

# AVR-3

Videotape Recorder/Reproducer

**AMPEX**



The world's first "intelligent" VTR

## The Most Dramatic Combination Of Advantages Ever Offered In A Quadruplex Videotape Recorder

### **Super High Band Pilot**

Unrivalled playback excellence, beyond the capability of any other signal processing technology plus unexcelled performance on any quad band.

### **An Extra Dimension of "Intelligence"**

Logic and housekeeping capability normally found only in external editing systems

### **Automatic Playback Switching**

Senses and switches to the correct band from any pair; Super High Band Pilot/High Band; High Band/Low Band Color; Low Band Color/Low Band Monochrome

### **Dual Speeds—Automatic Switching**

Superior picture quality at either 15 or 7.5 ips. Automatic switching to correct playback speed

### **Unmatched Editing Capabilities**

- Standard Editor
- Optional Edit Controller with EDM-1 Editing System interface
- Optional EDM-1 computer-controlled external editing system, for unprecedented creative range

### **Simplified Controls**

Conveniently located for maximum efficiency

### **Advanced Standard Features**

- Digital Time Base Corrector
- Constant-tension, fully servoed reels
- Vacuum capstan
- Sophisticated shuttling
- Full monitoring
- Electronic tape timer
- Autotracking
- Status indicators on control panel

### **Convenient Maintenance**

Easy access to all electronics and subassemblies; additional LED status indicators on PWAs; state-of-the-art circuit design

### **Outstanding Economy**

Unequalled return on investment in terms of original cost, performance capability at 15 or 7.5 ips, production versatility, operating efficiency, low power consumption, and simplified maintenance



## Operation: Classic Simplicity And Sophisticated Editing Capabilities Offer The Utmost In Functional Control

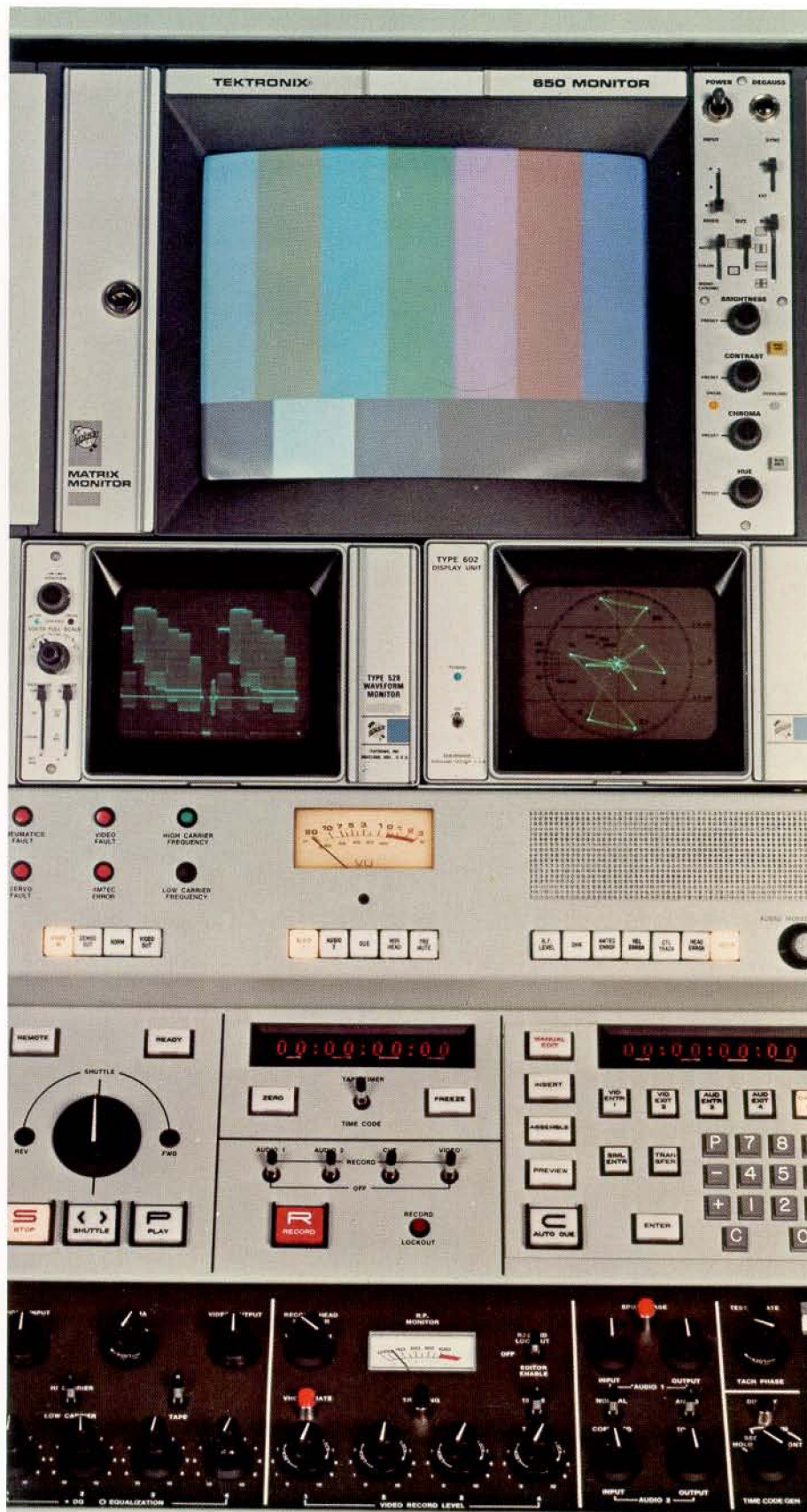
**Ease of Operation.** The AVR-3 is without qualification the easiest quad VTR in the world to operate. Because of its automatic features, manual controls have been simplified. With Super High Band Pilot, setup and video head optimization can literally be accomplished in seconds, allowing maximum time for productive work.

