

Secrets of Stereo Alchemy  
Find, File and Forget 'Em

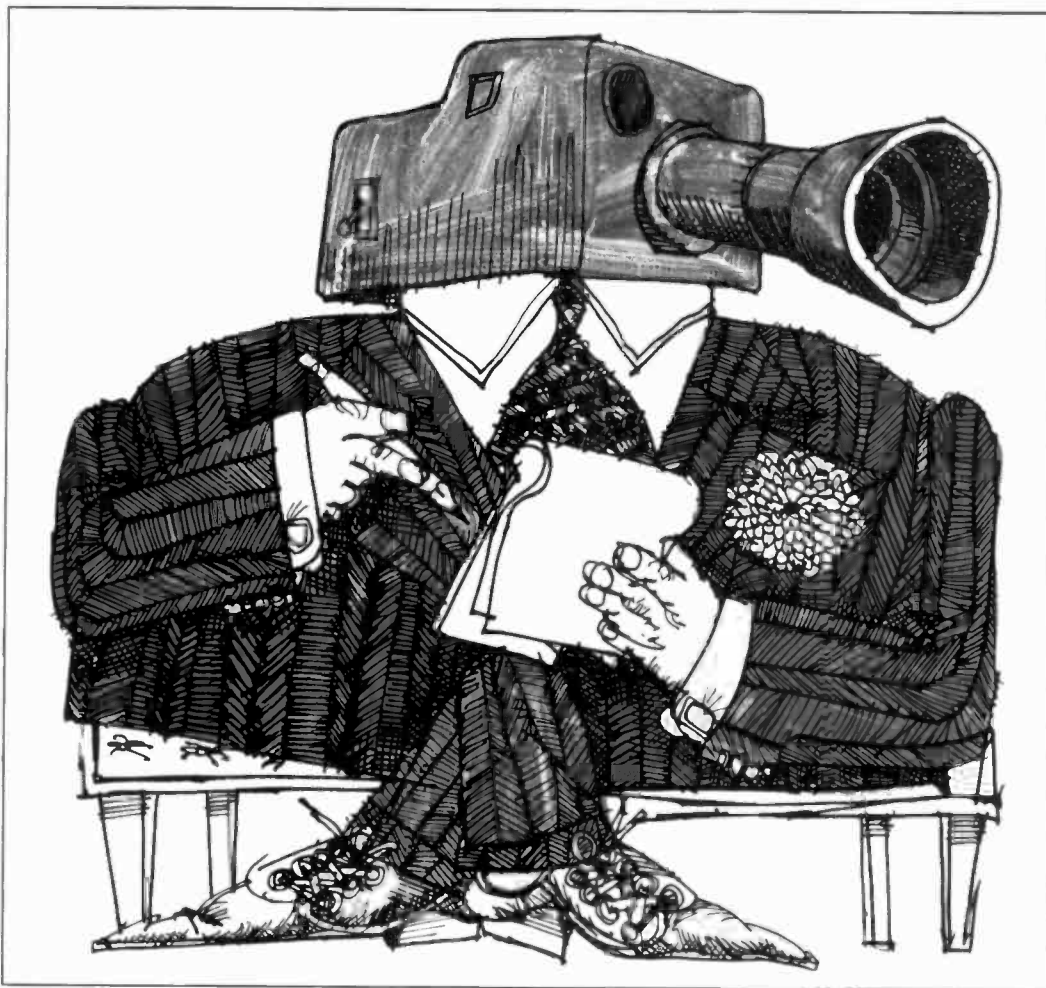
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# tape

50c VOLUME 13, NO. 3

r e c o r d i n g

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Videotape Psychotherapy

# Anyone who walks into a store and asks for a reel of tape deserves what he gets.

Chances are he'll walk out with a square peg for a round hole. Buying tapes is a lot like buying film. Lots of brands, types, sizes. Confusing? Not if you read further.

For one thing, don't buy a "white box" off-brand to save pennies. If it's worth recording, it's worth recording on a proven brand, like Reeves Soundcraft... supplied on all reel sizes from the 2 $\frac{3}{4}$ -inch size for miniature portables, on up to the 14-inch reel. Professionals and home recordists prefer Reeves Soundcraft Tapes for their reliability and performance qualities.

But—in asking for tape, you should say more than just the words "Reeves Soundcraft." You should ask for the Reeves Soundcraft Tape best suited to your recording needs.

An economical all-purpose tape like Reeves Soundcraft **STANDARD**, can probably answer most of your requirements. It gives you professional mastering quality with low print characteristics for any material that requires only normal playing time, (1200 ft. on a 7-inch reel).



If, however, you are a school concerned with rough handling or an archive recording for posterity, you should be using Reeves Soundcraft **LIFETIME**... the only tape with a life-time guarantee! Its rugged DuPont Mylar base makes the big difference. Virtually unbreakable. Never flakes or dries, regardless of temperature or humidity extremes. Both Standard and Lifetime offer normal playing time—1200 ft. on a 7-inch reel.



On the other hand, if you want to record long symphonies on a reel, Reeves Soundcraft **PLUS 50** should then be your choice. It provides 1800 ft. on a 7-inch reel to give you 50% more playing time! For example, over 6 hours of recording at 3 $\frac{3}{4}$  ips. Excellent dynamic range and rugged 1 mil Mylar base make Plus 50 the preferred extended-play tape.



We have another tape that offers even more playing time. Reeves Soundcraft **TRIPLE PLAY**. This is the highest quality tape ever produced on a thin Polyester base. You get 3600 ft. on a 7-inch reel, or three times the play of Standard tape. Triple Play has remarkable wide range response and greater output than any other triple play tape.



Now for the ultimate in tape technology. Reeves Soundcraft **GOLDEN TONE**. High frequency output is 25% greater than the next best brand. This tape is so perfect you can run it at half the speed to double your playing time, and still enjoy full fidelity recording. 1200, 1800 and 2400 ft. lengths on 7-inch reels.



Visit your dealer for tape, and ask for Reeves Soundcraft—either Standard, Plus 50, Lifetime, Triple Play or Golden Tone—whichever one best suits your recording needs.

Write for Bulletin RS-64-12A.

 **REEVES SOUNDCRAFT**  
DIVISION OF REEVES INDUSTRIES INC

Main Office: Danbury, Connecticut • New York • Chicago • Los Angeles • Export: CBS Records Intl., 51 W. 52 St., N.Y.C. • Available in Canada

# COLUMBIA STEREO TAPE CLUB

now offers you

# ANY 4 STEREO TAPES

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FOR ONLY

if you join the Club now and agree to purchase as few as 5 selections in the next 12 months from the more than 200 to be offered

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### REVOLUTIONARY SELF-THREADING TAKE-UP REEL



Just drop the end of the tape over this reel, start your recorder, and watch it thread itself! Unique Scotch® process automatically threads up tape of any thickness, releases freely on rewind.

Value up to \$33.95 at regular Club price

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Terre Haute, Indiana 47808

I accept your special offer and have written in the boxes at the right the numbers of the 4 tapes I would like to receive for \$5.98, plus a small mailing and handling charge. I will also receive my self-threading reel — FREE!

My main musical interest is (check one):

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POPULAR

I understand that I may select tapes from any field of music. I agree to purchase five selections from the more than 200 to be offered in the coming 12 months, at the regular Club price plus a small mailing and handling charge. Thereafter, if I decide to continue my membership, I am to receive a 4-track, pre-recorded tape of my choice FREE for every two additional selections I accept.

Print Name..... First Name Initial Last Name

Address.....

City.....

State..... Zip Code.....

This offer is available only within the continental limits of the U.S.

SEND ME THESE FOUR TAPES (fill in numbers below)


48-TA

IF YOU ARE ONE OF THE FORTUNATE PEOPLE who owns 4-track stereo tape playback equipment, you know the thrill of the near-perfect fidelity, the unsurpassed sound of tape. Now you have an exceptional opportunity to build an outstanding collection of superb stereo tapes at great savings through this generous offer now being made by the Columbia Stereo Tape Club!

By joining now you may have ANY FOUR of the magnificently recorded 4-track stereo tapes described here — sold regularly by the Club for up to \$33.80 — for only \$5.98!

TO RECEIVE YOUR 4 PRE-RECORDED STEREO TAPES FOR ONLY \$5.98 — simply fill in and mail the coupon provided above. Be sure to indicate the type of music in which you are mainly interested: Classical or Popular.

HOW THE CLUB OPERATES: Each month the Club's staff of music experts chooses a wide variety of outstanding selections. These selections are described in the entertaining and informative Club Magazine, which you receive free each month.

You may accept the monthly selection for the field of music in which you are primarily interested . . . or take any of the wide variety of other tapes offered . . . or take no tape in any particular month.

Your only membership obligation is to purchase 5 tapes from the more than 200 to be offered in the coming 12 months. Thereafter, you have no further obligation to buy any additional tapes . . . and you may discontinue your membership at any time.

FREE TAPES GIVEN REGULARLY. If you wish to continue as a member after purchasing five tapes you will receive — FREE — a 4-track stereo tape of your choice for every two additional tapes you buy.

The tapes you want are mailed and billed to you at the regular Club price of \$7.95 (occasional Original Cast recordings somewhat higher), plus a small mailing and handling charge.

SEND NO MONEY — Just mail the coupon today to receive your four pre-recorded 4-track stereo tapes — ALL FOUR for only \$5.98!

**IMPORTANT NOTE:** All tapes offered by the Club must be played on 4-track stereo playback equipment. If your tape recorder does not play 4-track stereo tapes you may be able to convert it simply and economically. See your local service dealer for complete details.

COLUMBIA STEREO TAPE CLUB  
Terre Haute, Indiana

<p><b>DOWN TOWN</b> PETULA CLARK How That Boy's Gone Jo Love - 10 MORE</p>	<p><b>THE KING FAMILY SHOW!</b> Pass Me By • Stardust Camb Evry Mountain 13 MORE</p>	<p><b>DORIS DAY'S SENTIMENTAL JOURNEY</b> Serenade In Blue I'll Never Smile Again, 12 in all</p>	<p><b>BROADWAY BOJQUET</b> The Magnificent Strings of Percy Faith</p>	<p><b>God Bless America</b> Mormon Tabernacle Choir Orchestra/Philo. Orch. 12 MORE</p>	<p><b>DAVE BRUBECK QUARTET</b> Angel Eyes Let's Get Away From It All Visits For Your Furs 4 MORE</p>		
<p><b>REVERIE</b> Dixie • Liza • Payne Cousins • Nectar • • Other Favorites 10 MORE</p>	<p><b>ROGER WILLIAMS plays THE HITS</b> Dear Heart • Mr. Lonely People 9 MORE</p>	<p><b>Elgart au Go Go</b> LES &amp; LARRY ELGART 10 MORE</p>	<p><b>GOLDFINGER</b> Original Motion Picture Sound Track 10 MORE</p>	<p><b>Rhapsody in Blue</b> An American in Paris Leonard Bernstein plays Gershwin 10 MORE</p>	<p><b>WEST SIDE STORY</b> Original Soundtrack 10 MORE</p>	<p><b>THE VENTURES PLAY TELSTAR</b> THE LONELY BULL 7 MORE</p>	<p><b>NEW CHRISTY MINSTRELS</b> Chorus Kisses Sweeter Than Wine Downtown Lark Day Springtime 7 MORE</p>
<p><b>My Name Is Barbra</b> Why Did I Choose You My Man • 10 MORE BARBRA STREISAND</p>	<p><b>Chaiovsky NLTORACKER SUITE</b> Profokiev: PETER AND THE WOLF Leonard Bernstein K of Philadelphia 10 MORE</p>	<p><b>TONY'S GREATEST HITS VOL III</b> Let My Heart In San Francisco I Wanna Be Arouse The Good Life 9 MORE</p>	<p><b>This is My Country</b> MORMON TABERNACLE CHORUS Star-Spangled Banner America, The Beautiful Filandia • Marseillaise 10 in all</p>	<p><b>ROBERT GOULET SUMMER SOUNDS</b> Plus Summer • Full Cast • 8 MORE</p>	<p><b>BOB DYLAN BRINGING IT ALL BACK HOME</b> Featuring SUBTERANEAN HOMESICK BLUES 10 MORE</p>	<p><b>An Historic Return HOROWITZ AT CARNEGIE HALL</b> 1977-1978. Twin-Pack Counts As Two Selections. The fabulous "live" performance, his first concert in 15 years!</p>	<p><b>TWIN-PACK Equivalent To Two Selections</b></p>
<p><b>PETER, PAUL &amp; MARY</b> A Song Will Rise 10 MORE</p>	<p><b>What's New Pussycat</b> featuring YOK JOHNS 10 MORE</p>	<p><b>LOVE AFFAIR THE RAJ CONNIFF SINGERS</b> 10 MORE</p>	<p><b>STANDING OVATION JERRY VALE</b> Love's Back In Town Granada The Song Is You 10 MORE</p>	<p><b>THE RETURN OF ROGER MILLER</b> Featuring (BO-WACKA-DO) plus KING OF THE ROAD 10 MORE</p>	<p><b>BOB BROOKMEYER and friends</b> STUN GETZ • RON CARTER HERBIE HANCOCK GARY BURTON • ELVIN JONES 10 MORE</p>	<p><b>ANDY WILLIAMS DEAR HEART</b> Red Roses For A Blue Lady Who Can I Turn To 9 MORE</p>	<p><b>Barbra Streisand People</b> Absent Minded Me Fine And Dandy 10 MORE</p>
<p>1988. Also excerpts from "Swan Lake" and "Peer Gynt" Suite</p>	<p>207. Also: Willow Weep For Me, Precious, Try To Remember, etc.</p>	<p>226. King of the Road, Rowntown, Meditation, 9 more</p>	<p>1734. Featuring the title song, sung by Shirley Bassey</p>	<p>1098. "Force impact and momentum." N.Y. World-Telegram</p>	<p>1037. "The most adventurous musical ever made." —Life</p>	<p>1008. Also: Green Onions, Red River Rock, Calcutta, etc.</p>	<p>2127. Also: We'll Sing In The Sunshine, 12 in all</p>
<p>2183. Also: Where Is The Wonder, I've Got No Strings, etc.</p>	<p>1070. "Ask it fully, warmly, richly performed." —High Fidelity</p>	<p>2150. Also: If I Ruled the World, Who Do I Turn To, etc.</p>	<p>1356. Also: Land of Hope and Glory, This Is My Country, etc.</p>	<p>2154. Also: Old Cape Cod, Mam'selle, If You Love Me, etc.</p>	<p>2007. Also: Gates of Eden, On The Road Again, 11 in all</p>	<p>1977-1978. Twin-Pack Counts As Two Selections. The fabulous "live" performance, his first concert in 15 years!</p>	<p>2183. When The Ship Comes In, For Lovers Me 10 more</p>
<p>2151. Other artists include Dionne Warwick, Mantel Han</p>	<p>983. Also: For All We Know, Just Friends, Mam'selle, etc.</p>	<p>1758. Also: If I Had You, I'm Always Chasing Rainbows, etc.</p>	<p>1892. Also: In The Summertime, There I Go Dreamin', etc.</p>	<p>1713. A lively session abounding in passion and truth</p>	<p>1905. Also: I Can't Stop Loving You, Emily, 12 in all</p>	<p>1646. Also: Love Is A Bore, My Lord And Master, Autumn, etc.</p>	

Now! An ultra-thin recording tape that gives you 1200 ft. on a 3¼" reel... yet so fine you never sacrifice quality!



# MICRO MEDIA 25

A revolutionary advance in recording tape which provides up to sixteen hours of play on a standard 3¼" reel. Here's a new world of convenience for tape fans because now you get four times longer play from miniature recorders. Micro Media 25 is the only recording tape on the market manufactured to rigid specifications from a ¼ mil tensilized polyester base. It's the only tape that's really different.



*Available at audio dealers throughout America, or write*

**MAGNETIC MEDIA CORPORATION 616 Fayette Ave, Mamaroneck, N. Y.**

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# tape

recording

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FEBRUARY, 1966

VOLUME 13, NO. 3

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# tape

LETTERS TO THE EDITOR

Park Ridge, N.J.

Your December issue article by Robert Angus on tape recording of shortwave broadcasts (p. 21) may have accidentally omitted an important point. Numerous shortwave broadcasters in foreign countries welcome tape recordings of their transmissions. Most of these stations reciprocate by sending

back fancy verifications and colorful photos and booklets.

Use three-inch reels that are sold with self-mailers. Record at 7½ i.p.s. and either single or two-track being sure to specify on the outside of the reel.

Those shortwave broadcasters welcoming tape recordings include: Rome, Tokyo, Moscow, New Delhi, Vatican City, Madrid etc.

J. C. Gillespie  
Gilder Associates

P.S. We are the mail order distributors for the "World Radio-TV Handbook." The 1966 Edition has just arrived (copy will be sent under separate cover). All of the address information of various stations are in WRH. The book sells for \$4.95 postpaid.

As an avid opera fan who has taped the Metropolitan Opera broadcasts for years, I read with interest Mr. Cary's pertinent remarks in the latest issue of your magazine.

For my part, I still manage to keep the recording companies very much in business, since I manage to buy every worth-while tape that is released. Needless to say, I do appreciate the fact that we have been offered a wider selection of operas lately, other than the usual *Bohemes*, *Aidas*, etc. I think that the recording companies are becoming more cognizant of the fact that there is a good demand for non-repertoire operas.

I think that RCA is to be con-

(Continued on page 50)

<b>88</b> <b>STEREO</b> <b>COMPACT</b> <b>SOUND AS GOOD</b>	<b>88</b>	<b>880</b> <b>STEREO</b> <b>PORTABLE</b> <b>AS THEY LOOK</b>
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The choice of music connoisseurs who demand the ultimate in full stereo fidelity. Though compact in size these Viking tape recorders set a standard of excellence for dramatic, life-like realism in recording quality. Compare feature for feature, size, quality, styling—and dollar for dollar you too will prefer a Viking tape recorder.

Choose an 88 Stereo Compact in the traditional cabinet with folding cover at left, or select the modern enclosure, center, to match your music system. For portability Viking recommends the 880 Stereo at right, complete with detachable speakers.



An 88 Stereo Compact costs less than \$340.00  
Walnut cabinets extra.

880 Stereo portable recorder less than \$440.00  
At better hi-fi dealers most everywhere.

**Viking** OF MINNEAPOLIS<sup>®</sup>  
9600 Aldrich Ave S Minneapolis, Minnesota 55420



Some plain talk from Kodak about tape:

# The lowdown on low-noise tapes... and on low-speed tapes



Designing a "low noise" tape is a bit like trying to fit a six-foot man with a pair of pants tailored for a five footer. Cutting off his legs is a solution... but it lacks elegance. Tapewise, if all you do is use a low-noise tape, you end up with lowered output; i.e., mighty short legs. And if you push up the gain, where's the low noise you were hoping for?

The art of low noisemanship requires a bit more finesse. And it's not so hard to master if you take a listen to KODAK's Type 34A Hi Output Professional Tape. Try this test: Listen to a "no signal" tape at high gain. Now turn down the gain until the hiss disappears. Wouldn't it be nice if you could listen to the tape that way? The solution, obviously, is to pick a tape you can put a lot on—and play it back at low gain... and low noise, naturally!

**Enters the star.** Compared to our own Type 31A Standard Play Tape, and to the low-noise product from a competitor we must keep mum about, the chart below reveals that KODAK Type 34A Hi Output Tape gives five or more additional decibels of undistorted output. At similar output levels, Type 34A is just as quiet as the next fellow's. It does this with no increase in print-through over general-purpose tapes. Pretty nice for silence lovers. The

values expressed in the chart are in decibels at optimum bias settings using our Type 31A as the reference.

**Some like it slow.** In medieval times, a favorite subject of theological discussion was just how many angels could dance on the head of a pin. KODAK can provide no informed opinion on this question, but leaps into the fray when it comes to how much signal you can squeeze on a given length of tape. Since tape started, tape speeds have been dropping. First it was 15 ips, then 7½ ips; the day of 3¾ ips is here for some. And the recorder manufacturers still haven't stopped. Who knows where it will end.

