

AMPEX

MODEL 300

**OPERATION AND
MAINTENANCE MANUAL**

MODEL 300

INSTRUCTION MANUAL
FOR
AMPEX MODEL 300 RECORDER

TABLE OF CONTENTS

SECTION I	- SPECIFICATIONS
SECTION II	- INSTALLATION
SECTION III	- OPERATION
	A. Electrical
	B. Mechanical
SECTION IV	- OPERATING PRECAUTIONS AND MAINTENANCE
	A. Mechanical Assemblies
	B. Head Assembly
	C. Electronics Assembly
SECTION V	- ALIGNMENT
	A. Overall Performance Checks
	B. Head Alignment
	C. Electronic Alignment
SECTION VI	- PARTS LIST
FIGURE 1	- Top Plate - Bottom View
FIGURE 2	- Capstan Assembly
FIGURE 3	- Reel Idler Assembly
FIGURE 4	- Take-Up Tension Arm
FIGURE 5	- Top Plate - Top View <i>None</i>
FIGURE 6	- Record Amplifier and Power Supply Schematic
FIGURE 7	- Top Plate Control Circuits
FIGURE 8	- Playback Amplifier Schematic
FIGURE 9	- Electronics Chassis - Top View
FIGURE 10	- Recommended Layouts
FIGURE 11	- Inter-Unit Connection Diagram
FIGURE 12	- Meter Control Panel (Bridging) Schematic
FIGURE 13	- Meter Control Panel (Matching) Schematic
FIGURE 14	- Remote Control Circuit
FIGURE 15	- Oscillator Coil Assembly Schematic
FIGURE 16	- Record Equalization Curves
FIGURE 17	- Playback Equalization Curves

SECTION I

SPECIFICATIONS FOR MODEL 300

All performance characteristics of the Model 300 Magnetic Tape Recorder equal or exceed the standards of the NARTB (National Association of Radio & Television Broadcasters). All Ampex audio recorders produce a tape frequency characteristic which has been accepted as standard by the NARTB.

TAPE SPEED: 15 inches per second and 7.5 inches per second, with speed change effected by a single control. The same control also provides the necessary equalization change to compensate for the change in speed.

FREQUENCY RESPONSE: At 15 inches ± 2 db 30 - 15,000 cycles.
At 7.5 inches ± 2 db 40 - 10,000 cycles.
Down no more than 4 db at 15,000 cycles.

SIGNAL-TO-NOISE: Over 70 db unweighted noise to maximum recording level. Over 60 db, as defined by NARTB standards. By NARTB definition, the signal-to-noise ratio is the ratio of peak recording level to the total unweighted playback noise when erasing a signal of peak recording level and in the absence of a new signal. Thus bias and erase noise are included, as well as playback amplifier noise. All frequencies between 50 and 15,000 cycles are measured. The peak recording level is defined as that level at which the overall (input to output) total rms harmonic distortion does not exceed 3% when measured on a 400 cycle tone.

STARTING TIME: Instantaneous. (When starting in the Normal Play mode of operation, the tape is up to full speed in less than 1/10 second.)

STOPPING TIME: When playing at 15 inches per second, tape moves less than 2 inches after depressing Stop button.

FLUTTER AND WOW: At 15 inches per second, well under 0.1% rms, measuring all flutter components from 0 to 300 cycles, using a tone of 3,000 cycles. At 7.5 inches, under 0.2%.

PLAYBACK TIMING ACCURACY: 0.2% or ± 3.6 seconds for a 30 minute recording.

PLAYING TIME: 32 minutes at 15 inch speed on standard NARTB reel; 64 minutes at 7.5 inch speed. The Model 300 will also accommodate the standard RMA reel in various thicknesses.

REWIND TIME: One minute for the full NARTB reel. (2400 feet)

CONTROLS: Start, Stop and Record are pushbutton, relay operated and may be remote controlled. Normal Play, Fast Forward, and Rewind on a selector switch, with rapid shuttling back and forth made possible by instantly changing from one mode of operation to the other without stopping in between.

COMPLETE PLUG-IN HEAD HOUSING: Double mumetal shield cans on playback head, equivalent shielding on record head, matching self-aligned covers on hinged gate. Drop-in threading.

SIMULTANEOUS MONITORING: Independent record and playback systems allow the tape to be monitored while recording.

RECORD AMPLIFIER: 10,000 ohms bridging input, normally set up for ± 4 VU in balanced or unbalanced.

PLAYBACK AMPLIFIER: Adjusted for ± 4 VU output, 600 ohms or 150 ohms balanced or unbalanced. Will deliver 20 dbm without exceeding 1% total harmonic distortion at any frequency from 30-15,000 cycles.

DIMENSIONS: Mechanical unit on 24-1/2" panel and Electronic unit on 12-1/4" panel. For standard rack, console or two case portable mounting.

SHIPPING WEIGHTS AND MOUNTING: Console 270 pounds, Portable Case 175 pounds, Rack 140 pounds.

POWER INPUT REQUIRED: 3 amperes, 115 volts, 60 cycles. (Available on special order for 50 cycles.)

METER CONTROL PANEL available at extra cost with features outlined below:

Mounted on 5-1/4" panel for rack, console, or portable case mounting.

Bridge Input step control will adjust record level for any input greater than -20 VU, 10,000 ohm bridging, any balanced or unbalanced line.

Output Step control will adjust level up to ± 8 VU regardless of tape level - - 600 ohm or 150 ohm balanced or unbalanced line.

VU meter will meter playback output while recording or playing back. Calibrated for ± 4 VU output.

Output key (line or cue).

Phone Jack with input-output key (A-B Key).

SECTION II

INSTALLATION

1. Open packing case carefully and save it. In the event of possible shipping damage, the case may be needed for return shipment.

2. Examine electronics chassis and see that any chassis that are shock mounted float freely on their rubber cushions.

3. If the equipment is to be Rack mounted, install in the rack so that the head cables will reach the electronic unit without being extended in length. Do not lengthen the head cables for any reason whatsoever, because increased cable capacity will cause undesirable resonance with the heads.

4. Install all cables as shown in Fig. 12.

5. Unpack and install the 12SJ7 tube in its socket. WARNING! BE VERY CAREFUL WITH THE 12SJ7 TUBE AS IT IS HAND SELECTED FOR LOW NOISE AND MAY BE DAMAGED BY CARELESS HANDLING. See SECTION IV Page 7 before turning on power.

6. Release capstan drive motor shipping lock. This is the spring catch which holds the motor away from the rubber-tired flywheel. The retaining ring should be broken off and the lock removed from the motor bracket. Do not make any adjustments on the drive system at this time. No adjustments need be made unless damage has occurred during shipping. NOTE: Whenever recorder is transported, be sure to lock motor, or capstan tire may be damaged beyond repair.

7. Connect input and output circuits to the machine. See ELECTRONIC OPERATION.

8. Connect power cord to 115 V., 60 cycles A.C. only.

9. The capstan speed should be checked with the stick-on stroboscope provided. Before checking, let drive unit run for at least five minutes to warm up lubricant in the capstan assembly. If the lubricant is stiff, the additional drag will cause greater compression of the rubber tire and the capstan will therefore run slightly slow until warmed up. Place stroboscope on capstan shaft with the sticky side down and view rotating shaft under 60 cycle light. If the speed is not correct the spokes will appear to rotate. Slight speed changes can be realized by change in capstan drive motor pressure. This adjustment is at spring D, Fig. 1 on the motor solenoid draw bar. If the adjustment is in the proper range, increasing pressure will slow the capstan, decreasing pressure will speed the capstan. Adjust for no rotation of the stroboscope spokes. (If drive motor pressure is too light, increasing pressure will speed the capstan. In this range the tire pressure is inadequate for stable operation, and the pressure should be increased until increase in pressure reduces capstan speed.)

10. Load the left hand reel holder with tape and thread as shown in fig. 5. Be sure the tape used has the oxide-coated side toward the rear of the machine; i. e., toward the head faces. Be sure to remove any adhesive that may have been used to seal the end of the tape. If this adhesive is not removed, the first layer may stick and cause a break in the tape.

11. A reel hold-down or editing knob should be placed on each reel spindle. Editing knobs, catalog #1917, are furnished with console and portable recorders, while hold-down knobs, catalog #4402, are furnished with rack models.

The #4402 reel hold-down knob works in the following manner. A removable pin in the bottom surface of the knob engages a corresponding hole in the turntable. A collet grips the turntable shaft when the top of the knob is rotated. Two spring loaded balls hold the reel to the turntable. A pin in the side of the knob drives the reel. The knob should be positioned on the NARTB reels so that the removable pin engages one of the turntable holes and approximately two thirds of the ball is exposed above the reel. The knob should not be pushed down all the way, but should stick up above the turntable. Once the knob is positioned correctly, the NARTB reels may be removed without removing the knobs. When using the knob with the small RMA reels, unscrew the removable pin. The knob is used only to prevent the reel from falling off the turntable, since three pins in the turntable drive and center the reel. Lock the knob to the shaft, avoiding excess pressure on the reel which could distort the reel flanges.

The machine is now ready for operation. NO FURTHER ALIGNMENT SHOULD BE NECESSARY

SECTION III OPERATION

A. Electrical:

With reference to Fig. 10 and 11, connect input and output circuits to machine. Turn on Power Switch. Mechanical operation is explained in Section III-B.

MACHINE WITHOUT METER CONTROL PANEL. Connect a ± 4 V. U. line (balanced or unbalanced) to the input receptacle J101S on the Electronic Chassis. The Record Level Control R101 has been adjusted at the factory to give the recommended tape level with this input. It is possible to record at proper tape level with inputs of -30 V. U. to ± 10 V. U. by readjusting the Record Level Control. The Playback Level Control R213 has been adjusted at the factory to give an output of ± 4 V. U. into a 600 ohm load from tapes recorded at the recommended operating level.

MACHINE WITH BRIDGING INPUT METER CONTROL PANEL. See Figure 12. Connect an input signal (balanced or unbalanced) to terminals 1, 2 and 3 of the Meter Panel. For unbalanced operation terminal 2 should be the ground side of the line. The input signal must be greater than -10 V. U. Set the Meter Panel Playback Step Control R1102 to 14. Record a signal and adjust the Meter Panel Record Step Control R1101 so the V. U. Meter reads "0". This indicates a ± 4 V. U. output signal into 600 ohms, since the meter is always connected across the Playback Output. The Playback Vernier Control R213 has been set at the factory so that "0" meter reading indicates the recommended tape level with the Meter Panel Playback Step Control set at 14. On playback, any tape recorded off level by a voltage ratio of 5 to 1 (14 db) may be reproduced at ± 4 V. U. by adjusting the Meter Panel Playback Level Control.

MACHINE WITH MATCHING INPUT METER CONTROL PANEL. See Fig. 13. Connect an input signal to the meter panel as described above. The input signal must be ± 4 V. U. or greater. Place the Monitor Switch in the "In" position. This transfers the V. U. Meter to the output side of the Meter Panel Record Step Control R1001. Adjust this control so the meter reads "0". The Record Control on the Electronics Chassis R101 has been adjusted at the factory so that "0" meter reading indicates the recommended tape level. Therefore, it is possible to adjust the record level before the tape is set in motion.

When the program level is properly set, start the tape in motion in the record mode of operation. To monitor the playback output place the Monitor Switch in the "Out" position. With the Meter Panel Playback Step Control R1002 set at 14 the V. U. Meter will read "0". This indicates a ± 4 V. U. output into 600 ohms. On playback, any tape recorder off level by a voltage ratio of 5 to 1 (14 db) may be reproduced at ± 4 V. U. by adjusting the Playback Level Control on the Meter Panel.

With input signals less than ± 4 V. U. the V. U. Meter monitoring the record input signal will not read "0". Therefore, it is necessary to set the record level with tape in motion and the V. U. Meter connected across the playback output (Monitor Switch in "Out" position). Set the Meter Panel Playback Control R1002 to 14.

Increase the gain in the record amplifier by adjusting the Record Control on the Electronic Chassis R101 until the meter reads "0". This will indicate the recommended tape level only when the Playback Control R1002 is set at 14. NOTE: This calibration will be lost if the playback Vernier Control R213 is changed.

