

A professional audio recorder, the AmpeX ATR-100, is shown from a high-angle perspective. The device is primarily black with silver accents. At the top, a control panel features a central analog meter with a scale from 0 to 10, flanked by two large rotary knobs labeled 'REPRODUCE' and 'RECORD'. Below these are smaller knobs and buttons for 'MANUAL' and 'PRESET'. The main body of the recorder is a dark, textured surface. In the center, a large, circular, silver-colored reel is mounted on a central spindle. To the right, a control panel with a grid of buttons and a small digital display is visible. The overall aesthetic is functional and professional, typical of high-quality audio equipment from the late 20th century.

AMPEX

ATR-100 Series
Professional Audio
Recorder

A different kind of audio recorder

ATR-100





ATR-100

In the three decades since Ampex introduced the first commercially feasible audio tape recorder in the U.S., many newer and improved recorders have come along. None of them, however, represented as great a step forward as this newest Ampex triumph, the ATR-100 Series.

The ATR-100 is a **different kind** of professional audio recorder, and here "different" means vastly better performance by any measurement.

Look at the specifications. Some of them are as much as an **order of magnitude** better than any other recorder now available.

Look at the all-new transport featuring a superb, fully servoed tape handling system and unique capstan drive with no pinch roller.

Look at the new matrix-type control panel, designed to be used as efficiently as a hand-held calculator.

Look at the editing capabilities, unrivaled by any audio recorder.

Look at its adaptability to any world recording standards and techniques.

Look at its maintainability, requiring only a handful of tools.

Close inspection of the ATR-100 and a demonstration of its capabilities prove beyond doubt that this is a truly different kind—a better kind—of audio recorder.

Performance

Incredible as it sounds, ATR-100 performance specifications are as much as an order of magnitude better than any presently achievable on any other audio recorder. A bold claim, especially in view of the conservative approach that Ampex traditionally takes toward quoted specifications.

Distortion Third harmonic distortion and intermodulation distortion are both at least an order of magnitude better. Third harmonic distortion is less than 0.3% at a recorded flux level of 370 nWb/m (0 VU). Intermodulation distortion is less than 1.0% at the same recorded flux level.

Signal-to-Noise This specification depends, of course, on tape speed and the particular technique of measurement used. Any way you measure it, ATR-100 S/N is significantly better than any other audio recorder. For example, it is in excess of 80 dB at 30 in/s, ANSI "A" weighted.

Frequency Response Ferrite heads and fluxgate head design deliver unbelievable response. Again, specs depend on tape speed and the range of frequencies measured, but look at ATR-100 response at 15 in/s over the commonly used range of 100 Hz to 15 kHz: just $\pm 3\%$ dB!

You can actually see the superiority of the ATR-100's semi-automatic phase equalization by observing on a scope how remarkably well it makes square waves. This outstanding phase response is achieved by a unique record circuit.

Flutter This specification also depends on tape speed and measurement technique, but consider a worst case. At 30 in/s the ATR-100 achieves full flutter spec in 0.5 second.

Speed/Timing Accuracy The triple-servo transport and unique capstan combine to deliver



superb speed accuracy. Speed variation from the beginning to the end of a full 2400-foot reel is just .02% maximum.

These specifications are only a few examples of the unprecedented performance of the ATR-100. The capabilities of the ATR-100 also allow it to use higher coercivity tape than any now available. When better tape is here, the ATR-100 can take full advantage of it.

Description

It even **looks** different. Any ATR-100 Series recorder is built around the basic machine, consisting of the transport with audio and transport electronics. There is an unbalanced input-output circuit with no meters and no operator adjustments, and in some places and some applications, that's enough. Yet all the advantages are here.

There is nothing traditional about the transport except Ampex quality. A super-rigid aluminum transport casting supports the fully servoed tape handling system. Both reel motors are servoed, as is the capstan, which has no pinch roller. You're assured of precise speed accu-

racy with constant tape tension at all times. With no tension adjustment, the ATR-100 handles any reel size from 2 inches to 14 inches in diameter.

The ATR-100 also treats your valuable tapes with a special brand of kindness. When you thread up a tape and engage the servos, constant tension takes over to insure that you never stretch a tape. You have positive, gentle control of tape motion in either direction at any speed, with complete confidence.

Dynamic braking on the ATR-100 also contributes to smooth tape handling, and also takes over in the event of a power failure to prevent tape damage. The ATR-100 always stops in a programmed manner, even without power.

Ferrite heads, unrivaled for performance and long life, are used in the ATR-100. Ceramic tape guides help provide precise tracking accuracy with gentle tape guidance. For additional protection, there is also a unique head gate that can be raised and lowered.

