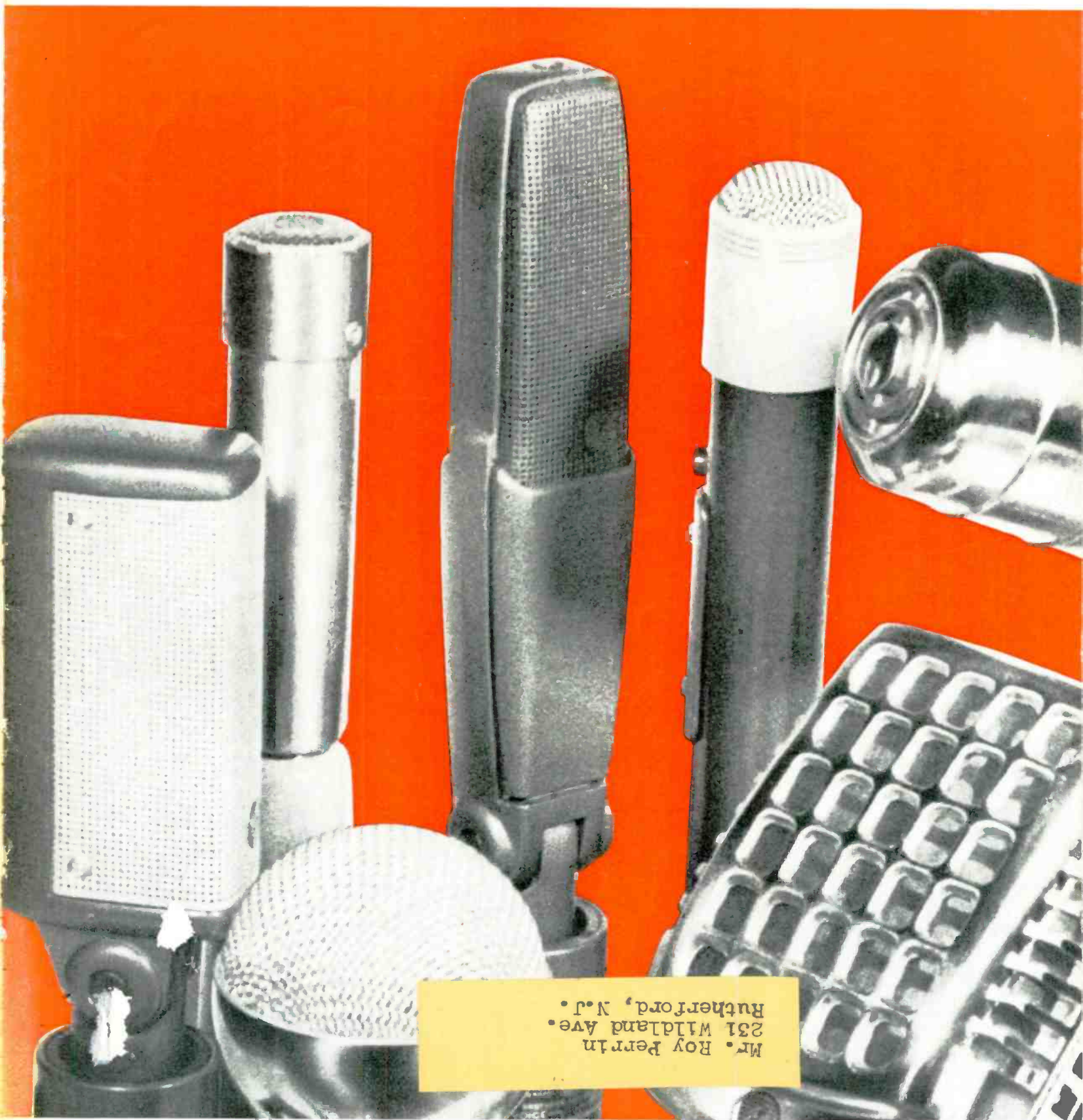


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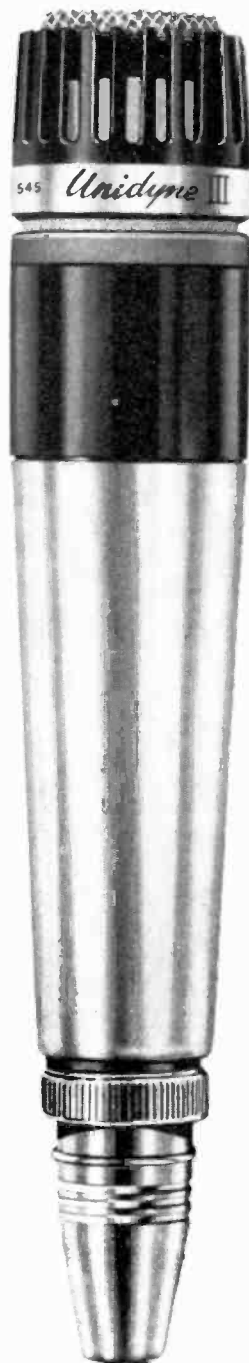
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TAPE RECORDING

VOL. 7 NO. 9

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NEW TAPES

★—Fair

★★—Good

★★★—Very Good

★★★★—Excellent

CLASSICAL

Reviewed by Robert E. Benson



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

STRAUSS: *Ein Heldenleben*, Op. 40 ("A Hero's Life")

London Symphony Orchestra; Leopold Ludwig, con. with Hugh Maguire, violinist
EVEREST T43038

4 track, 7½ ips
\$7.95...42 min.

I found this tape a great disappointment. The orchestral playing is undistinguished and Leopold Ludwig throws no new light on the colorful score. *Ein Heldenleben* was dedicated to Willem Mengelberg and the Concertgebouw Orchestra, and their recording on Telefunken, no longer available, was a revelation in interpretation and performance. Even better was Mengelberg's old recording with the New York Philharmonic, once available on an RCA Camden LP, which was the finest performance I've ever heard of this music, with surprisingly good sound for its time.

The present recording is the only *Ein Heldenleben* on four-track tape. A very fine two-track tape exists with Fritz Reiner conducting the Chicago Symphony Orchestra, differing greatly from the Mengelberg, but valid in its own way, with some of Victor's best sound. Now that RCA has announced its intention to release four-track 7½ ips reel-to-reel tapes, they might possibly release the Reiner *Ein Heldenleben*, perhaps coupling it with Reiner's equally fine *Also Sprach Zarathustra*. There is a new Deutsche Grammophon stereodisc with Herbert von Karajan and the Berlin Philharmonic Orchestra, presenting an elegant reading with cloudy reproduction.

The Everest tape has the usual resonant sound associated with the label, spectacular in many ways. Much of the brass detail is lost, but this may be the way Ludwig wanted it to be. If you can find the RCA Camden monophonic disc with Mengelberg and the New York Philharmonic, grab it quickly—there's no better performance recorded.



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

TCHAIKOVSKY 1812 Overture and Capriccio Italien, Op. 45

London Symphony Orchestra conducted by Kenneth Alwyn, with the Band of the Grenadier Guards
LONDON LCL 80019

4 track, 7½ ips
\$7.95...29 min.

These performances have been best sellers on London stereophonic discs, and will probably continue in that category on stereo tape. The tape has greater clarity than the discs, but there is still considerable distortion at the end of the *Overture*. Both works receive lively performances, with generally clean stereo sound, without much hall reverberation.

At the end of the *Overture*, in addition to the Band of the Grenadier Guards, you'll hear an organ and the cannon which seems to have become a prerequisite for recordings of this music. The resultant sound isn't noticeably bigger than some other recordings using smaller forces. However, this coupling of two of Tchaikovsky's most popular works will doubtless appeal to many stereo tape enthusiasts.



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

VAUGHAN WILLIAMS *Job* ("A Masque for Dancing")

London Philharmonic Orchestra conducted by Sir Adrian Boult
EVEREST T-43019

4 track, 7½ ips
\$7.95...44 min.

Vaughan Williams wrote *Job* as a musical setting of eight of William Blake's illustrations for the Book of Job, based on the familiar Biblical tale, and this is one of the composer's finest works.

Sir Adrian Boult is an old hand when it comes to the music of Vaughan Williams, for he has recorded all of the symphonies as well as many other important works. His earlier recording of *Job* (London monophonic disc LL 1003), also with the London Philharmonic, was highly praised when released some years ago. This new stereo tape version on Everest is perhaps more tightly knit soundwise, with dryer sound than is usually associated with the label. In summation, an engrossing score, superbly performed and well recorded.



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

BRAMHS Piano Concerto No. 1 in D Minor, Op. 15

Gary Graffman, pianist, with the Boston Symphony Orchestra conducted by Charles Munch

RCA KCS 4017
4 track, 3¾ ips, cartridge
\$6.95...45 min.

The Brahms *D Minor Concerto* is one of the most difficult of all concertos, and very seldom does one hear a performance conveying both its majesty and serene poetry. This tape is no exception, partly because of insufficient orchestral sound, with bloodless cellos and double basses. The slow tape speed also produces a high hiss level.

Gary Graffman is one of the finest young American pianists and plays admirably, but conducting the music of Brahms has never been a strong point of Munch, as evidenced by his recordings of the first, second and fourth symphonies. RCA already has an almost definitive record of the Brahms First Concerto with Rubinstein, Reiner and the Chicago Symphony (RCA monophonic disc LM 1831). Evidently the Rubinstein version wasn't made in stereo, for certainly if it had been it would have been issued on stereo tape instead of the Graffman-Munch performance.

SHOWS



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

THE KING AND I

Hello, Young Lovers, I Whistle A Happy Tune, My Lord and Master, The March Of The Siamese Children, Song Of The King, I Have Dreamed, Something Wonderful, Getting To Know You, A Puzzlement, Shall We Dance? Western People Funny, We Kiss In A Shadow

Arranged and conducted by Warren Barker
WARNER BROS. WST 1205

4 track, 7½ ips
\$7.95...40 min.

Usually we mention the fidelity of a tape last, but in this instance we just can't help putting it first. Marvelously clear, tinkling sound, beautifully reproduced.

The box label does not give the orchestra here, we shall assume it is a Warner Bros. orchestra; but what a thrilling performance they give. Perhaps it is due to the inspiration of Warren Barker who has created a wonderful musical keepsake. I personally believe every tape library should have a section devoted entirely to show releases and this one of *The King And I* is truly a "must" addition.

We'll be playing this one over and over without tiring of it I am sure. If you like show music, go get it.



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

ANNIE GET YOUR GUN AND CALL ME MADAM

It's Wonderful, It's A Lovely Day Today.

The Girl That I Marry, Lost In His Arms, You're Just In Love, Who Do You Love, It's An Old Fashioned Idea, Anything You Can Do, The Best Thing For You, Doin' What Comes Natchlerly

Starring Judy Lynn and Larry Douglas
TELECTROSONIC TT-410

4 track, 7 1/2 ips
4.98...24 mins.

There could only be one Irving Berlin. He is a master at writing the musical scores for Broadway shows. His works have great appeal to old and young alike.

While Judy Lynn and Larry Douglas have fair voices, they most certainly are not presented as well as they might be.

Unfortunately, this tape does not have the get-up-and-go, the life, it should have. It is dry and lacks the lustre both Annie Get Your Gun and Call Me Madam enjoyed on the stage. The arrangements, the entertainers, the recording in whole jogs along without much enthusiasm.

The stereo effect, however, is good and it makes for mildly pleasant listening.



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

THE SOUND OF MUSIC

The Sound of Music, My Favorite Things, The Lonely Goatherd, Sixteen Going On Seventeen, No Way To Stop It, Climb Ev'ry Mountain
Do-Re-Mi, Maria, Edelweiss, How Can Love Survive, An Ordinary Couple and Climb Ev'ry Mountain (Reprise)

The Pete King Chorale
KAPP KT-41021

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

Bouncing carefree renditions by a group which appears to enjoy singing to the fullest. They sing, harmoniously, with gusto, and they possess the togetherness so necessary in a chorale such as this.

These selections are from Rodgers & Hammerstein's musical, The Sound of Music. They have a jaunty, more-ish sound—a happy spirit rings forth.

We are very familiar, of course, with "Do-Re-Mi" which found national popularity. This is a sing-along persuader for sure.

Sit back and revel in this enchanting chorale release. Rodgers and Hammerstein's music always seems to carry a stamp of appeal, and this is no exception.

We cannot locate the accompanying orchestra on this tape, but they certainly perform well.

Bright, natural fidelity all the way.



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

AN EVENING WITH LERNER AND LOEWE, Vol. 2

Gigi: Prelude; Thank Heaven for Little Girls, I Remember It Well, The Parisians, I'm Glad I'm Not Young Anymore, Say A Prayer for Me Tonight, The Night They Invented Champagne, Gigi
Paint Your Wagon: Prelude; Another Autumn, They Call the Wind Maria, I Talk to the Trees, Wand'rin Star, How Can I Wait, Finale: There's a Coach Comin' In; I'm on My Way

Robert Merrill, Jan Peerce, Jane Powell, Phil Harris with the RCA Victor Symphony Orchestra and Chorale, under the direction of Johnny Green
RCA KPS-4012

4 track, 3 3/4 ips, cartridge
\$8.95...44 mins.

Here again we have a great group of talented entertainers singing songs from Lerner & Loewe's musicals Paint Your Wagon and Gigi. Robert Merrill and Jan Peerce have booming voices; Mill Powell's voice is not too strong, but it is very sweet; and Phil Harris has an all-around vocal talent with a Southern drawl.

This is a most pleasant release. The music is greatly appealing, the singing adequate and the orchestra and chorale most ably back the soloists.

The fidelity of the greater part of these cartridge releases does not approach the quality of that on 7 1/2 ips, reel to reel. Sound here is substantially clear, but does not have the preciseness of some reel to reel tapes.

POPULAR



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

101 STRINGS PLAY THE BLUES

St. Louis Blues, Shades of Blues, Symphony for Blues, Blues in the Night, Frankie & Johnny, Birth of the Blues, Basin St. Blues, Blues Pizzicato

Directed by D. L. Miller
BEL CANTO ST-80

4 track, 7 1/2 ips
\$6.95...30 mins.

Got the blues? If you don't, you will have after hearing this one, or at least you will have that slow, blues swinging beat mulling around in your noodle.

To me, blues music has a something—let's call it hypnotism—all its own. And its beat is fascinating. Been a long time since I heard blues played so richly, so elegantly with a full orchestra. Sounds like something Paul Whiteman would do, and I think its great. It's like "gone" man—bound to send any cat into orbitville.

I like it—I like it—I like it. And I think most music enthusiasts who hanker after "blues" now and then will too.

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HOW'S YOUR HEARING?

Tapebook #2

by James M. Laing, M.Ed.

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

Jessica's Day, The Midnite Sun Never Sets, Muttnik

Count Basie and His Orchestra
ROULETTE RTC-501

4 track, 7 1/2 ips
\$7.95 . . . 40 mins.

I have never heard Basie and his orchestra any better than on this tape. My only complaint is the same old monotonous one I have come up with all too often. Too much of a good thing eventually causes it to become wearisome to listen to.

The music here is from the pen of Quincy Jones, which is all well and good, but it seems to me they could have slipped in one or two familiar ditties.

Some of this is good swinging dance music, some of it I guess you can do nothing with except listen. Oh, one note follows another all right, but the resultant sound is just, well—sound. Most of this tape contains stodgy, uninteresting music, a shame to waste such talent as Basie's.

Fidelity, as usual with tape—the best.



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

GET THOSE ELEPHANTS OUT'A HERE

Get Those Elephants Out'a Here, My One and Only Love, In the Wee Small Hours of the Morning, Moten Swing, Monster Rally, Three Cheers, Blues For Brian, Fraternity

The Mitchells; Andre Previn
MGM STC-1012

4 track, 7 1/2 ips
\$7.95 . . . 36 mins.

I have been studying the box label for this release and I was most impressed by the background of Red, Whitey and Blue Mitchell; there was no need to read about Andre Previn—his work on Gigi and his pop recordings speak for themselves.

And then being all set for a whiz-bang musical experience, I spun the tape. What a letdown.

The boys are all professionals, I'll go along with that, but the selections and the arrangements on this tape are mediocre to say the least. When you've got this type personage assembled for a recording session, there is no reason in the world why they shouldn't have good music to play.

Perhaps I'm not "hip" to this kind of nonsensical musical nothing, or perhaps these particular selections were chosen because they best bring out the talents of each man—I can't be sure, but in any event it was a chore to have to listen to the second half of this one.

You may like it, I can only suggest you hear it before adding to your tape collection.

As for fidelity and stereo, the rest of this

review takes a different turn as of now.

Every plunk of the bass, of Andre at the piano, every blast of the brass is just about as near perfect as it could possibly be as far as reproduction is concerned.

I was curious about the title of this release, until I read that the "elephants" referred to were the bases Red and Whitey used to practice with so diligently at home. Their mother used to exhort the boys to get them out of her living room.



Music ★
Performance ★
Fidelity ★★
Stereo Effect ★★

7 PIECES

Happy Man, Lovely Willow, Song of the Wind, Princess, The Story, The Little Melody, Time Machine

The Jimmy Giuffre 3
VERVE VSTC-212

4 track, 7 1/2 ips
\$7.95 . . . 46 mins.

The title of this one is derived from the fact that there are seven numbers here, all composed by Jimmy Giuffre.

Here again, this reviewer cannot speak for those real "gone" jazz lovers who may consider this tape a real gem. It sounds more like a practice session than a recording "take" to me. The music is such that it makes one think of almost anything but what you are hearing. It just might as well not be.

Please Verve, with such exquisite reproduction of sound facilities, give us something to listen to and enjoy, to dance to, or even make conversation about, not this dry, uninteresting sound.



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

MANTOVANI FILM ENCORES, VOLS. 1 and 2

Vol. 1: My Foolish Heart, Unchained Melody, Over the Rainbow, Summertime in Venice, Intermezzo, Three Coins in the Fountain, Love Is A Many Splendored Thing, Laura, High Noon, Hi-Lili, Hi-Lo, September Song, Theme From "Limelight"
Vol. 2: The High and the Mighty, A Certain Smile, Friendly Persuasion, Que Sera, Sera, Tammy, Be My Love, April Love, When You Wish Upon A Star, Separate Tables, Around the World, Fascination, Secret Love

Mantovani and His Orchestra
LONDON LPK 7003 TWIN-PAK

4 track, 7 1/2 ips
\$11.95 . . . 76 mins.

Rich music, brilliantly exploited. I think Mantovani could take "The Farmer in the Dell" and mold from it a charming arrangement. Here, he has chosen the theme songs of varied motion pictures and he has practiced his magical musicianship to present a moving panorama of exciting sound.