B. Mechanical:

When the machine is ready to operate, turn on the power switch, see Fig. 5. This turns on the amplifiers and control circuits. The capstan drive will also start if the tape has been threaded, as the takeup tension arm operates a switch which shuts the motors off when the tape runs out. Pushing the Start button will now start the tape moving according to the mode selected on the Play, Rewind, Fast Forward control. In the Play position the tape will be reproduced at the output terminals. Pushing the Record button will permit an input to the machine to be recorded on the tape with almost simultaneous playback of the new program. A 1/2 second time interval should be observed between pressing the Start button and pressing the Record button to avoid switching transients magnetizing the record head. Pushing the Stop button will stop the machine and turn off the recording amplifier; therefore, one must always push the Start and Record buttons, in that order, to record. The mode selector switch allows transfer from Play to Rewind or Fast Forward without pushing the Start button when switching. This helps greatly in editing and segueing. However, when going from Rewind to Play, the machine shuts off and the Start button must be used to restart the tape motion.

If, when the tape is running in Play, it is desired to accelerate or slow the tape, it may be done as follows:

TO SLOW THE TAPE: Hold the Start button down and push the Stop button for the length of time desired. Upon releasing the Stop button the tape is again up to speed.

TO ACCELERATE THE TAPE: Move the selector to the Fast Forward position. Return to Play when desired.

These two motions are useful when cueing, segueing or synchronizing programs. This can only be accomplished by reason of the rapid start feature incorporated in this machine.

SECTION IV

OPERATING PRECAUTIONS AND MAINTENANCE

A. Mechanical Assemblies:

The drive system employs three motors. Two induction motors with solenoid operated brakes are used for takeup and rewind. These motors are shown in Fig. 7 and require no service attention! The torque of these two motors is adjusted at the factory by means of resistors R801, R802 and R803, and should be left alone unless shipping damage to the resistors has occurred. Both motors are adjusted for a tension of 5 to 6 ounces pull on the reel hub in Play. On top plates for 1/2 inch or 1 inch wide tape these tensions are increased to 10 to 16 ounces. R802 is adjusted for the maximum hold-back tension during Fast Forward and Rewind which will still allow the tape to accelerate when starting with a full reel.

The third motor is the synchronous motor used for capstan drive. This motor is mounted on a hinge which is moved by a solenoid to engage the motor and the capstan flywheel. The hinge is positioned by the Drive Motor Return Spring "B" when the solenoid is deenergized. A stronger return spring is required for rack mounted machines than for console or portable units. See Section VI Parts List.

When the machine is turned on and the tape threaded into position, the solenoid "C" pulls the motor into engagement with the capstan flywheel tire and drives it. The pressure between the motor and flywheel is adjustable at spring "D" and is adjusted to give synchronous speed as described in INSTALLATION.

The capstan shaft has a permanently lubricated ball bearing at the bottom end to take the flywheel load and to maintain a minimum of friction, see Fig. 2. The upper bearing on the shaft is a precision bronze sleeve bearing which permits absolutely true running of the capstan.

The mechanism of the capstan idler is operated by solenoid "E" in Fig. 1 and is returned by spring "A". Capstan idler pressure is set so that it will deform or break the tape if the tape is stopped with the hand while the machine is running. This pressure is adjusted at point "F" in Fig. 1.

The reel idler is shown in Fig. 1 at "G". This shaft has two single shielded ball bearings. Factory lubrication is for the life of the bearings. Should these bearings require servicing or replacement the complete reel idler assembly should be exchanged for a factory reconditioned unit. The extremely low pulley run-out of this assembly is achieved by a final finish cut being taken while running on its own bearings after final assembly. Under no circumstances should the shaft be removed from the assembly, since in all probability the relationship of parts will be lost. This may result in the introduction of the reel idler period into the measurable flutter and wow components of the machine.

The mechanical brakes on the rewind and takeup motors ordinarily require no adjustments. Should trouble occur which appears to be due to faulty braking,

the tension may be adjusted. The only adjustment on the brakes is performed by adjusting tension at "H" in Fig. 1. If machine throws a loop of tape on stopping, the trailing reel brake tension is too low, or if it breaks the tape the tension is too high. However, unless tampered with, the adjustment should be permanent until such time as the brake bands wear out.

CLEANING: Daily attention should be given to the cleaning of the following:

- (1) Capstan Shaft
- (2) Head Faces
- (3) Tape Guides

Clean all surfaces of the above with carbon tetrachloride applied with a soft cloth.

Weekly attention should be given to the cleaning of the capstan idler wheel. It should be cleaned with ethyl alcohol. Great care must be taken to see that oil does not reach the capstan idler tire. Oil will not only contribute to tape slippage but will also ruin the tire.

LUBRICATION: Every 3 months or 1000 hours.

1. Drive Motor: The drive motor uses a sleeve bearing and should be lubricated every three months or 1000 hours, whichever occurs first, with one of the following oils:

Gulf Oil & Refining Company Gulfcrest "A"

Standard Oil Co. of Indiana Stanoil #18 or #25

Sacony Vacuum Oil Co. Gargoyle D, T. E. Light

The motor should be lubricated with a pump-type oil can. To reach the upper bearing in the console model, use a flexible spout or else attach a piece of spaghetti to the end of the spout. In the portable model, the upper bearing is most conveniently reached by unbolting and lifting the top plate. The top plate should be tipped up by raising the righthand end, as viewed when facing the front of the machine. The plate need only be lifted a few inches to expose the bearing to be lubricated. CAUTION - DO NOT OVER-LUBRICATE SUCH THAT OIL MAY GET ON EXPOSED RUBBER SURFACES.

2. Capstan Idler: The capstan idler should be lubricated with a drop of S.A.E. 30 oil on all bearing surfaces. WARNING - under no condition should oil

be allowed to come in contact with the rubber surfaces of the capstan idler or the capstan flywheel.

3. Capstan: The upper bearing of the capstan should be lubricated with S.A.E. 30 motor oil every 3 months. To oil: Loosen set screw in dust cap surrounding the capstan shaft just below the tape contact point. Push the rubber idler wheel away from the shaft just enough to allow the cap to be removed. This exposes a felt washer which covers the oil hole. Remove this washer and oil through the larger of the two holes exposed. Fill until no more oil will enter! Replace as disassembled.

PRECAUTIONS:

REELS. In order for the brakes to work properly, the same size reel must always be placed on both turntables. In using the small RMA 5- or 7-inch reels, abnormal hold-back tensions will occur at the end of the reel due to the small hub diameter. This may cause trouble due to slippage at the capstan idler. If the small type reels are to be used exclusively, an additional 150 ohm, 50 watt resistor should be inserted in series with each of the resistors (R801 and R803), which are in series with the Rewind and Tapeup motors respectively. The machine will not meet specifications for flutter and wow when using the 5- or 7-inch RMA reels because of the discontinuity of the hubs on these reels.

BRAKES. In order to avoid the tightening action which occurs when brake bands become glazed, the brake bands have been treated with graphite. With the graphited brake bands, the proper tension as measured on the NAB reel hub in the unwinding or energizing direction is 14 oz. Should the brakes exhibit a tendency to tighten up or grab, they should be retreated with graphite. A mixture in the proportions of one level tablespoon of graphite to one 8 oz. cup of carbon tetrachloride can be applied to the felt of the brakebands with an oil can. After graphiting, the motors should be run 10 minutes with the brakes on to wear in the graphite. This may be accomplished by disconnecting the brake solenoids temporarily. On top plates for 1/2 inch and 1 inch wide tape, asbestos brake linings are used to increase the braking tensions. Graphite should not be used on these linings.

TAPE SLIPPAGE. The tape will slow down near the end of the program, if the capstan idler pressure is not great enough. This, of course, will become worse at the end of the reel where the hold-back tension is highest. The condition is further exaggerated if a small RMA type reel is used, in which case the hold-back tension is even higher.

Effective capstan idler driving force is reduced as the capstan idler gradually picks up the lubrication with which Minnesota Mining and Manufacturing Company type 111 tape is treated. This lubrication is quite important, as it reduces flutter and head wear, permits more uniform head contact and therefore less high frequency amplitude variation, and any tendency for the tape to "squeak". This "squeaking" sometimes occurs at the slow speed when using the small reels

and is very objectionable. For this reason, the capstan idler should be cleaned with ethyl alcohol at least once each week.

To test for proper capstan idler pressure, hold the tape while the machine is running in the Play position. The idler pressure should be sufficient to deform or break the tape. The pressure can be increased by the adjustment at Point "F" in Fig. 1.

SPEED. If the machine has been subjected to severe cold the drive should be allowed to warm up for 5 minutes to reach stability. This is especially true at the high tape speed.

CAPSTAN MAGNETIZATION. The capstan may become magnetized by contact with a magnetized tool. Should this occur it may be demagnetized with an A. C. solenoid placed over the shaft and slowly pulled away.

DUMMY PLUGS. Two dummy plugs must be inserted into the appropriate sockets in the top plate for correct operation of the recorder. These plugs are catalog No. 567, 8 pin Jones plugs, with pins 1 and 2 jumpered and pins 7 and 8 jumpered.

1. One No. 567 must be plugged into receptacle J804S, labeled "Remote Control", located on the connector panel underneath the top plate. It is removed only when remote control is desired and the remote control cable must be plugged into the receptacle.
2. The other No. 567 must be plugged into receptacle J805S, labeled "Cable to Model 375 60 Cycle Amplifier", located on the connector panel underneath the top plate. When the Model 375 is used with the recorder, the input-output cable from the 375 is plugged into this receptacle. NOTE: The Model 300 and 301 do not incorporate the 60 cycle amplifier connector; therefore, the second dummy plug is not required. If the Model 375 is to be used with these models, it should be wired to the capstan motor terminal strip as explained in the Model 375 Instruction Book.

SECTION IV

OPERATING PRECAUTIONS AND MAINTENANCE

B. Head Assembly.

The head housing, See Fig. 5., is a die cast assembly which contains the three heads used in the recording process. The heads are respectively erase, record, and playback as viewed from left to right when facing the machine. The gate on the housing holds the playback and record shield covers and the tape-lifting fingers. The function of the tape-lifting fingers is to remove the tape from the heads when the gate is open during Rewind or Fast Forward operation. This reduces head wear considerably. The tape may leave a deposit on the heads if allowed to contact them at high speeds. Such a deposit will seriously impair the performance of the machine and should be guarded against by always opening the gate on Fast Forward and Rewind. If a deposit is left, it may be easily removed with carbon tetrachloride on a soft rag. Never use metal of any kind to touch the head surfaces. The gate should never be allowed to spring shut, but should be closed gently.

HEAD MAGNETIZATION.

Occasionally the heads may become magnetized through an electrical fault in the amplifiers, improper use of the machine, or by the heads coming in contact with a magnetized object. This will result in an increase of noise level from 5 to 10 db. It is especially important that the heads be free of magnetization if you are to realize the dynamic range of type 111 tape. It should be remembered that any phenomena that tends to put an unbalanced pulse through the record head will magnetize it. Such pulses can appear in the form of signal or power line pulses. If the following precautions are observed, no difficulty should be experienced;

1. Do not remove any tube from the record amplifier while the machine is recording.
2. Do not connect or disconnect input leads or head leads while recording.
3. Do not depress the Record button until after depressing the Start button. In other words, allow the transient caused by switching the motors and solenoids to die out before the record head is connected. A one-half second pause is sufficient.
4. Do not saturate the record amplifier with an abnormally high input signal. Such a signal would be 10 db. greater than tape saturation and 30 db. greater than normal operating level.
5. Do not test continuity in the heads with an ohm meter.

HEAD DEMAGNETIZATION.

Should the heads become magnetized, they can be demagnetized with an AMPEX head demagnetizer (stock number B-704). In the event that time does not permit the owner of the machine to wait for delivery of a demagnetizer, he may make one as follows: Cut a piece of transformer lamination to a 1/4" x 2" size. Wrap the strip of metal with suitable insulating material and wind approximately 400 turns of No. 36 wire and attach a 4' length of 2 connector cord. Bend the iron strip into a "U" shape and bring the ends of the "U" to a spacing of 1/4". Connect to a 6 volt source of A.C., open the gate on the head housing and bring the ends of the "U" in contact with the 2 poles on the magnetized head. Remove the demagnetizer very slowly, allowing the A.C. field to die off gradually. Repeat this operation on record and playback heads only, as the erase head will demagnetize itself. In the event demagnetization is not effected, repeat the process several times.

SECTION IV

OPERATING PRECAUTIONS AND MAINTENANCE

C. Electronics Assemblies.

WARNING.

