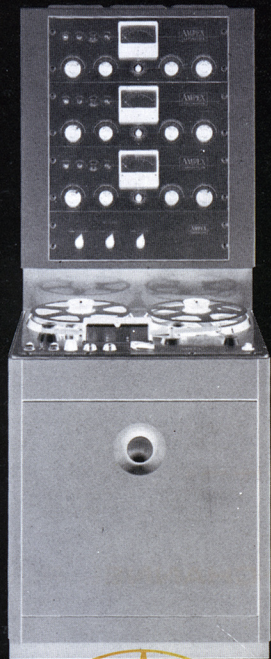


AMPEX
CORPORATION

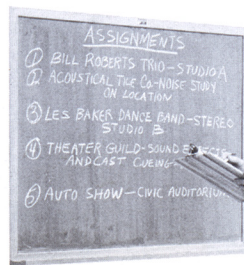
MULTI-CHANNEL RECORDING

AMPEX
CORPORATION



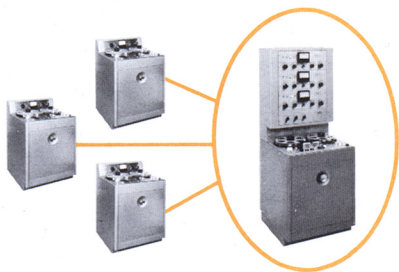
DYNAMIC NEW DIMENSIONS IN SOUND RECORDING

Ampex Multi-Channel Recorders are revolutionizing the concepts and techniques of recorded music. First choice for stereo, they are used to record the master tapes for almost all big-label releases. But their versatility goes far beyond the recording of 3-dimensional sound. Multi-channel recorders will take on a wide variety of additional assignments no ordinary single-channel machine can touch... such as recording an orchestra at one time, and a soloist at another, in complete synchronization. To fully appreciate how this is possible, and how a multi-channel recorder can greatly increase recording capabilities, one will need to know how they operate...



AN AMPEX MULTI-CHANNEL RECORDER.....

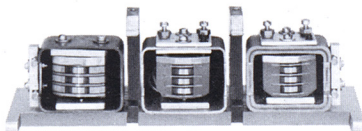
is actually two or more tape recorders built into a single cabinet or rack. But though they share the same housing, each keeps its own electronics and controls, VU meters and recording and erase heads. This, of course, means that each can be operated independently as to when it records, what it records and at what level. They can also be operated simultaneously, as is done in stereophonic recording. But this is just the beginning.