These movie theme songs are quietly

relaxing and just listening to their soothing qualities helps calm away the ruffles of this maddening routine of life.

There appears to be a considerable amount of imbalance here, however, and also poor miking. The right channel sounds much heavier than the left and again, as unfortunately all too often, there are moments of loud sound which rattles your ear drums, but when you turn the volume down before you know it, you've lost some of the quieter passages.

Not one note of sound as glorious as this should be lost.

LATIN



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

FURIOSO!

Gitana Te Enamoraste, Catalina Por Bulerias, Desengano, La Castanuela, La Rabida, Ay Mi Huelva, Aires De San Fernando, Danza De Las Marianas, Arbesca, Los Arrayanes, Bulerias Del Terremoto

Sabicas, Dolores Vargas with Los Compañeros del Flamenco
 DECCA ST 7-8900
 4 track, 7½ ips
 \$7.95 . . . 42 mins.

My first observation of this release is that it would have been much better if the shouts of Dolores Vargas had been eliminated. Now, I am sure this lady is a great Flamenco dancer, and her stamping feet pound out a fast, rhythmic beat. Indeed, I wonder if there weren't a few holes in the floor when she was through.

The dancing feet and the clapping "castanuelas" make a nice accompaniment to the guitar, but they are in some instances too overbearing.

Sabicas knows his guitar inside out, up-sidedown, forward, backward, sideways, and whatever other position you could imagine. He is superb.

Strong stereoism, excellent fidelity.

MISCELLANEOUS



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

TV ACTION JAZZ

Peter Gunn, Riff Blues (Mike Hammer), Perry Mason Theme, 77 Sunset Strip, M-Squad, The Thin Man, This is the Naked City, Fallout! (Peter Gunn)

Mundell Lowe and His All Stars
 SMS C23
 4 track, 3¾ ips, cartridge
 \$6.95 . . . 26 mins.

Since the advent of television, the theme songs of many shows have become as familiar to viewers as the pop songs played by the disc jockeys. They can't help but be, after you listen to them every week two or three times per show. They grow on you, just because they are familiar, however, does not mean they are always well liked.

Seeing action on the screen before you gives the musical background much more likability than when you just hear the music floundering along.

This group of eight musicians belong more to the night club circuit than any other faction. Even in stereo, they lack "schmalz".

So-so in all respects.

NEW TAPES RECEIVED

REEL TO REEL

Bel Canto, East of Suez, 101 Strings, ST-75, 4 track, 7½ ips

Bel Canto, Gypsy Camp Fires, 101 Strings, ST-87, 4 track, 7½ ips

Bel Canto, Quiet Hours, 101 Strings, ST-86, 4 track, 7½ ips

Bel Canto, TV Jazz Themes, The Video All-Stars, ST-90, 4 track, 7½ ips

Bel Canto, Victory At Sea, The London Philharmonic Orchestra, Reinhard Linz conducting, ST-72, 4 track, 7½ ips

Elektra, The Limelinters, ETC-1509, 4 track, 7½ ips

London, Dvorak: Symphony No. 2 in D Minor, Opus 70 and Symphony No. 5 in E Minor, Opus 95 'From The New World,' Rafael Kubelik conducting The Vienna Philharmonic Orchestra, LCK 80008, 4 track, 7½ ips, Twin-Pak

Mercury, Motion Picture Themes of Victor Young, conducted by Richard Hayman, STC 60012, 4 track, 7½ ips

Omegatape, Backgrounds for Brando, Elmer Bernstein and His Orchestra, SST-828, 4 track, 7½ ips

Roulette, Basie/Eckstine Incorporated, Count Basie, Billy Eckstine, RTC-507, 4 track, 7½ ips

United Artists, I Want To Live, Gerry Mulligan, Shelly Manne, Art Farmer, composed and arranged by Johnny Mandel, UATC-2202, 4 track, 7½ ips

Vanguard, An 18th Century Concert, I Solisti di Zagreb, Antonio Janigro, conductor, VTC-1617, 4 track, 7½ ips

Vox, Liszt: Piano Concerto No. 1, E flat major—Piano Concerto No. 2, A major. Alfred Brendel, piano; Pro Musica Orch. Vienna, Michael Gielen, conductor, XTC 703, 4 track, 7½ ips

Vox, That Larin Beat For Dancing Feet, Irving Fields Trio, XTC-711, 4 track, 7½ ips

CARTRIDGES

RCA, Cha Cha, Tito Puente at Grossinger's, KPS-3122, 4 track, 3¾ ips

RCA, Greenwillow, original cast album, KPS-4019, 4 track, 3¾ ips

RCA, Orienta, The Markko Polo Adventurers, KPS-3054, 4 track, 3¾ ips

RCA, The Westward Movement, Jimmie Driftwood, KPS-3083, 4 track, 3¾ ips

Coming

Another Sound Story (No. 3) will be appearing in the September issue of Tape Recording—watch for it.

Meanwhile, copies of No. 1—Dr. Vladimir A. Ussachevsky with examples of changed sounds and Tony Schwartz with his sounds of N. Y. city is still available.

Sound Story No. 2—The Contact Microphone, by Kenneth Miller, which humorously presented "sounds" of the body is also available.

The cost is \$1.00 apiece for these delightfully different collector's items.

IF:

YOU are a tape recording enthusiast and—

YOU want to keep up to date on industry developments and techniques and—

YOU wish to know ways and means of getting the most from your recorder and—

YOU like how-to-do-it articles for home fun and—

YOU are interested in the newest new products on the market and—

YOU enjoy reading about the experiences of amateur and professional recordists all over the world and—

YOU follow consumer reports on equipment tested by our staff—

THEN . . .

TAPE RECORDING magazine is for you. You get all the above plus regular features such as Questions & Answers, Feedback, Crosstalk, Tape Club News, Classified Ads, etc. in this magazine, which is devoted to tape and the unmatched reproduction and versatility of which it is capable.

When you invest in TAPE RECORDING, you do so without any risk since we have always maintained a "money-back guarantee" policy should you not be satisfied with your investment.

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CROSSTALK

from the Editors

IT WOULD SEEM TO US that an industry, now about ten years old and which has had a functioning industry association for seven of those years might have set more standards for the recording and reproduction of sound.

* * * * *

UNHAPPILY, THEY HAVE not come very far. No equalization standards, for instance, have been officially set for the commonly accepted speeds of 7-1/2, 3-3/4 and 1-7/8 inches per second. The only standard existing in this field is the one set in 1953 by the NAB but this applies only to the 15 and 30 IPS professional recording speeds.

* * * * *

FUNNY THING IS that the majority of machines produced do come fairly close to a standard—and that standard is the European standard set by the CCIR (International Radio Consulting Committee), which has set standards for all speeds. These standards have been accepted as a world-wide standard for radio broadcast use and have been accepted as "home" standards in many European countries.

* * * * *

WE DON'T PRETEND to know why standards work has not been very productive in this country in regard to magnetic recording. Perhaps no one has really felt the urge to get the job done. It is not the fault of C. J. LeBel, Chairman of the MIRA Standards Committee for he has written hundreds of letters over the years trying to get things nailed down. The industry certainly has enough engineers to do the job—perhaps management has been lax in not seeing to it that the work is done—on company time.

* * * * *

STANDARDS MIGHT SOUND like something far removed from the average tape recorder owner, but they are not. It is standardization of sizes of tape, of equalization and of speeds that makes the recorded tape market possible. It also makes it possible for the exchange of tapes between various machines.

* * * * *

FORTUNATELY, many of the machines have drifted by common consent toward the CCIR standard. Since this is the case, why not adopt that one? If this is unsatisfactory to the US public and manufacturers, then how about getting on with the experimentation to set a US standard? It can be done—all that is needed is the will to do it.

* * * * *

STANDARDS ARE UNUSUAL bits of knowledge. Anything which is set up as a standard must be justified by engineering research. No one company or engineer can say "This is the standard—because we say so." In fact, no engineer would ever dare make such a statement. It requires extensive experimentation and searching to find the ultimate truth and then it requires a meeting of many minds who must be shown that the proposed standard is based on work which is both valid and correct.

* * * * *

THIS TAKES TIME . . . but SEVEN years?

* * * * *

ALMOST ALONG THE line of standards is the work to be undertaken by the Society of Motion Picture and Television Engineers under a \$24,000 grant by the U.S. Office of Education. This will evaluate the adequacy and suitability of presently available types of audio-visual equipment and devices in terms of current and future educational needs. It will also formulate engineering principles that will serve as guideposts in the development of audio-visual devices for use in education. The project will be headed by John Flory of Eastman Kodak.

* * * * *

THIS WORK MAY HAVE a bearing on the specs for recorders for school use if the SMPTE includes recorders on their agenda. If so, we hope the MRIA will invite itself in on the discussions and decisions as they apply to magnetic recording. Possibly this might be the lever that will hasten the standards work, else the industry might find itself in the position of having standards set by others.

* * * * *

BIG NEWS ON THE TAPE FRONT is that Capitol and RCA will issue 4-track reel-to-reel tapes! Capitol is already out with them and RCA is due to ship in July. Among the RCA tapes are Van Cliburn, Chet Atkins, Lena Horne, Victor Herbert. Belefonte, Perry Como and, hold your hat—Elvis!

INDUSTRY NEWS

REEVES SOUNDCRAFT is quite proud of the fact that their new videotape is being used in the Tiros weather satellite. Two video recorders are housed in the satellite which can snap up to 32 pictures on command from the ground. These can be relayed instantly to earth or stored on the tape and sent back on command. One recording system covers an area of 800 square miles using a wide-angle lens and the other covers a smaller area. The tape is $\frac{3}{8}$ of an inch wide and records along the length rather than the width. Frank Rogers, Reeves executive vice president also reported that the firm's tape sales were up 35 per cent in the first quarter of the year.

MAGNECORD, according to general sales manager, Hugh Daly has been awarded a contract by the Navy to build a special recorder for recording such things as sonar signals, which fall within the audio range. The first contract was for over \$800,000 which went to the parent company, Midwestern Instruments.

ROBINS INDUSTRIES presented a gold-plated splicer to Robert DeVilbiss, manager of Sound Foyer of Los Angeles in commemoration of the 250,000 "Gibson Girl" splicer sold. Hy Post, president of Robins made the presentation at the recent Electronics parts show.

RCA will start a direct to the customer tape cartridge service as an aid to people who have bought cartridge machines but have not been able to obtain the cartridges through their dealers.

TOSHIBA, of Tokyo, Japan is said to be starting design work on a small video recorder suitable for use in education, industry and the home. A single head is used. The project was reported on at the recent convention of the Society of Motion Picture and Television Engineers.

TELECTRO INDUSTRIES CORP. has moved its consumer tape recorder production to a new plant which will employ about 500 people and increase production about 100 per cent according to Harry Sussman, president. The move was made because the main plant facilities were overtaxed by the fast growing line.

BELL SOUND Division of Thompson, Ramo, Wooldridge is buying 50 acres of land on the northern outskirts of Columbus and are busy making detailed plans for a new 108,000 square foot manufacturing plant according to General Manager, Ken Bishop. More space is needed for production of their stereo line.

AMERICAN RECORDING TAPE has become a division of Greentree Electronics according to Stanley M. Freeman, ART president. The parent firm recently acquired the tape firm to further its expansion into the fields of electronics and magnetic tape.

EASTMAN KODAK has announced a sound striping service for both 8 and 16mm film for use in magnetic projectors. Service, called "Sonotrack" is only available at present from the Kodak Processing Laboratory in Rochester. Cost will be 6 cents per foot on reels less than 400 feet and 4 cents per foot for 400 or more feet with a minimum charge of \$3.00.

KEYSTONE CAMERA CORPORATION of Boston recently acquired the Amplifier Corporation of America. Purpose of combination was to combine electronic developments with the photo business.

BURGESS BATTERY COMPANY is expected to enter the raw tape field shortly. The firm has been working on a tape for the past five years and will build its own coating plant at Freeport, Ill.

FERRODYNAMICS CORPORATION, makers of Sonoramic tape is said to have under development a method of tape duplication that will produce 96 reels of recorded tape at one time. The recording is done before the tape is slit into $\frac{1}{4}$ inch widths and spooled. Fred Kantor, Ferro-dynamics president, said that the firm will enter the recorded tape field and be able to market popular recordings at a price competitive with stereo discs. The company will also offer custom duplicating, packaging and distribution services to the recording industry. At present Ferro-dynamics is scheduling its price line for tapes that carry a half-hour or more of music for \$4.95.

NAT WELCH, genial former vice president of ORR Industries, makers of Irish tape is now in business for himself. His firm will be known as "Nat Welch, Business Development" with offices in the Wright Building in Auburn, Alabama.

HAMMOND ORGAN COMPANY which has developed a unit which reverberates sound has licensed Philco and Zenith to use the device. They will apply it to their new phonos. Perhaps this is something into which some tape recorder manufacturers should look. The device uses two delay lines and Ferrite rotors.

AMPEX CORPORATION had record sales for their fiscal year which ended in April according to prexy George Long. Both sales and net earnings after taxes were up 47%.

NEWCOMB AUDIO PRODUCTS has brought out a 4 track version of its model SM-310 which will both play and record quarter-track tapes. Reel capacity is $10\frac{1}{2}$ inches and price is \$499.50.

ELECTRONIC INDUSTRIES ASSOCIATION has issued standard measurement for hi-fi music power output. Copies of standard giving details of test conditions, terms and test procedure are available at 25 cents a copy from the EIA Engineering Department, 11 W. 42nd Street, New York 36, N. Y. Ask for EIA Standard RS-234.



RECORD & PLAY WHILE AWAY...

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See Your Electronics Parts Dealer, or Write:



DON'T THROW AWAY YOUR TAPE RECORDER BECAUSE OF HIGH NOISE LEVEL

THE MOST COMMON CAUSE OF H.N.L. IS A MAGNETIZED HEAD



ROBINS HD-6

The best prescription for this is Robins Head Demagnetizer (HD-6) listed by U.L. Most manufacturers recommend demagnetizing of recording heads after every 3-10 hrs. of use. Such knowledgeable care of your head will eliminate the cumulative effects of starting and stopping your recorder, switching, transients, line noise, etc. Magnetized heads can ruin recordings. Stay clear of annoyance from background noise and insure best possible performance by demagnetizing with Robins Head Demagnetizer HD-6 list \$10.00.

ROBINS NEWEST BOOKS!

"TELEVISION TAPE RECORDING" by George B. Goodall (48 pp. illus.) TE-48 A semi-technical book by ROBINS on methods and techniques in the amazing new field of Video Tape Recording, just pub. Price \$1.00.

"HOW TO GET THE MOST OUT OF TAPE RECORDING," by Leo Sheridan (TE-128) 128 pp. illus. For the non-professional recordist, describes developments in stereo, how to buy and operate a tape recorder, etc. Price \$1.00.

"TAPE EDITING AND SPLICING" (TE-24) 24 pp. illus., \$35.

SEND FOR FREE CATALOG AT DEALERS EVERYWHERE!

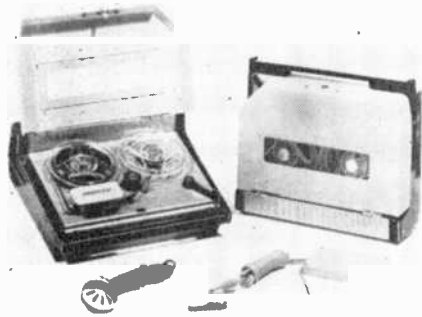
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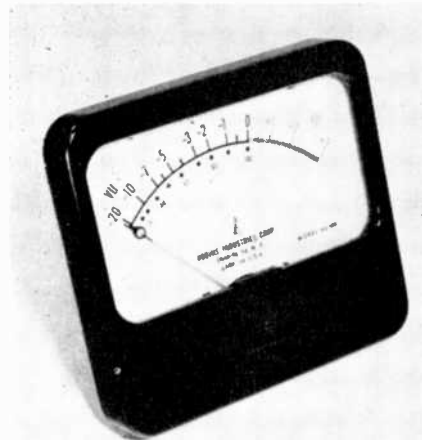
NEW PRODUCTS

"TRAVEL PAK" PORTABLE



Universal International Sales Corp., 314 Fairview Ave. N., Seattle 9, Wash. is distributing the "Travel Pak" fully transistorized miniature portable tape recorder which weighs just 3½ pounds and is only 4¾ x 2½ x 8 inches in size. It operates on regular penlight batteries and has up to 32 minutes of playing or recording time on each tape. The tape speed is 3¾ ips, battery life is 5 hours for motor and 20 hours for amplifier, frequency response is 100-4,000 cps, wow and flutter is less than 2%, and one switch controls off, stop, play, rewind and record. The price (complete with leather case, recording microphone, ear listening device, and telephone microphone for recording 2 way telephone conversations) is \$97.50. Contact Universal for additional information.

ROBINS VU METER



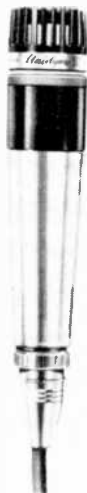
Robins Industries Corp., 36-27 Prince Street, Flushing 54, N. Y., has announced a new VU meter, model VU-100. With this meter a tape recordist can get maximum signal-to-noise ratio, and he will also be able to prevent tape saturation beyond the erase capabilities of the recorder. Specifications for this meter include: 4½" VU meter, 2 color scale, modulation calibrations—0-100%, VU calibrations —20 to plus 3, dual impedance inputs, 200 micro amps, 0-VU operation, mounts in 2¾" diameter hole. Price, \$22.00. Write Robins for more information.

AUDIO SLIDE SYNCHRONIZER



Audio Slide Corp., Rome, N. Y. is marketing an audio slide synchronizer. This instrument adapts any standard tape recorder and any standard automatic projector into a fully integrated system of synchronizing tape and slides. The tape is slit by passing regular ¼ inch recording tape through the Synchro-Slitter that comes with every kit. The slit is automatically placed between the tracks of the tape and in no way does it affect the life or reproduction quality of the tape. Both monaural and stereo playback can be used. After slitting, the tape is then passed through the synchronizer and threaded through the recorder in the normal manner. The synchronizer's activating arm "feels" the slit and automatically changes the slides as the tape plays. Cost of the Audio Slide Synchronizer Kit is \$59.95. Write manufacturer for complete details.

