tape

More Than 20 Distinct Under-water Porpoise Sounds Have Been Recorded at Florida's Famed Marine Studios

"There are more things in heaven and earth, Horatio, than are dreamt of in your philosophy." In this famous quotation, Shakespeare might well have included "under the sea". For here, in the mysterious realm of marine life, are wonders concerning which the knowledge of man is very limited. But even now, the veil is being lifted — through patient and painstaking scientific research.

In the study of under-water sounds, for example, very interesting progress is being made at the Marine Studios in Marineland, Florida. This huge oceanarium — a mecca for tourists from all over the world — is ideally suited to such examinations. Its two great tanks are populated with an impressive variety of deep sea denizens, under conditions closely approaching their natural environment. And the 200 glass portholes, located at various levels, give an excellent view of every portion of the interior.

One of the biggest attractions at the Marine Studios is "Flippy" the porpoise, whose playful antics and seeming intelligence are a continual source of amazement to visitors. The porpoise, of course, is not really a fish at all — but a mammal. It has no vocal cords. Yet experiments have proved beyond a doubt that the porpoise actually can emit audible sounds. Tape recordings of these sounds, picked up by a hydrophone, or under-water microphone, provide valuable material for study by experts in undersea life.

Mr. F. G. Wood, Jr., Marine Studios curator, explains this recording work as follows:

Equipment used for the under-water recording includes a U. S. Navy Projector Type CFF-78187 (which is capable of both



Mr. F. G. Wood, Jr., curator of Marine Studios, makes an under-water tape recording from one of the lower level observation stations. The hydrophone, suspended inside the tank, can be seen through the window.

pickup and transmission under water), an amplifier, speaker or headphones, and an Eicor tape recorder.

The investigations are primarily concerned with sounds audible to the human ear and their significance with regard to the activity or behavior of the porpoises. The two species so far recorded include the bottle-nosed porpoise or dolphin and the spotted or long-snouted porpoise.

The sounds which they have thus far produced include whistles, barks, yelps, chirps, snorts and mewing and rasping noises. Twenty distinct varieties of these sounds have been recorded. Their exact significance is not yet understood, although some of the sounds appear to be correlated with emotional states such as fear or excitement. A baby porpoise separated from its mother, emits constant high-pitched whistles. The mother reacts to these whistles and may locate her offspring by means of them.

Some of the sounds — such as whistles — can be clearly heard above the surface of the water. Others are audible only through Hydrophone. Previous studies made by visiting scientists at Marine Studios have revealed that porpoises can hear sounds well above the range of human hearing, and it appears likely that they may be capable of producing such sounds, although there is as yet no reliable data to substantiate this.

This sound recording technique opens up an entirely new field of marine research — one which may eventually give us a much better understanding of life under the sea.



"Flippy", the loquacious porpoise, flips skyward to snatch a fish from the attendant's hand, at Marine Studios, Marineland, Florida.

Binaural Tape Recordings Aired on Separate FM and AM Channels

Station WQXR Conducts Historic Three-Dimensional Broadcast

One of the many important conclusions reached by those who attended the Audio Fair held at the Hotel New Yorker on Oct. 28 - Nov. 1, was that binaural sound is here to stay.

In theory, binaural sound is not new. But it is only recently that standard equipment has been made commercially available for binaural recording and reproduction.

The effect of binaural sound on the ears has been compared to that received by the eye viewing stereoptican photographs. Ordinary broadcasting and recording methods are like ordinary photographs — the scene is captured, but the space relationship, the feeling of presence, the "third dimension" is lacking.

With binaural hearing, the music or speech is received as it originates. The person on the left is heard on the left. Those in the rear are heard in the rear. The progress of a person moving across the stage can be followed. It is possible to focus on a single instrument or voice.

Binaural sound in all its startling realism was much in evidence at the Audio Fair. In the Magnecord exhibit room, for example, the new Binaural Magnecorder was convincingly demonstrated with properly spaced loudspeakers as well as with binaural headphones.

