SPECIFICATIONS

AMPEX UNIVERSAL STEREOPHONIC RECORDER/REPRODUCER

The Ampex Universal stereophonic recorder/reproducer is an instrument of full professional quality, capable of essentially distortionless frequency response from 30 to 20,000 cycles per second at the operating speeds of 7-1/2 inches per second and 30 to 15,000 cycles per second at 3-3/4 inches per second. Its precision-engineered timing accuracy is such that it offers perfection of pitch held to tolerances of less than one-third of a half-tone. Playing times, using standard (.002"), long play (.0015"), and extra-long play (.001") tapes are as follows:

A. 4-TRACK STEREO TAPES

1200 foot reel	3-3/4 ips	2 hrs. 8 min.
	7-1/2 ips	1 hour 4 min.
1800 foot reel	3-3/4 ips	3 hrs. 12 min.
	7-1/2 ips	1 hour 36 min.
2400 foot reel	3-3/4 ips	4 hrs. 16 min.
	7-1/2 ips	2 hrs. 8 min.

B. 2-TRACK STEREO TAPES

1200 foot reel	3-3/4 ips	1 hour 4 min.
	7-1/2 ips	32 minutes
1800 foot reel	3-3/4 ips	1 hour 36 min.
	7-1/2 ips	48 minutes
2400 foot reel	3-3/4 ips	2 hrs. 8 min.
	7-1/2 ips	1 hour 4 min.

C. MONAURAL TAPES, HALF-TRACK

1200 foot reel	3-3/4 ips	2 hrs. 8 min.
	7-1/2 ips	1 hour 4 min.
1800 foot reel	3-3/4 ips	3 hrs. 12 min.
	7-1/2 ips	1 hour 36 min.
2400 foot reel	3-3/4 ips	4 hrs. 16 min.
	7-1/2 ips	2 hrs. 8 min.

REWIND TIME: Less than 90 seconds for 1200 foot reel.

RECORD INPUTS: High impedance line inputs (radio/TV/phono/auxiliary) 0.3V rms for program level; high impedance microphone inputs.

PLAYBACK OUTPUTS: Approximately 1/2V rms from cathode follower when playing program level tapes.

PLAYBACK FREQUENCY RESPONSE: 30-20,000 cps at 7-1/2 ips; 30-15,000 cps at 3-3/4 ips.
Within ±2 db 50-10,000 cps at 3-3/4 ips, 50 db dynamic range;
Within ±2 db 50-15,000 cps at 7-1/2 ips, 55 db dynamic range.

FLUTTER AND WOW: Under 0.2% rms at 7-1/2 ips; under 0.25% rms at 3-3/4 ips.

HEADS

Separate stacked heads for record, playback and erase. Special 2-channel playback head has built-in positive shift control to accommodate either 4-track or 2-track tapes. Heads are manufactured to the same standards of precision that exist in Ampex broadcast and recording studio equipment. Surfaces are lapped to an optical flatness so precise that they reflect specified wavelengths of light, resulting in uniform performance characteristics and greatly minimizing the effect of head wear. Stereo head gap alignment: the azimuth alignment of one head gap in the stack with respect to the other is held within 20 seconds of arc, equivalent to less than 10 millionths of an inch—a degree of precision achieved through use of a unique process involving micro-accurate optical measurements within a controlled environment. Head gap width: 90 millionths of an inch ± 5 millionths of an inch.

ELECTRO-ACOUSTIC TRANSDUCERS

To present to the ear a completely accurate, undistorted re-creation of the original sound, Ampex engineers have designed an electronically and accoustically integrated system of components which, functioning together, far transcends any previous concepts of amplifier-speaker combinations. Because each part of the system—amplifier, sound projector, and enclosure—is engineered with as much attention to its function within the system as for its individual operation, the result is coverage of a far greater portion of the audio spectrum with lower distortion and greater smoothness than ever before attainable at any power level. Optimum crossover is effected through the use of multiple L/C networks. All parts of the system are Ampex-designed and built.

