

TAPE RECORDER ANNUAL 1968

EVERYTHING YOU NEED TO KNOW ABOUT TAPE RECORDING

How to Choose a Tape Recorder * The New Home Cartridge Machines * Battery Portable Tape Recorders * Creative Taping * Home Video Recorders * Prerecorded Tape Roundup Directory of Stereo Tape Recorders, Tape Accessories, Mikes

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HOME CARTRIDGE



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All prices shown less base and cartridge.

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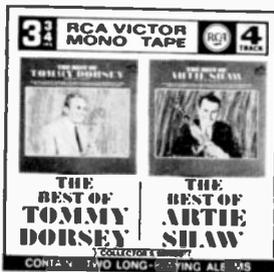
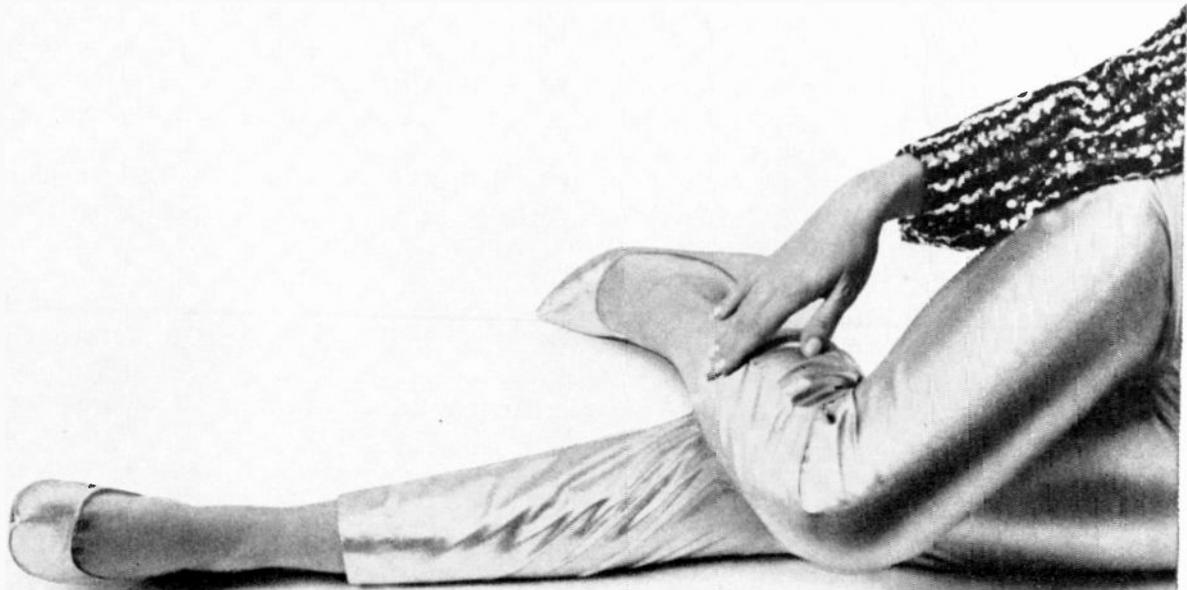
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1968 TAPE RECORDER ANNUAL is published by the Ziff-Davis Publishing Company, One Park Avenue, New York, N.Y. 10016. Also publishers of HiFi/Stereo Review, Popular Electronics, Electronics World, Electronic Experimenter's Handbook, Communications Handbook, Electronics Installation and Servicing Handbook, and Stereo/HiFi Directory. Copyright © 1967 by Ziff-Davis Publishing Company. All rights reserved.
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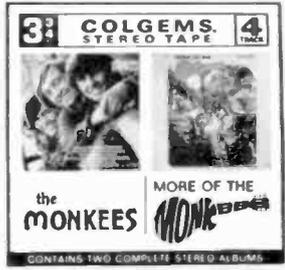
Here's what R. D. Darrell wrote in *High Fidelity* in reviewing RCA Victor's first release of thirty-two 3¾-ips reel tapes:

"... an imposing release of over thirty open reels inaugurates the new RCA Victor catalogue of 3¾-ips tapings. Happily, the visual attractions of the new box-cover designs, reel labels, and distinctive gold-colored plastic used for the reels themselves are not belied by the sonic attractions.

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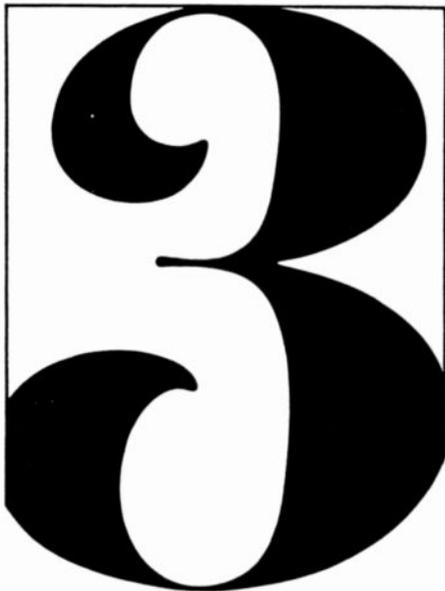
- The Best of Tommy Dorsey/The Best of Artie Shaw
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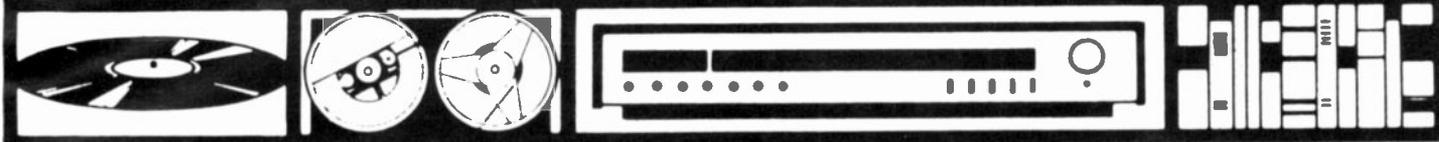
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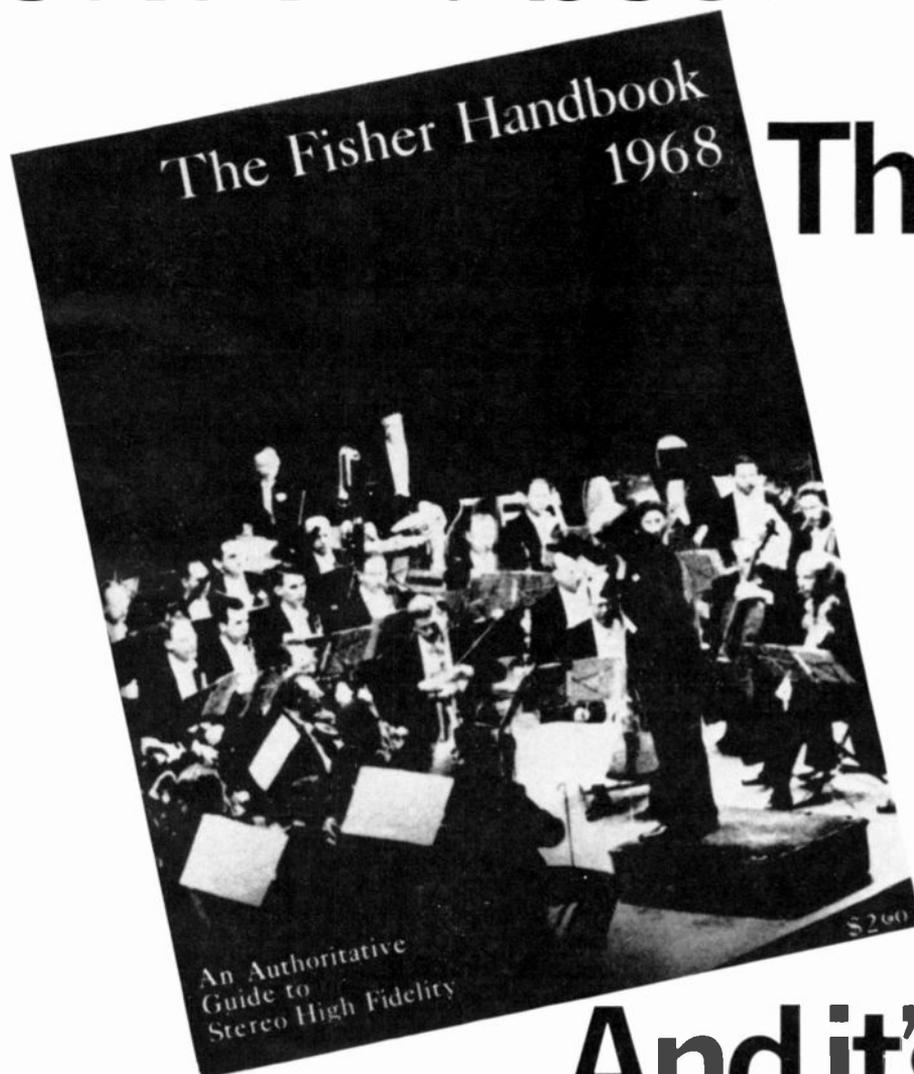
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TAPE RECORDER ANNUAL

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TAPE RECORDER ANNUAL

TAPE RECORDING: PAST, PRESENT, AND FUTURE



THE PACE of scientific discovery and technological development in our day has become so rapid, we are so regularly assaulted with news of advancements and achievements, that we seem sometimes to have lost completely the capacity for wonder and, more, the faculty of appreciating the accomplishments of the human mind. In less hectic days, there was time to acknowledge the genius that in Edison produced the first recording machine, in Bell the telephone, and in de Forest the triode vacuum tube. But who, this fourth edition of the *Tape Recorder Annual* prompts me to ask, invented the tape recorder? Roughly speaking, these modern marvels are the perfected fruits of scientific labors over the last quarter century, so useful and so ubiquitous that we now take them completely for granted, as if they had always been around. They haven't.

The idea of the first tape recorder sprang complete, like Athena from the head of Zeus, from the inventive genius of a Dane, Valdemar Poulsen, in 1898. His machine was a wire (later steel tape) recorder, cumbersome, low in output, and limited in frequency response, but still amazingly like the recorders of today. As early as 1912 Lee de Forest applied his tube amplifier to the problem of increasing the Poulsen machine's output signal, and in 1935 the first magnetic recording tape (paper backed) was exhibited at the German Annual Radio Exposition in Berlin.

Developments during and since World War II have made the tape recorder an indispensable tool of our space program, computer technology, and both commercial and private recording. Ingenious new applications in business, in the home, and in the laboratory seem to grow almost exponentially, and manufacturers continue to respond with machines of greater complexity, utility, and economy. The younger generation, in particular, seems to have assimilated the idea of tape recording as naturally as perhaps their grandparents took to the Kodak. It may very well be, in fact, that the demands of the young, with their insistence on music everywhere and all the time, are the principal engine behind the success of the most recent addition to the audio arsenal: the tape cartridge. The cartridge concept (and cartridge machines, for that matter—RCA, Revere) has been around for some time, but it took off like a big-bottomed Thunderbird only when it found its way onto the nation's dashboards. The next step was a logical one, and a number of manufacturers (see the article "Car Cartridges Come Home" in this edition) are already making tape-cartridge units, either complete or integrable, for use in the home.

Obsolescence is a word in the grand old American tradition. It is celebrated with enthusiastic impartiality by icemen, movie-house pianists, and buggy-whip manufacturers, and some worthy pundits see them being joined shortly by the purveyors of phonograph discs, turntables, and reel-to-reel recorders. Not quite yet. Tape cartridge technology still has a way to go before it can compete successfully with either disc or reel-to-reel tape in the most critical area of all—fidelity. Furthermore, the mumbo-jumbo of four-track/eight-track/cassette formats is ripe for a shakeout, and the question of playing time (complicated by tape thickness, oxide formulations, and tape speed itself) will become serious as soon as tape-cartridge manufacturers approach the classical-music catalog seriously. And when the short-pants period is outgrown, the tape cartridge machine will take its place as an adjunct to, not a replacement for, existing audio systems.

—Editor

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CAR CARTRIDGES COME HOME

MANUFACTURERS HAVE BEEN QUICK TO SEE THE LOGIC OF MAKING THE PHENOMENALLY SUCCESSFUL AUTOMOTIVE TAPE-CARTRIDGE MACHINES A CONVENIENT PART OF HOME AUDIO SYSTEMS

By FRANK PETERS

HAVING already been the target of a barrage of newspaper and TV advertising and of articles in a variety of publications, audio enthusiasts should by now be pretty well acquainted with automobile stereo tape cartridge players. The manufacturers

have made their points with such slogans as "Put stereo on wheels," "Spend happier hours in your car . . . equip it with stereo," and other variations on the theme of enjoying music in stereo in the comfort of your car. The public in some areas—such as the West Coast and Texas—has accepted the idea, bought the equipment, and is generally happy about mobile tape players. And the same is taking place in other parts of the country.

Since at least one of today's car cartridges (Fidelipac) was originally designed for fixed—rather than mobile—operation for such purposes as broadcast programming and background music, a logical next step was to adapt the car-cartridge player for home use. The primary appeal of the new approach is the possible double use of the cartridge. In other words—"Enjoy stereo tapes in your car, *and* play them in your living room." As the chewing-gum ad says, "Double your pleasure. . . ."

CUSTOMERS who bought four-track machines of the Fidelipac type in the early days of auto stereo can now find home players for their tapes. And owners of eight-track car sets have an even wider choice. A third available system, using the Philips twin-hub cassette (cartridge), also holds much promise, as does PlayTape, a fourth approach using a two-track miniature cartridge.

For current owners of automobile cartridge players, the choice is clear. If they want to hear their cartridge tapes indoors, they simply buy a home player designed for the particular type of cartridge they own. The players may take the form of a self-contained "luggage" portable, a "component-type" three-piece ensemble (player plus two speaker systems), or a deck (with preamplifiers) for plugging into an existing stereo outfit (component stereo music set-up or console with tape-player input jacks). There are also de luxe console or table-top combination tape-cartridge players that include a stereo tuner and phonograph.

In cases where the auto player is a double-duty, self-contained type that includes speakers (such as certain SJB sets—from Martel's Automotive Division) it is merely a matter of toting it from car to house and plugging in an appropriate power-supply unit, generally a converter which changes 120-volt a.c. to 12-volt d.c. Automatic Radio's unit, one that normally plays through the speakers installed in a car, at home drives a pair of neat little walnut speaker systems.

The home players are operated in more or less the same way as the auto-stereo units. Slip in a cartridge (and possibly pull a lever) and presto—music! Like their auto counterparts, they offer a certain degree of program selection (press a button and the program on an adjoining set of tracks comes into play). Some models indicate which set of tracks is in operation by means of an illuminated track indicator. All except the decks have volume, tone, and balance controls (or should have!).

Owners of a good stereo outfit—either in component or console form—can add a home-player deck that involves a minimum of fuss and only a small amount of space. The units are generally slim and fit into what might otherwise be regarded as waste space. The home player decks, with their 120-volt a.c. motors, are considerably less expensive than auto players since they play (by plugging into the auxiliary inputs) through the existing stereo amplifier and its speakers, and are therefore fairly simple mechanisms.

But there are some rather elaborate units too, such as the Bogen MSC Compact, which is a full music system comprising an AM/FM stereo receiver, a record player, and an eight-track tape-cartridge player in one handy—if not portable—walnut-cased package, plus a pair of optional speaker systems.

Lear Jet Corp. has an 80-watt AM/stereo FM receiver with integrated eight-track cartridge player in a metal cabinet with walnut-grained vinyl finish. Speaker systems are optional.

Panasonic, in its Model RE 7070, also has an AM/FM stereo receiver with built-in eight-track player, but with a smaller power output—18 watts. It is priced at \$239.95 complete with compact walnut speaker systems.

SJB, in its Portamount series, offers ensembles consisting of four-, eight-, or four/eight-track decks with either mono or stereo FM tuners, complete with chrome-housed speakers. These sets operate in the auto, and, in conjunction with an a.c. converter, they can also be used in the home.

Capitol is marketing a combination eight-track tape player and record changer in a wood table-top base with clear plastic cover. The amplifier has inputs for a stereo tuner, and matching speaker systems are included.

The self-contained luggage-type portables cost more than the straight decks. The higher price covers the necessary amplifiers and speakers, plus the housings. The self-contained component ensembles, in turn, are generally more costly than the luggage type because they usually come in furniture-wood cabinets.

THE quality of sound produced by the home players is determined by (1) the quality and frequency range of the prerecorded tapes; (2) the quality of the deck on which the tapes are played; and (3) the overall quality of the amplifier and speakers (either built-in or separate). Most cartridges of the four- and eight-track variety are potentially capable of perhaps 50 to 12,000 Hz response or better. However, for various reasons, almost all limit their high-frequency response to a much lower figure. When one listens for the first time to a home player reproducing tapes that he has previously heard only in his car, he may be somewhat disappointed. He will be aware of more tape hiss, which in an automobile is usually masked by motor and road noise. (However, be-

cause of the absence of motor and road noise and perhaps because of better speakers in the home units, he is likely to hear a wider range of frequencies.) He may also observe a diminution of stereo effect. This results from the wide difference between the acoustics of the more open home surroundings and those of the intimate, closed-space environment of the auto. The difference in acoustic values will be similar to that between stereo headphones and speaker systems. In addition, a number of tapes made for auto use (for good technical reasons) are considerably compressed—meaning that there's very little difference between the loud and the soft passages. This is advantageous in auto use, but sonic realism suffers somewhat when such tapes are played at home.

The new home-player owner will probably be aghast at the wide variations—even among the tapes of one given brand—in frequency response, volume level, and signal-to-noise ratio of the cartridges when played on a home machine. (The variations were there in the car also, but were obscured by the other special conditions.) And although there are thousands of popular-music tapes, the number of classical items is still appallingly small. And many of these are, at best, the "pop" or light classics.

All of the above is not meant to deter prospective home-player purchasers. It is merely a matter of recognizing the possible deficiencies of cartridge tapes and making allowances for present conditions which, given both industry and public acceptance of this latest hi-fi component, cannot be expected to endure for long. Overriding the possible drawbacks is the big factor of convenience. This alone, for many people, is justification enough for tape cartridges.

The foregoing has been addressed to those up-to-the-minute people with auto players who want a home player for their existing cartridges. But what about the newcomer to the world of tape cartridges who plans to start with either an auto *or* home player and to buy the second unit at a later time? Which system is best?

Let's take a look first at the debit side of the question. With only a few exceptions, the four- and eight-track cartridge machines do not offer recording capability. Only a handful of the current crop of players have fast forward capability for relative ease in locating favorite songs or portions of tape (Kinematix, Universal Tapedex, Capitol, Lear). In the few available cartridge recordings of symphonies and concertos, the works are punctuated with pauses and clicks at varying intervals, negating one of the basic virtues of the tape medium—its potential for long uninterrupted programs.

If higher cartridge prices (higher than discs, that is), lack of recording capability on the majority of units, and the other shortcomings of cartridge machines are of little concern, then it is a matter of deciding which kind of player to buy—four- or eight-track, or the "compatible" four/eight-track type. An important fact to consider is

that four-track players are generally lower priced than the eight-track units. But four-track players require manual track change at the halfway point, whereas eight-track systems play all the way through with no attention. Although there are more four-track tapes available right now, eventually they will be outnumbered by the eight-track cartridges. And there are more top-name popular artists on eight-track tapes.

FOR the do-it-yourself tape enthusiast who likes to create his own program material rather than buy pre-recorded continuous-loop tape cartridges, there are several home machines on the market that enable him to do so. One such four-track recorder/player comes from Muntz. Designated Audio-Stereo Model AR300, the unit (newly priced at \$199.95) contains a record changer that makes it possible for the user to put his favorite discs into cartridge-tape form. A smaller deck version, Model AR500, without the changer, is available at \$179.95. Another Fidelipac-type recorder/player is Craig Panorama's Model C516, priced at \$229.95. It is housed in a walnut cabinet and records from a microphone, tuner, or phono source.

For those wanting to record their own eight-track continuous-loop cartridges, there is Roberts' Model 1725-8L, list priced at \$389.95. This unusual machine is a combination reel-to-reel stereo recorder with a built-in eight-track recorder/playback mechanism. It enables the user to dub program material onto a tape cartridge from regular prerecorded tapes or from an external tuner or phonograph.

Sony has a handy, compact eight-track stereo cartridge recorder/player (Model TC-8) at about \$100. The unit plugs into the tape-output jacks of a stereo system or the "line" outputs of a stereo tape recorder.

For those wanting to make both four- and eight-track tapes, there is Kinematix's Model KX1799, offering a built-in record changer and an unusual tuner that plugs into the cartridge tape slot. Automatic Radio also has AM and FM plug-in "cartridges" available for their home/car player.

An offspring of the major four- and eight-track loop concepts is the miniature two-track continuous loop principle developed by PlayTape, Inc., New York. This approach utilizes the basic tape storing and handling characteristics of the eight-track concept and also runs at the same speed— $3\frac{3}{4}$ ips. But the similarity ends there. The PlayTape cartridge is just about one-fourth the size ($3\frac{7}{16} \times 2\frac{3}{4} \times \frac{7}{16}$ inches) of a typical eight-track cartridge. Instead of quarter-inch audio tape, it uses eighth-inch tape. Tapes are presently available only in monophonic form. (However, two of the current line of six playback machines—including one for automobiles—have a "stereo" position on the panel. In the event that PlayTape cartridges are ever made in stereo

form, these two instruments will be ready to play them—but monophonically.) The units do not include recording capability.

Prerecorded PlayTapes come in five different categories. A "Red Hot Single" group offers two tunes, six minutes of play, at 99 cents. The "Extended Play" group, running 12 minutes of playing time, contains four tunes and is priced at \$1.49. The "Long Play" group, which offers 24 minutes of music, is priced at \$2.98. Up to 12 minutes of songs and stories are offered in the "Kiddie Tape" category, priced at \$1.49. The firm's cultural or "General Information" series is priced at \$1.00 and \$1.50, with timing not specified as we go to press.

The PlayTape system in just one year has gained broad acceptance in the so-called "youth" market. The playback machines, ranging from a book-size model to a table model measuring $7\frac{1}{2}$ x $14\frac{1}{4}$ x $10\frac{1}{4}$ inches, are priced from \$16.95 to \$69.95, with the auto unit tagged at \$32.95.

THOSE who want the convenience of the cartridge plus some of the flexibility of the reel-to-reel format might weigh the merits of the Philips cassette system. The cassette is a cartridge which uses tape one-eighth of an inch wide and runs at $1\frac{7}{8}$ ips (instead of $3\frac{3}{4}$ ips as in the other systems). The Philips cartridge is approximately one-quarter the cubic size of the four- or eight-track continuous cartridges, but it offers as much (or more) playing time as the average four- or eight-track loop cartridge. The machines all have fast forward and rewind capabilities, and some have digital counters for fast program location. A recent home unit of this type from Norelco, Model 2502, offers automatic operation, taking a load of six cassettes for up to $4\frac{1}{2}$ hours of playback without attention. This playback deck sells for just under \$100.

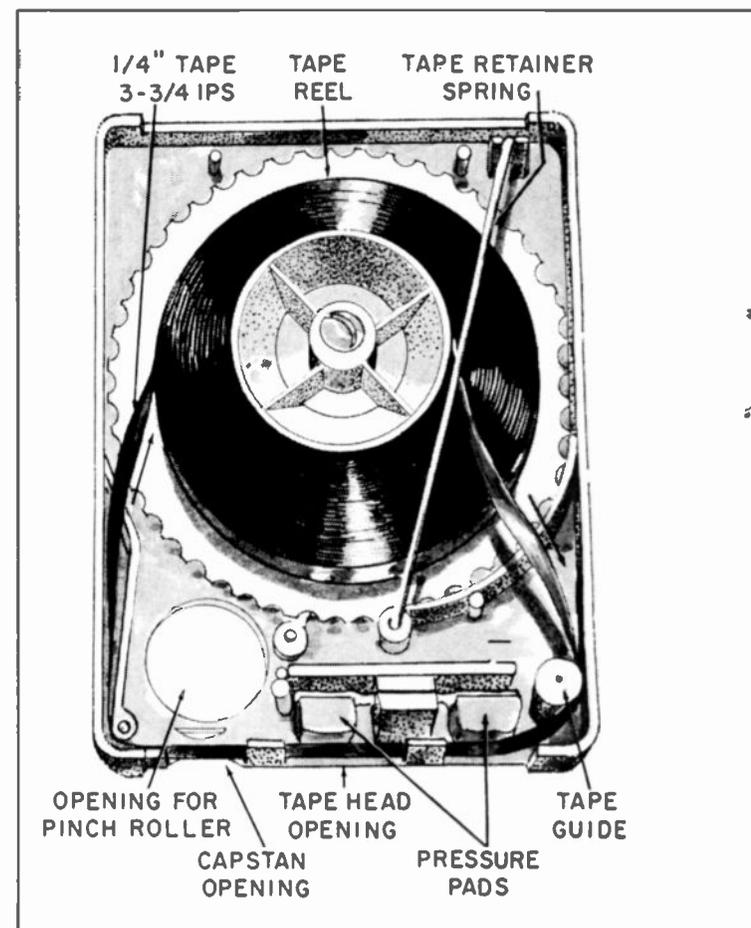
Prerecorded stereo tapes are being sold in cassette form at \$5.95 by several companies, and blank tapes are available in lengths of one hour (\$2.65), ninety minutes (\$3.75), and two hours (\$5.50). In operation, the tape moves from one hub to the other. When one side is completed, a sensing mechanism is triggered, and the tape stops. The cartridge must then be turned over to play the second side. In relation to the eight-track continuous cartridges (and to a lesser degree in relation to four-track cartridges), the Philips-type machines are at a disadvantage because of the necessity of turning the cartridge over at the halfway point. (The eight-track cartridges play all the way through with no attention; the four-track require the push of a lever or button at the halfway point.) However, this is a minor flaw in an otherwise attractive approach. Further, one full side of a 90-minute cassette offers 45 minutes of playing time—more than most four- and eight-track cartridges offer for two sides. And the figure is even larger with a two-

hour tape. (It must be noted that currently no company is prerecording long-play cassettes, but the capability is there for the hobbyist to exploit. Record companies may decide to use this capability at a later time.)

Philips-type machines, available under more than seventy different brand names around the world, provide recording capability in either mono or stereo. Furthermore, mono tapes made on one Philips-type recorder can be played back without problems on the same brand—or any other brand—Philips-type stereo machine. Or stereo tapes made on one Philips-type stereo recorder can be played back monophonically on another mono Philips-style unit.

Philips-type machines—originally introduced in America under the Norelco brand name—come in a variety of forms. First out was the Norelco battery-operated Carry-Corder Model 150, a coat-pocket-size mono recorder, now priced at \$69.95. Similar units are available under a dozen or more brand names.

Now there is available a \$130 stereo playback-only cassette model designed specifically for auto use by Norelco. The machine has a "letter-box" feed slot; inserting the cassette into the slot activates the tape-drive mechanism and electronics. Mercury's AP8300 will record in mono, in addition to playing back stereo. This makes it a dual-purpose machine: suitable for dictation on the road *and* for playing back prerecorded stereo tapes. Its price, which includes the microphone and



two speakers, is \$119.95. As with other car tape players, speakers can be mounted in the dashboard or elsewhere. More such units are entering the market under a variety of brand names.

Also available from major manufacturers are desk-top mono and stereo miniature recorder/players for Philips cassettes (with built-in or external speakers), FM radio recorder/players, and a variety of table-top and portable self-contained units, plus component-type ensembles in various wood finishes and cabinets.

For those who want the convenience of cassettes and have no desire to record their own material, there are a few playback-only units, priced under \$30. Notable are units from Peerless, Telerad, and Norelco, the former a "wrist-strap" model, the latter a vertically styled unit with a carrying handle on top. Both take up a minimum of space; in fact, they can fit into an overcoat pocket.

How do the Philips-style cartridges compare sonically with the more widely distributed four- and eight-track forms? Quite favorably. Frequency response is given as 60 to 12,000 Hz for some of Norelco's sets, as an example (and my ears tell me these specs are attained). Signal-to-noise ratio and wow and flutter characteristics are excellent—particularly considering the slow speed at which Philips cassettes operate.

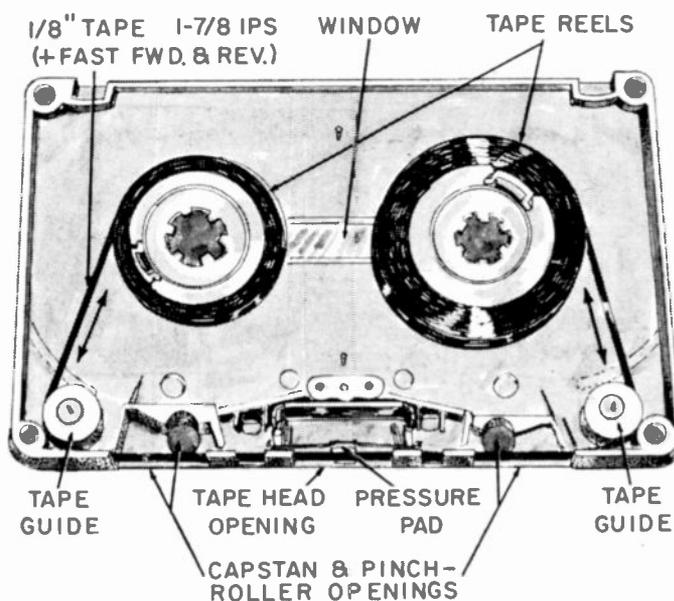
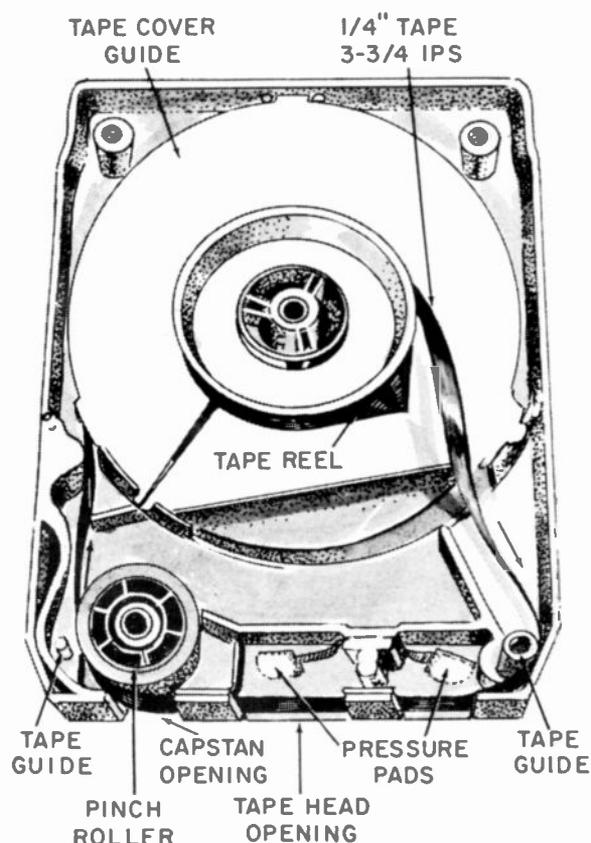
However, despite certain basic quality requirements set by Philips for its licensees, there will inevitably be some variation in overall quality of the units made by

the more than seventy manufacturers. Your best bet is to check the specs of the particular machines being considered—and then to listen to them, if you can.

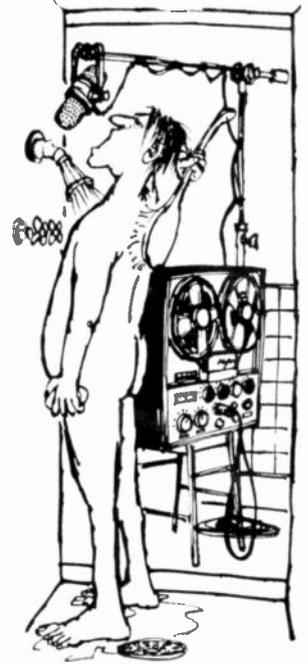
What about the availability of prerecorded cassette tapes? There are now quite a few on the market, with more undoubtedly to come. Prerecorded stereo tapes in cassette form are being sold at \$5.95 by several companies. The largest supplier—Ampex Stereo Tapes—handles more than sixty record labels, duplicating these in various forms. Seventeen of these labels now appear in the cassette mode.

General Recorded Tapes, with 38 labels in its fold, is offering music from 18 of them in cassette form. Mercury is offering prerecorded cassettes of more than 25 labels, and is expected to expand this list. Smaller companies, such as Sentry, are marketing prerecorded cassettes at a somewhat lower price. Some of the program material is from the smaller record companies, and some of it from foreign countries. Lower prices are also in the offing from the big suppliers. Ampex, for example, is planning a line at \$4.95 in the near future.

The number of tapes by well-known performing artists available in cassette form is still somewhat limited, owing in part to the major "holdouts." But you can dub these "names" yourself from discs, off the air, or from reel tapes. When all of the big recording companies go cassette, the Philips system is likely to give the continuous-loop units a run for their money.



The three basic types of tape cartridges are shown here with their covers removed. On the facing page is the oldest of the three types, the Fidelipac, which is similar to the Orrtronics cartridge. Left is the Lear Jet Stereo-8 type which, aside from its eight-track format, differs from the Fidelipac in that it employs a built-in pinch roller. The Philips "cassette" (above) can be considered a miniature reel-to-reel system encased in a cartridge. Note that all three units have tape guides and pressure pads built in as part of the cartridge structure.



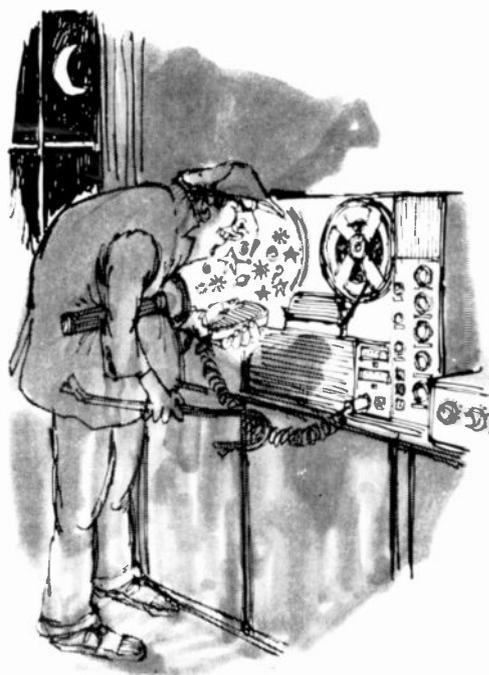
The Reeling





Mind

By Charles Rodrigues





THE NEW SELF-REVERSING

BY PUTTING THEIR HEADS TOGETHER, DESIGNERS HAVE FOUND

ALTHOUGH the art of music reproduction has made tremendous strides since the days of the morning-glory speaker horn, progress in most aspects of the field today, though steady, is generally of the inching kind—except in tape recorders. When it comes to tape recorders, it seems that the only thing measurable in inches is tape speed—everything else goes by leaps and bounds. The latest leap is the reversible (bi-directional, if you insist) tape machine. True, the first of the breed appeared on the market some half-dozen years ago, but the trend has now taken firm hold. At least eight manufacturers are currently offering reversible stereo recorders to the American home market.

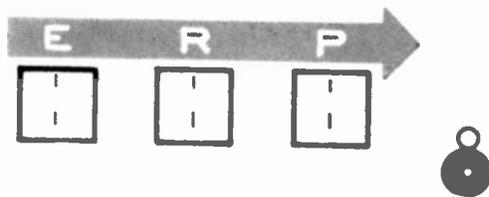
Despite their unity of intent, however, manufacturers have found more than one way to reverse a machine, and there is great diversity in their approaches to other aspects of design as well. For the prospective purchaser of one of the newer tape machines, it is important to understand how they vary in their features, flexibility, and convenience.

As it records or plays, the conventional tape machine moves the tape in a direction (usually from left to right) that we may term *forward*. But the reversible machine is also able to play with the tape moving in the *reverse* direction (right to left), thus doing away with the tiresome business of exchanging reels on the supply and take-up spindles. Some machines can record as well as play in reverse. Others are designed for playback only in the reverse mode—if one wishes to record in the reverse direction, the usual reel interchange is required.

Designing a machine for bi-directional operation is no simple matter. In order to reverse tape direction, it is necessary to change the direction of the capstan-drive motor, change the relative torques of the supply- and take-up-reel drives, and transfer the recorder's preamplifier connections from the head(s) used in forward to the head(s) used in reverse. To minimize the need for the personal attentions of the operator, most reversibles offer not only manual but also automatic reversal. At the end of the reel, some type of sensing device actuates a solenoid, which in turn operates switches and performs the other mechanical actions needed to make the required changes. The devices that sense the approaching end of a tape reel and actuate the solenoid are varied and imaginative:

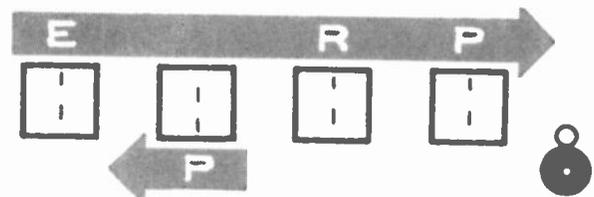
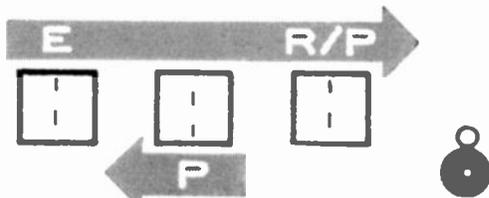
- *Foil sensing* (Bell and Howell, Concord, Lafayette, Panasonic, one Roberts, and some Teac) is the most popular method. Metal-foil leader tape is attached to the end of the playing tape, or an adhesive foil strip is pressed in place. As the foil passes over a sensing device, it completes an electrical circuit within the tape recorder, thus activating the reversing mechanism.

- *Silence sensing* (Sony) requires no added foil or special preparation of the tape. The playback signals from all four tracks of the recorded tape are continuously monitored by a special head to produce a "guard" voltage that keeps the reversing mechanism inactive. If there is no signal on all four tracks for a number of seconds (as presumably happens only at the end of the tape), the guard voltage drops to zero, and reversal takes place.



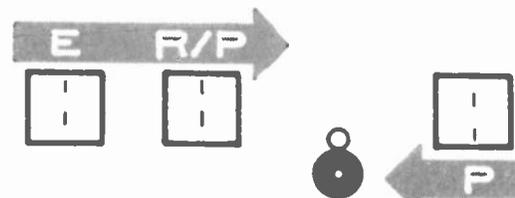
(1) Usual stereo four-track, three-head arrangement and tape-motion direction. The two tangential circles represent the capstan and the idler wheel.

(2) A three-head arrangement employing a dual record/playback head for forward and playback-only head for reverse. Note reverse playback action.



(3) A four-head setup similar to (2), except that the separate record and playback heads permit off-the-tape monitoring during forward recording.

(4) A three-head configuration in which the reverse playback-only head has the tape pulled across it rather than pushed, as in (1), (2), and (3).



TAPE RECORDERS

By HERMAN BURSTEIN



THAT THERE'S MORE THAN ONE WAY TO REVERSE A RECORDER

- *Tone sensing* (Ampex) depends on a subsonic tone, at about a 20-Hz frequency, which the user can record at any point on the tape simply by depressing a button on the Ampex machine. In playback, the same tuned circuit that generated the tone responds to the subsonic signal and actuates the reversing solenoid. In recording, one is unlikely to encounter audio tones sustained enough and low enough to impress a false reversing signal on the tape; in playback, the reversing signal is inaudible on most equipment. (Incidentally, all pre-recorded tapes manufactured by Ampex have the subsonic reversing signal already prerecorded at the end of each side.)

- *Phase sensing* (Teac Models A5050 and A6010) works at the opposite end of the sound spectrum from Ampex's tone sensing. Teac's phase-sensing system utilizes both stereo channels on which are impressed (via pushbutton) two separate and different supersonic signals. When the sensing circuit picks up the paired (in-phase) signals, it activates a solenoid control that does the reversing. The signal, of about a half-second duration, can be erased at will. Teac claims that phase sensing, because of the high frequency employed, does not introduce spurious noises. Nor can the program material on a prerecorded tape falsely trigger the machine.

- *Time sensing* (Roberts) employs an index dial that can be pre-set to a point corresponding to desired elapsed time, which of course must be predetermined. As the tape moves, the dial rotates, and when the dial pointer comes around opposite the index mark, an electrical

circuit is completed to produce reversal. Roberts also gives the Model 400X user the option of foil sensing.

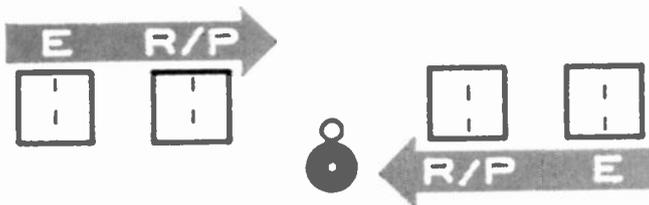
As noted above, some machines are capable of recording as well as playing in the reverse mode, while others only play. Those that record in reverse as well as play in reverse are the following: Ampex 2100 series; Bell and Howell Models 2291, 2295, and 2297; Concord 776 and 776D; Lafayette RK960; Panasonic 780; Sony 660ESP and 560D; and Teac Models A3010, A4020, and A2020.

Of the above, the following *automatically* reverse in the record mode as well as in the play mode: Concord 776 and 776D; Lafayette RK960; Teac Models A3010, A4020, and A2020; and the Sony 560D.

Machines that offer automatic reversing *in playback only* are: Ampex 1100 series; Panasonic RS1000; Roberts 400X and 7000RX; and Teac Models A1500, A1600, A4010S, A4000, A5050, and A6010. This group also offers full recording capability, but the usual reel interchange common to traditional recorders is required.

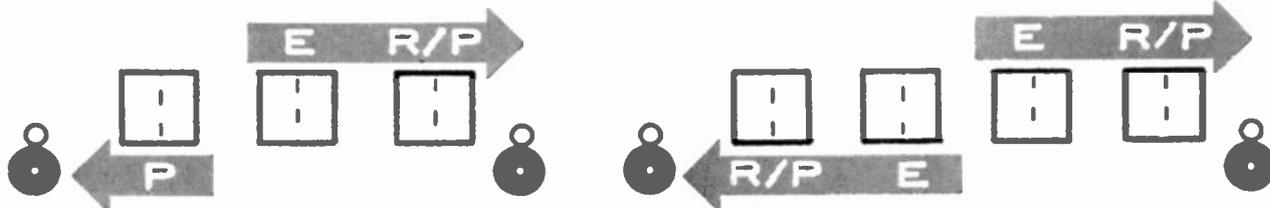
In most reversing tape recorders, automatic reversal is confined to one change of direction—from forward to reverse. Some others (Ampex 1100 and 2100 series, Lafayette RK960, Panasonic RS1000, Roberts 400X, and Teac 6010) offer the "repeat" feature, meaning that they can also automatically switch from reverse back to forward again. Of the five above companies, only Lafayette offers repeatability for recording as well as playback. The rest limit repeatability to playback to obviate accidental erasure of an existing recording.

E = erase
R = record
P = play



(5) A four-head machine that resembles the unit at (4) mechanically, but differs in that a combined record/play head and an erase head permit bi-directional recording.

(6) and (7) Two dual-capstan arrangements that use three and four heads, respectively. The three-head machine cannot record in the reverse direction, as can the four-head machine. Neither arrangement permits instant monitoring from the tape.



It has long been dogma among tape-recorder designers that, for minimum wow and flutter, the drive capstan (in conjunction with the pressure roller, of course) should *pull* tape, not push it. Thus, in a conventional tape machine, we find that the tape always passes over the heads before it reaches the capstan; the capstan, in effect, pulls the tape past the heads against the drag of the supply reel or pressure pads. Accordingly, a number of reversible machines have extra "reverse" heads installed on the opposite side of the capstan so that in reverse the capstan is still pulling tape over the heads. This is known as symmetrical operation. But other machines defy the rules and employ asymmetrical operation. Here all the heads are on the same side of the capstan, so that in reverse mode the capstan is actually pushing the tape.

TEAC, a manufacturer that has produced machines with both symmetrical and asymmetrical transports, holds that pushing tape does not necessarily give inferior results; the primary consideration in designing a transport that will push tape across the heads in the reverse mode is the number of heads involved and accurate variable tape-tension control. In the "pushing" mode, the tape tension required for proper head-to-tape contact is being supplied by the acting takeup reel, and every element that causes friction in the tape's path will reduce tape tension. In a unit designed for reverse playback only, the single playback head in the tape path causes no difficulty, but when multiple heads are required for forward and reverse erase, record, and play functions, tape-to-head contact may be completely lost near the capstan despite any reasonable amount of torque supplied by the takeup reel, according to Teac. The use of pressure pads further complicates the problems.

Tape-designer ingenuity has also given us some machines that will let us have our cake and eat it too: they are designed so that the tape is pulled in either direction, which reduces the total number of heads. The heads are centrally mounted between separate right and left capstans. In the forward mode, the tape is engaged by one capstan; in reverse, by the other.

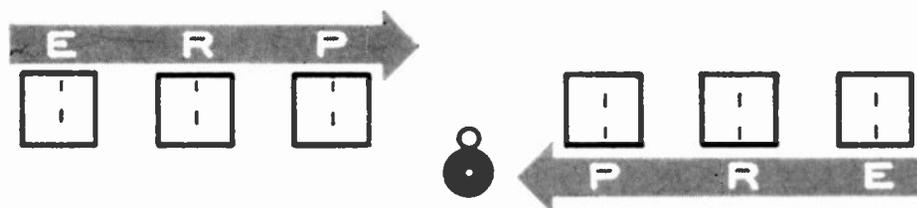
An unusual example of the double-pull approach comes from Bell and Howell. The firm's three new self-

threading machines have swinging heads with built-in tape guides. In operation, the heads swing from one side of the capstan to the other, and the capstan therefore pulls the tape over the same heads in both directions.

One important advantage of the repeat feature in the late-model recorders is the opportunity it offers for sequential mono operation. With suitable switching, a tape machine could record or play all four mono tracks in sequence. At the time of writing, sequential operation was offered by only one special-purpose machine, the Viking 225, designed solely for mono playback at 1 $\frac{7}{8}$ ips. Intended for background music and similar continuous programming, the machine will play for 16 hours (with $\frac{1}{2}$ -mil tape) before repeating itself.

The latest development on the automatic-reversing and multiple-play horizon is a new Sony automatic reel-changer/recorder from Superscope. The new product, Model 760, incorporates several engineering innovations: a reel-changing mechanism, automatic tape threading, automatic reversing, and ejection of the completed reel after all tracks have been played. The unit will play both sides of five prerecorded reels completely unattended. The size of the reels can vary from three to seven inches in diameter and may be intermixed. The 760 features pushbutton solenoid controls for manual operation. For automatic operation, one merely presses a button and the first reel is released from the spindle. The tape is automatically threaded and reverses automatically after the first two tracks of a four-track stereo tape have been played. When the tape has made a complete reverse cycle, the ejector mechanism slowly rises from the deck panel beneath the reel and lifts it from the playing spindle. The completed reel is then tilted and slides gently off the deck panel into a tray built into the side of the recorder. When the reel ejector drops back into the deck panel, the next reel drops into place and the automatic sequence repeats itself. Reversing is triggered by silence sensing, as in Sony Models 560 and 660ESP.

It is difficult to predict what changes will be wrought by tomorrow's technology in the highly competitive, fast-moving tape field, but it appears that tape-reversal, at least, is here to stay and may shortly be expected to be a standard feature on all home tape machines.



(8) A full six-head arrangement that permits recording and monitoring directly from the tape in both forward and reverse. Note that tape is pulled in both directions.



KNOWING THE ANSWERS TO TWO SIMPLE QUESTIONS WILL SIMPLIFY YOUR DECISION-MAKING WHEN **BUYING A TAPE RECORDER**

By **BENNETT EVANS**

BEFORE you open a catalog, visit a dealer, or make any other moves remotely resembling shopping for a tape recorder, you had best ask yourself two serious and interrelated questions—to wit: (1) What do I want a recorder *for*? and (2) How will I use it? Knowing the answers to even these simple queries will be an enormous help in getting a machine at least somewhat tailored to your purposes—and will probably save you money in the bargain.

Let's see what's involved in these questions. If you mean to roam about the city and countryside making candid recordings of anything from subways to songbirds, you'll want a battery-powered recorder. Not one of those toys the drugstore gives away practically free with every malted, but something perhaps in the \$75-and-up range designed for serious recording. The minimum hallmark of quality in a battery portable is capstan drive, which propels the tape at a steady speed

between a rotating metal shaft and a rubber idler wheel. The toys use "rim drive," with the takeup reel pulling the tape through the machine at a speed that varies according to the amount of tape on the reel at any given moment.

Battery machines, especially those that record at $7\frac{1}{2}$ ips (inches per second), make recordings anywhere from adequate to excellent, but none, because of the minute dimensions of their speakers, play back nearly as well as they record. Almost all, however, have output jacks that can be used to feed external hi-fi systems for a considerable improvement in sound. And for even better results, tapes made on the battery-operated portables can be played back on full-size, full-fidelity machines. (See Ken Gilmore's article elsewhere in this edition for a discussion in depth on the battery-powered machines.)

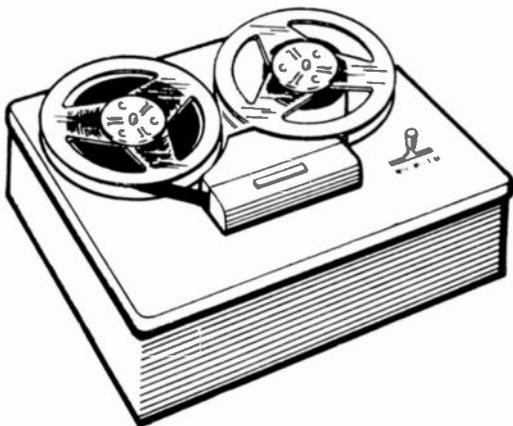
When we come to the full-size machines, we find that there are three basic types: the tape transport, the tape deck, and the complete recorder (see accompanying illustrations). If your only interest is in playing pre-recorded tapes through your audio system, you can save a good deal by buying a tape transport that (by definition) consists simply of a tape-handling mechanism and a playback head (no record or playback electronics) whose output must be fed into the tape-head inputs of your amplifier—assuming that your amplifier has such inputs. Some transport manufacturers also sell playback-only preamplifiers that feed the tape inputs of amplifiers lacking tape-head facilities. These preamps usually give better sound, since they provide an exact electrical match for the playback head of their companion transport and usually offer different playback equalizations for different speeds (a feature which most audio-system tape-head inputs lack). However, if your amplifier does not have tape-head inputs, your best bet is a deck with built-in preamps.

If you want to record, you'll want at least a tape deck, and possibly a full recorder. Both include tape transport and record and playback preamplifiers, and the full recorder also has amplifiers (usually between 1 and 10 watts per channel) and speakers as well.

Before you decide between the lighter, more compact tape deck and the complete recorder, ask yourself whether you'll be using your machine only as part of your home audio system (in which case you'll want the deck), or whether you'll be recording and playing in more than one place (in which case you'll want the full recorder with speakers). You may prefer the lighter, smaller deck for remote recordings, too, if you're content to listen only through headphones to what you're recording. Considering the relatively small difference in cost, even if at present you don't intend to make recordings, the deck with preamps is almost always a better bet than the transport without electronics.

REEL capacity and speeds are other basics to consider. Virtually all recorders except the battery-powered or very cheap ones take reels in all sizes up to 7 inches in diameter. The 7-inch reel is the standard for pre-recorded tape and pretty much a necessity for making recordings of reasonable length at $7\frac{1}{2}$ ips. Those few a.c.-powered recorders that take only 5-inch reels usually have only their low cost to recommend them. Professional-size, $10\frac{1}{2}$ -inch reels are a luxury, but a handy one if you need to make very long recordings at $7\frac{1}{2}$ ips and/or prefer not to use thin tapes.

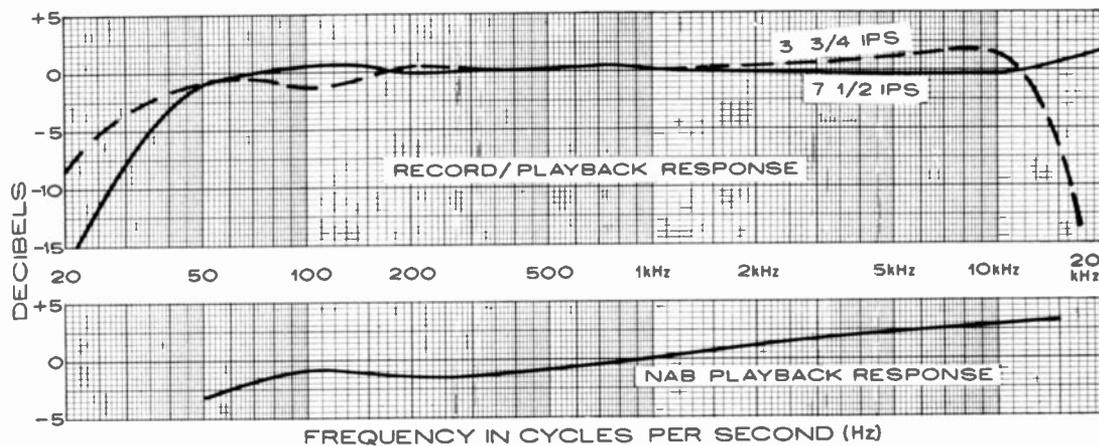
Virtually all full-size tape machines can be run at both $7\frac{1}{2}$ and $3\frac{3}{4}$ inches per second, and these two tape speeds are standard for prerecorded tapes. With today's better home recorders, the 15-ips speed has no sonic advantage unless you plan to make—or play—professional master tapes or do much critical editing.



The tape transport consists only of a tape-moving mechanism and a playback head. Since it lacks electronics, the machine requires an amplifier with a tape-head input.



The tape deck will record and play back and may have a separate playback head that permits off-the-tape monitoring. Neither power amplifiers nor speakers are included.



The two graphs above are typical of those that appear in technical reports on tape recorders. The bottom graph charts the playback response of a recorder to a test tape that is recorded to conform to the National Association of Broadcasters (NAB) recommended playback curve for pre-recorded tapes. A flat line on the 0-db axis would be a perfect response within the 50- to 15,000-Hz range specified by the NAB standard. The top graph shows a machine's playback response (at two speeds) to a test-tone series recorded on the same machine.

(Sounds and pauses on tape are twice as long at 15 ips, making them easier to find and splice in or out.) A low speed of $17\frac{1}{8}$ ips provides double the recording time of $3\frac{3}{4}$ ips and is handy for long recordings of spoken material, where the lower fidelity isn't too bothersome. The very slow speed of $1\frac{5}{16}$ ips (found on few machines) is twice again as economical—but offers still lower fidelity.

Once you've made a decision on the type of machine you want, you next need to consider the recorder's basic performance specifications: its frequency response and freedom from wow, flutter, noise, and distortion. Wow and flutter are stated in specification sheets as percentages—the lower the percentage, the better. If an appropriate prerecorded tape is available, a good test is

to listen to long-drawn-out piano tones. "Wow" manifests itself as a slow see-sawing of pitch; flutter is a faster, gargly variation (which, on a machine that is out of adjustment, may make everything sound as if it were underwater).

Noise is usually stated either as "so many decibels below zero recording level" (for example, "−60 db") or as a signal-to-noise ratio without the minus sign (60 db). Either way, the larger the number's absolute value—disregarding the presence or absence of minus signs—the quieter the machine: −60 db is better than −50, and the equivalent 60-db signal-to-noise ratio is substantially better than 50 db. Most tape-recorder noise consists of hiss, but hum may also be present. Since noise is referenced to a given signal level (0 db), which in turn is referenced to a given distortion level, one manufacturer's rated signal-to-noise level of −50 db may be more or less noisy than another manufacturer's −50 db.

DISTORTION is seldom stated on recorder specification sheets, though sometimes the 0-db (or maximum recording-level) point is defined as the level producing 1 per cent or 3 per cent distortion on the tape. The "standard" distortion level at which 0 db is established is 3 per cent, but any given manufacturer may be using a higher or lower figure.

If you can *hear* wow and flutter—or distortion below the 0-db recording level—then there is too much of it in the machine you're testing. Noise, however, seems to be prevalent in home tape recorders, and the best way to judge the noise level of a recorder is to compare it with that of the best recorder in the showroom. Bear in mind, though, that a recorder with limited bass



The full recorder includes a stereo amplifier with output power between 1 and 10 watts per channel, plus a pair of speakers either built-in or as part of the cover.

and treble response may seem to have less hum and hiss than a full-range recorder. Play back the same tape on several machines and compare their overall sound qualities for frequency range and smoothness as well as for wow, flutter, noise, and distortion.

When you've settled on the type of tape machine you want, and have narrowed down your choice to those with adequate sound for your purposes, you may find that the machines you've selected differ radically in both the number and the kinds of extra features they offer. Among the differences you're likely to encounter are variations in the type of recording-level indicator, sound-on-sound facilities, and mixing inputs: in the number of inputs, heads, and motors; and in the provision for automatic reverse.

Unless you're doing radio-broadcast work with a recorder whose VU meter must conform to standard professional specifications, you'll probably find a green-glowing "magic eye" tube just as useful as a recording-level indicator. It responds quickly to sound peaks, has a carefully designed built-in time lag, and makes it easy for you to prevent the distortion that comes from recording at too high a level—or the noise that comes from recording at too low a level. However, more and more new machines feature VU-"type" meters that have little advantage other than that they look professional and that recorder designers find them easier to use with transistor circuits. The neon-bulb indicator is too imprecise and makes it difficult to get good recordings. And in any case, few new machines use them.

Almost any stereo recorder can be used, somehow, for trick "sound-on-sound" recordings that can make you sound like a one-man trio, quartet, or even a massed chorus. Some recorders require special external connections for this, while others do it internally, with a flick of a switch or two. Don't reject a machine for lack of sound-on-sound facilities unless you're sure you'll *use* those facilities (most people never do). But if you do intend to use them, you should have no trouble finding a satisfactorily equipped machine.

Input-mixing facilities let you record and adjust independently the levels of a "live" voice and recorded music simultaneously on the same track—which is handy for slide-show narrations and the like. They also make it easier to do sound-on-sound recording if your machine lacks specific internal switching for it.

Several new tape recorders are designed to serve as a temporary or permanent nucleus for a complete hi-fi system. Such recorders have flexible input facilities and some even have built-in tuners. But if you already have a hi-fi system, this may be superfluous.

The presence of three heads in a recorder is usually a sign of quality—and expense. Most tape machines use the same head for recording and playback, connecting it to the record and playback electronics according to

whichever function is in use. By separating the record and playback heads, three-head systems gain two important advantages: each head can be optimally designed for its particular job, and one can listen to recorded material via the playback head an instant after it has been put on tape by the record head. This, of course, provides a constant check so that you can monitor the quality of the recording while it is being made.

Three motors in a tape machine usually signify quality and cost. By using separate motors for the capstan and both reels, a recorder can achieve simpler, more reliable construction (fewer cams, levers, and push-rods required for changing modes) and will usually wind and rewind tape faster than (though seldom quite as gently as) a one- or two-motor machine. But reliability and simplicity are the main three-motor advantages, for while winding and rewinding speed is not too important in home use, gentle tape handling is. Check any machine, regardless of how many motors it has, for controls that operate smoothly and rapidly without jamming or breaking the tape, and for a smooth, even wind of tape upon the reel.

AUTOMATIC reverse is a great convenience with four-track machines, eliminating the need to get up and interchange reels when one pair of tracks has played through. Most auto-reversing machines play in both directions but record in only one. Two-way recording may, however, be a boon worth its extra cost to those who tape long works and events which they are not free to interrupt, such as radio programs; it is less important when dubbing from other tapes or phonograph records. (The reversing machines are discussed in depth elsewhere in this edition.)

One final word of advice: pick your machine on the basis of quality first, features second. And spend enough to ensure your satisfaction. With few exceptions, you will find both good fidelity and the most important features in machines from about \$150 to \$250, and little worth your notice below that range. Machines above \$250 offer more quality and usually more features (such as three heads). In the \$450 to \$600 bracket, the main improvement is likely to be superior construction, long-term reliability, and perhaps such "professional" features as a 10½-inch reel capacity. Three heads and three motors are also common in this range. Beyond \$600 lie only a few 10½-inch reel machines and a number of totally professional units that offer greater reliability than any home machine—greater than the average home user may ever need—but often fewer features. Whatever your recording needs or inclinations, you can probably find a tape machine that fits them to a "T"—provided you are clear on what your needs are, and keep them firmly in mind while shopping for your unit.

TAPING AND THE LAW

A BRIEF GUIDE FOR THE TAPE HOBBYIST



EQUIPPED with a tape recorder and a sufficient supply of tape, the amateur recordist can capture the universe of sound and preserve its myriad fascinations indefinitely. He can tape party hi-jinks, vocal awakenings of his child, or the cacophony of exotic market places.

The tape recorder can capture for repeated playing those radio programs that give great enjoyment, but which, until recently, would vanish with the moment. He can tape "live" performances that may not be available on commercial records in stores, or he may copy records on tape to preserve the pristine quality of the discs, to make up interesting programs, and to save storage space.

These functions and uses of the tape recorder are taken for granted by the owner of the machine, and apparently by its producer and vendor. Such functions are superficially innocent enough, being indulged in for pleasure, convenience, and economy. Yet beneath this tranquil appearance may lie a maze of legal ramifications, since the recordist has actually utilized the creative efforts of many different sources in achieving his end product. There is the subject matter of a performance such as a song or concerto, the unique performance of the artist, the production of the disc recording, the broadcast of

the program. May all of these be utilized freely and without concern by the tape recordist?

Actually, the strict letter of the law places restrictions on such uses. As a practical matter, however, in spite of the inherent and literal legal violations which may be involved in many activities of the average recordist, the law is rarely applied against a non-commercial amateur. As a matter of everyday practice, what you do in your own home with no other people involved is still pretty much your own affair. However, the moment your acts assume a public nature, and others, particularly those outside your immediate family, come into the picture, so too can the law, for it is the business of that "jealous mistress" to protect the interests of individuals with relation to the public insofar as it pertains to unwarranted invasion of privacy, the ownership of rights in intellectual creations, and the public distribution of artistic performances and productions.

It therefore would be wise for the recordist to bear certain legal points in mind while pursuing his avocation. His hobby can and should be fun, and free of legal entanglements. If he is guided by the following summary, he'll be that much surer of keeping it so.

IF YOU

- A. record yourself, friends, parties, or famous personalities (in person)
- B. copy phonograph records either directly or off the air
- C. tape programs off the air
- D. tape live performances—

DO NOT

sell or distribute your recordings *unless* you obtain permission to do so from the following, wherever applicable:

- 1. the persons involved
- 2. the performer(s) and person, company, or agency to which he may be under an exclusive service contract

- 3. the copyright owner of the subject matter of the performance, if it is a work protected by copyright
- 4. the program's broadcaster and producer
- 5. the manufacturer of the record.



BATTERY PORTABLE TAPE RECORDERS: A BUYERS' GUIDE

LABORATORY AND USE TESTS DISCOVER FINE
PERFORMERS AT ALMOST EVERY PRICE LEVEL

By KEN GILMORE



A SHORT TIME ago, while doing research for an article on battery-powered tape machines to be used as voice recorders, I found that many of the pack-em-up-and-sling-em-over-the-shoulder machines I surveyed were also surprisingly fine for recording—and at least fair for playing back—music. I therefore took a number of the leading machines and put them through their paces as music reproducers.

Portable tape recorders are, of course, quite definitely special-purpose machines, particularly when it comes to making music. The best of the portables record magnificently; they're as good as the best a.c.-operated home machines and equal to some professional equipment in their ability to get a good, clean, wide-range, low-distortion signal on tape. They do have limitations, however, the primary ones being the output power of the playback amplifier and the size of the built-in loud-speaker it drives.

The playback system of a portable, in fact, must really be considered simply an on-the-spot monitor—a device with which you make sure you have approximately what you hope you have on the tape. The sound produced by the built-in playback system of even the best portables might be compared to that of a good table radio. It can be clean and pleasant—nice to listen to as background music on a picnic or to fill the void during a blackout when your regular equipment is out of service—but it is not to be confused with high-fidelity sound. For full-fidelity playback, the tape must be reproduced on an a.c.-operated home machine. Another approach that achieves results about as good is to play the tape on the portable recorder, but to feed the signal from the portable (using a patch cord) to a hi-fi system.

With the foregoing in mind, I put a representative

group of portables through a series of recording and playback tests designed to show just what the machines at the various price levels can do. Unless otherwise stated, all the recorders take 5-inch reels, and have recording-level meters that also serve as battery-condition indicators.

This was my test technique: First, I recorded all material at a tape speed of $3\frac{3}{4}$ inches per second (ips) for comparative purposes, except on the few machines that record and playback only at $1\frac{7}{8}$ ips. (Machines that can operate at $7\frac{1}{2}$ ips have better high-frequency response and wow and flutter characteristics at the higher speed, but I did not use $7\frac{1}{2}$ for my comparative tests because so few portables have it.) To standardize results as much as possible, I used Scotch 150 1-mil tape on all except the cartridge models, which come with their own tape—whatever it is—already enclosed in the cartridge.

I recorded a voice passage on each machine using its own microphone, to check general quality and to make sure that everything was working properly. With stereo recorders, the voice check also gave a quick indication of stereo effectiveness. I then recorded musical excerpts of three different records: Gilbert and Sullivan's *H.M.S. Pinafore*, performed by the D'Oyly Carte Opera Company (London OSA 1209), for full orchestra and chorus and male and female solo voices; Sibelius' *Karelia* Suite, played by Alexander Gibson and the London Symphony (RCA Victor LSC 2405), for full orchestra with brilliant brasses and also for sustained horn tones; Chopin's Concerto No. 1, played by Artur Rubinstein (RCA Victor LCS 2570), primarily for sustained piano tones in the slow movement.

Each selection was recorded in two ways: first, through the microphone input of the recorder under test. The microphone was mounted 12 inches from a

high-quality speaker system and centered on an axis between the woofer and tweeter. The second recording was made directly from the amplifier's tape-output jack with a patch cord to the recorder's auxiliary input. (In rare cases in which a recorder did not have an auxiliary input, the signal was connected into the microphone input using a special patch cord with a built-in attenuator to avoid overload.) The amplifier was set to provide a monophonic signal for those tape recorders that required it. Finally, a sustained 3,000-Hz tone from an audio signal generator was recorded on each machine to provide a test signal that would easily show up any wow and flutter problems.

When all program material had been recorded on each machine, it was played back in three ways. First, each tape was simply played back on the machine on which it was recorded. This gave some indication of the machine's overall record-playback quality. Second, the tape was again played back on the same machine, but with the output signal fed into a 50-watt stereo amplifier and through two quality bookshelf-type speakers. And third, I played the tapes (except for those made on cartridge machines) through a high-quality home tape recorder connected to the hi-fi system.

This last test provided a check on how good the recording sounded when not limited by the portable's playback electronics. In addition, wow and flutter that was put on the tape during the recording process was not reinforced by being played back on the same portable machine. During each type of playback, I constantly made A-B comparisons of one machine against another, so that their relative strengths and weaknesses became clear. Finally, as I played back the 3,000-Hz tone, I not only listened to it, but observed it on an oscilloscope to get a clearer picture of the machine's wow and flutter characteristics.

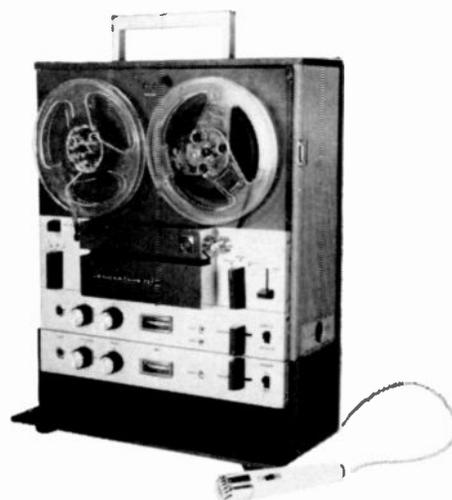
WHEN all of the testing was completed, I had gained several impressions. Among them were the following:

- Music reproduction obviously is a tougher test of a machine's quality than voice reproduction, at least in one important respect. While a machine used strictly for voice can get away with a reasonable amount of wow and flutter, one used for recording or playing back music cannot—unless you like singers with excessive vibrato and instrumentalists who sound as though they can't quite decide where each note is.

