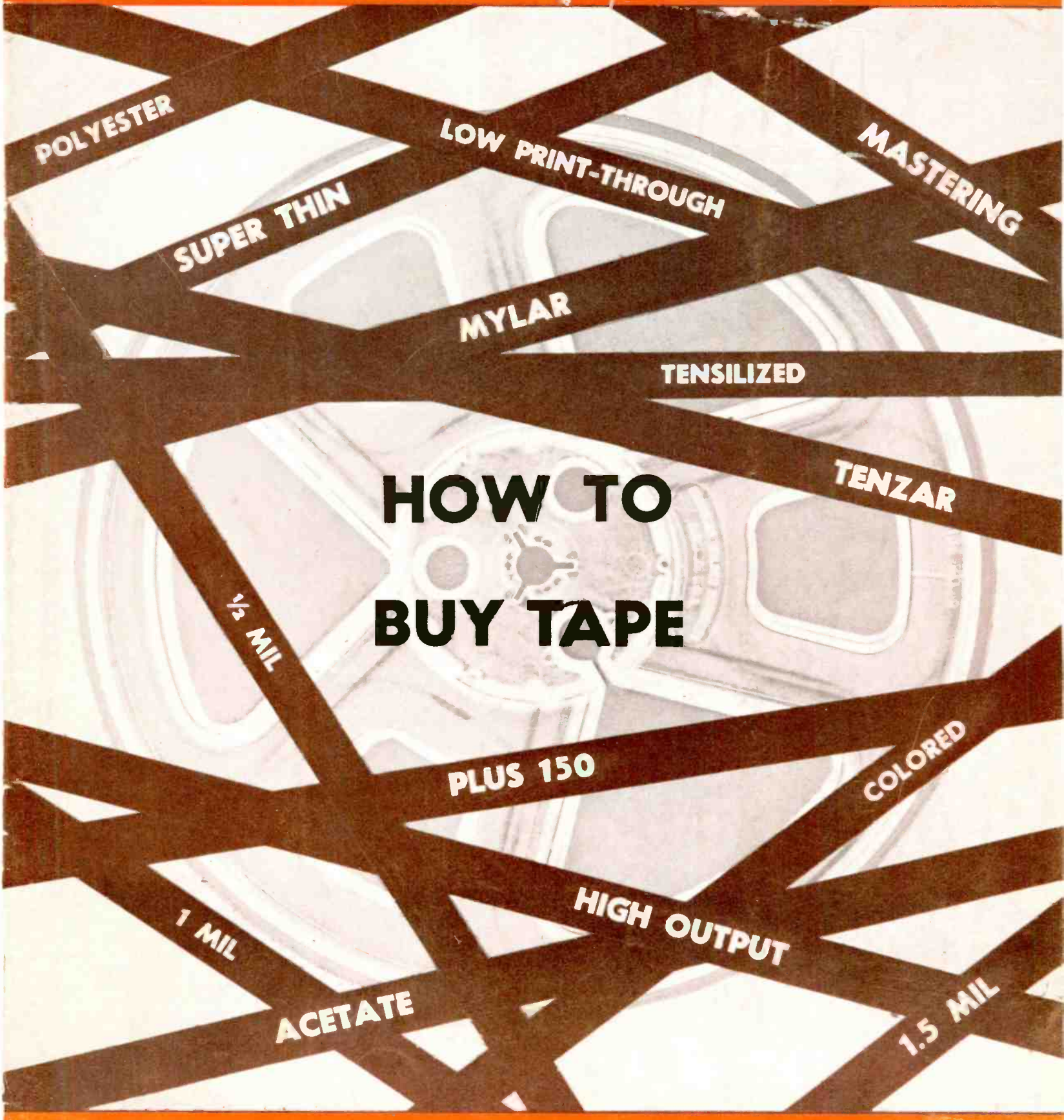
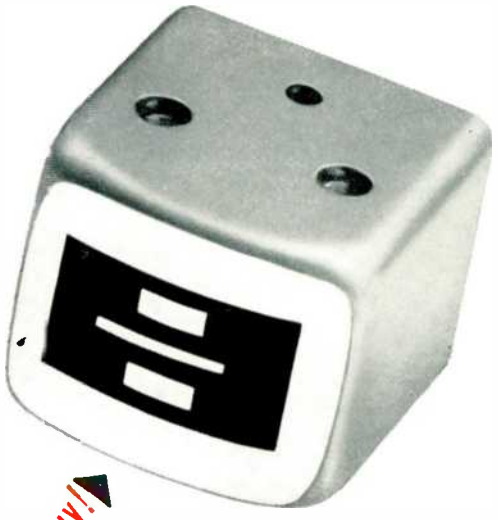
TAPE RECORDING



HOW TO BUY TAPE

May, 1961

35c



Here's where Soundcraft Tapes with FA-4 outperform any other tape you can buy!

There is no fooling a recording head ...it knows! It can reproduce only that which your tapes are capable of recording. To thousands of professional and amateur tape recordists, one tape has proven its ability to reproduce sound with a quality that is unmatched. That tape is Soundcraft with FA-4—the exclusive frequency adjusted formulation that **captures the full dynamic range of sound.** It costs no more to discover how well your tape recorder can perform.

REEVES SOUNDCRAFT CORP.

Great Pasture Rd., Danbury, Conn. ■ Chicago: 28 E. Jackson Blvd.
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P.S. Your recording head will appreciate Soundcraft's built-in lubrication.

R-143

New way to take sharp focus candids...on tape!

This is the new Webcor Microcorder—the *portable* portable—shown actual size. Transistorized down to 4¼ pounds with batteries, it's the *one* tape mechanism fit to be shoulder-strapped alongside your fine camera. Uncompromisingly built, the Microcorder asks no quarter. It gives as good as it takes—as you can prove by playing back its recordings on custom tape installations. Versatile! Push button operation, two speeds kept constant by capstan drive. Dual track, records and plays back more than an hour on one reel. Complete with recording level meter, battery life indicator, batteries, wide range mike, dynamic speaker and adjustable leather shoulder strap. Candidly, it's great!

$175

WEBCOR Webcor MICROCORDER

TAPE RECORDING

VOL. 8 NO. 6 MAY, 1961

IN THIS ISSUE

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For studio quality at home,

use the tape professionals use: "SCOTCH" BRAND!

For the home user as well as for the "pro," getting the desired sound from your recordings depends in great measure on the tape you use. "SCOTCH" BRAND Magnetic Tape—the performance standard of the broadcast industry—provides consistently high-quality recordings that capture sound with the fullest fidelity. Here are important reasons why . . .

The *uniformity* of "SCOTCH" Magnetic Tape—held to microscopic tolerances of backing and oxide thickness—results in the dynamic range being identical throughout each reel, as well as from one reel to another. The *high-potency oxides* used permit a thinner coating that results in greater tape flexibility, more intimate head-to-tape contact for sharper resolution. Exclusive *Silicone lubrication* impregnates the coating of "SCOTCH" Magnetic Tape with lifetime lubrication that protects the recorder head, eliminates squeal, extends tape life.

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MINNESOTA MINING AND MANUFACTURING COMPANY
. . . WHERE RESEARCH IS THE KEY TO TOMORROW

NEW TAPES

★—Fair ★★—Good ★★★—Very Good ★★★★—Excellent

CLASSICAL

Reviewed by Robert E. Benson

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

GROFE: Grand Canyon Suite
GERSHWIN: Piano Concerto in F (with Reid Nibley, pianist)
Utah Symphony Orchestra conducted by Maurice Abravanel
WESTMINSTER WTP 136
4 track, 7½ ips
$11.95 . . . 65 min.

A fine twin-pack tape, logically combining two well-known American works. These are admirable interpretations, straight-forward rather than inspired.

The Utah Symphony performance is a fine testimony to the quality of the minor American orchestras. Reid Nibley's performance brings out the lyrical aspects of the Gershwin *Concerto*, setting a high standard for future four-track releases of this work. The *Grand Canyon Suite* is played here as well as any of the competing versions, and is impressive as a simple statement of the score. Sonically, it lacks the echo-chamber effects used in the Morton Gould recording (RCA FTC 2006, $8.95, coupled with Beethoven's *Wellington's Victory*), which might be an attraction to some listeners.

The sound is superb—clean, crystal-clear and wide-open, with extraordinary percussion. No program notes, but an attractive modern package.

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

BERLIOZ: Fantastic Symphony, Op. 14
Virtuoso Symphony of London conducted by Alfred Wallenstein
AUDIO FIDELITY FCST 50,003
4 track, 7½ ips
$8.95 . . . 48 min.

Audio Fidelity has released many technically superb recordings in a pop vein, but on this, one of their first ventures into the classics, something went wrong. There are many fine things about this recording; Wallenstein presents one of the most effective recorded interpretations of this important Romantic symphony, and the playing of the hand-picked orchestra is of a high order. The tape is elaborately packaged in a gold-foil box.

I found the sound quite objectionable. There is overprominence of the lower strings throughout. Violin tone is thin, and the loud brass passages are harsh and distorted, regardless of the claims of lack of distortion in the accompanying notes. It may be that the review copy was overmodulated, causing this distortion, and it is suggested that you listen before buying. A good section to sample would be the last few minutes of the final movement.

Audio Fidelity is to be commended for using the extra tape necessary to avoid interrupting the third movement, placing movements one and two on the first track, and the final three movements on the second track. However, it is hardly necessary to have an announcement on the tape at the end of the second movement telling us to turn the tape over for the final three movements. All in all, a disappointing release, particularly for a label of Audio Fidelity's standards.

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

MENDELSSOHN: Symphony No. 4 in A Major, Op. 90 "Italian"
SCHUBERT: Symphony No. 5 in B Flat
Israel Philharmonic Orchestra, Georg Solti, cond.
LONDON LCL 80009
4 track, 7½ ips
$7.95 . . . 49 min.

It's always a pleasure to hear a good performance of Mendelssohn's *Italian Symphony*, and this one is as good as any. On this London tape it is most attractively paired with Schubert's *Symphony No. 5*, one of that master's most delightful works. Neither of these symphonies is particularly brilliant so far as scoring is concerned, and one couldn't expect a spectacular tape sonically, but what is in the scores is expertly captured by London's engineers.

As one would expect from Solti, these are energetic performances, and one of the finest recordings of the Israel Philharmonic Orchestra, which will afford continued listening pleasure.

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

MENDELSSOHN: Piano Concerto No. 1 in G Minor, Op. 25
Piano Concerto No. 2 in D Minor, Op. 40
Rudolf Serkin, pianist, with the Philadelphia Orchestra and the Columbia Symphony Orchestra conducted by Eugene Ormandy
COLUMBIA MQ 308
4 track, 7½ ips
$7.95 . . . 42 min.

Why Licia Albanese makes her personal recordings on tough, long-lasting tapes of MYLAR®

No need for fussy storing with tapes of "Mylar"; they're unaffected by heat or cold. They're thinner, save valuable storage space.

"An interpretation of an operatic role is a growing, living thing that changes from year to year," says famous Metropolitan Opera soprano Licia Albanese. "That's why I always use tapes of 'Mylar' when I study a role. These tapes never dry out or get brittle with age. So no matter how far in the future I play back and check my interpretations, I know they will be the same as the day I recorded them."

Today, only tapes of "Mylar" give you such long life and lasting fidelity. Only these super-tough tapes have a 300% safety margin against stretching and breaking. Only these superior tapes give you 50% or more extra playing time per reel without sacrificing strength.

The next time you buy a reel or cartridge of tape, look for these exclusive advantages. Then, like Licia Albanese, get your favorite brand, made with "Mylar"* polyester film.

NOTE: NEW LOW PRICES ON HEAVY-DUTY TAPES OF "MYLAR" GIVE YOU THEIR ADVANTAGES AT A COST JUST A TRIFLE HIGHER THAN ORDINARY TAPES.

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. . . through Chemistry

DU PONT MYLAR® POLYESTER FILM

For one of its initial releases on four-track tape, Columbia has issued the two Mendelssohn piano concertos, played by Rudolf Serkin, with Eugene Ormandy conducting, the *Concerto No. 1* with the Philadelphia Orchestra, and the *Concerto No. 2* with the Columbia Symphony Orchestra.

The performances are dazzling pianistically; Serkin turns both of these concertos into virtuoso display pieces. Sound is of Columbia's best, although perhaps a bit on the steely side on the high strings. The *Concerto No. 2* is plagued with extraneous sounds, but not to the extent that most listeners would find them distracting. Columbia has issued the *Concerto No. 1* by itself on a two-track tape, GMB 78, *$6.95*, which is not appreciably better than the four-track version.

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

MENDELSSOHN: Violin Concerto in E Minor, Op. 64
LALO: Symphonie Espagnole, Op. 21
Mischa Elman, violinist, with the Vienna State Opera Orchestra conducted by Vladimir Golschmann
VANGUARD VTC 1623
4 track, 7½ ips
$7.95 . . . 56 min.

Elman made his American debut in 1908, playing the first American performance of the Tchaikovsky Violin Concerto, and has now been playing before the public for more than a half-century. In this recent recording, the famed Elman tone is frequently evident, and there is much to admire, but the performances are marred by occasional lapses in intonation. On the credit side are Golschmann's sensitive accompaniments, and top-notch sound from Vanguard.

There are better four-track tapes of both works currently available, both played by Ruggiero Ricci. The Mendelssohn is coupled with the Bruch *Concerto in G Minor* on London LCL 80003, *$7.95*, and the Lalo, coupled with the Sibelius *Concerto in D Minor*, is on London LCK 80046, $11.95. For sentimental reasons, however, some listeners may prefer the Vanguard release as a memento of one of the legendary masters of the violin.

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

CONCERTOS UNDER THE STARS
Side One: Wildman: Swedish Rhapsody, Rachmaninoff: Prelude in C♯ Minor, Bath: Cornish Rhapsody, Liszt: Liebestraum
Side Two: Addinsell: Warsaw Concerto, Beethoven: Adagio From Moonlight Sonata, Litolff: Sherzo From Concerto Symphonique
Leonard Pennario, Pianist; The Hollywood Bowl Symphony Orchestra conducted by Carmen Dragon
CAPITOL ZP 8326
4 track, 7½ ips
$7.98 . . . 45 mins.

Here is music for night-time listening—melodies so beautiful you wonder at the imaginative genius of those who conceived them. Leonard Pennario is superb as he interprets them on the piano. Carmen Dragon and the Hollywood Bowl Symphony Orchestra provide the absolutely correct setting for this wonderful presentation, without altering the music as written for piano alone.

Good stereo effect and fidelity, but some tape noise is present.—*F. N. West*

SHOWS

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

FINIAN'S RAINBOW
Sequence A: Overture, This Time of Year, How Are Things in Glocca Morra, Look to the Rainbow, and others.
Sequence B: Old Devil Moon, Necessity, Something Sort of Grandish, The Begat, and others.
Original cast of the Broadway production, featuring Jeannie Carson, Howard Morris, Biff McGuire, Carol Brice, Sorrell Booke, and Bobby Howes
RCA FTO-5003
4 track, 7½ ips
$8.95 . . . 43 mins.

This tape is the original cast of the New York City Center 1960 production of this charming Irish musical and offers much improvement over the old Columbia album made in the late Forties.

Jeannie Carson, in fine singing voice, leads a strong cast through the delightful score and makes the lovely melodies come alive again right in your living room. Carol Brice, Howard Morris and others assisted by an excellent choral background give plenty of polished support. RCA Victor has done an exceptionally good recording job. Well balanced performance in all phases—music, fidelity and stereo effect.

This is one for all the family.—*F. N. West*

POPULAR

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

TONIGHT!
Un Sospiro, Jalousie, Dark Eyes, Mexicali Rose, Tales From the Vienna Woods, I Love You Truly, Sweethearts, Memories Are Made of This, Hi-Lili, Hi-Lo, Catch A Falling Star, Nola, Stout Hearted Men, Maid With the Flaxen Hair, I Got Rhythm, Near You, Rustle of Spring, Let's Fall in Love, Spring Song, Hungarian Rhapsody in C Sharp Minor, and others
Roger Williams, accompanied by the Quiet Men
KAPP KTP 45009
4 track, 7½ ips
$11.95 . . . 93 mins.

If you haven't personally met Roger Williams before listening to the amazing "Tonight" tape, you'll feel like he's an old friend by the time you finish with it.

His performance not only displays his musicianship, but his spoken commentaries show an engaging and humorous personality. Starting slowly, he runs the gamut in his musical selections, from Liszt to Strauss, from Gershwin to Rock 'N Roll (He'll tell you about that) and through it all you'll love it and him too.

The Quiet Men, who accompany him throughout the concert give a good account of themselves when he shares the spotlight with them. Sebastian, Roger's brainchild, a mechanical or electrical whoozis, provides a humorous interlude.

The tape is well recorded, considering it was a live performance. Some tape hiss is present but after awhile you don't seem to be bothered by it.

Real good listening!

HISTORICAL

BOSTON, Birthplace of Liberty
Creative Associates, Boston, Mass.
Dual track, 7½ ips
$5.95 . . . 57 mins.

Sidney A. Dimond, heading up Creative Associates is responsible for the conception, preparation and production of this tape. He and his associates have done a good job.

Actually, this tape is a tour in sound around historic Boston with the actual sounds and voices of the city. The bells of Old North Church, which Paul Revere rang, an actual Sunday service in the church including its Johnston organ, the solemn tick of the clock of the Park Street church where the song "America" was first sung.