But there are some problems involved. At 15 ips a single cycle of signal at 1,000 cycles-per-second covers 15 thousandths of an inch longitudinally on the tape as it travels by. At 1¾ ips (to go to extremes) it's down to less than 2 thousandths of an inch. As a result, as tape travel speeds decrease, tape "resolution," to borrow a photographic word, becomes more and more important. A second problem is that external magnetic flux on the tape available to thread the reproduce head also decreases in proportion. This means that you need a high-efficiency tape. Last but not least, the tape itself has to be thin for

maximum footage on a given reel. People buy long-playing tapes because they play long.

Put all these problems together and our trusty KODAK 11P ½ Mil Double Play Tape sounds better and better. Look at the chart which compares it to a premium-priced famous name brand recently improved for low speed... and to a competitive general-purpose tape. KODAK 11P shows off as well as the first, and better than the second. Figures are in decibels using our 11P as the reference.

	Competitive double-play tape	Premium-priced competitive "improved" low-speed tape	KODAK 11P double-play tape
Optimum bias	+0.5	-0.5	0.0
Sensitivity at 37.5 mil wavelength	-0.6	-1.2	0.0
1 mil wavelength	-2.5	-0.2	0.0
0.6 mil wavelength	-2.6	+0.4	0.0

KODAK Sound Recording Tapes are available at most electronic, camera, and department stores. New, 24-page, comprehensive "Plain Talk" booklet covers all the important aspects of tape performance, and is free on request. Write: Department 8, Eastman Kodak Company, Rochester, N. Y. 14650.


	KODAK 31A Tape	Premium-priced competitive low-noise tape	KODAK 34A Tape
Bias	0.0	+0.4	+0.8
Sensitivity at 37.5 mil wavelength	0.0	-3.0	+2.1
Input at 2% harmonic distortion	+10.0	+11.4	+13.0
Output at 2% harmonic distortion	+11.5	+10.7	+16.3
Saturation Output	+20.0	+19.0	+23.6
Maximum Dynamic Range	75.0	79.0	79.0
Modulation S/N Ratio			
—20 to 1000 CPS	62.0	57.0	62.0
—1000 to 15,000 CPS	64.0	65.0	67.0

EASTMAN KODAK COMPANY, Rochester, N. Y.







**We just developed a sound tape so sensitive that you can now cut recording speed by half, yet retain full fidelity. You can actually record twice the music per foot. Your budget will applaud. Start savings with this new box.** 

SCOTCH® Brand "Dynarange" Series Recording Tape is the name. And this one makes all music come clearer, particularly in the critical soprano range. Reason: This tape cuts background tape noise in half. With this result: You can now record at 3½ ips all the finest fidelity that before now your tape recorder could only capture at 7½.

Your dealer has a demonstration tape that lets you hear the excellence of this new tape at slow speed. Costs a little more. But you need buy only half as much—and can save 25% or more in tape costs. Or, if you use this new tape at fast speed, you'll discover fidelity you didn't know your recorder had.

Other benefits of new "Dynarange" Tape: Exceedingly low rub-off keeps recorders clean. The "Superlife" coating extends wear-life 15 times over ordinary tapes. Lifetime Silicone lubrication assures smooth tape travel, protects against recording head wear and extends tape life. Comes in new sealed pack, so tape is untouched from factory to you. Reasons aplenty to see your dealer soon, hear a demonstration. And try a roll!

"SCOTCH" AND THE PLAID DESIGN ARE REG. TMS OF 3M CO., ST. PAUL, MINN. 55119 ©1965, 3M CO.



Magnetic Products Division



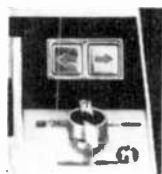


## SOMEDAY, THERE MAY BE OTHER FULLY AUTOMATIC TAPE RECORDERS LIKE THE NEW CONCORD 994



The 994 gives you automatic reversing  Plays or records automatically three different ways  Stops by itself where you want it to  Threads itself automatically  And, the 994 is available now!

With the transistorized 994, Concord introduces a new dimension to tape recording. Some might call it modernization, some might call it automation. We think of it as *convenience*—in playing, in recording, in starting and stopping, in threading, in hours of uninterrupted listening. You can't compare it to anything because the 994 is as different from the conventional stereo recorder as the old crank-type Gramophone is from the modern record changer.



**AUTOMATIC PROGRAMMING.** You can program the 994 to play or record one side of a tape from beginning to end and stop automatically. Or, to play/record first one side of the tape, reverse, play the other side, then stop automatically. Or, to play/record forward and back, forward and back, continuously, as long as you like—an hour, six hours, or all day. You may change direction of tape any time you like by merely pressing the direction change buttons. These same lighted buttons automatically show you direction of tape travel.

**PUSH-BUTTON KEYBOARD.** The operating controls are literally at your fingertips. This is the one recorder you can operate without arm waving, and with one hand! As far as threading, that's even simpler—the 994 threads itself automatically.



After all this, we didn't just stop in designing the 994. We kept going. As a result, the 994 offers superb performance and every conceivable feature required for your listening and recording pleasure. Here's a brief sample: three speeds with automatic equalization, four professional heads, two VU meters, digital tape counter, cue control, sound-on-sound, exclusive Concord Trans-A-Track recording, 15-watt stereo amplifier, professional record/monitoring system. The 994 may also be used as a portable PA system, with or without simultaneous taping.



**TWO-WAY STEREO SPEAKERS.** The split lid of the 994 houses a pair of true two-way speaker systems, each containing a tweeter, woofer, and crossover network. A pair of highly sensitive *dynamic* microphones is included.



The 994 is priced under \$450.\* An identical recorder, Model 990 comes without speakers or microphones and is priced under \$400.\* Both are at your dealer's now. So why wait? Drop in for a demonstration and find out for yourself what *fully automatic tape recording by Concord* is all about! Or, for complete information, write Dept. SR-4.

For Connoisseurs of Sound

Other Concord models from \$50 to \$800.

# CONCORD 994

CONCORD ELECTRONICS CORPORATION, 1935 Armacost Avenue, Los Angeles, California 90025  
IN CANADA: Magnasonic Industries, Ltd., Toronto/Montreal

\*Prices slightly higher in Canada.

THE SIGNATURE OF QUALITY ■ Tape Recorders/Industrial Sound Equipment/Dictation Systems/Communications Devices/Closed Circuit Television

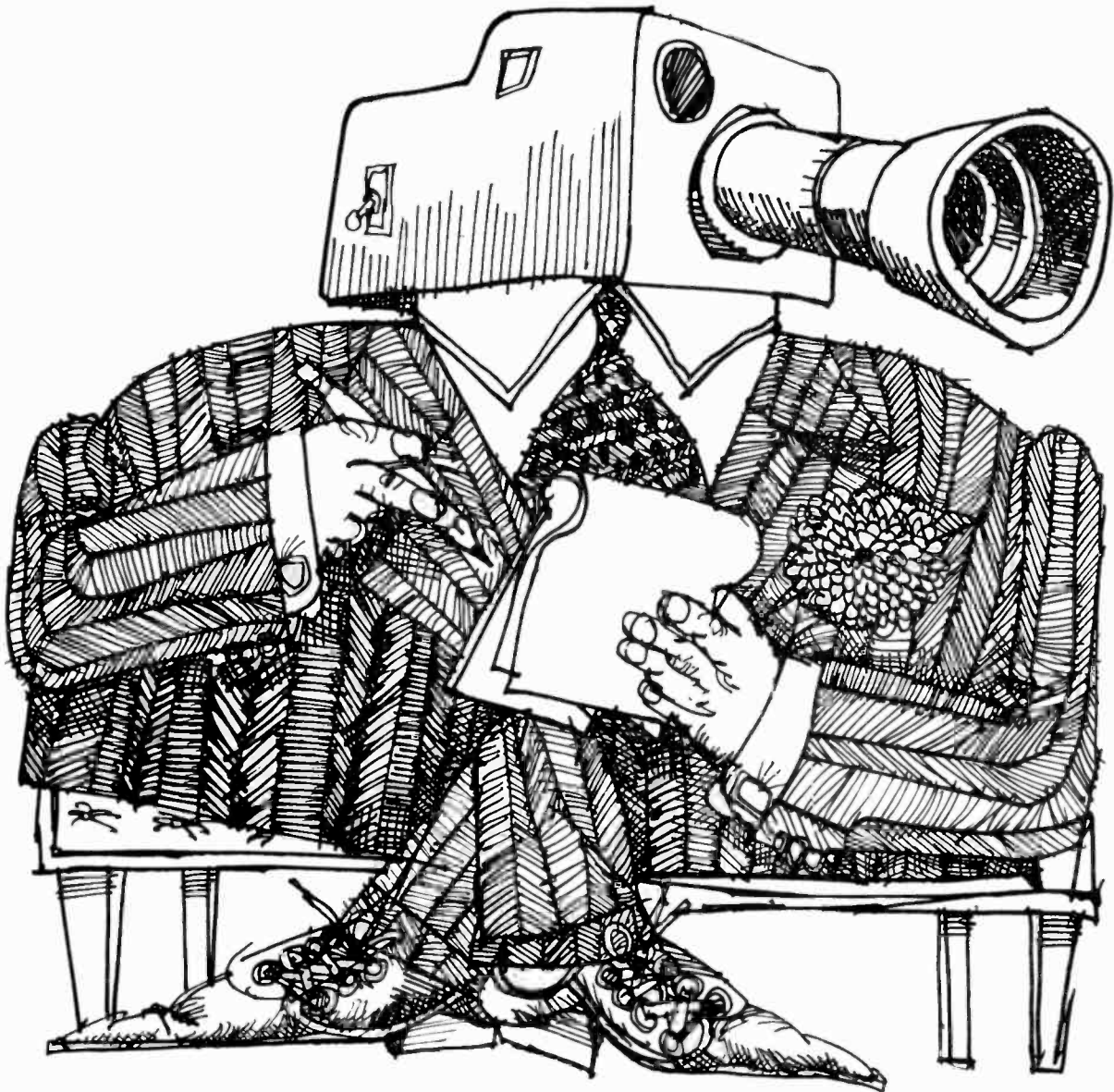
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# Will Videotape Replace The Analyst's Couch?

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*by Eugene Chernell, M.D.\**

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Home videotape may be an intriguing—albeit expensive—hobbyist item, but how about practical use? Several of us here at the Department of Psychiatry of the University of Mississippi Medical Center believe we've found a way of putting our model to use—with practical, measurable results. We use our videotape recorder to diagnose and treat mental illness—and our initial results show a marked improvement rate in patients treated with the videocorder.

The program began with our acquisition of a video tape recorder in August, 1963. The machine we bought then was a professional model, costing some \$12,000. Not that a low-cost home videocorder wouldn't have done just as well—it would have, and it would have saved us plenty of money. But they weren't available then. We bought the machine originally to help instruct students—before long, we had found a variety of other uses, including psychiatric diagnosis and analysis, and eventually we included it in the treatment process itself.

I'm getting ahead of my story. It's common practice, in the study of psychiatry, to have students observe an actual patient in the classroom, to ask questions of the professor and to discuss the case in the presence of the patient. Some students feel inhibited, and such discussion frequently does the patient himself no good. So we decided to interview patients in advance—privately—and videotape their answers. Thus we could show the case we wanted whenever we wished. We could show particular symptoms, being sure that the patient would perform on cue. Students found that they were able to ask more questions and discuss the case more freely without the physical presence of the patient himself.

The videocorder soon found other uses. We began to videotape treatment sessions of resident and patient, and we found the more experienced supervisor could use the tape to point out both good and bad aspects of the sessions to trainees. The trainees felt that actually seeing their mistakes, in addition merely to being told about them, made them much clearer, and, therefore, they were more ready to accept criticism. A nat-

*The videotape recorder can be used to diagnose and treat mental illness.*

\*Dr. Chernell is affiliated with the Department of Psychiatry, University of Mississippi Medical Center, Jackson, Miss.

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## Videotape...

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ural corollary of this was that trainees were more quickly able to correct their errors, once they recovered from the initial shock resulting from self-exposure and confrontation.

This observation led us to our next step in the use of a videocorder as a therapeutic tool, as opposed to its obvious uses as an aid to teaching and training. We felt that if the resident psychiatrists could benefit from self-confrontation to the extent of recognizing their errors and, thereby, make active attempts to correct them, then it was perfectly reasonable to expect a moderately motivated patient to be able to do the same thing. I should note that psychiatric disorders can, almost without exception, be reduced to difficulties the patient is having with other human beings, difficulties in interacting with them and in communicating with them. We have known for a long time that these same problems occur in the two-person structure of the doctor-patient relationship, often reflecting the very same problems the patient is having with the significant persons in his everyday environment. Therefore, helping the patient to correct these difficulties with his doctor is a necessary first step towards helping him to correct them with everyone else he meets.

With all this in mind, we began our study of audio-visual confrontation on an emotionally disturbed individual. We were already aware that the almost universal reaction of all who hear themselves on audio tape for the first time is to be surprised, often displeased, and usually somewhat disbelieving. "Is what I'm hearing *me*? Is that how I really sound?" Now we were going to give our patients the chance to *see* themselves as others see them, and we fully expected it to be a startling experience.

During the length of the study, we took every patient that was admitted to our hospital unit and video taped sessions with the same psychiatrist at periodic intervals during their hospital stay. These interviews took place in a special room with three Dage cameras and one Sarkes Tarzian camera concealed behind one-way mirrors, thereby giving the impression of privacy. All patients were aware that they were being televised, of course. The cameras themselves were in a control room which surrounded the interviewing area, and were managed by experienced technicians. The equipment in the control room also included a VR 1100 Ampex video tape recorder, Conrac monitors, associated camera controls and switchers, an origination and distribution cabling network, a Telefunken microphone

system and Altec 250 SU sound console plus associated sound power amplifiers. The cost of such a system is, of course, high—but the development of lower cost cameras and recorders should help to make it possible eventually for any institution which so desires to install similar equipment.



Following structured and video taped interviews, we took alternate patients to the viewing room where they saw a replay of what had just taken place. This is possible because of videotape's great advantage over film—no need for processing and no delay between recording and playing back. The viewing took place in a private room adjoining the control room, with only the patient and interviewing psychiatrist present. The viewing room contained a Conrac monitor, two 15 inch Audax speakers and a remote control of the video tape recorder, to allow us to stop the playback at any point for purposes of discussion, if it appeared desirable to do so. At that point, and on all subsequent occasions, the patients' comments were recorded by the psychiatrist who sat with them, but offered no comments of his own. Follow-up interviews were done four days after admission, and then at weekly intervals until discharge. These follow-up interviews lasted approximately five minutes each and concentrated on how the patient was progressing and on his comparison of the present with his condition on admission as he remembered it. Half the group

*This process might aid greatly in the treatment of patients at a very small cost.*

(having the experience of seeing the videotaped sessions) always saw the current segment plus all previous segments in sequence, giving them a chance to compare the reality of their earlier status with their memory of it. The alternate patients in the nonview group had exactly the same experiences but, of course, had no comments to be recorded. Our initial sample consisted of 80 consecutive patients admitted to our neuro-psychiatric unit: 40 saw themselves on videotape and 40 had the same television interviews but did not see the tapes.

The results were startling. Each patient's degree of improvement was being rated by an independent psychiatrist-observer who had no idea which patients had experienced the visual confrontation and which had not. We found that 50 per cent of those patients in the videotape view group were judged to be maximally improved clinically. In the nonview group approximately 50 per cent of the patients were clinically judged to be only minimally improved. This striking improvement suggested that the visual confrontation experience did alter the clinical course of the patients and had a marked and beneficial effect on their degree of improvement. In the two groups, the complete results were as follows:

	View group	Nonview group
Cured or maximally improved	47½%	12½%
Moderately improved	32½%	42½%
Minimally improved	20%	45%

There were other significant and interesting findings. The patients in the view group seemed to become more motivated in treatment and developed a greater interest in getting well, almost as if it took the confrontation experience to convince them that they were indeed sick.

Almost without exception the visual confrontation was a new and unsettling experience for the people involved, the *first* time they saw themselves as others see them. The responses the patients made on a verbal level indicated this. They uniformly referred to the first exposure as unpleasant and wondered why we were making them undergo such a harrowing ordeal. Successive screenings, however, became less painful and easier to endure. When the patients, on subsequent viewing occasions, began to note improve-

ment in themselves they were able to verbalize their feelings that this was no longer an unpleasant experience but had become a very meaningful and beneficial one. They also stated that they could see reasons for the viewing session and were no longer angry at the "unpleasantness" of the first exposure.

Individual differences in responses were noted. The sickest patients tended to pick out isolated parts of their behavior which they realized were abnormal. They were able to recognize parts of the interview where they had been irrational and, by doing this, they were able to go on to make definite efforts to change and correct their now obvious defects. This is much the same process and sequence that helped our residents to learn, as described earlier.

Many patients were disturbed by their own images as demonstrated by the tape. They would often respond in a dramatic way as far as their appearance and total behavior was concerned, usually with a marked emotional reaction often followed shortly by considerable clinical improvement. This led easily to later analysis by the psychiatrist of the patient's actions and reactions, and the multitude of reasons underlying them.

Some implications for the future are inherent in these findings. It should be possible to develop more elaborate and sophisticated uses of visual confrontation as a therapeutic experience. For example, our technique did not take into account the particular needs and individual differences that exist from patient to patient. By design we did not change our interview format in any way, as this would have interfered with the controlled (statistical) aspects of the study. Eventually we could prepare tapes geared to, and especially suited for, particular behavioral problems. This will make the technique far more flexible and will help to establish better criteria for its use.

Other implications are that with present-day technical advances in television and video tape equipment, this process might aid greatly in the treatment of patients at a very small cost in terms of money or the time of scarce professional mental health personnel. It may be that the self-confrontation would not have to be limited to a patient's behavior with a psychiatrist and could be extended to other types of personal relationships. Obviously there are aspects and potentials which will have to be investigated with further studies, and it can be said truthfully that we have not yet begun to tap the potential uses of visual confrontation as a therapeutic technique.

bass soloist or a drummer during the recording by adjusting your treble and bass controls. Remember that as you decrease the bass in one channel it's a good idea to decrease the treble in the corresponding channel to maintain proper balance. For the most part, however, you'd be best advised to set your tone controls and forget them. The types of music which gain most from this sort of enhancement are those with plenty of bass and treble—symphonic music, band music, jazz with drums or string bass—although the same technique can be applied to just about every tape in your library with the possible exception of talk tapes.

The next control (or controls) to consider are volume or balance. If you have a separate volume control for each channel at your disposal, you'll be able to do more than if you have a single volume control plus a balance control. By using these controls properly, you can convert a monaural recording of, say, a train, into a locomotive chugging from left to right across your living room or a speaker moving about as he talks. Here's how: let's take the locomotive as an example. You've recorded it monaurally, then brought it home for transfer to a larger reel of tape. To move it from left to right, you turn your right volume control all the way down. You begin the recording with the left control also turned low. As the train approaches, you turn your left control up. Then as it nears you, begin turning up the right control as well. As it moves toward the right, continue turning up the gain on your right channel while beginning to turn down the gain on your left. Eventually, the train has passed and fades off into the distance, as you turn down the gain on the right control. If you

have a single balance control, you can do the same thing by putting it all the way to the left, then turning up both it and the volume control as the train approaches. As it passes you, continue turning the balance control to the right while you lower the volume.

As you can see, electronic enhancement can be fun—and it can add to the enjoyment you'll get from your tapes. By combining these volume control adjustments with those on tone controls, you should be able to create some very realistic stereo effects. It's important to note here, however, that you should never try these tricks with material being broadcast, or that which can't be redone if it doesn't come out right. That means that you'll be working with monaural disc or tape recordings (there's no point in trying these tricks with live recordings because it's easier to record these in true stereo to begin with). If you're working from tape, remember that each time you make a copy, you lose three db in signal-to-noise ratio. If this is the first copy from an original tape, that should present no problem.

Remember, too, that when you turn the treble up on one channel, you'll pick up all the tape hiss, record scratch and surface noise as well as the highs in the original recording. The bass control will pick up turntable rumble (if any) or any boominess in the original recording. If you find either of these excessive while you're making your recording, you can stop, go back to the beginning and readjust your controls to cut out the objectionable feature. It's for this reason that you should render all the controls on your amplifier(s) operative and not use those on the recorder itself. That way, you can hear exactly what is going on to the tape.

