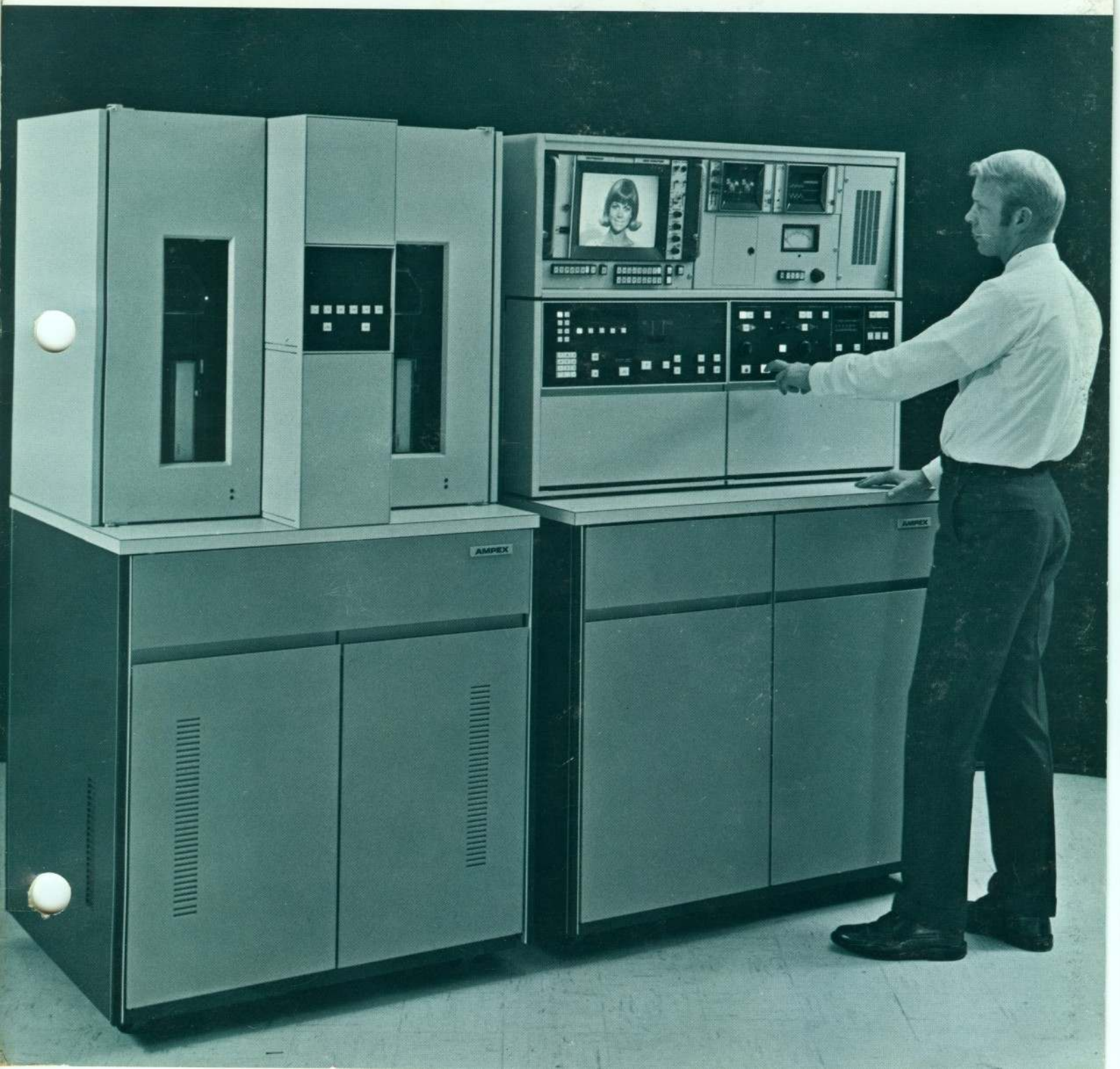
AMPEX

ACR-25
Automatic Video Cassette Recorder/Reproducer



ACR-25

The concept.

Smoother, cleaner station breaks. A more professional broadcast look to short-event sequences. Happier clients. Relief from the crunch of running short segments back-to-back on conventional videotape machines. A more efficient and economical use of manpower; a more profitable use of air time.

These long-awaited qualities are what make the broadcast video cassette so desirable. The AMPEX concept goes much further.