The sounds themselves are explained by such people as the verger of Kings Chapel, the Vicar of Old North, the superintendent of Faneuil Hall, Cradle of Liberty and others.

Into these has been woven a continuity done by Bob Walsh and Donald Born which maintains a steady pace throughout.

This is an excellent tape and a worthy addition to its predecessors which have earned Creative Associates eleven national awards. This tape can also give you ideas as to how you can use your own recorder.

NEW PRODUCTS

CONCERTONE SERIES 500

American Concertone, Inc., 9449 W. Jefferson Blvd., Culver City, Calif. has announced the introduction of their new "Series 500" tape recorders. The series consists of three basic units, the Concertone M-506 tape transport, M-508 monaural and M-507 stereo. Among the features are high or low impedance inputs and outputs, large VU meters and separate line and mike inputs. The equipment is furnished with three fully shielded heads with space for a fourth for special effect work. It employs three hysteresis motors, two for tape reeling and a heavy duty hysteresis synchronous capstan motor in an unusually effective indirect tape drive system. The unit is two speed and available in 3¾—7½ ips or 7½—15 ips. Prices: M-506 Tape Transport $349.50; M-508 Complete with monaural preamp $520.00; M-507 Complete with stereo preamps $645.00. Other information is available from the manufacturer.

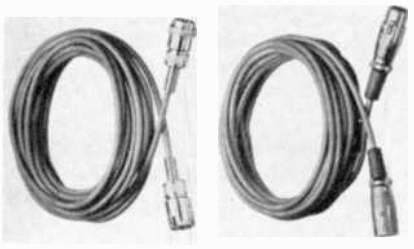
V-M SLIDE SYNCHRONIZER

V-M Corp., 280 Park Street, Benton Harbor, Mich., has introduced the Model 1412 Synchronizer which enables the user to add his own words and his own music to his own slides. Narration, music and pictures are all perfectly synchronized automatically. This V-M synchronizer is designed for use with a V-M tape recorder and a remote control slide or strip film projector. It imposes a low 60 cycle pulse signal on the recording tape which will, during play-back, cycle or trip the projector in synchronism with the program recorded. On the V-M "Add-A-Track" machine the commentary can be recorded on one track and the slide-change pulse signal on a second track. With this recording method, the commentary is unaffected when the pulse is erased and re-recorded to change the timing of slide changes. Background music and sound effects may be added to the commentary by using "Add-A-Track." Price: $49.95. Write for details.

SMALL PORTABLE

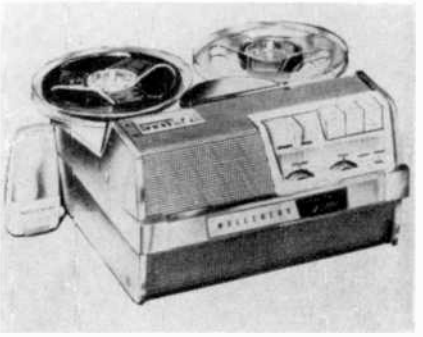
Lafayette Radio, 165-08 Liberty Ave., Jamaica 33, New York, has introduced a new, full-function portable tape recorder designated RK-125. The recorder is supplied complete with telephone pick-up, earphone, patch cord, microphone, 3" reel of tape, empty reel, and batteries. It measures 6" x 8¼" x 2¾" and weighs only 2½ lbs. Maximum tape economy is maintained by use of 3¾ ips tape speed and half track tape head-records and plays up to 34 minutes on a standard 3" reel of tape. A single function control provides for Rewind, Stop and Forward with a second control furnishing variable Volume with Play or Record chosen by a simple slide switch. The RK-125 utilizes a sophisticated transistor circuit with 3 transistors and contains its own 2" x 3" PM speaker and amplifier. Cost: $29.95.

SWITCHCRAFT CABLES



Switchcraft, Inc., 5555 N. Elston Avenue, Chicago 30, Illinois, is marketing two new cables introduced by Switchcraft which make it possible for anyone to add an extra length to existing cables of public address, tape recording or studio microphones without using tools, wiring or soldering. Both cables are "plug-in" type. All that is necessary is to disconnect present cable from microphone, plug in the extension cable, and connect the old cable to the free end. Cables are two-conductor, shielded and 25 feet in length. No. 93BU94 has Amphenol MC3M and MC3F plugs. No. 91BU92 has Cannon and XL3-11 and XL3-12 plugs. Full information and prices may be had by writing the manufacturer.

HOME-AUTO RECORDER



A home tape recorder also designed for use in boats or autos without a separate converter has been announced by Wollensak Optical Co., Div. of Revere Camera Co., 320 East 21st St., Chicago 16, Ill. It is the Wollensak T-1700. Its built-in power converter enables it to be operated from either AC 110 volt house current or the DC 12 volt battery current common in autos and on many battery-equipped boats. The recorder's 10 watt amplifier can be used as a public address system. It has frequency response of 40 to 15,000 cps plus or minus 3 db at 7½ ips, and a response of 40 to 8,000 cps plus or minus 3 db at 3¾ ips. At both speeds, signal-to-noise ratio is 48 db, with wow and flutter less, than .3% and distortion under .8%. Contact Wollensak for price and all details.

ORIGINAL RECORDED RELEASES

The Ferrodynamics Corp., Lodi, N. J., announced its coming recorded tape releases of original recorded material. An intensive search has been going on and is still under way to locate talented performers who have not yet established a national reputation, but whose performances are of a quality equal to that of well known names in the industry. The tapes will be four track stereo. These original stereo recordings will be devoted almost exclusively to material that is not now available on either tape or disc. We are looking forward to hearing some of these original releases.

CORRECTION

In our April issue of TAPE RECORDING we quoted the price of either the Magneraser Model 200C or Model 220C manufactured by the Amplifier Corp. of America as $24.00. We have since been informed this price was released erroneously and should have been $18.00 instead.

CROSSTALK

from the Editors

ACCORDING TO HERB BROWN the president of the Magnetic Recording Industry Association, the greatest potential in the high fidelity field now rests with the tape recorder. He feels that the phonograph market has hit a saturation point and is now basically a replacement market.

* *

BACKING THIS UP is the fact that every major music company in the United States is now marketing music on tape and the large manufacturers of music equipment are impressed with the long range future of tape.

* *

THE MRIA PREXY sees three tape markets. The first is the traditional tape recorder market of the familiar reel-to-reel machines. The second is the emerging market of the tape player, which has no recording facilities but simply is used to play tapes through hi-fi systems. The third market will be for the tape cartridge. He feels that by next year, serious attention will be paid to the tape cartridge and during the next decade it will be directly competitive with phonograph discs.

* *

WE THINK HE IS RIGHT. The magnetic recording industry has the better mousetrap. Its products have the capability of giving more, better and longer lasting hi-fi than any others. Present prices are well within the reach of those who do not mind paying a little bit more for the best. And there is no reason why further improvements will not result in still lower prices . . . and this without obsoleting present machines.

* *

AS WE MENTIONED LAST MONTH, the fact that such firms as Eastman Kodak, Sarkes-Tarzian and, just announced, Burgess Battery Company will be making raw tape is indicative of the expected growth in the field of tape recording.

* *

THERE ARE OTHER GROWTH areas for tape in addition to the hi-fi field. One of these is in education where the tape recorder is becoming an increasingly important tool for teachers. The installation of language laboratories in high schools and colleges continues at a rapid pace. All of this means many more thousands of machines installed which will consume hundreds of thousands of reels of tape.

* *

THE USE OF TAPE IN BUSINESS and industry is likewise on the increase. Magnetic dictating machines have practically outmoded the older types. One of the big factors here is the erasability of tape, enabling it to be used over and over again. In industry, tape is running machines, doing computations and magnetic banking, which uses figures printed in magnetic ink on the checks, is growing in use.

* *

IN FACT, TAPE HAS about taken over in every field of recording from sound to data and instrumentation. Many of the machines we now have could not exist without tape and research and progress would be hampered.

* *

ACTUALLY THE "HI-FI" field is about the only one that the tape recorder, in one form or another, hasn't taken over. Perhaps the day for this is at hand. How soon this will happen depends upon one thing—how much drive the industry puts behind it.

INDUSTRY NEWS

RECORD INDUSTRY ASSOCIATION OF AMERICA which keeps tabs on phonograph and phonograph disc production has voted to add recorded tape sales statistics, according to an action by the board of directors.

Start on the new project will be made in April or May.

REEVES SOUNDCRAFT is offering an exclusive recording of Cole Porter selections as a premium. The 30 minute tape is offered in 2 or 4 track stereo and is available only through the purchase of a Soundcraft Premium pack which consists of two reels of tape, one blank and the other recorded. Purchaser pays price of two blank reels plus one dollar. Vice President Frank Rogers said that previous Soundcraft Premium packs have been very successful because the music is exclusive and well recorded.

WEBCOR has upped George Simkowski to the post of Merchandise Manager and appointed Ed Stern to the post of Advertising Manager.

BURGESS BATTERY COMPANY, a division of Servel, Inc. has entered the raw tape market according to Fred J. Kirkman, Burgess president. The pre-production program and pilot run has been underway since 1954. A separate magnetic tape division has been established and the firm will produce both audio and instrumentation tapes. Regular channels of distribution through wholesalers will be followed with the tape being sold by hi-fi shops, photo stores, drug and department stores. The plant is at Freeport, Ill.

FERRODYNAMICS CORPORATION, Lodi, New Jersey, is looking for an extremely limited number of tape recorder owners to serve as a jury to pre-test their new musical tapes before they are marketed. Successful applicants will receive one tape a month and will not know the contents until they play it. They will be asked to fill out a form giving their opinion of the tape. The tapes will cost $2.75 each on a three month basis, $2.50 each on a six month and $2.25 each for a year. Those tapes which receive the best ratings will then be released through regular tape distribution channels. For details write to Ferrodynamics.

LIVINGSTON AUDIO PRODUCTS, 147 Roseland Avenue, Caldwell, New Jersey, has resumed the sale and distribution of Livingston tapes which represent one of the largest tape libraries in the nation. The distribution was formerly handled by the Stereo Music Society which is now out of business. Catalogs will shortly be available and may be had on request to the firm.

TANDBERG announces that John Seliski of Minnesota Audio Visual Co., Minneapolis, Minn. has won the dealer contest and was awarded a two week free trip to Norway, home of the Tandberg. Eric Darmstaedter, president of Tandberg of America announces that the firm will triple its facilities at Pelham, N. Y. including a nine story building.

ERRATUM

The price of the Webcor Transciever was incorrectly given in the article in the last issue. The correct price is $189.95 for the pair with single units selling for $99.95. They are American made.

FREE BOOKLET

Webcor, 5610 W. Bloomingdale Avenue, Chicago 39, is offering an 8-page booklet which contains a number of practical suggestions on ways in which the tape recorder can be used in conjunction with a camera. The booklet covers such things as audio-visuals for home, business or school, travel photography sound, both movie and still, darkroom operations, wedding recording, etc. The booklet is free and may be had by writing to Webcor and asking for it. The booklet also shows the complete line of Webcor recorders.

TAPE CLUB NEWS

Tape Club Organizing Continues

We have noted in the past few months an increasing number of new clubs being organized, which we are always glad to see. Another has been set up in Montreal, Canada. It is known as Magneto-Vox Club and, according to its secretary, J. M. Roussel, it will specialize in "round robin" tapes. Every member will be free to participate in at least two round robins. The club is preparing a "Soundhunters Manual" for its members, and will gradually organize a "Sound Encyclopedia."

Every member has a call sign that identifies him as an MV member. This club accepts members in any part of North America, i.e. Canada and United States. It is a Bilingual organization and all publications are made in English and French.

To receive an application blank and more information, write to the club's Executive Secretary listed in our roster. Only *active* tape recordists are wanted.

Club Has Taped Liturgical Music

There is an organization known as the Russian Orthodox Liturgical & Folk Society which has a collection of taped liturgical music.

According to the Julian calendar (the old Greek calendar) on January 7, 1961 the Eastern Orthodox Church throughout the world celebrated their Birth of Christ or Christmas day. As is generally the practice in all Russian, Greek, Syrian and Ukrainian churches, liturgical music with no accompaniment is rendered—music of such great artists and composers as Chaikowsky, Bortniansky, Rachmaninoff, and others.

The secretary of the Russian Orthodox Liturgical & Folk Society, John S. Gaydosh, has these divine liturgy services, both Easter and Christmas on tape, both monaural and stereo. The services were taped at the following churches: Russian Orthodox Cathedral, Phila., Pa.; Russian Orthodox Church of St. John the Baptist, Edwardsville, Pa.; and the Russian Orthodox Churches of Singae, N. J., Mayfield, Pa., Coaldale, Pa., Clifton, N. J., Spring Valley, N. Y. and Paris, France.

These tapes will be exchanged with other Russian Orthodox choirs or Eastern Orthodox Church choirs if you write to Mr. Gaydosh at 71 Dawson Avenue, Clifton, N. J. He also has tapes of groups singing and playing instruments rendering Russian, Ukrainian, Syrian or Greek folk songs, Russian Orthodox Church music sung in English and Russian Orthodox music over a period of many years.

Teen VS-ers

Al Crannell, South Glens Falls, New York, has recently been appointed Teen Counsellor by The Voicespondence Club. Al, blind and not far out of his teens himself, has been active in working locally with young people in between handling calls at his phone answering service. His recorder is going almost constantly these days, what with answering teen tapes and taking messages from his phone clients.

VS Tape Contest

After a somewhat slow start entries are now rolling in for The Voicespondence Club's tape contest. The contest, designed to encourage more imaginative use of tape recorders, is limited to club members only. They may submit entries in any of three categories: compositions, documentaries, and miscellaneous. Handsome "Golden Mike" trophies are to be given as first prize in each category.

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.

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

BILINGUAL RECORDING CLUB OF CANADA
Rene Fontaine, Secretary
1657 Gilford St.
Montreal 34, P. Que. Canada

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

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

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

MAGNETO-VOX CLUB
J. M. Roussel, Sec.-Exec.
8140, 10 Ieme 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.

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., GPO. Adelaide, South Australia

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

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

THE NEW ZEALAND TAPE RECORDING CLUB
Murray J. Spiers, Hon. Secretary
39 Ponsonby Road
Auckland, W.1., New Zealand

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

IRC Establishes Committees

The Indiana Recording Club has established the following committees to handle the organization's activities. Also listed are the committee chairmen.

Membership—Mazie Coffman; Program—Howard Belschwender; Publicity—Elizabeth L. Kelley; Tape Squeal—Donald W. Powderly; Tape Library—Norbert Kuzel; Contact—Helena Gibson; Associated Clubs—Ed Wingenroth; Welcome Committee—John and Lorene Chandler; Voice of History—Ed Bush; Special Funds—Ray Albert; Teen-Agers—Mary Quillen; Contests—Hubert Griffey; Parliamentarian—Donald W. Powderly; Budget Committee—Walter Gibson.

We are happy to see the great enthusiasm the directors of this club have. It is fairly new and we first heard of it just last issue. Since then we have received some back bulletins and the activities and undertakings this club is planning and is already engaged in are the kind of things which spur such clubs to quick and steady growth.

From "Foreign" To "Overseas"

We have received a letter from Mr. John F. Wallen, director of the Australian Tape Recordists Association which mentions something we were entirely unaware of and which we thank Mr. Wallen for calling to our attention. He advises us that many ATRA members commented on our using the word "Foreign" in our Join A Club box listing, since we in America could also be considered "foreign" depending on where one resides.

His suggestion to substitute the word "Overseas" is much appreciated and a glance at our roster will indicate that it is well taken.

Passing along some ATRA news, John tells us that Aussies have always been favorable to American enthusiasts wishing to join that club. Because of the increasing volume of inquiries being received each month from the U. S., ATRA has appointed Mr. Wm. C. Eaton, of Box 1967, Las Vegas, Nevada as the U. S. and Canadian club representative.

There are so many Aussies eager to learn more about America, and waiting to talk about "the Land of the Kangaroo" down-under, that a cordial invitation is extended to U. S. enthusiasts in all states.

Many ex-servicemen are at present "revisiting" on tape, the places in Australia that they came to like so much during the last war.

One U. S. club member, Mr. Terry Heick of 121 No. Birchwood Ave., Louisville, Kentucky, is endeavoring to organize the first overseas branch meeting of ATRA in Louisville, and has eleven residents to his credit already.

The Association's six-weekly Newsletter keeps every member in touch with headquarters and members' activities, and an Airmail membership of $6.00 produces a four-day postal service, instead of normal surface-mail category of $3.00, this latter taking six weeks.

ATRA has increased in membership from 34 in March '59 to over 300 at present, and a target of 500 total members by June, 1961 is their aim. It's our bet that they'll make it.

TAPE IN EDUCATION . . . . . Robert C. Snyder

(This month's column is a continuation of a series begun in March on teaching machines and newly-developed techniques of programmed learning which make them possible.)

"I believe strongly that every American should have an opportunity to have maximum development of his talents, under the most beneficial circumstances, and that is what the Constitution provides. That is what I strongly believe." So spoke President John F. Kennedy at a press conference on February 8, 1961.

If the principle stated by President Kennedy should become the accepted definition of the role of education in a democracy, it would seem to me to be a great step forward.

For too long, educationists in this country (and in many others as well) have tended to assume that a democratic education meant essentially the same education for each child—not much more and not much less—regardless of vast differences in abilities and interests.