Program Material	Benefit from enhancement	Technique
		boost bass and treble controls, add reverb
symphony orchestra	great	boost bass and treble controls, add reverb,
orchestra with solo instrument	moderate	use volume control add reverb
solo instrument— few lows or highs	little	add reverb, boost bass and treble controls boost bass and treble, add reverb, use volume
solo pipe organ	some	use volume control, boost bass and treble
jazz instrumental ensemble	considerable	add reverb
pop group with vocalist	considerable	boost bass and treble, use reverb
dance band	considerable	add reverb, use volume control
folk singer	little or none	
single speaker	none	use volume control to shift positions
dialogue	little	use volume control, bass and treble controls,
sound effects	great	reverb as needed

# Perfectionist's guide to record playing equipment

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1. Track flawlessly with any cartridge at its lightest recommended tracking force . . . even as low as  $\frac{1}{2}$  gram.
2. Play all standard speed records — 16, 33, 45 and 78 rpm.
3. Vary pitch of any record with 6% Pitch-Control.
4. Achieve perfect tonearm balance with elastically damped counter-balance that offers both rapid and fine-thread adjust.
5. Dial stylus force with precision of continuously variable adjust from 0-grams up, plus the convenience of direct reading gram-scale.
6. Start automatically with either single play or changer spindle . . . and start manually at any position on either rotating or motionless record.
7. Remove records from changer spindle or the platter without having to remove the spindle itself.
8. Change turntable speed and record size selector at any time during cycling or play.
9. Install in just  $12\frac{3}{4}$ " x  $11\frac{1}{2}$ " area with only  $6\frac{1}{2}$ " clearance above for changer spindle.
10. Mount, secure and demount from base or motorboard . . . all from above.
11. Even restrain the tonearm during cycling without concern for possible malfunction or damage.

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Equipment reviews in every leading audio publication—and by consumer testing organizations—have placed Dual Auto/Professional Turntables in a class by themselves as the equal of the finest manual turntables. And these findings have been confirmed repeatedly by experienced audiophiles, many of whom have actually traded in their far more costly manual equipment for a Dual.

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**DUAL 1019**  
Auto/Professional Turntable  
... newest, most sophisticated  
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automatic turntable. \$99.50

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# Which Battery For Your Recorder?

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*by Robert Angus*

Nearly two-thirds of all the tape recorders sold last year required batteries to operate them. They ranged from recorders selling for as little as \$19.95 and operating from two penlight batteries to semi-professional models selling for \$400 and more using special power packs of their own. If you're the proud owner of a battery-operated portable, you've probably been wondering about batteries. Which one is right? How can you protect your recorder from leakage? By spending more money, can you get a battery that is more reliable or will last longer? Can a better battery give you higher fidelity? What's the best way to store batteries when you're not using them? What's the difference between a penlight battery and a C cell? Do large batteries store more energy than small ones? Just how interchangeable are batteries?

The list of questions goes on and on—and the problem is that most recorder dealers aren't equipped to answer them because they haven't been handling batteries long enough to have

Batteries come in a variety of sizes. The most commonly used, both in transistor radios and in tape recorders, are the AA, the C and the D cell. The AA, also known as the penlight, is the smallest of the group, but it produces as much power as the D (standard flashlight battery) or the intermediate-sized C cell. Each puts out approximately 1½ volts of power. The difference in size, however, does affect the storage capacity of each battery. Larger batteries, as a rule, have a longer shelf life (because they can store more energy) than smaller ones.

We noted a moment ago that three of the common battery types are rated at 1½ volts output, regardless of size. Actually, many manufacturers produce a battery which has an output of 1.65 volts or so as it comes fresh from the factory. Then, as it sits on a dealer's shelf or unused in a transistor recorder, the voltage drops very slowly (at the rate of a few hundredths of a volt per year) until the battery reaches a condition of final exhaustion, at which time voltage begins to drop



learned the answers themselves. Today, you can buy batteries in any five-and-ten-cent store, virtually any drugstore, discount houses, department stores, mail order houses, camera stores, hi-fi shops, even in your neighborhood supermarket. But few, if any, of these stores are able to provide you with proper advice on how to select your battery from among the dozens of sizes, brands and types on the market.

Including private label batteries, there are literally dozens of brands on the market today. The major American brands are Burgess, Eveready, Mallory, RCA and Ray-O-Vac. In addition, there are a number of imported lines to choose from, most of them made in Japan. While the standard battery models accommodate better than 80 per cent of the recorders on the market, there are a few which require or can use special types of batteries. The Sonnenschein rechargeable alkaline battery (which we'll discuss later) is one such example.

very rapidly. As a practical matter, the larger batteries of most reputable manufacturers have a shelf life of two years or more under proper storage conditions.

There's that term "shelf life" again. Just what does it mean? As many dry cells become older they gradually deteriorate either in use or idle. This deterioration is the unavoidable result of very slow chemical reactions and moisture changes which take place in time in the cell. These effects are ordinarily referred to as shelf deterioration. They gradually reduce the service output and lessen the cell's usefulness. Smaller cells have a proportionately shorter shelf-life than larger ones. AA batteries, for example, may have a shelf-life of only a few months.

Actually, the batteries will last as long installed in a recorder or radio as sitting on the shelf (provided that the unit is always turned off). But the battery manufacturers advise against this because of the possibility that they may leak. The industry, several years ago, created a "leak-proof"

battery—but the Federal Trade Commission promptly took action when it began getting reports of damage done to radios and other equipment by acid leaking from these cells.

If you've examined your dealer's stock of batteries in any detail, you may have noticed that some manufacturers offer more than just one kind of D cells (as well as the other sizes), ranging in price from 20 cents to \$8. There are three broad categories of battery construction, and prices within each category tend to reflect the quality of construction. The least expensive are the carbon-zinc batteries. These are the most common of all batteries, the type used for years in flashlights before transistor gear came along. A zinc can is filled with a mixture of electrolyte paste and manganese dioxide. In the center of the can is a carbon rod to which is affixed a metal cap. Such batteries usually are designated "Flashlight Battery" and sell for about 20 cents each. The same components are used in the leak-resistant (formerly leakproof) batteries, except that carbon is used

four times the life expectancy of a carbon-zinc cell. In addition, alkalines maintain their peak power much longer and provide the lowest operating cost in high drain applications, despite a price of about 75 cents for the average D cell. Some of these alkalines are rechargeable; most are not.

Finally, there's the rechargeable nickel cadmium or mercury battery. While some of the former come in D, C or AA sizes, they are not interchangeable with alkalines of carbon-zinc because they produce only 1.25 volts of power. "For some equipment, this is inadequate. For others, it's just marginally adequate, and the strain of such operation greatly shortens the life of the battery. Thus there is no advantage in their use," an official of Union Carbide's Everready division told TAPE RECORDING. Besides, the nickel-cadmium D cell sells for \$8.

Actually, it doesn't take a technician to realize that 1.5 volts isn't enough to power the average flashlight, much less operate a tape recorder. The

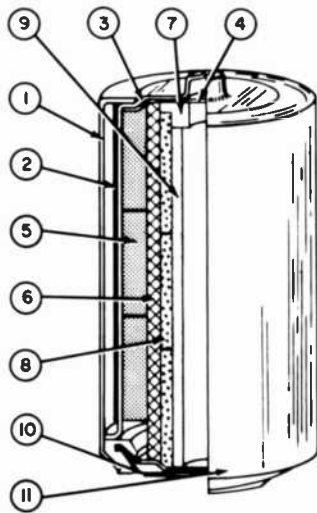


to form the can while the center rod is made of zinc. These sell for about 25 cents, and provide slightly longer life than the ordinary flashlight battery. The former are considered quite adequate for occasional use, while the latter are considered a better buy for the more-than-occasional user. Neither type is rechargeable. Some manufacturers make heavy duty batteries of both types, for heavy power drainages or for heavy usage. Most consumers, however, don't use their transistor recorders or radios often enough to warrant their use. Those who do might be well advised to consider an alkaline battery.

These differ from carbon-zinc cells in the highly alkaline electrolyte which is used. Two principal features are a manganese dioxide cathode of high density in conjunction with a steel can which serves as a cathode current collector, and a zinc anode of extra high surface area in contact with the electrolyte. Alkaline batteries can be substituted easily for any application requiring a carbon-zinc cell. The advantage is a gain of about

batteries are connected electrically in series, which means that the total power available is the product of the number of cells called for by the manufacturer times 1.5 volts.

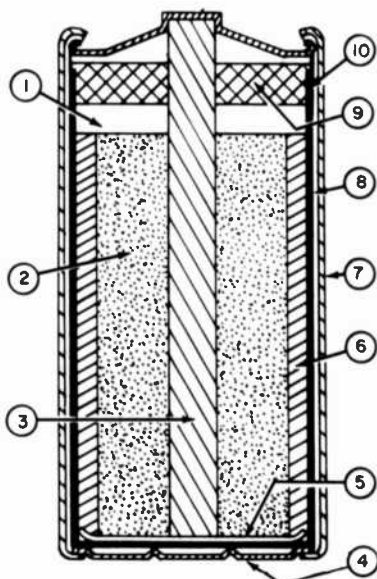
Besides these standard batteries, there are some special-purpose models including wet cells, rechargeable alkaline battery packs such as the Sonnenschein (noted above) and some radio battery packs still in use in the older recorders. These vary in voltage from the six required by such European recorders as the Uher 4000 series and the Telefunken M300 to the 90-volt packs required by some of the older Magnemite portables. In most cases, recorder manufacturers supply these batteries as optional extras with their lines. Don't try substituting here unless the manufacturer specifically recommends a substitution or unless you're absolutely sure you know what you're doing. If you guess wrong, the unit probably won't work. If it does, results will be disappointing and the battery will wear out before its time.



ALKALINE C CELL

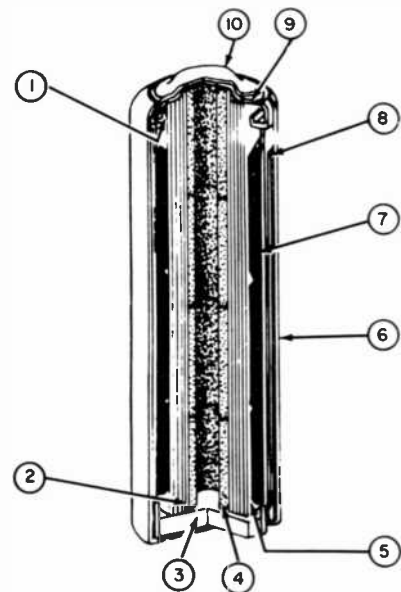
1. Outer Nickel-Plated Can
2. Tube Adapter
3. Inner Gold-Plated Can
4. Insulator Disk
5. Manganese-Dioxide Cathode Cylinders
6. Electrolyte Absorbent with Barrier
7. Insulating Ring
8. Zinc Anode Cylinders
9. Inner Absorbent
10. Molded Double Top
11. Insulating Plastic Jacket

CARBON-ZINC D CELL



1. Sealing and Insulating Gasket
2. Electrolyte Absorbent Separator Material
3. Insulator Spacer
4. Powdered Zinc Anode
5. Microporous Plastic
6. Outer Steel Case
7. Mercuric Oxide-Graphite Cathode Cylinders
8. Absorbent Sleeve
9. Tin-plated Steel Inner Top
10. Nickel-Plated Steel Outer Top

1. Air Space
2. Manganese-Dioxide-Carbon-Electrolyte Cathode Mix
3. Carbon Electrode
4. Steel Bottom
5. Paper Bottom Washer
6. Starch-Flour-Electrolyte Gel Separator
7. Steel Jacket
8. Laminated Paper Tube
9. Pitch Seal
10. Zinc Anode Can



MERCURY AA CELL

# tape

## NOTES

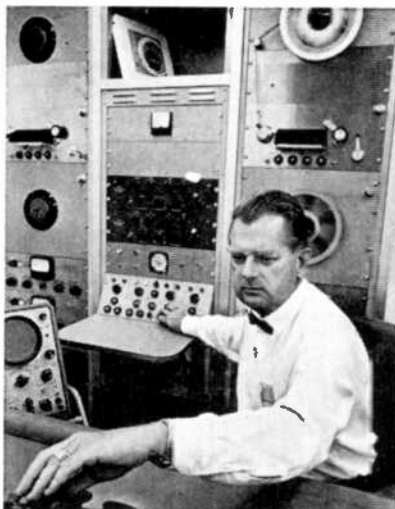
If you're like us, you have a mess of wires running all over the house connecting extension speakers in the kitchen, the den and the bedroom to your tape recorder and hi-fi amplifier. And, if you're like us, you've probably faced the problem of turning off one set of speakers while another continues to operate. If you want to shut off one or more sets of extension speakers, the answer is simple: just install an L-pad volume control in each line, and turn the volume all the way off.

The problem comes when you want to turn off the living room speakers while those in the den continue to operate. Unless you're an electrical engineer, or unless you've been able to pick up the right control from a Japanese importer, you've had to do like us—unscrew the terminals of your living room loudspeakers, then go around the house turning down the volume controls on all the speakers you're not using.

Well, somebody has come up with something to help out. Switchcraft now has a stereo selector switch which can accommodate up to three speaker systems. With the 657 control, you can choose any pair of stereo speakers, or any combination of pairs simply by turning a dial. The unit is mounted on a wall plate and can be installed inside your high fidelity component cabinet or at some inconspicuous spot. The unit lists for \$9.50 in brushed brass or brushed stainless steel.

We tried it the other evening and found that it does, indeed, perform as advertised. It doesn't serve as a volume control—you'll still need L-pads in all your lines to control each separate speaker. But it does switch back and forth with ease—and it's much more ruggedly built than some of the \$4.50 imports.

**Q. WHEN A FOREMOST RECORDING ENGINEER RECORDS PROFESSIONALLY, WHAT KIND OF TAPE DOES HE USE?**



**Q. WHEN HE RECORDS AT HOME, WHAT BRAND DOES HE CHOOSE . . . TO BE JUST AS SURE?**



**A. ULO VILMS GOES AMERICAN BRAND ALL THE WAY!**

As chief audio engineer for the world's largest pre-recorded tape duplicators, he knows the best performing and most reliable tape is AMERICAN. He chooses AMERICAN at home on his 'busman's holiday' for the same reason. Mr. Vilms' recordings, whether for clients or for his family and friends will be just as brilliant, just as flawless when played years from now. Isn't that what tape recording is all about? Anything less is a waste of time and money.

**Q. Why don't you go American?**



**AMERICAN**  
RECORDING TAPE



Greentree Electronics, 291 South La Cienega Blvd., Beverly Hills, Calif.



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# Why I Tape Chamber Music

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*by Peter Whitelam*

Chamber music has been called "the music of friends." And so it is. The few works that exist in the tape catalog reveal an intimacy and refinement quite different from any other musical form. At its best, chamber music is an elegant conversation between a small group of poets. It is artistry in miniature, like the novels of Jane Austen. No large gaudy canvas, but beauty compressed into four square inches of exquisitely carved ivory.

Musicians define chamber music as "music for two or more instruments, with a part written for each." A part for each, there's the difference. Instead of writing for a bank of violins or a selection of brass, a composer can explore each instrument in depth, counter-balancing one voice against another. The results are often extraordinary. Compare the orchestral works of Brahms, Schumann, Franck with their chamber music. The hyperbole, the high-flown rhetoric is missing. Instead, there is tenderness and warmth, an unpretentious unfolding of the composer's innermost thoughts.

The keystone of modern chamber music is the *String Quartet*: music written for two violins, viola, and cello. But chamber music literature involves many forms. There is the *Sonata*: usually for violin and piano, cello and piano, or flute and piano. There is the *Trio*: violin, viola, cello or violin, piano, cello. In addition, include the *Piano Quartet* for piano, violin, viola, cello; the *Quintets* either two violins, two viola, and cello or the regular string quartet with piano; the *Sextet*: two each of violins, viola, cellos. After this, musical dictionaries vary. Some include the *Septet* and the *Octet*, two forms explored delightfully by Beethoven, Schubert and Mendelssohn. This is indeed "the music of friends," but the scoring is usually woodwind, and the mood created is quite different from that of the string ensemble.

When did chamber music start? Actually, the idea of two instruments playing in concert dates back to the Middle Ages. The origins of modern chamber music, however, lie in the choral music of the sixteenth century and the instrumental music of the seventeenth century. There is a definite resemblance between the madrigal and the quartet and quintet. Listen to the four-part or five-part masses of William Byrd, or the coral music of Gabrieli or Orlando Gibbons. Each voice, like each instrument in the chamber ensemble, has its own part. It is interesting to note that the first quartet written for four instruments (by Allegri) dates from this period.

In the seventeenth and early eighteenth centuries, instrumental music was dominated by the harpsichord. Its part, however, was not written

out in full. It led with themes, rather like a concerto, and the balance of instrumental parts—the conversational element of chamber music—was missing. Nevertheless, early examples of chamber music can be found in this era; by William Young, who published chamber music in Innsbruck in 1653; by Scarlatti, who wrote four quartets for strings in 1715; by Corelli, Torelli, Couperin, Telemann, Stamitz, and Bach—who composed 21 chamber works, including the six sonatas for violin and harpsichord.

The modern concept of chamber music dates from the middle of the eighteenth century and Haydn. John Haydn was truly the initiator of chamber music as we know it today. Altogether, he created over 80 quartets, more than 30 piano trios, and numerous trios for flute or strings. It is fascinating to trace their development, from the early Opus 1 set (available on Vox records, but not on tape) through to the posthumous works, Opus 131. Fortunately one of Haydn's earliest quartets, Opus 20, Number 4, is available in a fine Concertapes version. It is coupled with one of the later quartets, the "Quinten" from the famous Opus 76 set. Listening to the earlier work, then the Opus 76 reveals an extraordinary development of form, an assurance of musical expression which was to affect Haydn's great inheritors, Mozart and Beethoven. This tape is worth acquiring for its historical significance, but the finest performances of Haydn chamber music on tape are those by the Amadeus String Quartet, on Deutsche Grammophon tapes. Highly recommended is the combination of the "Emperor" Quartet from Opus 76, and Mozart's "Hunt" quartet from the magnificent set of six Mozart dedicated to the memory of Haydn. The slow movement of the "Emperor" will be familiar to many as a series of variations on the Austrian national anthem, but the entire work conveys majesty and strength. The scoring is rich, almost symphonic in mood, with powerful octaves, double-stopping, and a full use of the cello's low register. The Amadeus capture all the nobility, the noise of its fine work, just as they instinctively bring the "Hunt" quartet to life, with its difficult themes, suggesting galloping to the hounds.

The beauty and inventiveness of Joseph Haydn is realized again in the DGG tape release of the two Opus 77 quartets. Originally designed to be part of a set of six, these superb works are all that the great composer had the time and strength to complete. Again, the performers are the Amadeus, and again their playing is distinguished. However, there is an air of showiness, of accentuated romanticism in these interpretations. They do not explore the inner voices of the related

instruments quite as successfully as the Schneider Quartet did on disc.

At the time of his death, Joseph Haydn had, almost single-handedly, raised the string quartet to an exquisite art form. It remained for Mozart and Beethoven to add the amazing range of emotional expression we find in subsequent compositions. Of the 60 or so complete works for chamber ensemble written by Mozart, some 14 are currently available on tape. The majority are on Concertapes. Indeed, of the 34 tapes devoted to chamber music, nearly two-thirds are Concertapes, to the credit of that firm and the disgrace of the major recording companies.

The Mozart collection is fascinating, particularly the four flute quartets, elegantly played by Samuel Baron and the Fine Arts Quartet; an interesting horn quintet, also with the Fine Arts; and versions of the magnificent Clarinet Quintet, and the Piano Quintet for piano and woodwinds. Then, of course, there are several tapes devoted to different string quartets from Opus 76. Of these, the "Hunt" quartet has been mentioned above. Also highly recommended is the performance of the 14th and 18th quartets, as played by the Julliard String Quartet. This group, which initially made its reputation as interpreters of modern music, has made some excellent contributions to the classical repertoire, particularly the quartets of Beethoven, Mozart and Schubert. Most are available on disc but not on tape. Their tape version of the 14th and 18th quartets, taken from the complete disc set, is undoubtedly the finest recording in years and belongs in the library of every tape collector.