Four standard record/playback speeds are available on all ATR-100 Series recorders, any two of which can be selected—or changed—by the user. The speeds do not



even have to be adjacent. Choose any pair from 3¾, 7½, 15 or 30 inches per second. You can order a 7½/15 in/s version, for example and later set it up for any other speed pair, even 3¾ and 30 in/s if you wish.

A speed selector knob for all four speeds is located on top of the head assembly cover. If a speed is selected other than the pair for which the machine is set up, the machine won't start, and a lamp near the selector knob illuminates as a reminder.

Control Panel No other feature of the ATR-100 is more visually and functionally up-to-the-minute than the new matrix-type control panel with LED indicators. With channel selectors and mode controls so conveniently arranged, any operator will soon find himself working more smoothly and efficiently than ever. What's more, the control panel can be mounted on either the right or the left side of the transport. (Left-handed tape machine operators of the world, your day has come!)

All transport controls have international symbols. There is no restriction on sequencing; you can go from any transport mode to any other without going through Stop, and without waiting for the machine to slow down or speed up.

An optional remote control panel with a 25-foot cable contains all functions except Dump Edit and deactivate servos.

An extremely accurate integral tape timer is standard equipment on the ATR-100. Its bright display reads in hours, minutes, and seconds, or you can set it up to display minutes, seconds, and tenths if you wish.



If your application requires more than just the basic ATR-100, then you can add optional input-output modules for a full capability one, two or four-channel recorder. (ATR-101, ATR-102, or ATR-104, respectively.) Each I/O module includes the nor-

Configurations

mal balanced input and output circuitry and its own metering. You can even switch the metering between ASA ballistics with VU indication, or EBU ballistics with Peak indication.

Transport and I/O modules are mounted in the attractive new optional cabinet, which can be placed on a bench or on the companion roll-around pedestal. Mounted on the pedestal, the recorder can be adjusted to any angle to suit the operator's preference.



Editing Along with all its performance benefits, the ATR-100 offers a number of features that make editing faster and easier.

First of all, the Ampex PURC (Pick Up Record Capability) is standard on all ATR-100 Series recorders. PURC gives you perfectly timed edits by eliminating the overlap at the beginning and the hole at the end of an edit.

ATR-100 machines can wind tape at speeds that you have to see to believe. You can wind a full 2400-



foot reel to another reel in just 60 seconds. Spool Mode allows you to spool tape off for storage at 60 or 180 in/s in either direction.

Once you reach an edit point, using the integral tape timer as an aid, you can position the tape precisely by turning the knob on top of the capstan, using just one hand. You don't have to rock the reels by hand.

To spill tape, the ATR-100 can be placed in Dump Edit mode. In this mode, the takeup tension arm is employed as a pinch roller, allowing the operator to spill tape in a controlled manner.

A Cosmopolitan Audio Tape Recorder

The basic ATR-100 is truly a recorder for anywhere in the world. Without modification or special accessories, it is adaptable to any locale. A universal power

supply allows it to operate from any line power source from 90 to 270 VAC, 50 or 60 Hz. Jumper settings for voltage, equalization, tape speeds, and operating levels permit the machine to be set up for any conditions preferred by users in every part of the world.

Maintainability

Thanks to the design concept employed in the ATR-100, it is one of the most easily maintainable audio recorders ever offered. All audio and transport electronics are easily accessible on plug-in cards employing backplane-type circuitry. I/O modules are easily removeable.

A minimum number of tools is all that is required for disassembly of the ATR-100. A couple of Allen wrenches are sufficient for most of the work you may ever want to do, including removal of the head assembly. The entire head assembly is precision machined to insure consistent tracking accuracy regardless of how many times head assemblies are changed. There's a limited azimuth adjustment, but you'll seldom if ever need it.

For added convenience, an ATR-100 mounted in the optional cabinet and pedestal can be turned completely upside down for servicing. You don't have to remove the transport from the cabinet, or take it off the pedestal.

A "Transparent" Recorder Ideally, a mixdown machine should be as "transparent" as possible to avoid degradation of the recorded signal. Considering its outstanding performance capabilities, the ATR-100 is as close to the ideal all-around recorder as you could find for any application; recording, mixdown, broadcast, postproduction or whatever. Once you've seen an ATR-100 in action, you'll never be satisfied with anything else.

Basic ATR-100

Transport

Audio & transport electronics (Basic machine can be configured as fixed rack mount or slide-type rack mount.)