Ampex video engineers have built a cassette machine around the most advanced video engineering package in the world: the AVR-1. They have automated the cassette machine and made its operational controls few, simple, and basic. They have given it excellent color fidelity and consistent playback quality. They have given the broadcaster his continuing choice of random *or* sequential programming of up to 40 events from up to 24 cassettes, with the option of easy last-minute push-button changes. They have given him automatic, semi-automatic, and manual operation, or even operation controlled by his own computer. With an eye on industry standards, they have developed a low-cost, reloadable cassette that can be loaded with a segment from a conventional tape reel. To accommodate news and sports clips, interviews, and other short features, they have provided up to six minutes play time (15 ips). And they have made it possible to run ten-second spots back-to-back-to-back-to-back — indefinitely.

To state it another way: with the back-to-back capability, and the opportunity to make quick last-minute changes, they have given the broadcaster the ability to exploit a full 100% of his commercial air time. And as an important side benefit, they have given him a machine that can assemble short program segments into a full-length presentation by dubbing them in sequence onto a reel-to-reel VTR — automatically or item by item.

There's much more, of course: 200-millisecond lockup, vacuum handling of cassettes and tape record and reproduce capability, dual transports, internal dubbing, control track rewrite . . . a long, impressive list of features and advantages. And backing it all up are the reliable field-proven transport and electronics of the AVR-1.

Ampex ACR-25

It will be one of the best investments you ever made.

Programming made simple.

It was an Ampex design goal to make programming with the ACR-25 convenient, simple, and flexible — and to eliminate the costly, time-consuming manipulation needed to handle short program events on conventional recorders. Our video engineers have succeeded to a remarkable degree. Here is the simple, two-part operation that programs a fully automatic playback sequence:

1. The operator puts the cassettes into numbered bins in the carrousel.
2. Following the program log, he presses buttons (A) to enter a bin number and a sequence number for each cassette; pushes the

STANDBY AFTER or END AFTER buttons (B) at the end of the sequence; and pushes the ENTER program button (C). At broadcast time, a press of the AUTO PLAY button (D) starts the whole automatic sequence.

Lockout switches behind the programming panel prevent accidental or deliberate tampering with the program.

Unmatched flexibility.

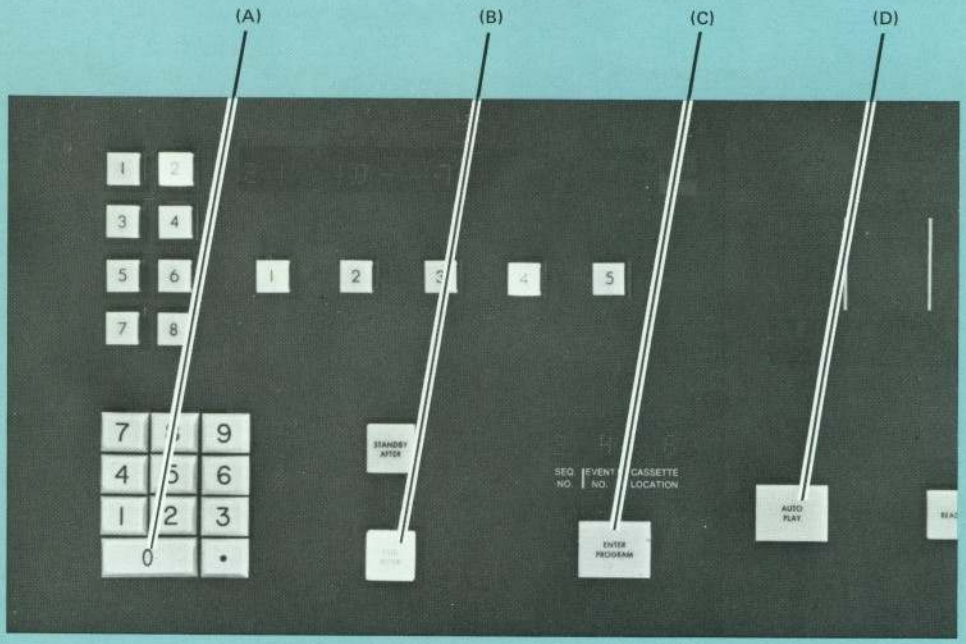
Consider the range of programming choices that ACR-25 opens up:

Two exclusive benefits put the ACR-25 in a class by itself. First, it can air events as short as 10 seconds and features or stories as long as six minutes (15 ips) or even twelve minutes (7½ ips). Second, the ACR-25's shorter recycle time (10 seconds from the end of a one-minute spot to the cue-up of another) also contributes to more flexible programming. Third, using the unique REWIND LOCKOUT feature, the broadcaster can postpone rewinding programs until after the sequence. The cassettes return to the carrousel unrewound, and the following programs can be threaded and cued up in ten seconds. The saving in transport time allows him to retain the back-to-back capability, even when airing six-minute features on either side of a ten-second spot.