Two other desirable recorder characteristics—low distortion and wide frequency range—are important for both voice and music. Although a voice recorded and played back under good conditions will be intelligible on practically any kind of machine, the same is not true under difficult conditions. In a noisy environment, or when taping a subject who doesn't speak clearly or directly into the microphone, it's difficult to get an under-



Channel Master 6464



Concertone 727



Concord F-100

standable tape unless the machine has both good response and low distortion.

In practice, this requirement for good frequency response and low distortion makes the question of speed stability more or less academic. A machine with the first two characteristics is likely to have overall high quality. That means its speed regulation will probably be pretty good, too. Thus, a machine that passes one test with flying colors will tend to perform well on the other tests also. However, there is one rather gray area. Some machines have reasonably good frequency response and distortion figures, and therefore make quite good voice recorders. They even sound good—for portables—on most music. But they fail when it comes to what I found was the toughest single test for portable recorders: wow and flutter on sustained piano (or guitar, or harp) tones. While most of the recorders I tested performed at least moderately well on most program material, audibly disturbing wow and flutter showed up on some of the sustained-tone tests. These machines would be fine for voice and even okay for most music—but stay away

from piano concertos and similar sustained-tone material.

• Some recorders are exceptionally sensitive to overload. Some are particularly sensitive to low battery voltage. In either case, the trouble is likely to show up as distortion (and, in the case of low voltage, as speed fluctuation). Moral: Make sure the level is not too high when you record. It pays to be conservative in your gain-control settings, keeping the record-level meter needles well within the specified area. This, of course, will vary from machine to machine. A little experimentation to determine the actual overload level is always worthwhile with any new recorder. And always record with fresh batteries, a full charge if your machine is rechargeable, or power from the a.c. line if convenient.

If a portable tape recorder can be called a special purpose device, a *stereo* portable tape recorder is a *special* special-purpose machine. Both of the two machines I had—the Concertone 727 and the Martel T-410—operated well and would be useful as *recording* machines. Since speakers are mounted on opposite sides of a small case, the stereo effect in playback is present, but not striking.



Concord 350



Norelco 101



Martel ST-410



Norelco 150

Placed at an angle in a corner, the machine produces somewhat more widespread stereo, but the relatively limited amount of power available still restricts results when compared to most home a.c.-operated stereo machines. Incidentally, more and more prerecorded material is becoming available on 5-inch reels—and without too much trouble you'll find that you can re-spool a lot of your 7-inch prerecorded tapes onto 5-inchers.

- Quality, in general, correlates with price. But there are exceptions. I came across at least one machine in the \$100 price range that is at least as good as one that costs twice as much.

BEFORE you buy, you can do a great deal to ensure that you get your money's worth. Here are some do's, don't's, and assorted hints for your buying expedition:

(1) Don't depend on the demonstration tapes that come with various machines as a quality check. These tapes represent masterpieces of programming; some make really inferior machines sound quite acceptable. In one extreme case (a recorder not included in this article)

the demonstration tape contained nothing but ricky-ticky and cha-cha music. The beat is spirited and gay—ideal music to sign checks by. But here's the problem. The machine had so much flutter and wow that it gave a brilliant vibrato even to a piano. And the frequency response was terrible. The tape was carefully designed to sidestep these problems. It was a fascinating demonstration—but only of the recordist's skill, not of the quality of the recorder.

(2) Do use your own prerecorded tapes—four-track for stereo machines, two-track for mono. Make sure your tape has clean, wide-range sound. It's a good idea to have a variety of program material—full orchestra and chorus; male and female solo voices; and something slow, preferably with sustained piano tones. Play the tape on various machines, comparing the same selection on different units. You'll find pronounced differences.

(3) If you have no prerecorded tape, make some recordings right in the store—assuming that you can. (Even if you use prerecorded tape, do a little recording in the store anyway to check out the machine thoroughly.



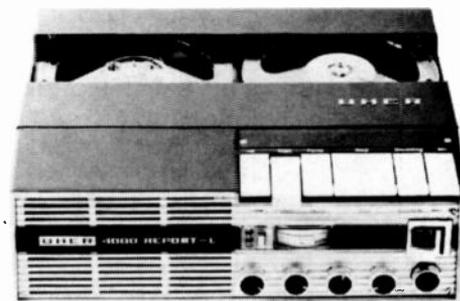
Telefunken 300



Sony 800



Sony 900.A



Uher 4000L

The prerecorded tape will save time, though.) You can use a microphone held in front of a high-quality speaker, but you'd be better off eliminating store noises and room acoustics by connecting the recorder to the amplifier playing the music. (In my experience, the microphone is rarely a limiting factor in the overall quality of the machine. Manufacturers try to furnish a mike whose frequency response includes essentially the entire range the recorder is capable of recording. In a few cases, manufacturers offer better microphones at extra cost. These mikes will usually improve quality somewhat, but the differences will not be large.)

You shouldn't rule out a recorder if you hear a small amount of flutter or wow on sustained piano tones, if the unit meets your requirements in other respects. Generally it will reproduce anything but this extremely difficult program material satisfactorily. Check with some moderately slow orchestral passages. If it sounds okay with those, chances are you'll be happy recording anything but piano concertos.

(4) Once you've made a choice, check the specific unit you expect to buy, not simply a demonstrator of the same model. Quality varies from one seemingly identical machine to another. One may have more wow or flutter than another, a third may have unbelievably loud motor noise.

(5) Shop for discounts. Except for a few brands, list prices are fiction.

Here's a general guide to what I found to be the best machines among those I checked in various price categories, and my impressions of each.

Expensive. The Uher 4000-L—at more than \$400, it should be good, and it is. While it suffers somewhat from the same playback limitations as other machines—small power amplifier and speaker—few machines of any size equal or surpass it as a recording device. Also in the expensive class, the Concertone 727 stereo machine has fine sound and excellent speed regulation at less than \$300.

Moderate. Sony 800, Telefunken 300 and 301 (the latter is a *four-track* mono machine), Martel ST-410. Excellent machines in the \$150-\$200 price range with clean sound and good speed regulation. The Martel is the only stereo machine in the category.

Low-cost. The Channel Master 6464, in the vicinity of \$100, is an excellent example of the quality available at this relatively low price. The Sony 900-A was the lowest priced machine tested, and it offers excellent value at \$70. (The Sony 907, which is identical but without built-in a.-c. operation, costs \$50.)

Three special machines. Both the Concord F-100 and Norelco Carry-Corder 150 sell for under \$100 each; they are the smallest machines tested (hardly bigger than a

brick) and put out an amazing amount of sound for the size. What's really amazing, though, is the sound either produces when played back through an auxiliary amplifier and speaker system. The Norelco 101 recorder is a one-of-a-kind machine. Although using relatively small (4-inch) reels perched on top, it has one of the largest speakers to be found on any portable. Consequently, its sound is among the best available in this kind of machine. The price, surprisingly, is about \$80.

Portable recorders, like other types of audio equipment, come with a wide variety of features, some highly useful, others less so. Here are some of interest:

Automatic Volume Control (AVC). Several of the models tested have automatic volume control. Among them: the Sony 800, the Sony 900 (a 3-inch reel machine), the Channel Master 6464, and the Concord 300. AVC is dandy for recording voices and telephone conversations, since it tends to level out the hills and valleys and make all voices of nearly equal volume. It does the same thing for music, which is bad, since the ups and downs in volume help to make music interesting. If you're planning to record music, make sure the machine you're considering has an AVC defeat switch.

Automatic/manual reverse. When you reach the end of the reel with the Concord 300 (a 4-inch reel machine), simply throw a lever and the tape instantly runs at recording speed in the opposite direction. A separate recording head puts another track on the bottom of the tape. This saves lifting off both reels and turning them over, a ritual necessary with most machines. The Concord 350 does the whole business automatically—during either record or playback—provided you've pasted a small strip of metallic sensing tape near the end of the reel or are using a tape that comes with the foil already on it.

Multiple speeds. The Concertone 727 and the Uher 4000-L run at $7\frac{1}{2}$, $3\frac{3}{4}$, $1\frac{7}{8}$, and $1\frac{5}{16}$ inches per second. The Sony 800 has three speeds— $7\frac{1}{2}$, $3\frac{3}{4}$, and $1\frac{7}{8}$. Other machines are equipped for both $3\frac{3}{4}$ and $1\frac{7}{8}$ operation. Exceptions are the Norelco 101 and 150 and the Concord F-100 with $1\frac{7}{8}$ only and the Telefunken 300 and 301 with $3\frac{3}{4}$ only.

Digital counter. Handy for finding selected parts of musical programs or conversations if you can remember to put labels on the reels and mark the position of selections (which I have trouble doing consistently). If you want one, you'll find it on the Martel T-410, Sony 800, Uher 4000-L, Channel Master 6464, Concord 350, and Concertone 727, among others.

Above all, my tests demonstrated that there are many excellent machines on the market. Whatever your needs and whatever the state of your bank account, you're sure to find at least one to do the job.



A five-year old's taped breakfast-cereal commercial—or imitation of a French chanteuse—is guaranteed to break up an adult audience in later replay. In the center photo Susan expresses astonishment at the magnitude of her talents as caught by Sony's HVTR.

The HOME VIDEO TAPE RECORDER

EXPENSIVE? MAYBE. . . BUT IT'S STILL THE
BEST FAMILY FUN MACHINE YET INVENTED

By RICHARD EKSTRACT

EVER SEE any brochures on low-priced video tape recorders? They stress versatility, dependability, compatibility, and the many uses of a VTR for business and personal improvement. But I haven't seen one yet that tells you about the fun you can have with a home VTR. Believe it not, the HVTR is one of the greatest fun machines ever invented. When I tell people how much pleasure I get from mine they usually ask, "Isn't \$1,000 a lot of money to spend on a machine just for fun?" Perhaps it is—but it's a lot cheaper than running a boat or a fancy sports car that needs a tune-up once a week. It's also creative fun that can be recreated with the flick of a switch.

My wife was the first in our family to pool-pool the idea of buying an HVTR. She's no more of a ham than most people, but she was also first in line to be recorded

after I set up the unit. I have yet to see anyone walk into the room when we're taping and not be delighted with the prospect of being recorded. Usually they don't know what to say or do and just goof around a bit, but they can't wait for the playback. If you get a home VTR, you'll soon find out what hams you've got both at home and among your friends.

What's involved in setting up an HVTR? Amazingly, not much. All the currently available systems consist of three basic units. First there's the television recorder, which resembles a somewhat oversized reel-to-reel audio tape recorder and is just a little more difficult to thread. (It took my seven year old son all of ten minutes to learn how to do it, so it's not impossible. Teaching him to keep his hands off it was a far more difficult task.) Next is the television set, which works just like any other

television set except that it is set up to provide sound and picture when playing back video tapes, to provide a TV picture and sound to be recorded, and to serve as a monitor for the third component—your home TV camera. The camera usually comes complete with tripod and cable for connection to the other components. After a few minutes of experimenting, you should be getting a pretty good picture on your monitor.

The next thing that amazes most people about an HVTR is how simple it is to use. You set it up, turn it on—and it works. They're expecting some complex electronic marvel out of Batman's laboratory that requires the combined genius of an electronic engineer and a professional photographer. And if they know anything at all about photography they're amazed at how little light is needed for a usable picture compared to the blinding glare needed for shooting indoor home movies. Perhaps that's one reason the home video tape recorder is so much fun to use: it's so simple to operate.

As soon as you get set up with your home television studio, you'll learn that your subjects, however anxious they are to be taped, need some sort of direction. What happens initially is that your friend Charlie will grab

the microphone and start doing his imitation of W. C. Fields or telling a few bad jokes. His wife Rosemary, a frustrated singer, may think she's on the Ed Sullivan Show. Usually these are fun to tape. But be prepared—Charlie is going to want to see himself again four or five times. He's utterly fascinated with his video personality and can't understand two weeks later why you erased that great tape he did. (Once you explain that the tape costs \$40 to \$50 a reel, he may see why you weren't inclined to preserve him in oxide forever.)

A HOME video tape recorder is capable of reproducing sound with fairly good fidelity. Unlike the situation with sound-stripped home movies, there are no problems of lip synchronization when taping the sound and sight of someone singing, acting, or speaking. In most cases, the microphone is plugged directly into the recorder. However, some suppliers (Ampex for one) provide an additional receptacle for the microphone on the video camera, using multi-conductor cable to carry the microphone signal to the recorder along with the video signal.

Microphone placement is not especially critical, because most of your recordings will probably be voice and



Relatively low levels of light (in comparison to the brightness required for home movies) suffice for the video camera. Here some scenes of childhood are documented on an Ampex machine.

sound effects rather than musical instruments. If you don't want a microphone showing with your subjects, you can place a directional microphone on the side out of the picture area or you can rig up a boom as they do in TV studios, suspending the microphone just above the subject's head and out of camera range. You may want to try some tricks in recording audio with a video recorder, such as recording a woman's voice as a man's lips are shown moving, or you may want to record someone mouthing the words of a pop record. This is great fun, and with a little experimentation you should be able to get just the results you want.

Since your friends are going to want to be taped—and you're going to want to be in the act yourself—some simple situation shows are easy to stage. For example, "What's My Line" or "Twenty Questions" can be arranged with a fixed camera so that no one has to serve as camera man. For "Twenty Questions" you prepare the questions in advance. For "What's My Line" you can let your friends decide their line on the spot. They jot the occupation on a piece of paper and hand it to the host/narrator before they go on. Of course, it's better if you handle the camera and add variety to your tapes. You

can pan around (go from left to right) to different faces or move in for a close-up. With a zoom lens, you can do close-ups from a fixed position. Even if you hold the TV camera in your hand, you'll find you can get excellent results without a great deal of effort. And, by knowing in advance what you're going to do, you'll get much more out of your subjects.

You can't have children in your home and expect them to stay away from the television recorder. And you can't always expect to be around when they are. I decided to teach my kids how to operate the recorder properly and let them have free access to it. They haven't broken a thing yet. What do children do? Everything adults do—only better. They sing, dance, act, talk, recite, and put on their own shows. One minute they'll be Batman and Robin, and the next minute they're doing a mock commercial for a breakfast cereal. Thanks to the reusability of tape, you can let them tape themselves all day. And, if you've ever been faced with a house full of children on a rainy weekend, you'll really be able to appreciate the blessing of a home TV recorder.

So far, I've only mentioned the things you can photo-

(Continued on page 42)



An amateur musical group rehearsing, a video letter from a distant (and affluent) relative, or simply watery fun around the pool are suitable subjects for home video taping—and, of course, the tape is reusable.

Directory of Home TV

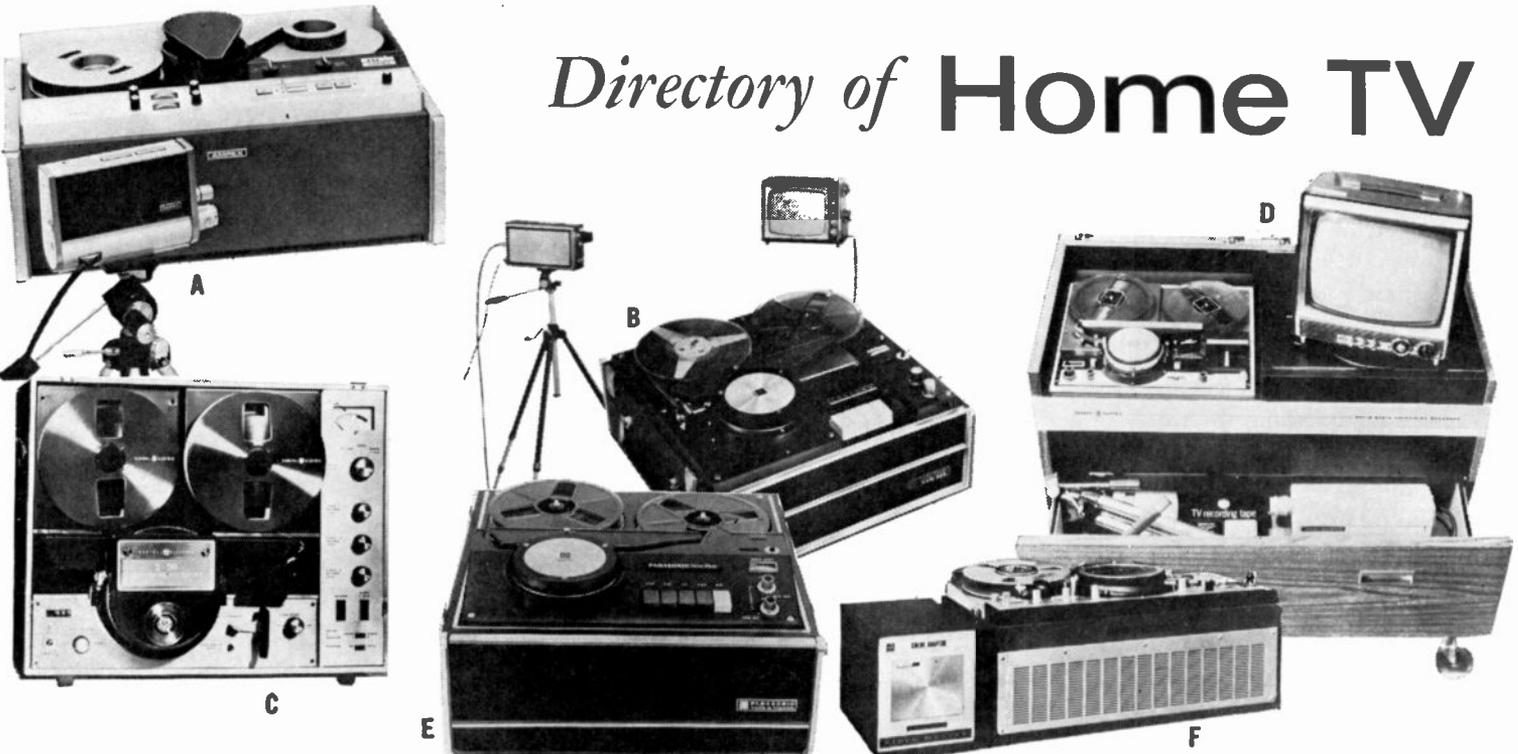


PHOTO	Model	Number of Heads	Tape Size Used (in)	Reel Size (in)	Tape Speed (ips)	Record-Playback Time (min.)	VIDEO				
							Input Level (V)	Level (Ω)	Output Level (V)	Level (Ω)	Response (MHz)	Horiz. Resolution (lines)
AMPEX CORP., 401 Broadway, Redwood City, California 94063											
A	VR-6050	1	1	9¾	9.6	60	1	75	R.f. ^a 300	2.5	250
	VR-7000	1	1	9¾	9.6	60	1	75	R.f. ^a 300	3.5	350
	VR-7500	1	1	9¾	9.6	60	1	75	R.f. ^a 300	4.2	350
CONCORD ELECTRONICS CORP., 1935 Armacost Ave., Los Angeles, Calif. 90025 ⁻											
B	VTR-500	2	½	7	12	60	1	75	R.f. ^a 300	2.5	250
CRAIG PANORAMA INC., 2302 15th St., Los Angeles, Calif. 90021											
	6401	2	½	7 or 8¼	9½	63	.5	75	1 75	—	200
GENERAL ELECTRIC CO., Audio Products Dept., Decatur, Illinois 62525											
C	VC-941	2	½	7	7½	90	1	75	1.4 75	—	200+
GENERAL ELECTRIC CCTV Business Section, Syracuse, N. Y. 13201											
D	2-30	2	1	8	7.8	63	.5	75	1 75	3	300+
	PT-3A	2	½	7	7½	64	1	75	1.4 75	—	200+
	PT-2A	2	½	7	7½	64	1	75	1.4 75	—	200+
MATSUSHITA ELECTRIC CORP. OF AMERICA, 200 Park Ave., N. Y., N. Y. 10017											
E	NV-8000	2	½	7	12	40	.4	75	1 75	2	200+
F	NV-204	2	1	8½	8.57	67	.5	75	2 75	3	340
PHILIPS BROADCAST EQUIP. CORP., 900 South Columbus Ave., Mt. Vernon, N. Y. 10550											
G	EL3400	1	1	8	9	40	1	75	1 75	3.2	285
REVERE-MINCOM DIV., 3-M CO., 2501 Hudson Road, St. Paul, Minnesota 55119											
	Wollensak										
H	VTR-150	1	½	8	7½	60	1	75	1 75	2	—
SHIBADEN CORP. OF AMERICA, 58-25 Brooklyn-Queens Expressway, Woodside, N. Y. 11377											
I	SV-700U	2	½	7	7½	60	1	75	1 75	3.5	300
SONY CORP. OF AMERICA, 47-47 Van Dam St., Long Island City, N. Y. 11101											
J	CV-2000D	2	½	7	7½	60	1	75	1 75	2.5	200
	CV-2000	2	½	7	7½	60	1	75	1 75	2.5	200
	TCV-2010	2	½	7	7½	60	1	75	1 75	2.5	200
K	TCV-2020	2	½	7	7½	60	1	75	1 75	2.5	200
L	DV-2400	1	½	5	7½	20	1	75	— 75	2.5	200

a—VHF channels 2 through 5; b—camera; c—monitor; d—tripod; e—microphone; f—mono version \$3995; g—recorder, camera, monitor as package \$1509.50; h—TV101 school trainer including VTR, receiver, viewfinder camera, tripod, console \$5800; i—R.F. modulator; j—built-in monitor; k—built-in timer.

Tape Recorders



AUDIO						Dimensions (in)			Weight (lbs)	Price (\$)	Special Video	Notes	
Micro. (dB)	Line (Ω)	Output (dB)	Response (Hz)	W	H	D							
—	50K	—	100K	—	—	—	85	1195	—	—	b, c, d, e		
.2 mV	200	.12 V	100K	{ 4 dBm 8Ω	600	50—12,000	29 3/4	13 3/4	20 1/4	100	3450	—	b, c, d, e
.2 mV	200	.12 V	100K	{ 4 dBm 8Ω	600	50—12,000	29 3/4	13 3/4	20 1/4	110	4495	color	b, c, d, e, f
1 mV	20K	1 V	1 meg.	1 V	600	60—12,000	17	10	16 1/2	52	1050	—	b, c, d, e, g
-60	10K	-10	10K	0	2K	70—10,000	21 3/4	13 3/4	17 3/4	65	1035	—	Accessories: camera, monitor, tripod, mike
-60	600	-20	high	0	high	80—10,000	18 1/2	10 1/2	16 5/8	—	1600	—	Includes camera, micro., monitor, cables
-70	600	-8	10K	+4	600/10K	—	26	11 1/2	17 7/8	88	3495	still, slow motion, color	two audio channels consists of VTR, camera, monitor console—VTR, camera, monitor
0.775 mV	600	—	—	-2	10K	80—10,000	15 1/2	9 3/4	16 1/2	62	1695	—	
0.775 mV	600	—	—	-2	10K	80—10,000	37 1/2	34 3/4	26	75	1995	—	
-60	20K	0	1 meg.	-20	600	80—10,000	16 5/8	9 7/8	16 3/8	54 1/2	1050	—	b, c, d, e, i
-65	600	-10	600	0	600	50—12,000	24 7/8	12 1/2	16 3/4	97	3750	still, color	b, c, d, e, i
1 mV	1K	200 mV	500K	1 V	20K	120—12,000	24 3/4	16 1/2	15 1/4	100	2495	—	b
.2 V	10K	—	—	.5 V	10K	50—10,000	20	9	14	50	1495	—	—
-60	10K	-14	10K	-14	Low	50—10,000	15 3/4	9 1/2	15 3/4	53	1295	still	b, c, d, i
-60	600	-2	high	0	high	80—10,000	19 3/4	9 7/8	15 1/4	42 1/2	695	—	b, c, d, e
-60	600	-2	high	0	high	80—10,000	18 1/2	11 7/8	13 3/4	46	730	—	b, c, d, e
-60	600	-2	high	0	high	80—10,000	27 1/2	11	16 1/4	66	995	—	b, c, d, e
-60	600	-2	high	0	high	80—10,000	29 1/2	11 7/8	11 7/8	70	1150	—	b, c, d, e, j, k
-60	600	—	—	—	—	—	10 1/2	9 3/4	12 1/4	12	1250	—	camera, view- finder, micro. battery powered

graph "live" with your video camera. But many people buy an HVTR simply to tape from the television screen. If you're a boxing or wrestling fan, you may wish to tape the fights. If you're a golfer, you may learn something by taping and playing back the best matches. If you like comedians, you could tape Alan King on the Ed Sullivan show Sunday, Johnny Carson on Monday night, and so on. Some people record segments of news shows over a period of time to maintain a sort of permanent historical record of the times to refer back to at some future date.

With the aid of a timing device, you can set up your TV recorder to tape "The Man from Uncle" while you're at the PTA meeting. Or set your recorder to tape a program on channel five for later viewing while you're simultaneously watching channel eleven on your main living room set. Or you can tape off the air even while you sleep. However, if you're thinking of developing a collection of old movies from the Late Show, remember you may have to stay up to change the reels, since about an hour is maximum recording time on a single reel.

Editing with today's slant-track (helical-scan) VTR is virtually impossible. So, if you're planning to splice together sections of tape, be sure to leave plenty of blank space around the section where you'll be making the cut. If you can avoid any kind of splicing you'll be a lot better off. If you do it, use proper splicing tape and techniques to eliminate the type of splice that might "catch" or damage the playback heads during operation.

As with any quality recorder, it is important to keep the heads clean. Some machines have provision for automatic head cleaning. With a machine that does not contain this feature, head cleaning should be done as frequently as after every five hours of use. You'll know soon enough if your heads need cleaning when your pictures begin to lose fidelity. In addition to cleaning the heads, all tape-to-metal contact surfaces should be wiped clean at the same time. Commercial head-cleaning solvent (your instruction manual will usually recommend a specific brand) is readily available for this purpose. Other than this, there's virtually no maintenance required for a home VTR.

An important tip for the neophyte HVTR operator: never allow the camera to be focused for extended periods directly at lamps, lights, or an open window during the day. This can cause an image to be burned into the vidicon tube which will be visible on future tapes. If you do burn an image onto the tube, try leaving the camera on in a blackened closet for an hour or so. This might correct the fault. A little care here is wise: a new vidicon tube can cost upwards of \$75.

Other points to remember: be careful not to drop or bump video tape reels. Even though the reels are sturdy, if they are bumped or dropped, the flanges could be bent,

causing improper tape feed and crimped or bent tape which would definitely affect picture quality. For this reason, video tape reels should always be handled carefully. A reel should never be handled by grasping the two flanges and squeezing them together. This could damage the unseen tape edges inside the reel.

If you find wrinkled or damaged ends on a video tape, cut them off. Threading wrinkled or crimped tape on your recorder can cause misalignment of tape and subsequent damage to the entire reel and the recorder's video head. When threading video tape, be especially careful around the guides and head drum to avoid bending or tearing. Also, you should not remove video tape without rewinding.

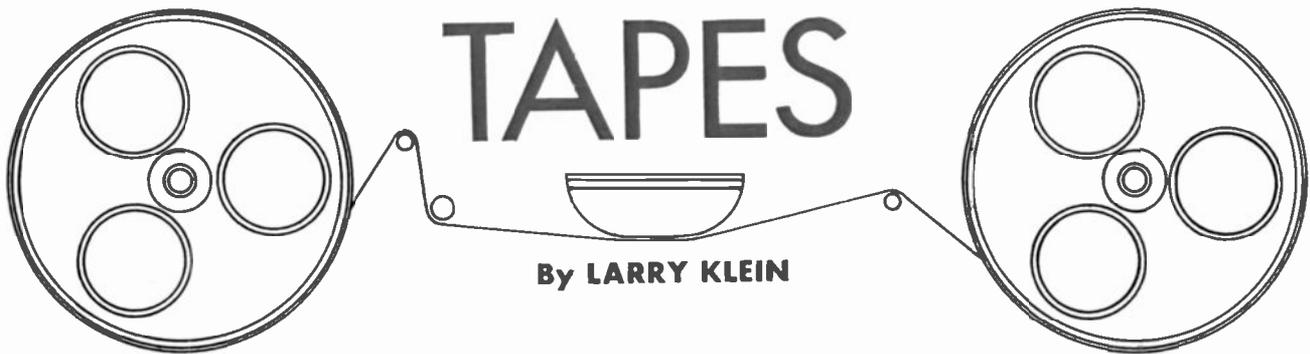
For best long-term storage, rewind tape reels end-to-end before replacing in the original carton. This ensures that the tape will be under uniform tension throughout the reel. At \$40 to \$50 per reel, you'll want to learn to take good care of your video tapes. Although an hour of videotape sounds high priced, it is still a lot cheaper than an hour of processed motion picture film with sound. And, of course, it has the advantage of reusability.

You may have heard that prices are coming down on home video recorders next year. Ampex claims that they expect to offer units at between \$450-\$650. Sony now offers a deck for as low as \$695. But if you want to get your feet wet while waiting for next year's models, you might opt right now for a closed-circuit TV camera that can be used to monitor the baby's room or visitors at your front door via a hookup from the camera to a modified TV set in your home. The camera will set you back perhaps \$300 (a TV-camera kit is available from Conar for slightly over \$200), but then the price of your home VTR will be a lot easier to handle when you purchase it as a single component later.

Where do you place your home VTR? If you have a den or playroom, that is the obvious place. If you're a bachelor with a small apartment, the set is likely to end up in the bedroom. I am told that many sets are being sold to affluent bachelors in Chicago, New York, and Los Angeles. A friend of mine who has one remarked the other day, "The HVTR is the greatest boon to bachelorhood ever invented. I've got girls calling *me* to come over because they heard about my VTR from their friends. They love to watch themselves on the TV monitor." He says he even swaps tapes with some of his friends. (In order to do this the tapes must be made on the same make and model of machine.)

Why the manufacturers have remained silent for so long on all the fun you can have at home with a VTR is beyond me. It's the greatest machine ever devised to put more entertainment into every room of your home. All of the low-price helical-scan systems by reputable suppliers work fine, and if you've got the price, infinite possibilities for fun and games await you.

A progress report on PRERECORDED HOME VIDEO TAPES



PROBABLY every story ever written on the home video tape recorder (HVTR) has discussed the possibility of commercial prerecorded video tapes. These tapes, so speculation goes, would be sold like records, and would not only deliver the sound of your favorite performers, but the sight of them as well. Candidates for being immortalized (until erasure) in videotape oxide include Broadway shows, historical events, training tapes, and, in fact, anything else currently available in the home-movie catalog.

Well, despite the proliferation of HVTR's, until the middle of last year, there were *no* prerecorded video tapes available. The reasons were many and compelling. Each of the manufacturers of the dozen or so video machines classified as home units (the classification seems to depend on price: if the machine costs less than \$2000—!—it qualifies) has his own ideas as to what constitutes the proper tape width, tape speed, synchronization arrangement, type of head scan, etc. As a result, the various brands and models had a severe case of the "incompatibilities." And to make matters even more ludicrous, until recently most of the manufacturers were loath to guarantee that a tape made on one sample of any model of their machine could be played on another.

Most of the HVTR purchasers were not too concerned about the brand-to-brand incompatibilities, because almost all were using the same machine for recording and playing back. In those cases where circumstances (in schools, for example) demanded that a tape made on one machine be playable on others, manufac-

turers were willing (usually at extra cost) to align several machines specially for intergroup compatibility. Last year Ampex, Sony, and General Electric announced that tapes made on specific models of their machine will henceforth be playable on all similar models. And tapes recorded either on the Sony or G.E. machines would be playable on the other brand. Unfortunately, this inter-brand standardization between Sony and G.E. did not really herald a compatibility breakthrough, since G.E. is using Sony's tape deck.

Into this somewhat unstable video picture (pun intended) stepped Audio Fidelity Records. A bit of history is in order here. About ten years ago, at a time when there were perhaps five different and mutually incompatible systems being proposed for stereo-disc recording, Audio Fidelity shocked some, and gratified others, by releasing the first commercial 45°/45° stereo disc. The fact that there were no commercial stereo phono cartridges designed to play their record deterred Audio Fidelity not a bit. Amidst anguished cries that there were better stereo recording methods and that the 45°/45° disc presented insurmountable problems to the phono-cartridge designers, Audio Fidelity forged ahead. The stereo bandwagon started to roll and it hasn't slowed down yet.

Apparently the opportunity to score another significant first in the home entertainment area was, for Audio Fidelity, too good a chance to miss. But what to record on video tape and for which machine? For Audio Fidelity, the answers to one of these questions was easy. After

all, AF is a recording company with performers under contract—why not video tape a disc-recording session of one of AF's more popular artists? All that was needed was a couple of TV cameras, a stage crew, a video control room with monitors, and a good director to switch the cameras on and off and to tell the cameramen what to shoot. The object was to produce a master video tape that could later be edited down to the required playing time.

I SUSPECT that Audio Fidelity found it was not an easy matter to produce a video tape under the conditions of a disc-recording session. No retakes were possible except when an audio retake was required. The numbers performed were in no sense staged—just a lot of musicians playing their instruments and Johnny Paycheck (one of Audio Fidelity's popular country and western artists) singing *Handcuffed to Love*, *Bayou Bum*, *Pride-Covered Ears*, and other items of interest to c & w fans. Given these conditions, the camera work evident in the previewed Paycheck tape was surprisingly good. However, one has to be entranced with country and western in general, and Johnny Paycheck in particular, to want to view an hour's performance in one sitting. But then again, you don't have to look, you can just listen. Audio Fidelity's plans to promote this tape with the idea that the viewer has the opportunity to sit in on a real live recording session is a fine example of virtue-out-of-necessity thinking.

Audio Fidelity also proposed a novel trade-in plan for their Audio 20/20 Video tapes. The cost to the consumer of a one-hour prerecorded tape is about \$50. If, on the tenth, fiftieth, or hundredth playback Johnny Paycheck begins to pall, simply return the tape and for about \$10 Audio Fidelity will erase Mr. Paycheck and replace him with a one-hour video performance of your choice from what Audio Fidelity promises will be a rapidly expanding catalog.

A potential flaw in Audio Fidelity's trade-in picture is the matter of tape wear and tear. The rotating playback head of the Sony/G.E. deck zips over the tape at 30 revolutions per second even though the reel-to-reel speed of the 1/2-inch wide tape is the standard 7 1/2 ips. The wear on the headgap arising from the head-to-tape friction limits useful head life on the Sony machine to something like 1000 hours. The tape life? That question remains open. Flaws in the oxide that would pass unnoticed on an audio tape causes "dropouts" on a video tape. These momentary thin streaks in the picture will inevitably increase as the tape is used and reused and the oxide coating becomes worn. However, Audio Fidelity states that their recordings are made on a long-life tape. How long is long? We don't know, but in any case, Audio Fidelity promises that if anyone gets stuck with worn-out tape, it will be AF, not their customers.

Commercial tape duplication is a tricky business at best, and it has only been within the past several years that the producers of prerecorded *audio* tape have managed to solve their quality-control difficulties. The problems arise from the economic necessity of duplicating the tapes in lots of ten or a dozen at very high speed (seven or eight times normal playing speed). The difficulties that occur with audio tapes include excessive noise, momentary sound loss, and poor frequency response. In HVTR taping, these same problems occur—except that now they are video (picture) defects. The video picture problems appear as interference, small streaks, and loss of definition. In addition, the frequency-response problem in video-tape dubbing is probably so severe as to make high-speed duplication impossible. At the present time, Audio Fidelity's Audio 20/20 Video tapes are copied on a one-to-one basis, but Sony has a multiple (a dozen at a time) slow-speed duplicator that will increase the production capability—if the market requires it. However, multiple duplication is not expected to drop the price of the prerecorded tape. As a matter of fact, at this time Audio Fidelity claims that the price charged for a tape does not cover the cost of its production.

OBVIOUSLY, AF's video-tape plans do not include the intent to lose money on a steady basis. The old gag "we take a loss on every unit we sell, but we make it up in volume" is really not a practical proposition in video tape or elsewhere. AF expects the HVTR market to burgeon, and prerecorded video tape sales to grow with it. And by the time things really get moving on the home-video scene—assuming they will—AF plans to have built up a substantial catalog of video-tape programs. And the fact that all of their master tapes are the 2-inch wide, standard Ampex broadcast type is important not only for reasons of technical quality—it means that Audio Fidelity is not tied to anyone's HVTR system. The same AF master tape can be used equally well to dub the 1/2-inch tapes of the Sony and G.E. machines or the 3/4-inch tape used by Ampex's HVTR's—or anyone else's for that matter.

AF also has a few other items going for them. It would seem to be in the commercial interest of any manufacturer of a HVTR to cooperate with Audio Fidelity in publicity and so forth simply for the opportunity to advertise the availability of prerecorded tapes for his machine. On the other hand, the multiplicity of non-compatible machines poses no real problems for AF because for a long time to come most of their tape duplicating is going to be on a one-to-one on-order basis. I suspect that for the consumer and for Audio Fidelity the joys, economies, and profits of mass production of prerecorded tapes are *not* just around the corner. But then again, pioneers never did have an easy time of it.

SPECIAL HOW-TO SECTION

How to START YOUR OWN TAPE CLUB

An organizer of one of this country's most active tape clubs outlines some of the preliminary steps necessary to get your tape club off to a good start.

By **HELEN KISH**

How to RECORD OFF THE AIR

A brief examination of the do's and don't's of off-the-air taping is a useful guide to one of the simplest and most satisfying of tape activities.

By **J. GORDON HOLT**

How to EDIT YOUR TAPES

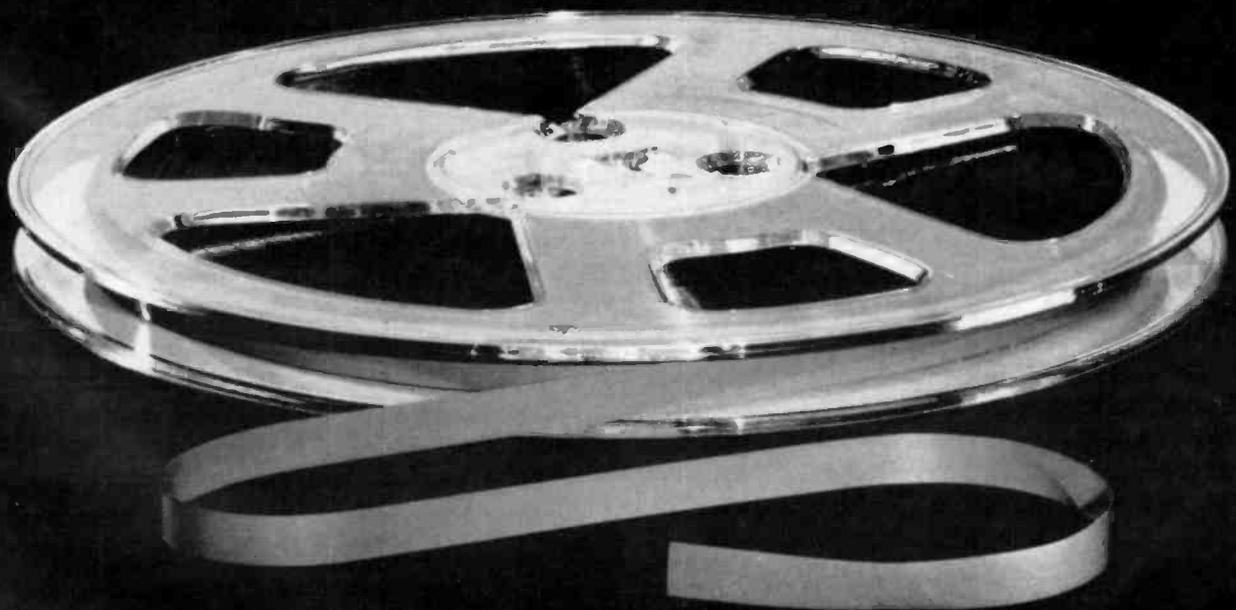
An introduction to the mysteries of tape editing by an expert whose credentials include a successful course of instruction in the art for the blind.

By **JOEL TALL**

How to EXPAND YOUR TAPE HORIZONS

The experiences of professional tape-recorder users provide tips and suggestions on how you can make fuller use of the rich potential of your tape recorder.

By **CAROL SCHWALBERG**



How to **START YOUR OWN TAPE CLUB**



MOST hobbyists sooner or later find someone with whom they can share their enthusiasm, but the fact that tape recording is in itself an excellent medium of communication makes it possible for tape hobbyists to be in personal touch with other recordists all over the world. Taping appeals to people of all ages and all walks of life—teen-agers, housewives who need a change from their daily routine, businessmen, the physically handicapped, shut-ins who may depend on tape for contact with the outside world, and senior citizens who would like to share their experiences with others. Through tape clubs all these people can find others of similar interests right in their own communities or at the other ends of the earth.

A belief in sharing the pleasures of a rewarding hobby with others was the basis on which the Indiana Recording Club (IRC) was founded in September 1960. It has continued to grow in membership, facilities, and scope ever since, and it is now one of the most active in the country. The experience gained through its founding and continued successful operation will, I think, be of interest and help to many people who wish to start such a club of their own.

To organize a tape club you will first need a nucleus of members in your own community. If you don't have enough interested friends, you might persuade your local newspaper to carry a notice asking those who would like to join you in this venture to write or call you. A similar notice could also be included in church bulletins, school newspapers, or the newsletters of fraternal associations or professional groups in your town.

Common desires to learn better taping technique, to reach out a hand in friendship to the far corners of the world, to exchange recipes or collect rare bird calls—these and many other interests will attract tape enthusiasts to a new club. When you have contacted ten or

twelve prospective members (you can start with fewer if their interest is strong enough), arrange your first meeting.

Since there is entirely too much work to the organizing and directing of club activities for one person to handle, it is wise to assign as many responsibilities to as many different members as possible. You will find that some who may become very active in club projects lack the time, talent, or interest to participate in administration of club affairs. It will quickly become apparent which ones can be counted on to carry out assigned or volunteer duties promptly, and they will make your most effective officers.

At your first meeting you should discuss the interests of your charter members, for this will influence the direction your club takes. Your group may wish to concentrate at first on improving their technical skills and limit their projects, at least in the beginning, to things that can be done locally. Or they may wish to branch out at once, contact existing clubs, and start corresponding by tape with people in other states or countries. Once that issue is decided, you should draw up a constitution and some by-laws to set basic policies for administering the club. This should cover such matters as membership, meetings, elections, and duties of officers and committee chairmen. Try to keep the constitution relatively simple to allow for flexibility and the development of a wider scope as your club expands, and if some of your first rules turn out to be unworkable in practice, you can always amend them later.

As in any organization, decisions must be made in a tape club, and in the case of the Indiana Recording Club they are handled by the Board of Directors, which consists of the current officers (President, Vice President, Secretary, and Treasurer) and the preceding president. Board meetings are held monthly, and situations at hand

can then be decided upon. In this way no one person is empowered to make policy decisions, and the Board thus becomes the starting point from which most club activities originate.

At the first meeting you should also make a record of certain facts about each member—a listing of name, address, family status, profession, taping equipment, and range of other interests. This will become your club directory. Membership fees can be determined by estimating printing, postage, and supply costs, and these will vary according to the quantity and quality of the materials you use and just what your club wants to offer its members.

Once you are established, you should get acquainted, as a club, with local dealers who handle tape recorders and taping supplies. Their cooperation and suggestions on equipment can be of great help. Sometimes they will inform the club of sales before they are advertised to the general public, and if your members buy their supplies in quantity through the club, you may be able to arrange discounts for large orders. Some dealers are helpful, too, in publicizing the formation of tape clubs and will encourage their customers to join.

What can your club offer to prospective members? In general terms, I think this can best be described as: education, family participation, fellowship, and entertainment. You should also provide those interested in joining you with specific information about what facilities your club has to offer, cost of membership, meetings, and your various activities. It is also important to let new members know what the club expects from them in return. There are a few matters of common courtesy (such as acknowledging receipt of tapes sent through the mail and returning borrowed tapes promptly) that should be stressed tactfully at the outset. Each member is, in his own way, a club ambassador, and it is important for the good of the club that all members show consideration of one another.

MOST clubs send "Welcome to the Club" tapes to all new members, and the Welcoming Committee continues to correspond by tape with new members who live at some distance from the headquarters area until they find regular tapespondents among the established membership. The Indiana Recording Club supplements the welcome tape with a system of round-robin taping which gives a new member an opportunity to chat with several other tape friends and to pass along his ideas, questions, complaints, and news for the club newsletter.

Corresponding by tape is such a pleasant and rewarding activity that no matter what your original purpose is in organizing, it is almost inevitable that as soon as your members begin tapespondence with people outside your community, your club will expand to include regular tapespondents all over the country.

When this happens, you will have to print or mimeograph your membership directory (remember that list you made at the first meeting?). A copy of the directory should be sent to each new member so that he can select a tapespondent with likes and interests similar to his own, or he may prefer to correspond with someone who has different hobbies and in this way expand his own interests.

One of the most important assets of a club is a periodic publication to be sent to each member. The Indiana Recording Club publishes a monthly eight-page newsletter, *Tape Squeal*, which is printed by photo offset. This process permits us to include drawings, cartoons, and even snapshots of members and club activities, but in the beginning you may wish to start more modestly with a shorter mimeographed bulletin. In *Tape Squeal* we provide news of developments in the world of tape recording, a bit of humor, hints on how to use a tape recorder more effectively, announcements of club projects, and other information that will be of interest to members. All members who feel that they have an article or pictures to contribute are encouraged to submit their material to the editor for consideration.

Tastes and interests vary widely among the members of a tape club, but many IRC members have gotten great pleasure from our club's public service projects. Several of our members are blind, and as a club service, a husband-and-wife team read *Tape Squeal* and monthly new-member listings and changes of address onto tape so that sightless members will not be left out of club news. Several members do a considerable amount of other kinds of reading for the blind, providing entertainment for some and a means to higher education for others. We have also made recording facilities available to physically handicapped people, and upon request the club has recorded wedding ceremonies so that relatives far away could share in such very special occasions. There is also an IRC committee that provides programs for churches, schools, and clubs.

IRC has encouraged a Tapes for Troops program, in which members send recorded tapes of music and entertainment to American servicemen around the world. We have also provided facilities for families to send voice letters to relatives in the service who are stationed in the U.S.A. and overseas—this is our Bridge from Home project. I am sure there are similar occasions in any community when a tape club can be of assistance. Our members have found that the satisfaction of having contributed their services to such projects is reward enough, but they also bring favorable publicity to the club. And you will need a certain amount of publicity to bring in new members to replace those who drop out for one reason or another.

Your group might consider establishing a club library containing tapes of music, special sound effects, historical

events, and miscellaneous subjects. Such a library is not only a benefit to existing members, but will attract new members to join the club. Many of our members who are interested in copying each other's personal tape libraries get together for dubbing sessions. These sessions are held in a member's home—living room, recreation room, or basement can be used—and recorders, tapes, and plenty of extension and patch cords are all that is needed.

We are fortunate in the Indiana Recording Club to have enough members locally so that we can enjoy monthly meetings with informative and entertaining programs. An annual picnic and Christmas party have often brought out-of-city and out-of-state members to join the fun. Our meetings are taped and are available to any member on request. Club meetings can be another means of bringing people together to share experiences and learn more about this rapidly growing hobby of tape recording.

Regular round-robin tapes going to several members, giving each one equal space to talk, can be circulated among small groups. This is a good way to encourage those with a bit of mike fright to gain confidence. Round-robin tapes can also be used for deeper discussions of a particular subject, and they are useful in giving those who are learning a new language opportunities to practice speaking it with others. Your members who are interested in 35mm photography will find tape-slide shows a good way to exchange armchair travelogues and to share last year's prize petunias or the family pet with tape friends.

A new twist in our club is the Mini Show, in which members of a round-robin group add a few of their photo slides to the regular tape commentary they circulate. This emphasizes our constant aim to involve as many people as possible in creative activity, thus promoting more taping with more people and resulting in the building of a stronger tape club.

Among our most rewarding experiences are our contacts with tape recordists overseas. Hearing right in your own living room the sounds of London streets, a steamer sailing on the Rhine in Germany, or the sounds of a happy family in Holland celebrating Christmas can be among the greatest joys of taping. Who would think that a man in Australia would be interested in General Custer and the Battle of the Little Big Horn? Just recently we had an inquiry from such a person, and by coincidence that same week a local newspaper contained an article referring to one of Custer's men; the article was quickly on its way to Australia. Through tapespondence one of our members discovered that a small school in Costa Rica could not afford the luxury of a pencil sharpener, and when the students in a tuberculosis sanatorium in Indiana learned of this through another IRC member, they took up a collection to send one to the school.

IRC members feel that through others' interests, their own interests have expanded, and you will find that your club's overseas activities will open many doors of enjoyment and learning. What better way is there to understand the people of another nation than by talking to them via tape?

A unique specialty of the Indiana Recording Club is the associate club plan, which provides for an exchange of club membership directories and newsletters. In this way members of each club can select names from the directory of the other without paying additional dues. Such an affiliation is a good way for a new club to make its first contacts with recordists in foreign countries.

The success of a tape club, like that of any other organization, depends on the interest, leadership, and activity of the members. It takes effort, of course, to bring results. There are times when you may feel that

A SELECTIVE LIST OF INTERNATIONAL TAPE CLUBS

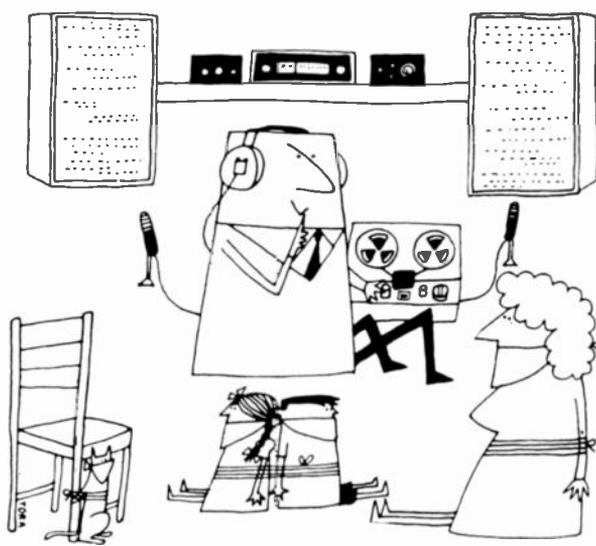
- Amateur Tape Exchange Association*—Ernest A. Rawling, President, 5411 Bocage, Cartierville, Montreal 9, P.Q., Canada
- American Tape Exchange*—Clarence J. Rutledge, Director, 1422 North 45th Street, East St. Louis, Illinois 62204
- Far and Wide Recording Club*—Barrie Harber, Co-chairman, Eccles, Maidstone, Kent, England
- Friendly Tape Network*—Fred Reynolds, 544 Clarkson Street, Denver, Colorado
- Indiana Recording Club, Inc.*—Mrs. Helen Kish, Secretary, 2426 Shaw Avenue, Indianapolis, Indiana 46224
- New Zealand Tape Recording Club*—John Simpson, Librarian, Awaroa Road, Helensville, North Auckland, New Zealand
- Organ Music Enthusiasts*—Carl Williams, Secretary, 152 Clizbe Avenue, Amsterdam, New York
- Stereo International Magnetic Tape Club, Inc.*—Robert J. Cline, U.S. Rep., 2510 West Main Street, Richmond, Indiana
- Stereo Tape Club Theatre & Cine Guild*—A. H. Williams, President, 3 Clan Building, 181 Main Road, Diep River Cape Town, South Africa
- Tapeworms International Tape Recording Club*—R. L. Preston, President, 4 Queen's Road, Maidstone, Kent, England
- The Australian Tape-Recordists' Association*—Graham P. Lowe, Honorary Secretary, P.O. Box 67, Eastwood, New South Wales, Australia
- The Voicespondence Club*—Charles E. Owen, Jr., Secretary, Noel, Virginia
- Pietermaritzburg Tape Recording Club*—Buddy DeKlerk, P.O. Box 335, Pietermaritzburg, Natal, South Africa
- World Tapes For Education*—Marjorie Matthews, Secretary, Dallas, Texas 75215
- Worldwide Tapetalk*—Charles L. Towers, Secretary, 35 The Gardens, West Harrow, Middlesex, England

you have grabbed a bear by the tail, because organizing and perpetuating a group of hobbyists of all interests from all over the world is a tremendous challenge, and once you've started, it's a tremendous responsibility—but the rewards are worth it.

A list of tape clubs is appended herewith for those

who are starting new clubs and wish to make exchange arrangements with established groups. And if I have failed in my efforts to inspire you to start your own group, perhaps you will at least apply for membership in one of these. Almost all of them welcome members from anywhere on earth.

How to **RECORD OFF THE AIR**



OVER four hundred and fifty FM stations throughout the country are now transmitting live and recorded stereo broadcasts. The expected increase in such broadcasts promises a sort of perpetual bonanza for the home stereo-tape recordist.

If you are merely going to *listen* to a stereo broadcast, all you need is a stereo FM tuner or receiver (although we will refer to "tuners" throughout this article, almost every suggestion made also applies to stereo receivers). But if you are going to tape the same program, you may occasionally run into trouble. The trouble appears as a continuous background whistle or tone that is recorded along with the desired program. The reason for the interfering tone is a little complicated, but briefly, the story is this. Every stereo tuner or receiver generates or reproduces in its multiplex section a high-level 19- or 38-kHz tone that serves to synchronize the stereo channels. If enough of this tone is mixed in with the audio signal at the tuner's output jacks, it can cause a continuous whistle to be recorded on the tape. This whistle is not the multiplex tone itself, but results from the interaction of the multiplex tone with the tape recorder's internal bias-oscillator tone. (The recorder's bias oscillator may be designed to operate anywhere in the 50- to 100-kHz range.) Before stereo FM recording was common, recorder-oscillator frequency was not a problem. Today, however, to make whistle-free recordings of stereo FM, the tuner must have good suppression of the 19- or 38-kHz multiplex tone, the tape-recorder bias-oscillator frequency must be high

enough (over 80 kHz) that it doesn't interact with the multiplex signal, and/or the tape recorder must have multiplex filters in its input circuits. Any *one* of these factors can do the job, and almost all recent tape recorders and tuners will work together without problems. If you have an older-model stereo recorder or tuner and are encountering whistle problems, check with the manufacturer of the unit for suggestions.

High-quality off-the-air recordings are the result of following a number of rules. The once-popular technique of recording from a microphone in front of a loudspeaker is, of course, out of the question. The only correct way to record radio programs, in either stereo or mono, is by a direct electrical connection between the tuner and the tape recorder. You can also record the sound portion of TV programs from the earphone jack on the set, but avoid attaching clips across the speaker terminals or volume control, as these present a dangerous shock hazard for a non-technical person.

In most installations, the tuner will connect directly to the control amplifier (or preamplifier, if a separate stereo preamplifier and power amplifier are used) and the recorder will take its signals from the amplifier's tape-output jacks. To achieve a consistent right and left channel on your tapes, it is a good idea to color-code (with matching dots of nail polish) the amplifier's right- and left-channel output jacks to match the recorder's right and left input jacks.

To an off-the-air recordist, the fact that the playing time

of a four-track stereo tape can be doubled by switching the reels and recording in the other direction is not too important—unless, of course, he has one of the recorders that will record in both directions without reel switching. With a non-reversing machine it is important to know how long the tape will run without interruption, because broadcasters won't stop the music to let you flip the reels. To estimate the playing time of a musical composition, look it up in the Schwann record catalog and figure a maximum of thirty minutes per 12-inch disc side. Some stations note the exact playing time of each selection in their program booklets, but if the information is not available, you may be able to estimate the length of an unfamiliar work by taking the total time scheduled for the concert and subtracting the approximate length of the more familiar selections. The most convenient approach, however, is to obtain a copy of *Timetable for Classical Repertoire*, a booklet that lists the playing times of over 2,000 compositions. It is available for 25¢ postpaid from Martel Electronics, 2339 S. Cotner Ave., W. Los Angeles, California (Attn: Timetable).

If it is evident that you can't fit the whole program on one reel, plan to change reels during a pause between movements. These pauses, particularly in live concerts, will usually be long enough to permit a quick change. Have the fresh tape pre-threaded onto an extra takeup reel; then all you have to do is lift off the reels that are on the recorder, drop the fresh ones on, guide the tape into its travel path, and start the recorder running again. With a little practice, you should be able to complete a reel change in under five seconds. Use the same brand and type of tape for these quick changes or you may find that there is an audible change in frequency response or signal level between reels.

Always load up with more tape than you think you will need. It is easy enough to clip off the blank excess later and use it for something else, but if your tape runs out before the end of the program, nothing can be done about it. You can use thinner tape to give you up to three times the capacity of a reel of standard-play tape. The playing-time chart (right) makes it possible to estimate the amount of "one-direction" recording time you can get from a variety of standard tape lengths.

If the program you want to record starts at 8:30, you'd better be on the job by ten past eight. Turn on all your equipment to give it time to warm up and stabilize. Station tuning and antenna adjustment is quite critical for optimum stereo reception, so tune carefully. During the warmup, use the preceding broadcast for setting the proper recording level and checking the balance between channels. By the time the clock creeps around to 8:28, everything should be warmed up; then check the tuner one last time for on-the-nose tuning.

Once the program is under way, keep an eye on the record-level indicators. If they seem a bit low or high, re-

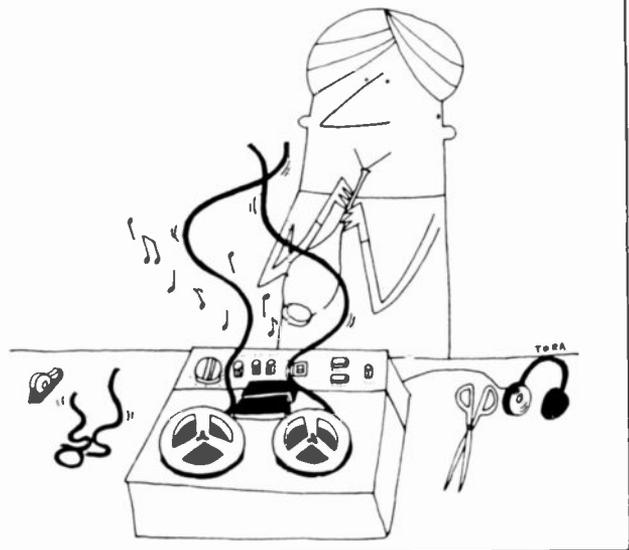
sist the temptation to make adjustments for a while, because the station engineer may correct the level at the studio. If level adjustments must be made, though, make them very gradually, and try to follow the expressive contours of the music. For instance, if you must raise the level, wait for a crescendo and then slowly turn up the control along with the swell of music. Remember that the best-engineered recordings are those that show the least evidence of technical tampering.

When the music finishes, let the announcer start talking before shutting off the recorder. This avoids the possibility of shearing off the tail end of the hall reverberation. One exception to this rule is the case of the live-performance broadcast, in which the dying echoes of the last note are often inextricably merged with a rising surge of applause while the announcer's voice comes in simultaneously. In such a case there is no moment of silence, no clean break in continuity to serve as a convenient place for a cut-off. The best way to handle this is to allow a few seconds of the applause to come through at normal volume and then fade out both channels together, reaching zero volume, if you can, before the announcer's voice comes on.

After your recording session is over and you have made some prize tapes, what can you use them for? As far as the law is concerned, you can use them for anything you see fit, as long as you do *not* (1) play them before a public gathering, (2) charge admission to listen to them, or (3) copy them for resale purposes. It isn't illegal to record radio programs, but if a musician's union or a record company caught you using their creations to make money, you would most certainly be sued, and you would probably lose the case.

RECORDING TIMES AND TAPE LENGTHS			
Tape length, feet	Recording time (for single pass in one direction, mono or stereo)		
	1 7/8 ips	3 3/4 ips	7 1/2 ips
150	16 min	8 min	4 min
300	32 min	16 min	8 min
400	42 min	21 min	10 1/2 min
600	1 hr 4 min	32 min	16 min
900	1 hr 36 min	48 min	24 min
1200	2 hr 8 min	1 hr 4 min	32 min
1250	2 hr 13 min	1 hr 6 min	33 min
1500	2 hr 40 min	1 hr 20 min	40 min
1800	3 hr 12 min	1 hr 36 min	48 min
2300	4 hr 5 min	2 hr 2 min	1 hr 1 min
2400	4 hr 16 min	2 hr 8 min	1 hr 4 min
2500	4 hr 26 min	2 hr 13 min	1 hr 6 min
3000	5 hr 20 min	2 hr 40 min	1 hr 20 min
3280	5 hr 49 min	2 hr 55 min	1 hr 27 min
3600	6 hr 24 min	3 hr 12 min	1 hr 36 min
4800	8 hr 32 min	4 hr 16 min	2 hr 8 min

How to EDIT YOUR TAPES



IT is probably not much of an exaggeration to say that every owner of a home tape recorder wants to be a skillful tape editor, whether his ambition is to simulate professional-sounding music or speech tapes, or merely to splice a tape that has accidentally been broken in use. There are, it is true, a number of books, pamphlets, and articles that purport to tell you all about it, but in my experience with such sources of information, they are as often notable for what they omit as for what they include. The aim of the beginner's guide to tape editing that follows is to fill in at least some of these information gaps.

Let us start with a prerequisite that is often overlooked: is your tape recorder designed for tape editing? Many machines are—which means that one can listen to a tape while turning the reels by hand. These machines usually have an edit or pause position among their controls. But if your tape recorder has no such facilities for editing—that is, if the tape drive cannot be placed in neutral with the play amplifiers on—write to the manufacturer of your unit for advice on how to make the necessary changes. If he cannot help you, take the machine to a good audio shop, preferably to one recommended by the manufacturer, and have the changes made.

Now, to turn to some neglected fundamentals:

(1) Editing tapes means cutting a single-direction tape, removing a segment you don't want, and then joining the two cut edges of the tape together. (By single-direction tape I mean a tape that has been recorded in one direction only, no matter how many tracks are made in that direction; thus the eight-track tapes measuring up to one inch wide that are used in recording music in studios can be included in this definition.) Although it is possible to edit a tape that has one or two tracks recorded in the forward direction and another one or two in the opposite direction, it is rarely done even by ex-

perts—and I advise that the amateur not attempt it. If you should find it necessary to edit a four-track stereo tape, for instance, it is best to borrow a second tape recorder, re-record each set of tracks onto separate single-direction tapes, edit these, and then re-record the edited version back onto four-track stereo tape.

(2) When you cut tape that has been recorded upon, you must cut it at an angle, commonly 45 degrees to the horizontal, to avoid causing a sharp click when the cut spot passes by the playback head. The reason for this is easy to understand. It has to do with what is called bias voltage, the very-high-frequency current used in recording in order to keep distortion low. Even at a moment when no program material is being recorded onto a tape, bias voltage is passing onto it. The chances are overwhelming that when you cut a recorded tape, remove a part, and then splice it back together again, you will have a higher bias current (or bias-plus-program current) on one side of the splice than you do on the other side. In playing the tape back, when a vertical splice arrives at the playback head-gap, which is sensitive to voltage changes, the bias-voltage change from one side of the splice to the other will come through audibly as a sharp click. But if the tape has been cut diagonally, there will be much less noise, because the voltage change will be spread out, so to speak, across a stretch of the tape.

(3) The cut ends of a tape must fit together without a gap or overlap when spliced. For years, tape editors customarily used a pair of scissors to cut tapes. They marked the tape at the two points where it was to be joined after cutting, snipped it somewhere between these two points, laid one end on the other with the editing marks exactly on top of each other, and then cut both pieces of tape at once. The problem with editing in this way, as you would soon learn if you tried it, is that it is extremely difficult to keep the two pieces of tape lined

up with each other perfectly, both in cutting and in splicing. Most of the time, unless you have been scissor-cutting for years, one piece ends up cut at a slight angle to the other. Oxide dust is likely to get into the space between the tape ends, and there will be a noise when the splice passes the playback head. Such improper alignment of spliced tape can also result in stretching of the edges of the cut pieces. This stretching, or ruffling, of a tape edge will cause a "burble" at that point in playback. Anyone seriously interested in doing a good splice, even if only to repair an accidentally broken tape, should have a tape splicer that will permit him to cut the tape exactly at 45 degrees, keep the tape absolutely straight, and splice accurately and cleanly.

(4) Use splicing tape made expressly for the purpose. Do not use ordinary cellophane mending tape. There are at present two kinds of splicing tape commercially available: one is an acetate-base tape, the other a polyester-base tape. (Mylar is DuPont's polyester tape.) If your splicing is done on tape that you do not intend to keep for several years, cheaper acetate splicing tape is satisfactory. But if you are splicing tapes intended for your permanent library, for storage more than two years, or for repeated playing, be sure to use polyester-base splicing tape. In applying a splicing tape, use enough—at least half an inch—to insure that the splice will not come apart under stress. Finally—a point that may be unnecessary in speech-tape editing, but is almost obligatory in music-tape editing—cut the ends of the splicing-tape segments diagonally (like the splice itself). Square-cut ends of splicing tape frequently cause a small amount of flutter (a momentary speed change) in tape playback; taper-cut ends are far less likely to do so. This is particularly true if you must splice within a sound—during a continuous tone, for example.

BUT at this point I must backtrack a bit. Most tape-head gaps (the gap between the two armature halves of the tape head where the recorded tape's magnetic fields are picked up as signal voltage) are so narrow that they cannot easily be seen with the naked eye. Then how can you decide where to mark a tape for cutting? On most home machines the heads are protected by an easily removable cover. With this off, you can see the gap by using a magnifying glass of about ten power. The gap will look like a thin perpendicular line in a single-track recorder; it will look like two slightly separated lines in a dual or four-track recorder. It is at this gap, or preferably its equivalent, that the tape must be marked for cutting. Why "equivalent?" It is not good practice to mark tape while it lies directly on the playback head. The marking pencil (use a black china-marking pencil for light-colored tapes, a yellow one for dark-colored tapes) leaves a residue that may get on the head-gap area and cause it to lose contact with the tape. If this should happen,

the higher frequencies recorded on the tape will not be picked up and the head gap may be damaged. The moral is: do not mark tape directly on the playback head; use a substitute point. Most tape recorders move tape from left to right, the head to the extreme right being the playback head. So choose a point for marking the tape somewhere to the right of the playback head. The edge of the head cover or a guide post provide handy index points. Accurately measure the distance between the marking place you have selected and the playback head-gap. Then mark the same distance on your tape-splicing block, measuring from the center of the diagonal cutting slot to the right. If you measure accurately, you can thereafter mark the tape at the tape-marking point on your recorder, place the tape in your splicer with the mark lined up precisely with the point on the splicer itself, and then cut the tape accurately at the diagonal cutting slot.

In many of my conversations with both amateur and professional tape editors, I have found that most of them seem to be sadly unaware of the fundamental points I have so far mentioned. But let me assure you that a good tape editor must become so proficient in these purely mechanical aspects of tape splicing that these operations require virtually no thought. Only then can the editor concern himself with the more "artistic" problems of tape editing.

NOW, with that bit of (necessary) moralizing out of the way, we can get down to the *art* of tape editing. As with most arts, practice makes perfect—or at least leads you in that direction. You cannot really know where the best spot to cut a tape is until you have a great deal of experience—listening and cutting and finding out by yourself what you have done right or wrong. Most important, you need to develop the ability to identify sounds as they emerge from the speakers when you are moving the tape reels manually; only then can you decide where to cut. After much practice, you will learn, for example, the difference between an *s* that sounds like a *z* and an *s* that is sibilant, and you will discover that you cannot replace one with the other. You will learn the difference between the sound of a soft *s* and the short *t* sound (they sound much alike at low speed). You will learn to discriminate at low speed between sounds like those of *b*, *p*, and *d* at the beginnings and endings of words. It is just such things that distinguish the expert editor from the tyro.

Sometimes even the expert becomes confused in deciding precisely where one sound ends and another begins. This happens most often in attempting to cut between two blending sounds in a diphthong. If your ear cannot separate these sounds in the normal forward direction, try listening in reverse. You may not be aware of it, but we normally "hear" sounds that just aren't there—our memories and imaginations supply missing sounds.

We imagine we hear a complete word, for instance, when often we are hearing a skeletal version. When you listen in reverse, however, you are forced to listen to actual recorded sound only. Therefore, in reverse listening, you can clearly hear the beginning of one sound and the end of another.