As a practical result, the tendency has been to make strong efforts to restrict students to substantial conformity to lesson plans and the teacher's scheduled teaching plan.

Instead of encouraging—or even permitting—students to work ahead and finish the material in a course as quickly as possible so they could get on to more difficult and advanced work, teachers have usually made great efforts to prevent reading ahead, etc.

In a real sense the reason is a practical one: in the usual classroom where the lesson is generally taught by a lecture by a teacher, the student who works ahead of the class will throw the teacher and, perhaps, the rest of the class off stride and possibly even cause serious confusion.

Yet, if the student is to "have an opportunity to have maximum development of his talents," then the student must be permitted and even encouraged to move ahead into more advanced and difficult material as rapidly as he is able to do so. Otherwise, obviously, the student will not be able to accomplish the maximum learning possible for him during the period he is in the school system.

The resolution of this conflict clearly requires a change in the system of teaching and learning employed in the school system. It means requiring the student *to teach himself* as much of a given course as he can *without waiting for the teacher to explain the subject first in a lecture or classroom presentation.*

It is this requirement for self-instruction or self-learning—not only in schools, but also in industry and the armed forces—which has brought so much interest to bear upon teaching machines and the principles of programmed learning which make them possible.

Tape and tape recorders can have a tremendous role in audiovisual education. In future years this role may even increase as tape and tape-connected devices mature.

Today, the tape recorder and an automatic slide projector controlled by it can permit a most effective presentation of an audio-visual sequence.

Tomorrow, an economical, compact video recorder with an add-a-track feature could become a major teaching device in speech, language, music, and other fields with an audio performance phase.

The simple video recorder, or even today's tape recorder with a linked automatic projector, can become a major teaching device for the manual or mechanical arts or skills and for the instruction of operators and technicians in assembling, operating, maintaining, and repairing machinery and equipment.

Future developments in computers using tape or other forms of magnetic recording may create possibilities for programs of education beyond anything that most of us can imagine today.

For these reasons this series of columns is attempting to go into detail on programmed learning and teaching machines.

TEACHING MACHINES AND PROGRAMMED LEARNING: *a source book*, 724 pages, edited by A. A. Lumsdaine and Robert Glaser, published 1960 by the Department of Audio-Visual Instruction, National Education Association, 1201 16th Street, N.W., Washington, D. C., at $7.50, is the obvious beginning point for anyone interested in obtaining a thorough grounding in the history and current status of thought in this new field.

Appropriately subtitled: *a source book*, this volume reprints some 45 basic writings in the field dating from 1926 up through early 1960, adds several explanatory and interpretive chapters and sections, and includes two appendices. Appendix I is an annotated compilation of all published papers in this field known to the editors as of June 1960. Appendix II is a consolidated bibliography of all the references cited by authors of papers in the book, together with citations for the papers abstracted in Appendix I.

All of this book is scholarly, much of it stimulating, and some even entertaining (I particularly enjoyed a paper by Thomas F. Gilbert, which begins on page 475).

Current articles in two recent magazines will provide additional information on a considerable amount of applied work being done on both machines and programmed materials for the machines.

"Education Machines—A Trend Toward Automated Teaching," by Dr. R. E. Packer, senior training systems analyst, General Dynamics Corporation, in the Feb.-March, 1961 issue of *Industrial Research* is so full of information it would be hard to summarize. Copies of this issue may be available at about $1.00 each from Scientific Research Publishing Co., Inc., 200 S. Michigan Ave., Chicago 4, Ill. (Annual subscription: $5.00 for six issues).

"There's a Teaching Machine in Your Future," and "Machine Taught Electronics" in the April, 1961 issue of *Electronics Illustrated* are somewhat less technical, but interesting in a popular style.

(To be continued next month.)

QUESTIONS AND ANSWERS

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

Voice Reappears?

Q—I am confronted with a mystery to which I can find no solution but I would imagine that you have run into it before and can suggest what I can do to eliminate it.

I am tapesponding with an individual in Helsinki, Finland. I record a message over one that he sends. On the playback it sounds perfect. When he plays it in Finland, he complains that he hears my voice superimposed on his previous recording. I have tried (in vain) to erase the entire tape before recording my message.

I am using a Wollensak T-1500 only a few months old. He is using a European machine. However, we had the same difficulty when I was using a Webcor about a year old—and he still another European machine.

I have played back the recordings I make on my Wollensak on the Webcor. They are perfect when I send them. How can this erased voice reappear after it gets to Finland? Is it conceivable that the proximity to the North Pole, there, has some effect on the magnetic tape? I have no trouble with the ones he sends me.—*Mrs. J. M. W., Middletown, N. J.*

A—*The difficulty arises from the fact that the erase and record heads of the machines which you use are of less length than the ones on your overseas correspondent's machine. Thus you do not completely erase his old recording for its full width.*

The playback head on his machine must also be wider than yours, since he is picking up the new track which you have made, plus the old one which was not erased completely.

The use of the new four-track heads in the newer machines has caused some difficulty in tapespondence with people who have the older two track heads on their machines. The four track head only covers about 1/16th inch on the top and bottom edges of the tape (when used as a dual track recorder) but the two track heads cover almost a full eighth inch. Thus there would still be left on the tape, about 1/16th inch of the old track which had not been erased. When this was played back on a machine having two track heads, both the old and the new tracks would be heard.

The reverse is not true, however, for a two track tape, with tracks about an eighth inch in width, will play on a machine having four track heads and there will be no difficulty.

The only solution is to use a bulk eraser which will clean the whole roll of tape of any signals at one time. His proximity to the Polar regions would have no effect on the tape since our global magnetism at any point is so weak it cannot affect any change in the magnetism in the tape itself.

Tape Thickness

Q—I am interested in tapespondence. I notice that there are some ten clubs listed in your magazine. My question is this: how does a person know which club to join? I am interested in corresponding, via tape, with persons in the southern U. S., Australia and Hawaii, etc. as sort of a stream-lined pen-pal deal where new friends could be made and possibly visited during holidays. Do the clubs listed go in for this sort of thing?

I have a recorder (V-M-720) and the instructions state that tape of 1½ or 1 mil should be used but ½ mil tape should not be used. How does a person discover whether a tape is ½, 1 or 1½ mils? I have numerous tapes of various makes and other than Audiotape, the mil is not mentioned anywhere on the carton, either inside or out.

I feel that the double-play tape is probably ½ mil since I do have some aggravating trouble with it binding up under the sides of the reels. This trouble is not present on standard play tapes.

What is the difference between double play tape and long play tape. I notice that one brand has both types as well as standard play.—*J. F., Swift Current, Sask., Canada.*

A—*We do not know what kinds of tape you are using but an examination of the boxes of all the major makers which we have on hand reveals that all of them carry the information as to the number of mils or fractions of a mil of the contents except Scotch. This is a point which we had never noticed before. The key in all cases, however, is the length of tape and this is given on all brands. Tape that is marked standard, or regular play will have 1200 feet on the reel. This is 1½ mil tape. Extra Play, Plus 50 etc. will have 1800 feet on the seven inch reel and this tape is 1 mil. Double Play will have 2400 feet on the reel and is ½ mil tape. A mil is one thousandth of an inch and denotes the thickness of the tape.*

As to which club to join—write to those which interest you (enclose a self-addressed stamped envelope) then see what each has to offer in the way of activities, directories, dues etc. and make your choice from that. Some clubs are general and some are specialized as to languages spoken or principal interests of the members, such as the organ club.

FEEDBACK

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

Tape Pals Everywhere

To the Editor:

Please forgive my delay in thanking you for publishing the letter from both Rusty and myself in your excellent magazine. The delay was caused by several things—perhaps you may like to know what happened. Perhaps your readers would also like to know!

The first replies to our tape-pal plea arrived in one day over here—27 of them! For the next three weeks, there were at least 6 cards, tapes, or letters in every one of our three daily mail deliveries. We answered what we could, and passed the remainder on to our local recording club members. Each member now has a couple of tape-pals each. Even now, the odd reply still arrives! Now, here's the point—tapes came not only from America, but also from South Africa, Trinidad, Hawaii, Philippines, Australia, Canada, and Switzerland! How's that for a widely-read magazine? We honestly were startled with such a reaction.

May we, once again, ask that this be printed in your columns? The reasons are twofold—First, your readers will, I am sure, be very pleased to know that so many people in so many countries also enjoy "Tape Recording." The second is also important. We received many replies which had not been answered, due to the fact that we had a rather bad fire here, which besides damaging much of our equipment, also badly burned many tapes and letters beyond recognition! Our recording equipment has been replaced, but we cannot replace the addresses on those tapes and letters. If anyone has not yet received a reply from us, will they please forgive us, and if they would like to drop us another tape, card, or letter, this time they *will* get an answer. Further, if any American would like a British tape-pal, a few of our club-members would like to hear from them. If a tape is sent to us, we will gladly pass it on to another British recorder-owner who wishes to talk to an American.

Finally, we should like to say to all Americans: Yanks (and Rebs) you're wonderful people, and the friendliest, most helpful people in the world. Any American touring this country will always find the warmest greeting waiting for them at the Acton Tape-Recording Club. Thank you again, gentlemen, for printing our letter. Our sincere best wishes to you and your magazine.—*Dave Wiseman, 8 Woodhurst Road, Acton, London W3, England.*

Glad to hear you got results and sorry to hear about the fire. We did have the feeling that somone read the magazine besides the editor's mother.

To the Editor:

I have recently purchased a tape recorder, subscribed to Tape Recording and now would like to exchange tapes with other tape enthusiasts.

In your February issue you printed a note from Paul F. McAvoy requesting tape pals so I sent one to him. I received an answer from him today and he has received so many tapes that he does not feel that he can continue to exchange with all who replied to his request.

Considering the response Mr. McAvoy received I wondered if you would print a similar note requesting tapes be sent to me. I would guess from the number Mr. McAvoy received I should set some limitations so would be particularly interested in hearing from folks in Colorado, Wyoming, Montana and Washington State.

As I mentioned I have only recently become the owner of a tape recorder and I certainly was pleased to learn of your magazine as it is the only one I have found devoted to tape recording, I enjoy it very much.—*David L. Messenger, 174 E. Lake Road, Canandaigua, New York.*

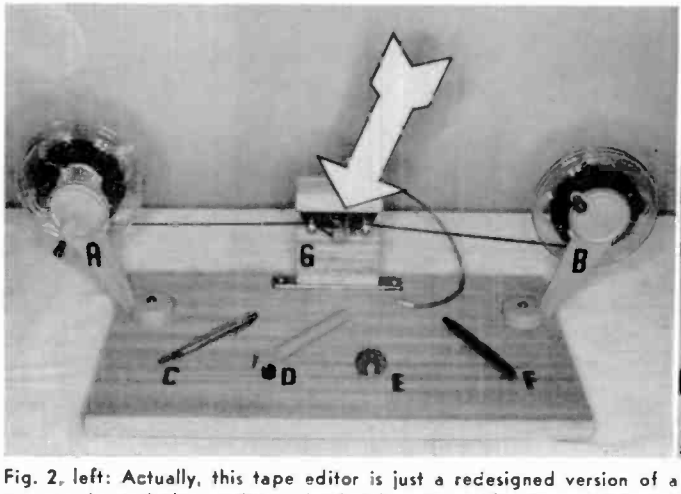
Fig. 1: "Hey, dad, this sounds like those funny chipmunks." Besides its use for actual tape editing, this special editor is great fun to play with, doodling around. By being able to vary the speed yourself, all sorts of odd sounds and "crazy" effects are possible.

Quick-Easy Editing

by Tommy Thomas

. . . . Ever hear of "editing headaches?" These are non-existent when you follow these simple procedures.

A SPECIAL fondness of mine lies in creating an interest in tape recording in people who so far have been able (somehow) to resist the fascinating magic of tape. Certainly, you and I already know just how engrossing a tape recorder can be, but there are still many people (altogether *too* many) who are missing out on a lot of the fun and seriousness of taping. So, whenever I can simplify what is generally regarded as electronically "mysterious," I like to



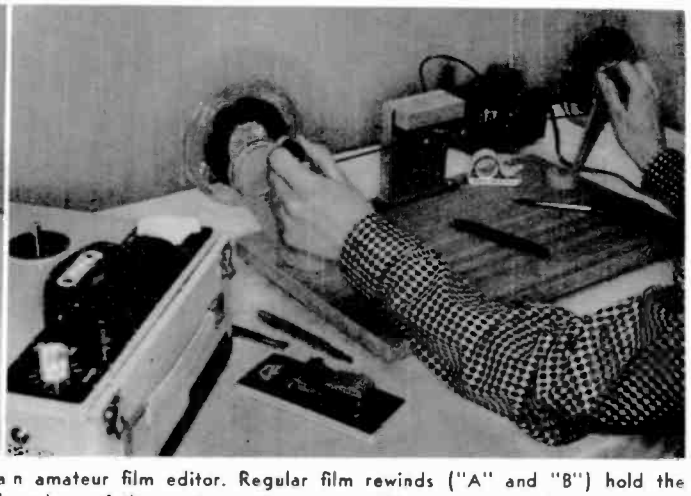
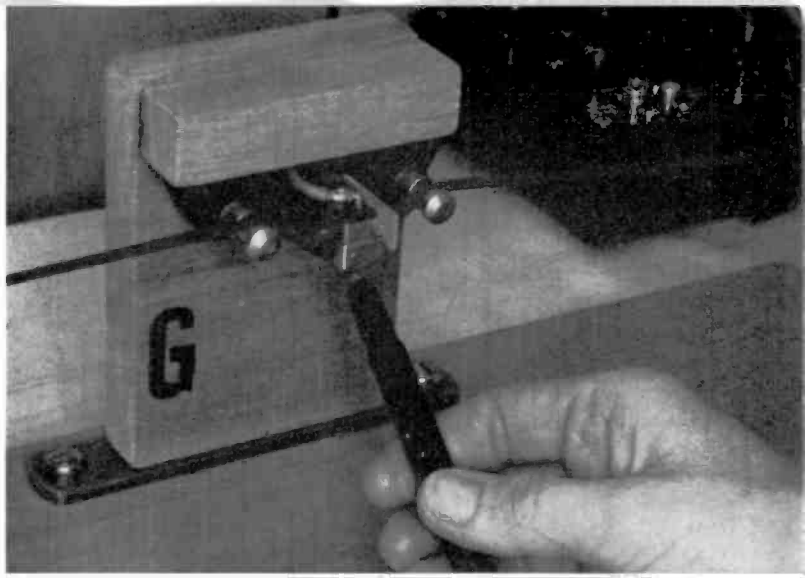


Fig. 2, left: Actually, this tape editor is just a redesigned version of an amateur film editor. Regular film rewinds ("A" and "B") hold the tape reels, and the auxiliary play-head assembly (at arrow) takes the place of the movie viewing screen. This gives you a degree of control usually impossible to obtain with a recorder alone. Fig. 3, right: First locate (on the recorder) the general area of the portion of the recording you wish to edit out. Then transfer both reels of tape over to the editor for the final back-and-forth "rocking" of the tape that will pinpoint exactly where you want to make your two cuts, at the start and end of the tape to be removed.



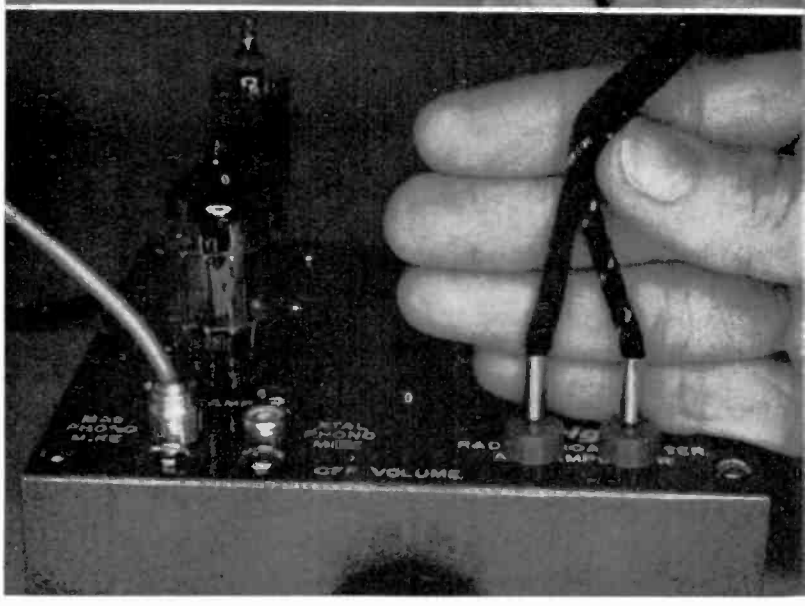


Fig. 4, top: Once you've located a cutting point on the tape (which is usually a very brief interval of silence in between two close sounds) mark it carefully with a china-marking pencil. If in doubt, check it again. And be sure to mark both ends of the portion of tape to be removed before doing any actual cutting, or it won't work. Fig. 5, middle: Finally, with the offending tape removed, splice the two "main" ends of tape back together and run it through the editor again to check that it turned out right. In the background is the Knight-Kit Broadcaster being used to amplify the weak tape signal . . . and encircled is where the 11-ohm headphones are plugged in. Fig. 6, bottom: For greater convenience, I mounted a pair of phone-tip jacks at the front of the Knight-Kit Broadcaster. So instead of the nuisance of having to somehow "clip unto" the rear terminals, I just plug the headset into the jacks. Also, for occasional loud-speaker use, I soldered a set of phone tips to the speaker leads.

do so. Also, the more downright out and out *fun* I can create with recording, the more people will become intrigued . . . and once they become even a little interested, it's just a matter of time until we've created another fan.