When either of the two channels was switched off, the music suddenly fell "flat" by comparison — then miraculously came alive again when both channels were switched on.



Here's a portion of one of the enthusiastic crowds that jammed the main ballroom of the Hotel New Yorker for the Magnecord binaural sound demonstration during the Audio Fair in New York.

In tape recorded binaural sound, one "track" of the tape is used for each channel. Thus program material picked up from the left hand microphone is separately reproduced through the left hand speaker, and the right hand speaker plays back exactly what was "heard" by the right hand microphone.

Of special interest to both recording and radio engineers, however, were the binaural broadcasts aired over Radio Station WQXR and WQXR-FM in conjunction with Magnecord and the Audio Fair. This marked the first binaural radio broadcast utilizing FM and AM for the separate "right hand" and "left hand" channels.

In ordinary broadcasting, when both FM and AM stations are airing the same program, the sound is picked up in the studio from a number of microphones and blended in the control room. The same blended sound is then sent to the AM and FM transmitters for airing. The radio wave is picked up in the home on either AM or FM and heard through a single amplifier and speaker, like hearing with one ear.

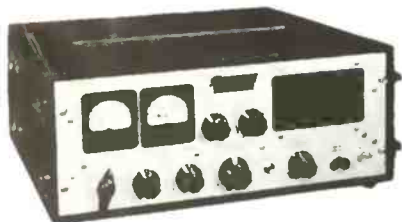
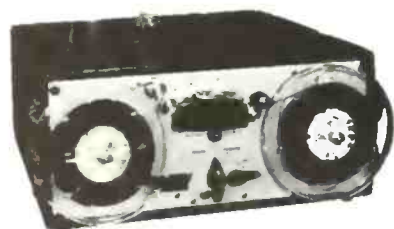
In this binaural transmission, the sound was picked up by two microphones placed a short space apart. The signal from one microphone was fed through the control

room to the AM transmitter, the other to the FM transmitter. There was no blending and the signals were kept separate. To receive the binaural effect in the home, the listener required only an AM radio and an FM radio — both tuned to station WQXR, and placed at opposite sides of the room. Fred Grunefeld, producer of WQXR's "Music Magazine" instructed the radio audience in the proper adjustment of its AM and FM receivers to obtain the binaural "two-ear" listening effect.

Arrangements for the exclusive WQXR demonstration were made by James E. Kovach, WQXR Station Manager, with the Audio Engineering Society's Executive Vice President F. Sumner Hall, Harold T. Sherman of the Society, and Richard S. McQueen, advertising manager of Magnecord, Inc.

Two binaural broadcasts were transmitted — one on Oct. 29 and the other on Oct. 30, at 9:05 P.M. The first broadcast featured binaural music Magnecord on Audiotape; the second featured a live orchestra under the direction of Jascha Zayde and the WQXR String Quartet. A press preview was held at 5:30 P.M. preceding the first broadcast on Oct. 29, in the Grand Ballroom of the Hotel New Yorker. Later the Ballroom was opened to the public to hear the binaural broadcast. McIntosh Amplifier and Electro-Voice Speaker manufacturers shared with Magnecord in the Ballroom presentations.

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Magnecord Model PT6-BAH binaural recorder and Model PT6-BN binaural amplifier, used during the Audio Fair demonstrations and for the historic WQXR binaural broadcast. Equipment includes separate input and output channels for each of the two sound "tracks".

Binaural Broadcast

(Continued from Page 4, Col. 3)

After the completion of these historic binaural broadcasts, comments from listeners started pouring in to Station WQXR's booth at the Fair. Generally speaking, everyone was thoroughly delighted, pleased, surprised and excited over the whole thing. There were a few exceptions of course. Trouble, where encountered, was due mostly to fading or interference on the AM channel or poor quality of the AM receiver used. Here are a few typical listener comments:

ROCKVILLE CENTRE, N. Y.: "Binaural sound is the greatest thing since FM came on the scene — it's just too bad we can't get the fidelity of two FM sets. Please keep up the experiments we would like it to become a permanent thing."