DECIDING upon the place at which to cut the tape is the next step. Normally the best place to cut is just before the sound following the last one on the tape you wish to retain. For example, take the sentence, "Editing according to the rules we are discussing is not difficult." The way to eliminate the qualifying phrase "according to the rules we are discussing" would be to cut from just a fraction of an inch before "according" to a fraction before "is." By cutting right on the verge of the next sound, instead of exactly halfway between the words, you will retain the slight echo or hangover generally remaining from the sound just past, and also an interval of room tone, which will prevent a sudden change of background sound should you splice in something recorded in another locale.

Good sense in speech editing requires that the mood or tone of a speech as heard be retained intact in the edited version. You should not risk changing the mood by editing even when you feel it is necessary to rearrange sentences in order to improve the sense of a speech. In most cases, it is better to let confusion reign for a few moments in the speaker's logic than to make him appear ridiculous by, for example, inserting a few words spoken in a sad tone between sentences delivered in a cheerful voice. Every speaker has his own natural rhythm; never disturb it. If you heed the advice just given about cutting close to the beginning of words, you will have no trouble in maintaining the natural pace. Don't even try to cut out "er's" or "ah's" or breathing sounds unless they are completely "in the clear." Commonly, a speaker drawls his "er's" out until, in a flash, a bit of inspired rhetoric comes to him—and then he continues in the same breath. Thus, the "er" runs into the following word most of the time; it cannot be cut out without making the speaker's delivery sound completely unnatural. Of course, you can cut out such things if they are followed by a beginning hard consonant sound such as *t*, *p*, or sibilant *s*. Radio and TV directors who know nothing about tape editing often will insist on cutting out nonsense against all expert advice. The result is often a speech that sounds as if it were done by an artificial voice machine.

When I recommend maintaining a speaker's natural pace, I do not mean that you should let him stew in rank error if you can possibly help him out of it by judicious editing. I once edited a speech made by an American general who was presenting a medal to some worthy in remembrance of a famous occasion. Unfortunately, the general persisted in using "momentum" when he meant

"memento." Luckily for him, he stressed the "o" of "momentum," and it was a comparatively easy matter for me to cut off the "um," replace the "o" with an unstressed neutral "eh," and put the "o" at the end to make "memento." I like to think that I helped to preserve a small part of West Point's reputation as a respectable educational institution.

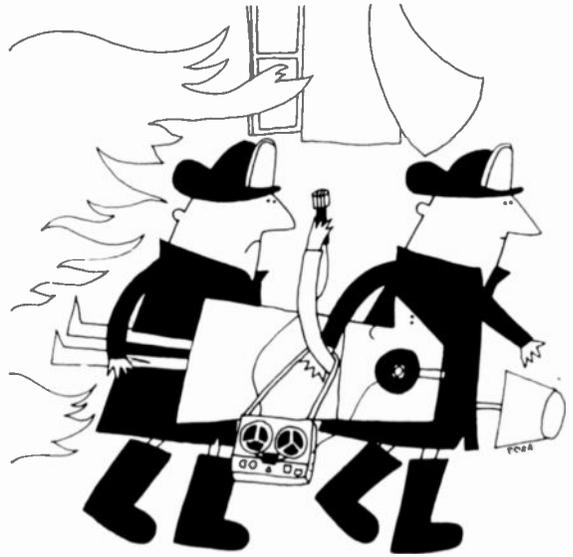
Try to train yourself to listen while recording, and you will eliminate the need for much difficult editing later. In the first place, before recording the material you want to preserve, record fifteen or twenty seconds of room sound in the recording locale. It may be useful while editing to be able to take from it a natural-sounding pause or to space between a couple of words properly. Make sure that any extraneous background sound is either eliminated or will be consistent throughout the entire taping. Turn off any loudly ticking clocks during the recording session, for example. If there are such rhythmic sounds in the background, they must remain consistent on the edited tape, and sometimes this can present serious editing problems. If it is not possible to remove the source of rhythmic sound during the taping, be sure to record enough of the sounds by themselves so that you can at least splice some in later where you need them to retain the rhythm.

A FURTHER refinement is learning how to cut tape and join it within similar sounds. Take our sentence "Editing according to the rules we are discussing is not difficult" again. In addition to the way I described previously, there is a second way to edit this sentence, and one that points the direction to a much better editing technique than the first. In this second method, you would cut in the middle of the "ng" sound in "editing" and at the same point in the "ng" sound of "following," and then splice. Provided that the sounds are of the same loudness, this method would result in the most noiseless splice possible.

Especially in editing music, cutting within sounds is desirable. For when you cut within sounds, almost always the noise created by the splice is obscured by the sound itself. In music editing, such cutting is usually done within impact sounds—*i.e.*, the beginning of the sound of a piano hammer hitting the strings, the beginning of a drumbeat, the bowing stroke of a violin. All of these impact sounds can be considered as very short bursts of noise, and if you cut within them the splice noise is lost completely. Do not, however, cut within a continuous tone (a held note, for example) if you can possibly avoid it; the splice will be heard no matter how carefully you do it.

And that, as they say, about does it. But for the novice at tape editing this is the beginning, not the end. The fundamentals simply provide him with the practical tools with which to acquire what no one can teach him: finesse, that fine discrimination which produces an equally fine product. Finesse comes only with observation, the exercise of good sense and skill—and practice, practice, practice!

How to **EXPAND YOUR TAPE HORIZONS**



JUST AS there's no reason why you should *always* have your morning eggs once over lightly when there are at least a hundred other ways of preparing them, there's no reason why you should be using your tape recorder exclusively for taping discs and music picked up from radio broadcasts. Or, for an even closer analogy, there's nothing wrong with lining the family up in front of the house, telling them to smile, and using your camera strictly according to the book. But why limit yourself? You could put the sun behind their backs, vary the exposure, change your position, add a filter, snap them candid or one at a time. Each time you would be using the same camera; what would be changing is your *control* over the camera, which is, after all, only a tool for taking pictures. Your tape recorder, like the camera, is also a tool—one with infinite possibilities—and you are exploring only a fraction of its actual potential if you are not using it to express yourself and your ideas creatively.

If the notion of getting the *most* out of your tape recorder has never occurred to you, it certainly has to a number of pioneers in the field, people who have been using tape recorders to produce listening experiences as various as their own selves and as personal as their thumbprints. Hearing what they have done and how they came to do it can serve as an instructive guide for your own experiments in this direction.

Advertising people have dubbed one of these tape pioneers "Mr. Sound." Tony Schwartz earned this appellation by capturing actual sounds, people, and events on tape more successfully and with a greater sense of reality than anyone ever had before—or, for that matter, since. His often startling results have been available as disc recordings for some time, and among those currently available in record shops are his "New York 19" (Folk-

ways FD 5558), "Nueva York" (Folkways FD 5559), "Millions of Musicians" (Folkways FD 5560), "A Dog's Life" (Folkways FD 5580), and "Music in the Streets" (Folkways FD 5581).

A self-described gadgeteer, Schwartz operated an amateur short-wave radio station while in high school. But, as he recalls, "If I spoke to a guy in Australia, all he would talk about was how he was coming in. If I asked any personal questions, he would cut me off instantly." Then, as now, Schwartz wanted to reach people. One day in 1945 he stopped into a music shop and bought his first recorder—one of those now-obsolete jobs that used wire, rather than tape. Besides recording music off the air, he asked folk singers to perform for him and collected other songs by placing ads in journals all over the world. He sent the results to various national radio stations, who responded by playing his recordings and sending back to him recordings from other sources. From all these he put together his first commercial disc, "The World in My Mailbox" (Folkways FD 5562).

Over the years Schwartz came to regard his recorder (now a tape unit) as another pair of ears to be carried with him anywhere and any time. "Things happen *when* they happen," he explains. He has taken his recorder along to the opera (a cough he recorded there later found its way into a commercial for cough drops), on visits to his family, and to the hospital at the time his baby was being born. He even taped the excitement that ensued at the time a fire broke out in his own apartment building.

Schwartz may combine sounds from various sources. Once he taped a boxing match, and over the sounds of leather connecting with flesh and the roar of the crowd can be heard one bloodthirsty voice calling out, "Rip that eye, baby! He's used to stitches. A couple more

won't hurt." Some time later, after fighter Davey Moore was killed in the ring, Schwartz took a tape of Pete Seeger singing the Bob Dylan song *Who Killed Davey Moore?* and interspersed the musical phrases with some of the sounds from the original boxing-match tape. The result is an unforgettable and undeniable emotional experience for any listener.

When Schwartz records, he aims for fidelity, not only to the true sound of a person or an event, but to the inner core of meaning of that person or event as well. The finished product sometimes staggers listeners with its quality. The late Marilyn Monroe, after hearing part of Schwartz's "The Fabulous Fifties," asked, "Where do you get such wonderful actors?"

The answer appears to be "just about everywhere." Schwartz once demonstrated how he recruited a "cast": on a tour of his neighborhood, he stopped by a group of boys who were chalking the sidewalk and asked simply, "What are you playing?" When they replied, he introduced his tape recorder and told them what he was about to do. As he explained, "Tapes should be candid in the sense that they are honest and frank, not in the sense that they are hidden."

Leaving the boys, he approached a blind street singer. "Is it true what people say about street singers having great wealth?"

She smiled. "You hear all kinds of crazy things . . . it's so far from true."

He continued: "Is it easier to be blind in the city or in the country?"

"The city. There are so many more people to give directions."

He went on to ask how she got started in street singing (she tired of living on welfare handouts), where she came from (Missouri), and if she would mind singing something from her youth. She responded with a blues:

*And when I'm gone,
And when I'm gone,
Don't you wear no black.
Cause if you do,
Cause if you do,
My ghost will come sneaking back.*

Schwartz feels no shyness about asking total strangers to speak into his mike, since he expects, from his past experiences, to be as interested in what his subject has to say as the subject himself. And having the subject involved in explaining himself to a sympathetic listener helps overcome mike fright: "He's not focusing totally on being a performer."

Of course, not everyone is prepared to approach complete strangers as informally as this. Fons Ianelli, a tapester friend of Schwartz, and himself a tape-recorder designer, suggests that more inhibited people first practice with older members of their own family with the

aim of recording some of their priceless reminiscences.

Of course, recording need not be candid, nor must the recordist have a couple of decades of experience. Consider, for example, Jason Scheckley, a fifteen-year-old high school sophomore, who very skillfully put together a dramatic "horror" tape for the amusement of his friends. This narrative without words uses the sounds of a phonograph stopping, footsteps, a scream, police siren, a knock on the door. This kind of tape can stand on its own or be used to embellish an appropriate slide show.

In the same story-telling way, a tape can give an out-of-towner an idea of what the big city is like. New York *Times* editor James Tuite once wrote about a casual visitor to Manhattan lying in a hotel twenty or thirty floors above the street, describing the sounds of the city as heard from his sleepless bed. He first hears "thin strains of music, the firm beat of rock 'n' roll, the frenzied outburst of the discotheque . . . shrill laughter or raucous shouts . . . a bottle shatters against concrete . . . the whine of a police siren, fire apparatus dashing through the night, a fire whistle from another direction . . . sirens converging . . . taxicabs honking . . . at dawn the sounds of garbage trucks, trash cans, the metallic jaws of sanitation trucks gulp and masticate the residue of daily living." Then, with morning, "the traffic bedlam, an occasional jet, an ocean liner . . . the pneumatic drill . . . the whistles of traffic policemen." Such a tape might keep 'em down on the farm forever.

JUST that sort of material—the sounds of everyday life—goes into the tapes compiled by tape-specialist Ivan Berger. His work is not heard as an entity in itself, but as a counterpoint to the sometimes realistic, sometimes abstract plays mounted in the small cafes and theaters of the Greenwich Village area—better known as Off-Off-Broadway. For Sam Shepherd's play *Cowboys*, Berger's tape served the purpose of recreating the Old West with sounds of crickets, galloping horses, and Indian war whoops. Used at the very end of the play's action is a tape of what Berger imagines the end of the world would sound like—traffic noises, a lonesome blues singer, staccato news and weather forecasts.

Berger first became interested in sound when he taped a Jean Paul Sartre play for rebroadcast on the FM station at Yale. After graduation, he came to New York, began by taping folk festivals and, later, preserving on tape the experimental work being done in Greenwich Village theaters. He soon became known as a source of high-quality tapes for special effects and background, and when producers and playwrights needed any tape work done, they came to him.

"In a way, reading a play for sound effects is like interpreting a piano score," Berger says. To achieve effects he considers appropriate, he will tape live sounds and

sounds off records, combining them in any way he likes. For the noise of a bomb dropping, for instance, he combined, through tape editing, the sound of an actual thunderclap with that of an exploding firecracker.

"I make a sound that is recognizable without any verbal context," he explains. "In the early days of radio, there were a lot of verbal cues—'Now I'm going to drill you. Now I'm really going to drill you.' Of course, you were then conditioned to accept the 'plop' or 'crack' sound effect you finally heard as a real pistol shot."

Since Berger's work can lean on no such cues, he rejects most ordinary sound effects as being insufficiently real, preferring to create his own. To return to the pistol-shot example, when none of those available seemed adequate, he tapped a plastic box with the metal end of a screwdriver, recording it at 15 ips—"it gave a sharper, shorter, thinner quality." Then he played the tape back at 3¾ ips. "At the slower speeds you lose the higher frequencies. I lowered the pitch of the sound by two octaves and lengthened its duration by a factor of four. Then I put in some tone control and emphasized the higher frequencies." The result of all this manipulation is an ideal pistol shot.

Berger customarily uses a three-head tape machine, one each for recording, erasing, and playing back. "The real difference is that I can monitor the tape during recording. It provides a continuous check on quality. And besides, I can get echo effects." For any recording work that will require eventual editing, he advises one- or two-track recording in only one direction. "This gives you the freedom to cut and remove sections of tape and arrange them in any order your desire. If you did record in both directions, you would have to cut and destroy whatever you had recorded in the other direction."

WHILE Ivan Berger revels in electronic techniques, choreographer Alwin Nikolais, who also makes extensive use of the tape medium, confesses, "When a tube blows, I'm licked." Co-director of New York's Henry Street Playhouse and considered one of the most forward-looking dance creators in the country, Nikolais came to tape out of need, not desire.

"The economics of modern dance cannot afford live musicians," he tactfully explains. In the days before tape, Nikolais used to haul two dancers out of the ranks and set them to beating drums. "When tape came along, it afforded a way to free the drummers for dancing." Necessity—and time—also brought invention. Working with James Seawright, he composed such pieces as *Imago* and *Sanctum*. Neither of them, however, is the kind of music you would hear in a concert hall or even in your own living room. It was composed specifically to accompany the dance. "My music is related to a visual event," says Nikolais.

Sanctum draws upon what Nikolais calls concrete

sounds, sounds which come from the real world—drums from China, Africa, and Israel, gongs from Indonesia, boxes, papers, jangling hardware, the human voice. The last is one of his favorites—but you might not be able to recognize it when Nikolais has finished with his tape processing. Every sound on his tapes is put through filters to remove certain frequencies. He may also use the sound backward as well as forward. "A particular sound put through electronic devices can be so many things," he remarks happily.

But Nikolais prefers sounds with no resemblance to real instruments—voices or noises, sounds that are pure and will interfere in no way with enjoyment of the dance action. To obtain these abstract sounds, Nikolais draws upon the resources of a special sound-making machine whose oscillators produce sounds which have sine, sawtooth, and other waveforms. These are fed directly into the tape recorder. To put together any one piece of music, Nikolais becomes a spendthrift with tape. He records, records, records. As many as four reels go into a "sound bank" from which Nikolais picks and chooses until he finally creates 10 minutes of his music.

It is a technique of composing which combines happy accidents, years of musical training, and a highly refined taste. "The initial sound bank may include hit-and-miss affairs, but chance becomes more predictable as you become more experienced and more sensitive," he says. Orchestrating all these various sound sources demands no more and no less than talent.

As New York *Times* music critic Harold C. Schoenberg wrote about *Imago*: "Nikolais and James Seawright created the tapes in about six weeks. Had a composer been commissioned to write a score, it would have taken at least six months. Then take the composer's commission . . . the considerable costs of copying the score and making orchestral parts . . . the costs of engaging an orchestra, rehearsal costs and the costs of orchestra and conductor."

On the other hand, "Once these tapes are spliced into their final form, that is it. Not only is no orchestra ever needed, but the tapes can be copied and sent anywhere in the world. One tape recorder and a minimum of two speakers are all that is necessary to insure a completely faithful performance. . . . At rehearsals the dancers can work with the same tape. Rehearsal tempos never vary. Never will there be bursts of temperament or tired fingers. A section can be repeated a hundred times and the loudspeakers will not complain, nor the tape recorder talk back."

Whether your own tape recorder will yield an expression of reality, a composition in abstract sound, or something entirely different from the two, only you can decide. As Tony Schwartz once remarked, "Life is an inexhaustible reservoir of material to be recorded and listened to."

Tape instant sight and sound

in a 20 foot room or at 2,000 feet

Now there's a low-cost Sony Videocorder for everyone. For the busy executive, an ideal setup consists of a Videocorder deck, a solid-state TV camera and a large-screen monitor/receiver. With this video tape system he can record and playback a sales presentation; a dry-run of an important speech. Or in moments of relaxation, a golf swing or a karate chop. The ad or broadcast executive can use it to tape programs off the air for review later. A complete system costs about \$1350.

For great results in the great outdoors—from taping sight and sound on a construction project to correcting a hitch in a little leaguer's swing—there is the new portable, battery-powered Videocorder. It consists of a solid-state TV camera about the size of an

ordinary movie camera, and a video tape recorder. VTR and rechargeable batteries in compact shoulder-pack weigh only 12 pounds. Recording "live" action is simple and fool-proof. There's a remote-control trigger on the camera's handle. A built-in 1-inch TV viewfinder shows exactly what's being taped. Up to 20 minutes of action can be recorded. Tapes can be played back immediately on any Sony 2000 series Videocorder. (Thousands are in use in education, business, the home). VTR deck, camera, zoom lens, microphone, battery and battery charger, \$1250.

There's a full line of Videocorders and accessories for real Hollywood-type effects at your Sony dealer. Sony Corp. of America, 47-47 Van Dam St., L.I.C., N.Y. 11101.

SONY® VIDEOCORDER®



WOULDN'T YOU REALLY RATHER HAVE A MAGNECORD?



MAGNECORD 1020

In its 1967 Buyers Guide, *Modern Hi-Fi and Stereo Guide* says: "The MagneCORD 1020 represents the first real entry into the home-entertainment market of a manufacturer known, and highly respected, for professional . . . tape machines. Other MagneCORDs can be and have been used in living rooms by critical listeners, but the 1020 is the first to look and feel at home there. Add to this new look the same precision and performance that characterize other MagneCORDs and you have a very fine product indeed . . . No other home machine tested for this magazine has ever exhibited such response at the extremes of the frequency spectrum, and the low bass response is a particular revelation over wide-range speakers, having the same kind of solidity found in studio master tapes . . . In every way, the MagneCORD 1020 is an excellent recorder . . . Ruggedly built, simple to operate, and superb in performance, the 1020 is definitely worth consideration by critical tape users."

What more can we say? If you're really serious about hi-fi tape, and recognize that

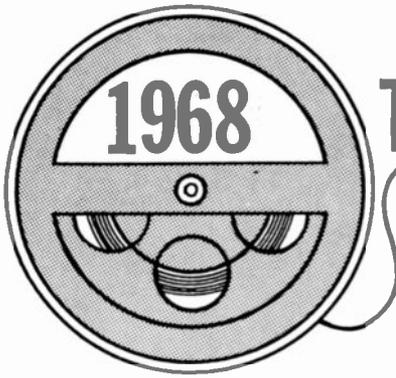
the investment of a few dollars more in highest-quality equipment will pay off ten-fold in the long run, the MagneCORD 1020 is for you. See your hi-fi/stereo dealer right away, for a thrilling demonstration.

MAGNECORD 1020 — 4-track design features 2 speed (7½, 3¾ ips) operation; takes up to 8¼" reels (50% more playing time than 7"); VU meters; counter; automatic shut-off; three separate heads. Solid-state stereo preamp with 900 mV output and dual mic and line inputs, with mixing facility. Response 45-18,000 Hz plus or minus 2 db at 7½ ips; s/n ratio 52 db at 7½ ips; flutter & wow 0.18% at 7½ ips . . . \$570.00

Optional walnut base . . . \$25.00

MAGNECORD 1024 — Home version of highly-rated Model 1021 professional recorder/reproducer. ¼-track stereo or 4-track mono operation; optional 2-channel stereo play head available installed in 4th head position; remote start-stop facility; 8¼" reel capacity; two-speed hysteresis drive motor . . . \$648.00 Case . . . \$60.00

MAGNECORD
tape recorders
DIVISION OF THE TELEX CORPORATION
9600 ALDRICH AVENUE SOUTH
MINNEAPOLIS, MINNESOTA 55420



TAPE RECORDER DIRECTORY

RECORDERS, PLAYERS, AND TRANSPORTS	59
TAPE-CARTRIDGE MACHINES	91
RAW TAPE	100
TAPE ACCESSORIES	105
MICROPHONES	111
HEADPHONES	119

AIWA

TP-1013 Portable Stereo Recorder
Solid-state stereo, 2-speed (3¼ & 1⅞ ips), 4-track design. Features 5" max. reel; will



operate from 4 "D" cells or 120 V a.c.; has two 8" oval speakers (one detachable); remote control sw.; supplied with 2 dynamic mics (one with remote control), batteries & accessory case 3⁹/₁₆" x 11¹/₈" x 15" d.\$109.95

TP-716 Portable Tape Recorder
Solid-state, dual-track, mono, capstan drive design. Features 2 speeds (3¼" & 1⅞"



ips); 3¼" max. reel; 2½" speaker; 250 mW dynamic output. Operates from 4 "C" cells or 117 V a.c. Supplied with remote-control mic, earphone & batteries, 9½" w. x 9½" x 3"\$49.95

TP-719 Portable Recorder
Solid-state mono, dual-track, 3-speed (7½, 3¼ with switch, and 1⅞ ips capstan change) design; wow & flutter 0.25% @ 7½ ips. Has 3" x 5" spkr. with 1.5 W output. Operates from 8 "D" batteries, 120 V a.c., or 12 V car battery. Will accept 7" reels. Supplied with attaché-size case with locking provision, car battery adapter, dynamic mic with "on-off" switch, batteries, and earphone, 16½" x 13" x 3½". \$139.95

TP-1001W Recorder
4-track solid-state, stereo, dual-speed (7½ & 3¼ ips) design. Has record-playback &



erase heads; 2 4" x 8" speakers; counter; vu meters. Response 70-15,000 Hz @ 7½ ips; wow & flutter 0.15% @ 7½ ips. 14½" x 13½" x 10" d. Supplied with two mics\$249.95

TP-1006W Tape Recorder
Solid-state; 4-track; 7" reel size; 2 speed (7½ & 3¼ ips; 1⅞ ips with capstan change) design. Response 50-18,000 Hz @ 7½ ips; 5 W/ch dynamic power (EIA 5% dist); wow & flutter 0.2%. Features sound-on-sound; sound-with-sound; vu meters; counter; pause control & 4" dynamic monitoring speaker. For use with external spkrs. 20¾" x 14" x 8". Supplied with DM-51 dynamic microphone\$329.95

TP-1012 Tape Recorder
Solid-state stereo design for a.c./d.c. operation (117 V a.c., 8 "D" cells, or 12 V bat-



tery). Features 4-track, 7" reel; automatic shut-off; two vu meters; pause controls; 2 speeds (7½ & 3¼ ips; 1⅞ ips with capstan change); counter; 1.25 W/ch dynamic output; two 6" x 4" speakers. Response 50-16,000 Hz. Supplied with 2 dynamic mics, 13½" x 12¾" x 7¼"\$169.95
All prices are "Suggested Retail".

ALLIED

1040 Stereo Tape Recorder
Records & plays 4-track stereo & mono at 7½, 3¼ & 1⅞ ips. Has detachable speak-



ers, two vu meters, two mic & two aux. inputs. Response 40-16,000 Hz @ 7½ ips; flutter & wow 0.15% @ 7½ ips. Supplied with 7" reel and two microphones. 15B7104U\$169.95

TD-1030 Tape Deck/Preamp
Solid-state, 3-speed (7½, 3¼ & 1⅞ ips) stereo design. Has record/play preamps for



4-track stereo and mono; digital counter; two mic inputs; two aux. inputs. Response 40-16,000 Hz ±3 dB @ 7½ ips (50-12,000 Hz @ 3¼ ips); flutter & wow 0.15% @ 7½ ips; S/N ratio 50 dB; HD 2.5%. Supplied with wood base, 7" reels & dust cover. 15W7103U\$129.95
12W7095 Dynamic mic\$ 11.76

AMERICAN GELOSO

TR-711B Portable Recorder
Transistorized; dual-speed (3¼ & 1⅞ ips), dual-track mono design. Response 100-6000 Hz; 25 W output; S/N 20 dB; wow & flutter .5%. Has combination level & battery condition meter; 2¼" speaker. Features monitor facilities when recording; 2 hrs. recording time; uses 6 penlight cells for life of 30 hrs. Supplied with remote-control mic, dual earphone & carrying case. 2" x 6" x 7". Optional equipment includes 120 V a.c. adapter, telephone pickup & others;



\$199.95

4-10 Tape Recorder

3-speed (3 3/4, 1 7/8 & 1 1/2 ips); transistorized, 120-V operation; 5" reel; mono de-



sign. Response 40-12,000 Hz @ 3 3/4 ips; S/N 50 dB; wow & flutter .2%; 2.5 W output. Features output jacks for monitoring, earphone, ext. spkr.; input jacks for remote mic., radio, remote foot pedal, telephone pickup, counter, vu meters. 12 3/4" w. x 5" h. x 11" d. wt. 12 1/2 lbs. Supplied with remote-control mic.\$269.95

G-540 Portable Recorder

Solid-state mono, dual-track, 1 1/8 ips design; response 80-10,000 Hz; output 1 W;



S/N ratio 48 dB; wow & flutter 0.5%. Has record/battery level indicator; operates from 8 "C" batteries, 12-V d.c. or 120-V a.c. 10" x 8" x 4 1/2". Supplied with remote-control mic & carrying case\$149.95 Many accessories available, including foot-pedal control, telephone pickup, mic mixer, etc.

AMPEX

AG-500 Series Tape Deck/Preamp

Two-speed solid-state professional recorder with 4-position head assembly with separate erase, record & playback heads; extra position for optional 4-track stereo playback or special requirements; has vu meters; response 30-18,000 Hz ± 2 dB @ 15 ips, 30-15,000 Hz @ 7 1/2 ips, 40-8000 Hz @ 3 3/4 ips; signal-to-noise ratio 55 dB @ 15 & 7 1/2 ips (half-track or 2-track), 50 dB @ 3 3/4 ips; wow & flutter .15% @ 15 ips, .18% @ 7 1/2 ips, 25% @ 3 3/4 ips; output +4 dBm into 600-ohm balanced or unbal-

anced load; rack space: transport 8 3/4" x 19" x 6" d.; electronics 3 1/2" x 19" x 6" d.

Model AG-500-1 full or half-track; single channel electronics include built-in mixer to mix line and mic or two mics; has two inputs: unbalanced bridging with provisions for plug-in line transformer or low-imp. plug-in microphone preamp; without case. Cat. #4010048-02 full track 7 1/2 & 15 ips.

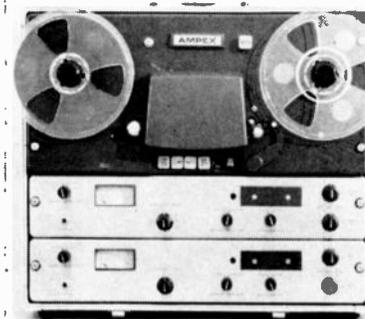
.....\$1202.00

Cat. #4010048-06 half track 3 3/4 & 7 1/2 ips.

.....\$1202.00

Cat. #4010048-04 half track 7 1/2 & 15 ips.

.....\$1202.00



Model AG-500-2 two channel; stereo or mono recording; has one input per channel; inputs are unbalanced bridging with provision for plug-in line transformers or low impedance plug-in mic. preamps; features sound-on-sound, cue tracks, and other special effects.

Cat. #4010049-06 two track, 3 3/4 & 7 1/2 ips.\$1432.00

Cat. #4010049-02 two track 7 1/2 & 15 ips.

.....\$1432.00

Remote control (in box with 30' cord)

.....\$85.00

Cat. #4010049-08 four track 3 3/4 & 7 1/2 ips. Has three 4-track record-erase-playback heads, a 2-track playback head & a head switch. Has 1 line input for each channel. Microphone preamps or line transformers may be used with line inputs.....\$1432.00

961 Tape Recorder

Features automatic tape reversing; solid-state design; 3 speeds; vu meters. Supplied with #702 mic and two #813 speakers\$349.95

2100 Series Tape Recorder

Three-speed (7 1/2, 3 3/4 & 1 1/8 ips) design features automatic tape threading, automatic end-of-reel tape reverse, and manual switch for tape reverse at any time desired. Machine adds inaudible pulse onto any tape, used to actuate end-of-reel reversal. All-solid-state. Has automatic shut-off and built-in preamps, power amps, and speakers. Four heads. Records 4-track stereo and mono, plays 4-track stereo and 4-track, half-track, and full-track mono. Response 30-18,000 Hz ± 2 dB @ 7 1/2 ips; S/N 52 dB @ 7 1/2 ips; power output 8 W/ch continuous r.m.s. Flutter and wow 0.08% @ 7 1/2 ips.

2150 uncased deck with stereo preamps only\$479.95

2160 portable deck with stereo preamps and



power amps\$549.95

2161 complete recording outfit with two

2113 slide-on speakers\$599.95

2165 portable in walnut cabinet with pre-

amps and power amps\$579.95

Model 622 Portable Speaker/Amp

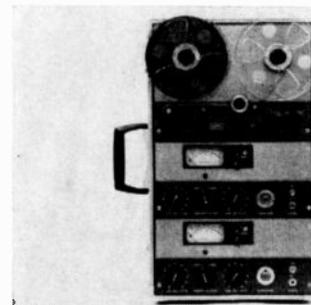
Designed for use with Model 602 Series recorder; 10-watt amplifier with frequency



response of 20 to 20,000 Hz ± 0.5 dB; hum and noise 70 dB below 10 watts; harmonic distortion less than 1%; speaker frequency response: 65 to 10,000 Hz; level and tone controls; a.c. convenience outlet; external speaker jack bypasses internal speaker; input impedance 20,000 ohms; output impedance 12 ohms; 13" x 16" x 8".....\$189.50

602-2 Series Recorders/Preamps

Stereophonic tape recorder using Model 602-1 tape transport and two Model 602-1



electronic chassis for stereo record/playback; two-track erase head, record and playback heads; all performance specifications identical to Model 602-1.

Cat. #4016023-02 7 1/2 ips, portable case

.....\$875.00

Cat. #4016023-04 3 3/4 ips, portable case

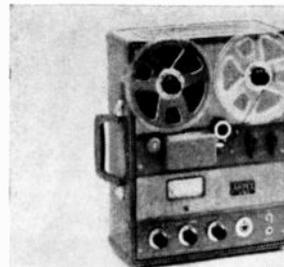
.....\$875.00

Cat. #4016023-01 7 1/2 ips, supplied un-

mounted\$795.00

602-1 Series Recorders/Preamp

Full-track or half-track recorder; 3 heads; erase, record, playback; frequency re-



sponse: 40 to 15,000 Hz, 40 to 10,000 Hz ± 2 dB, no more than 4 dB down at 15,000 Hz; wow and flutter under 0.17% r.m.s.; signal-to-noise ratio: full track, over 57 dB below peak recording level at 3% total harmonic distortion; half track, over 55 dB; vu meter; separate record and playback preamplifiers; reel size: 7"; timing accuracy: ± 3.6 seconds in 30 minute recording; microphone and high level inputs with full mixing provisions; vertical or horizontal operation; separate playback preamp permits instantaneous comparison between incoming program material and actual recording; headphones jack; output:

VIKING MEANS EXTRA VALUE IN HI-FI STEREO TAPE RECORDERS

Now, for the first time, you can enjoy the superior reproduction, the quality engineering of a full fidelity tape recorder with three-speed, three-motor drive and solid state electronics at surprisingly modest costs. New VIKING 423 and 433 recorders are exciting additions to your stereo system — exciting both inside and out. Unequaled for operating convenience, impeccably styled, expertly engineered, these new VIKINGS are ideal for both audiophiles and serious recordists.

VIKING 433 Three speed, quarter-track stereo recorder with three separate hyperbolic tape heads, solid state record and playback electronics. Equipped with stereo headphone jack for monitoring; monitor gain controls for each channel. Eight-position function selector illuminates color-coded indicator windows. Three drive motors; mixing controls (for sound-on-sound editing), echo

switch, push-button counter, automatic shut-off, pause control, foolproof tape motion and record switch interlock. Optional remote pause control and walnut base . . . **under \$370.00**

VIKING 423 A solid, sensible, no-gimmicks unit with three speed, three motor drive and modern solid state electronics at an amazingly low price. Quarter track stereo; operates in vertical/horizontal position; built-in pause control; hyperbolic tape heads; push-button counter; directional control levers interlocked for foolproof operation; illuminated record meter, optional remote pause control and walnut base . . . **under \$250.00**

VIKING 433

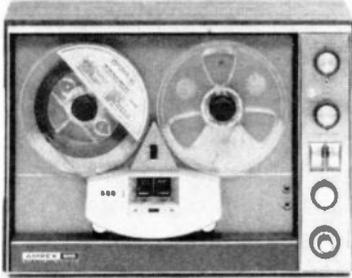


VIKING
tape recorders
A DIVISION OF THE
TELEX CORPORATION
9600 ALDRICH AVENUE SOUTH
MINNEAPOLIS, MINNESOTA 55420

+4 dBm into 600 ohm load from tapes recorded at program level.
 Cat. #4016021-04 Half-track, 7½ ips, portable case\$625.00
 Cat. #4016021-08 Half-track, 3¾ ips, portable case\$625.00
 Cat. #4016021-03 Half-track, 7½ ips, unmounted\$575.00
 Cat. #4016021-02 Full-track, 7½ ips, portable case\$625.00
 Cat. #4016021-01 Full-track, 7½ ips, unmounted\$575.00

800 Series Tape Recorders

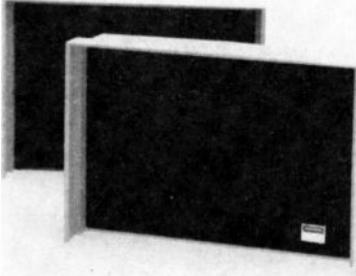
Four-track stereo, ½ track & mono; transistorized; dual capstan drive, no pressure



pads; vu meters; 3-speed (7½, 3¾, 1½ ips). Response 50-15,000 Hz ± 4 dB @ 7½ ips. Signal-to-noise -46 dB @ 7½ ips. Wow & flutter .2% @ 7½ ips. Model 850 deck only with preamps \$199.95 Model 860 portable deck with preamps, power amps\$289.95

813 Speaker System

Portable slide-on type; impact resistant molded plastic frame, 9" x 6" oval speaker



.....pair \$29.95

1100 Series Tape Recorders

Four-track stereo, ½ track & mono; automatic threading; electronic & manual reversing; transistorized; dual capstan drive, no pressure pads; vu meters; 3 speed (7½, 3¾, 1½ ips); has provision for automatic slide projector actuator. Performance at 7½ ips: response 50-15,000 Hz ± 4 dB, S/N -46 dB, wow & flutter .2%. Model 1150 deck only with preamps.....\$299.95 Model 1160 portable deck with preamps,



power amps\$389.95 Model 1165 furniture deck with preamps, power amps\$419.95

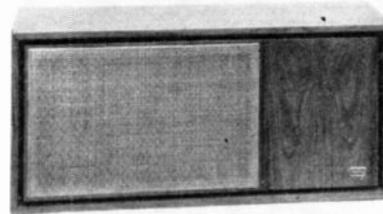
1113 Speaker System

Impact-resistant molded plastic case with 9" x 6" dual-cone speaker. Response 50-

15,000 Hzpair \$49.95

3010 Series Speaker System

Solid walnut, infinite baffle, fiberglass filled design with 10" woofer, two 3" tweeters.



h.f. level control. Available with cane (#3010) or charcoal brown (#3011) grille clothca. \$149.95

4010 3-Way Speaker System

Bookshelf design with 12" woofer, two shielded back-loaded mid-treble wide-dispersion radiators & a dome lens multicellular ultra-high horn tweeter; crossovers at 1800 & 8000 Hz. Level controls for mid and treble ranges; 8 to 16 ohms; capacity 75 W music power; 24" x 14" x 12". Oiled walnutpair \$379.90

815/816/817/818 Speaker Systems

Bookshelf design with an extended-range woofer & a 3½" tweeter. Response 50-15,000 Hz; 8 ohms; 10 W music power capacity.

815 Walnut cabinet with tan grille clothpair \$59.95
 816 Walnut cabinet with gold grille clothpair \$59.95
 818 Walnut cabinet with cane grille.....pair \$59.95
 817 Fruitwood cabinet with paisley grille clothpair \$59.95

Accessories

#701 mic.: Omnidirectional dynamic type, 3¼" x ¾" dia., with stand.....\$9.95
 #1101 mic. Omnidirectional dynamic type\$19.95
 #2001 mic.: Omnidirectional dynamic type, 7" x 1½" dia., with stand\$29.95
 #140 headset: Dynamic stereo with foam ear pads; stereo phone plug adapter \$29.95
 #141 headset: Dynamic with foam ear pads & stereo balance control at headset \$39.95
 Recording Accessory Kit: Complete maintenance kit. Includes head demagnetizer, head cleaner, tape splicer, leader tape, splicing tape, and cotton swabs.....\$22.50

985 Tape/Radio System

Combines stereo tape recorder with an AM-FM stereo tuner in a single, compact walnut

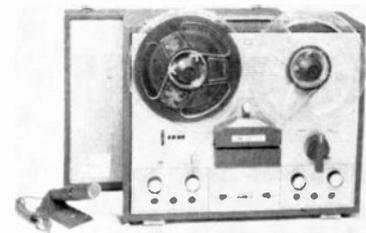


cabinet with tambour door. Recorder specifications similar to 1100 Series tape recorder. Has automatic reverse & pause control. Will record directly from tuner. Supplied with two mics.\$599.95 Matching speaker systems. Model 830Pair \$99.95

ARISTO

10R-804 Stereo Tape Recorder

Solid-state, four-track, stereo design; records/plays stereo; 7" reels; a.c. operated; vu meter; individual tone & volume controls each channel; digital counter; fast-forward sw.; two-speed selector sw. Can operate either horizontally or vertically.



Comes with two dynamic pencil mics & stands, aux. patch cords for recording direct from tuner or TV, 7" reel, 12" h. x 14" w. x 7" d. Net\$75.99

14R-806 Stereo Tape Recorder

14-transistor, 4-track design; plays and records stereo in vertical or horizontal posi-



tion; 7" reels; a.c. operation; push-button control; two vu meters; digital counter; volume & tone controls each channel; fast-forward sw.; automatic stop; two-speed selector sw.; removable extension speakers. Comes with two dynamic pencil mics with stands; aux. patch cords; 7" reel, 15½" h. x 20¾" w. x 8½" d.Net \$139.99

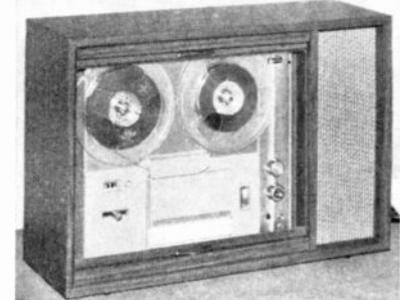
ARVIN

37L09 Portable Recorder

Solid-state, battery-operated, two-speed (1¾ & 3¾ ips) mono design; response 150-5000 Hz @ 3¾ ips; supplied with remote control mic, 9½" x 8¾" x 3¾".....\$39.95
 871.06 Voice-actuated mic.\$18.95
 871.10 Foot control\$ 3.95
 739 117-V a.c. adapter\$ 8.95

86L38 Mono Tape Recorder

Solid-state design; 4 tracks; 3 speeds (7½, 3¾ & 1½ ips). Features sound-with-



sound; monitoring facilities; pause control; 2½ W dynamic power @ 5% dist. & 4-ohm load. Response 70-12,000 Hz ± 5 dB @ 7½ ips; wow & flutter 0.2% @ 7½ ips. Wood grain vinyl cabinet with mic, 24" x 16½" x 8½" d.\$119.95

57L19 Tape Recorder

Both battery (six "D" cells) and 117 V a.c. operation. Features 2 speeds (3¾ & 1½ ips); mono; 3" x 5" speaker; 5" reel;



425 mW dynamic power (EIA @ 5% dist.). Response 100-8000 Hz; S/N ratio 40 dB. 13½" x 6" x 12" d. Supplied with remote-control mic.\$69.95

67L39 Portable Tape Recorder

Stereo design; 4 tracks; 3 speeds (7½, 3¼ & 1½ ips); will operate from 8 "D" cells or 117 V a.c. line; has two 5¼" oval speakers & detachable wing cabinets. Dynamic power 0.75 W/ch (EIA @ 5% dist.); response 60-10,000 Hz ±4 dB @ 7½ ips; wow & flutter 0.25% @ 7½ ips. Supplied with two dynamic mics. 24" x 14" x 7"\$164.95
All prices quoted are suggested retail.

BELL & HOWELL

2297 Tape Recorder

Solid-state, 4-speed (15½, 1½, 3¼ & 7½ ips). 4-track stereo design. Features auto-



matic tape loading (using air cushion); automatic play & record in both directions with automatic tape reversing in both directions; automatic mixing on either or both channels from different inputs; audible search control; digital counter; automatic head degaussing; pause control; vu meters; automatic shut-off; 15 W/ch dynamic power (EIA 5% dist.). Response 40-18,000 Hz ±3 dB; S/N ratio 51 dB; wow & flutter 0.09% @ 7½ ips; power amplifier HD 50-20,000 Hz 3% at rated output ..\$449.95

2295 Tape Recorder

Same as Model 2297 except power output 8.4 W/ch dynamic (EIA 5% dist); power amplifier THD 3% at 1 W from 50-15,000 Hz\$399.95

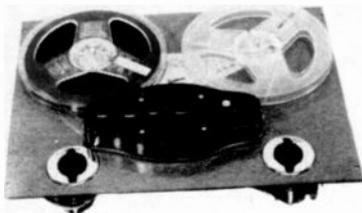
2291 Tape Deck/Preamps

Same as Model 2297 except does not have power amplifiers or tone controls\$349.95
All prices suggested list.

BRENELL

Mark IV & IVB Tape Decks

Tape deck chassis; dual track; takes up to 4 heads for record, playback, and erase;



3 speeds; 3 motors; frequency response: 3.75 ips, 50 to 6000 Hz; 7.5 ips, 50 to 12,000 Hz; 15 ips, 30 to 15,000 Hz (all ±3 dB); flutter and wow less than 0.2%; tuning eye level indicator; dual track operation for up to 7" reel; requires preamp and amplifier; speed change by screw-on 2:1 ratio capstan sleeve and slow-fast stepped flywheel and motor pulley assembly; Mumetal heads; mechanical brakes;

1968 EDITION

2 knob contro'. interlocked; digital counter; fast rewind; size 15"x11½"x3¾"d; mounting: from horizontal up to 85° slant. Mark IV. 1 upper track erase head; 1 upper track record/playback head; (mono)\$144.50

Mark IVB. 1 upper, 1 lower track erase head; 1 upper, 1 lower track record/playback head; (staggered stereo).....\$182.87

Mark 5 Series Tape Deck

Four speed (1½, 3.75, 7.5 & 15 ips); two switches control record, playback, wind & rewind; has revolution counter; normally deck is supplied fitted with one erase and one record/playback head (upper track in operation); provision is made for extra heads to be mounted easily when required for special purposes.

Mark 5 Mono record/playback.....\$169.50
Mark 5B Stereo record/playback.....\$199.50

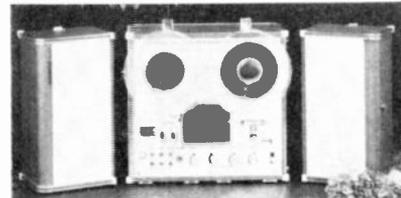
Mark 5 Record/Playback Amplifier

Primarily designed for use with Brenell tape decks; frequency compensation is to CCIR standards at 7.5 & 15 ips; 7 watts output; two amplifiers required for stereo operation; has high-frequency tone control; microphone input 2-5 mV into 2 megohms; tuner-phono 250 mV into 700,000 ohms; tubes—EF86, ECC83, EL84, 1Z80. EM81 size 15" w. x 4½" h. x 5" d.; without power supply.\$ 84.60
With power supply.....\$109.50

CHANNEL MASTER

"Sir Realist" 6430 Stereo Recorder

Transistorized; 2-speed (7½ & 3¼ ips); ¼-track, 2-channel stereo record & play-



back; 4-track mono record & playback. Design has 2 vu meters for record & playback; digital counter; mic & aux. inputs; 2-1000-ohm line outputs; 2-8-ohm outputs for ext. spkr.; headphone jack & 3 W/ch power amp. Response 50-15,000 Hz @ 7½ ips; S/N 47 dB; channel separation 65 dB @ 1000 Hz; 4" extended-range spkrs. are used in removable lids. Solid wood vinyl-covered cabinet. 14½" x 13" 13¾". Supplied with 2 mics\$219.95

"Troubadour" 6431 Stereo Recorder

Solid-state, 4-track, 2-speed (3¼ & 7½ ips) design; capstan drive; digital counter;



independent channel controls; single-lever mode control; vu meter with switch. Response 50-15,000 Hz @ 7½ ips; audio output 2 W/ch; two 4" x 6" speakers. 7" reels. 17" x 7½" x 14"; 117 V a.c. Supplied with two directional mics.List \$219.95

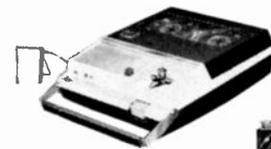
CONCERTONE

700 Portable Mono Recorder



Sound advice from Stan Kenton

"Sounds are my business. That's why it's such a pleasure for me to be selling Craig products, too. Craig has developed a full line of tape equipment that has captured the buying fancy of the consumer. It's a no-nonsense line with a great price-value relationship that really moves the merchandise off the shelves. Check out Craig. See your Craig rep and let's start selling together." **THE COMPLETE CRAIG LINE INCLUDES THESE HOT-SELLING ITEMS. WRITE FOR OUR COMPLETE LINE BROCHURE TODAY!**



Craig #212



Craig #2107



Craig #3104



Craig #2602



... products for your pleasure

Craig Panorama, Inc., 2302 East 15th Street, Los Angeles, California 90021
CIRCLE NO. 12 ON READER SERVICE CARD

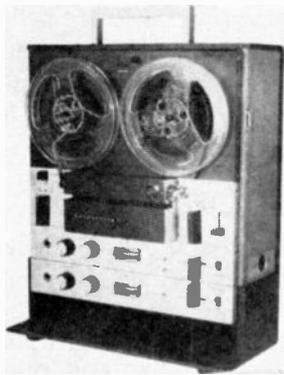
Cordless & a.c. operated, 2-track, transistorized, 4-speed (1 $\frac{1}{16}$, 1 $\frac{1}{8}$, 3 $\frac{3}{4}$ & 7 $\frac{1}{2}$ ips) remote-control design using 7" reels. Op-



erates from six "D" size flashlight cells & has built-in 117 V a.c. power supply. Flutter & wow 0.25% r.m.s.; response 30-15,000 Hz @ 7 $\frac{1}{2}$ ips & 30-30,000 Hz @ 1 $\frac{1}{16}$ ips; S/N ratio 45 dB; has 5 $\frac{1}{2}$ " x 3" speaker, 10 $\frac{3}{8}$ " x 11 $\frac{3}{4}$ " x 5 $\frac{9}{16}$ ". Supplied with omnidirectional mic & special dictation mic & remote start-stop switchLess than \$189.00

727 Portable Stereo Recorder

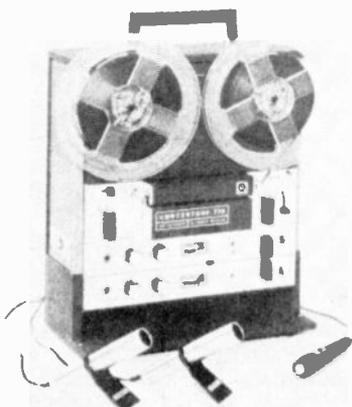
Operates on either 117 V a.c. or batteries. Features 4-track, transistorized, 4-speed



(1 $\frac{1}{16}$, 1 $\frac{1}{8}$, 3 $\frac{3}{4}$ & 7 $\frac{1}{2}$ ips) design; 3 separate heads; remote control; built-in stereo amps & speakers; 5" max. reel size. Operates from six "D" cells. Response 50-3000 Hz @ 1 $\frac{1}{16}$ ips & 30-14,000 Hz @ 7 $\frac{1}{2}$ ips; wow & flutter 0.3% @ 7 $\frac{1}{2}$ ips; two record-level vu meters also provide battery condition reading. Supplied with voice-type remote control mic, 12 $\frac{1}{4}$ " x 18 $\frac{1}{2}$ " x 5 $\frac{1}{2}$ "\$179.95

770 Portable Stereo Recorder

Similar to Model 700 in design & operation except 4-track stereo record & play



back. Supplied with additional omnidirectional mic, 11 $\frac{13}{16}$ " x 13 $\frac{7}{8}$ " x 5 $\frac{1}{8}$ "Less than \$289.00

302-D Stereo Tape Deck/Preamp

Solid-state design; 3-speed (7 $\frac{1}{2}$, 3 $\frac{3}{4}$ & 1 $\frac{1}{8}$ ips); 4-track; has two heads (erase &

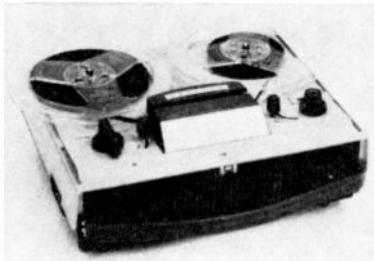


record/play); pause/cue control; dual-type vu meter. Response 50-15,000 Hz @ 7 $\frac{1}{2}$ ips; wow & flutter 0.15% @ 7 $\frac{1}{2}$ ips; S, N ratio 50 dB @ 7 $\frac{1}{2}$ ips. Features sound-with-sound & automatic shut-off. Accepts up to 7" reels. Does not have power amps. Has two line & two mic inputs & two line outputs, 14 $\frac{1}{2}$ " w. x 19" x 4 $\frac{1}{2}$ "\$169.95

CONCORD

Model 102 Mono Tape Recorder

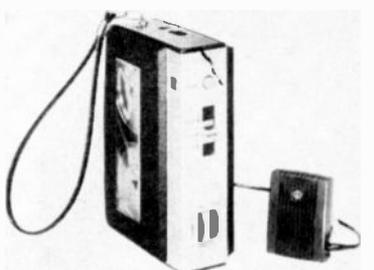
Solid-state design; 2 speed (7 $\frac{1}{2}$ & 3 $\frac{3}{4}$ ips), dual-track mono; response 50-10,000



Hz; wow & flutter .3% @ 7 $\frac{1}{2}$ ips. Has mic. & aux. inputs; earphone monitor output; built-in amplifiers with 10" x 2 $\frac{1}{2}$ " spkr.; level indicator. Supplied complete with crystal mic & earphone; 5 $\frac{1}{2}$ " x 12 $\frac{1}{2}$ " x 11"\$79.95

F-20 "Sound Camera"

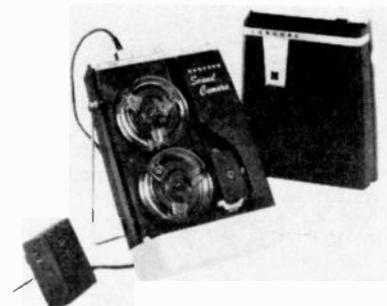
Dual-track, solid-state, battery-operated mono record & playback design. Takes



2 $\frac{1}{2}$ " reel. Uses standard "C" flashlight cells; provides 30 minutes playing time per reel; has variable speed control & record/battery level indicator; supplied with remote dynamic mic, 6 $\frac{3}{8}$ " x 2 $\frac{1}{4}$ " x 4 $\frac{1}{2}$ "\$25.00
Optional accessories: EP-1 earphone; FT-2 foot sw.; TP-2 telephone pickup; AC-5 120-V a.c. adapter.

F-85 "Sound Camera"

1 $\frac{1}{8}$ ips recording speed. Mono dual-track



portable design operated from 4 standard flashlight batteries (a.c. adapter optional equip.); 12 hours battery life; 2 $\frac{1}{8}$ " max. reel; solid-state. Has record level & battery life indicator, 5" x 7" x 3"; 2 lbs.; supplied with dynamic mic & carrying case\$39.50

501D Tape Recorder/Preamps

Solid-state, 4-track, 3-speed (1 $\frac{1}{8}$, 3 $\frac{3}{4}$ & 7 $\frac{1}{2}$ ips) stereo record & playback design;



has two vu meters; 7" reels; automatic shut-off; cue control; counter. Response 30-18,000 Hz \pm 3 dB @ 7 $\frac{1}{2}$ ips (30-10,000 Hz @ 3 $\frac{3}{4}$ ips) wow & flutter 0.17%; S, N ratio 50 dB. Mahogany cabinet, 14 $\frac{3}{4}$ " x 12 $\frac{1}{2}$ " x 4 $\frac{1}{4}$ "under \$150.00

776D Tape Recorder/Preamps

Solid-state, stereo, 2-speed (3 $\frac{3}{4}$ & 7 $\frac{1}{2}$ ips), 4-track record & playback design. Features "Reverse-A-Track"; sound-with-sound. Response 30-20,000 Hz \pm 3 dB @ 7 $\frac{1}{2}$ ips; wow & flutter 0.15%. Has stereo line outputs; 7" reels; walnut cabinet, 20" x 13 $\frac{1}{2}$ " x 7"under \$280.00

Model 122 Mono Recorder

Solid-state, 3-speed (7 $\frac{1}{2}$, 3 $\frac{3}{4}$ & 1 $\frac{1}{8}$ ips), dual-track design. Response 50-12,000 Hz



@ 7 $\frac{1}{2}$ ips; features 6" built-in speaker; counter; vu meter; aux & mic inputs; 14" x 6 $\frac{1}{2}$ " x 11"\$125.00

Model 300 Dual-Power Recorder

Will operate from six "C" batteries or 120-V a.c. Features dual speed (1 $\frac{1}{8}$ & 3 $\frac{3}{4}$ ips) 2-track, mono operation. Has record/battery level indicator; automatic record level control. "Reverse-A-Track" feature; takes up to 4" reel; response 60-10,000 Hz @ 3 $\frac{3}{4}$ ips. Solid-state design. Supplied with remote control dynamic mic, 3" x 10" x 9"; 6 $\frac{1}{2}$ lbs.\$125.00

Maybe all you need is half a tape recorder.

Because if you already have a stereo system, the other half is sitting in your living room.

The Panasonic System Maker is what the professionals call a four-track stereo tape deck.

This means it's a stereo tape recorder without an amplifier or speakers. All you have to do to make it whole again is to plug it into your own system.

And because you don't need all the extras, you don't have to pay for them.

You can get the System Maker, Model RS-766, for \$149.95.* If you've been looking at fine stereo tape recorders lately, you know that \$149.95 is practically a giveaway price.

Especially when you consider that the System Maker has 18 Solid State devices, two precision VU meters, three-speed capstan drive, a 7" reel capacity, automatic power shutoff, and operates vertically or horizontally.

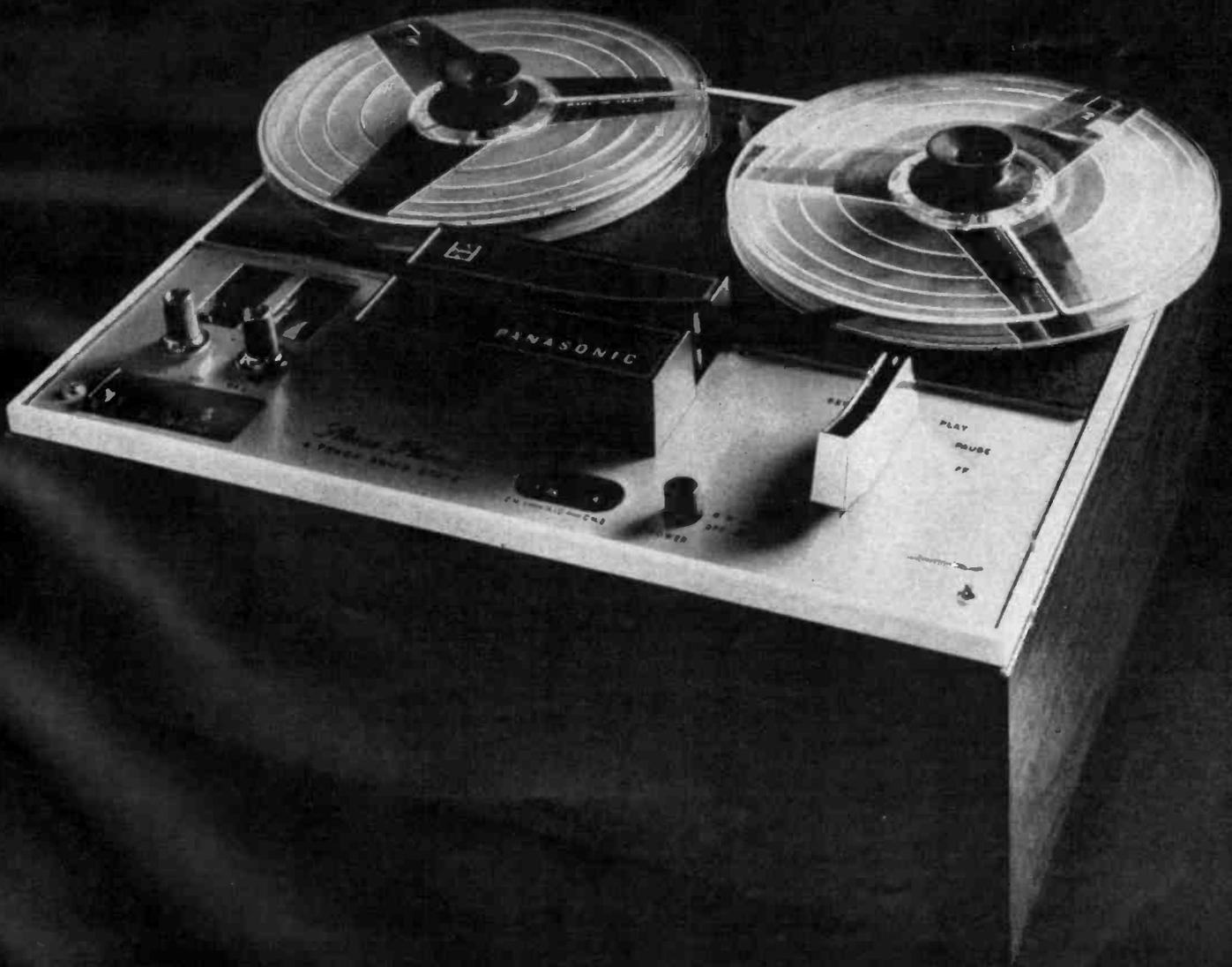
But if you need a whole tape recorder instead, we make a complete line.

In fact, we're the largest manufacturer of tape recorders in the whole world.

You can get a tiny Panasonic portable for as little as \$39.95. Or a \$200.00 professional unit that goes in the broadcasting stations we build, if you really want to get into the Big Time.

Of course, the only way to find out what tape recorder you want is to see a Panasonic dealer.

We're pretty sure that you'll wind up talking to yourself that evening.



PANASONIC[®]

200 PARK AVENUE, NEW YORK 10017
*SUGGESTED LIST PRICE, CANADIAN PRICE HIGHER



Optional equipment. VM-10 voice-operated mic; FT-2 foot sw; TP-2 telephone pickup.

350 Automatic Portable Recorder

Features automatic tape reversal & voice-operated start/stop; 2 speeds (3 3/4 & 1 1/2



ips); solid-state circuits; battery operation (six "D" cells); vu meter/battery level indicator; dual track; counter; cue button; external monitor; 3" x 6" speaker; mono operation. Uses up to 5" reels; response 50-10,000 Hz. Supplied with remote-control dynamic mic. 11 1/2" x 11" x 4". 10 lbs.\$200.00

Optional equipment; AC-6 120-V adapter; FT-2 foot sw.; TP-2 telephone pickup.

Model 220-T Mono Tape Recorder

Three speeds (7 1/2, 3 3/4, 1 1/2 ips); permits playing time of 2 hours at 7 1/2 ips with



2400 foot, 7" tape; solid-state; response 40-15,000 Hz @ 7 1/2 ips; 40-5000 @ 1 1/2 ips; built-in 4" x 6" speaker; electronic-eye level indicator; digital tape counter; includes dynamic microphone and earphones; 12" x 13" x 7 1/2".\$149.95

Model 444 Tape Recorder

Solid-state preamps; 3-speed (7 1/2, 3 3/4 & 1 1/2 ips) design with built-in amplifiers



and speakers; record/playback. 2-track stereo or mono; separate erase & record/play stacked heads; response 50-15,000 Hz

±2 dB @ 7 1/2 ips; wow & flutter 0.2% r.m.s. @ 7 1/2 ips; S/N ratio better than 40 dB; HD less than 2% @ 3 dB below rated output; two inputs/ch (47 ohms to ext amp & 8 ohms to ext spkr); 30A5 output tubes are used; split speakers in case cover for remote placement; 5 W/ch output; has 2 vu meters; features sound-on-sound recording; supplied with two dynamic mics & mahogany carrying case; 11 1/2" x 13 3/4" x 14" d.\$199.95

F-90 "Radiocorder"

Combines an AM tuner with a 2-speed (3 3/4 & 1 1/2 ips) 2-track, battery operated



or 120-V a.c. solid-state recorder. Features direct recording from AM tuner; takes up to 3 3/4" reels; has record/battery level indicator & 2 W output. Supplied with remote control dynamic mic.\$89.95

700 Series Recorders

Solid-state, 4-track stereo with detachable speaker enclosures. Features vu meters,



counter, 2 dynamic mics, cue button, monitor, sound-with-sound. Has mic & high-Z inputs; "Trans-A-Track" recording facility. Model 727 2-speed (7 1/2 & 3 3/4 ips); one ea erase & record/playback heads; unidirectional tape transport; response 30-20,000 Hz ±3 dB; wow & flutter 0.15% @ 7 1/2 ips; S/N ratio 50 dB; 6" speakers; 7 1/2 W/ch output; automatic shut-off. Mahogany\$300.00

Model 776 Same as 727 except has automatic "Reverse-A-Track" feature; with 2 ea erase and record/playback heads; automatic electronic shut-off. 13" x 20" x 6 1/2" plus speaker 6 1/2" x 6 1/2" x 10". Mahogany\$349.50

CRAIG PANORAMA

"Craig 910" Stereo Tape Recorder

Solid-state, 4-track, dual-speed (7 1/2 & 3 3/4 ips) design. Features sound-on-sound; built-



in stereo preamps & power amps & two 4" x 5" spkrs. Has vu meters, radio & mic inputs. Response 50-15,000 Hz @ 7 1/2 ips. 17" x 14" x 5 1/2" d. Supplied with mics.\$179.95

"Craig 212" Portable Tape Recorder

Two-speed (3 3/4 & 1 1/2 ips), 2-track mono design. Operates on six "C" batteries or op-



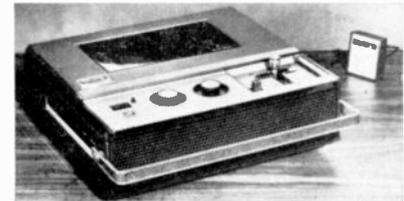
tional a.c. adapter. Response 160-7000 Hz @ 3 3/4 ips & 150-3500 Hz @ 1 1/2 ips. 750 mW output. Has automatic level control & fast wind & rewind. Use 3 3/4" reels, a 4" x 2 1/2" spkr. and has inputs for mic; foot-switch & earphone jack output. 7 7/8" w. x 9 1/4" d. x 3 1/8". Dynamic remote-control mic included.\$39.95

2108 Portable Recorder

Deluxe version of "Craig 212"; added features include battery meter & aux. input.\$49.95

2106 Portable Recorder

Mono design; battery (six "D" cells) or optionally a.c.-operated; features 5" reel; 2



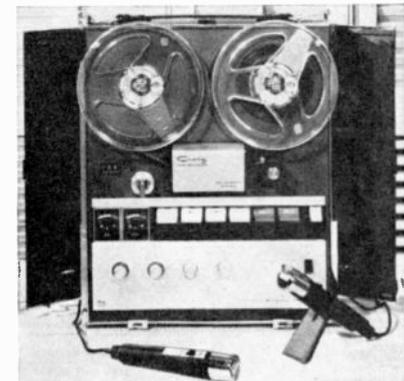
speeds (1 1/2 & 3 3/4 ips); wow & flutter 0.3% @ 3 3/4 ips; S/N ratio 40 dB; 0.55 W output. Response 150-7500 Hz @ 3 3/4 ips; records on 1/2-track with d.c. erase; has mic & radio inputs; 3" x 6" speaker & remote-control mic. 10 1/2" x 11 1/2" x 4 1/4".\$71.95

2107 Portable Recorder

Mono design; 5" reels; 3 speeds; operates on batteries or automatically switches to a.c. power. Has built-in voice actuation; automatic or manual sound-level control.\$139.95

2202 Portable Stereo Recorder

Solid-state, 4-track design; operates on six "D" cells, a.c. current, or 12 V auto battery.



Features sound-on-sound; sound-with-sound; automatic stop; 3 speeds (1 1/2, 1 1/2, 3 3/4 ips). Has vu meters; inputs for mic; remote switches & aux; a.c. bias & erase; output 0.5 W/ch; response 100-10,000 Hz @ 3 3/4 ips; supplied with two mics. 10 1/2" x 12" x 5 3/4" d.\$199.95

2403 Stereo Tape Recorder

3-speed design with automatic shut-off; 7" reels; dual vu meters; counter; 2 1/2 W/ch.

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CL-297

Walnut cabinet\$239.95

2404 Tape Deck/Preamps

Same as Model 2403 except does not include power amps\$159.95
All prices quoted are "List prices".

CROWN

SX700 Series Tape Recorders

Record and play response 30-25,000 Hz ± 2 dB @ 7½ ips; has three-motor modular-designed transport; differential magnetic braking; automatic stop; two-speed record/play equalization; 7½ & 3¼ ips (1½ & 15 ips available); handles up to 10½" reels; wow & flutter 0.09% @ 7½ ips; S/N ratio 44 dB @ 7½ ips; HD 1.5%; inputs: two high imp. inputs per channel, mic or line; +6 dBm or 2.5 V output.

SX711 Full-track mono\$ 895.00
SX712 Half-track mono\$ 895.00
SX724 Two-track stereo\$ 995.00
SX724-P2 Four-track stereo with two- and four-track stereo playback\$1220.00

CX700 Series Solid-State Recorders

Three heads, three motors featuring differential magnetic braking, automatic stop, three speeds. Handles up to 10½" reels; wow & flutter 0.09% @ 7½ ips. Available with either mono electronics or stereo control center. Response @ 7½ ips (4 tr) 30-30,000 Hz ± 2 dB; S/N ratio 60 dB. Four-channel stereo control center. Basic unit with 4 unbalanced line inputs, 2 mixing inputs per channel; line (basic) or microphone, RIAA phono (using optional plug-in modules). Outputs 0 level, 5000 ohms unbalanced or up to +18 dBm (using optional amp module); two 5" vu meters.

CX711 Full-track mono\$ 995.00
CX712 Half-track mono\$ 995.00
CX722 Two-track stereo\$1295.00
CX724 Quarter-track stereo\$1295.00
Complete series of players-only available.