But I'm going to need your help!

For instance, this particular article is about the serious subject of *editing tape,* yet it also provides a way for you to introduce your friends to a few of the intricacies of taping that should completely surprise them with their simplicity. Therefore please keep in mind, as we go along here, the possibilities for vividly demonstrating to others how much fun you're having. And you can also show them (and this is important, I feel) how basically simple tape recording is, and that there's nothing that need intimidate them.

So here for a starter, this month, are a couple of quite useful aids to tape editing that you can assemble, easily and inexpensively. VERY IMPORTANT! In the January and February issues of this magazine I fully described an Auxiliary Play-Head Assembly that you could make for your recorder, along with several auxiliary systems of amplification that you might use. Because this type of system involves the use of a preamplifier *that has been especially equalized for tape head playback,* then of course this is the type of system to use in order to realize the full dynamic range of your equipment. But for special usage, as illustrated in the photos accompanying this article, it's possible to use Allied Radio's inexpensive Knight-Kit "Wireless Broadcaster/Amplifier" (described in the March issue) to provide your total amplification. This dandy little Broadcaster/Amplifier was not designed with tape recording in mind, hence it lacks the proper equalization necessary for use with tape. But still, even with the slight amount of distortion that this introduces, it does a mighty job with the ultratiny signal that comes from your playback tape head. It's strong enough, all by itself, to drive a five-inch speaker for low-level monitoring. And with head-phones, the volume is so loud that it's actually necessary to turn the volume *down* to make listening comfortable. All in all, it's a good little outfit (if you *already* have it on hand) for experimental use in tape editing. And it's slightly sensational when hooked up all alone to a playback head—as shown with the tape editor here—to illustrate to your friends just how simple and uncomplicated tape playback really can be. Naturally, for more serious work, you'll want to use properly equalized equipment.

With the tape editing "machine" shown here, and with just a modicum of practice that's really more fun than work, you can now begin to do some *really tight* editing between words, passages of music, etc. Also, you'll learn how to edit without having to cut or splice the tape at all, with just the aid of a simple permanent magnet. You can erase clicks, words or even entire passages if you wish, and you can "go over" previously recorded sound, causing it to swell or fade at your command. Of course, you can only do this editing on one channel—or one *set* of channels, with stereo—but this can't be helped . . . and actually, shouldn't cause you any great difficulties.

MAKING A TAPE EDITOR

One of the principal ways of locating exactly where you

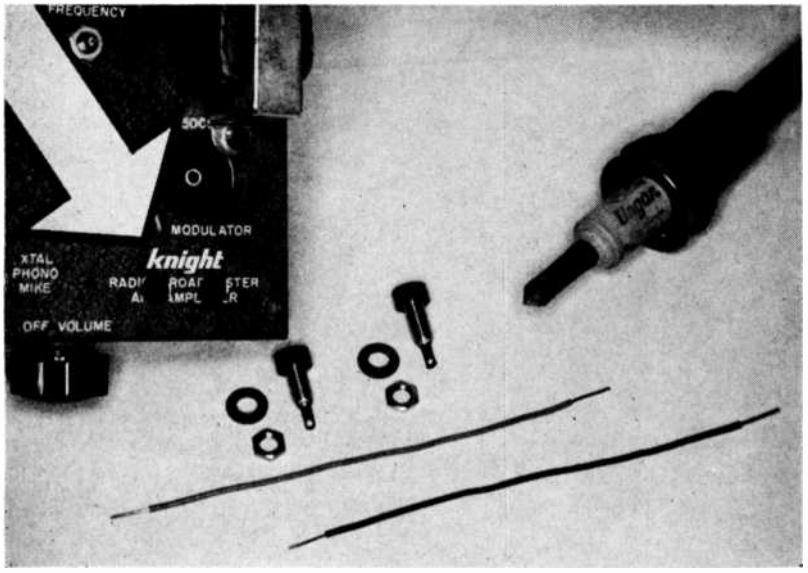


Fig. 7: Be sure to use insulated phone-tip jacks, and put them on carefully so that the metal of the jacks does not touch the metal of the chassis. When drilling the holes for the jacks (at arrow), first remove the fragile tubes and then put a piece of cloth under and inside the chassis, to "collect" the flying metal shavings.

want to cut a tape, in editing, is by first running the tape to the approximate spot where you want to make your cut, and then "'rocking" the tape back and forth over the recorder's playback head while you listen closely. In many recorders it's not possible to do this easily, and even when it is, it's often next to impossible to readily get at the playback head, so you can *very precisely* make a grease pencil mark at the exact spot where the cut is to be made. That's when having a simple tape editor next to your recorder can be most helpful. By transferring your tape over to the editor each time, you can easily do a precision job of locating your "cutting points."

Basically, the editor consists of a pair of movie-film rewinds (see Fig. 2) that are mounted on a piece of board, with the Auxiliary Tape Head Assembly mounted on a line in between the two rewinds. Very likely you can get the rewinds at your local camera store, but if not, you can send to Sears Roebuck as I did. Mansfield Rewinds, No. 3C9381, set of 2 for $3.75, shpg. wt. 1 lb. They'll hold up to seven-inch plastic tape reels quite snugly. The exact board-mounting is not at all critical (mine are 15" apart), as long as the two rewinds are in line with each other. Note that the auxiliary tape head assembly is mounted *upsidedown* as shown in the various photos. Again, exact dimensions are not important; just be certain to get properly lined up with the two tape reels so the tape won't scrape against the reel flanges.

By the way! The black tape shown outlining assembly "G" in Figure 1 was just placed there temporarily so this portion of the editor would show up better in the photo.

The shielded cable from the auxiliary tape head goes directly to the Knight-Kit Broadcaster (or, if you built the "Echo Master" last January, to your auxiliary preamp/poweramp/speaker system if you wish) and is plugged into the "MAG-PHONO-MIKE" input as shown in Figure 6. Speaker volume won't be loud enough for critical listening for editing purposes, so you'll need a pair of headphones that are within the 3.2 to 16-ohm range of the Broadcaster's output. The set my son Mark is wearing in Figure 1 came from Allied Radio (100 N. Western Ave., Chicago 80, Ill.); they're American Bell Dual Headphones, No. 59-J141, 11 ohms, $2.00 plus postage on 1¼ lbs. Also, when ordering the phones, it might be a good idea to order a couple of Type 202 *Insulated* Tip Jacks, No. 41H110, 13¢ ea., 2 oz. ea. (See Figs. 6 and 7.) It just takes an easy few minutes to mount these jacks on the Broadcaster chassis and solder and lead two insulated wires from them to the speaker terminals at the rear of the set. This makes future use of the Broadcaster much more convenient.

Now you're all set to go!

Put a reel of tape on the left rewind, thread the tape through the head assembly over to an empty reel on the right, and "start cranking." Forget about editing for now and just enjoy yourself. And it's really quite an experience, varying the tape speed according to your own personal fancy . . . from slow "hippopotamus talk" to an Alvin-like frenzy. As I mentioned before, besides being a useful tool for editing purposes it's a fun-thing also. I first discovered this myself when my two sons took over and had a ball playing various tapes. It's tremendously fascinating at parties, also, especially when it's hooked up to a more powerful auxiliary preamp/poweramp/speaker system so everyone in the room can hear. First record a person's voice the regular way on your recorder (or the group singing), and then transfer the tape over to the editor for your guests to play around with. Finally, after doodling around with the tape editor awhile, and after chasing the kids and any others away, you can settle down to serious experimenting yourself and, as originally intended, some actual editing.

ERASE-EDITING WITH A PERMANENT MAGNET:

If you hold a small permanent magnet against your recorded tape as it passes through your recorder, it will erase the tape. The erasure won't be as "complete" as when your electronic erase head does the job, but it's pretty effective nonetheless. It will erase all of the previous signal all right but, unfortunately, instead of leaving a completely blank, noiseless tape, there will be a noticeable residue of "hiss" noise remaining. Not real annoying, but *there*. Perhaps

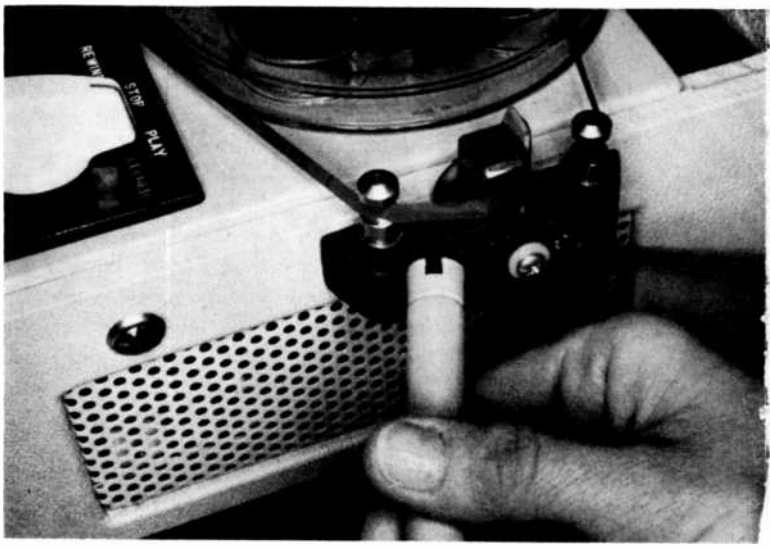


Fig. 8: With the auxiliary play-head assembly back on your recorder and a small, powerful permanent magnet to aid you, it's possible to edit your tapes without cutting them . . . by varying the distance of the magnet from the passing tape. With the magnet used as shown here, you can immediately hear the results of your editing.

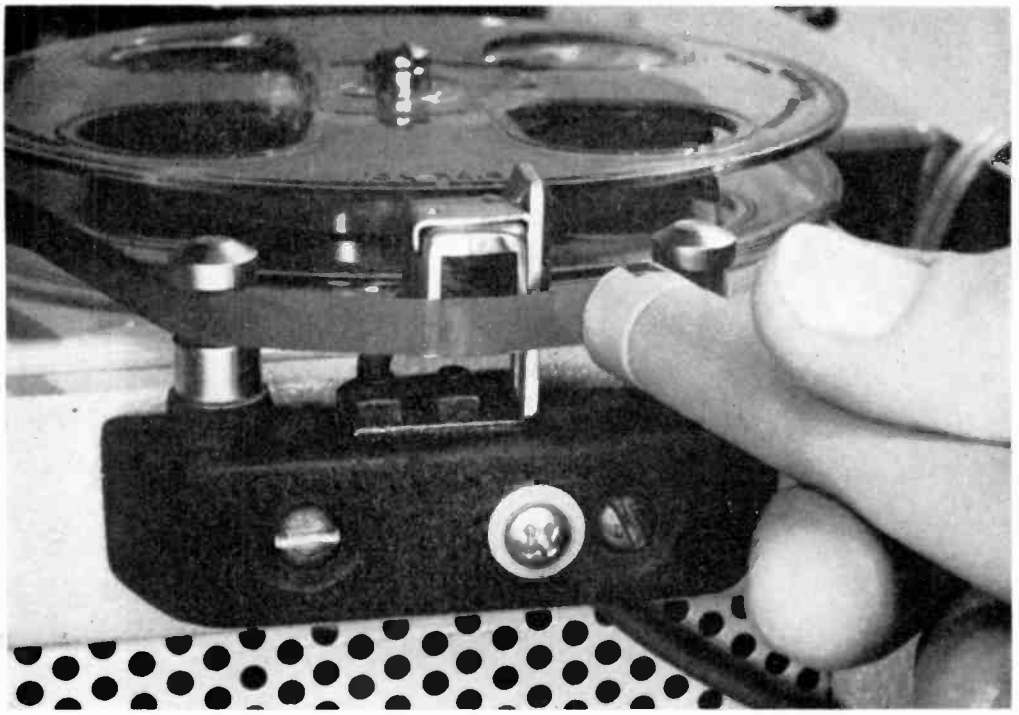


Fig. 9: Now the magnet (fastened to a wooden dowel for ease of handling) is being used on the other side of the auxiliary play-head. This way you can hear the recording immediately before you erase, making it a simple matter (with practice) to hold the magnet against the tape during the exact times you want to make an erasure.

this remaining tape noise will keep you from taking this system of "editing" too seriously, but even so it's vastly entertaining to play around with. And it very effectively and graphically illustrates how magnetism can affect your tapes.

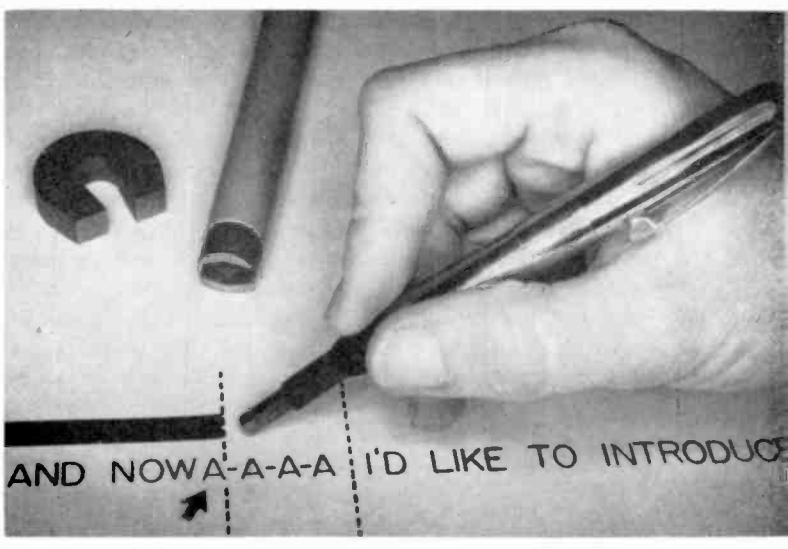
So, to find out the possibilities here, attach the Auxiliary Tape Head Assembly back on the side of your recorder and put on a reel of tape that has an "expendable" recording on it. Thread it through the recorder, past the auxiliary head and back to the takeup reel. Then, with the recorder set on "Play," but with the recorder volume on zero (minimum), listen to your tape via your auxiliary system. Now hold a small magnet up against the tape at a point *just before it gets to the auxiliary tape head* (see Fig. 8). You'll discover that as the magnet gets closer and closer (slowly, now) to the tape, more and more erasure takes place, until there is complete erasure when the magnet is actually touching the moving tape. Practice with the magnet at different distances until you become acquainted with just how close you have to go to begin erasure . . . and try varying the erasure for different effects. Since you'll be hearing the tape immediately as it leaves the magnet, you'll be able to tell exactly what is being done, just as you do it.

Then, as in Figure 9, hold the magnet on the "after" side of the auxiliary head. Now you won't be able to immediately hear the results of what the magnet is doing but, rather, you will be hearing the tape just *before* you erase rather than afterwards. If you wish to erase a certain "click" or word or even an entire passage, it's easier to do this way. Working quickly, you hold the magnet in against the moving tape during the time you are hearing the offending sound, and remove it a fraction of a second after hearing it come to an end. Now I hope that all of this doesn't sound complicated because it isn't at all. Quite the reverse, in fact. And since it only involves the extra cost of a few inexpensive magnets, it's certainly well worth trying.

You should experiment with different magnets, to discover just what they will do. Of the three magnets shown in Figures 2 and 10, the small and powerful Alnico "button" magnet "D" seems to be the most all-around useful. You can get one from the Radio Shack Corp., (730 Commonwealth Ave., Boston 17, Mass.) for 25¢ plus postage on 3 oz. It's their Eclipse Button Magnet, No. A49J241, Type 821A. Also very useful for certain effects is the less powerful "pencil" magnet "C" that is shown. Unhappily, I'm not too sure about exactly where you can get one, though you might try asking at a local auto supply store, or maybe at a hardware.

A Final Thought! It might be a good idea to keep a tape-head demagnetizer handy when you're using a permanent magnet this close to the auxiliary tape head . . . so you can demagnetize the head each time when you finish a session with a magnet. Subsequent tapes run past the head would lose some of their higher frequencies if the head had accidentally become even partially magnetized, so it's good insurance to demagnetize "to be sure."

Fig. 10: Here's how to remove a sound (at arrow) that's right next to a word you want to keep. First use the tape editor to find and locate the portion of tape shown between the dotted lines. That removed, put the magnet just barely close enough to the end of the tape so as to erase the "A" without affecting the "Now." Carefull



Radio-TV News Writing class at Marsnall College Journalism Department uses the tape recorder to record stories they have written for radio and TV. These are then played back and the student writer can concentrate on his own style and writing mistakes. The recorder simplifies instruction because the student can hear mistakes.

TEACHING BY TAPE

by Bill Francois

. . . . the modern method of learning.

A TAPE recorder is as essential to a teacher of radio and TV news writing (and others, too) as a pencil is to a reporter. This is high praise indeed, but these mechanical memory boxes have earned it for four very good reasons.

Tape recorders 1) permit students to monitor their own mistakes; 2) act as an effective substitute for sound on film; 3) help in the preparation of institutional-type programs, and 4) allow a teacher to escape some extracurricular chores.