For post-production work, the AVR-3 offers some very important benefits. Tape can be shuttled at speeds up to 375 ips, yet absolute control is maintained at all times. The acceleration/deceleration profile is automatically controlled for the most gentle tape handling possible. End-of-tape sensing circuitry prevents the tape from being inadvertently unwound from either the supply reel or the takeup reel. Tape handling control is automatically adjusted for any size reel from 7 to 16 inches.

An electronic tape timer with control track updating assures precisely accurate tape positioning, and eliminates tape timer errors.

Full monitoring is conveniently adjacent to the AVR-3 operating controls. Included are a video picture monitor, waveform monitor, a performance monitor with vector display capability, and audio monitor.

The primary controls are clearly marked and laid out in a very logical manner. Secondary controls are located on a convenient panel that can be closed when not in use. Maintenance controls and adjustments are located on the front of the PWAs, and are within easy reach.



## Performance: A Higher Level Of Excellence For All Recording Standards Plus

**Super High Band Pilot.** AVR-3 introduces the unique advantages of Super High Band Pilot, for the best performance possible with today's most advanced video technology.

Super High Band Pilot combines a number of technological advances to produce the best picture quality possible, *all the time, automatically.* When equipped with Super High Band Pilot, the AVR-3 doesn't require any "fine tuning" adjustments to perform at its peak, because it inherently delivers top quality performance.

The key element of this remarkable achievement is a steady stream of error correction information provided by Super High Band Pilot. Color velocity error and equalization are corrected continuously, totally eliminating banding, before the errors can affect the playback signal. Only Super High Band Pilot has this exclusive signal processing capability. When a band other than Super High Band Pilot is employed, the AVR-3 utilizes improved conventional signal processing devices such as a Velocity Compensator, Color Dropout Compensator, and Auto-Chroma.

With Super High Band Pilot, picture quality at 7.5 ips is virtually indistinguishable from High Band at 15 ips. Recording and playback at the slower, more economical speed becomes truly practical because quality is not compromised. Furthermore, the AVR-3 senses the correct playback speed and switches to it automatically whenever 15 ips and 7.5 ips tapes are interchanged. Since the correction capabilities of Super High Band Pilot are all automatic, any user can now attain the very highest standards of performance on a routine

basis. Operator training is simplified, and overall productivity is enhanced.