The random-access memory can program up to 40 events at once. Up to 24 cassettes can be programmed as sequential events, or randomly, in any order. Cassettes can be programmed to play twice or more in the 40-event program. The random-access feature makes it possible to delete, substitute, or change sequence, right up to air time, usually by just pushing buttons. Taking the controls from AUTO to SEMI-AUTO mode gives the director total control at all times.

Sequences can be as short as a single event, or as long as 40 events. A sequence can end in standby status, with the next two events cued up and ready to play, or in end status, with all cassettes rewound and returned to the carrousel.

Consider the economic benefits of all these operational choices: conventional recorders are now free to do more profitable production work. There is more air time to sell, because there are none of the programming restrictions imposed by reel-to-reel machines. Last-minute changes or sales of open time are feasible. Errors and make-goods are virtually eliminated. Your customers will appreciate the improved service.



Operation made simple.

Acknowledging that each broadcaster has his own approach to operation, and with some understanding of the minor and major emergencies that arise in day-to-day broadcasting, Ampex has designed the ACR-25 to do its job in a variety of ways. These operational methods are calculated to save operator time, to save make-goods, and to make every second of air time pay. In addition to the Automatic mode, the ACR-25 has three other modes: manual, semi-automatic, and external computer control. Manual is the basic mode.

Manual operation.

In this mode, for all intents and purposes, the ACR-25 gives the station engineer two conventional reel-to-reel recorders, separately operable. There is a complete manual system control for playback, editing, cue and control track writing, dubbing off-the-air or from another VTR, dubbing from one cassette transport to the other, or dubbing onto both transports simultaneously. The Control Console has manual controls for all of the functions handled automatically in the AUTO mode: thread, cue, record, playback, shuttle, unthread. Also provided are record mode controls, such as control track rewrite, dub record, cue sequence record, and audio and video record (for either or both transports). Faulty control tracks can be replaced, cue tracks rewritten. An Electronic tape timer is included.

Semi-automatic operation.

With the SEMI-AUTO button engaged, the operator can select cassettes one by one. One cassette is being played; one is ready or is being cued up; and the operator is dialing the next one with a selector knob (A). This mode gives a director the option of last-minute program changes. He can select the material he wants segment by segment. The ACR-25 also becomes a creative tool for program assembly in this mode: with the available program segments in the carrousel, the director can put together a feature item by item, deciding on the sequence as he goes. This mode can also be used as a backup procedure to protect against the failure of the customer's computer.

Automatic operation.

With the memory programmed, the operator presses the AUTO button to put the machine into the automatic mode; the READY button to thread and cue the first two cassettes; and the AUTO PLAY button to start automatic operation. After completion of a sequence, another touch of the AUTO PLAY button is all it takes to start the next sequence in the program.

