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 broadband (20 cps to 15 kci) 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.G.)

- 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 one of three different post-emphasis characteristics for each speed: for 15 ips, NAB (50 microseconds), CCIR (35 microseconds), or AMEX. In the 7 1/2, 15, or 30 ips speed positions, 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 testing, 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.

- Maximum reliability and performance are obtained through use of military/industrial grade nuistors 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 ± 10%).
- Require only TWO types of nuistors which greatly reduces spare parts requirements.

- Newly designed precision heat 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 1/4, 1/2, 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 dissipation 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 nuistors are not damaged by accidental overload during servicing. (R)

- 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 es-
tential 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.
- Shephard 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
preamplifier 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 locat-
ing. 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 de-
pressed 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" or ½" tape width
- MR-70-3 Three channel,½" or 1" 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 #21628 for complete perfor-

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. 6-1, 401
Broadway, Redwood City, California.

1. “Performance and Reliability Requirements for a Master Tape Re-
R. Narma and W. M. Fujii.
2. “Dynamic Range Limitations in Tape Recording,” Journal Audio Engi-
3. “Noise Limitations in Tape Reproducers,” Journal Audio Engineering
4. “Mechanical Damping in Tape Transports,” Journal Audio Engineering
Society 12, 140—146 April 1964. J. G. McKnight.