**Automatic Sensing.** AVR-3 is the world's easiest videotape recorder to operate, with its many automatic features and simplified operating controls.



In addition to the automatic speed switching described above, the AVR-3 also offers automatic switching between bands. The machine can be configured with one of three pairs of bands: Super High Band Pilot/High Band; High Band/Low Band Color; or Low Band Color/Low Band Monochrome. When a tape is played back the AVR-3 senses the correct band and automatically selects the proper playback circuitry.

This gives AVR-3 users a unique advantage; they can intermix bands and speeds at will to suit their particular needs and applications.

### Other Performance Features.

In addition to the Super High Band Pilot benefits, other standard AVR-3 features include a digital time base corrector, a new digital autotracking system, fully servoed reels, a constant-tension tape servo, a video head optimizer, and a vacuum capstan.

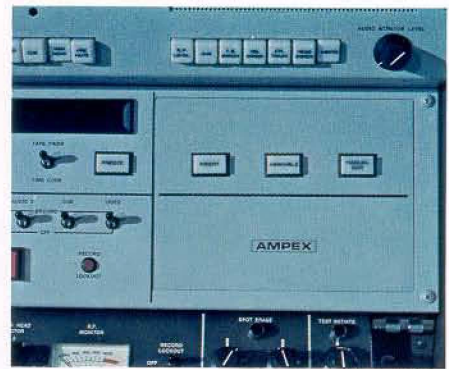
**Dual or Stereo Audio.** For users who require a second high-quality audio track, the AVR-3 offers a dual audio option. Each track maintains a high signal-to-noise ratio, allowing two audio signals to be recorded with equal quality on both channels. The stereo audio option is equally consistent.

**Assemble Editing.** Two time-saving capabilities of the AVR-3 are particularly beneficial in assemble editing operations. First, recording of "crystal black" before many editing sessions is no longer necessary. The AVR-3 capstan servo will slow slew from its playback reference to the record reference at the edit point. Since the slow slew takes place over a nominal 120 fields at a controlled rate, the resulting tape can be edited or used in any manner.

A second capability eliminates the need for pre-recording of SMPTE/EBU time code. The optional Time Code Generator-Reader locks to the reproduced time code before an edit and presets the generator to start the time code recording at the proper address when the edit takes place. Time code on the edited tape is thus virtually uninterrupted.



## Editing: An Extra Dimension Of Intelligence Provides More Flexibility And Greater Creative Range



Manual Editor



Edit Controller

AVR-3 offers a wide choice of editing capabilities, ranging from simple manual editing to the most sophisticated computer-controlled editing available anywhere.

The standard editor permits manual control of insert and assemble edits. It is designed for applications that require minimal editing capability.

An optional Edit Controller offers a unique array of expanded editing capabilities and considerably more growth potential. This editor operates with either time code or tape timer information, and includes search capability. Edit points can be entered during previewing simply by pressing the ENTER button at the appropriate time, just like cue-tone editing. The keyboard can also be used for entry of edit points, and unlike other editors, allows entry of separate video and audio entrance and exit points. If a subsequent decision requires an edit point to be moved, the adjustment can be made very easily from the keyboard.

Also available is an exclusive color framer which eliminates all color ambiguities between edited segments. A time code generator-reader, and a character generator are also available as options. With the character generator accessory, a user can take time code off the cue track and display



EDM-1

it on a monitor for offline decision making.

With or without the optional accessories, the Edit Controller adds a remarkable extra dimension of possibilities to the AVR-3. For example, all housekeeping functions are automatically calculated and controlled without the aid of an external system. Once the video and audio edit points are keyed in, the Edit Controller takes over and automatically computes and controls the pre-roll addresses, acceleration/deceleration profiles, synchronizing information, and all switching necessary for precise edits.

In addition to the Edit Controller, the AVR-3 accommodates an optional plug-in computer interface. This enables two-way communication via ASCII formatted serial data over a pair of twisted wires with any computer editing system.