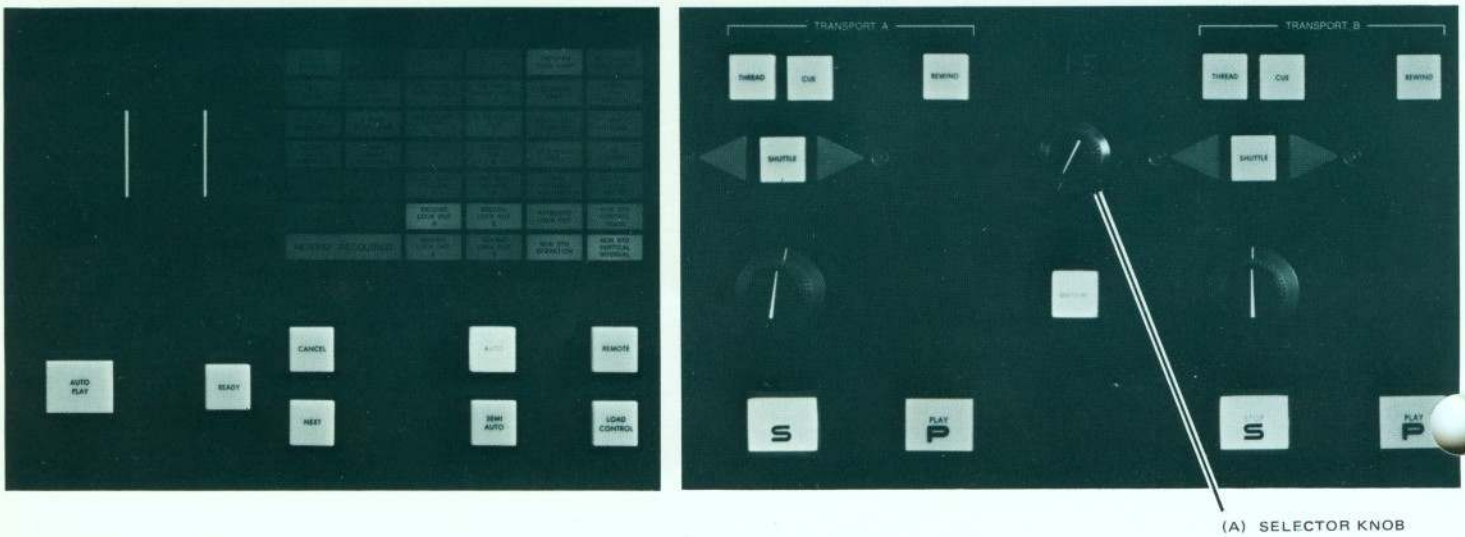
The transports will pull cassettes from the carrousel in programmed sequence, thread and cue up tapes, play them, rewind them, and return them to the carrousel. At the end of a sequence, the machine will either go into the STANDBY AFTER mode, with two cassettes cued up and ready to play, or into the END AFTER mode, with all cassettes rewound and back in the carrousel—depending on how the machine has been programmed. With the machine in the STANDBY AFTER mode, another touch of the remotable AUTO PLAY button starts the next sequence. A digital display panel shows the next five cassettes to be played, and can be used to show all 40 programmed events in groups of five.

The CANCEL button returns cassettes to the carrousel; NEXT stops the tape that is being played and immediately starts the next one.

Computer-controlled automatic operation.

Ampex provides appropriate connectors for those who prefer to use an existing computer at the broadcast facility rather than the ACR-25's own memory. The interface may differ with each computer, but the ACR-25 accepts an eight-bit word (six bits for the bin number; two for the instruction code) for control by an external system.

This mode resembles the SEMI-AUTO mode, with the computer doing the advance selecting. In ef-



(A) SELECTOR KNOB

fect, the ACR-25 checks with the computer instead of its own internal memory for each successive instruction; the number of events and sequences are then limited only by the computer's memory and the 24-cassette capacity of the carrousel. The computer verifies the identity of each tape during cue-up by reading a code on the control track. This information can be used by the computer for logging and/or billing procedures.

Remote operation.

The automatic operation panel is remotable — including the display panel and the READY, AUTO PLAY, NEXT, CANCEL and mode controls. Key sections of the engineering control panels are remotable separately from the operational controls.

The cassette.

Important basic benefits have been built into the ACR-25's convenient, low-cost cassettes:

- They contain up to six minutes of program material (at 15 ips; 12 minutes at 7½ ips), plus leader, trailer, and SOT/EOT (Start of Tape/End of Tape) marks.
- Spools are designed to meet proposed industry standards for interchangeability with units from other manufacturers.
- Recorded program material on a conventional reel can be wound directly onto a cassette spool. No dubbing — and resultant quality loss — is necessary. Conversely, tapes recorded on an ACR-25 can be wound on a reel and played on a conventional recorder.
- Cassettes can be easily disassembled, loaded (with a SMPTE/EBU standard recording or blank tape), and reassembled by station personnel. The tape spools are removable and readily shipped or stored in a light, inexpensive container; the cassette can be re-used with other spools. And a manual Cassette Spooler is included; it permits tape to be wound off reels onto cassette spools. It also includes a precision punch for making SOT and EOT marker holes.
- The cassettes are high-impact moulded plastic—tough and durable, with a bare minimum of moving parts.
- A number of precautions are built into the cassettes. First, they cannot be put into the ACR-25 carrousel any way but the right way. Second, they include a Record Lockout device to prevent inadvertent erasure of program material. Third, they include an Off-Line Rewind Lockout for segments longer than one minute. It permits the cassette to return the carrousel unrewound after playing — to allow the retention of the ten-second back-to-back capability.