HIGH-FREQUENCY SOUND PROJECTOR

This unit is essentially omni-directional, unlike conventional "tweeters", utilizing a rigid spherical piston in place of the usual cone or horn. Its wide angular distribution is highly important to proper stereophonic effect, since it is the high-frequency end of the audio spectrum which contributes most to the spatial relationships of stereo sounds.

Frequency response is absolutely flat in the important critical regions, and when operated under laboratory conditions, properly baffled in the anechoic chamber and used with its companion crossover network, the absolute acoustic pressure response, on-axis, is within ±2 db from the mid range crossover point to 15,000 cps. The net effect, either in the laboratory or in your living room, is uniquely satisfying performance. This spherical projector has, in fact, exceeded the expectations and the critical performance parameters of its designers.

12" LOW-FREQUENCY SOUND PROJECTOR

Utilizing a high-efficiency magnetic circuit and edgewise-wound ribbon voice coil, this bass unit provides an unusually smooth response, free of peaks and valleys and extraneous sounds. One of the important factors contributing to this performance is a specially engineered cone design, with a carefully executed edge treatment for the purpose of eliminating the effects of edge resonance. This edge design provides high flexibility without unwanted spurious radiations—particularly critical in stereophonic reproduction because of the relatively poor direction-resolving ability of the human ear at lower frequencies. Throughout its range, this bass projector within its acoustic chamber, delivers more audio power with less distortion than the great majority of conventional speaker systems available today.

AMPEX AMPLIFIERS

The function of the amplifier section of the Ampex electro-acoustic transducer is to accept input signals from any source, and without introducing any alteration in the form of the signals, amplify they linearly to whatever level is desired. To accomplish this, Ampex amplifiers provide operating characteristics (unequalized) flat within ±0.1 db, with total harmonic distortion less than 0.5 of 1%, throughout the maximum range of human hearing ability, at rated output.

Amplifier units designed for the Ampex Custom Series are rated at 15 watts each, and together deliver an effective 30 watts (60 watts peak) of audio power. Noise and hum are 85 db below rated output, and input sensitivity is 0.58 V to develop rated power. The output stages use two new beam power type 6973 output tubes in class AB push-pull operation.

Output circuitry is of the distributed load type, providing ultra-linearity of response.

ANECHOIC TEST CHAMBER PROCEDURES

To insure that every Ampex transducer meets or exceeds its specifications, it is performance-checked in comparison with production standards developed in the Ampex anechoic chamber. The Ampex Audio chamber is unique in that it is used as an extension of production techniques in controlling product quality off the assembly line.

Actual production designs of electro-acoustic transducers—amplifiers, sound projectors and enclosures—are introduced into the chamber's conditions of free space wave propagation for evaluation and determination of absolute values of performance. Standards thus established are used to check the performance of every transducer as it is assembled into a home music system, insuring that its future owner will receive the benefits of a properly integrated and completely tested group of acoustical components.

AMPEX FM AND AM STEREOPHONIC TUNER

One of the most important performance criteria in the reproduction of stereophonic broadcast is that of balance. The Ampex stereophonic FM and AM tuner was designed throughout its circuitry to provide optimum balance between the two parallel channels at all levels of operation. This is not only important for listening enjoyment, but critically important for stereophonic recording off the air.

The independent, precisely balanced channels of the Ampex stereophonic tuner offer unusually good selectivity and sensitivity. In measurements made in accordance with IRE standards, quieting sensitivity is 5 microvolts for 30 db of quieting (measured at 300 ohm antenna terminals). Maximum sensitivity is .95 microvolts for 0.1 V into a 1 megohm load. In performance tests made by an independent laboratory, the tuner's oscillator radiation was extremely low—only a small fraction of the amount permitted by FCC regulations. All RF, IF and AF sections are shock-mounted to reduce possibility of microphonics.

