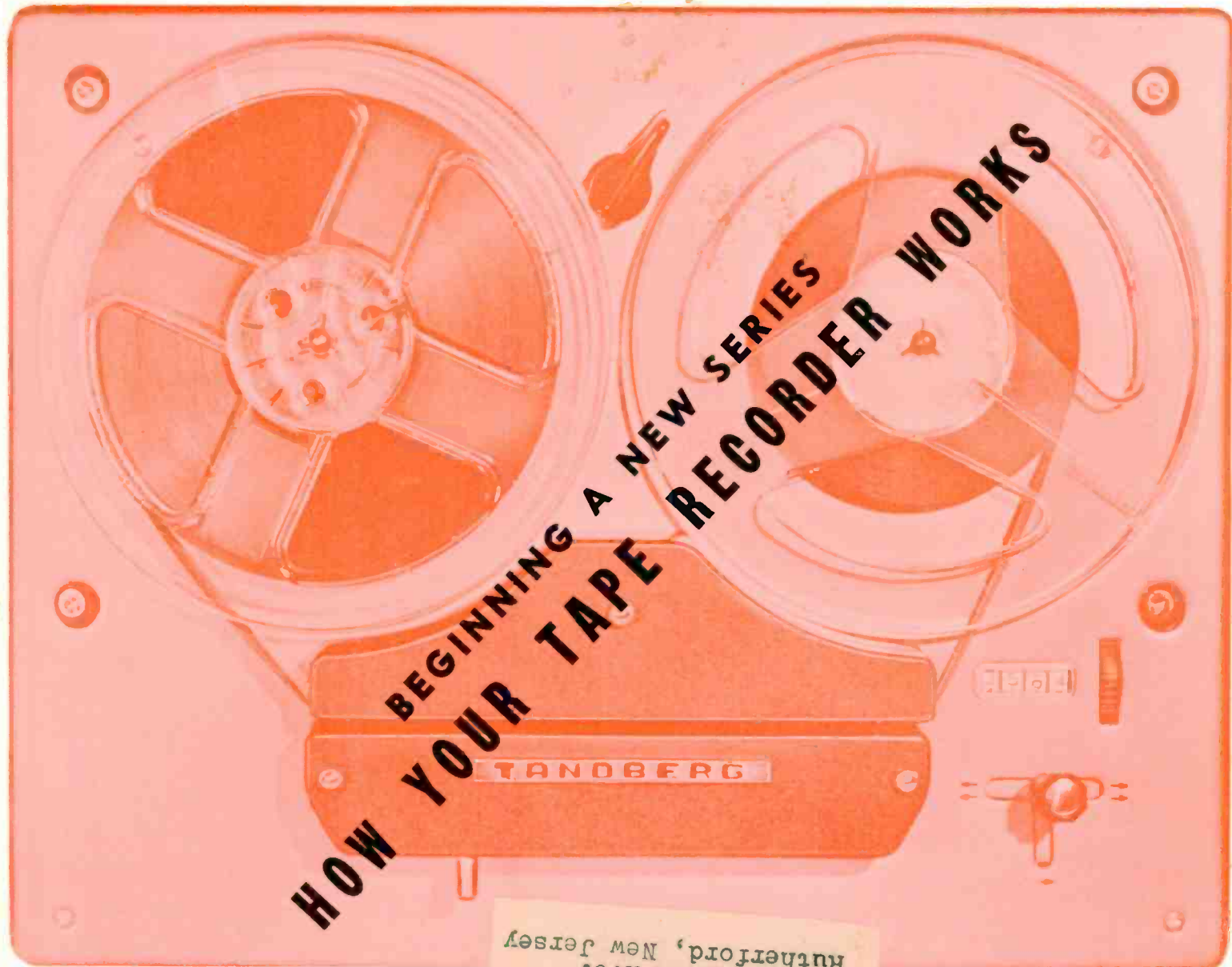


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231 Woodland Ave.
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January, 1962

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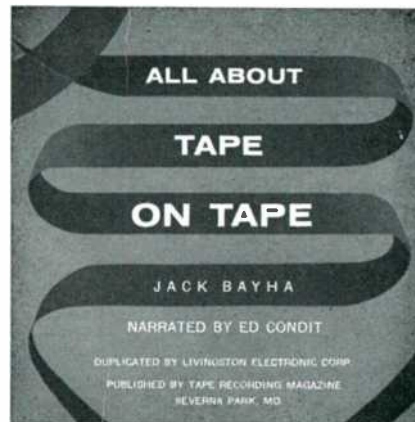
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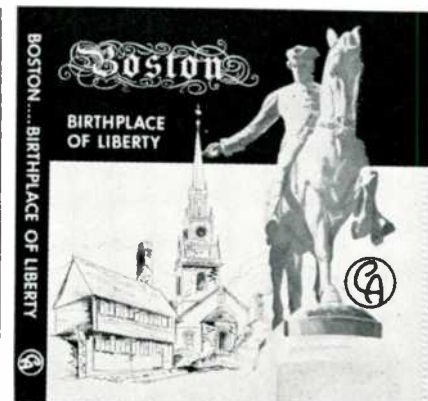
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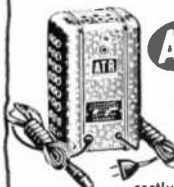
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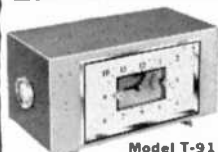
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TAPE RECORDING

VOL. 9 No. 2

JANUARY 1962

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NEW TAPES

★—Fair

★★—Good

★★★—Very Good

★★★★—Excellent

CLASSICAL

Reviewed by Robert E. Benson



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

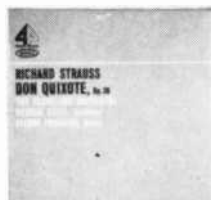
MAHLER: Symphony No. 4 in G Major
Sylvia Stahlman, soprano; Amsterdam Concertgebouw Orchestra conducted by Georg Solti

LONDON LCL 80075
4-track, 7½ ips
\$7.95...54 mins.

Early this year the London (English Decca) engineers ventured to Amsterdam for the first time in about ten years to record once again the great Concertgebouw Orchestra. Two performances were recorded—Mahler's *Fourth Symphony* conducted by Solti, and highlights from Tchaikovsky's *Swan Lake Ballet*, with Anatole Fistoulari conducting, the latter not yet available on four-track tape.

In the late forties, London issued a long series of Concertgebouw recordings, monophonic of course, which even by today's standards are superb recreations of the sound of this wonderful orchestra playing in the unmatched acoustics of its own hall. The orchestra has been recording for Epic (Philips) since leaving London, and although there are some notable exceptions, a majority of the orchestra's Epic recordings are quite inferior technically, hardly presenting an accurate tonal portrait of it, so it was with great anticipation that this new tape was received.

From a technical standpoint, this is stunning, although with a bit more hall sound it would be even better. There's plenty of left and right, enormous dynamic range, and very low tape hiss. Orchestral playing is superb; no other orchestra plays Mahler as well as the Concertgebouw, and one might single out the magnificent horns and glorious woodwinds. Solti is one of the most versatile of today's conductors and his sympathies include Mahler's music; this version is preferred over its four-track rival with Fritz Reiner and the Chicago Symphony (RCA FTC 2027, \$8.95) and it costs a dollar less. Sylvia Stahlman's bright soprano and accurate intonation are ideal for the Angelic solo in the last movement. After this auspicious start, we look forward hopefully to a long and continuing series of Concertgebouw recordings on the London label.



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

STRAUSS: Don Quixote, Op. 35
Pierre Fournier, cellist; Cleveland Orchestra
conducted by George Szell

EPIC EC 815
4-track, 7½ ips
\$7.95...40 mins.

Don Quixote is a symphonic poem for solo cello and orchestra based on the Cervantes figure, and consists of an introduction, theme with ten variations representing the various adventures of the *Don*, and a finale. Strauss's score is one of his most intricate, a showcase for the magnificent Cleveland Orchestra, which is now second to none in the United States.

George Szell might be called a "cold-blooded" Strauss specialist; *Don Quixote* could use more sentiment than he provides. However, his sure command is ever apparent, and it is unlikely there will be a better performance for some time to come. Pierre Fournier is today's leading interpreter of the cello solo representing the tragic figure of *Don Quixote*, and now his performance has been immortalized in stereo; an earlier monophonic recording with Clemens Krauss and the Vienna Philharmonic has been deleted.

Epic's sound is exemplary, with resonance, warmth, depth and plenty of zing. The only possible disadvantage to this release is that the music is interrupted for the tape turnover. Too bad this couldn't have been coupled with another of the Strauss major symphonic poems of similar length, with each uninterrupted. Regardless, this is a tape to cherish.



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

RAVEL: Daphnis and Chloe (complete ballet)

New England Conservatory Chorus; Boston Symphony Orchestra conducted by Charles Munch
RCA FTC 2089
4-track, 7½ ips
\$8.95...56 mins.

It's interesting to note that this is Munch's second stereo recording of this music; his earlier one, also with the Boston Symphony Orchestra, is available only on a 3¾ ips cartridge. This new performance is, of course, superb, but if I had to make a choice between the two versions, I would chose the earlier one, because it has better sound.

Perhaps some listeners will like the kind of reproduction on this new tape. It is remarkably transparent, and of wide dynamic range. However, the Boston Symphony sounds colorless as recorded here, with a distant pickup, and tympani that sound all out of proportion to the

rest of the orchestra. The Boston Symphony surely deserves better than this.

Tape hiss is very low, but there is some print-through of the overly-prominent tympani. The Monteux-London Symphony version on London L 80034, \$7.95, is preferable to this, but we must still wait for a truly great recording of this music.



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

BEETHOVEN: Wellington's Victory Symphony, Leonore Overture No. 3, Prometheus Overture

London Symphony Orchestra conducted by Antal Dorati, with cannons, howitzer, muskets, and spoken commentary by Deems Taylor

MERCURY ST 9000
4-track, 7½ ips
\$7.95...43 mins.

The musical interest of this tape is negligible; *Wellington's Victory* is a minor work of Beethoven to say the least, and Antal Dorati is hardly at his best conducting his music.

However, if you want a tape to stun your friends, this will serve the purpose nicely. There are no less than 188 cannon blasts imposed on the music, plus various muskets, producing an extraordinary amount of noise. Mercury obviously intends this to be the successor to their enormously successful recording of Tchaikovsky's *1812 Overture*. If you're interested in this sort of thing, you must have this tape.

Morton Gould's Victor tape (FTC 2006, \$8.95) of *Wellington's Victory* is rather tame going by comparison, but perhaps a better buy as it is coupled with Grofe's *Grand Canyon Suite*, recorded with some rather unusual spacious effects.

SEMI-CLASSICAL



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

GAITE PARISIENNE (OFFENBACH)
Gayne Ballet Suite, Khachaturian
Boston Pops Orchestra/Arthur Fiedler
RCA FTC-2045
4 track, 7½ ips
\$8.95...36 mins.

When the Boston Pops and Arthur Fiedler combined their efforts on "Gaite Parisienne," there could be only one result—"Pops is Tops." Offenbach himself, would applaud the lively, spirited treat-

ment that emerges from Fiedler and his baton, as he leads the orchestra merrily along through a colorful interpretation of this classic of all concert programs.

While this offering has appeared sometime previously in a 2 track version (RCA, ECS-15), it is just as sparkling and pleasant on the 4 track medium, and just as desirable. However, I wish the engineers had found a better place to end the "A" side than the abrupt stopping in the middle of a musical passage.

The Khachaturian Ballet Suite, while tacked on somewhat as an afterthought to fill out the tape, gives a splendid account of itself, through the Fiedler interpretation and, of course, is a welcome addition to an already pleasing tape.—*F. N. West.*

SHOWS



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

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Mantovani and His Orchestra
LONDON LPM 70042
4 track, 7½ ips
\$6.95 .. 36:10 mins.

You never have to wonder whether a Mantovani tape will be good—you just know it will pay rich musical dividends. This tape begins with the title and theme music followed by the folk tune "Karen," both from the film "Exodus."

It continues through some of the best themes from recent movies and shows and, combined with the deftness which is a Mantovani trademark, becomes 36 minutes of delightful listening. Among other things, it is a real delight to hear music as he plays it, rather than have it distorted by electronic magic into a musical checkerboard, which seems to be the vogue at present with so many recordings.

An excellent investment for your library.—*F. N. West.*

POPULAR



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

FOR THE YOUNG AT HEART

Sequence A: When You and I Were Young, Maggie, Young at Heart, I Was Young and Foolish, Too Young, You Make

Me Feel So Young, Like Young
Sequence B: Hello Young Lovers, Especially for the Young, Too Young to Go Steady, While We're Young, Young Love, When Hearts Are Young

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RCA FTP-1071
4 track, 7½ ips
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It's all tied together with a little swinging beat throughout, but on the sweet side.

Sound is rich, vibrant and well recorded.—*F. N. West.*



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

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4 track, 7½ ips
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Music ★★★★★
Performance ★★★★★
Fidelity ★★★★★
Stereo Effect ★★★

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Some of the most interesting developments in tape recording are taking place in old-established factories and laboratories in Europe. The fullest information about them appears regularly in *TAPE Recording Mogozone*, published in London, England, since February 1957.

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TAPE

RECORDING MAGAZINE

7 Tudor St., London, EC4, England

Someone To Watch Over Me, Don't Bring Lulu, Sweet Georgia Brown, Clap Hands! Here Comes Charley, Do-Do-Do, It Had To Be You and others

Music from the TV show; songs by Dorothy Provine and the Music of Pinky and her Playboys

WARNER BROS. WST-1394

4 track, 7 1/2 ips

\$7.95...36 mins.

Very young people sometimes wish they were older. Older people are always wishing they were younger. The reason for this must be the music of the Twenties. Who wouldn't want to have lived during this period and who wouldn't wish to go back and relive it.

Dorothy Provine (Pinky), The Chorus Girls and The Trio have accomplished this miracle and for the price of this tape you too can have your wish.

Thirty authentic tunes of the times sung and played with all the realism and feeling as only an old timer can vouch for.

To the vast TV audience Dorothy needs no sales pitch and this is not a sales pitch —just an enthusiastic invitation to enjoy this Warner Bros. contribution to the musical history of the Twentieth Century. —C. Parody.

PERCUSSIVE OOMPAH

Beer Barrel Polka, Liechtensteiner Polka, Pennsylvania Polka, Too Fat Polka, Good-bye, Trink, Trink, Bruderlein, Trink, O Du Lieber Augustin, The Happy Wanderer.



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

Auf Wiederseh'n Sweetheart, Mack the Knife, Accordion Joe, In Munchen Steht Ein Hofbrauhaus

Rudi Bohn and His Band
LONDON LPL 74009

4 track, 7 1/2 ips

\$7.95...27:35 mins.

The Phase 4 technique makes the old time German Band take on a new modern sound, with Bongos and Maracas added to enhance the percussive effect. This colorful tape has Rudi Bohn and his excellent musicians romping merrily along through a group of old country favorites in a rollicking, beergarten style.

Marches, polkas and drinking songs are dispensed in happy, foot tapping rhythms that will appeal to everyone.

The entire tape is a barrel of fun whether you want to sing, dance, or just listen.—F. N. West.



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

MELODY & PERCUSSION FOR TWO PIANOS

Unforgettable, Secret Love, To Each His Own, Ruby, April in Portugal, My One and Only Love, Autumn Leaves, Misty, Golden Earrings, Young At Heart, April Love, The Gypsy

Ronnie Aldrich and His Two Pianos

LONDON LPL 74007

4 track, 7 1/2 ips

\$7.95...32:50 mins.

In this tape of "Melody and Percussion for Two Pianos" effective use is made of the Phase 4 recording technique in overcoming the difficulties of properly recording the piano and the result is an album of twin piano music of amazing clarity and balance. Ronnie Aldrich, a superb artist, knows his way around two keyboards as he weaves the various moods of a dozen popular melodies in a charming program.

He is supported by a percussive group that supplies the tonal effects which do not intrude upon the music but, rather, support the firmly placed left and right pianos.

The sound is rich, warm and brilliant.—F. N. West.



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

PERCUSSION IN THE SKY

You Are My Lucky Star, The High and The Mighty, Don't Let the Stars Get in Your Eyes, I've Got the Sun in the Morning, Blue Moon, Look for a Star, Moonlight Becomes You, Over the Rainbow, I'm Sitting on Top of the World, The Moon Was Yellow, Stairway to the Stars, When You Wish Upon A Star

Werner Muller and His Orchestra

LONDON LPL 74008

4 track, 7 1/2 ips

\$7.95...34:25 mins.

Werner Muller and his orchestra take on a celestial sound in this tape as he creates a sky mood with songs of the sun, moon and stars.

Through the medium of London's phase 4 sound, his imaginative scoring and arrangements create new and exciting impressions of old standards such as "Sun in the Morning," "Blue Moon," "Stairway to the Stars" and others.

The strings and brass as well as the rest of the orchestra are balanced against each other as they go into orbit and flit back and forth across the speakers to create a spacious hi-flying sound.—F. N. West.