CX800 Series Solid-State Recorders

Can be remote controlled; features computer logic control photocell automatic stop; three motors; differential magnetic braking; three speeds. Handles up to 10½" reels; wow & flutter 0.06% @ 15 ips. Available with either mono electronics or stereo control center; response @ 7½ ips 30-30,000 Hz ± 2 dB; S/N ratio 56 dB. Four-channel stereo control center. Basic unit with 4 unbalanced line inputs, 2 mixing inputs per channel; line (basic) or microphone, RIAA phono (using optional plug-in modules). Outputs 0 level, 5000 ohms unbalanced, or up to +18 dBm (using optional amp module); two 5" vu meters. Available with low-impedance mic, input and balanced 600-ohm output.

CX811 Full-track mono\$1495.00
CX812 Two-track mono\$1495.00
CX822 Two-track stereo\$1790.00
CX824 Quarter-track stereo\$1790.00
CX844 Four-channel in-line\$2880.00
Complete series of players-only available.

SA 30-30 Tape Recorder Amplifier

Solid-State; 20 W ch continuous sine-wave power into 8-ohm load (30 W ch @ 4 ohms); damping factor is 200 at all frequencies below 1000 Hz; response 10-50,000 Hz ± 1 dB at rated output; HD 0.2% for all power levels up to 20 W, 1¼" x 8" x 19". Can be mounted in standard relay rack or in carrying case of Crown tape recorders.

For rack mounting\$199.00
For shelf installation (with cover) \$215.00

SX800 Series Solid-State Recorders

Uses SX700 electronics and CX800 transport.
SX811 Full-track mono\$1395.00
SX812 Half-track mono\$1395.00

SX822 Two-track stereo\$1495.00
SX824 Quarter-track stereo\$1495.00

Complete series of SP700 and SP800 players are available.

CROWNCORDER

CTR5000 Portable Recorder

Battery-operated, 2-speed (1½ & 3¼ ips) capstan drive; optional 120 V, 50/60 Hz



plug in; push button operation with fast forward; automatic level control, a.c. bias for 100-10,000 Hz record/playback; vu meter; 4 hours recording time @ 1½ ips & 0.5-mil tape, 2 hours @ 3¼ ips; comes complete with dynamic mic with remote control sw.; telephone pickup, input patch cord, monitoring earphone, batteries, tape & 5" take-up reel; charcoal & grey with red & chrome trim; has 3" x 5" speaker, 10½" x 4½" x 8½"; 6.7 lbs.\$74.95
CTR5050 Same but with built-in 120 V, 50-60 Hz\$84.95
CX5002 Same but with 12 transistors & voice-operated control\$84.95

CRC5800F "Radio Crowncorder"

5" reel, battery-operated portable tape recorder with AM-FM radio & p.a. facilities:



recorder features push-button operation; fast forward; automatic level operation; a.c. bias recording with 100 to 10,000 Hz response; 1 W output; 2-speed capstan drive; dual-track, 2-head recorder; vu meter; tape speed 3¼ & 1½ ips; comes complete with dynamic mic; telephone pickup; patch cord, monitoring earphone, tape & take-up reel & batteries. Optional a.c. adapter available, 11½" x 5" x 10¼".\$109.95
CRC5850F Same but with built-in a.c., 120 V, 50/60 Hz.\$119.95

Prices quoted are "Suggested List Price".

DUAL

CTG/27 Stereo Tape Deck/Preamps

Solid-state; 4-track; stereo/mono record & playback; 3¼ & 7½ ips; mixing controls for any two inputs—operate ganged or separately. Has provisions for synchronized use with slide and motion picture projectors; sound-with-sound; multi-play (sound-on-sound). Counter; pause button; automatic stop; response 25-16,000 Hz ± 2.5 dB @ 7½ ips; S/N ratio 50 dB; wow & flutter 0.1%. In walnut-finished hardwood veneer base, 16½" x 14½" x 7½" d.\$199.50

DYNACO

Transistorized Tape Recorder

Imported from B&O of Denmark; fully transistorized, 3-speed complete recorder



with built-in power amplifiers; three inputs (200-ohm mic, RIAA equalized phono, radio tuner) mixed via professional-type slide potentiometers; provision for sound-on-sound and echo; two record-level meters; hysteresis synchronous motor; separate record and playback heads; tape-input monitoring; preamp output; all plug-in circuit boards; 40-16,000 Hz ± 2 dB; r.m.s. flutter less than 0.075%; peak-to-peak flutter less than 0.2%; S/N ratio 50 dB.\$498.00
Portable version of the above machine includes a pair of monitor speakers built into the case covers\$525.00

FERROGRAPH

Series 5 Mono Recorder

Two-speed (3¼ & 7½ ips), 3-motor design; wow & flutter .16%; response 40-10,000 Hz ± 3 dB @ 3¼ ips, 40-15,000 Hz @ 7½ ips; dual inputs (.003 V & 1 V peak); output; speaker or 2½ V @ 15 ohms; includes amplifier & speaker.
Model 5A/N\$425.00

GRUNDIG

TK 245 U Stereo Recorder

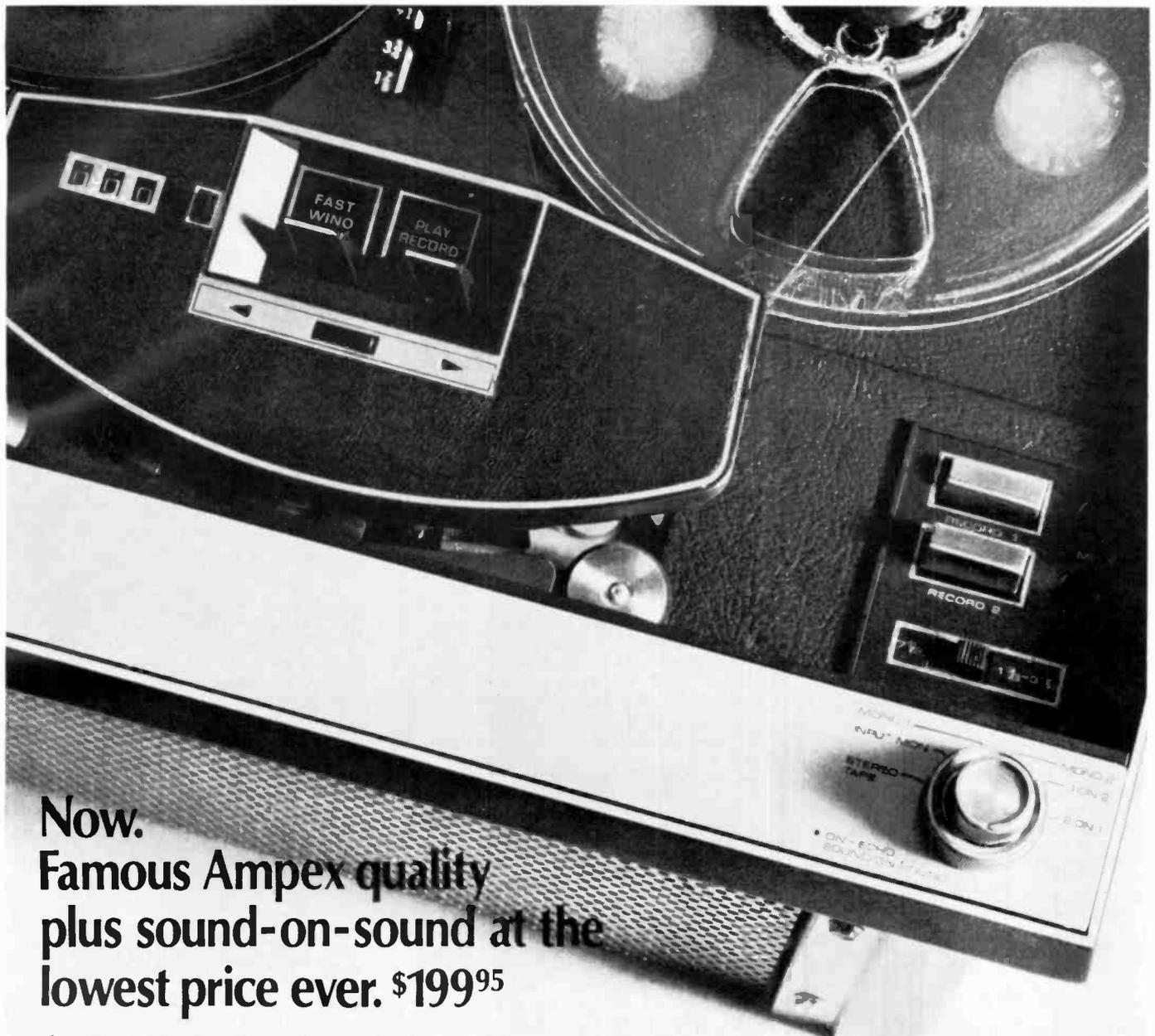
Two-speed (7½ & 3¼ ips), four-track mono stereo record; stereo playback with



external amplifier. Response 50-16,000 Hz @ 7½ ips; wow & flutter $\pm 0.12\%$ @ 7½ ips; 4-digit tape counter with reset; level indicator; automatic shut-off by foil at tape ends. Output 4 W dynamic power; two dual dynamic speakers, 16" x 13" x 7¼". Comes with mic., 7" take-up reel, cable for connection to any tuner and amp, with standard U.S. jackList \$249.95

TK 341 Stereo Recorder

Three-speed (7½, 3¼ & 1½ ips), four-track stereo/mono recorder. Response 40-18,000 Hz @ 7½ ips; signal-to-noise ratio greater than 50 dB; wow & flutter less than $\pm 0.1\%$ @ 7½ ips. Sound-on-sound & sound-with-sound; echo & verb optional extra. Records live, off-the-air, from tapes, discs, or phone (optional extra). Push-button operation, pause bar, automatic shut-off; digital tape counter with push-button reset. 12 W/ch dynamic power; two 6" x 4" speakers, 20¼" x 15¼" x 8".



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If you've been an audio enthusiast for long, you know that Ampex tape recorders are the standard of the broadcast and recording industries. All the major networks use them. So do most local TV and radio stations. And almost all commercial record companies.

Now you can add that kind of quality to your component system for just \$199.95 with the all-new Ampex 750 tape deck.

The 750 gives you unmatched sound quality because it has Ampex's exclusive deep-gap heads. The deep gap means music performance remains consistently high for the life of the head. And because deep-gap heads are engineered to last longer, you'll enjoy peak performance for about three years—two years longer than most other heads.

The new 750 tape deck has Ampex's exclusive rigid-block construction. Recording and playback heads are securely anchored to a precision-machined metal casting. As a result, tapes align with the heads to one thousandth of an inch. With that kind of alignment, a 750 will find every sound that's on the tape.

Finally, the 750 offers sound-on-sound recording and monitoring. You can mix narration with music tracks—add sound and musical effects to your home-produced programs. It's a professional feature you'd never expect to find on a machine priced this low.

Let the music get through to you on the Ampex 750. It's the low-price deck with the big name behind it.

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AMPEX
CORPORATION



(Walnut cabinet model, \$249.95)

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110/220 V, 60 Hz. Supplied with stereo mic, matching mic cables, take-up reel, cable for connection to any tuner and amp with standard U.S. jackList \$309.95

TS-340U Stereo Recorder

Three-speed (7½, 3¼ & 1½ ips), four-track stereo/mono design; solid-state ampli-



fier; sound-on-sound; sound-with-sound; echo effect built-in; push-button operation; monitoring of input signal or tape; automatic shut-off by foil at tape ends; 4-digit tape counter with reset. Unit can be used as stereo amp. Response 40-18,000 Hz @ 7½ ips; wow & flutter ±0.1% @ 7½ ips; three heads (erase, record, playback); two 7" x 5" PM dynamic speakers; 110/220 V, 50/60 Hz, 20¼" x 15¼" x 8½". Comes with stereo mic & table tripod, matching cables, 7" take-up reel, cable for connecting any tuner or amplifier with standard U.S. jack.List \$369.95

HEATH

1020 Heathkit/Magnecord Tape Deck/Preamps

Transistorized, 2-speed (3¼ & 7½ ips), 4-track stereo or mono playback & record



design. Response 45-18,000 Hz ±2 dB @ 7½ ips; S/N ratio 52 dB @ 7½ ips; rewind time 1200' in 120 sec. Has high-imp. mic & aux. inputs & emitter-follower outputs 0.9 V ±0.2 V @ 400 Hz & 0 vu. Features sound-on-sound, sound-with-sound (mixing), and echo. 17½" w. x 13½" d. x 8¼". Kit AD-16 (less base)\$399.50 ADA-16-1 Walnut base\$19.95

HITACHI

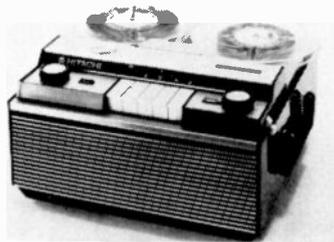
TRQ-570 Mono Tape Recorder

All-transistor, 2-speed (3¼ & 1½ ips) portable battery (9 V) or a.c. operation

(117 V); two-track mono; automatic volume control; 5" reels; push-button control; dynamic mic with remote control sw.; tape counter; 150-8000 Hz @ 3¼ ips, 150-4000 Hz @ 1½ ips; 6" x 3¼" speaker; 11¼" x 9½" x 3¼"; 8.4 lbs; accessories included\$79.95

TRQ-700 Solid-State Mono Recorder

3-speed (7½, 3¼ & 1½ ips); 7" reel; features "Levelmatic" automatic level control;



tone control; push-button operation; 110/120 & 220/240, 50/60 Hz a.c. operation; 2-track mono; 3 W output; 50-15,000 Hz @ 7½ ips; 50-9500 Hz @ 3¼ ips; 6" x 4" speaker; 7½" x 13½" x 12½"; 16½ lbs; comes with dynamic mic & empty 5" reel.\$89.95

TRQ-707 Stereo Tape Recorder

Features solid-state, 4-track, 3-speed (1½, 3¼ & 7½ ips) design; has 2 vu meters; automatic volume (level) control; mic & line inputs; automatic stop device (using pilot signal oscillator); digital counter; two 6" speakers; 2½ W/ch dynamic output. Supplied with two mics\$199.95

TRQ-330R Mono Tape Recorder

Two-speed (3¼ & 1½ ips) portable 7-transistor unit; distortion-free recording



with "Levelmatic"; earphone monitor; dynamic mic with remote control sw.; ½ up to 1½ hrs. recording on 3" reels; output 800 mW; 4" x 2¼" PM speaker; 150-7000 Hz @ 3¼ ips; 150-4000 Hz @ 1½ ips; 6 "C" cells; a.c. adapter available; 10¼" x 2½" x 8½"; 4½ lbs including batteries.\$59.95

KNIGHT-KIT

KG-415 Tape Deck/Preamps

Solid-state stereo design with pre-assembled Viking tape transport. Has six solid-state



plug-in modules, including headphone amplifier and bias test oscillator modules. Features separate monitor switch with monitor-level controls, mixing facilities, push-to-reset digital counter, easy-edit head cover. Three 4-track hyperbolic-contoured heads permit direct tape monitoring, echo, sound-on-sound recording. Six-position "selector" control with record and playback

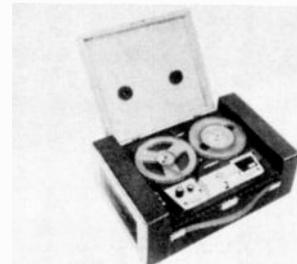
operation shown by illuminated windows. Two vu level indicators for record and playback of each channel. Response: 50-18,000 Hz ±2 dB @ 7½ ips; 50-14,000 Hz ±2 dB at 3¼ ips. Flutter & wow .2% r.m.s. @ 7½ ips. Signal-to-noise ratio 50 dB. Has modular 1-kHz test oscillator for precise adjustment of head voltages, dual preamps drive low-impedance stereo headphones. 17 transistors & 6 diodes. 14½" x 14" x 8½".

22A3788UW Kit\$269.95
22A3003W Walnut base\$19.95

KORTING

TR3000 Tape Recorder

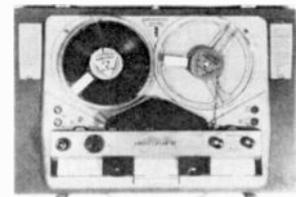
Two-speed (7.5 & 3.75 ips); plays 4-track & 2-track stereo & mono; records 4-track stereo & mono; has stereo amplifiers & speakers; features p.a. amplifier & sound-on-sound dubbing; response 30-20,000 Hz ± 3 dB @ 7.5 ips, 40-15,000 Hz @ 3.75 ips; wow & flutter .2% @ 7.5 ips; S/N



ratio 45 dB; 10 W output; 16½" x 12" d. x 6¼" h.; supplied with two low-impedance mics.....\$199.95

TR4000 Transistorized Tape Recorder

Three-speed (7.5, 3.75 & 1½ ips); 4-track record & playback with stereo amplifiers &



speakers; features 3 heads (erase, record, playback); separate bass & treble controls in record position; one knob for synchronized dubbing; completely transistorized; record level meters; remote pause; variable echo or reverb effects; response 30-20,000 Hz @ 7.5 ips, 40-7000 Hz @ 1½ ips ±3 dB; wow & flutter .1% @ 7.5 ips; S/N ratio 45 dB; 10 watts audio output; 120 V operation; 18" x 13" d. x 8" h.; supplied with two low-impedance microphones\$299.95

LAFAYETTE

RK-960 "Automatic Reversing" Tape Recorder

4 head, 4-track solid-state stereo design. Features one manual & three automatic tape reversing positions; 3 speeds (1½, 3¼ &



7½ ips): sound-on-sound; sound-with-sound; two 4-pole induction capstan driver motors; vu meters; stereo headphone jack; 6 inputs. Response 30-22,000 Hz ±3 dB @ 7½ ips; S/N ratio 50 dB; flutter & wow 0.25% r.m.s. @ 3¾ ips. Housed in black leatherette-covered wood case. 22" x 15½" x 8¼" d.\$299.95

RK-920 "Automatic Reversing" Tape Deck/Preamps

Same design as RK-960 except without stereo amplifier\$199.95

RK-880 Stereo Tape Deck/Preamps
Solid-state, 3-head, 4-track design. Features 3-speeds (1¾, 3¾ & 7½ ips); sound-on-



sound; sound-with-sound recording; and direct recording from magnetic phono pickup. Other features include: hysteresis synchronous motor, vu meters, separate record and monitor volume controls, and automatic end-of-tape switch. Response 30-22,000 Hz ±3 dB at 7½ ips; S/N ratio 53 dB; flutter & wow 0.15% at 7½ ips. Polyester walnut-finish wood cabinet. 15¾" x 13" x 7¾" d.\$249.95

RK-860 Stereo Tape Recorder

Solid-state 4-track stereo & mono, 3-speed (1¾, 3¾ & 7½ ips) design. Features



sound-on-sound; sound-with-sound; plus direct stereo disc-to-tape copy through magnetic phono inputs. Makes direct recording from FM stereo tuners. Has dual vu record/playback level meters, monitor speaker switches, and two 5" x 7" speakers. Response 30-22,000 Hz ±3 dB at 7½ ips; wow & flutter 0.15% at 7½ ips; S/N 53 dB. Audio output 6 W/ch dynamic power. Black leatherette wood case. For horizontal or vertical use\$219.95

RK-840 Stereo Tape Recorder

Solid-state, 4-track stereo & mono record/playback, 3-speed (1¾, 3¾ & 7½ ips) design. Features sound-on-sound, sound-with-sound, vu meters, automatic end-of-tape shut-off, built-in 5" speakers. Response 40-18,000 Hz ±3 dB at 7½ ips; wow & flutter 0.2% at 7½ ips; power output 3 W/ch dynamic power; S/N ratio 48 dB. Black leatherette covered wood case. 15¾" x 14" x 7¾" d. 120-V, 60 Hz. Supplied with dynamic microphones\$169.95

RK-815 Stereo Tape Recorder

Solid-state, 4-track, 3-speed (1¾, 3¾ & 7½ ips) stereo design. Features 2½ W/ch dynamic power; sound-with-sound; sound-on-sound; vu meters; and two 5" x 3" speakers. Response 40-15,000 Hz ±3 dB at 7½ ips; S/N ratio 45 dB. With solid vinyl case, removable cover, dynamic micro-

phones. Vertical or horizontal operation. 11¾" x 12¼" x 6¾" d.\$129.95

RK-810 Tape Recorder

Solid-state, 4-track, 3-speed (1¾, 3¾ & 7½ ips) design. Permits stereo playback



when used with external amplifier. Features two heads; tape counter; vu meter; tape head output jacks; external speaker jack and stereo headphone jack. Response 40-15,000 Hz ±3 dB at 7½ ips; wow & flutter 0.25% at 7½ ips; S/N ratio 40 dB. In solid vinyl case with removable cover, accessory compartment, dynamic microphone. 11¾" x 12¼" x 6¾" d.\$89.95

RK-820 Stereo Tape Deck/Preamps

Solid-state, 4-track record/playback preamps, 3-speed (1¾, 3¾, 7½ ips) design. Records sound-with-sound, sound-on-sound. Has vu meters, digital counter & external amplifier outputs. For vertical or horizontal use. Response 40-18,000 Hz ±3 dB at 7½ ips; wow & flutter 0.15% at 7½ ips; S/N ratio 50 dB. Includes wood utility base. 12¾" x 10¾" x 6" d.\$109.95
Deluxe walnut base\$ 9.95

RK-830 Stereo Tape Deck/Preamps

Three-head, 4-track stereo deck with built-in solid-state preamps; 3-speed (1¾, 3¾ & 7½ ips) design. Records sound-on-sound, sound-with-sound. Features vu meters; digital tape counter; automatic end-of-play shut-off. Has source or tape monitor. Response 40-18,000 Hz ±3 dB @ 7½ ips; wow & flutter 0.15% @ 7½ ips; S/N ratio 50 dB. Includes wood utility base. 12¾" x 10¾" x 6" d. in wood base.\$159.95

Deluxe walnut base\$ 9.95

RK-142V Mono Tape Recorder

Solid-state, 2-speed (3¾ & 7½ ips), dual-track mono record/playback; has 4" x 6"



speaker; record level meter; provision for external speaker; S/N ratio 42 dB @ 7½ ips; wow & flutter 0.2% @ 7½ ips. Complete with dynamic microphone and carrying case. 11¾" x 9¾" x 7½"\$59.95

MAGNECORD B

"1020" Stereo Tape Deck

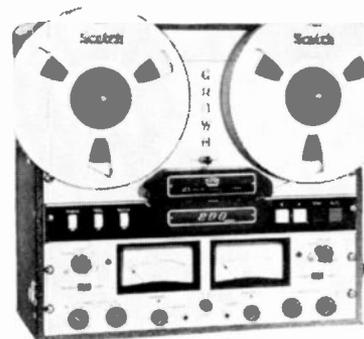
4-track design without built-in power amplifiers or speakers. Features 2-speed (7½ & 3¾ ips) operation; takes up to 8¼" reels; vu meters; counter; automatic shut-off; three separate heads. Solid-state stereo preamp with 900 mV output & dual mic and line inputs with mixing facility. Response 45-18,000 Hz ±2 dB @ 7½ ips; S/N ratio 52 dB @ 7½ ips; flutter & wow 0.18% @ 7½ ips\$570.00



Leadership presents

the **NEW**

**Computer Logic Control
Pro 800 Transport**



MODEL SX 824

In the league of nimble-fingered tape-handlers there exists a recurrent problem. It has been demonstrated time and again that anyone can ruin a valuable tape by absentmindedly outsmarting the interlock system of an otherwise safe tape recorder.

In answer to this problem and similar problems arising in automated and remote control applications, the CROWN Pro 800 was designed. This recorder has a computer logic system using IC's which prohibit all such destructive operations.

The CROWN computer stores the last command given it in its memory (forgetting all previous commands) and by a continuous knowledge of the operating state of the machine (motion and direction), it takes all the necessary measures and executes the command. This is all done *without* time-wasting delay mechanisms.

Computer Logic Control brings to you rapid error-free tape handling. It is actually impossible to accidentally break a tape. Call your CROWN dealer NOW!

MOST PERFECT REPRODUCTION

- ☞ Performance as yet unequalled
- ☞ Four years proven Solid State circuitry
- ☞ Extremely low noise electronics

FINEST TAPE HANDLING

- ☞ Computer smooth operation
- ☞ True straight line threading
- ☞ Patented Electro-Magnetic brakes never need adjusting

Write to **Crown International**
Box 1000, Dept. TRA-68
Elkhart, Indiana 46514

MADE ONLY IN AMERICA

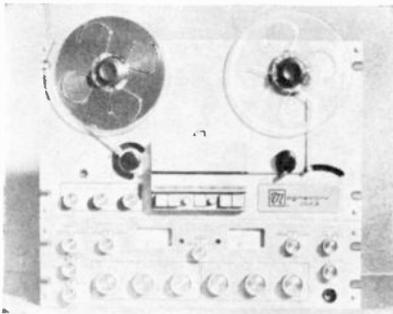
CIRCLE NO. 14 ON READER SERVICE CARD



Walnut base\$25.00

"1022" Stereo Tape Recorder

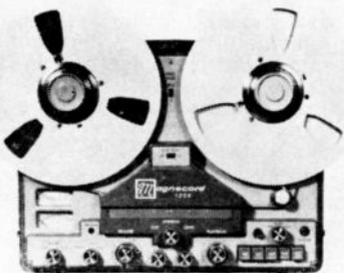
Similar to Model "1021" in design & performance but for stereo operation. 2-speed



(7½ & 15 ips): wow & flutter .17% @ 7½ ips, .15% @ 15 ips; response 30-16,000 Hz ±2 dB @ 7½ ips & 35-22,000 Hz @ 15 ips. Heads: selectable 2-channel erase, 2-channel record, 2-channel play & ¼-track play\$788.00
With case\$848.00

"1028" Stereo Tape Recorder

2-speed (7½ & 15 ips) tube design. Wow & flutter .15% @ 7½ ips & .1% @ 15 ips:



response 35-16,000 Hz ±2 dB @ 7½ ips & 35-18,000 Hz @ 15 ips; S/N 55 dB; reels 5", 7" & 10½"; rewind time 2400' in less than 1 minute. Inputs: high & low imp. mics & high-impedance balanced & unbalanced bridge. Outputs: cathode-follower, 2.5 V & 150/600 ohms balanced, 17" s" w. x 12¾" h. x 12" d.

"1028-2X" 2-track stereo or ½-track mono; less case\$ 995.00
"1028-24X" with 4th head (¼-track stereo play), less case\$1075.00
"1028-4X" ¼-track stereo or 4-track mono, less case\$ 995.00
"1028-42X" with 4th head (2-track stereo play), less case\$1075.00
Case optional.....\$ 50.00

"1048" Stereo Tape Recorder

Same as Model "1028" except for tape speeds 3¼ & 7½ ips; response 40-16,000 Hz ±2 dB @ 7½ ips, 12" deep. Available versions & prices same as Model "1028" tape recorder.

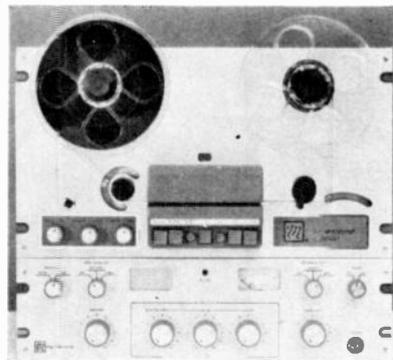
"1024" Stereo Tape Recorder

Similar in design & performance to Model "1021" except for stereo operation. ¼-track stereo or 4-track mono operation. Heads selectable ¼-track erase, ¼-track record, ¼-track play. Optional 2-channel stereo play head available installed in 4th head posi-

tion. Inputs: mic. (50 kohms), high impedance mixing bridge & aux. bridge. Outputs: emitter-follower & aux. emitter-follower (.5 V)\$648.00
With 4th head installed.....\$673.00
Case\$ 60.00

"1021" Mono Tape Recorder

Two-speed (3¼ & 7½ ips) mono recorder; full-track record & erase and half- or full-



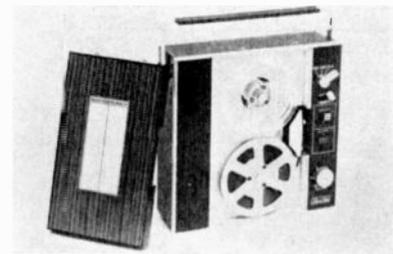
track playback. Wow & flutter .2% @ 7½ ips; response 45-18,000 Hz ±2 dB @ 7½ ips; S/N 53 dB for both speeds. Inputs: low-imp. mic., balanced bridge, unbalanced bridge, mixing bridge & aux. bridge. Outputs: 150/600 ohm balanced & aux. A & B unbalanced. All-transistor design featuring built-in cueing speaker with separate volume control & amp. (amp will drive an external speaker); phone jacks; mixing input with separate gain control; simultaneous record & playback; adjustable impedance input & output transformers; vu meter remote "start/stop."

Transport size 19" w. 10½" h. x 7½" d.; amplifier size 19" w. x 5¼" h. x 12" d.\$708.00
With case\$768.00

MASTERWORK

751 Portable Tape Recorder

Solid-state, mono, 2-track design. Features 3" x 7" speaker, 2 speeds (1½ & 3¼ ips),



5" reel, 3 hrs. recording time, level indicator light. Operates on 6 "D" flashlight batteries or 120 V a.c. (no adapter needed). Supplied with remote mic. telephone pickup, a.c. cord, and batteries. 11¼" x 11¼" x 4"\$59.95

M-792 Tape Recorder

Solid-state mono design. Features 3" x 5" speaker. 2-speed (3¼ & 7½ ips) operation.



7" reel, level meter, digital counter. Supplied with dynamic mic & stand, monitor-

ing earphone, and leatherette covered all-wood case. 12" x 5½" x 13"\$79.95

M-808 Stereo Tape Recorder

4-track, dual-speed (7½ & 3¼ ips), solid-state design. Features response 80-15,000



Hz @ 7½ ips; two 4" x 6" speakers in detachable wood enclosures; vu meters; 7" reels; digital counter. Includes two mics & ebony leatherette wood cabinet. 22" x 14" x 7"\$129.95

730 Portable Tape Recorder

Solid-state, mono, 2-track design. Features 2 motors, 4" speaker, 2 speeds (1½ & 3¼

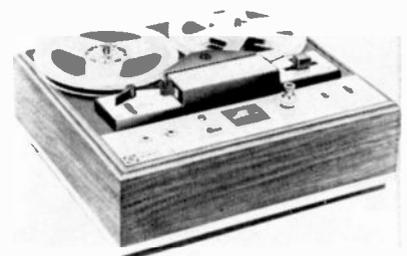


ips). Operates on 4 standard flashlight batteries and is adaptable to a.c. operation. 3" reel max. Supplied with remote-control dynamic mic, earphone, and batteries. 9" x 9½" x 4¼"\$39.95

McDONALD

TD-1020 Tape Deck/Preamps

Solid-state stereo 4-track, 3-speed (1½, 3¼, 7½ ips) design; response 30-14,000



Hz ±3 dB @ 7½ ips; wow & flutter 0.15% @ 7½ ips. Has vu meters; 7" reels; a.c. bias oscillator; 3 heads (record, playback, erase). Designed for horizontal operation. Does not have power amps or speakers. Supplied with walnut case 14¼" x 13" x 5½"\$129.95

MIRANDA

Model "Mirandette C" Portable Recorder

2-speed (3¼ & 1½ ips); dual-track, battery or 120 V a.c. operated. Dual-purpose



2 new decks with features no other comparatively-priced decks have. Period.



AND HERE THEY ARE:

Phase Sensing Auto-Reverse System

This feature is exclusive with model A-6010 and there's nothing quite like it on any other professional-quality deck. TEAC's Phase Sensing allows automatic reverse play.

To make it work, simply press a control panel button which automatically applies an electronic reverse sensing signal to any part of the tape you choose. The Auto-Reverse System of both models A-6010 and A-4010S can also be operated with the use of sensing foil. Also, A-6010 can operate on repeat play simply by connecting an optional unit.

Symmetrical Control System

Another feature exclusive with TEAC and available with both models. This is a piano-key touch control operation for fast-winding in both directions, playback and stop. We say touch, we mean touch.

Symmetrical control is smooth and fool-proof. And wait until you see what it does to enhance tape longevity.

Outer-Rotor Motors

The reel drive motors in the professional type deck or recorder you own now are probably of the hysteresis torque type. They're very good, but TEAC's new outer-rotor motors are better. Their movement is comparable to the movement you'll find in a fine, expensive watch. And this means incredibly smooth, steady reel drive with far less tape rewinding tension. Less wow and flutter, too! The dealer who demonstrates TEAC will prove it for you.

Four Heads in a Unit

Record, erase, forward and reverse play back. TEAC decks have all four of which two play back heads are hyperbolic type with narrow gaps. The whole unit is removable and interchangeable with that of model A-6010, and unsur-

passed for ease of maintenance. Magnificent performance characteristics of TEAC heads—the wide frequency range, reduction of annoying crosstalk, improved SN ratio and distortion-free quality of sound reproduction. (Plug-In Unit for A-6010)

Four Solid-State Amplifiers

Two units for recording, another two exclusively for playback. Another point: Model A-6010 uses costly silicon transistors for additional reliability, strength and sound quality.

And There's Much More

A tape tension control switch which assures total protection of thin long-playing tapes. Automatic shut off, of course. A pair of easy-to-read jumbo VU meters. 100 KHz bias-frequency. Independent LINE and MIC input controls to permit mixing signals from two recording sources. And an optional remote control unit.

A-6010 Specifications: Four heads, 4 track, 2 channel. 7" maximum reel size. Tape speeds 7½ and 3¾ ips (±0.5%). Dual speed hysteresis synchronous motor for capstan drive, 2 eddy current outer-rotor motors for reel turntables. Wow and flutter: 7½ ips: 0.08%; 3¾ ips: 0.12%. Frequency response: 7½ ips: 30 to 20,000 Hz (±2 db 45 to 15,000 Hz); 3¾ ips: 40 to 14,000 Hz (±2 db 50 to 10,000 Hz). SN Ratio: 55 db. Crosstalk: 50 db channel to channel at 1,000 Hz. 40 db between adjacent tracks at 100 Hz. Input: (microphone): 10,000 ohms, 0.5 mV minimum. (line): 300,000 ohms, 0.1 V minimum. Output: 1 volt for load impedance 10,000 ohms or more.

A-4010S Specifications: Four heads, 4 track, 2 channel. 7" maximum reel size. Tape speeds 7½ and 3¾ ips (±0.5%). Dual speed hysteresis synchronous motor for capstan drive, 2 eddy current outer-rotor motors for reel turntables. Wow and flutter: 7½ ips: 0.12%; 3¾ ips: 0.15%. Frequency response: 7½ ips: 30 to 20,000 Hz (±2 db 50 to 15,000 Hz); 3¾ ips: 40 to 12,000 Hz (±3 db 50 to 7,500 Hz). SN Ratio: 50 db. Crosstalk: 50 db channel to channel at 1,000 Hz. 40 db between adjacent tracks at 100 Hz. Input: (microphone): 10,000 ohms, 0.25 mV minimum. (line): 100,000 ohms, 0.14 V minimum. Output: 1 volt for load impedance 100,000 ohms or more.

TEAC®

TEAC CORPORATION OF AMERICA 1547 18th St. Santa Monica, Calif. 90404
CIRCLE NO. 43 ON READER SERVICE CARD

recording level & battery quality indicator with digital counter. Response 200-6000 Hz \pm 5 dB; wow & flutter .3%; 2 3/4" x 4" speaker (500 mW @ 5% dist.); S/N 40 dB. Uses 3" reel, 4 D-cell batteries & has 6 transistors & 1 diode: 9 3/8" x 8 3/16" x 3 1/4". wt. 7 1/2 lbs. Supplied with remote-control dynamic mic., leather carrying strap, shoulder grip, and a.c. cord...\$169.95
 Carrying case.....\$ 11.95
 Foot control.....\$ 6.95
 Telephone pickup.....\$ 5.95

NEWCOMB

TX10 Series Tape Deck/Preamps
 Features 10 1/2" tape reels; record & playback level meters; mixing controls for dual

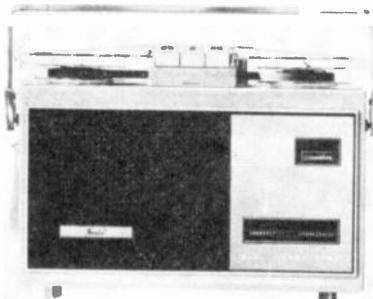


mic & line inputs with individual control knobs; sound-on-sound; 3 heads (record, playback, erase); bias indicator lights. Monitor before recording or off the tape; 2-speed (7 1/2 & 3 3/4 ips); 4-digit counter; automatic shutoff. Response 30-18,000 Hz \pm 2 dB @ 7 1/2 ips; wow & flutter .15% @ 7 1/2 ips; S/N 55 dB; HD 1%; output 5 V from cathode followers. Size unmounted 12 1/8" x 16" x 8".

- TX10-2 1/2-track stereo; 3 3/4 & 7 1/2 ips; less case\$750.00
 - TX10-4 1/4-track stereo; 3 3/4 & 7 1/2 ips; less case\$750.00
 - TX10-215 1/2-track stereo; 7 1/2 & 15 ips (special order only); less case\$825.00
 - TX10-415 Same as TX10-215 except 1/4-track\$825.00
 - CA-133 Portable case\$25.00
 - SA-80B Portable 20 W/ch. music power stereo amp with portable case; 8 1/2" x 16 3/8" x 16 3/8"\$199.50
 - J-200 Portable 2-way speaker system with tweeter control & case; 14 3/4" x 20" x 10 1/4"\$79.50
 - K-400 Portable 3-way speaker system with tweeter control & case; 16 3/8" x 23 1/2" x 10 1/4"\$129.50
 - SA-80B-J2 Complete reproducing system; 1 SA-80B, 2 J-200 with cables, wt. 71 lbs\$368.40
 - SA-80B-K2 Complete reproducing system; 1 SA-80B, 2 K-400 & cables, wt. 102 lbs\$468.40
- Misc. accessories available.

NORELCO

"Continental 101" Portable Recorder
 Transistorized. 2-track, 1 3/8 ips design. Response 80-8000 Hz; S/N 45 dB. 6 "D"-type



batteries are used to provide 40 hours of recording. Uses 4" tape reel for 3 hrs. recording. Has combination level & battery condition indicator & dynamic mic. Wt. 7 lbs. 11" w. x 3 3/4" d. x 8"\$79.50
 Accessories available: Leather carrying case, remote mic. sw., a.c. adapter & headphones.

4408 Stereo Tape Recorder

4-track, 3-speed design; response 40-18,000 Hz. Has 2 vu meters & facilities for mix-



ing, monitoring & automatic stop. Supplied with stereo mic & cabinet plus two separate speaker systems\$350.00

PANASONIC

RQ-501A "The Bandleader"

Mono solid-state portable recorder; 2-track, 2-speed (3 1/4 & 1 7/8 ips) design; operates



from 117 V line or 6 "D" cells; has 4 heads; response 80-80,000 Hz; a.c. bias; d.c. erase; 2 W dynamic power; 3 1/2" speaker vu meter; tone control; counter; battery indicator. Has automatic level control & will play & record in both directions; can be used as p.a. system. 11 3/8" x 3 3/8" x 10" d. Supplied with remote mic.\$125.00

RQ-705 "The Reporter"

Mono tube design; a.c. operation; 2-track, 2-speed (7 1/2 & 3 3/4 ips); has 2 heads; response 100-15,000 Hz (a 7 1/2 ips; S/N ratio 45 dB; a.c. bias & erase; 4 W dynamic power; vu meter; tone control; counter; pause control; 6" x 4" speaker; automatic level control; 7" reel; 13 1/4" x 6 1/4" x 13" d.\$99.95

RS-766US "The System Maker"

Combines tape deck & preamps; same as RQ-705, except is solid state, 3-speed (1 3/4, 3 3/4 & 7 1/2 ips) stereo design with 4 tracks; S/N ratio 52 dB; 2 vu meters; does not have power amplifier or speaker; 13 1/4" x 11" x 5 1/2".\$149.95

RS-1000S "The Concert Master"

Solid-state 4-track, 4-head continuous automatic-reverse stereo tape deck with preamps; features vu meters; counter; tape head or source monitoring; sound-on-sound; echo; "Pan-A-Trak" for language or music study; Two-speed (7 1/2 & 3 3/4 ips) design; response 25-20,000 Hz (a 7 1/2 ips; S/N ratio 52 dB; has a.c. bias & erase. 16" x 21" x 9".\$699.95

Accessories for RS-1000S

- RP-8900S Speaker/amp system; has built-in solid state 20 W dynamic power amplifier & 8" woofer & 2 3/4" cone tweeter; ca.\$179.95
- RP-8046 Remote control push-button unit for up to 9 feet.\$39.95
- WM-2092P Dynamic pencil mic & stand; ca.\$12.95

RQ-113S "The Power Pal"

Mono portable recorder; 2-track, solid-state, 2-speed (3 3/4 & 1 7/8 ips) design; operates from 6 "C" cells; features 3 1/4" reel; 2 heads; response 150-6000 Hz (a 3 3/4 ips; d.c. bias; d.c. erase. 1 W dynamic power; 3"

speaker. Has automatic record level control & remote mic. 9" x 3 1/4" x 10".\$37.95

IQ-103S "The Reminder"

Same as RQ-113S but will also operate from 117 V a.c. line.\$49.95

RS-755S "The Maestro"

Solid-state, 4-track stereo design; two speeds (3 3/4 & 7 1/2 ips); response 60-15,000 Hz @



7 1/2 ips; S/N better than 50 dB; 4 W/ch dynamic power; solid-state circuitry; two 6" x 4" PM speakers; vu meter; tape counter; fast-forward; pause control; lever operation; 14 9/16" x 18" x 7 7/8"; 23 lbs., a.c. operated; 7" reels; supplied with 2 mics....\$179.95

RS-780S "The Impresario"

Four-track, 3-speed (1 3/4, 3 3/4 & 7 1/2 ips) design; mono & stereo; response 30-18,000



Hz (a 7 1/2 ips; S/N better than 52 dB; 8 W/ch music power; vu meters; tape counter; fast-forward; pause control; push-button operation; two 6" x 4" woofers, two 2 3/4" tweeters; a.c. operated; 7" reels; 16 3/4" x 15 1/2" x 11 1/2".\$349.95

RQ-102S "The Recorder"

Two-speed, two-track mono design; 3 1/4" reel; battery or a.c. operation; 100-7000 Hz response @ 3 3/4 ips; S/N better than 50 dB; dynamic power 1 W; 3 1/2" PM speaker; vu meter; battery indicator; fast-forward; lever operation; over-all size 9 3/8" x 3" x 8 1/2"; 4 lbs.\$59.95

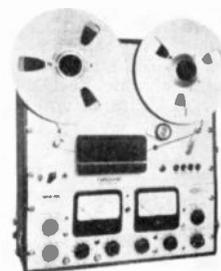
RQ-156S "The Pilot"

Two-track mono design; two speeds; 5" reel; 100-7000 Hz response @ 3 3/4 ips; S/N better than 40 dB; 1 W dynamic power; 3 3/8" PM speaker; vu meter; battery indicator; tape counter; fast-forward; push-button operation; 11 1/2" x 9 1/2" x 4"; battery or a.c. operated; 7 1/2 lbs.\$79.95

PREMIER

"Tapesonic" Stereo Recorder

All-silicon solid-state design with 5 modular plug-in units. Features 3 speeds (15, 7 1/2 & 3 3/4 ips); 3 separate 1/4-track stereo heads; monitor from tape; A-B switch; automatic stop. Four electric push-buttons adaptable for remote control. Three motors. Two electronic mixing inputs per channel for mic, radio & phono. Handles up to 10 1/2" (NAB) reels. Bias check for each channel; 4 1/2" vu meters. Response 35-



26,000 Hz ± 2 dB @ 15 ips; 30-10,000 Hz ± 3 dB @ 3 3/4 ips; S/N ratio 56 dB @ 15 ips. Supplied without case for custom installations.

- Model 70-TRSQ 1/4-track stereo\$615.00
- Model 70-TRSH 1/2-track stereo\$615.00
- Model 70-TRH 1/2-track mono\$480.00
- Model 70-TRF Full track\$542.00
- Portable carrying case for above\$ 34.50

RCA

YJS13 Mono Tape Recorder

2-speed (3 3/4 & 1 1/2 ips). 2-track record & playback design; remote control; vu meter; 3" reel-to-reel; operates from 4 "C" cells; has 4" oval speaker & input for 117 V a.c. adapter (optional). Supplied with mic. batteries. 3 3/8" x 9 3/4" x 11 1/4" d.\$39.95
 YJS15 Same as YJS13 except can also be operated from 117 V a.c. line.\$49.95

YJS17 Mono Tape Recorder

2-speed (3 3/4 & 1 1/2 ips). 2-track record & playback design; has automatic level control; 5" reels; remote control; vu meter & 4" oval speaker. Operates on 6 "D" batteries. 117 V a.c. operation optional. With mic. 4" x 12 3/8" x 11 1/4" d.\$65.00
 YJS20 Same as YJS17 except can also be operated from 117 V a.c. line.\$79.95

YJH32 Mono Recorder

3-speed (7 1/2, 3 3/4 & 1 1/2 ips), 2-track design; features 7" reels; pause switch; vu meter; automatic level control; counter. Has 6" oval speaker. Supplied with mic & mic stand. earphone. 16 1/4" x 13 1/2" x 8 1/2" d.\$99.95

YJH36 Mono Recorder

Same as YJH32 except has public address switch; 4 track; 7" oval speaker; 15 1/2" x 20 1/4" x 8 1/4" d.\$129.95

YJH38 Mono Recorder

Same as YJH32 except has provisions for sound-plus-sound recording. 15 1/4" x 20 1/4" x 8 1/4" d.\$139.95

YJG42 Stereo Recorder

3-speed (7 1/2, 3 3/4 & 1 1/2 ips), 4-track design; features sound-plus-sound; public address switch; pause control; two vu meters; two 6" speakers; automatic level control; automatic tape shut-off; tape counter. Supplied with 2 mics. 16 3/4" x 18 3/4" x 8 1/2" d.\$179.95

YJG52 Stereo Recorder

3-speed (7 1/2, 3 3/4 & 1 1/2 ips). 4-track design; features pause switch; sound-plus-



sound; public address switch; two vu meters; automatic level control; automatic tape shut-off; tape counter. Has two swing-out, lift-off speaker enclosures with 8" two-way & 2" tweeter in each. Comes with 2 mics. 17" x 18 1/2" x 12 1/2" d.\$229.95

REVOX

G-36 "Mark III" Tape Recorder

2- or 4-track (7 1/2 & 3 3/4 ips) stereo design. Has 3 heads (record, play, erase); 3 independent motors, direct drive (no belts used); reel sizes up to 10 1/2" with reel size selector; two vu meters. Speed accuracy $\pm 0.3\%$; wow & flutter $\pm 0.1\%$ at 7 1/2 ips. Response 40-15,000 Hz at 7 1/2 ips. S/N 50 dB. Has record & play amplifiers; 6-watt built in mono amplifier & spkr. (Separate external speaker required for stereo play-



back.) Sound-on-sound, sound-with-sound, and echo. Less carrying case. 15" x 12 1/4" x 9 1/2"; 2- or 4-track versions\$535.00
 Two-track design. 7 1/2 & 15 ips\$665.00
 Carrying case 18" x 13" x 12"\$ 14.00
 Satin walnut case 16 1/2" x 13 1/2" x 9 1/2"\$ 40.00

RHEEM CALIFONE

3080T Mono Recorder

Dual-track, 3-speed (1 1/2, 3 3/4 & 7 1/2 ips) design; wow & flutter 0.15% @ 7 1/2 ips;



10 W dynamic power output. Response 50-15,000 Hz. Features 8" speaker, mic & line inputs, counter, vu meter. Can be used as a p.a. system & has monitor selector switch. Supplied with high imp. mic. 13" x 13 3/8" x 7"\$149.50

70-TC Mono Recorder

Solid-state, dual-track, 2-speed (3 3/4 & 7 1/2 ips) design; wow & flutter 0.18%; 10 W



dynamic power output. Response 50-15,000 Hz ± 2 dB. Has vu meter; 8" speaker; monitor selector sw.; counter. Can be used as a p.a. system. Supplied with high imp. mic. 13 1/4" x 13 1/4" x 9"\$199.50

3200-A Tape Recorder

Stereo tape recorder with three-speed option; edit lever. Tracks may be recorded independently & played back simultaneously. Mono to 4-track stereo recording with 2- & 4-track stereo playback. Has two 7" built-in speakers. Output 5 W ch dynamic power; digital counter; frequency response 40-18,500 Hz; 16 1/4" x 13 3/4" x 7 1/2"\$289.50

ROBERTS

Model 400X Stereo Recorder

Features 22,000 Hz Cross Field record head

Introducing the fabulous
UHER®
 'DECK 7000'

by **martel**



THIS NEWEST MEMBER OF THE FIRST FAMILY OF TAPE RECORDERS BRINGS YOU FULL PROFESSIONAL PERFORMANCE AND UHER ENGINEERING AT A MODEST COST. NOW EVERYONE CAN ENJOY UHER SUPERIORITY, WITH ITS ABILITY TO PRODUCE FLAWLESS STUDIO QUALITY RECORDINGS.

SOLID-STATE 2-SPEED MONAURAL AND STEREO; AUTOMATIC END-OF-REEL SHUT-OFF; 2 ILLUMINATED VU METERS; 4 DIGIT INDEX COUNTER; PAUSE CONTROL; TUNER, PHONO, AND MICROPHONE INPUTS; 7" REEL CAPACITY; 40-18000 CPS FREQUENCY RESPONSE. IN WALNUT ENCLOSURE. 2 ACCESSORY CABLES INCLUDED.

WHERE THE NEED IS FOR A COMPLETE PORTABLE TAPE RECORDER, THE UNSURPASSED

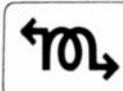
UHER® ROYAL STEREO 8000

IS THE FINAL ANSWER. FEATURES NORMALLY FOUND ONLY IN FULL STUDIO EQUIPMENT MAKE THE 8000 THE ONE TRULY OUTSTANDING PORTABLE STEREO TAPE RECORDER IN THE ENTIRE FIELD.

AND, FOR THE EQUIVALENT SOPHISTICATION IN A TAPE DECK, MASTERS OF RECORDING HAVE PROCLAIMED THE UHER® 9000 UNEQUALED.

FOR DETAILED INFORMATION ON THESE FINEST OF ALL RECORDING INSTRUMENTS, SEE YOUR UHER® DEALER, OR USE THE COUPON TO OBTAIN LITERATURE GIVING DETAILED DESCRIPTION.

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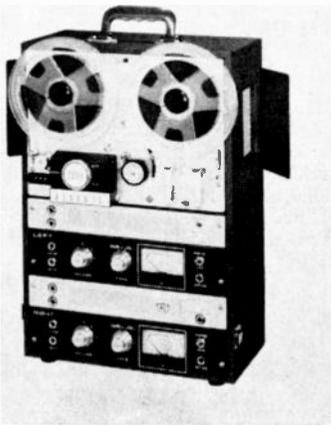
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design; echo-chamber effects; replay double reverse for automatic, continuous 4-track stereo tape replay; repeat (replays any part of tape over & over); sound-on-sound; sound-with-sound; special bias for FM recording. Dual speed (7½ & 3¾ ips). Has stereo amplifier, two 6" (8 ohm) speakers; 2 vu meters; automatic stop; edit guide; 3 heads (record-play-erase) S/N -45 dB; 8 W/ch output; 2 V preamp output; wow & flutter .1%; channel separation 50 dB; 17¼" x 16" x 12¼"\$799.95
 Model 455 Same as 400X Except without automatic forward & reverse play and Cross Field head\$599.95

Model 720-A Stereo Recorder

Features sound-with-sound; stereo amplifiers; two 4" (8 ohm) speakers; 3-speed



(7½, 3¾ & 1½ ips); automatic stop; pause edit; 2 heads (record/playback-erase). Response 40-15,000 Hz ±2 dB; S/N 50 dB; 3 W/ch output; wow & flutter .12%; ch. separation 60 dB; 20" x 14" x 9" ..\$339.95

6000 Series Tape Recorders

4-speed (7½, 3¾, 1½, 1¼ ips) portable, battery-operated designs with Cross Field



record head system. Response 40-20,000 Hz ±2 dB @ 7½ ips; S/N -45 dB; wow & flutter .18% @ 7½ ips; 4 W/ch output. Features 3 heads; ¼-track record & play; 17 hours recording time @ 1¼ ips; 5" reel; 4 tracks; 6 V rechargeable battery (120 V

adapter available); index counter; 32 transistors & diodes. Input sensitivity .1 mV mic & 60 mV radio/phone; 4" h. x 9¾" x 10" d. 11 lbs., 2 oz. less battery.

Model 6000 M. Mono design with 5" oval spkr., mic & batteries\$299.95
 Model 6000 S. Stereo design with mic, rechargeable battery, battery charger, a.c. adapter, 2 power amps, one built-in speaker\$359.95

5000 Tape Recorder

Features 22,000 Hz transistorized professional recording studio Cross Field stereo



operation; takes all size (including 10½") reels without adapters. 3 speed; electrical speed change; 4-digit counter; 2 vu meters; hysteresis-synchronous direct-drive capstan motor; 2 large speakers; equalized preamp outputs; 4 heads; 16 W/ch output ..\$699.95

Model 7000RX Stereo Tape Recorder

Features single master control programmer plus automatic reverse play & automatic



select play. Features 4-speed operation; 20 W/ch music power; 22,000 Hz response; sound-with-sound; sound-on-sound; 3 heads, including Cross Field; counters; 2 mic & 2 line inputs. Has 2 external stereo speaker outputs\$579.95

Model 1700 2-Track Mono Recorder

2-speed (7½ & 3¾ ips) design with built-in p.a. system. Has input mixing facility; vu



meter; counter; response 40-12,000 Hz ±3 dB @ 7½ ips; S/N ratio 45 dB; wow & flutter 0.2% @ 7½ ips; record/play & erase heads; 3 W peak output; vacuum-tube design; 4" x 6" spkrs. 15½ x 13½" x 7½" d. Supplied with dynamic mic\$179.95

Model 1725 Stereo Tape Recorder

4-track stereo & mono record & play; 4-speed option design. Features automatic end-of-tape shut-off; counter; pause control; vu meter. Vacuum-tube design. Response 40-18,000 Hz ±3 dB @ 7½ ips; S/N ratio 45 dB; wow & flutter 0.2% @ 7½ ips. Has 2 preamps & 2 external speaker outputs & mic & phone/radio inputs. 13¼" x 7½" x 13¼"\$269.95
 1725W/S907A Housed in walnut cabinet with two external speaker systems in matching walnut\$299.95

1719 Stereo Tape Recorder

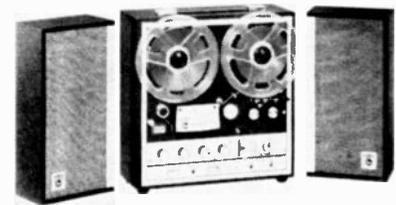
Solid-state; 2-speed (7½ & 3¾ with 15 ips optional). 4-track design. Features sound-with-sound; separate volume & tone controls for each channel; speaker "on/off"; record monitoring; track select; sound adding; 2 vu meters; counter; 3 heads (record, play, erase) 5 W/ch dynamic music power (3 W/ch continuous sine wave). Response 40-15,000 Hz ±3 dB @ 7½ ips; S/N ratio 47 dB; Wow & flutter 0.25% @ 7½ ips. Has two speakers, one each side of case. Supplied with portable Pyroxylin covered case 15¼" x 14½" x 9". Comes with one mic.\$199.95

1721 Stereo Deck/Preamps

Same as Model 1719 but does not include power amps & speakers; has preamp outputs. Supplied with Pyroxylin covered base 15¼" x 14½" x 6½" but without mic.\$179.95

1720 Stereo Recorder

Same as Model 1719 but has two separate detachable speaker enclosures instead of



built-in. Supplied with portable Pyroxylin covered case 15¼" x 14½" x 10½". Comes with 2 mics.\$219.95

Note: All Roberts stereo models, unless otherwise specified, record 4-track stereo, play back 4-track & half-track stereo; record 4-track mono; play back 4-track, half-track & full-track mono. 15 ips speed optional on all models.

SONY/SUPERSCOPE

Model 530 Stereo Recorder

Solid-state. 4-track stereo or mono record/playback; 3-speed (7½, 3¾, 1½) design. Features 20 W/ch dynamic power; sound-on-sound; automatic shut-off; vu meters; counter; pause control. Response 40-15,000 Hz @ 7½ ips; S/N ratio 45 dB; flutter & wow 0.1% @ 7½ ips; has detachable speaker systems. Supplied with two F-96 dynamic mics. 15¼" x 19¾" x 10" d.\$399.50

350 Stereo Tape Deck/Preamps

Solid-state, 4-track stereo/mono record/



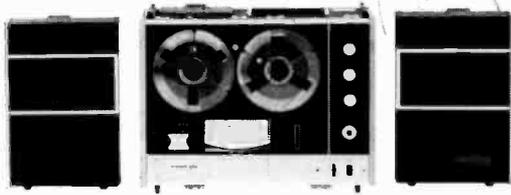


There's Music in the Air...

...and it's yours for the taping, when you own a Sony Solid-State Stereorecorder



Model 560—Auto-Reverse ServoControl Custom Stereo Sound System, under \$499.50



Model 530—Quadradial Sound Stereo Tape System, under \$399.50



Model 200—Portable Stereo Tape System, under \$199.50



Model 230—Portable Custom Stereo Sound System, under \$249.50*



Model 250-A—Compact Stereo Tape Deck Recorder, under \$149.50



Model 560D—Auto-Reverse ServoControl Tape Deck Recorder, under \$349.50



Model 350—Three-head Stereo Tape Deck Recorder, under \$199.50

Simply connect your Sony to an FM stereo receiver or radio and you're ready to record. You'll capture every sound from the opening bars to the last thrilling note. All flawlessly reproduced with superb Sony high fidelity sound. It's so easy to build a musical tape library to hear your favorites, again and again, on everlasting Sony magnetic tape. Relax and tape a world of music at home, in your favorite easy chair. There's music in the air...preserve it forever with a Sony!

SONY'S PROOF OF QUALITY — A FULL ONE YEAR WARRANTY



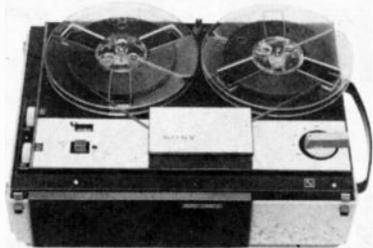
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 CIRCLE NO. 40 ON READER SERVICE CARD

*In walnut case (230W), under \$299.50

playback; 2-speed (7½ & 3¼ ips) design. Features sound-on-sound; vu meters; tape & source monitoring; 3 heads; pause control; counter; automatic shut-off. Response 50-15,000 Hz ±2 dB @ 7½ ips; S/N ratio 50 dB; flutter & wow 0.19% @ 7½ ips; has preamps only—for use with ext. power amps & speakers. With walnut grained base. 17½" x 12½" x 6½"\$199.50
 350C Same except mounted in portable carrying case. 18½" x 17" x 6½" \$219.50

"Sonymatic 104" Recorder

Solid-state, 2-track mono record & playback; 3-speed (7½, 3¼ & 1½ ips) design.



Features automatic record control; automatic shut-off; 10 W dynamic power output; p.a. operation; 4" x 6" spkr; pause control. Response 50-10,000 Hz @ 7½ ips; S/N ratio 46 dB; flutter & wow 0.15% @ 7½ ips; mic & aux. inputs; supplied with F-96 dynamic mic. 6½" x 16" x 10¼"\$99.50

"Sonymatic 105" Recorder

Solid-state, 4-track mono record/playback; 3-speed (7½, 3¼ & 1½ ips) design. Features



10 W dynamic power output; vu meter; mic & line mixing; pause control; automatic volume control; sound-on-sound; automatic shut-off; counter; response 50-12,000 Hz @ 7½ ips; S/N ratio 48 dB; flutter & wow 0.12% @ 7½ ips. Supplied with F-96 dynamic mic. 14¼" x 13¼" x 7¼"\$139.50

777-4 Tape Deck/Preamps

All-transistorized 4-track record and 2- and 4-track playback; 2-speed (7½ & 3¼

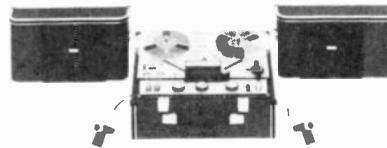


ips) design; features special "Electro-Bilateral" head construction; three motors; complete remote control; sound-on-sound; mic & line mixing; tape and source monitoring; 3" vu meters; response 50-15,000 Hz ±2 dB @ 7½ ips; signal-to-noise ratio 50 dB; flutter & wow less than .15% @ 7½ ips; has built-in stereo preamp and output jacks for connection to external power

amps; 16" w. x 17¼" h. x 9" d.; weight 43 lbs.Less than \$695.00

200 Solid-State Recorder

Four-track stereo/mono record/playback system; features built-in stereo amplifier &



speakers (15' separation); 2 vu meters; sound-on-sound; two speeds (7½ & 3¼ ips) & counter; response 50-14,000 Hz @ 7½ ips; flutter & wow less than .19% @ 7½ ips; signal-to-noise ratio 45 dB; inputs: 2 mic & 2 high-level line; supplied with two F-96 dynamic micsLess than \$199.50

250A Tape Deck/Preamps

All-transistor stereo design; with record & playback preamps. 4-track; vu meters; auto-



matic shut-off; automatic tape lifters; single-knob operation; 7½ & 3¼ ips; flutter & wow .19% @ 7½ ips; response 50-14,000 Hz; S/N 50 dB. Has mic. & line inputs. 14½" x 6½" x 9" h.Less than \$149.50

"ServoMatic" 800 Mono Recorder

Battery or a.c. operation; 3 speed (7½, 3¼, 1½ ips); transistorized; 5" max. reel. Re-



sponse 50-12,000 Hz @ 7½ ips; flutter & wow .15% @ 7½ ips; has automatic record level (a.v.c.) with defeat sw. for recording music; vu meter for level & battery voltage indication. Supplied with cardioid dynamic mic with remote start/stop sw. 12¼" x 10½" x 4¼"Less than \$199.50

900-A "Sonymatic" Mono Recorder

Transistorized; either a.c. or battery operated; 2-speed (3¼ & 1½ ips) design. Re-



sponse 90-9500 Hz @ 3¼ ips; flutter & wow .25% @ 3¼ ips. Has automatic record level (a.v.c.) circuit and record level indicator; 3¼" max. reel; 2 hour capacity on reel. Dynamic mic with remote stop/start sw. Vinyl carrying case; optional accessory nickel-cadmium rechargeable battery pack. 8¼" w. x 8¼" x 3¼"; 5½ lbs\$69.50

F-85 Voice Command Mic

For use with Models 900, 907 & 860\$22.00

230 Stereo Tape Recorder

Solid-state, 4-track, 3-speed (7½, 3¼ & 1½ ips) design with 10 W, ch dynamic



power; response 30-18,000 Hz @ 7½ ips; wow & flutter 0.09% @ 7½ ips; S/N ratio 50 dB. Features automatic shut-off; counter; two vu meters; input for magnetic phono; two detachable speaker systems. Supplied with two Sony F-45 dynamic mics\$249.50

230-CPW Same as Model 230 except cabinets. Walnut enclosures replace portable type; speakers are in bookshelf-type enclosures\$299.50

560 Stereo Tape Recorder

Solid-state, 4-track, 3-speed (7½, 3¼ & 1½ ips) design with 10 W/ch dynamic



power. Features Sony E.S.P. (electronic sensory perception) automatic reverse; response 30-18,000 Hz @ 7½ ips; wow & flutter 0.07% @ 7½ ips; S/N ratio 52 dB. Features two vu meters; counter; automatic sentinal shut-off after tape has made complete reverse cycle; input for magnetic phono. Has two detachable speaker systems. Supplied with two Sony F-98 cardioid dynamic mics\$499.50

560D Tape deck version of Model 560; does not include power amps & speakers. Has walnut cabinet\$359.50

860 Battery/A.C. Portable Recorder

Solid-state mono, 2-speed (3¼ & 1½ ips) dual-track, 5" reel design with built-



in a.c. converter for 117 V operation. Features automatic record level control; aux. high-level input; counter; record monitoring through speaker; can be used for p.a. Response 50-13,000 Hz @ 3¼ ips; wow & flutter 0.15% @ 3¼ ips; S/N ratio 48 dB. Supplied with remote-control Sony

F-85 cardioid dynamic mic\$149.50
 VC-283 Voice-actuated mic\$22.00

STANDARD

SR-250 Portable Tape Recorder

2-speed (1 7/8 & 3 3/4 ips) solid-state design. Can be battery or a.c.-d.c. operated; 1 1/2 W output; 4" speaker; tone control; remote-controlled dynamic mic; radio tap. Supplied with a.c. line cord, batteries. 3 3/8" x 9 7/8" x 6 3/16". 5 lbs.\$69.95

SR-300 Portable Tape Recorder

Two-speed (1 7/8 & 3 3/4 ips) design. Features 120-V a.c. or battery operation and 3 1/2"



reel for 2 hours play at 1 7/8 ips. Has recording level indicator. Supplied with dynamic mic, batteries. 8 1/4" x 8 1/8" x 3 1/16". Weighs 5.1 pounds\$49.95

SR-550 Mono Tape Recorder

Features two-speed (1 7/8 & 3 3/4 ips); dual channel, a.c. bias record system. Will op-



erate from 117 V or 230 V, 50/60 Hz or from 12 V d.c. (8 "D" cells). Transistorized design has automatic record level position & monitor facilities; record level & battery life indicator; 3-digit counter; 5" reels. Will replay tape in either direction plus endless play. Response 100-7000 Hz \pm 5 dB @ 3 3/4 ips. Power 1.5 W max; S/N ratio 40 dB @ 1 kHz. Supplied with dynamic mic with remote control switch, power cord. 11 1/16" x 11 3/16" x 3 3/8"\$139.95

TANDBERG

Model 11 Tape Recorder

Battery-operated (10 1.5-V cells or rechargeable type can be used); battery eliminator for connection to 110/220 V, 50/60



Hz. Three speeds (7 1/2, 3 3/4 & 1 7/8 ips); electronic speed control; maximum reel diameter 7", with cover 5". Response 40-16,000 Hz @ 7 1/2 ips; S/N ratio 56 dB at maximum recording level @ 7 1/2 ips; wow

& flutter better than 0.2% @ 7 1/2 ips; vu meter, solid-state. Inputs: radio & mic; outputs: line & headphone. 13" x 10" x 4", 7 lbs.\$695.00

Series 12 Tape Recorder

Three-speed (7 1/2, 3 3/4 & 1 7/8 ips), 4-track, solid-state stereo design. Features an erase



and record/playback heads; 2 level indicators; center-channel output; two 4" x 7" built-in speakers. Power output 3 W max for int. speakers & 10 W max continuous power (5% HD) for remote speakers. Response 40-16,000 Hz \pm 2 dB @ 7 1/2 ips; inputs: low-Z mic 0.15 mV sensitivity; high level, 1 megohm, 75 mV sensitivity; low level, 100,000 ohms, 7.5 mV sensitivity. 15 3/8" x 11 3/16" x 6 7/8". Teak cabinet and TC-57B carrying case\$498.00

Series 6X Tape Deck/Preamps

Features separate erase, record & playback heads in addition to a special bias head for extended frequency response. Permits sound-on-sound & tape monitoring after recording. Has individual mixer record controls; separate playback controls; pause button; 4-digit counter & optional remote

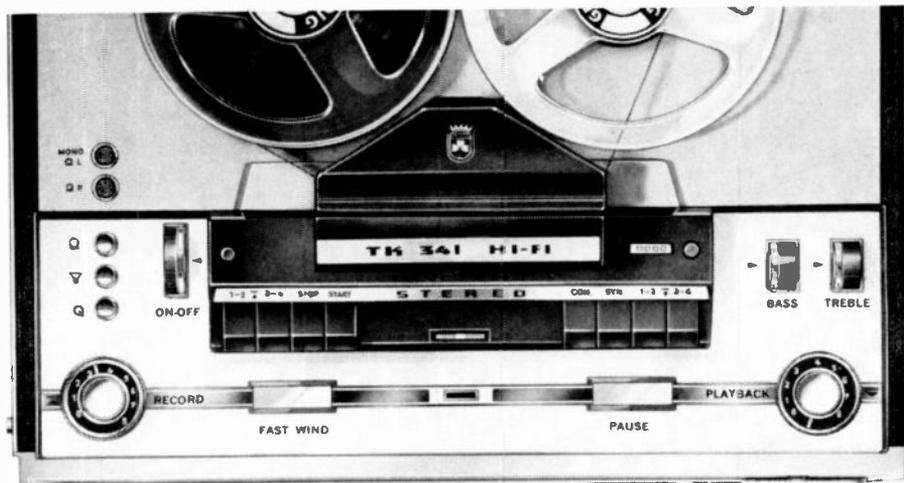


control. Tape speed 7 1/2, 3 3/4 & 1 7/8 ips. Has preamps only. Mono center channel output 1 V @ 200 ohms & dual stereo outputs 1.5 V @ 2000 ohms & 150 mV @ 10,000 ohms. Oscillator is transistorized, balance tubes. Dist. 0.5% at max. record level & 0.2% at max. playback level. Response at 7 1/2 ips is 30-20,000 Hz \pm 2 dB; wow 0.1%; S/N 62 dB. 15 3/8" x 11 3/16" x 6 13/16". Has teak wood cabinet. Model 64X Four-track\$549.00
 Model 62X Two-track\$549.00

Series 8 Mono Tape Recorders

Two-speed (3 3/4 & 1 7/8 ips) mono design; response 60-10,000 Hz \pm 2 dB @ 3 3/4 ips; wow & flutter 0.2% @ 3 3/4 ips; built-in 7" x 4" speaker; 3 watt output; S/N ratio 50 dB below max. recording level; has recording level indicator; four-digit counter; 15" x 11 1/8" x 6 3/4" h.; can be used as p.a. amp; tube design.
 Model 8-23 2-track design in teak cabinet\$227.50
 Model 8-23F 2-track with built-in solenoids; foot pedal for remote control operation\$315.00
 Model 8-43 4-track mono; can be used with Tandberg slide synchronizer ..\$245.00

GRUNDIG STEREO TAPE SPECTACULAR



With a keyboard like this, how can you miss? Grundig's TK 341 4-Track, 3-Speed Stereo Tape Recorder puts every new trick of audio magic at your fingertips: echo and reverberation effects, synchronized sound-on-sound and sound-with-sound, pause bar, monitor jack, automatic stop, dozens more. TK 341 tapes from any source with professional versatility

and push-button ease. And plays back with fabulous fidelity: 40 to 18,000 cps frequency response, 12 watts music power each channel. Just tell your audio dealer you're itching to get your fingers on those TK 341 controls... and then open your ears to that great Grundig sound. With Grundig, hearing is believing! Write for brochure.