The input tube in the playback amplifier is D.C. heated by returning the B supply through its heater. Fuse F101 protects the input tube against abnormal heater surges. The Neon indicator A101 will light in the event of failure of the playback input tube heater or the 1/4 ampere protective fuse F101. SHOULD THIS HAPPEN, THE CAN OF THE FILTER CONDENSER (C113) WILL BE AT A HIGH POTENTIAL WITH RESPECT TO GROUND AND FOR THIS REASON IS PAPER COVERED. C113 SHOULD THEREFORE BE REPLACED ONLY WITH CONDENSERS HAVING AN INSULATED COVER. F101 and A101 are located on top of the electronics chassis. DO NOT REMOVE INPUT TUBE WITH POWER ON, as damage to C114 may result. DO NOT REPLACE F101 WHILE NEON BULB IS LIGHTED, or the new fuse will blow. Therefore, to replace the input tube or the fuse, always turn power off and wait for neon to stop glowing.

DUMMY PLUG.

A Connector J 105S, labeled "Remote Power" is incorporated in the Electronic Assembly to feed filament and B supply current to auxiliary equipment. A #567 Dummy Plug (a Jones plug with pins 1 and 2 jumpered and pins 7 and 8 jumpered) must be inserted in this connector for the proper operation of the machine. It is removed only when it is desired to feed power to a Meter Control Panel or a Mixer-Preamplifier.

METER CONTROL PANEL.

The Meter Control Panel is designed for balanced input and output. If it is desired to operate unbalanced, the following terminals on the Meter Panel should be used as the ground side of the line.

Terminal 2 on the Line In connections.
Terminal 10 on the Monitor Connections.
Terminal 15 on the Line Out connections.

SECTION V
ELECTRONIC ALIGNMENT

Alignment is the necessary adjustments required to have the Electronic Assembly of the tape recorder perform properly. A machine "out of alignment" may be characterized by poor frequency response, high noise, low output, or high distortion. It should not be necessary to align the recorder when it comes to you from the factory. The procedures described on the following pages have been performed at the factory prior to shipment. Further adjustments are not required except as found necessary in routine maintenance.

Alignment consists of the following steps:

I Overall Performance Check

1. Frequency Response
2. Noise Measurement
3. Distortion
4. Flutter and Wow

II Head Alignment

III Playback Alignment

IV Record Alignment

1. Record Bias and Level Adjustment
2. Record Equalization
3. Record Noise Balance

V Erase Adjustment

Standard alignment tape #4494 is available for alignment purposes. It contains a 15 Kc. tone for head azimuth check, a reference tone for level adjustment and a series of tones for a playback response check. It is recorded at 15 inch tape speed, 10 db below recommended operating level. **IMPORTANT!** Before playing the standard tape, demagnetize the heads with the Ampex Head Demagnetizer #704. Magnetized heads will cause a partial erasure of the high frequencies on the standard tape.

I. OVERALL PERFORMANCE CHECK

The following procedure is recommended for checking the performance of this recorder at the time of installation and as necessary thereafter.

1. Overall Frequency Response:

Thread a new reel of tape on the machine. The equalization curves for this machine have been established by use of Minnesota Mining and Manufacturing

Company type 111 tape, construction 5RBA or later. Slight deviations in performance can be expected when using tapes of other manufacture.

a. 7-1/2 Inch Response:

DUE TO THE NATURE OF THE PRE-EMPHASIS IN THE RECORD CIRCUIT, TAPE SATURATION WILL OCCUR AT THE HIGH FREQUENCIES UNLESS THE RESPONSE CHECK IS MADE AT LEAST 20 DB BELOW NORMAL OPERATING LEVEL.

Therefore, check the response with a sensitive meter such as a Hewlett-Packard 400C connected to the output. In absence of a sensitive meter, a standard V. U. Meter, preceded by a flat amplifier with at least 20 db gain can be used. Response will be within the limits indicated in Section I Specifications.

b. 15 Inch Response (30 Inch Response Model 301 Only)

Make the response check approximately 10 db below operating level to avoid saturation effects. The response will fall within the limits indicated in Section I Specifications.

2. Overall Noise Measurement:

Overall wide band noise should be measured with a vacuum tube voltmeter such as Hewlett-Packard 400C while playing back a tape that has been previously erased on the machine. First erase a tape with the input to the record amplifier shorted. Rewind and play this tape back. This will prevent the inaudible bias frequency leakage from entering into the noise measurement, thus producing a false reading. The wide band noise should be below the figures listed in Section I Specifications.

3. Distortion:

Overall distortion may be measured by connecting any standard distortion measurement apparatus across the output. The readings from a wave analyzer or selective frequency distortion meter will be more accurate at lower distortion levels. Distortion readings are somewhat dependent on tape. Readings of 1% are normal at operating levels while reading of 3% are normal at 6 db above operating level.

4. Flutter and Wow:

Flutter or wow is the change of speed over a short time interval in a periodic manner. It can be measured by means of a standard flutter bridge such as A. K. Tatum (Beverly Hills, California) Model 2-A Flutter Meter. Variations in amplitude as indicated on level measurements do not constitute flutter and are entirely due to tape coating variations. Readings will be well under the figures indicated in Section I, Specifications.

II. HEAD ALIGNMENT:

The high frequency response of the recorder depends on the correct head alignment. If tapes are to be interchangeable from one machine to another the heads of all machines must have the same azimuth setting. This is accomplished by using a Standard Tape (Catalog #4494) for aligning the heads of all machines. Head alignment is independent of tape speed; however, it is recommended that the heads be aligned at 15 inches per second since the standard tape is recorded at this speed.

Remove the top cover from the Head Housing by removing the two screws from the top and pulling cover gently back and up. Looking at the Head Housing from the front the three heads from left to right are: Erase, Record and Playback.

The azimuth angle of the erase head is not adjustable.

The Record and Playback Heads should be aligned only after reading and fully understanding the procedure under PLAYBACK AND RECORD CIRCUIT ALIGNMENT.

The actual physical alignment of the Record and Playback Heads consists of placing a 1/4" spintite socket wrench on the left hand elastic stop nut in each head and adjusting back and forth until the proper azimuth angle is arrived at.

First adjust the Playback Head azimuth by playing the standard tape at 15 inches per second and adjusting the stop nut for the maximum output of the 15 kc tone (first tone that appears on the standard tape).

The Record Head azimuth is then aligned with the Playback Head by recording a 15,000 cycle signal from an audio oscillator on a blank tape and adjusting the record stop nut for maximum playback output.

III. ALIGNMENT OF PLAYBACK CIRCUITS:

1. Thread an audio standard tape on the machine. Terminate the output with a 600 ohm external termination or set the Line Out Switch on the Meter Panel to the "cue" position. Connect an external V. U. Meter across the output or set the Monitor Switch on the Meter Panel to the "Out" position. Connect an amplifier and loudspeaker or a pair of headphones to the output of the machine or to the phone jack on the Meter Panel so the voice announcements on the standard tape can be heard.

2. Set the machine into the Play mode of operation at the 15 inch per second tape speed. If the machine is equipped with a Meter Panel, set the Meter Panel Playback Step Control on 4.

3. The first tone on the tape should be used to adjust the playback head azimuth as described under Head Alignment.

4. The second tone on the standard tape is used to adjust the playback level.

Without Meter Panel.

Adjust the Playback Level Control on the Electronic Assembly R213 so the output is -6 dbm (.388 volts RMS) since standard tape level is 10 db lower than operative level.

With Meter Panel.

With the Meter Panel Playback Control set at 4, adjust the vernier control on the Meter Panel (R213) so the Meter reads "0" (± 4 dbm output). Reposition the Meter Panel Playback Control to 14, since the standard tape level is 10 db below operating level.

5. Playback Equalization: The Playback Amplifier is factory equalized by means of the High Frequency Playback Equalizer (R207), in accordance with the standard voltage curve shown in Figure 17. The recommended method for adjusting the Playback Amplifier response is to connect an audio oscillator and vacuum tube voltmeter to the Playback Amplifier as shown in Figure 17. Adjust the Playback Equalizer (R207) to give the frequency response of the standard 50 microsecond curve. Deviation from this curve is not recommended. Check the playback level setting with a standard tape if any change is made in the Equalizer. NOTE: Fixed Equalization is employed for the 30 inch tape speed on the Model 301.

The above will properly align the playback circuit for operation at both speeds.

The 15 inch standard tape will play back within ± 2 db to 15,000 cycles when the Playback Amplifier is adjusted to the standard curve. Failure for the standard tape to play back within these tolerances after the Playback Amplifier has been aligned indicates one of the following:

- a. Trouble in the Head Assembly, such as worn heads.
- b. A faulty Standard Tape which has been partially erased at the high frequencies by passing over magnetized heads, etc.

An overall frequency response check will isolate the trouble. Good overall response indicates a faulty Standard Tape. Poor overall response indicates one of the following:

- a. Faulty Heads.

- b. Tape deficiency.
- c. Record or Playback Amplifier improperly equalized.
- d. Incorrect bias.

Alignment of the Record circuits as described in the next sub-section will further aid in isolating trouble.

IV. ALIGNMENT OF RECORD CIRCUITS:

Record alignment should be attempted only after the playback has been properly aligned.

Perform the following operations in the sequence indicated:

1. Record Bias and Level Adjustment

The record bias current is factory adjusted for optimum overall response and low frequency distortion. However, the optimum value of bias current will vary with different types of tape. The record equalization characteristics on this equipment have been determined for peak bias at 1000 cycles at 15 inch per second tape speed. Peak bias means that the bias current is adjusted so that the 1000 cycle signal is recorded at its maximum level. Adjust the bias in the following manner:

- a. Thread a blank tape on the machine. Terminate the playback output with a 600 ohm termination or set the Line Out Switch on the Meter Panel to the "cue" position. Connect an external V.U. Meter across the output or set the Monitor Switch on the Meter Panel to the "Out" position.
- b. Connect an audio oscillator to the input of the Record Amplifier or to the Meter Panel if the machine is so equipped. Set the oscillator at ± 4 dbm (1.23 volts RMS) 1000 cycles.
- c. On machines with a Bridging Meter Panel, set the Meter Panel Record Step Control to 14. On machines with a Matching Meter Panel, set the Record Level Control to "0". The Playback Step Control on either style of Meter Panel should be set at 14.
- d. Start the tape in the Record mode of operation at 15 inch per second tape speed. Make a preliminary record level set by adjusting the Record Control in the Electronic Chassis (R101) so the playback Output is approximately ± 4 dbm (1.23 volts RMS).
- e. Adjust the Bias Control (R126) for the maximum playback output of the 1000 cycle tone.
- f. Reset the audio oscillator to 250 cycles ± 4 dbm (1.23 volts RMS).

HEAD MAGNETIZATION.

Occasionally the heads may become magnetized through an electrical fault in the amplifiers, improper use of the machine, or by the heads coming in contact with a magnetized object. This will result in an increase of noise level from 5 to 10 db. It is especially important that the heads be free of magnetization if you are to realize the dynamic range of type 111 tape. It should be remembered that any phenomena that tends to put an unbalanced pulse through the record head will magnetize it. Such pulses can appear in the form of signal or power line pulses. If the following precautions are observed, no difficulty should be experienced:

1. Do not remove any tube from the record amplifier while the machine is recording.
2. Do not connect or disconnect input leads or head leads while recording.
3. Do not depress the Record button until after depressing the Start button. In other words, allow the transient caused by switching the motors and solenoids to die out before the record head is connected. A one-half second pause is sufficient.
4. Do not saturate the record amplifier with an abnormally high input signal. Such a signal would be 10 db. greater than tape saturation and 30 db. greater than normal operating level.
5. Do not test continuity in the heads with an ohm meter.

HEAD DEMAGNETIZATION.

Should the heads become magnetized, they can be demagnetized with an AMPEX head demagnetizer (stock number B-704). In the event that time does not permit the owner of the machine to wait for delivery of a demagnetizer, he may make one as follows: Cut a piece of transformer lamination to a 1/4" x 2" size. Wrap the strip of metal with suitable insulating material and wind approximately 400 turns of No. 36 wire and attach a 4' length of 2 connector cord. Bend the iron strip into a "U" shape and bring the ends of the "U" to a spacing of 1/4". Connect to a 6 volt source of A.C., open the gate on the head housing and bring the ends of the "U" in contact with the 2 poles on the magnetized head. Remove the demagnetizer very slowly, allowing the A.C. field to die off gradually. Repeat this operation on record and playback heads only, as the erase head will demagnetize itself. In the event demagnetization is not effected, repeat the process several times.

should not be touched unless all heads have been thoroughly demagnetized with an Ampex Head Demagnetizer or equivalent. If noise of a crackling nature is still found to exist in the output of the machine, connect a 1 MFD condenser across the output and adjust the Noise Balance Control, (R126), for minimum record noise as read on a sensitive meter or heard in a loudspeaker connected to the machine output through a power amplifier.