From a value standpoint, the ability of a student to monitor his own mistakes must come first. Given this opportunity, there is no question that students will overcome writing "blocks" much more quickly. Why? Because they're able to "hear" themselves making mistakes. In fact, many teachers (writing, public speaking, etc.) can profitably use a tape recorder. It simplifies instruction and helps to arouse the interest of students.

At Marshall College in Huntington, W. Va., students in Radio and Television News Writing constantly strive to improve their writing techniques. Since these fledgling journalists must be taught to write for the "ear," rather than the eye, they learn much faster if they can listen to a playback of their stories. No criticism of a story is complete until the story is replayed several times. And the beauty of using a tape recorder is the ease by which an objectionable piece of writing can be replayed.

To give you some idea of the difference in newspaper and radio-TV styles of writing, here are two Associated Press wire stories written for newspapers:

MOSCOW—(AP)—A 1,148-pound Soviet "space station" hurtled toward a mid-May rendezvous with the planet Venus today after a spectacular piggyback launching the United States does not expect to achieve for another 18 to 24 months.

CHARLESTON—(AP)—A resolution for a referendum on the liquor-by-the-drink issue may meet its first committee test in the legislature this week.

Since newspaper "leads" tend to be packed with too many facts, writing for radio-TV must give the listener time to tune in. A rewrite job on the two newspaper stories might take this form for use on the air:

Russia's latest space shot—already a million miles on its way to Venus—is being tracked by admiring U.S. scientists who can't hope to achieve such a launching for at least 18 months.

And, on the second AP story:

The storm that's been brewing over the liquor-by-the-drink issue may burst in the state legislature this week.

Tune your ear in on these rewritten versions and it soon becomes obvious why a tape recorder is essential. The writers can hear the difference.

Not long ago, students were assigned the job of writing a simulated on-the-scene broadcast of the Holden, W. Va., mine disaster. One senior, Don Fannin (now a reporter on the *Huntington Advertiser*), taped his story. Had he done a good job? He wasn't sure until the tape was replayed for a live audience. Those who heard it were visibly moved.

"It was as if we were at the scene of the disaster," one student said.

Fannin's story on tape has been preserved and forms the basis for an ever growing "library" that will be used for future instructional purposes.

The tape recorder also is used for interviews, radio features, and many other kinds of writing. The student writes a story, tapes it and, with the class participating, the end result is picked apart. When the student has been alerted to objectionable writing, the tape is replayed. It's astonishing how many additional criticisms become obvious at this time. The value of this technique lies in the student hearing his own mistake. As a result he is better equipped to detect his own errors during the composition stage.

Since leading journalists believe that newspaper writing can take some cues from the radio-TV style of writing, it seems likely that this technique would prove useful in other writing classes.

Another intrinsic benefit from the use of tape recorders is ***student interest.*** Nothing is more boring than to hear an instructor's voice droning on and on. The taped playback of a story always seems more dramatic, keeps sleepy-eyed students awake. Especially the student whose story is being replayed! Many of them have never heard their recorded voice. Therefore a tape recorder in the classroom can't be beat as an attention-getting device.

The second use for the tape machines results in the saving of school funds. Substituting the tape recorder for sound on film means that the journalism department does not need to buy a 16mm sound camera and pay the extra cost for sound film.

Students learn how to use a 16mm camera (sans sound), how to edit the film, and how to script it. But the scripting is done on the tape recorder—as though the news announcer were reading the script while the film was being projected on the TV screen. The key to pulling off this nifty stunt is proper script writing so the tape recording and film are synchronized. If the student has fouled up, the mistakes can be easily spotted.

In this case, the student can SEE and HEAR the results of his work. If the student had to read his script at the same time the film was being projected, he would be unable to spot errors in shooting and editing the film.

The budding journalists also can use the tape recorder for obtaining news interviews. This, correlated with silent film, gives coverage in depth.

This was tried successfully when Marshall journalism students went to WHTN-TV (the CBS outlet in Huntington). Here they gathered, wrote and edited two newscasts in a 12-hour period. One of the stories which deserved coverage was a science fair where hundreds of high school students had their exhibits on display. While the film was being projected on the TV screen, a tape recording also was used on an interview with the science fair director, thus providing coverage in depth (both sight and sound).

A third advantage of tape recorders are their value in preparing "promotional" material. For example, the Journalism Department at Marshall recently undertook a high

Prof. Walter Felty, audio-visual director at Marshall College, records a lecture which will be used later. For teachers who must miss a class, this is one way to let the recorder take over while you are gone.

Left: While silent 16 mm film is being projected on screen, a tape recording can be made explaining or instructing in conjunction with the film. For all practical purposes this makes a good substitute for sound on film—and is less expensive.

Below: A library of tape recordings should be a "must" for most teachers. Guest speakers, radio programs, and other educational events can be taped and filed away for future use.

school visitation program. The purpose: To alert high school students to the possibilities of journalism careers. As part of this educational program some 350 high school journalists and their teachers were guests at the department's annual United High School Press. More than 300 feet of 16mm film was used to record this two-day event. A tape recording now will be made to synchronize with the film. Both the recording and the film will be used in future high school visitations.

Most colleges and universities have similar visitation programs. Certainly nothing is so boring as listening to one speaker for an hour or two. A 15-minute film-tape program can be a refreshing pace-changer. The students will be more attentive and the results will be more rewarding.

Last—but not least—is the added freedom that a tape recorder can give a teacher. These are just a few examples. because the list is very long:

1. If an exhibit is planned, a teacher need not remain in the room as students examine it. Several informative-type messages can be taped which will be explain the nature of the exhibit, its importance, etc.

2. If a teacher—any teacher—is expecting a prominent person to speak to the class, why shouldn't that person's talk be taped? Future students will derive just as much value from this talk, and the teacher will have succeeded in adding to her library. Whenever the occasion demands, she can fall back on the library to spark classroom interest. The novelty will not wear off.

3. Walter Felty, director of audio-visual instruction at Marshall, has even taped entire lectures when he had to be absent from class. And the students loved it. There is something fascinating about this added dimension in teaching.

4. To cite just one example of how a history or civics teacher could use a tape recorder, suppose an important event were to be broadcast on radio. Why shouldn't that teacher tape the broadcast and replay it for her students? This same technique can be used by teachers at all levels—and with refreshing results. A music teacher can do the same thing.

These, then, are just a few of the ways tape recorders can be used in classrooms. If you teach, better explore the ways you can use a good tape recorder.

Both you and the students will benefit.

Acquiring A Cheap Universal Headset

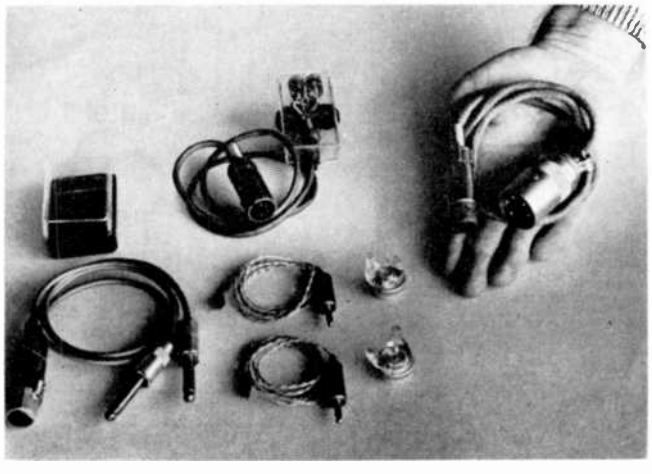
by John Berridge

. . . . if you've been thinking of purchasing a headset, read this before making your final decision.

THIS is one of those ideas that is whipped up to solve one immediate need, and ends up collecting uses like a dog collects burrs. The headset itself, in my case at least, was acquired quite literally, hence the title of this article. Practically everything but the controls came out of various junk boxes, and these were donated by a friend who had no further use for them. However, for those who may be shy on one or two items, I've included a parts list or shown how these parts can be collected. If your acquisitive powers are good, you should be able to keep the cost below $5.00.

This unit as a whole, two earpieces, control box and adaptor cable/s, was originally assembled for use with the mike mixer which I first mentioned in an article in the April, 1959 issue and in greater detail in the August, '60 issue. In addition to the regular output, the mixer was also designed with monitor and cue outputs, the former merely being a feed from the main output with its own amplifier and level control, the latter an amplified output switched to any of the inputs so that this input could be monitored separately while recording was going on (cueing up a disc or second tape would be the usual reason for using this cue circuit). As you can see, if you can listen to two different sounds simultaneously, one in each ear (and it doesn't take much practice either), then a headset with two entirely different channels will be a great help. I hope to be able to describe some useful recording tricks with this headset at some other time.

I'll describe other, less specialized, uses for this headset in a moment. Right now, assembly is the important consideration. The earpieces themselves are used hearing-aid types complete with plastic moulds, which hold the earpiece to the ear, and cords. I collected quite a few of these by rummaging through the reject box of a friendly hearing-aid dealer. The requirements of this type of equipment are very demanding and various pieces get thrown out at the slightest pretext. Cords get thrown out too when all that's wrong with them is that they're dirty. If you hunt through a pile of these rejects, it should be easy to find a pair that works satisfactorily. The earpieces are clipped into a plastic insert which is usually custom-fitted to the ear by the dealer. However, again you can rummage through old ones until you find a reasonably comfortable pair. You won't normally be wearing them for prolonged enough periods to cause you any discomfort. The two-pin plugs on the bottom ends of the cords were cut off and replaced with sub-miniature phone plugs, mainly because I had matching sockets on hand (two-pin sockets of the necessary type are hard to find and would have presented phasing difficulties as I'll show shortly).



The complete headset. The adaptor cable at bottom left fits most outputs, the other on the right being made up to fit a TV studio intercom outlet. The earpieces are carried in the plastic box at upper left to keep them clean, the whole assmbly fitting easily into a coat pocket.

The control box is a small plastic one with a plastic clothes pin cemented on the back. The two thumbwheel pots are mounted through rectangular slots filed in the sides of the box, the phone sockets in holes drilled in one end, and a length of 4-core connecting cable fed through a rubber strain-relief grommet in the other. As you can see from the photographs, this cable terminates in a 4-pin Cannon plug, and various adaptor cables are made up to go with it. These adaptors have a matching 4-pin Cannon socket at one end and a plug or plugs at the other to go with whatever output arrangements you may encounter from time to time. The large Cannon plug shown, for instance, was used to patch into the intercom facilities of the TV studios of the Canadian Broadcasting Corporation here in Toronto. I've omitted the adaptor cables from the schematic since the reader is undoubtedly capable of making up his own.

The circuit is elementary in the extreme. Pins 1 and 2 of P3 feed the right-hand earpiece with pot R2 in series wth it through J2 and P2, pins 3 and 4 do the same for the left-hand side. Somebody will undoubtedly complain that the load on the equipment varies as you alter R1 or R2. Frankly, the mismatch has never bothered anyone who's used this arrangement and I don't intend contesting the point. Why the control box? The two outputs you monitor may have widely differing levels, often with no level control of their own, and you do need some sort of control over the levels at each ear. It's almost impossible to cut up a low-level disc in one ear with high-level voice or music going in the other.

By now, dear reader, you've probably realized that this is also a good stereo headset, just the thing for monitoring stereo recordings, and this brings me to an important aspect of the wiring. Enough has been written in this and other magazines about correct phasing of stereo speakers that I'm not going into it here. Suffice to say, authorities agree that

it is absolutely essential that both channels of any stereo recording and playback system be in phase with each other. The same goes for stereo headsets, and for this reason I suggest you examine the schematic rather closely.

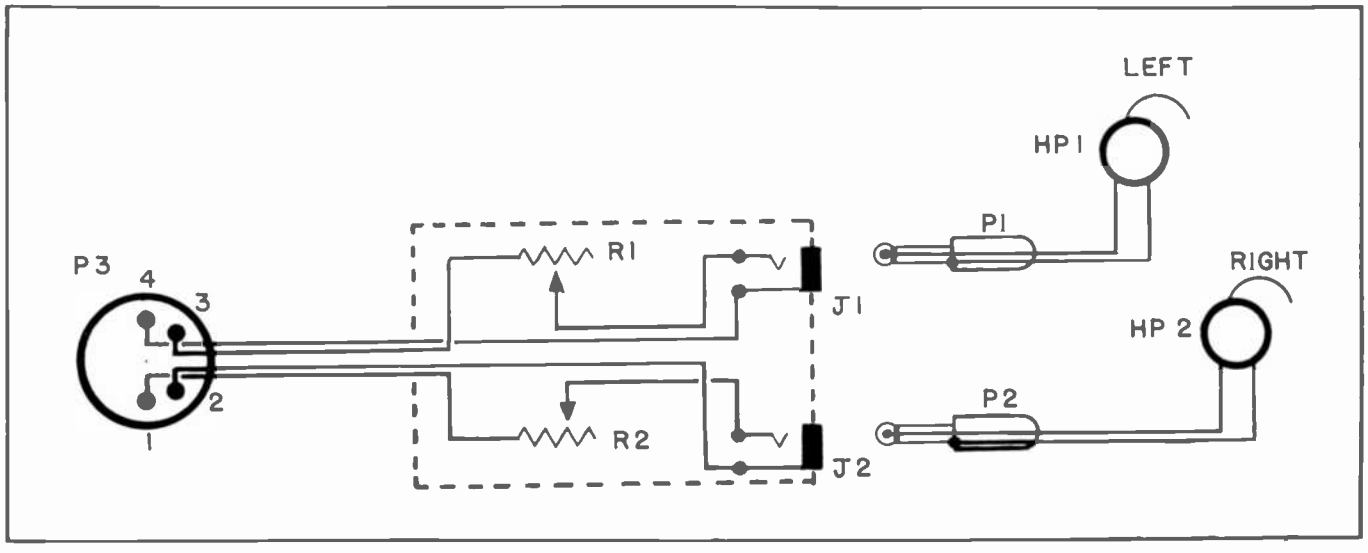
You'll notice in the control box wiring that the ends of the tracks of R1 and R2 go to the lower of the two pin numbers, used for each channel, of P3. The sliders go to the centre (tip) of the jacks J1 and J2, and the higher pin numbers go direct to the ground side (sleeve) of the jacks. The same kind of convention must be maintained in whatever adaptor cables are made up. The earpiece cords present a little more of a problem since they're usually not color-coded, and the problem is best solved by a listening check. Note that a little detective work with an ohmmeter plus a little logical reasoning can give you the correct in-phase connections, but frankly I'd say your chances are exactly 50/50. There's no way of telling whether the internal connections of the two earpieces follow the same wiring conventions, and since they're sealed you can't pull them apart to find out without ruining them. Try it this way.

Get hold of a socket to match P3 and temporarily solder jumper wires across pins 1 and 3 and across pins 2 and 4. Now feed some sort of signal into these two jumpers. Turn R2 full up and R1 right down (this may not kill the sound in the left earpiece completely but that doesn't matter). The sound will be clear and in your right ear (if it isn't, check your wiring!!). Now turn R1 full up. The sound should INCREASE IN LEVEL and move to the centre of your head. If it drops in intensity and becomes vague and confused, reverse ONE of the 2-pin plugs which connect to the earpieces and listen again. Don't expect to decide first try either since it sometimes takes even the best of us a little while to make up our minds which is correct. Once you're sure, scribe or paint lines across each plug and earpiece in such a fashion that they must be matched up for connections to be correct. Better still, you can always cement the plugs to the earpieces permanently (something I haven't got around to doing myself yet). Simply make sure, after that, that your adaptor cables are correct, even if you don't intend using them for stereo. If you plan to use this set-up for regular mono listening or monitoring, make up your cable so that pins 1 and 3 of the socket are joined along with pins 2 and 4. Note too that if you've planned your control box layout properly, when the box is clipped to your belt or shirt pocket the left jack will feed the left earpiece controlled by the left knob, the right will feed the right. Thus, you should never have that bugaboo of other stereo headsets, putting the things on wrong way round and getting the whole darned orchestra back-to-front!!

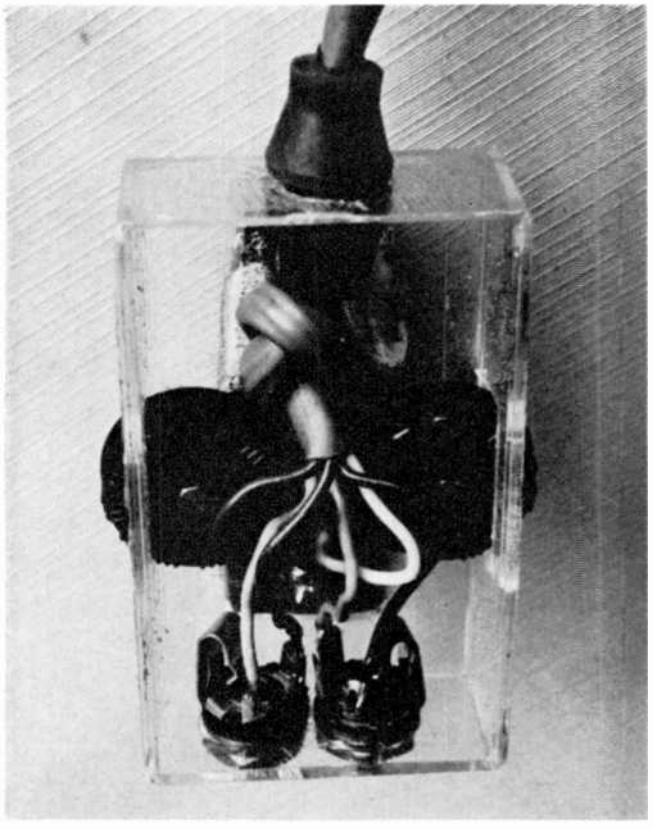
It's as simple as that and you can cut corners all over the place by using whatever parts you may have on hand. The thing has as many uses as you can think of for a headset, since it's all headsets in one, and with no headband to worry about you can wear it for hours, then slip it in your pocket where it's always ready for use.