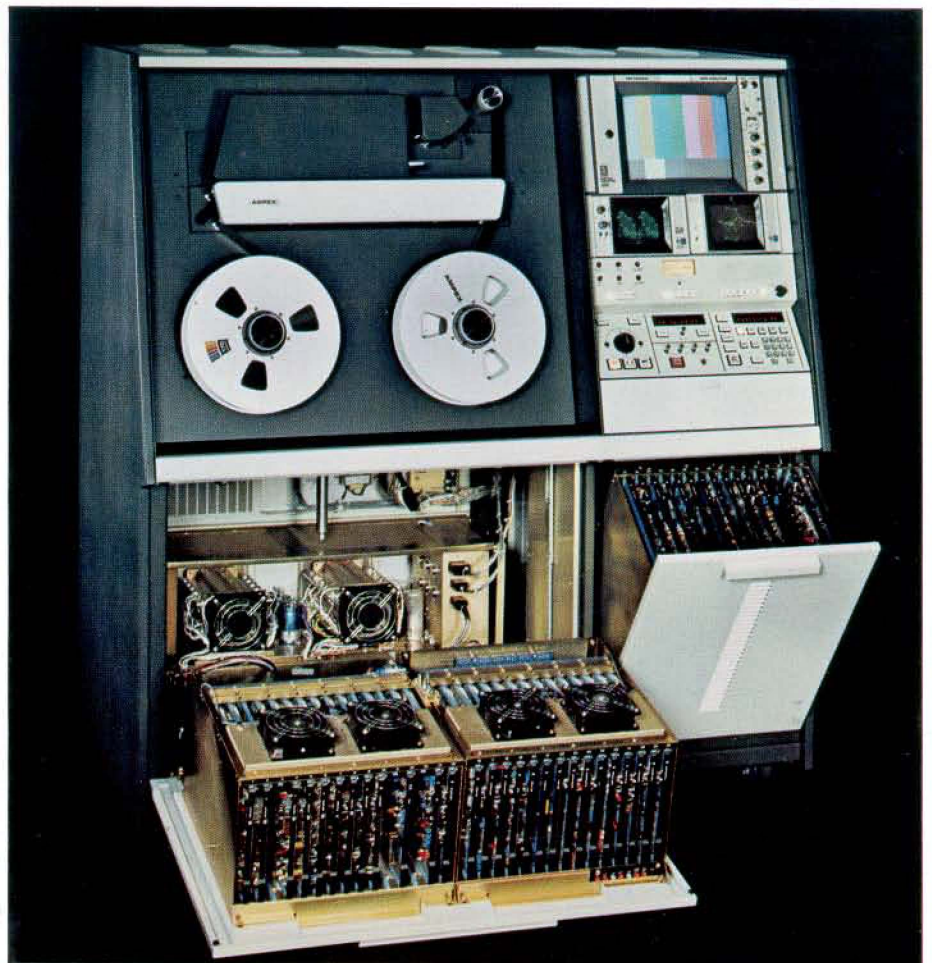
### AVR-3 and EDM-1: The Ideal Marriage

The extra dimension of "intelligence" provided by the Edit Controller immediately makes the AVR-3 completely compatible with the ultra-sophisticated Ampex EDM-1 computer-controlled editing system. In fact, these two outstanding products were designed expressly for each other. In combination, they offer unmatched creative opportunities as well as production efficiency. The EDM-1 features a very sophisticated switcher designed for computer control, large memory capacity, and a wide selection of controls and special effects. Teleproduction will achieve new artistic heights with maximum efficiency when the AVR-3 and EDM-1 are teamed together.

## Maintenance: It Was Never Easier

The AVR-3 is designed to be as easy to maintain as it is to operate. The electronics are easily accessible in tilt-out bays. LED status indicators on the monitor panel and on the printed wiring assemblies help isolate trouble spots and speed up maintenance. Circuitry is simplified by the use of state-of-the-art backplane wiring design. PWAs can be replaced in seconds if necessary.