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

TONY BENNETT SINGS A STRING OF HAROLD ARLEN

When the Sun Comes Out, Over the Rainbow, House of Flowers, Come Rain or Come Shine, For Every Man There's A Woman, Let's Fall in Love, Right as the Rain, It Was Written in the Stars, What Good Does It Do, Fun to Be Fooled, This Time the Dream's on Me, I've Got the World on a String

Tony Bennett; songs arranged and conducted by Glenn Osser

COLUMBIA CQ 356

4 track, 7 1/2 ips

\$6.95...45 mins.

Tony sings a dozen songs by Harold Arlen, some that are not too well known, but most of them here written for stage or screen. He sings in a straightforward style but after a few songs all done in the same tempo, the listening becomes monotonous. One of Tony's best characteristics is sincerity and he really gives in this one. His fans will love this effort.

Columbia's recording is bright and clean. Glenn Osser brings the musical background to top height in brilliance and fullness. If you like Tony Bennett, you'll like this tape.—F. N. West.



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

PIANO ITALIANO

Side 1: Three Coins in the Fountain, Arrivederci Roma, O Sole Mio, Mattinata, Love Theme From La Strada
 Side 2: Funiculi Funicula, Come Back to Sorrento, Theme from La Boheme, Volare
 George Greeley, guest pianist with the Warner Bros. Orchestra
WARNER BROS. WSTC-1402
 4 track, 7 1/2 ips
 \$7.95... 30:50 mins.

This album is really a sentimental repetition of concerts George Greeley played with his father thirty years ago. Displaying faultless piano technique, he is supported by the Warner Bros. Orchestra and Mandolin Choir. This group, of course, provides the flavor which sets the stage for the rendition of these great Italian melodies. All beautifully performed with good stereo separation, exceptionally clean recording and sparkling arrangements. First rate listening!—*F. N. West*



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

SKIN TIGHT

Sequence A: Perdido, Allah's Holiday, Caravan, Lover, Song of India, You're Just in Love
 Sequence B: Hindustan, Dry Bones, How High the Moon, Opus One, Hawaiian War Chant, Jungle Drums
 Marty Gold & His Orchestra
RCA FTP-1043
 4 track, 7 1/2 ips
 \$7.95... 32 mins.

There is real significance to the title—Skin, in this instance, means drums, several dozen of them, including one dozen kettle drums tuned to provide a range of two complete octaves. This happy percussive family is used, not to produce a collection of dull thuds and bangs, as you might suspect, but to make music!

The result is surprising. Of course, the drums are prominent, because this is a percussion tape, but not to the exclusion of the melody. It's different and lots of fun to listen to, especially if you are drum enthusiasts. A good recording with plenty of stereo separation.—*F. N. West*



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

GOLDEN HIT INSTRUMENTALS

Side 1: Bonanza, Apache, Ja-Da, Wheels, Ram-Bunk-Shush, Pepe, Calcutta
 Side 2: Wonderland by Night, Hearts of Stone, Bounty Hunter, Asia Minor, Honky Tonk
 Al Caiola Guitars with Orchestra
UNITED ARTISTS UATC 2229
 4 track, 7 1/2 ips
 \$7.95... 28 mins.

Attention rock and rollers—this is strictly for you. Most of these tunes were, or are still, very popular with the teenage R & R's.

The beat is definitely, but definitely, there. Any teenage gathering will want to play this again and again.

One particular song on this tape really sends yours truly. It is the one slow selection in the group—Wonderland by Night. Its appeal goes beyond the teenagers and reaches those of us who like a slower rhythmic tempo.

Al fingers his guitar like it was made just for him, and he uses a bassy string effect that adds a little extra to each rendition.

Every twanggggg is perfectly reproduced which is only natural, cause after all folks—it's on tape!—*J. M. Cover*.

SEASONAL



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

A CHRISTMAS OFFERING

Silent Night, Hark! The Herald Angels Sing, We Three Kings Of Orient Are, Angels We Have Heard on High, O Tannenbaum, God Rest Ye Merry, Gentlemen, It Came Upon A Midnight Clear, Vom Himmel Hoch, Sweet L'il Jesus, Ave Maria, O Holy Night, Alleluja
 Leontyne Price (soprano); Herbert Von Karajan conducting members of The Vienna Philharmonic Orchestra
LONDON LPM 70049
 4 track, 7 1/2 ips
 \$6.95... 60 mins.

We just received this lovely Christmas tape and although this is our January issue, it is distributed in December, so we decided to include this seasonal tape review.

The combination of soprano Leontyne Price and Herbert Von Karajan conducting members of the Vienna Philharmonic is a happy one indeed. Each thoroughly appreciates the artistry of the other and thus each strives to enhance the other's contribution. By so doing, they have come up with a recording which glides smoothly along, and is a pure delight to listen to or, if you wish, to sing along with.

The crystalline voice of Miss Price is predominant above the choral backing. It is powerful, but never harsh.

Most of the selections for this release are of the inspirational type rather than the newer bouncy, swinging Christmas ditties.

Everyone participating in this recording seems to effect the harmony which surrounds the Christmas season, not excluding the engineers who have flawlessly reproduced the sound.

This tape is well worth its economical cost.—*J. M. Cover*.



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CROSSTALK

from the Editors

THERE IS ONLY one word that can be used to describe the future of magnetic tape and that word is "Fabulous".

* * * * *

EVERYTHING NOWADAYS IS expanding at an exponential rate. In the years past, the growth curve of births, developments, industrial production and other things showed a steady slope upward. But indications are today that the curve is climbing almost vertically.

* * * * *

WE ARE NOW talking in terms of a population explosion, the more people who are born in turn produce still more people. Or take the matter of speeds. For centuries man's speed was limited to how fast he could run. Then came the horse which advanced his speed to about thirty miles an hour. Then the train which went up to sixty, then the automobile which jumped the speed to the neighborhood of three hundred, this was followed by the airplane with current speeds in the four-thousand mile range and this by the rocket with speeds up to 25,000 miles an hour. Each of these developments took far less time than the one preceding and was accomplished in a shorter number of years. Thus any curve showing the growth of speed would become steeper and steeper as the changes became not only greater from step to step but the time interval also became shorter.

* * * * *

A LOT OF PEOPLE have for years talked about the growth of the tape recorder and, while sales have not gone up exponentially in the past there are some reasons for believing they will do so in the future.

* * * * *

LET'S LOOK AT PROGRESS in the audio field. It was some eighty-five years ago that Edison made the first sound recordings. Fifty-five years later the principles of stereo were laid down. Fifteen years after that the first tape recorders became available. Five years later the microgroove record came about and about one year later the first stereo appeared on tape. As you can see, the advances are coming at shorter and shorter intervals. Since the days of the first tape recorders about fifteen years ago we have seen the recorders go from full track at 15 ips down to four track at 3-3/4 ips with 1-7/8 ips projected but not yet here. Each step has meant that tape has improved in quality and come down in price. Each of these steps likewise has made its use more attractive to the consumer. . . . which meant more recorders could be sold. People who wanted a recorder but felt it was too expensive no longer had this as an excuse for not buying one.

* * * * *

IT WOULD TAKE only more volume to bring the prices of recorded tapes even with or below the prices of disc records. It is already possible in the field of monaural tape using four tracks. A five inch reel of tape can hold two hours of music at the 3-3/4 ips speed—this is equivalent to three or four record albums having a retail value of about twelve dollars or more. We believe the tape could be made to retail at about half the price of the discs. The four-track "twin-pack" stereo tapes now on the market are significantly cheaper than the equivalent time on stereo discs.

* * * * *

THE CURVE of the tape recording business has been a gradual slope upward over the years. We believe that there are now signs that it will shortly reach the exponential point and start upward at an astounding pace. Since there is hardly a facet of life as we know it today which is not progressing at ever increasing speed, there is no reason to believe it will be otherwise with tape.

INDUSTRY NEWS



Stars of "Bachelor in Paradise"—Bob Hope and Janis Paige.

WBCOR is mighty happy with the fine display of their Regent Coronet recorder in Bob Hope's new picture, "Bachelor in Paradise." Hope acts the part of a researcher and uses the recorder for note-taking on the lives and mores of people here and abroad. Dealers are tying in with promotions when the picture hits town. It was released in the first week in November.

The Kansas City Webcor distributor is promoting a contest to choose Kansas City's most ideal bachelor. The winner will receive an all-expense paid trip to Chicago including tickets to the Bears game and a night on the town. A similar contest is being held in Dallas in cooperation with radio station WBOX.

If you want a good laugh, see the picture when it comes your way.

H. R. (Bud) LETZTER, former Webcor vice president and general sales manager who recently left the firm, has been named national Sales Manager of the Hammond Organ Company. He had been with Webcor since 1948.

SUPERSCOPE, marketers of the Sony line of recorders, has issued a 16-page catalog of their tape recorder and microphone line. It gives full specifications and a copy may be had on request to the firm at Sun Valley, California.

ARMOUR RESEARCH FOUNDATION is suing 3M Company for royalties it claims are due under a patent license contract. 3M has asked for dismissal of the suit on the basis that the patent has been declared invalid.

The MAGNETIC RECORDING INDUSTRY ASSOCIATION will again sponsor the San Francisco Home and High Fidelity Show, according to James Logan, director of the event. The show will be held March 7 to 11 in San Francisco's famed Cow Palace. The attendance at the 1961 show topped 37,000.

BETTER BUSINESS BUREAU—MRIA booklet on tape recorders will soon move into a second printing bringing the total up to over 100,000 copies. The booklets are available through local BBB offices and through shops selling recorders.

THE 1962 NAVA convention will be extended by another day. This was an-

nounced by Executive Vice President Don White after a count of ballots by exhibitors revealed they favored the extension by a vote of 52 to 36. The NAVA convention has grown steadily in importance over the years and will become increasingly important as schools up their use of teaching aids. The 1962 convention is scheduled for the hotel Morrison in Chicago, July 21 to 23.

NORELCO, 230 Duffy Avenue, Hicksville, L. I., has just issued a colorful brochure on their line of recorders and speakers. Copies may be had on request. It features a buyer's guide and condensed applications chart for all Norelco recorders.

AMPEX AUDIO, 1024 Kifer Road, Sunnyvale, California, has added two new tape recorders to its line. The units are known as the "Fine Line" series and will both record and play 4-track stereo.

INSTITUTE OF HIGH FIDELITY MANUFACTURERS has instituted an advertising campaign in some general magazines extolling the virtues of components over "package" goods. This is the first time the organization has undertaken such an effort to reach a broader segment of the public.

ROBERTS ELECTRONICS, INC., is now merchandising its own brand name of raw tape and has designed an attractive display rack for dealer use. The firm is at 5920 Bowcroft Street, Los Angeles 16, Cal.

GEMA, the German musicians and composers society, has won a legal victory in its campaign to collect royalty payments from tape recorder owners in Germany. The West Berlin court ruled that mere ownership of a tape recorder is evidence of intent to tape music! Following this line of reasoning, the court declared that GEMA is justified in demanding an annual royalty payment from each tape recorder owner on the premise that he is taping music controlled by the society.

If the recorder owner refuses to pay then he must furnish proof that he is not taping music and that he will not tape music for the rest of the year. The court has thus shifted the burden of proof from GEMA to the tape recorder owner. The annual royalty would amount to about \$2.50.

Actually the legal victory is a rather empty one since there is no practical way of enforcing the decision. GEMA could set up a sleuthing arm but the cost would be prohibitive.

GEMA has also been thinking of demanding that tape recorder manufacturers keep lists of purchasers of their equipment and turn these over to GEMA. This would require another court decision since the manufacturers refuse to do it. Another possibility lies in levying a fee on each recorder made which the manufacturer would pay and pass along to the purchaser. Manufacturers likewise take a dim view of this scheme.

Now, with the court decision, the society has visions of annual royalties—the problem is how to collect them.

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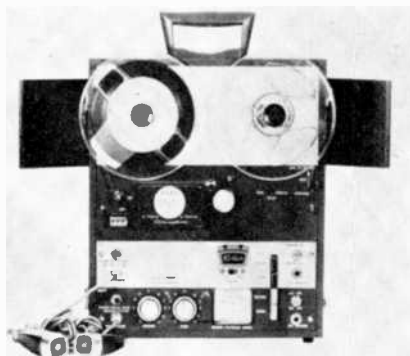
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NEW PRODUCTS

ROBERTS STEREO RECORDER



Roberts Electronics, Inc., 5920 Bowcroft Street, Los Angeles 16, Calif., has announced its 1040 stereo tape recorder. This machine can record FM multiplex stereocast; it features 4-track stereo and monaural record/play; 2-track stereo and monaural play; sound-with-sound using either track as a basic track; dual self-contained power stereo amplifiers and dual built-in extended range stereo speakers. Tape speeds are $7\frac{1}{2}$ ips and $3\frac{3}{4}$ ips and 15 ips with conversion kit. Other 1040 features include dual microphone inputs, dual phono-radio inputs; dual pre-amp and external speaker outputs, push-button function switches, automatic shut-off, automatic muting on rewind, professional edit lever, professional VU meter with channel switch, professional index counter and dual concentric volume and tone knobs with clutch controlled balance. The price is \$299.50. Write for further information.

EKOTAPE 500 SERIES



Webster Electric Co., Racine, Wis., has introduced the new 500 Series transistorized portable Ekotape A-V and tape teaching recorder, which is designed to meet the weight and physical requirements of some schools and the armed forces. It weighs only 22 lbs. and includes such features as three heads in the recording mechanism; a special recess for the microphone; a slide type selector switch, with two positions which allow the student to monitor his own voice as it is being recorded and to pretest final record-

ing; plug-in jacks for microphone, headsets, etc., located at rear of unit; slide-type pause control switch; separate volume controls for recording and playing back, and a newly-designed reel shaft assembly which assures more positive holding of tape reels in position. The Ekotape 500 is a $1\frac{1}{2}$ track monaural recorder and records in either of two standard speeds, $3\frac{3}{4}$ or $7\frac{1}{2}$ ips. Price and additional information can be obtained from the manufacturer.

NEW MINIFON DISTRIBUTOR



The new exclusive distributor in the United States for Minifon portable recorders is International Telephone and Telegraph Corp., 320 Park Ave., New York 22, N. Y. This equipment is produced in Hamburg, Germany by Protona GmbH. The Attache, shown above, offers features aimed at general business and commercial dictating requirements. All models are battery-powered and fully transistorized, weighing as little as one pound, 12 ounces. For information on this line, you can now write to ITT Distributor Products Division at the above address.

CROSBY MULTIPLEX ADAPTER



Crosby Electronics Inc., Syosset, L. I., N. Y., is marketing the MX-101 stereo FM multiplex adapter. This adapter, when attached to the multiplex output of the tuner, will provide full stereophonic effect even in fringe areas, according to the manufacturer. It has a "Dimension" control knob which

can vary the stereo separation from monophonic to "extended stereo." A special noise filter makes satisfactory reception possible in fringe areas. The front panel of the Crosby MX-101 also has a selector switch with "Stereo" and "Stereo Filter" positions, a push-push on/off power switch and a pilot light indicator. The adapter sells for \$69.95. Write to manufacturer for additional details.

NEW FERRODYNAMICS TAPE



The FerroDynamics Corp., Lodi, New Jersey, has announced the introduction of a new magnetic recording tape, which the manufacturer claims is new and improved as "a result of the application to the regular production line of techniques learned in the company's pilot plant operation." The new tape will be marketed under the same "Brand Five" label previously used for the company's line of moderately priced recording tape. It will be in a completely redesigned package of bright orange with a large, white numeral "5." It will be available in all standard combinations of reel size, tape thickness, and base materials, including acetate, Mylar, and tensilized Mylar. According to the manufacturer, one of the most important technical improvements in the tape is a newly developed dry synthetic lubricant that eliminates squeal and gumming of recording and playback heads and reduces head wear. It also has a harder scratch resistant formulation that prevents flake-off and peeling or deposit on guides or heads.

NEW BELL CARTRIDGE RECORDER

The Bell Sound Division of Thompson Ramo Wooldridge Inc., 555 Marion Road, Columbus 7, Ohio, recently exhibited its new tape cartridge recorder. It is no larger than a woman's vanity case, plays and records stereo and weighs less than 18 lbs. Model 601 is a completely monaural record playback machine, slated to sell for \$139.95; Model 602 is equipped for stereo recording and playback through a second amplifier-speaker system, and it will sell for \$169.95; Model 603 will record and play stereo through its own built-in stereo amplifier and is scheduled to sell for less than \$200. All models will have two speeds— $3\frac{3}{4}$ and $1\frac{7}{8}$ ips. For complete details on this new cartridge, contact the Bell Sound Division of Thompson Ramo Wooldridge.

"WHY MY RECORDER IS IMPORTANT TO ME" CONTEST

WIN A REEL OF TAPE. Tell us in your own words why your recorder is important to you, not why it could be important to someone else. Entries will be judged on the basis of their usefulness to others and on the uniqueness of the recorder use. No entries will be returned. Address your entry to: Important Recorder Contest, Tape Recording Magazine, Severna Park, Md.

Dear Editor:

My tape recorder is important to me in many ways: it plays music for me, it brings my friends into my home for visits, but that isn't all, it works for me. My husband and I are both blind and we operate a concession stand in a large hospital under the Business Enterprise Program for the Blind, which is state supervised. It is necessary for us to keep accurate records of purchases and sales and to turn them in to the program supervisor each month. At the beginning of each month, when I total the sales and purchases, which I have kept in Braille up to this point, I read the records on my tape recorder at a speed at which I can type them. Then I play them back and type them as the recorder reads them to me. It is much easier and much faster than reading Braille and typing the material.