Options & Accessories

Input/Output Modules (1, 2, or 4, as required)

Cabinet (One cabinet fits all configurations)

Pedestal (Attaches to cabinet)

Portable Case

Remote Control (With 25-foot cable)

VS-10 Variable Speed Oscillator (Allows variable capstan speed control ± 50 to 250% of nominal)



Preliminary Performance Specifications

ATR-100

TAPE WIDTHS ¼ inch (6.3 mm) for full track and 2 track 2 channel systems, 0.075 inch (1.9 mm) track width

½ inch (12.6 mm) for 4-track systems, 0.070 (1.8 mm) track width

TAPE SPEEDS 3.75 in/s (9.5 cm/s), 7.5 in/s (19.05 cm/s), 15 in/s (38.1 cm/s), 30 in/s (76.2 cm/s)

(any two speeds may be selected)

REEL SIZE 2-inch to 14-inch diameter (50 mm to 355 mm)

REEL TYPE NAB, EIA (cine')

INPUTS (with Input/Output system—bridging input standard)

Balanced, Floating

Input impedance—50k Ω , Resistive \pm 5.0%, 5Hz—20kHz

Input Level (variable):

Minimum: -5 dBm, to produce 1000nWb/m recorded flux level

Maximum: +40 dBm

Input clip level, including record amplifier at mid-freq. 26 dB above system operating level

Input level (preset)

-1dBm to +20dBm to produce 1000nWb/m recorded flux level.

OUTPUTS (with Input/Output system)

Balanced, Floating

Output impedance: <50 Ω , 5Hz—20kHz

Maximum output level:

with 600 Ω load—+28dBm

with 200 Ω load—+25dBm

Preset output level:

Line output level is adjustable over a range of +12dBm to -2dBm

Metering:

Meters are switchable, VU or peak

VU ballistics conform to ASA standards

Peak ballistics conform to EBU standards

Zero meter reading is continuously adjustable over a range of +12dBm to -2dBm line level

INPUTS (without Input/Output system)

Unbalanced

Input impedance—10k Ω , min., 5Hz—20kHz

Input level— -5dBm, nominal, for system operating level

-5dBm input level provides 26 dB clip level margin at mid-freq.

OUTPUTS (without Input/Output system)

Unbalanced

Output impedance—40 Ω , 5Hz—20kHz

Minimum load impedance—5k Ω

Output level -5dBm, nominal, for system operating level

-5dBm output level provides 26dB clip level margin at mid-freq.

OVERALL FREQUENCY RESPONSE

Speed	Reference Frequency	Within \pm 0.75dB	Within \pm 2.00dB	REFERENCE LEVEL* (0 is operating level)
30in/s	1kHz	200Hz - 20kHz	35Hz - 28kHz	0
15in/s	1kHz	100Hz - 15kHz	20Hz - 20kHz	0
7.5in/s	500Hz	100Hz - 10kHz	30Hz - 15kHz	-10dB
3.75in/s	500Hz	—	30Hz - 10kHz	-20dB

*Operating level is 370 nWb/m at 700Hz for Ampex 456 tape and 260 nWb/m at 700Hz for Ampex 406/407 tape.

SIGNAL-TO-NOISE RATIO Overall signal to noise ratio, 7.5 - 30in/s measured with respect to a record level of 1040 nWb/m (9dB above an operating level of 370 nWb/m) when using Ampex 456 tape or direct equivalent. At 1040 nWb/m mid-freq. 3rd harmonic distortion is less than 3%.

Tape Speed and Equalization	Track Format	30Hz - 18kHz Un-weighted	ANSI "A" Weighted	CCIR Rec 468 Weighted
30in/s AES	full trk.	77dB	81dB	73dB
	2T & 4T	72dB	76dB	67dB
15in/s IEC/CCIR	full trk.	74dB	78dB	70dB
	2T & 4T	70dB	74dB	65dB
15in/s NAB	full trk.	73dB	77dB	69dB
	2T & 4T	69dB	73dB	63dB
7.5in/s NAB	full trk.	75dB	78dB	70dB
	2T & 4T	71dB	74dB	63dB
7.5in/s IEC/CCIR	full trk.	71dB	76dB	67dB
	2T & 4T	68dB	71dB	62dB
*3.75in/s IEC/NAB	full trk.	68dB	72dB	64dB
	2T & 4T	64dB	66dB	57dB

*At 3.75in/s overall s/n ratio is measured with respect to a record level of 740 nWb/m (6dB above operating level of 370 nWb/m). At 740 nWb/m mid-freq. 3rd harmonic distortion is less than 3%.

Ampex Corporation reserves the right to change specifications without notice and without obligation. These specifications supersede all previous specifications, stated or implied.

EQUALIZATION Any two speeds of the four available are jumper selectable. These two speeds are then automatically switched with transport speed switch. Each speed selected provides equalization adjustable over the range of AES/NAB/IEC/CCIR Standards.