So, in fact, does the Concertapes recording of the Clarinet Quintet. Reginald Kell's control of the clarinet is phenomenal and he is supported well by the Fine Arts Quartet. At times, one wonders whether Mr. Kell is not being too fussy. The opening Allegretto seems too refined, although he certainly brings this great work to life as few performers have before.

Of the 16 incomparable string quartets written by Ludwig Van Beethoven, only three are in the tape catalog. Since the LP catalog contains three complete sets, would it be unreasonable to hope that Columbia might make the superb Budapest Quartet versions available in a multi-tape package? As it happens, there are no performances of the Budapest on tape, an extraordinary neglect on the part of Goddard Leiberson, head of Columbia. For the Budapest Quartet is, without doubt, one of the leading ensembles in the interpretation of the classical repertoire.

Meanwhile, we have two of the early Opus 18 quartets, and the mighty Opus 131, from the last five masterpieces. All are performed by the Fine Arts on Concertapes. The earlier pieces are bright, incisive, with much of the sunshine and

radiance one finds in Haydn. The Opus 131 is a different work altogether, possessing all the mystery, all the strange other-worldly insight that the deaf composer invested in his final compositions. The Fine Arts Quartet do not project the extraordinary emotional range of the Budapest Quartet in this work, but they do produce a lean, strong tone with less color, but more attack. These are clean, firm performances, true to the music, but without the supreme involvement found in the Budapest disc versions.

The same thing can be said of the Fine Arts performance of the Charming Beethoven Septet. Here the group is joined by the New York Woodwind ensemble (who also have made a fine tape performance for Concertapes of the Beethoven and Mozart Quintets for Piano and Woodwind, with excellent co-operation from Frank Glazer). This music, however, does not require the same depth of expression as the late quartets. The tone is playful, the spiritual overtones are not in evidence.

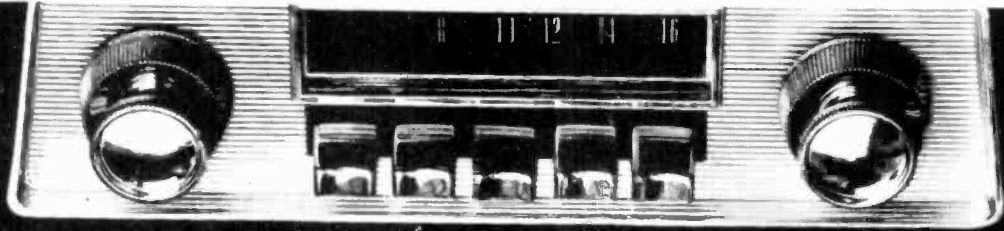
In recent months, two Beethoven tapes have been issued that deserve instant recognition. The first is the complete set of Sonatas for Piano and Cello, as played by the great Russians Sviatoslav Richter and Mstislav Rostropovitch on Phillips. The five sonatas are well distributed over Beethoven's span of composition, and the musicians are well acquainted with the Beethoven repertoire. The performances are broad, romantic, profound, with every mood captured and presented with unexcelled technique. The amazing feature of this release, however, is the incredible rapport that exists between the players. Not since the Schnabel-Fournier performances of 1948 have two musicians illuminated the lyric and dramatic contents of these sonatas so vividly.

The second tape is historical. Two days after his arrival in America in 1940, the composer Bela Bartok joined Joseph Szigeti in a performance of Beethoven's "Kreutzer" Sonata, and other violin sonatas by Debussy and Bartok himself, at the Library of Congress. That is the performance preserved on this tape, and it is an extraordinary collaboration. Together they create an edifice, a soaring arc of beauty that is true poetry. Both Szigeti and Bartok were supreme virtuosos, possessing magnificent technique and thorough training in the romantic tradition. The result is playing as it is rarely heard today: immense freedom, a furious drive and sense of exhilaration. By comparison, David Oistrakh's "Kreutzer" performance with Oborin seems small and vapid. The Bartok Sonata is likewise dazzling and forceful, but the Debussy Sonata lacks the delicate colors other musicians have evoked from the music. The tape, incidentally, is by Vanguard.

(Romantic Chamber Music on tape will be covered in the next issue.)



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# tape

## TAPESPONDENTS WANTED

MARGARET ALEXANDER, 25 Meadows Ave., Bronxville, New York 10708. Owns Dual Track (3¾ ips.) Interested in talking to housewives in other countries. Also cooking, folk lore, folk music. All tapes answered.

ROBERT ARONIN, 8727 West Congress Apt. 2, Milwaukee, Wisc. 53225. Owns Sony 250-A stereo or mono (3¾ & 7½ ips.) College student, (age 20). Interested all music, theater, photography, current affairs, books, sports, etc. will answer in English, Italian, German, Spanish, Russian.

DAVE BRUNSTROM, 1564 Dale Ave., Winter Pk., Florida 32789. Owns Columbia & Heathkit-mono (3¾ and 7½ ips.) Varied interests. Adult-singer.

DAVID BUCHINGHAM, Apt. 47, 1350 Crowley Lane, Fairfield, Calif. 94533. Owns Norelco #401, four-track stereo playback, (15, 17½, 7½, 3¾ ips.) Interests varied, you name it, "I'm interested."

GARY CARMICHAEL, 131 Deaderick Dr., Kingsport, Tenn. 37664. Interested in racing cars, guns, guitar, folk music, drafting, etc. Answer all. Teenager.

ARTHUR CHIMES, 30 Fieldstone Dr., Livingston, N.J. 07039. Owns a Lafayette RK-137A four-track mono (3¾ & 7½ ips.) Interested in Satire, Old Radio, Early Television, West-Coast radio (esp. Telephone shows). Wants opinions. Can supply N.Y. radio and opinions on any subject. Teenage-adults welcome.

TEXAS CODY, 92-25 175th St., Jamaica, N.Y. 11433. Mono only two-speed (7½ & 3¾). Interested in Vocals: Jolson, Hildegard, Smith, Tucker, Crosby, Sinatra etc.—also Humor: Newhart, Cohen, Skelton, etc.

MYRTLE DANEWALIA, 1808 Kearney St., N.E., Washington, D.C. 20018. Owns AIWA (TP-704) dual track-maz. 5" reel—(3¾). Interested in exchanging Spanish lessons for English. Also music, prayers, poems, etc.

WALTON DELL, JR., 415 Charlotte Dr., Pittsburgh, Pa. 15236. Owns Akai 27, Viking 75, Sony 101, Sony 263D, Dokorder Pt-6. (any tape) Dual track mono (3¾ ips preferred for voice—7½ for music). Former D.J., record library 4,600 discs, all music. Will trade certain items. Interested in Audio production, photography, jazz piano, sound effects, novelty (especially Spike Jones), etc. Glad to offer production tips & trade tape hints & ideas. All tapes answered, prefer Adult, either sex. Age 28, single.

CLAY DUNN, CMR BOX 80362, Davis-Monthan AFB, Arizona. Owns Roberts 1630 & 720 and Webcore 2201 three speed 17½, 3¾, 7½ ips) stereo and mono two and four track. Interested in correspondence, exchanging recordings, ideas, etc., with anyone interested in literary interpretation, Theatrical Stage, Adult.

SID FINLEY, Box 1709, Asheville, N. Carolina 28802. Owns (2) Wollensaks, mono, (3¾ & 7½ ips.) Interested in C.B. radio, motorcycles, women, voice, novelty records—have many, tapes will be answered promptly. Adult.

ROBERT FLEISCHER, 136 Greenlawn Ave., Clifton, N.J. 07013. Owns Revere 1100 half track-mono (3¾ ips), Wollensak 1580 (3¾ & 7½ ips) two or four-track stereo or mono & Norelco 101 (17½) half track mono. Speaks some German. Interested in photography, broadcast band and shortwave, rock and roll, stereo or mono. Will answer all tapes. Age 17.

RONALD GILLESPIE, 2715 Indiana Ave., Covington, Ky. 41015. Owns Roberts 770, stereo-mono four-track (17½, 3¾, 7½ ips.) Interested in Philosophy, psychology (ESP and sleep-learning) science, music: popular, jazz, rock-n-roll, live recordings. Foreign "spondents": England, Japan, etc. broad minded tapespondents wanted. Adult.

LLOYD GROSSE, 220 Dartmouth Ave., Fair Haven, N.J. Owns Wollensak T-524 (four-speeds) two-track mono & Norelco mono transistor (17½ ips.) Interested in old-time radio shows. Have catalog available. Have growing collection.

DON HAMMILL, 115 Roxborough Ave., Kitchener, Ontario, Canada. Owns Sony 500-mono or stereo—(3¾ & 7½ ips.) Interested in jazz, chess, sleep-learning, trout fishing, architecture, bridge, comedy, baseball. Answer all.

JOHN HOWE, 84 Sproat, Detroit, Mich. 48201. Owns Telectro 8-Wollensak two or four track-stereo (7½ ips.) Enjoys all instrumental music, prefers organ & folk music. Interested in renewing old friends & making new ones. Adult. Will answer all tapes. 7 inch reels, please.

HARRY JAY, 5 Iona St., Black Rock, Melbourne, Australia. Owns Uher Royal stereo, Uher Reporter 400QS, Telefunken KL85, Concord 884-mono or stereo. (17½, 3¾ & 7½ ips.) English and German speaking. Interested in life recordings, theatre and cabaret shows, interviews, historic recordings. All tapes answered.

Adult. Theatre and commercial photographer.

KIP KENNEDY, 2013 E. Sevier Ave., Kingsport, Tenn., 37664. Interested in most any subject, art photography, sports, radio electronics, literature, travel, golf, humor etc. Will answer all teens. Teenager.

LARRY LAUER, 3205 Elm Ave., Brookfield, Ill. 60513. Owns Roberts 770 four-track stereo (17½, 3¾ & 7½ ips.) mono or stereo. Also a Norelco 300, four track mono. (17½, 3¾ & 7½ ips.) age: 17. Interested in hi-fi and radio announcing, stereo LP's, jazz, rock-n-roll, anything but opera. English only but welcomes other countries, will answer all tapes.

MOTTE LEGARE, Vet. Adm. Hosp., Salem, Va. 24153. Owns AIWA TP-70 mono. (17½, 3¾ & 7½ ips.) Hospitalized Veteran age 39. Single. Interested in exchange with armed forces personnel (male or female) also veterans (in or out of hospital's—centers, etc.) and other adults. Access to other recorders, belongs to W.T.E. tape organization, enjoy brief, chatty tapes on music, drama, art, general science, world news, non personal general discussion etc. Send music on 5 inch reels. English, some French. Write first.

ROBERT LENN, 200 Sahara W., Las Vegas, Nev. Owns Uher 4000 (7½, 3¾, 17½ ips.) mono-and-Roberts-stereo (7½ & 3¾ ips.) Interested in Spanish singers (classical, light popular and cante flamenco), Latin American-bossa nova, French pops, Japanese pops. Exchange more of same plus Greek, Arabic and Indian. Large collection—answer all tapes. Professional singer and actor.

JERRY LIPMAN—1750 Rivera St., San Francisco, Calif. Owns Sony 262-SL, Wollensak (3¾ ips.) Researching music of Michael Balfe (1808-1878), and the "unusual". U. S. or Foreign-English speaking only.

EDWARD LUKER, 40 La Rancheria, Carmel Valley, Calif. 93921. Owns Norelco 401 & Concertone 800. Interested in classical, opera, old timers, collector items, some popular. Exchange tapes.

WILLIAM F. MARTIN, 462 Kendrick Ave., S.E., Atlanta, Ga. 30315. Owns Grundig-Bell-mono or stereo—(3¾ or 7½ ips.)

DON MAYER, 511 Geyer St., Frankenth, Mich., 48734. Owns Sony 350 stereo-recorder (7½ ips.) Interested in radio and prefer rock and country music.

# tape

## REVIEWS

### Teresa Stich-Randall

**Mozart:** *Exsultate Jubilate; Mass in c, "Great"; Laudamus te; Handel—Preis der Tonkunst; Schubert: Salve Regina.* Saar Chamber Orch. cond. Ristenpart Westminster 17092, \$6.95.

Music Performance Recording

The Handel and the Schubert make their first appearances on tape with this release—and a welcome addition they are. Teresa Stich-Randall is the possessor of a beautifully rich soprano voice who made her reputation in Germany as an interpreter of Mozart. One would expect her *Exsultate Jubilate* to rank with Erna Berger's or Lily Pons' (it grossly out-classes the latter), but one is pleasantly surprised at her performance of Handel's ode to music. We are indebted to General Recorded Tapes for this release which, we hope, will open the oratorio and sacred music field for tape. It goes without saying that Westminster has provided a recorded sound worthy of Miss Stich-Randall and the Saar Chamber Orchestra. Encore! Encore! —R.A.

### Massenet

**Thais and Herodiade:** *Highlights soloists, chorus and Paris Opera Orch. cond. Dervaux and Pretre.* Angel Y2S3674, 3¾ ips. \$ 9.95

Music Performance Recording

Ever wonder why *Thais* and *Herodiade* aren't performed more often in American opera houses? This tape gives a clear answer—both are crashing bores, despite some acrobatics for soprano and tenor. Nor is our quibble with the performers, who present these holdovers from the 19th century with as much style and grace as possible. Rita Gorr as Herodiade is particularly fine. (*Thais* is less attractively portrayed). Michael Dens, too, deserves

high marks for his vocal ability and conductors Pretre and Dervaux keep things going at a lively pace. The Meditation from *Thais*—perhaps the best-known selection on the tape—receives a reflective, slightly understated reading which may explain why it stands out from the historicities which surround it.

We'd like to congratulate Angel for picking the perfect format for introducing off-the-beaten-track material such as this. The twin-pack idea makes it possible to hear some 50 minutes or so of arias without interruption. The slow tape speed makes the whole thing economical for the collector who wants to try something new. Fidelity on this tape, incidentally, sounds quite high. —R.A.

### Buxtehude

**Four Sonatas, Op. 1; Harpsichord Suite No. 12; Two Canzonettas.** Robert Brink, violin; Judith Davidoff, viola da Gamba; Daniel Pinkham, harpsichord. Music Guild 121, \$6.95.

Music Performance Recording

Dietrich Buxtehude, for our taste, has always been one of the lesser mid-Baroque composers (he was born in northern Germany in 1637 and died in 1707, just at the beginning of the careers of J. S. Bach, Handel and Vivaldi). He is best known for his cantatas and compositions for the organ, so it is somewhat surprising to find his first appearance on tape to be a collection of chamber music.

However one may feel about the North German baroque, Buxtehude is a necessary and welcome addition to the tape catalogues—particularly when his cause is pled as eloquently as Daniel Pinkham and his associates plead it here. We find the performances to be both stylish and tasteful, and the Music Guild engineers have provided a small chamber sound to accompany it. Again, we'd like to take exception to the growing trend to hinge tape boxes at the top rather than at the side. We find it a nuisance. —R.A.

### Offenbach

**Tales of Hoffman, Gianna d'Angelo, Victoria des los Angeles, Elisabeth Schwarzkopf, Nicolai Gedda, George London, Ernest Blac, chorus, Paris Conservatory Orch. cond. Cluytens.** Angel Y3S3667, \$ 9.95

Music Performance Recording

We opened this box with a built-in bias against it. For years we've been sold on Sir Thomas Beecham's 1952 film version (still available in mono on London Records). But Conductor Cluytens' lively, melodic conducting quickly won us over, as did the vocal ability of Angel's all-star cast. Personally, we would have preferred the use of the same bass-baritone throughout, although Messrs. Guiselev, London and Blanc perform admirably. Among the ladies, Elisabeth Schwarzkopf's courtesan has a too-tired, too-experienced flavor for our taste, but Mmes. d'Angelo and de los Angeles are, in a word, superb.

This is another of Angel's 3¾ ips opera tapes. It seems highly successful to us, with about the same tape hiss and background noise we get from 7½ ips tapes. If there is any loss, it may be in the high frequencies, which tend to be somewhat subdued. Wouldn't it be commercially possible to offer tapes of new recordings such as this at both 3¾ ips and 7½ ips? —R.A.

### Charlie Shavers Quartet

**Sing Along with Charlie Shavers includes Carry Me Back, Gilded Cage, Old Kentucky Home, Good Old Summertime, Old Apple Tree, Give My Regards to Broadway and others.** Sesac 18-4701, \$2.98 (8-track Lear Jet cartridge)

Music Performance Recording

## Tape Reviews...

The only hitch to the low price of this tape cartridge is the shortness of the program—only two selections per track, or about six minutes' playing time. On the other hand, the convenience of having only two selections per track made it possible to find any selection we wanted within seconds—something you can't be sure of doing on reel-to-reel tapes. The Charlie Shavers Quartet is long on nostalgia, and has a way with these old favorites which, if it doesn't get you singing along, will at least get your attention. In our car—a Volkswagen 1300—the sound was highly directional, and quite satisfying.

—R.A.

### Tijuana Brass

*Whipped Cream and Other Delights*, includes *Whipped Cream*, *Love Potion #9*, *Green Peppers*, *A Taste of Honey*, *Lemon Tree*, *Peanuts*, *Butterball*, *Tangerine*, *Ladyfinger* and others, AM 51-110, \$5.98. *Lear Jet Eight Track Cartridge*.

Music Performance Recording



Here's one of the hottest albums around in cartridge form. It sells for \$5.98, and has the advantage of having its 12 tunes arranged three to a track for the listener who wants to find one in a hurry. On the other hand, the sound seems inferior to the reel-to-reel version released recently by Ampex. There's a good deal more tape hiss and the cartridge seems to lack highs. On the other hand, the tunes have spirit and bounce. R.E. said in his review of the reel-to-reel version that "it provides a wonderful showcase for any good music system." Sorry, but the cartridge version doesn't—at least not in our living room.

—R.A.

### Woody Herman

*The Fourth Herd*, includes *Catty Corner*, *Lament*, *the 13th Instant*, *In a Misty Wood*, *Blues for Indian Jim*, *The Swing Machine*, *Panatela*, *Misery Stay 'Way from My Door*. SESAC 18-3101, \$2.98. *Eight-track Lear Jet Cartridge*.

Music Performance Recording



This low-priced tape cartridge contains eight tunes on four tracks—approximately 22 minutes' worth of music conveniently arranged. The big band sound is here, although Herman seems to have lost some of his fire over the years. Played in a living room, this cartridge has rather more tape hiss than reel-to-reel users



are used to, and a sharply restricted high end. On the other hand, there is the convenience of being able to find any tune on the tape in seconds. Personally, we'd be for a Woody Herman twin-pack of more familiar tunes. But this is better than nothing—and it's the only Lear Jet Woody Herman cartridge around.

—R.A.

### Tchaikovsky

*Swan Lake*, *Sleeping Beauty Suites*, *London Virtuoso Symphony Orch. cond.* Winograd Audio Fidelity 16-50,010, \$6.98. *Lear Jet Eight-Track Cartridge*

Music Performance Recording



The same comments apply to this tape cartridge as to Winograd's recording of the *Nutcracker Suite* and *Romeo & Juliet*. We find this seven-year-old recording just as annoying as ever in the living room, but utterly captivating in the car. The performance doesn't get any better when it takes to wheels, but the seeming increase in sonics will cause all but the most jaundiced listener to overlook its shortcomings. One would wish that International Tape Cartridge Corporation would include program notes with its cartridges, even though the solo motorist won't be able to read them. They can serve to keep other passengers in the car quiet while the music is on.

—R.A.

*Romeo & Juliet*, *Nutcracker Suite*, *London Virtuoso Symphony Orch. cond.* Winograd Audio Fidelity 16-50,006 \$6.98. *Eight-track Lear Jet Cartridge*.

Music Performance Recording



We remembered this release unfavorably from our first acquaintance with it in 1959. But we plugged it into the Lear Jet player in our Volkswagen, we found our critical faculties suspended. From all around us came the lush sounds of Tchaikovsky. The music was nice, the sound was spectacular, and it helped us to weave in and out of traffic more easily.