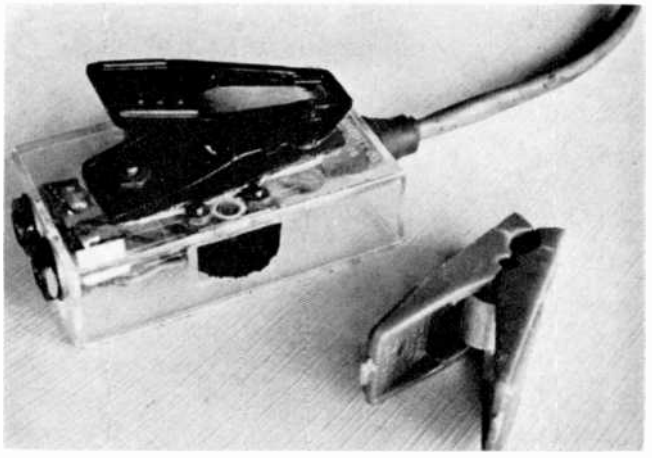
Uses? Being able to monitor a disc or second tape without stopping your recorder. You can cue the thing up at the beginning while you're talking, then bring it in at just the right moment, a great big step toward professional-sounding tapes particularly in voicesponding. Needs a mike mixer as well, of course, but I shouldn't need to point out the advantages of owning one of those. With a mono adaptor cable and a pair of test prods, the headset can be used for preliminary fault-finding. Just follow the signal through from the source until you lose it and you have the location of the trouble. Thanks to the series resistance, you can bridge the earpieces across a speaker without fear of burning them out, although it's a good idea to leave the speaker or some other terminating resistor connected to the output transformer to act as a load. You can check out a preamplifier, kit-built or component, before you have power amp and speaker, since the headset can be driven by low voltages. You can also enjoy stereo on a budget since you can listen without amp or speaker until such time as financial conditions are better.

For recording itself, there's stereo and mono listening and monitoring both at home and out on location. A headset out in the field is almost essential since it's usually only the most expensive recorders that have built-in stereo speakers, mostly in detachable wings, and they're not of the best quality. Incidentally, you'll be quite surprised at the high quality of the sound that you get from these earpieces. Despite claims by friends that they're only designed for speech (not true as it happens since even deaf persons listen



Schematic of the complete headset. Adaptor cables are made up to match P3, enabling the user to patch the headset into the output of any equipment he may encounter.





Above: A plastic clothes pin like the one at the right is cemented to the back of the control box. The box can then be clipped to the belt or pocket, thus taking the weight of the box away from the earpieces. Left: Internal wiring of the control box is quite simple and uncrowded. When the cover is replaced, access to the controls is obtained by the portion sticking through the slots cut in each side.

to music), they sound remarkably good over the whole audible frequency range. Some may sound better than others so try and pick them for sound quality as well.

Stereo and mono listening at a good level without disturbing other people is another use for this headset. You can have a lot of fun late at night with your recorder without your neighbors complaining. Do your experimenting, editing, electronic music, voicespondence late at night and you also avoid picking up the bedlam of background noises that exist in the daytime. The uses for this headset are limited by your imagination only.

PARTS LIST

HP1, HP2 .....Earpieces (Telex "Earsets" or hearing-aid)
P1, P2 .....Miniature phone plugs (Telex or similar)
P3 .....4-pin microphone plug (Amphenol 91-MC4M)
J1, J2 .....Miniature phone jacks (to match P1, P2)
R1, R2 .....Centralab sub-miniature controls, 10,000 ohms
2 .....Earpiece connecting cords
1 .....Plastic box ¾" x 1¼" x 2" or similar
1 .....Plastic clothes pin
1 .....9" length 4-core cable
1 (or more as required) ...4-pin socket Amphenol 91-MC4F (to match P3), cable and appropriate plugs to match personal equipment
1 .....Strain-relief grommet

KNOW WHAT YOU BUY!

SINCE the advent of the four-track heads and the continued production of standard monaural recorders having two track heads it is well to understand what each will do and save disappointment when buying.

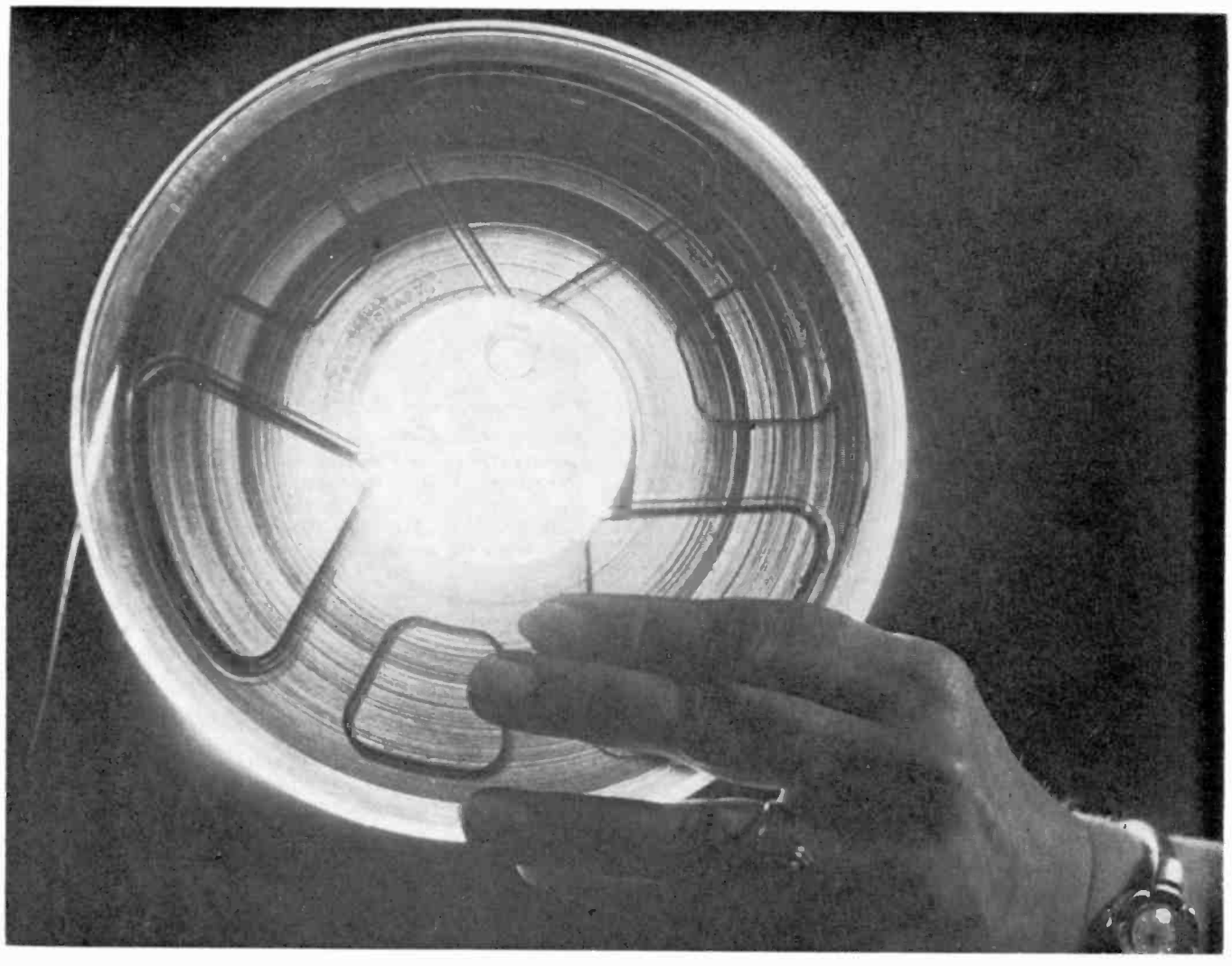
The standard monaural recorder with two-track heads records one track on the top edge of the tape on the first pass through the recorder. After the reel is turned it records the remaining track. Each track occupies about *half the width of the tape.*

In contrast, a recorder equipped with a four track head (stereo play but no stereo record) may record exactly as does the dual track recorder. However, the track width is only about *one-quarter the tape width.* Such recorders will play tapes made on two track recorders but when recording over a two-track tape using a four-track recorder, as in tape correspondence, the old message is not completely erased because the track width of the four-track machine is only half of that on the two. When the tape is played on a two-track machine, both the new and old recordings will be heard.

A recorder with a four-track head and with a selector switch enabling you to select any track will record monaurally on all four tracks by repeated reel reversal. A recorder without a selector switch is just the same as a two track recorder, with a track along each edge of the tape and a large empty space between tracks.

Most recorders which have stereo record will also permit the recording and playback of individual tracks. The stereo recorder records or plays two tracks at a time (tracks 1 & 3, then with reel turnover, 2 & 4). Some machines permit the playing of one track while listening to the second, such as the V-M Add+A+Track or the Webcor Synchro-track and others Not all stereo machines will do this, however, and if it is a feature which you desire, for language or music study, be sure that this feature is incorporated. In the ordinary stereo recorder *both* tracks are in either record or play at the same time and the functions cannot be split.

Before buying, decide what you want to do: monaural record and playback only, monaural record and playback plus stereo play, stereo record and play, or monaural record, stereo play plus play one track while recording the second.



HOW TO BUY TAPE

by Mark Mooney, Jr.

Part IV of a series on tape

IF there were but one kind of tape on the market the problem of which to use on your recorder would solve itself.

At one time there was but one brand but today, with the growth of the industry there are eleven manufacturers of tape: American Tape Co., Ampex, Audio Devices, Burgess Battery Co., Ferrodynamics, Minnesota Mining and Manufacturing Co., RCA, Reeves Soundcraft, Sarkes-Tarzian, Triton Tape Co., and underway but not yet in production as this goes to press, the Eastman Kodak Co.

All of these people have their own plants that actually manufacture tape. In addition to these there are perhaps fifty brands of tape which are name brands. These tapes are manufactured by one or more of the regular tape firms but sold under the name of a particular store or other organization.

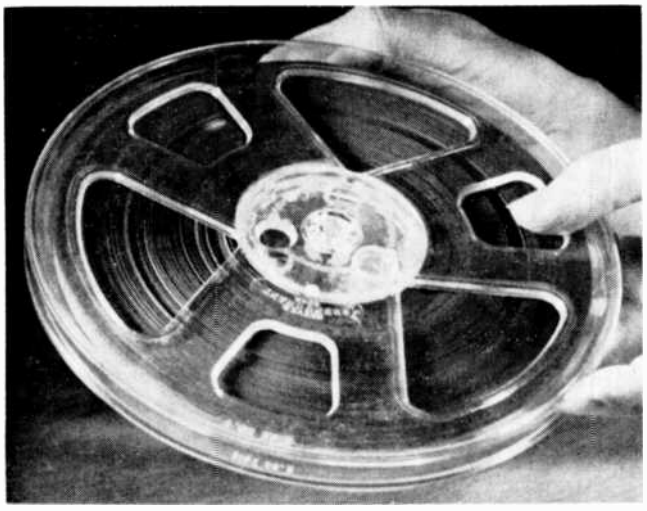
Then there are the so-called "bargain" or "white-box" tapes which have no identification as to maker and which are sold at about half the price of standard tapes.

In addition, there are three bases on which the oxides may be coated: acetate, polyester or Mylar, and Tenzar. There is the standard oxide formulation for recording and playback, which varies from company to company and is closely guarded as a trade secret, and there is "High Output" tape which has a different formulation, as does "Low Print Through" tape.

The tapes are also obtainable in thickness of ½ mil, 1 mil and 1½ mils. Mylar is obtainable in all three thicknesses, Acetate in 1 and 1½ mil.

About the only thing that is common to all is that they are ¼ inch in width (although other widths are used for instrumentation and video taping) and they are available on standard sized reels, 3 inch, 5 inch, 7 inch and 10½ inch.

This all might appear to add up to a very confusing situation but it is not as bad as it looks.



The appearance of the tape as wound on the reel can show if the slitting has been well done. The tape should show a semi-mirror like appearance. The reel shown has been unevenly wound and should be rejected.

As with so many products which we buy, such as gasoline, which we never even see, we have little to go on except the integrity of the maker and what kind of performance we secure from the product.

It takes many hundreds of thousands of dollars to establish a product and those companies which advertise their tapes mean business. They would be very foolish to spend money offering a shoddy product because they would be jeopardizing both their name and their investment. They think enough of their products to put their names on them and to stand or fall by what your reaction is.

This also applies to the name brand tapes to some extent for there the marketing firm is assuming the responsibility to the consumer.

TESTING TAPE

As mentioned in the last issue there are numerous tests which the reliable factory applies to the tape it produces. These include some 15 mechanical tests (proper width, smoothness of edge, squealing, strength, thickness of coating etc.) and about 10 electrical tests (proper sensitivity, good frequency response, uniformity, erasability, distortion, etc.). Many of these tests require elaborate and costly machinery of high precision, so on these points we must rely on the integrity of the tape maker.

But there are a few simple tests which the buyer of tape can apply to tape.

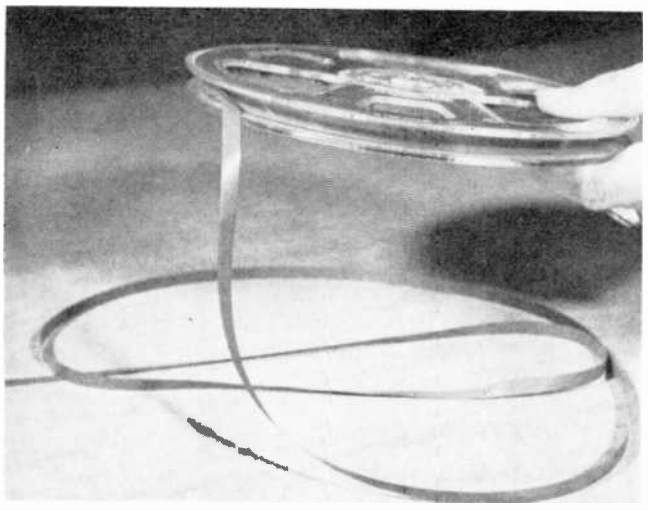
One is the examination of the tape on the reel. The edges of the tape should live evenly and present an unbroken appearance. A well slit edge will show by giving the side of the reel almost a semi-mirror like appearance. A frayed edge lacks this luster and may be indicative of tape which will tear easily in the machine or shed oxide from the edge which will pile up on heads or guides.

The coating of the tape can be checked for smoothness by looking down a length of it at a small angle. It should reflect like a mirror. There should be no marks across the width of the tape which would show uneven coating speed

The coated surface of the tape should be smooth. If a piece is held to the eye and viewed at a slight angle it will reflect like a mirror. Below, note image of bars of package in tape in foreground. A warped image is caused by distortion of the base material.

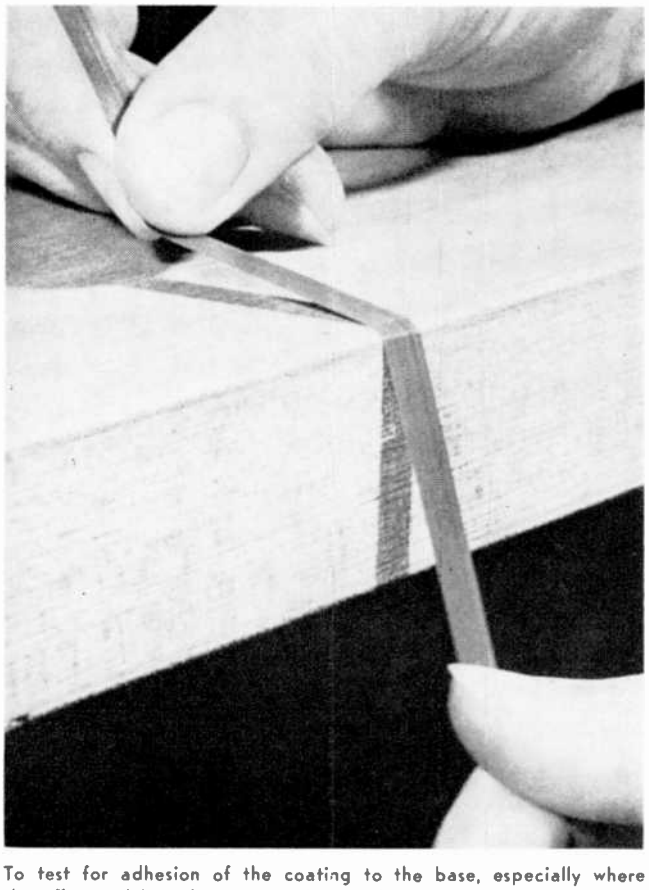
and there should be no bumps or holes. By holding up the reel to a strong light, crushed particles or splices show up immediately. Beyond this you need a microscope.

