

TAPE RECORDING



New cartridge now under development
—see page 32

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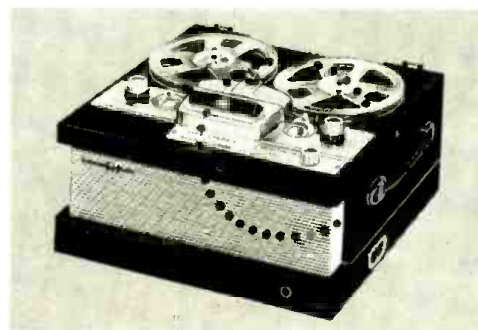
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TAPE RECORDING

VOL. 7 NO. 6

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NEW TAPES

★—Fair

★★—Good

★★★—Very Good

★★★★—Excellent

CLASSICAL

Reviewed by Robert E. Benson



Music ★★★★★
Performance ★★★★★
Fidelity ★★★★★
Stereo Effect ★★★★★

VILLA LOBOS: *Uirapurú* (Symphonic Poem)
Modinha (from *Bachianas Brasileiras No. 1*)
PROKOFIEV: *Cinderella Ballet Suite*
Stadium Symphony Orchestra of New York;
Leopold Stokowski, cond.
EVEREST STBR 3016
2 track, 7½ ips
\$10.95...45 min.

Great performances of fascinating scores, with spectacular sound and a minimum of tape hiss. *Uirapurú* is a symphonic poem about a legendary Enchanted Bird, and is full of exotic percussive effects. *Modinha*, the second movement of the composer's *Bachianas Brasileiras No. 1*, is scored for an orchestra of cellos. *Cinderella* represents Prokofiev at the peak of his facilities, and Stokowski has taken six movements from the ballet for this suite. If you liked Stokowski's RCA Victor two-track tape (DCS-18, \$9.95) of excerpts from Prokofiev's *Romeo and Juliet* ballet, this new Everest tape is a must for you.

Stokowski revels in the lush orchestration of all three works and Everest's sound is glorious, admittedly with some exaggerated effects never to be found in live performance, but very compelling on a recording. Don't miss this one for some off-the-beaten path music, stunningly recorded.



Music ★★★★★
Performance ★★★
Fidelity ★★
Stereo Effect ★★★

TCHAIKOVSKY: *Symphony No. 5 in E Minor*,
Op. 64
London Symphony Orchestra, Sir Malcolm
Sargent, cond.
EVEREST STBR 3016
7½ ips, 2 track
\$10.95...46 min.

Sir Malcolm Sargent and the London Symphony present a mild interpretation of this familiar symphony, recorded in glossy stereo sound. Sargent makes a cut of eighteen bars in the last movement; otherwise the performance is complete. The reproduction is not up to Everest's usual high standards, being overly resonant with a resultant lack of clarity; tympani are undefined, and much brass detail is lost. The orchestra has an artificial brilliance which perhaps some listeners may find appealing.

Comparing the two-track release with the four-track version (Everest T-43039) shows no difference between them except the price, the four-track tape costing \$3 less than the two-track.



Music ★★★★★
Performance ★★★
Fidelity ★★★
Stereo Effect ★★★

SAINT-SAENS: *Symphony No. 3 in C Minor*,
Op. 78 (with organ)
Detroit Symphony Orchestra, Paul Paray
conducting, with Marcel Dupré, organist
MERCURY STC 90012
4 track, 7½ ips
\$7.95...34 min.

This tape will doubtless please many hi-fi enthusiasts, as there are some spectacular effects, with heavy bass and brilliant highs. To me the strings are shrill when they play loudly, and the organ, in its louder passages, has a similar harsh quality.

This is an excellent performance with many virtues, but it must be compared with the *Urania* two-track tape with Hans Swarowsky conducting the Vienna Philharmonica Orchestra. The latter performance is equal to the Paray, and the *Urania* engineers have captured a richness and warmth not to be heard on the Mercury tape. Prospective buyers might keep in mind that RCA Victor has a new version of this symphony with Charles Munch and the Boston Symphony which has not yet been announced for tape release.



Music ★★★★★
Performance ★★★
Fidelity ★★★
Stereo Effect ★★★

FRANCK: *Symphony in D Minor*
Graz Philharmonic Orchestra, Dr. Hans Wolf,
cond.
LIVINGSTON 4T-8
4 track, 7½ ips
\$8.95...37 min.

I've never heard of the Graz Philharmonic Orchestra or Hans Wolf, but they collaborate to present a fine performance, recorded with wide dynamics and the rich, resonant sound this symphony demands.

This tape would be highly recommended if it were not for the fact that Livingston has broken the second movement by placing less than two minutes of it at the end of the first track, with the remainder of the second movement and the final movement on the second track. It seems inexcusable to interrupt a symphonic movement when the addition of less than two minutes playing time of tape would avoid it.



Music ★★★★★
Performance ★★
Fidelity ★★★
Stereo Effect ★★★

BERLIOZ: *Requiem*, Op. 5
Hartford Symphony Orchestra, Hartford
Symphony Chorale, Hartt Schola Cantorum,
with David Lloyd, tenor; Fritz Mahler
conducting
VANGUARD VTF 1610
4 track, 7½ ips
\$9.95...77 min.

Here is the complete Berlioz *Grande Messe des Morts*, Op. 5 in stereo on one seven-inch reel of tape! The sound is generally satisfactory, with big hall resonance, and virtually no tape hiss. The sound of the *Rex Tremendae* is particularly impressive, but the *Tuba Mirum*, with its four brass bands and sixteen tympani, should be a shattering listening experience, and it isn't on this tape. David Lloyd is not up to his usual standard in the *Sanctus* tenor solo, and the chorus frequently lacks authority. This tape can give a great deal of listening pleasure, but unfortunately it is not a great performance of the Berlioz Requiem.

Keep in mind that RCA has a recording of this music soon to be released with Charles Munch and the Boston Symphony Orchestra.



Music ★★★★★
Performance ★★★
Fidelity ★★★
Stereo Effect ★★★

TCHAIKOVSKY "1812" OVERTURE AND
CAPRICCIO ITALIEN
The Nord Deutsches Symphony Orchestra
conducted by Wilhelm Rohr
BEL CANTO ST-79
4 track, 7½ ips
\$6.95...28 mins.

Tchaikovsky's "1812" Overture relates the composer's musical interpretation of the battle of Borodino in 1812. A Russian hymn, "God Preserve Our People" (Before Communism) opens the piece, and then gradually we are led into the violent, surging crescendos of battle into which traces of the Marseillaise & Russian folk song are interwoven. Finally, we hear the victor's Russian National Hymn proudly sounding amid the bells of Moscow ringing out their victorious bongs. The climaxing panorama of sound is lush and all enveloping.

Capriccio Italien strikes me as having a lively opening what with its trumpet fanfare, and a lively ending with its resounding tarantella, but in between a milder, free flowing tempo is evident.

This West German Symphony orchestra

capably follows the baton of Wilhelm Rohr. We are not "shook" by the resultant tape, but it is nevertheless stimulating and desirable listening, both performance-wise and fidelity-wise.

J. C.



Music ★★★★★
 Performance ★★★★★
 Fidelity ★★★★★
 Stereo Effect ★★★★★

GROFÉ: Grand Canyon Suite
 Cslo Philharmonic Orchestra, Oivin Fjeldstad, cond.

STEREO MUSIC SOCIETY SMS S-21
 4 track, 7½ ips
 \$8.95... 33 min.

Recommended as a technically satisfactory tape of a good if not outstanding performance. The highlight of this version is an unusually fast *On the Trail*, which makes most other recordings sound plodding indeed. Big acoustics, with nice spread and separation, perhaps a little light on low bass.

This appears to be the same performance issued on RCA Camden Stereodisc CAS 468, which sells for \$2.98 as compared to \$8.95 for the present version. However, the disc has considerable distortion and cannot boast the clarity and separation of this tape.



Music ★★★★★
 Performance ★
 Fidelity ★★
 Stereo Effect ★★

RAVEL: Bolero BIZET: Carmen Suite
 Hampshire Philharmonic Symphony Orchestra, Cyril Holloway, cond.

TELECTROSONIC TT-409
 4 track, 7½ ips
 \$4.98... 26 min.

The six brief excerpts from Bizet's *Carmen*, not identified in the notes accompanying this tape, are the *Prelude to Act 1*, *Children's Chorus*, *Les Dragons d'Alcala*, *Intermezzo*, *Aragonaise* and *Les Torçadors*. This tape also contains one of the fastest Boleros ever recorded. Both works receive rough performances and the sound is far from today's standards with boomy bass and an extraordinary amount of tape hiss, particularly in the *Carmen* excerpts.

SEMI-CLASSICAL



Music ★★★★★
 Performance ★★★★★
 Fidelity ★★★★★
 Stereo Effect ★★★★★

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American in Paris, Stella by Starlight, Ritual Fire Dance, Moonlight Sonata, Main Theme (On the Trail) Grand Canyon Suite, Grieg Piano Concerto
George Greeley, guest pianist with the Warner Bros. Orchestra
WARNER BROTHERS WST 1291
4 track, 7½ ips
\$7.95...40 mins.

George Greeley imparts every iota of artistry necessary to make these piano concertos the loved, always popular charmers they are, both in his playing and in his arranging. To appreciate this tape as it should be appreciated, take time to just relax and listen. It has a tonal richness throughout, that is joyous to hear.

Mr. Greeley caresses the piano keys with a gentle, but firm, touch. He is a man in love with the instrument and he plays as such.

The engineers have preserved every note cleanly, clearly and most correctly. Delightful fidelity.

POPULAR



Music ★★★
Performance ★★★★★
Fidelity ★★★★★
Stereo Effect ★★★★★

MISTER GUITAR

I Know That You Know, Rainbow, Hello Bluebird, Siesta, Country Style, Show Me the Way to Go Home, I'm Forever Blowing Bubbles, Backwoods, Country Gentleman, Slinkey, Jessie, Concerto in C Minor
Chet Atkins
RCA KPS-2012
4 track, 3¾ ips, Cartridge
\$5.95...26 mins.

It's quite a leap from the hillbillyish ring of "Country Style" to Rachmaninoff's Concerto in C Minor, but then Chet Atkins is quite a jumper. We have noted that some who have heard this release like certain individual selections and care little for others. And then there are other listeners who prefer the "others," but care little for those portions liked by the first group. In any case, everyone seems to like some parts of this tape. Personally, we're "nuts" over the whole thing. I would guesstimate we've heard it about 25 or 30 times now and we're not the least bit tired of it.

Mr. Atkins has applied the add-a-track method to his renditions and the end result is delightful indeed. No matter what the selection, what the tempo, what the arrangement, "Mr. Guitar" most ably lives up to his alias. Cheers for this entertaining performer.

Cheers also to RCA's engineers who have turned out a sterling reproduction. Every pluck of every string is clear as a bell.

ELLA FITZGERALD SINGS THE RODGERS AND HART SONG BOOK

Side 1: Have You Met Miss Jones?, You Took Advantage of Me, A Ship Without A Sail, This Can't Be Love, The Lady Is A Tramp, Manhattan, Johnny One Note,



Music ★★
Performance ★★★
Fidelity ★★★★★
Stereo Effect ★★★

I Wish I Were In Love Again, Spring Is Here, It Never Entered My Mind, Where or When, Little Girl Blue
Side 2: Give It Back To The Indians, Ten Cents A Dance, There's A Small Hotel, I Didn't Know What Time It Was, I Could Write A Book, My Funny Valentine, Bewitched, My Romance, Wait Till You See Her, Lover, Isn't It Romantic, Blue Moon
VERVE VST 4-205

4 track, 7½ ips
\$11.95...81 mins.

Here again, as is too often the case, we have too much of one thing, specifically in this instance too much of Ella. We would like to see some companies come out with tapes having a mixture of talents and types of music.

Ella Fitzgerald has an alluring voice, well suited to pop ballads. Her range is flexible and her style indicative of a professional. She is a fine entertainer and we enjoy her performance until it becomes overdone. To me, 15 minutes of any singer is quite digestible, 30 minutes and you are slightly disturbed, 45 and you feel bloated, one hour and you are ready to chuck the whole business, anything over this and you wish you had never heard of the singer.

Fidelity is tiptop, we miss none of Miss Fitzgerald's vocal inflections.



Music ★★★
Performance ★★★
Fidelity ★★★★★
Stereo Effect ★★★★★

LET'S ALL SING WITH THE CHIPMUNKS

Yankee Doodle, Chipmunk Fun, The Little Dog, Old MacDonald Cha Cha Cha, Three Blind (Folded) Mice, Alvin's Harmonica, Good Morning Song, Whistle While You Work, If You Love Me (Alouette), Ragtime Cowboy Joe, Pop Goes The Weasel, The Chipmunk Song

David Seville & The Chipmunks
BEL CANTO (LIBERTY) 7132

4 track, 7½ ips
\$7.95...28 mins.

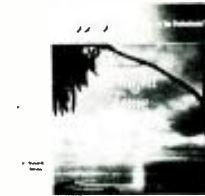
Shades of speeded sound! When the American public first heard these charming make believe, toothy, chattering chipmunks and the ever-troublesome Alvin, they took to it like an American institution such as beer and potato chips. What this proves, I don't know, but I'm glad this kind of fun-loving Americanism is alive. Without it, we're dead. Dwell too much on Communism, rocker competition, disease, taxes, monopolistic enterprises, and you're apt to land in the looney bin. On the other hand, you hear something nutty like the Chipmunks and you can pull yourself back on the beam again if you'll just let yourself be pulled.

This tape is definitely oriented for children, but aren't we all children to some degree?

Delightful, charming, cute, humorous, and any other cheerful adjectives you can conjure up.

Actually, I don't know why this tape is called "Let's All Sing" because there is not really too much opportunity to do so, but it is still fun.

Beautiful engineering Bel Canto.



Music ★★★
Performance ★★★
Fidelity ★★★★★
Stereo Effect ★★★

TWILIGHT TIME

Everything I Have Is Yours, Temptation, I Don't Know Why, Stairway To the Stars, Just You, Just Me, Seems Like Old Times, Hold Me, I'll See You in My Dreams, Blue Moon, Linger Awhile, You Are My Lucky Star, By the River Sainte Marie

The Monarchs of Melody
STEREOPHONIC MUSIC SOCIETY S8

4 track, 7½ ips
\$7.95...34 mins.

This distinctively different type of instrumental quarter combines a Hammond organ, accordion, guitar and bass. The organ gives the music a spaciousness, the accordion lends a more intimate touch, the electric guitar contributes a bit of melodic freshness, and the bass adds a subtle, insistent beat. The result is a smoothly blended, rhythmic sound with an ever present pulse. Flowing, velvety dreamland type music.

Noted a bit of crosstalk now and again, but otherwise the recording is sparkling clean.



Music ★★★
Performance ★★★★★
Fidelity ★★★★★
Stereo Effect ★★★★★

SHOW TUNES AND OLD FAVORITES

Gigi, Sunday, It's All Right With Me, Pussy Foot, Whistle a Happy Tune, Wunderbar, I Could Have Danced All Night, Polka Dots and Moonbeams, Rose Room, Cuddle Up a Little Closer, I Get A Kick Out of You, Blue Lou

LIVINGSTON 4T-5

4 track, 7½ ips
\$7.95...30 mins.

Whenever we hear the Lenny Herman aggregation, we get the feeling of close coordination between the group. The sound they produce is uncluttered by competition between the performers for spotlight attention.

Even the singers harmonize well and just seem to jell smoothly.

This is a delightful tape in all respects, it is fine for dancing, listening, or as pleasant relaxing background music.

Well balanced stereophonically, excellent fidelity.



Music ★★
 Performance ★★★
 Fidelity ★★★★★
 Stereo Effect ★★★★★

EXOTICA VOLUME ONE

Quiet Village, Return To Paradise, Hong Kong Blues, Busy Port, Lotus Land, Similua Stone God, Jungle Flower, China Nights, Ah Me Furu, Waipio, Love Dance

Martin Denny Group

BEL CANTO (LIBERTY) 7034

4 track, 7 1/2 ips
 \$7.95... 32 mins.

Martin Denny is an adept musician who takes a piece of music, improvises it with the help of some novel sound producing gadgets such as glasses, bamboo sticks with drum heads, small cymbals and what have you, and comes up with a most effective sounding array of selections. These sounds are, of course, in addition to the regular bongoes, vibes, bass and piano of the group.

All of this is backed up with a melee of bird calls and whistles. We sense the Afro-Cuban beat most of all on these rhythmic interpretations although an oriental flavoring is also present. The group uses its musical imagination to the fullest a la Arthur Lyman.

An offbeat addition for your tape collection. We all like a change from the usual now and again and this tape provides just that.

This reviewer enjoyed the tape not only for its variation, but for the tastefulness with which Mr. Denny combines the sounds he uses to create a melodic rendition.