Electronics bays open all the way down to floor level for maximum access to the machine from the front. Access to the back of the AVR-3 may seldom be required, but if it is, there is no hindrance. Every subassembly and accessory on the AVR-3 is within easy reach.



# AVR-3 Specifications\*

## VIDEO PERFORMANCE

### Bandwidth

Measured at grey level. Reference frequency 100 kHz. Notch on SHBP for pilot is at exactly 1 1/2 times subcarrier frequency.

	Flat to (MHz)	-3 dB at (MHz)	Tolerance	Notch Depth
<b>525</b>				
LBM	4.1	4.5	±1.0 dB	-
LBC	4.1	4.5	±1.0 dB	-
HB	4.5	5.0	±0.5 dB	-
SHBP	4.5	-	±0.5 dB	40 dB
<b>625</b>				
LB	4.5	5.0	±1.0 dB	-
HB	5.5	6.0	±0.5 dB	-
SHBP	5.5	-	±0.5 dB	40 dB

### Signal-To-Noise Ratio

Measured at 50% grey level on an interchange basis as p-p signal vs rms noise. (Rhode & Schwarz unweighted)

	10-Mil Tip (15 in/s)	6-Mil Tips (7-1/2 or 15 in/s)
<b>525</b>		
LBM	46 dB	-
LBC	42 dB	-
HB	46 dB	43 dB
SHBP	46 dB	43 dB
<b>625</b>		
LB	42 dB	-
HB	43 dB	40 dB
SHBP	45 dB	43 dB

### Low Frequency Linearity

2% maximum Blanking to Peak White. Deviation from a straight line.

Differential Phase & Gain	525 Line Systems	625 Line Systems
Differential Gain	3%	4%
Differential Phase	3°	4°

Measured using a blanking to peak white ramp with 40% subcarrier.

### Chrominance-To-Luminance Delay

	525 Line Systems	625 Line Systems
Maximum	25 ns	30 ns

### Transient Response

Measured using a 2T sine<sup>2</sup> pulse and bar.

	Low Band	High Band and SHBP
K-Factor Maximum	2%	1%

### Moiré

	525			625		
	LBC	HB	SHBP	HB	SHBP	
Moiré	-32 dB	-40 dB	-40 dB	-36 dB	-40 dB	

### Starting Time

Measured from the Ready mode

	525/60	625/50
Without color framing	0.5 sec max	1.0 sec max
With color framing	1.5 sec max	2.5 sec max

## AUDIO PERFORMANCE

**Frequency Response**—measurements relative to a frequency of 500 Hz.

### Mono Audio (as per ANSI C98.6):

Nominal Tape Speed	15 in/s	7 1/2 in/s
Measurement Level	110 nWb/m	35 nWb/m
Fullband	50 Hz to 16 kHz	50 Hz to 15 kHz
Tolerance	±2 dB	±2 dB
Midband	200 Hz to 12.5 kHz	200 Hz to 6 kHz
Tolerance	±1 dB	±1 dB

### Dual Audio (optional):

Nominal Tape Speed	15 in/s	7 1/2 in/s
Measurement Level	110 nWb/m	35 nWb/m
Fullband	50 Hz to 16 kHz	50 Hz to 15 kHz
Tolerance	±3 dB	±3 dB
Midband	200 Hz to 12.5 kHz	200 Hz to 6 kHz
Tolerance	±1.5 dB	±1.5 dB

### Cue Audio (as per ANSI C98.6):

Indicated response does not include the notch frequencies. Notch is at 240 Hz (or 250 Hz), 25 dB deep and less than 50 Hz wide.

Nominal Tape Speed	15 in/s	7 1/2 in/s
Measurement Level	82 nWb/m	46 nWb/m
Fullband	50 Hz to 12.5 kHz	50 Hz to 10 kHz
Tolerance	±3 dB	±3 dB
Midband	300 Hz to 10 kHz	300 Hz to 6 kHz
Tolerance	±1.5 dB	±1.5 dB

### Signal-To-Noise Ratio

#### Audio:

Weighting	Playback Equalization	Reference Level	Mono Audio	Dual Audio (L Track)
Unweighted	ANSI C98.3 (2000/35µs)	220 nWb/m	56 dB	48 dB
	CCIR (35µs)	254 nWb/m	56 dB	49 dB
		3% distortion	57 dB	50 dB
ASA "A" Curve	ANSI C98.3	220 nWb/m	57 dB	49 dB
As Per CCIR Report 469	CCIR	254 nWb/m	48 dB	43 dB

### Cue:

Measured with the internal notch. Reference level 260 nWb/m. Signal-to-noise ratio 35 dB unweighted.