We are members of the Voicerespondence Club and have made some very good friends through it and our tape recorders, of which we have two.—*Mrs. Eileen Pendleton, Mobile, Alabama.*

Gentlemen:

I became interested in the recording and amplification of sound when it was discovered that our little granddaughter was deaf.

My recorder is very important to me as an instrument to capture common household sounds, car motors and horns, planes, trains, etc., and to amplify those sounds through a "training unit" employing sound compression and dynamic earphones so that our granddaughter may become acquainted with such sounds, many of them being danger signals.

It is also very important to me for keeping an accurate record of the progress made in her lip reading and speech.

In addition to this I use it as a music system in our restaurant and have organized a worldwide tape exchange.

In short, my tape recorder is my contact with the world.—*Marion Chism, Carlinville, Illinois.*

Gentlemen:

Some two years ago I became blind and had to quit work. I am not looking for sympathy. The reason I write is to prove how important my recorder has been to me.

The Association for the Blind here in New Hampshire contacted me and asked me if I would like to make use of a tape recorder. I had no knowledge of a recorder at the time, but today I have.

When I became blind, I couldn't correspond with my friends and relations any more because handwriting was impossible

for me, so some of my friends I knew had tape recorders and I joined the Voicerespondence Club of Noel, Virginia and through voiceresponding, all the depressed, discouraging feeling I had disappeared. Now I always voicerespond with my friends through tape. It would be lonesome for me day in, day out otherwise. It is most interesting.

Another reason is that it is very educational. I have learned all kinds of subjects from my recorder correspondence that I had never heard of before. To tell the truth, today I know more than I did before I lost my sight.

Another reason my recorder is important to me is that although I am not a musician I like music and my voiceresponding pals have been furnishing me with a library of music on tape. They either send me a tape, or I send them a tape of my own and they fill it up with music for me.

Another thing is the sound effects I get. They are most interesting and they too go into my library.

Another reason is that I learned to type through my recorder. This is one of the greatest things, because now I can type letters to my friends and relations who do not have a recorder.—*Joseph N. Bilodeau, Nashua, N.H.*

Dear Editor:

Having a very large number of correspondence contacts all over the world, even in such faraway countries like Madagascar, Mozambique, Iran, Borneo, Siberia (Soviet Union), etc., exclusively in Esperanto (the international language), I am also tapesponding with my Esperanto friends, wherever that is possible in order to learn about their ability for mastering and using this future universal language of the human race. With my Ampex 970 I am able to tapespond with an Esperantist of whatever nationality, exchange useful ideas with him in ONE language common to both of us without any help by an interpreter and all this just for the cost of the tape and the postage for mailing it. The only other means to accomplish this could be done by spending thousands of dollars for traveling to all corners of the world. For me my tape recorder and Esperanto go together for one purpose, getting an international conference into my home, listening to tapes recorded in Esperanto from Japanese, Hungarian, Estonian, Swedish, French, etc., etc., tapesponders.

I have been also using very effectively tape recorded Esperanto lessons in correspondence courses for my students living in isolated places of the U.S.A. and Canada. That almost equals private tutoring, enabling the students to listen and

practice the spoken language. Readers who are interested in Esperanto and in getting in contact with Esperanto tapesponders in foreign countries will be advised "kun plezuro" (with pleasure) by the local groups of the Esperanto League for North America, or by the writer of this entry.—*Ralph R. Bonesper, 1793 Riverside Dr., Apt. 3 J, N. Y. 34, N. Y.*

Gentlemen:

My tape recorder is important to me as an instrumental music teacher in several public schools which have small orchestras, because through tape these orchestras can practice "together" in preparation for combined concerts. Then by taping the concerts I can provide a full orchestra for the separate groups to play in later.

Recently a unique use for my stereo recorder occurred when two distant schools demanded demonstrations for their P.T.A. meetings to be held at the same time. The problem was solved by recording my remarks to the parents on one channel, which was fed into the school's P.A. system. On the other channel, which fed through a small speaker located among the young players on the stage, I gave them instructions, counting the rhythm to start them playing and filled in the piano accompaniment and missing instruments. Meanwhile I was free to appear in person at the other meeting. On the recording I told the parents that my heart was really with them because of my enthusiasm for tape recording and at that moment they actually heard my heart beating! Everything worked successfully and afterwards they told me that they paid even better attention than if I had been there myself. Fellow music teachers, beware!—*Jack Dalby, Portland, Oregon.*

Gentlemen:

My tape recorder is important to me because it has faithfully recorded our children's voices since they were tots through their senior high bands, choruses, plays, and church activities. This gives a record of growth, development, joys and sorrows which can be preserved also for them in later years which cannot be duplicated. Our tape recorder has proved invaluable in speech therapy, book reviews, oral school and church work of all types. Every family should have a recorder to catch moments of their family life on tape, that, as every family knows, comes only once in a lifetime. Your recorder will keep alive forever for you the shouts of the children coming home from school, their initial efforts on musical instruments and will follow their progress as they advance. It will preserve happy holiday family gatherings, it will recall for you at the push of a button your son's jubilant reaction the day he passed his driver's test. And it will keep all this for you always, even when your children are no longer home, and, in our case, the oldest son was stricken fatally with cancer in 1958. It goes without saying that the seventeen years of recording we did with and for him is one of our most precious possessions now.

Keep your memories—forever—on tape.—*Lorna Seibert, Norwalk, Ohio.*

FEEDBACK

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

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

Dealers Have Problems Too

To the Editor:

In reading your Feedback column, I notice that some of the readers think the dealers should demonstrate recorded tapes—and evidently the dealers don't do this.

I wonder if it would be of interest to your readers to read of the experiences which we have had in handling pre-recorded tapes, after having been in this business for about ten years. About a year or so ago, some of the dealers here in Fort Worth were throwing their pre-recorded tapes on the market, cutting prices. The writer has done the same thing, but, instead of throwing them on the market with a big ad and a big price cut, I decided to leave my tapes available on hand here and let my customers have the benefit of the cut prices. Seven-dollar tapes we sold for \$3.50 and \$9.00 tapes for \$4.50. We still have a few left. For the past year, we have been studying the recorded tape situation again. We had stocked about \$2,000 worth and found that when we demonstrated a tape, it rarely was purchased, with only perhaps 10% buying. It was noticed, however, that when the movie "Around the World in 80 Days" was so highly publicized, many customers would come in and buy that tape—which shows that publicity can help sell a recorded tape.

One incident which was a deciding factor on discontinuing the sale of more tapes happened when a prospective buyer came in and indicated that he wanted to buy a couple of recorded stereo tapes. We were handling Livingston, Omega, and several others. He had a pretty good choice from which to select. After playing several tapes for better than two hours to this undecided customer, he finally decided that he didn't want any. That was the last time we demonstrated a tape until we had another customer come in sometime later and ask to try a tape. I replied, "No, if I tried it, you wouldn't buy it." Nevertheless, we put it on and after playing it for a short while, he said he would take it. After his departure, it was noted by several customers who were in the shop that we pretty well put him on the spot. He almost had to buy the tape. So, until we get another idea of some sort, I don't believe we will demonstrate any pre-recorded tape.

For the benefit of your readers, I might also mention that about six or seven years ago, we allowed our customers to try out machines. Believe it or not, one young couple managed to wrap the tape around and underneath the reels on three machines. I kind of kept my eye on them when the young man said to the little bleached blonde, "I think we had better go." So they left. That also cured us of the idea of letting customers operate the machines. I noticed that sort of thing happened to other dealers, also. Now we show a machine if the persons are seemingly interested in buying it; but I cannot understand why a person who earns

\$3 or \$4 an hour will go into a dealer's place of business and expect that man to average \$1.50 an hour, which is what I would say they would clear. I defy any small dealer to show a bigger profit than \$1.50 an hour.

We have here in our business an unusually good class of customers, perhaps because we are not downtown in the business area, where at one time we had our place of business. Our customers have formed the habit of buying stereo machines that will either play and/or record stereo. The customers get together with a neighbor or at a club or they go to a library. There they can copy records or rent records for copying. They can copy one another's pre-recorded tapes, getting together about a night a week, (and they tell me it goes into the wee hours of the morning) having the fun of making their own recordings. The big cut-price houses are moving in around here, and the little concerns are going out of business. I could write you a story about that, too.

We are also answering Mr. J. Frydman of Montreal, Canada, whose letter was published in your October issue.

We would appreciate your publishing our name and address also, hoping that other dealers in the United States and Canada will also contact us . . . and we promise to answer every letter.—George F. Bischof, 1503 E. Vickery Blvd., Fort Worth, Texas.

Dealer Wants Promotion

To the Editor:

In September I wrote you regarding exchanging ideas with other dealers. To date I have received replies from three dealers in the U. S. This, of course, made me happy, as they seemed keen. However, I was hoping for a much greater response.

In any case, I now realize that more must be done to improve our sacred profession. I would like to voice a strong protest against the big (and small) manufacturers of tape recorders and accessories for not promoting the whole tape recording field and for not educating the public in this intricate but rewarding business. Many people before me have said the same, and I am sorry I was not fast enough to join in and register my vote of agreement.

I would like to see TAPE RECORDING tickle the big ones, shake them off their high seats, lower their noses to the level of the everyday, off-the-street customer and try to promote tape recording as many other fields do. (Photography contests, Ham's ham-fests, car racing, etc.) The only absolute must is that they do it willingly without thought of personal advertising and purely for tape recording's own sake.

In my opinion, your effort in "Why My Recorder is Important to Me" is the first, real great effort in the right direction. As a dealer I read every word; I admit I learned more from these few letters than any other form of literature.

I would like also to point out that your magazine is very good in its other articles. As a matter of fact, I give this magazine free to all would-be customers to convince them of how important a tape recorder can be. In many cases this was the decisive factor for a sale.

To summarize, I feel that your magazine is in a good position to promote and have others promote tape recording more effectively, and I hope to see TAPE RECORDING Magazine grow.—J. Frydman, Tape Recording Center, Inc., 5239 Park Ave., Montreal, Quebec, Canada.

It is possible that the lack of industry-wide promotion is due to the fact that the industry is so young. Photography has been around for more than 50 years and hamming ever since the days of the old spark transmitters and auto races likewise date back to the early years of the century.

Perhaps one of these days soon the leaders of this industry will catch the same sort of vision that you and the industry's customers have. We can see no other logical reason for the lack of push on an industry-wide basis.

As we have mentioned editorially, perhaps part of the difficulty lies in the habit of looking at the tape recorder strictly as a competitor to the phonograph and its prime use as a music playing instrument. This is a passive use for the instrument in contrast to its creative use—as with a camera, ham rig or the care and feeding of a racing car. It is our opinion that this must come about before tape recording can reach its full stature.

Actually there are very few dealers who depend upon the sale of tape recorders and tape as their prime business, so perhaps the small number of replies you received is not surprising. Dealers themselves have been very remiss in the promotion of tape. If they were all like you, business would be booming. We're glad to learn that the magazine is of help to you and to your customers.

Good Suggestion

To the Editor:

I placed an ad in a recent issue of Tape Recording stating that I was interested in swapping folk music tapes with other collectors. The response was excellent and I have acquired several new tape exchange friends. The thought has occurred to me that probably your magazine could perform a fine service to tape exchangers by publishing a list of names and addresses of persons interested in swapping taped music or speech. Each name could indicate the type of material and the recording speed and configuration. This should be very helpful to all concerned.—John W. Beal, U. S. Naval Station, Navy #537, c/o FPO, New York, N. Y.

See page 16—Ed.

LOOKING FOR LOW PRICES
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1373-TR EASTON RD., ROSLYN, PA.
"THE BRAND NAME STEREO SPECIALIST"

TAPE CLUB NEWS

Interpreted Exchanges

As European Director of Stereo International Magnetic Tape Club, Roy V. Huddleston is endeavoring to put the club on a broader language basis. His plan is to have a member in country A speak his own language on the top track of a stereo machine in between stereo music, effects, experiments, etc. This member then sends the tape to an interpreter of the language spoken who records a translation of the speech on the bottom track in the same direction of tape travel. The interpreter then forwards the tape to its destination where the member in country B can listen to the stereo offerings and turn down track one to listen to the translated message.

This method would be a great help in learning various languages.

Mr. Huddleston is seeking persons who can record stereo and are bi-lingual or multi-lingual, from all parts of the world. Anyone interested in aiding this project is requested to contact him at 9 College Avenue, Melton Mowbray, Leicestershire, England.

CTRI Cooperates With Broadcast

Several members of Catholic Tape Recorders, Int. in the USA and other countries will participate in a series of radio broadcasts, "A Nation in Prison." The broadcast is aired weekly over one of the major radio stations in Washington, D. C. and treats mainly the themes of crime and social problems. Director of the program is Rev. Nicholas R. Reid, O.P., one of the Catholic chaplains for the government of the District of Columbia.

CTRI members will act as correspondents for the weekly broadcast. They will interview notable persons in the field of crime and social problems, using their tape recording equipment to do so.

Father Nicholas has expressed his appreciation to CTRI and its members for the speedy cooperation and enthusiasm toward this broadcast series.

CTRI will make announcements later as to members participating and the time of broadcasts.

Voicespondents Visit European Members

For a long time we have been suggesting that tape recording has a special place in education. And often the best way to make full use of it is through the personal contacts offered by voicespondence. Mrs. Edwin Lucéanos, high school language teacher of Dunedin, Florida, recently carried with her to Europe a group of her language students so that they might meet in person the other members of The Voicespondence Club over there with whom they had been exchanging tapes. In addition to this "in person" visiting new programs of tape exchange were set up and methods of teaching languages were discussed with other

JOIN A CLUB

TAPE RECORDING Magazine assumes no responsibility for the management or operation of the clubs listed. This directory of clubs is maintained as a service to our readers. Please write directly to the club in which you are interested regarding membership or other matters.

AMATEUR TAPE EXCHANGE ASSOCIATION
Ernest Rawlings, President
5411 Bocage Street
Cartierville, Montreal 9, P. Q., Canada

AMERICAN TAPE EXCHANGE
Cortlandt Parent, Director
Box 324
Shrub Oak, N. Y.

CATHOLIC TAPE RECORDERS OF AMERICA, INTERNATIONAL
Jerome W. Ciarocchi, Secretary
26 South Mount Vernon Avenue
Uniontown, Pennsylvania

CLUB DU RUBAN SONORE
J. A. Freddy Masson, Secretary
Grosse Ile, Cte, Montmagny,
P. Que., Canada

INDIANA RECORDING CLUB
Mazie Coffman, Secretary
3612 Orchard Avenue
Indianapolis 18, Indiana

MAGNETO-VOX CLUB
J. M. Roussel, Sec.-Exec.
8140, 10th. Avenue
Montreal 38, Que., Canada

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

STEREO INTERNATIONAL
O. B. Sloat, Director
1067 Flatbush Avenue
Brooklyn 26, N. Y.

TAPEWORMS INTERNATIONAL TAPE RECORDING CLUB
Marion Chism, Co-ordinator
129 South Broad Street
Carlinville, Illinois

THE VOICESPONDENCE CLUB
Charles Owen, Secretary
Noel, Virginia

UNION MONDIALE DES VOIX FRANCAISES
Emile Garin, Secretary
886 Bushwick Avenue
Brooklyn 21, N. Y.

WORLD TAPE PALS, Inc.
Marjorie Matthews, Secretary
P. O. Box 9211, Dallas 15, Texas

OVERSEAS

AUSTRALIAN TAPE RECORDISTS ASSOC.
John F. Wallen, Hon. Secretary
Box 970, H., G.P.O. Adelaide, South Australia

ENGLISH SPEAKING TAPE RESPONDENTS' ASSOCIATION
Robert Ellis, Secretary and Treasurer
Schoolhouse, Whitesome By Duns
Berwickshire, Scotland

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

THE NEW ZEALAND TAPE RECORDING CLUB
Kenneth M. Tuxford
P. O. Box 7060
Auckland, W. I., New Zealand

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

European language teachers. Not the least of the highlights of the trip was a TV program at Frankfurt, Germany, planned by Voicespondence member Gerd Nieckau. In addition to helping with the study of languages, voicespondence is also helping to extend "magnetic recorded friendships" throughout the world.

ATE Seeks Publicity Manager

The American Tape Exchange is in need of a publicity manager. They are looking for a "live wire" member volunteer. Anyone interested can send their offer of help to Cort Parent. An example of the type of work this person would be doing follows:

Mr. Jim Ownby, who owns station KN-DI, Honolulu, Hawaii, writes that he would like to develop a program from members of tape clubs around the world, to be aired as a public service or non commercial program, in Hawaii. He would like a selected number of ATE club members to supply 2 or 3 minute reports, once a month. It could be an interview with a well known person, a travelogue type report on your area or anything of interest to listeners in the state of Hawaii. In exchange for helping to arrange the series, station KN-DI will give the ATE as much publicity as possible.

If ATE is to participate in this program, it needs someone to handle the club's promotion. Once the club has its volunteer, it will print the information necessary for members to become reporters on the show, which is tentatively titled "America Talks on Tape."

World Tape Pal Member Forms Freedom Crusaders

The Freedom Crusaders, an informal, international organization about 150 strong, are swapping tape recordings on what personal freedom means to them.