ACTUALLY TWO OR MORE TAPE RECORDERS BUILT INTO ONE UNIT



RECORDINGS ARE MADE IN PARALLEL TRACKS ON THE TAPE

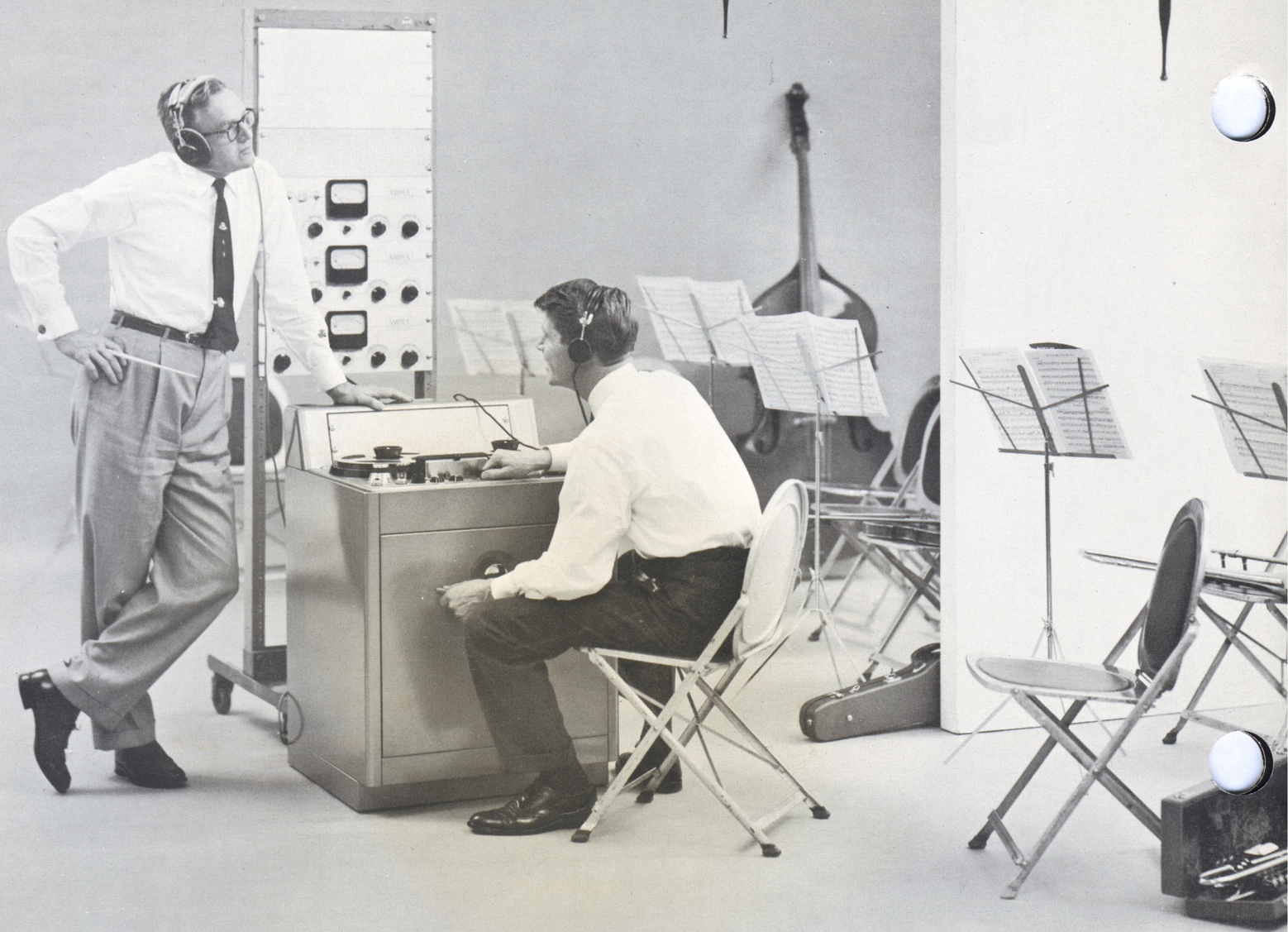


A COMPLETE THREE-CHANNEL HEAD ASSEMBLY

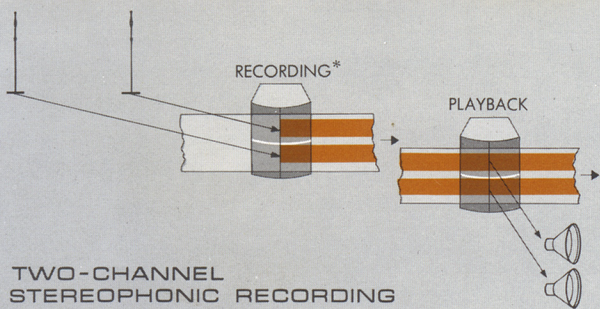
These recorders share a common reel of magnetic recording tape, operated from a single drive system. Recordings from the separate channels or recorders are made in parallel tracks on the tape.

The third important feature of multi-channel recorders is that the gaps in both the recording and playback head assemblies are in perfect vertical alignment. Now, recordings can be made from these "in-line" heads separately or simultaneously. In either event they will exist on the tape in a fixed "time" relationship to each other. And when played back over heads that are also perfectly aligned, the sounds will be heard in the exact relationship in which they were recorded — or as we say, in complete synchronization. (The illustration at the left shows a complete three-channel head assembly, how the heads are aligned and their relationship to each other.)

It is the unique ability of a multi-channel recorder to make separate recordings from two or more sources and to play them back simultaneously that enables it to take on a wide variety of assignments, such as the recording of . . .