GRUNDIG-TRIUMPH-ADLER SALES CORPORATION

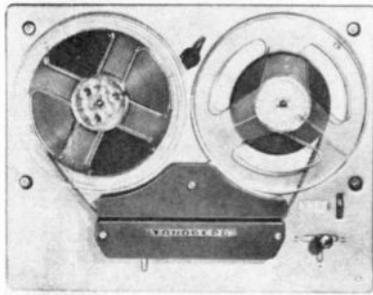
355 Lexington Avenue, New York, New York 10017

WORLD FAMOUS IN RADIOS, TAPE RECORDERS, AND ADLER TYPEWRITERS
 CIRCLE NO. 53 ON READER SERVICE CARD

Model 8-43F 4-track with built-in solenoids; foot pedal for remote control operation \$330.00
 Model 9-23 Same as 8-23 except 3-speed operation (includes 7½ ips); without carrying case & mic. \$273.50

Model 65 Stereo Playback Deck

Three-speed (7½, 3¾ & 1½ ips), 4-track stereo playback tape deck; response 30-



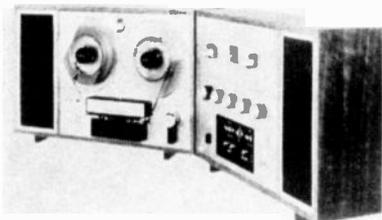
20,000 Hz @ 7½ ips, 30-15,000 Hz @ 3¾ ips, 50-7,000 Hz @ 1½ ips; 4-pole synchronous motor; lever knob for playback, fast forward, fast reverse; 4-digit revolving counter; complete mechanical drive; over-all size of the deck 16" x 12" x 6". \$199.50

TEAC

All models provide electrical speed change within motor instead of mechanical method; 4-track; 2 channel; solid state design; 7" reels & vu meters. Unless otherwise indicated they have four heads, 2 speeds (7½ & 3¾ ips), and 3 motors. All performance characteristics are given for 7½ ips speed. All machines are stereo design and are available on special order with ½-track or full-track heads.

A-2020 Stereo Recorder

Four head, four track, two channel stereo design. Three speeds (7½, 3¾ & 1½ ips);



wow & flutter 0.15% @ 7½ ips; response 30-20,000 Hz (±3 dB 50-15,000 Hz) @ 7½ ips; signal-to-noise ratio 50 dB. Sound-on-sound; automatic reverse; four-pole hysteresis synchronous motor; headphone amplifier for 8 ohm phones; tone control. Vertical or horizontal operation. 21¼" x 13" x 6" x 10"; 117 V, 60 Hz \$399.50

A-3010 Stereo Tape Deck

Four-head, four-track, two channel stereo deck. Three speeds (7½, 3¾ & 1½ ips); 7" reel; response 30-20,000 Hz (±3 dB 50-15,000 Hz) @ 7½ ips; signal to noise ratio



50 dB; crosstalk 70 dB channel to channel @ 1000 Hz. Features new outer-rotor motors used for reel drive in addition to a hysteresis synchronous motor for capstan drive; two vu meters; sound-on-sound recording; sound monitoring; vertical or horizontal operation; automatic shut-off at end of tape motion; all silicon transistor amplifiers; automatically selected record equalizers; tone control; headphone amplifier to permit use of 8-ohm phones. 17" x 15½" x 7¾". 117 V, 60 Hz \$399.50

A-5050 Stereo Tape Deck

Four-head, 4-track, 2-channel, two speed (7½ & 3¾ ips) design; three motors, one



dual-speed hysteresis synchronous for capstan drive, two eddy-current types for reel turntables. Response 30-20,000 Hz (±2 dB 45-15,000 Hz) @ 7½ ips; wow & flutter 0.08% @ 7½ ips; signal-to-noise ratio 55 dB. Push button control; remote control facilities for all recorder operations; protection from accidental erasure. 21" x 14½" x 9½". Walnut finished wooden cabinet \$669.50

A-6010 Stereo Tape Deck

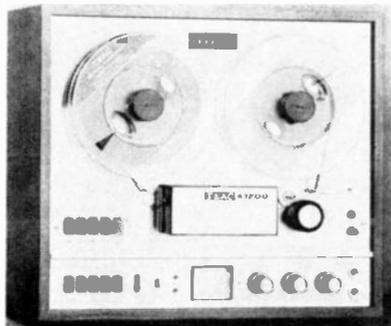
Four-head, 4-track, 2-channel, two-speed (7½ & 3¾ ips) design; three motors;



automatic reverse provides continuous playback in both directions. Phase Sensing System permits reverse signal to be applied to tape automatically. Response 30-20,000 Hz (±2 dB 45-15,000 Hz) @ 7½ ips; wow & flutter 0.08 @ 7½ ips; S/N ratio 55 dB. 20¾" x 17¾" x 6¾", 110/117 V, 50/60 Hz \$699.50

A-1200 Tape Deck

Has 3 heads; features stereo echo & "Add" recording. Response 30-20,000 Hz; wow &



flutter 0.12%. Does not have power amp & speaker. Has mic & line input & 1 V pre-amp outputs. 16½" x 17½" x 11½". Walnut cabinet \$349.50

4010S Tape Deck

Features contact tape automatic reverse play & monitoring actual sound on tape



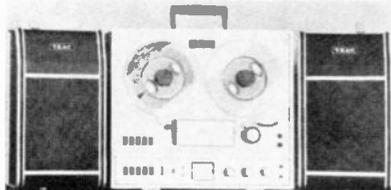
while recording. Response 30-20,000 Hz; wow & flutter 0.12%. Does not have power amps or speakers. Has preamp output 1 V and mic & line inputs. All mechanical functions are solenoid operated. 17½" x 17½" x 9¾". Walnut wood cabinet \$499.50

A-1500 Tape Deck

Features "Add" recording & stereo echo. Has 4 heads for automatic reverse play & monitoring actual sound on tape while recording. Response 30-20,000 Hz; wow & flutter 0.12%. Does not have power amps or speakers. Has mic & line inputs & 1 V preamp output. Has separate preamps for record & playback. 16½" x 15½" x 11½". Portable type case \$449.50

A-1600 Tape Recorder

Stereo design featuring "Add" recording & stereo echo; with separate record & playback



amplifiers; line & mic inputs. Response 30-20,000 Hz @ 7½ ips; wow & flutter 0.12% @ 7½ ips; S/N ratio 50 dB; 8 ohms; 2 W; ch dynamic power output. Features electrified automatic reverse for uninterrupted play of up to four hours. Solid-state design. 16½" x 15½" x 11¾". \$549.50

A-4020 Tape Recorder

Features automatic reverse, bi-directional recording. Response 30-20,000 Hz; wow & flutter 0.12%; has line & mic inputs; 8



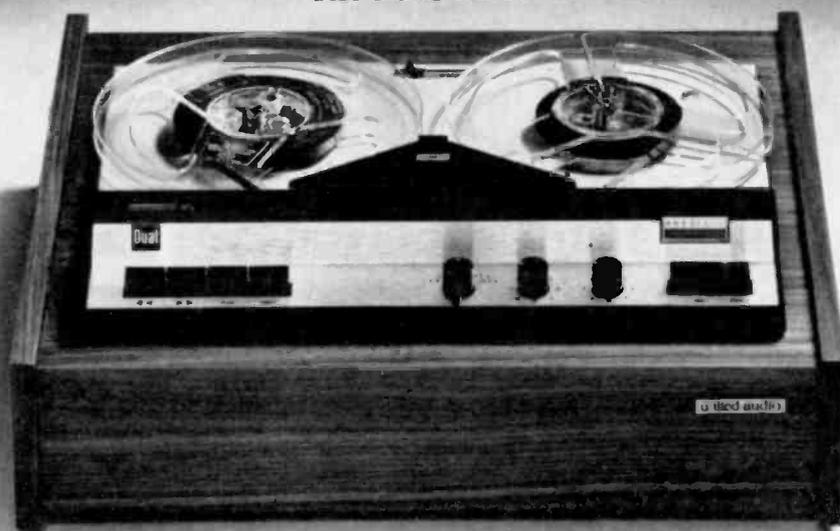
ohms; 20 W dynamic output each channel. 18½" x 16¾" x 9" \$699.50

A-1610 Tape Deck

Features phase-sensing automatic reverse for both directions. Has separate record & playback preamps. Response 30-20,000 Hz; wow & flutter 0.08%. Does not have power

Dual's reputation for precision has now gone to its heads.

The Dual TG 27



For years, Dual has been known primarily for precision, automatic turntables. Now, something new has been added. Our first tape deck: the TG 27.

It's constructed with the same precision and reliability we built into our turntables. It provides the audiophile with a rugged, dependable, easy-to-operate deck without frills or gimmicks.

Take the tape heads, for example. We make them ourselves. Their unique hyperbolic contour provides maximum tape-to-head contact. And they go a long way towards explaining the Dual's superior high and low end response. (They also eliminate the need for pressure pads.)

Or examine the braking system. It's coordinated with a slip-clutch which limits the amount of tension imparted to the tape during acceleration. The tensile strength of even the thinnest tapes will not be exceeded.

The new Dual TG 27 4-track stereo tape deck at \$199.50 with all-silicon circuitry, records and plays back at either 3¾ or 7½ ips. Other features include pushbutton operation, mixing controls for any two inputs, sound-with-sound and sound-on-sound.

Our reputation for precision has indeed gone to our heads, and there's nothing but good to show for it.

For more information, write **United Audio Products Inc.**, 535 Madison Ave., N.Y. 10022.

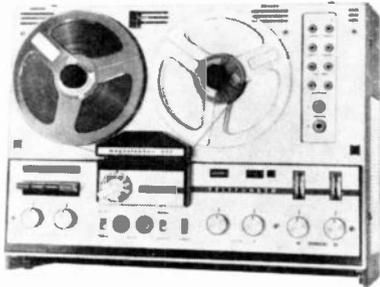


amps or speakers. Has 1 V preamp outputs. Has facilities to accommodate two additional heads (6 total). 20 3/4" x 17 3/8" x 6 7/8"\$699.50
All prices are "suggested list".

TELEFUNKEN

"Magnetophon" 204U Recorder

Solid-state four-track, dual-speed (7 1/2 & 3 3/4 ips) stereo design; response 40-18,000



Hz (at 7 1/2 ips; S/N ratio 45/50 dB; wow & flutter 0.2%/0.15%). Features level indicators; counter; automatic stop & 6 W/ch dynamic power output, has built-in speakers: 8 1/4" x 13 3/4" x 18 1/2". Walnut cabinet\$299.95

"Magnetophon" 300 Portable Recorder

Solid-state, two-track, 3 3/4 ips mono design; response 40-14,000 Hz; 2 3/4" x 4" speaker:



1 W output. Operates direct from a 6 V d.c. battery source. Has a.c. power/recharger unit, car adapter & pause control. 10 3/4" x 3" x 10 7/8". 3 hours playing time with 5" reel.\$129.95

"Magnetophon" 302 Recorder

4-track, 2-speed (1 7/8 & 3 3/4 ips), mono

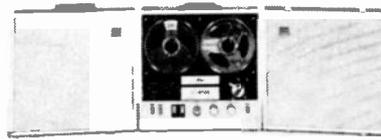


record & playback design; features 5" reel; response 40-14,000 Hz (at 3 3/4 ips; S/N ratio -46 dB; wow & flutter ±0.3%). Has 2 3/4" x 4" speaker; 1 W output. Will operate on five 1 1/2 volt flashlight cells or storage battery. Has a.c. power supply/battery charger. 10 1/2" x 3" x 11"\$159.95

TOSHIBA

GT-810S Stereo Tape Recorder

Three-speed (7 1/2, 3 3/4 & 1 7/8 ips), 4-track stereo record/playback design; response 30-15,000 Hz (at 7 1/2 ips); two 6 5/16" dynamic speakers; fifteen transistors; 4 diodes, 4 thermistors; 120 V, 50/60 Hz operation; two record level meters; 3-digit index counter; 4 outputs, 4 inputs; 16" x 7 1/2" x 15 3/4"; total weight with speakers 37 lbs.; comes with 2 dynamic mics, 2 high-output earphones, 1 roll splicing



tape, 1 7" reel demo tape, 1 empty 7" reel, 2 reel caps, 2 jumper cables.\$249.50

GT-611P Portable Recorder

All-transistor, a.c. or battery powered record/playback unit; 3 3/4 & 1 7/8 ips; will handle up to 5" reels. Features recording & battery voltage indicator; record, play, stop, rewind, and fast-forward push-buttons; automatic or fixed-level recording; heavy-duty motor; a.c. bias. Comes with dynamic mic with remote-control sw., 5" reel with tape, 5" reel, batteries, a.c. adapter cord, shielded connector cable, 50 Hz capstan sleeve adapter. High-impact cabinet, ebony with chrome trim. 11 3/8" w. x 3 3/4" h. x 9 3/8" d.\$79.50
Prices are "Suggested Retail".

UHER

Model 4000L Portable Recorder

All-transistor, 2-track, 4-speed (7 1/2, 3 3/4, 1 7/8 & 1 5/16 ips) mono design; powered by five Ni-Cad cells or rechargeable battery.



6-12 V or separate 120 V a.c. power supply; electromagnetic start/stop remote control by means of microphone or remote switch; digital counter; vu meter and power supply indicator; acoustic switch available for sound control for start and stop of tape; response 40-20,000 Hz ±2.5 dB (at 7 1/2 ips; S/N 52 dB; wow & flutter 0.1% (at 7 1/2 ips); output speaker 1 watt; inputs: microphone 0.1 mV (at 2000 ohms); radio 1 mV (at 47,000 ohms); phono 4 mV (at 1 meg-ohm); 10 hours playing time with Ni-Cad cells; 11" x 9" x 3 1/2"; weight without batteries 7 lbs.; complete with remote control dynamic microphone, leather case, shoulder strap, a.c. power unit, battery charger, and "Dryfit" storage battery\$440.00

"Universal 5000" Recorder

All-transistor, 2-track, 3-speed (1 5/16, 1 7/8 & 3 3/4 ips), 6" reel design. Response 40-



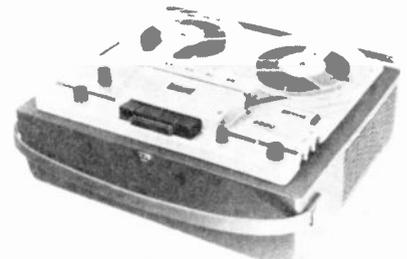
16,000 Hz (at 3 3/4 ips; S/N 48 dB; wow & flutter .2% (at 3 3/4 ips); output 2 W @ 4 ohms. Has digital counter, automatic recording level control, completely solenoid controlled; vu meter & inputs for low-impedance mic., radio, phono. Playback outputs 2.5 V (at 4 ohms & 0.9 V (at 47,000 ohms, 6" x 10" x 13"\$300.00

Model 8000 Tape Recorder

Four-track stereo/mono record & playback; completely transistorized; separate record/playback heads; features built-in impulse transmitter for automatic slide-projector synchronization; echo effect; remote control; sound-on-sound; automatic shut-off; has built-in stereo speakers, 2.5 W/ch (at 4 ohms); 3 inputs: radio, mic & phono; headphone/speaker outputs; 4 speeds (7 1/2, 3 3/4, 1 7/8 & 1 5/16 ips); will accept 7" reels; response 50-20,000 Hz ±2.5 dB (at 7 1/2 ips); wow & flutter 0.1% (at 7 1/2 ips; S/N 50 dB; 117-250 V a.c., 50/60 Hz operation, 14" x 15" x 7"; supplied with one dynamic mic.\$420.00

6000 Mono Tape Recorder

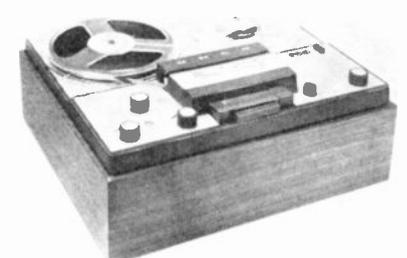
Transistorized, 2-track, 2-speed (7 1/2 & 3 3/4 ips), 7" reel design; response 40-18,000 Hz



±2.5 dB; S/N 45 dB; wow & flutter ±0.15% r.m.s.; 2 W (at 4 ohms. Has digital counter, vu meter, 3 inputs (mic, phono, radio) and 2 outputs. Speaker & earphones, 14" x 15" x 7". 117-250 V a.c., 50-60 Hz.\$160.00

7000D Tape Deck/Preamps

Transistorized, 4-track for stereo or mono record/playback, 2-speed (7 1/2 & 3 3/4 ips);



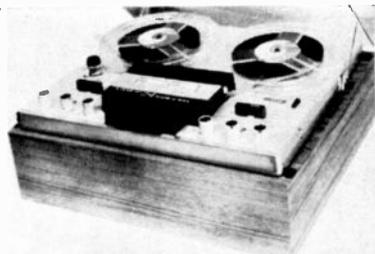
7" reel design; response 40-18,000 Hz ±2.5 dB (at 7 1/2 ips; S/N 48 dB; wow & flutter ±.08% r.m.s.; output 0.75 V (at 15,000 ohms. Has 4-digit counter, automatic end of tape shut off, vu meter, mic & line inputs. Permits sound-on-sound, 117-250 V a.c., 50/60 Hz operation. 14" x 15" x 7"\$149.50

Model 4400 Stereo Recorder

Stereo version of Model 4000L; has additional stereo power amplifiers & speakers, is a 4-track design\$450.00

9000 Tape Deck/Preamps

Transistorized stereo tape deck with preamps, 4-track, 2-speed (7 1/2 & 3 3/4 ips), 7" reel design. Response 20-20,000 Hz ±2.5 dB (at 7 1/2 ips; wow & flutter .06%, 110 0.15%. Has built-in tape cleaner, tape tension equalizer, adjustable azimuth of the playback head for prerecorded tapes, vu meters, 4-digit counter, 3 inputs



(mic, radio, phono). Complete sound-on-sound facilities. 117-250 V a.c., 50/60 Hz.\$400.00

1000 Portable Tape Recorder

Will operate from 117-250 V a.c., five "D" cells, or 6-12 V car battery. Solid-

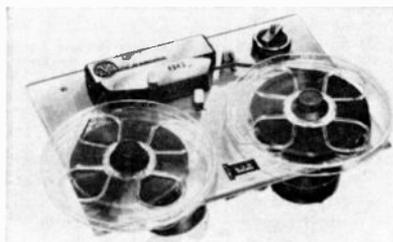


state design; response 20-20,000 Hz ± 2.5 dB @ 7 1/2 ips; single 7 1/2-ips speed; full-track; 5" reels max. Features automatic photoelectric level control; overload filter; "Pilotone" level adjust; battery condition checker; monitoring off the tape; stroboscopic speed control; built-in speaker; pause control. Designed especially for sound synchronization of motion picture films. 11" x 9" x 3 1/2"\$1000.00

VIKING

87 Series Tape Transports

Two-speed (7 1/2 & 3 3/4 ips); 4-pole motor (hysteresis synchronous motor available at extra cost); flutter & wow .2% r.m.s.; long-term speed regulation .5%; digital



counter and tape run-out switch; handles up to 7" reels; wt. 12 1/2 lbs.; panel size 13" x 9 1/2".

Model 87P Playback only, half-track mono head\$138.00
 Model 87R Record/playback, half-track mono, 2 heads\$144.00
 Model 87Q Playback only 1/2- & 1/4-track mono & stereo, 1 head\$141.05
 Model 87RQ Record 1/2-track mono, playback 1/4- & 1/2-track mono & stereo; 3 heads\$165.25
 Model 87ES Record/playback 1/2-track mono & stereo, 2 heads\$157.85
 Model 87RMQ Record 1/4-track, playback 1/4- & 1/2-track mono & stereo, 3 heads\$170.30
 Model 87ERQ Record 1/2-track, playback 1/4- & 1/2-track mono & stereo, 3 heads\$178.65
 Model 87ESM Record/playback 1/2-track mono & stereo, 3 heads\$185.50
 Prices quoted are for tape decks only; for recording with Model 87RQ, ERQ, RMQ, & ESM, use RP83-3 record/playback amplifier; for other models use RP83. For stereo design, use two amplifiers.

Model 88 Stereo Deck/Preamps

Solid-state, 2-speed (7 1/2 & 3 3/4 ips), 4-track design. Response 30-18,000 Hz ± 3



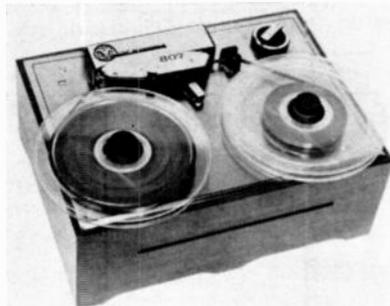
dB @ 7 1/2 ips; flutter & wow 0.2% @ 7 1/2 ips; S/N ratio 55 dB @ 7 1/2 ips; HD 1%. Features counter, vu meters, monitor facility, sound-on-sound, automatic shut-off. Pre-amp outputs 2 V; tape transport same as Model 87\$339.95
 1600 Cabinet, fold-back walnut\$29.95
 1500 Cabinet, walnut\$18.95
 Model 880 Same as 88 but with 5 W/ch dynamic power @ 8 ohm amp & two detachable speaker assemblies, each with 5"



woofer and 2 1/2" tweeter & crossover. 21 1/2" w. x 14 3/8" x 9 1/4" d. Supplied with portable case.\$439.95

Model 807 Tape Player

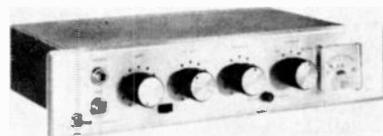
Plays mono or stereo 1/2- or 1/4-track at 7 1/2 ips or 3 3/4 ips. Features automatic shut-off:



response 30-18,000 Hz @ 7 1/2 ips; flutter & wow 0.2% @ 7 1/2 ips. Does not have pre-amps; heads connect direct to tape head input of external amp. 6 1/2" x 13 1/2" x 10" d.\$124.95

RP83 Record/Playback Preamp

Response: recording, 30-16,000 Hz ± 3 dB @ 7 1/2 ips; 30-12,000 Hz @ 3 3/4 ips:



playback, 25-20,000 Hz @ 7 1/2 ips, 25-14,000 Hz @ 3 3/4 ips; output 1 V to power amplifier; monitor output 1 V to headphones; high- and low-level inputs with individual level controls; vu meter; 3-position selector switch; playback output level controls; signal-to-noise ratio 50 dB @ 7 1/2 ips with signal recorded 6 dB below saturation; harmonic distortion 1%;

tube design. 11 1/8" x 2 5/8" x 5 1/2" d. behind panel; two required for stereo operation: for use with 2-head designs\$92.50

RP83-3 Record/Playback Preamp

Same as Model RP83 except for 3-head designs.\$94.50

Model 230 Tape Deck

Relay & solenoid controlled with tape motion remotely controlled. Has photoelectric run-out sensor; counter; can be supplied as single speed or dual speed (1 1/8 & 3 3/4, 3 3/4 & 7 1/2, 7 1/2 & 15 ips); flutter & wow 0.2% @ 7 1/2 ips. 16" x 10 1/2" x 8".

230FTRM Full-track, erase, record, play or monitor\$379.25

230RM Half-track mono, erase, record, play or monitor\$346.75

230ESM Half-track stereo, erase, record, play or monitor\$367.95

230RMQ Quarter-track stereo, erase, record, play or monitor\$353.25

These four models are standard designs for use with Viking RP110 or RP120 recording amplifiers. Many other head combinations are available but not compatible with RP110 & RP120.

Optional equipment: 19" rack mount panel \$3.00; mechanical run-out \$6.25; single photocell run-out \$18.95; 2-photocell run-out, re-cue/cycle sw. included \$36.00; remote control \$38.00; counter \$9.00; portable case #100 \$59.50

Studio 96 Professional Tape Deck

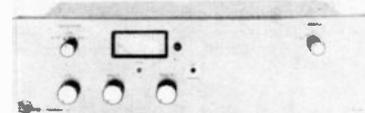
Rugged design, 10 1/2" reel capacity; choice of dual-speed operation (7 1/2-15 ips, 7 1/2-3 3/4 ips, or 3 3/4-1 1/8 ips). Has connector for remote control of play-stop, fast forward-stop-rewind. Will accept up to 4 heads—any choice. S/N 55 dB @ 7 1/2 ips; flutter & wow .1% @ 7 1/2 ips. Face plate 19" x 12 1/4". Price varies depending on heads used—ranging from \$605.95 for a dual 1/2-track design to \$598.95 for 4-head 1/4-track combination.

423 Stereo Tape Deck/Preamps

Solid-state design; 3 speeds (1 1/8, 3 3/4 & 7 1/2 ips); 4-tracks; response 50-15,000 Hz ± 3 dB @ 7 1/2 ips; input sensitivity for 0 vu: 0.55 mV for 2500-ohm impedance mic; aux. 100 mV; HD 1.5%; vu meter; wow & flutter 0.2% @ 7 1/2 ips. Has pause control. 15 3/4" x 12 3/8" x 6 1/2" behind panel. Tape deck mechanism similar to Model 433\$269.00
 Walnut base.....\$ 20.00
 Remote pause control.....\$ 25.00

RP110 Mono Tape Record/Play Amplifier

Transistorized design for use with tape transports having separate erase, record &



playback heads such as Model Studio 96. Response 30-16,000 Hz @ 7 1/2 ips; S/N 55 dB below peak recording level @ 7 1/2 ips. Standard model\$299.00
 There are many variations from Standard in form of options & accessories.

RP120 Tape Record/Play Amp

Similar to RP110 except dual channel



(stereo) design\$399.00

433 Stereo Tape Deck/Preamps

Three-speed (1 1/8, 3 3/4 & 7 1/2 ips), 4-track

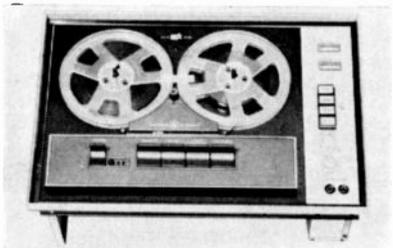


design; response 40-18,000 Hz ± 3 dB @ 7½ ips; S/N ratio 54 dB; THD 1% at 0 level; flutter & wow 0.2% @ 7½ ips; inputs for 0 level: mic 0.5 mV; aux. 75 mV. Features solid-state design; 3 heads; mixing controls; echo sw.; sound-with and sound-on-sound; counter; pause control; automatic shut-off. Has preamps only; output 1 V low impedance. 15¼" x 14¾" x 6½" behind panel\$369.95
 433W With walnut base.....\$389.95
 433R With remote pause.....\$394.95
 433RW With remote pause & walnut base\$414.95

V-M CORP.

1492 "Stereo/Fidelis" Deck/Preamps

Solid-state, 3-speed, 4-track stereo design. Has conventional inputs & outputs; pause



switch; counter; vu meters; automatic shut-off & "Add-A-Track" feature.\$209.95

749 "Words & Music" Recorder

Solid-state, 3-speed, 4-track stereo design. Features pause control, "Add-A-Track," vu



meter, automatic shut-off. Has mic, aux, and V-M slide-projector synchronizer inputs. Detachable speaker housings contain 6" oval speakers. Wood case, onyx vinyl covering\$259.95

737 "Echo" Recorder

3-speed, dual-track stereo design. Features pause control, timer & 2 built-in 6" oval



speakers. Wood case, onyx vinyl covering\$199.95

760 "Charger" Portable Recorder

Solid-state, dual-track mono design with built-in rechargeable nickel-cadmium bat-

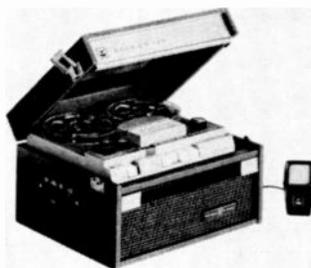
tery providing 4 hours recording time. Has record/battery level meter\$129.95

733 "Assembly" Recorder

3-speed, 4-track mono design with single stacked head. Has automatic shut-off & pause button & 5" x 7" speaker. Molded polypropylene case.\$189.95

729 "Courier" Recorder

Rugged 3-speed, 4-track mono design. Has pause control & "Add-A-Track" feature,



plus 6" oval speaker. Wood & green polypropylene case.\$119.95
 728 Same except without "Add-A-Track" feature; 2-track recording.\$ 99.95

727 "Delegate" Recorder

Solid-state, 3-speed, dual-track mono. Has 2 heads record/playback & erase; 6" oval speaker. Silver grey case.\$169.96

754 "Stereo/Fidelis" Tape System

Solid-state, 3-speed, 4-track stereo design with AM-FM stereo tuner. Has phono, mic & aux. inputs for ext power amp, speakers, and V-M slide projector synchronizer. Features pause control, counter, vu meters, automatic shut-off, and "Add-A-Track." Speaker housing detachable and each has a 6" x 3½" oval speaker. Various accessories included.

Walnut veneer\$469.95

Black vinyl\$439.95

744 Without tuner, black vinyl wood case\$339.95

Prices listed are "suggested retail".

WOLLENSAK

5710 2-Track Mono Recorder

Solid-state, 3-speed (7½, 3¼ & 1½ ips) design. Features 4" x 6" built-in speaker;



vu meter; pause control; counter; automatic shut-off; monitor facility; automatic head demagnetization. Response 40-17,000 Hz ± 3 dB @ 7½ ips; wow & flutter 0.25% @ 7½ ips; S/N ratio 48 dB @ 7½ ips; output 3 W dynamic power at 5% HD. Has mic & phono/radio inputs. 16" w. x 10" x 7" d. Supplied with protective cover & mic.\$159.95

1500SS 2-Track Mono Recorder

Solid-state, 2 speed (7½ & 3¼ ips) design. Features built-in speaker; vu meter; counter; pause control; monitor facility. Accepts accessory foot control. Response 40-15,000 Hz ± 3 dB @ 7½ ips; wow & flutter 0.25%; S/N ratio 48 dB; output 10 W dy-



amic power. 9 W continuous @ 5% HD. Has mic & phono/radio inputs. 6½" x 10¼" x 11¼"\$184.95

WOLLENSAK MODELS 5720, 5730, 5740, 5750, & 5800 are all solid-state, 3-speed (7½, 3¼, & 1½ ips), 4-track stereo & mono play & record designs. Response 40-17,000 Hz ± 3 dB @ 7½ ips; wow & flutter 0.25% @ 7½ ips; S/N ratio 48 dB @ 7½ ips. Except for Model 5720, power output is 3 W dynamic power @ 5% HD. All have 2 mic & 2 phono/radio inputs. Feature vu meters; pause control; counter; automatic shut-off; monitor facility.

5720 Preamp/deck. Does not include power



amp & speakers. Preamp outputs 1.2 V. 19¾" w. x 9¼" h. x 7¾". Accessories not supplied\$189.95

5730 Portable with two 4" x 6" built-in

speakers. Supplied with metal cover lid, one

dynamic mic. 16" x 10" h. x 7" d.\$199.95

5740 Supplied with detachable (6") speak-

er housings; vinyl covered case & 1 dynamic

mic. Closed 21½" w. x 10½" h. x 10½";

open 42" w. x 10½" x 7½" d.\$229.95

5750 Same as 5740 except hardwood cabinet

.....\$249.95

5800 Supplied with separate walnut match-

ing speaker systems; each system has a 6"

x 9" low- and mid-range speaker & a 3"

tweeter with crossover network. Recorder

21" w. x 11" x 9"; speakers 20" x 11" x

8" d. Supplied with a dynamic mic & wall

mounting hardware\$299.95

5810 AM-FM Stereo Tuner

Walnut cabinet matches 5800 system. FM

usable sensitivity 10 μ V; response 40-12,000

Hz (stereo); separation 25 dB @ 1 kHz;

hum & noise 25 dB below 1 V output

.....\$169.95

3500 Portable Mono Tape Recorder

Operates from six "D" cells or 117-V a.c.

Features 2 speeds (3¼ & 1½ ips); 5"



reels; automatic record level; solid-state

design; vu level/battery condition meter.

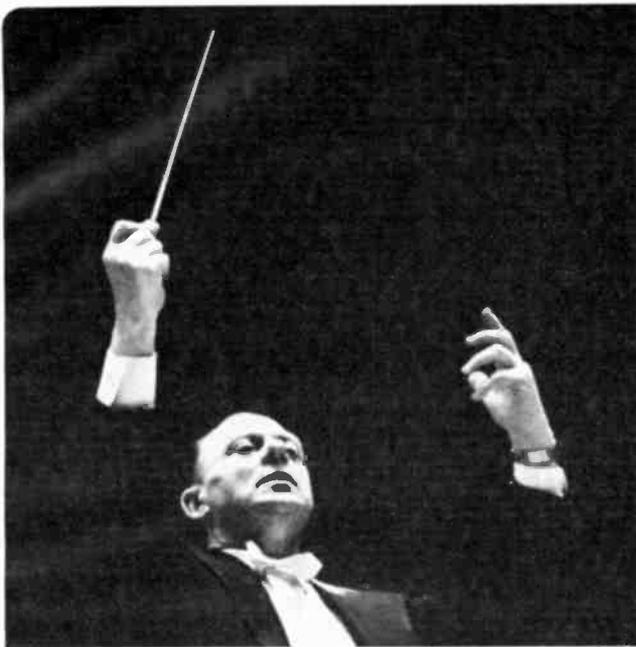
Response 100-8000 Hz ± 4 dB @ 3¼ ips;

wow & flutter 0.4% @ 3¼ ips; output

750 mW. Supplied with remote mic. 11½"

x 10¼" x 4"\$89.95

Build a world of your own on "Scotch" Brand Dynarange® Tape.



Great moments in music . . . happy times at home and away—capture whatever sound you want to save on "Scotch" Brand "Dynarange" Recording Tape. "Dynarange" delivers true, clear, faithful reproduction across the entire sound range. Makes all music come clearer . . . cuts background noise . . . gives you fidelity you didn't know your recorder had.

And "Dynarange" saves you money, too! Delivers the same full fidelity at a slow 3 3/4



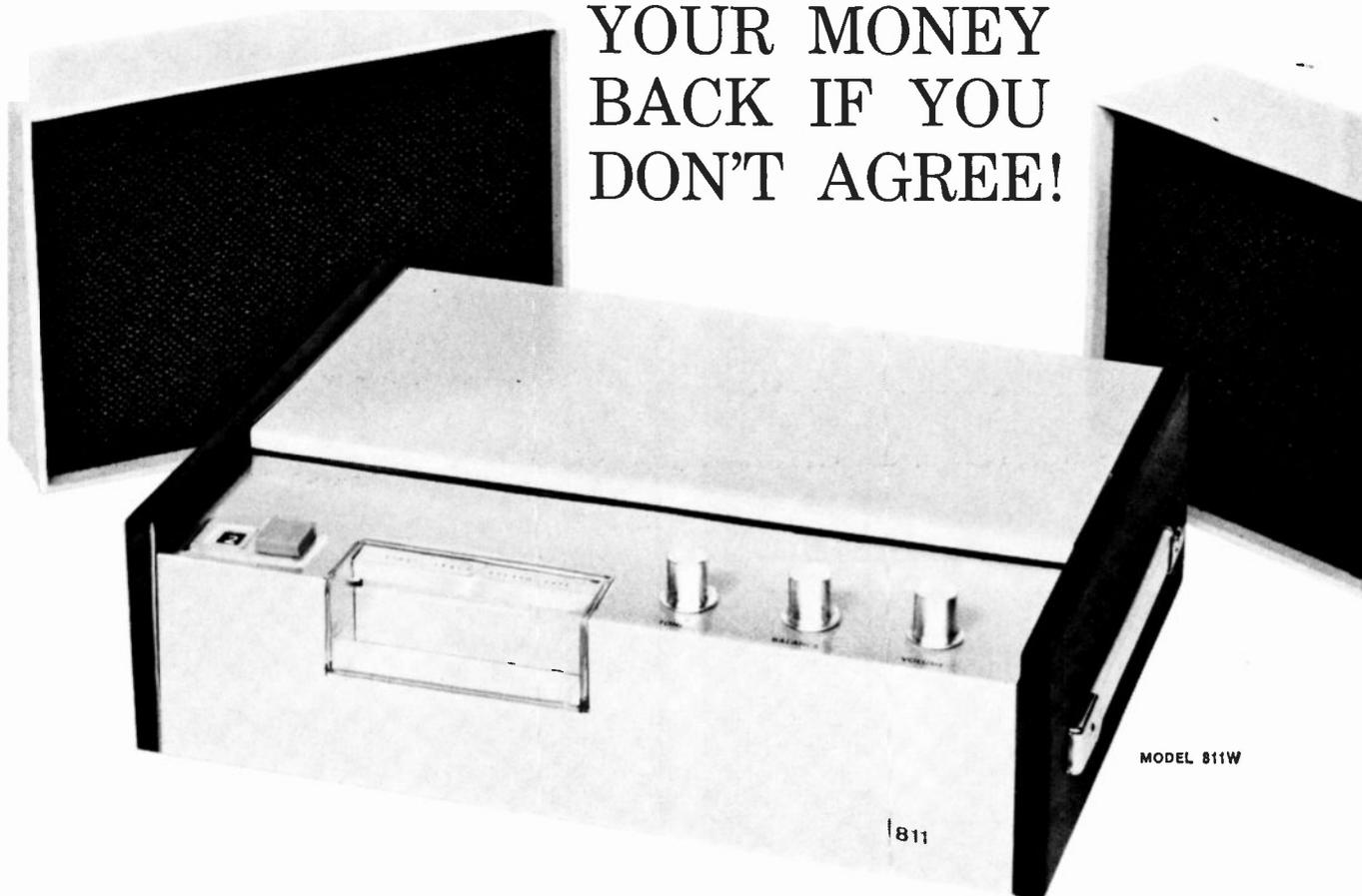
speed that you ordinarily expect only at 7 1/2 ips. The result: You record twice the music per foot . . . use half as much tape . . . save 25% or more in tape costs! Lifetime silicone lubrication protects against head wear, assures smooth tape travel and extends tape life. Isn't it time you built your own private world of sound on "Scotch" Brand "Dynarange" Recording Tape?

Magnetic Products Division **3M** COMPANY

"SCOTCH", "DYNARANGE" AND THE PLAID DESIGN ARE REGISTERED TRADEMARKS OF 3M CO.

VIKING MAKES THE BEST-SOUNDING 8 TRACK PLAYER.

YOUR MONEY BACK IF YOU DON'T AGREE!



Viking, first and largest tape cartridge equipment maker in the world, introduces three new solid state stereo tape cartridge players that rival the richness of a component hi-fi system! We're so proud of these new 811 players . . . so confident of their superior sound . . . we'll give you your money back if you can find another that sounds better!

See the new Viking Series 811 cartridge players at your hi-fi dealers *now*. They're built with the same high quality, the same rugged durability that made them the choice of General Motors cars. But these home models are styled to fit right in with your component system or add a touch of beauty to any room.

Full fidelity playback of 8-track cartridges; automatic and push-button track selection; 40-15,000 Hz frequency response; 0.3% rms flutter and wow; numerical track indicator.

MODEL 811 — Table top unit in walnut cabinet with built-in playback pre-amplifier for use with existing stereo equipment in the home.
Under \$100

MODEL 811W — Table top unit in walnut cabinet, completely self-contained. Has built-in power amplifier; two satellite speakers; volume, balance and tone controls; 10 watts IHF music power; stereo headphone jack.
Under \$150

MODEL 811P — Portable, self-contained unit with built-in power amplifier; two detachable speakers; volume, balance and tone controls; 10 watts IHF music power; stereo headphone jack; two-tone vinyl finish.
Under \$150

VIKING tape recorders
DIVISION OF THE TELEX CORPORATION
9600 ALDRICH AVE., SOUTH, MINNEAPOLIS, MINN. 55420

CIRCLE NO. 51 ON READER SERVICE CARD

1968 TAPE-CARTRIDGE MACHINES

AIWA

TP-728 Cassette Recorder

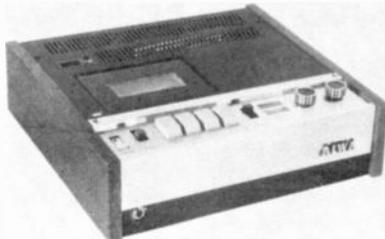
Solid-state, a.c.-d.c. design. Features capstan drive; mono record & playback; output 500



mW dynamic power (EIA 5% dist.). Has 4" x 2½" spkr.; a.c. bias & erase. Supplied with mic. earphone, batteries, case & a.c. line cord. 10¾" x 6" x 3¼"\$79.95

TP-1009 Cassette Tape Deck

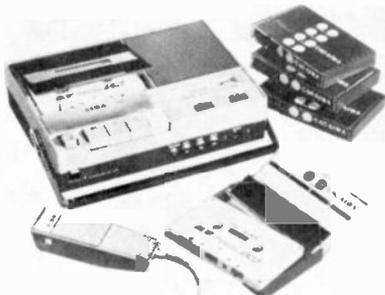
Solid-state, stereo, 117 V a.c. design; response 50-10,000 Hz; has preamps only for



record & playback; pause control; 1 V output each channel; two vu meters; a.c. bias & erase. 11" x 10" x 3¼"\$109.95

TP-707PJ Cassette Recorder

Solid-state, dual-track, mono; capstan drive design. Features a.c. bias; 1½" spkr. w.



tape (all cassette cartridges are 1½" in width); 2½" speaker; 200 mW dynamic power; operates from 4 "C" cells; has record level battery indicator meter. Supplied with remote control mic & earphone\$69.95

TP-817 Auto Cassette Player

Dual-track, mono, cassette-type, capstan drive tape player; 17½ ips; up to 60 min. playing time; output 2 W; 3½" internal spkr. slide sw. for use with car spkr. 6- or 12-V operation; uses Philips-type cassettes; push-button control of rewind, play, fast-forward; transistorized drive motor. 5½"

w. x 3" h. x 8¾" d.; 7½ lbs.\$69.95
All prices are "Suggested Retail".

AMERICAN GELOSO

"Stenotape 915" Cartridge Recorder
Solid-state, dual-track mono, 17½ ips design basically used for voice recording. Has auto-



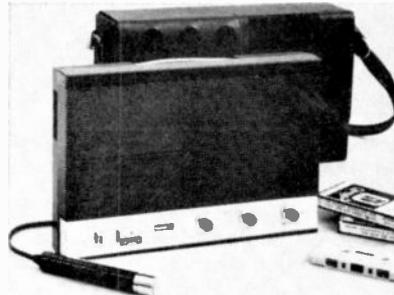
matic-stop device with buzzer; automatic gain control; time indicator; 4 inputs. Uses reel-to-reel type cartridges of their own design—not compatible with any others. 120-V a.c. operated; 150 mW output.

915A Complete with foot pedal and earphone\$249.95
915B Complete with fingertip control and earphone\$249.95

AMPEX

Micro 20 Cassette Recorder

Solid-state, a.c.-d.c.-battery operated mono



recorder with remote mic. 12½" x 8" x 2¾"\$99.95

Micro 50 Cassette Deck/Preamp

Solid-state stereo cassette player/recorder; a.c. operated; does not have power amps and speaker. Features counter, vu meter, pause & record level controls. Has two omnidirectional mics. & walnut case. 14½" x 8¾" x 3½"\$139.95

Micro 85 Cassette Recorder

Solid-state stereo cassette player/recorder; a.c. operated. Features record level, tone &

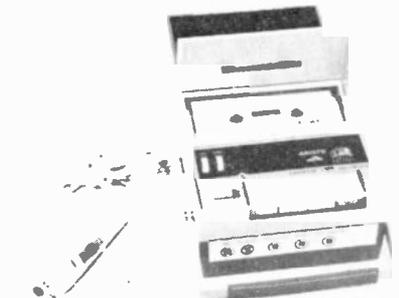


pause controls & counter. Supplied with two omnidirectional mics & two separate speaker systems. Walnut cabinets. 14½" x 8¾" x 3½"\$199.95

ARISTO

6R-808 Cassette Recorder

6 transistor cartridge recorder; piano-key push-button controls; dual tone level and



battery drain indicator; a.c. jack; non-erase recording lever. Comes with remote-control pencil mic., recording cartridge, aluminum carrying handle. Matching a.c. adapter (#11-808) available extra. 2½" h. x 4¾" w. x 8¾" d.Net \$39.99

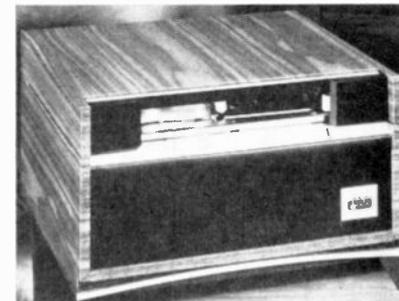
ARVIN

97C38 "Four 'N Eight" Cartridge Player

Stereo design plays both 4 & 8 track cartridges; solid-state design with automatic



channel selection; cartridge ejects & unit turns off automatically at end of tape. Will handle 4", 6" & 8" endless loop cartridges. 1½ W/ch dynamic power (EIA @ 5%). Speakers are 4" x 6" each in 4" w. x 6½" h. x 13" d. Cabinets are walnut wood grain finish 14" x 8" x 13" d.\$159.95
97C38-A Same less speakers\$139.95
97C38-S Two matching speakers\$ 24.95
97C08 Deck/preamp only 8" x 13" x 14" w.\$ 99.95
97C18 Deluxe version of 97C08 with wal-



nut wood cabinet\$119.95

28L09 Cassette Recorder

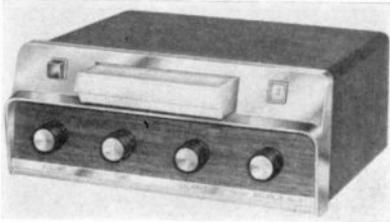
Mono design with built-in a.c. adapter; vu meter & battery indicator. response 70-8000 Hz; S/N ratio 42 dB; operates from six "C" cells; has 2" x 3" speaker. Supplied with remote control mic. 10" d. x 7"

x 2 1/2"\$69.95
 All prices quoted are suggested retail.

AUTOMATIC

"TapeDek-8" Cartridge Player

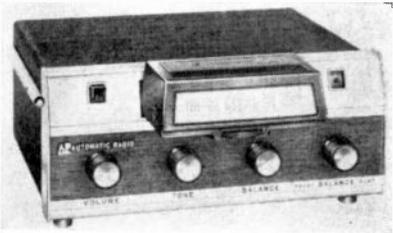
Solid-state stereo design based on 8-track cartridge. Response 50-15,000 Hz; wow &



flutter 0.3%; operates from 12 V d.c. negative ground system. Has channel indicator & facilities to pick your album. Has control for front-to-rear speaker balance & left-to-right balance. Has lock & key theft-proof mounting bracket. Supplied with 4 instant-mount speakers & all hardware. 8" w. x 3 3/4" x 8"\$129.95
 120 V a.c. power pack available.

"TapeDek" Convertible

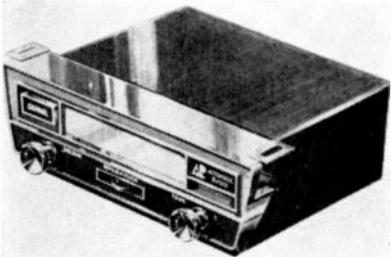
An all-in-one solid-state cartridge entertainment center. Various inserts are available



to provide AM, FM, 4- or 8-track reproduction. Operates from 12 V negative-ground system. Output 5 W dynamic power (2 1/2 W/ch). Supplied with four instant-mount speakers, slip-in mounting bracket with key lock. Has visual program indicator & special AM-FM antenna. 8 1/2" x 3 3/4" x 7 1/2" d. Basic design for use with 8-track stereo cartridges\$129.95
 FM tuner cartridge\$ 49.95
 AM tuner cartridge\$ 29.95
 Universal power supply for 117 V operation\$ 28.25
 Bookshelf speaker features high-compliance woofer & tweeter. Response 50-15,000 Hz. 13 1/4" x 5 3/4" d. x 7 1/2". Walnut\$ 29.95

MNE-6725 Cartridge Player

Based on 8-track stereo, playback-only design; 3 3/4 ips; wow & flutter 0.3%; re-



sponse 50-15,000 Hz; output 4 W dynamic power (2 W/ch); 12 V negative ground. Features solid-state circuitry, automatic switching of channels at end of each play. Supplied with two 5" speakers. 6 1/4" x 2 1/2" x 6" d.\$69.95

AUTO-SONIC

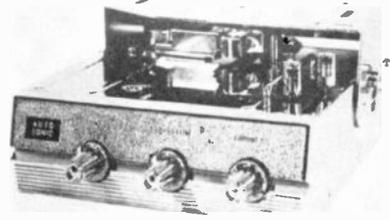
ST-100 Auto Cartridge Player

Solid-state, 4-track, 3 3/4 ips, 2-channel stereo design; response 100-6000 Hz ±3 dB; wow & flutter 0.3%; HD 0.3% @ 1000 Hz; S/N ratio 35 dB; output 2.5 W/ch dynamic power (EIA 5% dist.) @

4 ohms. Operates from 12 V d.c. battery. Choice of stereo car speakers. 7" x 3 1/2" x 7"\$69.95

ST-300 Auto Cartridge Player

Same as ST-100 except 3 W ch dynamic power (EIA 5% dist.) at 4 ohms. 7" x 3 1/2" x 7 1/2"\$79.95



3 1/2" x 7 1/2"\$79.95

ST-308 Auto Cartridge Player

Same as ST-300 except compatible for all 4 inch 4 & 8 track cartridges. Has automatic & manual track change control for 8-track operation\$99.95

ST-408 Auto Cartridge Player

Same as ST-308 except deluxe version with automatic start. 9" x 4" x 7 1/2"\$119.95



Same as ST-308 except deluxe version with automatic start. 9" x 4" x 7 1/2"\$119.95

ST-808 Auto Cartridge Player

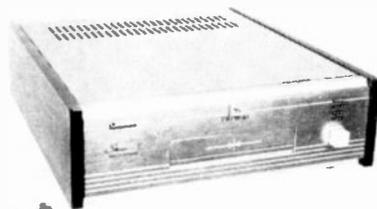
Solid-state, 8-track, 4-channel, 3 3/4 ips design; response 70-7000 Hz ±3 dB; wow & flutter 0.3%; HD 3% @ 1000 Hz; output 5 W/ch dynamic power (EIA 5% dist.) at 4 ohms. Choice of speakers; has automatic start & automatic or manual track selection; 12 V d.c. operation. 8" x 5" x 8"\$119.95

ST-80G Home Cartridge Player

Same as ST-808 except 117 V a.c. operation 12" x 3 1/2" x 11". Less speakers\$119.95

ST-80D Home Cartridge Deck

Same as ST-80G except does not have power amplifiers; 200 mV output\$99.95



er amplifiers; 200 mV output\$99.95

G-448 Home Cartridge Player

Same as ST-80D except compatible 4 &



8-track design; response 50-7000 Hz ±3 dB. 11" x 4" x 10"\$99.95
 PHS-648 Same with portable carrying case & two detachable speaker systems. 18 1/2" x 5 1/2" x 13"\$159.95
 Various other models & accessories available. All prices are "list".

BORG-WARNER

Deluxe 8-Track Tape Player

Solid-state stereo. 12 V negative-ground design; features 3 3/4 ips operation; re-



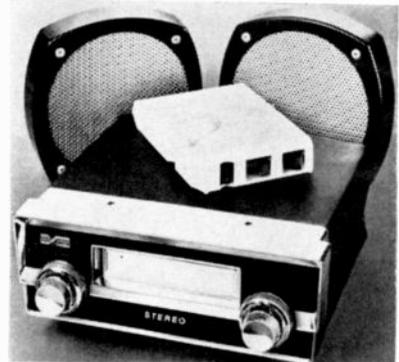
sponse 70-10,000 Hz; 0.75 W/ch dynamic power (EIA 5% dist.); 8 ohm output. Supplied with two 5 1/4" waterproof speakers. 3" x 8" x 7 1/2"\$119.95

"Mark II" 8-Track Tape Player

Similar to "Deluxe" design but economy version without speakers\$89.95

"Cart/able 8" Cartridge Tape Player

Portable 8-track. 120 V a.c. design; has detachable speaker cases. Supplied with



stuff-resistant black or beige case\$99.95
 All prices are "Suggested Retail".

CONCORD

F-100 Cartridge Portable Recorder

Designed around standard cassette cartridge. Will record and play back mono; will play prerecorded stereo cassettes; up to 2 hours recording. Features solid-state design; battery operation; automatic shut-off; record/battery level indicator; 1 1/2 ips; response

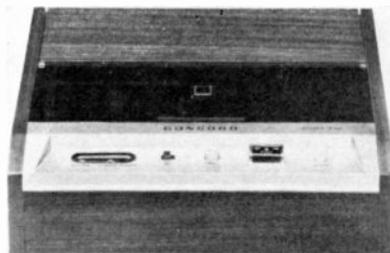


60-10,000 Hz; wow & flutter 0.25%. Supplied with remote control mic. 5" x 8" x 2 1/2"\$100.00

Accessories available: AC-7 120-V adapter, carrying case, shoulder strap, FT-2 foot control, TP-2 telephone pickup, EP-2 carphone.

F-105 Stereo Cassette Recorder/Preamps

Solid-state design with preamps. To be used with external hi-fi power amplifiers; has 4



tracks; 1 7/8 ips; separate vu meters; aux. & mic inputs. Response 40-18,000 Hz; wow & flutter 0.1%; S/N ratio 45 dB. 8 1/2" w. x 2 1/2" x 8".under \$140.00

CP-250 Cartridge Player/Preamps

Stereo 8-track playback unit for use with ext. hi-fi power amps. Response 50-15,000



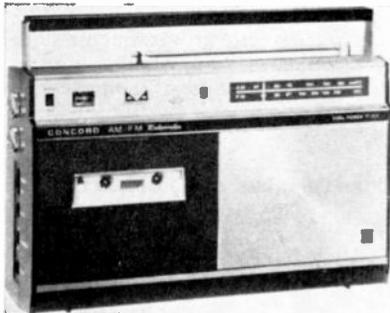
Hz; program lights indicate which track is playing; program selector button changes track. 9 3/8" x 4 1/8" x 9 1/4" d.under \$100.00

CA-150 Cassette Car Adapter

A sliding tray with plug-in connections for playing through auto speaker system; designed for Concord F-100 cartridge "Sound Camera"under \$40.00

F-103 Cassette "Radiocorder"

Combines an AM & FM receiver with a cassette cartridge recorder; solid-state mono



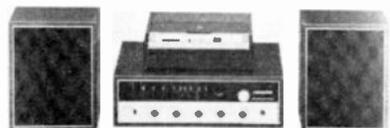
design; battery & a.c. operation. automatic shut-off in both play & fast wind/rewind modes; record level/battery condition meter; 1 7/8 ips; a.f.c.; telescoping antenna; with remote-control dynamic mic. 12" x 9 1/4" x 3 3/4"under \$150.00

F-200 AM-FM Cassette Recorder

Combines solid-state AM & FM circuits with F-100 "Sound Camera". The battery-operated F-100 can be removed for portable use; has remote control mic. 15 3/4" x 8 1/4" x 7 7/8"under \$150.00

HES-1 Cassette System

Combines solid-state AM-FM stereo receiver with stereo cassette tape deck & two



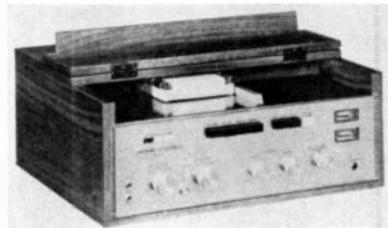
bookshelf speakers. Response 40-18,000 Hz; wow & flutter 0.24%; S/N ratio 45 dB. Has two vu meters; cue device; dust cover. 7 3/8" w. x 9 1/2" x 4 1/8". Speakers are 7 3/8" x 9 1/2" x 4 3/8". All teak cabinetryunder \$250.00

CRAIG PANORAMA

C-516 Cartridge Stereo Recorder

94

Solid-state, 4-track, 3 3/4 ips, 120-V design for use with Fidelipac tape cartridges. Has



automatic start & stop, a.c. bias & erase system, dual inputs, dual output for spkrs. & stereo phone jack. Response 75-15,000 Hz; wow & flutter 2.5 : 10 W/ch dynamic power output; S/N ratio 40 dB. Will record from mic, tuner, or phono. Up to 2 hrs. playing time. 13 1/2" w. x 10 3/4" d. x 6 1/2". Less speakers\$229.95

"Craig 3103" Car Cartridge Player

Solid-state, 4-track, 3 3/4 ips; 10 to 16 V d.c. design for use with Fidelipac tape cartridges.



Has dual stereo playback heads; separate volume, balance & tone controls; automatic track selection & reset button. Playing time 1 hr. Response 100-10,000 Hz ± 3 dB. Output 8 W/ch dynamic power; S/N 40 dB; HD 3%; wow & flutter 0.3%. 7 3/4" w. x 2 3/4" h. x 8 3/4". Less speakers ..\$129.95

2602 Cassette Recorder

Battery-operated with battery life indicator & a.c. adapter jack.\$69.95



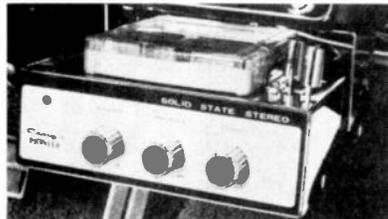
2604 Push-button operation\$68.95

3104 4/8-Track Tape Player

Compatible 4 & 8 track stereo playback. Features automatic selection; lighted track indicators; 117 V a.c. operation.\$99.95

3110 4-Track Car Stereo Player

Plays all sizes of 4-track cartridges; output 2 W/ch; response 100-7500 Hz @ 3 3/4 ips.



7" w. x 3 1/2" x 8 1/2" d.\$49.95

All prices quoted are "list".

CROWNCORDER

CTR9000 Compact Cassette Recorder

Solid-state, 1 7/8 ips design with a.c. bias; response 100-8500 Hz; 800 mW output. Will record/play cassette-type cartridges; mono; 2 1/2" speaker; operates from 4 flashlight cells (117-V adapter available). Has recording level/battery condition meter. Supplied with remote mic. 2 3/8" x 4 3/4" x



8 3/16". Suggested list price.\$74.95

SCS9350M Stereo Cassette with AM-FM Stereo Receiver

4-track, 1 7/8 ips. Features monitor facilities through speakers or phones; 2 detachable

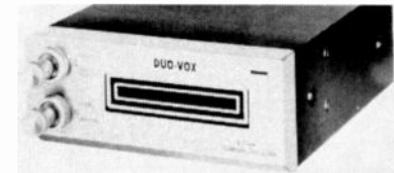


speaker systems, both battery-operated (4 "D" cells) built in & 117 V a.c.; records either mono or stereo; 1.3 W/ch output; 2 record level meters. Response 100-10,000 Hz. 12 3/8" x 4" x 17 3/16". Supplied with 2 mics. Suggested list price.\$189.95

DUO-VOX

DS-800 8-Track Stereo Tape Player

Solid-state, 13-transistor unit for use on 12 V d.c. (neg. or pos. ground); with con-



verter can be used on 120 V a.c. lines; accommodates standard 8-track cartridges; tracks changeable by pressing knob; response 60-10,000 Hz; can be used with 2 or 4 spkrs (available separately)\$119.95

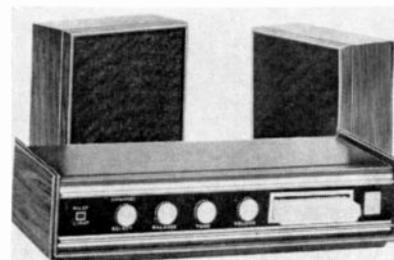
GENERAL ELECTRIC

M8340 Cassette Tape Recorder

Home version, 1 7/8 ips design for stereo record/playback. Has two detachable speaker systems (each with 6" x 9" speaker); automatic shut-off; pause control; vu meters. All walnut cabinets; supplied with two dynamic mics\$189.95

M8610 8-Track Cartridge Player

Plays standard 8-track pre-recorded tape cartridges; 3 3/4 ips; capstan drive; re-



sponse 50-10,000 Hz ± 3 dB. Features separately housed 9" x 6" speakers. Walnut cabinets\$139.95

LAFAYETTE

"PRO-540" Cassette Tape Deck

4-track, reel-to-reel stereo tape cartridge

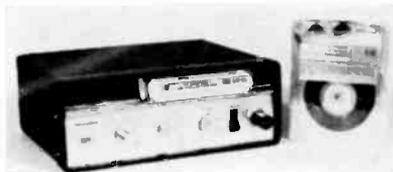
TAPE RECORDER ANNUAL

record/playback unit. Designed to plug into any existing hi-fi component system. Plays and records up to 90 min. per cartridge, using both tracks. Push-button control of all tape modes: record, fast-forward, rewind, pause, stop, cassette ejector. 3-digit push-button reset tape counter; automatic shut-off sw.; record safety button; vu meter. Two mic. 2 aux. inputs; 2 ext. amp. outputs. Response 50-12,000 Hz. 105/120 V. 50/60 Hz. 5 3/4" x 8 7/8" d. No. 99-1553WX\$109.95

LIVINGSTON

"Audiosphere" Cartridge Player

Compatible system in that both 8- and 4-track tape cartridges can be played on



same machine. Features mono or stereo playback; automatic channel switching; up to 80 min. play without repeat; 5 W/ch dynamic power; solid-state design; response 35-15,000 Hz; 12 V d.c. negative ground operation; 3 3/4 ips; flutter & wow 0.3%. 9" x 3 1/4" x 7" d.\$129.95

MASTERWORK

M-650 Cartridge Tape Recorder

Record & playback. 1 7/8 ips, 4-track design. Features cassette-type cartridges; auto-



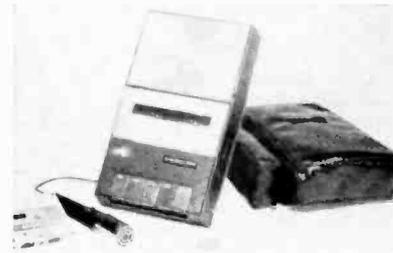
matic level control; will operate on batteries or 117 V a.c. line. Playing time up to 90 min. 4 7/8" w. x 9" x 3 1/2". Has dynamic mic.\$69.95

MERCURY

Cassette Recorder Series

Features record & playback; 1 7/8 ips; solid-state design; automatic stop at end of hub; capstan drive; battery-operated (five 1 1/2 V "C" cells); 2-track; 500 mW output; response 100-7500 Hz; S/N ratio -45 dB; wow & flutter 0.5% r.m.s.; 2 1/2" speaker. Has vu meter/battery indicator.

Model 8060 Supplied with remote-control dynamic mic. 8 3/4" x 4 3/4" x 2 3/8" mono design. Optional equipment: headphones,



We re-invented tape recording

Norelco introduced the Compact Cassette in the United States. Then we introduced machines to play it on.

First came the Carry-Corder® '150'—the first cassette machine. (Now it's the world's most popular tape recorder.) Then came the first two home cassette recorders—the monaural '350' and the stereo '450'.

Now we've added a *fourth* first—the new portable '175'—the first monaural cassette portable with a big speaker. And there are

more firsts in the making.

Our re-inventions make up a complete line of cassette recorders you can choose from. They all record on blank cassettes. (Only the Norelco cassette has a lifetime warranty.) And they all play back the new pre-recorded cassettes you've heard about.

Take a look at our re-inventions. Either for yourself or for a gift. We have the first and finest line of cassette recorders. We should. We re-invented tape recording in the first place.



Norelco

the re-inventor of tape recording

North American Philips Company, Inc., High Fidelity Products Department, 100 East 42nd Street, New York, N. Y. 10017

CIRCLE NO. 31 ON READER SERVICE CARD

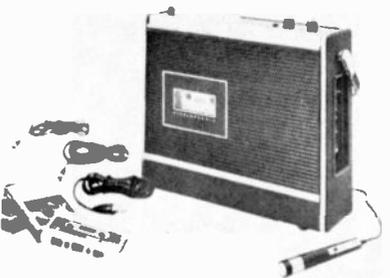
a.c. adapter, foot pedal control & telephone pickup coil\$69.95

Model 4450 Tape deck: 4-track stereo design; response 60-10,000 Hz; wow & flutter



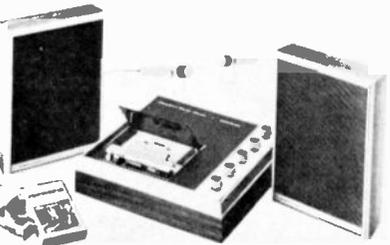
0.3%; a.c.-type bias & erase; 117 V a.c. operation; does not have power amplifiers or speakers. 10½" x 10½" x 3"\$114.95

Model 7200 117-V a.c. & battery operated (12 V—8 "D" cells); 4-track stereo design;



power output 2 W; response 60-8000 Hz; S/N ratio —40 dB; wow & flutter 0.4%; 6" x 4" speaker. Will play & record 2-track mono & has stereo play & record preamps with only one channel of power amplifier & speaker. Second channel designed for ext. amp. & speaker. Supplied with remote-control mic; same optional equipment as for Model 8060. 10" x 12" x 3¾"\$129.95

Model TR-4500 4-track stereo record/play-back; 117-V a.c. operation; has two de-



tachable speaker systems (6" speaker) with 4 W/ch dynamic power; response 60-10,000 Hz; wow & flutter 0.3%; supplied with 2 mics. 10½" x 10½" x 3"; speaker cases 10" x 7" x 3½"\$159.95

AP8300 Auto Cassette

For 10 to 14 volts positive- or negative-ground operation; 4 tracks; 1½ ips stereo design; 3 W/ch dynamic power; response 50-10,000 Hz; S/N ratio —45 dB; wow & flutter 0.3%; solid-state design. 7" x 6½"



x 2½". Supplied with two 5" speakers, dynamic mic with remote switch & mounting brackets\$119.95

TR8700 Stereo Cartridge Recorder

Portable 4-track, solid state record/play design using Norelco (Philips system) reel-to-reel cartridge; up to 90 minutes playing time; response 65-8500 Hz; 1½ ips; 750

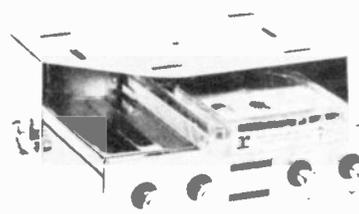


mW/ch music power; wow & flutter 0.3%; S/N 45 dB. Features automatic stop; vu meters; two 3" x 5" speakers in detachable housings. Supplied with remote ("on-off") controlled mics; operates from four "D" (6 V) batteries or built-in 120 V a.c. adapter. Walnut case, hinged lid\$159.95
All prices are suggested retail.