These recordings were among the first stereo spectaculars, recorded in London with a pickup orchestra. The music selected for the sessions was inclined to be obvious, and the conductors, including Arthur Winograd, spent no time hunting for subtleties. What resulted were straightforward no-nonsense recordings of war-horses such as these. The engineers spread the orchestra wide on the sonic stage, boosted the bass and treble, and let 'er rip. In tape cartridges there are no longer the souped-up high of yesterday, and the gut-punching bass has been reduced to a juke box thump when heard in the living room. For maximum enjoyment, though, don't listen to these cartridges in your living room. Buy yourself a small car and try them there.

—R.A.

### Bernstein

*Popular Music; The Sound of Strings*, *Alfred Drake*, *Roberta Peters*, *Ray Charles Singers*, *Enoch Light Orchestra*. Command 30-60000, \$5.95. *Eight Track Jet Cartridge*.

Music Performance Recording



This tape cartridge twin-pack contains two recordings which, in our view, aren't similar enough to belong together in a twin-pack, and aren't dissimilar enough to set each other off. Both provide familiar music in tasteful (sometimes striking) arrangements. Here are such Bernstein hits as "New York, New York," "Maria," and "Lucky to Be Me" together with a non-Bernstein assortment which includes "I Cover the Waterfront," "That Old Black Magic," "Summertime," "Manhattan Serenade" and "Long Ago." The latter group are orchestral only, and can be somewhat disappointing if you're expecting Alfred Drake, and Roberta Peters to do the same magic things for these standards that they do for the Bernstein numbers. We listened to this one in a car and found it easily the equal of FM car radio with the added advantages of no commercials and carphone-type stereo spread.

—R.A.

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## BRUBECK

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Angel Eyes, Dave Brubeck Quartet, includes *Violets for your Furs*, *Angel Eyes*, *The Night We Called It a Day*, *Let's Get Away From It All*, *Everything Happens To Me*, etc. Columbia CQ757, \$7.95.

Music  
Performance  
Recording



Dave Brubeck scores another bullseye with this highly listenable tape featuring seven great songs written by Matt Dennis. The latter is also featured as the author of the enjoyable liner notes sprinkled with reminiscences of artists who first recorded the tunes contained in the set.

The "conversations" between Brubeck and alto saxist Paul Desmond are worth listening to—and listening to, and listen-



ing to . . . Each hearing discloses some nuances missed the time before, each hearing points up the tremendous rapport between the two. Dave plays a lot of "full piano" in this set and aficionados will find it brimming with Dave's traditional highly inventive solo passages, covering a wide gamut. The rhythm selection is solidly behind the soloists. The sound measures up to the fine songs and their magnificent readings.

Buy this one!

—F.P.

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## CASH

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Johnny Cash Sings the Ballads of the True West, includes *Streets of Laredo*, *Johnny Reb*, *Letter From Home*, *Bury Me Not*, *Sam Hall*, *Green Grow the Lilacs*, etc. Columbia double-play album C2Q750, \$11.95.

Music  
Performance  
Recording



How a company the stature of Columbia could release such a hybrid as this, defies reason. It is not good hillbilly, not good Western, not good Nashville, and

it's not good folk music. Johnny Cash's attempts to be dramatic with recitations come across instead as maudlinized hokum. The female chorus—albeit top quality—jars on one's senses in the role it plays here. Relieving this set from loss are the selections such as Sweet Betsy and Green Grow the Lilacs, done in a simple, "straight" style with appropriate instrumental accompaniments including guitar, banjo and harmonica.

The same sort of simplicity throughout could have made this set a solid success.

—F.P.

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## Chopin

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Impromptus Nos. 1-3; Fantasia-Impromptu in c#; Polonaises Nos. 1-7; Andante Spianato and Grande Polonaise in E<sup>b</sup>, Artur Rubenstein, piano. RCA Victor FTC 7009, \$14.95.

Music  
Performance  
Recording



Is RCA Victor planning to record the entire Chopin repertoire with Rubenstein? After hearing this highly satisfying twin pack, one can only hope so. The playing is, of course, technically perfect and the recording, made in Carnegie Hall, is an example to other companies of how to capture the piano on tape. Believe it or not, this is the first appearance on tape either of the complete impromptus or of the Polonaises.

Rubenstein's playing of the polonaises and impromptus is much more than a technically perfect performance recorded in high fidelity. It shows a deep understanding and feeling for the highly romantic mood of the music, a mood which still strikes a responsive chord in many concertgoers. Chopin may be too saccharine for the younger generation, but if you want recordings of the familiar melodies, Rubenstein's are the ones to buy.

—R.S.

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## Bellini

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Arias from *Beatrice di Tenda*, *I Puritani*, *Norma*, *La Sonnambula*, Joan Sutherland. London LOL 90109, \$7.95

Music  
Performance  
Recording



Joan Sutherland is undoubtedly one of the greatest voices before the public today, today, and it is because of her personal interest in the works of Bellini that *I Puritani* has appeared in stereo at all, and that Metropolitan Operagoers have had the chance to see and hear *La*

*Sonnambula*. Sutherland hits all the notes—beautifully—but she fails to breathe life into these characters. The result is an assortment of wooden (or pasteboard), rather vapid woman standing around a concert stage. Neither Maria Callas nor Renata Tebaldi has Sutherland's vocal equipment these days, but both were able to take Bellini's somewhat unbelievable characters and turn them into passionate flesh-and-blood.

Norma, the most believable of the lot, comes across best. Sutherland's *Casta Diva* is a sonic joy to behold. Suffice it to say that the recording is of a very high order, and the star receives suitable support from the London Symphony Orchestra and the Orchestra of the Maggio Musicale Fiorentino conducted by her husband, Richard Bonyng. The Covent Garden orchestra, conducted by Francesco Molinari-Pradelli is heard in the *Norma* excerpts. The recordings are, of course, excerpts from London's complete recordings of the latter three operas.

One word of complaint—this tape is the latest example of Ampex's stupid and thoughtless practice of printing identifying information on the top (and hinging the box on the top) rather than on the side of the package. This may be great for browsers in stores, but it makes for unnecessary awkwardness in home storage. If Ampex feels it's necessary to include information on the top of the box, why not follow the practice of RCA Victor and Columbia who provide it in both places?

—R.A.

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## Handel

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12 Concerti Grossi, Opus 6, *Schola Cantorum Basiliensis* cond. August Wenziger. Archive Production ARS 3246, \$16.95.

Music  
Performance  
Recording



At last, completeness seems to be coming to tape—and high time, in our opinion. For several years, the record companies have been on a completeness kick, offering complete Beethoven symphonies, the complete Scarlatti harpsichord sonatas, even the complete music of Anton von Webern. Here we have the complete Handel concerti grossi, Op. 6 at a price well below that of stereo discs in performances Handelian will be proud to own. Personally, we've never found these concerti grossi, in their entirety, among the most interesting of the composer's instrumental works, although nos. 5, 10 and 12 offer some truly beautiful moments. Unfortunately, the tape catalogues being what they are, the Concerti Grossi

## Tape Reviews...

are an all-or-nothing proposition; there are no individual recordings.

The Archive package has much to recommend it besides completeness and economy. It's thoroughly annotated (as are all Archive releases) and packaged conveniently with three concertos per stereo track (three interruptions) as opposed to the two concertos to be found on each side of the disc version (five interruptions). Performances are understanding and sympathetic, if not as vigorous as one might like. Recording is suited to the chamber playing of the Schola Cantorum—warm and intimate, never spectacular. —R.A.

### Purcell

*The Indian Queen, Abridged, Patricia Clark, John Whitworth, Richard Standen, London Chamber Singers and the London Chamber Orchestra cond. Anthony Bernard. Music Guild M 124, \$6.95.*

Music Performance   
Recording 

Lovers of baroque music will welcome this addition to the tape catalogues. For those to whom the music of Henry Purcell is *terra incognita*, this tape will be a charming introduction. To those who know the English master's other incidental music for stage works, operas and sacred music, it will be a necessary addition to their libraries. Included in the score is one of Purcell's most beautiful (and most popular) songs, "I attempt from love's sickness to fly," recorded brilliantly here by Cynthia Glover. Other outstanding performances are those of countertenor John Whitworth and Patricia Clark, whose deliciously rich soprano is heard in the air "To suffer for him." The only quibble about this tape, recorded several years ago by the Club Francais du Disque, is that it is "technically augmented stereo", i.e. phoney stereo. The electronic enhancement of the recording doesn't really provide stereo sound—but on the other hand, it doesn't interfere with what is a truly high fidelity monaural recording, either. —R.A.

### Haydn

*Quartets, Op. 77 Nos. 1 and 2, Amadeus Quartet. Deutsche Grammophon DGC 8980, \$7.95.*

Music Performance   
Recording 

Thanks to Deutsche Grammophon, there are now five Haydn string quartets on tape (including these two). And many thanks are due, because the chamber music of Haydn is among the most melodic and inventive of its time. The two quartets recorded here are not as well known as the Emperor, but each has a charm of its own. Unfortunately, the Amadeus Quartet's playing of No. 2 in F seems stiff and wooden, particularly in the scherzo-like Minuet. On the other hand, the Quartet in G (No. 1) has all the life and buoyancy one could wish. It's difficult to realize that the same group recorded both.

The recording, too, is not wholly satisfactory. The sound is that of an exceptionally large studio or empty concert hall, with plenty of resonance. The trouble is that this robs the music of some of its intimacy. Perhaps we've been spoiled all these years by Concertapes' fine close-miked recordings of the Fine Arts Quartet. —R.S.

### MANCINI

*Dear Heart and Other Songs About Love, Henry Mancini orchestra and chorus, includes Girl from Ipanema, Mostly for Lovers, Can't Buy Me Love, Mr. Lucky, etc., RCA Victor FTP 1292, \$7.95.*



Music Performance   
Recording 

A collection consisting largely of easy-paced, tuneful melodies, many co-composed by Mancini himself. The chorus is top drawer. So are the arrangements, although they tend to a sameness that gets a bit monotonous. The exception is "The New Frankie and Johnny, a brisk, brash item that effectively breaks the monotony.

Standouts of the set are Dear Heart, Soldier in the Rain, How Soon, and Dream.

Essentially, this is a high class sing-along, featuring tunes of the 60's rather than the 90's. —F.P.

### BEACH BOYS

*Beach Boys Concert/All Summer Long, The Beach Boys, includes Fun, Fun, Fun, Little Deuce Coupe, In My Room, Hush-abye, Little Honda, Wendy, etc. Capitol Y2T 2370, \$ 9.95*

Music Performance   
Recording 

Unless you are a Beach Boys fan, listening all the way through the Concert segment of this album is guaranteed to give you the heebie jeebies. It's not the Beach Boys' fault—(they sing sweetly, Oh so sweetly!) it's the screaming fans inscribed here and you can't tune them out.

All Summer Long consists of the flower bed-with-a-beat sound usually associated with the Beach Boys, plus the fade-out endings, totally unimaginative.

Whatever happened to the masculine sound that used to be part of male singing? —F.P.

### FEYER

*I Still Like to Play French Songs the Best!, George Feyer, piano, with orchestra conducted by Dick Jacobs, includes La Vie En Rose, J'attendrai, La Seine, La Mer, Can Can, etc. Decca ST74-4333, \$7.95.*

Music Performance   
Recording 

Bouncy, well-played schmaltz, guaranteed to please those who want to dance, those who want to listen, or those who want to do both.

Dick Jacobs provides Feyer with a lush, string-laden setting for his classically-oriented talents. This classicism is delightfully expressed in Never On Sunday (French?) into which Feyer weaves the Second Hungarian Rhapsody.

Unlike some other popular pianists of the day, Feyer varies his playing, so that when the tape ends you wish there were more. —F.P.

### ORGAN MUSIC

*Italian Organ Music of the 17th and 18th Centuries, played by Luigi Ferdinando Tagliavini, Music Guild 129, \$6.95.*

Music Performance   
Recording 

Connoisseurs of ancient classical organ music should find this sonically successful album to their liking. The organ used for this recording was constructed about 100 years ago by the Serassi family of Bergamo, noted organ builders. It is housed in Piscogne (Brescia).

All of the side one music is serious and sober. Side two contains the delightful Pasquini Pastorale, with its folkish melodies and rhythms, two "conversational" Scarlatti sonatas, and three exquisite and melodic works by Zipoli.

Hi-finicks will find the bass notes at the end of the Trabaci Consonanze and the Merula Capriccio great for checking out speaker response—or for showing off what their systems can do. —F.P.

### KENTON

**The Romantic Approach/The Ballad Style, Stan Kenton and his orchestra, includes More Than You Know, Sunday Kind of Love, All The Things You Are, Say It Isn't So, Fools Rush In, etc. Capitol Y2T 2377. 3¾ ips (equivalent of two LP records) \$9.95.**

Music Performance Recording



**TASTE.** This set has it. The tunes, the arrangements, the playing—all reflect a high level of taste. And sophistication. Here is Kenton not of the Big Brash Band, but Kenton of the quiet, the subtle, presenting great songs in creative settings that bring out their moods and feelings exquisitely.

The dialogues between brass, reeds and piano are of a high calibre, (the "sound" is reminiscent of Glenn Miller at his peak) and always there is the beat, almost caressing, keeping the mood fluid.

It will take a trained ear to hear the difference between this and music recorded at 7½ ips. —F.P.

### HORN

**Horn Concertos Nos. 14 (Mozart), Horn Concertos 1 & 2 (R. Strauss), Dennis Brain and the Philharmonia Orchestra conducted by H. Von Karajan and Wolfgang Sawallisch, Angel Y2S 3669, \$**

Music Performance Recording



The reissue of these concerti for French horn is a sad reminder of the tragic early death in 1957 of one of the great musical talents of our time.

Conversely, we can rejoice that Angel has seen fit to keep alive Dennis Brain's superbly sensitive performances through the medium of magnetic tape.

The Philharmonia provides inspired accompaniments, with each conductor serving Brain to the utmost.

The Mozart concerti are a delight, abounding in easy-to-catch-and-follow melodic lines and youthful, uncluttered musical emotions.

The Strauss First Concerto written in 1884 at the age of 20, struck this listener as un-Straussian, smacking more of the simplicity of Dvorak and Smetana than the complexity of Strauss of the later tone poems. Which is all to the good.

The somewhat bombastic Second horn Concerto (1942) is reminiscent of Til Eulenspiegel and Don Juan, but is not nearly as inspired.

The album notes do not indicate when the recordings were made. The Doctoring for so-called stereo and the slow running speed has added a rather high noise-hiss level. But this should not deter the serious collector from buying this historical gem. —F.P.

### OVERTURES

**William Tell and Other Favorite Overtures, Leonard Bernstein and the New York Philharmonic Orchestra, Columbia MQ 735, \$7.95.**

Music Performance Recording



Zampa with its various moods and tempi is brightly done, with zest. But throughout Mignon one has a feeling that the orchestra was called on to do a boring chore; but this may be the nature of the music. The zest returns as the orchestra attacks the Raymond overture. The strings are exquisite in the quiet passages. As the mood switches and the pace quickens, you sense that all participating are having a grand time.

The Poet and Peasant and William Tell are approached with proper reverence and gravity in the opening measures. Then as the tempi accelerate, the orchestra pitches in with gusto, squeezing out to the fullest all the dynamic nuances of these battered warhorses. This is done so perfectly one wonders if Bernstein had conducted tongue-in-cheek; there is a strong suggestion of suppressed laughter at these perennials. They CAN be funny if regarded as non-serious music.

Wonderful balanced sound and great "presence" make this one a winner. — F.P.

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**gives you such quality sound and weighs so little—at so quiet a price.**

Only OKI 300 sounds so magnificent, and costs so little. It's a compact concert hall, lighter than 16 lbs., spectacular solid-state 4 track stereo. And it dresses up any room it's in. Hear it today — the matchless sound of OKI 300. Only \$219.95\*. 1 year warranty,\*\* See and hear it at your OKI dealer.



## ONLY OKI 300



\*Manufacturer's suggested list price.  
\*\*1 year parts, 6 mos. labor.



**Chancellor Electronics, Inc.**  
457 Chancellor Avenue, Newark, New Jersey 07112



# Let's Look Inside The Dynamic Microphone



**T**HIS is no ordinary microphone. It's a University Dynamic. Its manner of working is no less complex than a modern day computer. Its system of elements is a carefully integrated electromechanical network in a critical acoustical area. Without showing it, it's really quite a bit more than it appears to be — you have to listen to know the results of its performance.

For example — you move toward a flurry of activity on a busy street corner and witness a man-on-the-street interview. To you and other observers the conversation is barely audible above the noise of people and traffic. But to radio listeners the conversation is clear and unaffected by the sounds of the city . . . They are remote . . . in the background where they belong. This is the distinct advantage of a microphone with a good directional pick-up pattern.



Model 8000 Directional (Cardioid) Shock Mounted



Model 8100 Directional (Cardioid) With Switch

To demonstrate another case in point — Imagine yourself an unseen observer in a conference room of a large organization. A tape recorder, fed by a single microphone in the center of the conference table, is in use to store all that is said. Many speak at once; some face away from the microphone; it appears that all that is said may never be recorded, but every word is captured on the magnetic tape for later review.

Both are University Dynamic Microphones, but they are different in design, to serve different applications. The first is a highly directional (cardioid) dynamic microphone, sensitive only to the areas of sound intended for radio transmission or recording . . . proportionally attenuating sounds emanating from adjacent unwanted areas. The second is a highly omni-directional dynamic microphone sensitive to sounds in all surrounding areas, specifically designed to pick up all sounds.

University makes only dynamic microphones, and they have the precision and reliability of modern day computers. Look at the inside to confirm this. The bullet shaped dome of the directional cardioid is a precise and significant component of the system. It smoothes the vital mid-range to provide a more dynamic, natural quality of sound. Filters, in a special configuration, soften sudden bursts of sound, minimize sibilants and protect the inner components from dust, dirt and the elements. A series of ducts further extends the performance of the microphone's transducer element providing gross and fine tuning (similar to the bass ducts of a speaker system) to sharpen the directional characteristics and reinforce the bass response.



Model 2040 Omni-Directional With Switch



Model 2000 Omni-Directional



Model 2050 Omni-Directional With Swivel & Switch

The unusual, rugged, yet highly sensitive characteristics of the exclusive University UNILAR diaphragm are responsible for the remarkable high frequency performance of the University Dynamic Microphone—sharp, bright, clear and transparent. The UNILAR diaphragm is not easily seen in the precision cut-a-way shown above. It is extremely light and sliver thin, rugged and virtually indestructible. It could easily withstand torturous bursts of sound and vibration, even without the "extra-measure-of-protection" blast filter screen in the assembly. This feature alone guarantees continued distortion-free and trouble-free performance . . . and, it is only one of many features that make the University Dynamic Microphone the choice of professionals and recording buffs. No matter

what the nature of sound, University captures the live natural quality that makes the difference right from the start . . . better than other microphones costing \$10, \$15 or even \$20 more. And, the exclusive University warranty gives you five times as long to enjoy this "lively sound." Stop at a franchised University Dealer today and try for yourself. Get more info too! Write to Desk Y 619, UNIVERSITY SOUND, P. O. Box 1056, Oklahoma City, Oklahoma 73101 . . . we'll send you a FREE copy of "Microphones 66."



Attach'e 6000 Directional (Cardioid) With Leveller

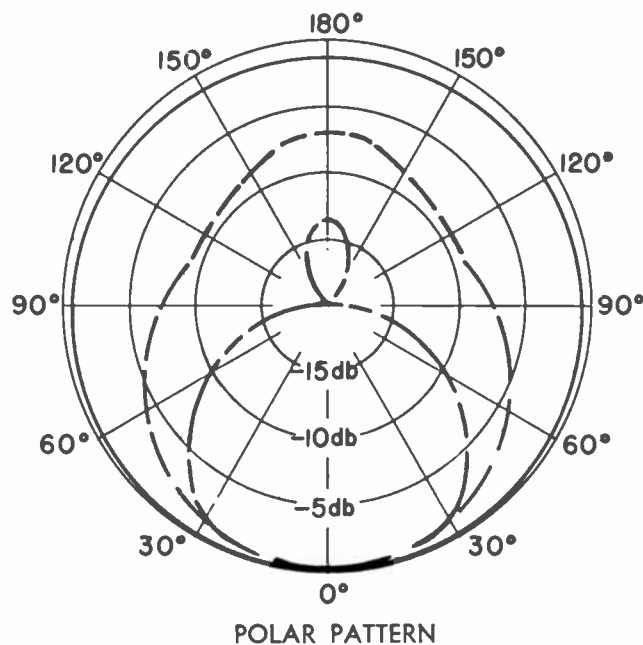
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# Microphone Characteristics

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*by Walter Salm*

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Once you select the general type of microphone you want to use for your recordings—crystal, ceramic, dynamic, velocity, or condenser—you'll want to consider another classifying factor, that of its area of sensitivity, called the pickup pattern.

