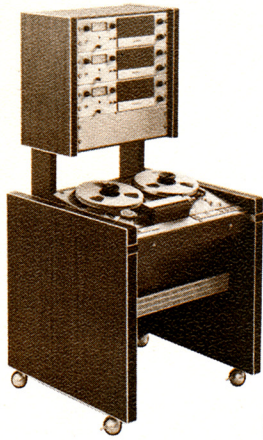


AMPEX

MR-70

The World's Most Advanced Master Recorder

*Establishing new standards of performance, reliability
and operating convenience in master recording.*



The MR-70 Master Recorder is the result of three years of research, testing, and development, during which Ampex engineers worked closely with key individuals in the Recording Industry. Their common objective was to establish new standards of performance, reliability and operating convenience in a master recorder. The result is the Ampex MR-70—a totally new master recorder—with major design innovations that meet the exacting requirements of the Recording Industry.



PERFORMANCE

The MR-70 has no equal in total performance. No effort was spared in its design and development to fulfill the demands of the recording industry in producing the finest quality monophonic and stereo masters.

- With today's low noise tapes, an improvement in **broad-band (20 cps to 15 kc) signal-to-noise ratio of 10 db** is realized over previous specifications.
- The electronics of the MR-70 are capable of even higher performance with future tape improvements.
- Frequency modulation noise ("scrape flutter") is virtually eliminated through unique design of the head assembly, employing a precision idler in the critical unsupported tape path, reducing the unsupported tape path length. **(A)**
- Components are permanently aligned to the most rigid and massive heavy-ribbed casting ever used in an audio recorder, assuring stability and precision of tape motion and tape tracking throughout the long life of the recorder. **(B)**
- Tape speed is "repeatable" and identical from reel to reel, and from day to day, even if recorder is moved between recording sessions.
- A constant hold-back tension system maintains constant tape speed and alignment from beginning to end of reel. **(C,C₂)**
- Viscous damped reel idler (a "floating" flywheel in an oil-filled shell) reduces wow. **(D)**
- Dynamic range is assured by generous electronic overload margin. Record amplifier:
Distortion, 25 db above operating levels, is less than 1% from 30 cps to 15 kc.
- Reproduce amplifier:
Distortion, at tape saturation level (14 db above operating level), is less than 1% from 30 cps to 15 kc.

- A balanced 150 kc master oscillator in the transport drives a feedback-stabilized bias and erase amplifier in each electronics, and maintains low noise and absence of even order distortion. The resulting symmetrical bias waveform eliminates the need for a "noise balance" control. The 150 kc bias frequency minimizes audible beats between the bias and the harmonics of high frequency signals.

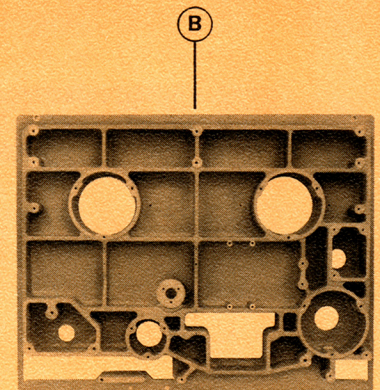
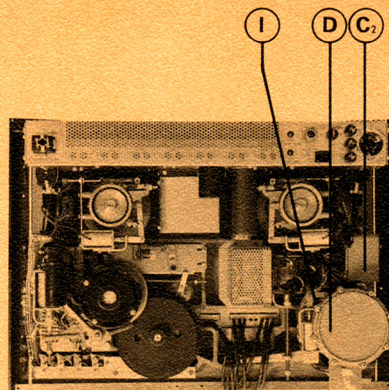
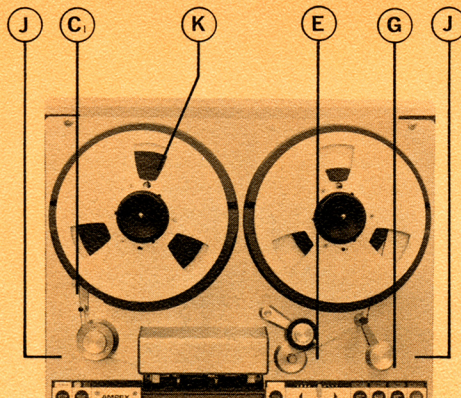
- Stray bias signals in the output line are kept 40 db below operating level.

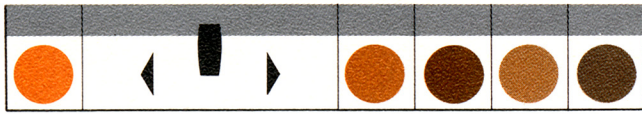


OPERATIONAL FEATURES

Convenience and ease of operation are key advantages of the MR-70. From variable speed winding and rewinding to facilities for easy editing, the MR-70 was designed with the operator in mind.