MUNTZ

C-100 4-Track Cartridge Player

Solid-state, ¾ ips stereo design; 12 V d.c. operation; 10 W/ch dynamic power (EIA 5% dist.); wow & flutter 0.25% r.m.s.; HI) 2% @ 1000 Hz & 1 W; response 50-12,000 Hz. 7¾" x 6¾" x 3¼". Choice of



stereo speakers. For use with Muntz "Single-1", "Twin Pak-2", "Quad-4" albums.....\$69.95

M-12 4 & 8-Track Cartridge Player

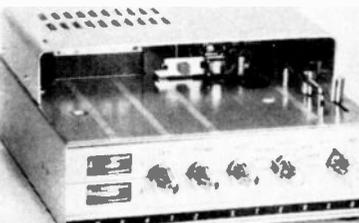
Solid-state, ¾ ips stereo design for 12 V d.c. negative-ground operation (positive



ground optional); response 50-12,000 Hz; 8 W/ch dynamic power (EIA 5% dist.); wow & flutter 2%. 7¾" x 8¼" d. x 4". Choice of stereo speakers. Will play "Mini-Pak", 4-track & 4 & 8 track "Single 1" & "Twin-Pak"\$89.95

AR-500 4-Track Cartridge Deck

Designed to play & record 4-track stereo from Muntz "MiniPak" to "Quad"; 117 V a.c. operation; has preamps only; needs ex-



ternal power amps & speakers; response 50-15,000 Hz; solid-state design; ¾ ips, 10" w. x 5" x 12" d.\$199.95

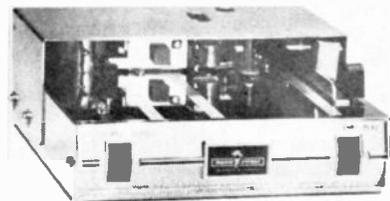
M-30 4-Track Cartridge Player

Solid-state, ¾ ips stereo design for 12 V d.c. operation; 4 W ch dynamic power

(EIA 5% dist.); wow & flutter 0.30%; response 50-10,000 Hz. 6½" x 5¾" d. x 2¾". Choice of stereo speakers. For use with Muntz "MiniPak" & full albums\$39.95

M40 4-Track Cartridge Player

Similar to Model M-30 except 5 W/ch &



response 50-12,000 Hz. 6¾" x 2¾" x 6½" d.\$49.95

C-50 4-Track Cartridge Player

Solid-state stereo design for ¾ ips and 12 V negative ground (positive ground



optional) operation; 60 W ch dynamic power (EIA 5% dist.); response 50-12,000 Hz; Choice of various stereo speakers; will accept full-length 4-track albums and Muntz "MiniPak". 6½" x 7" d. x 2¾"\$59.95

HW-1 4-Track Cartridge Player

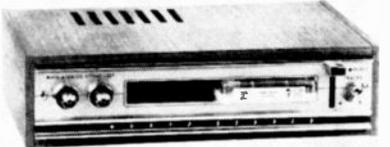
Solid-state, 4-track, ¾ ips stereo, 117 V a.c. design; will play all sizes of 4-track



cartridges; 12 W/ch dynamic power (EIA 5% dist.); 8 ohms output; response 50-15,000 Hz; wow & flutter 0.25%. Choice of speakers as optional equipment. 10¾" x 5¾" x 12" d.\$79.95

HW-12 4 & 8-Track Cartridge Player

Accommodates all cartridge sizes; 117 V



a.c.; ¾ ips operation; with walnut cabinet, less speakers\$119.95
All prices are "suggested list".

NORELCO

All Norelco cassette machines are designed around the Philips reel-to-reel cartridge & 1½ ips.

"Carry-Corder 150" Cassette Recorder

Portable design operating direct from built-in batteries. Features 2-track 2 x 30 minutes playing time. Response 100-7000 Hz ±3 dB; S/N ratio 45 dB; wow & flutter 0.35%. Supplied with mic & carrying case. 7¾" x 2¼" x 2¼"; 3 lbs.\$89.50
Car-mount. A special tray-like mounting

assembly. When "Carry-Corder 150" is inserted, connections are made to car radio; can then be used as a car player.....\$24.50

"Continental 175" Mono Recorder

Enlarged version of the 2-track portable 150. Is operated from built-in batteries; features larger speakers; record level control; response 80-10,000 Hz.....\$100.00

"350" Cassette Recorder

Solid-state table model. 2-track mono design. Features automatic record level control; response 60-10,000 Hz; digital counter. Has built-in speaker with removable sound reflector lid. 120 V a.c. operation. Supplied with mic & teak cabinet.....\$130.00

"450" Cassette Recorder

Solid-state stereo design based on the 4-track reel-to-reel cassette; response 60-12,000 Hz; wow & flutter 0.1%. Has stereo record level control; tone, loudness & balance controls; counter; vu meter & can be used as a p.a. system. Supplied with two satellite speakers in matching teak cabinets. 120 V a.c. operation.....\$200.00

2502 Automatic Stereo Changer

Cassette-playback only; will handle six cartridges for up to 4½ hours playing time. Has preamps only. Response 60-10,000 Hz.....\$100.00

2502 Cassette Player

For mono & stereo playback; a.c.-operated; has preamps only; response 60-10,000 Hz. 4½" x 8" x 2½".....\$50.00

2600 Car Cassette Player

Stereo design; playback only; has "on-off" indicator; pause control & cassette reject bar.....\$130.00

175 Portable Cassette Recorder

Larger version for the "Carry-Corder 150." Operates on six batteries. Features mono operation; record/playback level controls; vu meter. Response 60-10,000 Hz. Supplied with remote mic.....\$90.00

2200 Cassette Portable

Battery-operated (six 1½ volt cells); response 100-7000 Hz; 300 mW output.....\$30.00

PANASONIC

RQ-3100S "The Secretary"

Solid-state mono portable cassette cartridge recorder; response 50-10,000 Hz @ 1% ips; operates from five "C" cells; two-track, two-head with 700 mW dynamic power. Has a.c. bias & erase, vu meter, battery indicator, mic; 4½" x 2½" x 9¼".....\$79.95

RCA

MJC28 Cartridge Player

Plays pre-recorded 8-track cartridges @ 3¼ ips. Features automatic track switching and includes stereo preamps; designed to be played through external amplifier. 7¼" x 12¾" w. x 9¾" d. Walnut finish.....\$79.95

YJD22 Cartridge Player

Same as MJC28 but includes solid-state power amplifier & two 7" oval speakers. 7¼" x 29½" x 9¾".....\$129.95

YJD16 Cassette Recorder

Designed primarily for voice recording; battery operated, mono unit with vu meter, a.c. jack, remote mic & batteries.....\$49.95

ROBERTS

838 Cartridge Tape Player

Designed around the 8-track "Stereo 8" cartridge. Will play back stereo or mono; has solid-state preamp outputs only. 120 V operation; provides continuous automatic repeat play. Walnut cabinet.....\$99.95
3884 Remote control for instant selection of any stereo track.....\$8.95

1725-8L Reel & Cartridge Recorder

Combines a Model 1725 conventional reel-to-reel tape recorder with a "Stereo 8" cartridge system. Permits recording & playback of 8-track cartridges. Supplied with two mics.....\$389.95
3884 Remote control for instant selection of any stereo track.....\$8.95

SONY/SUPERSCOPE

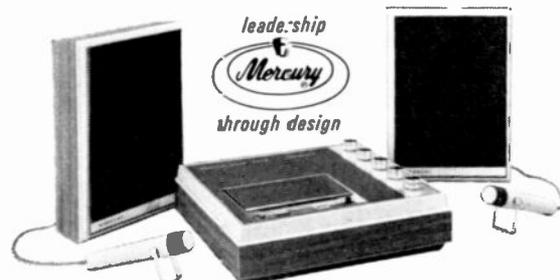
TC-8 8-Track Cartridge Deck/Preamp

Solid-state stereo design for recording/playback @ 3¼ ips 8-track cartridges; response 40-12,000 Hz; wow & flutter 0.32%; S/N ratio 45 dB. Has two low-impedance mic inputs; two high-level aux. inputs or mag. phono with RK-66 adapter (optional).....\$99.50

three new conversation pieces from Mercury.



No wonder everybody's talking about (and into) these new cassette tape recorders. They're spirited sounding and looking gear for inside, outside and on the road. They're lightweight, compact and completely versatile machines. And, best of all, they're merely three of six new Mercury cassette tape recorders that are the talk of the town. See them all, plus Mercury blank Compact cassettes and Mercury's sensational and growing library of pre-recorded music cassettes.



TR 4500 Solid State Stereo Record/Stereo Playback HI-FI Cassette Tape System

Home system is AC operated with 8 watts power output. Fast forward and rewind, record, volume, balance and treble controls • VU meter • stereo headphone jack • full complement of input and output jacks. Matched 6-inch PM loudspeakers, 2 dynamic mikes, 2 patch cords. Compact cassette. 10½" x 10½" x 3". \$159.95

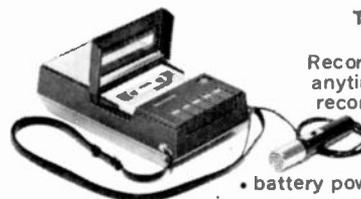
AP 8300 Solid State Full Stereo Playback/Monaural Record Automobile Cassette Tape Recorder

For recording as well as stereo playback. Automatic level control • volume, balance and tone controls • start, stop, fast forward and rewind controls • dynamic remote control mike with retractable cord • night light • matching 5-inch speakers • mounting bracket fits all cars on dash or console • Compact cassette. \$119.95



TR 8060 Solid State Cordless Cassette Tape Recorder

Records and playback anywhere, anytime. Push-button controls for record, rewind, play, fast forward and stop • cassette viewing window • VU meter/battery level indicator • battery powered with AC option • Carrying case • accessory pouch • remote control mike • earphone • Compact cassette. \$69.95





If you've been using any of the so-called bargain tapes, chances are you should have your heads examined. The odds are good that the heads are excessively worn and you're not getting the most out of your recorder. If you want to keep "factory-fresh" sound to your recorder—and avoid future "headaches" and keep it that way—Here's the prescription—buy Sony Professional Quality Recording Tape. Sony Tape is permanently lubricated by the exclusive Lubri-Cushion process. Sony's extra-heavy Oxi-Coating won't shed or sliver and is applied so evenly that recordings made on Sony Tape are not subject to sound dropouts. Sony Tape captures and reproduces the strength and delicacy of every sound—over and over again. There's a bonus, too, with every 5" and 7" reel of Sony Tape—a pair of Sony-exclusive "Easy Threader" tabs to make tape threading the easiest ever. And Sony reels are a sturdier, heavier gauge plastic for protection against possible warping. It's just what the "Doctor" ordered and yours for just pennies more than "bargain" tape.

SONY SUPERSCOPE
 SUN VALLEY, CALIFORNIA • 91352
 CIRCLE NO. 39 ON READER SERVICE CARD

TC-100 Mono Cassette-Corder
 A.c./battery operated with built-in a.c. converter. Features 1 7/8 ips, 2-track automatic

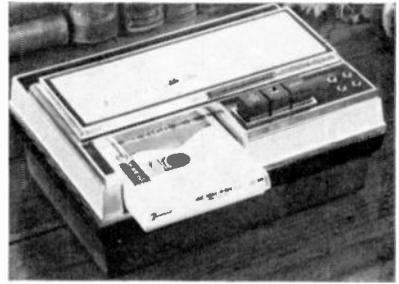


recording control; battery level & record level meter. Operates from 4 "C" cells that can be replaced by an optionally available rechargeable nickel-cadmium battery pack (recharging circuit is built-in). Supplied with remote control mic\$99.50

TC-50 Mono Cassette-Corder
 Compact, 1 7/8 ips, 2-track design will operate from four type "AA" batteries. Features automatic record level control; built-in mic; built-in speakers; battery level meter; response 50-8000 Hz @ 1 7/8 ips; wow & flutter 0.35%; S/N ratio 40 dB; supplied with leather case\$99.50

SYLVANIA

TP-8 8-Track Deck/Preamps
 Stereo tape cartridge playback; a.c. operated; features selection of continuous play



or automatic shut-off after 4th channel. 10" x 7" x 4 1/2"\$99.95

TELEFUNKEN

"Magnetophon" 4001 Cassette Recorder
 2-track, 1 7/8 ips, mono record & playback design; response 8-10,000 Hz ±3 dB; S/N



ratio -45 dB; output 400 mW; operates on five "C" cells. Supplied with remote-control mic\$69.95
 A.c. power converter available.

TOSHIBA

KT-81 8-Track Cartridge Player
 Plays 8 full tracks, 4 full stereo programs; automatic repeat; automatic start/stop; 20 W power output (10 W/ch); illuminated

program indicator; program selector; hysteresis synchronous motor; wide-range tone control; balance control; tape speed 3 3/4 ips; response 50-15,000 Hz; solid-state stereo power amps. 110/120 V, 60 Hz. 14 1/2" w. x 4 1/2" h. x 8 1/2" d. Walnut veneer cabinet with chrome/ebony control panel ..\$119.50
 KT-80 Tape deck. Same as KT-81 except has no power amps; response 50-10,000 Hz. 13 1/2" w. x 4 1/2" h. x 8 1/2". Walnut veneer cabinet with chrome/ebony control panel\$69.50

Price is "Suggested Retail".

WOLLENSAK

4200 Cassette Recorder
 Battery-operated, solid-state, 1 7/8 ips mono record/playback design. Cassette is reel-to-reel type; response 80-10,000 Hz ±3 dB; wow & flutter 0.3%; S/N ratio 45 dB; output 400 mW continuous sine wave; playing time 90 min. Features vu meter; dynamic mic with remote start/stop sw. Supplied with mic, cassette & carrying case. 4 1/2" w. x 7 7/8" x 2 1/4" d\$74.95

7100 Cartridge Recorder
 Completely automatic tape changing system; automatically threads the tape, plays,



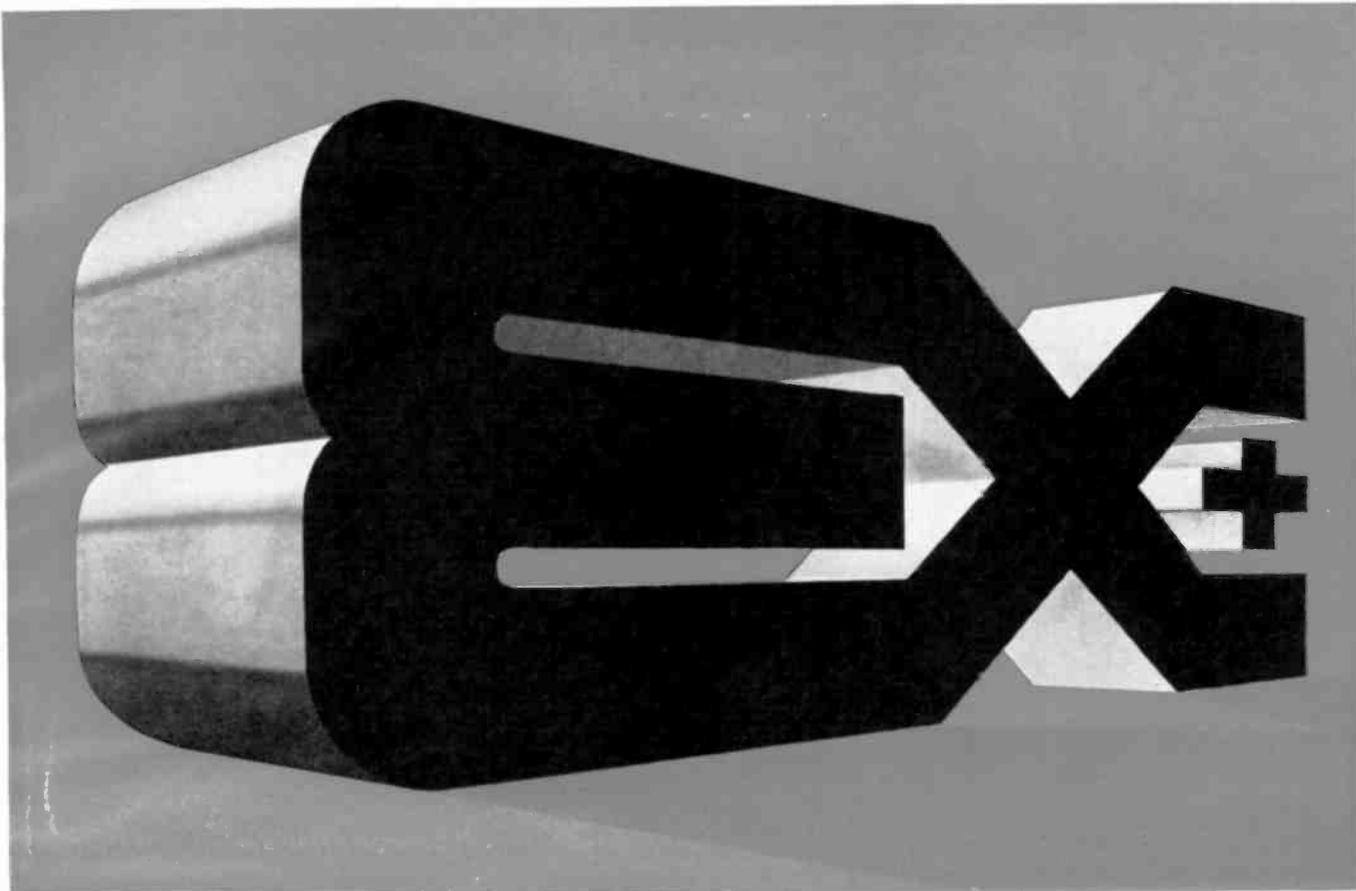
rewinds, rejects the completed cartridge and repeats the process through as many as 20 stereo music selections during a 15-hour period; speed 1 7/8 ips; cartridge 3 3/4" square x 1/2" thick; features new type recording head; specially developed magnetic tape; precision index counter; wow & flutter 0.3%; S/N ratio 48 dB; dynamic power output 9 W per channel; 5 watts continuous @ 5% HD; inputs: microphone 2 mV @ 10 megs, phono-radio 1 V @ 1 meg; outputs: aux. 1 V nominal, speaker 8 ohms; response 40-15,000 Hz ± 3 dB @ 1 7/8 ips; 7" x 14 1/2" x 14 1/4" (approx.); weight approx. 32 lbs.

Model 7100 Recorder-player with 2 mics\$399.95
 Model 7000 Recorder-player deck model with 2 mics\$339.95

7200 Cartridge Recorder
 Automatic cartridge changer. Will play 48 minutes/stereo cartridge & up to 96 min-



utes/mono (15 hours/loading). Single speed 1 7/8 ips, 2-track stereo or mono record/playback. Response 40-15,000 Hz ± 3 dB; wow & flutter .3%; S/N 48 dB. Has 2 dual-channel inputs (mic & radio/phono) & 2 outputs ea. channel. (Preamp 1 V & external speaker, 9 W/ch dynamic power, 5 W/ch sine wave @ 5% HD). Supplied with 2 ext. speaker systems (ca. 6" x 9" elliptical & 3" tweeter). 19" x 10 1/4" x 5 3/4". Recorder 16" x 15 1/2" x 8 1/4".\$459.95



*you hear ^{even} more with this
exclusive new process
by **AMPEX***

Why? Because the EX + master tape can be recorded at the maximum recording input level (up to 100% increase in volume over ordinary recording). That's why you can play EX + tapes on your machine at much lower volume levels, effectively reducing distracting incidental noises, such as hiss and hum, by up to 50%! Now you'll enjoy every subtle nuance of the original performance . . . the purest sound ever heard . . . and it's yours for life on unbreakable Polyester Tape. Hear the amazing difference of EX + Stereo Tapes at your Ampex dealer.

*Look for the EX + . . .
symbol of Stereo Tape excellence*

AMPEX STEREO TAPES

2201 Lunt Avenue, Elk Grove Village, Illinois 60007
CIRCLE NO. 4 ON READER SERVICE CARD

RAW TAPE

AMPEX

Series 500 Recording Tape

Available on .5, 1, and 1.5-mil Mylar in regular and slow-speed oxides; designed for super-critical home recording.

Regular Oxide:

531-13—1.5 mil, 600', 5" reel	.....\$2.65
531-15—1.5 mil, 1200', 7" reel	.....\$4.25
541-13—1.0 mil, 900', 5" reel	.....\$3.40
541-15—1.0 mil, 1800', 7" reel	.....\$6.20
541-15M—1.0 mil, 1200', 7" reel	.....\$3.50
551-13—0.5 mil, 1200', 5" reel	.....\$5.45
551-15—0.5 mil, 2400', 7" reel	.....\$9.50

Slow-Speed Oxide:

536-15—1.5 mil, 1200', 7" reel	.....\$4.75
545-15—1.0 mil, 1800', 7" reel	.....\$6.90
545-15M—1.0 mil, 1200', 7" reel	.....\$3.95
556-15—0.5 mil, 2400', 7" reel	.....\$10.75

Series 900 Recording Tape

Designed for large-library home recording.

Type 911 1.5-mil acetate.

150', 3" reel	.....\$0.65
600', 5" reel	.....\$1.75
1200', 7" reel	.....\$2.95

Type 921 1.0-mil acetate.

225', 3" reel	.....\$0.80
900', 5" reel	.....\$2.50
1800', 7" reel	.....\$4.25

Type 931 1.5-mil Mylar.

600', 5" reel	.....\$2.25
1200', 7" reel	.....\$3.65

Type 941 1.0-mil Mylar.

225', 3" reel	.....\$1.00
900', 5" reel	.....\$2.85
1800', 7" reel	.....\$4.95

Type 951 0.5-mil tensilized Mylar.

300', 3" reel	.....\$1.35
1200', 5" reel	.....\$4.50
2400', 7" reel	.....\$7.95

AUDIOTAPE

Master 1.5-mil Mylar Tape

Made on 1.5 mil Mylar base; durable in wide temperature range.

Type 671M, 600 ft., 5" reel	.....\$3.20
Type 1271M, 1200 ft., 7" reel	.....\$5.10

Double Recording (.5-mil tempered Mylar)

Made on tempered Mylar; allows twice as much recording per reel; stronger than double length tape.

Type 331T, 300 ft., 3" reel	.....\$1.60
Type 1231T, 1200 ft., 5" reel	.....\$5.45
Type 2431T, 2400 ft., 7" reel	.....\$9.50

Triple Recording (tempered Mylar)

Three times as much recording time per reel as standard plastic-base tape, plus same extra strength as other tempered Mylar tapes.

Type 633T, 600 ft., 3 1/4" reel	.....\$2.95
Type 1833T, 1800 ft., 5" reel	.....\$6.95
Type 3633T, 3600 ft., 7" reel	.....\$11.95

Long Recording (1-mil plastic base)

Provides 50% more recording time per reel: 1-mil cellulose acetate base; maximum economy for applications where high strength is not required.

Type 941, 900 ft., 5" plastic reel	.....\$3.50
Type 1841, 1800 ft., 7" plastic reel	.....\$5.50

Longer Recording (1-mil Mylar)

Made on 1-mil Mylar polyester film; provides 50% more recording time per reel; exceptional strength and durability plus longer storage life.

Type 261, 225 ft., 3" plastic reel\$1.00
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Type 961, 900 ft., 5" plastic reel\$3.60
Type 1861, 1800 ft., 7" reel\$6.20

Standard Recording (1.5-mil Mylar)

High-strength super-durable magnetic tape that meets the highest professional standards of performance; withstands extreme temperatures; virtually immune to humidity; gives maximum tape life under any conditions of use or storage.

Type 671, 600 ft., 5" plastic reel	.....\$2.65
Type 1271, 1200 ft., 7" reel	.....\$4.25

Double Recording (.5-mil Mylar)

Made on .5-mil Mylar; twice as much recording time per reel as standard plastic-base tape; suitable for extended-play applications where tape tension is not excessive.

Type 1231, 1200 ft., 5" reel	.....\$3.50
Type 2431, 2400 ft., 7" reel	.....\$6.50

Standard Recording (plastic base)

Professional-quality recording tape; maximum fidelity, uniformity, frequency response and freedom from noise and distortion; 1.5 mil acetate.

Type 351, 300 ft., 4" plastic reel	.....\$1.35
Type 651, 600 ft., 5" plastic reel	.....\$2.25
Type 1251, 1200 ft., 7" plastic reel	.....\$3.50

Low-Noise Tape

Provides high signal-to-noise ratio and reduced hiss level: on 1.5-mil plastic base.

Type 1257, 1200 ft., 7" reel\$4.30
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BASF

LGS 52 Recording Tape

Polyvinyl chloride, "Luvitherm" base; 1.5-mil Standard Play.

900 ft., 5 1/4" reel	.....\$3.09
1200 ft., 7" reel	.....\$3.75

LGS 35 Recording Tape

Polyvinyl chloride, "Luvitherm" base; tensilized 1-mil Long Play.

900 ft., 5" reel	.....\$3.33
1200 ft., 5 1/4" reel	.....\$3.72
1800 ft., 7" reel	.....\$5.42

LGS 26 Recording Tape

Polyvinyl chloride, "Luvitherm" base; tensilized 3/4-mil Double Play.

300 ft., 3" reel	.....\$1.47
450 ft., 3 1/2" reel	.....\$2.44
900 ft., 4 1/4" reel	.....\$3.98
1200 ft., 5" reel	.....\$4.90
1800 ft., 5 1/4" reel	.....\$6.00
2400 ft., 7" reel	.....\$7.80

PES 35 Recording Tape

Polyester base; tensilized 1-mil Long Play.

1200 ft., 5 1/4" reel	.....\$4.76
1800 ft., 7" reel	.....\$6.62

PES 18 Recording Tape

Polyester base; tensilized, 1/2-mil Triple Play.

600 ft., 3 1/2" reel	.....\$2.94
900 ft., 4" reel	.....\$4.27
1200 ft., 4 1/4" reel	.....\$6.13
1800 ft., 5" reel	.....\$7.65
2400 ft., 5 1/4" reel	.....\$8.82
3600 ft., 7" reel	.....\$11.76

*"Luvitherm", an unplasticized polyvinyl chloride film, is used as a backing material. During production it is prestressed, giving the tape excellent mechanical properties.

C-60 Cassette

PES-18 type tape in cassette cartridge; 300', 60 minutes

.....\$3.08
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C-90 Cassette

PES-12 polyester-base, tensilized, 1/4-mil in cassette cartridge, 450', 90 minutes

.....\$5.08
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BURGESS

Series No. 111 1.5-mil Plastic

111-1.5 150', 3" reel\$0.70
111-2.5 250', 3 1/4" reel\$1.25
111-3 300', 4" reel	.....\$1.35
111-6 600', 5" reel	.....\$2.25
111-8.5 850', 5 1/4" reel	.....\$2.85
111-12 1200', 7" reel	.....\$3.50

Series No. 190 1.0-mil Extra-Play Plastic

190-2.25 225', 3" reel	.....\$0.90
190-9 900', 5" reel	.....\$3.50
190-12 1200', 5 1/4" reel	.....\$4.25
190-15 1500', 7" reel	.....\$4.50
190-18 1800', 7" reel	.....\$5.50

Series No. 102 1.5-mil Mylar

102-6 600', 5" reel	.....\$2.65
102-8.5 850', 5 1/4" reel	.....\$4.25
102-12 1200', 7" reel	.....\$4.25

Series No. 150 1.0-mil Extra-Play Mylar

150-2.25 225', 3" reel	.....\$1.00
150-3.75 375', 3 1/4" reel	.....\$1.75
150-9 900', 5" reel	.....\$3.60
150-12 1200', 5 1/4" reel	.....\$4.65
150-15 1500', 7" reel	.....\$5.15
150-18 1800', 7" reel	.....\$6.20

Series No. 200 .5-mil Double-Length Tensilized Mylar

200-3 300', 3" reel	.....\$1.60
200-6 600', 4" reel	.....\$3.05
200-12 1200', 5" reel	.....\$5.45
200-17 1700', 5 1/4" reel	.....\$7.05
200-24 2400', 7" reel	.....\$9.50

Series No. 290 .5-mil Triple-Length Tensilized Mylar

290-6 600', 3 1/4" reel\$2.50
290-36 3600', 7" reel\$11.95

Series No. 131 1.5-mil Plastic

131-12 1200', 7" reel\$4.40
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Series No. 138 1.5-mil Mylar

138-12 1200', 7" reel\$5.10
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Series No. 175 1.5-mil Mylar

175-6M 600', 5" reel\$2.40
175-12M 1200', 7" reel\$3.75

Series No. 141 1.5-mil Plastic

141-6 600', 5" reel	.....\$1.75
141-12 1200', 7" reel	.....\$2.95

Series No. 140 1.0-mil Extra-Play Plastic

140-9 900', 5" reel	.....\$2.50
140-18 1800', 7" reel	.....\$4.25

Series No. 142 1.0-mil Extra-Play Mylar

142-9 900', 5" reel	.....\$2.85
142-18 1800', 7" reel	.....\$4.95

Series No. 144 .5-mil Double-Length Mylar

144-12 1200', 5" reel	.....\$4.50
144-24 2400', 7" reel	.....\$7.95

IRISH

190 Series Recording Tape

Standard, 1 1/2-mil, acetate base, 1/4".	
195-111111 150' 3" reel	\$0.65
195-121111 300' 4" reel	\$1.55
195-131111 600' 5" reel	\$1.75
195-141211 850' 5 1/4" reel	\$2.50
195-151111 1200' 7" reel	\$2.95

Extra-length 1-mil, acetate base, 1/4".	
196-111111 225' 3" reel	\$0.80
196-121111 450' 4" reel	\$2.10
196-131111 900' 5" reel	\$2.50
196-141211 1150' 5 1/4" reel	\$3.75
196-151111 1800' 7" reel	\$4.25

Extra-length, 1-mil, polyester base, 1/4".	
197-111111 225' 3" reel	\$0.95

The average embarrassed non-technical music-loving layman's clip-and-save INSTANT GUIDE TO RECORDING TAPE



Does that shiny new tape recorder you got for a gift have you buffaloed? Do you panic at the terms like acetate tapes, Mylar tapes, tempered Mylar tapes, standard-play tapes, longer-recording tapes, double-length tapes, triple-time tapes, low-print tapes, low-noise tapes, and inches-per-second? Here's how to stop trembling and start taping. A complete course in four easy, step-by-step lessons... plus a clearly marked paragraph of advertising from the makers of Audiotape.

Lesson 1. The Basic Question— Acetate or Mylar Base?

When you record something, you are magnetizing microscopic particles of iron oxide. If you don't know what iron oxide is, don't worry. Just bear in mind that the particles have to be attached to something or they will blow away, so they are coated onto plastic tape. This base tape can be either acetate or Mylar. Choice of base does not affect fidelity of sound, so why a choice? To save you money and trouble.

Acetate gives you economy. It's not as rugged as Mylar, but professional recording studios prefer it and use it almost exclusively. You may prefer it too.

Mylar* gives you mileage. It survives for years even in deserts and jungles (if you're taping tribal chants, you'll want Mylar). Mylar tapes also can be made exceedingly thin, which means a reel can hold more feet for a longer, uninterrupted program.

'Tempering' overcomes Mylar's tendency to stretch under stress, and is used for the thinnest, most expensive tapes (the next lesson takes you painlessly through thick and thin). *DuPont's registered trade mark for its polyester film.

Lesson 2. Standard-Play, Longer-Recording, Double-Length, Triple-Time.

Instead of "Play," "Recording," "Length" or "Time," think of "Thickness." Picture a tape-reel 7 inches in diameter. It will hold 1200 feet of standard-recording tape (acetate or Mylar)... 1800 feet of longer-recording tape (considerably thinner acetate or Mylar)... 2400 feet of double-recording tape (still thinner Mylar). Easy, isn't it? Now move on to:

Lesson 3. Which Speed to Record At.

RECORDING TIME PER TRACK: ONE DIRECTION (IN MINUTES)				
TAPE SPEED	1200 FT.	1800 FT.	2400 FT.	3600 FT.
1 7/8	128	192	256	384
3 3/4	64	96	128	192
7 1/2	32	48	64	96
15	16	24	32	48

Your tape recorder probably allows you to record at several different speeds (you, by the way, are a recordist; only your machine is a recorder). What's the reason for this smorgasbord of speeds? The faster the speed, the higher the fidelity; the slower the speed, the more playing time per foot and per dollar.

- 15 ips (inches-per-second). Commercial recording companies use this speed when they tape your favorite performer for later transfer to records. Forget it.
- 7 1/2 ips is what you need for really good hi-fi music at home, and for the clearest reproduction of speech (foreign-language homework, sound-tracks for home movies, cocktail-party capers). An 1800-foot reel will play for 45 minutes—the length of a long-play record.
- 3 3/4 ips is fine for background music and for most speech applications—dictating to your secretary and recording baby's first words. An 1800-foot reel will play for an hour and a half.
- 1 7/8 ips is a businesslike speed without hi-fi frills. Good for taping conferences at the office because it puts a lot of words on a single reel. An 1800-foot reel will play for three hours.
- 15/16 ips is not recommended for anything but continuous monitoring. An 1800-foot reel will play for 6 full hours. Unless you do wire-tapping, you are probably not in the market for 15/16 ips and you're ready to try this:

CIRCLE NO. 5 ON READER SERVICE CARD

Tricky Test Question.

Q: How do you get longer playing time per reel of tape?

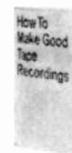
A: You can do it in either of two ways. (1) At slow speed. The tape plays longer but sound fidelity is reduced. (2) On thin tape. You get more footage per reel but it costs proportionately more. (To put it another way, the same recording job can cost you a dime or a dollar, depending on the method you select. If you're clear in that, you've earned your diploma.)

Lesson 4 Post-Graduate Course.

Experienced tape recordists, with ears and equipment that are ultra-sensitive, can sometimes hear "echoes" caused by "print-through." Think of it as a leakage of sound from layer to layer when very thin tape is wound on the reel. When you achieve that kind of expertise, you'll want special "low-print" coatings... as well as "low-noise" coatings which eliminate the barely perceptible tape-hiss that only the most expensive amplifiers can pick up anyway.

Advertising Paragraph.

Now that you feel like an expert, you'll want the brand of tape that's used by experts because it's made by experts. Its name is Audiotape. It's made by the people who supply tape for recording studios, corporate computers, Cape Kennedy countdowns and automobile stereo cartridges. It's made in the full range of acetate Mylar tempered Mylar standard play longer recording double length triple time low print low noise. It's made better. Ask anybody who knows. They'll tell you to ask for Audiotape.



How To Make Good Tape Recordings. 150 pages packed with easy-to-understand tips. Regularly \$1.50. Yours for 25c or the end tab from reel of Audiotape (7-inch size). Audio Devices, Inc., Dept. TR, 235 East 42nd Street, New York 10017.



197-121111	450'	4"	reel	\$2.25
197-131111	900'	5"	reel	\$2.85
197-141211	1150'	5 3/4"	reel	\$3.50
197-151111	1800'	7"	reel	\$4.95
Double-length, 1/2-mil. polyester tensilized base, 1/4".				
198-111111	300'	3"	reel	\$1.40
198-121111	600'	4"	reel	\$3.75
198-131111	1200'	5"	reel	\$4.50
198-141211	1650'	5 3/4"	reel	\$6.80
198-151111	2400'	7"	reel	\$7.95

200 Series Professional Tape

Standard 1 1/2-mil. acetate base, 1/4".				
211-111111	150'	3"	reel	\$0.70
211-131111	600'	5"	reel	\$2.25
211-141211	850'	5 3/4"	reel	\$2.80
211-151111	1200'	7"	reel	\$3.50

Extra-length, 1-mil. acetate base, 1/4".

221-111111	225'	3"	reel	\$0.90
221-131111	900'	5"	reel	\$3.25
221-141211	1150'	5 3/4"	reel	\$4.00
221-151111	1800'	7"	reel	\$5.25

Extra-length, 1-mil. polyester base, 1/4".

241-111111	225'	3"	reel	\$1.00
241-131111	900'	5"	reel	\$3.40
241-141211	1150'	5 3/4"	reel	\$4.50
241-151111	1800'	7"	reel	\$5.80

Double-length, 1/2-mil. polyester tensilized base, 1/4".

251-111111	300'	3"	reel	\$1.60
251-131111	1200'	5"	reel	\$5.45
251-141211	1650'	5 3/4"	reel	\$6.80
251-151111	2400'	7"	reel	\$9.50

Standard, 1 1/2-mil. polyester base, 1/4".

231-131111	600'	5"	reel	\$2.65
231-151111	1200'	7"	reel	\$4.25

270 Series Low-Print & Mastering Tape

Standard, 1 1/2-mil. acetate base, 1/4".				
271-151111	1200'	7"	reel	\$4.40

Extra-length, 1-mil acetate base, 1/4".

272-151111	1800'	7"	reel	\$7.25
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Standard, 1 1/2-mil. polyester base, 1/4".

273-151111	1200'	7"	reel	\$5.50
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Extra-length, 1-mil. polyester base, 1/4".

274-151111	1800'	7"	reel	\$7.35
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Double-length, 1/2-mil. polyester base, 1/4".

275-151111	2400'	7"	reel	\$9.80
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RCA

"Red Seal" Series

1-mil Long-Play Acetate Base

10A-2.25	225 feet, 3"	reel	\$0.55
10A-3.75	375 feet, 3 3/4"	reel	\$1.15
10A-9	900 feet, 5"	reel	\$3.50
10A-18	1800 feet, 7"	reel	\$5.50

1.5-mil Professional-Grade Acetate Base

15A-1.5	150 feet, 3"	reel	\$ 0.70
15A-3	300 feet, 4"	reel	\$ 1.35
15A-6	600 feet, 5"	reel	\$ 2.25
15A-12	1200 feet, 7"	reel	\$ 3.50

1.5-mil Professional-Grade Acetate Base

Low-noise, low-print				
15ALN-12	1200 feet, 7"	reel	\$4.40	

Mylar (Polyester) .5-mil Tensilized

Extra-Long Play

5TM-3	300 feet, 3"	reel	\$ 1.60
5TM-6A	600 feet, 3 3/4"	reel	\$ 2.95
5TM-6	600 feet, 4"	reel	\$ 3.05
5TM-12	1200 feet, 5"	reel	\$ 4.75
5TM-24	2400 feet, 7"	reel	\$ 8.75

Mylar (Polyester) 1-mil Long-Play

10M-2.25	225 feet, 3"	reel	\$ 1.00
10M-9	900 feet, 5"	reel	\$ 3.60
10M-18	1800 feet, 7"	reel	\$ 6.20

Mylar (Polyester) 1.5-mil Professional-Grade

15M-6	600 feet, 5"	reel	\$ 2.65
15M-12	1200 feet, 7"	reel	\$ 4.25

"Vibrant Series" Full-Frequency Recordings

Acetate (plastic) Base

V15-A-6	600 feet, 1.5-mil, 5"	reel	\$1.50
V15-A-12	1200 feet, 1.5-mil, 7"	reel	\$2.50
V10-A-9	900 feet, 1-mil, 5"	reel	\$1.95
V10-A-18	1800 feet, 1-mil, 7"	reel	\$3.75

Mylar (Polyester) Base

V10M-9	900 feet, 1-mil, 5"	reel	\$2.25
V10M-18	1800 feet, 1-mil, 7"	reel	\$4.25
V5TM-12	1200 feet, .5-mil tensilized, 5"	reel	\$3.95
V5TM-24	2400 feet, .5-mil tensilized, 7"	reel	\$6.95

Polyester Base Cartridge Tape

K10M-2.75 Special reel for use with RCA cartridge tape recorder.

275', 2 1/4"	reel	\$2.07
10M5.6C	Snap-load cartridge, 560'	\$4.50

SCOTCH

No. 102 "All-Purpose" Tape

For all general recording; suitable for long-term storage; on super-tough, weather-balanced 1 1/2-mil polyester backing.

102-1/4-600	600'	5"	\$2.65
102-1/4-1200	1200'	7"	\$4.25

No. 111 "All-Purpose" Tape

For all general recording; 1 1/2-mil plastic backing.

111-1/4-150	150'	3"	\$0.70
111-1/4-300	300'	4"	\$1.35
111-1/4-600	600'	5"	\$2.25
111-1/4-1200	1200'	7"	\$3.50

No. 120 "High-Output" Tape

Over 100% more output, greater dynamic range, and freedom from distortion on signal peaks, 1 1/2-mil plastic backing.

120-1/4-300	300'	4"	\$1.35
120-1/4-600	600'	5"	\$2.25
120-1/4-1200	1200'	7"	\$3.50

No. 131 "Low-Print" Tape

Reduces print-through to a point below noise level of most professional machines; allows long-time storage, 1 1/2-mil plastic backing.

131-1/4-1200	1200'	7"	\$4.40
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No. 138 "Low-Print, Extra Strength" Tape

Same as No. 131 except on strong 1 1/2-mil polyester backing.

138-1/4-1200	1200'	7"	\$5.10
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No. 150 "Extra Length, Extra Strength" Tape

Designed to withstand temperature and humidity extremes; high potency oxide on 1-mil polyester backing.

150-1/4-900	900'	5"	\$3.60
150-1/4-1800	1800'	7"	\$6.20

No. 190 "Extra Length" Tape

Provides as much recording time as 1 1/2 reels of standard tape; high potency oxide on 1-mil plastic backing.

190-1/4-900	900'	5"	\$3.50
190-1/4-1800	1800'	7"	\$5.50

No. 200 "Double Length, Double Strength" Tape

As much playing time as two reels of standard tape; for recording opera, concerts, or conferences; high potency oxide on tensilized polyester backing.

200-1/4-600	600'	4"	\$3.05
200-1/4-1200	1200'	5"	\$5.45
200-1/4-2400	2400'	7"	\$9.50

"Dynarange Tapes"

Although originally engineered for professional use, these tapes are now available for home recording. Provides high-fidelity recording even at 3 3/4 ips.

201 1 1/2-mil plastic				
201-1/4-600	600'	5"	\$2.80	
201-1/4-1200	1200'	7"	\$4.40	
202 1 1/2-mil polyester				
202-1/4-600	600'	5"	\$2.85	
202-1/4-1200	1200'	7"	\$5.10	

203 1-mil polyester				
203-1/4-900	900'	5"	\$3.10	
203-1/4-1800	1800'	7"	\$7.35	

No. 282 "Sandwich" Tape

Micro-thin protective plastic shield over oxide coating to eliminate oxide rub off and increase wear up to 30 times; weather-proof 1 1/2-mil polyester backing.

282-1/4-600	600'	5"	\$3.10
282-1/4-1200	1200'	7"	\$4.95

No. 290 "Triple Length" Tape

1/2-mil tensilized polyester backing.

290-1/4-1800	1800'	5"	\$6.95
290-1/4-3600	3600'	7"	\$11.95

No. 8000 "Quick-Load" Cartridge

Completely self-contained; threads automatically; available with high potency No. 150 tape in transparent or opaque cases.

8000-1/4-320C	320'	\$4.00
8000-1/4-560C	560'	\$4.50
8000-1/4-560C	560'	\$4.50

"Living Letters" Tape

111-1/4-150-LL	150'	3"	\$0.90
200-1/4-300-LL	300'	3"	\$1.85
290-1/4-600-LL	600'	3"	\$2.95

SONY/SUPERSCOPE

PR-150 Recording Tape

Extra-heavy formula Oxi-coat homogenized oxide coating. Polyester backing, "lubri-cushion" impregnated lubricant.

1800', 7"	reel	\$6.20
900', 5"	reel	\$3.60
300', 3 3/4"	reel	\$1.75
300', 3"	reel (designed for "Tapemates" correspondence) comes in self-mailing box	\$1.60

SOUNDCRAFT

"Standard" Tape

1.5-mil acetate base; professional quality; economy priced.

S-1	150 ft., 3"	reel	\$0.70
S-6	600 ft., 5"	reel	\$2.10
S-12	1200 ft., 7"	reel	\$3.50

"Standard-50" Tape

Long-play version of "Standard" tape on 1-mil acetate base.

S5-9	900 ft., 5"	reel	\$3.29
S5-18	1800 ft., 7"	reel	\$5.17

"Lifetime" Tape

For use where utmost strength and quality are necessary; 1.5-mil Mylar base.

L-1	150 ft., 3"	reel	\$0.75
L-6	600 ft., 5"	reel	\$2.65
L-12	1200 ft., 7"	reel	\$4.25

"Plus-50" Tape

Made on 1-mil Mylar for 50% more playing time than standard 1.5-mil tapes; combines long play with great tape strength.

PL-2	225 ft., 3"	reel	\$1.00
PL-9	900 ft., 5"	reel	\$3.40
PL-18	1800 ft., 7"	reel	\$5.80

"Triple-Play" Tape

.5-mil Mylar base				
TP-3	300 ft., 2 3/4"	reel	\$1.45	
TP-6	600 ft., 3 3/4"	reel	\$2.29	
TP-18	1800 ft., 5"	reel	\$5.10	
TP-36	3600 ft., 7"	reel	\$10.00	

"Triple-Play" Tensilized Tape

.5-mil tensilized Mylar base; extra long play; extra strength.

TP-6T	600 ft., 3 3/4"	reel	\$2.72
TP-18T	1800 ft., 5"	reel	\$6.80
TP-36T	3600 ft., 7"	reel	\$11.75

"Golden Tone" Tape

High quality special tape; 25% more high-frequency out & 7 dB better signal-to-noise ratio; 7" reel.

GTA-12	1.5-mil acetate base, 1200'	\$4.70
GTM-18T	1-mil tensilized Mylar base, 1800'	\$7.50
GTM-24T	.5-mil tensilized Mylar base, 2400'	\$11.40

TAPE ACCESSORIES

AMPLIFIER CORP.

Model 150A "Magneraser" Junior

Bulk-type magnetic tape eraser: field intensity 750 gauss; duty cycle on one min.,



off five min.; can also be used to demagnetize sound film up to 35 mm. on plastic or metal reels: 4 1/4" x 4 1/8" x 2 1/2"; 120-V. operation\$18.95

Model 200C "Magneraser"

Bulk tape eraser; operating voltage 100-130 volts; operating frequency 50-60 Hz; 2" high, 4" dia.

Model 200C.....\$24.00
Also available: Model 220C, identical in price and specifications except for operating voltage of 200-260 volts instead of 110-130 volts a.c.

AUDIOTAPE

Audio Head Alignment Tape

Prerecorded at 2 kHz, 10 kHz, 15 kHz, recorded at 15" per second; intervals between tones are 5 seconds duration: 300 ft. on 4" reel10.00

Audio Head Demagnetizer

Demagnetizes tape recorder heads; requires only plug-in to conventional a.c.



outlet\$10.00

AUDIOTEX

Tape Accessories

Language Lab service kit contains tape splicer; tape threading leader, hi-fi service tool kit; tape strobe; head cleaner & lubricant; cloth tape cleaner; head demagnetizer; splicing tape; tape and record labels, 30-099\$54.95

Deluxe tape splicer handles all sizes of splicing tape; tape dispenser simplifies operation; cuts & trims splicing tape with indented cut, 30-106\$8.95

Standard tape splicer has curved cutting blades which give splice two rounded indentations; for use on all 1/4" tapes, 30-104\$7.95

Tape splicer for editing or repairing broken tape; all-aluminum construction; cutting blade included, 30-100\$2.75

Professional taperase will demagnetize tape reels of any size up to 10" diameter; erasing leaves no low-frequency spikes or

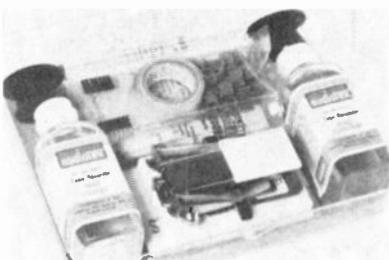
thump. With 6' cord and momentary 'on-off' sw. 30-114\$33.00

Tape recorder accessory kit includes tape splicer, splicing tape, tape threading leader, tape and cleaning solvent, tape end clips, phono & recorder oil; tape cueing labels, tape & record labels, 30-148\$9.95

Tape recorder strobe: designed to check speed of 7 1/2 & 3 3/4 ips tape recorders, 30-234\$5.95

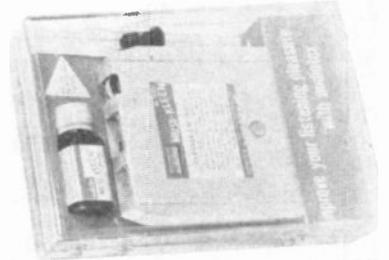
Head demagnetizer designed to be used without removing head cover; complete with momentary push-button switch & 6' cord, 30-112\$12.10

Tape recorder care kit includes tape splicer, splicing tape, tape head cleaner & lubricant,



tape reel holder, tape end clips, cleaning brush, cotton swabs, cleaning cloth, tape cueing & indexing labels, 30-125\$14.95

Cartridge head cleaner can be used for both home & auto tape players. Cartridge is in-



serted in unit and cleaned in 30 seconds. Kits includes cleaner cartridge, cleaning fluid, and replacement belts, 30-620\$5.95

Tape head cleaner for auto tape players is an aerosol which removes dust and oxide particles, 30-630\$1.95

Auto tape player care kit for 4- & 8-track players. Kit contains tape head lubricant, tape head cleaner, two 6" cleaning brushes, and 10 plastic pouches for storing tape cartridges, 30-636\$3.49

All prices are "list".

CRESTWOOD

Cassette Speaker/Amp

Battery operated (45 V battery), portable amplifier speaker system for use with cassette-type tape players; solid-state amplifier has 30-30,000 Hz response; spkr. covers 50-12,000 Hz. Cabinet measures 16" x 13 3/4" x 7 3/4" and has space to accommodate cassette player; separate volume & tone controls, 10 lbs; a.c. adapter/re-charger available extra for 117 V, 60 Hz operation. Suggested list price\$69.50

CROWNCORDER

CTA4000 "Telephone Valet"

Automatic telephone answering device intended to be used with any tape record-

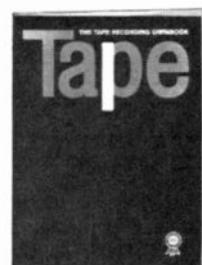
You can't buy a better recording tape at any price



IRISH MAGNETIC RECORDING TAPE
45E Broadway, New York, N.Y. 10013

CIRCLE NO. 21 ON READER SERVICE CARD

FREE!



Just Published

It's a regular mini-library on the care and affection of TAPE RECORDERS (*How to select. What to look for. Performance factors.*); TAPE (*Tips on splicing, editing and handling.*); MICROPHONES (*How to select and use them.*); and many other provocative and useful facts. Yours FREE.

Elpa Marketing Industries Inc.
New Hyde Park, N. Y., 11040

Please send me FREE "The Tape Recording Omnibook". I'm interested in: _____
A Tape Recorder _____ Editing Systems
_____ Microphones

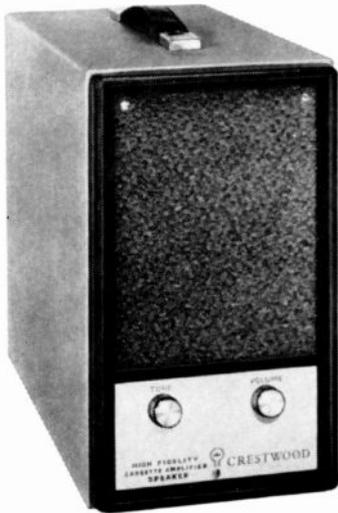
Name _____

Address _____

City/State/Zip _____

CIRCLE NO. 16 ON READER SERVICE CARD

Make an Amazing RECORDER COMBINATION out of your *Cassette* TAPE RECORDER



NEW!
Hi-Fidelity
Solid State
Battery Powered
Portable
Speaker

LIST PRICE
\$69⁵⁰

CRESTWOOD *Cassette*

AMPLIFIER/SPEAKER GIVES BIG HI-FI PERFORMANCE

The magnificent sound of this revolutionary Amplifier-Speaker is almost unbelievable. The overall frequency range from the richest low tones to sparkling highs compares favorably with expensive and bulky amplifiers and speakers. There is ample volume for almost any use.

The Answer to Portable Hi-Fi Sound

The exceptional recording quality and complete portability of a good battery operated Phillips type Cassette Recorder left only one thing to be desired—a Hi-Fidelity Amplifier-Speaker of equal portability—independent of AC connections.

The Crestwood is the perfect answer to this need. This combination delivers a quality of sound that surpasses that of most portable tape recorders—regardless of price. And, it operates with equal satisfaction with other types of tape recorders.

The Crestwood gives excellent sound from still other electronic sources—TV, modern radios, and record players. Two Crestwood speakers make ideal components for Stereo Reproduction.

INDOORS, OUTDOORS WORK OR PLAY—ANYWHERE!

Size 16" x 13³/₄" x 7¹/₄"
Wt. 10 lbs. Separate
volume and tone controls.
A.C. Adapter Available



If your dealer can't supply, order direct, give dealer name

CRESTWOOD PRODUCTS CO.

312/256-2716

221 N. LaSalle St. Dept. 510 • Chicago, Illinois 60601
CIRCLE NO. 13 ON READER SERVICE CARD

er having remote-control facilities. Message dictated into unit tells caller to record message through phone. At end of 1-minute cycle, phone handset moves down, hanging up phone, and shutting off tape recorder. Number of calls limited only by capacity of reels used with tape recorder. Solid-state; frequency range 200-5000 Hz; answering time 30 seconds; message recording time 30 seconds; power consumption 15 watts. 8¹/₄" x 2" x 10¹/₁₆". 100/117/200 V a.c. operationList \$99.95



EDITALL

KP-2 Editing Kit

Complete kit includes splicing block, 30 splicing tapes, demagnetized razor blade, grease pencil\$3.50

KS-2 Editing Kit

For 1/4" tape. Includes 4" x 3/4" x 1 1/4" block, marking pencil, roll of splicing tape & cutting blade\$7.50

KS-3 Same except larger block (5 3/4" x 1" x 3/8")\$9.00

LAFAYETTE

99-1516 Bulk Tape Eraser

Provides tape noise level 4-6 dB below noise level from recorder erase heads; pilot light; fused; draws 6 1/2 amps; designed for 110-120 volt, 60-Hz a.c. operation\$18.95

MICROTRAN

HD-40M Tape Head Demagnetizer

To be used in direct contact with tape head; 117-volt operation; 4" x 1 1/4" diameter\$6.15

HD-15 Magnetic Tape Eraser

Bulk tape demagnetizer for 1/4" and 1/2" tape widths. Can be used for 8, 16, and 35 mm sound film as well. 4 3/8" x 2 1/2" w. x 4 1/8".\$11.95

HD-11M Magnetic Tape Eraser

Heavy-duty design for use with tape reels up to 10 1/2"\$23.50
Adapter for NAB 10 1/2" reels\$2.30

NORTRONICS

Nortronics has replacements for over 1700 domestic and foreign recorders. Dealers have replacements and conversions listed by recorder model number and head number. All replacement heads and "Quik Kits" (mounting hardware) come with complete instructions for easy installation.

1200 Series Premium Record, Record/Play Heads

Four-track stereo, laminated-core heads with all-metal, hyperbolic face construction; replaces older TLB, CSQ, and 1100 styles. Appearance same as Model 1000.

#1200 High impedance; 800 mH inductance; 100 μin gap; for use with vacuum-tube circuits. No-mount type\$28.20

#1201 Medium impedance; 400 mH inductance; 100 μin gap; for use with vacuum-tube or transistor circuits. No-mount type\$28.20

#1202 Low impedance; 100 mH inductance; 100 μin gap; for use with transistor circuits. No-mount type\$28.20

#1203 Low impedance record-only; 50 mH inductance; 500 μin gap; for use with vacuum-tube or transistor circuits. No-mount type.\$28.20

#1205 Medium impedance; 200 mH inductance; 500 μin gap; for use with vacuum-tube circuits. No-mount type\$28.20

#1207 Medium-low impedance; 200 mH inductance; 100 μin gap; for use with transistor circuits. No-mount type\$28.20

Same as above with rear mount\$29.70

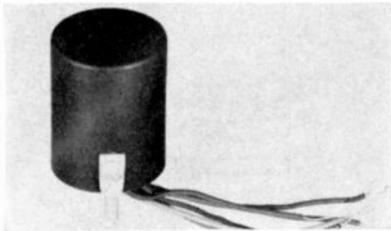
T60F Oscillator Transformer

For 12AU7A tube circuit use with all record, record/playback, and erase heads listed; frequency range 70-100 kHz depending on the impedance\$4.50

Model T60E Oscillator Transformer

65-kHz bias for recording and erase current for either high or low impedance heads; Circuit diagram for a one-tube oscillator included.\$4.50

Model T60-T2 Oscillator Transformer
Similar to Model T60E but designed for transistor circuitry; 40-100 kHz; will de-



liver 25 to 150 volts to crase and record heads\$4.50

Model T70-T2 Oscillator Transformer
For printed-circuit board; has plug-in, dip-solder terminals with nylon case; efficient



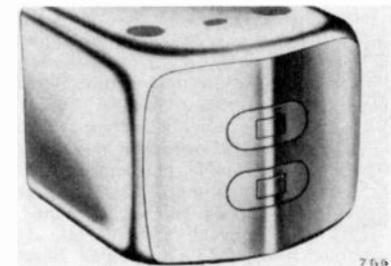
ferrite E-core construction; operating frequency 60-110 kHz; secondary voltage 40-120 V\$4.50
T70-T6 Osc. transformer for printed-circuit board. Same as T70-T2 except operating frequency 250-500 kHz for duplicators & secondary voltage 70 V\$9.00

Model AT-100 Alignment Tape

7½ ips full-track for checking record/play heads of all types; 40-10,000 Hz; recorded for checking azimuth, equalization, and head wear\$4.95

1000 Series Record/Play Heads

Four-track stereo, laminated core, high-quality heads with all-metal hyperbolic



face construction; replaces older CSQ, TLB & TLD-1 designs.

#1000—High impedance; 800 mH inductance; 100 µin. gap; for use with vacuum-tube circuits; no-mount type\$21.00

#1001—Medium impedance; 400 mH, inductance; 100 µin. gap; for use with vacuum-tube or transistor circuits; no-mount type\$21.00

#1002—Low impedance; 100 mH inductance; 100 µin. gap; for use with transistor circuits; no-mount type\$21.00

All above with rear mount\$22.50

1800 Series Record/Play Heads

Two-track stereo; laminated core; all-metal heads; hyperbolic face construction; replaces older TLA and TLD-S styles.

#1800—High impedance; 800 mH inductance; 100 µin. gap; for use with vacuum-tube circuits; no-mount type\$23.30

#1801—Medium impedance; 400 mH in-

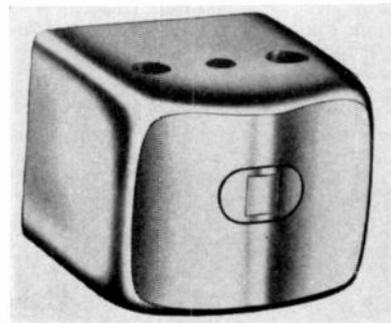
ductance; 100 µin. gap; for use with vacuum-tube or transistor circuits; no-mount type\$23.30
#1802—Low impedance; 100 mH inductance; 100 µin. gap; for use with transistor circuits; no-mount type\$23.30
Same as #1800, #1801, #1802 except rear mount\$24.80

2600 Series Record/Play Heads

Two-track mono; laminated core; heads with all-metal hyperbolic face construction; replaces older SLS style.

#2600—High impedance; 800 mH inductance; 100 µin. gap; for use with vacuum-tube circuits; no-mount type\$15.90

#2601—Medium impedance; 400 mH inductance; 100 µin. gap; for use with



vacuum-tube or transistor circuits; no-mount type\$15.90

#2602—Low impedance; 100 mH inductance; 100 µin. gap; for use with transistor circuits; no-mount type\$15.90

#2603—Special record only head; 50 mH inductance; 500 µin. gap; for use with vacuum-tube or transistor circuits; no-mount type\$15.90

3000 Series Record/Play Heads

Two-track mono; laminated core, all-metal heads, hyperbolic face construction; replaces older SLS style.

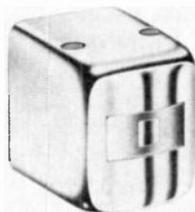
#3000—High impedance; 800 mH inductance; 100 µin. gap; for use with vacuum-tube circuits; no-mount type\$8.40

#3001—Medium impedance; 400 mH inductance; 100 µin. gap; for use with vacuum-tube or transistor circuits; no-mount type\$8.40

Same as #3000 and #3001 except rear mount\$9.90

3100 Series Record/Play Heads

Two-track mono; solid core heads with



cylindrical metal face construction; center track.

#3100 High imp.; 1000 mH; 160 µin. gap for use with vacuum-tube circuits; no-mount type\$8.40

#3101 Med. imp.; 400 mH; 160 µin. gap; for use with vacuum-tube or transistor circuits; no-mount type\$8.40

Same as above with rear mount\$9.90

3200 Series Premium Record, Record/Play Heads

Two-track mono, laminated core heads with all-metal hyperbolic face construction; replaces older SLS style.

#3200 High impedance, 800 mH inductance; 100 µin. gap; for use with vacuum-tube circuits. No-mount type\$15.90

every tape recorder
owner
**OUGHT TO
HAVE
HIS HEAD
EXAMINED!**



If you've been using your tape recorder regularly for a year or more—the tape head is probably worn out. As the oxide coating on the tape comes in abrasive contact with the head, it gradually grinds away the metal. Output becomes erratic and high frequency performance suffers. Crisp sounds become mushy. Vivid tones get blurry. Without even realizing it, you *lose* the fidelity and realism your tapes and equipment are capable of giving you.

Every tape recorder should regularly have the Look-Touch-Listen test that immediately tells you if it's head replacement time. Ask Nortronics—world's leading tape head manufacturer—for Bulletin 7260 that explains this simple do-it-yourself test. If you do need a new head, ask your dealer for a Nortronics replacement!



8101 Tenth Avenue North
Minneapolis, Minnesota 55427
CIRCLE NO. 32 ON READER SERVICE CARD

NEW FROM TAPE-MATES
BEETHOVEN
 THE NINE SYMPHONIES
 JOSEF KRIPS
 conducting
 THE LONDON SYMPHONY ORCH.



APPROX.
 6 HOURS
\$18⁹⁵
 Suggested
 Retail Price
 TMS-2R-1
 (2 REEL SET)

PLUS A complete catalog of over 160 HOURS or Tape-Mates 3 hour long-play stereo albums of:

POP/CLASSICS/JAZZ/VOCAL
 SHOW/VARIETY/DANCE/ETC. **\$11⁹⁵**

All 3 3/4 ips on 7" reels

Suggested Retail Price

Ask your local dealer or write for complete catalog information to:

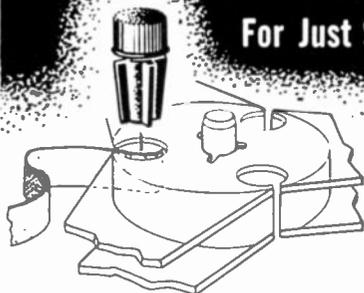
TAPE-MATES



5727 W. Jefferson Blvd., Los Angeles, Cal. 90016

CIRCLE NO. 2 ON READER SERVICE CARD

**End Tape Fumbling
 Forever!
 For Just \$1**



Tape-It-Easy gives you positive tape threading, eliminates frustration of having tape end slip out. No danger of tape breakage.

It's easy as 1-2-3!

1. Insert end of tape in reel slot.
2. Twist Tape-It-Easy into reel.
3. Turn reel one revolution.

That's all there is to it with TAPE-IT-EASY.

\$1 postpaid

At Hi Fi and Record Stores or Use this Coupon

TURNEX COMPANY FREE STORAGE HOLDER
 Box 1223
 Darien, Conn. 06820

Gentlemen: Enclosed is \$1. Please send TAPE-IT-EASY tape threader & free holder.

Name:

Address:

City: State: Zip:

CIRCLE NO. 46 ON READER SERVICE CARD

#3201 Medium impedance; 400 mH inductance; 100 μ in. gap; for use with vacuum-tube or transistor circuits. No-mount type\$15.90
 #3203 Low impedance record only; 50 mH inductance; 500 μ in. gap; for use with vacuum-tube or transistor circuits. No-mount type\$15.90
 Same as above with rear mount\$17.40

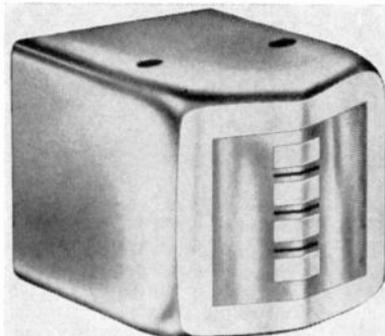
4100 Series Record/Play Heads

Full-track mono; laminated core heads with plastic, hyperbolic face construction; replaces older SF style.

#4100—Medium impedance; 250 mH inductance; 160 μ in. gap; for use with vacuum-tube or transistor circuits; no-mount type\$34.70
 #4101—Special record only head; 70 mH inductance; 500 μ in. gap; for use with vacuum-tube or transistor circuits; no-mount type\$34.70
 Same as #4100 and #4101 except rear mount\$36.20

5600 Series Record/Play Heads

Four-channel; laminated core heads with



all-metal hyperbolic face construction.

#5601 Special record-only head; low impedance 50 mH; 500 μ in. gap spacer; for use with vacuum-tube or transistor circuits; no-mount type\$99.00
 #5602 Low imp.; 90 mH; 100 μ in. gap spacer; for use with vacuum-tube or transistor circuits; no-mount type\$99.00
 #5603 Med. imp.; 370 mH; 100 μ in. gap spacer; for use with vacuum-tube or transistor circuits; no-mount type\$ 99.00
 Same as above with rear mount\$105.00

5700 Series Record/Play Heads

Three-channel premium hyperbolic face construction. For stereo record/play plus cue channel on broadcast cartridge machines.

#5701 Medium impedance, record/play; 370 mH, 100 μ in. gap spacer; for vacuum-tube or transistor circuits\$99.00
 #5702 Low impedance record/play; 100 mH, 100 μ in. gap spacer for transistor circuits\$99.00
 #5703 Low impedance record only; 50 mH, 500 μ in. gap spacer for vacuum-tube or transistor circuits\$99.00

5800 Series Record/Play Heads

8 tracks on 1/4" tape; 2-channel 8-track hyperbolic metal face heads; use in automotive & background music players.

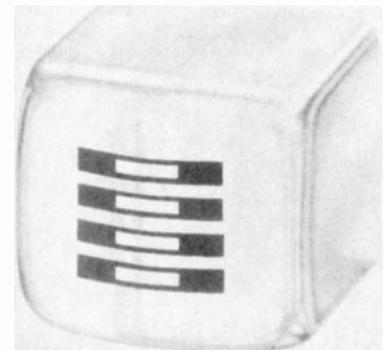


#5800 Medium imp. record/play; 400 mH; 100 μ in gap; no-mount type\$15.00
 #5810 Low imp. record-only; 10 mH; 500 μ in gap; no-mount type\$21.00
 #5813 Low imp. record-only; 50 mH; 500 μ in gap; no-mount type\$21.00

5830 Series Record/Play Heads

Four-channel, 8-track hyperbolic metal faced heads.

#5832 Medium low impedance record/play; 200 mH; 100 μ in gap; no-mount



type\$81.00
 #5834 Low impedance, record only; 50 mH; 500 μ in gap; no-mount type\$81.00
 #5836 Special low impedance record only for duplicating; 2 mH; 500 μ in gap; no-mount type\$81.00

1400 Series Erase Heads

Four-track stereo; laminated core; double gap; premium quality with full metal face construction; replaces older SEQ and SE-50 styles.