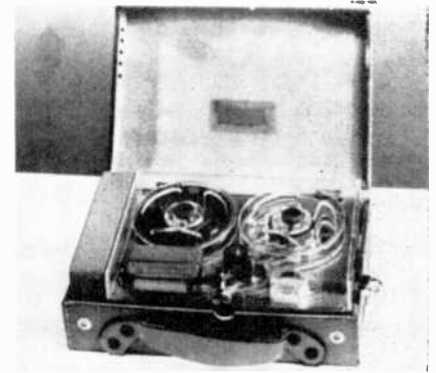
SHURE UNIDYNE III



Shure Brothers, Inc., 222 Hartrey Ave., Evanston, Ill., has introduced a new probe-type unidirectional dynamic microphone called the Model 515 Unidyne III. It can be stand-mounted or hand-held; it weighs just 0.6 pound; and the pickup pattern is symmetrical in all planes around it. The cardioid pattern is usually uniform at all frequencies and it also permits the Unidyne III to be placed at a 75 per cent greater distance from the performer than is possible with omni-directional mikes. Ruggedly built, the microphone is unaffected by temperature and humidity variations. An ad-

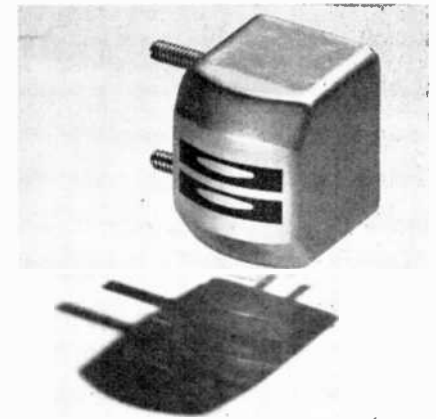
justable swivel adapter supplied with the Unidyne III permits it to be tilted through 90° from vertical to horizontal. Frequency range is from 50 to 15,000 cps and the cost is \$85. Additional information is available from Shure.

TRANSISTOR RECORDER



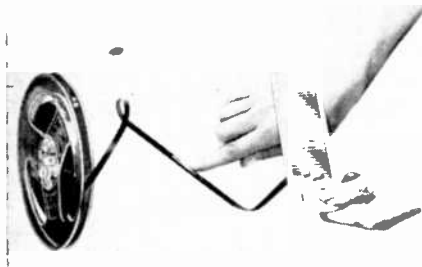
The Electronics Division of the Morse Sewing Machine Company, 122 West 26th Street, New York City, N. York. has introduced a new 4½ lb. transistor tape recorder. The Morse #300 features six transistors and a varistor to assure sound quality. The 300 has a speed of 3¾ ips, and uses a 3" reel of tape, has wow and flutter of less than 1.5%, uses the dual track system, operates on penlight batteries, and has a single control system. The cost is approximately \$100. Contact above manufacturer for additional details.

4-TRACK HEAD



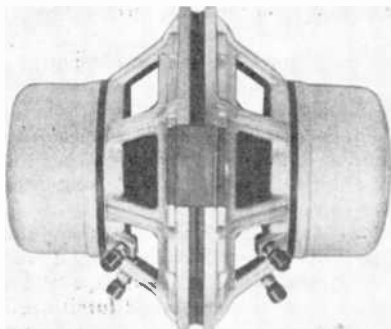
The development of a new, compact, 4-track magnetic recording and playback head has been announced by Fidelitone, Inc. The head is designed to include a broad scope of electrical connections with a wide range of inductance. It has optional right or left hand mounting facilities. The heart of this tiny head contains two separate channels with a novel design of solid core. The tapered cores have a flat response to 15 Kc (with standard compensations) obtainable at 3¾ ips. For complete information, contact Fidelitone, Inc., 6115 Ravenswood Ave., Chicago 26, Ill.

QUIK-CUE TABS



W. H. Brady Co., 727 W. Glendale Ave., Milwaukee 9, Wisconsin, is marketing the Brady Quik-Cue Contact Tabs, which are highly conductive, pressure-sensitive aluminum foil tabs. These are applied to magnetic tape for automatic stop-start-repeat operation. They are applied wherever automatic switching or cueing is desired. When the tab reaches the contact points of a switch on the machine, it actuates the mechanism to stop and shut off the player, or reverse and repeat the program. These handy tabs are fast and easy to use. 42 individual tabs are furnished per handy dispenser card. They are simply removed from the card and applied to the edge of the tape. These tabs cost less than 2¢ apiece. For more information, write Department 173 of the W. H. Brady Co.

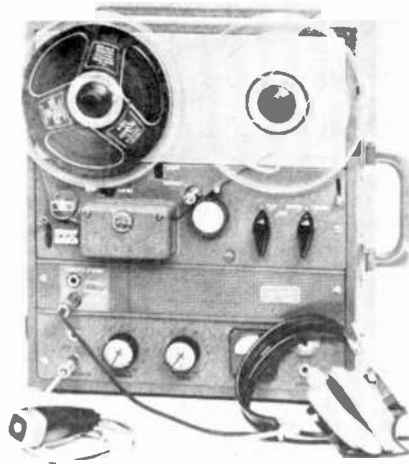
STEREO SPEAKER SET



Wilder Engineer Products, 2013 N. Halstead St., Chicago, Ill. announces that the Wilder Twin Stereo Speaker Set is now available to the public. The set contains 2 stereophonic speakers. Each speaker is tested to be identical in every way with its mate. Then the speakers are sealed together for the customer's protection. No speakers will be sold as a pair if the seal has been broken. For details and price, contact Wilder.

ROBERTS "DUET"

Roberts Electronics, Inc., 829 North Highland Avenue, Los Angeles 38, Calif., has introduced their new "Duet", Model 90-D recorder. With this machine, anyone can do multiple recording, sound on sound, or sound with sound. After recording the basic track, the second simultaneous recording may be made while listening to the basic recording, either through earphones or an external amplifier speaker system. Erase and re-recording of the second track



may be repeated indefinitely without erasure of the basic track. The "Duet" also performs all normal functions of a half-track monaural recording and a 2-track stereo playback unit: with all the characteristics of previous Roberts recorders. Cost—\$349.50. Write Roberts for details.

NEW KNIGHT RECORDER



Allied Radio Corp., 100 N. Western Avenue, Chicago 80, Ill. has announced the release of the new Knight Model KN-4060 stereo tape recorder. It has three speeds (7½, 3¾, 1½ ips), records and plays both 2 and 4-track stereo tapes, and at 7½ ips, frequency response is 50-15,000 cps, wow and flutter is below 0.25%, and signal-to-noise ratio is —45 db. Other features include pushbutton controls, a digital counter, automatic shut-off, and it is supplied in a gray leatherette covered carrying case. It is priced at \$229.95. Write Allied for complete information.

SOUND EFFECTS CATALOG

MP-TV Services, Inc., 7000 Santa Monica Blvd., Hollywood 38, Calif. has announced the release of its 1960 catalog of new sound effects. These sound effects are on records. Included in the new edition of sounds is the series on America's defense program comprised of sounds recorded live during maneuvers at sea aboard the aircraft carrier USS Ticonderoga, and the sounds of Navy jet fighters and missiles recorded at the Navy's Pacific Missile Range. A new feature of this large sound effects library is a new "Documentary" Series. The initial offerings cover recordings made of General MacArthur's farewell speech before Congress, the Coronation speech of King George VI, and a special reading of Lincoln's Gettysburg Address. Plans for expansion of this series are under way. For a free copy of Catalog No. 2-60, write MP-TV Services, Inc.

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DRESSER, 69-02 AA, 174 St., Flushing 65, N. Y.

FEEDBACK

Excerpts from readers' letters will be used in this column.
Address all correspondence to: The Editor: TAPE RECORDING, Severna Park, Maryland

Outdoor Recording

To the Editor:

Yes, I have a suggestion to expand the idea of greater use for the recorders:

Out-of-doors sounds of nature, expanded beyond anything which has been tried out by non-professionals.

The Brand Foundation of Ornithology at Cornell has given a lead to all America when much financial backing was required—and Doctors Allen and Kellogg had that backing. But now it can be done without so much expense. Now it can be done with less cumbersome equipment. Now, much more is known of what is needed for wild-life recording.

Aside from the excitement of getting a new, live sound on tape, the healthful expenditure of energy in the surroundings of the out-of-doors can bring incalculable benefit to the recordist and furnish a new source of interest devoid of the interminable complexities and strain of urban life.

It is, therefore, good for the individual whose recording takes him out to nature in her most natural setting and also for those with whom he comes in contact afterward; for he will be a calmer man, a man freshened by closer contact with the world of which we know—generally speaking—so little, and yet upon which we so greatly depend.

How many people, for instance, know the bird sounds even around their homes? The birds which come as summer visitors to help us by devouring the insects hatching out in spring to pester us in one way or another? The birds which nest near us and fit into the ecology of life, human, animal and plant. How many hear a bird singing at night and can tell a visitor—"Oh, that's our only night singing bird. the _____"?

We can badger the radio stations to give us some calls of local birds. They would need tapes of the calls and somebody who knew something about it.

Recently, here in Canada, all across the country, people have asked for a repeat of a program originating in Toronto called "Voices of April." It was put on again on June 11 because there were so many requests! It is from tape recordings of Dr. W. W. H. Gunn, who in this country is our Allen and Kellogg, and Thom Benson of the CBC who did the narration.

School authorities, naturalists and scientists should be behind the furtherance of this use of the tape recorder, and I believe they are. But they need a little serious showing and some good explainers—they are in an exclusive class, slow to move but sure.

The June issue of TAPE RECORDING has again fed my imagination and stimulated my interest.

Particularly vital to me were the articles

"Make Creative Sound Your Hobby" and "Miniaturization Saves Space." And, of course, your Crosstalk, in which you commented on what Mr. Gough had said and asked for suggestions.

Thank you for the many helps and interesting material in TAPE RECORDING. This number is a whiz.—Mrs. H. M. S. Bell, Victoria, B. C.

Wants More On Tape

To the Editor:

Can't something be done about getting Ralph Flanagan to record again. He has one mighty fine tape out, but that seems to be it. Also, I notice very few operatic orchestral selections or ballets. In fact, at the present time, I buy more records and tape them myself since I cannot get commercially recorded tapes to my liking.—Edward F. Klimowicz, Linden, N. J.

How about it recording companies?

Tape Mailing

To the Editor:

The letter printed in the May issue mentions Weisman and Chapman are having trouble getting answers to their tape-spondence here in the U.S.

I will be glad to tape them but I do not know what special wording as well as address may be necessary on an envelope to England, also what is the approximate airmail postage for, let us say, time-and-a-half Mylar tape of the 3" size in a clasped envelope.

I have never taped to anyone out of the U.S.A., even to our Canadian friends. So if you can let me know how much postage will be required, I will send a tape to Weisman.

I am starting my third year of receiving TAPE RECORDING MAGAZINE. It may be much longer but anyway, I like it very much. I am glad that you ran the article in Tape Club News "Please Customs Have a Heart." This may be one reason that has deterred many prospective tape spondents either from starting or causing them to stop without anyone knowing the reasons. The customs "red tape" partly has made me hesitate in taping to other lands, not in what I might say but the packaging and such.—Charles C. Byers, Bluffton, Indiana.

You can obtain from your local post-office a small green sticker "Customs-Douane." This should be filled in and affixed to the envelope. On it you describe the contents such as "Tape letter, of no commercial value. To be returned to sender," and you must also put the weight and the value—which in this case would be zero.

Put the proper postage on the envelope and mail it. Postage rates to England are: Surface mail (by boat) First class, 8 cents for the first ounce and 5 cents for each additional ounce. By air it is 15 cents per half ounce or fraction.

A full three inch reel and an envelope weighs just under two ounces, therefore the postage by surface mail would be 13 cents or, by air mail, 60 cents. Surface mail takes about a week each way.

Dislikes Directory Issue

To the Editor:

I was very disappointed in the June 1960 issue. If you want to make just a catalog out of the magazine, why not put your cover on Audio's catalog. Why not more "Questions and Answers" or articles like Mooney's. Those are real interesting.—Morris J. Douglass, South Gate, Cal.

Wants Monaural Tapes

To the Editor:

I am interested in obtaining pre-recorded monaural tapes of popular dance bands but have been unable to locate a supplier of such. I shall be pleased if you will be so kind as to advise me of a source of this type of tape.—J. S. Noble, Arlington, Va.

We understand that Lubbock Radio Co., 1722 Avenue H, Lubbock, Texas has some stock of monaural tapes and we would suggest you contact them. The only other way to get your name bands in monaural is to tape them from the air or records.

Likes Creative Recording

To the Editor:

To your remarks in "Crosstalk" about creativity on tape and your article "Making Creative Sound" . . . a fervent Amen. It's sorely needed.

May I propose two suggestions along these lines: 1—A national contest under your sponsorship. Recorder, tape and accessory manufacturers should furnish prizes for outstanding examples. Winning tapes to be written up in your columns, short examples circulated on 3" reels you mention. Local radio in winner's area (or other interested stations) could also furnish good exposure and incentive by airing tapes.

2—Run specific assistance items, i.e., one on a nearly fool-proof system of logging tape "clips" for documentaries, etc. Keep up the good work.—Richard S. Levy, Buffalo, N. Y.

We'll see what we can do about both these items.

Likes Name Change

To the Editor:

Congratulations on the change in name. I agree the "hi-fi" has fallen into the victrola class.

Readers must hoard your magazine instead of throwing away old issues as is done with most publications. We still get inquiries about Demi-tape from an ad that appeared about five years ago—H. J. Hasbrouck, Teaneck, N. J.

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 Confusion

Q—I need to know how the 4-track or quarter-track head will work with my present tapes that have been recorded dual track. I know that I can play those tapes O.K. but when I want to record, can I just take a tape that was previously recorded dual track (both tracks recorded) and record a quarter track, erasing one side only without having both recordings come up on playback?

Perhaps I am not making this clear. I realize that the best method is to use a bulk eraser and start with completely clean tape, but it may be that I want to keep what is on side two, or something on part of the reel and it is in this case that I might want to record without bulk erasing the reel.

Since this machine erases and records only quarter-track, I am wondering if this will cause me trouble on a tape previously recorded dual-track and played back on the quarter-track machine. I also can see that to play back a tape recorded on the four-track machine on a dual track machine, it would have to be bulk erased.—G.F.T., Fort Rucker, Alabama.

A—Dual track machines lay down a track that is 80 mils wide measured from the top of the tape than a blank space of 90 mils and another track of 80 mils making a total of 250 mils or 1/4 inch.

The erase head on dual track recorders erases a path 110 mils wide to provide a safety margin and insure complete erasure of the old track.

On the four-track machine, the erase head erases a track 55 mils wide. The record head lays down a track 43 mils in width giving a protective area of 12 mils, split on either side of the recorded track.

Thus if you make a four track recording on a previously recorded tape (dual track) you will be clearing a swath 55 mils in width out of the 80 mil recorded track. But this will be a clear track and your four-track recording (43 mils wide) should not suffer interference from what is left of the old track. However, if you played this track back on a dual track recorder you would hear the new 1/4 track and also pick up the sound from the 25 mils of old track.

In making a recording on a four-track machine that is to be played on a two-track unit, clean tape should be used and only the two outside tracks should be recorded.

A tape recorded on any or all tracks by a four-track machine and played back on a four-tracker, will have clean sound without any interference from previous recordings.

Home Movie Narration

Q—I wish to record background narration when showing 8 mm home movie films. This was being done by phono and mike into mixer and then into the proper input at the tape recorder. The question for

clarification—is there a four-track recorder whereby I can record background music on one quarter track, rewind to the beginning, play back the music thus recorded and during playback of same record narration or sound effects (where it may be required) on another of the quarter tracks so both tracks can be connected to a single speaker. Thus having music and narration together from the speaker when the tape is synchronized with the film running through the projector.—H. H., Jersey City, N. J.

A—We suggest you look into the V-M 720 Add-A-Track recorder, or, in the higher price range, the Ampex 960 or Concertone. The 720 with the Add-A-Track feature permits you to record on one track and then, while playing this back, to record the other track in perfect synch. On playback, each track will come out of its own speaker. The unit will also play stereo.

The Ampex 960 is used by recording on one track and then, while listening to this track, or recording on a second track the contents of the track plus whatever you add by way of mike or other source. The same is true of the Concertone. Any flubs must be done over completely as you wind up with one sound track. With the V-M, since you record one track at a time, either track may be changed without affecting the other.

"Bleeding Splices"

Q—At one time we ran out of our usual splicing tape and used an inferior tape and we have been plagued with "bleeding splices" on the entire group of tapes. I believe I read an article in your magazine by the director of Impact which mentioned "powdering splices". Perhaps this is not related in any way to sticky splices but at this point we are looking for a remedy from all sources.—Mrs. W. B., Norfolk, Va.

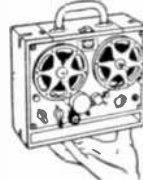
A—Sticky splicer which cause the tape to jerk and produce wow may be temporarily cured by dusting them with a good grade of fine talcum powder, or with graphite. The object is to get the powder to adhere to the sticky spots so that it will not stick to the tape guides and heads and also, to make the tape pay off evenly from the feed reel.

The only permanent cure is to go back and remove all the bad splices and redo them with good splicing tape. At the same time, any goo which has bled from the splices to the layers of tape must be removed or sticking and jerking will continue.

If it is impossible to remove the defective splices and clean up the tape then powder all sticky spots and make a copy tape. The old tape should be filed away as the "master" and the copy tape used for playback or to make additional copies as needed.

Use a little powder as you can to remove the stickiness and be sure to clean the heads and guides afterward to remove any that might have been rubbed off.

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TAPE CLUB NEWS

WTP Meeting of Dallas Reel #1



LeRoy King, Program Chairman of Dallas Reel #1 of WTP, introduces guests of honor, Dorothy and Ito DiLuck of Seattle. Left to right: Harry Matthews, International President, LeRoy King, Dorothy DiLuck, Ito DiLuck, R. C. Clark, Secretary of Reel #1.

World Tape Pals headquarters at Dallas, Texas has welcomed visitors from many countries during the past three months. Most recent visitors were Dorothy and Ito DiLuck, of Seattle, Washington, who were honored at a dinner meeting of the Dallas Reel #1 of WTP. After the dinner, the couple presented a tape/slide show on England and Germany, compiled from their last year's 15 month world tour, on which they met 75 tape pals in 48 countries.

News From World Tape Pals Headquarters

Graham Hislop, who joined WTP in Dannevirke, New Zealand, was a guest at headquarters in mid-May, as he toured the United States on his way to England before returning to New Zealand later this year.