Layer-to-layer adhesion may be tested by holding the



To check for adhesion of one layer to another, also known as blocking, check whether or not the tape unwinds freely when the reel is held horizontally.

reel vertically and observing if the tape will fall away and continue to unwind when the reel is turned to the horizontal position. Tape which will not pass this test may cause wow and flutter on the recorder by sticking to itself or to guides and heads or may even, if tightly wound and left for some time, adhere so tightly that the coating may be torn from the base. This severe sticking is rare. The tape must be free from static electricity on this test or the static may make it appear unsatisfactory. Tape which does stick may be salvaged to some extent by powdering it with talcum powder. A copy tape should then be made and the sticky tape discarded.



To test for adhesion of the coating to the base, especially where the effects of humidity are involved, a length of tape is run coated side down over a desk edge.

Whether or not the tape is subject to cupping may be simply determined by feeding a length of it from a flat surface. If the tape stands straight and stiff after five inches or more has been pushed out over the edge, it may be assumed that it is cupped. This is a manufacturing fault which leads to poor winding qualities and imperfect contact with the heads under normal pressure pad pressure or tape tension.

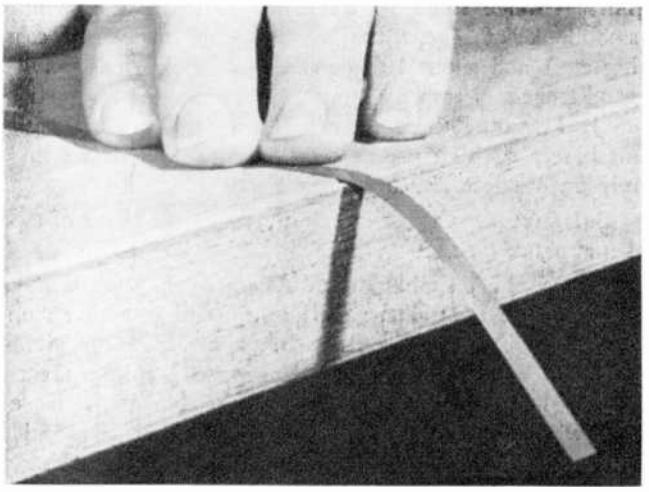
There are a couple of simple checks to see how well the coating is adhering to the base. One is to take a piece of the tape and work it over the edge of a desk, oxide side down. The other is to place the tape on a flat surface and press down a piece of adhesive tape on part of it. Then quickly remove the adhesive tape (like when you pull it off so it won't hurt) and examine it. It should come away clean. If there are chunks of coating on it, drop the reel in the nearest waste basket.

Satisfactory tape will have neither bias or curl and this may be detected by stretching about six feet or so on any flat surface, such as the floor. If a bit of tension is applied to each end, the tape should lie straight and also touch the surface all over. If the tape shows a curvature, it will not track properly over the heads and will not wind correctly on the reel. If the edges of the tape show a wave, its feeding from the reel will be uneven and, in four track where the outside tracks go to the edges of the tape, there may be a variation in sound strength. Improper winding on the machine, even with perfect tape can lead to this trouble, especially if the tension is too great.

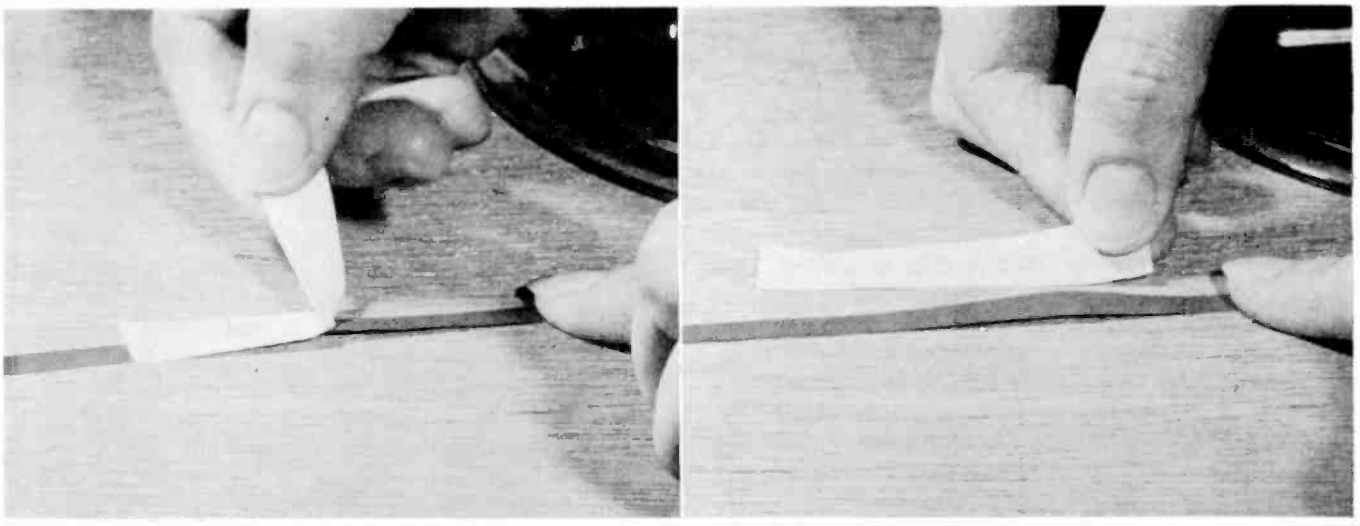
These are about all the on-the-spot tests that can be accomplished with little or no equipment. The further testing of tape takes you into rather expensive gear.

The problem of which tape to buy breaks down into six categories: 1—for what do you want to use it? 2—how much playing time do you require without reel turnover? 3—special requirements due to location (high humidity, tropical conditions, etc.), 4—storage conditions, 5—whether or not your machine will handle the tape (this applies to the $\frac{1}{2}$ mil tapes), 6—special applications.

The standard oxide formulations and coatings offered by all leading tape makers are satisfactory for 99% of all recording uses. If you need increased sensitivity and higher output (akin to more sensitive photographic film) then



To test for cupping (transverse curvature of the tape) push a length over the edge of a desk or board. If it stands out straight more then five inches the tape must be suspect. Cupping leads to poor winding.



Another test to determine how well the coating sticks to the base is to take a short length of adhesive tape and stick it to the tape. Then remove it sharply and note whether or not the coating stays on the base. If the adhesive comes away clean, as shown in the right hand photo, the adhesion of the coating to the base is satisfactory.

High Output tape would serve you better. In the same vein, the mastering Low Print Through tapes will give you greater protection against print-through and should you be mastering for production runs or for untouched storage over a period of years, then these tapes would serve you well.

The amount of abuse to which the tape will be subjected will determine the best type of base material to use. Mylar has a higher breaking point than acetate, although both the break point of acetate and the yield point of Mylar, or polyester, are above the strains encountered on a properly functioning tape recorder. Tenzar base, which is just coming on the market is likewise a strong base material. The use and abuse angle will also dictate the thickness of the base material to use, 1½ mils being the thickest ordinarily used for audio recorders.

The amount of playing time you require without reel turnover will answer the problem of base thickness. A 7" reel of 1½ mil (1200 feet) tape will last 32 minutes at 7½ ips. The same size reel of 1 mil tape (1800 feet) will run 48 minutes and in the ½ mil thickness (2400 feet), 64 minutes.

The 1 mil tape is usually marked extra-play, Plus 50, Plus 150, Longer Recording or some other designation that it will run longer than standard tape.

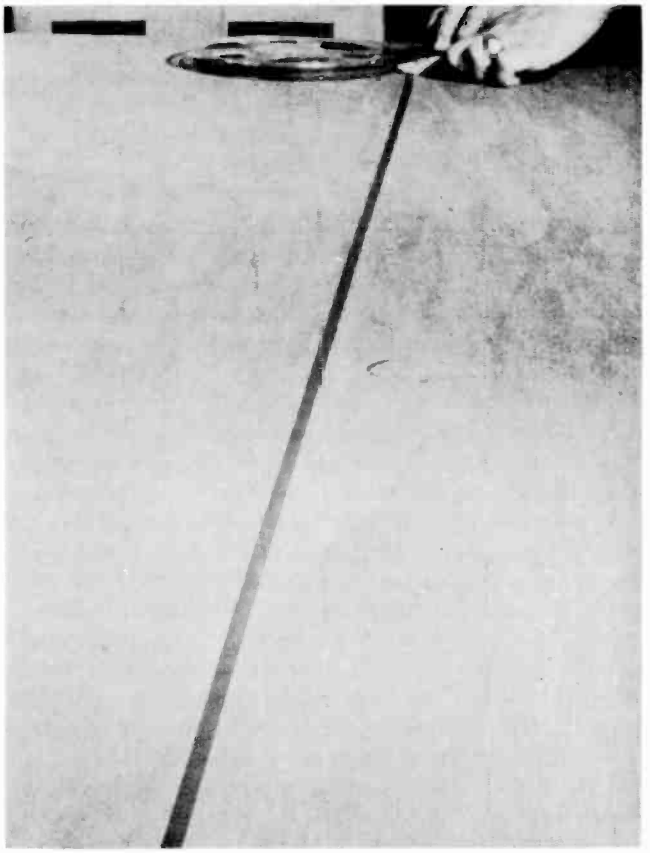
Next are the Double Play, Super Thin, etc. tapes which are universally ½ mil Mylar. Some machines can use these tapes, others cannot. Your recorder instruction booklet will tell you if this super thin tape (½ of 1 thousandth of an inch in thickness) will operate on your machine. Chief difficulty with it lies in proper recording to avoid print-through and in handling it so it won't snarl or stretch.

Remember, the oxides are all the same on any one brand of tape irrespective of the thickness of the base, the only exceptions being the High Output and Low Print Through tapes previously noted. Your choice therefore simplifies itself into determining: 1—how strong a tape you need, 2—how long it must play.

Special conditions, such as tropical environments will affect your choice of base. The polyester or Mylar tapes, being impervious to changes in temperature and humidity are probably the better choice for extreme conditions. Akin to this are the storage conditions. Acetate will keep well at normal temperature and humidity levels, Mylar frees you completely from any storage considerations. The question then becomes one of price, for Mylar is more expensive than acetate.

For special applications, such as the endless tape magazines, etc. a tape coated with graphite is used so that the layers will continually slip over each other without binding.

(*Next Month—more about buying tape plus a directory of all present day tapes of prime manufacturers.*)



If a length of tape is stretched across a flat surface, such as a desk top or floor and slight tension placed on the ends, the tape should lie straight, flat and true, without curvature or waviness, to be satisfactory.

WANTED: Two Improvements in home tape recorders.

by Robert I. Colin

THE home tape recorder is a product of modern electronics that has given many people much pleasure. Manufacturers have done wonders in bringing down prices and in adding conveniences and refinements. There are, however, two areas in which the usefulness and conveniences of home tape recorders could be greatly enhanced, especially for those owners who, like myself, like to use the recorder as an adjunct to their own music-making. These improvements would require a co-operative standardization effort among the recorder manufacturers. My hope is that by publication of this little article my suggestions may come to the attention of the industry, enlist support of other recorder users, and perhaps in time be acted upon.

One suggestion is for standardization of the operation and calibration of the digital revolution counter. The other is for provision of a manual vernier speed adjustment facility. Background discussion and reasons follow:

The revolution counter is an extremely useful gadget, even in present non-standardized form. In my own case, and I presume that my practice is common, I maintain a 3 x 5 file card for each side of each tape. On the card are noted the beginning and ending revolution counter readings for each composition (sometimes also for individual movements or for passages of special interest), plus other data such as date, performers, originating broadcast station, overall performance time, etc. By reference to the digital information, and using fast forward or reverse, I can locate any desired composition or movement for playback quickly, painlessly and accurately.

The same digital information is also useful as a basis for determining how many minutes of unused recording time are available anywhere on the tape—beginning, end, or between already-recorded portions. Then, when I plan to record something new off the FM radio (main source of my tapings), if I know in advance the playing time of the composition in question, I can select an appropriate and safe interval somewhere on my tapes. This practice results in great economy of tape utilization, an important factor to most of us, and avoids the embarrassment of running out of available tape before the composition is completed.

As for advance knowledge of the playing time of classical music pieces, a certain amount of such information is available in the orchestral music catalogues of some music publishers. There is also an extensive "Time Table" published by W. Colbert of Audio Exchange, N. Y. In my own case I have formed the habit of keeping a stop-watch handy and noting down the time of performance on the FM radio, for future reference, whether actually tape-recording or just listening. As a result, over the years I have been able to check and very largely supplement the published timing information, especially in regard to 16th-18th century music and chamber music.

Of course, for the purpose in question the digital revolution counter readings are not immediately useable. The indicator counts and displays revolutions of one or the other tape reel and does not directly (i.e., proportionally) indicate feet of tape or minutes of time. That is because we are counting the revolutions of a reel whose effective diameter is continually increasing or decreasing as the tape winds on or off. The mathematical relation between reel revolutions and feet of tape (or minutes of play) is, to a close approximation, a parabolic function. Proving this, and deducing the explicit relation between revolutions and linear tape speed, thickness of tape and reel dimensions, is an interesting problem that I recommend to mathematics and physics teachers to give to their students as an exercise in elementary integral calculus.

For practical purposes, however, the simple procedure is to make up a series of calibration charts or tables empirically, relating digital indicator readings to time of play for one's own machine. Using a stop watch or the sweep-seconds hand of any watch, make a trial run at 7½ IPS playback speed, noting down the counter readings at, say, every two minutes. This must be done for each standard thickness of tape that you may use, corresponding to 1200, 1800 and 2400 foot tape lengths. On putting the information into graph, chart or tabular form, it becomes a simple matter thereafter to convert from revolution counter numbers to minutes of play, or vice-versa, and with surprisingly good and consistent accuracy. By reference to such charts I have been able to utilize from 80% to 95% of my tape capacity.

So far, so good. The trouble comes when you bring your tapes and digital location readings over to a friend's home, to play certain compositions on the friend's machine, or vice-versa. Or if you cannot be on hand when a certain desired composition is to be broadcast, and give the friend a tape on which to record for you, or vice-versa. Now we have to revert to the primitive and painful method of locating a desired composition, or a given free interval on the tape; that is, by screeching trial and error, backwards and forwards. Revolution counter readings will *not* in general apply to other models or makes of recorders; nor will the charts relating revolutions to minutes of play have any universal validity. The reason is that the modus operandi of the counter is not standardized. In some machines the counter works off the feed reel, in others it works off the take-up reel; additionally, in some cases the digital indicator counts actual revolutions, in other cases there is an intermediary step-up or step-down gear ratio.

If I should buy a new tape recorder to replace the old one, I should be faced with the formidable job of (1) making up new calibration charts relating counter digits to minutes; (2) re-determining, by trial and error, the digital location readings corresponding to several hundred compositions already recorded on some thirty two-track tapes!

I suggest that it is time for manufacturers of home tape recorders to work towards adoption of a standard modus operandi and calibration for the revolution counter. Then the same digital location readings would be valid for all machines—yours, mine, and our friends. Also, one set of

charts relating counter digits to minutes of play would have validity for all machines. Also, distributors of prerecorded tapes could indicate on the carton the digital location of individual compositions or movements, just as phonograph disk distributors talk about "Band 1," "Band 2," etc.

In order to achieve the advantages mentioned above, it would not matter which modus operandi were adopted, so long as it were standardized. I offer, however, two suggestions at least for further consideration in this regard.

I recommend that the counter work off the take-up reel rather than the feed reel. The practical reason is that in such a case a calibration chart converting revolutions to minutes (for a given thickness of tape, of course) would be valid even for a reel of tape of which the total length differs substantially, for one reason or another, from the standard 1200, 1800 or 2400 foot lengths. The reason might be accidental or intentional removal of portions of tape, or splicing on of additional lengths of tape. In any such case, however, the take-up reel starts with the same initial (empty) reel diameter; on the other hand, the initial tape diameter on the feed reel would vary and upset the calibration chart validity. Of course, there might be mechanical considerations, possibly involving wow and flutter, to make operation off the feed reel preferable. That is a question for the experts to decide.

My other suggestion for standardization is for a one-to-one gear ratio between reel revolutions and the units indication (last wheel) of the counter. This gives sufficient vernier accuracy for precise location of particular points on the tape, yet introduces no troublesome ambiguities. Even with a 3-wheel digital indicator (units, tens, hundreds, up to 999) and a 2400 foot tape, the indicator would go through 000 only once. With a one-to-one ratio, the total revolutions for the 1200, 1800 and 2400 foot tapes in use today are—approximately and respectively—950, 1450 and 1900. Simple inspection of the reel enables one to distinguish safely between, say, 235 revolutions and 1235 revolutions; a 4-wheel indicator is not needed.

In this connection it is interesting that one British manufacturer of home tape recorders features a strictly linear footage (hence, time) indicator. The revolution counter apparently works off a special idler pulley (i.e., constant diameter device) rather than off one of the tape reel spindles. In such a case the relation between indicator numbers and feet of tape (or minutes of play) is strictly proportional, so standardization is automatically achieved. In fact, just one simple, linear calibration chart is then valid for any length of reeled-up tape; and for any thickness or even mixture of thicknesses of tape; and even for any reel dimensions! Such a linear tape footage indicator principle has so many advantages from the users' point of view that it might very well be considered by the American home recorder industry.