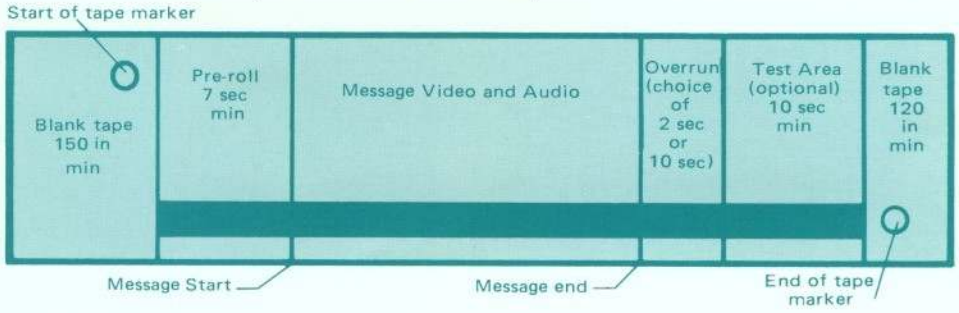
ACR-25 cassette tape format. Digital information near the end of the program can be used to initiate an external event at one of a number of preselected times.

Tape format.

Precision-punched holes for photocell sensing were found by Ampex engineers to be the most practical way to mark EOT and SOT on the cassette tape. This concept offers great flexibility, convenience, and low cost.

Another important feature of the ACR-25 tape format is that its specifications for tape length before and after the SOT and EOT marks meet the threading requirements of other manufacturers' equipment, and of conventional videotape machines.

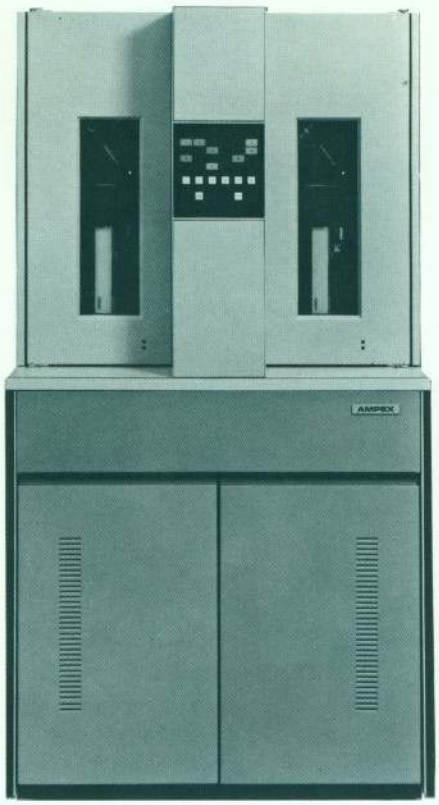
The cue track format provides space for digital information utilizing the proposed SMPTE time and control code. The additional information can verify program content, mark the cue-up point for Start of Program, provide an auto roll cue for another videotape recorder or other equipment, provide an auto roll cue for the next cassette, or provide a Program Stop Cue. The track can also be used to control voltages that will compensate for incorrect chroma phase, video gain, audio gain, and black level, recorded on the original tape.

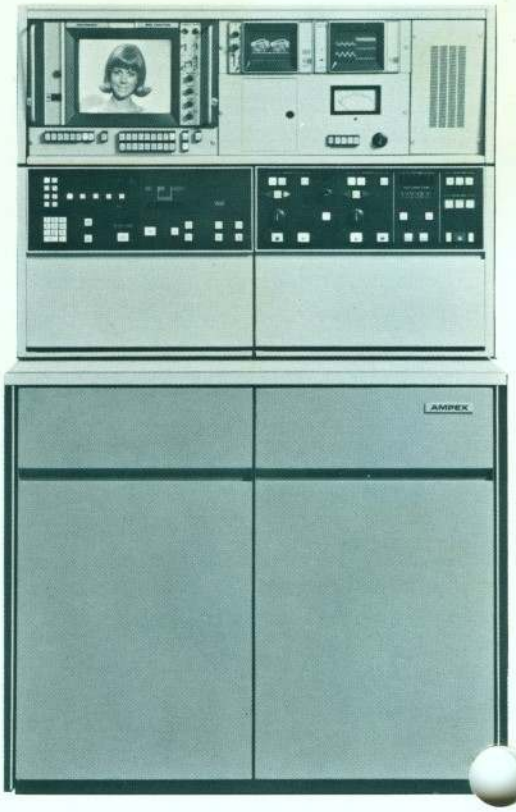


The hardware that makes it all possible.