As for fidelity, it couldn't have sounded better if we were seated at a ringside table in the Shell Bar of the Hawaiian Village listening (although I must admit we'd have like reviewing it that way).



Music ★★★★★
 Performance ★★★★★
 Fidelity ★★★★★
 Stereo Effect ★★★

MUSIC OF LEROY ANDERSON, VOL. 2

Belle of the Ball, Horse and Buggy, The Waltzing Cat, Blue Tango, Summer Skies, Song of the Bells, The Typewriter, The Syncopated Clock, The Girl in Satin, China Doll, Fiddle-Fiddle

Frederick Fennell conducting the Eastman-Rochester "Pops" Orchestra

MERCURY STB 90043

4 track, 7 1/2 ips
 \$6.95... 32 mins.

Leroy Anderson's individuality and stylistic arranging is tops in our book. This is a varied tape, selection-wise, and all in all most enjoyable listening.

When we listen to arranging such as this, we thank heaven such music minded artists such as Anderson still do exist. Sometimes for hours on end we listen to tapes by the so-called "society" orchestras which seem to go on endlessly with the musicians just

playing their instruments because — well, they were meant to be played and because they are paid to play them. The music is lifeless and dull.

But here, Anderson's music is performed by musicians who appreciate its value and seemingly play because they enjoy doing so. The composer, musicians, and recording engineers have each added their talents to come up with a charming release.

Fidelity is excellent, although it sounds as if there was a mite too much close miking in spots.



Music ★★★★★
 Performance ★★★★★
 Fidelity ★★★★★
 Stereo Effect ★★★★★

THE EDDY DUCHIN STORY

To Love Again, Manhattan, Shine On Harvest Moon, It Must Be True, Whispering, Dizzy Fingers, You're My Everything, Chopsticks, On the Sunny Side of the Street, Brazil, La Vie En Rose, To Love Again

Carmen Cavallaro

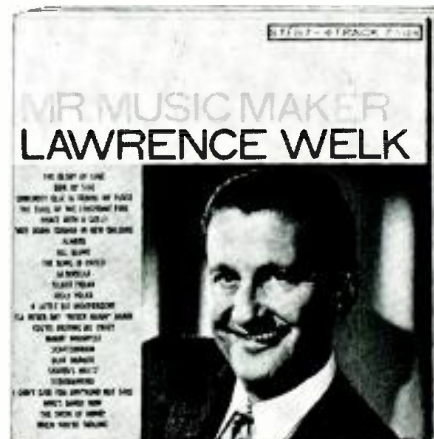
Music from the cinemascop sound track

DECCA ST 7-8289

4 track, 7 1/2 ips
 \$7.95... 30 mins.

Pure as an uncut gem—and a "gem" of a tape is what we have here. First off, can't help mentioning the crystal piano tinkling and fidelity.

The tape contains quality—quality music,



I'm Lawrence Welk—and I've never sounded better than I do on this sparkling new STEREO TAPE by

bel canto



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Performance ★★★★★
Fidelity ★★★★★
Stereo Effect ★★★★★

4444
TRAC

THE VOICES AND STRINGS OF LAWRENCE WELK

Your Eyes Have Told Me So, I'm In the Mood For Love, I Don't Know Why, Stars Fell On Alabama, Speak To Me Of Love Embraceable You, I Didn't Know What Time It Was, Serenade From "The Student Prince", The Night Is Young and You're So Beautiful, Goodnight Sweetheart
Featuring Joe Feeney, Alice Lon, Lennon Sisters, Jim Roberts, Maurice Pearson, and The Lawrence Welk Glee Club

BEL CANTO (DOT) ST/67

4 track, 7½ ips
\$7.95... 28 mins.

Lawrence Welk is all-musician, and his devotion to genuine, wholesome, simple music is a refreshing delight. He picks the kind of music that never diminishes in popularity. You respect the music, and the talented performances given on this tape.

The leading soloists are backed by a 36 piece string orchestra and a 28 voice glee club. All told, they add up to a smooth, well organized, well directed assemblage. There is a uniform, all-one feeling.

The range of Joe Feeney is remarkable and we particularly liked his renditions. As for the glee club, you can even hear them breathing together—perfectly lovely.

We feel the stereo balance on this tape is especially well directed.



Music ★★★
Performance ★★★★★
Fidelity ★★★
Stereo Effect ★★★

DAVID ROSE PLAYS MUSIC FROM GIGI AUTUMN LEAVES

Autumn Leaves, The Autumn Waltz, September in the Rain, Blue Autumn, Indian Summer, Shine on Harvest Moon, 'Tis Autumn, Autumn Serenade, Autumn Nocturne, October Mist, Autumn in New York, Autumn Holiday

Gigi: The Night They Invented Champagne, Gigi, Thank Heaven for Little Girls, Say A Prayer For Me Tonight, Waltz At Maxim's, The Parisians, I Remember It Well, A Toujours, I'm Glad I'm Not

Young Anymore, It's A Bore
David Rose and His Orchestra
MGM ST 3592-3640
\$11.95... 60 mins.

Autumn Leaves is warm, soothing pipe and slippers music. Easy listening if ever there was.

The music from Gigi is gay and bouncy for the most part, although "Say A Prayer For Me Tonight" is quite a tender number.

Strings seem somewhat subdued by the brass, however, and perhaps a more thought out mike placement would have made a better presentation.

David Rose's tranquilizing style of playing is right up to snuff.

The stereo effect on this one is quite good and fidelity too is satisfactory.

NEW TAPES RECEIVED

REEL-TO-REEL

Concertapes, The Fine Arts Quartet, Bela Bartok, String Quartet No. 3, String Quartet No. 4, 4 track, 7½ ips, 4T-5004

Everest, Brahms, Symphony No. 3 in F Major, Op. 90, Stokowski conducting The Houston Symphony Orchestra, 4 track, 7½ ips, T-43030

Everest, Tchaikovsky, Symphony No. 5, in E Minor, Op. 64, Sir Malcolm Sargent conducting The London Symphony Orchestra, 4 track, 7½ ips, T-43039

Everest, Villa-Lobos Uirapuru; Prokofiev, Cinderella (Ballet Suite), Leopold Stokowski conducting The Stadium Symphony Orchestra of New York, 2 track, 7½ ips, STBR-3016

Hiftape, Have Organ Will Travel, George Wright, 4 track, 7½ ips, R721

Kapp, The Sound of Music, The Pete King Chorale, 4 track, 7½ ips, KT-41021

London, Hits I missed, Ted Heath and His Music, 4 track, 7½ ips, LPM 70007

London, Ravel: Daphnis et Chloe (Complete Ballet), Pierre Monteux conducting The London Symphony Orchestra and chorus of the Royal Opera House, Covent Garden, Chorus Master: Douglas Robinson, 4 track, 7½ ips, LCL-80034

London, Stravinsky Petrushka, Le Sacre Du Printemps, Ernest Ansermet conducting L'Orchestre De La Suisse Romande, 4 track, 7½ ips, LCK-80006

London, Tchaikovsky 1812 Overture, Op. 49; Capriccio Italien, Op. 45, London Symphony Orchestra conducted by Kenneth Alwyn and The Band of The Grenadier Guards, Major F. J. Harris, MBE Director of Music, 4 track, 7½ ips, LCL 80019

London, Tchaikovsky Swan Lake Ballet, Ernest Ansermet conducting L'Orchestre De La Suisse Romande, 4 track, 7½ ips, LCK-80028

Omegatape, Smash Flops, as sung by The Characters, 4 track, 7½ ips, MT-811

Warner Bros., The Dixieland Story, Matty Matlock and the Paducah Patrol, 4 track, 7½ ips, PST-1202

CARTRIDGES

Stereophonic Music Society, Grofe Grand Canyon Suite, The Oslo Philharmonic Orchestra, Oivind Fjeldstad, conductor, 4 track, 3¾ ips, C21

Stereophonic Music Society, Leon Bibb Sings Folk Songs, 4 track, 3¾ isp, C1

TAPE CLUB NEWS

Please Customs, Have A Heart

Cheers to the Australian Tape Recording Association in their go-round with the Postal Customs Department in Adelaide, Aust. It appears that many club members were receiving their tapes, bearing Customs Inspection labels, stretched, overlapped and otherwise botched up. The "ATRA invisible microphone" decided to go behind the scenes at the department to attempt to establish the cause of this unnecessary damage.

When they had a look at the machine used for customs snooping (in their search

for pre-recorded music tapes and pornographic matter) they were horrified. The machine used, when running on fast forward was stopped by pressing with ever increasing force on the outer rim of the reels. A similar method was used on rewind, and when the tape "did not seem to track right," a duster held against the trailing reel kept up the necessary tension.

On lodging a complaint regarding all of the foregoing, packets were received without further examination, and the manufacturer of the machine used was asked to check over the department's property. (A certain official was also given a course of instruction in the operation of said machine.)

Subsequent censored tapes have been found to be so neatly wound that one would think they had come straight from the tape manufacturer.

We also found it amusing to note that one of the officials who checks the tapes through Customs admitted that he found a certain doctor's tapes from Indiana so interesting, he listened to them all the way through. Just goes to prove how interesting and wonderful this hobby of tapespendence is.

Club Interest

Organ Music Enthusiasts wishes to express that this club is a group interested primarily in the exchange of organ music, its discussion, and trading information on building or restoring organs.

A new directory of members will be issued in September and anyone having the above interests and wishing to join should make inquiry as soon as possible before that time.

Tarver Memorial Fund

The well-known Special Fund of The Voicespondence Club has now become the Tarver Memorial Fund. Its function will continue unchanged, and its monies will be used as always to pay the dues, furnish tapes, and help furnish recorders to blind and otherwise handicapped persons who could not afford them for themselves. The change in name, designed to honor Mr. and Mrs. James E. Tarver of Augusta, Ga., who played so large a part in the founding of Ways and Means for the Blind, Inc., was adopted by the Club's Board of Advisors.

Contributions by VS members during the past quarter have amounted to \$101.74. Much of the Fund's money at present is being used to finance the purchase of recorders by handicapped people with no interest or carrying costs being charged. Other money is used to furnish tapes at less than cost to The Voicespondence Club's hundreds of blind members.

Marian Tape Library

Catholic Tape Recorders, International member Merrill Maynard of Taunton, Mass. has started a Marian Tape Library for the club. This library will contain tapes concerning the Blessed Virgin Mary.

Rev. Father John Clark, S.J. of Alma



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215 North Baldwin Ave.
Sierra Madre, Calif.

BILINGUAL RECORDING CLUB OF CANADA

Rene Fontaine, Secretary
1657 Gifford St.
Montreal 34, P. Que. Canada

CATHOLIC TAPE RECORDERS OF AMERICA, INTERNATIONAL

Jerome W. Ciarrocchi, Secretary
26 South Mount Vernon Avenue
Uniontown, Pennsylvania

CLUB DU RUBAN SONORE

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ORGAN MUSIC ENTHUSIASTS

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152 Clizbe Avenue
Amsterdam, New York

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P. O. Box 416, Dept. T, St. Louis 66, Mo.

THE VOICESPONDENCE CLUB

Charles Owen, Secretary
Noel, Virginia

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2516 S. Austin Boulevard
Chicago 50, Ill.

WORLD TAPE PALS, Inc.

Marjorie Matthews, Secretary
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123 Sutton Common Rd.
Sutton, Surrey, England

THE NEW ZEALAND TAPE RECORDING CLUB

Murray J. Spiers, Hon. Secretary
39 Ponsonby Road
Auckland, W.I., New Zealand

Please enclose self addressed, stamped envelope when writing to the clubs.

College, Los Gatos has been asked to read for the first tape, which will be on Mariology devotions. Plans for sending a round robin tape to members giving them a quick rundown of what exists in the library are under way.

Any member interested in contributing to the club is asked to contact Merrill Maynard, P. O. Box #4, Taunton, Mass.

Where Are You?

Many times in club bulletins we have read of the reference to a problem which apparently has plagued all clubs. This is the problem of those members who fail to answer tapes. Now, World Tape Pals has decided to run a space in their club bulletin called "Lost or Strayed WTPs" listing these delinquent members, with the request that other members having knowledge of their whereabouts please write in.

Delays caused by illness, moving, unexpected work, etc. are understandable of course. It is those folks who delay replying for no particular reason at all that should be jugged a wee bit and we say "hurrah" to WTP for finally attempting to do something about this situation.

New Club, Maybe?

George A. Benton, 3rd, 1018 Leo Way, Oakland 11, California, would like to hear from you if you would like to know more about, or help in the formation of, a new tape club based upon the round robin tape. Postage must be included.

CROSSTALK

from the Editors

BEFORE ANYONE GETS too excited about the new cartridge development shown on the cover, and described by Dr. Goldmark beginning on page 32, it might be well to remember a few points. 1—the only machine available is a laboratory prototype model. 2—no firm has indicated that it will make its music available on these cartridges, including Columbia, whose laboratories developed the device under contract from 3M. 3—no machines will be available for sale until sometime in 1961. 4—tapes for the machine will require special duplication equipment which 3M is setting up in St. Paul. 5—this is a complete system of its own which is utterly foreign to any machine now in use.

* * * * *

THE MACHINE appears to be designed for music, music, music. The cartridges are in a well, the mechanism is concealed by a cover. This would have to be removed for any splicing, etc. If the tape breaks in the cartridge you heave it in the ashcan. If it breaks outside the cartridge you can splice it in the regular way. Since the tape is Mylar this may be a moot point.

* * * * *

WE HAVE BEEN accused on some occasions of being anti-disc. Readers have suggested that since the disc has had a long and useful life that we let it die quietly instead of pushing it over the cliff.

* * * * *

WE HAVEN'T BEEN anti-disc so much as we have been pro-consumer. We have nothing against the LP. It is ten years old, it works well. But the stereo disc is another matter. It was crashed on the market and the poor engineers have been fighting like crazy to make it better as it went along. This they have succeeded in doing in some measure. The discs put out now are better than the first ones.

* * * * *

A REMARK MADE by Dr. Peter Goldmark, head of CBS labs, during the press conference explaining the new cartridge machine seems largely to have gone unnoticed. He said "After six or eight playings the stereo disc deteriorates rapidly." He is the man who was primarily responsible for the invention of the LP record. We are glad to have such distinguished backing for what we have believed all along.

* * * * *

THERE IS NO question but that tape is best and since it costs only a few dollars more in the 4-track form, or in some cases less than the stereo disc, the disc becomes an unwise purchase, if you want it to last. Tapes will sound the same ten years from now, they are a permanent investment.

* * * * *

SEVERAL PEOPLE at the press conference looked upon the new cartridge as the beginning of the end for the stereo disc, and well it might be. It could be that the public is so used to thinking of recorded music in terms of discs that they want them even though they have heard that tape is better. If so, it is because this industry has not done the kind of promotion job it should have.

* * * * *

ALONG THIS LINE we are quite interested to note that Bell Sound systems has begun to promote its cartridge units which use the RCA type cartridge. Their units are very nice ones and so far Bel Canto, RCA and SMS are making music available to play on them. In order to help promote the units they are offering a deal for dealers which dealers should look into. They can get the scoop by writing to Bell Sound.

* * * * *

AT THE SAME TIME, United Stereo Tapes is making tapes available to the distributors of records of those companies which also have a tape line through UST.

* * * * *

SO IT LOOKS LIKE YOU, the consumer, have a fat lot of goodies from which to choose.

NEW PRODUCTS

SYNCHRONIZED SOUND-SLIDES



An electronic device which links most tape recorders and any Kodak Cavalcade projector for synchronized sound-slide shows has been announced by Eastman Kodak Company, Rochester, N. Y. This device, Kodak Cavalcade Programmer, Model 1, permits simultaneous narration and/or musical background to operate together with inaudible "trip signals" which will automatically change slides in the projector. A narrator can control the "trip signals" with a button on the Programmer, enabling him to view the slide show and record his commentary at the same time. During playback, the trip signals advance the slides automatically. The Programmer is attached to the tape recorder microphone and speaker jacks, and to the projector's remote control outlet. Then it becomes the central control unit for the setup. The Programmer sells for \$95. Write to Eastman Kodak for additional information.

NEW TAPE



Agfa, Inc., New York, N. Y., will soon introduce two new polyester recording tapes. According to the manufacturer, these tapes are prestressed in both directions thus eliminating stretching problems; they are impervious to solvents such as benzene and acetone, to changes in temperature, and to moisture; they have a highly uniform magnetic coating that will not peel off; and they have a high distortion resistance. Agfa Magneton PE 31 is a long-play tape 8/10 mil thick, and PE 41 is a double play tape a little less than 6/10 mil thick. In addition to these two tapes, Agfa is also introducing an editing sound tape for camera fans who like to prepare a commentary to accompany their slides or movies. All tapes come with a red leader at one end and a green at the other, and a silver contact

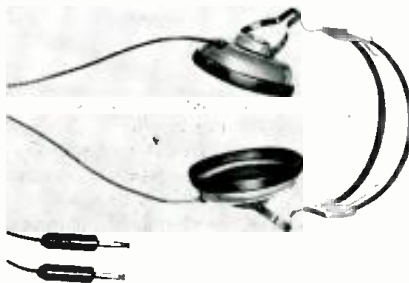
switching strip between the leaders and recording tape. The tape will be packaged in a unique flip-open box which can be stored on a book shelf, and the tape removed without taking the box from the shelf. An inner box swivels out with the tape in it. For details and prices, write to Agfa.