My second basic recommendation is for provision of a vernier speed adjustment facility. This would be a great convenience for those of us, amateur or professional, who would like to accompany the music in playback on our own instrument, for fun, practice or study.

Now, a tape recorder may be (and the more expensive models are) satisfactory in regard to short-term constancy of speed; that is, in respect to minimal wow and flutter. Absolute speed, however, and also long-term constancy of the same, which determine the absolute musical pitch on playback, is another matter. The absolute speed, or musical pitch, will vary from machine to machine, and on one machine from time to time. The reasons—possibly weather or power supply fluctuations, or mechanical wear and tear—can best be explained by the experts; but the situation does exist. It is easily demonstrated by the following experiment. Record a musical tuning fork tone, via microphone, on a length of tape. Play the tape back on various other machines, and on the original machine at various times. Compare the playback pitch with the pitch of the original "live" fork. The existence of beats is a sensitive indication of discrepancy in pitch, hence in linear tape speed, between recording and playback conditions. Just one beat per second, for an A = 440 music fork note, represents a musical pitch interval of about 1/20 semitone, or a speed discrepancy of about 0.2%.

Now a *constant* (i.e., no wow or flutter) difference between the playback pitch of a tape recording and the theoretical A = 440 concert pitch standard, amounting to ¼ semitone or even more, would probably bother no one except academic purists or those persons who have the gift of "absolute pitch." Such a difference, however, does distinctly bother anyone who tries to play along with the recording on an instrument of fixed or semi-fixed pitch. It is true, in order to adjust to the pitch discrepancy the strings of a violin might be detuned from standard A = 440 pitch. This procedure, however, is a nuisance; also, the resulting altered timbre and response of the fiddle is upsetting to a player. A pianist could do nothing at all about the situation. If the pitch discrepancy amounts to about ⅛ semitone or less, a player on flute, clarinet, etc., could make shift by manipulation of his lips, and/or by utilizing the instruments' limited tuning slide capability. With ¼ semitone or greater discrepancy, he is in trouble.

It is no doubt impractical to expect the absolute linear tape speed of all tape recorders to meet a long term 0.2% specification; nor is such a rigid specification necessary for ordinary musical enjoyment. My suggestion is to "live with" some reasonable absolute speed variation; but to supplement this, for special purposes, with a facility for a manual readjustment of speed or a "vernier" control. Then, the users to whom absolute pitch matters could always "zero beat" the playback pitch against that of an A = 440 fork, or against that of their own particular instrument. How to provide this facility is a problem for the mechanical engineers; it is to be noted that some phonograph turntables have provision for vernier speed adjustment around each standard RPM.

Incidentally, to the best of my own experience, phonograph disk playback rarely shows any absolute pitch discrepancy such as to make it difficult to accompany the playback. In the phonograph, only one factor determines linear needle speed, hence pitch; that is RPM of the turntable. In tape recorders, the capstan might have perfect long term constancy and precision of absolute RPM; but precision of *linear tape speed,* and hence pitch, can be affected by changes in the diameter of the capstan due to temperature or wear, or by variations in tape slippage, tension or stretch. Whatever the reasons, however, it appears that provision for vernier speed control is even more desirable for tape recorders than for phonographs. My own suggestion for the vernier speed range to be provided would be of the order of plus or minus 2%, which corresponds in musical pitch to about plus or minus a half-semitone.

NEW PRODUCT REPORT

STA OK STED

Product: Webcor Royalite II

Manufacturer: Webcor, 5610 W. Bloomingdale Ave., Chicago, Ill.

Price: $199.95, monaural, $249.95 stereo

WEBCOR ROYALITE II

. . . . lightweight monaural recorder is also available in stereo playback model.

THE Webcor Royalite II is the lightest recorder that Webcor has ever made. (excepting the battery-driven portable Microcorder) The case is sturdy and mar resistant even though the machine is light in weight. Aluminum and plastic have been used where appropriate to cut the poundage.

The unit has three speeds, 1⅞ inches per second, 3¾ ips and 7½ ips. The speed should be changed only with the motor running.

Standard dual track heads are furnished in the monaural model 2101. It is also available as a self contained stereo unit (model EP-2108) which includes a 20 watt dual-channel amplifier, a stereo balance control and external speaker and amplifier jacks for both channels. This model is equipped with a four-track head with head shift to play two track tapes.

The monaural model has an amplifier rated at 10 watts which is more than adequate for average use.

The controls include fast forward, play/record, rewind and stop. All are piano-key type push buttons. We found the stop to be positive with no danger of tape spillage.

There are separate controls for treble and bass and the on-off switch is incorporated in the volume control. In addition, there is a monitor control which permits the hearing of material, either through the recorder speaker or through headphones plugged into the external speaker output jack, while a recording is being made.

The edit key control stops the tape motion at any point in either record or play. By depressing the record interlock button and moving the edit key to the left, the button will hold down and the record level may be set without running tape or the recorder may be used as a 10 watt PA system.

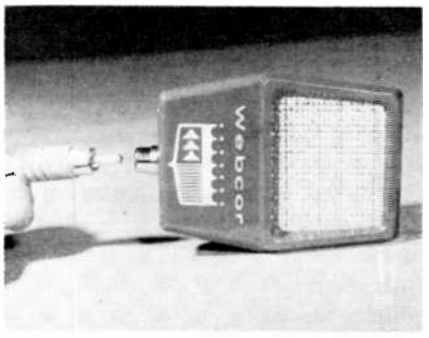
The recorder is so designed that it may be used in either a horizontal or vertical position. Rubber tape reel hubs are supplied to hold the reels in place and insure quiet operation. They are not necessary when the recorder is used in the horizontal position, although they do eliminate any possibility of noise caused by the reels themselves. It is advisable to slip them on the spindles when the recorder is used vertically, however, to prevent the reels from working off the spindles.

The recorder will take 7 inch reels and tape threading is straight line through the slot. The recorder should be threaded with the machine in "stop" position.

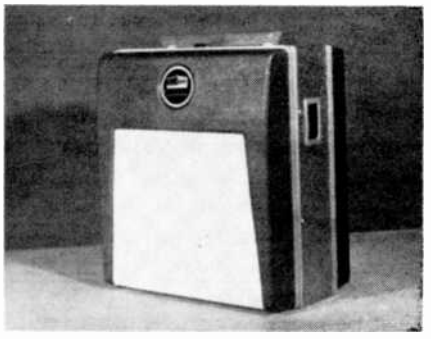
An automatic, end-or-reel stop is provided which shuts off the tape drive should it break or should the end of the tape come through.

The recorder has two 3″ x 5″ elliptical speakers and the wow and flutter rating is less than .4% at either 3¾ ips or 7½ ips.

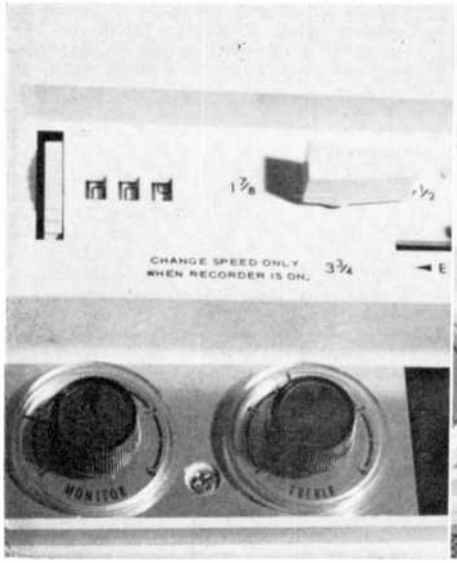
The microphone furnished with the



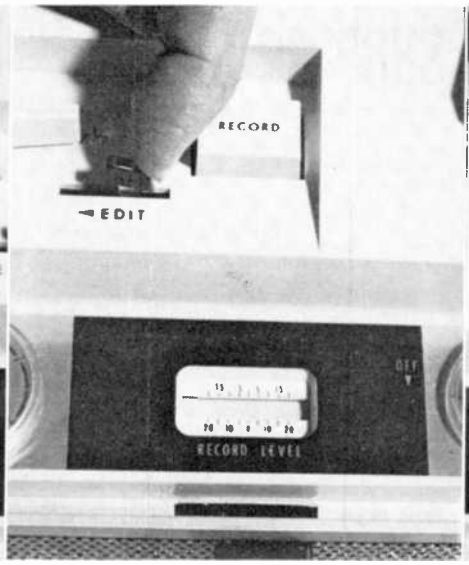
The microphone has no cord of its own. Instead, the auxiliary shielded cord is used and plugged in at the base.



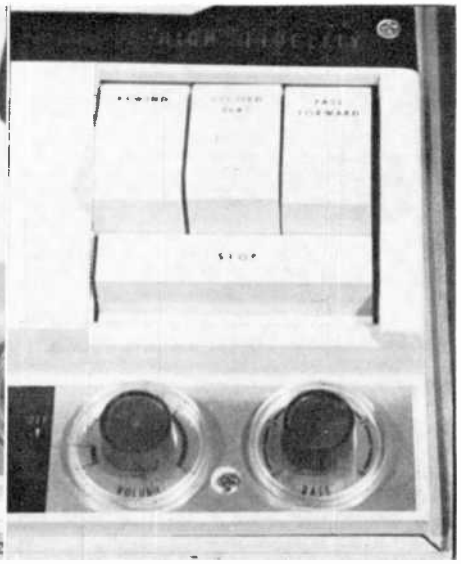
The case is attractively finished in black, gray and silver. The weight is only 19 pounds complete.



Left side of deck has counter, speed change lever, monitor and treble controls. Speed is changed with motor on.



Center section of deck has edit key for stopping tape, record interlock button and record level indicator.



On right are tape motion controls including rewind, record/play, fast forward and stop. Knobs are volume and base control.

recorder is a hand-held ceramic with a plastic case. To conserve weight and space, the microphone does not have a permanent cord attached, instead the auxiliary shielded cord which is used for connection to external speakers, etc. does double duty as a mike cord. The mike has a cinch plug on the bottom into which fits the jack on the cord.

There is only one input on the recorder which serves for both the microphone and other sources (radio, phono, etc.). For recording from these a different cord is required which is obtainable at Webcor dealers. This cord incorporates a 22,000 ohm resistor and has a double tip. There is also a cord that has alligator clips on one end for attaching to the voice coils of a speaker.

The 1⅞ inch per second speed was adequate for voice and covers the voice range very well. Satisfactory reproduction and recording of both speech and music were achieved at both the 3¾ ips and 7½ ips speeds. The 10 watt output is sufficient to give good volume without distortion.

The handle is on the front of the case and is spring loaded so that it lies flat when not in use and serves as an ornament.

When first operating the machine, it is turned on, then the edit lever is slid to the left and the record interlock depressed. This lights the record indicator. The hand is then placed on any metal part of the recorder and if the indicator moves, the plug should be reversed to secure minimum hum level.

The recorder performed well under test and is worthy of your consideration.

SHOP OR SWAP

Advertising in this section is open to both amateur and commercial ads. TAPE RECORDING does not guarantee any offer advertising in this column and all swaps, etc., are strictly between individuals.

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.

Remittance in full should accompany copy. Ads will be inserted in next available issue. Please print or type your copy to avoid error. Address ad to: Shop or Swap, Tape Recording Magazine, Severna Park, Md.

WANTED—DINAH SHORE TV Program of 2-26-61. David Huntback, 4528 Whitaker Ave., Philadelphia 20, Penna.

ANY FRENCH SPOKEN in Louisiana? Please let me know by tape: Jacques Cimon, 525, Wiseman, Montreal 8, Canada.

LEARN MUSICAL INSTRUMENT of your choice—easy! New home study tape course. Write for free brochure. Carver School, Box 366-AH, Palos Heights, Ill.

PROFESSIONAL RECORDING TAPE—First quality of prime manufacturer. Full frequency response. Permanently lubricated. Money back guarantee. Acetate: 1200', 1½ Mil, 4/$5.00; 1800' 1 Mil, 4 $6.65. Mylar 1200', 1½ Mil, 4 $5.84; 1800', 1 Mil, 4/$8.20; 2400', ½ Mil, 4 $12.60. Postage 20c each reel. Hisonic, 1212 North Park Road, Hollywood, Florida.

WANTED: OLD QRS or similar type player piano rolls. State price and selections. Don Dietz, 1571 Pauline Drive, Sunnyvale, Calif.

WANT: SET OF AMPEX 601 half-track or 601-2 stereo heads. Might trade a 601 and 620 for a 601-2 if deal could be made. Michael Ivor, 330 W. Minnezona, Phoenix 13, Arizona.

PARTY RECORDS—SAMPLER & CATALOG $1.00. DRC—11024 Magnolia Blvd., North Hollywood, Calif.

SPOKEN WORD TAPES. Swap, sell or rent me yours. Send list. Ed Mishkin, 117 Merion Road, Merion, Penna.

LEARN WHILE ASLEEP, hypnotize with your recorder, phonograph or amazing Electronic Educator endless tape recorder. Free catalog lists over 200 unusual tapes, records, equipment for experimenters. Sleep-Learning Research Association, Box 24-TR, Olympia, Washington.

TRADE EDISON CONCERT PHONO, dozen cylinders, Mg horn, A1, for late stereo Woll or equal dual track. Brooks, 520 La Belle, Oconomowoc, Wisc.

JACQUES CIMON, 525, Wiseman, Montreal, 8, Canada, telephone CR. 2-9529, would like to hear either by tape, card, phone, from tapists in the Greater Montreal area, French and English-speaking, interested in stereo, portable tape recording.

FOR SALE: Two Altec "Laguna" speaker systems. Absolutely cannot be told from new. Cost $599.50 each, sell the pair for $650.00. One Electro-Voice "Georgian" 600 speaker system in perfect condition. Cost $529.95, sell for only $260.00. One Altec 515 extra heavy duty "Voice of Theatre" woofer, perfect, cost $120.00, sell for $65.00. One Marantz Audio Consolette, good condition, works like new, $75.00. Alan B. Li Calzi, Bridgeton R. D. 2, N. J.

KORTING STEREO RECORDER MT-158, $210.00; two Viking 75 stereo decks, 2T-$65.00, 4T-$85.00; Viking RA-72, $42.00; thirty 1800' reels acetate tape, $2.00 each. Sam Wherry, 1702 Division, Evansville 14, Indiana.

BELL & HOWELL TDC Stereotones wanted Model 730G new or excellent condition. Quote prices. Professor Shevenell, University Ottawa 2, Ontario.

A TALKING LETTER, (3 inch reel), can now be sent to any relative, friend or acquaintance in Southern California who does *not* own a recorder! You make the recording yourself anywhere in the U. S. No obligations. No fees! Send for information! Talking Letters, 6431 Primrose Ave., Hollywood 28, California

PROMPT DELIVERY, we will not be undersold. Amplifiers, Tape Recorders, Tuners, etc. No Catalogs, Air Mail Quotes. Compare. L. M. Brown Sales Corp., Dept T, 239 E. 24th St., N. Y. 10, N. Y.

BUY—RENT ANY DISC—Any Tape. All labels catalog: 50c. DRC—11024 Magnolia Blvd., North Hollywood, California.

FOR SALE: TAPESONIC 70-D, 3 speeds, takes 7" and 10½" reels, perfect condition, self-contained speaker and amplifier, $250 F.O.B. White Plains, New York. TV-Time, 7 Orchard Parkway.

GOSPEL MUSIC—do you like Convention Singing and Quartet Music?? I have too many tapes—write for prices and speed. I never erase a tape, therefore the stack grows. McAdoo Bruington, Box 4192, Lynchburg, Virginia.

LEARN HYPNOTISM, SELF-HYPNOSIS from recorded tapes! Other amazing Tapes, Books, Records. Complete Sleep-Learning information! Free Catalog! Philanthropic Library, Drawer TR697, Ruidoso, New Mexico.

FOR SALE: Roberts Stereo Tape Recorder (Model 90C-A901 with Multi Erasehead and dual VU Meters). Spotless and in guaranteed perfect working condition. Used less than 25 hrs. Sold new for $500, yours for only $280. Recorder will be shipped in original carton. Two microphones for $12.50 each additional. Will include some Stereotapes free. Herman Eggers, Box 172, Bismarck, North Dakota.

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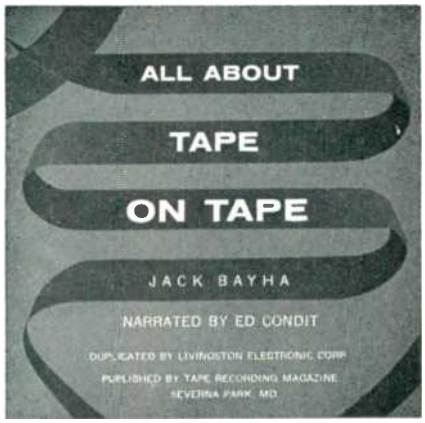

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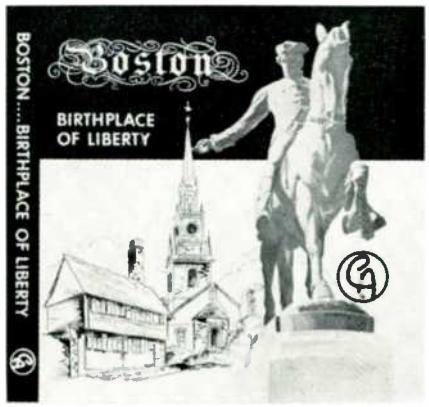

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