This group was formed by and is run by J. Lawrence De Laney of Los Angeles. He got the idea from being a member of World Tape Pals, whose motto is, "World peace is a matter of understanding."

Mr. De Laney is spending a year in Las Cruces, N. M. While there, he hopes to obtain personal freedom recordings from Spanish-speaking people to be exchanged with Latin Americans to help combat the spread of communism in those countries. Any persons interested may contact him at 1042 West Van Patten in Las Cruces.

The Russians started pen pals in South America, which have led to numerous trade concessions, and Communists agents, both Russian and Chinese, have infiltrated throughout South America.

"If we don't act," De Laney declared, "we are going to lose Latin America to the Reds."

The tapes of the Freedom Crusaders try to stick primarily to what freedom in religion, politics, and the press, mean to them. The Crusaders have two Russian members, and De Laney said blank spots in their recordings indicate censorship.

Keep up the good work, Mr. De Laney.

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 question will be used in this department.

Multiple Questions

Q—I am a comparative newcomer to the field of tape recording and quite naturally I have many questions on the subject. However, instruction booklets and store personnel leave much to be desired in the way of clear explanations to even simple inquiries. I have heard this complaint from many other people. Sometime, at your convenience, would you answer the following:

1—I have a two-speed, two-track recorder which records monaurally and plays back either two or four-track stereo as well as monaural. Now, by playing back a four-track stereo tape on a four-track recorder, what advantage is gained over playing it on a two-track unit which has two channels?

2—Why should music be recorded at $7\frac{1}{2}$ ips rather than $3\frac{3}{4}$ ips—or does it matter very much?

3—What can be done to avoid tape squeal? Does the quality of the tape make a difference?

4—Is it or is it not advisable to use a cleaning tape occasionally until such time as a more thorough cleaning of the recording heads is necessary?

5—When recording directly from a TV speaker by means of alligator clips and a phono plug, I get the following results—when going through the mike jack by means of an adapter the excess power tends to cause distortion, when utilizing the smaller input jack by means of a plug with no adapter reproduction is not loud enough. What do you suggest?—A. J. M., Jersey City, N. J.

PS: I receive your magazine by means of recorded tape, thanks to the kind efforts of Mr. Edgar Violette of Hartford, Conn., who performs this service for a large number of sightless persons throughout the country. A word of appreciation is in order both to him for his generous efforts and to you for allowing him to do so—thank you.

A—1—If your recorder will record monaurally on two tracks and also play back four-track stereo tapes then it is not equipped with a dual track head but it actually is a four-track recorder. In recording or playing back monaurally you are using the two outside quarter tracks on the tape. In playing stereo you use one outside track and one inside track. Four-track tapes cannot be played on a two-track, two-channel machine because it would then play two tracks on each channel—which sounds awful, especially since one is backward in relation to the other.

2—The higher speed permits recording the maximum frequency response of which the machine is capable. Because the tape is traveling at higher speed the magnetic patterns have more room to spread out hence higher frequencies can be recorded. This applies to any sound, not just music. However, in many cases the $3\frac{3}{4}$ ips speed is adequate. The cartridge machines use

this lower speed and there is even a cartridge under development which will use the $1\frac{7}{8}$ " per second speed. As tape and heads have been improved the speeds have gradually gone down, while the quality has gone up. The thinking today is that the $7\frac{1}{2}$ speed is best for finest fidelity and the $3\frac{3}{4}$ ips speed is adequate for most uses.

3—Tape squeal is generated by the momentary sticking and release of the tape on the heads, guides or other parts of the recorder with which the tape comes in contact. This, in turn, is usually the result of a tape losing its lubrication or of dirt on the recorder parts. The latter is especially true of the pressure pads which hold the tape against the heads. Regular cleaning is the answer. Poor quality tape will show a greater tendency to tape squeal than that of good quality.

4—Anything you do that helps keep the recorder clean should be done. The use of a cleaning tape should help in this regard.

5—Using the phono input with no adapter from the speaker terminals should give you sufficient volume for recording, if not then we would suggest you have it checked by a serviceman. To use the mike input, you will have to put a resistor in the line to cut down the amount of current going into the input.

We are glad that Tape Recording is available to those with sight handicaps.

Rewind Tape

Q—I have a Revere tape recorder. When I play a reel of 1200 ft. of tape I rewind by taking the tape out of the track and rewind with the tape going to the rewind reel directly.

I can't see why I should rewind the tape while it is in contact with the heads which I think wears out the heads more quickly. I rewind from one reel to the other directly. A radio salesman says this is wrong and the rewind should stay in the same position as when recording.

Does it hurt the machine if I just rewind as I do or should I leave the tape in the same position as when playing or recording?

Does it hurt the recorder if I play it continually for three or four hours or should I give it a rest now and then so it does not get so hot?—J. D., Jamaica Plain, Mass.

A—It is really not necessary to remove the tape from the slot when rewinding since the tape merely rides past the heads and is not held in contact with them by the pressure pads. We do not recall if the Revere recorder has a tape lift feature which lifts the tape completely clear of the heads on rewind. It does no harm to rewind directly as you are doing.

All recorders will heat up to a certain degree when used but once they reach running temperature they should not become any warmer. Make sure you do not block any of the ventilation holes provided so there will be a good passage of air through the machine. The recorder will play for as many hours as you desire and there is no need to shut it down unless the temperature rise becomes excessive, in which case it should be checked by a repairman to determine the cause of the excessive heat.

Spare Time Income

Q—Is it possible to earn spare-time income with a tape recorder?—E. G., East Hartford, Conn.

A There are a number of ways in which a recorder may be used to earn extra income. In making straight recordings it is possible to earn money by making recordings of conferences, meetings, etc., and then selling the tape. Further money may be made if you can transcribe the tape to paper. Weddings also offer an opportunity. Arrangements should be made with the couple prior to the wedding and the recording set-up should be in place and checked out before the wedding begins. The church authorities should also be consulted and they can be very helpful in alerting you to the best spots to make pickups where the participants will be the closest to the mike.

If you have a portable, or have an inverter in your car you can produce tapes for radio stations (these must be recorded one track only). Such things as interviews with well known people, sporting events and man-on-the-street tapes could be made. Taking inventory for stores and typing off the inventory from the tapes is another way that extra money may be earned. We are sure you can think of still more.

SOMETHING NEW WILL BE ADDED

Beginning next month we will run a new monthly column for those seeking tape correspondents, looking for swaps of tapes, etc. This service will be free. If you wish your name listed send us the following information on a postcard: 1—Name, 2—Mailing Address, 3—Kind of recorder, speed and number of tracks (for example: Wollensak, $7\frac{1}{2}$ or $3\frac{3}{4}$ dual track), 4—Subjects on which you want to tapespond or items for which you are looking, 5—Indicate whether you are an adult or teenager. Listing will be run two months and then dropped to make way for new listings. Address your postcard to: TAPERESPONDENTS WANTED, Tape Recording Magazine, 101 Baltimore-Annapolis Blvd., Severna Park, Md.

TAPE IN EDUCATION Robert C. Snyder

ONE of the more dramatic advances made by tape over the past few years has been its increasing use in the field of education.

A good part of this was brought about by the growth of the language laboratory. Starting first in specialized schools for armed forces personnel, the language laboratory has grown in numbers with startling rapidity.

Where there were formerly only a few of these installations, there are now an estimated 2500. Not only are they found in the colleges, which quickly followed the armed services lead in language teaching methods but they are now in high schools across the United States.

Much of this growth was made possible by the National Defense Education Act of 1958 with its emphasis on the teaching of science, math and modern foreign languages and which also provided matching funds to the states for the purpose of purchasing materials, training teachers, etc., to further the objectives set forth in the bill.

But we are wondering if the term "Language Laboratory" is not too restrictive. Would it not be better to call these installations "Learning Laboratories"? There is not good reason why their use need be restricted to the teaching of foreign language, especially if the school schedule is such that full use is not being made of the installation.

These labs are expensive pieces of equipment and their full value to the taxpayer can only come about by the fullest utilization.

Practically all of them operate on the dual track principle with one track being in the play position when the second is in record. Thus a student can imitate what he hears from the first track; then later, compare his recording with the master.

This is most effective in the teaching of languages where the correct imitation of a native speaker of a foreign language is the best way to learn to speak the language correctly.

But might not this same principle also be applied to other fields? It would be interesting, for instance, to apply it to anything that must be memorized, from a poem in the English class to the periodic table in Chemistry.

Basing the tapes on the principle of the teaching machine, that is by presenting the material and immediately questioning the student on it, the proper reinforcement could be achieved. Any points missed could be covered by the student simply by re-winding the tape to the point where the weakness occurred and going over the material again.

Since each student works more or less alone in his own booth and with his own headphones and machine, those capable of rapid assimilation of the lesson material could advance at a fast pace while the slow-

er students would not be embarrassed or left behind.

Many language laboratories are equipped with a teacher's console which permits the teacher to talk directly to any student without the others hearing, or the teacher may talk to the entire class at once.

Some laboratory machines also work on the principle of providing a copying channel where the master material is copied at each position from a master played on the console.

It would thus be possible, in this type of operation, for the teacher to prepare a lesson tape on a regular good quality recorder and, using the copying type of lab, to have each student have his own copy to work with during the class.

The same technique that is being used in industry to train assembly line employees might likewise be transferred to the learning laboratory, thus freeing the teacher from repetitive work and permitting him to devote his time to helping the students over the rough spots.

In the subject of Plane Geometry, for instance, the tape could very easily, and step by step, give the directions for constructing the necessary diagrams. The tape could likewise explain the significance of what was being done and present the theorem. If the student should come to a spot which was not as understandable as it might be he would, after a replay or two, call the teacher on the intercom and ask for help on that particular point. This help could then be given privately back over the intercom or the teacher could come to the student's position to see what might be done to help.

This technique would free the teacher from standing at the blackboard, chalk in hand and drawing the diagrams a step at a time while the class copied them down on paper. The machinery would take care of this, increasing the student's ability to listen and follow directions from the spoken word, an art on which there cannot be too much emphasis.

Similarly, the learning laboratory might be used by the physics teacher when dealing with sound and its propagation and nature. There is no better way to teach sound than by means of sound and the laboratory with its tape machines would provide a ready means of instructing the class.

The beauty of the learning lab lies in its making possible almost individual instruction of each student in contrast to the general classroom situation where all must proceed at the same pace.

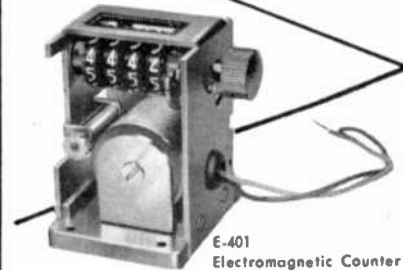
Further, as we have noted, it provides a means of freeing the teacher for the type of creative work for which he was trained.

We are sure that the more imaginative teachers can see applications of this technique to their own situations and it might turn out too, that the firms which supply course materials might also do some thinking along these lines.

Various Types of Tamura's Zero-Reset Counters



M-301 Counter



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Tamura Electric Works Ltd.

364, Shimomeguro-2, Meguro, Tokyo, Japan
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1776 Columbia Road Washington, D.C.

TAPE RECORDERS



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How Your Recorder Works

by Mark Mooney, Jr.

PART I OF A SERIES

Motors and Tape Transports

ANY tape recorder is an electro-mechanical device. Like the hyphenated word which describes it, the recorder can be broken down into two principal parts. One is the tape transport and the other is the electronics.

The Tape Transport

Tape transports have but one function, no matter how complicated they may be, and that is to move the tape. For play or recording, the tape must be moved in a constant and unvarying manner past the heads. If it does not move as uniformly as possible, then wow and flutter are introduced which causes a wavering of pitch in the recorded material. Any change in speed, even if the change is a steady one, will affect the pitch of the material recorded on, or played back from the tape.

The tape handling function on most recorders also includes a fast-forward mode in which the tape may be rapidly shifted from the feed reel to the take-up reel and rewind which rapidly spools the tape back on the feed reel.

Tape transports are not all alike and several different types have emerged suited to special purposes. The transport which handles the RCA type cartridge is essentially the same mechanism which is used in reel-to-reel recorders' however, the position of the various elements has been

altered to fit the cartridge. Both the RCA and Bell machines, which use the cartridges, will also accept small reels of tape.

Another broad type of tape transport are the units designed for playing continuous loop cartridges. These include the Viking, Cousino and Orr machines. In these the tape is on a hub and, as the machine plays, the tape is drawn from the layer nearest the center of the hub and, at the same time, the tape is wound up on the outside edge of the pack.

Another type of tape transport is that developed by CBS Labs under a contract with Minnesota Mining and Manufacturing and which may be on the market next year. This likewise employs a cartridge, but it differs from both the RCA, Cousino and Viking types in that the cartridge is actually a housing holding a quantity of tape on a hub. The end of the tape is attached to the hub.

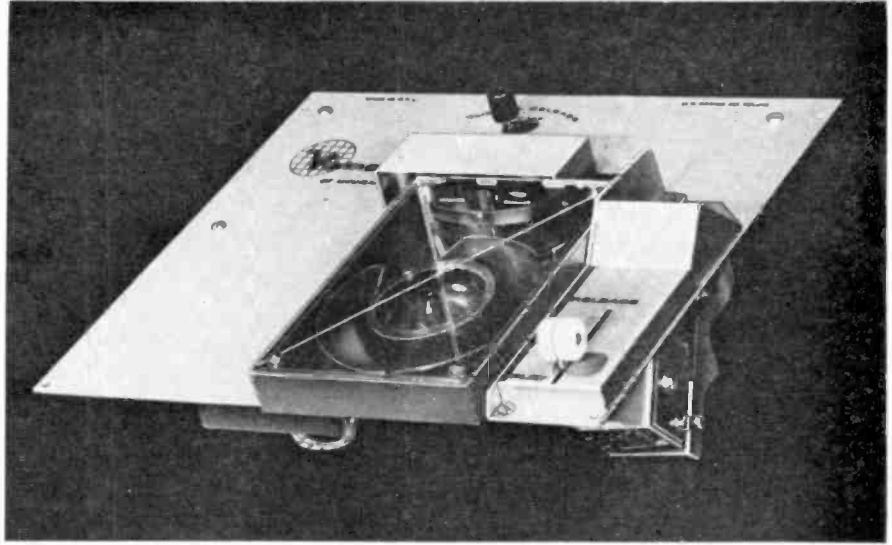
In operation, the leader in the machine engages the tape in the cartridge and draws it out over the heads, winding it upon a take-up reel. When the tape comes to the end it stops and is then automatically rewound into the cartridge by the machine and the next cartridge advanced to playing position.

The Armour Research Foundation also developed a machine for playing tapes which employs a reel with flanges



Left: the typical home tape recorder is exemplified by this V-M model having two reels and using a capstan and roller tape drive. Right: the Magneticon, a machine designed for school language labs uses the RCA type cartridge. The principle is still reel-to-reel.

The Viking cartridge unit has a continuous cartridge in which the tape is drawn out from the center of the hub and continuously wound up on the outside. It has a capstan and roller drive, the roller coming up from below the deck to press the tape against the revolving capstan.



and a wide leader strip with a hook on the end. The wide leader binds under the reel flanges and holds the tape in place. When inserted in the machine, the hook is engaged by an eye and the tape drawn across the heads as in the 3M machine. It is then rewound by the machine at the conclusion of the playing or recording.

The machines mentioned so far employ a capstan and roller which, when pressed together with the tape between them and driven by a motor, cause the tape to move.

Some self-powered portables and dictating machines offer still another form of transport in that they do not employ a capstan and roller drive but instead simply pull the tape by powering the take-up reel. This, of course, means that the speed of such units varies as the diameter of the tape on the take-up reel changes. Tapes made on these machines cannot be played satisfactorily on regular recorders since the latter have a steady speed. This would result in the first part of the tape being played too fast

and the last part too slow. Only in the middle of the tape would the speeds match and the reproduction be true.

Some instructional machines, such as the Litton Industries unit for teaching factory assembly procedures also employ this system of a driven take-up reel but they use an RCA type cartridge instead of reels. Tapes made for this machine must be made on the machine or with a special unit having a similar tape transport mechanism.

Most of the specialized machines such as the video recorder and instrumentation recorders employ the reel to reel principle using a capstan and roller. These machines are designed for starting and stopping in incredibly short times and the data processing machines also are capable of moving the tape at high speed, much higher than even professional audio recorders. Needless to say, their cost is compatible with their capabilities. A video recorder will run from \$24,000 up and the computers and data handlers may run into hundreds of thousands of dollars.



Even though this recorder costs in the neighborhood of \$24,000 it still is a large-sized version of the regular tape recorder employing the same kind of capstan and roller drive. It does have revolving heads to enable the recording of television frequencies which range up to 4 megacycles per second.



The Cousino machine uses a Cousino cartridge which is a continuous loop of tape. Up to an hour of playing time may be had. A capstan and roller furnish the drive.



The Grundig portable has a DC motor and moves the tape by powering the take-up reel. It has no capstan and roller. This makes the speed of the tape vary, depending upon the amount on the take-up reel. It records and plays back satisfactorily, but its tapes cannot be played on standard machines.