BROOKLYN, N. Y.: "I sincerely hope you continue these programs and in time convert entirely to Binaural Sound. It has created more excitement among us music-lovers at Pratt Institute than 'Cinerama'."

BRONX, N. Y.: "I listened to your experiment in Binaural Broadcasting with both amazement and satisfaction. While I presume its commercial possibilities are off in the distant future, it certainly was a notable experiment."

TEANECK, N. J.: "As a regular listener to WQXR, I want to extend my congratulations and applause to your binaural sound experiment last week. I found it a musical experiment that I can only describe as thrilling and exciting."

BROOKLYN, N. Y.: "We found it most interesting and pleasant to close our eyes and envision violinists and cellists clinging to our curtains and playing, fine singers perched on our bureau, and Mr. Zayde himself holding forth upon our bed. Notwithstanding an AM set which is not too selective in the number of stations it plays at one time, this was one of our most enjoyable listening experiences."

BRONX, N. Y.: "I want to express my appreciation of your binaural broadcasts. I have never experienced such depth and direction of sound as during these programs. The music and voice actually seemed to originate in my living room."

These binaural broadcasts, in addition to marking another milestone in radio transmission, went a long way toward selling the music-loving public (at least in the listening area) on the advantage of binaural "two-eared" sound. We believe that it is here to stay.

STREAMLINED STYLUS SHARPENING SERVICE

Worn-out Recording and Playback Styli Now Resharpended and Returned in 5 Days

Here's good news for economy-minded disc recordists.

Audio Devices' resharpener service — which has been available ever since the Audiopoint line was introduced about 15 years ago — has now been streamlined and simplified so that points can be processed and returned more quickly than ever before. And improved packaging facilities give extra convenience and safety in handling and mailing the points to be resharpener.

This accelerated service will make the economies of stylus resharpener particularly attractive to all users of disc recording equipment. A resharpener stylus is, in every respect, the equal of a brand new one. It is ground and polished on the same precision machines, by the same skilled craftsmen, and to the same precise standards of dimensional perfection. Yet the resharpener cost is less than *half* the original stylus cost.

Here, for example, are the current list prices for Sapphire and Stellite Audiopoints, together with the resharpener costs.

TYPE	LIST PRICE	
	New Point	Per Resharpener
Recording Audiopoints		
Sapphire No. 14 (87°)	\$7.25	\$3.25
Sapphire No. 14 (70°)	7.25	3.75
Sapphire No. 202	5.25	2.60
Stellite No. 34	1.75	.85
Playback Audiopoints		
Sapphire No. 113	6.50	2.25
Sapphire No. 103	2.00	1.00
Sapphire No. 303	2.00	1.00

If a Sapphire No. 14 (87°) is resharpener five times, total cost of original stylus plus five resharpener amounts to \$24.75 List. In comparison, six new points which would be required for doing the same amount of recording work would amount to \$43.50 List. In this case, resharpener saves a total of \$20.00, reducing the average cost per stylus from \$7.25 to \$3.92 List.

To help you get the most out of this cost-saving service, here are some helpful pointers on stylus resharpener.

Why Resharpener

The condition of the stylus is one of the most important factors in achieving perfect disc recording and reproduction. A worn or damaged recording stylus will produce an unsatisfactory cut. And a worn or



These handy mailing cards and envelopes simplify the return of recording and playback styli for fast resharpener. Cards hold 4, 8 or 16 points.

chipped reproducing point will impair playback quality and can cause irreparable damage to the recorded disc.

When to Resharpener

Visual inspection through a good magnifier will reveal a chipped or damaged stylus, which, of course, should be replaced immediately. But a worn or dulled stylus can only be detected by its *performance*. Surface noise or scratch is a pretty sure sign that the cutting stylus should be replaced or resharpener. The shininess or light-reflecting ability of the groove walls is a direct index of the quietness of cut. The desired degree of shininess can be gauged by comparison with a new and unplayed commercial phonograph record. A playback point which does not track properly, gives poor tone quality, or causes rapid wear of the disc is very likely to need replacement or resharpener. Also, excessive wear in a playback point can usually be observed under magnification, in the form of flattening or deformation of the extreme tip.