DUAL SPEED PORTABLE



Lafayette Radio, 165-08 Liberty Ave., Jamaica 33, N. Y. has introduced a new dual speed portable recorder. It has a single rugged function control (reverse, stop, play and record) plus an on/off volume control. Speeds of 3 3/4 and 7 1/2 ips; frequency response 60 to 8500 cps at the faster speed; other features include 5" permanent magnet speaker, a record level indicator light, output jack for an extension speaker, and separate inputs for recording from microphone or phonograph. Finished in scuff resistant pyroxylin material. Price—\$54.50. Contact Lafayette for additional information.

DYNA-TWIN HEADSET



The Electro Mechanical-Acoustic Division of Telex, Incorporated, St. Paul, Minn. is producing the new Dyna-Twin headset. It contains two comfortable muff-type earphones. The twin hi-fidelity receivers have a frequency response from 50 to 15,000 cycles based on actual results of equal loudness tests. This headset is constructed of stainless steel, Teflon and Neoprene. It comes complete with an 8 foot flexible cord and three-contact plug or two standard phone plugs. It can be used monaurally or stereophonically. For price and details, write to above.

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TAPE IN EDUCATION

Robert C. Snyder

AND now, more on using the tape recorder for instruction in the elementary school classroom.

Let us consider a possible use of the tape recorder for instruction in poetry in, let us say, the third or fourth grade.

Our teaching objective will be to tell what poetry is, show how the poet accomplishes a purpose within the poetic framework, and how the poem can grow into another form such as song. As a final part of the instruction in succeeding class sessions we will permit the student to learn to recite and evaluate his recitation. All this we will do making use of the tape recorder; to make and present a pre-recorded instructional tape and to serve as a student practice recorder and analytical device.

In any teaching situation we will benefit from having an outline. In this case the first part of our outline will be developed into an actual recording script. The presentation we will outline here might well run into fifteen minutes, so we will simply indicate the order and general technique which we would follow.

Here we go:

NARRATOR: Good morning, boys and girls. Today we are going to learn something about poetry.

Do you know what a poem is? Most poems are a kind of story. They can be short or very long. They can be funny or serious. They may be told so that some words rhyme; and they be written so that the words can be read with a regular rhythm or beat.

But, the rhyme or rhythm of the poem should not turn into a sing-song. In saying or reciting most poems you should speak so your listeners can understand the story that the poem is telling.

The poem that we will learn is "October's Party" by George Cooper. Do you know how it goes? Well, so you will know, I'll read the whole poem for you. Here it is:

(In best recitation form for meaning and flow)

"October gave a party.

The leaves by hundreds came;—

The chestnuts, oaks, and maples,

And leaves by every name."

(continue in best form to end of poem).

"Now, that wasn't hard, was it? Let's see how a boy or girl might do with this.

"Oh, hello there, young man. Would you like to tell us about October's Party? Yes? Well, go ahead."

BOY: (In fast sing-song fashion).

"October's Party by George Cooper.

"October gave a party/the leaves by hundreds came/the chestnuts, oaks, and maples/and leaves/ by every name. . . .

NARR: (Breaking in) well, that's not too bad, but remember, we want to tell a story about a party, not just try to get through the words of a poem.

I have an idea. Let's play a game. I'll pretend that I've just been down to the woods and seen something very interesting and I'll come back and tell you about it. You can ask me questions and I'll tell you all about it in George Cooper's words.

Would you like that?

BOY: Yes.

GIRL: Oh, Yes.

NARR: (As if just back from the woods) Oh hello there, Billy and Jane. I've just come back from the woods and I saw the most interesting thing.

BOY: What did you see?

NARR: (Telling it as prose) Well . . . October gave a party . . . and the leaves by hundreds came. There were chestnuts, and oaks, and maples, and, well . . . leaves of every name. Everybody helped with the party, too.

GIRL: What did they do?

NARR: Well, the sunshine spread a carpet. And everything was grand. Mrs. Weather led the dancing, and Professor Wind the band. . . . (continue with dialogue and recitation to end of poem.)

NARR: How did you like that?

BOY: That was fun.

GIRL: I never knew you could tell a poem like that.

NARR: Whenever you want to tell a poem for anybody try to remember that most poems are telling a story. Make sure that you don't get so interested in the rhyme or the rhythm of the poem that you forget to make sure that your listeners hear the story.

And another thing. Did you know that a poem can grow into a song if you put a tune to it?

GIRL: (Somewhat doubtful) What kind of a song could you make out of a poem like "October's Party"?

NARR: You could make a waltz.

BOY: (Incredulously) A waltz? How do you do that?

NARR: Well, a waltz goes like this (hum tempo of first four measures of "The Waltz You Saved For Me"). We can sing "October's Party" in waltz time like this. (Sing first stanza of "October's Party" to "The Waltz You Saved For Me").

BOY: Gee, that's good. What else can you do with it?

NARR: You could make a rock and roll song out of it.

GIRL: (Unbelieving) Oh, you couldn't do that.

NARR: Yes you can, like this. (Sing a stanza of poem to rock and roll tune then add refrain as follows:)

"Rock, rock, rock, rock, rock 'round October

The leaves are turning brown,

Rock, rock, rock, rock, rock 'round October

The leaves come tumbling down."

(Sing next stanza, repeat refrain, and so on to rock and roll end on last singing of refrain).

BOY: Golly, I never knew you could do anything like that with a poem.

NARR: Well, that's the way a poem grows and that's how it can become a song. But, now I have another idea. If you will go home and learn the words to "October's Party" I'll let you record your own voices and hear how you sound. Would you like that? (Pause) O.K., then copy the words down and take them home and learn them.

(to be continued next month)

QUESTIONS AND ANSWERS

Questions for this department may be sent by means of a postcard or letter. Please Address your queries to "Questions and Answers," TAPE RECORDING, Severna Park, Maryland. The most interesting and widely applicable questions will be used in this department.

Track Trouble

Q—I have a Tandberg Model 5 which records and plays both 2-track and 4-track tape. I have played both 2 and 4-track recorded tapes of quite a few companies with completely satisfactory results.

Recently a friend purchased an Ampex Signature Home Music System which plays and records two track but only plays 4 track, without recording. The other day he loaned me a tape he had recorded—a stereo 2-track recording but I could not play it as stereo since only the top track plays back correctly—the bottom track seems to only come out in dribs and drabs. Can you give me any idea why this is so. Both the Ampex and the Tandberg play all recorded tapes perfectly and the Ampex will play tapes I have recorded on my Tandberg.

Also I can play tapes recorded on a 2-track stereo recorder Ampex owned by another friend. This has us all quite baffled. Can it be a question of the recording head in the first Ampex being out of line?
—E. F. K., Linden, N. J.

A—The difficulty you are experiencing is unusual and very probably the result of a misalignment as under ordinary circumstances the Ampex and Tandberg will produce tapes which may be played interchangeably.

The Tandberg has a standard 4-track head which has a top track width of 43 mils, a space of 90 mils and then another track of 43 mils in width. The Ampex recording head has a track width of 70 mils, a space of 100 mils and then another track 70 mils wide. For playback the Ampex uses a second standard 4-track head which can be shifted up or down depending upon whether 2- or 4-track stereo is being played.

The track on a recorded tape will run 43 mils, then a 25 mil space, another track of 43 mils, a 25 mil space, a third 43 mil track, a 25 mil space and a final 43 mil track. Taking it from the top, this will give a distance from the edge of the tape to the bottom of the third track of 179 mils (this may be 180.5 mils where a 1.5 mil space has been left between the top edge of the tape and the top of the first track).

On the Ampex the distance from the top of the tape to the bottom of the second track (when recording two track stereo) is 70 plus 100 plus 70 or 240 mils.

To the top of the second track from the edge of the tape it is 170 mils so you can see that this track will overlap the lower head of the Tandberg by only 9 or 10 mils.

If the head in one machine is high or low by a very small fraction in relation to the other, the trouble you describe is quite likely to occur.

It is even possible that it may happen if old or stretched tape is used which will cause a further misalignment. Since your

recording of the second track is coming through now and then, it leads us to believe that the tape is skewing slightly as it passes the head giving you an on and off reproduction, plus the misalignment mentioned earlier.

If it is important to you that tapes on these two machines be interchangeable then we would suggest you have the head of the Ampex raised a few thousandths of an inch so more of the track will cover the Tandberg head, or, if the Tandberg head is high, lower it.

Head Alignment Inquiry

Q—Thanks for the "All About Tape on Tape" I think it is splendid and should be in all recordist's collections.

I would like to ask a few questions. When aligning the heads on the recorder does this alignment apply to the heads being perpendicular to the tape and/or parallel to the tape? The reason I ask this is that on my T1500, the pressure arm on the record/playback head is bent considerably and I have noticed this situation on several like models.

I notice in several articles that they say the cable for taking off material from radio or TV should be shielded whereas the one furnished with my recorder (the one with clips on) is not. Does this make any difference and can the length of the cable be extended.

Incidentally I tapespond with someone and when they answered my tape I found theirs was practically unreadable on my machine. I feel a trifle squeamish about telling him about it and wonder if one should let others know when such a situation arises.—P. M., New York, N. Y.

A—The gap in the head should be in a truly vertical position and the tone on the test tape is for adjusting the angle of the gap in relation to the tape so that maximum output is secured. A recorder with a head out of line will play tapes made by it with fine results however, if the head is seriously misaligned a tape from another recorder, or a musical tape will not sound well on it.

The angle of the pressure pad arm has no bearing on the head alignment however, the pad should fit square and snug against the head right over the gap.

If the takeoff for radio or TV is made at the speaker terminals unshielded cord of almost any length may be used. If the takeoff is at the preamp or volume control, then shielded cable is necessary to avoid hum pickup.

If you are sure your recorder is OK we would suggest that you inform your tapespondent about the condition of the tape. He should be glad to know it. If it plays properly on his machine then the head on one or the other machine is out of line.



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FEEDBACK

Excerpts from readers' letters will be used in this column.

Address all correspondence to: The Editor: TAPE RECORDING, Severna Park, Maryland

Likes Classical 4 Track

To the Editor:

The article printed in February 1960 issue, Feedback Column, by A. E. Foster, is a good step, strategically pointed, to help make it known what the consumer is concerned with. I have some further grist to add.

I collect only classical music on stereo tape. Until quite recently, I was not at all interested in 4-track tape. It was only with the announcement that London had released her catalogue to this medium that I seriously considered adding a 4-track head to my deck. This company's releases, alone, would be sufficient for my library but fortunately, a few Westminster, Vanguard and Mercury are available. And, by direct correspondence, I have learned of others who have recently joined forces with UST.

It is the manner in which the Mercury and Westminster have been released which causes me to question the merits of 4-track tape. I, for one, will not run through but 10-15 minutes of tape and then turn the whole blasted mess over, just for another 10-15 minutes of music. (This was absolutely abolished when 78s and 45-EP discs gave up.) Splitting movements and works is another nuisance. I shudder to think of a 4-track version of the announced London "Also sprach Zarathustra" split half-way through. On 4-track tape of shorter selections, which must be reversed to complete the composition, two tapes must be purchased and spliced together, thus permitting uninterrupted listening and doubling the cost. But this is a cost of convenience. It is only for the ease of editing and the advantage of being able to group selections onto one reel that I prefer 2-track tape. This grouping is quite difficult with 4-track releases.

Yet, as evidenced in the Vanguard releases, 4-track can be processed with some intelligence behind it. All selections are complete on one side or are lengthy enough to require and justify both directions in playing.

The London catalogue offers unlimited material for pairing thusly. However, a good instance of lack of concern in a tape release is the Mercury Saint-Saens 3d Symphony. I have noticed this tape available for some time in local stores in 4-track version but I have not heard of anyone purchasing it. I have had the 2-track version on order for more than two months and not received it although by correspondence with Mercury, I have learned it is available. The symphony is of the length awkward to 4-track and benefited by 2-track; or it could be paired with the Chausson, recorded by the same company, and both symphonies offered in continuous form on 4-track.

As to the question of cost, whether dis-

counted or not. As far as I am concerned, there is no cost comparison between disc and tape. Discs cannot stand up for more than half a dozen plays and still retain their highs. When this disc is replaced, the cost versus argument is sunk in favor of tape. Nor is there any concern about off-center pressings, bad pressings, grit or scratches with tape. I gave up years of record-collecting about three years ago and at the same time, gave up all the clutter and extraneous noises inherent to the medium.

There is no better medium than 4-track for opera and other extended works. I sincerely hope that the industry will treat it kindly, with much common sense and the interest of the consumer at heart. Many of us are certain that the results will be unquestionably rewarding for both manufacturer and consumer. Instead of dictating what we must have, let us show through our purchases, pleas and complaints what we want and desire. Companies who have a long history of stubbornness and waywardness gradually fall in line and I'm sure the sitting dog, aside from but two or three instances, will not be drastically missed.—*William V. Holman, Portland, Oregon.*

Good Tip

To the Editor:

That was a very good tip you gave in your first Question and Answer of your January issue mentioning Dr. Scholl's Kiro felt.

I bought the smallest package which contained 2 strips 4 5/16 x 2 7/8 inches for 45 cents. This has the adhesive on the felt which is protected by a covering that is removed when using. This smallest package is 10 times more than a person would want so anyone buying a package can treat his friends. Anyone taking his recorder away from his home should carry a piece of this Kiro felt so he will be prepared should the pads go haywire.

Enclosed is a sample piece so you can show your friends.

I subscribe to several electronics, mechanical and sporting magazines but your TAPE RECORDING magazine is the only one I read cover to cover and several times over as I absorb more after each reading.—*Charles Huseman, Cincinnati, Ohio.*

Thanks for the sample and also for the kind words.

Microns

To the Editor:

It has been called to my attention that tape recorder manufacturers have been describing tape head gap widths in terms of "microns," while meaning *micro-inches*, as in "90 microns width (.000090 in.)."

I would like to point out that a micron is a unit in the metric system, equal to a millionth of a meter. 90 microns equal

.0035, is 39.37 times as large as a micro-inch.

I can't emphasize too strongly that the use of the word micron in any other sense than a millionth of a meter is incontrovertibly and incontestably incorrect, and should not be tolerated under any circumstances. All scientific work and measurements are based upon the metric system, of which the micron is a part. Think what confusion can be wrought by the unthinking introduction of a new meaning for the word micron!

I believe that this point should be the subject of editorial comment, that all manuscripts should be carefully scanned for misuse of the word micron, and that tape recorder manufacturers should be apprised of the serious nature of a misuse of this terminology.

Micro-inch, after all, is an economical term, and it *does* mean a millionth of an inch, which micron does *not*.

I notice, in your current November issue, that in the article, "Heads You Win," the author, Charles F. Murphy, has been very careful to use microinch. I am very pleased to see that; keep up the good work. One of your competitors was not so careful in the October issue. — *Philip N. Bridges, Rockville, Md.*

Attention Southerners

To the Editor:

I was wondering if it would be possible through your magazine to obtain one of your readers to tapespond with?

I am 21 years of age and my hobbies are motor cycles, swimming, the cinema and, of course, tape recording.

My recorder is a Grundug TK 20 single speed (3¾ ips).

If your magazine is a nationally read one, then I would like especially a fellow recordist living in Tennessee or Texas, or one of the southern states.

I should also like to know if it is possible to place a subscription for your magazine here in England.—*Edmund Redfern, 3 Krowl Gap, Ave., Haslingden, Rossendale, Lancashire, England.*

There is your opportunity you Tennesseans and Texans. Anyone wishing to tapespond with Mr. Redfern please contact him directly. You should be able to place a subscription to Tape Recording through any of the larger booksellers who handle international subscriptions or you may send it in direct. Incidentally, TAPE RECORDING magazine is not only nationally read but internationally.

Dropouts

To the Editor:

I am afraid you gave out some bad info in reply to M. L. G. (March issue) who asked about skips. You said, "Inasmuch as you are using a standard brand, that possibility (bad tape) is definitely out of consideration."