Drive Motors

There are three principal types of motors used in tape recorders. The average quality home-type machine is most often powered by a four-pole, shaded-pole motor. The recorders used in radio stations and the top quality advanced amateur machines are powered by hysteresis synchronous motors. The self-powered portables, which are battery driven, have small direct current motors as their motive source.

The motor is one of the most critical parts of a recorder for on its performance depends the operation of the machine. A motor for tape recorder use must hold a constant speed, for any variation will show up in the recorded sound. It must also be reliable, not heat up excessively and be quiet running. It must also be fairly well

shielded so that stray magnetic fields will not be generated.

The shaded-pole motor is found in most machines of the home-type. It meets the requirements very well and, in addition, is small and can be made at a reasonable cost. It will also tolerate periods of stalled operation, if something jams on the recorder, without damage to itself.

In the shaded-pole motor the armature (the revolving part) attempts to keep up with the changing polarity of the alternating current from the power lines.

The speed with which it turns is dependent upon the number of poles in the motor. A two-pole motor will turn at about 3600 rpm whereas a four-pole motor will turn at half that speed or 1800 rpm. An eight-pole motor will turn at 900 rpm.

Because of the "slip" in the motor, the shaded pole motor never can reach the speed where it matches the change in the current and this slip may go as high as 40%, the amount depending upon the load and the friction in the drive system.

The other type of motor, the synchronous motor runs exactly in time with the alternations in the current (60 cycles per second) because of its internal (and more expensive) construction. It has the advantage that it will never vary in speed, running at a constant 3600 rpm.

The synchronous motor is not perfect, however. It has a tendency to "hunt" for the common speed and thus can introduce some wow or flutter into the recordings. Tape recorder engineers use flywheels or other means to smooth out this characteristic so that the drive to the capstan is smooth and steady.

The speed of the motor shaft must be translated into inches of tape per second and this is accomplished on a direct drive machine by machining down the capstan to proper size to give the speed desired.

Any tape recorder may be speeded up by making a sleeve for the capstan which is of larger diameter than the capstan shaft. In fact, some recorders use this method as a speed change.

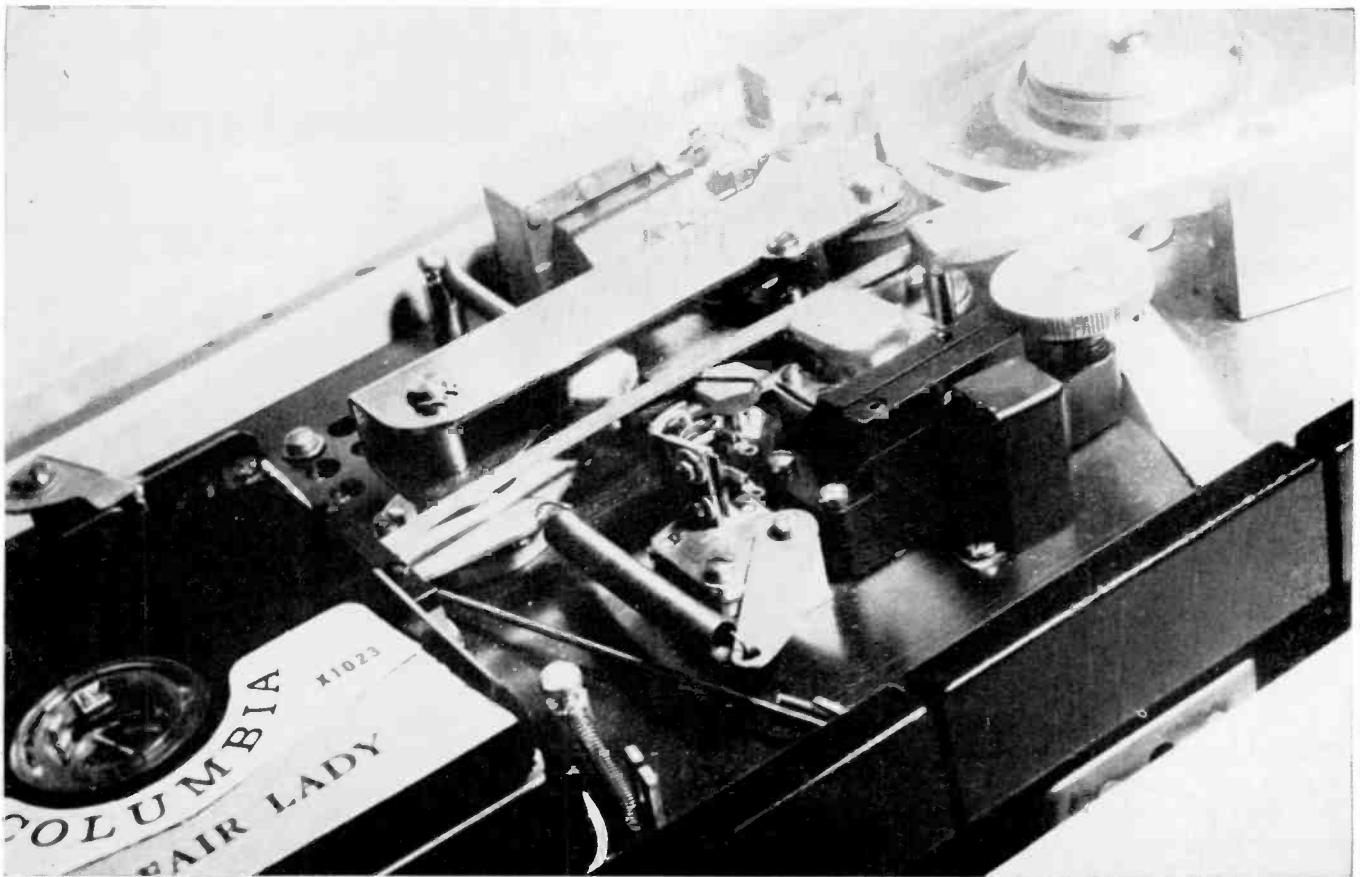
If it is not possible to directly drive the capstan from the motor shaft, then belts or drive pucks may be inserted to get the desired speed at the capstan.

The induction motor of the shaded-pole variety, because of its slippage in trying to keep up with the rotating magnetic field, will slow down according to the load or if the current drops in the line. These variations are minor but are enough to throw synchronization off should the tape recorder be used in conjunction with a movie projector, or another tape recorder that is driven by a constant speed motor. In copying tapes, for instance, the turning on of some heavy current drawing appliance in the home might slow one recorder while another with a synchronous motor would hold to speed. Two machines with identical type motors would, of course, both drop in speed at the same time.

Since there are no sliding metal contacts in either a shaded-pole or synchronous motor, there is nothing to wear except the bearings, and the motors are very trouble free. All will warm up while operating.

It is possible to burn out a motor by the application of DC to it, hence a tape recorder should never be plugged into anything but AC. Once the coils are burned out it is most often best to replace the entire motor rather than attempt having the coils rewound.

Many of the motors are lubricated for life and other



The CBS-3M machine holds the tape in the cartridge visible at the lower left of the photo. The tape is drawn through the machine by a leader strip. After playing, it is automatically rewound and the next cartridge is brought into position. It is not yet on the market.

than an occasional cleaning to remove dust and dirt sucked into the machine through the ventilation holes, need no attention. The instruction book will delineate any motor maintenance items.

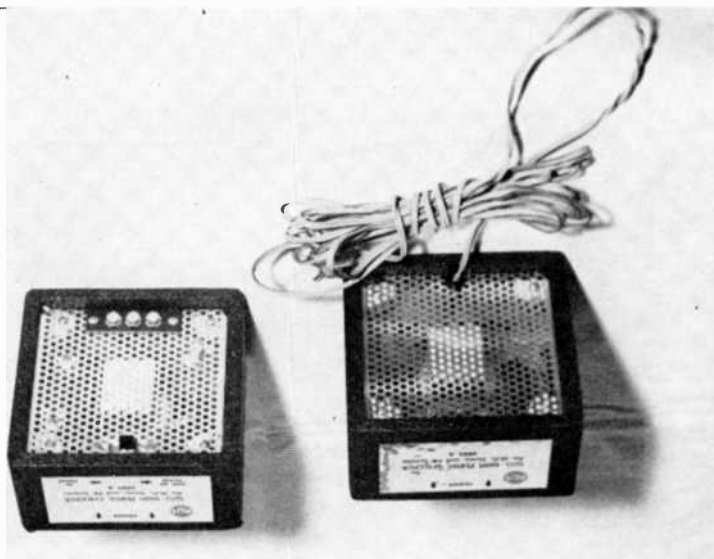
By introducing a small amount of DC current into the motor it is possible to brake its action and even complete-

ly stall it. This method is used in some recorders having a motor for each reel plus a motor for the capstan. The braking action is used to control tape tension and the complete stall to achieve a quick stop.

(Next month—Recorder Drive Systems)



This machine was developed by the Armour Research Foundation but so far has not seen any commercial use. The tape is held on the reel by means of beaded flanges and a wide leader strip attached to the end of the tape. The strip has a hook on it which engages an eye on the machine which then threads the tape past the heads. Rewind is automatic.



The RCA Phase Checker consists of these two units, one of which is placed in front of each speaker and the output measured by means of a voltmeter.

Balance and Phase Your Speakers

by Clif Parody

. . . new RCA kit enables you to check speaker phase quickly and accurately.

THERE are many important design requirements for a good stereo system.

Two of the most important are correct speaker phasing and balanced amplification. Correct speaker phasing simply means connecting the voice coils in the same polarity so they both move in the same direction when the same signal is applied to the input of the amplifiers.

Balanced amplification means that both voice coils move the same distance when these similar signals are applied. Neither of these requirements is a problem to the designer, but they become mighty big problems to the person installing the equipment.

They become big problems because there is no really foolproof way to tell when either is correct the first time you listen to a stereo recording on a new system. This is because phasing and balance affect only the stereo depth and separation, not the musical quality. Stereo depth and separation varies with the recording techniques and subject matter. It is rather hard to tell how much you are missing because of improper equipment adjustment and also how much just isn't in the recording.

Until the introduction of the R.C.A. Phase Checker most methods of phase and balance checking depended upon listening tests to determine correctness. Although fairly good results can be obtained by an experienced listener, it is, at best, someone's uncertain opinion. Not too exacting to satisfy most of us.

A more exact method of balancing amplifiers is by using an output balance indicator which is a zero center voltmeter. When the output voltage is zero for a balanced input voltage, then we know the amplifier gains are balanced. This method is fine if the two speakers are identical, but meaningless otherwise.

The R.C.A. WG-360A Phase Checker provides a simple means of dynamically checking both phase and balance of a stereo system in a simple and straightforward manner. Every component in the system is included in the check,

from the input source to the sound energy output of the speakers.

The Phase Checker consists of two four inch dynamic loudspeakers. They are of the permanent magnet dynamic type with high impedance, 50 ohm voice coils. Frequency response is from 40 to 4,000 cycles. The speakers in this application are used as sound powered microphones, generating a voltage proportional to sound intensity. When properly connected the voltage generated by the speakers is used in determining proper phase and balance.

The units are identical electrically, but differ physically. Unit "A" contains a speaker and a fifteen foot extension cord to which is attached a standard R.C.A. phono plug. Unit "B" contains a speaker, a double pole-double throw slide switch, a crystal diode (1N60), a step-up transformer and a phono jack into which the other speaker is plugged.

The voice coils and the primary of the transformer are all connected in series. The double pole slide switch is used to reverse the polarity of the voice coil of unit "B."

To avoid confusion, R.C.A. refers to the units as "receptors," rather than speakers, which they resemble, and "Receptors" is the word used from now on.

All that is necessary to ready the Phase Checker for use is to plug the extension cord of unit "A" into the jack of unit "B" and connect a volt-ohm-milliammeter to terminals numbered 1 and 2 at the rear of unit "B." The meter should be set to the 50 micro-ampere scale. The photo at top of page 23 shows the set up.

If an oscilloscope is available it can be used in place of the meter and connected between terminals 1 and 3. These are the secondary terminals of the step up transformer.

To check for proper phasing, the receptors are placed over the low frequency speakers of a multiple speaker assembly or over the center of the baffle opening of a single speaker unit. Be sure that both receptor units are in the same relative position to each speaker. The photo

below, left, demonstrates a good way of accomplishing this. Both speakers are turned on their backs and the receptor units are then placed on top of the appropriate opening in the grill. The appropriate opening is, of course, the one in front of the bass unit.

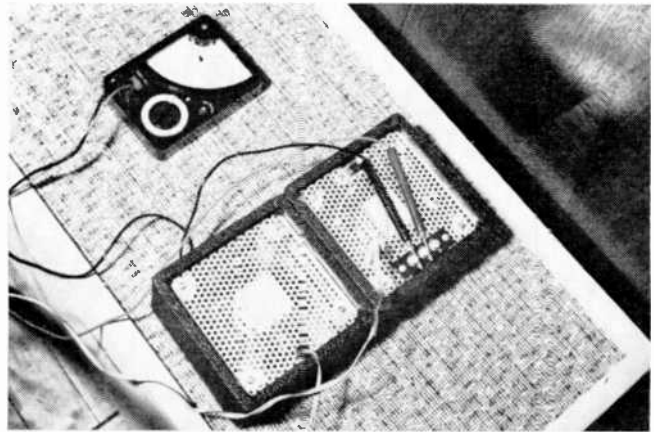
A signal is applied to the input of the amplifiers which preferably should be a single low frequency tone of about 100 cycles, although a tape or disc containing low frequencies can be used. It is important that the amplifiers be set up for monophonic operation which is accomplished on most pre-amps by setting the mode switch to Mono A + B.

The balance control should be set at center or, if two separate gain controls are used, they should be set for approximately equal gains on both channels. The volume should be adjusted to obtain a comfortable voltmeter reading, about half-way up the scale.

Now move the slide switch on unit "B" back and forth. In one position the voltmeter reading will be highest. If this reading is obtained with the switch in the "in phase" position, you've been lucky and your speakers are in phase. If the highest reading is obtained with the switch in the "out of phase" position, all you have to do is to reverse the connections to one speaker only. It doesn't make any difference which speaker, and stereo should sound a lot better.

Once the voice coil connections have been properly made, checking balance is very simple. Using the same set up, merely throw the switch to the "out of phase" position and adjust the balance control for a minimum reading of the voltmeter. Now the sound output from both speakers is equal and opposite in polarity resulting in a lower reading on the voltmeter. Theoretically, the meter should drop to zero, but this will not be true in all cases because of slight differences throughout the system. The balance thus obtained is far more exacting than can be obtained by ear.

If you find that balance is obtained with the balance control far off center, say a quarter turn either way, it would be worth while checking tubes in the channel being favored as this would be an indication of more than



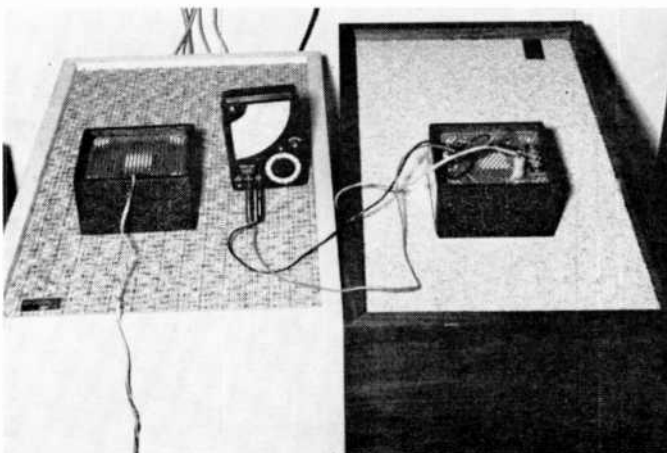
The Phase Checker and voltmeter showing the connections made between the two pickup units and the meter. Each unit contains a 4 inch dynamic speaker with high impedance voice coils.

normal gain difference. However, if you are using two different speakers this much compensation by means of the balance adjustment might be required.

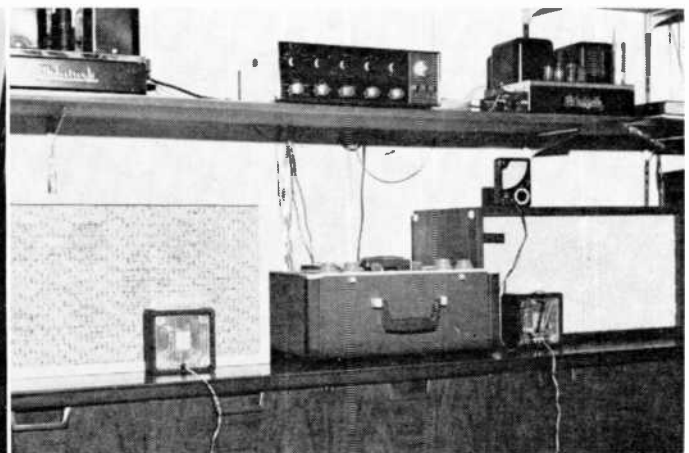
If your stereo system has separate power amplifiers with individual gain controls, have them set full on when making the foregoing adjustments. Minor variations in gain can then be made by decreasing the gain of the favored amplifier to bring the balance control to center. Again, however, if it is necessary to reduce the gain by more than a quarter turn of the control, check the tubes in the other channel.