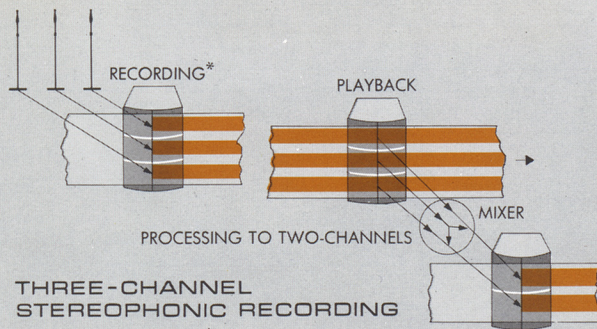
STEREOPHONIC SOUND



TWO-CHANNEL STEREOPHONIC RECORDING

In stereo recording, two or more channels are used. Each records from a microphone carefully positioned to pick up one "aspect" of the sound. Exact position of the microphones depends on the size of the orchestra or other sound source, the types of microphones used, the room acoustics and the effect desired.

The important thing is that each separate channel is recording different aspects of the sound on the same tape at exactly the same time. When played back these sounds are heard in their original relationship, and the illusion is 3-dimensional stereo.



THREE-CHANNEL STEREOPHONIC RECORDING

One of the more recent developments in stereo recordings is the use of a three-channel machine to record the master. This has certain advantages over conventional two-channel recording, the most important being its ability to eliminate any tendency for a "hole-in-the-middle" to develop. This can occur when the sound source is large, as with symphony. What happens is that the two channels used for conventional stereo recording just do not record a sufficient level of sound from the center — and in the playback this has the effect of a "hole" in the sound between the usual two playback speakers. This can be

* This is a simplified diagram. Actually in standard practice left microphone feeds top channel, right microphone lower channel.

avoided by recording a third channel near center-stage. The three-channel original is then mixed to a two-channel with the audio of the center channel divided proportionately between the two final channels. In playback, the effect is well balanced stereo—with no “hole” in the middle.

Called the ultimate in high fidelity, all big-label stereo tape and records have been recorded on Ampex Multi-Channel Recorders. Now, independent studios every-

where are finding a ready market for local stereo recording. And tapes made on an Ampex are the accepted standard everywhere.

The stereo boom is now rapidly spreading to radio-broadcast. Ampex Multi-Channel Recorders provide finest possible quality playbacks of stereo tapes, feeding either the AM-FM, the multiplexed FM system, or any other two or even three-channel broadcast system.

MONAURAL MASTERS FROM MULTI-CHANNEL RECORDINGS

When the assignment is to produce a monaural recording, taping the original on a multi-channel and processing it by mixing these to a single-channel offers some outstanding advantages . . .

recording levels at this time is of secondary importance. This can be taken care of *later* and at leisure in the re-recording or mixing session.

At the end of the recording session, the various parts of the orchestra will be recorded on separate channels, all in



In the ordinary single-channel recording of monaurals, a great deal of time and care must be taken to get microphones properly positioned and recording levels of the various orchestral sections balanced. Often, this means long recording sessions, tying up studios and equipment. And all too often a tape recorded and approved on one day, just doesn't sound quite right the next. Then one is faced with either calling back the talent and re-recording, or accepting an unsatisfactory tape.

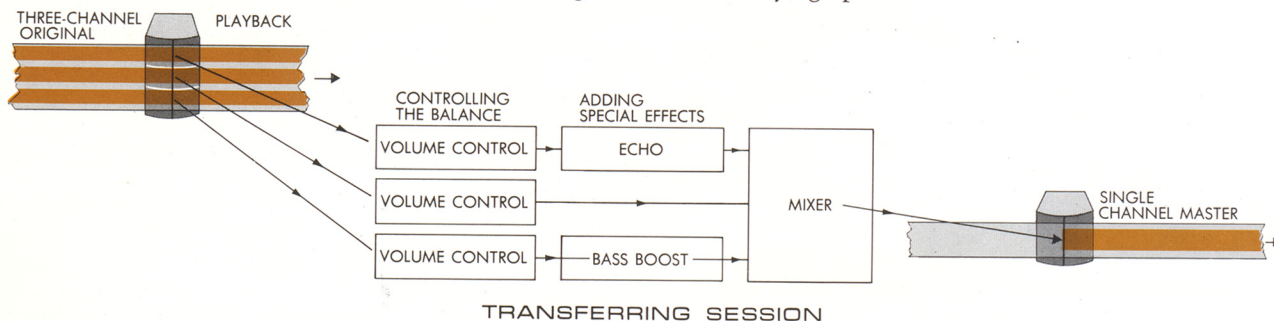
Situations like this can be easily avoided — with multi-channel equipment.