FM operation is drift-free, and the tuner incorporates full electronic AFC (automatic frequency control) in the circuit, easily switched "on" or "off" from front panel. The FM tuner uses a 3-gang tuning capacitor with a stage of tuned RF. AM circuitry includes broad and sharp selectivity positions, 3-gang tuning capacitor with stage of tuned RF, and incorporates a Bridged-T, inductance-tuned, 10 kc whistle filter for sharp and effective elimination of heterodynes. Tube complement includes 11 single-purpose and 6 multi-purpose tubes, for an effective complement of 23 tube functions. Engineering features include accurate visual tuning indicators for achieving properly balanced tuning, built-in antennas for console operation, and convenient, simple controls and flywheel tuning mechanisms. The Ampex stereo tuner also features provision for adapting to FM multiplex stereo broadcast reception. Frequency response—FM: 20-20,000 cps; AM: 20-8,500 cps. Total distortion less than 1/2 of 1%.

AMPEX AUDIO CONTROL CENTER

The Ampex audio control center enables you to instantly select any desired source of sound, internal or external, for stereophonic or monaural reproduction. Each of the two channels has independent pushbutton-controlled inputs permitting selection of music from tape, records, FM-AM tuner, TV tuner, or other external source.

Separate controls are provided for bass and treble response, permitting individual adjustment as desired by the listener, with a maximum boost or cut of 16 db. Two loudness controls—one for each channel—are mounted on concentric shafts and friction-coupled to permit setting and maintaining uniform calibration and balance of audio levels. These controls provide treble and bass compensation for maximum listening pleasure at any desired volume level.

The audio control center utilizes a self-contained transformer power supply, with metallic rectifiers to minimize heat and extend life of components. Pre-amplifier tube heaters are DC-powered to insure lowest hum and noise characteristics. Four dual purpose low noise tubes are used, performing eight separate tube functions. Two dual purpose 12AX7's are feedback-equalized to either RIAA phonograph input (magnetic cartridge) or to tape playback equalization (direct from tape heads). A 12AX7 dual purpose tube serves as a tone control amplifier and incorporates inverse feedback to provide distortion-free tone control action.

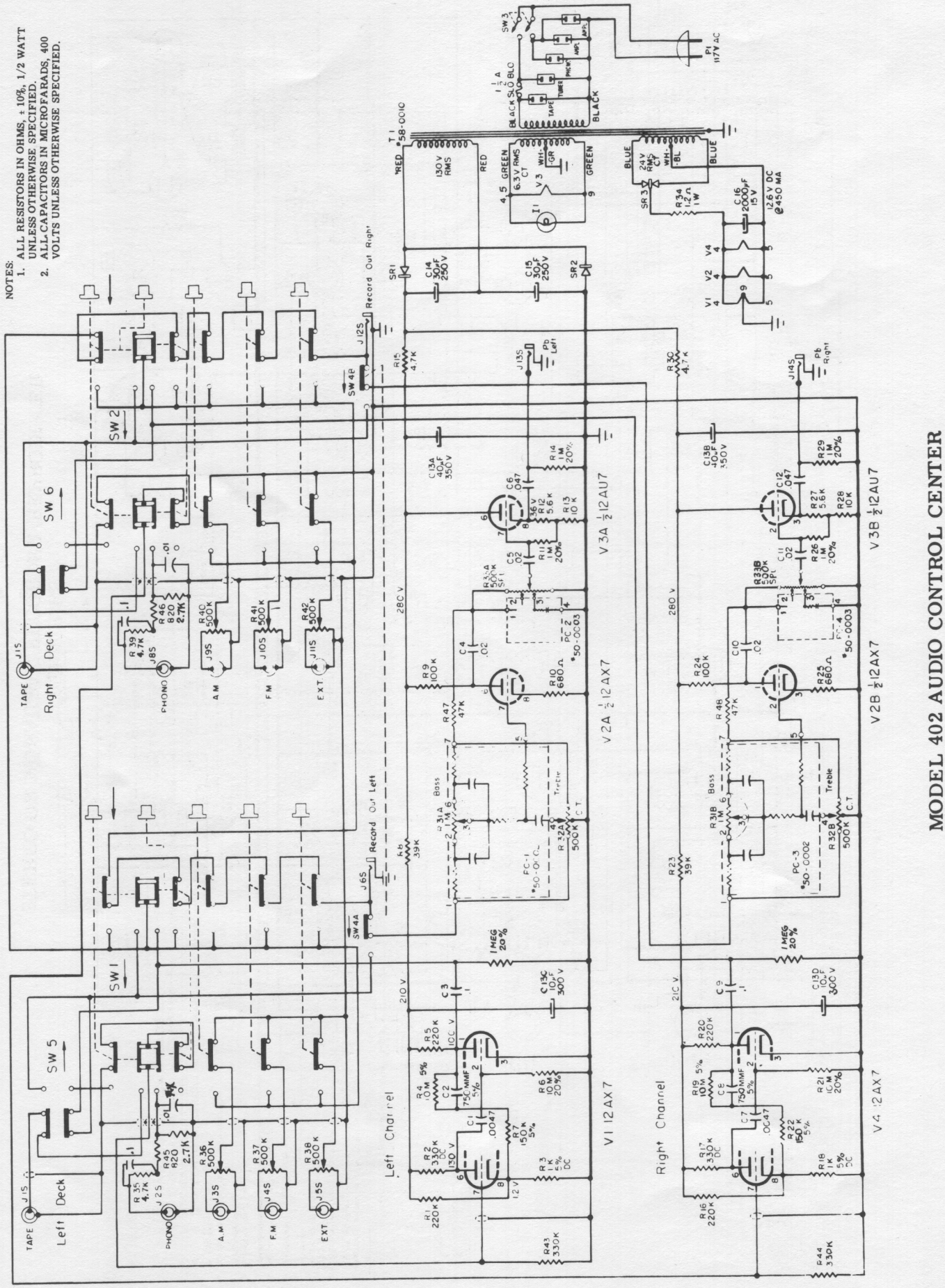
Two separate cathode follower outputs are provided by the 12AU7 utilized in this unit. The latest type of tone control contour is used—one especially designed with constant slope and variable turnover point. The advantages of this type of control are immediately apparent when used in conjunction with wide range, distortion-free amplifier and sound projectors such as those in all Ampex products. Over-all frequency response (tone controls flat) 20 to 20,000 cps ± 1 db. Total distortion less than .5 of 1%.