It is common practice among broadcasting and recording engineers to refer to any microphone by its pickup pattern. Instead of saying "ribbon" or "dynamic," engineers refer to microphones as *cardioid*, *bidirectional*, *unidirectional*, or *omnidirectional*. This practice is based on the fact that recording or broadcasting studios will have on hand some of each of these microphones. Within a given price bracket each of these will probably have essentially the same frequency response range, with only the areas of pickup sensitivity differing.

Microphone patterns (i.e., pickup patterns) are related to the electro-mechanical-acoustic characteristics of the diaphragm or ribbon, configuration, size and placement in the case. Basic internal structures such as magnet poles, acoustic grids, baffles, vents and physical size are pattern controlling factors.

The directional characteristics of a microphone are represented graphically by polar diagrams. The signal output of the microphone for various angles of incident sound is plotted in polar fashion using the microphone location as the origin and defining sound from the front as being at 0°.

Thus an omnidirectional pattern is often represented as a circle with the microphone at the

center. The variation in output signal strength are represented by a percentage or difference in decibels from some established reference level. These diagrams are normally shown at several representative frequencies and will often vary appreciably with frequency.

The velocity or ribbon microphone was one of the first high fidelity sound pickup devices put into service in the early 1930's. The corrugated ribbon in the modern velocity microphone may be as small as  $\frac{1}{8}$  inch wide and one inch long. It is suspended very closely on its long axis between the poles of a magnet. The narrow ribbon acts both as a diaphragm and electrical transducer.

The ribbon microphone is more technically called a pressure gradient microphone, in that sound waves striking one surface of the ribbon head-on will then traverse around the internal magnet pole pieces to strike the opposite side of the ribbon. The motion of the ribbon in the strong magnetic field is a direct product of the pressure differential between its two sides at any given instant. The resulting electrical signal at any frequency and at any moment is a direct product of the velocity of the ribbon.

Since the ribbon is open to impinging sounds from both sides, it is bidirectional. This is due to the fact that the pressure differential between the two sides of the ribbon decreases to zero as the angle of the sound incidence changes from head-on (to either face of the ribbon  $\theta = 0^\circ$ ) to a side approach to either edge of the ribbon

## Microphone Characteristics...

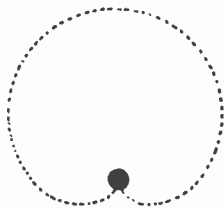
where  $\theta = 90^\circ$ .

The pressure differential of the impinging sounds is represented by the cosine of the angle  $\theta$  which is zero. Thus the bidirectional ribbon microphone is said to be "dead" on its sides. The three dimensional pattern as viewed from the top of the bidirectional microphone forms on the flat surface a figure eight—each loop of the eight extending out from one sensitive surface. To the mathematician this figure is known as a "lemniscate," but to the audio engineer it represents a bidirectional pickup pattern.

Some manufacturers offer high quality velocity (ribbon) microphones which have been designed to provide pickup pattern which is unidirectional. This is made possible through the use of properly designed acoustical networks. These acoustical arrangements insure that voltages produced by the ribbon element are maximum for those sounds which approach from the front, and are minimum for those sounds which approach from the rear (actually at  $\pm 135^\circ$ ), thus establishing a cardioid polar characteristic. The term "super cardioid" is used to describe the pickup pattern of such a microphone.

Among the pressure operated microphones, the crystal and ceramic units generally have an omnidirectional pattern, sensitive in all directions spherically from the diaphragm.

The shape, design, interior acoustic baffles and ports are contributing factors in setting a microphone's pickup pattern. These, along with the electrical circuits, can be adjusted to modify pickup pattern. Among the most versatile for a variety of pickup patterns are specific models of the condenser microphone. In certain models (Telefunken or AKG) the pattern may be changed, acoustically or electrically to serve as a



cardioid, omnidirectional or bidirectional microphone. The cost of the condenser microphone is high, directly proportional to its complexity and difficulty to manufacture. Some moving-coil dynamic microphones compete in quality with the condenser microphone but at less cost.

In general recording, wide frequency response is desirable. Ordinary crystal or ceramic microphones do not fulfill this need. The utility microphone furnished with the average home recorder

is ordinarily deficient in both its low and high frequency ranges. Better quality crystal or ceramic units with improved responses can be obtained, and will enhance the quality of home recordings. These, however, will not equal the quality of a good dynamic microphone.

Dynamic microphones provide a variety of frequency response ranges, usually related to the price tag. Naturally a \$10 dynamic isn't going to provide the performance you can expect from a \$50 or \$100 microphone. At the same time, it isn't necessary to buy the most expensive unit on the market if you don't really need it.

A decent dynamic microphone can be purchased for \$30 to \$50. Microphones at this price should provide fairly uniform frequency response from about 60 to 12,000 cycles. At about 12,000, the response will start to fall off and will be definitely down in level at 15,000 cycles. Sometimes, by designing a high resonance point into the mechanical-acoustic construction of the unit, a microphone will have a peak near its upper frequency limit. This is done to extend the high range. But if the frequency response graph shows too much of a peak, the recorded sound may tend to sound shrill at frequencies within the peak region. If the resonance peak has a blunted top to the curve, it shows that some effort has been made to damp this resonance and the recorded sound at this point will be more natural. No frequency response curve will be ruler-flat, no matter what the manufacturer says but these curves can come fairly close to this ideal with careful design.

In general, the best frequency response comes from condenser microphones. Since these are usually too expensive for the average home user, the next choice for frequency response is the high quality dynamic. These can range in price from about \$50 (for the RCA SK-46) up to several hundred dollars.

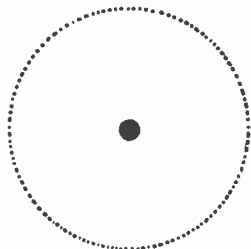
Typical cardioid dynamic microphones are the Shure 55S "Unidyne II" and the Shure 545 "Unidyne III." These microphones have proven themselves for general-purpose recording. The "55S" is rugged and can be used outdoors as well as indoors. It has a unidirectional (cardioid) pickup pattern that is effective in eliminating feedback and unwanted background noise. It sells for about \$48. The 545 provides good voice and vocal reproduction and does not over-emphasize bass. It will also eliminate feedback, unwanted background noise and boominess. It sells for about \$51.

Some of the latest dynamic microphones (such as the Electro-Voice omnidirectional 635A) can compete with the performance of older, more expensive microphones. The secret of the EV635A is in a specially processed diaphragm and a highly

*Dynamic microphones provide a variety of frequency response ranges, usually related to the price tag.*

precise magnet and coil assembly. Radio and TV stations are starting to use this microphone because of its exceptional performance, small size, and the dynamic's inherent ruggedness. The price is about \$49.

Output level is an all-important factor that is difficult to evaluate. Piezoelectrical (crystal and ceramic) types have very high output signals into high impedance inputs, and work well into circuits designed for them. High impedance dynamic microphones develop smaller signal voltages, but in many cases, still enough to operate properly with most tape recorders. Some of the fancier models have very low levels at a low impedance and need some sort of matching transformer or perhaps a preamplifier between the microphone and the recorder. This is also true of some velocity microphones; the velocity's output is also low at a low impedance. And, without the match-



ing transformer, or preamp, the recording level control must be cranked all the way up to get any signal at all. With some recorders a preamp is a must—a consideration when buying the microphone. Solid state (transistor) preamps can be relatively inexpensive—from seven to \$20, and their use will be covered later, along with other important accessories.

Many microphone specification sheets will state the output signal in decibels. For example, one may say: "Output, -55 db." What this means in terms of signal voltage can be anybody's guess. The db (decibel) level is in relation to a specific reference point selected by the manufacturer. On the same reference scale, a microphone with an output of -55 db has a higher signal voltage output than the microphone with a rating of -60 db. All things being equal, a microphone rated at -55 db should be usable if properly matched in impedance without a preamplifier with most tape recorders.

Impedance matching, next to actual microphone selection, is the most important factor in making good recordings. The so-called high-impedance microphones are generally crystal and ceramic units. These connect into an input impedance of about 50,000 ohms at the recorder. But plug in a dynamic microphone with a 150-ohm impedance and you've got trouble. This

kind of mismatch will attenuate the signal level to a point where recording becomes impractical.

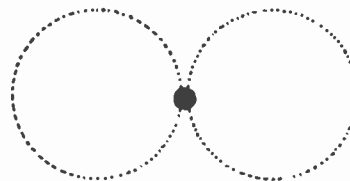
Many dynamic microphones have an impedance matching transformer built into the case. Very often, a screwdriver-slot selector switch is also included, enabling the user to choose the most convenient impedance for use with his equipment. This switch is usually marked "H" and "L" (for high and low), and the exact meaning of the high and low value will be found only in the specification sheet or technical data packed with the microphone. Read this material carefully!

If you end up using a low-impedance microphone with a high-impedance input tape recorder, then a line matching transformer must be inserted between the microphone and the recorder. A transformer of this type runs about nine dollars and is well worth the investment for the resulting increase in fidelity.

The length of cable between the microphone and the tape recorder can have an appreciable effect on frequency if a high-impedance microphone is used. The cable length develops what is known as a capacitive reactance between the outer shield and the inner conductors and this can reduce high-frequency response considerably. For high impedance microphones of this type, keep cables shorter than 25 feet.

Low impedance microphones (50 to 250 ohms) on the other hand, used with an input transformer close to the recorder can be used with almost any reasonable length of cable without an adverse effect on performance.

One minor—but important—point when buying a microphone: many units are available with a built-in On-Off switch. Actually, the On-Off switch has its use and place, but care must be taken to prevent switching off the microphone accidentally during recording. The unit should have a locking plate which will prevent the switch from being turned off inadvertently.



#### IN THE NEXT ARTICLE:

Microphone accessories can not only make recording sessions easier, they help you get professional results. Included will be stands, booms, mounts, mixers, transformers, reverberation units and other important hardware you should know about.

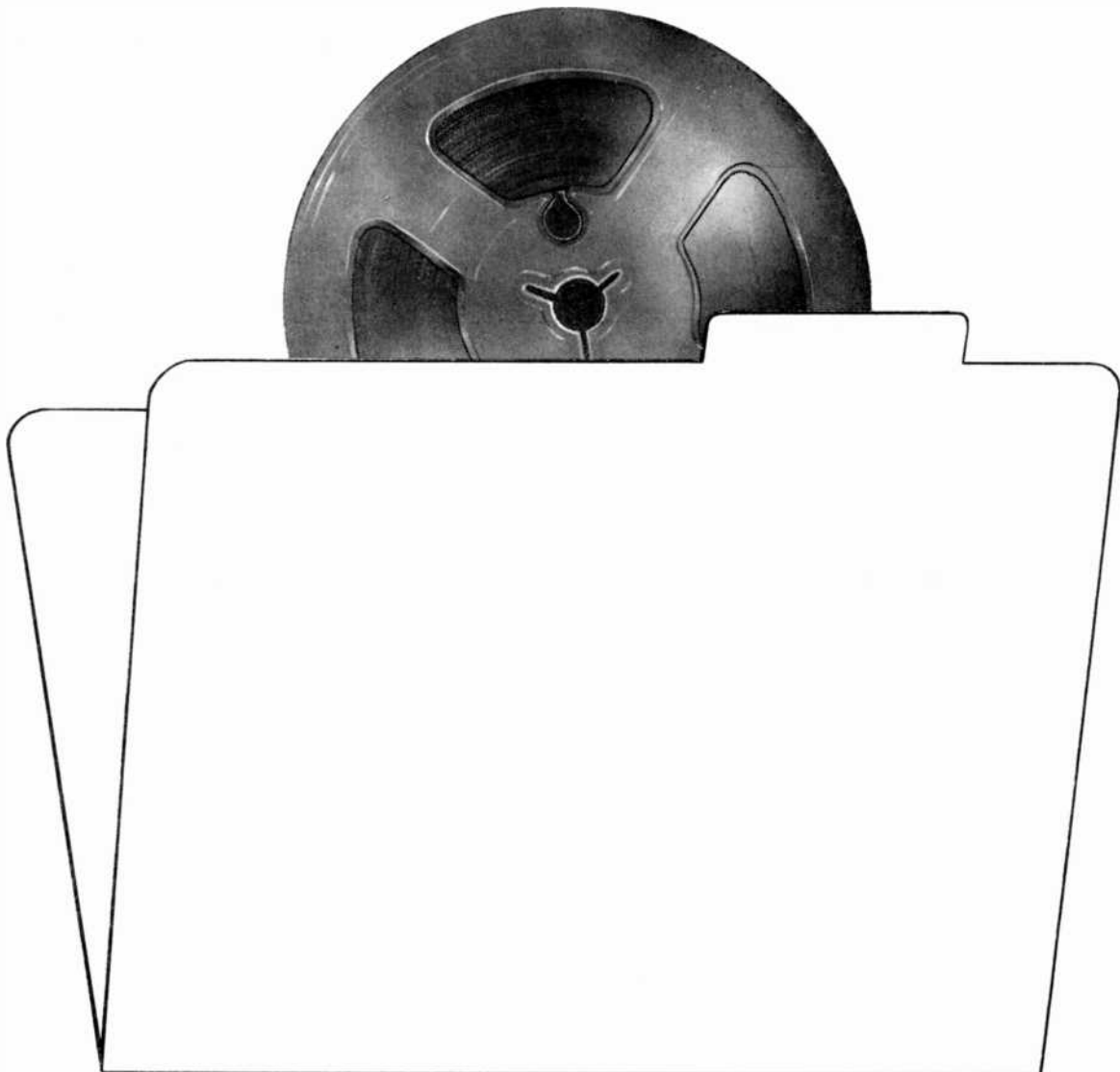
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Find 'Em  
File 'Em  
Forget 'Em

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*by Robert McBride*

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*Sooner or later you're going to have to arrange your tapes in an orderly manner.*

If you're serious about building a tape library, sooner or later you're going to find the need to arrange your tapes in an orderly fashion so you can find what you want when you want it. And you may need, before you reach that point, a system for indexing and filing your tapes so that others can find them and use them when they need them. As long as your library remains relatively small, and consists of essentially the same kind of material—complete symphonies, for example; or the complete campaign speeches of Harry Truman—you won't have any trouble finding what you want without a filing system. It's only when your library begins to grow and when you begin expanding into new areas—bird calls, Russian lessons from Radio Moscow, many short pop or symphonic pieces, sounds of streetcars—that you're likely to run into trouble.

A filing system, if it is to do any good, must be able to account for all of these and many, many more. Some years ago, the Library of Congress set up an admirable system for phonograph records. While that system still lends itself to the filing and indexing of prerecorded tapes, it is inadequate for most privately assembled tape libraries for several reasons. First, tapes generally hold much more sound than records. Second, the Library of Congress simply adapted its book title and author system to cover music—the sounds of satellites or an important business conference have no authors.

TAPE RECORDING asked me to work on a filing system which could include every eventuality of sound recording—from the prerecorded Beethoven Fifth Symphony to the 3600-foot reel containing four monaural tracks of sounds, off-the-air comedy, speeches and pop tunes.

Let's take the simplest tapes first—those containing one or two symphonies by the same composer, a single complete opera or a pop concert by a Nat King Cole or Harry James. These tapes can be filed on your shelf more or less in alphabetical order and, when they're by themselves, don't need any indexing. If you find you're going to amass a number of such tapes, you may be interested in a two-letter four-digit system for simplicity. The first of the two letters, if your collection is classical, is the composer's initial. The second is assigned arbitrarily, to separate one "B" from another. Let's assume your collection now includes the Bach Brandenburg Concertos on one tape, the Beethoven Ninth Symphony on a second and the Brahms first and

third symphonies on a third. Bach arbitrarily would become BA in your library. Beethoven, then might be BB and Brahms BC. But suppose you add Berlioz' *Symphonie Fantastique* and Bellini's *Norma* at some future date. Rather than try to keep the composers in alphabetical order, you'll find it simpler to assign these composers BD and BE—and so on.

If your collection is pop-oriented, you'll probably prefer to file by performing artist. Let's suppose you have one full tape of Frank Sinatra, another of George Shearing and a third of Artie Shaw. These could become SA, SB and SC. As you fill up a tape of Keely Smith, it becomes SD. In either case, you'll find few composers or performers whose names begin with X, Y or Z. These letters serve for certain types of anthologies. As you add your second Beethoven or Sinatra tape, it becomes BB2 or SA2, and so on.

This system works well where only one composer or one artist appears on a tape. But let's suppose your Beethoven tape contains Mendelssohn's *Ruy Blas Overture* as a filler. You'll continue to file the tape as BB2 or 3, but you'll need a cross-reference to tell you where to look for the Mendelssohn. That means a pile of 3 x 5 file cards and a drawer or box to put them in. You'll need a card for "Ruy Blas" and another one for "Mendelssohn"—and before long, you'll be typing up cards for Beethoven and Brahms as well.

TAPE RECORDING has designed some index cards (they appear on page 38). You may prefer to make your own, or to order cards already printed from the Library of Congress. These cards are printed for specific records, and cover most (but by no means all) of the important classical releases each year. Those records and prerecorded tapes which are indexed carry a code number for ordering. A typical code number might be R65-2000—the number before the dash indicating the date of issue. I'd suggest ordering two cards for every composer-title combination on the record or tape, then filing one card alphabetically with the composer's name, the other alphabetically by title.

Now let's take some of those anthologies—long tapes with no outstanding composer or artist (in my opinion, no tape should be filed by composer or artist unless that individual accounts for better than 25 per cent of the playing time of the tape and more than any other individual artist or composer). Let's suppose a compendium of old-

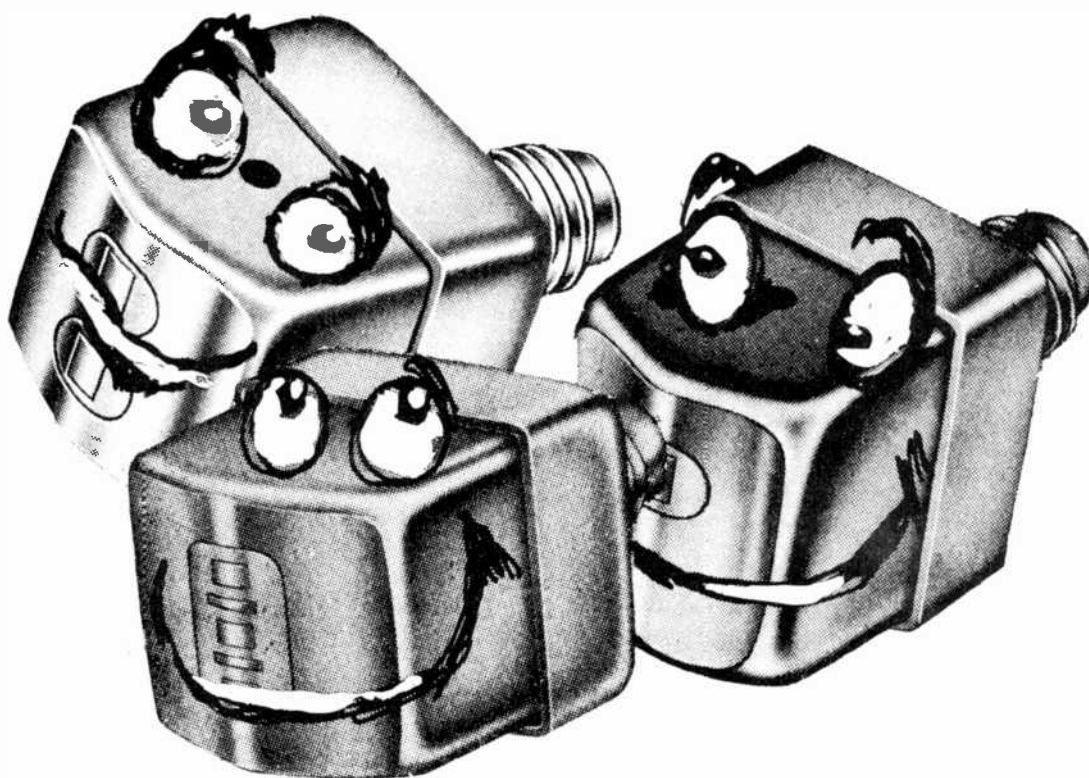
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# Three Heads Are Better Than Two

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*by Peter Suthern*

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Ever consider—owners of two-head recorders—what things you might be able to do if you had *three* heads on your machine? Here are three possibilities:

- (1) You can monitor directly off the tape precisely what you're recording as you record it.
- (2) You can add echo effects.
- (3) You can experiment with sound-on-sound (multiple recording). Sound interesting? Well, you can probably convert your two-head machine to three-head and we'll show you how.