When the original recording is made on an Ampex Multi-Channel, normal microphone set-ups are used with groupings such as rhythm, reeds, brasses, strings and soloists fed to separate channels. Recording levels are adjusted to get a good recording on each channel, but balancing of

complete synchronization with each other. Now this can be transferred to a final monaural track by mixing the output of each channel into a single-channel recorder. And it is at this time that the balance of the various parts of the orchestra can be controlled by adjusting the volume level of each channel before it's mixed. And you can do this without tying up talent or studio space!

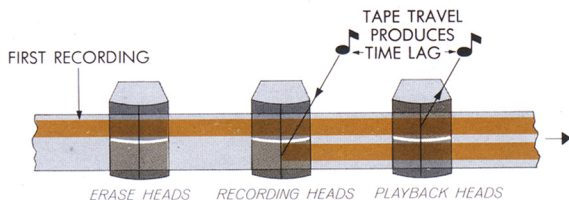
Special effects can also be added at this time, such as echo, bass boost or reverberation. This can be done to each channel separately, if desired, thus limiting special effects to certain parts of the orchestra, or to the soloist.

Transferring from a multi-channel original does not affect it in any way. So if the “mixed” monaural is not completely satisfactory, it can be transferred from the original as many times as is necessary — without calling the talent back or tying up a studio!



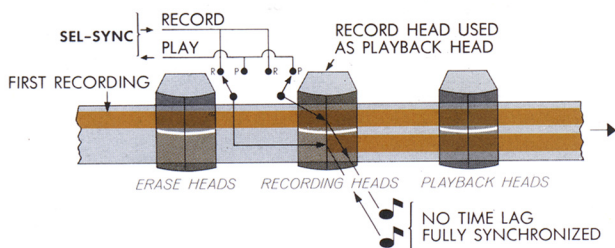
MORE ABOUT MONAURALS, STEREO AND SPECIAL EFFECTS

RECORDINGS CANNOT BE ADDED IN SYNCHRONIZATION ON ORDINARY EQUIPMENT



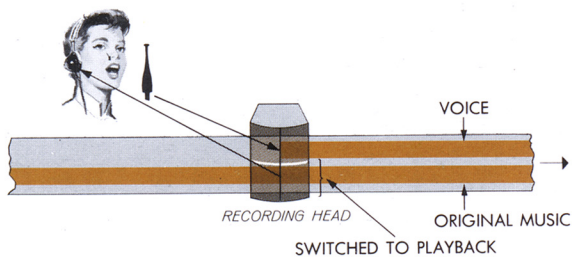
Ampex Multi-Channel Recorders have an exclusive feature that makes it possible to add new material at any time to previous recordings . . . and to do this in complete *synchronization*. An example would be that of adding a singer soloist now to music recorded at an earlier date. Normally this would be most difficult if not impossible to do, for this reason — to record the new sound in synchronization with the first, the new recording must be made while listening to a playback of the first recording. In conventional multi-channel recorders the problem is that the playback head used for listening is located to the right of the recording head and so there is a *time lag* between what is heard and what is recorded . . . in other words, the second recording is not in synchronization with the first and the results are unusable.