V. ERASE ADJUSTMENT:

It should not be necessary to make this adjustment except at rare intervals because of the high degree of stability of the oscillator circuits. Do not make this adjustment unless the erase head will not erase the previous program. Do not readjust erase to attempt to eliminate crackling tape noise, as the erase current does not produce crackling even if out of adjustment. If adjustment is indicated, the following procedure must be taken:

- a. Pull out the Erase Cable from the Record Chassis plug (J103P).
- b. Make an adapter plug by inserting a 10 ohm resistor in series with the ground side of the erase cable.
- c. Insert adapter in J103P, insert cable in adapter.
- d. Place a vacuum tube voltmeter such as Hewlett-Packard 400A or 400C across the 10 ohm resistor. Set on 3 volt scale. Full scale will read 300 Ma. erase current.
- e. Loosen the Erase Trimmer C120 for minimum capacity and slowly increase the capacity (counterclockwise rotation from top of chassis) until the meter reads 150 to 180 Ma. Higher currents will produce unnecessary heating of the head.
- f. NOTE: Align the record circuit as described under Record Alignment after making this adjustment, since a change in erase current will produce a change in bias current.

MODEL 300 ELECTRONIC ASSEMBLY - CATALOG #559
 MODEL 301 ELECTRONIC ASSEMBLY - CATALOG #1094

Schematic Ref. No.	Description	Ampex Stock Number
A101	Neon Lamp 1/25 Watt	LA-4
C101	50 MFD 25 V. Electrolytic Condenser	CO-60
C102	.25 MFD 600 V. Tubular Condenser	CO-35
C104	10 MFD 450 V. Electrolytic Condenser	CO-55
C105	.1 MFD 600 V. Tubular Condenser 5%	CO-34
C106	50 MFD 25 V. Electrolytic Condenser	CO-60
C107	.1 MFD 600 V. Tubular Condenser	CO-33
C108	10 MFD 450 V. Electrolytic Condenser	CO-55
C109	.0035 MFD 500 V. Mica Condenser 5%	CO-10
C110	.002 MFD 500 V. Mica Condenser 5%	CO-7
C111	1. MFD 400 V. Metalized Paper Condenser	CO-47
C112	16 MFD 150 V. Electrolytic Condenser	CO-56
C113	20/30/30 MFD 475 V. Electrolytic Condenser	CO-244
C114	100 MFD 25 V. Electrolytic Condenser	CO-104
C115	10 MFD 450 V. Electrolytic Condenser	CO-55
C116	10 MFD 450 V. Electrolytic Condenser	CO-55
C117	.1 MFD 1000 V. Tubular Condenser	CO-95
C118	.1 MFD 1000 V. Tubular Condenser	CO-95
C119	.002 MFD 500 V. Mica Condenser 5%	CO-7
C120	.001 MFD Mica Trimmer Condenser	CO-91
C121	.0005 MFD 500 V. Mica Condenser 5%	CO-5
C123	100 MFD 50 V. Electrolytic Condenser	CO-63
C124	20 MFD 450 V. Electrolytic Condenser	CO-57
C125	.0001 MFD Padder Condenser	CO-92
C126	.0001 MFD Padder Condenser	CO-92
C201	.1 MFD 200 V. Metalized Paper Condenser	CO-97
C202	4 MFD 450 V. Electrolytic Condenser	CO-54
C203	50 MFD 25 V. Electrolytic Condenser	CO-60
C204	.1 MFD 600 V. Tubular Condenser	CO-33
C206	.036 MFD 150 V. Tubular Condenser 5%	CO-111
C207	50 MFD 25 V. Electrolytic Condenser	CO-60
C208	4 x 20 MFD 450 V. Electrolytic Condenser	CO-65
C209	.25 MFD 600 V. Tubular Condenser	CO-35
C210	50 MFD 25 V. Electrolytic Condenser	CO-60
C211	.1 MFD 600 V. Tubular Condenser	CO-33
C212	.1 MFD 600 V. Tubular Condenser	CO-33
C213	.1 MFD 600 V. Tubular Condenser	CO-33
C214	50 MFD 25 V. Electrolytic Condenser	CO-60
C901	.004 MFD 500 V. Mica Condenser 5%	CO-11
C902	.004 MFD 500 V. Mica Condenser 5%	CO-11
C903	.0004 MFD 500 V. Mica Condenser 5%	CO-89
C904	.0004 MFD 500 V. Mica Condenser 5%	CO-89

NOTE: ORDER PARTS BY AMPEX CATALOG NUMBER ONLY!

Schematic Ref. No.	Description	Ampex Stock Number
F101	1/4 Amp Fast Blowing Fuse	FU-4
J101S	Chassis Connector	PL-58S
J102P	Chassis Connector	PL-61P
J103P	Chassis Connector	PL-62P
J104P	Chassis Connector	PL-13P
J105S	Chassis Connector	PL-54S
J201P	Chassis Connector	PL-59P
J202P	Chassis Connector	PL-4P
J203P	Chassis Connector (Meter Panel Only)	PL-26P
K101	3 Pole Double Throw DC Relay	RL-26
K102	3 Pole Double Throw DC Relay	RL-2
K201	3 Pole Double Throw DC Relay (Model 301 Only)	RL-2
L101	20 Millihenry Choke	CH-8
L102	12 Henry Choke	3479
L103	20 Henry Choke	3480
L104	100 Millihenry Choke	CH-15
R101	100,000 Ohm Carbon Potentiometer	RE-227
R102	2200 Ohm 1 Watt Composition Resistor	RE-7
R103	47,000 Ohm 1 Watt Composition Resistor	RE-22
R104	10,000 Ohm 1 Watt Composition Resistor	RE-15
R105	1 Megohm 1 Watt Composition Resistor	RE-32
R106	39,000 Ohm 1 Watt Composition Resistor 5%	RE-44
R107	100,000 Ohm 1 Watt Composition Resistor	RE-26
R108	2200 Ohm 1 Watt Composition Resistor	RE-7
R109	47,000 Ohm 1 Watt Composition Resistor	RE-22
R110	10,000 Ohm 1 Watt Composition Resistor	RE-15
R111	470,000 Ohm 1 Watt Composition Resistor	RE-31
R112	1200 Ohm 2 Watt Composition Resistor	RE-158
R113	220 Ohm 1 Watt Composition Resistor	RE-1
R114	2200 Ohm 1 Watt Composition Resistor	RE-7
R115	10,000 Ohm 10 Watt W. W. Resistor	RE-90
R116	470,000 Ohm 1 Watt Composition Resistor	RE-31
R117	50,000 Ohm Carbon Potentiometer	RE-226
R118	1 Megohm 1 Watt Composition Resistor	RE-32
R119	47,000 Ohm 1 Watt Composition Resistor	RE-22
R120	6000 Ohm 40 Watt W. W. Resistor	RE-244
R121	220,000 Ohm 1 Watt Composition Resistor	RE-28
R122	10,000 Ohm 25 Watt W. W. Resistor	RE-122
R123	600 Ohm 10 Watt W. W. Resistor	RE-73
R124	10,000 Ohm 10 Watt W. W. Resistor	RE-90
R125	100 Ohm 1 Watt Composition Resistor	RE-260
R126	10,000 Ohm W. W. Potentiometer	RE-255
R201	470,000 Ohm 1 Watt Composition Resistor	RE-47
R202	1 Megohm 1 Watt Composition Resistor	RE-32

NOTE: ORDER PARTS BY AMPEX CATALOG NUMBER ONLY!

MODEL 300 & 301 SECTION VI - Page 3

9-15-52

Schematic Ref. No.	Description	Ampex Stock Number
R203	1000 Ohm 1/2 Watt W. W. Resistor 1%	RE-49
R204	300,000 Ohm 1/2 Watt W. W. Resistor 1%	RE-52
R205	100,000 Ohm 1/2 Watt W. W. Resistor 1%	RE-51
R206	1 Megohm 1 Watt Composition Resistor	RE-32
R207	5000 Ohm Carbon Potentiometer	RE273
R208	10,000 Ohm 2 Watt Composition Resistor	RE-168
R209	1000 Ohm 1 Watt Composition Resistor	RE-5
R210	330,000 Ohm 1 Watt Composition Resistor	RE-306
R211	100,000 Ohm 1/2 Watt W. W. Resistor 1%	RE-51
R212	27,000 Ohm 1 Watt Composition Resistor	RE-19
R213	100,000 Ohm Carbon Potentiometer	RE-227
R214	1200 Ohm 1 Watt Composition Resistor	RE-261
R215	33,000 Ohm 1 Watt Composition Resistor	RE-20
R216	10,000 Ohm 2 Watt Composition Resistor	RE-168
R217	47,000 Ohm 1 Watt Composition Resistor	RE-22
R218	1 Megohm 1 Watt Composition Resistor	RE-32
R219	10,000 Ohm 5 Watt W. W. Resistor	RE-262
R220	22,000 Ohm 1 Watt Composition Resistor	RE-171
R221	1 Megohm 1 Watt Composition Resistor	RE-32
R222	1000 Ohm 1 Watt Composition Resistor	RE-5
R223	1 Megohm 1 Watt Composition Resistor	RE-32
R901	47,000 Ohm 1 Watt Composition Resistor	RE-22
R902	47,000 Ohm 1 Watt Composition Resistor	RE-22
R903	100 Ohm 1 Watt Composition Resistor	RE-260
R904	100 Ohm 1 Watt Composition Resistor	RE-260
T101	Input Transformer	3478
T102	Power Transformer	3477
T103	Oscillator Coil Assembly	512
T201	Output Transformer	1154
TS101	Terminal Strip - 8 Terminals	TS-2-8
T901	Torroidal Coil	1011
V101	6C5 (Recommended) or 6J5 Vacuum Tube	TU-3
V102	6C5 (Recommended) or 6J5 Vacuum Tube	TU-3
V103	6SN7 Vacuum Tube	TU-13
V104	5U4G Vacuum Tube	TU-1
V105	815 Vacuum Tube	TU-16
V201	12SJ7 Vacuum Tube - Factory Selected	TU-12
V202	VR-150 Vacuum Tube	TU-2
V203	6J7 Vacuum Tube	TU-15
V204	6SN7 Vacuum Tube	TU-13
V205	6SN7 Vacuum Tube	TU-13
	Tube Shield Assembly V101	644
	Dummy Plug (Power)	567
	Millen Shaft Lock	SM-1
	Octal Sockets	SO-1
	Octal Sockets -Shock Mounted (V201 & V202)	SO-11
	Condenser Socket	SO-9

TOP PLATE ASSEMBLY MODEL 300 CATALOG #511
 TOP PLATE ASSEMBLY MODEL 301 CATALOG #1122

Schematic Ref. No.	Description	Amplex Stock Number
A801	6-8 V. Panel Lamp - Bayonet Base	LA-5
A802	120 V. 6 Watt Lamp - Candelabra Screw	LA-6
C501	5 MFD 330 V. A. C. Capacitor	CO-80
C601	3.75 MFD 330 V. AC Capacitor	CO-86
C701	3.75 MFD 330 V. AC Capacitor	CO-86
C801	.1 MFD 600 V. Tubular Condenser	CO-33
C802	.1 MFD 600 V. Tubular Condenser	CO-33
C803	.1 MFD 600 V. Tubular Condenser	CO-33
C804	.1 MFD 600 V. Tubular Condenser	CO-33
C805	80 MFD 150 V. Electrolytic Condenser	CO-105
C806	80 MFD 150 V. Electrolytic Condenser	CO-105
C807	.1 MFD 600 V. Tubular Condenser	CO-33
C808	.1 MFD 600 V. Tubular Condenser	CO-33
C809	.1 MFD 600 V. Tubular Condenser	CO-33
F801	5 Amp 250 V. Fuse	FU-5
F802	5 Amp 250 V. Fuse	FU-5
F803	2 Amp 250 V. Fuse	FU-2
J801P	Chassis Connector	PL-27P
J802S	Chassis Connector	PL-68S
J804S	Chassis Connector	PL-54S
J806S	Chassis Connector - Utility Outlet	PL-141S
K801	3 Pole Double Throw DC Relay	RL-26
K802	3 Pole Double Throw DC Relay	RL-26
R801	150 Ohm 50 Watt Adjustable Resistor	RE-259
R802	500 Ohm 50 Watt Adjustable Resistor	RE-221
R803	150 Ohm 50 Watt Adjustable Resistor	RE-259
R804	10 Ohm 5 Watt W. W. Resistor	RE-264
S501	Micro Switch	SW-2
S502	Dual DPDT Toggle Switch	SW-51
S503	Dual DPDT Toggle Switch	SW-51
S801	DPST Toggle Switch	SW-4
S802	6 Pole 3 Position Shorting Switch	SW-18
S803	Single Pole Pushbutton N. C. (Stop)	SW-35
S804	Single Pole Pushbutton N. O. (Record)	SW-34
S805	Double Pole Pushbutton N. O. (Start)	SW-12
SR801	Selenium Rectifier	SR-4
TS501	Terminal Strip - 9 Terminals	TS-1-9
TS601	Terminal Strip - 6 Terminals	TS-1-6
TS701	Terminal Strip - 6 Terminals	TS-1-6
TS801	Terminal Strip - 4 Terminals	TS-2-4

NOTE: ORDER PARTS BY AMPEX CATALOG NUMBER ONLY!