From far off Pitcairn Island in the South Pacific Ocean, WTP members Floyd and Violet McCoy were house guests of Dallas WTP G. C. Godwin. Their slides of life on Pitcairn were the feature of the April meeting of Reel #1.

First of the series of spring visitors was the WTP representative for France, Robert Krouch, of Paris, who was also honored at a WTP dinner. Bob came to Dallas especially to discuss executive business of the organization with Dallas headquarters.

Offer Assistance

Two active members of the Australian Tape Recordists Association, Pat Lydon and Don Campigli, offered assistance to fellow club members which we feel is worthy of mention. It is this type member every club seeks.

Pat has a considerable amount of literature supplied him by manufacturers and distributors of tape recorders and related items which he makes available to any fellow Aussie member upon request.

Both he and Don are ready and willing to help any member in any matter pertaining to tape recording they can. For instance, they will make "dubbings", bulk erasures, demonstrate certain techniques of recording, criticize (nicely) tapes, etc.

All the boys ask in return is that any postal charges be borne by the supplicant.

Organ Music Enthusiasts Chapter Meeting

The regular monthly meeting of the Suf-

folk County Chapter, Organ Music Enthusiasts, was held on Wednesday evening May 25 at 8 o'clock at the Organ Salon of Keyboard Corner, a music shop located in Lake Ronkonkoma, L. I. Members were surprised by a visit of the club secretary, that ramblin' wreck from Amsterdam, New York, Carl Williams. This boy really gets around. The doings of the meeting were duly recorded by the chapter secretary, a Wollensak recorder.

Members were privileged to work out on a couple of new Kimbal Spinet model organs, one a transistor job, the other a photo cell model. The girls promptly started to outdo Ethel Smith and the fellows tried to imitate Lenny Dee. Not much luck, but they sure had a swell evening. They had quite a ball playing twin organs and everyone is waiting for the tape to be edited so they can hear how the whole thing turned out.

Mr. Freeman, the owner of the Keyboard Corner was a gracious host and treated everyone to refreshments to top off a very pleasant evening, and he also invited them to return soon.

Blind Members Meet

Two of the Voicеспondence Club's blind members who have talked to each other on tape for some time recently met in person. Roger Boggs of Santa Barbara, California, and Frank Merryman of Hearne, Texas, met at the Guide Dog School in San Rafael, California, when they both went there to be "fitted" with new guide dogs. Frank and Roger were so enthused about recording in general and voicеспonding in particular that they talked a number of other blind persons into joining the club. About one out of every five members of VS are blind and the club maintains many special services for them.

Catholic Digest May Be Recorded

Blind listeners of Catholic Tape Recorders, International have gotten the consent of the club's authorities to seek volunteer cooperation to record the Catholic Digest. Negotiations with the publishers are now under way. The club would like some monastic community to take on this project if they were provided tape, and they will seek out a source for tape too.

CTRI Member in Tanganyika

Brother Bertrand, SDS, a member of Catholic Tape Recorders, International, has a post in Tanganyika, Africa. The mission he is in is on a high hill in a mountainous terrain.

He came to Tanganyika in 1959 and was immediately assigned to the construction of new buildings in the mission. While he had few mechanical aids at his disposal, labor is plentiful and cheap and his work has progressed. Soon now, Brother Bertrand hopes to help in the construction of a new church in the community.

Recently he sent a tape recording of African children singing hymns, etc. to club headquarters which was thoroughly enjoyed.

This devoted man is anxious to hear from

fellow club members of CTRI. We are sure his tapes must be most interesting to listen to.

ATE Gets New Secretary

Stuart Crouner, former secretary of the American Tape Exchange, has notified all club members that his successor has finally been chosen. Not long ago Stu regretfully reported that he had to relinquish his secretarial duties and hoped that the club would not have to be disbanded.

He received many suggestions and volunteers to help keep the club organized, and after much consideration, he finally chose a successor in Cortlandt (Cort) Parent of Peeksville, N. Y.

Cort has a wide background of public service; he is most active in his community church, in the Boy Scouts, and in the taping spirit, having successfully organized and administered the Maple Leaf Network, a Canadian tape net from the Atlantic to the Pacific.

The new secretary takes over July 1, 1960. We wish him as much success as Stuart has had.

JOIN A CLUB

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BILINGUAL RECORDING CLUB OF CANADA
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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
J. A. Freddy Masson, Secretary
Grosse Ile, Cte. Montmagny,
P. Que., Canada

ORGAN MUSIC ENTHUSIASTS
Carl Williams, Secretary
152 Clizbe Avenue
Amsterdam, New York

TAPE RESPONDENTS
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Jim Greene, Secretary
P. O. Box 416, Dept. T, St. Louis 66, Mo.

THE VOICESPONDENCE CLUB
Charles Owen, Secretary
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WORLD TAPE PALS, Inc.
Marjorie Matthews, Secretary
P. O. Box 9211, Dallas 15, Texas

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John F. Walton, Hon. Secretary
Box 970. H., G.P.O. Adelaide, South Australia

TAPE RECORDER CLUB
A. Alexander, Secretary
123 SUTTON Common Rd.
Sutton, Surrey, England

THE NEW ZEALAND
TAPE RECORDING CLUB
Murray J. Spiers, Hon. Secretary
39 Ponsonby Road
Auckland, N.Z., New Zealand

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

TAPE IN EDUCATION

Robert C. Snyder

FROM time to time readers of this column have seen and will continue to see references to the use of tape and other audio-visual devices as being exceptionally well adapted to helping the gifted student advance rapidly and, in some cases, perhaps beyond the abilities of the teachers in his own school.

Pedagogues are often heard to comment that such advances are undemocratic because the system that permits them does not insure the same level of education to all students.

To me it seems that true democracy, whether in education or elsewhere, can be achieved only if every individual is allowed and encouraged to advance to the maximum of his own abilities.

On occasion this must mean that teachers must recognize that individual students may, in truth, know more than the teacher and may possess more ability as a child than the teacher possesses as an adult. Without doubt, such recognition is hard on the adult ego. But, is it not enormously more gratifying to be able later to recognize that one has aided and encouraged a truly outstanding person on to exceptional performance?

Three unrelated quotations which have come to my attention in recent days seem to me worth calling to your attention.

The first is extracted from an editorial from *The Washington Post* of June 18, 1960, entitled, "On Standing Up." The editorial dealt with the refusal of Stephen Bayne—apparently an outstanding student at the Westbury, Long Island, High School—to accept a citizenship award from the local American Legion post on grounds of personal principles. The *Post* editorial concluded:

"Some words of Judge Learned Hand are worth remembering:

"Our dangers, as it seems to me, are not from the outrageous, but from the conforming; not from those who rarely and under the lurid glare of obloquy upset our moral complaisance or shock us with unaccustomed conduct but from those, the mass of us, who take their virtues and their tastes, like their shirts and their furniture, from the limited patterns which the market offers."

The second quotation is from Bill Gold, also of *The Washington Post*, usually considered a humorous writer, but often pungently to the point. In his column of June 14, 1960, entitled, "The Team Doesn't Always Win," Bill wrote as follows:

"This is an era of bigness, and not in Government alone. The one room school-house of memory is now a consolidated education factory. The corner grocery is a supermarket. The owner of the one man bicycle repair shop long ago gave up the struggle and went to work on an auto plant assembly line. Institutions already huge continue to congeal into bigger and bigger globs of human activity.

"The team has become all-important. Personnel managers want to hire team players—men and women who will fit them-

selves into standardized operating procedures, and refrain from rocking the boat. And one can well wonder: Where, if anywhere, does the individual creative thinker—the rugged individualist—fit into this picture? Or has he become obsolete?

"Some serious research has been done on this subject. Advertiser's Digest recently referred to these studies:

"The University of Chicago has found that of this country's 54 'most important' inventions, 33 were the result of individual effort, and only 21 were group projects.

"Yale University divided 96 students into two groups of 48. The first group worked on a set of problems as individuals. Each student worked alone. The second group was organized into a dozen four-man 'teams.'

"The results showed that the solitary workers came up with more ideas and better ideas. Their thoughts were superior in originality and practicality.

"At M.I.T. it was found that it is sometimes useful to bring together creative people. Working together, and presumably pooling special skills and talents, they may produce valuable results.

"But after 16 months of such an association there is a steady decline in results. The implication is that fresh associations can be stimulating and useful, but after a while this wears off and individual effort again becomes more likely to be rewarding.

"Progress, like evolution, occurs because occasionally an offspring turns out to be unaccountably unlike its parents. But this is an era in which being different is discouraged, and domineering bigness pushes us toward conformity.

"The man who thinks for himself may be a hero in a cigarette commercial, but elsewhere there is a tendency to regard him as the jerk who is rocking the boat. If you want to live a peaceful life you join the team, rah, rah, rah, and conform. What this presages for the individual thinker I leave you to contemplate on your own."

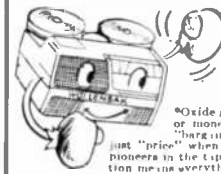
The third quotation is to be found in the publication, *Modern Foreign Languages and the Academically Talented Student*, just published jointly by the National Education Association and the Modern Language Association of America, and available from either of those organizations for \$1.00.

In referring to the responsibility of the educational system to provide language learning opportunities for the academically talented, the introductory section states, "The first responsibility is to ensure the type of program in which the above skills [listening, speaking, reading, writing] can be mastered most effectively. The second responsibility is to encourage and to make possible for the academically talented a rapid and UNOBSERVED progress through the program as well as greater perceptions in depth." (Italics are those of the authors of the report, but the additional underscore is mine.)

During this summer when you may be formulating your plans for the coming year, how about giving a little thought to what you can do to encourage the more gifted students in your classes?

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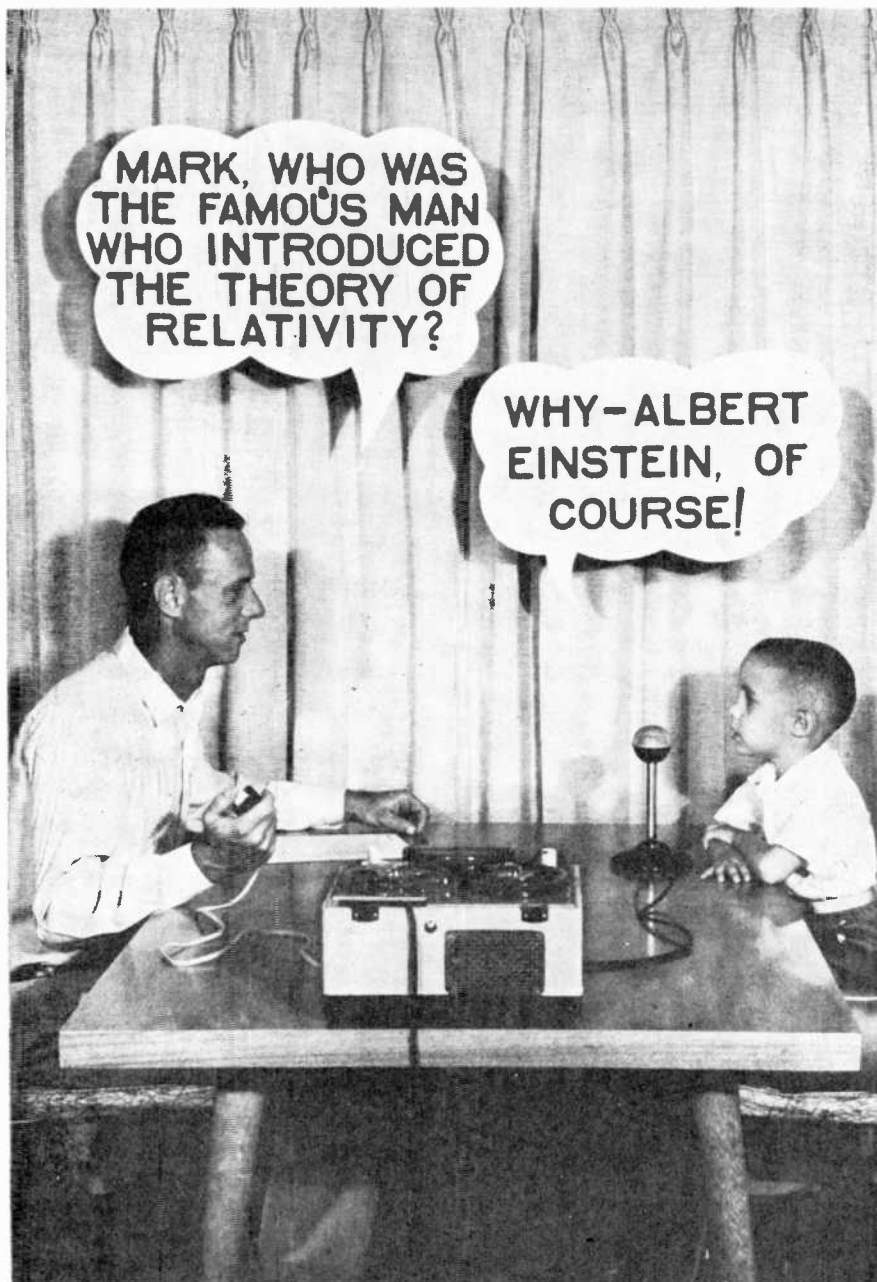
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Out of the Mouths of Babes

by Tommy Thomas

. . . . make your child a genius with this trick recording method.

Fig. 1: This is the set-up, though during the actual recording you wouldn't want the recorder on the same table with the microphone (to prevent picking up motor vibration). Only one mike was used, so it was placed very close to the child to make up for his low speaking voice. And notice the "cut-off" switch in the recordist's right hand, used during long delays.

HERE'S an opportunity for you to get better acquainted with the interesting art of splicing and editing tape. To most home recordists, editing is something to be put off and avoided at all costs. And even the making of a simple splice is detoured as often as possible. Naturally, then, many of you are missing out on some of the richest dividends to be derived from tape recording.

So what say I arrange to introduce you to "Basic Editing?" This is editing at its simplest, yet it will enable you to take care of almost all the simple needs of home recording . . . and then some. We'll work on the theory that splicing—which is the basic chore in editing—is really very easy but is only done quickly and consistently correctly through practice. Therefore we'll have to get in some practice.

Now most of you have undoubtedly already read articles about tape splicing and editing, so I won't bore you by repeating all the details. And I'll go along with you when you think that the idea of *learning* is not exactly the most fascinating one in the world. So how about if I fix it so

that you'll be enjoying yourself right from the beginning? We'll put together a private little "masterpiece" of tape recording . . . an end-result of personal recording that you can proudly show off to your friends. Something that will have their mouths dropping a bit in disbelief as they listen to a tape recording that obviously *couldn't be possible*.

Sure, it'll be a bit of a chore to do, especially if splicing and editing tape is new to you. But it'll be easily worth it, as you'll end up with a wonderful little "demo" tape AND a lifetime of ease and familiarity with tape editing. You'll never again have to—or even *want* to—sidestep this fascinating control over your own recordings.

Fig. 1 tells the story in a nutshell. We're going to have you—or anyone else you wish—quizzing a small, preschool child who can't read and whose usual manner of talking is far from profound (naturally). Yet, when your friends hear the end result of your recording of this quiz session, they will hear the child quickly and easily answering any question that is put to him. Absolutely any question at all! The youngster is obviously too young to be reading notes,

so he can't be getting the answers that way. And his answers are quite prompt, so certainly no one is whispering them into his ear. Therefore, you will have a recording that will pretty thoroughly mystify your audience.

Basically, the "secret" is this: Although the final recording will most likely only be a few short minutes in length, the actual recording session with the child will have lasted twenty or thirty minutes, or even longer. Because in each case, each question you asked was immediately followed by your giving the child the word-for-word answer which he just repeated after you. That's right! You not only ask the questions (which is easiest done from a script you have prepared ahead of time), but you answer them yourself. All the child does, actually, is repeat your answers. Later, after you have edited out (removed) all of your own words of prompting, the end result is the tape as described before. That's the whole thing. Although it takes time to do, it's really very simple.

Now, let's go through a portion of an actual "script" that I made up recently. I don't have any preschoolers in my own family so I borrowed little Mark Etter, the son of good friends of ours. The microphone is placed very close to the child, to make up for the fact that he was answering in a low, little-boy voice. I started the recording with just casual talk with Mark, asking things that he could easily answer. Then I steered the conversation into a game of "Play Pretend." We pretended that he was a very smart young man and I began asking questions that got increasingly more difficult. By that time the recording (the final result, remember) was going like this.

TOM: "Mark, what's two plus two?"

MARK: "Four! You can ask me something harder than that."

TOM: "Oh, you think you're pretty smart, huh? Well, what's six times seven?"

MARK: "Ha! That's easy. Forty-two."

TOM: "Hmmm-mm, you're pretty good at this pretending business. Now then, what's eleven times twelve, divided by four? That ought to slow you down."

MARK: "Three-three."

TOM: "Three-three? Oh, I guess you mean thirty-three. Wait a second, while I figure this out myself . . ."

And here I mumbled aloud through the whole figuring,

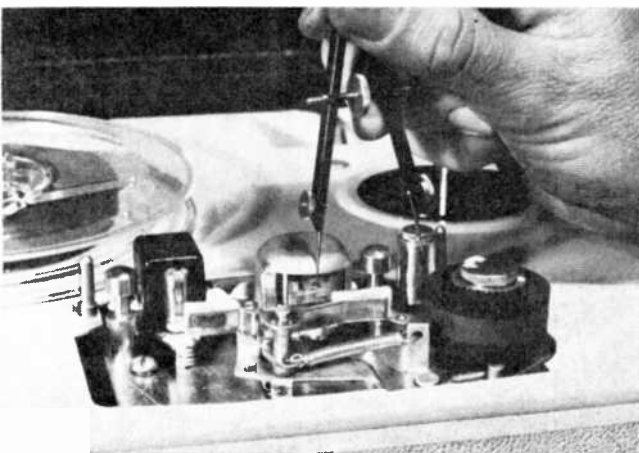


Fig. 3:—As a guide for all your future editing, measure the distance from the playback head to the motor capstan (where it presses against the rubber roller). If you're not quite sure where the playback "gap" is, just measure—carefully, without scratching—to the center of the head. Then transfer this measurement to a handy card or piece of tape.