There are other uses to which this equipment can be put. Unit "B" can be converted to a sound level meter by inserting a shorting plug into the jack normally used for the other speaker. This shorting plug can be easily made by soldering a wire between the center post and outer shell of a standard phono plug. With the voltmeter connected, this single receptor can be used to determine the relative output of different speakers. With the shorting plug in place unit "B" can also be pressed into service as a dynamic microphone with high impedance output.

Of all the possible uses, however, the most popular is bound to be the balance check of a stereo system providing assurance to the owner of the best possible performance.



RIGHT: The Phase Checker units must be accurately positioned over the cone of the loudspeaker in the cabinet or false readings may be obtained. Do not put it over bass ports nor over tweeters; make sure it is over the principal speaker.



WRONG: Merely placing the Phase Checker units in front of the speakers as shown in this photograph will not give you the best results. Easiest method is to lay the speakers on their backs, as shown in the photo at left. This makes proper positioning easy.

Delay Relays & Timer Clocks & Solenoids

by Tommy Thomas

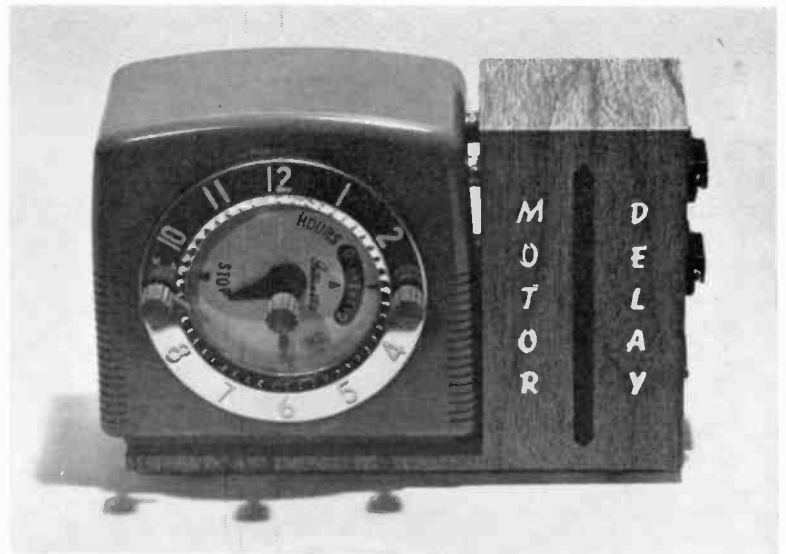


Fig. 1, above, right: Usually, when auto-starting a tape recorder, the timer clock starts everything up at once. You can get more on your tape, though, if a simple MOTOR DELAY is added to the timer circuit, to allow the electronics to warm up before engaging the tape drive.



Fig. 2: The "heart" of the unit is this Amperite thermostatic delay relay which comes in tube form. The relay is hermetically sealed in a glass envelope, with SPST normally-open 3 amp. contacts that close automatically by heater action after a delay of so many seconds. The tiny 2-watt heater element works off 115-volts AC-DC.

DELAY relays, which fortunately can be both inexpensive and easy to use, offer many intriguing possibilities in supplementary tape recording circuits. And though the little Amperite units shown here come encased in a 9-pin, radio-type tube and have the fancy title of "relay," actually they're hardly much more than a simple SPST switch that has a delay-action as part of its function. You close or open the switch (via the heater control) but nothing happens for a few moments. Then the switch works, either to turn something on or off, depending on which type relay you're using. It's as simple as that, and just as simple to put to work for you. Hooked up to an automatic timer clock and a recorder, one of these delay relays can be used to "hold up" the starting of the tape until the recorder has first warmed up, thus saving you a half minute or so of otherwise "wasted" tape. Or, hooked into the solenoid "Disengager" system described last month, you now can have a means of turning off the solenoid immediately its job is done, without the need of an auto-timer.

The *Amperite Thermostatic Delay Relay* sells for \$2.35 at almost any local radio supply store, or you can order it from one of the mailorder companies such as Allied Radio, Lafayette, etc. You'll also need a 9-pin miniature tube

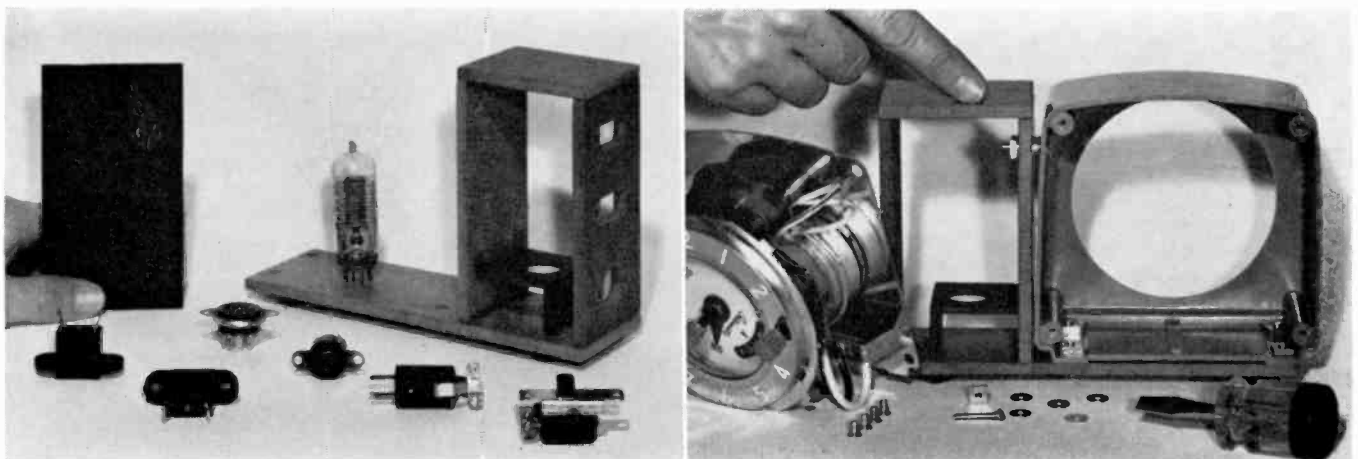


Fig. 3, left: Here are the basic parts, including (lower right) the special plug and slide-switch necessary for the hookup to the recorder motor. The simple housing is of ordinary $\frac{1}{4}$ "-thick Masonite glued together, and includes a little "shelf" for the delay tube socket. Also, at far left, you'll need a panel to close up the front later. Fig. 4, right: The timer clock should be bolted directly to the Masonite housing, and this is best done after first removing the four corner screws that permit easy removal of the complete works. Note that besides the four machine screws and nuts at the bottom of the plastic timer housing, side screws (at finger) add to the rigidity.

socket to go along with it, as it's not advisable to solder the wiring directly to the tube pins themselves. Actually, these delay relays come in two sizes, but as there's no special advantage in the larger size for our purposes here, be sure to get the miniature model as shown in the photos. Hermetically sealed inside the glass tube is a SPST (single-pole, single-throw) switch that is controlled by a tiny 2-watt heater element. When 115 volts AC or DC is applied to this heater it slowly warms up and thermostatically bends over to close or open the switch contacts. Depending upon the relay you're using (they're not individually variable at this low price), you can have either a normally open or a normally closed switch that automatically closes or opens in anywhere from 2 to 180 seconds.

An easy way to understand the working of this delay relay is to concentrate on just four of the tube "pins" or contacts. In fact, to make your wiring and soldering easier, you can actually cut off the tube *socket* terminals marked 2, 3, 5, 7 and 9 as they won't be needed. Of the remaining four terminals, "1" and "6" go directly to the heater element. It is necessary to wire your circuit so that 115 volts AC or DC is applied directly to this heater via the "1" and "6" pins. That is what is done in both the timer clock and the solenoid circuits shown in Figs. 7-b and 12. Now, though the switch (whose contacts are represented by tube socket terminals "4" and "8") is *controlled* by the heater element, actually there is no further connection. Pins "4" and "8" are switch contacts only. The power necessary to actuate the device being controlled by these switch contacts (here, either the recorder motor or the solenoid) is supplied separately, and does *not* come from the heater element electricity.

WITH THE TIMER CLOCK:

As I mentioned before, these relays are not variable. You decide just which type of switching you want, normally open (N.O.) or normally closed (N.C.) and that's the type relay you buy. Also decide exactly how much de-

Fig. 6, right, center: Fasten the various parts securely in place, making sure that there is room for everything, including the wiring which must not be allowed to touch the hot tube. Then, remove everything again so you can glue on the front panel, sand it down neatly to size, and perhaps cover it all with appropriately patterned contact plastic.

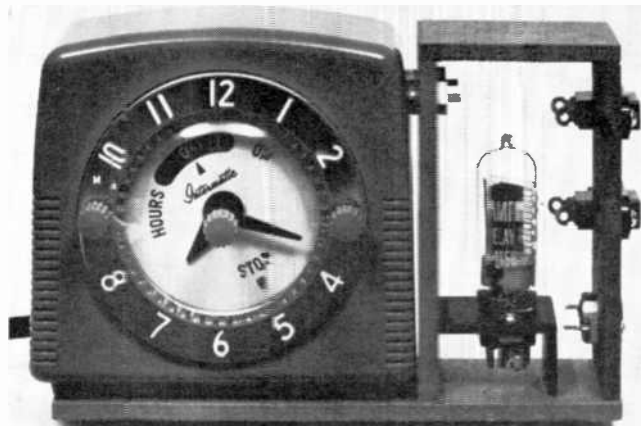


Fig. 5: Although the exact shape and size of the little housing is not too important, be sure to leave adequate room around the relay tube to allow for proper ventilation. The upper two receptacles are regular solder-lug AC chassis sockets, while the lower one is purposely different as it connects directly to the recorder motor.

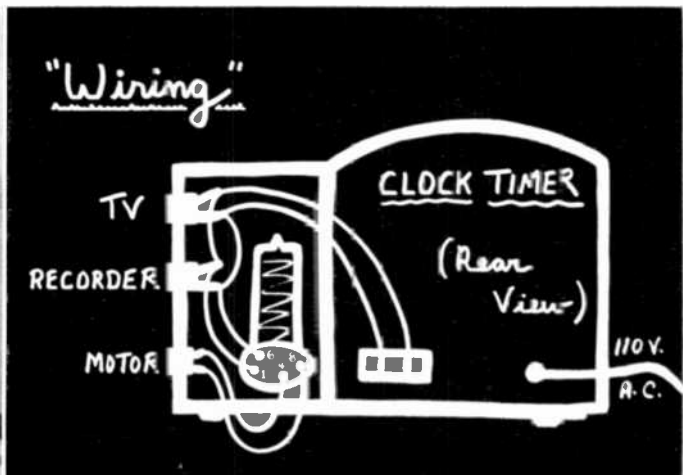
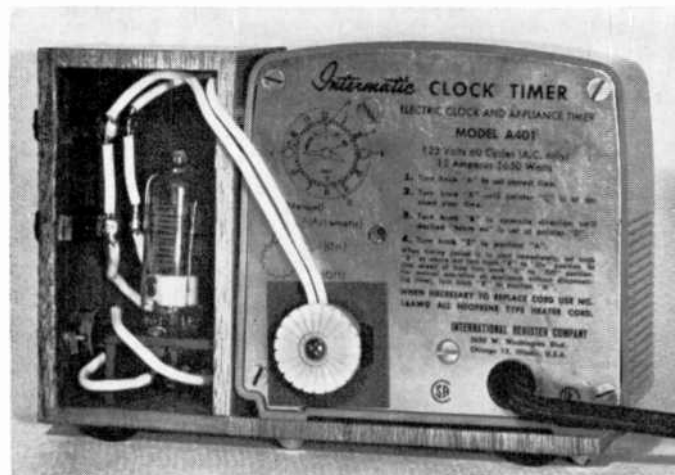


Fig. 7-a, left: At the rear of the timer clock is a 115-volt a.c. receptacle where the units to be controlled plug in. So, hooked up in parallel are the two AC chassis sockets for the TV (or whatever) and the tape recorder, plus the hookup to the relay's heater. Fig. 7-b, right: This blackboard sketch diagrams the simple wiring necessary. The numbers below the tube correspond to the numbers on the miniature tube socket and should be wired exactly as shown. Numbers "4" and "8" represent the contact points of the SPST relay switch.

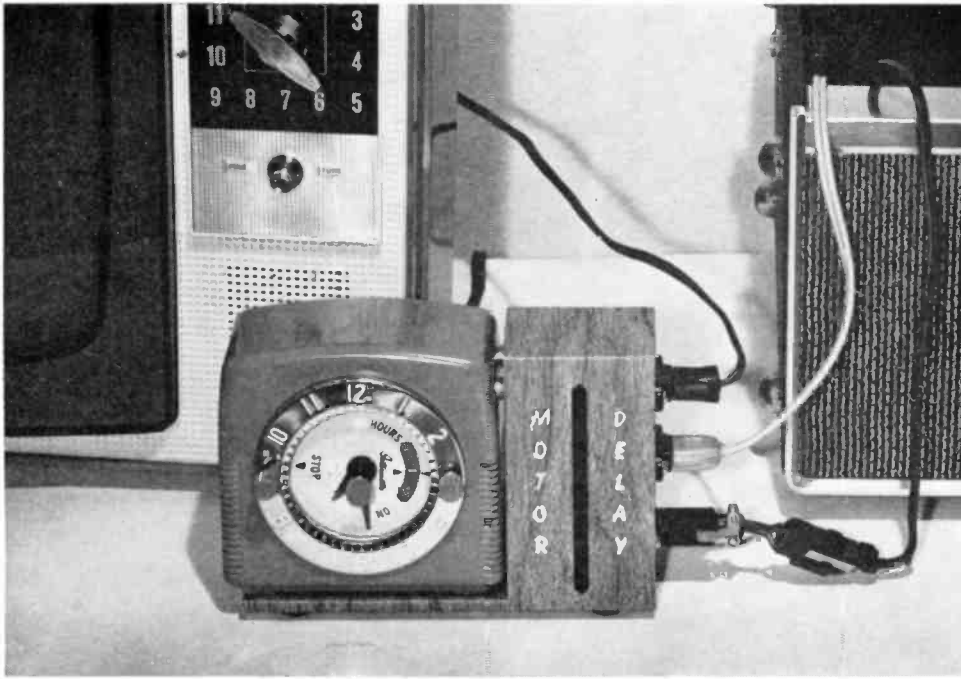


Fig. 8: All "plugged in" and ready to go. Both the TV and the recorder, via the auxiliary AC chassis sockets, plug directly into the timer clock control, as does the heater (only) of the relay tube. When the clock turns all these on, the relay switch delays the starting of the recorder's motor for approximately thirty seconds.

lay you need, and get the relay that has that much delay figured into the thermostatic control. But a word of "caution" here! Only \$2.35 for a time-delay relay is not very much money. You could easily spend ten or twenty times that much. So don't let it come as a great surprise to discover that the *accuracy* of these ingenious little Amperite relays isn't too great. For example, the N.O. relay I use in my timer circuit (Amperite No. 115N030T) is rated as a 30-second-delay relay but it actually *and consistently* closes after about 23 seconds. Since my recorder warms up in 14 seconds and our TV gets going in 19, that's just about perfect for the auto-timer system I use. I just wanted to point this out to you so you won't be unnecessarily disturbed if the particular delay relay you get is "off" somewhat. It's to be expected and really shouldn't make any great difference at all. And of course you can always "play it safe" by getting a relay with a somewhat longer-rated delay than you actually need. Or perhaps you can even talk the store into letting you try several different (but rated the same) relays until you come across the "closest" one?

Actually incorporating one of these delay relays into your timer-clock circuit is a simple matter, as shown here. If the clock you're using is the same one (see Nov. '61 article for complete details on this special "Intermatic" timer), then you can follow the photos exactly. Otherwise, with another timer, make the necessary minor changes along the way. The outer dimensions of the Masonite housing shown here are 7" wide, 4 $\frac{1}{8}$ " high and 2 $\frac{1}{8}$ " deep (with the actual tube housing being 2 $\frac{1}{2}$ " wide). Besides the Amperite Delay Relay and a corresponding 9-pin miniature tube socket, you'll need two AC chassis sockets with solder-lug terminals and a Cinch-Jones Series 300 2-contact chassis-mounting socket (Type S-302-AB). Other type sockets will work as well, but be sure that the lowest socket, which is only a *switch* connection, is one that will NOT accept a regular AC line plug.