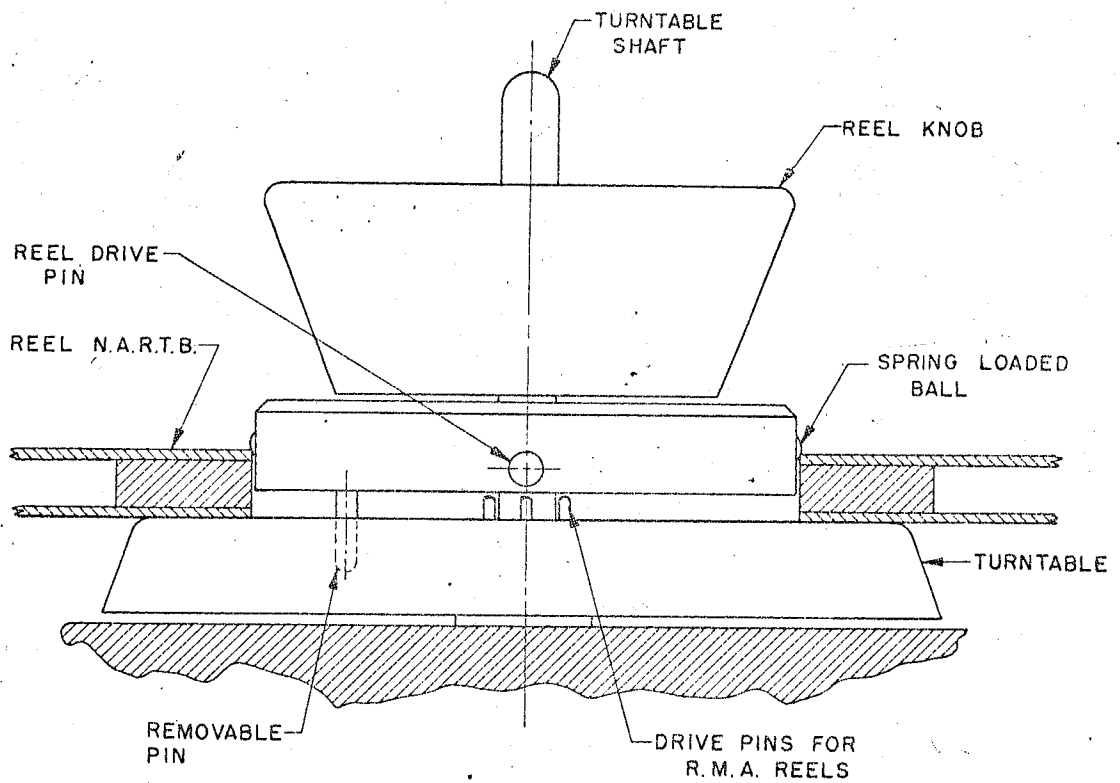
Reference Number	Description	Ampex Catalog Number
	Drive Assembly Model 300	520
	Drive Assembly Model 301	630
	Capstan Assembly	366
	Capstan Dust Cap	362
	Capstan Felt Washer - Dust Seal	494
	Capstan Truarc Retainer	RR-5-1
	Capstan Idler Assembly	500
	Capstan Idler Arm	372
	Capstan Idler Arm Bearing Housing	374
B501	Drive Motor Assembly - Model 300	1030
B501	Drive Motor Assembly - Model 301	1075
	Drive Motor Return Spring(Console and portable)	1024
	Drive Motor Return Spring (Rack Mount Only)	390
	Drive Motor Shield	1905
K502	Drive Solenoid	670
	Felt Washer	PW-6-1/4-416-816
	Drive Motor Pressure Adjusting Spring	389
K501	Capstan Solenoid	670
	Felt Washer	PW-6-1/8-416-816
	Capstan Idler Return Spring	400
	Capstan Idler Adjusting Spring	676
	Tape Speed Switch Assembly (incl. S501, S502, S503)	364
	Takeup Assembly (Complete)	339
	Takeup Motor Assembly-Complete with motor, Flange, Brake Drum & Turntable	2458
	Brake Housing	317
	Brake Band Assembly	328
	Brake Band Leaf	720-1 & 2
K701	Brake Solenoid	337
	Brake Adjusting Spring	322
	Turntable Pad	958
	Rewind Assembly	338
	Rewind Motor Assembly-Complete with Motor, Flange, Brake Drum & Turntable	2458
	Brake Housing	316
	Brake Band Assembly	328
	Brake Band Leaf	720-1 & 2
K601	Brake Solenoid	337
	Brake Adjusting Spring	322
	Turntable Pad	958
	Takeup Tension Arm Assembly	425
	Tape Guide Hook	355
	Tape Guide	675

Reference Number	Description	Ampex Catalog Number
	Takeup Tension Spring	422
	Reel Idler Assembly	354-0-(22.10)
	Tape Guide	257
	Head Assembly - Console	475-1
	Head Assembly - Rack & Suitcase	475-2
	Gate Pins	DR-2-3-10
	Gate Spring	438
	Dummy Plug - Remote Control	567
	Record Pushbutton Guard	463
	Start and Stop Bushbutton Guards	361
	Speed Change Knob	KN-10
	Mode Selector Lever Knob	KN-2
	Fuse Holder	FE-1
	On-Off Pilot Lamp Base - Amber	DL-6
	Record Pilot Lamp Base - Red	DL-7
	WESTON PANEL CO	
	METER CONTROL PANEL	
	Meter Control Panel-Matching-Weston Meter	515-3
	Meter Control Panel-Matching-Burlington Meter	515-4
	Meter Control Panel -Bridging-Weston Meter	515-1
	Meter Control Panel-Bridging-Burlington Meter	515-2
	Input Cable Assembly	569
	Cable Connector	PL-33P
	Output Cable Assembly	568
	Cable Connector	PL-1S
	Level Control Cable Assembly	570
	Cable Connector	FL-34S
	Panel Lamp Cable Assembly	625
	Cable Connector	PL-24P
J1001S	Phone Jack - Open Circuit	JA-3
J1101S	Phone Jack - Open Circuit	JA-3
M1001	VU Meter - Burlington	ME-2
M1001	VU Meter - Weston	ME-4
M1101	VU Meter - Burlington	ME-2
M1101	VU Meter - Weston	ME-4
R1001	600 Ohm T-Pad Mixer Control	RE-236
R1002	20,000 Ohm 20 Step Potentiometer	RE-235
R1003	560 Ohm 1 Watt Composition Resistor	RE-3
R1004	3600 Ohm 1/2 Watt W. W. Resistor 1%	RE-269
R1005	2700 Ohm 1 Watt Composition Resistor	RE-8
R1006	560 Ohm 1 Watt Composition Resistor	RE-3
R1101	10,000 Ohm 20 Step Potentiometer	RE-234
R1102	20,000 Ohm 20 Step Potentiometer	RE-235
R1103	560 Ohm 1 Watt Composition Resistor	RE-3

Reference Number	Description	Ampex Catalog Number
R1104	3600 Ohm 1/2 Watt W. W. Resistor 1%	RE-269
R1105	2700 Ohm 1 Watt Composition Resistor	RE-8
S1001	DPDT Lever Switch	SW-20
S1002	DPDT Lever Switch	SW-20
S1101	DPDT Lever Switch	SW-20
S1102	DPDT Lever Switch	SW-20
TS1001	Terminal Strip - 18 Terminals	TS-1-18
TS1101	Terminal Strip - 18 Terminals	TS-1-18

MISCELLANEOUS

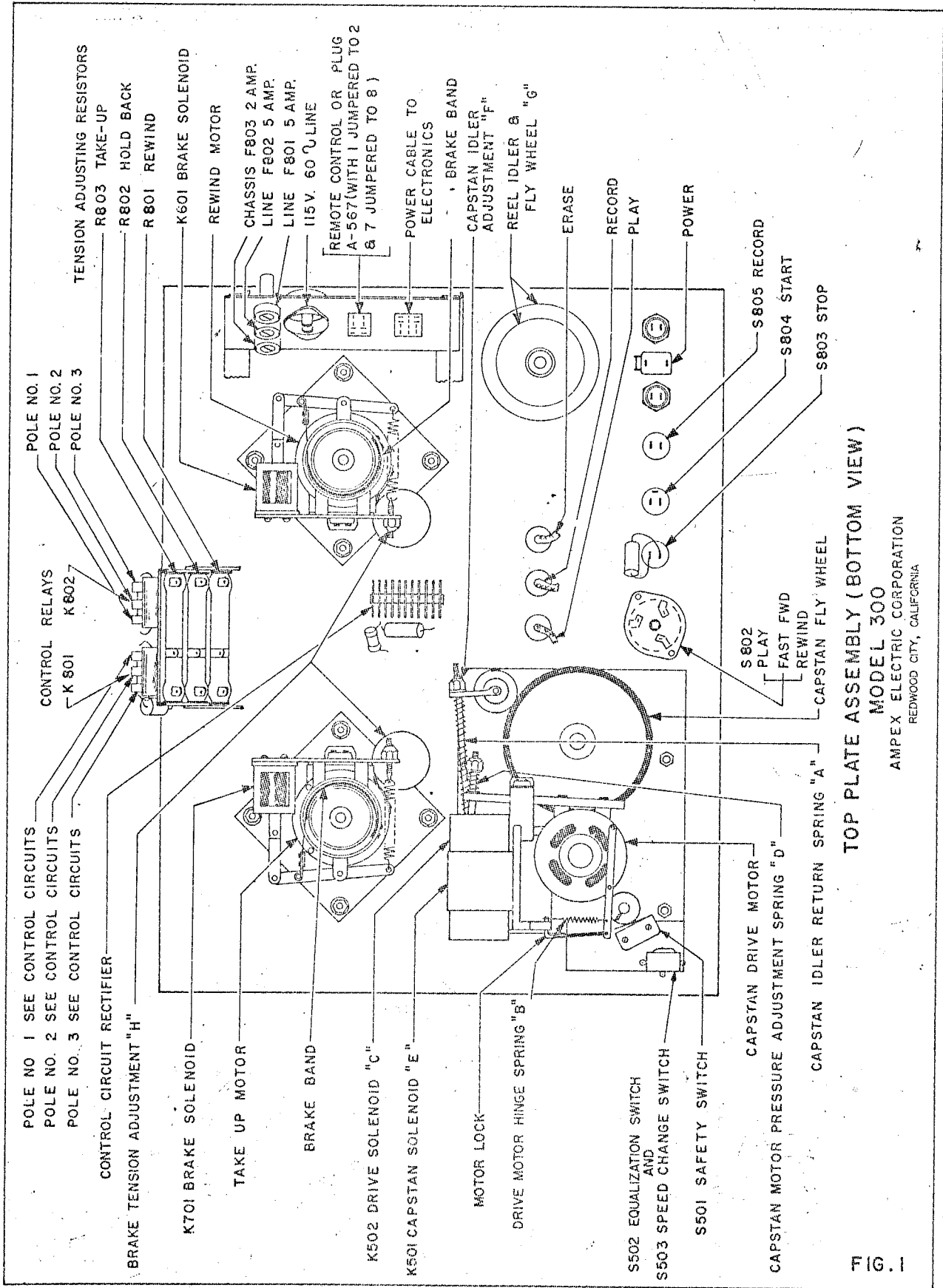
A2001	Remote Record Lamp Base - Red	DL-7
	120V. 6 W att Lamp Candelabra Screw	LA-6
S2001	Single Pole Pushbutton-Normally Open	SW-34
S2002	Double Pole Pushbutton - Normally Open	SW-12
S2003	Single Pole Pushbutton - Normally Closed	SW-35
	NARTB 10 1/2 inch Reel	539
	Reel Knob - Editing (Console & Suitcase)	1917
	Reel Knob - Hold Down (Rack)	4402
	AC Power Cable	564
	Interconnecting Cable (Console)	563-2
	Interconnecting Cable (Rack & Suitcase)	563-1
	Fan Assembly for Console Cabinet	2695
	Air Filter	AF-1
	15"/Sec. Strobosticker	575
	15"/Sec. Standard Alignment Tape	4494
	Head Demagnetizer	704



CAUTION:- DO NOT PUSH KNOB ALL THE WAY DOWN TO THE TURNTABLE OR SPRING LOADED BALLS WILL NOT HOLD REEL IN PLACE.