I can't agree. Many manufacturers advertise no "drop-outs" which is an admission that this difficulty exists. Besides, I've recorded on enough namebrand tape to know that the trouble does exist, though to a lesser degree than was true a few years ago. I hope M. L. G. doesn't take his recorder apart when there's nothing wrong with it.—*M. S. Scherer, Brewer, Maine.*

We don't mean to be stuffy about this but we still feel that M. L. G.'s difficulties were not due to the tape. Dropouts are few and far between. Even so, an ordinary dropout is generally so small that its passage across the head would make so little difference it wouldn't be noticed. In instrumentation work, however, where information is packed on the tape like sardines in a can, dropouts can cause difficulty and wrong answers from the computers. As you mention, tape has vastly improved and seldom today do we find a manufacturer even mentioning dropouts in his ads.

Mailing Rates

To the Editor:

I am surprised at your statement on page 19 of the August issue in which you state that tapes over 8 ounces must be sent parcel post. A regulation has been in effect ever since the postage was increased from 3c to 4c on first class mail that third class rates were 1½¢ per ounce up to but not including one pound. There is a minimum of 3¢ for the first two ounces, of course. Seven inch tapes may therefore be mailed for approximately 17¢, depending upon the packaging.—*Gordon F. Turner, Fort Rucker, Alabama.*

Reader Turner is entirely correct and we goofed on that one, for which we apologize. As he states, the third class rate is now 3 cents for the first two ounces plus 1½ cents on each additional ounce up to but not including one pound. Our thanks to him for setting this straight.

Want Tape Pals

To the Editor:

My good friend and I are both very keen on tape recording and wonder if we could, possibly through the good offices of your magazine, obtain tape pals in America.

We both use Grundig recorders with speeds of 178, 3¾ and 7½ ips. We're both 28 and we're not experts. We'd like to talk to ordinary people about ordinary things and we love all kinds of music, photography, etc.

We have one tape pal in America and we're just bursting to have more—it's first class enjoyment and a wonderful hobby.

I expect, after reading this, that you'll suggest an international tape club. Well, we tried one and I've already resigned. First, we lost a bunch of tapes sent to club members that didn't bother to answer and then we were insulted by a national representative—and we're still trying to figure out why.

We promise to answer all and every tape sent to us within a few days of receiving same.—*Dave Wiseman and Hilda (Rusty) Chapman, c/o 8 Woodhurst Road, Acton, London W'3, England.*

The usual rule in the tape clubs is to query a person first by letter to see if he wishes to tapespond before sending tapes. Perhaps you hit some folks that no longer wished to engage in tapespondence. We are sure some of our readers will take advantage of your offer.



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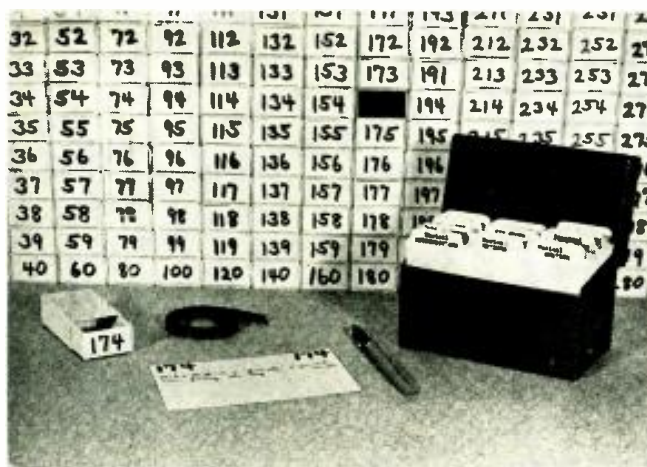
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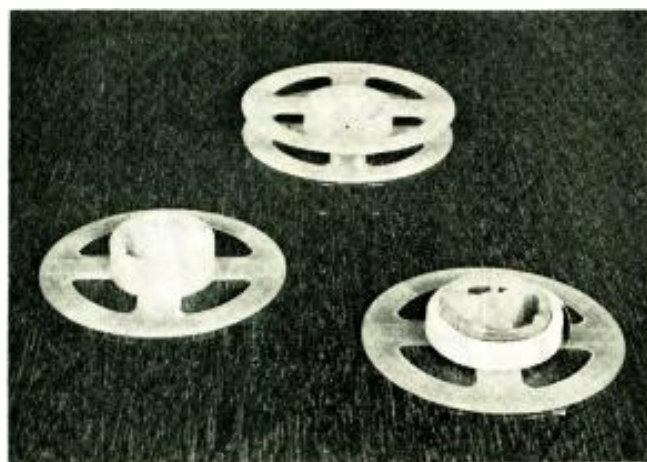
by Tommy Thomas

... file away your prized bits of recorded sounds for future use.



WE record a little bit of anything and everything at our house: doings with our youngsters, songfests with friends, LP's transferred to tape, TV programs, etc. And for a while there, until I figured out my "Pill Box Filing System," I was hard put to keep all of these various materials separate, and in good shape for the later listening of only those portions that were really worth saving.

So now I just let everything accumulate all on one (and sometimes more than one) 7" reel, and whenever I get the chance I cut out the individual items and file them away in numbered boxes, along with separately filed-away 3x5 cards indicating what each of the boxes contain. Most items are pretty short—two minutes or less—so I file the tapes away in inexpensive little cardboard pill boxes I buy at the drug store (for 3½¢ each). For longer excerpts I have a few dozen 3", 4" and 5" empty reels each in its own file-coded box. In this manner I can file anything from a quite-brief sound effect on maybe only six inches of tape, to as much as 22½ minutes of a TV program, radio program or recorded incidents of family life which we wish to preserve



Left, top: Store and file most of your tape excerpts without reels, putting them into inexpensive little cardboard pill boxes. With 1 mil tape, each of these boxes will easily hold up to two mins. of tape. Middle: The special "unloader reel" is an ordinary plastic 3" reel from which one flange has been removed right down to the hub. Then, to make the "loader reel" a length of ¼" wide cloth tape is anchored to the hub and wound around it to about a thickness of ⅛". Bottom: Find the end of the recording and play it just past the tape head. Cut the tape at this point. Below: To give you more room to work, remove the supply reel of tape and replace with the empty "loader reel." If running past the end of the recording a bit has left a segment of sound you don't want, snip it off. This recorder threads from right to left.



MARCH 1960 NEW RELEASES

- K *ST-72 VICTORY AT SEA
London Philharmonic Orchestra
- K *ST-73 CONTINENTAL JAZZ
Les Cino Modernes
- K *ST-74 GAITE PARISIENNE
P. Montiel conducts le Ballet Francaise
Orchestra
- K *ST-75 EAST OF SUEZ
101 Strings
- K *ST-76 THE GREAT STANDARDS
101 Strings
- K *ST-77 A NIGHT IN THE TROPICS
101 Strings
- K *ST-78 SYMPHONY FOR LOVERS
101 Strings
- K *ST-79 1812 OVERTURE & CAPRICCIO ITALIAN
- K *ST-80 THE BLUES
101 Strings
- K *ST-81 HIT AMERICAN WALTZES
101 Strings
- K *ST-82 RUSSIAN FOLK SONGS
- K *ST-83 PICTURES AT AN EXHIBITION
- K *ST-84 GRAND CANYON SUITE
101 Strings
- K *ST-85 SCHEHERAJAZZ
By Skip Martin & All Stars
- K *ST-86 THE QUIET HOURS
101 Strings
- K *ST-87 GYPSY CAMPFIRES
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- K *ST-88 RUSSIAN FIREWORKS
101 Strings
- K *ST-89 PORGY & BESS
101 Strings
- K *ST-90 TV JAZZ THEMES
By The Video All-Stars
- K *ST-91 THE GOLDEN AGE OF DANCE BANDS
- K *ST-92 TORERO
Genaro Nunez conducts in Mexico City
- K *ST-93 BACH
The Majesty of the Luneberg Organ
- K *ST-94 CONQUERORS OF THE AGES
The London Philharmonic Orchestra
- K *ST-95 OPERA WITHOUT WORDS
101 Strings
- K *ST-96 GOLDEN SAXOPHONES
Billy Vaughn and Orchestra
- K *ST-97 THEME FROM A SUMMER PLACE
Billy Vaughn and Orchestra
- K *ST-98 ANATOMY FOR A MURDER
Duke Ellington Score
- K *7132 SING ALONG WITH THE CHIPMUNKS
- K *7006 EXOTICA II
Martin Denny
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- STA-10 DREAMS BY THE
DOZEN
Written-- orchestrated - conducted
by Walter Scharf. Piano solos
by Harry Sukman.
- STA-11 ADVENTURES IN
EXOTIC LANDS
The Paris Theatre Orchestra
under the baton of Henri Baste.
- K *STA-12 HONEYMOON IN
SOUTH AMERICA
The Rio Carnival Orchestra.
- K *STB-13 OKLAHOMA
The New World Theatre
SYMPHONY FOR BLUES
The Hamburg Philharmonia
Orchestra.
- K *STA-15 FOR WHOM THE
BELL TOLLS
Piano solos by Harry Sukman.
- STA-16 THAT GELLER FELLER
Herb Geller - alto sax; Lou Levy - piano;
Lawrence Marable - drums; Harold Land -
tenor sax; Kenny Dorham - trumpet, Ray
Brown - bass.
- STB-17 WARSAW CONCERTO &
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The Hamburg Philharmonia Orchestra.
- STB-18 A TRAVELOGUE
IN STEREO
Walter Scharf conducts.
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KING AND I
- K *STA-20 AROUND THE WORLD
Music from the original score by Victor
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The Nord Deutsches Symphony Orchestra
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The Nord Deutsches Symphony Orchestra
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- K *STA-29 HARRY MARSHARD
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- K *STB-30 DANCE HITS OF 30'S
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This is music born of a depth that is a composite mirrored from the sadistic pagentry of the PLAZA DE TOROS, to the scorched arid soil of the plateaus. It is this temperament that influences the tenderness and the fiery excitement of all Spanish music from the classics to Flamenco. This is SOUL OF SPAIN!!

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BEL CANTO STEREOPHONIC RECORDINGS

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Sung and played by the Polynesians.
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The New World Theatre Orchestra conducted by Heinrich Alster and The Hollywood Sound Stage Chorus.
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- K *STB-51 JACK SMITH SINGS YOU ASKED FOR IT
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- K *STB-52 BALLADS OF THE BUSHLAND
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- K *STB-54 STRICTLY FOR DANCING
Max Pillar and his dance band. . . Music that makes people want to dance.
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Lawrence Welk plays with that "ballroom feeling". Here is music to dance to or to sit back and listen.
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- K * ST-57 MR. MUSICMAKER - L. WELK
This is a combination of STC-55 and STC-56 (available in 4 track) and cartridge only.
- K *STB-58 BILLY VAUGHN PLAYS THE MILLION SELLERS
In the world of music, a million seller is the best that there is. And this is Billy Vaughn's best.
- K *STB-59 STARDUST - PAT BOONE
Stardust is a romantic ballad whose popularity never wanes, and Pat Boone sings it with honest warm hearted sentiment.
- K *STB-60 BLUE HAWAII - BILLY VAUGHN
Billy Vaughn goes Hawaiian. . . and everybody goes Billy Vaughn.
- K *STB-61 LOVE SCENE - ELMER BERNSTEIN
The most intimate and most enduring of movie music for everyones favorite and romantic moment.

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Using fast-rewind, run the tape backwards onto the "loader reel," stopping when you get a little beyond the beginning of the recorded section you wish to extract.



for future use. (By the way, I use 1-mil Mylar tape at 7½ ips exclusively, on monaural twin-track.)

Now here's where the fun and endless possibilities come into the picture. For one thing, I do quite a bit of corresponding by tape, and I "pep things up" considerably with my spliced-in insertions taken from my continually expanding files. Maybe I'll use the lively opening music taken from the Hennesey TV Program to "open" my own recording. And later on I'll pause while talking and splice in a TV commercial. It's often quite uproarious how really absurd some of these commercials sound when put unannounced into the middle of a home recording. Then, of course, there are the family things that work out so much better this way. How much more interesting to splice in that funny argument my two boys had a couple of Saturdays ago (that I recorded at the time, and then filed away in Pill Box No. 188), than to call the boys over to the mike right now and get them to dutifully say hello to Grandma.

Of course, the very best Family Life Bits we keep for ourselves, to weave into occasional "Family Albums" every time we've accumulated enough to warrant a complete full-length reel of tape.

And we have separate files of recorded music and comedy sketches from TV, which we want to use. Sometimes we

Back up the tape, winding it a couple of turns around the hub of the special 3" reel. The cloth tape already wound around the hub makes for an easy grip here.



include one or more of them in with correspondence tapes we send to friends. The rest (and best) are all filed away individually until enough of any one category is accumulated to call for the splicing together of a complete 7" reel. And since this is all twin-track recording, we're usually—but not always—limited to just one track, so we save the second sides of most of these reels for the recording of LP's of interest (which we borrow for just this purpose).

Naturally, all this cutting-out and splicing-in of lengths of tape necessitate your being at least somewhat adept at making a quick and easy splice. This is a subject that has been gone into many times before, so I won't get too detailed here. I would like to mention, though, that the use of a semi-automatic splicing machine (such as the "Gibson Girl" model put out by the Robins Industries Corp.) makes the job simple and sure each time, as it must be if you're doing much splicing. Of course, use only the recommended type of splicing tape, and NOT ordinary Scotch-type cellulose tape (it's too sticky at the edges). And I might add that for me at least, correctly *over-lapping* the diagonally-cut tape edges just a hair-breath has been my own guarantee of noise-free splices every time.

Now the big thing that makes this whole system economically practical is that the storage of most of the tape segments (hundreds of them) is in little cardboard pill boxes. *No storage reels are necessary!* For a while there I was trying to hand-wind each of the lengths of tape into the tiny boxes. But this proved impractical so I fixed up two special "LOADER" and "UNLOADER" reels that turned this chore into a cinch. In making up the "LOADER" reel, the ¼"-wide cloth tape wrapped around the hub was a length cut from a reel of Walsco "Kleen-Tape," but any ¼" cloth tape should do.

The accompanying series of step-by-step photos will show you how to extract any certain selection of tape (no matter how short or long) from your main reel quickly and easily. This is how I constantly build up my own file of recorded segments, ready for instant use whatever the splicing/editing occasion. Later, when I have enough collected to make up a full-length 7" reel of any certain subject, I find myself a free hour some evening and splice it all together. The 3x5 cards tell me what I have, and let me arrange the different selections in just the order I want. With recorded TV



Locating the exact spot for the cut here takes practice, especially if it's between two sounds that are close together on the tape. My method is to listen to the tape, letting it run through my right hand as shown. When I come to the place where the cut is to be made, I instantly stop the tape by squeezing together my thumb and forefinger, immediately afterwards stopping the machine-control with a turn of my left hand. Then I reach in with the blunt-nosed tweezers to grab the tape just past the recording head, and I lift the tape out and cut it there.

music, for example, I usually splice the selections one after the other, with perhaps four seconds of (new and unused) silent tape spliced in between each. **NOTE!** When recording from TV I always try to use a consistent system so as to have a fairly uniform result, volume-wise. This, of course, is so all the different selections will go well together later when they're put one after the other on a single reel.

But the most fun of all is when I'm making up a 5" reel of correspondence (or a "Family Album" reel), and I splice in all sorts of items from my varied assortment in the pill boxes. Usually recorded from TV, I have short selections which come under headings of Opening Music, "Bridge" Music (which I often use in between changes of topic), and Ending Music. There's a whole section just devoted to interesting commercials. And another section for wierd and wonderful sound effects. I can't wait to use a spine-tingling two-minute segment I recently recorded during a late-late movie, where Frankenstein's monster is on the loose chasing the townspeople, and ending with a menacing knock on a big door. Golly, I've got circus music and people riding on roller coasters, shrieking their heads off. My little pill boxes are just bulging with all sorts of wonderful items that I

keep having fun with constantly . . . through the simple system of just splicing them in when needed.

There are two different systems for adding in the special filed-away lengths of tape: (1) Most often I make the "main" recording without stopping. I build up to what is to be spliced in, while recording and talking into a microphone. At this point I pause for a few seconds of recorded silence, and then I go on talking, mentioning the to-be-spliced-in-material as if it were already there. Afterwards, at the end of the reel (first side only, in twin-track, *before going on to the second side*), I come back and do the actual splicing-in. Naturally, it's necessary to have left enough tape off of the main reel so as to have room for all the extra segments of tape which are to be added. (2) In this system I stop talking when I'm ready to enter a certain splice-in portion, but I continue recording (silence) for another 20 seconds or so. Then I stop, backtrack almost to my last word, and put in the splice. Following the spliced-in recording, I have that interval of silence in which to pause before I go back to talking on the microphone again.

Both of these systems have their individual advantages, and you'll have to experiment to see which one *you* happen



Left: Now, with your selection of tape cut out of the main reel, take the "loader reel" and (using your fingertips pushing from below) push the entire coiled-up length of tape up and right off the reel. Having the cloth tape around the hub lets you do this quite easily. Right: Finally, with the coiled-up tape free of the reel, it's an easy matter to drop it into an empty pill box and file it away for future use. And be sure to fill out a 3 x 5 file card immediately, numbered the same as the pill box, with a short memo saying what's on the tape.

