

PRELIMINARY

MR-70 MASTER RECORDER

DESIGNED SPECIFICALLY FOR THE MASTER RECORDING INDUSTRY

GENERAL The totally new Ampex MR-70 incorporates major design innovations to meet the increasing demands of the recording industry. It represents three years of planning, research and development, while working closely with recording industry engineers.

PERFORMANCE MAJOR ADVANCES IN ELECTRICAL AND MECHANICAL PERFORMANCE:

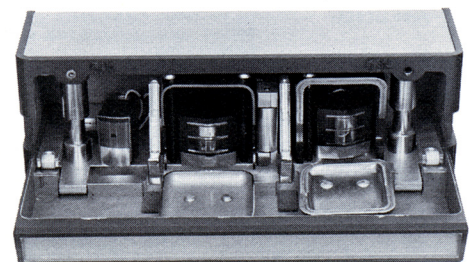
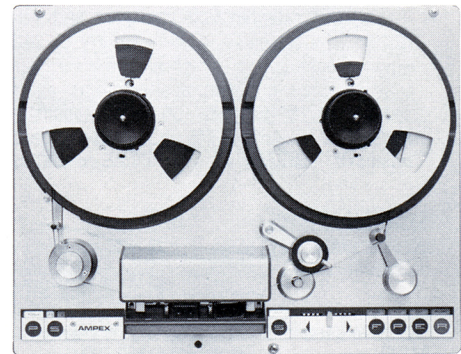
1. 10 db improvement in overall signal-to-noise ratio.
2. Major reduction in electronic distortion.
3. Built-in capability for even higher performance with future tape improvements.
4. Radically improved tape motion.
5. Maximum reliability through use of industrial/military grade Nuvistors.
6. Fully compatible with other ¼-inch and ½-inch Ampex recorders.
7. Human-engineered for easy loading and editing.

TAPE TRANSPORT The outstanding mechanical performance and reliability of the MR-70 is provided by a wide number of design features in the drive system:

- Indirect drive by heavy-duty hysteresis synchronous motor.
- Fast, positive starts — essential to master recording techniques — provided by power boost to reel idler, motors and solenoids during start function.
- Precision and stability of tape motion (flutter, scrape flutter, wow, drift) improved and assured by:
 - a. permanent component alignment to massive, heavy-ribbed casting;
 - b. viscous damping of reel idler (a "floating" flywheel in an oil-filled shell);
 - c. additional scrape flutter idler in critical area of head assembly tape path;
 - d. greater precision of bearings and all critical parts.
- Speed accuracy is "repeatable" and identical from reel to reel, day to day, even after movement of recorder from one location to another.
- Illuminated push button control of all functions; over-sized solenoids in critical positions; rugged telephone-type relays.
- Positive, constant holdback-tension system utilizing a servo loop maintains constant tape speed and alignment from beginning to end of reel.
- Interchangeable hubs for turntables permit use of either U.S. (NAB and EIA) or European (CCIR) type reels.
- Variable speed wind/rewind (from creeping to 400 ips in either direction) for easy and efficient editing.
- Easy editing edit button (1) releases brakes to permit easy hand movement of tapes (2) stops take-up reel allowing tape to "spill" (3) cancels tape lifters.

HEADS/HEAD ASSEMBLY

- Three new high precision heads are machined and aligned to maintain absolute azimuth and zenith and require **no adjustment for the life of the heads.**
- Fixed azimuth head stacks are individually replaceable and one head assembly can accommodate either ¼, ½, or 1" head stacks.
- Scrape flutter idler reduces modulation noise.
- Power operated tape lifters.
- Drop down gate, providing full access to heads for easy editing and cleaning.



ELECTRONICS All new, advanced nuvistor electronics have been designed for the MR-70 to take full advantage of today's low noise tapes, and to anticipate the potential improvements in tape during the next ten years.

- With the use of today's low noise tapes, an improvement in broadband (20 cps to 15 Kc) signal-to-noise ratio of 10 db is realized over previous Ampex recorders and tapes.
- Electronics are capable of another 10 db improvement in signal-to-noise ratio as tape improves.
- Improved frequency response (see specifications).
- Maximum reliability and performance through use of industrial/military grade Nuvistors. Test-proven to be 10 to 20 times more reliable than conventional vacuum tubes, and twice as reliable as conventional germanium transistors.
- Variety and range of adjustments increased to accommodate future equalization curves.
- Electronics are extremely stable; capable of long periods of operation, allowing changes in line voltage and environments without need for re-adjustment. This is accomplished by the use of conservative design, highly stable circuits, large amounts of feedback, and premium quality components.
- Record driver-amplifier, line amplifier, bias amplifier, master bias oscillator and Sel Sync* pre-amplifier are plug-in modules.
- Record and playback level controls incorporate locks to prevent accidental change of settings.
- Built-in Sel Sync* — a switching system that permits converting any of the recording heads to serve as a temporary playback head, while the others are still recording.