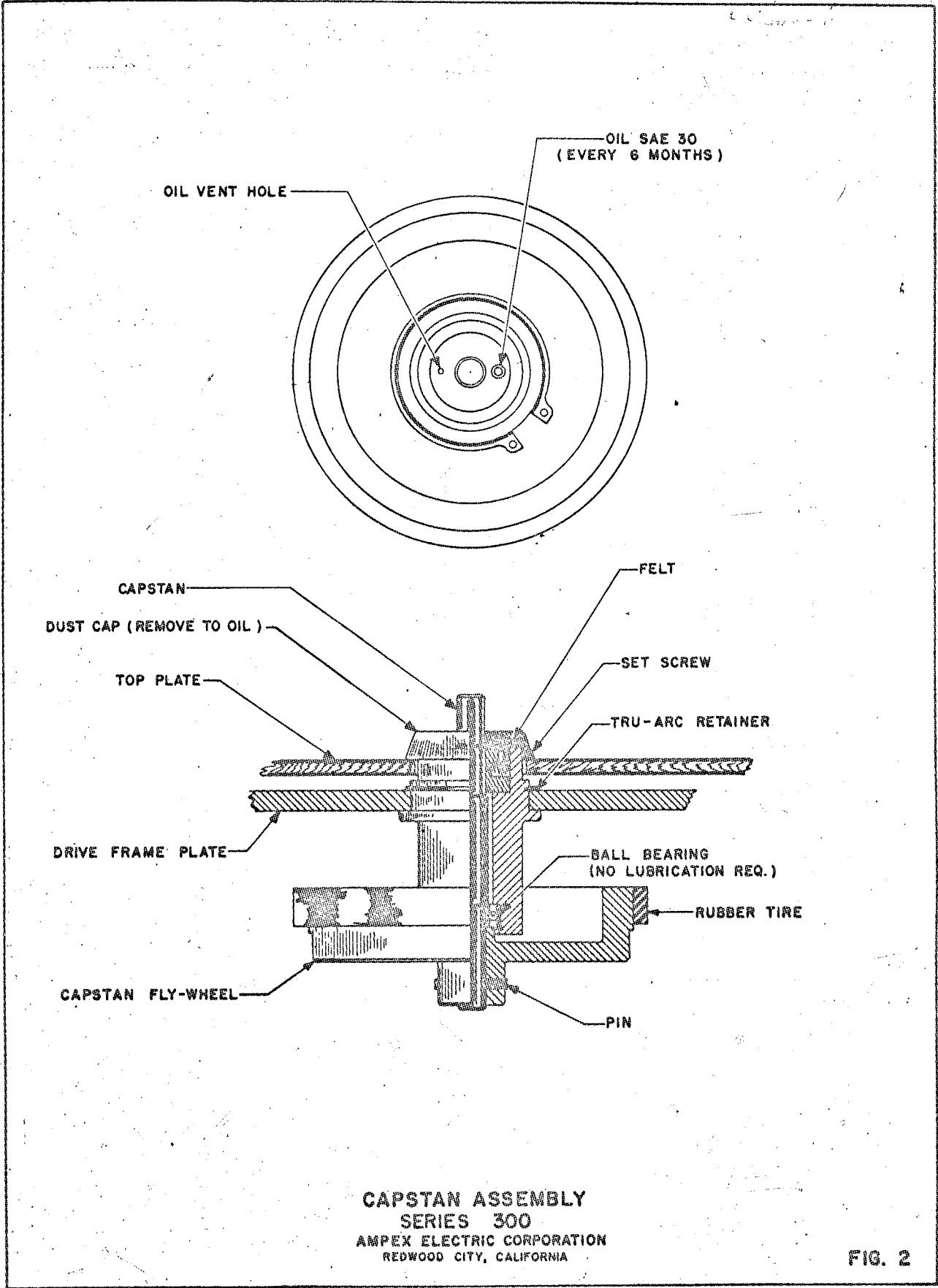
REEL HOLD-DOWN KNOB
 AMPEX ELECTRIC CORPORATION
 REDWOOD CITY, CALIFORNIA.

FIG. 0



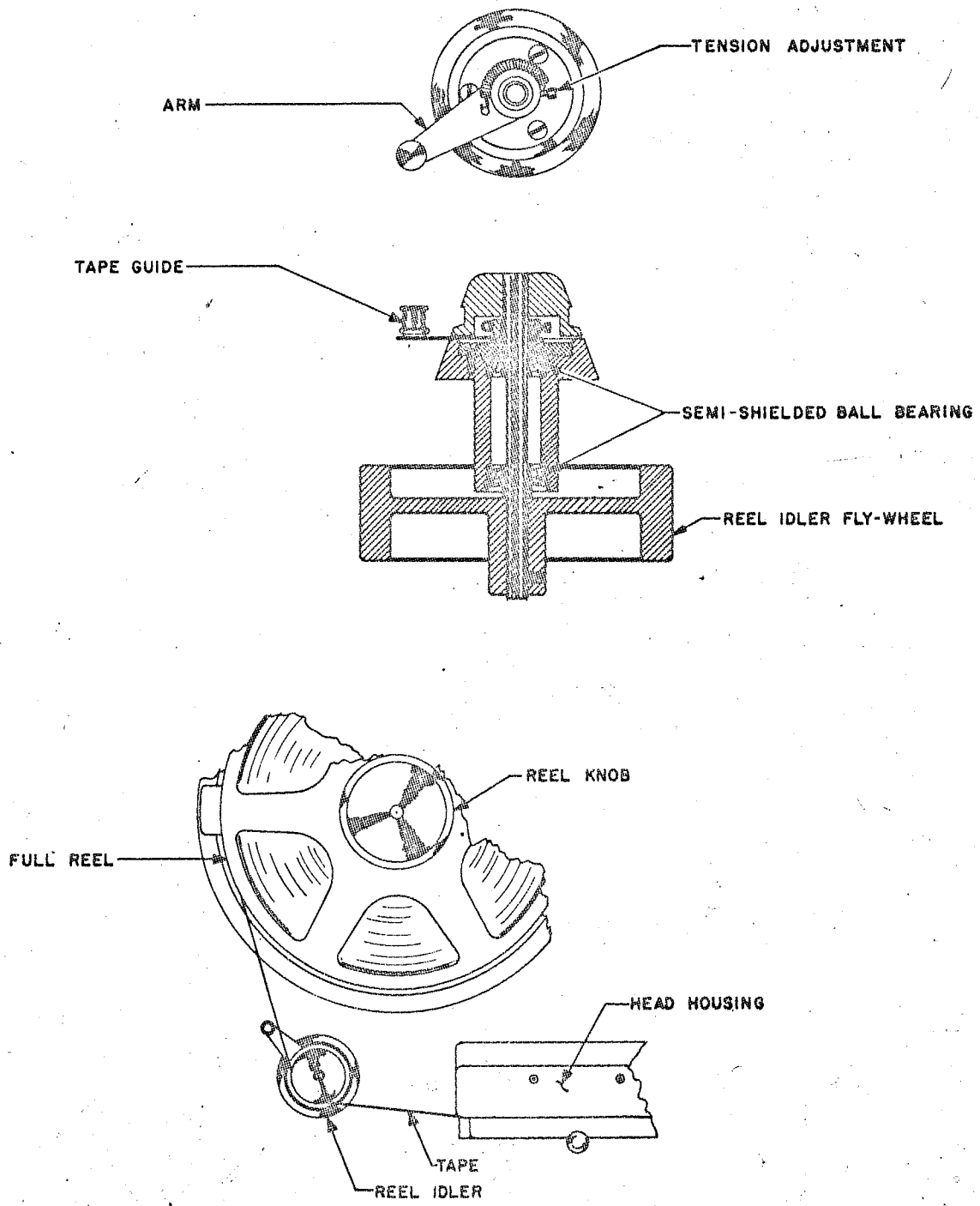
TOP PLATE ASSEMBLY (BOTTOM VIEW)

MODEL 300
AMPEX ELECTRIC CORPORATION
REDWOOD CITY, CALIFORNIA



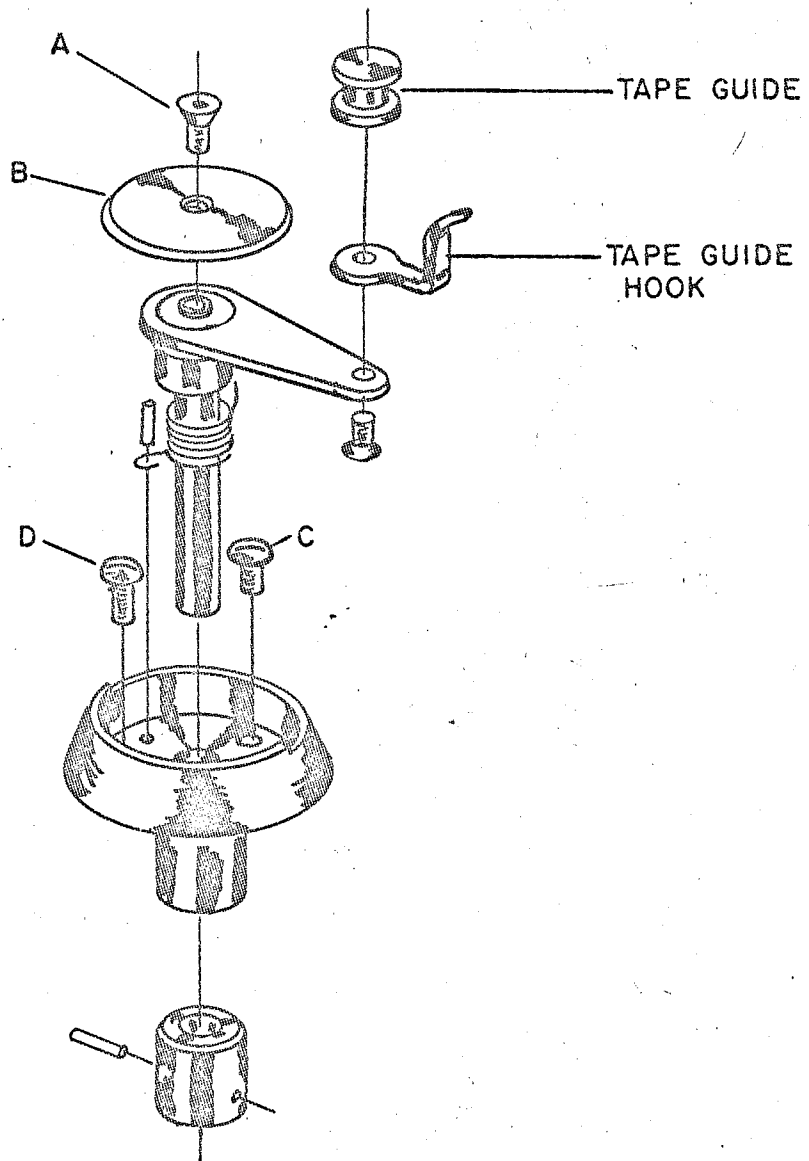
CAPSTAN ASSEMBLY
SERIES 300
 AMPEX ELECTRIC CORPORATION
 REDWOOD CITY, CALIFORNIA

FIG. 2



REEL IDLER ASSEMBLY
 SERIES 300
 AMPEX ELECTRIC CORPORATION
 REDWOOD CITY, CALIFORNIA

FIG. 3



TO REMOVE ASSEMBLY FROM TOP PLATE REMOVE
SCREW A, DISC B & SCREWS C & D. LIFT OUT.

DO NOT OIL ASSEMBLY.