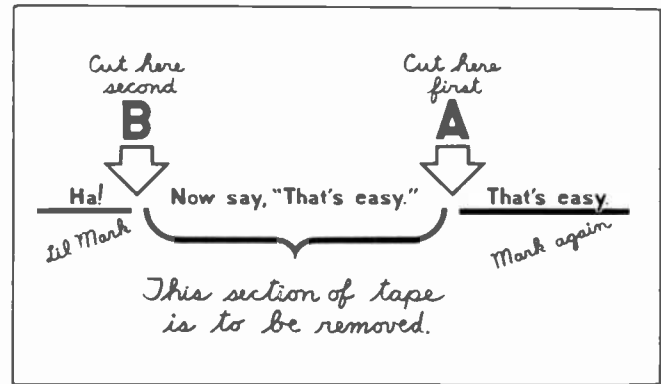


Fig. 2: Let's follow the simple editing procedure, showing exactly what is done. Notice that there are definite, deliberate PAUSES OF SILENCE (at "A" and "B") before and after each segment of tape that is to be removed. It is these small pauses throughout the recording that make the final editing so easy to do. The words being removed are the "prompting," of course.

finally coming to the same thirty-three conclusion myself . . . making young Mark seem quite brilliant since he had rattled the answer off so quickly. After the arithmetic we went into questions such as who discovered America and on into a lot of other things that got pretty complicated. At the end, seemingly quite bored with the ease of it all, this little guy put me in my place with a long paragraph of very precocious rhetoric.

All in all, when this sort of performance comes from a little kid who is well-known to your friends (and naturally, if your own child is the right age, this is really perfect), it makes for quite a clever deal. Now, let's backtrack a bit and run through this same portion of dialogue again, only this time we'll listen in on what was *really* said, before the editing took place.

TOM: "Mark, what's two plus two?" ("Now Mark, say 'Four!'")

MARK: "Four!"

TOM: ("Now say, 'You can ask me . . .'")

MARK: "You can ask me . . ."

TOM: ("Now say, ' . . . something harder . . .'")

MARK: ". . . something harder . . ."

TOM: ("Now say, ' . . . than that!'")

MARK: ". . . than that."

TOM: "Oh, you think you're pretty smart, huh? Well what's six times seven?" ("Now Mark say 'Ha!'")

MARK: "Ha!"

TOM: ("Now say, 'That's easy.'")

MARK: "That's easy."

TOM: ("Now say, 'Forty-two.'")

MARK: "Forty-two."

TOM: "Hmmm-mm, you're pretty good at this pretending business. Now then, what's eleven times twelve, divided by four? That ought to slow you down." ("Now Mark, say 'Three-three.'")

MARK: "Three-three."

Et cetera, et cetera.

I suppose this sounds complicated, but it's not at all. The main asset you need here is patience. And a young child in a happy mood so he'll go along with you in all this crazy-to-him nonsense. Depending upon the child, the number of words at a time that he will be able to repeat after you will vary. With little Mark, three words at a time (or four if they were all little words) usually seemed to be the limit. So I just broke his part of the "script" up into

one, two or three-word bits, and had him repeat them after me one after the other. Whatever inflection I used, he automatically mimicked, so there was no problem there. And if he didn't repeat it exactly correct the first time, then we did it over and over again until it was just right. It took us about 25 minutes to go through a script that lasted a whole 3½ or so minutes on the finished, edited tape. (Later, the final editing took about 3½ hours.)

NOTE! Of utmost importance here are the slight *pauses of silence* before and after each segment of tape that is to be removed. These must be put in this way, for they are what make it possible for even a beginner to do an expert job of editing with just a minimum of practice. Later, as you become more adept, you will have acquired the "knack" of dividing up portions of sound that are quite close together. The more you keep in practice, the greater will be your control. Also notice that the recordist in Fig. 1 has a Remote Control Switch (described in a previous article) in his right hand. If you have added this useful accessory to your own recorder, you may want to use it here to make your final editing chore a bit simpler. You can inconspicuously stop the recorder during those times when you may have to do extra explaining to the child, for instance. Or maybe for a brief "rest period" now and then.

Now, just in case there's any doubt about this final editing being hard work, let me tell you. It is! It's a tedious job going through this whole tape, snipping out the un-

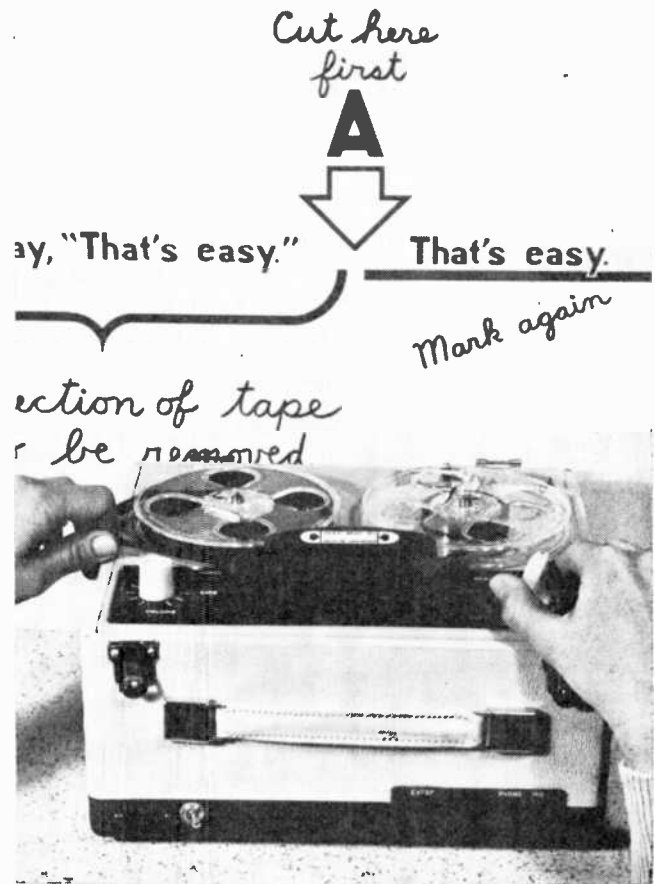
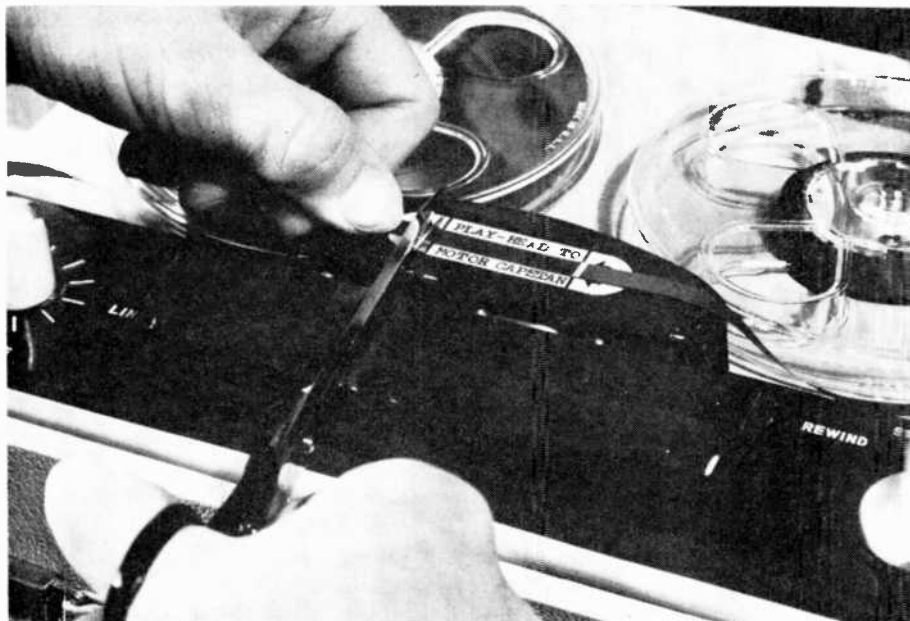
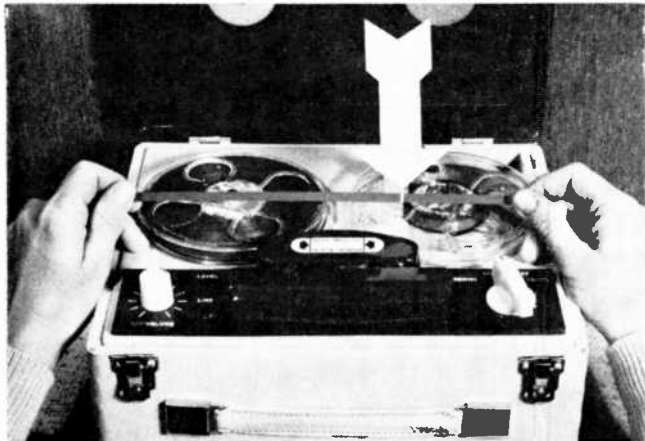


Fig. 4 (Above): The first cut (at "A") is made after the last word in the section of tape being removed, and JUST BEFORE the next section that is to be preserved. This recorder plays from left to right, so I let the tape run through the fingers of my left hand. Then, by squeezing thumb and forefinger together, I can instantly stop the tape at any point. Immediately afterwards my right hand turns the recorder mechanism to "Stop."

Fig. 5 (Left): Now lift the tape out and examine it, dull side up. Look closely and you'll see a slightly "glazed" spot (at arrow) which was made by the motor capstan spinning against the tape when your hand stopped it from moving further. This point, naturally always the same distance from the playback head, is your Reference Point for the cutting of the tape.

Fig. 6: The scissors point out where the tape is to be cut. For convenience, I keep my measurement (from Fig. 3) on a piece of cardboard stuck atop the protective head cover. Line up the "glazed" spot with the right marking and cut the tape over the left marking. In this manner, you will always be cutting the tape EXACTLY WHERE YOU LAST HEARD IT.

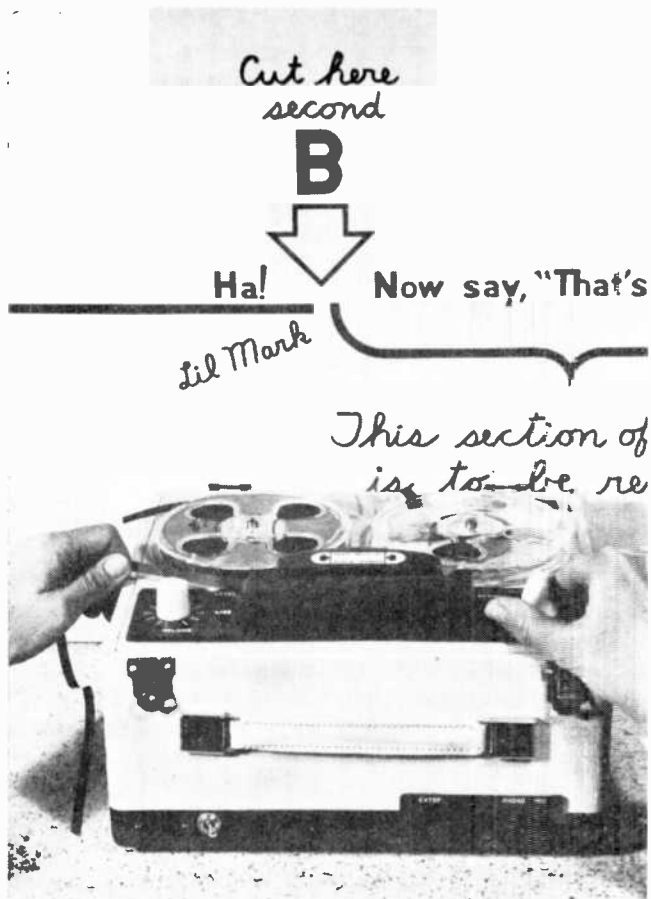


Fig. 7 (Above): Now pull a portion of the tape back and let it run through your fingers again (this is why we cut at end-point "A" first). Follow the same procedure as before for locating point "B" during the pause JUST AFTER the last word to be kept, and cut the tape there. Discard the portion of tape that was cut out, to be used some other time (if long enough) or thrown away.

Fig. 8 (Right): Naturally, if your recorder is equipped with some sort of an "Instant Stop" lever, your editing problems will be simplified. Just stop the tape with the special control and reach in and mark the tape right at the play-head gap. You can mark both the beginning and the end of the section you want removed, then stop the machine and cut out this portion.

wanted segments one at a time, and each time putting the remaining "master" tape back together again. But let me say also, speaking personally, *that this was the most fascinating and joyful bit of tape recorder work that I'd ever accomplished.* It's quite a thrill, believe me, "slaving over a hot recorder," turning out something that wasn't there before. And as you slowly get the tape edited and pieced together just the way you want it, even you yourself will be astonished at how real it all sounds. It's most convincing, on the final polished tape, that you're listening to the recorded answers of an actual Child Prodigy.

THE BONUS FACTOR! You'll likely fumble around a bit when you first get started splicing and editing tape. But by the time you've reached the end here you should be doing practically professional quality work consistently. And in the future, any time you want to do this sort of thing, it'll be easy. This particular recording is a novelty item, of course, but it'll give you practice for all the more practical types of editing that you'll run into in home recording. In fact, once you know these "basics," you'll be quite pleased to discover just how often you can very easily "polish up" those valuable recordings that you want to save and play again and again. With your new experience behind you, you'll have made your hobby of recording many-fold more enjoyable because now you'll have the added pleasure of being "in full control."

So better get to it!

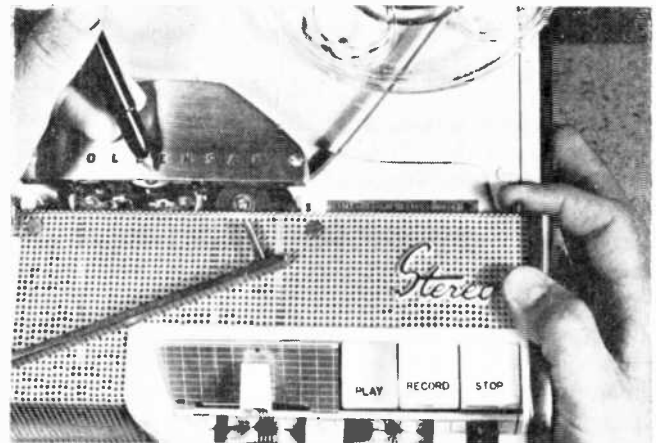
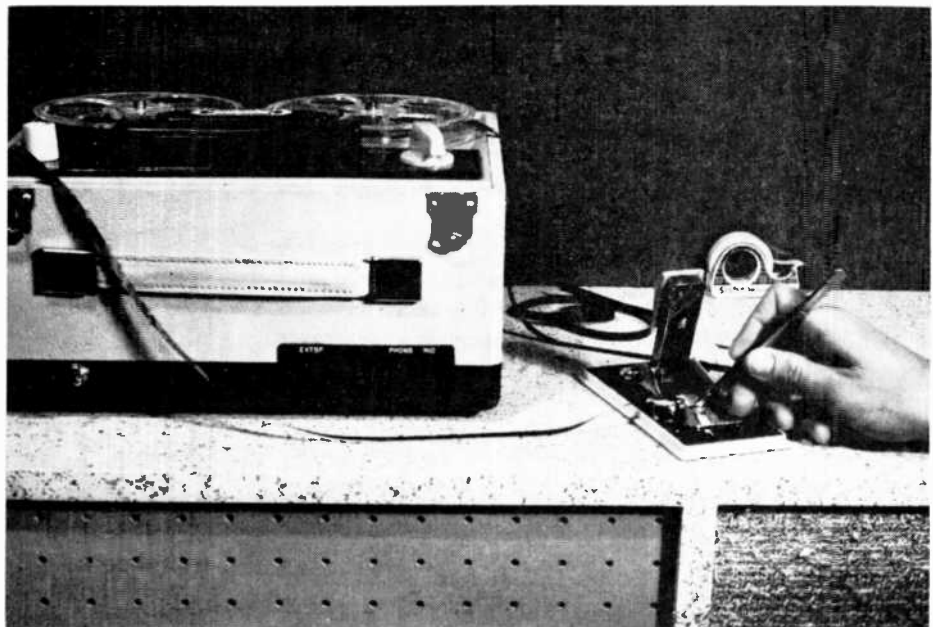


Fig. 9: Finally, with the unwanted section of tape cut out and set aside, you're ready to splice together the two ends "B" and "A." Done neatly and correctly—which comes with practice—the fact that a portion of tape has been removed will be completely undetectable. Now you're ready to move on to the next section of tape that has to be removed.



Tape Flies the Jets

by Sheldon O'Connell

. . . . conversations between control tower and pilots are tape recorded.



LONDON Airport, Orly, Prestwick, Idlewild, these are names read across baggage weigh-in counters, flight schedules and Custom notebooks; busy airline crossroads directing a flow of skyway traffic through the day and night in as many time zones.

There are other airports too, smaller, in more remote areas where the roar of jet fighter take-offs and speed tests streak the sky. To each, co-ordination and quick reference data is a vital success and safety factor.

Commercial airlines, Air Force test centres, overseas staging areas, all are using tape to record conversation between control tower and pilot. As each plane wings into the perimeter of tower approach communications, instructions regarding crosswind conditions, clearances and landing zones that form the interchange of pilot-tower communication, are all recorded. Eight separate recording units carrying 10" tape reels can operate constantly, each one monitoring an approach frequency channel, radar, ground approach control, and others. The centre of this giant sized tape operation is located immediately below the green windowed Control Approach Tower.

Tapes rest in a deck-tray; this is a tape deck minus circuitry, becoming a tray when the pull-up side handles are used. The recording process is started when each tray is pushed along metal ways in the stacking cabinet, to connect with a power supply.

At the close of each double shift an operator inserts replacement trays for each of the frequencies covered, and removes the nearly spent tape trays. Recorded reels are carefully dated, their frequency and time of changeover noted, and carefully filed away in a shielded cabinet.

An engraved diagram stencilled into each tray indicates operating and threading procedure, and reduces to a minimum the chance that someone might not be able to play or record with this equipment. The 10" reels complete with capstans, guides and tape deck can almost be called "cartridges" on the grand scale. Instead of tape being removed after play or record, this feature of an entire assembly lifting up and away is an interesting process.

To rewind or play, the deck is brought to a stationary playback machine, open centres of the 10" reels slip over protruding hubs on the mechanism and are set in motion at the turn of a switch. Rewinding one of these mastodons is accomplished by lifting the ribbon of tape out of a worked guide, turning the left reel half a revolution to draw up slack, and switching to "Rewind." As an experiment, while reels flashed by at "Rewind," I assumed the model was geared to instant stop, and flicked a button. Instantly yards of spiralling audiotape took off and up, up, into the wide blue yonder, without control tower clearance, and all the "Roger, over and outs" in the world couldn't put it back together again. The fault, however, was not in the machine, but the experimental tap at an "off" instead of "stop" button.