For the fast lockup and back-to-back programming capability needed to make the cassette concept useful in all situations, Ampex borrowed heavily from the field-proven AVR-1. The ACR-25 offers the same high levels of performance in a specialized package.

Two cabinets house the ACR-25. The Transport Console holds the two transports, the carrousel, loading controls, and gauges and controls for the pneumatic systems. Programming, operating, and setup controls, a Mark IV Electronic Editor (optional), signal controls, system monitoring equipment, power supplies, logic and servo card bays, and twin maintenance panels are in the Control Console. The cabinets can be side-by-side or separated, depending upon the organization and layout of the studio.





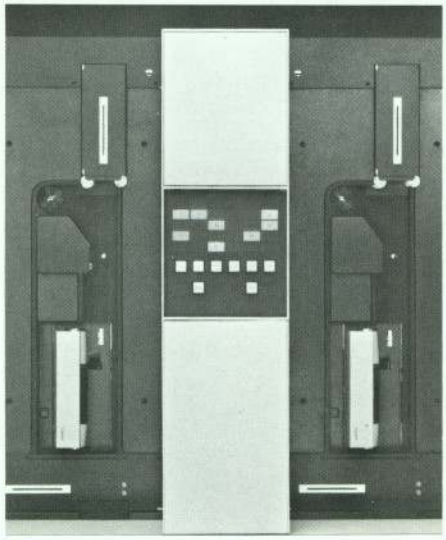
Transports.

Twin cassette transport systems flank the carrousel in the Transport Console. A glance at a status panel tells the operator which bins are loaded.

An interlock prevents him from putting a cassette into a bin from which a cassette has been pulled and placed on a transport.

Gentle vacuum pressure pulls the cassette from its spring clamp onto the transport and threads the tape.

The female guide, audio head shield, and vacuum capstan move into place. At this point the transport becomes, for practical purposes, a reel-to-reel machine. AVR-1-type vacuum columns handle the tape precisely but gently, holding tension at close tolerances, isolating cassette spools from the capstan, smoothing out tape movement, and insuring an excellent tape pack. Stops and starts are smooth and instantaneous; the ACR-25 has the AVR-1's 200-millisecond (350 for 625-line standard) lockup time.



Wherever practical, airfoil bearings are used to guide tape, moving it against a cushion of air. In the Rewind mode, tape is moved away from all heads for high speed movement; for loading or unloading, the video head guide, capstan, and audio head shield all retract from contact with the tape. To eliminate tape speed inaccuracies at the capstan, pinch rollers have been eliminated and a vacuum capstan used instead.

All of the ACR-25's air support systems are self-contained. The studio's house air pressure system can be used for video head air bearings and air-lubricated tape guides, if desirable. An automatic sensing system in the ACR-25 will sense any failu of the house air system and auto matically switch to its own system.

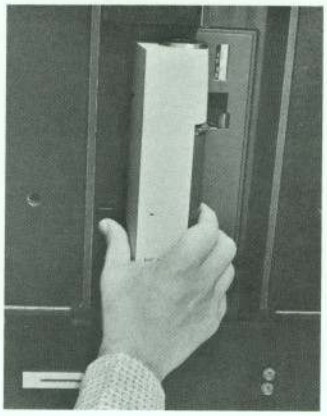
Electronics.

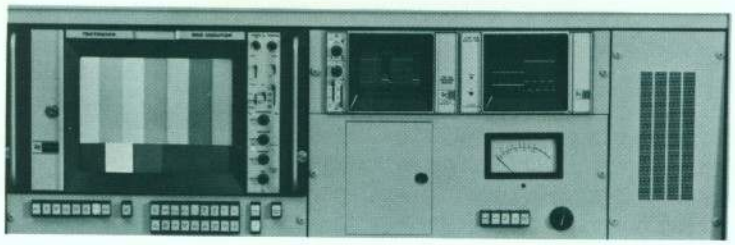
Advanced servo systems and electronics from the AVR-1 give the ACR-25 computer system reliability and stability. They supply third-generation performance standards to the cassette concept.