### Distortion

Measured as total harmonic distortion. Reference frequency 500 or 1000 Hz.

	Signal Level	Without Predistortion	With Predistortion
Mono or Dual	110 nWb/m	< 1%	< 1%
Audio	220 nWb/m	< 3%	< 1%
Cue	260 nWb/m	< 5%	-

### Crosstalk

-40 dB or less at 1 kHz.

### Flutter

	15 in/s	7 1/2 in/s
Unweighted NAB 0.5 to 200 Hz	0.1% rms	0.15% rms
Weighted ANSI 54.3 or DIN	0.08 ±% peak	0.1 ±% peak

### Transients ("clicks and pops")

Reference 220 nWb/m -45 dB. Measurements are made with a true rms reading meter.

### Input Signals

Composite video 0.7 to 1.8V p-p at 75 ohms impedance.

Reference composite video or color black 0.7 to 1.8V p-p at 75 ohms impedance. (Not required for non-synchronous playback.)

Audio 1, Audio 2, and Cue line -24 dBm to +12 dBm at 10 k or less impedance, balanced or unbalanced.

### Output Signals

Composite video (2 outputs available) 1.0V p-p at 75 ohms impedance.

Monitor composite video (switched by front panel monitor controls) 1.0V p-p at 75 ohms impedance.

Audio 1, Audio 2, and Cue line +8 dBm or 0 dBm nominal at 30 ohms or less impedance. Peak output +24 dBm into 600 ohms.

External speaker (switch selection) 20 watts peak into 8 ohms.

## GENERAL

### Recording Time

Based on a 9400-ft. reel of two-inch tape

	7 1/2 in/s	19.85 cm/s	15 in/s	39.7 cm/s
250 min	240 min	125 min	120 min	

### Shuttle Speed

375 in/s

### Tape Timer Accuracy

With continuous single speed control track ±1 frame any tape length.

With no control track ±3 seconds per hour of tape.

### Video Recording and Line Standards

Two recording standards within any line standard switch selectable (automatic selection on playback).

Line Rates	Recording Deviation	Color System
525/60	HB SHBP*	NTSC
525/60	HB LBC	NTSC
525/60	LBC LBM	NTSC
525/60	HB SHBP*	PAL M
625/50	HB SHBP*	PAL/SECAM
625/50	HB LB	PAL/SECAM

\*SHBP = super high band with pilot. Pilot frequency is exactly 1 1/2 times subcarrier frequency. (SHBP is not used with SECAM.)

### Physical Dimensions

Height	Width	Depth	Weight
63 in	58 in	31 in	1100 lbs
1600 mm	1473 mm	787 mm	500 kg

### Environment

Temperature: 0 to 45°C.

Humidity: 10% to 90% non-condensing.

Cooling air enters from rear of machine or through filter in bottom of machine for "computer floor" installations.

### Power Input

Voltage: Transformer taps at 5% increments cover the nominal voltage ranges with an allowable input variation of ±5%. Greater input voltage is allowed depending on derating curves for temperature and altitude. Voltage taps are available at 103, 109, 115, 123, 206, 218, 230, 246 volts AC.

Frequency: 48 to 62 Hz single phase.

Current:	109V	218V
Average (in record)	15 amps	7.5 amps
Peak (shuttle acceleration)	30 amps	15 amps

### Air Input

1.5 SCFM at 45 to 55 lb/in<sup>2</sup> (42.5 L/min at 3.3 to 4.0 kg/cm<sup>2</sup>)

### \*Specifications subject to change without notice.

All performance measured using Ampex 175 video tape or equivalent.

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