A two-head recorder has one erase head and one combined record/play head. The sound head is a compromise design intended to work either as a record head or as a playback head. The principal advantage, from the manufacturer's viewpoint, is lower cost. The compromise works out pretty well as far as fidelity goes, but you are stuck with the unchangeable fact that when the head is recording, it cannot at the same time be playing back.

In a three-head machine, you have an erase head, a record head and a playback head, in that

order. Each is "optimized" (to use engineer's jargon) for its own function, and each is completely independent. To illustrate: You are recording. The tape passes first the erase head, where it is wiped clean of any previous recording or noise. As it passes the record head, the new signal is produced in the tape. *A fraction of a second later*, the same point passes the playback head. Because the playback head is completely independent, even to the extent of having its own separate preamplifier, you can listen to the signal that you have just recorded on the tape. This is by far the most conclusive way to be sure that there are no unexpected noises or distortions and that the microphone balance is correct.

In that fraction-of-a-second delay lies the key to the echo-simulating you can do on the three-head machine. Here's how it works (figure one).

You make a normal recording, except that a portion of the signal from the separate playback head is mixed with the new signal. The delay in the playback signal (about 0.15 second at 7½ ips, twice that at 3¾ ips) at reduced volume, mixed



with the original, makes a sound very much like real echo. (In real echo, many reflections arrive at the ear at a different time with successively lower and lower amplitude. Simple tape reverb, with only one playback head, doesn't sound completely natural. It's still pretty dramatic, though, and opens up a whole new world of special sound effects.)

Figure two shows a form of sound-on-sound recording. Note that the playback head precedes the erase head.

#### Adding the Extra Head

To add an extra head to your recorder is a job that will call for ingenuity. It may not be practical on all machines. (See figure three.) The best position for it is in line with the other heads, after the existing record/playback head for echo (in the direction of tape travel) or before the erase head for sound-on-sound. (If your machine records four-track *mono*, you can still put the new head last. More later.) If it's possible to mount it near a tape guide, do so. If not, between guide and capstan or even beyond the capstan will do.

One of the best heads to use is the Nortronics 1001, a four-track stereo head, with the Nortronics QK-74, "Quick-Kit" mount. Both are available from most local audio retailers. If you live in a rural area, try Allied Radio Corp., 100 N Western Ave., Chicago, Ill. 60680. The 1001 head is stock no. 80 U 084S, \$21; the QK-74 is 80 U 849S, \$2.25. Beautifully detailed instructions are included with the head and the mount, so you should have no particular trouble once you establish whether your machine has space for a third head. (Just be sure to read all the instructions before you begin. You'll learn a lot about tape recorders, and you will save yourself some anguish later.)

#### Connecting the head

The head alone is not enough. You will also need a preamplifier to build up the signal and equalize it for flat response. This can be any

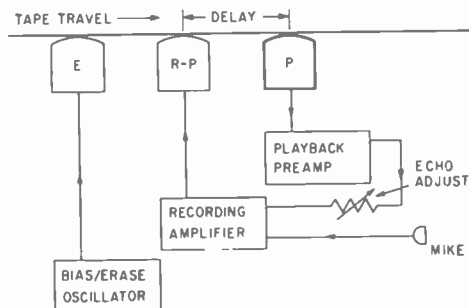


Fig. 1—Delay between moment of recording and moment of playing back, plus mixing of record and playback signals, produces echo-like effect. "P" is the added playback head; "E" and "R-P" are erase and existing record-playback heads.

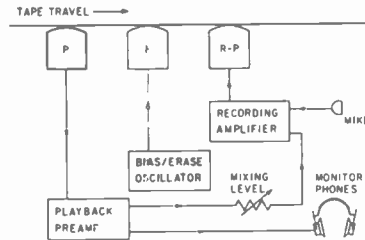


Fig. 2—Similar setup, except with new playback head preceding erase head, permits sound-on-sound recordings. With four-track machines, it is possible to place new head after existing record-play head, as for echo, above, and still get sound-on-sound. Text explains in further detail.

type of preamp intended for use with a tape head. For example, many of the one-tube "outboard" magnetic phono preamps that were common in the early days of hi-fi when people started converting to magnetic pickups, then again later at the beginning of the stereo era when people added a second channel. G-E "UPX" series, and Fisher PR-6 are examples.

For compactness and convenience, the best bet is a transistor tape preamp module sold by Burstein-Applebee, 1012 McGee St., Kansas City, Mo. 64106. It costs \$4.95 plus postage; order it as stock no. 17 B 200. Instructions are supplied—it comes ready to use. (Ask B-A to send you a catalog, too. They carry a tremendous variety of radios, tape recorders, parts, tools, gadgets, electronic components, telephones and such things.)

One more possibility: if you intend to use the extra head mainly for monitoring, the Shure SA-1 Solo-Phone stereo headset amplifier does a good job. The equalization is not completely accurate for tape playback (it being designed for phono cartridges) but it's close enough for the purpose and very convenient. The output jacks of the SA-1 accept ordinary stereo headphone plugs (four, eight or 16-ohm phones).

#### Using your (new) head

To monitor a recording via the new head, you



This outboard head was added to a Knight KG-115 recorder (Viking transport), which already had three heads. The fourth head was installed for experiments with multiple-delay echo effects. It's placed between capstan and tape run-out switch.

## Three Heads...

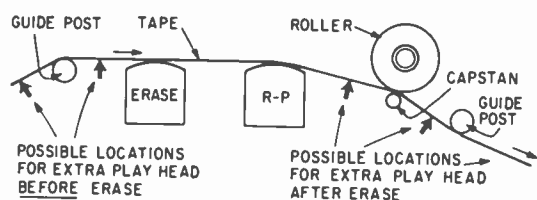


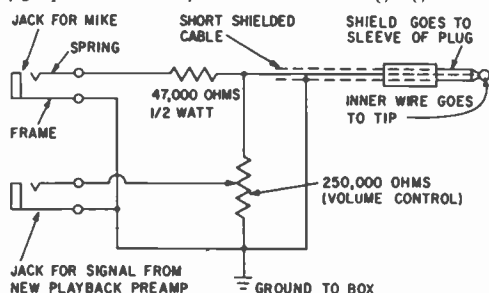
Fig. 3—Possible locations for extra playback head, before and after existing heads. It should go, if at all possible, between a guide post and an existing head, or between guide post and capstan.

need nothing but the preamp and a pair of earphones.

For echo generation, you need to mix a part of the preamplified signal from the new play head with the incoming signal. If your recorder has facilities for mixing the mike input with radio, "line" or other high-level input, you're all set. Just use the mike normally, and plug the output of the new tape-head preamp into the high-level input. Record with the mike control at normal level, and advance the "line" gain control for the proper echo effect. You'll have to experiment for the correct level setting. If the setting is too high, you will get a sustained reverberation that doesn't die away, or a buildup until the sound degenerates into a roar.

If your recorder doesn't have mixing facilities, a separate mixer will do (such as the one described in the November-December issue of *TAPE RECORDING*), or you can build the simple device shown in figure five. Almost any commercial mixer will work, also.

The only way to change the *delay* in the echo is to change the spacing between the record head and the new playback head, or to change the tape speed. The higher the speed, the shorter the delay. The delay at  $3\frac{3}{4}$  ips is twice that at  $7\frac{1}{2}$ . At  $1\frac{7}{8}$  ips, the delay is twice as long again. The



Mixing circuit of Fig. 4 built into half of 4 x 2 1/4 x 2 1/4-inch Bud Minibox. Other half can be slipped on for complete shielding, if necessary (drill hole for cable, in that case!). Jack nearest hand is MIKE jack of Fig. 4.

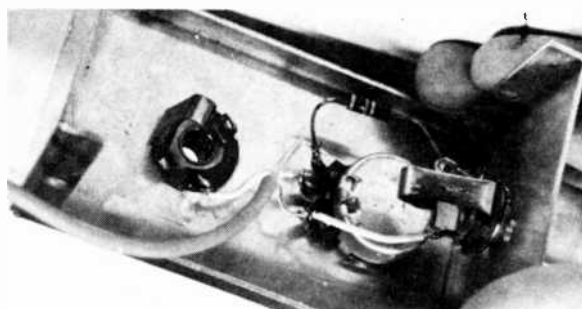


Fig. 4—Simple mixing box to use for echo and sound-on-sound experiments.

closer the play head is to the record head, the shorter the delay time.

### Sound-on-sound

The most practical way to set up sound-on-sound on an ordinary two-track two-head recorder is to place the new playback head *first* in line—that is, before the erase head. Again, the preamplified and equalized output of the new head is mixed with the new signal. For example, you record one part of a song in two-part harmony. Rewind the tape, and begin playing it back. As it passes the new playback head, first in line, the signal is picked off and fed not only to your monitor earphones, but also back into the recorder and ultimately to the record head, as though it were an altogether "fresh" signal from the mike. But meanwhile, the erase head has cleaned the first recording off the tape, leaving it blank until it passes the record head again. With this rerecorded signal, you mix a new signal from the mike: the second part of the two-part harmony. Both parts are now recorded simultaneously on the tape.

You can of course repeat this and get three- or four-part harmony, but with each the noise and distortion will increase somewhat, and the stakes are higher, too. A mistake in the fourth recording means re-doing all earlier parts. Do multiple sound-on-sound recordings in a dead-quiet room, be sure the tape is well erased before you begin, and that your whole recording setup is electrically as quiet as possible.

If your recorder can record all four tracks monophonically, make your first recording on track one. Then switch the recorder to record on the other track in that direction. Play the first recording (with your new playback head placed just *after* the original record/play head) and mix the played-back signal with the new, second part from the mike. The mixed signal is then recorded on the second track. That way, you can do both echo and sound-on-sound with the new play head placed after the existing record/play head.

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# tape

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## EQUIPMENT REVIEWS

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*We believe that there are four major categories of recorders on the market today, each requiring a different type of testing to produce the maximum amount of information for a prospective purchaser or user. There are the economy models, primarily designed for tape beginners on a budget; moderately priced machines for general home use; component-quality recorders and decks; and battery-operated portables. The first group, which generally includes those machines priced under \$200, are judged on the basis of value for money, ease of operation, features and durability of construction. Those in the middle price range (from \$200 to about \$350) are judged on these bases plus their high fidelity characteristics. Since some purchasers will be interested in sound fidelity, we publish those test results which best indicate the capabilities of the unit to the user. For component-quality recorders and decks (those priced above \$350), we include full test results and discussion of construction as well as data on features, ease of operation, etc. Since most battery-operated portables are admittedly of limited fidelity, our reports concentrate on reliability, quality of construction, ease of operation, portability and other factors more likely to be of interest to the portable user. Those few battery-operated portables which do claim to be component-quality units will be reported on with full technical details.*

*We have adopted this procedure of testing and reporting because we believe it can best help readers to find the right machine for their particular needs and because it seems to us patently unfair to compare the technical capabilities of a \$149 recorder with one designed to sell for twice or three times as much.*

---



ReVox G-36

The ReVox G-36 stereo tape recorder is made in Switzerland by Willi Studer Manufacturing Company and is distributed world wide through ReVox International. In the United States it is distributed by Elpa Marketing Industry and it sells for \$500.00.

It weighs approximately 43 lbs., is 18 $\frac{1}{8}$ " wide (in the carrying case) x 13 $\frac{1}{2}$ " deep x 9 $\frac{5}{8}$ " high without the cover in place. The plastic cover is held in place by two plastic snaps at the bottom and two plastic keys at the top, all of which fit into the aluminum extrusion which forms the top binding of the carrying case. The width of the deck proper is 15" and this allows 1" approximately at each end of the deck for the stowage of spare reels and other accessories, as well as providing a means of ventilation. The carrying handle is located on the right hand end of the case. A speaker grill is located in the front of the case.

A unique feature of the ReVox G-36 is the fact that it is capable of utilizing 10 $\frac{1}{2}$ " reels. The ReVox is equipped with three motors, three motors being almost a necessity for 10 $\frac{1}{2}$ " reels. The winding characteristics of the ReVox handling 10 $\frac{1}{2}$ " reels are extremely good, equal to that ordinarily found in professional recorders.

The reel locks are an integral part of the spindles and are permanently secured. The ReVox G-36 will not handle NAB type hubs on an aluminum 10 $\frac{1}{2}$ " reel, but it does quite handily handle the fiberglass 10 $\frac{1}{2}$ " reel and this may be counted an advantage from the long term point of view. Metal reels have the disagreeable habit of becoming misshapen and no amount of effort will correct that condition. The fiberglass reels, however, are very smooth on the inside, retain their shape and are tapered to offer the optimum for tape packing. One might even consider this a plus feature.

The electronics are vacuum tube, identical for each channel, and having radio, diode or microphone inputs. We did not discover the explanation of these terms in the manual. It appears that the "radio" input is for relatively high levels, the "diode" input for detector outputs from the tuner and the "microphone" for any medium to high impedance microphone. Each channel is equipped with its own VU meter, but the VU meters are not intended to monitor play back and function only during record mode. The ReVox G-36 is fairly unique in that, while it has a monitor amplifier, the monitor amplifier is monaural. It may be switched from one channel to the other, or switched so that it combines the outputs from both channels. The volume of the monitor amplifier may be controlled by its own separate control, however, the play back outputs from the pre-amplifier intended to feed auxiliary equipment have no volume control. This may stem from the fact that it is traditional among European manufacturers of professional equipment to provide fixed level outputs which are not monitored with VU meters. The idea here appears to be that if you get it on the tape properly, playing it back on the (properly adjusted) play back amplifier will give you exactly what



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you put in. Willi Studer is well known both in Europe and the United States for his professional machines and it is to be expected that some of their characteristics would be carried over into the ReVox Model G-36.

In a technical evaluation of the ReVox measurement of wow and flutter was astounding. At  $7\frac{1}{2}$ " per second the combined wow and flutter on this particular machine was .01% and at  $3\frac{3}{8}$ " per second it was .085%. Unquestionably superior performance in this area. Rewind time for 1200' of tape was 47 seconds while fast forward time for the same reel was 43 seconds. The machine wound the tape in a tight even pack.

At normal record level (OVU indicated) the total harmonic distortion on channel 1 was .72% and on channel 2 .8%, both quite respectable figures by any standards. The signal to noise ratio, measuring down from OVU indicated, was for channel 1 52DB and for channel 2 53DB. Again, both quite respectable figures.

Sensitivity on the tuner input was 1.1 millivolts on both channels and on the microphone input one millivolt on both channels. The crosstalk measured at one KC was 34DB for channel 1 and 38DB for channel 2. Output at the cathode follower jacks, from a OVU tape, was .26 volts for channel 1 and .26 volts for channel 2. Power output level from a OVU tape, with the monitor amplifier gain wide open was 5 watts into a 5 ohm load.

The summation: we think that anyone seriously considering the purchase of a quality tape recorder ought to include a careful trial of the ReVox Model G-36 in his investigation before reaching a decision to buy.

### Magnecord Model 1020



The Magnecord Model 1020 is a completely transistorized quarter track reel to reel recorder selling for \$570. It is  $17\frac{5}{8}$ " wide x  $13\frac{5}{64}$ " high x 7" deep (including the feet). It weighs 35 pounds without the case. A walnut base (or wrap around) is also available for \$25. Operating tape speeds are  $3\frac{3}{4}$  and  $7\frac{1}{2}$  ips. The manufacturer claims that the recorder will handle tape thicknesses of  $1\frac{1}{2}$ , 1,  $\frac{3}{4}$  and  $\frac{1}{2}$  mil. The head configuration consists of a quarter track stereo erase head, a quarter track stereo record head, and a quarter track stereo reproduce head. Reel sizes are specified as five and seven inch reels in accordance with the NAB specifications and an  $8\frac{1}{4}$ " reel as supplied by Magnecord.

In use tests of the recorder, in connection with hi-fi equipment, prior to technical testing, it was found that the recorder gave back mirror images of any material fed to it at  $7\frac{1}{2}$  ips. Fairly surprising was the fact that at  $3\frac{3}{4}$  ips it was nearly impossible to distinguish any difference between the source and tape material. With an 8' reel it is alleged that this recorder would provide 1 hour 15 minutes of recording time at  $7\frac{1}{2}$  ips and  $2\frac{1}{2}$  hours at  $3\frac{3}{4}$  ips, all in one direction. Thus it is conceivable that one could put as much as 5 hours of stereo programming on one  $8\frac{1}{4}$ " reel.

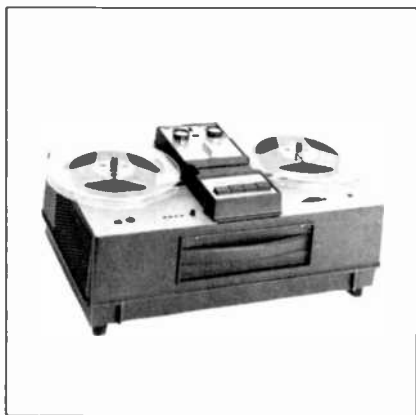
The manufacturer's specifications for flutter on this recorder are .18% at  $7\frac{1}{2}$  ips and .025% at  $3\frac{3}{4}$  ips measured in accord with the American Standards Association, Standard #Z57.1-1954. Our measurements on this particular record indicated that the combined wow and flutter at  $3\frac{3}{4}$  ips was 0.17% and at  $7\frac{1}{2}$  ips 0.12%, both well inside the manufacturer's published specification and quite acceptable by anybody's standards. The manufacturer claims a timing accuracy of plus or minus 1% at  $7\frac{1}{2}$  ips and plus or minus 2% at  $3\frac{3}{4}$  ips. As nearly as we could tell, using a measured length of tape, this recorder very well exceeded that specification. Rewind and fast forward time for 1200' of tape was 80 seconds, which is in agreement with the manufacturer's specifications.

The manufacturer specifies signal to noise ratio of 52 DB at  $7\frac{1}{2}$  ips and 48 DB at  $3\frac{3}{4}$  ips. At  $7\frac{1}{2}$  ips we measured 55 DB on channel 1 and 57 DB on channel 2, reference to 3% third harmonic distortion

point. At  $3\frac{3}{4}$  ips the signal to noise ratio on channel 1 was 52 DB and on channel 2, 54 DB. The manufacturer specifies distortion as 1.5% total harmonic distortion. We measured 1.2% on channel 1 and 1.3% on channel 2. On the playback of an NAB tape we found this recorder to be within 2 DB of laying on the NAB curve. At  $7\frac{1}{2}$  ips tape speed the frequency response was down 2 DB at 45 cycles on channel 1 and  $1\frac{1}{2}$  DB on channel 2. At 100 cycles channel 1 was up  $1\frac{1}{2}$  DB and channel 2 was up 2 DB. At 500 cycles channel 1 was up  $\frac{3}{4}$  of 1 DB and channel 2 was up  $1\frac{1}{2}$  DB. The frequency response was flat out to 5 kc where channel 2 was up  $\frac{1}{2}$  DB and channel 1 was up  $\frac{1}{2}$  DB. At 10,000 cycles channel 1 was up 2 DB and channel 2 was up 2 DB. At 15,000 cycles channel 1 was up  $1\frac{1}{4}$  DB and channel 2 was up  $1\frac{1}{4}$  DB. At 20,000 cycles channel 1 was down  $1\frac{1}{2}$  DB and channel 2 was down  $1\frac{3}{4}$  DB. Overall frequency response at the slow speed showed channel 1 down 2 DB at 35 cycles and channel 2 down 2 DB at 35 cycles. At 100 cycles channel 1 was down  $\frac{1}{2}$  DB and channel 2 down  $\frac{1}{2}$  DB. At 250 cycles channel 1 was up 1 DB and channel 2 up  $1\frac{1}{2}$  DB. The response was flat from that point out to 4 kilocycles where channel 1 was up  $1\frac{1}{2}$  DB and channel 2 up 1 DB. At 5 kilocycles channel 1 was up  $1\frac{1}{2}$  DB and channel 2 up  $1\frac{1}{2}$  DB. At 7,000 cycles channel 1 was up  $1\frac{1}{2}$  DB and channel 2, 2 DB. At 10,000 cycles both channels were down 2 DB.