SEL-SYNC* MAKES SYNCHRONIZATION EASY



Ampex Multi-Channel Recorders have a feature called *Sel-sync* that avoids this problem and actually makes it easy to make synchronized recordings. *Sel-sync* is essentially a switching system that temporarily converts any one of the recording heads to serve as a playback head. This means that this temporary “playback” head is directly above or below the heads used to record the new material. Thus, there is no *time lag* between what is heard and what is recorded, and the new recording will be perfectly synchronized with the original track. In actual practice it works like this . . .

ADDING A MISSING SOLOIST

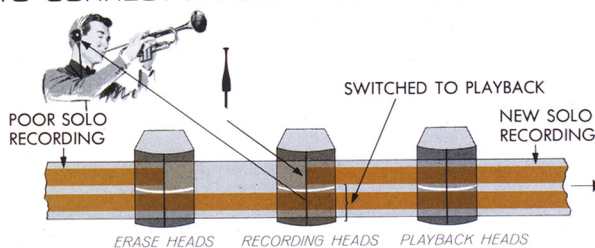


*Sel-sync (selective synchronization) TM Ampex Corp.

Suppose the assignment is to record an orchestra with a singer soloist, but the singer is unable to be present. There's no need to call off the recording session — record the orchestra on one channel. When the singer comes in at a later date, the tape can be run through the recorder with the recording head on the orchestra track switched to *playback*. The singer hears this over headphones. She sings in time with the music to a “live” mike that feeds a recording head on another track in complete synchronization with the originally recorded music and without disturbing the original recording.

Once both channels are satisfactory, they are balanced in recording to a monaural, or to a stereo if desired, through appropriate mixing networks.

TO CORRECT A POOR PERFORMANCE



If during a recording session the various sounds going to separate channels have been kept well isolated from each other, any one track can be erased and re-recorded again without affecting the others. If, for example, a combo with a trumpet solo had been recorded on separate tracks and it was later discovered that the soloist had muffed a note, this can be corrected by calling back only the trumpet player. Using *Sel-sync* as described above, this particular track is re-recorded with a new solo. (Erasure of the incorrect track is automatic when recording on the track to be corrected.)

UNLIMITED SPECIAL EFFECTS

Virtually any number of special effects can be created, limited only by the number of channels on the recorder. Multiple effects, for example, are simple and effective. To produce these, individual or group performances are recorded on one channel. Then, using *Sel-sync*, another performance is added to a second channel. By mastering both to a monaural the effect is an “overdub.” This is the technique used so effectively by Les Paul and Mary Ford. Their recordings are made on a special 8-Channel Ampex.

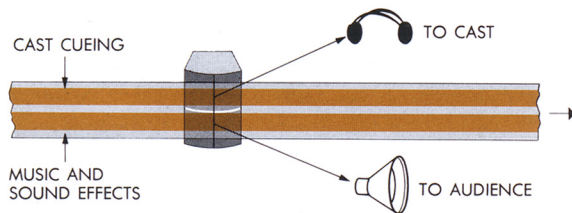
Multiple recordings can also be used in stereo playback to achieve “novelty” separation effects.

Echos are easy to add. The playback of the first recorded channel is fed into the recording head of a second channel. The second recording duplicates the first but lags a fraction of a second. When both channels are played back at the same time, the effect is that of an echo. (This can also be done on just one track by feeding the output of the playback to the record amplifier.)

OPPORTUNITIES IN SPECIAL ASSIGNMENTS

When you are equipped with an Ampex Multi-Channel Recorder you will be able to take on a wide variety of special assignments not possible with single-channel machines. Often these are very profitable because they require multi-channel equipment and knowledge not shared by everyone in the recording business.

THEATRICAL SOUND EFFECTS PLUS CAST CUEING - SYNCHRONIZED



A popular ice show and an operatic puppet show both depend on Ampex Multi-Channel Recorders to supply the music and sound effects heard by the audience — and the perfectly timed cueing for the cast back stage. Both the sound for the audience and directions for the cast come off the same tape. In making the recording, the music, dialog or other sounds to be heard by the audience are recorded first on one channel. Then while monitoring this recording over headphones, the director or producer can record instructions to the cast on a second channel, and the two channels will be synchronized. The *Sel-sync* attachment is not necessary in this instance as absolute tempo synchronization is not required here. (The time lag is only a fraction of one second.)