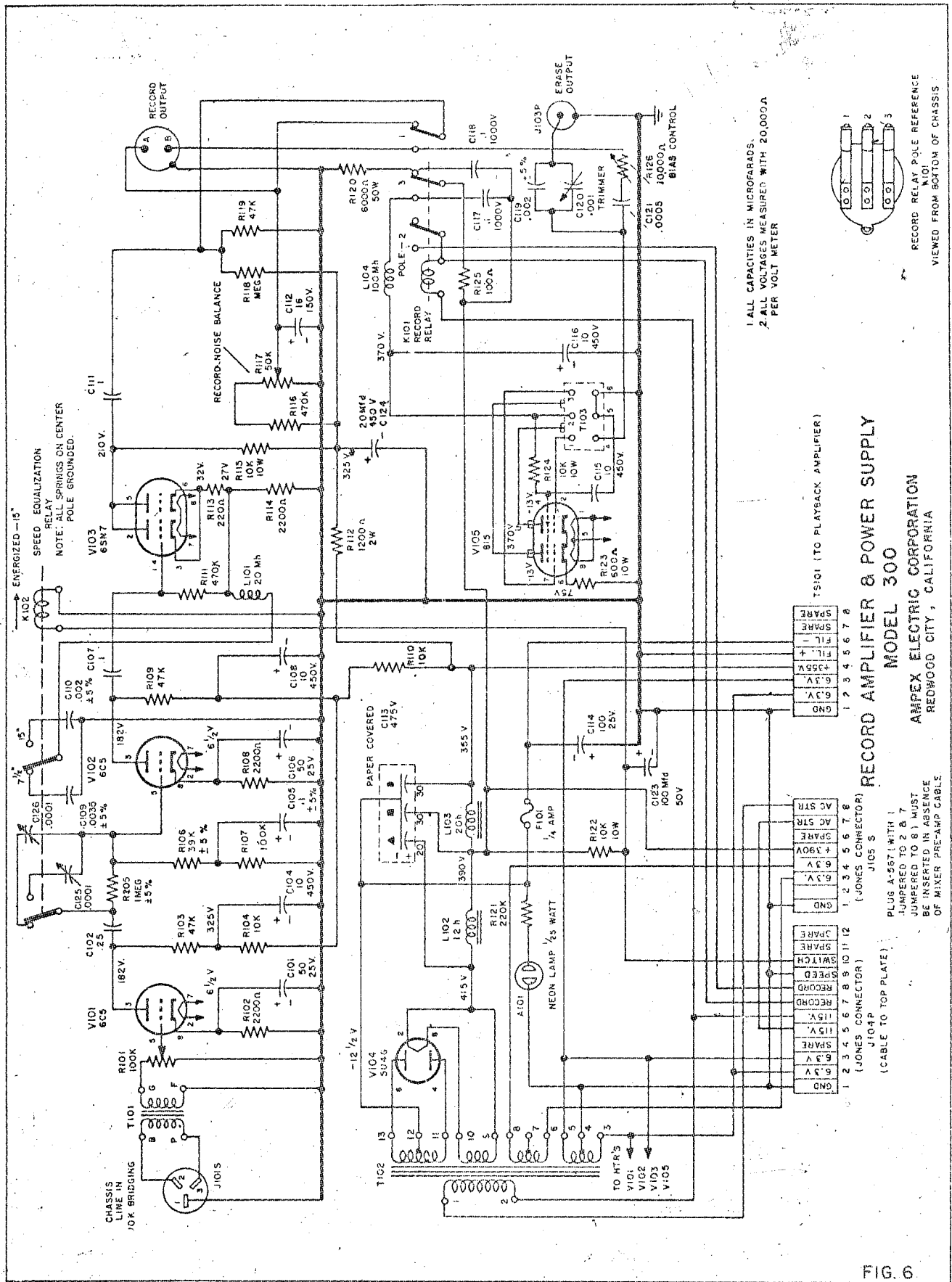
TAKE-UP TENSION ARM ASSEMBLY

SERIES 300

AMPEX ELECTRIC CORPORATION

REDWOOD CITY, CALIFORNIA

FIG. 4



1 ALL CAPACITIES IN MICROFARADS.
2 ALL VOLTAGES MEASURED WITH 20,000Ω PER VOLT METER

FIG. 6

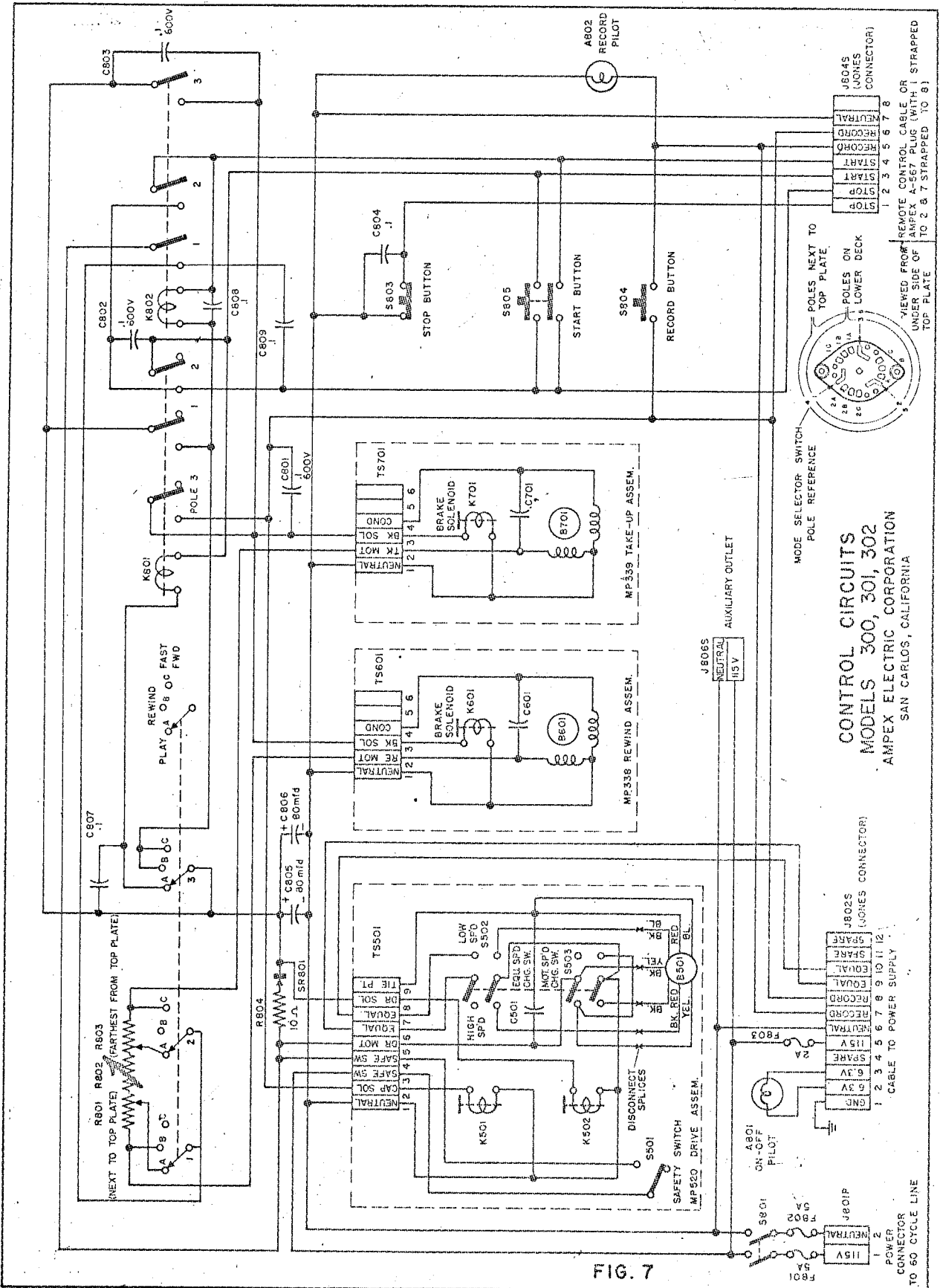
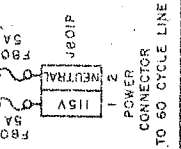
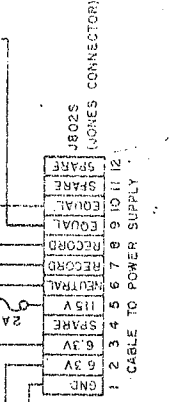
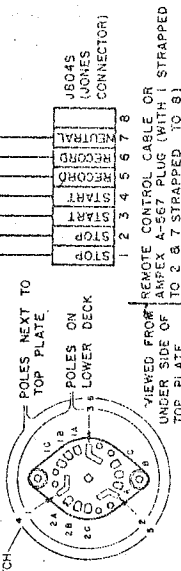