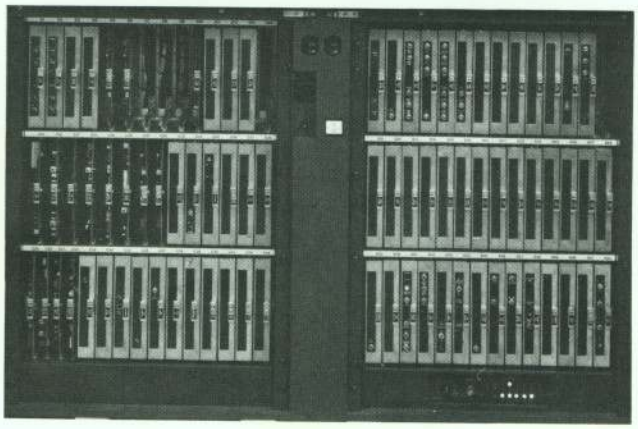
Cassette spools, for example, are always under AVR-1-type servo control in both the PLAY and REWIND modes. Other features — such as automatic band selection and the automatic tracking accessory—are common to the AVR-1 and the ACR-25. In fact, the ACR-25 is available in a time-share configuration that permits it to time-share broad-range time-base correction with an AVR-1.

The ACR-25 accepts all AVR-1 accessories: Auto-Chroma, Velocity Compensation, Auto-Tracking, Drop-out Compensation, etc. Vertical interval switching between transports provides a stable picture even when the tape being played is cancelled and instantaneously replaced with another (the NEXT control feature). The ACR-25 can write new control tracks to replace non-standard tracks on tapes received from outside sources (Control Track Rewrite accessory). It can also control chroma phase, video gain, audio gain, and black level, utilizing digital information on the cue track (Auto Playback Adjust Accessory). In this way it maintains consistent playback quality even with improperly recorded tapes. This means that the station always has complete control over program quality.

The ACR-25 records in high band only; in playback, it is compatible with all SMPTE/EBU high and low-band, color and monochrome standards. Band selection is automatic on playback. The ACR-25 stays locked to station sync in all modes.







Maintenance made simple.

Special care was given to the ACR-25's design from the maintenance standpoint. The Transport Console presents both transports at the front of the machine for easy access to head assemblies. The Mark XX Video Head Assemblies can be removed or remounted with the press of a button lock.

To keep out dust and dirt, reduce the need for maintenance, and protect tape against induced dropouts, the transports operate in a sealed environment.

All low-level electronics for the ACR-25 are located in the control console. Access to circuit boards has been simplified; and because circuitry for the two transports is identical, trouble-shooting is greatly simplified. Most ACR-25 boards are also interchangeable with those on the AVR-1.

Extensive monitoring systems and built-in testing devices also help to reduce time spent in checkout and maintenance procedures — carry-over from the excellent built-in maintainability of the AVR-1.

Features

- 6-minute play time per cassette at 15 ips.
- Sequential or random access to 24 cassettes.
- Back-to-back sequencing of tapes of any length up to 6 minutes.
- 200 milliseconds start time. (350 milliseconds in 625-line systems.)
- Complete record/playback flexibility. Provides internal record/playback, simultaneous record, automatic or manual playback.
- Available in a configuration permitting time-sharing of AVR-1 electronics.
- Operates at either 7½ ips or 15 ips.
- Cassettes can be loaded by operator with a standard (SMPTE/EBU) recording or blank tape.
- Vacuum tape handling system—provides rapid, gentle tape handling, with minimum mechanical parts.
- No head-to-tape contact during rewind.
- Complete automatic operation — can be computer controlled with proper interface.
- Compatible with all SMPTE/EBU high/low-band, color/monochrome standards with automatic band selection in playback. (Records high-band only.)

Specifications

Video Response:

MONOCHROME	DOMESTIC		INTERNATIONAL	
	525/60 Low-Band	525/60 High-Band	625/50 Low-Band	625/50 High-Band
Bandwidth:	Flat to 4.1 MHz; −3db at 4.5 MHz; Tolerance to ±1 db	Flat to 4.5 MHz; −3db at 5.0 MHz; Tolerance ±0.5 db	Flat to 4.5 MHz; −3db at 5.0 MHz; Tolerance ±1 db	Flat to 5.5 MHz; −3db at 6.0 MHz; Tolerance ±0.5 db
Signal-to-Noise Ratio:	46 db peak-to-peak video to rms noise on interchange basis (monochrome)	46 db peak-to-peak video to rms noise on interchange basis (monochrome and color)	42 db peak-to-peak video to rms noise on interchange basis (monochrome)	43 db min. peak-to-peak video to rms noise on interchange basis (monochrome and color)
Transient Response:	Maximum K-factor 1% (Utilizing 2T sine² Pulse)	Maximum K-factor 1% (Utilizing 2T sine² Pulse)	Maximum K-factor 1% (Utilizing 2T sine² Pulse)	Maximum K-factor 1% (Utilizing 2T sine² Pulse)
Low Frequency Linearity	2% Blanking to White (max.)	2% Blanking to White (max.)	2% Blanking to White (max.)	2% Blanking to White (max.)