#1400—High impedance; 80 mH inductance 30,000 ohms impedance at 60 kHz; for use with vacuum-tube circuits; 60 kHz operating voltage: 90-150 volts; no-mount type \$12.00
 #1401—Medium impedance; 10 mH inductance; 2800 ohms impedance at 60 kHz; for use with vacuum-

tube or transistor circuits; 60 kHz operating voltage: 28-42 volts; no-mount type ..\$12.00
 Same as #1400 and #1401 except rear mount\$13.50

3600 Series Erase Heads

Two-track mono; laminated core; premium quality with full metal face construction; double gap; replaces older MEH and ME-100 styles.

#3600—High impedance; 80 mH inductance; 25,000 ohms impedance at 60 kHz; for use with vacuum-tube circuits; 60 kHz operating voltage: 100-150 volts; no mount type\$8.00
 #3601—Medium impedance; 8 mH inductance; 2000 ohms impedance at 60 kHz; for use with vacuum-tube or transistor circuits; 60 kHz

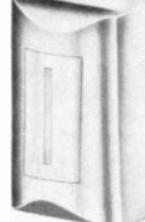
operating voltage: 32-48 volts; no-mount type\$8.00
 Same as #3600 and #3601 except rear mount\$9.50

4400 Series Erase Heads

Full-track mono; laminated core; double gap; premium quality with full metal face construction; replaces older MEF and ME-250 styles.

#4400—High impedance; 40 mH inductance; 12,000 ohms impedance at 60 kHz; for use with vacuum-tube circuits; 60 kHz operating voltage: 100-105 volts; no mount type\$14.00

#4401—Medium impedance; 3.6 mH inductance; 1000 ohms impedance at 60 kHz; for use with vacuum-tube or transistor circuits; 60 kHz operating voltage: 32-48 volts; no-mount type ..\$14.00
 Same as #4000 and #4001 except rear mount\$15.50



2200 Series Erase Heads

Two-track stereo; laminated core; double gap; premium quality with full metal face construction; replaces older SEH and SE-100 styles.

#2200—High impedance: 80 mH inductance; 25,000 ohms impedance at 60 kHz;

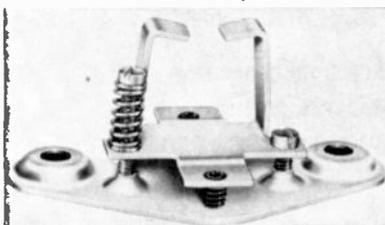
for use with vacuum-tube circuits: 60 kHz operating voltage: 100-150 volts; no-mount type\$12.00

#2201—Medium impedance: 8 mH inductance; 2000 ohms impedance at 60 kHz; for use with vacuum-tube or transistor circuits: 60 kHz operating voltage: 32-48 volts; no-mount type\$12.00



"Quik-Kit" 74 Adjustable Head Mounting Assembly

For updating tape decks to use Nortronics no-mount heads. Includes provision for ad-



justment of tape head for wrap, height, tilt, and azimuth\$2.25

ROBERTS

Model 3885 Bulk Eraser

Will accept any tapes up to 7" reel size\$15.95

ROBINS

Model TM-88 Bulk Tape Eraser



Hand-held eraser for 1/4" tapes.....\$17.50

Model TK-5 Strobotape Kit

Consists of five lengths of 25-inch nonmagnetic leader tape with strobe markings plus small neon light which flickers at a rate of 120 times per second; designed to be spliced into a roll of tape. The strobe markings will indicate relative speed of the tape machine\$2.50

Model TS-8D Deluxe Tape Splicer

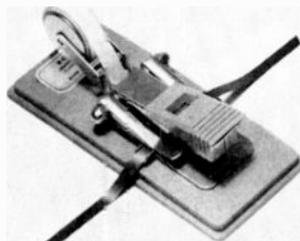
Cuts tape diagonally; features "See-Thru" windows indicating cut and trim positions; blade centering adjustment; unit has re-



placeable cutter cartridge and blade.\$12.75

Model TS-4S Tape Splicer

Similar in performance to Model TS-8D. Does not have "See-Thru" windows: sup-



plied with roll of 3/8" x 100" splicing tape \$10.00

TS-6 Tape Splicer

Adjustable for 40° or 90° cut. Complete with 25 cut, self-stick patches\$5.00

Model TM-99 Bulk Tape Eraser

Demagnetize up to 1/2" wide; can erase



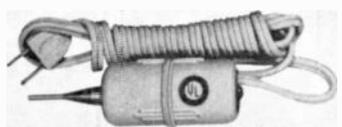
background noise on old tapes; takes up to 10 1/2" reels; size 3 3/4" x 5 1/4" x 6 3/4" \$46.00

Model TM-77 Bulk Tape Eraser

Low-cost version of Model TM-99; accepts reels up to 7"\$26.50

Model TD-6 Head Demagnetizer

Allows user to demagnetize tape recorder



heads; plugs into a.c. line\$11.00

Model TD-3 Head Demagnetizer

Low-cost version of Model TD-6 demagnetizer\$6.50

Model TM-44 Bulk Tape Eraser

Will take up to 7" reel size; 1/4" max. width 117 V a.c. operation\$17.50

Model TW-1 Tape Strobe

Intended to be held against tape; will check 3 3/4 & 7 1/2 ips speeds\$10.00

SOUNDCRAFT

"Magna-See"

A non-toxic, non-inflammable chemical solution that lets you see the magnetic track recorded on tapes.

Complete kit.....\$12.00
Can of solution (1/2 pint).....\$ 4.25

VIKING

Self-Energized Speaker System

Designed to work with any tape deck or as a monitoring speaker for recorders without such a facility; each walnut enclosure contains 8" woofer, 3 1/2" tweeter, cross-over network; enclosures are acoustically matched to speakers. 60 W stereo amplifier is built into one of enclosures. Each enclosure measures 16" x 14" x 5" d.\$119.00



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CIRCLE NO. 33 ON READER SERVICE CARD

For Tough Recording Jobs Choose The Only Microphone With Backbone!



**ELECTRO-VOICE
MODEL 676
DYNAMIC CARDIOID**

E-V The backbone of the Electro-Voice Model 676 is no mere decoration. It's visible proof of the most exciting idea in directional microphones—Continuously Variable-D (CV-D)[™].

And it takes a directional microphone to solve your tough recording problems: bad acoustics, audience noise, poor balance between performers.

Here's how CV-D works. We attach a very special tapered tube to the back of the microphone element. This tube automatically varies in effective acoustic length with frequency. It's a long tube for lows — a short tube for highs. All this with no moving parts! The tube is always optimum length to most effectively cancel sound arriving from the back of the microphone, regardless of frequency.

This ingenious solution* is years ahead of the common fixed-path designs found in most cardioid microphones. The 676 offers significantly smoother response at every point—on or off axis—plus more uniform cancellation to the rear. It is also less sensitive to wind and shock. There is almost no "proximity effect"... no boosted bass when performers work extra close.

Long life and smooth response are guaranteed by the exclusive E-V Acoustalloy[®] Diaphragm. And the

676 has unusually high output for a microphone so small. Of course you get dual output impedances, high efficiency dust and magnetic filters—all of the hallmarks of Electro-Voice design that have made E-V a leader for years.

But that's not all. The 676 has an exclusive bass control switch built in. Choose flat response (from 40 to 15,000 cps) or tilt off the bass 5 or 10 db at 100 cps to control reverberation, reduce low frequency feedback and room rumble.

Write today for complete specifications, or visit your E-V sound specialist's to see this remarkable new microphone. And when difficult recording problems must be faced squarely, stand up and fight back with the microphone with a backbone (and CV-D)—the new Electro-Voice 676 dynamic cardioid!

*Model 676 Satin Chrome or TV Grey,
\$100.00 list; in Gold, \$110.00 list.
Shown on Model 420 Desk Stand, \$20.00 List.
(Less normal trade discounts.)*

ELECTRO-VOICE, INC.
Dept. 1072TA; 648 Cecil Street
Buchanan, Michigan 49107

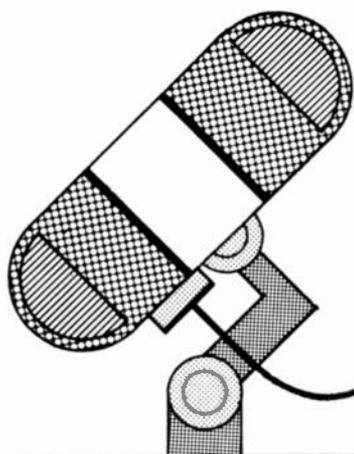
Electro-Voice[®]
SETTING NEW STANDARDS IN SOUND

*Pat. No. 3,115,207

252

CIRCLE NO. 15 ON READER SERVICE CARD

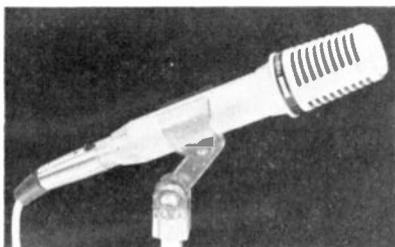
MICROPHONE DIRECTORY



AKG

D-200E Microphone System

Two-way cardioid dynamic type; frequency range 30-15,000 Hz \pm 3 dB; sensitivity



—55 dB (re 1 mW/10 dynes/cm²) 0.16 mV/ μ bar; impedance 200 ohms \pm 15%, —30%; min. load impedance 500 ohms. Uses two coaxially mounted elements with 500-Hz crossover network; mechanically isolated within the outer housing against shock. 7³/₁₆" long, 1¹/₈" dia., 8 oz.\$69.00

ALTEC LANSING

Model 681A Microphone

General-purpose, moving-coil dynamic design; response 50-18,000 Hz; output im-



pedance 150/250 or 20,000 ohms (specify impedance); output —55 dBm/10 dynes/cm²; omnidirectional; 1¹/₈" dia. at top, 7³/₈" long; dark green baked enamel and brushed chrome; comes complete with 15-foot cord.\$82.50
26A Desk stand extra\$25.00

Model 682B Microphone

Similar in design and style to Model 681A; response 45-20,000 Hz; output impedance 150/250 ohms with standard 3-pin Cannon connector plus 15' of cable supplied; two-tone baked enamel finish, black and dark green or dark brown and platinum, or brushed chrome.\$87.50

674A and 675A Microphones

Dynamic, omnidirectional types; response 50-14,000 Hz; output level —58 dBm/10



dynes/cm²; supplied with 15-foot 2-conductor shielded cable.

674A Omnidirectional (150/250 ohms)....

.....\$45.00

675A Omnidirectional (20,000 ohms)

.....\$45.00

678A and 679A Microphones

Dynamic, cardioid types; response 50-14,000 Hz; output level —58 dBm/10 dynes/cm²; supplied with 15-foot 2-conductor shielded cable.

678A Cardioid (150/250 ohms)\$52.00

679A Cardioid (20,000 ohms)\$52.00

All prices shown are consumer net.

AMERICAN MICROPHONE

Model D-20 Microphone

Dynamic omnidirectional for hand-held or stand-mounted use, or as a lavalier. Re-



sponse 80-12,000 Hz; output level —58 dB; 4¹/₂ foot single-conductor shielded cable. Supplied with protective leather bag, lavalier neckcord assembly, and floor stand adapter. Non-reflecting black finish. Available either hi-Z or lo-Z\$20.00

Model D-30 Microphone

Dynamic omnidirectional designed for lavalier use. Response 100-10,000 Hz; output level —60 dB; "on-off" switch; 16-foot single-conductor shielded cable. Lavalier neckcord assembly and fin stand supplied.



1³/₁₆" d. x 3¹/₄" l. Non-reflecting black finish. Hi-Z only\$20.00

Model D-40 Microphone

Dynamic omnidirectional. Exceptionally smooth response 60-12,000 Hz; output level —59 dB. Medium (200 ohms) and high impedance; 16-foot, two-conductor shielded cable (connector at microphone end), unbalanced to ground. Brushed chrome finish; ³/₈"—27 threads in stand coupler\$40.00

Model D-50 Microphone

Dynamic cardioid. Response 80-10,000 Hz; output level —60 dB; front-to-back ratio better than 20 dB. Dual impedance (lo-Z or hi-Z) selectable at free end of 6-foot two-conductor shielded cable. Unbalanced to ground. Supplied with desk stand, floor

stand coupler, protective plastic bag, 1" d. x 5¹/₂". Non-reflecting black\$60.00

ASTATIC

788 "Metro" Dynamic Microphone

Omnidirectional design with "pop-proof" and "blast-proof" diaphragm; insensitive to moisture and temperature; convertible from hand to stand to lavalier use; detachable cable connector; response 60-13,000 Hz; 150 ohms or high impedance; output 58 dB at 1 mW/10 dynes/cm²; furnished complete with 20-foot cable, on-off sw. stand adapter, lavalier assembly; 9¹/₁₆" h. x 1¹/₂" dia.\$79.50

Model 77 Series Microphones

Dynamic cardioid design; front-to-back pickup differential 18 dB; rugged and insensitive to temperature and moisture; blast-proof diaphragm; essentially flat from 30-15,000 Hz; impedance selector switch; high-impedance position (40,000 ohms), open circuit voltage —48 dB @ 1 volt/dyne/cm²; low-impedance position (30-50 ohms) power level into 50 ohms —52 dB @ 1 mW/10 dynes/cm²; medium-impedance position (150-250 ohms), —53 dB.

Model 77\$82.50

Model 77L\$72.50

Model G77 Complete with grip-to-talk

desk stand, 8-foot cable.....\$97.45

Model 77 (Gold finish).....\$92.50

Model 77L (Gold finish).....\$82.50

All "L" models furnished less "on-off" switch, cable, and adapter; intended for use with the company's Model G grip-to-talk desk stand.

AUDIOTEX

Studio Microphone

Dynamic type; output level —62 dB with flat frequency response 50-12,000 Hz; 50,000 ohms impedance; 6' shielded cable; molded phone plug attachment, 4¹/₈" long x 1⁷/₁₆" dia. Satin chrome finish\$17.50

Studio-Recorder Microphone

Ceramic type for general use; output level —50 dB with flat frequency response 50-10,000 Hz; 6' shielded cable; molded phone



plug; 5³/₄" long x 1¹/₂" dia.\$12.25
Prices are "list".

BEYER

M-55A Dynamic Mic

Omnidirectional, moving coil design with built-in transformer. Response 70-16,000 Hz; output: low imp. —56 dBm, high imp. —54 dB. Output impedance 200 and 80 kohms. Supplied with 10' cable & desk stand. 1.2" x 1.2" x 4.5"\$20.00

M-80A Dynamic Mic

Unidirectional, moving coil design with built-in transformer. Response 50—16,000



Hz; output: low imp. —53 dBm, high imp. —50 dB. Output impedance 200 & 80 kohms; cardioid polar pattern. Supplied with 10' cable & desk stand. 1.2" x 1.2" x 5.2"\$30.00
M-808A Matched pair\$65.00

M-64 Dynamic Mic

Unidirectional, moving coil design. Response 100-10,000 Hz; output —52 dBm. Output impedance 200 ohms; cardioid polar pattern. Designed for use with SH126 gooseneck mounting. 1" x 3.1"\$50.00
SH126 Gooseneck & 15' cable and connectors\$12.00

M-69 Dynamic Studio Mic

Moving coil, unidirectional design. Response 50—16,000 Hz. Output —50 dBm;



cardioid polar pattern; output imp. 200 ohms. Supplied with mic cable connector but without cable. 6.7" x 0.9" (head 1.7")\$65.00
For outdoor operation use windshield WS84\$22.00

M-260 Dynamic Studio Mic

Ribbon design with voice/music switch. Response 50—18,000 Hz. Output —58 dBm; hypercardioid polar pattern; output imp. 200 ohms; supplied without cable but with connector socket. 6.5" x 0.9" (head 1.7")\$55.00

M-610 Dynamic Mic

Moving coil design. Response 50—15,000 Hz. Output —52 dBm; cardioid polar pat-

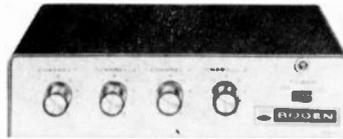


tern; output imp. 200 ohms. Supplied without cable but with connector socket. 6.5" x 0.9" (head 1.7")\$60.00
WS84 Windshield\$22.00
All Beyer microphone output levels are at 1 kHz and for low imp. 0 dBm = 1 mW/10 μbar and for high imp 0 dB = 1 V/μbar.

BOGEN

MX6A-T Solid-State Mic Mixer

All-silicon, solid-state, a.c.-powered mixer which can be used to add four microphones or other signals to existing p.a. systems or tape recorders; up to 3 units



can be parallel for 12 individual inputs. Four inputs can handle high-Z or low-Z microphones, electric guitars; two of the four channels accept tuner or xtal cartridges. 9¼" x 6" x 2¾"; weight less than 5 lbsList \$74.85

DYNACO

Model 200 Stereo Microphone

Ribbon velocity microphone utilizing two separate housings which can be rotated up to 90° apart for adjustable separation. Top



element unplugs to provide mono mic (Model 100). Figure-8 pattern; response ±2 dB from 30 to 13,000 Hz. ±3 dB from 20 to 15,000 Hz. 200-ohm output. Switch provides normal music, close talk with attenuated low end, or muted positions. Sensitivity Gm = —156 dB.
Model 200\$149.95
Model 100 Mono microphone\$ 89.95
Model 150 Conversion element for 100 to 200\$ 69.95
MT-2 Matching transformer (2 x 200 ohms to hi-Z)\$ 24.95

ELECTRO-VOICE

635A Omnidirectional Microphone

Has 4-stage pop & dust filter; for hand or stand. Response 80-13,000 Hz (rising); out-



put —55 dB; low-impedance. Supplied with Model 310 clamp & 18' two-conductor cable. 6" l. x 1½" dia., 6 oz.List \$82.00

Model 664 Cardioid Microphone

Dynamic; unidirectional; frequency response 40 to 15,000 Hz; output —58 dB; 150 ohm and high impedance; diaphragm shielded from dust; filter to minimize wind blast; on-off switch; pressure cast case; assembly includes hinge; 15 foot cable; size 7¼" x 1½"; weight 26 oz.
Chrome finish\$85.00
Model 664G Gold finish\$90.00

Model 630 Dynamic Mike

Response 60-11,000 Hz; output —55 dB; has "off-on" switch; available in high-imp-



pedance or 150 ohms (matches 50-250 ohms); low impedance balanced to ground; 2" x 6½"\$52.50

Model 636 "Slimair" Dynamic

For p.a., recording, and general use; re-

sponse 60-13,000 Hz; output —58 dB;



pop-proof head; wide pickup range; on-off switch; satin chrome finish; tilttable head; Hi-Z or Lo-Z by changing one wire in connector; 15-foot cable; 10¼" long including stud; 1½" max. dia.\$72.50
Model 636G Gold finish\$77.50

Model 623 Slim Microphone



Dynamic; omnidirectional; frequency response 60 to 12,000 Hz; output —56 dB; high and low impedance; cast case; hinge head; on-off switch; built-in MC-4 connector ¼"-27 thread; satin chrome; 15 foot cable; size 7½" x 1¼"; weight 15 oz.\$57.00

Model 641 Dynamic Mike

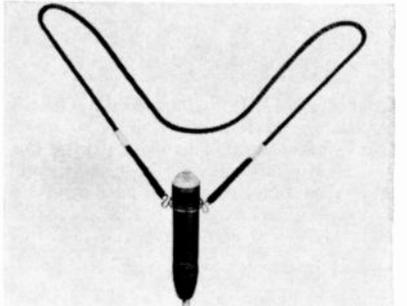
Dynamic type; high output level; wide range response; for p.a., home recording,



communications; integral on-off switch; response 70-10,000 Hz; output level —57 dB; omnidirectional; 15-foot cable; Hi-Z or balanced 150 ohms (matches standard low impedances)\$39.50

Model 647A Microphone

Omnidirectional, dynamic lavalier design. Response 70-9,000 Hz; Hi & Lo imped-



ance selected at cable. Sensitivity —155 dB; output (Lo. imp.) —61 dB (0 dB = 1 mW/10 dynes/cm.²). Supplied with 18 ft., 3-conductor shielded cable, neck cord & belt clip; 3¼" long x ¾" dia.\$82.50

Model 729 Ceramic Microphone

Cardioid design; wide-angle front pick-up; response 60-8000 Hz; high-impedance; on-off switch; output —60 dB; 7¼" l. x 1½" w. x 1½" d.; single-conductor shielded 8½ ft. cable\$24.50
Model 729SR Has relay operating switch and three-conductor (one shielded) cable\$26.50

Model 727 Slim Ceramic

Similar in appearance to Model 729; with-

stands extremes of temperature and humidity; response 60-8000 Hz; output -55 dB; high-impedance only; 8½-foot cable; available with or without on-off switch; 7¼" x 1½" x 1½"; supplied with desk stand and floor stand coupler\$20.00
 Model 72*SR With relay control switch\$23.50

Model 715 "Century" Ceramic

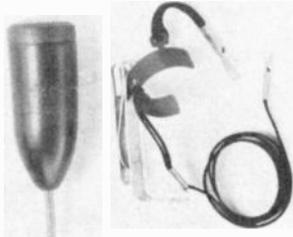
Use in any position (in hand, on table, on stand, or overhead); ceramic element;



60-7000 Hz; output -55 dB; Hi-Z; 5-foot cable; nondirectional; rugged and lightweight; 3" x 2½" x 1"\$14.75

Model 624 Dynamic Lavalier

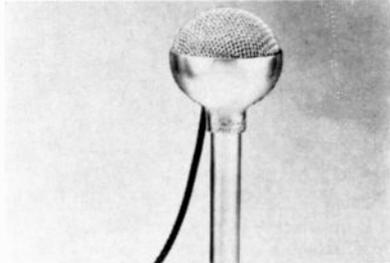
Response 100-7000 Hz; output -56 dB;



features wire mesh head acoustically treated for wind & moisture protection; available in high impedance or 150 ohms; not balanced to ground; 3½" x 1½"\$42.50

920 "Spherex" Crystal Microphone

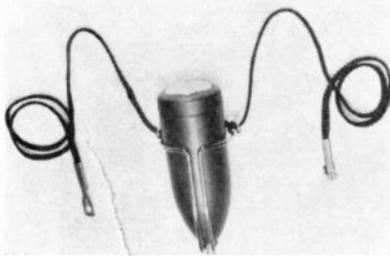
Omnidirectional pickup. Response 60-10,000 Hz; output -50 dB; wire mesh head



treated for wind & moisture protection. Has high capacity & high impedance; 2¼" dia., 15' cable; 8 oz.List \$27.50

924 Lavalier Crystal Microphone

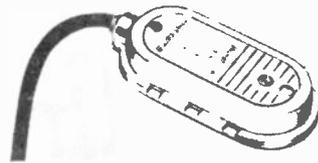
Supplied with neck cord, support clip & 18' cable. Has wire mesh head for wind &



moisture protection. Response 60-8000 Hz; output -60 dB; high imp.; 1½" dia. x 3½". 8 oz.List \$23.50

Model 805 Contact Microphone

For guitar, banjo, other stringed instru-



ments: Hi-Z; sealed crystal; chrome finish; 15-foot cable\$20.00

Model 335A Blast Filter

Designed for use with Models 630, 641, 638 & 634 microphones. Will not affect freq. response \$12.50

Model 355 Windscreen

Designed for use with Models 655C, 654A, 636, 623 & 926. Reduces wind blast with-



out altering freq. response. Acts also as a protective device\$11.00

Model 524A Windscreen

Designed to fit Electro-Voice Model 664 cardioid microphone. Also protects against



dust, magnetic particles & mechanical shock.\$12.00

Model 721 Ceramic Mic

Inexpensive design. Response 100-5000 Hz; output -52 dB; high impedance; can be



hand held or with integral fold-out stand. 2¼" w. x 3¾" h. x 1"\$6.50

502B Matching Transformer

Designed for use in series with microphone line. Transformer windings have low dis-



tributed capacity and excellent shielding against inductive hum. Low-impedance output matches 150-25,000 ohm inputs. High-impedance output is 40,000 ohms. Response 30-20,000 Hz. 3½" x 1" dia.\$16.50

631 Omnidirectional Microphone

Design is similar in appearance to Model 635A; response 80-13,000 Hz; dynamic-type design with a sealed magnetic "on-off" switch inside case. Has removable magnetic actuator. Available in hi-Z (25,000 ohms) or low-Z (150 ohms). Has built-in 4" stage windscreen. EIA sensitivity -151 dB for hi-Z and -149 for low-Z\$60.00

FARGRAM

Parabolic Microphone

Reflector design for use with transistorized battery-operated tape recorders. Spun alumi-



MICROPHONES MAKE BETTER RECORDINGS

because they are designed and manufactured in Sweden's leading laboratory!

MICROMINIATURE SOLID-STATE CONDENSER MICROPHONES -



#EK-71 Omnidirectional Pattern\$99.50

#EC-71 Uni-directional (Cardioid Pattern) \$109.50

Extremely sensitive, sensationally low noise level, multiple selectable impedance, frequency response ± 3 db 40 - 18,000 Hz. Size: 2 11/16" x 11/16" O.D. Weight: 1 1/4 oz.



FULL RANGE OF POWER SUPPLIES

AC, battery operated Mono and Stereo - from \$19.50



A WIDE SELECTION OF ACCESSORIES TO UP-GRADE YOUR LIVE RECORDING TECHNIQUES TO STUDIO QUALITY

Wind-pop screens, lavalier mounts, boom mounts, extension cables, etc., etc.

STUDIO CONDENSER MICROPHONE



The finest microphone in the world - performance and features absolutely unmatched. Strictly for the professional or highly advanced hobbyist.

#TC-4\$295.00



DYNAMIC CARDIOID MICROPHONE

#D44. Hand held, lavalier, or stand mounted, reproduction is smooth, natural, free of harshness from below 60 c/s to above 16 kc/s. High rear rejection eliminates background noise. Pop/wind screen design makes the D44 ideal for outdoor recordings and close talking.

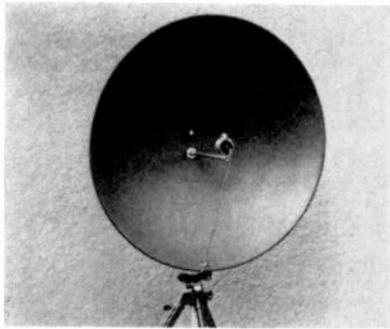
#D44HL Hi-Z and low impedance\$34.95
 #D44BS with On-Off Switch in handle ...\$39.95

Ask your Dealer for PML Microphones to increase your recording enjoyment or write for name of your nearest dealer and free illustrated brochure . . . Dept. TA

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 NEW YORK, N.Y. 10016

CIRCLE NO. 17 ON READER SERVICE CARD 113



num 24" reflector with sighting gunsight on microphone. Impedance 200 ohms; reflector depth 5"; wt. 5 lbs; at 100 ft. from 500-5000 Hz sensitivity of mic. is increased 15 dB with reflector. To be used with any heavy-duty camera tripod with pan-tilt head. Supplied with mic., reflector & gunsight, microphone holder.....\$98.50

LAFAYETTE

99-4581 Omnidirectional Dynamic Mic

Response 100-10,000 Hz; 5" l., 2" dia.; 20 ft. cable; has "on-off" switch and dual impedance (50,000 & 600 ohms); threads to 3/8" stand\$9.95

99-4603 Omnidirectional Dynamic Mic

Response 100-10,000 Hz; imp. 50,000 & 250 ohms; 7" l., 1 1/8" dia. Supplied with



20 ft. cable; with clamp mount; has "on-off" switch\$9.95

99-4588 Omnidirectional Dynamic Mic

General-purpose design; response 80-12,000 Hz; imp. 10,000 ohms @ 1 kHz; 5 1/2" l., 1" dia.; finished in black & silver; 8 1/2 ft. cable; with stand & clamp\$14.95

99-4591 Cardioid Dynamic Mic

Cardioid pattern for speech or music; response 10-15,000 Hz; imp. 50,000, 250 ohms; 4 1/2" l., 1 1/8" dia.; 5 ft. cable; with stand\$7.95

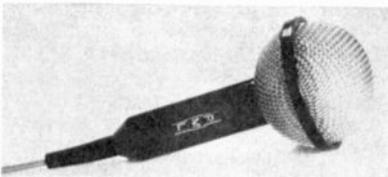
99-4593 Omnidirectional Dynamic Mic

All-purpose design; response 50-11,000 Hz; imp. 50,000, 250 ohms; 9" l., 1 1/8" dia.; 19 1/2 ft. cable; threads to 3/8" stand; has "on-off" switch\$11.95

PML

D-44 Dynamic Microphone

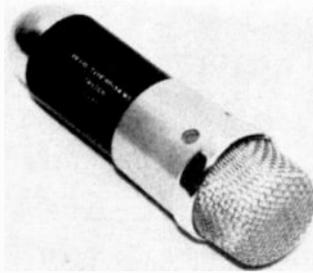
Cardioid design; 200 ohms unbalanced; response 60-16,000 Hz ± 5 dB, EIA sensitivity



-71 dB; 5" long. Supplied with 12' cable\$34.95
D-44BS With "on/off" sw. & 30 ft cable; 200 ohms balanced & hi-Z\$39.95

RD-34WS Dynamic Microphone

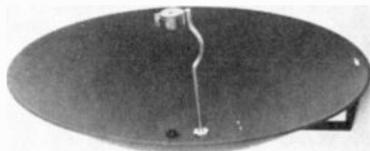
Cardioid design; 200 ohms balanced; response 30-20,000 Hz ± 3 dB, EIA sensitivity



-74 dB, 4 1/4" x 1 1/4" dia. Supplied with 18' cable\$75.00

Parabolic Reflector

Frequencies over 10,000 Hz contained within 10° angle. Sensitivity increased 14 dB.



May be used with any mic 18 to 21 mm outside diameter\$49.50

RCA

BK-6B Dynamic Microphone

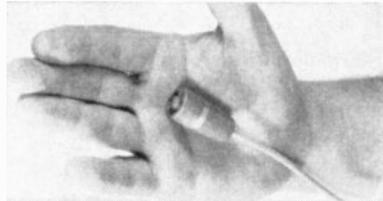
Lightweight (23 oz.) microphone 2 9/16" x 1 1/16" in size; effective output level is -67



dBm (EIA rating, -158 dB); response 60-15,000 Hz; 250-ohm output impedance may be changed to 30 or 150 ohms by a change of cable connections; hum pickup is low (-112 dBm); supplied with 30' of shielded three-conductor cable. But without connector. It does include lanyard & fastener\$86.00

BK-12A Dynamic Microphone

Non-directional, lightweight design, 60-18,000 Hz; output -60 dBm (10 dynes/cm.²) at 1000 Hz, 150 ohm. For use with 30 to 250 ohm unloaded inputs. Supplied with clip-type lanyard, tie clip holder & cable clip. 3/4" dia., 1 1/2" long, 30' cable\$95.00



cm.²) at 1000 Hz, 150 ohm. For use with 30 to 250 ohm unloaded inputs. Supplied with clip-type lanyard, tie clip holder & cable clip. 3/4" dia., 1 1/2" long, 30' cable\$95.00

SK-30 Dynamic Microphone

Omnidirectional, lightweight design, 60-12,000 Hz; output -56 dBm (10 dynes/cm.²) @ 1000 Hz, 1 1/2" dia. x 4 1/2" long; 20' cable, 50-250 ohm input impedance\$30.00



cm.²) @ 1000 Hz, 1 1/2" dia. x 4 1/2" long; 20' cable, 50-250 ohm input impedance\$30.00

Model SK-31 30,000 ohm input impedance\$31.00

SK-46 Velocity Microphone

An economy ribbon design for indoor use; has good frequency response (40-15,000 Hz) and bi-directional pickup characteristics; output impedance 200 ohms but may be reconnected to 15,000 ohms; effective output level is -58 dBm at 250 ohms (EIA rating, -150 dB) or -60 dBm at 15,000 ohms; supplied with 25' of two-conductor type shielded cable but without connector.\$54.95

BK-1A Pressure Microphone

Ideal for outdoor use; offers smooth response for both voice and music; provides uniform response from 50-15,000 Hz; swivel mounting can be used to control directional characteristics; vertical position is non-directional, the horizontal position is semi-directional; output impedance is 250 ohms, but 30 and 150 ohm connections are included; effective output level is -56 dBm (EIA rating, -148 dB); hum pickup is below -112 dBm; supplied with 30' of three-conductor cable but without connector.\$73.50

SK-45B Talk-Back Microphone

Ideal for talk-back, cue, and p.a. use; dynamic microphone is essentially non-directional, with a -56 dBm output level (EIA



rating, -147 dB) when connected for 150 to 200 ohm balanced output, and -58 dB when connected for 15,000 ohms output; frequency response 70-12,000 Hz; supplied with 25' of shielded cable but without connector.....\$45.00

SK-39A Utility Microphone

Inexpensive dynamic microphone for cue and talk-back applications; plastic dia-

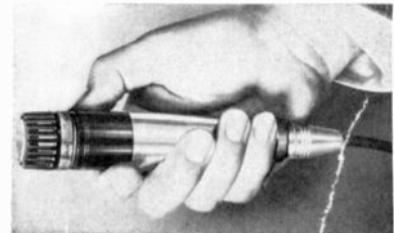


phragm is impervious to moisture and rain; response 60-10,000 Hz; output level -55 dBm (EIA rating, -150 dB); can be used with amplifiers having 150-250 ohm input; 15 oz.; supplied with 25' two-conductor cable.\$23.40

SHURE

Model 545 "Unidyne III" Microphone

Dynamic type; cardioid; frequency response 15-15,000 Hz; output -57 dB low



level, -58 dB high level; dual impedance; 18' three-conductor shielded cable; 5 3/4" x 1 1/4"\$85.00
Model 545S "Unidyne III"; as shown

above, but mounted on permanent swivel base with on/off switch.....\$89.95
 Model 545L same as 545 except 150 ohms imp. & supplied with lavalier assembly & belt clip. Has 20' 2-conductor shielded cable\$70.00

Model 55SW "Unidyne" Microphone
 Dynamic type; unidirectional; frequency response 50 to 15,000 Hz; output: -55 dB at 35-50 ohms, -56.5 at 150-250 ohms; -57.5 at 35,000 ohms; 3-position impedance switch; Alnico V magnet; die-cast zinc case, satin chrome finish; Amphenol MC3M connector equivalent; self-adjust swivel; 7/8" -27 thread; on/off switch; 20 foot 2-conductor shielded cable; size 7 3/8" x 2 1/4" x 3 1/16"; wt. 1 1/8 lbs., shpg. 3 1/8 lbs.
 Model 55S without switch.....\$85.00
 Model 55S with switch.....\$83.00

580S "Unidyne A" Dynamic Microphone
 Unidirectional design; ideal for controlling feedback in p.a. & home recording applications. Has cardioid pickup pattern; shock-mounted element; "on-off" switch; response 50-12,000 Hz; output -58 dB; choice of hi- or low-impedance models; 6 1/8" x 1 1/4" diameter; supplied with 15' cable with strain relief.
 580SA High impedance.....\$59.00
 580SB 150-250 ohms.....\$52.00
 580SA-MP Matched pair for stereo recording; high-impedance; complete with plugs attached\$118.00

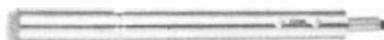
Model 565 Dynamic Cardioid Mic
 Moving coil dual-impedance (150 & 40,000 ohms) design. Response 50-15,000



Hz; built-in wire mesh screen & internal filter protects against wind & "pop". Power level -57 dB (0 dB = 1 mV with 10 μbars) EIA rating\$95.00
 Model 566 with vibration-isolation shock mount\$140.00
 Model 565S "on-off" switch on swivel connector assembly\$100.00

Model 585SA Dynamic Cardioid Mic
 Same as 565 except 150 to 250 ohms. Supplied with "on-off" sw. & 15' 2-cond. shielded cable\$65.00
 Model 585SB High impedance\$58.00
 Model 585SAV with adjustable volume control\$72.50

578 Omnidyne Ultra-Slim Probe
 Designed as a dynamic omnidirectional type p.a. microphone; response 50-15,000 Hz;



output: -59 dB high impedance, -60 dB low impedance; built-in wire mesh "pop" filter reduces breath noises; dual impedance (200 ohms & high); 3/8" dia., 7 3/16" over-all length; complete with "on-off" switch and special slip-in swivel stand adapter; available in matched pairs for stereo recording (matching to ± 1 dB in level and within ± 1 1/2 dB in frequency response)\$82.50

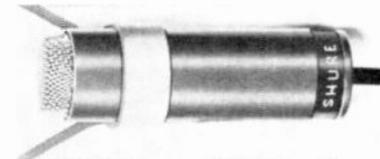
578S Dynamic Microphone
 1968 EDITION

Omnidirectional; fixed stand design with "on-off" sw. Response 50-15,000 Hz; 50-250 ohms imp.; open-circuit voltage .10 mV; EIA sensitivity -155 dB; supplied with 18' two-cond. cable; .78" diameter.
\$90.00

Model 550S "Probe-Dyne" Microphone
 Rugged, omnidirectional, dynamic design. Response 50-15,000 Hz; dual impedance, choice of 50-250 ohms & high; output 57.5 dB for low imp. & 58.5 dB for high imp.; complete with on/off sw., swivel & 18' cable.
 Chrome finish.....\$69.00
 Gold finish.....\$79.00

540S "Sonodyne II" Microphone
 Dynamic type; unidirectional; response 50-13,000 Hz (provisions for altering response to increase voice intelligibility); output: -57 dB at 50-250 ohms, -54.5 dB at high impedance; adjusts for high or low impedance; modern die-cast zinc and Armo-Dur case; satin chrome and black finish; self-adjusting "lifetime" swivel; 15-foot, 2-conductor shielded cable; 6 3/32" x 1 1/2 3/2" x 2 9/16"\$49.95

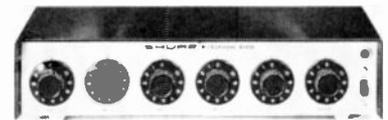
Model 570 Lavalier Microphone
 Miniature size professional-quality dynamic microphone designed for lavalier use; fea-



tures special "shaped" response; output -59 dB; reduces pickup of clothing and cable noise; lightweight, flexible, 30' microphone

cable attached; response 50-12,000 Hz with rising response to 6000 Hz; impedance 150 ohms to match low-impedance inputs; omnidirectional, 3/4" dia. x 2 3/8" over-all length; net weight 2 oz.....\$95.00

M68 Microphone Mixer
 Solid-state design; will mix 4 mic channels plus aux. Has individual gain controls &



master. High & low imp. input selection. 2 1/8" x 11 1/16" x 5 1/16"\$125.00

571 Dynamic Microphone
 An adaptation of Model 570 for stand or hand-held use. Can be used as lavalier type with accessory A57L assembly. Omnidirectional; response 50-10,000 Hz; 50 to 250 ohm impedance; open-circuit voltage .085 mV; EIA sensitivity -153 dB; supplied with 30' two-conductor cable; 2 3/32" dia.\$95.00

560 Dynamic Microphone
 Lavalier, dual-impedance design; response 40-10,000 Hz with rising characteristic to



4500 Hz; high & low (150 to 250 ohms) impedance; open-circuit voltage level 1.48 mV (high imp.) & .149 mV (low imp.);

When you 'pick a pair' for stereo



**go Turner 603...
 get the quality you're paying for!**

Almost all stereo microphones are expensive . . . yet relatively few, at any price, can match the performance of Turner's Model 600 cardioids. The 600's incorporate a four-stage blast filter to virtually eliminate 'pop' and feedback, for instance . . . so you can use the 600's under almost any conditions. The 600's offer true cardioid sensitivity, too . . . and they do so at about half the price of competitively-performing microphones.

If you're looking for mikes to match, or surpass, the quality of your new rig . . . or if you simply want to make an improvement you can really hear in your old set-up . . . look into a pair of acoustically-matched Turner 600 cardioids. The matched set is called a 603 package . . . so ask for it wherever quality recording components are sold.

Get the performance you're paying for.

THE  MICROPHONE COMPANY
 909 17th Street N.E.
 Cedar Rapids, Iowa

CIRCLE NO. 45 ON READER SERVICE CARD

with 18' two-conductor cable; 1.356" dia.\$42.50

Model 315 Gradient Microphone

Ribbon type; bi-directional; frequency response 50 to 12,000 Hz; output -63 dB at 30-50 ohms; -58 dB at 150-250 ohms, -62 dB at high impedance; 3-position impedance switch; Alnico V magnet; die-cast zinc case; satin chrome finish; self-adjust swivel; 3/8"-27 thread; Amphenol MC3M connector equivalent; 20 foot 2-conductor shielded cable; size 6" x 1 1/2" x 1 1/4"; wt. 1 lb., shpg., 3 1/4 lbs.\$89.50

Model 315S with switch.....\$91.50

575S "Versadyne" Microphone

Dynamic type; omni-directional; response 40-15,000 Hz; output: high impedance



-56 dB, low impedance -57.5 dB; choice of high or low impedance versions; black Armo-Dur body with satin anodized cap and stainless steel grille; furnished with special stand adapter; on-off switch; attached 7-foot single-conductor shielded cable; 4 3/4" x 1 1/4".

Model 575S (high impedance).....\$24.00

Model 575SB (low impedance).....\$21.00

Model 275S "Versaplex" (ceramic version)\$15.00

430 "Commando" Microphone

Controlled magnetic type; omni-directional; frequency response 60 to 10,000 Hz; output: Lo-Z and Hi-Z, -52 dB; changeable pin jacks give choice of 2 impedances: 150-250 ohms or high impedance; polystyrene and die-cast zinc case; satin-chrome and gray finish; A25 type swivel adapter; 3/8"-27 thread; Amphenol MC2M connector; 15 foot 2-conductor shielded cable; press-to-talk switch, locking plate furnished; size 6 3/4" long; top diameter 1 1/4"; handle 3/4"\$38.50

Model 245 "Uniplex" Microphone

Ceramic type; uni-directional; response 50-7000 Hz; output -59 dB; high imped-



ance; die-cast zinc case; includes swivel adapter; 15-foot single-conductor shielded cable; 4 3/4" x 1 1/4"; wt. 3/8 lb.\$35.00
Model 245S (with "on-off" switch) ..\$37.00

SONOTONE

Model CM-10A "Ceramike"

Ceramic microphone; frequency response 50 to over 11,000 Hz ± 2 dB; sensitivity 56 dB below 1.0 volt per microbar; omni-directional; high impedance; includes 7 feet of shielded cable with phone plug; does not include stand; 5 1/8" x 1 1/16" diameter at grille\$18.40
Model CMS-10 mike stand: table design\$5.50
CMC-10A Low-Z microphone complete with table stand\$23.65
CMC-11A High-Z microphone complete with table stand\$23.65

Model CM-30 Microphone

Ceramic design for voice frequencies. Response 60-7000 Hz; sensitivity -49 dB ± 2 dB; 2 meg. load impedance. Has push-to-talk button, dashboard mounting bracket & spring spiraled 4-conductor cable.\$14.70

CM-30M with dashboard magnet mount.\$17.35

CM-3050 Low-Z version; response 170-7000 Hz; sensitivity -62 dB; impedance 33,000 ohms; usable to 10,000\$15.75
CM-305M With dashboard magnet mount \$18.40

CDM-80 Series Cardioid Microphones

Dual-imp 200 & 50,000 ohms; with "on-off" switch; response 80-12,000 Hz; front-to-back ratio 16 to 20 dB; sensitivity @ 1 kHz -83 dB (low-Z) & -59 dB (high-Z)\$43.50

DM70-100 Dynamic Microphone

Omnidirectional design; response 80-15,000 Hz; imp. 50,000 ohms; sensitivity -60 dB @ 1 kHz; supplied with 7' cable, 4 1/2" x 1 1/4"\$27.50
DM70-200 Same except 10,000 ohms imp. with sensitivity of -66 dB @ 1 kHz.....\$27.50

DM70-500 Same except 200 ohms imp; sensitivity -83 dB @ 1 kHz\$27.50

DM70-550 Same except with "on-off" sw\$29.50

DMC70-200 With table stand\$32.75

DMT70-200 Matched pair with table stands\$55.50

DMC70-500 With table stand\$32.50

DMT70-500 Matched pair with table stands\$55.50

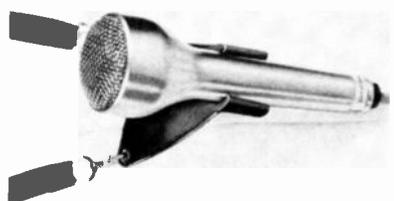
DMC70-550 With table stand; mic has "on-off" sw\$34.75

DMT70-550 Matched pair with table stands; mic has "on-off" sw\$59.50

DMT70-550 Matched pair with table stands; mic has "on-off" sw\$59.50

DM10-100 Dynamic Microphone

Omnidirectional design; response 80-16,000 Hz; imp 50,000 ohms; sensitivity -57



dB @ 1 kHz; supplied with 7' cable; 5" x 1 1/2"\$24.50

DM10-200 Same except 10,000 ohms imp; -63 dB @ 1 kHz sensitivity\$24.50

DM10-500 Same except 200 ohms imp; sensitivity -80 dB @ 1 kHz\$24.50

DMC10-200 With table stand\$29.75

DMT10-200 Matched pair with table stands\$49.50

DM10-550 Same except equipped with "on-off" sw\$25.50

DMT10-500 Matched pair with table stands\$49.50

Model CMT-10A or CMT-11A

Matched Twin Microphones

For stereo tape use; ceramic type; acoustically matched to 2 dB; Model CMT-10A has frequency response 50 to over 11,000 Hz; Model CMT-11A has frequency response 80-9000 Hz; Model CMT-10A output level -56 dB\$37.30 pair

CM-1050WR Microphone

Wide-range, low-impedance microphone, for voice and music applications; response 50-10,000 Hz; sensitivity -58 dB; impedance 250k although usable down to 33k\$19.45

CMC-1050WR With table stand\$24.70

CMT-105WR Matched pair with table stands\$39.30

CM-1050SR Microphone

Speech range, low-impedance microphone, designed for speech applications; response 170-9500 Hz; sensitivity -62 dB; impedance 33k although usable down to 10k\$19.45

CMT-1050WR Matched Twin Microphones

Matched twins—low-impedance ceramic microphones designed for music and speech taping in stereo; acoustically matched to ± 2 dB; response 50-10,000 Hz; sensitivity -56 dB; impedance 250k (usable to 33k)\$39.30

CMC-1050WR Microphone

Wide-range, low-impedance ceramic microphone with matching stand; response 50-10,000 Hz; sensitivity -58 dB; impedance 250k (usable to 33k).....\$24.70

Dynamic Ball Microphones

Ball-type units with built-in windscreen; housed in slim metal case; equipped with lavalier & neck strap.

DM70-100-B Omnidirectional; 50,000 ohms; 50-15,000 Hz; -60 dB ..List \$39.00

DM70-200-B Omnidirectional; 10,000 ohms; 50-15,000 Hz; -66 dB ..List \$39.00

DM70-500-B Omnidirectional; 200 ohms; 50-15,000 Hz; -83 dBList \$39.00

DM70-550-B Same as DM70-500-B except with swList \$42.50

"Studio 70" Dynamic Microphone

Professional lavalier & multi-purpose unit in slim metal case with 18-foot cord & cord clip; 200 ohms; 50-15,000 Hz ± 1/2 dB; -83 dB; omnidirectional; CMS-10 desk stand including AD-10 floor-stand adapterList \$79.00

SONY/SUPERSCOPE

F-96 Dynamic Microphone



Wide-range; available as either low or high impedance; features thin tapered design\$ 17.50

F-121 Cardioid Microphone

Dynamic design supplied with 20' cable, desk stand, clip-on stand holder & carrying case. Impedance 50, 150 or 10k ohms. Response 70-12,000 Hz. Output EIA Standard -151.8 dB; 7" long, 1 1/16" dia. max. (1" min.) Has "on-off" sw.List \$99.50

TURNER

Model 141-11 Microphone

Lightweight crystal model; ideal for tape recorder use; chrome finish; for use in hand, on stand, or as lavalier mic; response 60-10,000 Hz; output level -52 dB; 6' single-conductor cable; molded phone plug and phone plug adapter; accessories extra\$12.00
L14CH Lavalier assembly.....\$ 3.60
L41-CH Desk stand.....\$ 3.30

Model 304C Ceramic Microphone

Supplied complete with desk stand, stand adapter, lavalier clip, 12' single-shielded



conductor; response 60-10,000 Hz; output level -60 dB\$9.90

Model 607 Microphone

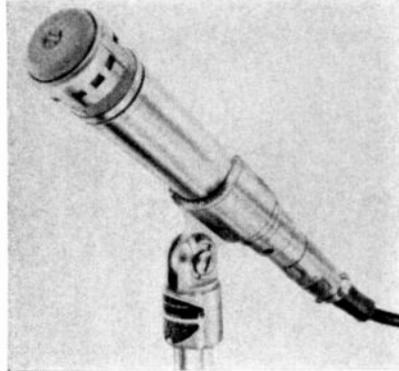
Response 60-8500 Hz; output level -55 dB; high impedance\$5.40

Model 707 Microphone

Small tape recorder microphone in satin-chrome finish, die-cast case with 6' cable; for use as hand or desk unit; response 60-10,000 Hz; output -54 dB\$7.50

Model 500 Dynamic Microphone

Cardioid design; response 40-15,000 Hz; output -55 dB; high or 150 ohm imped-



ance selected at cable end; 20' cable\$50.40
Model S-500 with switch\$53.50
Model C-7 stand\$ 5.70

Model 58 & 58A Lavalier Microphone

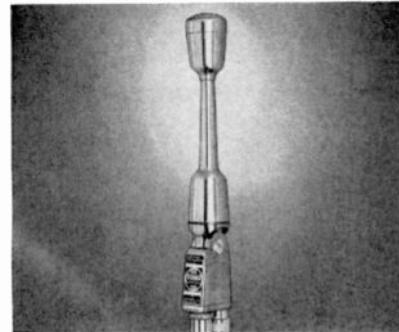
Dynamic type with essentially non-directional pickup pattern; designed for use where freedom of movement is required; weighs 3 1/2 oz., 4" long.

Model 58 High or 150 ohms, selected at end of cable; output level -60 dB with high impedance; response 60-13,000 Hz for high impedance & 60-18,000 Hz for low impedance; 3-conductor, 25' shielded cable\$34.20

Model 58A 50 or 200 ohm impedance selected at end of cable; response 60-18,000 Hz; 3-conductor, 25' shielded cable\$34.20

Model 95D Microphone

Dynamic p.a. microphone; available with "on-off" switch; complete with 20-foot



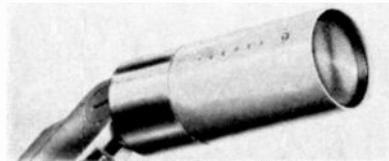
cable; response 100-10,000 Hz; output -58 dB; choice of 50, 200 or high ohms\$25.50

Model 500-04 Microphone

Matched cardioid dynamic microphone set for stereo or mono recording. Available in satin chrome finish or Roman gold, with phone plugs; response 40-15,000 Hz. Choice of Hi or 150 ohms impedance. Output level -55 dB; Has special wind screens for out-of-doors recording. Per set\$100.80

Model 44D Dynamic Microphone

Hi-output design with omnidirectional pickup pattern. Response 85-15,000 Hz adjustable to 60-15,000 Hz; output -56.5 dB. Complete with 12' cable & "on-off" sw. Hi or 150-ohm impedance available..\$27.00



Model 44X Same as 44D except crystal element. Response 60-10,000 Hz; output -53 dB\$27.00

600 Cardioid Dynamic Mic

Response 50-15,000 Hz; output level -55 dB high-impedance. Supplied with 12' cable. 1 1/4" x 6". Front-to-back discrimination 20 to 25 dB over entire frequency range\$35.70

Model 602 Low imp\$35.70
Model 603 Matched pair with desk stands & phone plugs\$79.80

700 Cardioid Dynamic Microphone

"Pop-Top" ball design; response 40-15,000 Hz. Has 20' cable, "on-off" sw. & stand adapter. Output: low impedance (150 ohms) -56 dB & high-impedance -55 dB\$55.20

Model 701 High impedance only\$37.20

UNIVERSITY

Model 2000 Omnidirectional Microphone

Variable impedance, dynamic design. Response 50-14,000 Hz; 50 or 20,000 ohms; sensitivity -143 dB; output level 50 ohms: 50 dB/1mW/10 dynes/cm.²; 20,000 ohms 28 mV/10 dynes/cm.²; hum reference -120 dB/0.01 gauss; 1 7/8" dia. For home recording. With stand adapter\$26.85

Model 8000 Cardioid Microphone

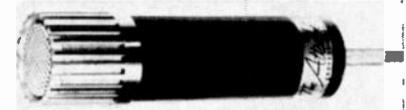
Variable impedance, dynamic design. Shock mounted for home recording. Response



70-15,000 Hz; 250-20,000 ohms; sensitivity -154 dB; output level 250 ohms: 60/10 mW/10 microbar, 20,000 ohms 8.5 mW/10 microbar; 1 3/32" dia.; with stand adapter\$34.95
Model 8100 With switch & adapter ..\$37.95

Attaché Cardioid Lavalier Mic

Dynamic design; response 50-15,000 Hz; 150 ohms impedance; sensitivity: -151 dB;



output level: -57 dB/1 mV/10 microbar. Supplied with neck cord\$39.75

5000 Series Super-Cardioid Mic

Highly directional, dynamic type. Response 25-20,000 Hz; variable impedance 250 &



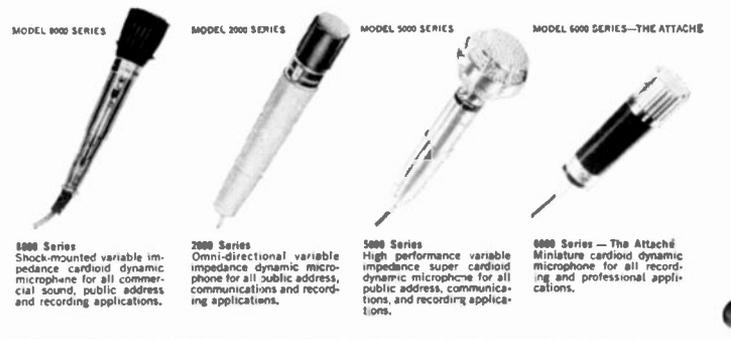
20,000 ohms (wired at plug); sensitivity -147 dB (EIA); output @ 200 ohms -54 dB/1 mW/10μbar; at 20,000 ohms 13 mV/10 μbar. 2 3/16" dia. x 9 3/8" long.

Model 5000 has wired-in cable & stand adapter\$51.60
Model 5020 has stand adapter & detachable cable\$56.95
Model 5050 has "on-off" switch, swivel stand adapter, and detachable cable \$59.95

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2000 Series Omni-directional variable impedance dynamic microphone for all public address, communications and recording applications.
5000 Series High performance variable impedance super cardioid dynamic microphone for all public address, communications, and recording applications.
6000 Series — The Attaché Miniature cardioid dynamic microphone for all recording and professional applications.



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TELEX SERENATA

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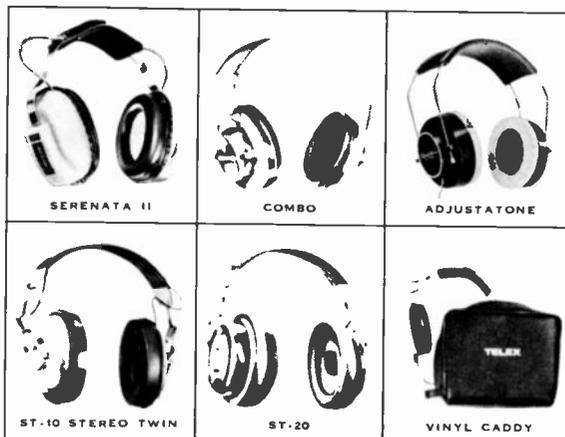
LEATHER-GRAINED PADDED VINYL CARRYING CADDY Universal size; fits all headphones . . . under \$5.00

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ADJUSTATONE High quality stereo headphones that deliver the same rich, deep bass as the new Combo, same adjustable tone control, similar high-fashion styling at an economy price. Big 3½" speakers, soft foam cushions, rugged plastic case . . . under \$16.00

ST-10 STEREO TWIN Capable of reproduction so precise, it's standard equipment on many of the finest stereo facilities in the world. Has dynamic driver element, lightweight vinyl ear cushions, deep cavity speakers, comfort-design headband . . . under \$25.00



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HEADPHONES DIRECTORY

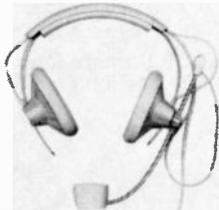
ASTATIC

2501 Ceramic Headphones

Freq. range 30-10,000 Hz; sensitivity 100 dB (sound pressure level) for 6.5 V input; impedance 20,000 ohms @ 1000 Hz; capacitance 3800 pF \pm 600 (each phone); HD less than .5% @ 1 kHz & 20.4 V input; 8.5 oz.\$27.75
 Model 2503 with ceramic boom microphone\$37.75

2601 Crystal Headphone

Freq. range 30-8500 Hz; sensitivity 100 dB (sound pressure level) for 4.5 V input; im-

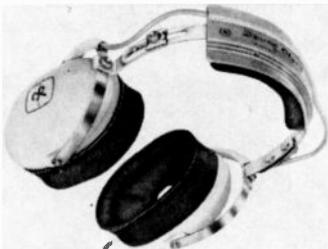


pedance 100,000 ohms @ 1000 Hz; capacitance 750 pF \pm 150 (each phone); HD less than .35% @ 1 kHz & 14.2 V input; 8.5 oz.\$22.75
 Model 2603 with ceramic boom microphone\$35.25
 Ceramic boom microphone for models 2501 & 2601; frequency range 30-8500 Hz; output 58 dB below 1 V/dyne/cm.²; 200,000 ohm impedance @ 1000 Hz; capacitance 750 pF \pm 150; recommended load 1 meg-ohm min.; wt. 2 oz. less cable\$14.00
 Headphones & microphone supplied with 6' cables and are available in stereo or mono and in green, grey, or beige.

CLARK

Model 100 Stereo Headset

Moving-coil (dynamic) design with plastic diaphragms; response 20-10,000 Hz \pm 3



dB; distortion less than 2% @ 100 phn level; sensitivity 1 mW @ 1000 Hz produces 100 dB (reference .0002 microbar); max. input 1 W/phone; 8 ohms; has 20 dB av. cushion attenuation to white noise; stereo or mono; supplied with 8' cable and 2-circuit plug\$39.50
 Model 103 same except 300 ohms.....\$39.50
 Model 112 same except 1200 ohms.....\$44.50

Model 200 Stereo Headset

Permanent magnet design; response 20-17,000 Hz. Sensitivity 1 mW input @



1000 Hz produces 105 dB per earpiece (reference .0002 μ bar). Max. input 1 W/phone; 8 ohms. Has 2-circuit stereo plug\$26.95

Model 250 Stereo Headset

With volume control, otherwise same as Model 200\$29.95

Model 1000 Stereo Headset

14 karat gold-plated hardware; earpiece dome simulated walnut grain\$84.95

FISHER

HP-50 Stereo Headphones

Response 30-17,000 Hz; power input for average level 15 mW; max. power 1 W;



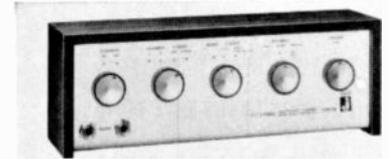
12 ohms; 6½' cable with stereo plug. Features full foam-cushioned cups of high-impact plastic. Has vinyl-covered spring-steel headband.....\$29.95

Price quoted is "List Price".

JENSEN

CC-1 Headphone Control Center

4-8 ohm electrodynamic phones; operates with any 10-watt/channel amplifier; stereo



design; new "Space-Perspective" design provides complete controls for personal listening; controls—speaker "on-off," left- or right-channel only or stereo with channel reversal; mono or stereo with choice of "Space-Perspective" or regular; balance; volume; 4¼" h. x 11¼" w. x 3" d.\$69.00

HS-2 Stereo Headphones

For stereo or mono listening; response 20-17,000 Hz, 4 ohms, 1 mW input required



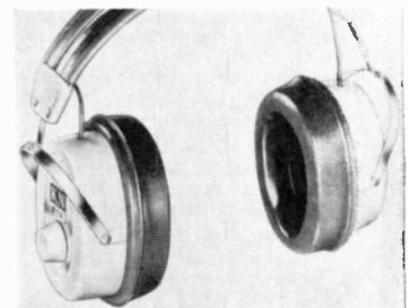
for adequate listening, 8-foot input cable and 3-conductor phone plug. Accessory jack panel is M-1648.

HS-2 Stereo headphone\$24.95
 M-1648 Jack panel\$ 4.95

KNIGHT

KN-876 Stereo Headphones

Response 16-16,000 Hz; dynamic transducer; 3-16 ohms; 8' cord plus individual vol-



ume control for each phone\$19.95

KN-878 Stereo Headphones

Has two 3½" transducers; response 30-15,000 Hz; 3-16 ohms impedance; with 8' cord; 10 oz.; charcoal grey plastic. 20AX9579\$11.95

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KN-879 Remote Control

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speakers "on" or "off". 2 3/4" x 2" x 4".
Less cable. 97U577M\$7.95
47U508 25 ft. 5-concl. cable\$1.31

KN-885 Stereo Headphones

Response 15-20,000 Hz; features separate volume & tone controls; moving coil dy-

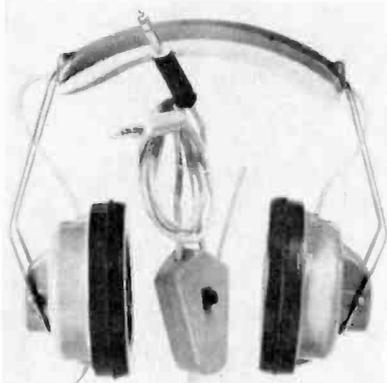


amic design; 8 ohms. Has 8' cord & 1/4" plug.
20B9580\$34.50

KOSS

SP-5NS Dual Mode "Stereophones"

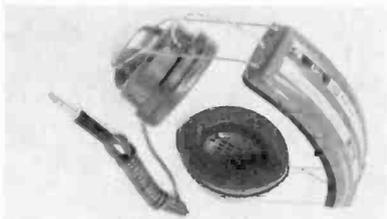
Switched lavalier with two plugs provides a stereo plug for monitoring or two mon-



aural plugs for playback use with recorders having two external speaker jacks\$24.95

Model SP-3XC "Stereophones"

Extremely sensitive 3 1/2" sound reproducers mounted in each earpiece; response



10-15,000 Hz; impedance 4-16 ohms; comes complete with adapter plate that connects to any system that will drive speakers\$24.95

Model SP-100 Same as Model SP-3 except for impedance of 100 ohms; for special and multiple installations\$24.95

Model SP-5SM "Stereophones"

Stereo and monaural phones in one; switch in lavalier changes operation from stereo to monaural or vice versa\$24.95

KO-727 "Stereophones"

Wide-range 10-15,000 Hz design; 4-ohm imp but can be used for 4, 8, or 16 ohms.



Sensitivity 1 V applied to driver will develop 127 dB of sound pressure relative to 0.0002 dyne/cm². Max. input 60 W/ch music power. Dist. 1% at max. output. Supplied with 10' 4-concl. cable\$34.95

Model T-1 Junction Box

Contains matching transformers for monitoring; 600-10,000 ohm outputs; two output jacks for Stereophones\$7.95

Model T-5 Remote-Control Listening Station

Junction box for connecting Stereophones to existing stereo or mono system; impedance



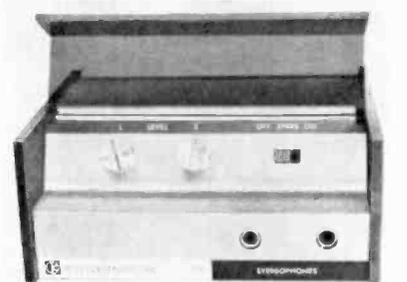
4-16 ohms; has jacks for two sets of Stereophones; one volume control for each ear; on-off speaker switch for personalized listening\$8.95

Model Pro-4A Headset

Response 30-20,000 Hz; max. input 10 watts/channel (60 W/channel music power); distortion less than 1% at maximum output; 4 ohms (600 ohms available); 10-foot coiled cord; rugged, shock-proof and fluid-filled ear cushions\$50.00

t-10 Listening Station

Wires to amplifier; will accept two sets of stereo phones with separate volume con-



trols. Has speaker "on-off" sw. Walnut cabinet. 4-16 ohms\$19.95

Model A-1220 Amplifier

For use with SP-3XC Stereophones; can be

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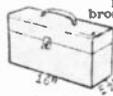
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1200' MYLAR, 1 1/2 mil (strong)	.98
1200' MYLAR 1/2 mil, tensitized, 5"	1.59
1800' Triple Play MYLAR, 5" Reel	1.98
1800' acetate (plastic) 7 inch	1.17
1800' MYLAR, 1 mil thick, 7 inch	1.39
2400' MYLAR, untensitized, 7 inch	1.99
2400' MYLAR, tensitized, 7 inch	2.59
3600' MYLAR, tensitized, 7 inch	3.49
Revere 10-2 Blank Cartridge Tapes	2.85
C-80 Cassettes 1 hr. (30 min. per side)	1.55
C-90 Cassettes, 1 1/2 hr. (45 min. per side)	2.20
C-120 Cassettes, 2 hr. (1 hr. per side)	2.95

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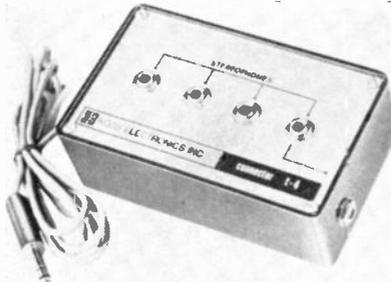
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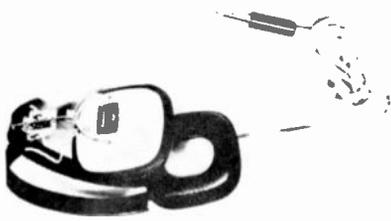
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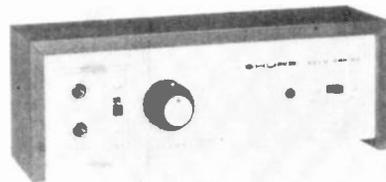
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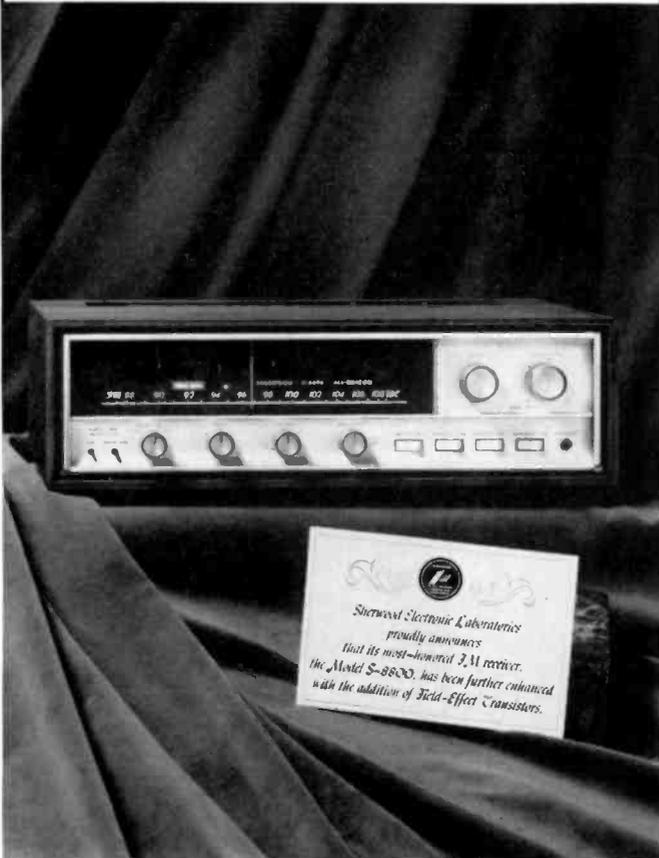
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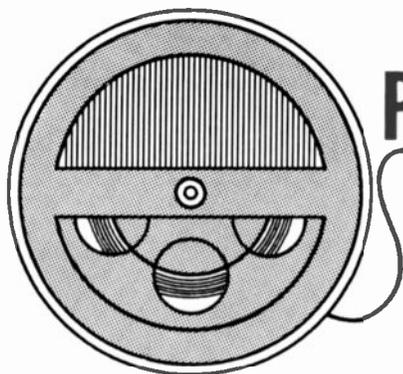
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RELEASED DURING RECENT MONTHS

William Flanagan • Joe Goldberg • David Hall • Nat Hentoff
Igor Kipnis • Rex Reed • Peter Reilly • Eric Salzman

Ⓢ = stereophonic recording

Ⓢ BACH: *Sinfonia in F Major (BWV 1071)*; *Sinfonia in D Major, for Violin and Orchestra (BWV 1045)*; *Concerto No. 6, for Harpsichord, Recorders, and Strings (BWV 1057)*. HANDEL: *Harp Concerto, in B-flat, Op. 4, No. 6*. George Malcolm (harpsichord); Mario Korchinska (harp); London Baroque Ensemble, Karl Haas cond. VANGUARD VEE 1919 \$4.95.