Notice, as is pointed out in Fig. 4, that the plastic housing of the timer clock is fastened at the side as well as at the bottom. Because of the sloping sides of the clock, use long machine screws here and fill the "between

spacing" with a few washers. This extra rigidity is necessary because quite a bit of strain is put on the Masonite housing each time the TV and recorder line plugs are pushed into or pulled out of the upper two receptacles. Finally, if you wish, you can *paint* the Masonite, but covering it neatly with patterned self-stickum plastic (about 49¢ a yard in most 5 & 10 or hardware stores) will make

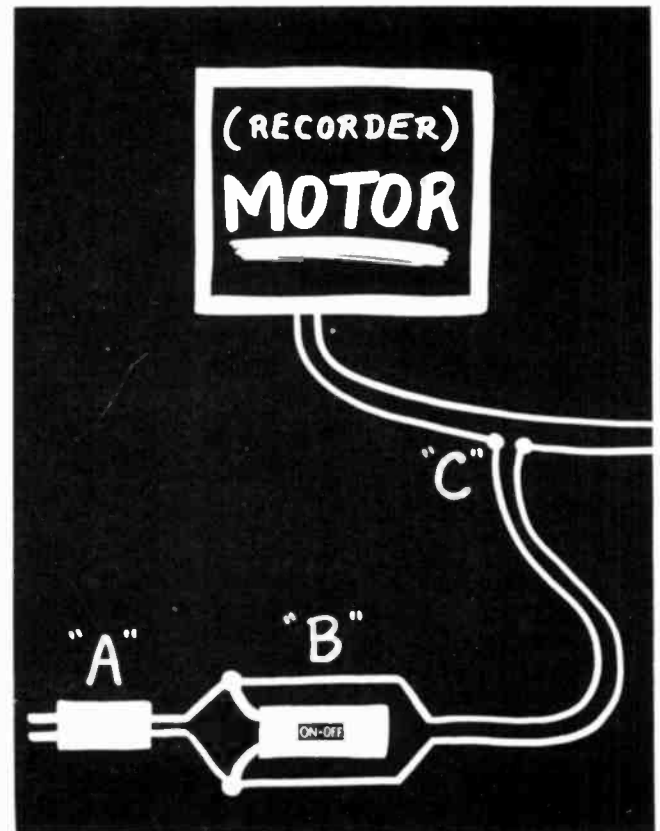


Fig. 9: Hooking up to the recorder's motor is simple as A-B-C, where "A" is a special Cinch-Jones plug. "B" is the SPST slide or toggle switch that closes the contact when the timer clock is not being used. And "C" is where one of the motor wires is cut and the two ends soldered to the zip-cord wiring coming from "A" and "B."

it look more attractive. And you can even "title" it in front if you wish, to further handsome it up.

Also shown in Fig. 3 are the Cinch-Jones Series 300 2-contact cable-clamping plug (Type P-302-CCT) and the slide-switch (any convenient SPST slide or toggle switch will do) used to connect between the timer clock and the recorder motor. The exact hookup is shown in Fig. 9, with switch "B" being left in its "ON" position whenever the timer clock is not being used. This entire cord—plug, switch and all—is just rolled up and stuck inside the storage space of the recorder when not in use.

WITH THE "DISENGAGER" SOLENOID:

Last month we discussed a *universal-type* solenoid system for disengaging your recorder's rubber idler wheel. This is used in auto-timer recording, to remove the pressure on the idler wheel after the tape has finished running, to prevent flat spots from possibly developing if allowed to "sit" too long. As described, the solenoid remained on until it was finally turned off by a timer clock.

Even better than having a timer clock shut off the solenoid, is utilizing one of these little Amperite Delay Relays in a special shut-off circuit (Figs. 10 to 12). Hooked up as shown here, the solenoid shuts *itself* off just two seconds after it goes on. This means that you can put this solenoid conveniently to work for you whenever you wish, to disengage the idler wheel automatically any time you have to go away from the recorder before the tape reaches the end. (Quite often, for instance, I leave the recorder playing background music for the family when I go out and work in my shop. And almost as often, during parties I let the recorder run out of tape without even noticing it until an hour or more later.)

Last month I advised you to be sure and get a *continuous-duty* solenoid. This type can be left on for any length of time without damaging the solenoid. Even without a timer clock to shut it off soon afterwards, it can be used to disengage your recorder's idler wheel. Then, the solenoid would be left "running" indefinitely until you arrived back to shut it off. Not good practice, exactly, but it'll work okay. Unfortunately, using a continuous-duty type solenoid is done at the expense of necessitating an extra large size solenoid (to absorb the heat produced).

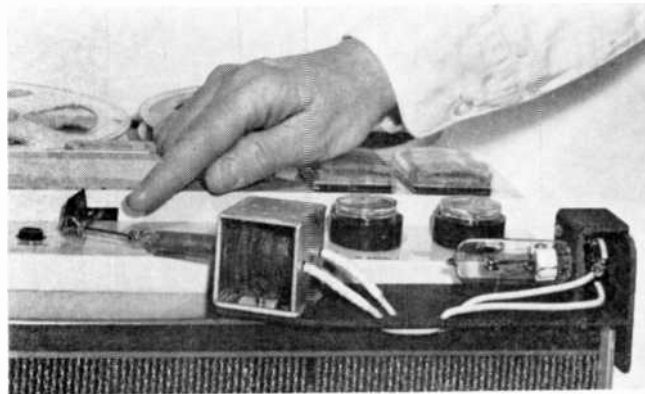


Fig. 10: Another use for a delay relay is in shutting off a "disengager" solenoid immediately after it has done its job, eliminating the need for a timer clock for this function (as described last month). The complete unit, which also includes a tape shut-off switch, is quickly put into use and is just as quickly removable.

Much neater—when you can use it—is the intermittent-duty solenoid, SINCE A SMALLER UNIT WILL EXERT THE SAME PULLING FORCE. Shown here is a Disengager System "personalized" for a specific recorder. Instead of needing the large Guardian Type-14 115 VAC *continuous-duty* solenoid of last month (with its 65 oz. pull), I experimented with a small pull-scale and discovered that this particular Knight recorder only required a 26 oz. pull to activate the Stop Lever. So I used a Type-2 *intermittent-duty* solenoid (which is appreciably smaller than the other) with a 27 oz. pull . . . and teamed it up beautifully with a Type-115C2T Amperite Delay Relay that switches the solenoid to "Off" in two seconds. These two units, plus the necessary tube socket and wiring, are mounted on a little Masonite framework that holds the solenoid "aimed" right at the Stop Lever of the recorder. And because of the light pull of the solenoid, a steel *cushioning* spring was not needed to absorb the solenoid's sudden shock each time. Another mounting possibility, which some of you may wish to consider, would be to permanently mount a solenoid on your tape deck, always available for instant use. The Amperite Delay Relay and the remaining wiring could be hidden away conveniently somewhere *inside* the recorder, to make an extremely compact installation.

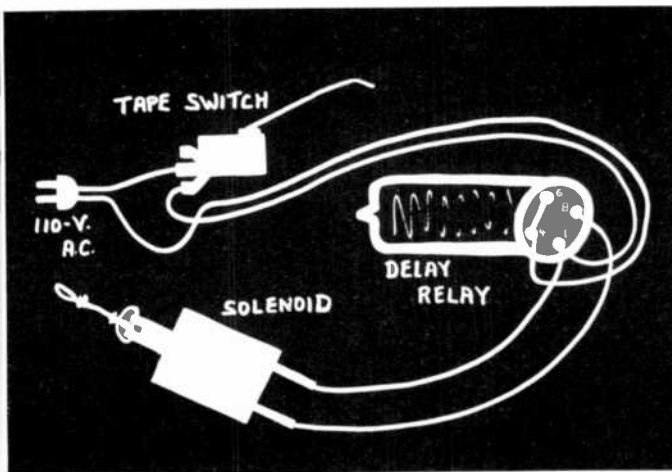
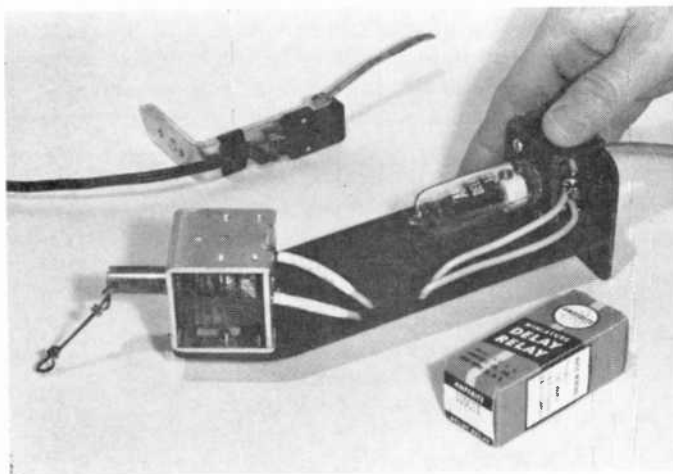


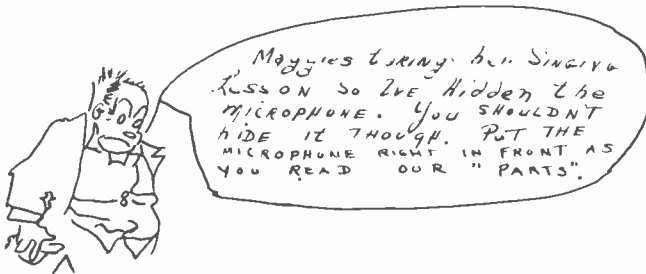
Fig. 11, left: Exactly how you construct the solenoid shut-off device will depend on the recorder you have. All you need, actually, is a support that will hold the solenoid in correct position for working the "Off" lever or knob to disengage the idler wheel, as well as necessary support for the delay relay tube and the needed wiring. Fig. 12, right: When the tape runs out, the tape switch immediately actuates both the solenoid and the heater element of the relay. First the solenoid acts to remove the pressure of the idler wheel and then two seconds later the relay turns the solenoid off. In this case, a delay relay that "opens" instead of "closes" is used for the job.

COMICS on TAPE

by Sheldon O'Connell



... pen and brush strokes come to life on tape.



L'L ABNER is comin' over the brow of the hill, and right after him is Daisy Mae, Blondie and Dagwood, together with a host of other cartoon characters that are familiar visitors to American homes every weekend. That's the time when the paper is scattered around front living rooms, with a different section for each age group. Don't know why it is, but Pop usually ends up with squares missing from the recipe-backed Sports page.

If there was a formula to guarantee peace and plenty, of the Sunday paper, that is, would you be interested? A tape recorder, one that is easy enough for a youngster to operate, and most of them are, plus the colored comic section of the paper, make a prize-winning combination to keep the youngsters happily occupied for a full afternoon, right from the headlines to the want ads and back.

Recorder and comics might be assigned any room, other than the one you've commandeered, and there a child can play happily, though somewhat noisily, reading dialogue balloons and describing the action on to tape. If there is a younger brother or sister it makes playtime even more

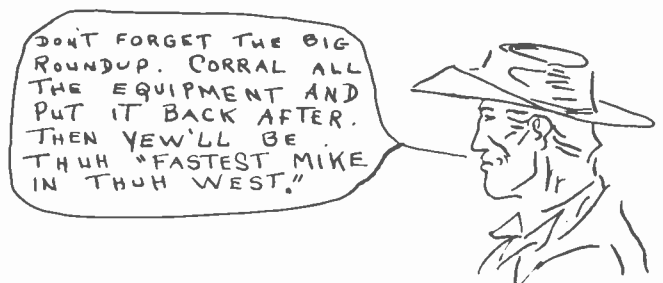
fun, each can take one or a handful of parts in domestic dramas from the Dagwood family circle to Terry and the Pirates and Orphan Annie.

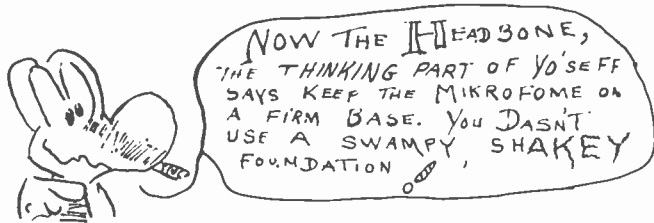
Do these comic strips have any plot, something to hang a story from? Many of them do, are self-contained playlets in themselves with an introduction, dialogues which give these tiny dramas pace and identity and closing scenes.

The ability to read aloud with expression is developed mostly through practice, educators recommend that this be done apart from class study groups, but it is rarely done on so voluntary a basis as an afternoon with the recorder, Li'l Abner and his friends.

Variations on straight taping of the comics can be managed the next time there's a classroom project, response would be enthusiastic, and serve as a gentle introduction to the drama clubs and theatre groups of later academic life.

The one occasion when taping the comics would interfere with the serious work of consuming mounds of cookies and candy is the junior age birthday party, when





strawberry ice cream goes to war against Flash Gordon.

Like tape recorders, the comic section of the Sunday paper isn't restricted to one age group, but to many, and there are a variety of tastes covered between their pages, Mary Worth, who captains the gossip squad, has all the drama and pathos any human could wring from a handkerchief, Dick Tracy and his entourage of hairy, shifty, stripe suited villains, Mandrake the Magician, Archie the teen King, and several more. Next time you're casting about for material that would record well in a mature party skit, just check the Sunday supplement for adult Westerners . . . adult westerns . . . that's where the cowboys don't do no shootin' to kill, just talk some, then blast away afore yew kin check the whites of their hats. If you want to read less than your neighbor, latch onto a black hat part, the black hats usually get shot up mighty fast and die quickly with a minimum of histrionics, just a gasp and a cough. White hat parts call for real acting ability, as every western addict knows, they just don't git kilt, frequently jumped by an unruly mob, or winged but not killed. The finish finds them on their feet, dusty but



game, with a bandage about the head, or croonin' a lullaby to their hoss.

You might divide the party guests into groups and after each records their comic skit, play them all back to the group as a whole and let them choose the best performance. A small prize for the winning team would make the entire "game" all the more fun.

Comics are not just restricted to the newspapers, of course, and another handy source, which makes just as good reading, are comic books. Many of the familiar newspaper characters are also found in comic books. In fact, today there are so many well known characters on TV, special adaptations of them into comics have been made, such as Cheyenne, Wyatt Earp, etc.

This type can make especially good reading fun, as the children become familiar with the mannerisms and dialogue of their favorites as they watch them on the TV screen and then try to imitate them when reading comic

books. In these instances, the children have actually heard and watched a real-live TV characterization of their hero and now they can better portray him as they read through a comic book adventure.

To make this interesting pastime even more fun, you can have each character identify himself by some small homemade trademark, such as a paper sheriff's badge, a cardboard gun, paper hat, cotton beard, etc. Dagwood's enormous before-bed sandwich would not only be fun to eat, but fun to make and it would fit in perfectly with a children's reading of the Bumstead comic character.

The possibilities are endless and all the happy sound

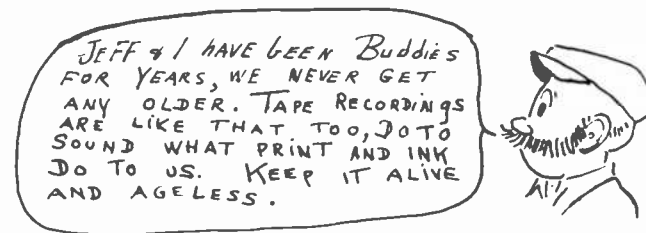


is captured on tape to be played back whenever wanted or to be filed away to be played some day when sis or junior are grown and the wonderful joys of childhood are lived again on tape.

Of course, the tape can also be erased and used again and again as desired.

It's an economic advantage to use the slower speed when recording material of this kind, since it covers the full frequency of the speaking voice. Microphones being what they are, will pick up the sound of papers or books rustling as each page is turned and brushed flat. This crackling can be irritating and a distraction to listen to on playback. When youngsters are reading they usually have the printed matter spread on the floor, this classic pose won't be changed by the introduction of a microphone on the scene. This should be kept off the floor, either suspended from a nearby table or placed on a hassock, to overcome the sound of excessive paper rattling and thumps from young elbows and feet.

No matter what your purpose, reading comics on tape is a new, all useful, all fun-filled diversion for today's eager, active youngsters. Most of us adults have tried our hand at script reading, now it's the children's turn, and what child doesn't enjoy the humorous, sometimes true-to-life shenanigans of comic characters. Why not have your offspring try it today, or next weekend, when all hands reach for the Sunday paper, try letting the junior editions run a pickup on Orphan Annie and gallop the Lone Ranger past the recording head for an afternoon of tape entertainment!



NEW RCA CARTRIDGE MACHINES



1961 ROUNDUP

As is usual at this time of year we like to look back and see what the old year brought to us in the way of developments in the field of tape recording.

Two trends were evident during the year. These trends are in their beginnings at the present writing but should develop and become a factor in the future.

One was the approval by the FCC of FM multiplexing, which has been renamed FM Stereo because the various trade associations concerned thought the former term to be too confusing to the public when it came to selling the equipment.

It got off to a slow start. At year's end there were only about 30 radio stations which had put FM Stereo on the air and these were doing it on restricted schedules. Many more stations are expecting to broadcast in this fashion and perhaps would be doing so now had equipment been obtainable from the manufacturers of transmitters.

Another factor in the slow start was the age-old "which came first, the chicken or the egg" complex.

Why should a radio station spend the money necessary to get on the air with FM Stereo when there were so few people equipped to receive it? Why should a person invest in the necessary gear for receiving it when there were so few programs for their sets to pick up. And so it went.

Radio stations felt that the manufacturers of FM Stereo receiving equipment should provide the sponsorship of the programs since they would be the ones to profit the most from it financially.

A second development that we feel

certain will increase both in volume and importance is the wedding of sound with both movies and slides.

V-M and Webcor, in the tape recorder industry both made available popular priced synchronizers which would operate any automatic slide projector from signals on the tape. Other synchronizers were made by firms in the photo field, such as Kodak and Bausch and Lomb, among others. Thus the two fields, photography and recording came closer together on these points.

Another wedding of photography and sound recording is coming about in the field of 8 mm movies for home and school. This was evident from the increased number of projectors becoming available which used 8 mm magnetically striped film and also the issuance of machines to apply the sound track to the film.

Fairchild Camera and Instrument Company had on the market a camera which recorded the sound as it took the pictures. The sound stripe was applied to the raw stock before exposure.