Splicing in a previously recorded segment of tape is even easier than was the removing of it in the first place (see text for details). Note here the use of the "un-loader reel," which is just a "loader reel" but without the cloth tape wrapped around the hub—so as to give the necessary clearance.



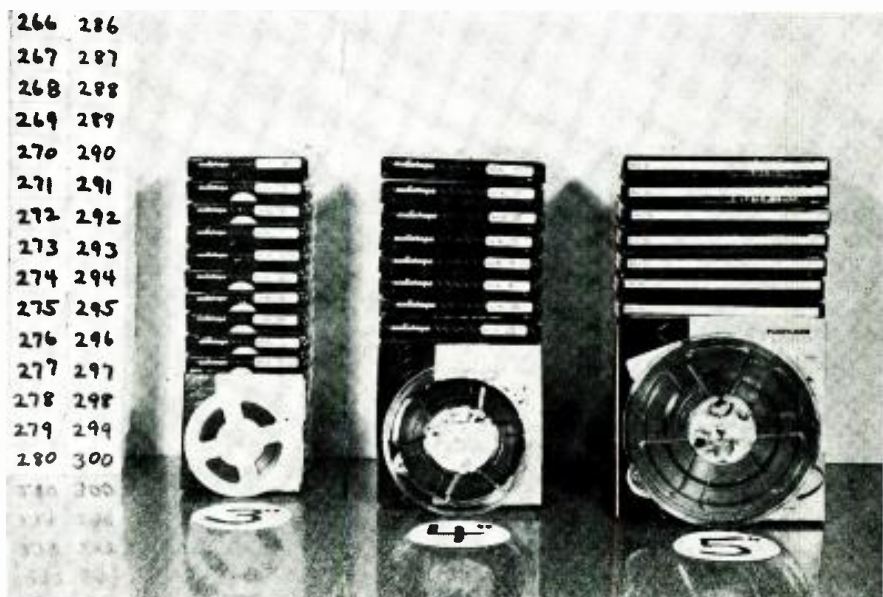
to prefer. But with either system you'll splice in the stored segments of tape in about the following manner:

- (a) Play the recording to where you want to enter the extra tape, and cut the main tape in two at this point.
 - (b) Remove the *Supply Reel* of tape, set it aside and substitute the empty "UNLOADER REEL."
 - (c) Now, with a pair of blunt-nosed tweezers, carefully extract the coiled-up tape from the proper pill box and drop it around the hub of the "UNLOADER REEL." Without the cloth tape around the hub, this is easy.
 - (d) Splice the beginning of this new tape to the end of the main-reel tape (where you just cut it in two), and then run this whole new tape segment onto the main *Take-Up Reel*.
 - (e) Put the original supply reel of tape back on the recorder (removing the now-empty-again "UNLOADER REEL") and splice the tape on this supply reel to the end of the tape of the take-up reel.
- And that's it! You're now all ready to continue on to your next splice (if any). Now most likely this sounds a lot

more complicated than it really is, once you get the hang of it. And when you have your filed-away tape segments coming from regular reels (rather than from the boxes without reels) it's just that much easier, as you'll soon discover. The system for splicing them in is about the same.

PLEASE NOTE! Twin-track tapes cannot be conveniently edited on the *second side* (though even this is not at all out of the question for those of you who have the required patience). This, of course, is because normally anything spliced into the second side will "louse up" the first side again. In the case of a correspondence tape, this is no real problem, since all you do is fill up the second side with talk. For those tapes you are saving for "posterity," then you might want to do as I do and use many of these second sides for recording borrowed LP's from phono to tape. Another solution is to make a one-side-only recording on the first track of a 7" reel of tape, say, and then (coupling together with a friend's recorder) re-record this onto a fresh half-length 5" reel. Put half of the recording on the first track, and then flip the 5" reel over and put the remainder on the second track, completely filling the reel. The possibilities are really endless.

For recorded segments over two minutes long, I use regular 3", 4" or 5" reels. Follow exactly the same removal system as shown in previous pictures, except substitute an empty regular reel for the "loader reel." And then store reel and all away in its own code-numbered reel box.





Courtesy 3M Company

Tape recorder specification: "Signal to noise ratio greater than 50 db."

Before we get into an explanation of what this means to the tape recorder owner, it might be well to go over the words themselves and see what they mean.

First is the word signal. In the ordinary connotation you are likely to think that signal means such things as a boy scout with signal flags, or the colored signals that are used in railroading, or even the hand signals you use when you are going to make a turn while driving.

But in the audio sense, the word signal means any intelligence that is to be communicated and this may include the voice, music, code, beeps and burps in instrumentation recording, radio navigation sounds and the like.

The word "signal" then, as applied to tape recorder specifications might be considered as what you want to hear, what is recorded on the tape to be played back, preferably loud and clear.

The ideal reproduction of sound would be to have only the signal issue from the loudspeaker but unfortunately in this imperfect world, this is presently impossible.

Which brings us to the subject of noise. Sounds which

displease us or which interfere with what we want to hear are generally considered to be noise, even though in themselves they might not be noise. For instance, if you are concentrating on a difficult problem and someone starts up some rock and roll music, this would be noise to you, even though to the person who turned it on, it might be the finest of reproduction. Or suppose you were listening to a speaker at a club meeting. When the room was dead quiet, with no one coughing, making noise with eating utensils or waiters banging plates around, you would have an easy time hearing what was said. But, if the speaker was boring and went on for some time, pretty soon you would note an increase in the noise. Perhaps some people would leave, giving rise to chair shufflings and footsteps, a few of the more impolite members might indulge in whispered conversation. As this noise increased, your ability to hear the speaker would diminish.

So noise might be defined as any unwanted sound which interferes with the sound we want to hear.

A ratio, of course, is an expression denoting how many times greater one thing may be than another. You may be six feet high and your youngster three feet, thus the ratio between you would be 2:1.

As we saw from a previous article, audio measurements are expressed in db's, which are the degrees on the audio man's thermometer. As you will recall, zero db was neither a loud sound nor a soft sound but one which could be heard pleasantly in a headphone.

We also established the fact that the db scale is logarithmic because that is the way our ears respond to sound. Most people cannot detect any change in sound level of less than 3 db, which actually is a doubling or halving of the sound, depending upon whether the sound is becoming louder or softer.

Db ratings are rather easily converted to sound intensity ratios. All you need to do is add the number of zeros indicated by the first number of the db rating to the number 1. For instance, 30 db would mean 3 zeros following the 1, or 1000. 40 db would be four zeros following 1 or 10,000 and 50 db would be 100,000. Thus if you have a 50 db difference between two signals the actual difference between them in terms of loudness would be 100,000 times. If there were two signals with a 30 db difference between them, one would be 1000 times as loud as the other.

While this difference may seem to be tremendous in terms of numbers, to the ears the difference is not so much because you have to *double a sound in db's* in order to make the difference apparent to the ear.

The rustle of leaves will run about 20 db (100) above zero db. A conversation runs about 60 db (1,000,000) and a 75 piece orchestra will whomp up a good solid 140 db which will be roughly 100,000,000,000,000 times as loud as the rustle of leaves. But you can hear both because the sensitivity of the ear is such that it responds in terms of the logarithm of the number rather than the number itself. To your ear the sound of the orchestra will be only about 7 times as loud as the leaves but actually the difference is much greater, as has been pointed out.

Now that we have the preliminaries out of the way and some understanding of each of the terms used in the specification, it might be well to look at the signal to noise ratio.

First we must get some idea of harmonic distortion. Harmonic distortion is caused by the tubes in the amplifier. If the amplifier is used normally then it will amplify in linear fashion and not distort the waveform of the signal. But if driven too hard, the signal begins to fall on the non-linear portion of the curve that shows the tube's amplifying characteristics and the tube begins to generate harmonics of the signal.

For instance, suppose the signal is a pure sine wave form, rising from the midpoint, gracefully curving over and coming down to the lower point and then rounding off again and heading back to the midpoint to complete the cycle. This curve when seen on an oscilloscope is a single line of light with the undulating form mentioned above.

Now suppose further that we drive the amplifier too hard or there are imperfections in its design. The result will be that the amplifier tubes will start to generate what is called a "second harmonic". This wave is like the signal wave except smaller in amplitude and double the frequency. It wouldn't matter so much except that this second harmonic mixes with the sine wave of the signal and distorts it out of shape. So what comes out of the amplifier is no longer the same thing that went in. Instead it is a combination of the two.

In addition, amplifiers also have a form of distortion known as intermodulation distortion. Like harmonic distortion, this takes the form of interference with the basic

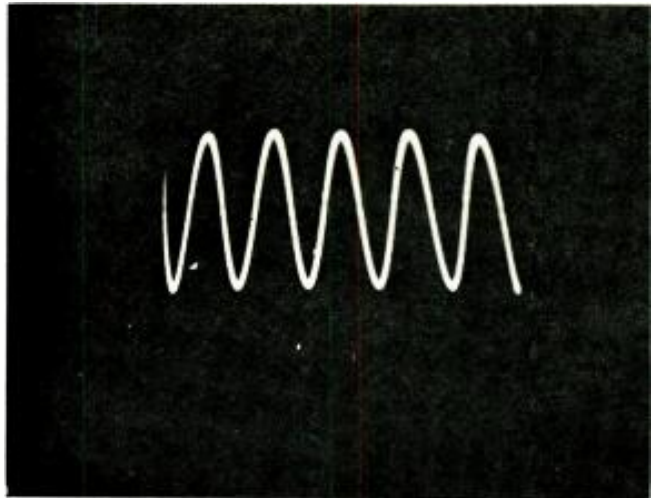


Photo by H. J. Hasbrouck

A pure sine wave signal looks like this on the oscilloscope. A distorted signal would be thickened due to harmonics interfering with the fundamental frequency. Distortion is easily seen by comparing the trace of the input signal to that of the output.

signal being fed into the amplifier so that what went in, comes out—but not the same.

This is caused by "off-beat" frequencies which combine with the pure signal. For instance, suppose you have a 5000 cycle per second signal that is pure sine wave. The amplifier generates a harmonic of 200 cycles due to faulty construction or driving it too hard. The output will then not only have the 5000 cycle per second note that went in but also one of 5200 cycles (the sum) and 4800 cycles (the difference). The addition of these unwanted frequencies has a tendency to fuzz up the reproduction so that it is not crisp and clear.

Obviously then, if we are going to measure a signal to noise ratio we must put some limit on the distortion that is permissible. Otherwise it would be possible to measure a signal of great strength, but distorted, against the quiet and have a real fine figure—but you wouldn't enjoy hearing it.

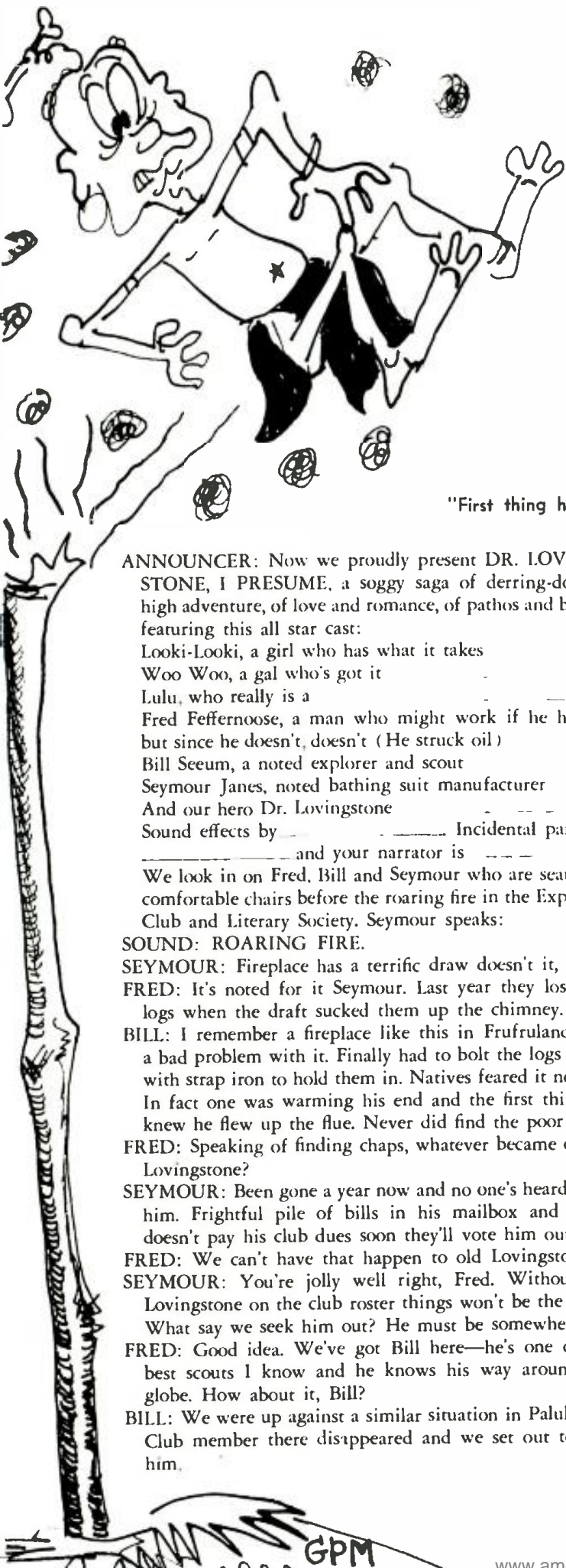
To put a lid on this, the engineers have established some standards. About 3% distortion is the limit, after which it may become objectionable, so signal to noise measurements are usually limited by this figure for professional audio recorders.

According to the NARTB Standards: "The standard reference level for signal to noise measurements shall be the output level obtained by reproducing tape produced by a recording system operating under normal conditions at which 2% total harmonic distortion of the recorded 400 cycle tone occurs using tape that is normally available."

To measure the signal to noise ratio, a signal is recorded on the tape, staying within the permissible limits of distortion and this is followed by an unrecorded portion of tape. The difference in the two, measured at the output determines the ratio.

So a recorder with a 50 db signal to noise ratio is quite satisfactory for the signal will be 100,000 times as powerful as the noise, as shown on a meter.

Since these measurements are electrical, they do not take into account any noise that the machine may make. A recorder could clunk, wheeze and groan but yet have a good S/N ratio. Perhaps what is needed is some rating that would indicate the noise the recorder makes, aside from the playback of tape.



DR. LOVINGSTONE, I Presume

. . . another script for your home fun.

"First thing he knew he flew up the flue."

ANNOUNCER: Now we proudly present DR. LOVINGSTONE, I PRESUME, a soggy saga of derring-do and high adventure, of love and romance, of pathos and bathos featuring this all star cast:

Looki-Looki, a girl who has what it takes . . .
Woo Woo, a gal who's got it . . .
Lulu, who really is a . . .
Fred Feffernoose, a man who might work if he had to
but since he doesn't, doesn't (He struck oil) . . .
Bill Seeum, a noted explorer and scout . . .
Seymour Janes, noted bathing suit manufacturer . . .
And our hero Dr. Lovingstone . . .
Sound effects by _____ Incidental parts by
_____ and your narrator is _____

We look in on Fred, Bill and Seymour who are seated in comfortable chairs before the roaring fire in the Explorers Club and Literary Society. Seymour speaks:

SOUND: ROARING FIRE.

SEYMOUR: Fireplace has a terrific draw doesn't it, Fred?

FRED: It's noted for it Seymour. Last year they lost two logs when the draft sucked them up the chimney.

BILL: I remember a fireplace like this in Frufruland, had a bad problem with it. Finally had to bolt the logs down with strap iron to hold them in. Natives feared it no end. In fact one was warming his end and the first thing he knew he flew up the flue. Never did find the poor chap.

FRED: Speaking of finding chaps, whatever became of old Lovingstone?

SEYMOUR: Been gone a year now and no one's heard from him. Frightful pile of bills in his mailbox and if he doesn't pay his club dues soon they'll vote him out.

FRED: We can't have that happen to old Lovingstone.

SEYMOUR: You're jolly well right, Fred. Without old Lovingstone on the club roster things won't be the same. What say we seek him out? He must be somewhere.

FRED: Good idea. We've got Bill here—he's one of the best scouts I know and he knows his way around the globe. How about it, Bill?

BILL: We were up against a similar situation in Palulululu. Club member there disappeared and we set out to find him.

SEYMOUR: Did you succeed?

BILL: Yes. Went twice around the world that trip, terrific hardships, no ice water in Poohna, caviar had run out in Omsk and Tomsk too, no fillet of sole in Magu Magu. Beastly.

FRED: Did you find him?

BILL: Yep. Finally found the poor chap.

SEYMOUR: Where?

BILL: Stuck between floors in a lift at the club. Club went in heavily for physical culture so members used stairs all the time. He was terribly emaciated.