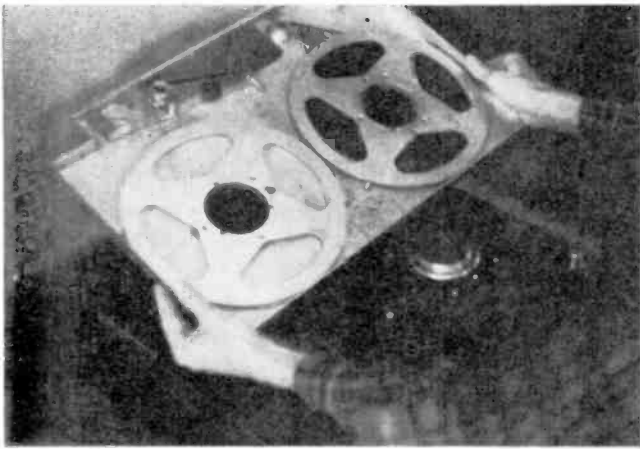
The quality of recording in these tower to pilot communications usually reflects the high output and restricted frequencies of the carbon microphone, found suitable because of its strong level, which overrides much of the background noise.

It is possible to patch into any one of the recording mechanisms to check the audibility of the signal being received in any or all of the channels, the "program" is then relayed through a rack mounted speaker.

Why this care in recording communications between air and ground, how can the cost be justified in terms of man



As each plane wings into the perimeter of tower approach communication air traffic control takes over with vital landing information and clearances. All ground to air conversation is tape recorded.



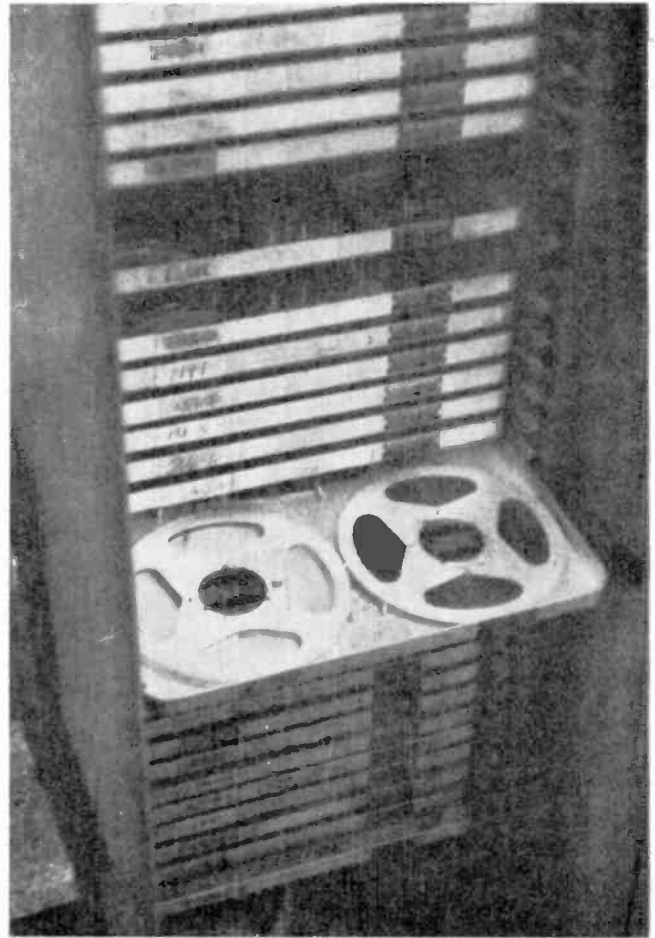
To rewind or play, the deck is brought to a stationary playback machine. Open centers of the 10" reels slip over protruding hubs of this mechanism, play at 1½ ips. An engraved diagram stencilled into each tray indicates operating and threading procedure. This is placed between reels at the back of the tray.

hours, equipment costs, filing and cross-checking procedures that take place at air terminals around the world? Consider the involvements of passenger and freight air traffic control, the dependence on information radioed from ground to air and response to this data. Only by recording all exchanges can there be a complete second by second accounting of what has gone before, the runway clearances, circling altitude, stacking position, and "On Final's."

In case of accident all recordings are impounded and later given complete study and analysis so that contribut-



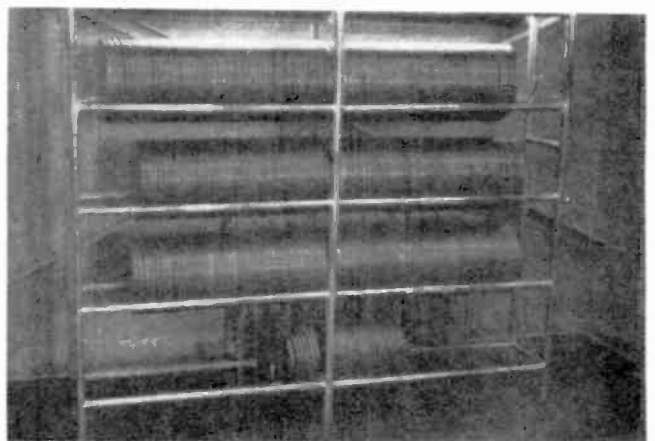
Center of a marathon 24 hour taping operation is located immediately below the green windowed control tower. Exchanges on each approach frequency are recorded separately.



Recorded reels are carefully dated, their frequency channel and time of changeover noted, then pushed along metal ways in the stacking cabinet. Ready for instant checking in case of inquiry.

ing causes of air disasters can be further reduced. The observations from both air and approach control centre have become a vital part of accident investigation.

Reports on performance, stresses, speed and maneuverability of the world's proudest jet flown prototypes have marked tape recording a significant contributor to the aviation industry's own development. Present at specialized runs, exhaustive tests that rip through cloud layers and sound barriers, tape recording has become co-pilot and sound spectator for some of the industry's most exciting moments, its microphone pointed skyward to record whatever adventures in space and research reach into tomorrow.



Nickels, quarters, or poker chips? It's hard to tell. In a correct pilot's eye view it reads from left rudder to starboard wingtip as a storage rack for the cannisters of tape reels.



Wide spacing of controls on a large front panel gives ease of operation and eliminates possibility of knocking off controls in error. Large meter is easily seen.

A Mixer With Some Unusual Features

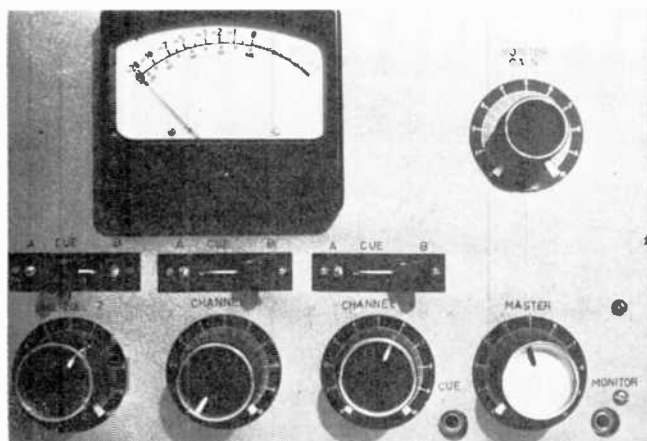
by John W. Berridge

... simplified design, minimum number of tubes used.

BACK in the April 1959 issue of this magazine, the author described the small recording studio which the Boy Scouts of Toronto had set up in the basement of their Headquarters. Included in this description was the mixer which had been designed and built specially for the purpose, incorporating a number of unusual features. A lot of interest has been shown in this particular item of

equipment, and for this reason it is described in full here.

All stages of the mixer use the same type tube. Not only does this simplify the design work but it also means that the absolute minimum of tubes are needed for spares. In actual fact, I've never found it necessary to carry more than one extra 12AX7 and one 6X4. On the only occasion when two tubes went at the same time, I was able to use V6 as a replacement for one of the preamplifier stages, and do without the monitor and cue facilities provided by V6. The 12AX7 was chosen for all stages because of its high gain, thereby reducing the number of stages needed. No microphone transformers were built into the input stages for two reasons. First, doing so would have reduced the versatility of the unit. Inputs would then have been limited to low impedance unless some complicated arrangement of jacks had been used. Since there are already fifteen jacks along the rear of the chassis, it would have meant considerable extra work and expense to incorporate separate high- and low-impedance inputs. Secondly it was felt that chassis mounting the transformers might give rise to extra problems in the form of induced hum or ground loops in each unit. For reasons which appear later, we wanted to keep the work as simple as possible. As it is, when we use high-quality, low-impedance mikes, a matching transformer of the cable mounting variety is plugged in between the mike and the mixer input.



All controls on the front panel have been clearly marked with the master gain control painted a different color to distinguish it from the others. The CUE and MONITOR outputs are brought out to the front to enable headphones to be plugged in.

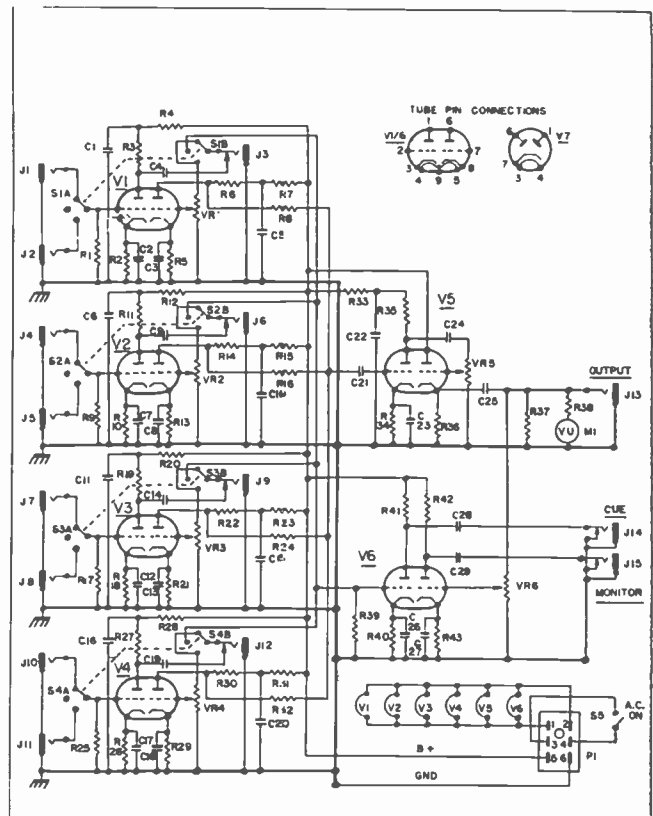
Versatile Arrangement of Inputs

A total of three inputs is available for each mixer stage, two mike-level and one high-level. The latter is necessary since too much gain would be present if a turntable preamp or the output of a second tape recorder were to be plugged into the regular inputs. The circuit used to accomplish this is a somewhat novel one first published in *Audio Engineering* some years ago. Amplification for the microphone is accomplished in the first half of the 12AX7 and interposed between the first and second halves of the tube is a closed-circuit jack. With nothing inserted in this jack, the signal from the first half of the stage is passed through to the top of the potentiometer which acts as the mixer control for that stage. However if a plug is inserted in this jack, the output from the first half of the stage is cut off, and the signal going into the second half is then provided by whatever is being fed into the high-level jack. Thus, plugging a turntable or recorder into the high-level input automatically disconnects any microphones that may be on that particular stage, eliminating the need to unplug them all the time.

A modification of the original circuit has consisted of adding a two-pole, three-way selector switch to each mixer stage. One half of this switch is used to select either one of two inputs, the centre position remaining unconnected; the second half is used to select either program or cue feeds, the centre position on this half going to the input of the CUE amplifier. Thus, the outside positions of the switch select either one of two microphones (unless something is plugged into the high-level jack) and feeds it through to the program amplifier. The centre position feeds whatever is coming off the high-level jack to the CUE amplifier. Normally this would be the output of the first half of the stage but since the centre position of the first half of the switch is unconnected, nothing comes through, effectively preventing any disturbing mike noise from being heard on the CUE circuit. If anything is plugged into the high-level input, this is fed to the CUE circuit, enabling the operator to listen to a disc or tape while recording is still going on. Discs can thus be cued up for insertion into a program while someone is speaking, and a disc-jockey program can be handled through this mixer.

Three Outputs Also Available

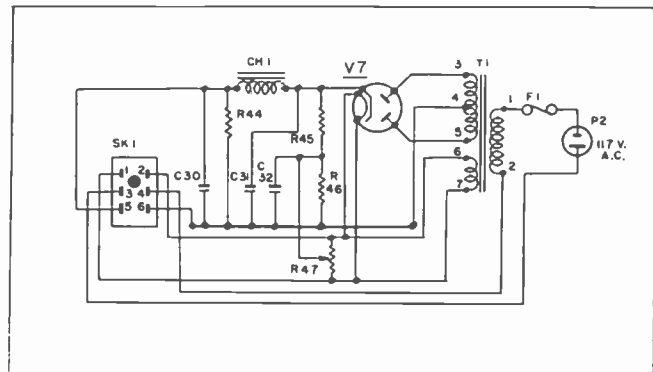
The output of each of the mixer stages is taken through an isolating resistor, paralleled with the other stages and fed through a coupling capacitor to the program amplifier stage. The first half of this stage is a conventional triode amplifier, as are all but the final program output. The first half feeds the second half in the same manner as the input stages but minus the jacks and switching facilities. Thus V5 becomes the master gain control for the whole mixer. A master gain control may seem like an unnecessary item, especially as most commercially available units don't possess one. However, in recordings of any scope it sounds much better to finish by fading down everything simultaneously. The second half of the program stage is a cathode follower and it was chosen for a number of reasons. Normal broadcast practice is to use a 600-ohm, balanced-line output for such a mixer. However, this means using a matching transformer and high quality transformers with good frequency response are expensive, added to which all but professional recorders have unbalanced inputs. So an unbalanced output was necessary. Despite this, there



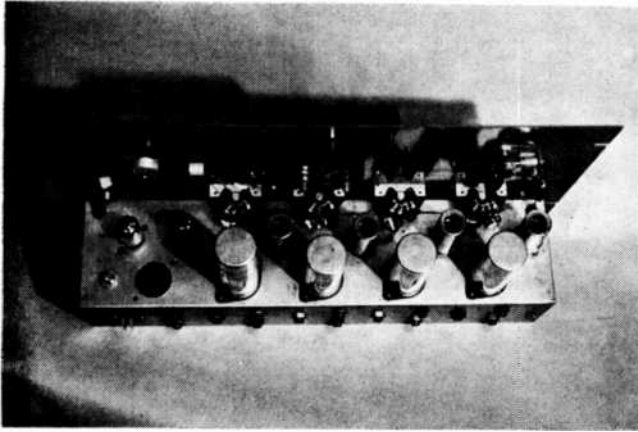
Circuit diagram of the completed mixer unit showing the added circuit features.

was still the possibility that the mixer and recorder would be separated by some distance under circumstances we might not be able to foresee. A low-impedance output thus became a second necessity to avoid degrading the frequency response of the signal over long lengths of cable. By using high-gain stages ahead of the output, we had enough gain available to enable us to use a cathode follower to overcome these problems.

The author realizes that several measures could have been taken to improve the overall performance of the unit. An obvious one is negative feedback and this could still be incorporated in each of the input stages and the program stage. Another measure would be to shock-mount the input tubes V1, V2, V3 and V4 in order to avoid the possibility of mechanical vibration giving trouble. Negative feedback was not used mainly because it would have meant adding another stage to overcome the loss imposed by the feedback. The present circuit arrangement puts out



The simple power supply contained on a separate 5" x 4" x 3" aluminum chassis.



This top view of the chassis shows the neat and simple layout and the need to keep the tube shields away from the front of the chassis to clear the selector switches.

about 1 volt (around the same as is got from a high-fidelity preamp). This is more than enough to feed the usual 100 mv "Radio" input of domestic recorders, and adequate for the 0.775 v LINE input of professional machines. The shock-mounting feature was left out mainly because it would have involved a great deal of mechanical work, and we were in somewhat of a hurry to get this piece of equipment into operation. No undue microphonic troubles have shown up since completion.

The CUE amplifier is a simple amplifying stage fed directly from the selector switches of the input stages. No attempt was made to isolate these switches from each other electrically nor was a coupling capacitor used for the stage. Since this stage would be used for cueing purposes only it was felt that any attempt to make it high quality would be wasted. (It has since proved of high enough quality to be used as a second monitor circuit as I shall explain in a moment). The MONITOR circuit is fed via a potentiometer from the output of the cathode follower, the pot'r acting as a monitor gain control. This is placed on the front panel since it is important to be able to change the listening level without changing the recording level. Also, as it comes after the master gain control, any changes made in the main circuit are reflected in the monitor output. Both CUE and MONITOR outputs are high-impedance and can be used to feed either headphones or a small amplifier and speaker. In the case of the MONITOR circuit, it might be better to use a good high-fidelity amplifier and speaker enclosure. The power supply has been kept on a separate chassis to avoid any hum problems, and is linked to the main chassis by a short length of 6-core cable and a Jones plug and socket. Note that the A.C. switch is on the front panel of the mixer for ease of operation. The whole unit goes into a cabinet with two lids, one of which covers the front panel, the other, somewhat deeper, covers the rear of the unit and houses the power supply. In use, the power supply cover is kept out of sight under the work table with just the interconnecting cable coming up to the mixer. The power supply is perfectly conventional.

Unusual Construction Practice Used

A haphazard but effective practice was adopted during the course of building this unit. Due to the fact that it was needed in a hurry, it was decided to do it a stage at a time. By starting with the power supply, checking it

out with a borrowed multi-meter, and then wiring the heater and B+ supplies it became possible to use each stage as it was tested out. The coupling capacitor C21 was temporarily soldered direct to the output jack J13, allowing us to do without the program stages for a short while. Once the first two input stages had been checked out, the unit could be used as a two-channel mixer until the author found time to continue the work. This also meant finding a time when the equipment in the studio was not in use, a factor which delayed the finish of the mixer by quite a while. However, being able to put it to (reduced) use immediately justified the delay.