- Convenient variable-speed wind/rewind (from creeping to 400 ips in either direction) for easy locating and editing. **(E)**
- Fully automatic tape lifters; manually retractable at any time. **(F)**
- Easy editing foot pedal (optional), or panel push-button **(G)** further simplify the editing function by: (1) releasing brakes in "stop" to permit hand movement of tape; (2) stopping take-up reel in "play" to allow tape to "spill" if desired; (3) cancelling tape lifters.
- Drop down gate provides full access to heads for easy cleaning, demagnetizing, and editing. **(H)**
- Fast, positive starts are guaranteed by supplying power **(I)** boost to reel idler and take-up motors during start function.
- Easy-to-see illuminated push-button controls for all functions. **(J)**
- Either U. S. (NAB and EIA) or European (CCIR) type reel can be used. **(K)**





Convenient remote control (optional) features include:

- .. Operation of all functions of record, play, fast forward, rewind, stop, and even gate-close in fast mode.
- .. Indicator lights showing mode condition of recorder.
- .. Remote operation of the output selector (A-B) functions.
- .. Remote control of recording and reproducing levels.

Built-in switching circuitry for Sel Sync* (see Sel Sync under accessories. (L))

When the tape speed is selected on the transport, relays automatically switch to the proper equalization in the electronics. A high-frequency response selector switch allows selection of three different post-emphasis characteristics for each speed: for 15 ips, NAB (50 microseconds), CCIR (35 microseconds), or AME†. In the 7½ ips or 30 ips speed position, any three post-emphasis characteristics from 17.5 to 100 microseconds may be pre-adjusted and then selected as desired. A separate switch controls the low end at each speed so that the 3180 microsecond low frequency pre- and post-emphasis may be switched in or out as required. Adjustments have sufficient range to accommodate equalization curves other than the labeled function. For example, the CCIR position could be re-adjusted to be a position for NAB post-emphasis, and pre-emphasis for high output tape.

Excellent stability and repeatability of performance under environmental or line voltage extremes improved by:

- .. Conservative design using only premium quality components.
- .. Stabilized circuitry — maintained by generous amount of feedback.
- .. High torque, high stability potentiometers which minimize changes due to shock or environments.
- .. Positive locks on record and reproduce level controls prevent accidental change of settings. (M)
- .. See last page for operational features of new Console Cabinet.



RELIABILITY

Long term, "year-in-year-out" dependability provided by use of high quality components, life testings, and Ampex leadership and experience in the design and manufacture of precision magnetic recorders for audio, video, instrumentation and computer applications.

High grade (ABEC class 7) ball bearings are used in all critical areas.

*Sel Sync (Selective Synchronization) TM Ampex Corp.

†Ampex Master Equalization

- Maximum reliability and performance are obtained through use of military/industrial grade nuvistors which: (N)
 - .. Are 10 to 20 times more reliable than conventional vacuum tubes.
 - .. Have a dynamic range that exceeds that of transistors, and provides greater safety margin for overloads.
 - .. Are rugged and reliable under shock and overload conditions.
 - .. Have closely controlled performance parameters (usually falling within $\pm 10\%$).
 - .. Require only TWO types of nuvistors which greatly reduces spare parts requirements.

- Newly designed precision head assembly guarantees perfect alignment throughout life of recorder. Fixed azimuth and zenith. **No adjustment is necessary for the life of the heads.** (Adjustable playback heads are available.) All head stacks are individually replaceable, and the same assembly can accommodate either ¼, ½, or 1 inch stacks. (O)

- Non-corrosive gold contacts are used on all switches and relays for dry circuits. Silver or palladium is used for high level circuits.

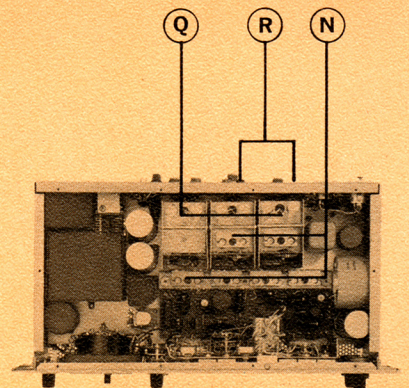
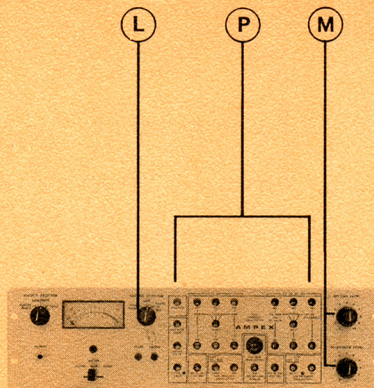
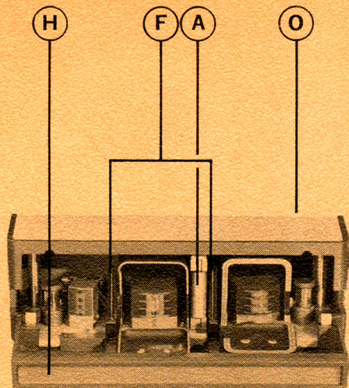
- Exacting quality control standards, life-testing procedures, superior components, and a large portion of Ampex experience have combined to make the MR-70 the world's most reliable master recorder.