SEYMOUR: Gad. I hope poor old Lovingstone is not lying somewhere terribly emaciated. What say we have a go at it lads? Let's find Dr. Lovingstone.

FRED: I'm with you Seymour, with you to the last dollar. Now let's get down to cases. . . .

BILL: I'd say from my experiences in Bongoland that we will need at least six . . . (FADE).

SOUND: MUSIC, HOLD UP FOR FIVE SEC. THEN FADE AND HOLD BEHIND ANNOUNCER.

ANNOUNCER: And so we take leave of our explorers planning their expedition to find Dr. Lovingstone. No hardship will be too great, privation and want will not stop them in their quest. They will find Dr. Lovingstone or die. Their first stop: France.

SOUND: MUSIC HOLD THEN FADE (FRENCH MUSIC PREFERABLY) FADE IN DINNER MUSIC CLINK OF GLASS, ETC.

SEYMOUR: Garcon, what do you recommend tonight?

WAITER (FRENCH ACCENT): The Paite de Foi Gras is very good monsieur.

FRED: Have you seen Dr. Lovingstone?

WAITER: Dr. Lovingstone, monsieur? Him I do not know.

BILL: No use looking further here.

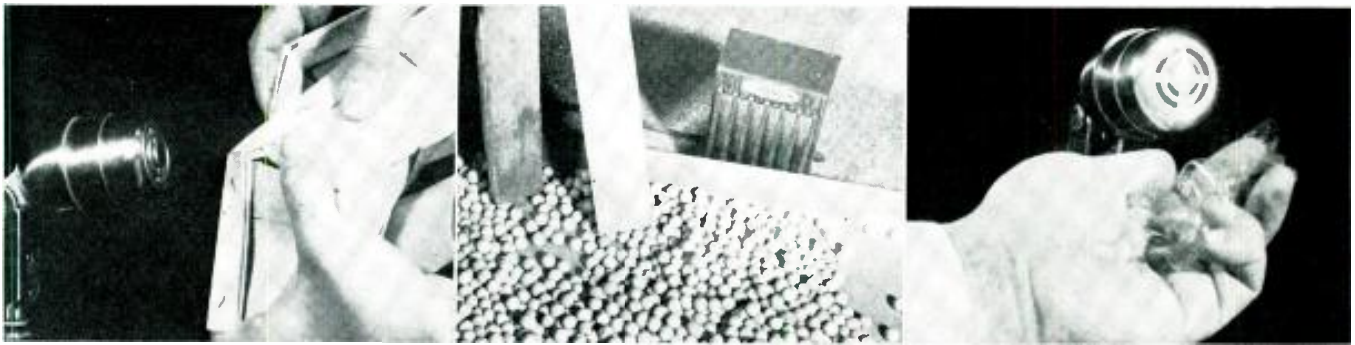
SEYMOUR: Do you have the tickets to the Follies, Fred?

FRED: Right here in my coat pocket.

SOUND: FADE MUSIC.

ANNOUNCER: Their dedication to their quest gave them no rest. On they went, next to Spain.

MUSIC: TOREADOR SONG OR SIMILAR. HOLD THEN FADE.



Left: For your plane crashing sound effect, crushing a small berry box works wonderfully. Hold the box in a straight line in front of mike. Middle: Two sticks pounded on dried peas gives the effect of tramping a gravel path nicely. Here the mike is placed beside the issuing sound. Right: Crumpling cellophane before a mike sounds very much like a crackling fire.

FRED: You have the bullfight tickets Seymour, ask the usher if he has seen Lovingstone.

SEYMOUR: Do you know Dr. Lovingstone? Have you seen him?

USHER: Sorry, Senor, I do not know heem.

BILL: No use looking further, let's go on in.

ANNOUNCER: On and on they went. (SOUND BRING UP "HURRY" MUSIC) HOLD BEHIND ANNOUNCER. To Italy

SOUND: FADE MUSIC. HOLD BEHIND VOICES.

SEYMOUR: Hurry up fellows, the opera starts promptly.

SOUND: MUSIC UP, HOLD THEN FADE.

ANNOUNCER: To Cairo.

BILL: I think we should stop at Shephards. That's the best place.

SOUND: MUSIC UP THEN FADE.

ANNOUNCER: To Narobi.

SOUND: JUNGLE TELEGRAPH.

FRED: What do the drums say Bill?

BILL: Drums say: Three white men seek fourth. Tell them nothing. Lousy tipplers.

SEYMOUR: I guess that finishes us here.

SOUND: MUSIC UP THEN FADE. HOLD BEHIND VOICES.

ANNOUNCER: Everywhere their search proved fruitless. In Capetown,

VOICE: Never heard of him.

ANNOUNCER: In India,

VOICE: No.

ANNOUNCER: In Russia,

VOICE: Nyet.

ANNOUNCER: In China,

VOICE: No.

ANNOUNCER: In Chile,

VOICE: No.

ANNOUNCER: In Rio de Janeiro.

VOICE: Sorry. We do not know him.

SOUND: FADE MUSIC OUT.

ANNOUNCER: In Rio they purchase a small plane and set out to the north with Bill as the pilot. Over the trackless jungle, disaster strikes.

SOUND: AIRPLANE ENGINE. HOLD BEHIND VOICES.

SEYMOUR: Bill, where are we?

BILL: Please don't ask embarrassing questions.

FRED: The map blew out the window an hour ago.

SOUND: ENGINE STARTS TO MISS.

SEYMOUR: Bill, what's the matter?

BILL: Gas is about gone, we'll have to land.

FRED: Where's the airport?

BILL: There isn't any!

SEYMOUR: Then how can we land?

BILL: Easy, we just keep going down until we run out of air.

SOUND: ENGINE QUILTS.

BILL: Fasten your seat belts here we go.

SOUND: CRACKUP—then silence.

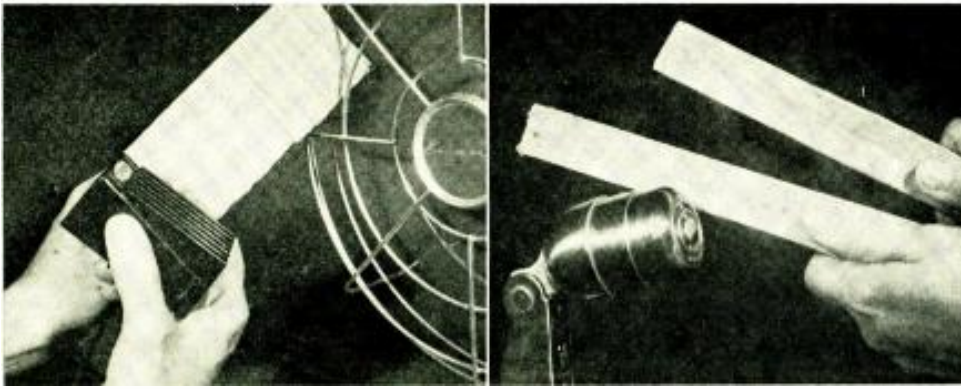
SEYMOUR: Bill are you O.K.? Speak to me.

BILL: A thing like this could spoil our whole afternoon.

FRED: Hey! Will you guys stop that chatter and give me



"For your information friend, that is a crocodile."



Left: When we touched the edge of a piece of stiff cardboard to spinning fan blades, we had an effective sounding plane—mike is in right hand. Right: Two sticks of wood don't resemble a crocodile's jaws in the least, but the resounding clack is similar to a juicy "snap." These are suggested methods of producing sound effects, perhaps you can dream up a few of your own.

a hand? I can't move.
SEYMOUR: Will you look at Fred. He's wedged in the baggage compartment. Let's give him a good pull. Bill, you take his other arm. (GRUNTS)
SOUND: CLOTH RIPS.
BILL: Well, here comes Fred, but there goes his pants.
SEYMOUR: Now to get down out of this tree.
NARRATOR: And so our intrepid band, taking a few worldly possessions, makes its way down the giant tree to the jungle floor. They find a path that leads them to a native village by a stream. Standing in the center is a huge bronzed native with a feather headdress. Bill speaks to him.
BILL: You chief. Me white man. Great bird crash in jungle, we here. We lookum for Dr. Lovingstone. You knowum?
CHIEF: I am indeed grieved to hear that your aircraft has been damaged. I had a similar experience just a month ago while flying to one of our more remote villages. Anent Dr. Lovingstone, I understand that he is living about five miles upstream. We have rowboats for hire or, for a small additional fee we can rent you an outboard motor. Of course, a deposit will be necessary, or do you carry a credit card?
ANNOUNCER: Using their credit card, our explorers rented an outboard and we find them tooling their way up the river.
SOUND: OUTBOARD MOTOR, WATER SPLASHING.
SEYMOUR: Look at that log up ahead in the river. The way it's split on the end you'd think it's a crocodile. Even seems to have teeth.
SOUND: SNAP.
BILL: For your information friend, that was a crocodile.
FRED: Hey look—up ahead. There's a sign on that tree.
SEYMOUR: And there's a boat landing. Steer for it Bill.
SOUND: UP MOTOR, THEN CUT.
FRED: We've found Lovingstone—see the sign.
SEYMOUR: It says "Private Property. Keep out" and it's signed "Dr. Lovingstone."
BILL: Hop out of the boat and let's go. There's a path.
SOUND: FOOTSTEPS ON BOARDWALK THEN ON GRAVEL PATH.
BILL: (PUFFING) This path sure is steep. Hey who's that?
SEYMOUR: Will you look at the size of that native. He has a spear, too.
FRED: He's blocking the path. What now?
NATIVE: Why you here?
BILL: We've come to see Dr. Lovingstone.
NATIVE: You have appointment?
SEYMOUR: Of course not.

NATIVE: Doctor's office hours 6 to 8 Tuesday and Friday, 1 to 4 Monday and Wednesday, other times by appointment.
FRED: But we're old friends of his.
NATIVE: OK, me probably ketchum heck but me take you to Doctor.
SEYMOUR: Phew—for a minute I thought we were in trouble.
FRED: Hey! Looki, Looki—dames.
SEYMOUR: Woo Woo!
BILL: What a Lulu!
GIRLS: (IN CHORUS) How you know our names?
LULU: Me Lulu—I like you.
WOO WOO: Me Woo Woo—you handsome.
LOOKI LOOKI: Me Looki Looki. You're cute.
NATIVE: Me go. Me sick of this.
BILL: Can you take us to Dr. Lovingstone?
LULU: Him asleep in hammock. Come.
LOOKI LOOKI: There he is.
SEYMOUR: By Gad it is Lovingstone!
FRED: Hey Lovingstone wake up. We've found you.
LOVINGSTONE: (AWAKENING) Uh. Huh. Wattsa-matter. Ho Hum.
BILL: Dr. Lovingstone, I presume.
LOVINGSTONE: Boys—Fred, Bill, Seymour. How did you get here?
SEYMOUR: We've combed the world to find you and get you back to civilization.
LOVINGSTONE: (INCREDULOUS) What!
BILL: Yes, Doctor. We have come to rescue you. Your club dues have expired and we know you wouldn't want to be read out of the Explorers Club and Literary Society.
FRED: So you can come back with us.
LOVINGSTONE: (CLAPS HANDS TWICE) Malu, tie up these three and throw them to the crocodiles.
BILL: Hey now. That's no way to treat us after we've come so far for you.
LOVINGSTONE: How is driving to work these days?
FRED: Terrible, takes hours.
LOVINGSTONE: How about taxes?
BILL: Bestly. High and going higher.
LOVINGSTONE: How about living expenses?
SEYMOUR: Don't mention them.
LOVINGSTONE: So you've come to take me back to that. Here I've got it made. No radio and TV commercials, in fact, no radio and TV. No taxes, all we want to eat free. No driving to work—in fact, no work. Beautiful girls for housemaids. And you want to take me away from this? Not on your life. Chuck them in the river Malu.
FRED: Wait a minute. Wait a minute. You've got some-

thing there doctor. Maybe I wouldn't mind staying here.

BILL: Sounds good to me, too.

SEYMOUR: Make it three.

LOVINGSTONE: Fine, fine. Glad to have you. There is one thing I have missed, that's a good game of bridge. I just don't seem to be able to teach these natives the new bidding system. Now with you fellows here we can have some real games. OK Malu, you can release them. Girls, we're going up on the patio. Will you bring the bridge table and some refreshments? The boys look hungry and thirsty.

GIRLS: (IN CHORUS) Yes, Master.

FRED: Gee what a life.

SOUND: FOOTSTEPS AWAY.

LOOKI LOOKI: Girls we haveum big opportunity here. Dr. Lovingstone big chief. Right?

WOO WOO: Right.

LOOKI LOOKI: Him have seven room thatched ranch house, not hut. Bill big chief, also Fred and Seymour.

LULU: Me begin see what you mean. Me like seven room ranch house, too, instead of hut.

WOO WOO: Me take split-level.

LOOKI LOOKI: We marry boys, we have nice house, too. We be princesses.

LULU: Marryin witch doctor come here soon. We be ready with triple wedding at reduced rate.

WOO WOO: Me like way Seymour lookum me. He nice man.

LULU: Me prefer Bill. Him big and handsome, have glint in eye and cute goatee. Him my style.

LOOKI LOOKI: Me likum Fred. Poor Fred needum someone to sew up pants.

WOO WOO: Good. We all likum different men. No fight. Helpum each other land fish.

DR. LOVINGSTONE (FROM DISTANCE): Hey girls, get moving. Get the refreshments for the guests. I hope you've planned something nice for them.

GIRLS (ENTHUSIASTICALLY IN CHORUS): You betcha!

SOUND: MUSIC UP—HOLD—THEN FADE.

NARRATOR: The time is one year later. We are back before the roaring fire in the Explorers Club and Literary Society. One of the members is summing up a discussion just held by a small group.

SOUND: FIRE.

VOICE: All right then, it's agreed. We've just got to find poor old Lovingstone and the last expedition that set out to find him. (FADE) After all we can't let them suffer in some remote spot.

SOUND: MUSIC UP, HOLD THEN FADE.

Production Notes

SOUND EFFECTS: *Fire*: crumple cellophane near mike. *Music*: play in background from a phonograph or another recorder. All sound effects and music can be taped consecutively and played on another recorder on cue if desired. *Clink of glasses*—clink glasses. *Airplane and outboard motor*: Piece of cardboard held against fan blades. *Jungle Telegraph*: Knock on empty box to simulate pounding on log. *Cruckup*: Crumple strawberry box wood near mike. *Cloth rip*: old windowshade makes best material, not too near mike. *Snap*: clack two boards together. *Footsteps on board*: two sticks "walked" on board. *Footsteps on gravel*: twist sticks in gravel in cardboard box near mike. *Voices*: Incidental voices may be taken by cast members with change of voice. Some parts, such as the waiter, usher, etc. may be feminine, depending upon the composition of your group. Insert names of participants in cast as called for in script, in spaces provided at beginning.



"You've got something there doctor."

A 1 7/8 IPS MAGNETIC RECORDING SYSTEM FOR STEREOPHONIC MUSIC

by

Dr. P. C. Goldmark,* Dr. C. D. Mee,*
Mr. J. D. Goodell,* Dr. W. P. Guckenburg*



AS part of a long range development program in the field of magnetic recording which CBS Laboratories undertook on behalf of Minnesota Mining and Manufacturing Company, pre-recorded tape systems for the home have been under study over a period of several years.

In order that pre-recorded tape can take an important place in the field of home entertainment, one must take into account a great many requirements, some of which are not easily met. For instance:

1. The tape must be contained in a compact cartridge in such a way that no part of the tape is exposed.
2. The amount of tape must be small and the cost of the cartridge low in order that the price of the final product can approach that of the record.
3. The sound shall be stereophonic with provision for three tracks for maximum flexibility. More about this later.
4. A complete musical composition should be played without interruptions; that is without reversing the cartridge or tape.
5. The quality of sound should be at least as good as the best of existing pre-recorded media.
6. The durability of the tape and cartridge must be high enough so that after several hundred plays, the sound remains unchanged.
7. It should be possible to place a number of cartridges on a tape machine equipped with a changer-type mechanism so that one can provide music for several hours.

Here we will report on the outcome of

these studies and subsequent developments which we believe will satisfy the above conditions and requirements.

It was clear from the outset that one was dealing with a system rather than just a few components. Thus intensive development work over a period of several years progressed simultaneously in such areas as methods of signal recording, magnetic transducers and playback heads, design of cartridges and tape transport mechanisms. The Laboratories' system work, in close cooperation with 3M, also included the development of a new tape with characteristics that provided optimum matching into the overall performance.

Late last fall the new pre-recorded system was in a sufficiently advanced stage to demonstrate it to most members of this industry.

3M had, at that time, stated that the Zenith Radio Corporation had joined this effort and entered the design of commercial equipment based on these developments.