It is a pleasure to test a recorder like this one.

#### Wollensak Model 5300



Manufactured by Minnesota Mining and Manufacturing Company. Selling price is \$279.95. All of the electronics of the Wollensak 5300 are solid state. The 5300 re-

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ords and plays stereo and monaural on four tracks and at four speeds:  $15/16$ ,  $17\frac{1}{8}$ ths,  $3\frac{3}{4}$ , and  $7\frac{1}{2}$ " per second. The recorder is also equipped with three watt audio amplifiers. Two matched speaker systems, each with a 6 x 9 woofer and a 3" tweeter, including the cross over net work for acoustically matching the cabinet provide what the manufacturer classifies as hi-fi sound.

The tape transport may be operated horizontally, vertically or any position in between. The recorder includes two level meters, which function in both record and playback. Each channel has a separate tone control which functions in playback only. There is a tape break switch to shut the recorder off in the event that tape breaks or runs out of the reel, a stereo head phone jack, automatic tape lifters and the bias frequency is specified as 100 kilocycles. The unit also has automatic head demagnetization and self adjusting brakes.

We utilized the recorder to record from another recorder, which

it did with complete satisfaction; we used it to record from its own tuner, which it did with complete satisfaction. And here we would like to interject a note regarding the tuner. We found that it had excellent stereo separation and was quite sensitive. This particular machine, when first received had a number of audible thumping and clicking sounds, however, after operating the recorder for four or five hours, all of these nerve racking sounds disappeared and the recorder operates as smooth as silk.

The manufacturer states that this recorder is equalized to the NAB standard. Our test results indicate that it is well within specifications on the right channel, however, the left channel tended to be off a little bit at 15 kilocycles. The manufacturer's specifications call for frequency response  $\pm 3$ DB from 40 to 17,000 cycles per second at  $7\frac{1}{2}$  ips tape speed. We found the recorder to meet these specifications quite adequately. At  $3\frac{3}{4}$  ips, the manufacturer claims frequency response from 40 to 10,000

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cycles per second plus or minus 3DB and we found the recorder to be slightly out of specifications at 10KC, though not seriously. The manufacturer specifies a signal to noise ratio of 48DB at 7½ ips, but does not specify the point from which the signal to noise ratio is measured. Measuring from 0 indicated on the VU meter of the recorder, it was found the signal to noise ratio of this particular machine was 44DB at 7½" per second. Distortion at 0 VU indicated on the recorder's meter was found to be 3½% on the left channel and 2.8% on the right channel.

Wow and flutter at 7½" per second was less than .25%. Our measurements indicated that this particular machine had a total wow and flutter of .22% at 7½" per second, .2% at 3¾", considerably better than the manufacturer specifies, .23% at 17/8" and only .275% at 15/16" per second. Fast forward time (with the speed selector control set at 7½" per second) was 69 seconds for 1200' of tape, while rewind time for the same reel was 66 seconds. With the speed selector control set at other tape speeds, the winding times were proportionately higher.

The Wollensak 5300 tape recorder represents an excellent value for the money and except for the lack of a phonograph would make a complete high fidelity system. You would hardly expect a 3M to encourage phonographs would you?

### Belcor Model 305



The Belcor Model 305 is a two speed, quarter track self-contained portable tape recorder. It is small in size, 14½" wide x 12½" deep x 8½" in height. It weighs 22 lbs., making it quite easy to carry and for use as a portable tape recorder. Two 5" dynamic speakers are keyed to make with each other and form the cover of the recorder, to make a complete package. The recorder comes equipped with two dynamic

microphones, two patch cords for recording from the radio, a spare 7" reel, a detachable power supply cord and a capstan for 50 cycle operation. A storage compartment is provided in the upper left hand part of the case for stowing all of the accessories, except the spare reel, when the recorder is to be moved from place to place. All in all, it is a neat, complete, small easily portable package.

The Belcor Model 305 is designed to operate from 117 volts, 60 cycle power. The tape speeds are 7½" and 3¾" per second. The electronics are partly vacuum tube, partly solid state, utilizing two type 12AX7 tubes, two type 32A8 tubes, one type 50EH5 tube, two silicon diode rectifiers and two germanium diode rectifiers. The electronics are switched according to function, being used for the record amplifiers during record mode and for the play back amplifiers during play mode. Thus this is a two-headed machine, with no provisions for monitoring from the tape. However, provisions are made to monitor the source material with the loudspeakers during recording. Two peak type level meters are provided to monitor record level. The level meters are not required in play back and are not utilized. Phono type jacks are located on each side of the unit to permit the use of extension speakers. Inputs for the microphone of each channel are provided on the front panel making for easy accessibility. The volume and tone controls are located on the left and right sides of the electronics panel, according to their normal use. The right hand volume control also functions as the power "on-off" switch. The UV meters are located side by side in the center of the panel, and are separated by a red plastic bar which covers the power pilot light, that also serves to illuminate the VU meters. There is also a front panel stereo mono switch, which ties the electronics together when it is desired to record monorally simultaneously on both tracks of the quarter track recording. The tone controls function only in the play back mode. All of the controls are conveniently located and all are clearly marked.

The tape transport section of the recorder is driven by a single motor, which also serves as a cooling fan. Speed change from 7½" to 3¾" is accomplished by means of a belt shifter of the push and

lock type. The head covers are very easily removable to permit cleaning and demagnetizing of the erase and record reproduce heads. The pressure pads are combined with metal shields in a unique arrangement which not only serves as a tape lifter (toward the heads) during record or play modes, but also serves to remove the tape from the heads during winding modes. The mechanism is operated by a bar knob on the right hand side of the mechanism.

We utilized the Belcor Model 305 in several different ways, giving it a rather thorough use test. First we connected it to our stereo system, made recordings from the stereo tuner and from another tape recorder. In both cases, the Belcor Model 305 gave a completely acceptable account of itself. Then we allowed our high school senior to utilize it for his own purposes for a day or two. At one time it was utilized to record voice tracks for a high school-produced movie. One of the Belcor microphones was mounted on the end of a long fish pole and was thus able to follow the actors through their scenes. Results were quite satisfactory.

In the technical tests, we found about what was to be expected in a recorder of this type. Wow and flutter at  $3\frac{3}{4}$ " per second tape speed was .35% and at  $7\frac{1}{2}$ " per second tape speed was .28%. These figures are acceptable for this type of recorder. Fast forward time for a 1200' reel of tape was two minutes and 35 seconds while rewind time for the same roll of tape was exactly the same. Sensitivity of the auxiliary input was  $13\frac{1}{2}$  millivolts on the left channel and  $14\frac{1}{2}$  millivolts on the right channel. Microphone sensitivity on the left channel was .2 millivolts and on the right channel .15 millivolts.

To sum up, the Belcor Model 305 is not a studio recorder, but then it was not intended to be. Obviously it was intended to serve as a utility recorder and that it does very well.

The Lear Jet Stereo 8 tape player is designed to play the new eight track magnetic tape cartridges that provide up to one hour and 20 minutes of stereo programming per cartridge. The power amplifiers are push-pull. The manufacturer's specifications covering tape playback indicate the tape speed to be

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$3\frac{3}{4}$  ips with a motor speed of 300 rpm.

From the cartridges we examined, we found them to be divided into four portions of three selections each. When the first portion is played, the top gap of the magnetic head picks up the left channel from track one. At the same time, the bottom gap of the head is positioned so that it is picking up the right channel of the program from track five. Program two is on tracks two and six, program three is on tracks three and seven, and program four is on tracks four and eight. Whenever the manual selector button is pushed, the program being played is interrupted and the next program sequence is played. The new program is picked up at approximately the same point of time from its beginning as the program that was being heard.

Wow and flutter is specified as less than .35%. Switching of the programs is automatic during continuous play and a push button is provided for immediate programming changes. The changeover from radio to tape player is made by full insertion of the tape cartridge.

The shaft which supports the rotor extends downward through the lower casting and serves also as the capstan shaft which drives the tape. There is a servo system which regulates the stability of the capstan motor.

We installed the Lear Stereo 8 tape player in a Nash automobile, where it was found to operate with eminent satisfaction, extremely good, probably owing to the fact that each channel of the tape player utilizes a four-watt push-pull transistorized amplifier and to the quality of the speakers supplied with this unit. In a laboratory evaluation of the tape player, it was found that it would operate satisfactorily over a fairly wide range of input voltages and that it was relatively free from wow when handled in an effort to produce wow.

Whatever reservations we may have had about the performance of eight track equipment, the Lear Stereo 8 tape player has tended to dispel. The Lear Stereo 8 will, without doubt, provide many hours of pleasure to those who are fortunate enough to own it.

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## Uher 24 Hi-Fi Special

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The Uher 24 Hi-Fi Special is a solid state recorder manufactured in West Germany. It is imported and distributed in the United States by Martel Electronics of Los Angeles, California. Although the instruction book is written in English, French, and Spanish, no specifications for the recorder are given. The recorder stands 7" high x 15 $\frac{3}{8}$ " wide x 13 $\frac{5}{8}$ " deep, front to back. It is intended for horizontal operation, as there are no reel hold downs to keep the reels on the spindles if one attempts to operate it in the vertical position. It weighs an even 20 lbs.

The recorder proper is equipped with Hirschman connectors. An input cord and an output cord are provided. One end of each of the cords has the Hirschman connector, while the other end is equipped with RCA type phono plugs for connection to American high fidelity equipment. The in-put and out-put connections are marked with European standard markings, which are explained in the instruction book. The instruction book also calls out the necessary type of adapter cords for using with this recorder in the event one wishes to use head phones or microphones. The instruction book was also accompanied by a schematic diagram of the recorder, drawn in the traditional German manner.

A couple of unique mechanical features found on this recorder are a screw located in the upper head cover, which permits adjusting azimuth of the play back head. This is the first and only recorder we have seen with this type of adjustment. In addition, there is a pylon located to the left of the tape break compliance arm, which it is purported will clean the surface of the tape, provided the tape is threaded to the left of the pylon, rather than to the right as indicated to be the normal tape path.

In a subjective evaluation of the

recorder, we used it to copy tapes from another recorder and to record some off-the-air stereo. In our subjective evaluation of the recorder, we felt the recorder put a little too much level on the tape. It handled the tape gently and safely, all of the controls worked exactly as one hopes they would in a new recorder. The recorder was very pleasant to operate except for the fact that the AB switch keeps popping back to the play back position. We think it would be nice to be able to lock it in ones choice of position.

All of the following checks were made utilizing the NAB equalization. On play back of the NAB tape, channel one was down 3DB at 5 kilocycles and channel two was down 2 $\frac{1}{2}$ DB at 5 kilocycles. At 12 KC channel one was down 7DB and channel two down 5DB. At 15 kilocycles channel one was down 11DB and channel two down 6DB. On the low end of the frequency response curve with the NAB tape, we couldn't get an accurate picture of the response because of gap fringing, on the quarter track heads.

On over all response recorded at minus 15 VU at 7 $\frac{1}{2}$ " per second tape speed, we found the response on the left channel even at the 3 $\frac{3}{4}$ " per second speed was excellent out to 15 KC and down as low as 30 cycles. On the right channel it was down only 3DB at 15 KC and was excellent on the low end.

The wow and flutter on the instrument were excellent, being only .04% at 7 $\frac{1}{2}$ " per second and .075% at 3 $\frac{3}{4}$ " per second. The sensitivity on the phono input was 55 millivolts, on the microphone in-put 2.0 millivolts and on the tuner in-put 22 millivolts, on both channels. The preamplifier output (a fixed level) at 0 VU, playing back a 1 KC signal recorded at 7 $\frac{1}{2}$ " per second was 1.5 volts on both channels. In summary, this is a very attractive recorder. Mechanically it is quite sound and gives excellent performance.

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# tape

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## NOTES

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The news in raw tape circles last year concerned tapes for slower-speed recording on conventional tape recorders—low noise tapes, high output tapes, special formulations to boost high frequency response. This year, the emphasis seems to be on tapes for battery-operated portables which will yield the maximum amount of playing time on a small package. There are two cases in point: Reeves Soundcraft's TP-3 and Micro Media 25, the product of a new firm called Magnetic Media Corp. The first is 300 feet of half-mil mylar tape on a reel 2 $\frac{3}{8}$ " in diameter. The latter is 1200 feet of quarter-mil mylar wound on a 3 $\frac{1}{4}$ " reel. Both were submitted to us recently for test.

There are certain obvious advantages to both types. TP-3 is intended for use specifically on such recorders as the Concord Sound Camera, where space is at a premium and where a maximum of recording time is wanted. It offers some advantages to owners of large recorders, too. Recorded at 1 $\frac{7}{8}$  ips on a conventional four-track recorder, it can hold slightly more than two hours' worth of talk or entertainment; if you're taping, it weighs only half as much—and costs just about half as much to mail as does a conventional 300-foot reel of half-mil tape (when mailed in the mailer Reeves supplies with each reel). The Micro Media tape, on the other hand, can hold four times as much sound as its midget cousin, yet can be used on virtually any battery portable now on the market.



How about the sound? Reeves TP-3 appears to be the company's standard oxide coating on a half-mil base. Sound is comparable to Reeves' larger reels—reproducing high frequencies and bass with full frequency when recorded at a tape speed of  $7\frac{1}{2}$  ips, producing about the same amount of tape hiss as most other tapes when recorded on a large recorder at  $1\frac{7}{8}$  ips. The tape, when used on a Concord Sound Camera, clearly is capable of all the sound quality of the recorder.

Micro Media 25 was tested by recording several test records on it at speeds of  $7\frac{1}{2}$  ips and  $1\frac{7}{8}$  ips, then by splicing lengths of it into other tapes—including TP-3—and making additional recordings. We found sound quality to be quite good at both speeds—with a boost to high frequencies, particularly at the slower speed. Tape hiss at  $7\frac{1}{2}$  ips is not low enough to qualify this as a low noise tape, but it does compare favorably with the standard formulations of most other manufacturers. At  $1\frac{7}{8}$  ips, we found tape hiss to be less noticeable than with some other standard brands. Like Reeves TP-3, we found Micro Media 25 up to all the demands of any small recorder.

A word about packaging: Reeves TP-3 comes in a lightweight cardboard mailer, ideal for tapespondence. Micro Media has developed an attractive two-tone (charcoal grey and blue) plastic box, hinged and opened by squeezing the sides of the box. By subjecting the box to the kind of rough treatment we suspect the Post Office may give it, we were able to crack it—showing that, in our opinion, it is not intended as a tape mailer (besides, the empty box weighs slightly more than three ounces). There's no doubt, however, that it's highly attractive on a shelf next to more conventional packaging. One problem: there's no space on the edge of the box for identification of its contents, and no provision even for

a code number to help recordists who may amass a number of these to find a specific reel. On the other hand, there is a paste-on label on which you can write or type a list of contents. This goes on the back or bottom of the box.

In preparing this report, we were unable to test for print-through because we didn't have time to let signals leak from one tape layer to the next. It's our opinion that because of the thin tape bases used, print-through could be more of a problem with these tapes than with conventional  $1\frac{1}{2}$  and 1 mil tapes. We'd like to note that this is conjecture—neither sample indicated any audible print-through during our test period.

Both tapes have a problem with stretching, again because of the thinness of the bases used. The Reeves tape is untensilized, and actually stretches more than the tensilized Micro Media tape, which is only half as thick. The battery recorders for which these tapes appear to be designed usually don't provide tension great enough to affect them (the Sound Camera refused to stretch the Reeves tape, no matter what we did to it). But larger battery recorders, such as the Uher 4000 and cord machines such as the Tandberg or Roberts, do indeed provide tension. We snapped both tapes on our first try at stopping fast forward. Even with care on our part, the large machines tended to stretch both tapes.

If your tape transport is gentle, we'd suggest you look into one or both of these tapes. They have certain definite advantages.

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The tape cartridge player boom (no pun intended) may be almost as striking when it hits European shores as it has been here. Britons got a preview of what they might expect from the cartridge player recently from the British Broadcasting Corporation's Washington

Correspondent Gerald Priestland, who filed the following report:

"It is never easy to get a taxi in Washington during the rush hour homewards, but during the sweltering summer a new refinement is introduced — trying to get an air-conditioned taxi. You can tell them because they drive about with the windows wound up. Some of those who have not got air-conditioning wind their windows up to pretend they have, but this is scarcely worthwhile since, by some incredible oversight, it costs no more to the passengers to be air-conditioned, and you can spot a fraud by the way the driver is sweating behind his window.

"I got a genuine one the other day, and flopped into it with a sigh of relief. We started moving. All of a sudden there was a tremendous blast of trumpets from the shell at the back. I whipped round in time to receive, on the back of my head, a counterblast from under the dashboard. The taxi, it appeared, was fitted with a stereophonic tape player.

"Not only that but the driver was a good music lover, and we were in the middle of Berlioz' Requiem Mass, probably the most devastating piece of music ever written, scored for an orchestra of 250, a choir of 500 upwards, at least 40 extra brass and a minimum of 16 kettle drums. And there I was shut up with them all, inside an air-conditioned stereophonic taxi, right in the middle of the 'Dies Irae'—'Day of wrath, oh day of mourning.'

"As we came to the 'Tuba Mirum,' the last trump, the driver—a Negro called MacPherson, by the way—switched on a little box labelled 'reverbomatic.' Instantly the taxi became the acoustical equivalent of St. Paul's Cathedral. Cavernous echoes reverberated around us as the 16 kettle drums went furiously at it. By the time I got home I felt as if I had actually attended the Day of Judgement and been found guilty."



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Letters . . .

(Continued from page 6)

gratulated for undertaking Verdi's seldom-heard *Luisa Miller*. I have heard just enough of it to whet my appetite for the complete opera, and am anxiously waiting this release—on tape.

We have also had some splendid recordings of seldom-performed repertoire opera. London's splendid *La Sonnambula* and Angel's equally fine *Samson et Delilah* come immediately to mind.

Incidentally, I've always hoped against hope that RCA would some day release their wonderful *Don Giovanni* on tape; also their *Barber of Seville* and *Macbeth*. True, I have these on records, but would gladly pay the price to have these on tape. Gad, that would be duplicating, wouldn't it! However, since I've quit smoking, just think of the largesse that I can bestow upon the recording companies!

George H. Schmelzer

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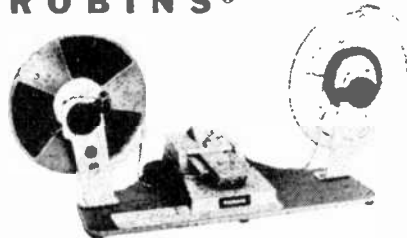
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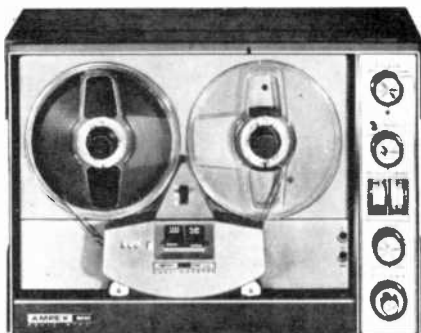
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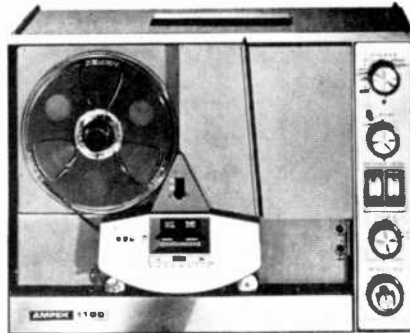
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