Additional electronic features:

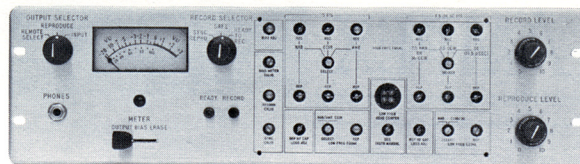
- A balanced 150 kc bias and erase oscillator in transport feeds a balanced bias amplifier in each electronics, thus eliminating the need for a "noise balance" control. The 150 kc bias frequency reduces noise at 15 ips and 30 ips speeds, minimizes beats between harmonics of high frequency signals and the bias.
- Stray bias signals at output line 40 db below operating level.
- Two speeds selected from transport, with relays switching equalization in electronics. A wide variety of equalizations are available for each speed. A high end selector switch allows the 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 post-emphasis characteristics from 17.5 to 100 microseconds may be

SPECIFICATIONS

OVERALL FREQUENCY RESPONSE:	30 ips 15 ips 7½ ips	40 cps to 20 kc ±1 db 30 cps to 15 kc ±1 db 25 cps to 20 kc ±2 db 50 cps to 12 kc ±1 db 30 cps to 18 kc ±2 db
SIGNAL-TO-NOISE RATIO:	7½ or 15 ips (NAB curve) Full track (234 mil track) 2 track ½" (200 mil track) 2 track ¼" and 3 track ½" (74 & 100 mil tracks) At 30 ips Full track (234 mil track) 2 track ½" (200 mil track) 2 track ¼" & 3 track ½" (74 & 100 mil track)	70 db 69 db 65 db 73 db 72 db 68 db
Peak record level long wavelength remanent flux level of (one Maxwell/inch of track-width) approx. 3% THD to unweighted noise (in a 20 cps-15 kc band) db. Low noise tape (3M-201).		
FLUTTER AND WOW:	30 ips less than .05% rms 15 ips less than .05% rms 7½ ips less than .08% rms Measured according to ASA Z 57.1-1954 all components from 0.5 cps to 250 cps included	
CROSSTALK:	50 db on standard multi-channel models	
START TIME:	Motor assisted fast start to full speed: 0.1 sec. ¼ & ½" tape. To stable tape motion 0.5 sec. ¼ & ½" tape	
TIMING ACCURACY:	±0.15%	
FAST MODES:	Single lever, continuously variable from 0 to 400 ips. Rewind time approximately eighty seconds for 10½" (2400 ft.) reel.	
MAXIMUM REEL SIZE:	11½" CCIR maximum	
TAPE SPEEDS:	2 speeds available, either 7½, 15 ips or 15/30 ips	

All specifications were determined from engineering prototypes. Specifications from production models should not differ significantly.

* TM — Ampex



preadjusted and then selected as desired. Another 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 desired.

- All normally used adjustments are available from the front panel.
- Test jacks are provided so that playback and record channels may be quickly checked with instruments without disconnecting equipment.
- All components readily accessible for service when plug-in amplifiers are removed.
- Record selector can be set to safe position (cannot record), ready-to-record, or Sel Sync* position. In the Sel Sync* position the record head is connected thru separate plug-in preamplifier to the line amplifier.
- Adequate overload margin in both record and playback channels. In the record channel the distortion at 25 db above operating level is less than 1% from 30 cps to 15 kc. In playback, distortion is less than 1% from 30 cps to 15 kc at tape saturation level (14 db above operating level).
- Line output strappable for 150 or 600 ohms without changing calibration since vu meter is on a different winding from the output. Output may be adjusted for +4 or +8 vu line level.
- Output may be switched from record to reproduce (A-B) from a remote location.
- Vu meter may be switched from output to bias or erase without affecting output.
- The record calibration output (after record gain control) is available at a -22 db level on a connector so that it may be continuously monitored.
- Potentiometer adjustments incorporate high stability, high torque construction to eliminate accidental change of adjustment.
- Gold plated contacts used on all switches and relays for dry circuit applications. Silver or palladium contacts used for power switching.

NUMBER OF CHANNELS	¼" tape — 1 or 2 channels
AND TAPE WIDTH	½" tape — 2, 3 or 4 channels
AVAILABLE:	1" tape — 3, 4, 6 or 8 channels
CONTROLS	On/Off switch
(Illuminated Pushbutton)	High/low speed switch (interlocked with electronics) Stop Fast (pushbutton and lever — pushbutton places transport into fast mode — lever controls direction & speed). Play Edit (In Stop, releases brakes and applies light hysteresis braking; in Play, stops take-up reel; in Fast mode cancels tape lifters). Record — Starts transport when electronics are in "ready-to-record" position.
MONITORING:	Independent record and playback systems allow tape to be monitored while recording. Independent sync pre-amplifier. Monitor output may be switched from remote location.
EQUALIZATION:	Equalization switching interlocked with transport speed switch. Choice of curves NAB, CCIR, AME, as well as adjustments to accommodate other curves in the 17.5 microsecond to 100 microsecond range either with or without the 3180 microsecond low frequency pre-emphasis.
INPUT:	Unbalanced 60 K ohm convertible to balanced 20 K (with plug-in bridging transformer). Will accept line levels from -20 to +12 vu.
OUTPUT:	150 or 600 ohm impedance +4 vu or +8 vu nominal line level. Balanced or unbalanced.
POWER LINE:	Strappable 115 or 230 range, adjustable by switch for ±10 volts providing for AC nominal voltages of 105, 115, 125, 220, 230 or 240. Versions for 50 and 60 cycle operation available.



AMPEX CORPORATION
PROFESSIONAL AUDIO PRODUCTS

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