Construction is straightforward with all components mounted on a steel chassis measuring 17" x 4" x 3" and zinc plated, the front panel being a standard 19" x 7" steel panel finished in a flat gray. While steel is better and cheaper for the front panel in any case where it might have to bear the weight of the chassis, an aluminum panel of the same dimensions is much easier to work on and just as good for most purposes. Steel is tough material to cut and aluminum might have saved me a lot of blisters. In my case, I lined up the bottom edge of the panel with the bottom of the chassis so that, when the panel is recessed into the front of a cabinet, the chassis rests on the bottom of the cabinet. A number of finishes could have been chosen for the panel but a flat gray is easier to mark or add decals to, though, as can be seen from the illustrations, scratches show up much more. Layout of the components on the chassis is quite simple, the tube sockets and electrolytic decoupling capacitors being evenly spaced along the chassis. Only one point needed watching and this was the fact that the selector switches project some way back from the front panel and clearance has to be allowed between these and the tube shields when the whole unit is assembled. The dial plates are cemented to the front panel with Glyptal cement and large circular knobs are used for all controls. It has been found from past experience that round knobs can be rolled underneath the fingertips, even operating two adjacent knobs with one hand with practice, whereas any other kind needs an awkward twist of the wrist. A dial light is shown in the top left-hand corner of the front panel but an even better idea would be to use an illuminated VU meter.

Wiring is also straightforward, although a number of precautions are necessary. The circuit diagram shows all ground connections going to a heavy bus wire which is grounded only at the input jacks. In actual fact, it is grounded at only one end, at jack J1. This was done to avoid hum pickup due both to ground loops and also to possible eddy currents in the chassis itself, the latter sometimes overlooked even in high quality audio gear. The heater leads were twisted and kept as far away as possible from signal leads. Considerable trouble was experienced at first with feedback over an input stage, but this was cured after the tube socket was turned around so that pins 1, 2, and 3 were closest to the input jacks. After this, care was taken to keep input and output leads separated as far as possible and no further trouble occurred.

Special Needs Helpful in Design

The need for twelve inputs may not seem apparent at first glance. Previous experience has taught the author that, though only a small number of microphones, two or three at the most, are ever likely to be used at any one

time (with the notable exception of an orchestral recording session, which we don't plan to do), many more may be needed in the long run. For instance, we have had many occasions when we have recorded a meeting or annual dinner with only one crack at it. This has meant a lot of frantic scurrying around to change mike positions during the course of the event in order to cover everything, and inevitably part of the proceedings has been missed. With this mixer the practice is now to borrow enough mikes to cover every possible program source and change from one to another by using the selector switches. Since mikes are the only sound source on this kind of assignment, it is possible to use eight and extra mikes are usually available to us, thanks to care in handling and prompt return on our part. Once back in the studio however, we find ourselves using one or two mikes, a second recorder (sometimes even a third) and a turntable. The latter have meant high-level inputs and the CUE facilities.

Another factor which has had to be borne in mind is that of clearly marking the function of every control for inexperienced users. The panel and chassis marking is quite rough, having been done in a hurry, but it serves its purpose. It was done in marking ink with a simple home stencil set, and then sprayed over with plastic spray. Several other more acceptable ways suggest themselves, including doing the lettering by hand on a sheet of art paper or Bristol Board and then protecting this with a sheet of 1/16 inch plexiglass. Then of course there are the Techni-Cal decals available at radio supply stores.

Since the completion of this mixer, a few unplanned bonuses have shown up. Not the least has been that this unit, with its monitoring facilities totally separate from the recorder, can be used with almost all tape recorders on the market today, including professional machines. For the same reason, it is possible to rehearse a session without having recourse to the recorder. All work is done on the mixer and the recorder need only be used when the actual recording is made, though sometimes a few feet of tape for a quality check is a good safeguard. The CUE and MONITOR outputs are both high-impedance and can be used for feeding a power amplifier and speaker enclosure for high-fidelity monitoring. By connecting the output of the tape recorder to one of the high-level inputs, we can play back a tape through the monitor system simply by turning up the appropriate mixer control. This hasn't worked with all recorders since some provide P.A. facilities automatically, whereby the input of the machine is connected through to the output, resulting in a feedback loop through the mixer. However, even this can be overcome simply by connecting the monitor amplifier to the CUE jack and using the selector switch in the CUE position, though this is not quite as convenient. Being able to monitor the output of the recorder in this way has given us another tool in our recording. On recorders utilizing three heads, connecting the output to one of the mixer channels has provided us with echo facilities which we can key in or out at will. On those occasions when our recording has taken the form of a short play, we've been able to dramatize it to good effect by the sparing use of echo.

No tests, other than continued listening, have been carried out on this mixer. This has been mainly because no test equipment is readily available for the purpose (certainly the author had none at the time), but even if it

were, little time would be available for prolonged tests, since the gear is in almost constant use. In any event, the author tends to view figures with a certain suspicion since too much depends on how they are interpreted, particularly in advertising hands. In any event, if the overall sound is satisfying to several highly critical ears, why make tests?

LIST OF COMPONENTS

Resistors

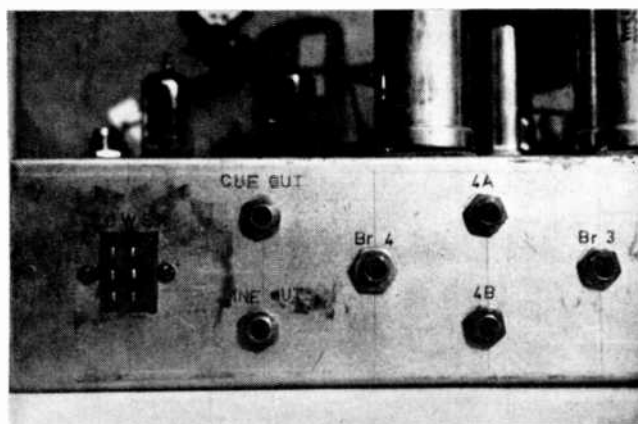
R1, R9, R17, R25—470K 1/2W
 R2, R5, R10, R13, R18, R21, R26, R29, R34—2.7K 1/2W
 R3, R6, R11, R14, R19, R22, R27, R30, R35, R41, R42, R46, 47K 1/2W
 R4, R7, R12, R15, R20, R23, R28, R31, R33—22K 1/2W
 R8, R16, R24, R32—220K 1/2W
 R36—33K 1/2W
 R37—2Meg 1/2W
 R38—3.9K 1/2W
 R39—1Meg 1/2W
 R40, R43—820 ohm 1/2W
 R44—3CK 5W
 R45—270K 1/2W
 R47—250 ohm wire-wound variable
 VR1, VR2, VR3, VR4—100K Log Taper Pot'r
 VR5—1 Meg Log Taper Pot'r
 VR6—3 Meg Audio Taper Pot'r

Capacitors

C1/C5, C6/C10, C11/C15—40/40 mfd. 450 v.w. Electrolytic
 C2, C3, C7, C8, C12, C13, C17, C18—25 mfd. 25 v.w.
 C4, C9, C14, C19—0.1 mfd. 250 v.w. Paper
 C16/C20/C22—40/40/40 mfd. 450 v.w. Electrolytic
 C21—0.5 mfd. 250 v.w. Paper
 C24, C28, C29—.05 mfd. 250 v.w. Paper
 C25—0.25 mfd.
 C26, C27—50 mfd. 25 v.w.
 C30/C31/C32—20/20/50 mfd. 450 v.w. Electrolytic

Miscellaneous

V1, V2, V3, V4, V5, V6—12AX7
 V7—6X4
 Ch 1—8.5 H Smoothing Choke e.g. Stancor C1279
 T1—Power Transformer Pri. 117 v 60 cys Sec'y 1. 125 : 0 : 125v 50
 mA 2. 6.3 v 2.0 A
 e.g. Stancor PA-8421
 P 1—6-pin Jones Plug Chassis Mounting P-406-AB
 P 2—Any A.C. cord and plug
 SK 1—6-pin Jones Socket Cable Mounting S-405-CCT
 J1 to J13—Single-circuit Jack e.g. Mallory SC-1A
 J14, J15, Closed-circuit Jack e.g. Mallory A-2A
 M 1—4 1/2" Panel-mounting VU Meter
 4—9-pin Miniature tube sockets with shield base and shield
 2—9-pin Miniature tube sockets
 1—7-pin miniature socket
 1—3-ft. Length 6-core Cable e.g. Belden 8446
 1—17" x 4" x 3" zinc-plated steel chassis
 1—19" x 7" steel or aluminum rack-mounting front panel
 Sundry wire, solder, nuts, bolts, lockwashers, and mounting hardware.



Symmetrical placement of all input and output jacks leaves room for the fingers. The markings correspond with those on the selector switches on the front panel, the high-level inputs being referred to as "Bridging" inputs and marked as such.

Should You Buy a New Mike?

by
Mark Mooney, Jr.

. . . every sound you record passes through your microphone — do you have a good one?

THERE are two weak links in the recording and reproduction of sound. One is at the front end of the chain—the microphone—and the other is at the hind end—the speaker. Anything that may be done to strengthen either or both will improve results.

Generally, the tape recorder electronics are quite satisfactory and are capable of producing a wider range than either the microphone or speaker furnished with the unit.

So the answer to the question posed by the title of this article "Should You Buy a New Mike?" is "Yes" if you want better recording results. This desire may not come upon you at once. It is usually after you have had some experience with recorders and have learned how sound should "sound" that you realize an improvement can be made.

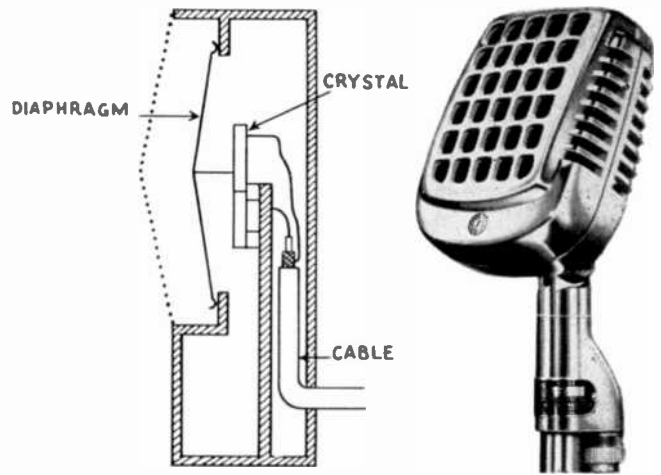
The microphones furnished with average home-type recorders are adequate for voice use and, in some cases, are also adequate for music.

One of the simplest and most obvious methods of selecting a better microphone is on the basis of price. In such matters as the purchase of a car, a radio or a suit, price is no absolute guarantee of quality however, without exception, the better the microphone the more it will cost.

One popular misconception about microphones is that the more expensive mike is more sensitive. In general, the exact opposite is true. A better microphone may be as sensitive as the cheaper ones but it is rare that it is more so.

Sensitivity is not one of the criteria in judging a good microphone. In purchasing a better mike, the buyer is paying for two things: flatter, more uniform frequency response and a broader band of response. Naturally, the better mikes are made of finer materials and have superb workmanship.

The first thing any professional recording engineer expects of a microphone is good frequency response. To get this he is willing to use microphones with low sensitivity. He uses recorders with a high degree of amplification and



At the left is a cross section of a crystal mike. It will be seen that the apex of the diaphragm is coupled to the crystal. The crystal is attached to the microphone case. The motion of the diaphragm deforms the crystal, producing an alternating voltage. Right: a crystal mike, the Shure 737A Monoplex. Its output is sufficient to drive any recorder and it is high impedance to match recorder inputs.

very low noise to overcome the lack or sensitivity of the mike.

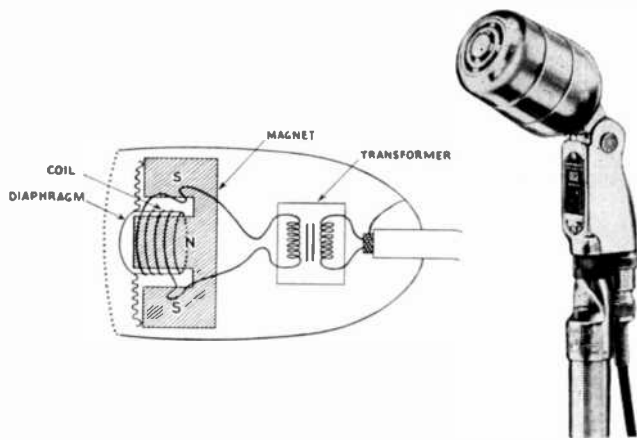
There are many characteristics which are desirable in a microphone. Everyone would like to have a mike of good output so that a number of tubes can be eliminated from the recorder. It would be nice to have a mike impervious to shock, and insensitive to temperature and humidity. Also, it should be small and as inconspicuous as possible. Nice as all these features are—the flatness of the response is the most important. Fortunately, most modern high-quality microphones have all these features.

But in the clamor for higher and higher frequency response many recordists have overlooked the fundamental—uniformity.

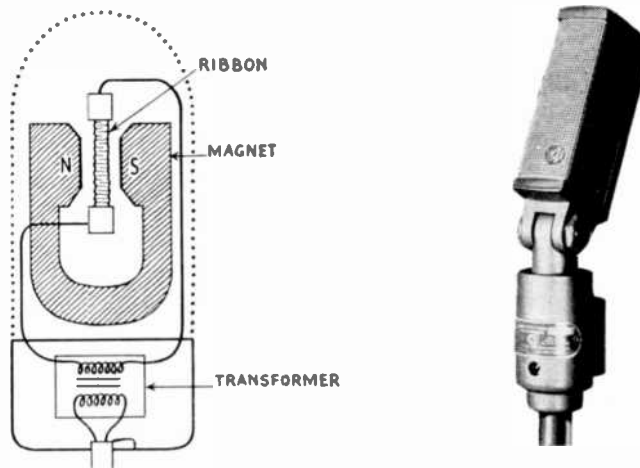
A comparison of the response curves of a number of microphones will quickly point up the difference. The mike of lesser quality will have peaks of output within its range of frequencies. It will produce stronger signals at some frequencies than at others. If the peaks are in the low region, the mike will produce a "boomy" recording. If it peaks high up in the frequency scale, sibilants in the voice will become objectionable. If it resonates in the middle frequencies, it may produce a hollow telephone-like sound.

The relatively inexpensive mike furnished with many home-type tape recorders has a strong output. In this way, the weight and bulk of the recorder may be reduced by eliminating the need for increased amplification and complex low-noise circuits. Consequently the possibility exists that some recorders may not have sufficient amplification built-in to enable the user to get results from a mike with a low signal output. In general the microphone should have a rating of 55 db or better if it is to be used with an inexpensive recorder. If a high-gain mixer or pre-amplifier is employed between the microphone and the recorder, then mikes of lower sensitivity may be used.

The best bet is to try the mike on your own recorder before making the final purchase. If its output is too low for your recorder, you will not be able to record your tape



Cross section of a dynamic mike. The output results from the motion of a conductor in a magnetic field. The coil is suspended within the magnet and is attached to the diaphragm. As the diaphragm moves it moves the coil and causes a current to be generated. Right: the Electro-Voice 630 Dynamic Microphone. Its output is about the same as a crystal mike and enough to drive a recorder.



The velocity or ribbon microphone. It uses a metallic foil ribbon suspended in a magnetic field with both sides of the ribbon accessible to the air. The ribbon is vibrated by the difference in sound pressure on the two sides, causing a current to flow. Right: Shure 333 Ribbon Microphone. This is an expensive studio-type microphone with low sensitivity but excellent frequency response.

with sufficient intensity even though you turn the recording volume all the way up. Fortunately, most tape recorders have considerable reserve gain but in using it, there may be an increase in amplifier noise with a resulting drop in the signal-to-noise ratio. Again, this can best be determined by actual trial, on your machine or a similar one.

Recordings made with a good mike will sound more natural. A cheap microphone tends to produce a "tinny" sound, losing the lows in such things as piano or organ music. This coupled with the peaks mentioned earlier tend to make the sound unnatural.

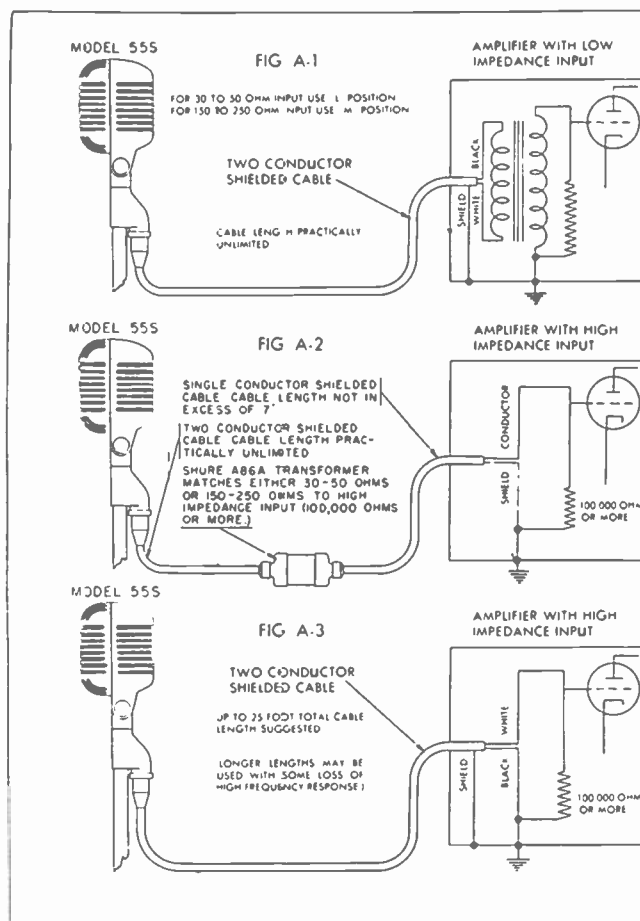
There are six principal types of microphones: ceramic, crystal, variable reluctance, dynamic, ribbon and condenser. Each has inherent advantages and disadvantages and the type of microphone should be selected with the kind of recording in mind.

The average recorder has either a crystal, ceramic or variable reluctance mike. The crystal mike, which usually has a range of from 100 to 8000 cycles, produces its signal by the bending of a crystal having piezoelectric qualities. (A voltage is generated when the crystal is deformed by sound waves.) Rochelle salt, barium titanate and ammonium dihydrogen phosphate crystals are used. Barium titanate is being used increasingly because it has a better frequency response.

The crystal microphone is susceptible to damage from high temperatures and humidity. At more than 120° F. it may be ruined and it should never be left in a hot car or in the direct rays of the sun. The crystal mike is also vulnerable to shock damage, although it will permit ordinary handling without harm.

One advantage of a crystal mike is that it has high sensitivity. It will pick up a weak sound some distance away and still put a strong signal into the recorder. Of all the mikes, the crystal is most likely to have the highest output (lowest db rating).