Some of the important features and parameters of the new tape cartridge system are as follows:

1. Tape speed is 1 7/8 inches per second. The width of the tape is 150 mils; the thickness 1 mil, and there is provision for three tracks. Each track is 40 mils wide.
2. The cartridge is approximately 3 1/2 inches square and 5/16 inches thick. The cartridge contains sufficient tape to play continuously for 64 minutes, and thus will carry more than 98% of the music compositions without interruptions. The space occupied by the cartridge in its container is approximately 4 cubic inches as compared with an LP record in its envelope with approximately 20 cubic inches.
3. The tape machine to be demonstrated today can take five cartridges and play them automatically one after the other. One can reject a cartridge during any part of its play similar to a record changer. The production versions of this machine now under development by Zenith will have fast

forward and reverse speeds. The same instruments will also serve as a home recorder using the new cartridges with blank tape.

Earlier reference was made to a third track which is located in the center of the 150 mil wide tape.

Extended studies have been undertaken in the Laboratories to determine the optimum acoustic conditions desired by the listener in the average home while playing pre-recorded music. Conventional stereophonic music, as now recorded, provides only a portion of the sounds that are perceived by the listener sitting in a concert hall. A large percentage of the total acoustic energy which reaches the listener's ears is reverberated and delayed sound which is considerably depleted of its original stereophonic character. Experiments in the Laboratories have shown that in a space simulating the average living room, a much more exciting and realistic sound can be produced giving an illusion of "being there." Thus, it is intended to record on the third track as an optional feature on the new pre-recorded tape system, the stereophonic sum signal delayed and reverberated to an optimum degree.

The new medium will provide maximum flexibility and a new dimension in sound. The reproducing instruments can be manufactured for two or for three tracks. Today a two-track version will be demonstrated.

Later some of the electrical and magnetic characteristics of the new system will be discussed. The data and curves shown are already based on the newly developed tape and represent the overall behavior of the entire system, that is, recording, tape and playback. The new tape is now in pilot production at 3M, but the cartridges played today still use the older tape on which these programs were recorded last fall.

Following the section dealing with the magnetic aspects of the new system, some of the mechanical problems and their solutions as encountered will be described.

A comparison of the new tape system with the original 15" per second tape mas-

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WAVELENGTH DEPENDENT LOSSES

Reproduction

1. Separation of head and tape surface.
2. Azimuth alignment of head and tape.
3. Replay head efficiency.

Recording

1. Tape thickness loss.
2. Recording field configuration loss.
3. Non uniformity of tape particles.

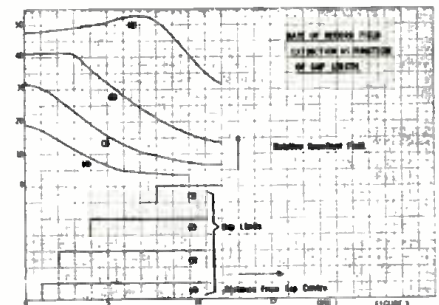
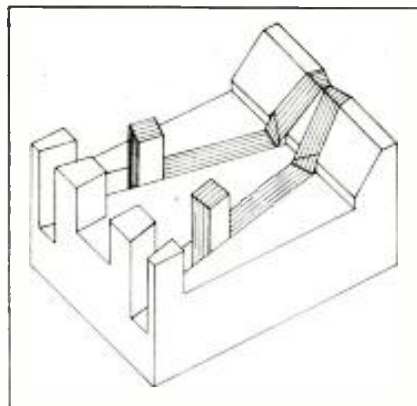


Fig. 1. (Left) losses in a tape system. Fig. 2. (Center) two-track head sub-assembly. Fig. 3. (Above) field distribution for 0.1 mil gap.

ter from which both the stereo records as well as the new tape cartridges have been derived, will be demonstrated. For this purpose, some sections of music have been alternately transcribed from the original master and the 1 7/8 inch per second narrow track version onto a 15" per second half track tape.

Magnetic and Electrical Characteristics

In order to achieve an adequate signal-to-noise ratio, frequency response and dynamic range at a tape speed of 1 7/8 i.p.s. significant developments of most components used in magnetic recording is required. For instance, due to the shorter wavelengths encountered, developments have been aimed at reducing the wavelength dependent losses. Figure 1 lists the important losses which have been minimized in the present system.

(A) Losses in Reproduction

1. There is an exponential reduction of the replay head flux with decreasing recorded wavelength due to the finite separation between the surface of the tape and the replay head pole pieces. At 15 kc/s and 1 7/8 inches/sec. this loss is almost 0.5 db per microinch separation.
2. Another important loss is associated with the azimuth alignment between the replay head gap and the line of constant recorded magnetization across the track width. For a conventional 90 mil. wide track a loss of 6 db occurs at 15 kc/s and 1 7/8 inches/sec. for a misalignment angle of 3 minutes.
3. The proportion of replay head flux shunted by the gap will increase when using the narrow gaps necessary to resolve the shortest wavelengths recorded at a tape speed of 1 7/8 inches/sec. In order to maintain a high efficiency it is necessary to compensate for a reduction in gap length by a corresponding reduction in gap depth.

B) Losses in Recording

1. A separation loss of the type described for reproduction occurs during recording due to the finite coating thickness. Those particles remote from the tape surface will thereby give an attenuated contribution to the tape surface flux and so will contribute less to the replay head flux.
2. The magnetization of a recorded tape

will not be uniform throughout the coating thickness since it depends on the rate of extinction and the direction of the recording field when the critical value for recording is reached after the tape has passed the recording gap. In addition to this, a further loss can occur due to change in phase of the recorded signal through the coating thickness caused by the vertical curvature of the effective recording plane of the recording head field.

3. For high resolution of the effective recording plane a sharp-cut-off of the recording field must be accompanied by a high uniformity in the magnetization characteristics of the individual particles of the tape. Elimination of particles with low critical fields for switching will also reduce self demagnetization effects.

The separation loss has one advantage in slow speed tapes for audio, since, due to the shorter wavelengths involved, print through is correspondingly reduced allowing new thin tape backing materials to be used with safety.

New Developments in Magnetic Recording Components

Although the major loss component, called separation loss, is inherent in presently known magnetic recording systems, it has been possible by improvements of tape and heads to achieve performance characteristics approaching those presently obtained from 7.5 i.p.s. machines. Such performance is achieved with a track width of 40 mil. Having a narrow track reduces the alignment problem.

It has been found that a conventional laminated ring type playback head can be constructed to be responsive up to 15 kc/s with a 1.5 mV output from a tape having 1/3 mil. coating thickness. A sub-assembly of the 2-track version of such a head is shown in Fig. 2. The replay head coils fit over the projecting laminations. Since the recorded wavelength at 15 kc/s is only 1/8 mil., it is necessary to form an effective magnetic gap of 1/16 mil. (or 1.5 microns.). It has been found that a 1 micron thick spacer gives satisfactory head resolution in prolonged use. By manufacturing the multitrack head in two halves, automatic colinearity of the gaps is assured and in practice the 10 kc/s sensitivity of the tracks

These photos show the appearance of the laboratory prototype. Left: with the cover on; control buttons are bar-type along front edge of machine. Right: Cover removed to show tape handling mechanism.

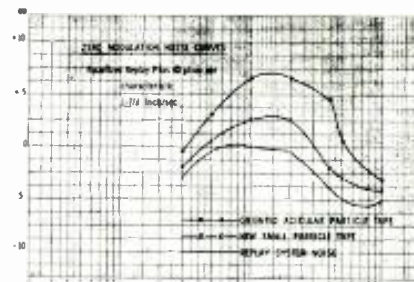
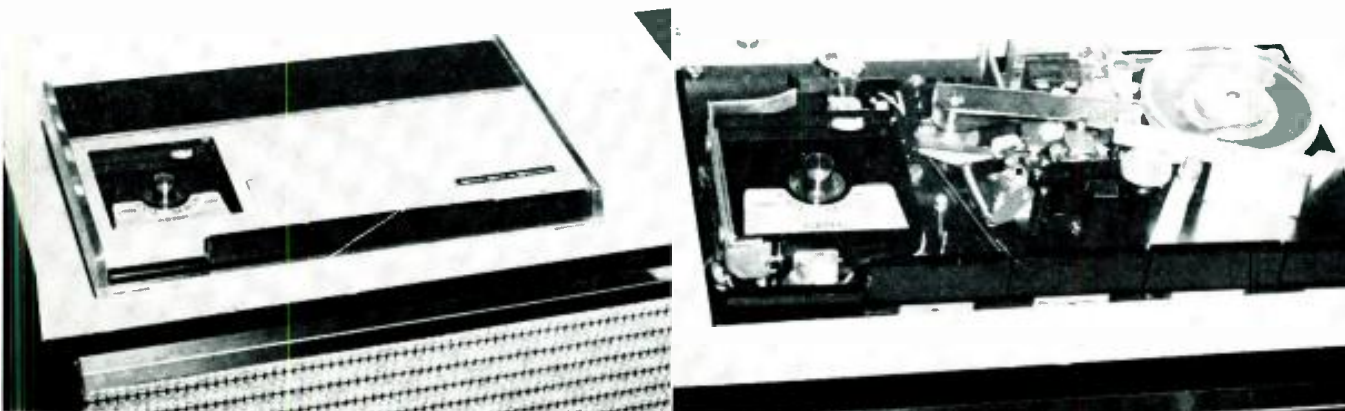


Fig. 4. Top curve, oriented acicular particle tape. Center curve, new small particle tape, lower, replay system noise. Curves are zero modulation noise curves.

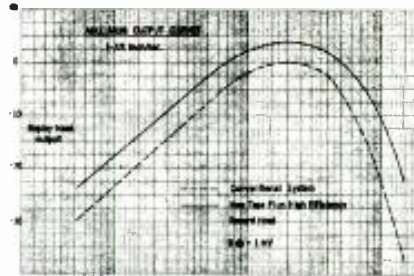


Fig. 5. Top curve, new tape plus high efficiency record head. Lower curve, conventional system. Both curves measured at 1 7/8 ips speed.

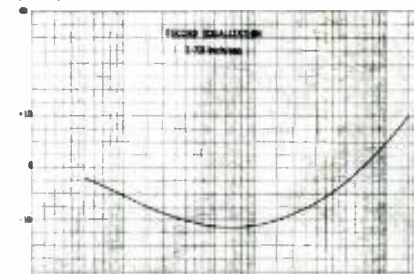


Fig. 6. Record equalization curve for new system at 1 7/8 inches per second speed. Curve derived by listening tests.

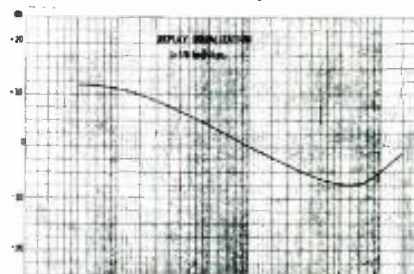


Fig. 7. Replay equalization giving a flat response from 30 to 15,000 cps at 18 db down relative to level giving 3% distortion at 1Kc/s.

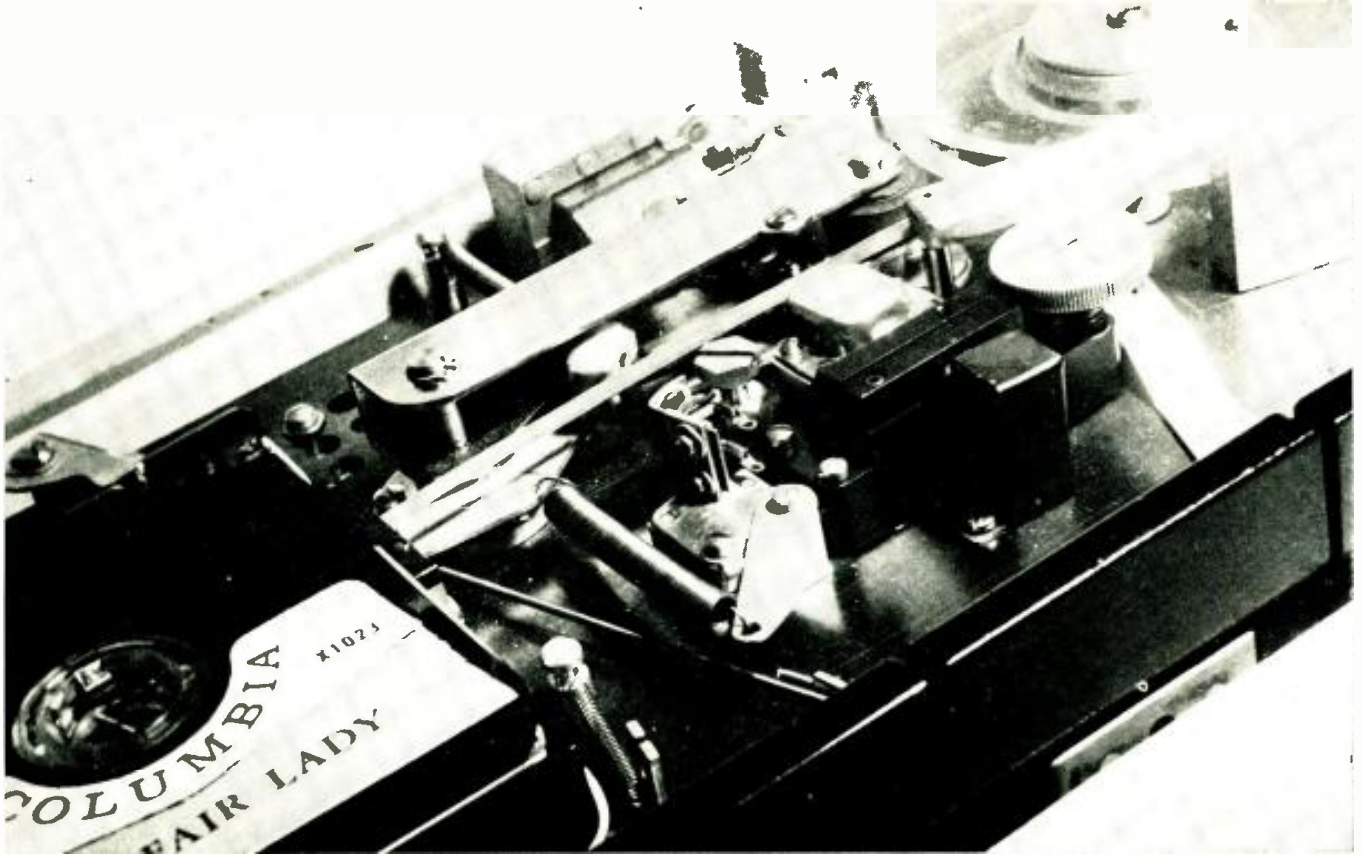


Figure references 9, 14, 15 & 16. A view of the tape deck. The felt pad can be seen at upper center of photo. Note position of leader tape ready to pull tape from cartridge, showing the straight line path of tape travel. The pressure roller may be seen at the right, slightly beyond the head.

differ by less than 4 db.

Similar mechanical refinement is necessary of course in the recording head. Fig. 3 shows a plot of the field distributions at 0.1 mil. spacing for various gaps. It is seen that the field decrement increases somewhat with gaps which are large compared to the spacing. Thus a long gap might be thought advantageous especially since the vertical field decrement is also reduced. In practice, however, the expected improvement does not occur probably due to the relatively greater vertical component of the effective recording field. Considerable development has been carried out to improve the recording field configuration for the very short wavelengths involved in this system. This work will be reported at a later date.

Significant advances have been made in the recording media leading to considerable reduction of the separation loss effects by 3M. Firstly, a tape lacquer formulation has been developed which is relatively soft, giving good head to tape contact. Particle rub-off on guides and heads has virtually been eliminated and the consequent amplitude variations considerably reduced at the shortest wavelengths. In addition the Laboratories

developed a higher output and lower noise tape as a result of changes in the magnetic material itself. Previous work has concluded that a reduction of effective particle size results in lower tape noise. The improvement achieved is shown in Fig. 4, where the weighted noise response for the existing tape (to be demonstrated) is compared with the new tape using optimum bias for each. A 4 db lower noise level is obtained in the mid-frequency range. Higher overall output is also obtained from the new material. It is found that the short wavelength efficiency is particularly improved. One reason for this is that a deliberate attempt was made to reduce the spread of critical fields required for magnetization change in the individual particles. For acicular particles better control of the size and shape is required and for effectively spherical or cubic particles it is necessary that the acicularity be kept low enough to make the crystal anisotropy dominant in all particles. Fig. 5 shows the improvement resulting from recording with the new tape using one of the high efficiency recording heads compared to that obtained with conventional 1 7/8 i.p.s. recording.