COLOR	DOMESTIC		INTERNATIONAL	
	525/60 Low-Band	525/60 High-Band	625/50 Low-Band	625/50 High-Band
Signal-to-Noise Ratio:	42 db peak-to-peak video to rms noise on interchange basis	46 db peak-to-peak video to rms noise on interchange basis	—	43 db peak-to-peak video to rms noise on interchange basis
Differential Gain:	3% max. Blanking to white	3% max. Blanking to white	—	4% max. Blanking to white
Differential Phase:	3° max. at 3.58 MHz off tape	3° max. at 3.58 MHz off tape	—	4° max. at 4.43 MHz off tape
Transient Response Max. K-factor 2T sine² Pulse	1%	1%		1%
Moire:	−32 db min. (Color bars 75% amplitude, 3.58 MHz Subcarrier)	−40 db min. (Color bars 75% amplitude, 3.58 MHz Subcarrier)	—	−36 db min. (Color bars 75% amplitude, 4.43 MHz Subcarrier)

Physical Dimensions:

Control Console:	
Height	78″
Width	48.5″
Depth	32.5″
Weight	1450 lbs.
Transport Console:	
Height	78″
Width	40.5″
Depth	32.5″
Weight	1750 lbs.
Cassette:	
Height	3.75″
Width	6.25″
Depth	2.5″

Temperature and Humidity:

Temperature	0°C to 45°C
Relative Humidity (non-condensing)	10% to 90%

Power Requirements:

Prime Power Frequency	50/60 Hz
Input Voltage	208/230V single phase 2-50 amp service
Standby Current	25 amps @ 220V
Max. operating Current	35 amps @ 220V

Video Signal Input (75 ohms impedance):

Composite Video	0.7 to 1.8V p-p
Sync	1.0V to 8.0V
Blanking	1.0V to 8.0V
H. Drive	1.0V to 8.0V
Vertical Drive	1.0V to 8.0V
Burst Key	1.0V to 8.0V
Subcarrier	1.5V to 2.5V

Video Signal Output (75 ohms impedance):

Composite Video Signal	1.0V p-p
Non-Composite	Switches with the scanning standard between 0.7 and 0.714 volts

Audio Input Signal:

Impedance	15000 ohms balanced or unbalanced bridging input
Amplitude	−24 dbm to +16 dbm
Source	Line, microphone, oscillator

Audio Output Signal:

Output Impedance	Less than 30 ohms
Peak Output Level	+30 dbm
Nominal Output at 0 VU on level meter	+8 dbm
Playback Equalization	
ANSI	2000/35 microsec.
CCIR	0/35 microsec.

Operation:

Tape Speed	
60 Hz	7½ ips or 15 ips
50 Hz	19.85 cm/s or 39.7 cm/s

Record/Playback Capacity:

Carrousel	24 cassettes
Record/playback time (per cassette)	6 min. (plus leader & trailer)
Cycle time (1 min. or shorter)	10 sec.
Cycle time (6 min.)	20 sec. (10 sec. with rewind lockout)

Starting Time:

200 millisec. in 525
350 millisec. in 625

Stopping Time:

0.2 from record or playback mode

Audio Performance:

Frequency Response (400 Hz reference)	
15 ips	±2 db 50 to 15,000 Hz
7.5 ips	±2 db 50 to 10,000 Hz
Signal to Noise	Down 55 db from peak operating level
Flutter and Wow	
15 ips	0.10% rms max.
7.5 ips	0.15% rms max.
Distortion (measured at 1 KHz)	
Operating Level	less than 1% rms

Programming:

Number of Stored Events	40 (Total of all events from all sequences)
Maximum Number of Sequences	40 (One event each)
Display	8 groups of 5 events each
Start Point	Any one of the 40 events

* Specifications subject to change without notice.

Your investment in Ampex equipment yields maximum returns when operated and maintained by Ampex-trained people. Live and videotape training courses available worldwide. For brochure, write Ampex Technical Institute, M.S. 2-11A, 2685 Bay Rd., Redwood City, Calif. 94063. U.S.A.

AMPEX

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