Number of Resharpener

If properly handled and subject only to normal wear, first quality dural-shank Audiopoints can be resharpener as many as ten times. If, however, the sapphire is chipped or broken, considerably more of the point must be ground away in the resharpener process and the maximum number of resharpener will be reduced accordingly.

End of Resharpener Life

To determine when a point can no longer be resharpener, examine it under a 20 power glass. If it is found that a considerable portion of the metal shank on the back (opposite the cutting face) has been ground away at the last resharpener, the point should not be returned again for further resharpener.

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NEW 7" Audiodiscs for 45 rpm



Left: 7" Audiodisc as used for recording, with brass center-hole adapter in place.

Below: 7" Audiodisc ready for playback, with brass center-hole adapter removed and shown separately in foreground.



These new 7-inch Red Label Audiodiscs have been specially designed for recordists who wish to make instantaneous recordings that can be played back on any standard 45-rpm record player. Dimensionally, they conform to the same standards as commercial 45-rpm phonograph records and have the standard 1½-inch diameter center hole.

For maximum ease in recording and reproduction, a separate brass center-hole adapter is supplied. This permits these discs to be cut on any disc recorder with the standard center pin and drive pin. After recording, the disc is ready for immediate playback on a 45-rpm phonograph, without any additional punching-out operation. This gives a smooth, clean center hole of precise dimensions, assuring trouble-free operation on automatic changers.

To record on one of these 7" Audiodiscs, the brass center-hole adapter is simply

placed over the center pin on the recorder turntable. The large center hole of the disc fits snugly over the adapter and the drive pin engages the drive-pin hole of the disc in the usual manner.

Paper labels on both sides of the disc are of sufficient thickness to give ample clearance between adjacent surfaces at the center of stacked recordings, assuring proper operation with the automatic changer mechanism.

The 7 inch, 45-rpm Red Label Audiodiscs are priced at \$1.50 list each. Two brass center-hole adapters are included in each package of 25 discs. The adapters, of course, can be re-used indefinitely for any number of recordings.

Resharpener Service

(Continued from Page 5, Col. 3)

What Points Can Be Resharpener

All Sapphire and Stellite recording Audiopoints and all Sapphire playback Audiopoints can be resharpener under the Audiopoint Resharpener Service. This service can also be utilized for any sapphire or stellite points of domestic manufacture. Steel points can not be resharpener.

How to Return Points for Resharpener

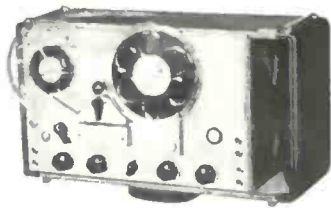
Just give the used points to your Audiopoint Distributor and tell him that you want them resharpener. He has a supply of special mailing cards and return envelopes which assure prompt and safe delivery to the resharpener plant. The points will be resharpener and returned to the Distributor *within five days* from the time they are received at the plant!

If you are a large user of Audiopoints and would like to save a little additional time by returning the points direct to the resharpener plant, your distributor can probably arrange for this and supply you with a quantity of the convenient mailing cards and self addressed return envelopes. Cards are available for holding four, eight or sixteen points. When points are returned direct from the user, the name of the Distributor through whom the billing is to be handled should be filled in on the space provided in the cover of the card.

Distributors who take active advantage of these Audiopoint Resharpener facilities are rendering a real and valued service for their clients — helping them to make substantial savings in the cost of recording and playback points.

NEW PRODUCTS

"CROWN" Portable Tape Recorder



The "CROWN" recorder, manufactured by International Radio and Electronics Corp., Elkhart, Ind., is a dual-speed, dual-track machine with 40 watts power output. Listed features include: frequency response of 3¾ and 7½ inches per second; fast forward, 160 in. sec.; rewind, 192 in. sec.; flutter and wow, 0.4%; output to total noise level, 52 db.