Equalization Techniques and Performance of the System

The recording equalization adopted for the new 1 7/8 i.p.s. record-replay system is shown in Fig. 6. This curve was derived by performing many listening tests on a variety of program material. It is the optimum characteristic which meets the requirement to load the tape optimally at all frequencies without overload danger. Using this in conjunction with the replay equalization (Fig. 7) a flat response is obtained from 30 cps. to 15,000 cps. at -18 db relative to a level giving 3% distortion at 1 kc/s. Under these conditions the ratio of the maximum signal level at 1 kc/s to the zero modulation system noise is 54 db. The 10 kc/s signal response at this maximum signal level is -12 db relative to that at low frequencies. Typical equivalent signal to noise ratio for professional 7 1/2 i.p.s. half track systems is 54 db with a corresponding 10 kc/s signal response at -6 db. Thus the new system with its own recording and replay characteristic approaches the 7.5 i.p.s. performance available today and has been found to be entirely adequate for all types of musical programs.

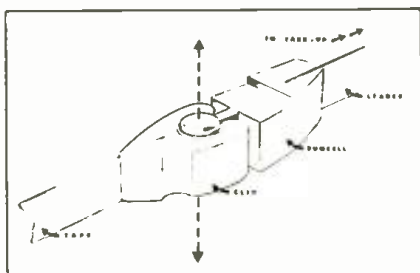


Fig. 8. (Above) cartridge coupling members hooking leader to tape. Fig. 10. (Center) cartridge brake mechanism.

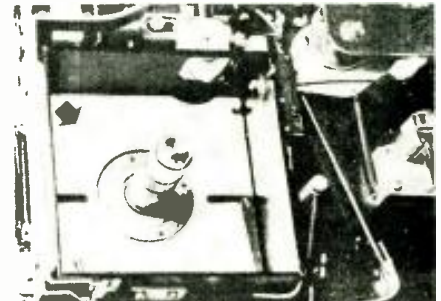
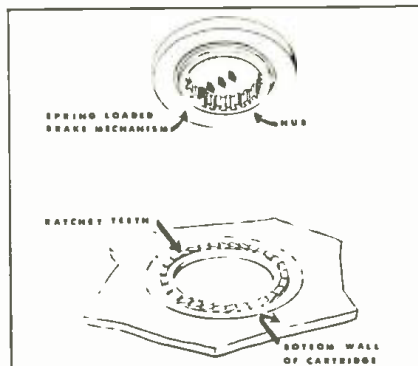


Figure references 11 & 13. View showing the cartridge spindle and well into which the cartridges fit for automatic playing.

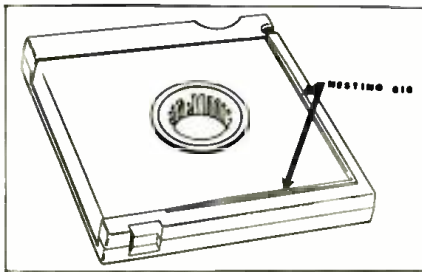


Fig. 12. Drawing of cartridge showing nesting ribs which hold the stack together.

MECHANICAL DESIGN PROBLEMS AND SOLUTIONS

One of the central problems in pre-recorded tape systems is the design of the tape packaging. Obviously, it is necessary to satisfy requirements of convenience as well as provide adequate protection for the tape. Naturally high quality performance with respect to music reproduction is a prerequisite.

In order to popularize pre-recorded tape it is essential to eliminate the process of manual threading between the reels. This requirement is dictated by the need for avoiding manual threading and also by the requirement to make the cartridge compatible with a practical automatic changer mechanism.

On first examination the notion of threading the tape permanently between two side-by-side reels contained in the cartridge is attractive. However, every practical design incorporating both the supply and take-up reels in the cartridge requires that sections of the tape be exposed through openings in the cartridge walls with consequent dangers of damage. Even in a single cartridge player there are many difficulties involved in coupling the tape of a dual reel cartridge to the drive system and the heads, but when the design of an automated changer is considered, these problems increase rapidly in number and magnitude.

A basic consideration in any type of cartridge is the need for relatively high speed transport in so-called "search" operations. If flanges are used on the reels inside the cartridge, the bulk is considerably increased and many problems of stability are encountered. Thus, high speed winding without flanges requires some method of maintaining a separation between the tape and the cartridge walls.

The three dimensional geometry of the reeled tape, the driving spindle in the transport mechanism, the walls of the cartridge and other components call for strictly orthogonal relationships or some automatic dynamic adjustment and an accurate system of tape guidance. Otherwise, the cumulative errors in repetitive reeling of the tape, even on the same machine, will lead to telescoping or angular displacement of the tape reel with respect to the cartridge walls. In brief laboratory experiments these problems may not be evident but in long term field use the increasing friction produces instabilities in the tape speed and eventually may completely block the reel from rotating.

The problem of smooth reeling without any flanges was solved by introducing a novel guiding member in the cartridge with adequate compliance to insure a smooth rewind cycle. This arrangement allows a tape

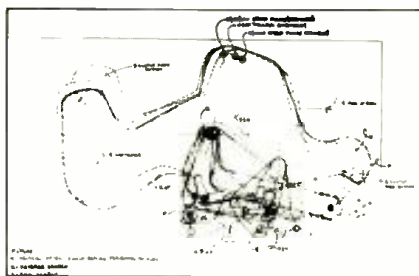


Fig. 15. Programming cam showing positions for play, neutral, forward and reverse search.

with an hour of playing time to be rewound in twenty seconds. (Five seconds has been achieved in the laboratory.)

Threading of the tape is accomplished by means of a leader permanently attached to the take-up reel in the mechanism. The end of the rewind cycle leaves the permanent leader in the threading path of the machine.

A very simple and economic solution was used for the design of the coupling between the reeled tape and the permanent leader. This consists of a "U" shaped device attached to the end of the tape in the cartridge and so shaped that it seals off the only opening in the cartridge when the tape is fully rewound. The permanent leader terminates in a dumbbell shaped element that readily mates with the "U" shaped clip. The dumbbell attached to the permanent leader can slip through the "U" shaped clip in a vertical direction with only a light detenting restraint but provides an absolute coupling in terms of horizontal pull when the two members are engaged. (Fig. 8)

In order to eliminate variations in back tension with dynamic changes in effective reel diameter, a felt pad is spring loaded against the surface of the tape as it leaves the cartridge and the supply reel is operated in free running bearings. This provides excellent tensioning characteristics and at the same time maintains the cartridge complexity cost at a minimum. Fig. 9 shows the tape deck and the felt pad.

Some kind of braking mechanism is essential in order to avoid partial unreeling and fouling of the tape within the cartridge under normal conditions of handling. The brake must be positive, reliable and simple to assemble. The device selected consists of a linkage mounted in the cartridge hub and spring loaded in a ratcheting relationship with teeth molded in the cartridge wall. When the cartridge is placed on the machine, the spindle releases the brake automatically. The brake is shown in Fig. 10.

The facility for driving the cartridge hub during the rewind cycle must be designed so as to permit random rotary orientations of the spindle with respect to the cartridge hub in the loading process. This is accomplished by means of radial slots around the inner periphery of the hub and a spring loaded two-toothed drive in the spindle. See Fig. 11.

The cartridges are designed with mating surfaces that couple them (see Fig. 12) together in a stable vertical stack. This feature contributes considerably to the ease with which they may be handled and loaded in a changer mechanism. The patterns are unsymmetrical so that the cartridges must be correctly oriented or they cannot be fitted

together. Other details of the mechanism make it impossible to load the cartridges in any way that results in improper operation.

The resulting cartridge design is compact, inexpensive and dependable. Actually, of course, the cartridge design was carried on in conjunction with the development of mechanisms capable of handling it in a fully automated changer so as to eliminate any mutually exclusive features. The actual changing mechanism consists simply of a spring loaded platform in a well (Fig. 13) with which the supply spindle is coaxial and an appropriate escapement. The latter is an essentially conventional device.

There are two escapement levers that operate in tandem on opposite sides of the cartridge well. One of the escapement levers is placed close to the corner from which the tape is fed in order to maintain accurate positioning between the clip terminal and the threading path.

The path for the tape is a straight line from the cartridge to the supply reel during the threading operation. When the tape has been pulled from the cartridge and starts to wind on the supply reel, the pressure pad that supplies the back tension and the pressure roller are automatically brought into position. (Fig. 14)

The take-up reel is operated with a conventional slipping clutch drive.

The successive cycles of operation are programmed by means of a multi-position rotary switch and several mechanical interlocks. The slipping clutches, brakes, speed changing idlers and the like are operated from the three-dimensional surfaces of a single complex cam (Fig. 15). All pressure roller, pressure pad and escapement operations may be programmed via suitable cam designs. It is necessary to provide a number of mechanical and a few electrical interlocks to prevent improper manual interference with machine operations, but these are relatively simple and straightforward in design.

The straight line character of the tape path does not require intermediate idlers and consequently the guidance problems are minimized. However, as in all such drives, it is important to maintain the pressure roller axis parallel to the axis of the capstan. This is accomplished by introducing sufficient compliance in the mounting of the pressure roller so that it is self-adjusting within small limits. The spring loading provides a simple adjustment for correcting major pressure differentials across the idler surface. (Fig. 9)

Obviously, there must be some means for sensing the end of the tape and various other portions of the operating cycle. In this machine these results are obtained by means of a simple analog computing linkage that cannot be disclosed in detail at this time. However, the method is independent of the length of the tape in a given cartridge and has displayed a very high degree of reliability.

The authors wish to express their appreciation for the advice and assistance during the course of this work by B. B. Bauer, A. A. Goldberg, J. C. Jeschke, H. R. Sherman, E. L. Torick, and J. C. Wistrand of CBS Laboratories and Barbara Ivins, formerly with CBS Laboratories. We also wish to acknowledge whole-hearted cooperation of Dr. W. W. Wetzel and his associates of 3M's Magnetic Products Division.

NEW PRODUCT REPORT



KNIGHT STEREO TAPE DECK

... features dual VU meters, 2 & 4 track head shift, mono or stereo record and play back.

THE Knight Stereo Tape Deck is a tape deck mounted in a carrying case. It contains recording and playback preamps but no power amplifiers or speakers. For playback it is necessary to connect it to a power amplifier, preferably stereo, and this in turn to loudspeakers.

It is a three speed unit, having speeds of $1\frac{7}{8}$, $3\frac{3}{4}$ and $7\frac{1}{2}$ ips selected by a wheel set in the deck of the machine. The speeds must be adjusted while the machine is in the stop position only.

On the same side of the deck is the equalization switch which should be adjusted to match the reading of the speed selector dial. It has two positions, one for $7\frac{1}{2}$ ips and the other for $3\frac{3}{4}$ and $1\frac{7}{8}$.

The unit is controlled by means of push buttons, six of them lined up in a row on the left side of the deck. These include stop, record, rewind, wind, play and pause.

The caution expressed in the manual that these buttons be pressed firmly and quickly all the way down, means what it says. All buttons, except the

pause and stop will lock in place when depressed. The stop button when pushed down returns all buttons to neutral.

An automatic cutoff is incorporated to stop the tape at the end of the reel or if the tape breaks. Like us you might run into a situation where the play button will not stay depressed and a loud buzzing issues from the machine. This is simply an indication that either the tape has not been threaded properly (almost an impossibility) or that there is too much slack between the reels. In our case it was the latter that caused the buzzing. No harm is done, of course, it is just a reminder that you have not done something right insofar as the machine is concerned.

This buzzing will also occur if the play, wind or rewind buttons are pushed down with no tape in the machine.

Fast forward and rewind are high speed and operated satisfactorily, as did the cutoff switch in all tape motion modes.

This unit has a very good ventila-

STA **FOK** STED

Product: Knight Stereo Tape Deck KN 4060

Price: \$229.95

Manufacturers: Allied Radio Corp., 100 N. Western Ave., Chicago 80, Ill.

tion system with an adequate perforated bottom plate (which should not be blocked by setting the machine on a soft chair or bed) and a large exit for the air in the storage well at the side of the deck. As a consequence after two hours run the deck was as cool as when we started.

It also be proved to be quiet in operation with scarcely any motor noise being noticeable.

The head may be shifted up or down by means of buttons mounted behind the head cover. This provides for playing or recording either four track or two track stereo tapes. For monophonic use, the head should be placed in the four track position.

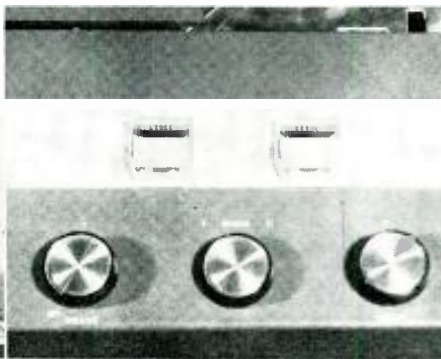
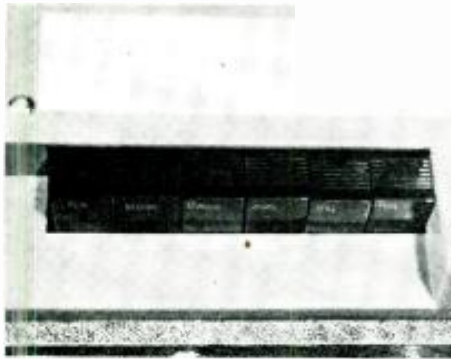
By following the usual routine, all four tracks on the tape may be recorded monophonically and played back. First record channel 1, then turn the tape over and change the selector switch to channel 2 position. For the third track the reel is flipped and the channel selector allowed to remain in the channel 2 position. When this recording is completed, the reel is again turned and the selector put back on the channel 1 spot for the final run through. In playback the same procedure is followed.

The signal source, mike, radio or other should be plugged into the channel 1 input and left there.

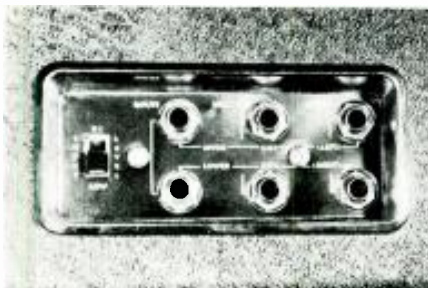
The inputs and outputs are grouped on one panel at the rear of the case and are plainly marked.



Closed, the case looks like this. It is covered with a dark grey plastic material and the lid is easily detachable.



Left side of recorder contains control buttons. From left to right these are: stop, record, rewind, wind, play and pause. On right side of deck are control knobs. The first is on-off and volume for channel one, the center knob is the selector switch and the one at right the control for channel two. Two VU meters may be seen above knobs.



All inputs and outputs are on the back of case. First set of jacks is for input, middle for monitoring and right for output. Switch at left selects high or low level.

There are two sets of them, one for the 1st channel which are arranged in a row at the top and the other for channel two below these. There is one input, a monitor position and one output per channel. To the left is a switch which controls both inputs. This is put in the high position when recording is done from a high level source, such as a phono or radio, and in the low position when a mike or mikes are used.

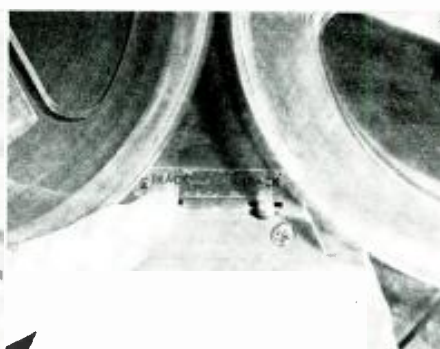
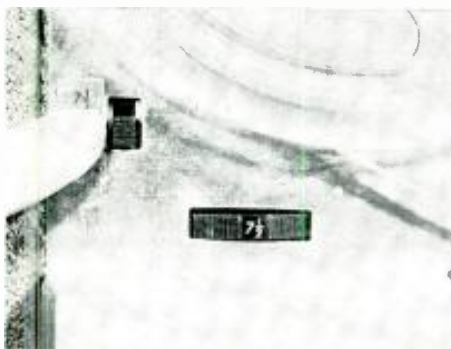
The outputs are to be connected to the inputs of a stereo amplifier. As mentioned earlier, the unit contains preamps but no power amplifiers or speakers hence the outside amplifier is

necessary. Monitoring during recording or playback can be done by plugging headphones in the monitor jack, either in channel 1 for mono monitoring or into both channels when monitoring stereo. The instruction booklet called for crystal headphones but we secured adequate volume using ordinary phones. An odometer type counter to index tapes is included and is positioned on the right side of the deck.

Since there is no power amplifier there are no tone controls on the unit. It must also be remembered when making connections to the power amplifier that the signal already has been pre-amplified and an appropriate input chosen.

Recording is done by depressing the record button and, while holding it down, depressing the play button which puts the tape in motion. If the record button alone is depressed, levels may be adjusted before the tape motion is started.

The unit worked well under test both in recording and playback. Frequency response was excellent and a speed check showed the machine to be operating within 1% of the stated speed.



Left: on left side of deck is equalization selector switch which is positioned to agree with speed selector dial below and to the right of it. Unit has three speeds. Right: buttons for head shift for two or four track are mounted behind head cover.

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