When used in the theater the music and sound effects channel is fed over separate amplifiers and speakers to the audience. The second channel with cast cues plays over a separate system set up back stage. There, over subdued small speakers or headphones, everyone from the curtain man to the main star hears instructions as to when to go out on the stage, turn up the lights, or what have you — without ever having to listen to or worry about what is going on out on the stage. They never miss-cue. They can't — it's all synchronized for every performance on multi-channel tapes.

LANGUAGE INSTRUCTION

With multi-channel equipment, a perfect recording of pronunciation exercises can be made by an instructor on one channel. Students, wearing headphones, can listen to this during playback and can practice-record their own voices along with the instructor's on a second channel. Now the student can rewind and replay the tape and listen to his pronunciation compared to the instructor's — both will be speaking in perfect synchronization. An extremely effective teaching method.

The master recording of the instructor speaking is usually made on a regular multi-channel recorder. For classroom playback use, Ampex makes a special recorder in which there is only a playback head (no record or erase) over

the instructor track. The second channel, however, is equipped with all three heads so that the student channel can be used over and over again indefinitely. The tape is reused by simply erasing only the student channel and allowing others to record over again.

RUNNING COMMENTARIES

Automobile shows, symphonies, historic occasions and other public functions often present one-chance opportunities in which a commentator's evaluation should be recorded along with the affair itself. When mikes are widely spaced, with a show on stage, the recorder in a second location and a commentator possibly in a press booth, balancing recording levels to a single-channel machine may present a complex problem. With two or more channels available, each can be recorded on separate channels and later balanced out to a finished monaural with ease. And during the mixing, each channel can be edited, permitting, for example, unwanted portions of the commentary to be removed without affecting the recording of the main event.

Simultaneous recordings of such commentaries are also very useful in group meetings, recording of scientific phenomena, and in medical and industrial applications.

SCIENTIFIC AND EDUCATIONAL USES

Often, psychological experiments and industrial noise studies require that a sound or stimulus be able to be replayed again and again and at the same time the reaction of the subject must be recorded, but only once. With multi-channel equipment these assignments can be handled almost routinely, erasing and re-recording the subject's channel as many times as necessary.

Ampex Multi-Channel Recorders can also be used in certain automation systems. In these applications energizing pulses can be pre-recorded on the channels to cause certain mechanical or electronic actions to take place, simultaneously with recorded commentary or music if desired.

COMPLETE RECORDING FACILITY

Multi-Channel Recorders do everything a single-channel machine can do, only better . . . take on any sound recording assignment — stereo, monaural, special effects.

COMPACTNESS — essentially two or more recorders built into a single housing.

SIMPLICITY — separate controls for each channel . . . one reel of tape . . . one tape drive.

FLEXIBILITY — permit sounds to be multiplied . . . to add special effects at will . . . to re-record . . . to automate.

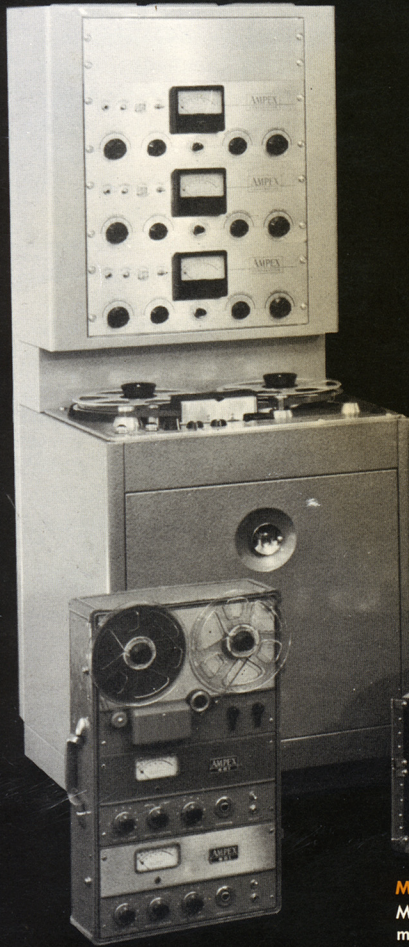
COMPLETE CONTROL — *Sel-sync* switching permits perfect tempo synchronization at all times.