Two microphone inputs and four output channels. Simultaneous recording with public address facility. Separate volume control for monitor and PA outputs. Includes 6" by 9" 10-watt speaker. Also available in DeLux model with single-track head. Weight, 36 lb. complete. Price, \$295.00 net for standard model; or \$325.00 for DeLux model.

MASCO Portable Disc Recorders

Mark Simpson Manufacturing Co., Inc., 32-38 46th St., Long Island City, N. Y., offers two portable disc recorder-reproducer units with PA facility. Model RK-5SLR with built-in AM tuner, and Model RK-5SL without tuner. Include provision for recording and playback at both 78 and 33 1/3 rpm. Three separate inputs for



recording from microphone, direct from phonograph, and direct from radio. Recording from microphone or radio independent or simultaneous. Built-in 5-watt amplifier, 6" PM speaker, separate volume and tone controls, and recording level indicator. List price, \$197.50 less radio; \$237.70 with radio.

audio pointers for the Recordist

by C. J. LeBel, Vice President
Audio Devices, Inc.

THE AUDIO HEAD DEMAGNETIZER

Occasionally Audio overreaches itself — we write about a new idea, and after a while the demand has grown to the point where we have to make the product.

The Audio Head Demagnetizer falls in this class. The virtues of demagnetizing magnetic recording heads were expressed in the AUDIO RECORD several years ago, after watching the effectiveness of the idea in a demonstration by Wentworth Fling. We soon found that it improved the reliability of laboratory measurements, and that the most critical studios were also finding demagnetization desirable. A sketch of a suitable device was shown in our booklet, FUNDAMENTALS of MAGNETIC RECORDING, but this increased the flow of requests rather than decreased it — for studios are seldom equipped to do machine work. It was finally decided to put the demagnetizer into production.



C. J. LeBel

What It Is

The Audio Head Demagnetizer, shown in Fig. 1, is an AC magnet assembly provided with extended pole pieces shaped to fit the contour of the recording head. Properly used, this head demagnetizer will remove any permanent magnetism which may have accumulated in the recording head —



Figure 1. Audio Head Demagnetizer complete with cord and plug for connecting to 110-115 volt 60 cycle circuit.

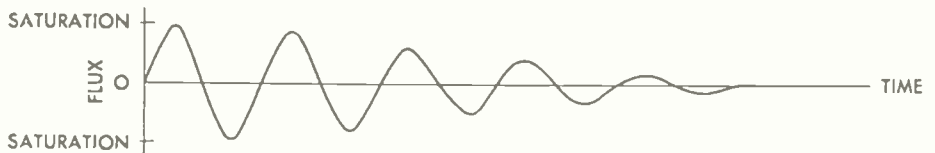


Figure 2. Hysteresis diagram showing how magnetic condition of head is carried in opposite directions, but with successively decreasing amplitude, finally ending at zero.

thereby reducing noise level which is attributable to this cause.

How It Works

The Audio Head Demagnetizer enables the magnetic condition of a recording head to be carried through a series of hysteresis loops of ever-diminishing size, leaving the head substantially free of permanent magnetism, as shown in figure No. 2. This operation is the same as the action of an AC erase head on tape.

How to Use It

1. Put a single layer of self-adhesive cellophane tape on the tips of the demagnetizer poles, as shown in figure No. 3. This prevents scratching the surface of the head.
2. Plug the cord into a 110-115 volt, 60 cycle outlet.
3. Place the demagnetizer pole tips against the recording head of the machine. Move the tips over the entire pole surface of the head for about one second. Then move the demagnetizer slowly away from the head and disconnect it from the power circuit. Slow removal of the demagnetizer from the head is particularly important, since it is the gradual separation of head and magnet which causes the hysteresis loops induced in the head to diminish slowly in size, finally ending at the zero point.
4. Be careful not to overheat the demagnetizer. It should not be left connected to the power source for more than five minutes at a time. If it gets too hot to hold comfortably, disconnect it.