SYSTEM DISTORTION Electronics Distortion:

System electronics distortion, including record amplifier, reproduce amplifier and Input/Output system, at any operating level up to 20dB above operating level at mid-freq. is <.03% total harmonic distortion and <0.05% SMPTE intermodulation distortion.

Overall record/reproduce distortion (using Ampex 456 tape or direct equivalent)

System operating level (0 VU) = 370 nWb/m (6dB above 185 nWb/m)

EVEN ORDER DISTORTION Even order distortion of a 1kHz signal recorded at 370 nWb/m is less than 0.1%

7.5in/s—30in/s

THIRD HARMONIC DISTORTION at 1kHz:

<0.3% at recorded flux level of 370 nWb/m (0 VU)

<3.0% at recorded flux level of 1040 nWb/m (+9VU)

SMPTE INTERMODULATION DISTORTION: <1.0% at recorded flux level of 370 nWb/m (0 VU)

3.75in/s

THIRD HARMONIC DISTORTION at 500Hz

<0.5% at recorded flux level of 370 nWb/m (0 VU)

<3.0% at recorded flux level of 740 nWb/m (+6VU)

SMPTE INTERMODULATION DISTORTION

<2.0% at recorded flux level of 370 nWb/m (0 VU)

CROSSTALK Crosstalk is measured by simultaneously placing the channel under test, and an adjacent channel in record mode. The adjacent channel is fed with an operating level signal, the channel under test has its input shorted. The residual signal on the reproduced output of the channel under test relative to operating level, is less than:

45dB, 100Hz—15kHz at 15in/s for 2-track

ERASE DEPTH Using Ampex 456 tape or direct equivalent at any wavelength shorter than 75mils (200Hz @ 15in/s) recorded 6dB above system operating level.

85dB min.

ERASE FREQ.: 144kHz

BIAS FREQ.: 432kHz

(Both bias and erase frequencies are derived from master crystal oscillator)

SPEED ACCURACY: (using 1.0 - 1.5 mil base film thickness tape)

Absolute speed accuracy: ±0.03%

Speed variation from beginning to end of reel: 0.02% max.

STOP TIME: 5.0 Sec. from fast wind modes

2.0 Sec. from spooling mode

0.7 Sec. max. from play mode (30in/s)

REWIND TIME: Normal fast wind modes—60 sec. for 2400 ft. reel

Spooling modes: (for 2400 ft. reel)

180in/s—2.7 min.

60in/s—8.0 min.

FLUTTER AND WOW:

Speed	ANSI 54.3/ DIN 45507 Peak Weighted	ANSI/DIN Peak Un- Weighted	NAB RMS Unweighted
3.75in/s	±0.1%	±0.15%	0.1%
7.5in/s	±0.05%	±0.12%	0.06%
15in/s	±0.03%	±0.08%	0.04%
30in/s	±0.03%	±0.08%	0.03%

START TIME:

Speed	Time to attain flutter spec.
3.75in/s	100 milliseconds
7.5in/s	200 milliseconds
15in/s	250 milliseconds
30in/s	500 milliseconds

ELECTRONIC TAPE TIMER: Tape driven, reads in hours, minutes and seconds (option: minutes, seconds and tenths of seconds).

Absolute accuracy: ±.05% (1 sec. in 2400 ft. reel at 15in/s)

HEADS: Ferrite, precision mounted

Full track, ¼"

2-track, ¼"

4-track, ½"

SIZE: Basic machine (incl. transport, power supply and audio & servo electronics.)

19"W x 12"H x 16"D
(483mm x 305mm x 405mm)

Cabinet (1 or 2 channel)
21"W x 19"H x 32"D
(533mm x 483mm x 813mm)

Cabinet (4 channel)
21"W x 23"H x 34"D
(533mm x 584mm x 863mm)

Input/Output System (1 or 2 channel)
19"W x 3½"H x 10"D
(483mm x 89mm x 254mm)

Complete System (incl. basic machine, 4-channel cabinet, I/O system and roll-around pedestal)
26"W x 46½"H x 32"D
(660mm x 1180mm x 813mm)

WEIGHT:

Basic machine—25 lbs. (56kg)

Cabinet—15 lbs. (7kg)

I/O System (2 ch)—15 lbs. (7 kg)

Pedestal—50 lbs. (23kg)

POWER LINE REQUIREMENTS: 90-115, 110-135, 180-230, 220-270VAC., 50/60Hz

POWER CONSUMPTION: 0.6KVA max. (with all acc.)

ENVIRONMENTAL OPERATING SPECIFICATIONS:

Temperature: 10° - 50°C (50° - 122°F)

Humidity: 20 - 95%, non-condensing

Sales and Service

ATR-100

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