MAINTAINABILITY

The MR-70 is designed throughout for minimum maintenance. Periodic preventive care is simplified to require minimum time and expense.

- Modular design, front panel adjustments and high quality components all add up to easy maintenance for the MR-70. (P)
- Plug-in electronic modules provide easy accessibility and maintainability of power dissipating functions. The record head drive and line output are accomplished with identical plug-in output amplifiers. The bias amplifier, master bias oscillator and Sel Sync* preamplifier are also modular. (Q)
- Rugged nuvistors are not damaged by accidental overload during servicing. (N)
- Test jacks are provided so that playback and record channels may be quickly and easily checked with instruments without disconnecting equipment. (R)
- See last page for maintenance features of new Console Cabinet.



A TOTALLY NEW MASTER RECORDER



With Major Design Innovations to Meet the Exacting Standards of the Recording Industry

In addition to the many advanced design features in tape transport and electronics, the MR-70 provides many **basic advantages in overall design concept** . . . advantages essential to the **compatibility** and **flexibility** requirements of modern master recording techniques and procedures:

1. The ability to record up to **eight** channels on one recorder.
2. Uses standard width tape — ¼, ½, or 1 inch.
3. Heavy cast frame to guarantee perfect alignment of components.
4. Easy, familiar editing procedures to reduce possibility of error.
5. Has its own erase head — tapes do not have to be "bulk" erased.
6. Built-in safety braking feature to keep tape from spilling in case of power failure or emergency.
7. The important ability to provide "sound-on-sound" recording or "over-dubbing."
8. Maintains compatibility with existing tape libraries.

ACCESSORIES FOR THE MR-70

STUDIO CONSOLE The compact, convenient console designed for the MR-70 offers many advantages and desirable features for the Master Recordist.

- The transport is mounted on a frame that will tilt to three different operating positions.
- The unit may also be tilted to a vertical position for easy maintenance and service.
- With plug-in cables removed the entire unit will swing through a 360° arc.
- The transport may be removed from the console by simply sliding along channels.
- Positive position locking of transport is maintained with self-locking sliding bolt.
- Front panel of the transport is hinged and may be released by two push-button catches. Simplifies adjustments when required.
- The console is beautifully finished on all sides (including the back), so it need not be placed against a wall to hide unsightly appearance. All cables are housed, and come into the console at floor level.
- Tough vinyl finish, in simulated walnut grain, will remain new looking even after years of constant service.
- Sheppard casters provide easy movement. Front two are locking type.
- For ease in shipment and lower freight costs, console may be easily dismantled before shipping if desired.

SEL SYNC* Sel Sync is an equalized plug-in playback pre-amplifier that allows the recording head to be used as a playback head. Incorporates 50 microsecond post-emphasis characteristics plus compensation for gap loss of record head.

EDITING FOOT PEDAL This is a valuable accessory for any master recordist. It frees the operator's hands during editing

operations by performing the following functions:

1. In STOP MODE: While the pedal is depressed, the reel brakes are released, a light hysteresis braking is applied, and the headgate is closed for easy editing and spot locating. Transport automatically returns to STOP when pedal is released.
2. In PLAY MODE: While the pedal is depressed, the take-up reel is stopped and the safe-switch is disabled to allow "spilling" tape. Transport stops when pedal is released.
3. In FAST MODE: While pedal is depressed, the headgate is closed; the gate opens when the pedal is released.
4. In RECORD MODE: The foot pedal is completely disabled and cannot interrupt a recording.

(Editing Push-Button is used when the foot pedal cannot be installed. Functions are the same as for the foot pedal, except that the editing circuit "holds" when the push-button is depressed and can only be released by pressing the "stop" button.)

MODEL OPTIONS

STANDARD MODELS All with in-line heads; dual speed 7½–15 ips, or 15–30 ips.

- MR-70-1 Single-channel (full track), ¼" tape
- MR-70-2 Two channel, ¼" tape width
- MR-70-3 Three channel, ½" tape width
- MR-70-4 Four channel, ½" or 1" tape width

SPECIAL MODELS MR-70-6 and 8 Six and eight channel 1" tape

SPECIFICATIONS See insert #A082S for complete performance specifications.

MORE INFORMATION AVAILABLE

Further technical information about the design of the MR-70 Master Recorder may be found in the following papers available from Ampex Corporation, Dept. 7-14, 401 Broadway, Redwood City, California. Request Bulletin #A166.

1. "Performance and Reliability Requirements for a Master Tape Recorder," **Journal Audio Engineering Society** 12, 274–279 October 1964. R. Narma and W. M. Fujii.
2. "Dynamic Range Limitations in Tape Recording," **Journal Audio Engineering Society** 12, 294–297 October 1964. R. Z. Langevin.
3. "Noise Limitations in Tape Reproducers," **Journal Audio Engineering Society** 12, 280–293 October 1964. E. P. Skov.
4. "Mechanical Damping in Tape Transports," **Journal Audio Engineering Society** 12, 140–146 April 1964. J. G. McKnight.

AMPEX

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