In the other method, the films are shot in a silent version, the film sound striped and then the sound added by means of the magnetic projector.

It is felt that there is a very great future in the wedding of sound and sight for home and school use.

Another development that may be the beginning of a wave was the increasing numbers of battery-powered portables both domestic and imported. This trend may mean the beginning of the use of the recorder as a creative instrument in this country as it is abroad. Being able to bring back the sounds of trips, etc., should make the hobby more appealing.

M.M.&M. SENSING TAPE



NEW SARKES TARZIAN TAPE



WEBCOR SLIDE SYNCHRONIZER



FUJIYA JAPANESE RECORDER



ORRTRONIC TAPEPLAYER



Further evidence of the growing "togetherness" of sight and sound was the issuance by Webcor of a free booklet describing the many ways in which a tape recorder could be used in conjunction with a camera or projector.

The MRIA in cooperation with the nation's Better Business Bureau also brought out a booklet giving the details on tape recorders and explaining four-track, how recorders operate, servicing, etc. This was made available through stores and from local better business bureaus across the country.

There was a dramatic increase in the use of tape for teaching in the public schools, especially in the matter of language instruction. At year's end there were some 2500 language laboratories installed in schools across the nation. Much of this was made possible through the National Defense Education Act which provided matching funds for states.

In the field of tape manufacture, several new firms got their products on the market including Burgess Battery and Sarkes-Tarzian. Reeves Soundcraft brought out their Hi-Fi line and also made available a striping machine for putting the magnetic track on 8 mm film. Minnesota Mining and Manufacturing opened its new tape plant at Freehold, New Jersey which increased the company's capacity to make tape by 150%.

Other tape companies continued with their research and development programs and most expanded as demand for raw tapes for all uses continued to grow. The long circulated rumor that Eastman Kodak would begin the manufacture of tape became reality. Their first production was for professional and computer use.

During the year, despite all the talk and advertising of stereo, the production of monaural machines continued

to outpace the stereo units, giving some substance to the feeling in some quarters that the purchase of a recorder does not necessarily indicate that it will be used for music.

Livingston Audio Products brought out a line of 10 monaural tapes on 3 inch reels, the first issue of monaural tape for a number of years.

Total tape recorder production was variously estimated since the industry collected no production figures of its own. An educated guess placed the total at about 750,000 units of which almost half were imports, most being the small Japanese portable units selling for under \$100 and many of them in the under \$30 class. This year's sales puts the total number of recorders now in use somewhere in the neighborhood of five to six million.

Production of four track musical tapes continued through the year building the catalog to about 1,000 titles.

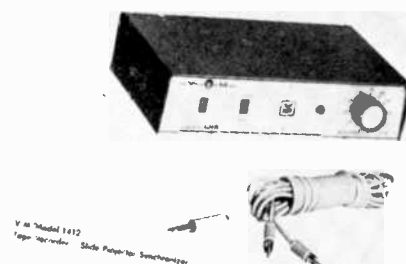
Cartridges were produced at a slower pace but some step-up was indicated toward the end of the year by Bel Canto, a subsidiary of Bell Sound who, with RCA were the principal producers of cartridge machines for general use. In the fall RCA brought out a new cartridge machine which was priced at about \$100 and which was much smaller and more compact than their former unit. This was expected to spur sales.

An increasing number of tape decks came on the market including those by Sony, Ampex and Tandberg. These were designed for people who had record playing equipment but who wished to take advantage of tape's superior playing and lasting qualities.

In the tape industry, 1961 was a relatively quiet year with no startling changes, unlike some previous years which had seen such changes as the switch from two to four track, etc.



V-M SLIDE SYNCHRONIZER
the Voice of Music



V-M Model 1412
Tape Recorder Slide Projector Synchronizer



NEW PRODUCT REPORT

STAFKSTED



BELL MODEL T-338 TAPE TRANSPORT

THE Bell Tape Transport is a two-speed, three motor unit that may be built in as a part of a hi-fi system or, if placed in the available accessory case may serve as a portable record or playback machine for stereo when connected to a power amplifier and speakers.

Since it is powered by three motors instead of the more usual one motor, it has no belts, pulleys or drive pucks. One motor is used for the feed reel, one for the takeup reel and one for the capstan. The motors are four-pole shaded-pole types. To stop the tape, electro-dynamic braking is used. This provides smooth and positive stopping through motor control rather than mechanical linkage.

The tape motion controls are on the right hand side of the deck and are of the piano key type. Speed selection is provided by two keys, one for the $3\frac{3}{4}$ ips speed and one for the $7\frac{1}{2}$ ips. The next key is the power off key which shuts the unit down. Next is the run key which puts the machinery in motion and next to that is the rewind, followed by the fast forward. The last key is a standby key which serves to turn the power on from the mains and also opens the head mechanism to receive the tape.

On the left side of the deck are the electronics controls including input for two mikes, record/play switches, push-to-release record interlock, record/play volume controls, two recording level meters, record/play indicators, which show whether the amplifier is set for recording or playback, and the 2 track-4 track head selector switch. A tape counter is provided on the right side of the deck.

The Model T-338 which was used for test consists of the T-333 deck with the RP-320 stereo record/play stereo amplifier attached and the whole enclosed in the 300-CC case.

Because all the units are separate a number of various configurations are possible from two-track monaural record and play (using the RP-321 monaural preamp) to the four-track stereo record and play represented by the T-338.

All models are identical mechanically, the only differences being in the head arrangements desired. The various preamps are designed to mount on the basic deck and become an integral part of it.

Since the unit ends at the preamplifier stage, a power amplifier and speakers are necessary. For stereo, a stereo amplifier and two speakers are

**Product: Bell Model T-338
Tape Transport**

**Manufacturer: Bell Sound Division,
Thompson, Ramo,
Wooldridge, 6325 Huntley
Rd., Columbus 24, Ohio**

Price: \$246.65

needed.

The transport includes a tape lifter which lifts the tape from the heads during rewind or fast forward and it also has an end of tape shutoff device.

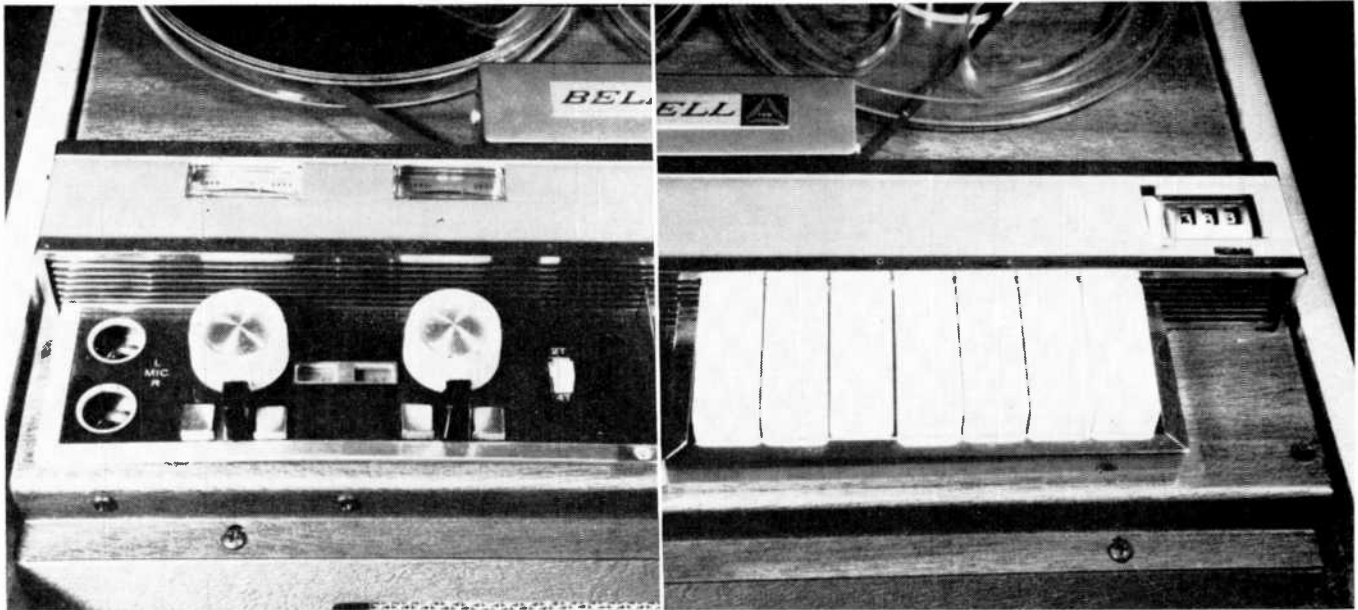
The tape feed is straight line and the standby key must be depressed in order to open the head assembly for the tape.

High impedance microphones may be plugged into the two jacks on the deck. Provision for recording from other sources has been made by jacks on the rear of the unit. A monitor jack for use during recording or playback is also provided and high impedance stereo phones (5000 ohms or more) should be used.

It is important to always make sure that the amplifier is in the mode in which you wish it. This is shown by the indicators provided. For playback the preamp should be in play, for if it is in record, the tape can be erased. The selector switch should always be checked with a glance before tape is run.



The case closed and in carrying position. The case is a useful accessory if it is desired to record away from home or if the deck cannot be built-in at home.



The left side of the transport has the record level meters, inputs for two mikes, Record/Play indicators, Push-to-Release Record Interlocks, Record/Play switches, Volume controls and Head Track selector switch. All tape motion is controlled by piano key type switches which from left to right are: 3¾ and 7½ selector keys, power off key, play/record, rewind, fast forward, standby (power on). The odometer type tape counter can be seen above keys at the right.

The two level meters will show the relative output for each channel and may be used to balance the feed into a stereo amplifier, in addition to their primary function as record level indicators.

There is one other caution and that is when going from fast forward or rewind to run, the standby key should be depressed and the tape allowed to come to a complete stop before depressing the run key.

The unit performed very well under test. As part of the test a dub was made from another tape and on an A-B test on playback it was impossible to discern any difference between the original and the tape made on the Bell Transport.

The piano type control keys were found to be convenient and they were likewise positive in action in all

modes. The tape braking action was found to be excellent and fast.

The frequency response on recording at the slower speed was excellent (as it was also at the 7½ speed) and the results obtained at the 3¾ ips speed were equal to or better than some machines at the 7½ speed.

The record equalization is automatically switched when the speed selector is positioned at the speed desired.

The transport is very well built and shows care in assembly. No trouble was experienced on its operation during the test.

The associated stereo preamplifier likewise performed very well and its moving coil meters were convenient to use and accurate.

We feel that this unit is worth your consideration.



Top: rubber reel locks are provided so that the reels will stay on when the deck is used in the vertical position. Lower: inputs and monitor jacks are on rear of deck. The transport may be used either horizontally or vertically.

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RATES: Commercial ads, \$30 per word. Individual ads, non-commercial, \$.05 a word.

In figuring the number of words in your advertisement, be sure to include your name and address. Count each abbreviation, initial, single figure or group of figures as a word. Hyphenated words count as two words. The name of your city, local postal zone and state count as two words. Maximum caps first four words. Proofs are not submitted on classified ads.

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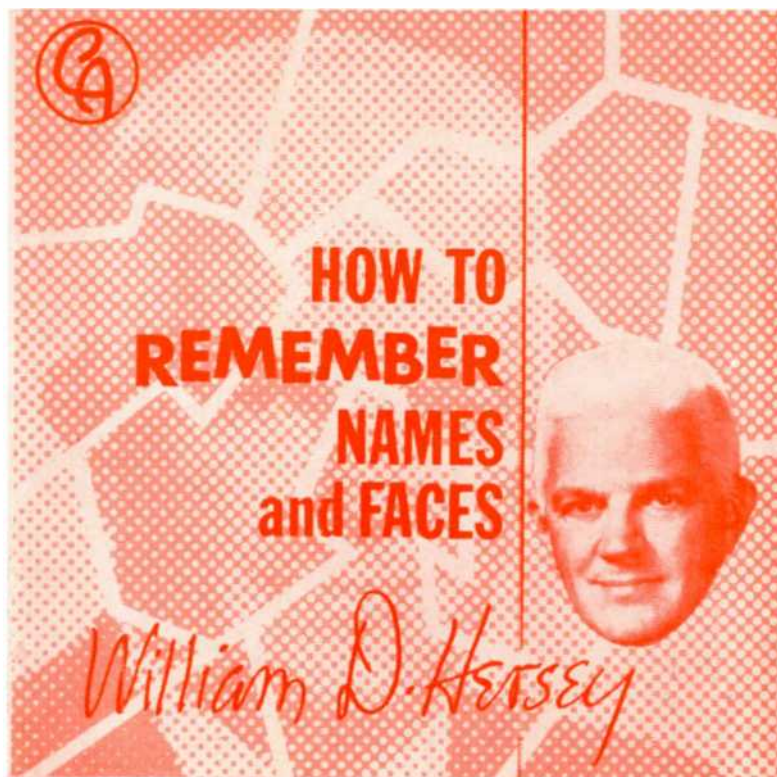
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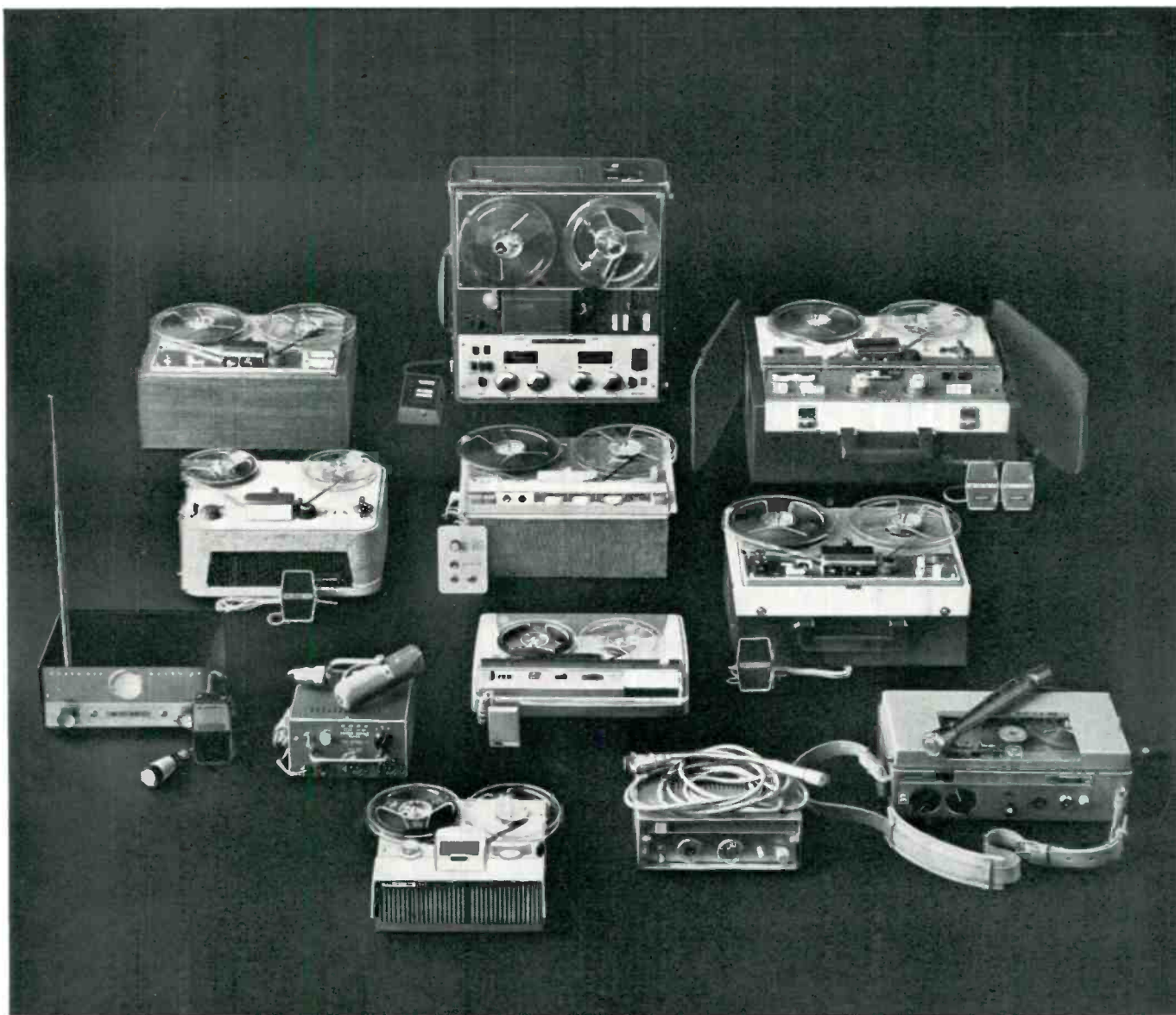
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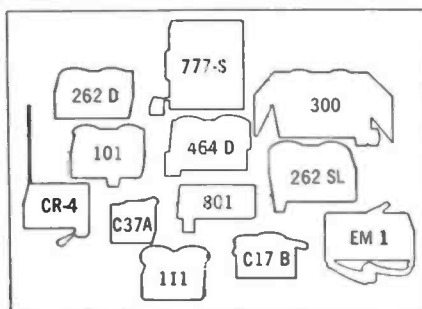


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