Why Demagnetize

Since the minimum noise level occurs with the tape in unmagnetized condition, it is important that the recording head

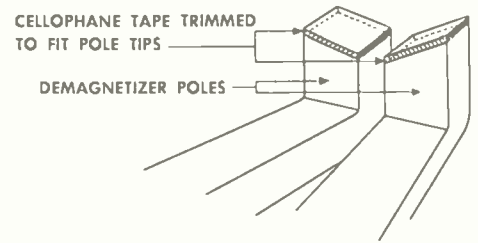


Figure 3. Sketch showing demagnetizer pole tips with cellophane tape in place.

impart no steady (dc) magnetism to it. This can only be true if the head is itself free from permanent magnetism.

When a recording machine leaves its factory, the heads are unmagnetized. However, music and speech consist of a series of transients, often not symmetrical in peak value. Other asymmetrical transients may occur in line noise, in starting and stopping the machine, and particularly during tests. The effect is cumulative, and after a week of steady use the recording head may have picked up enough magnetism to raise the noise level by several db and to increase second harmonic distortion slightly.

What the Demagnetizer Cannot Do

There are no universal panaceas in engineering and so the demagnetizer will not necessarily make your machine quieter. The following common causes for high noise level may exist:

1. Magnetized recording head.
2. Noisy input tube in reproducing preamplifier of machine.
3. Noisy resistor or condenser in reproducing preamplifier of machine.
4. Hum pickup in machine circuits.
5. Bias leakage masquerading as noise.
6. Faulty bias waveform during recording.

Head demagnetization, of course, can only remedy fault No. 1. If any of the other difficulties exist, they must be cured before demagnetization is worth while. For example, a number of machines have sufficiently poor bias waveform and enough hum so that these form the major causes of noise.

Different heads and different machines differ unpredictably in their tendency to magnetization, so that the easiest way to judge the effectiveness of a demagnetizer is to try it. If the unit fails to help your particular machine, it may be returned to your jobber for full credit — provided, of course, that it has not been damaged. The price of this Audio Head Demagnetizer is \$12.00 List.

the **RIGHT COMBINATION** for
maximum performance at minimum cost



audiotape

that meets the most exacting
professional requirements



NEW 7" REEL

that eliminates the
"high-tension zone"

NO SPLICES. As always, plastic-base Audiotape in 1200 and 2500 ft reels is guaranteed *splice-free*.

NO FRICTION SQUEAL. Perfected anti-friction process eliminates annoying tape squeal—prevents "tackiness" even under extreme temperature and humidity conditions.

MINIMUM DISTORTION. Audiotape's oxide coating is especially formulated to give *maximum undistorted output*. Comparative tests show its marked superiority in this respect.

MAXIMUM UNIFORMITY. All 7" and 10" reels of plastic-base Audiotape are *guaranteed* to have an output uniformity within $\pm 1/4$ db—and a reel-to-reel variation of less than $\pm 1/2$ db. And there's an actual output curve in every 5-reel package to prove it!

PRECISION TIMING. Improved reel design with $2\frac{3}{4}$ " hub reduces timing errors by eliminating the tension and speed changes formerly encountered at the beginning and end of the winding cycle. Ratio of OD to hub diameter is the same as the standard NAB 2500 ft reel.

CONSTANT PITCH is another advantage of the new reel design resulting from the more uniform tape speed throughout the winding cycle.

SLOWER ROTATIONAL SPEED, due to larger hub diameter, minimizes vibration and avoids possible damage to tape on fast forward and rewind.

REDUCED HEAD WEAR can also be expected, because the maximum tape tension is materially decreased.

audiotape gives you all these advantages at no extra cost!

* Trade Mark

This new 1200 ft plastic reel with $2\frac{3}{4}$ " diameter hub is now being supplied on all orders for 7" reels unless otherwise specified... at no increase in price. Remember—with Audiotape, there's only *one* quality—the finest obtainable! Audiotape is available in all standard size reels from 150 to 5,000 feet.

AUDIO DEVICES, Inc.

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