The variable reluctance mike is a moving armature type in which an armature is moved by the diaphragm in a coil



If the recorder has a low impedance input, as many professional recorders have, then it is connected as shown in the top illustration, using a transformer inside the recorder to match the grid. In the second drawing, a low impedance mike has been connected to a home type recorder with a high impedance input through the use of a matching transformer in the mike cord. The lower drawing shows how the connections must be made when long mike cables are used. The cable shield is grounded to the recorder chassis and the two wires carrying the mike current are fed to the grid.

of wire in a magnetic field. This mike is not affected by temperature or humidity and can also withstand considerable shock. It has better low frequency response than the crystal mike and in general produces better sound reproduction.

The dynamic mike has a coil attached to the diaphragm in the presence of a magnetic field. As the diaphragm moves the coil, a current is generated in it which is conveyed to the recorder input. The dynamic microphone is rugged, unaffected by variations in temperature or humidity and is generally of high quality.

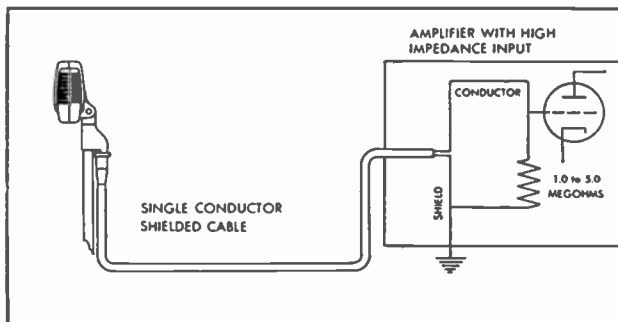
Unlike the previously mentioned mikes, the ribbon, or velocity, mike is operated by the particle velocity in the sound wave. It consists of a very thin foil ribbon suspended in a magnetic field with both sides freely accessible to the air. The ribbon is vibrated by the difference in sound pressure on the two sides, producing an electrical current.

The ribbon microphone is used extensively in professional recording work. While impervious to heat and humidity it is susceptible to damage by shock and wind.

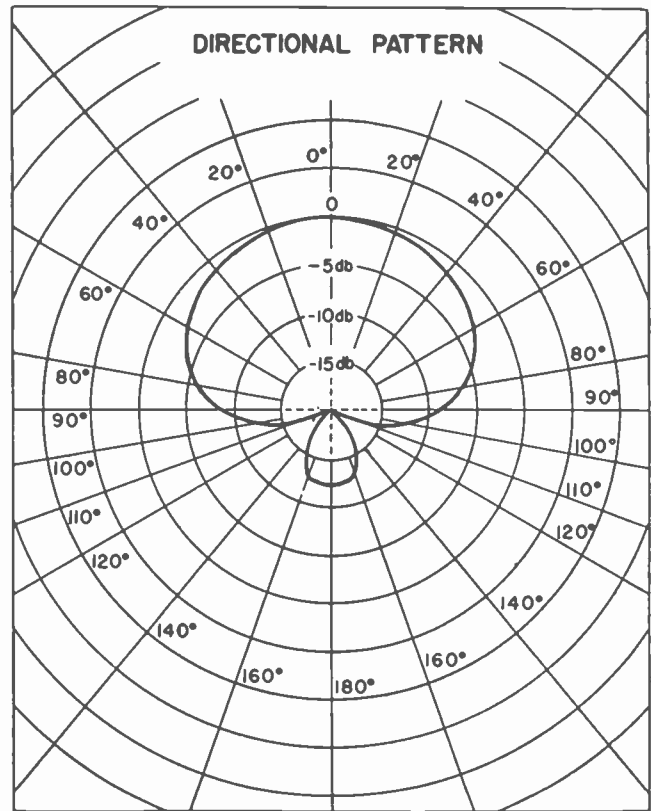
The condenser microphone has a thin foil diaphragm which is stretched a minute distance in front of a back plate. As the sound waves move the diaphragm back and forth, the capacitance changes and this produces the signal for the recorder. These mikes are extremely low level and must be used with amplifiers, not only to increase the output but to provide the necessary current to operate the mike itself. They are used mostly in professional applications. These mikes have wide frequency range, a non-directional field, low distortion and low internal noise. Its disadvantages are its non-directional field pattern for some applications, the requirement that a pre-amplifier be an integral part of the microphone and it must have a power source for the amplifier. If moisture gets into it, it may become noisy.

One other mike should be mentioned and that is the ceramic. This employs barium titanate and is similar in characteristics to a crystal mike except that the element is in the form of a ceramic slab. It may be operated at higher temperatures and humidity.

Microphones may be further divided into high and low impedance. The average recorder is built to take a high impedance mike. With one of these mikes a transformer is not necessary but there is a limit on the cable length, up to about 20 feet being maximum. The lines are sensitive to hum pickup unless adequately shielded. Crystal mikes are always high impedance, dynamics can be built



This illustration shows how a high-impedance microphone is connected to a home type tape recorder. Because the mike is high impedance it is coupled directly to the grid of the first vacuum tube in the amplifier which is also a high impedance load.



This directional pattern chart shows how a uni-directional mike picks up sound. The radial lines indicate the angle from dead center in front of the mike and the circles the amount of db. The heart-shaped, or cardioid, pattern shows that the mike picks up best from straight ahead and will pick up sound effectively up to 90° on either side. Past that point the sound pickup falls off. Only a very slight pickup is made from the rear. A mike like this is useful in cutting down background noise.

to have a wide range of impedances and ribbon mikes are very low. The impedance of the microphone must match that of the recorder input.

If a low impedance mike is used with a home-type recorder then a microphone transformer must be used in the line, installed close to the recorder.

A low impedance microphone may be connected to almost any length of cable without adverse effects.

Microphones may also be divided by their sound pickup characteristics. The pickup pattern of a unidirectional microphone is heart-shaped, or cardioid. This type is the most useful, covering about 90% of recording needs and it has the advantage of subduing background noise coming from behind the microphone. They also reduce the possibility of feedback.

The non-directional mike (eight-ball) picks up sound from all directions and is useful in conference recording. The ribbon, or bi-directional mike, picks up the sound from front and back with the sides practically dead.

In making your choice of a new mike, establish first what you will be using it for, then select a mike most nearly fitting your needs. Be sure that your recorder will be able to handle it, or provide pre-amplification so it can. Take into account the amount of handling and possible rough usage it will receive.

Once you have made the selection, get the best mike you can afford. You will be pleased with the difference.

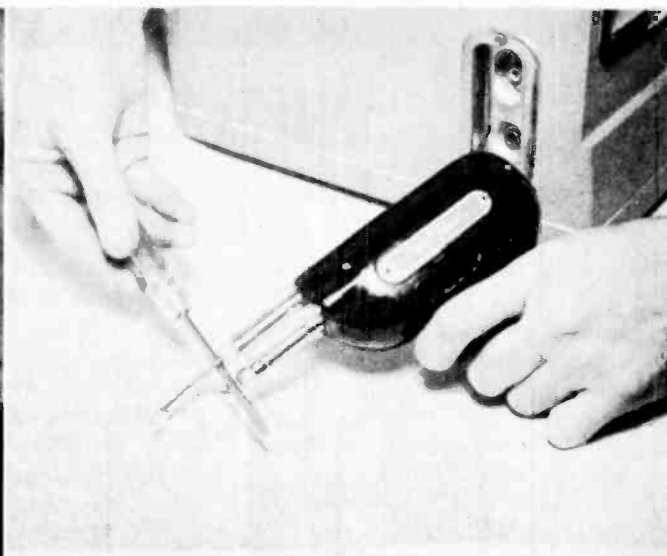
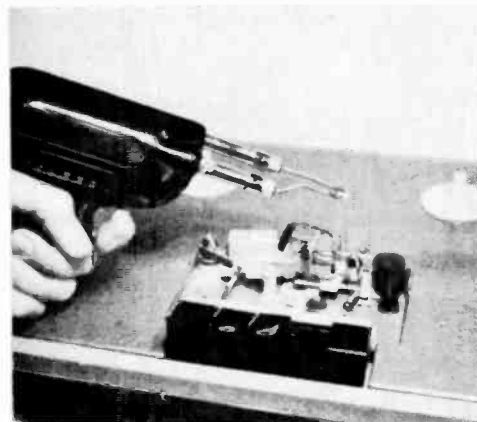
TAPE TIPS

by John Comstock



Left: For better sound reproduction, tack acoustic material to inside surfaces of cabinet to absorb speaker's backwave and reduce mechanical resonance.

Right: If you suspect playback head is "burned out" (open), put controls on playback and bring plugged-in soldering gun or iron near the head. If squeezing the trigger gives hum in output, head is okay. Check all tubes before making this check.



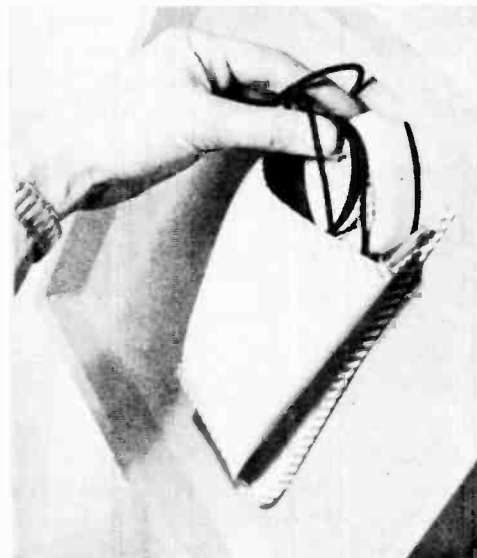
Below: Length of plastic wire "spaghetti" plastic taped to cleaner-lubricant applicator lets you reach inaccessible places easily.



Middle, left: Clean the fan blades with a soft cloth occasionally. The weight of accumulated dust can upset motor speed appreciably. Avoid bending blades.

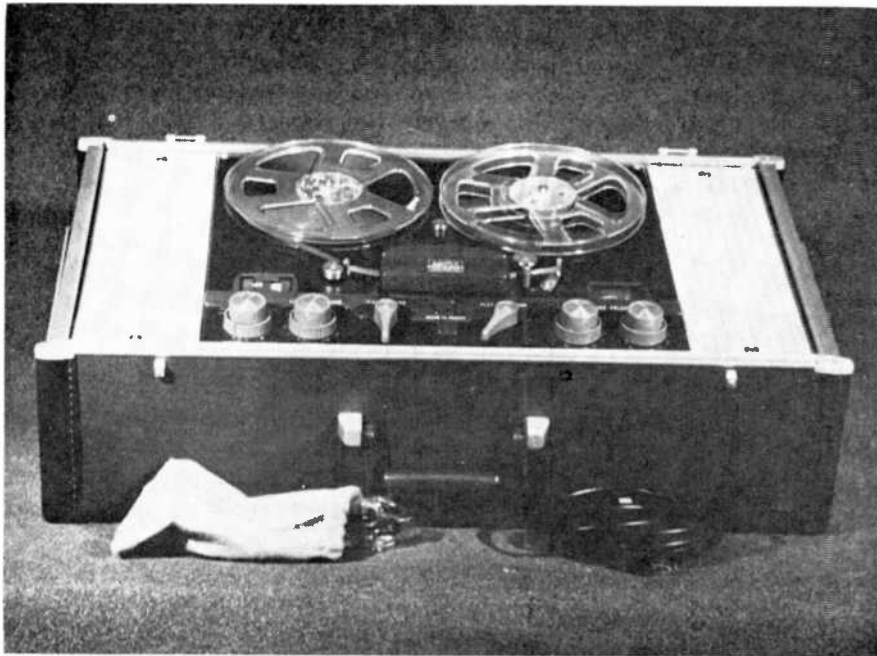
Middle, right: Demagnetize tools before using them around recorder's head to prevent magnetic induction. Use soldering gun, head demagnetizer or bulk eraser.

Bottom, right: Pocket cut from old shoe bag tacked to inside of recorder's lid holds mike conveniently. Also, plenty of room for other accessories.



NEW PRODUCT REPORT

STA **OK** STED



AMPEX 970

. . . unit features monitoring facilities for stereo playback

THE Ampex 970 has the same operational features as the model 960 however, a stereo amplifier and speakers have been added within the case so that the unit will play tapes without the need of connecting it to external amplifier-speakers, as is the case with the 960.

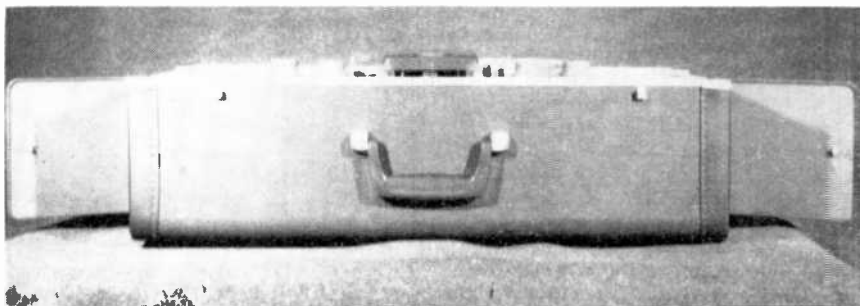
The amplifier is a stereo amplifier of 3 watts capacity (1.5 watts per channel) and has a total peak power output of 6 watts.

The purpose of this stereo amplifier is to provide monitoring facilities and Ampex suggests that the unit be connected to an external amplifier-speaker

system, such as their 2010, or its equivalent in order to obtain the maximum quality of which the machine is capable.

A novel development in this machine is the door-like "sound directors," one on each side of the case. These may be opened up to 80° for the purpose of directing the sound forward. A grille on each end of the case also permits the sound to emerge.

While the two foot separation provided by the case is too close for full stereo effect, nonetheless, rather satisfactory results are obtained with the sound directors opened despite the



On each side of the case are the "sound directors" which may be opened up to 80° for directing the sound forward to provide the desired stereo acoustical pattern in the immediate monitoring area.

Product: Ampex 970

*Manufacturer: Ampex Audio,
Sunnyvale, California*

Price: \$595

short base line.

If the directors are opened full and the unit placed catcornered in the corner of a room, the walls may be used as reflectors to give greater separation.

The 3-watt amplifier is sufficient to give a room full of sound.

In place of the output jacks on the 960 the 970 has an additional panel which contains right and left external amplifier jacks and left and right headset jacks.

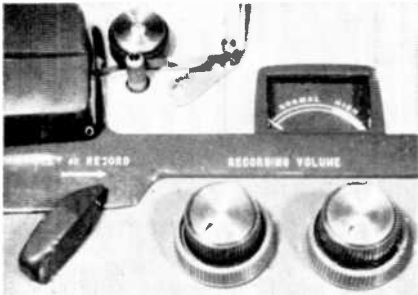
The external amplifier output jacks are the same as the 960 with an output of .75 volts for driving an external amplifier-speaker.

The headset jacks are connected to the output of the internal monitor amplifiers and may be used for monitoring through a headset. If desired, full-range external speakers with a voice coil impedance of 4 ohms may be plugged into the jacks to provide wider speaker separation than provided by the speakers in the case. When headsets or external speakers are plugged into these jacks, the monitor speakers are disconnected.

Inputs for the radio/phonograph are located in the center panel on the back of the case and accept standard RCA type phono plugs. The microphone inputs are in another panel on the left of the case. The inputs are for high-impedance microphones.



The case measures two feet in length, giving sufficient separation for stereo effect when in front of the unit. Case is finished in grey with brushed aluminum trim.



Top: left side of recorder has counter, playback/recording selector and listening volume knobs, fast forward and rewind control, record and stop button. Lower: right side of unit has recording volume controls for radio/phone and microphone, play/record lever and VU meter. Capstan and roller with end of tape cutoff switch is above knobs.



To insure optimum output from both two and four track tapes the head can be shifted by moving a lever at the rear of the head cover. Speed change knob is in foreground.

The tone control is mounted on the right side of the case behind the director door. This control is treble, plus or minus. With the control in full clockwise position, the frequency response of the amplifier is flat over its



Sound director doors are on each end of case. Above hand can be seen the treble control which goes from flat position to considerable attenuation of the treble.

full frequency. With the control in the opposite position, the treble is attenuated. Somewhere between the two extremes will be found the spot that gives the most pleasing sound.

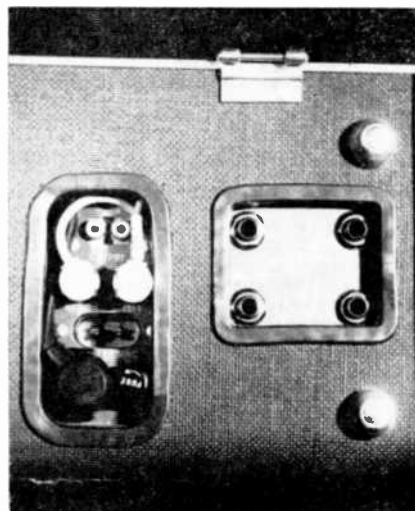
The Model 970 is not light in weight, tipping the scales at 48 pounds. In size it measures 9 x 15 x 25½ inches.

As has been mentioned, the basic mechanism is the 960, which is a very versatile unit. It will play either two or four track stereo tapes, or monaural, and record two track stereo. The head shift lever shown in the photo gives maximum playback from either.

The controls are grouped along the front edge of the recorder and include: on-off-stereo/mono selector (playback or monitor) mono or stereo record, listening volume, phono/radio input recording control, microphone input control, fast forward and rewind, play and record tape motion, stop and record interlock. Unit also has automatic shutoff, two speeds, 3¾ and 7½ ips and an index counter.

The machine is easy to operate but you will need to read the instruction book carefully if you plan to take advantage of all of the advanced recording techniques within the possibilities of this unit.

The addition of the speakers in the case makes it possible to carry the stereo rig as one package, instead of three as formerly required. While the intent of this new feature is monitoring, it does provide fairly good listening as is, which can be improved, of course, by the regular external amplifier-speaker for large areas.



Inputs and outputs are conveniently grouped on rear of case. Mike inputs (not shown) have separate panel. Inputs include radio/phone and line; outputs for headset and external amplifier.

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Listening to a recording with excessive noise level is like looking at a photograph that has a flat, gray tonal value with low contrast.



Reducing the noise level is like seeing a more "contrasty" copy of the same picture — all tones are clean and sharp.

Improving "contrast" by reducing background noise

BACKGROUND noise is the low-level hum or hiss heard during quiet portions of a recording, where no recorded signal is present. Obviously, this background noise should be kept as low as possible. Since it effectively blankets the lower-volume recorded sounds, it limits the dynamic range (or contrast) of your recordings. Background noise in a tape recording is usually less of a problem than with a phonograph record. But the true audiophile will go to great lengths to reduce it to the absolute minimum because its effect, though subtle, can be very irritating.

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