DEPENDABILITY — long life and low maintenance.

UNIVERSAL ACCEPTANCE — tapes recorded on an Ampex Recorder are the accepted standard everywhere. They are the standard of the industry, world-wide.

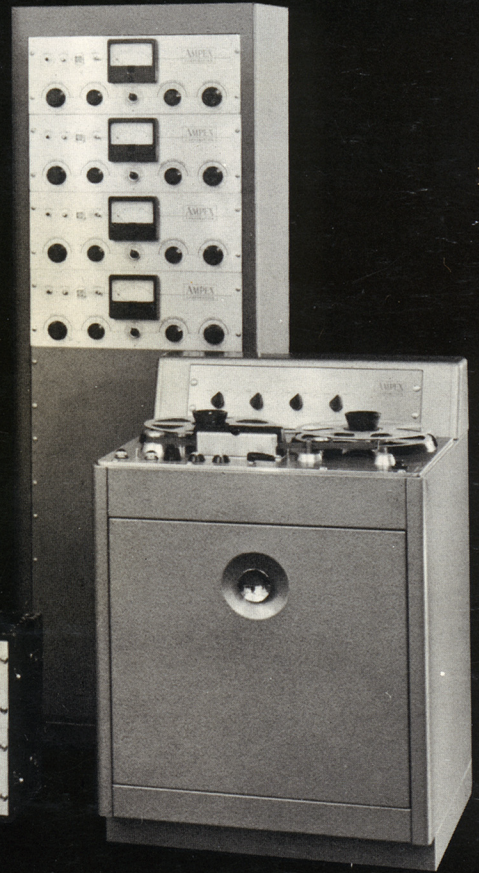
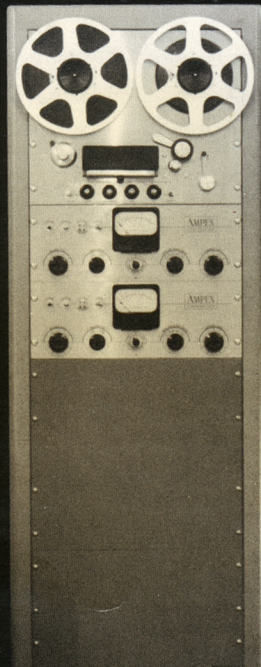
MODEL 300-3C

Magnetic tape recorder available in 2 and 3 channel console models. Rack mount or portables also available.



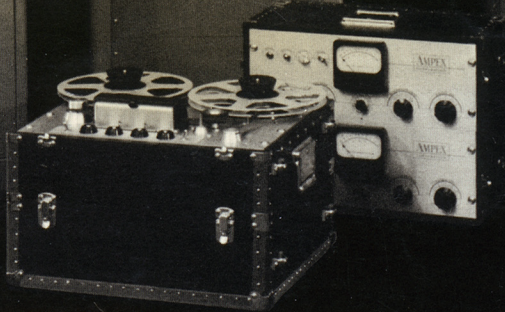
MODEL 351-2U

Magnetic tape recorder available in 2 channel for rack mounting.



MODEL 351-2P

Magnetic tape recorder portable model with 2 channels.



MODEL 300-455-C

Magnetic tape recorder 4-channel 1/2" tape model with Sel-sync control on console. Other models available up to 8 channels and up to 1" tape width on special order.

MODEL 601-2

Portable stereophonic tape recorder available with 2 channels only.



All models available in single-channel versions with full or half track heads.

Also makers of High Speed Tape Duplicators, Digital and Analog Tape Recorders, the VR-1000 Videotape* Recorder and stereophonic music systems for the home.

Detailed brochures and specifications available on all equipment

934 CHARTER STREET, REDWOOD CITY, CALIFORNIA
OFFICES AND DEALERS IN PRINCIPAL CITIES. REPRESENTATIVES IN OVER 50 FOREIGN COUNTRIES