Performance: Spirited
Recording: Good
Stereo Quality: Good
Speed and Plying Time: 3¾ ips; 44'32"

At \$4.95 this package is a fine buy for tape buffs who fancy Baroque repertoire. Though there are other four-track tape performances of the music of the Bach F Major Sinfonia and the concerto, as well as of the Handel concerto, none of these pieces has ever been issued on tape in precisely the form it is heard here, for the Bach works are transcriptions by Bach himself of the first and fourth Brandenburg Concertos, and the Handel opus is a version of his Organ Concerto, Op. 4, No. 6. The lively D Major Sinfonia of Bach, evidently the introduction to a lost church cantata, is, however, a genuine first release on tape.

The music here is not only delightful itself, but it offers an opportunity for fascinating insights into Bach and Handel as transcribers of their own works. As has always been the case with the London Baroque Ensemble recordings under Karl Haas, the performances are authentic in style, vivacious in rhythmic pulse, and transparent in texture. They are beautifully captured sonically—despite the 3¾-ips speed. D. H.

Ⓢ BARTÓK: *Bluebeard's Castle*. Christa Ludwig (mezzo-soprano), Judith; Walter Berry (baritone), Bluebeard. London Symphony Orchestra. István Kertész cond. LONDON 90119 \$8.95.

Performance: Completely absorbing
Recording: Excellent
Stereo Quality: First-rate
Speed and Plying Time: 7½ ips; 59' 27"

This performance of Bartók's moody one-act opera is quite extraordinary. In the first place it sounds marvelously idiomatic (it is sung in Hungarian). Second, the solo contributions are so sensitively conceived that the listener cannot help being totally absorbed in the drama. Last, the orchestral playing and conducting are on the most superior level, with recording that does full justice

to the score. The tape processing is extremely good, and, commendably, a libretto is included with the box. Highly recommended. I. K.

Ⓢ BEETHOVEN: *Missa Solemnis, in D Major, Op. 125*. Gundula Janowitz (soprano); Christa Ludwig (mezzo-soprano); Fritz Wunderlich (tenor); Walter Berry (bass); Vienna Singverein Choir; Berlin Philharmonic Orchestra, Herbert von Karajan cond. DEUTSCHE GRAMMOPHON DGG 9209 \$11.95.

Performance: Intensely lyrical
Recording: Good
Stereo Quality: Excellent
Speed and Plying Time: 7½ ips; 86'

This is the third recording of Beethoven's *Missa Solemnis* to be made available on four-track tape. I have heard neither the disc nor the tape of the performance conducted by Klemperer, but the fact that that tape is recorded at 3¾ ips would most likely put it out of the running from a sonic standpoint. The other 7½-ips reading is Leonard Bernstein's (Columbia M2Q 529). That Bernstein's performance is nearly ten minutes shorter than Karajan's here is a hint at the basic difference in character between the two interpretive approaches. Karajan does not storm the heavens, but rather seeks to expose the lyrical essence of Beethoven's noble and poignant score. This is especially evident in the *Qui tollis* of the *Gloria* and in the *Et incarnatus*.

The solo vocalists are unusually well matched, and meet, with no audible effort, the exacting demands of phrasing and *tessitura* imposed by Beethoven. The Vienna Singverein is altogether superb, and the Berlin Philharmonic—particularly solo violinist Michel Schwalbé in the *Benedictus*—is in top form. The DGG recording is eminently satisfactory on the whole, if rather unusually spread out in depth and breadth.

As I have noted with respect to some of Karajan's other recorded performances, the Austrian maestro seems at his best in large-scale choral and operatic works such as this, which emerge without the annoying over-refinements of phrasing that have marred some of his purely orchestral recordings. If Leonard Bernstein's treatment of the *Missa Solemnis* is too high-voltage for your taste, this tape by Karajan represents a fine alternative with first-rate sonics. D. H.

Ⓢ BEETHOVEN: *Quartets, Op. 59, Nos. 1, 2, and 3 ("Rasoumovsky")*; *Quartet No.*

10, in E-flat major, Op. 74 ("Harp"). Juilliard String Quartet. EPIC E3C 849 \$11.95.

Performance: Excellent
Recording: Clear and of good quality
Stereo Quality: Not marked
Speed and Plying Time: 3¾ ips; 130' 26"

Two hours and ten minutes of Beethoven here, and the tape quality is good. These are, above all, admirable performances. I do not agree with those who criticize the Juilliard players for over-precision or lack of feeling. These are not, of course, ultra-Romantic readings; but then this is not ultra-Romantic music. It is Classical art in the best and most precise meaning of that misused term. I find the Juilliard players anything but mechanical and insensitive; certainly they are never merely metronomic and never fall into the "modern" fallacy of playing only from phrase to phrase. Indeed, they are aware of, and project, some of the bigger formal ideas of this music better in many respects than the "traditional" chamber musicians—represented by, say, the Budapest players. Yet the Juilliard Quartet maintains a kind of buoyancy and ensemble articulation that is quite right for this still relatively extrovert middle-period Beethoven. There is one problem, generic to big albums and large collections: the loss or lack of certain desirable repeats.

These recordings nicely survive the transfer to 3¾ tape: the quality of the sound itself is close and clear but not dry, like that of a comfortable room, and is at a high level. The stereo effect is not particularly directional, but the voicing is certainly always clear. Since the original disc set had three records, this tape comes out according to my calculations a bit cheaper. In any case, it's a good buy. E. S.

Ⓢ BRAHMS: *Symphony No. 3, in F Major, Op. 90*; *Symphony No. 4, in E Minor, Op. 98*; *Variations on a Theme of Haydn, Op. 56a*. Berlin Philharmonic Orchestra, Herbert von Karajan cond. DEUTSCHE GRAMMOPHON DGG 8927 \$11.95.

Performance: Among the finest
Recording: Excellent
Stereo Quality: Fine
Speed and Plying Time: 7½ ips; 93' 13"

These performances, like those of the First and Second Symphonies released last year (DGG 8925), are typical of Herbert von Karajan's work with his superb orchestra. Control and polish are never missing, but

the warmth, power, and expressive lyricism of Brahms' scores are always to the fore. This is a particularly exalted-sounding Third, a work that more often than not defies success in recording. The bonus of the Haydn Variations (other double-play reels contain only the two symphonies) will be welcome to all who do not own Karajan's disc set of the *German Requiem*, on which it was also included. The tape processing, except for some slight pre-echo at the start of the Third, is thoroughly satisfactory; in comparison with the disc version, the tape lacks spaciousness and a degree of brilliance, but without reference to the discs, it is one of the better examples of tape reproduction I have heard in recent months. I. K.

⑤ **DONIZETTI: *Lucrezia Borgia***. Montserrat Caballé (soprano), Lucrezia; Ezio Flagello (bass), Alfronso; Alfredo Kraus (tenor), Gennaro; Shirley Verrett (mezzo-soprano), Orsini; Giuseppe Baratti (tenor), Rustighello; Robert El Hage (bass), Astolfo; other soloists; RCA Italiana Opera Orchestra and Chorus, Jonel Perlea cond, RCA VICTOR TR38001 \$17.95.

Performance: **Compelling**
Recording: **Very good**
Stereo Quality: **Not spectacular**
Speed and Playing Time: **3¾ ips; 134'42"**

As an operatic production, this album must be counted a success, not least because of the efforts of Montserrat Caballé in the title role. All the other principals are in good voice as well, and the performance has a lot of dramatic and vocal eloquence.

Caballé, of course, is the mainstay, and although her portrayal of the morally ambivalent Lucrezia is temperamentally rather placid, it is impossible not to be affected by the lovely sounds she emits. The final *cabaletta*, after the death of Lucrezia's son, also affords this outstanding singer some opportunities for vocal display, and she acquires herself quite stunningly.

Finally, it must be noted that Jonel Perlea holds his forces together very well and effectively conveys both the gracefulness and the dramatic vigor of the score. Regarding the recording, this is one of the first to be issued by RCA Victor in 3¾ ips, and the results are surprisingly good. Disc and tape versions are more closely matched than with many tapes of this speed, the only obvious exception being a slightly thicker, less open sound in the massed ensembles and some slight loss of highs (i.e., cymbals are clearer and have more presence on the disc set). Stereo is only moderately well used for suggestion of movement or depth. The disc-version libretto can be obtained at no charge by sending the usual postcard. I. K.

⑤ **GOUNOD: *St. Cecilia Mass***, Irmgard Seefried (soprano); Gerhard Stolze (tenor); Hermann Uhde (bass); Czech Choir and Czech Philharmonic, Prague, Igor Markevitch cond. DEUTSCHE GRAMMOPHON DGC 9111 \$7.95.

Performance: **Worthy**
Recording: **Excellent**
Stereo Quality: **Fine**
Speed and Playing Time: **7½ ips; 50'36"**

Gounod's fairly lengthy mass is a mixture of somewhat dated bombast and some perfectly lovely reflective portions, most of which seem to occur in the work's second

half. The performance in this first taping (three versions are presently available on discs) is excellent overall, although, of the soloists, only Gerhard Stolze is completely satisfying. Most outstanding is the quality of the choral and orchestral work, and Markevitch has an impressive command over these forces. The slightly distant microphoning captures the atmosphere of a church performance most effectively. I. K.

⑤ **IVES: *Symphony No. 2 (1897-1902); The Fourth of July (1913)***, New York Philharmonic, Leonard Bernstein cond.; Seymour Lipkin, asst. cond. (Also included is a discussion of Charles Ives by Leonard Bernstein.) COLUMBIA MQ 857 \$7.95.

Performance: **Handsome**
Recording: **A-1**
Stereo Quality: **Wonderfully effective**
Speed and Playing Time: **7½ ips; 55'17"**

With this release, all four symphonies of Charles Ives, the prophet-patriarch of Ameri-



MONTSERRAT CABALLÉ
Vocally stunning as Lucrezia Borgia

can music, are available on four-track tape. The sprawling yet curiously moving Second Symphony gets a broadly expansive performance: Leonard Bernstein clearly revels in the rich organ-like sonorities written into the slow sections, and indeed, the lyrical emphasis here makes the "barbaric yawp" of the last movement that much more of a shocker. Some of the popular and patriotic musical materials heard in the Second Symphony also turn up in *The Fourth of July*, the rhythmic complexities of which demand the services of a second conductor (Seymour Lipkin here) for most effective results.

The subtle inner-voice lines of the Second Symphony and the dense texture and conflicting rhythms of *The Fourth of July* are brilliantly set forth by Bernstein and Columbia's recording engineers. The results, to my ears, are clearer on tape than on the corresponding disc. Bernstein's talk on Ives is a welcome and illuminating bonus, and will increase the value of this tape for those who have yet to sample the Ivesian tonal fabric in all its vitality, complexity, and richness of substance. D. H.

⑤ **MAHLER: *Songs from "Des Knaben Wunderhorn"***, Janet Baker (mezzo-so-

prano); Geraint Evans (baritone); London Philharmonic Orchestra, Wyn Morris cond, ANGEL ZS 36380 \$7.98.

Performance: **Excellent**
Recording: **Moments of constriction**
Stereo Quality: **Fine**
Speed and Playing Time: **7½ ips; 47'09"**

Included here are all the songs of Mahler's "Youth's Magic Horn" anthology of 1888 except for two, *Urlicht* and *Es sungen drei Engel*, which he was to use, respectively, in his second and third symphonies; included as well are the late additions to the set, *Revelge* and *Der Tambourgeißel*. They are marvelously performed, all their *Weltschmerz*, irony, and sweetness beautifully imparted by the two soloists and the conductor. As the only tape version of this music, it can be highly recommended, although sonically there are moments of constriction in the loudest passages; the disc reproduction, too, though not entirely free of distortion, features a fuller bass response and more open-sounding highs than the tape. In quieter passages, however, the tape is a good match for the disc, and the orchestral clarity and the brilliance of the playing are most pleasurable. The leaflet of texts and translations that accompanies the disc must, as usual with Angel, be sent away for. I. K.

⑤ **MAHLER: *Symphony No. 8, in E-flat***, Erna Sporenberg, Gwyneth Jones, Gwyneth Annear (sopranos); Anna Reynolds, Norma Procter (altos); John Mitchinson (tenor); Vladimir Ruzdjak (baritone); Donald McIntyre (bass); Leeds Festival Chorus; London Symphony Orchestra Chorus; Orpington Junior Singers; Highgate School Boys' Choir; Finchley Children's Music Group; Hans Vollenweider (organ); London Symphony Orchestra, Leonard Bernstein cond. COLUMBIA M2Q 876 \$11.95.

Performance: **Bernstein in excelsis**
Recording: **The best so far**
Stereo Quality: **Reasonably effective**
Speed and Playing Time: **7½ ips; 79'05"**

This "Symphony of a Thousand" is nothing to attempt to play back on compact equipment. No less than the best will do full justice to this tape, for otherwise the balances in this huge sonic fresco, built around the ancient *Veni Creator Spiritus* hymn-text and the final scene of Goethe's *Faust*, Part II, simply fail to take effect. But when this tape is heard at maximum room level on the finest playback equipment, there can be no doubt that Leonard Bernstein and his soloists, multiple choruses, organ, and augmented orchestra have gotten everything that can be gotten out of this fabulous, overloaded score. The sheer kinetic impact is overwhelming.

For those who seek solid musical substance, let me say that while I find the evocative "landscape" episodes of the *Faust* movement wonderfully poetic, I would gladly sacrifice the whole of the Mahler Eighth for the refined and poignantly tragic intensity of *Das Lied von der Erde*, composed two years later in 1908. In the Eighth, huge sonorities are piled up in the first movement, but it all gets to be rather much of a muchness, despite some enormously impressive moments—as in the recapitulation of the initial *Veni Creator* theme about two-thirds of the way through. The soloists and choirs do themselves

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proud, most notably Gwendyth Annear in her brief *Mater Gloriosa* episode in the finale, Donald McIntyre as Pater Profundus, and John Mitchinson in the demanding Doctor Marianus role. I am not sure that the musical substance of the Mahler Eighth is worth all the effort demanded, but Leonard Bernstein has set forth a strong case. I repeat that the recorded sound "works" only under the best playback conditions possible. D. H.

⑤ MOZART: *Così fan tutte*. Irmgard Seefried (soprano), Fiordiligi; Nan Merriman (mezzo-soprano), Dorabella; Hermann Prey (baritone), Guglielmo; Ernst Haefliger (tenor), Ferrando; Erika Köth (soprano), Despina; Dietrich Fischer-Dieskau (baritone), Don Alfonso; RIAS Chamber Chorus; Friedrich Wilhelm Schulz (harpsichord); Berlin Philharmonic Orchestra, Eugen Jochum cond. DEUTSCHE GRAMMOPHON DGR 8863 two reels \$21.95.

Performance: Superior
 Recording: Excellent
 Stereo Quality: First-rate
 Speed and Playing Time: 7½ ips; 181' 59"

From the standpoint of cost, this *Così*, released in disc form about three years ago, is some ten dollars cheaper than its only other tape competitor, the recent Böhm version on Angel. It is an extremely satisfying performance, with a cast as strong as (if not stronger than) any other available on either tape or disc. Mozart style is well taken care of here; the direction is sensitive and well paced, and it sparkles in the proper places. There are no weak singers, and the orchestral work is beautifully balanced both with the voices and within its own ensemble. Except for a slightly brighter sound in the disc version, the tape is a good match for the records, with extremely clean reproduction throughout and ideal stereo separation. It is, in fact, one of the finest-sounding reel recordings I have had the pleasure of hearing in some time. A libretto with translation is included. I. K.

⑤ MOZART: *Horn Concertos: No. 1, in D Major (K. 412); No. 2, in E-flat (K. 417); No. 3, in E-flat (K. 447); No. 4, in E-flat (K. 495)*. Mason Jones (horn); Philadelphia Orchestra, Eugene Ormandy cond. COLUMBIA MQ 796 \$7.95.

Performance: A-1
 Recording: Good
 Stereo Quality: Good
 Speed and Playing Time: 7½ ips; 52'41"

Mozart's friend Ignaz Joseph Leutgeb may have felt put upon by some of the difficulties Mozart posed in these concertos written for him—especially in that he had no modern valved instrument to ease matters—but musicians and listeners of subsequent generations have been wholly delighted, and justifiably so. These works rank among the most ingratiatingly lovely items of lighter Mozartiana. Despite the generally prevailing key of E-flat (dictated by the nature of the instrument), the horn concertos are not lacking in variety. Pert humor is dominant in the initial D Major piece, and the special lyrical touch of the mature Mozart comes to the fore in the last.

Mason Jones, first-chair horn of the Philadelphia Orchestra, courses through this music (including cadenzas of his own compo-

sition) with the utmost ease and velvet tone—even when using the old-style valveless *Waldhorn* for the finale of the D Major Concerto; and Ormandy provides an accompaniment of cat-like lightness and agility. First-rate sound all the way! D. H.

⑤ MOZART: *Piano Quartets: No. 1, in G Minor (K. 478); No. 2, in E-flat (K. 493)*. Peter Serkin (piano); Alexander Schneider (violin); Michael Tree (viola); David Soyer (cello). VANGUARD VTC 1714 \$7.95.

Performance: Dromatic
Recording: Bright
Stereo Quality: Good
Speed and Playing Time: 7½ ips; 53' 47"

The key of G Minor for Mozart, like that of C Minor for Beethoven, set the musical stage for terse and tense drama, and it is in the highly dramatic pages of the G Minor Piano Quartet that Peter Serkin, Alexander Schneider, and their colleagues do themselves and Mozart proud. The more gentle and elegant E-flat sounds a bit hard tonally in the keyboard department, with the decidedly bright and rather reverberant recorded sound contributing to this general impression. Nevertheless, this tape marks a major addition to the four-track catalog of chamber music, both as performance in its own right and as a first tape version of two supreme masterpieces of the repertoire. D. H.

⑤ MOZART: *Quintet in C Major (K. 515); Quintet in G Minor (K. 516); Quintet in D Major (K. 593); Quintet in E-flat (K. 614)*. Griller String Quartet; William Primrose (viola). VANGUARD EVERYMAN VEA 1917 \$8.95.

Performance: Expositive
Recording: Good
Stereo Quality: Good
Speed and Playing Time: 3¾ ips; 109' 17"

In general, these performances of four of the Mozart quintets are as far above even an uncommon excellence of musicianship as you are likely to encounter. The approach is broad, expansive, lyrical—even somewhat romantic. The romantic aspect is not so much in deviation from tempo or phrasal mold, but rather in the very sumptuousness of the string sonority itself. But particularly in masterpieces like these, the day of thinking of Mozart as only a sunny classicist-genius is happily past.

I have a couple of things to carp about, even in these superior performances. In all but the G Minor, there is a similitude of dynamics that is not only a little palling in itself, but also minimizes the differentiation in contrasting thematic and motivic elements. Furthermore—and this is only a suspicion—I get the feeling that Primrose (who most certainly cannot be accused of a moment's up-staging) has not so much adapted his style and string sound to the Griller ensemble as he has allowed the quartet to make its adjustments to him.

Be that as it may, the performances are high-level. Vanguard's recorded sound is good, if just a shade "covered," and the stereo treatment is subtle and refined. W. F.

⑤ PURCELL: *Music for the Theatre. The Fairy Queen, The Indian Queen, and King Arthur (instrumental and vocal excerpts); Bonduca: Overture and Air; The Old Bach-*

clor: Bourrée; Abdelazer: Rondeau; Pausanias: Sweeter Than Roses; The Married Beau: Jig; Distressed Innocence: Air; Amphitryon: Sarabande; The Double Dealer: Air. Joan Carlyle (soprano); Bath Festival Orchestra. Yehudi Menuhin cond. *A Purcell Anthology. Four-Part Fantasias: No. 4, in G Minor; No. 7, in C Minor; No. 8, in D Minor; No. 11, in G Major; Five-Part Fantasia, in F Major (upon one note); Pavan in G Minor; Trio Sonatas: Set I—No. 6, in C Major; No. 8, in G Major; Set II—No. 6, in G Minor.* Yehudi Menuhin, Alberto Lysy, Robert Masters (violins); Cecil Aronowitz, Walter Gerhard (violins); Derek Simpson (cello); Ambrose Gauntlett (viola da gamba); Roy Jesson (chamber organ, harpsichord); Yehudi Menuhin, director. ANGEL Y2S 3685 \$11.98.

Performance: Zestful and meticulous
Recording: Good
Stereo Quality: Good
Speed and Playing Time: 3¾ ips; 103' 13"

JAMES COYNE



JOAN SUTHERLAND AND MARILYN HORNE: As *Semiramide* and *Arsace* in Rossini's opera

Except for London's *Dido and Aeneas* and Music Guild's *The Indian Queen*, this jam-packed Angel tape contains all the significant Purcell repertoire extant in four-track tape format. It comprises no less than thirty-three theater-music bits and pieces, including such famous items as "I attempt from love's sickness to fly" from *The Indian Queen* and the *Abdelazer* Rondeau that served Benjamin Britten as the basis for his *Young Person's Guide to the Orchestra*. The performances are zestful and stylish, and soprano Joan Carlyle is heard to best effect in the celebrated "Fairest Isle" aria from *King Arthur*. Nevertheless, the effect of the theater-music sequence as a whole is rather scrappy, most of the excerpts being exceedingly short and following no genuine dramatic sequence.

It is in the collection of fantasias and trio sonatas, together with the G Minor Pavan, that we have the finest musical substance and even more telling performances. Polyphonic in texture and generally somber in tone, the Purcell fantasias reveal both the expressive depth and the formal craft that the short-lived Restoration master had at his command. The great G Minor Chaconne (Trio Sonata No. 6 from the second set) is the noblest and most moving of all the instrumental music here. The other two trio sonatas, more Ital-

ianate in style, provide a lively and welcome contrast to the fantasias.

Menuhin and his confreres perform these works with singular care and thoughtfulness of line, rhythmic vitality, and expressiveness. The recorded sound is excellent throughout the two sequences of the tape. What is to be deplored, however, is the complete absence of program notes—a sorry omission from this important addition to the four track tape repertoire. D. H.

⑤ ROSSINI: *Semiramide*. Joan Sutherland (soprano), *Semiramide*; Marilyn Horne (mezzo-soprano), *Arsace*; Joseph Rouleau (bass), *Assur*; John Serge (tenor), *Idreno*; Spiro Malas (bass), *Oroe*; Michael Langdon (bass), *Ghost of Nino*; other soloists; Ambrosian Opera Chorus; London Symphony Orchestra, Richard Bonyngne cond. LONDON LOR 90123 two reels \$21.95.

Performance: Sutherland's and Horne's show
Recording: Superior
Stereo Quality: First-class
Speed and Playing Time: 7½ ips; 168' 27"

Having read a number of reviews of the disc version of this recording, not many of them thoroughly favorable, I rather expected to listen to this tape of *Semiramide* (heavily cut, perhaps advisedly) with something less than total pleasure. It is true, of course, that among the male singers there are some less-than-ideal voices: tenor John Serge gets around the notes very well, but his is not a very attractively produced sound, and of the basses only Spiro Malas makes a satisfactory impression. But when the two leading ladies get going, either in their separate arias or together in duets, one listens with rapt astonishment. Bonyngne does not convey the excitement of a Toscanini, perhaps, but this performance still has much to recommend it. At any rate, I found myself enjoying it thoroughly. The sonic reproduction on tape is full and brilliant. There is a slight tape hiss, but altogether this is sonically a closer match for the disc version than I have heard on tapes over the last year or so. Ampex has always been very good about including librettos with their tape boxes; with this release, they resort to the system of including a postcard, not even self-addressed or stamped, requiring the purchaser to obtain the libretto by mail. I. K.

⑤ SCHUMANN: *Fantasia, in C Major, Op. 17; Etudes Symphoniques, Op. 13*. Vladimir Ashkenazy (piano). LONDON LCL 80182 \$7.95.

Performance: Impressive
Recording: Good
Stereo Quality: Good enough
Speed and Playing Time: 7½ ips; 65' 13"

Like his older compatriot Sviatoslav Richter, the young Russian pianist Vladimir Ashkenazy favors a broadly lyrical approach to the great Schumann C Major Fantasia. But whereas Richter emphasizes the poetic element throughout this expansive work, Ashkenazy brings a good measure of Horowitz-like excitement to the central march movement.

Expansive is surely the word (if you don't disdain puns) for Ashkenazy's way with the bravura *Etudes Symphoniques*; for besides the normal sequence of twelve variations, he includes—between the ninth and tenth—a series of five discarded by Schumann but

resurrected by Brahms in 1893. As with his reading of the Fantasia, Ashkenazy's ultra-romantic approach accentuates dramatic contrast to the maximum, creating a sense of near-schizophrenia as between Schumann the man of action and Schumann the dreamer. Yet he also manages to hold the musical structure together—no mean feat!

This is the first four-track tape version of the Symphonic Etudes. (The alternative version of the Fantasia is the supercharged Horowitz performance on Columbia's tape of that pianist's 1965 Carnegie Hall concert.) London's piano sound is consistently excellent throughout the reel. *D. H.*

⑤ **SHOSTAKOVICH: *The Execution of Stepan Razin*, Op. 119; *Symphony No. 9*, in E-flat Major, Op. 70.** Vitaly Gromadsky (bass); RSFSR Russian Chorus; Moscow Philharmonic Symphony Orchestra, Kiril Kondrashin cond. MELODIYA/ANGEL ZS 40000 \$7.98.

Performance: Virile
Recording: Excellent
Stereo Quality: Superior
Speed and Playing Time: 7½ ips; 51'54"

Shostakovich's score *The Execution of Stepan Razin* (1964), based on a poem by Yevgeny Yevtushenko, starts off by sounding a little like updated Moussorgsky, but winds up with an impact that seems more than the sum of its musical contents. The seventeenth-century Cossack brigand is presented as an anti-Tsarist revolutionary, a concept that must have obvious appeal for Soviet ideologists. The music, full of insistent hammerings, has a strange fascination, and the performance is extremely effective. The Ninth Symphony, composed in 1945, is, in almost total contrast, light and witty, with a large share of Shostakovich's irony. Here again, the interpretation is excellent and sharply detailed. Certainly this is the most satisfactory recording of the symphony since Koussevitsky's 1946-47 album (recently reissued in mono form in the RCA Victor disc album VCM 6174). The present Russian-made recording has astonishingly good sonic reproduction; orchestral details come through with unusual clarity, brilliance, and presence. The tape version, in comparison with the disc, is slightly lacking in bass, but it also has a brighter-sounding top. Having complained in other cases of Angel's practice of not including texts and translations with their tape packages, I must report with pleasure that a text leaflet (including transliteration and translation) is provided here. *I. K.*

⑤ **R. STRAUSS: *Don Quixote*, Op. 35.** Pierre Fournier (cello); Giusto Cappone (viola); Berlin Philharmonic Orchestra, Herbert von Karajan cond. DEUTSCHE GRAMMOPHON DGGC 9009 \$7.95.

Performance: Brilliant
Recording: Sumptuous
Stereo Quality: Not enough separation
Speed and Playing Time: 7½ ips; 44' 15"

Don Quixote, written in 1897, is the last but one of the nineteenth-century tone poems with which Strauss began his career as a composer. It is also easily the best in terms of inventiveness, a virtuoso but organic use of the orchestra, play of ideas, big shape and meaningful expressive detail. It is in *Don Quixote* (and virtually only *Don Quixote*) that the relationship between Strauss

and Mahler—so often referred to and so often repudiated—is really apparent.

This is a stunning, if not exactly profound, version. It leans a bit toward the sort of Hollywood production the Germans are always so scornfully accusing us of turning out. Fournier is at his best, Cappone an excellent Sancho Panza. There are things I don't like: the purely theatrical effect of some of the ritards and tempo changes, the ugly tone of the oboes, a certain impatience, an anxious desire to push everything for maximum effect. Nevertheless, one doesn't say no very easily to a performance like this, and its effect comes through without loss on the tape. The DGG sound has less *ambiance* and greater clarity than usual, but I think the failure to separate the solo viola and the cello (and the first and second violins as well) is a major mistake. After all, that is at least in part what stereo is for; Strauss built such antiphonies into the score, and there is no excuse for overlooking a chance to make such essential points when the means for making them are there. *E. S.*

⑤ **R. STRAUSS: *Ein Heldenleben*, Op. 40.** Berlin Philharmonic Orchestra (Michel Schwalbé, violin), Herbert von Karajan cond. DEUTSCHE GRAMMOPHON DGC 8025 \$7.95.

Performance: Superb
Recording: Excellent
Stereo Quality: First-rate
Speed and Playing Time: 7½ ips; 45'54"

Because of Herbert von Karajan's well-known rigid control over his performing forces, some might expect this interpretation of Strauss' autobiographical tone poem to be overrefined. Yet nothing could be less true of this performance, which, in spite of the fact that Karajan's orchestral discipline is quite obvious, glows with spontaneity. It is one of the most satisfying and convincing accounts of this often unconvincing score that I have heard. Foremost among its merits are the sensitivity of the conducting and the ravishingly beautiful orchestral playing. The sonic reproduction, too, is exceptional, only a little lacking in the solidity of bass to be heard on the disc version, and ultra-transparent even in the thicknesses of the battle sequence. *I. K.*

⑤ **R. STRAUSS: *Four Last Songs*; *Mutertändelei*, Op. 43, No. 2; *Waldseligkeit*, Op. 49, No. 1; *Zueignung*, Op. 10, No. 1; *Fremdliche Vision*, Op. 48, No. 1; *Die heiligen drei Könige*, Op. 56, No. 6.** Elisabeth Schwarzkopf (soprano); Berlin Radio Symphony Orchestra, George Szell cond. ANGEL ZS 36347 \$7.98.

Performance: Exquisite
Recording: Excellent
Stereo Quality: Fine
Speed and Playing Time: 7½ ips; 39' 54"

Whether in the introspective *Four Last Songs* or in the earlier works, Elisabeth Schwarzkopf is in superior form here. She spins out the most beautiful line imaginable in this repertoire, quite devoid of any of the mannerisms or hootiness of vocal production that have occasionally marred some of her more recent recordings. Add to this a warm, vibrantly sensitive accompaniment by George Szell, and you have a release worth the serious attention of all vocal collectors. A comparison of tape and disc versions revealed

relatively little difference between the two sonically, although the disc gives the impression of a slightly fuller bass and a fractionally less bright top. Either way, it's an outstanding release. The text leaflet included with the disc can be obtained by mail for the tape version. *I. K.*

⑤ **TCHAIKOVSKY: *Violin Concerto in D Major*, Op. 35.** Igor Oistrakh (violin); Moscow Philharmonic Orchestra, David Oistrakh cond. MELODIYA/ANGEL ZS 40009 \$7.98.

Performance: Splendid
Recording: Excellent
Stereo Quality: First-rate
Speed and Playing Time: 7½ ips; 33' 52"

It is common to speak of the younger Oistrakh as a considerably less appealing and less commanding figure than his father. In the case of the present performance, no apologies need be made for him. From all standpoints, this is excellent fiddling. The violinist here displays a faultless technique, a beautifully warm tone, a decided flair for brilliance in the appropriate spots (the cadenza is a stunner), and a marvelously idiomatic (for this score) *Russian* temperament. I found his interpretation extremely enjoyable. Oistrakh *père* provides a thoroughly competent and loving accompaniment that is perfectly satisfying even if it does not have the authority of one of the big-name conductors. Angel's Soviet recording is much brighter on tape than in the disc version, but the latter has a far fuller bass. With a stiff bass boost, however, the tape is startlingly good and superior, I think, to the occasionally muddy disc. *I. K.*

⑤ **VERDI: *Nabucco*.** Tito Gobbi (baritone), Nabucco; Elena Suliotis (soprano), Abigaille; Carlo Cava (bass), Zaccaria; Bruno Prevedi (tenor), Ismaele; Dora Carral (soprano), Fenena; others; Chorus of the Vienna State Opera and Vienna Opera Orchestra, Lamberto Gardelli cond. LONDON LOR 90118 two reels \$21.95.

Performance: Stirring
Recording: Very good
Stereo Quality: Admirable
Speed and Playing Time: 7½ ips; 119'52"

Nabucco, Verdi's third opera and first large-scale success, was given its premiere in 1842. Its Biblical subject matter is anything but accurate historically, but the rousing succession of arias, marches, ensemble numbers, and choruses is sure to please admirers of early Verdi. This, of course, is the opera that contains the famous "*Va, pensiero*," the chorus of the Hebrew slaves; but some of the other highlights, though less familiar, are equally impressive. The three major roles—Nabucco, the Hebrew prophet Zaccaria, and the villainess Abigaille—are for the most part impressively sung in this performance. The most exciting voice is that of Elena Suliotis, who provides Callas' kind of intensity as well as a sound—complete with the vocal faults—that is quite reminiscent of the older singer. Tito Gobbi is sometimes taxed by Verdi's writing, but his characterization is vital and powerful. The bass Carlo Cava performs sonorously, although without much variety of color. The other parts are well executed, the choral and orchestral work is thoroughly satisfactory, and the con-

(Continued on page 132)

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ducting is well paced and exciting. The sonic reproduction on the tape is quite satisfactory; only in comparison with the discs does the tape seem lacking in fullness, although it plays extremely cleanly. Stereo effects are well handled. A libretto and translation are included. I. K.

⑤ WAGNER: *Tannhäuser*. Wolfgang Windgassen (tenor), Tannhäuser; Grace Bumbry (mezzo-soprano), Venus; Anja Silja (soprano), Elisabeth; Josef Greindl (bass), Landgrave; Eberhard Wächter (baritone), Wolfram; Gerhard Stolze (tenor), Walther von der Vogelweide; Franz Crass (bass), Biterolf; George Paskuda (tenor), Heinrich; Gerd Nienstedt (bass), Reinmar; Else-Margrete Gardelli (soprano), Shepherd, Chorus and Orchestra of the Bayreuth Festival, Wolfgang Sawallisch cond. PHILIPS PTG 960 two reels \$19.95.

Performance: Competent
Recording: Very good
Stereo Quality: Excellent
Speed and Playing Time: 7½ ips; 169'53"

The only available *Tannhäuser* on tape, this recording of actual performances at the 1962 Bayreuth Festival is a satisfactory if not outstandingly superior production. Neither conductor nor soloists are standouts, although there are some moments in the third act when Windgassen rises to expressive heights. The orchestra playing is competent, but the chorus does not appear to its usual advantage under the normally expert direction of Wilhelm Pitz. One does have the feeling of an actual performance through a sense of stage movement and the sonic atmosphere of the theater, but the routine level of the interpretation and a merely adequate cast place the performance far below the level attained by London in their Wagner recordings. On tape, the layout of the acts is well maintained (although there are some unavoidable breaks), and the reproduction is good, albeit somewhat lacking in bass. A German libretto with English translation is commendably included. I. K.

⑤ WAGNER: *Die Walküre: Ride of the Valkyries; Siegfried: Forest Murmurs; Das Rheingold: Entrance of the Gods into Valhalla; Die Götterdämmerung: Siegfried's Rhine Journey; Siegfried's Funeral Music*. London Symphony Orchestra, Leopold Stokowski cond. LONDON LCL 75016 \$7.95.

Performance: Rich and vital
Recording: Handsome
Stereo Quality: A-1
Speed and Playing Time: 7½ ips; 45'56"

Almost the first symphonic records I ever owned, some thirty-five years ago, were the pair of 1929 Victor discs of the Stokowski-Philadelphia performance of Wagner's *Rienzi* Overture, with the orchestral finale of *Die Götterdämmerung* as filler. I remember as vividly as though it were yesterday how overwhelmed I was by the immense power and vitality of the performance (Stokowski was not fussing with tempos in those days), not to speak of the tonal opulence of the orchestral playing.

I find that the same amazing vitality and much the same beauty of orchestral sonority comes through in far more transparent textures in this London Phase 4 tape done nearly forty years later. In short, it represents

Stokowski at his very best—young in spirit, unfussy, and immensely communicative. It is when we get away from the snippets of *Die Walküre*, *Das Rheingold*, and *Siegfried* (superbly played though they are) and into the extended and epic *Götterdämmerung* excerpts that the full measure of Stokowski's Wagnerian interpretation can be taken. He wisely sticks to Wagner's original somber ending of the *Rhine Journey*, with its statement of the Rhinegold motive in the minor key, and begins the Funeral Music at the moment of Hagen's treacherous spear thrust. The result, both as effective editing and musical performance, is powerfully moving, gaining substantially in impact by virtue of its dramatic continuity.

The London Symphony players are in top form all the way, and most of all, I am grateful that the London Phase 4 engineering staff has seen fit to avoid the stereo gimmickry that has marred some of their other efforts. The stereo illusion here is wholly natural, and the recorded sound as a whole has body, a sense of depth, and transparency. This is one of the best Wagner tapes around. D. H.

COLLECTIONS

⑤ EUGENE ORMANDY AND THE PHILADELPHIA ORCHESTRA: *Greatest Hits*. Offenbach (arr. Rosenthal): *Gaité Parisienne: Cancan*. Delibes: *Sylvia: Pizzicato Polka*. J. Strauss, Jr.: *On the Beautiful Blue Danube*. Debussy (arr. Caillet): *Clair de lune*. Sousa: *The Stars and Stripes Forever*. Khachaturian: *Gayne: Sabre Dance*. Vaughan Williams: *Fantasia on Greensleeves*. Benjamin (arr. A. Harris): *Jamaican Rhumba*. Falla: *El amor brujo: Ritual Fire Dance*. Sibelius: *Finlandia*. Philadelphia Orchestra and Mormon Tabernacle Choir, Eugene Ormandy cond. COLUMBIA MQ 869 \$7.95.

Performance: Super-deluxe
Recording: Sumptuous
Stereo Quality: Good
Speed and Playing Time: 7½ ips; 34'17"

From a wide variety of previously released items, Columbia has culled this super-deluxe pops-concert mish-mash. It is thoroughly enjoyable fare as background music for the affluent society. However, you should be warned that the high-powered Offenbach and Sousa performances, not to speak of the choral apotheosis in *Finlandia*, are certain to drown out all conversation—even after the third martini! D. H.

⑤ GREAT SOPRANOS OF OUR TIME. Gounod: *Faust: Jewel Song*. Victoria de los Angeles (soprano); Orchestra of the Théâtre National de l'Opéra, Paris, André Cluytens cond. Beethoven: *Fidelio: Abscheulicher*. Birgit Nilsson (soprano); Philharmonia Orchestra, Heinz Wallberg cond. Mozart: *Nozze di Figaro: Dove sono*. Elisabeth Schwarzkopf (soprano); Philharmonia Orchestra, Carlo Maria Giulini cond. Verdi: *Macheb: Sleepwalking Scene*. Maria Callas (soprano); Philharmonia Orchestra, Nicola Rescigno cond. (Five others, with Régine Crespin, Joan Sutherland, Elisabeth Schwarzkopf, Maria Callas, and Victoria de los Angeles.) FAMOUS DUETS FROM THE OPERA. Bizet: *Pearl Fishers: Au fond du temple saint*. Nicolai Gedda (tenor); Ernest Blanc (baritone); Orchestra of the Théâtre National de l'Opéra-Comique, Paris, Pierre

Dervaux cond. Mozart: *Don Giovanni: Là ci darem la mano*. Graziella Sciutti (soprano); Eberhard Wächter (baritone); Philharmonia Orchestra, Carlo Maria Giulini cond. Puccini: *Madame Butterfly: Flower Duet*. Victoria de los Angeles (soprano); Miriam Pirazzini (mezzo-soprano); Orchestra of the Rome Opera House, Gabriele Santini cond. (Five other duets, with Victoria de los Angeles, Antonietta Stella, Maria Callas, Giulietta Simonato, Carlo del Monte, Franco Corelli, Nicolai Gedda, and Tito Gobbi.) ANGEL Y2S 3692 \$11.98.

Performance: Mostly memorable
Recording: Good
Stereo Quality: Satisfactory
Speed and Playing Time: 3¾ ips; 91'30"

Each sequence of this tape collection is the equivalent of one disc, taken in turn from various sources, including operatic recitals and complete operas. The selection is commendable, both of sopranos and duets. Perhaps only Crespin is several cuts below her colleagues here in vocal equipment (*Walküre: "Eine Waffe lass' mich dir weisen"*) and dramatic credibility. Sutherland's *Don Giovanni* aria ("*Or sai chi l'onore*") represents a somewhat earlier stage of her career, and in spite of some impressive singing she seems a bit lightweight for the role. The standouts are, without question, de los Angeles, Schwarzkopf, and Nilsson (a marvelous *Fidelio* aria), and, among the duets, the captivating Zerlina of Graziella Sciutti. Angel's sound is reasonably good for this tape speed, with a fairly solid bass response that sounds as though it had been boosted. The top end is not entirely free of distortion (as in the *Barber of Seville* duet), and there is the usual peak in the upper midrange. As is customary with Angel's tapes, a postcard is enclosed so that the purchaser may obtain the free text leaflets. I. K.

ENTERTAINMENT

⑤ THE ANIMALS: *Animalism*. The Animals (vocals and instrumental accompaniment). *All Night Long; Smoke Stack Lightning; Louisiana Blues; Going Down Slow*; and eight others. MGM STX 4414 \$5.95.

Performance: Intense
Recording: Too much bass
Stereo Quality: Good
Speed and Playing Time: 3¾ ips; 44'17"

The most interesting of the British rock groups so far have been the Beatles, the Rolling Stones, and the Animals. The Beatles are the least deeply rooted in American Negro blues, and they have evolved into the most inventive of the three. The Rolling Stones have also moved on to create a more distinctive and personal repertoire while, however, remaining close to the blues spirit as they perceive it. The Animals, as this collection shows, are the most blues-oriented of the three, although they too from time to time stretch out to more contemporary concerns. Eric Burdon, their lead singer, is sometimes quite effective as a spinner of blues moods, but at bottom he still does not sound idiomatic. Instrumentally, the group is occasionally arresting, particularly the unidentified organist on these performances. (Why no personnel listing?) But if the Animals are to grow as themselves, they need more of their own material to help them find out more clearly who indeed they are.

To make up for recording peculiarities I'd suggest listening to this tape with treble up and bass reduced. N. H.

⑤ **BAJA MARIMBA BAND:** *Watch Out!* Baja Marimba Band (instrumentals). Julius Wechter and Herb Alpert arr. *Spanish Moss; Gay Rancho; Telephone Song;* and eight others. A & M 118 \$5.95.

Performance: Amusing
Recording: Excellent
Stereo Quality: Very pronounced
Speed and Playing Time: 3¼ ips; 29' 47"

One of the secrets of Herb Alpert's success (along with his undisputed talents as a performer, arranger, and producer) must be that he is able to find a good deal of fun and happiness in music. In a time when pop music seems to range only from "If-the-bomb-doesn't-get-us-then-the-fallout-will-so-you-better-say-yes-baby" to the maniacal groups and the banalities of the pop singers of "good" music (any song previously sung by Frank Sinatra), Alpert's contributions on the A & M label tend to be quite refreshing. The Baja Marimba Band is no exception. It is a nine-member group led by Julius Wechter, who seems to be a gifted artist.

Nothing is taken very seriously here, and songs that start out in one tempo often end up in another. The Latin Sound is not treated as inviolate, and there are injections of Dixieland, jazz, and rock. As usual the arrangements by Alpert, this time in collaboration with Mr. Wechter, are superb, as is the sound. The stereo definition may be too distinct for some, but I didn't mind it. Highly recommended. P. R.

⑤ **COUNT BASIE:** *Broadway Basie's Way.* Count Basie (piano); orchestra. *Hello Young Lovers; Mame; From This Moment On; People; A Lot of Livin' to Do; Just in Time; On a Clear Day (You Can See Forever);* and five others. COMMAND CMC 905 \$5.95.

Performance: Powerful but relaxed
Recording: Excellent
Stereo Quality: Very good
Speed and Playing Time: 7½ ips; 34' 52"

A jazz treatment of standards from Broadway shows, this set presents the Basie band—in arrangements by Chico O'Farrill—without gimmicks or intrusive ornamentation. The playing, in the Basie tradition, is straightforward and swinging, with space for such substantial soloists as trombonist Al Grey, tenor saxophonist Eddie Davis, and trumpeter Roy Eldridge. There are two rarities here: the presence of Eldridge, who was a Basie sideman for only a brief time, and of drummer Eddie Shaughnessy. The clarity and presence of the recording are even more satisfying on tape than they were on the Command disc. N. H.

⑤ **THE BEACH BOYS:** *Pet Sounds.* The Beach Boys (vocals and accompaniment). *Don't Talk; Sloop John B; Caroline No; Pet Sounds;* and seven others. CAPITOL ZT 02458 \$7.98.

Performance: Great to fair
Recording: Superb
Stereo Quality: Superb
Speed and Playing Time: 7½ ips; 36' 13"

The Beach Boys are my own particular favorite rock-and-roll artists. I honestly believe they are so far ahead of their other scraggly

contemporaries that even first-rate groups like the Mamas and the Papas seem anemic by comparison, and peripheral organizations like the Fugs or Manfred Mann aren't even in the same league. They are undeniably the most accomplished musicians on the current pop scene. And when they stoke up the fires in their boilers, get their engines going, and blast full steam ahead through compositions like *I Just Wasn't Made for These Times*, they sound like what might possibly happen if Stan Kenton's entire orchestra ever teamed up for a rock-and-roll date with the musically hip Hi-Los. The instrumental passages in this number, combining vocal harmonies à la Four Freshmen with harpsichord, make it the most exciting single piece of modern music I've heard lately. And when Brian Wilson, who writes the music behind the group's lyrics, gets going on his own, the results are Stravinsky-ish enough to be spine-tingling. (Do yourself a favor: dig the instrumental excitement on *Let's Go Away for Awhile* on side one, and you'll be surprised that such powerful music could emanate from the rock scene.)

The only thing wrong with the Beach Boys is their lyrics. Tony Asher, another member of the group, supplies most of them, and they are trite. Thank goodness they don't drive their listeners in search of a fallout shelter with lyrics about artificial insemination and yellow submarines, but it's possible to go too far in the other direction, too. Consequently, nothing more serious ever happens in the lyrics of their songs than some teenybopper losing her ring. For musicians who use everything from Chinese gongs to sounds from *Carmina Burana* in their music, who sing with inventive harmony, lyrics too puerile to match the sophistication of the group are a thorn in the side that should be worked out. Otherwise, this is a stunning tape, highly recommended to all music lovers. R. R.

⑤ **PETULA CLARK:** *I Couldn't Live Without Your Love.* Petula Clark (vocals); orchestra, Tony Hatch and Johnny Harris cond. *Bang Bang; Homeward Bound; Two Rivers; Elusive Butterfly; Rain; Strangers in the Night;* and six others. WARNER BROS. WSTX 1645 \$5.95.

Performance: Professional
Recording: Good
Stereo Quality: Good
Speed and Playing Time: 3¼ ips; 35' 22"

Pet Clark does not fit today's style in British girl pop singers, most of whom are gushing, talentless, and utterly unappetizing. She combines a girlish vulnerability with a sophisticated *chanteuse* quality and comes across as fresh and genuine. She isn't much of a singer, but she does generate a certain natural spark. She looks like she brushes her teeth, her songs are a much-needed change of pace from the screwball slush her rivals peddle, and sometimes—unexpectedly—out comes a Mermaid jolt or a bit of Piaf passion.

This is a tape with a basic beat, better for dancing than listening. But there are some fine moments: *Bang Bang* is a riotous parody of pop music of the *Boots* variety, the ghastly *Strangers in the Night* and Paul Simon's overexposed *Homeward Bound* sound better than usual, and the soul-searching job she does on her own autobiographical composition *Two Rivers* is sleek and polished and about as poetic and thoughtful as modern music is likely to get. R. R.

⑤ **TENNESSEE ERNIE FORD:** *My Favorite Things.* Tennessee Ernie Ford (vocals); Jack Halloran Singers (vocals); orchestra, Jack Fascinato cond. *Dear Heart; King of the Road; Love; Hello, Dolly!; I Left My Heart in San Francisco;* and six others. CAPITOL YT 2444 \$5.98.

Performance: Easy
Recording: Very good
Stereo Quality: Good
Speed and Playing Time: 3¼ ips; 28' 58"

This tape might as well have been called "Tennessee Ernie Sings Other Folks' Hits." Ol' Ern generally sticks to hymns and spirituals, and has a Christmas album or two, but he usually stays away from the pop charts, except when he has gotten on them all by himself, as with *Sixteen Tons*. This time, though, he has recorded what comes close to being a collection of top-of-the-chart hits.

He sounds as easy and casual as ever, but there is just the slightest hint of discomfort under it all, as though he were bewildered in his new role and tried to give the songs the emotions he thought they were supposed to have, rather than the ones he felt. His devotees might well love this tape; others will probably prefer the originals. J.G.

⑤ **STAN GETZ:** *Stan Getz with Guest Artist Laurindo Almeida.* Stan Getz (tenor saxophone); Laurindo Almeida (guitar); George Duvivier (bass); Edison Machado, José Sorrez, David Bailey (drums); Luiz Pazo, José Paulo (Latin rhythm). *Young Lady; Outra Vez; Winter Moon; Do What You Do, Do; Sabra's Samba; Maracatu-Too.* VERVE VSTC 362 \$7.95.

Performance: Sinuously lyrical
Recording: Very good
Stereo Quality: Excellent
Speed and Playing Time: 7½ ips; 32' 18"

Stan Getz and Laurindo Almeida are a well-matched team, particularly in a program, as here, of Latin-colored jazz. Both are at ease in spinning melodic variations; both have a subtle ear for exactly apt harmonies; and both are at their inventive best in the medium tempos that prevail in this set. The rhythm accompaniment is appropriately supple, and the quality of sound is first-rate. My only reservation is that, as skillful as the music-making is, there is a sameness of mood over the total playing time. But for certain occasions, this would make attractive background music. N. H.

⑤ **JOE HARRIOTT:** *Indo-Jazz Suite.* Joe Harriott (alto saxophone), Kenny Wheeler (trumpet), Pat Smythe (piano), Coleridge Goode (bass), Allan Ganley (drums), John Mayer (violin), Chris Taylor (flute), Diwan Motihar (sitar), Chandrabas Paiganka (tambura), Keshan Sathe (tabla). *Overture; Contrasts; Raga Megha; Raga Gaud-Saranga.* ATLANTIC ALC 1465 \$7.95.

Performance: More jazz than Indo
Recording: Superb
Stereo Quality: Very good
Speed and Playing Time: 7½ ips; 35' 15"

A double quintet—one playing jazz and the other playing Indian music—is directed by John Mayer in what purports to be a blending of these traditions. It is not. On the first side particularly, the Indian music is used essentially for decorative effect. More interweaving of cultures takes place on the sec-

ond side, but the union still sounds artificial. It should be noted, however, that Joe Harriott's jazz playing in this set is among his most impressive on record so far. He has disciplined his passion and power and merits a wider audience in America. N. H.

⑤ **BOBBY HEBB:** *Sunny*. Bobby Hebb (vocals); Joe Renzetti arr. *Sunny*; *Where Are You?*; *A Satisfied Mind*; *Crazy Baby*; *Bread*; *For You*; and six others. PHILIPS PTX 600212 \$5.95.

Performance: Okay
Recording: Good
Stereo Quality: Excellent
Speed and Plying Time: 3¼ ips; 31'44"

Bobby Hebb combines rhythm-and-blues with country-and-western music and comes a cropper. I'd like to hear his basic, hominy-grits voice on material more deserving of his time, but in this collection he manages to impart a certain splash of honesty and warmth to his own composition *Sunny* and to the old Sinatra chestnut, *Where Are You?* Hebb's musical background hints at certain limitations (he was hired by Roy Acuff to play the spoons with the Smoky Mountain Boys on "Grand Ole Opry" when he was a teen-ager), but with the right handling he might establish a stronghold in the pop field.

I could do without the liner notes, however; they insist brazenly that "Bobby Hebb is the most irresistible, the most constant, the most basic, and the *only* native American musical idiom. Now that the Hebb career has been born in the most fertile soil of the music world, this album will nourish a mighty oak tree." C'mon! I'm on his side too, but if I were to read that jacket copy in a record store, I'd hide the tape behind the nearest rack of Mantovani's. R. R.

⑤ **JACKIE AND ROY:** *Changes*. Jackie Cain and Roy Kral (vocals); orchestra, Claus Ogerman, Oliver Nelson, and Charles Calello arrs. *Dedicated to Love*; *Yesterday*; *In My Life*; *Counting*; *Norwegian Wood*; *Bye Bye*; *Changes*; *The Word*; and three others. VERVE VSTX 368 \$5.95.

Performance: Sensational
Recording: Superb
Stereo Quality: Superb
Speed and Plying Time: 3¼ ips; 29'41"

One icy day last winter, I received an advance copy of a new record album by Jackie Cain and Roy Kral called "Changes," and when I played it I almost could not believe my ears. For longer than I care to remember they have been two of the hippest, sunniest, most unbelievably brilliant musicians America has produced—the two people in jazz who could do *anything*. Long before the Swingle Singers, the Hi-Los, and Lambert, Hendricks, and Ross, when Jackie Cain was a beautiful young daisy-blonde still in bobby sox, she and Roy were integrating vocal sounds with jazz scored for instruments. Since then, they have sung salutes to classical composer Darius Milhaud (accompanied by a tuba player from the St. Louis Symphony), Miles Davis trumpet solos, and everything between. And I have heard them praised by everyone from Alec Wilder and Richard Rodgers, who flipped when he heard their arrangement of *Mountain Greenery*, to John Sebastian of the Lovin' Spoonful. In Las Vegas, they are the favorite after-hours musicians of such people as Stan Kenton, Frank

Sinatra, and Julie London, and once, when they tried to close an engagement that had already been held over six months, Jerry Lewis offered to pay them out of his own pocket to stay.

I tell you all this only because you'll never hear it from Jackie and Roy. They do not blow their own horn or hire press agents. They sing because they love what they do. And what they do has always been ahead of its time.

And now we have "Changes," which shows Jackie and Roy's maturity and keen awareness of the current trends in music and the world around them. There has always been excitement and swing in their work, but here they even interpret the NOW stuff and manage to make it sound humorously gay, with crisp, floating beats and electrifying two-voice counterpoints. They communicate emotionally in such an incredible way that the Beatles' *Norwegian Wood* sounds like a composition for symphony orchestra. Jackie's impeccable solo on *Yesterday* is the grooviest, most soul-stirring vocal I've heard on this song, and I even got involved with John Sebastian's absurd *Can't Buy Me Love*, which has a raunchy rock beat that sounds like a revival meeting and a jam session at the same time. None of the songs are really monumental, yet Jackie and Roy do breath-taking things with all of them.

Jackie and Roy are ahead of their time, but what a wonderful thing to be, considering the time they're *in*. On this tape they have added the spice, the herbs, and the occasional mushroom to the tasteless brew that passes for NOW music, and they prove that with all our *Kitsch* there's plenty of art around too. You just have to know where to look for it.

R. R.

⑤ **MIRIAM MAKEBA:** *All About Miriam*. Miriam Makeba (vocals); Harold Dodson (bass); Leopoldo Flemming (drums); Sivuca (guitar). *Ballad of the Sad Young Men*; *Click Song*; *Four-Letter Word*; *Más que nada*; *Mommy, What Is Heaven Like?*; *The Sound of a Drum*; *U Shaka*; *I Think I Ought*; *Yetentu Tizaleny*; *Maria Fulo*; and two others. MERCURY STC 61095 \$5.95.

Performance: Stirring
Recording: Superb
Stereo Quality: Superb
Speed and Plying Time: 7½ ips; 34'16"

Every single band on this tape is a knockout. Though I don't think it is Miriam Makeba's greatest collection (she'll have to go a long way to beat "The Magic of Makeba," the last album under her old RCA Victor contract), the whole thing seems happily relaxed. I'm glad to see that she drew upon her marvelous way with American jazz ballads. All the distinctive South African clicking sounds that made her reputation are heard here, but the real marvel is the way she does Tommy Wolf's *Ballad of the Sad Young Men*, which is fast becoming one of the jazz classics of American music. Listening to her bluesy, no-holds-barred voice let go on this mournful and depressing song gave me the same kind of chill I felt when I first heard Ethel Waters sing *Supertime*. It would be hard to find a more sympathetic rhythm section than the one that backs her up here.

Makeba's voice is by now overly familiar. I wish she would sing more and cut out the

tongue-on-palate tricks. Still, in everything she does she shows enormous responsibility to her art. This tape is a valuable experience.

R. R.

⑤ **THE MAMAS AND THE PAPAS:** *The Mamas and the Papas*. Cass. John, Michelle, Denny (vocals); orchestra. *No Salt on Her Tail*; *Trip, Stumble, and Fall*; *Words of Love*; *My Heart Stood Still*; and eight others. DUNHILL DHX 5010 \$5.95.

Performance: First-rate
Recording: Excellent
Stereo Quality: Excellent
Speed and Plying Time: 3¼ ips; 32'45"

This tape is an unqualified success on all counts. It also signals what I think is the most hopeful sign in American, as opposed to British, popular music in a decade or



THE MAMAS AND THE PAPAS
A boisterous, literate professionalism

more. Here is a group that has drawn from many sources, including the Beatles, but has come up with a boisterous, energetic, and highly literate signature of its own. First, the lyrics, by John Phillips (who also composes the music), are by turns so intelligent, so poetic, that they should set an example for everyone working in popular music today. The second encouraging trait is the high degree of professionalism shown by the Mamas and the Papas in their performances. It is not the glacial kind of professionalism that eventually vitiates both the performers and the material, but is a display of the care, taste, and relaxation (the result of enough advance preparation) that are the marks of all really good entertainers.

And not to be lightly brushed aside is the superb work of their discoverer and producer Lou Adler, who incredibly enough found them only one year ago; he consistently provides them with exactly the right arrangements and recording techniques. The arrangements are also notable in that they are truly integrated, musically as well as electronically. I don't think I have heard many albums in which the total technical resources of recording, editing, and mastering have been brought together this well. The Mamas and the Papas' flamboyant versatility enables them to put together an astonishing variety of sounds. They present

a total conceptual approach to each song. With an insouciant disregard for cliché or formula they swing easily from the low-down ragtime of *Words of Love* (with a lusty solo by Cass) to *The Dancing Bear*, with its echoes of early Stravinsky, to a standard like *My Heart Stood Still*, underscored by a rock beat. Out of each song they are able to make a complete musical whole that is gratifying no matter how many times one listens to it.

If you think that a great deal of the fuss being made lately over popular music is engineered by promoters and that the music is listened to by people who should be old enough to find better things to do with their time, then listen to this tape. It is ample proof that popular music today is in better shape than it has been since the 1930's and that it needs no apologies for the interest it is generating in all age groups. P. R.

⑤ SERGIO MENDES: *Sergio Mendes & Brasil '66*. Sergio Mendes & Brasil '66 (vocals and instrumentals). *Daytripper*; *O Pato*; *Berimbau*; *The Joker*; and six others. A & M AMX B8 116 \$6.95.

Performance: Sleek
Recording: Good
Stereo Quality: Very good
Speed and Playing Time: 3¾ ips; 25'49"

The longest selection on this tape runs three minutes and fifteen seconds. Most numbers last less than three minutes and several are under two minutes. And, as you will notice from the above listing, the complete tape runs well short of half an hour. Therein, I think, lies one of the secrets of the success of this group. What they do, which is an exceedingly sleek mixture of jazz, bossa nova, and Beatle-ism, is a very heady potation, and quite sensibly they offer small portions of it. I think that's smart: everybody loves musical carbohydrates, but quite often the vendors of these carbohydrates don't seem to realize that a little goes a long way.

This is an excellent group, helped enormously by Mendes' really inspired arrangements and the skill of Herb Alpert, who produced this tape with his usual super-professionalism. P. R.

⑤ WES MONTGOMERY: *Tequila*. Wes Montgomery (guitar), Ray Barretto (conga), Ron Carter (bass), Grady Tate (drums), George Devens (vibes); string orchestra. *Tequila*; *The Big Hurt*; *Bumpin' on Sunset*; *The Thumb*; *Midnight Mood*; and five others. VERVE B 88653 \$6.95.

Performance: Technically adroit
Recording: Very good
Stereo Quality: Good
Speed and Playing Time: 3¾ ips; 34' 20"

Many consider Wes Montgomery a much finer guitarist than I do; I have found, both on records and in clubs, that his style is seldom more than a function and display of his remarkable octave technique. Once in a while he breaks loose to become emotionally moving or exciting, but it is an extremely rare occurrence. Rare enough, incidentally, to be totally absent from this album.

"Tequila" is basically a mood jazz set, with strings arranged by Claus Ogerman so unobtrusively that they seem almost non-existent. It is pleasant, easy, "hip" listening, and certainly better than the moodless "mood" records, but there is little of substance here to engage the listener. J. G.

⑤ OTIS REDDING: *The Dictionary of Soul*. Otis Redding (vocals) and unidentified instrumental accompaniment. *I'm Sick Y'All*; *Sweet Lorene*; *Ton of Joy*; *Love Have Mercy*; and eight others. VOLT VLX 415 \$5.95.

Performance: Fervent
Recording: Good
Stereo Quality: Very good
Speed and Playing Time: 3¾ ips; 35' 38"

A secular sermonizer, Otis Redding comes out of the hard-core rhythm-and-blues tradition which, in turn, has its roots, in part, in Negro church music. His insistently thrusting passion gets wearying after a time, but if you take him two or three numbers at a stretch, he can shake you, if not startle you. One surprise here is Redding's transmutation of *Tennessee Waltz* into a throbbing, gospel-like plaint. One mistake is *Try a Little Tenderness*, during which passion overflows and becomes bathos. N. H.

⑤ THE SANDPIPERS: *Guantanamera*. The Sandpipers (vocals); orchestra. *Strangers in the Night*; *Carmen*; *La Mer*; *La Bamba*; *Enamorado*; and seven others. A & M AMX 117 \$5.95.

Performance: Very good
Recording: Excellent
Stereo Quality: Excellent
Speed and Playing Time: 3¾ ips; 33' 16"

The Sandpipers consists of three boys and two girls. It is a refreshing and modest group with a moderately hip and mostly pleasing sound. In *Stasera gli angeli non volano*, they won me over completely with a performance that reminded me of the incomparable Les Compagnons de la Chanson. Nothing else on the tape reaches quite that level, although *Louie, Louie*, sung in Spanish, as is *La Bamba*, comes reasonably close to that excellence. *Carmen* is saved by an imaginative orchestration by Nick Decaro, who has interpolated a few bars of Bizet in appropriate places, but the lyric, which is aimed at the teen market, is ludicrous.

The major fault here, I believe, is that A&M has tried to cover too many bases. Although in their photograph the Sandpipers look quite young, they are least effective in teen-oriented material. I should like to hear them doing more things like the aforementioned *Stasera gli angeli non volano*, or *La Mer*, which is also on this

tape and done very well. Somehow they don't have a very American sound—so why push it when there are so many good French, Italian, and Spanish songs around? P. R.

⑤ THE TEMPTATIONS/MARVIN GAYE/MARTHA AND THE VANDELLAS/THE SUPREMES/OTHERS: *Sixteen Big Hits*. The Temptations, Marvin Gaye, Martha and the Vandellas, The Supremes, Jr. Walker and the All-Stars, The Marvelettes, Brenda Holloway, Stevie Wonder, The Miracles, Four Tops, The Contours, Kim Weston (vocals); various orchestras. *How Sweet It Is*; *Shot Gun*; *My Girl*; *Where Did Our Love Go*; and twelve others. MOTOWN MTC 651 \$7.95.

Performance: Sweetly swinging
Recording: Good
Stereo Quality: Very good
Speed and Playing Time: 7½ ips; 45'36"

This is the fifth tape collection of hits from the Motown catalog, and it's a particularly good illustration of the "Motown sound." The formula of this Detroit company is to soften the thrust of the basic rhythm-and-blues beat by orchestral textures (often including strings) and by instructing its vocal artists in the use of a wider and more subtle range of dynamics than is characteristic of undiluted rhythm-and-blues. The softening, however, is not total, and enough of the bite and urgent sensuality of the idiom remains to make these performances generally compelling. The major limitations are of repertoire and mood. A few basic themes are reiterated again and again—love and lost love and defiant rejected love. Therefore, this collection is best heard a little at a time rather than all the way through at a single sitting. N. H.

⑤ JR. WALKER AND THE ALL STARS: *Road Runner*. Jr. Walker and the All Stars (vocals); orchestra. *Road Runner*; *Pucker Up Buttercup*; *Last Call*; *San-Ho-Zay*; and seven others. SOUL SLX 703 \$5.95.

Performance: Steamy
Recording: Good
Stereo Quality: Good
Speed and Playing Time: 3¾ ips; 35'15"

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shape. Prepare to have them take quite a beating (your ears, that is) when you put on this tape. Jr. is loud and the All Stars are even louder; on some tracks, which appear to have been done before live audiences, the pandemonium swells to almost orgasmic proportions. *Pucker Up Buttercup* and *Money (That's What I Want)* are two of Jr. and the group's best numbers, along with the already widely known *I'm a Road Runner*. All are performed in frantic, gutsy style.

This is not an album for your Aunt Bessie, or even for your sister Kate. As a matter of fact, if I were you, I'd leave the family out of this completely. What they don't know won't bother them. But as for that chick down the hall. . . .
P. R.

© NANCY WILSON: *Hello Young Lovers; Nancy Naturally!* Nancy Wilson (vocals); orchestra, George Shearing, Milton Raskin, and Billy May cond. and arr. *Sophisticated Lady; Little Girl Blue; Nina Never Knew; Since I Fell for You; My Babe; A Good Man is Hard to Find*; and eighteen others. CAPITOL Y2T 2673 \$9.98.

Performance: Tops
Recording: Excellent
Stereo Quality: Excellent
Speed and Playing Time: 3 3/4 ips; 65' 28"

One of the aspects of observing the trends in current music is the way they defeat and baffle the true artists, who must sing trash to make a living. That, more than anything else, is the reason I rejoice in the stratospheric success of Nancy Wilson. She is one of the few people on the music scene who sell records by singing with taste. While Mel Tormé and Sarah Vaughan—and yes, even Ella Fitzgerald—have sacrificed their self-respect singing gibberish clearly beneath them for a chance to hit the Top Twenty, Miss Wilson has never lowered her standards. Still she always ends up on the popularity charts.

Happily, this tape is a merger of two of her best albums, and it is even more interesting because it represents Early Nancy and New Nancy. The "Hello Young Lovers" side features a group of delicious hand-picked songs spun into a glossy cocoon by a string choir arranged by George Shearing (who even plays harpsichord on *Miss Otis Regrets*). This collection—wistful, young, tender—is notable primarily for the remarkable perception Miss Wilson shows by including a great, little-known Tommy Wolf tune called *Listen Little Girl*. Listen to the trembling vibrato held at arm's length like the sound of a tuning fork on the word "girl!"—it's almost like having Lee Wiley back. So much for what might be called the salad.

The meat and potatoes appear on side two, with Miss Wilson wailing the blues like a jaded chanteuse who has paid her dues to life. This is the jazz side, and Miss Wilson demonstrates an ability, picked up through experience, to swing from the ceiling on hard-to-sing tunes like Willie Dixon's *My Babe*. I'm convinced she can sing anything, and on this tape she sings almost everything. I can't imagine any collection without it.
R. R.

New tape releases are reviewed each month in HiFi/STEREO REVIEW

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