4-SPEED STEREO/MONAURAL RECORD CHANGER

This outstanding record changer, made for Ampex by Garrard, incorporates a high quality General Electric dual-axis variable reluctance pickup for reproducing stereo and monaural discs interchangeably. Features include a powerful constant-speed 4-pole motor, extra quiet heavily weighted turntable, automatic shut-off and swivel-mounted tone arm. The changer incorporates a special Ampex modification to permit operation with full bass response, avoiding distortion which can be otherwise noticeable at high power levels. This modification consists of a special suspension system to provide adequate acoustic isolation.

DIMENSIONS

SIGNATURE: 64" x 20" x 33" high
CRESCENDO: A-423 CW, CT, FP, TM
51" x 22" x 32" high
A423-B
47" x 21-1/2" x 32" high
CUSTOM: 52-1/2" x 19" x 28-1/2" high
PORTABLE: 9" x 15" x 17-1/2" high
AUDIO CONTROL CENTER PANEL: 4-1/2" x 14-15/16"
DEPTH REQUIRED BEHIND PANEL: 9"
STEREOPHONIC TUNER PANEL: 4-1/2" x 14-15/16"
DEPTH REQUIRED BEHIND PANEL: 9"


NOTES:
1. ALL RESISTORS IN OHMS, ± 10%, 1/2 WATT UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITORS IN MICROFARADS, 400 VOLTS UNLESS OTHERWISE SPECIFIED.
Left Deck
Right Deck
Left Channel
Right Channel
SW 1
SW 2
SW 3
SW 4A
SW 4B
SW 5
SW 6
V1 12AX7
V2A ½ 12AX7
V2B ½ 12AX7
V3A ½ 12AU7
V3B ½ 12AU7
V4 12AX7
T1 #58-0010
Record Out Left
Record Out Right
TAPE
PHONO
AM
FM
EXT
Bass
Treble
BLACK
GREEN
RED
BLUE
280 V
210 V
130 V RMS
6.3 V RMS CT
24 V RMS CT
12.6 V DC @450 MA
1MEG 20%
MODEL 402 AUDIO CONTROL CENTER