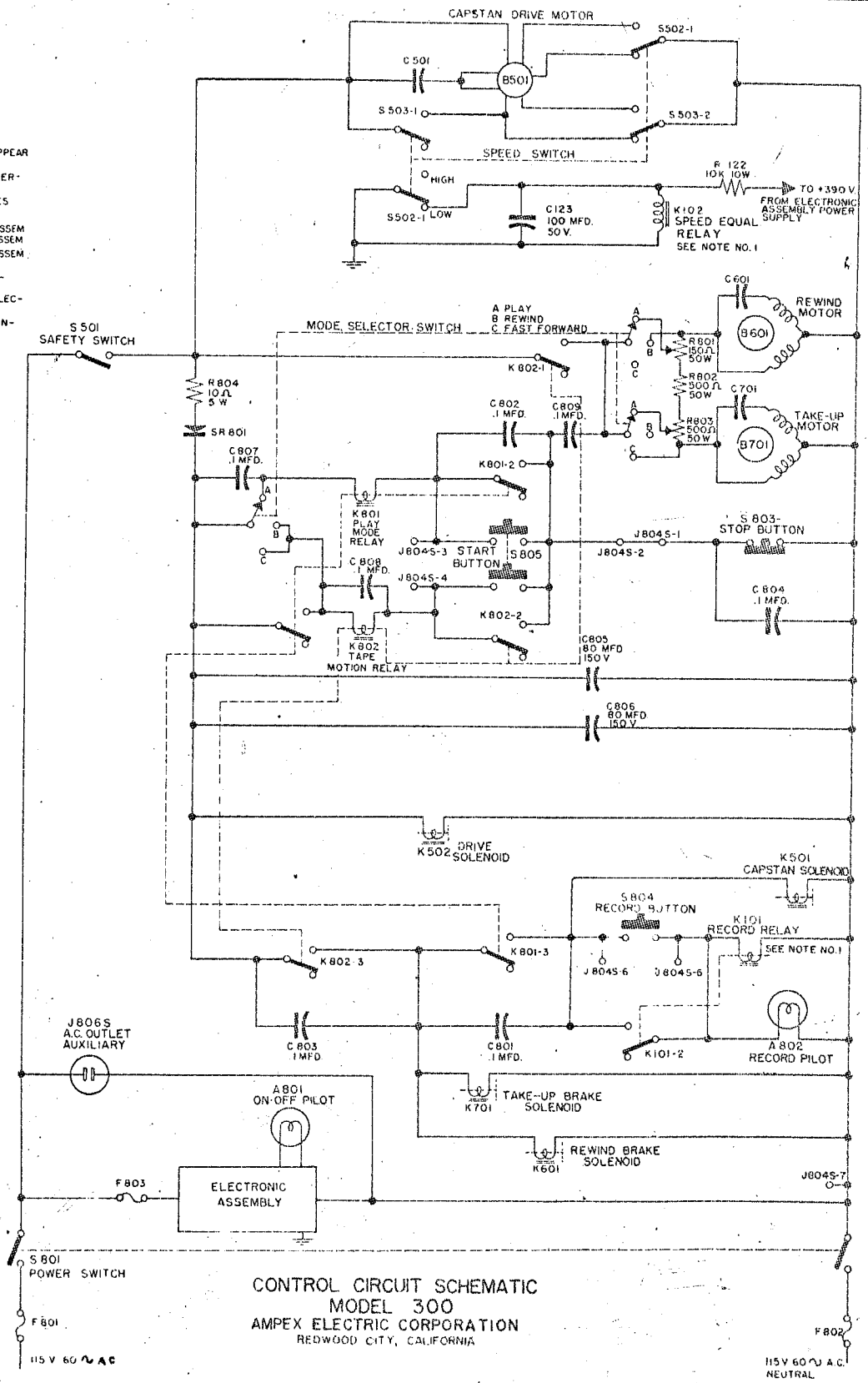
FIG. 7

CONTROL CIRCUITS
 MODELS 300, 301, 302
 AMPLEX ELECTRIC CORPORATION
 SAN CARLOS, CALIFORNIA



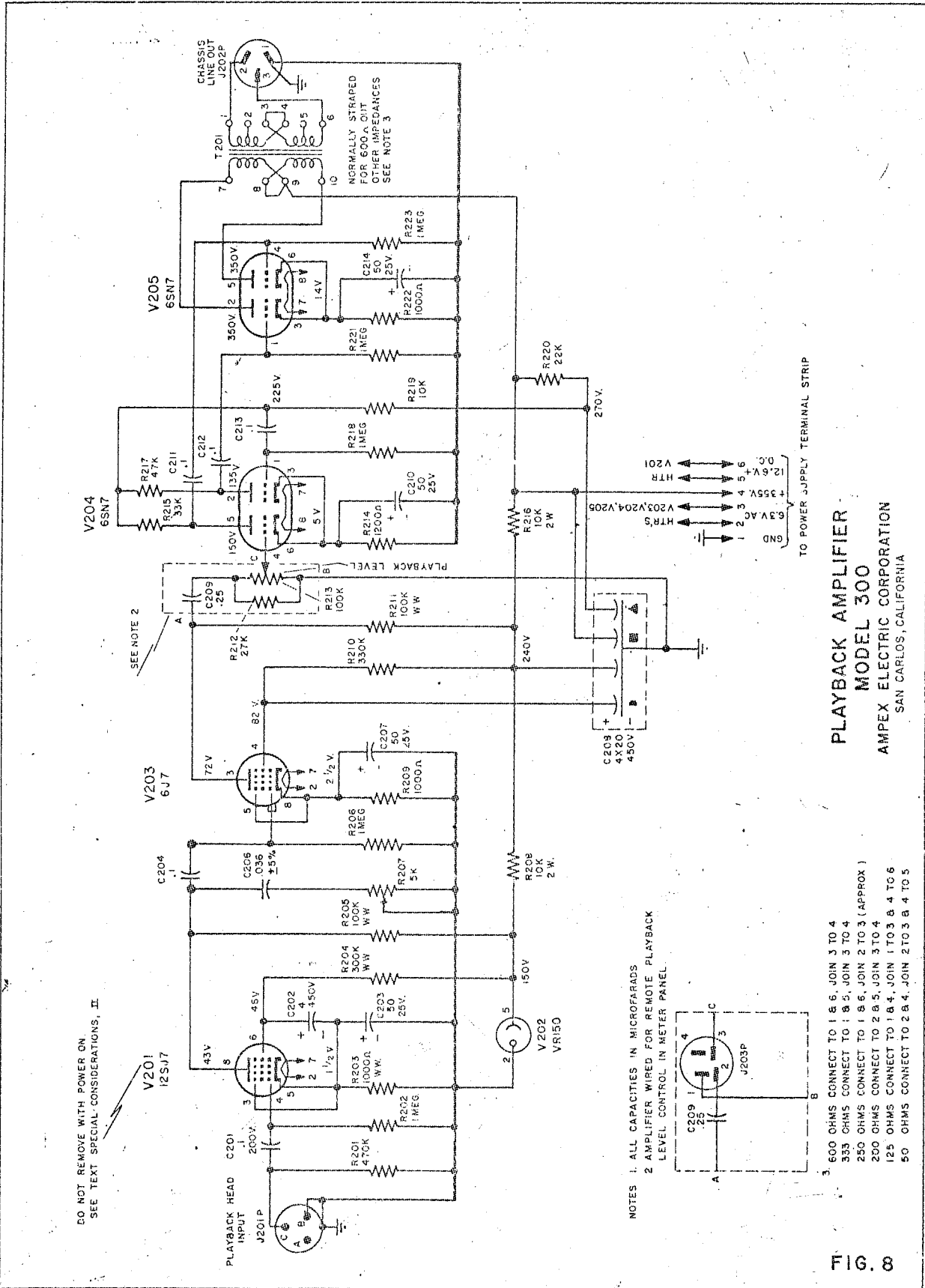
NOTES:

1. TWO SETS OF CONTACTS APPEAR IN ELECTRONIC CIRCUITS
2. ALL RELAYS SHOWN DE-ENERGIZED.
3. SCHEMATIC NUMBER INDICATES LOCATION OF COMPONENT
- 500-DRIVE ASSEM.ON TOP PLATE ASSEM
- 600-REWIND ASSEM.ON TOP PLATE ASSEM
- 700 TAKE-UP ASSEM.ON TOP PLATE ASSEM
- 800 TOP PLATE
- 100 RECORD AMPLIFIER ON ELEC-TRONIC ASSEMBLY
- 200 PLAYBACK AMPLIFIER ON ELEC-TRONIC ASSEMBLY
- 4 J8045 REMOTE CONTROL CON-NECTOR



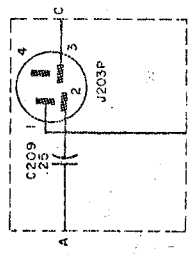
**CONTROL CIRCUIT SCHEMATIC
MODEL 300
AMPLEX ELECTRIC CORPORATION
REDWOOD CITY, CALIFORNIA**

FIG. 7A



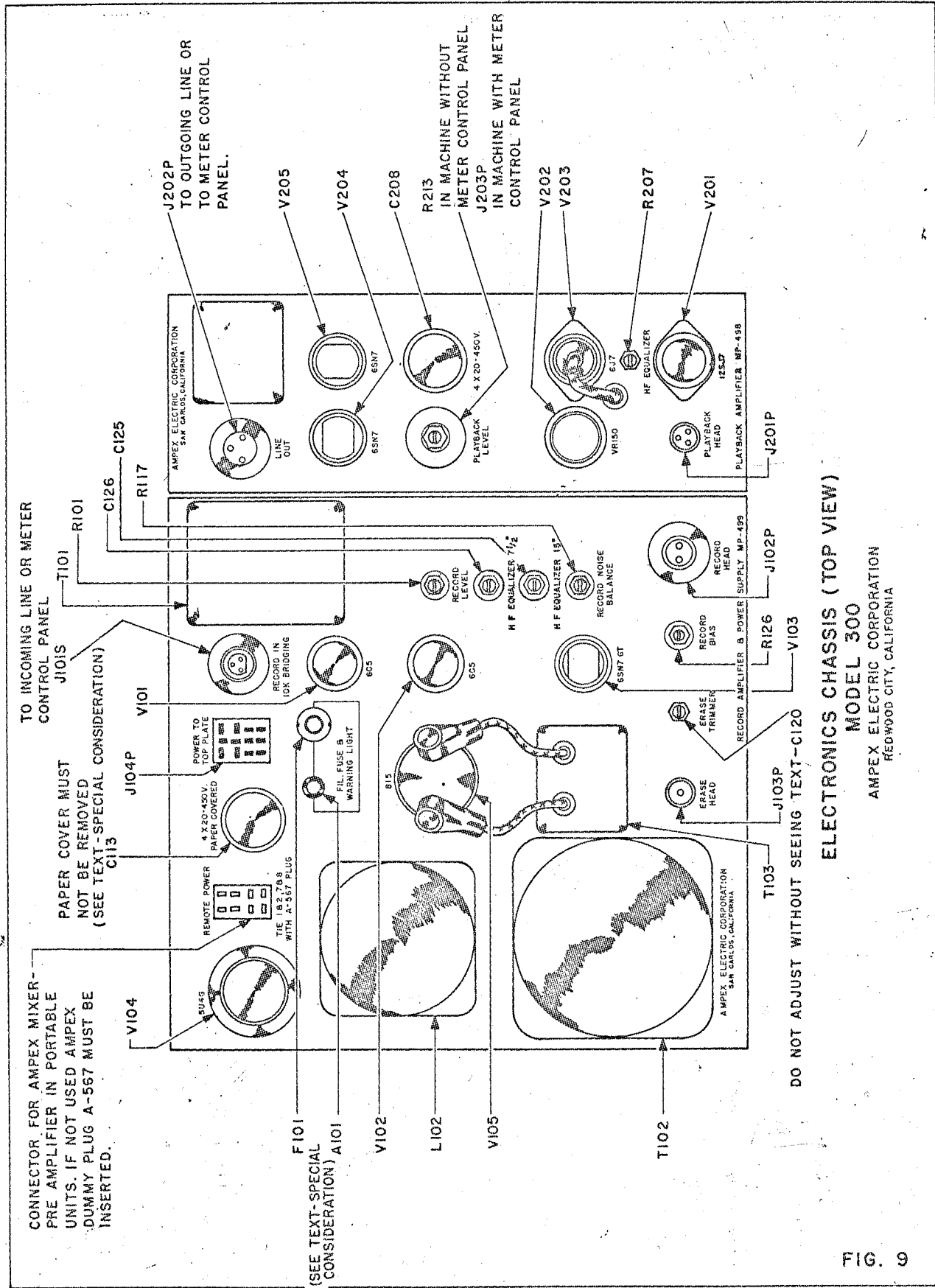
**PLAYBACK AMPLIFIER
MODEL 300**
AMPEX ELECTRIC CORPORATION
SAN CARLOS, CALIFORNIA

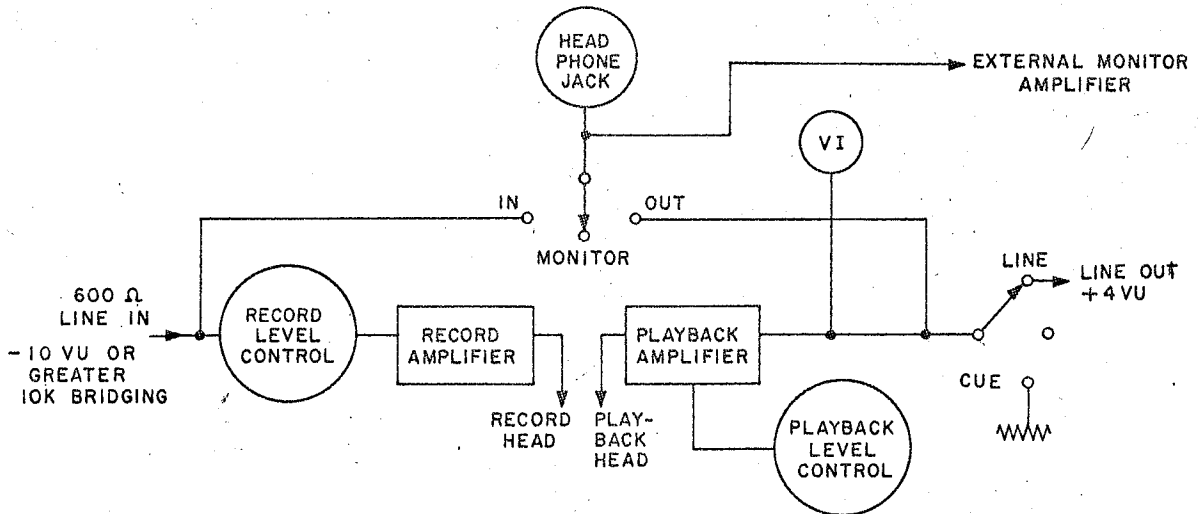
- NOTES
1. ALL CAPACITIES IN MICROFARADS
 2. AMPLIFIER WIRED FOR REMOTE PLAYBACK LEVEL CONTROL IN METER PANEL



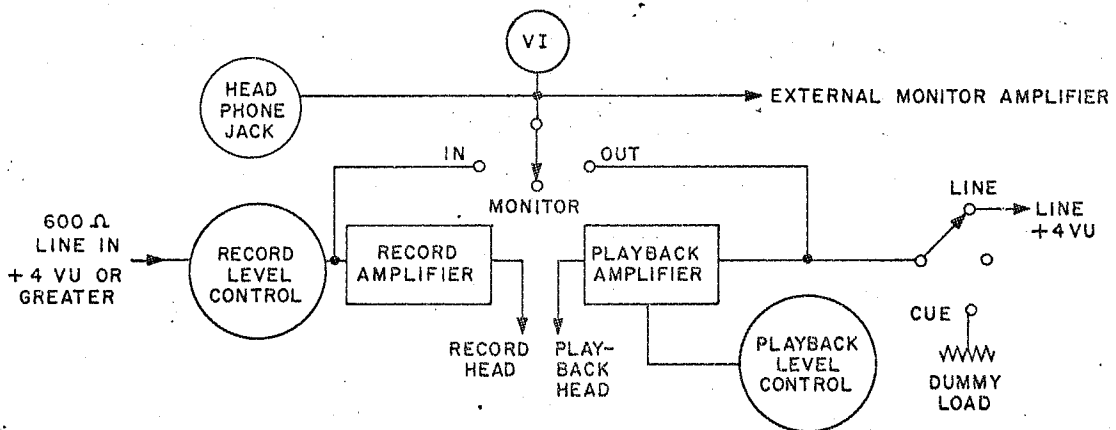
3. 600 OHMS CONNECT TO 1 & 6, JOIN 3 TO 4
- 500 OHMS CONNECT TO 1 & 5, JOIN 3 TO 4
- 250 OHMS CONNECT TO 1 & 6, JOIN 2 TO 3 (APPROX)
- 200 OHMS CONNECT TO 2 & 5, JOIN 3 TO 4
- 125 OHMS CONNECT TO 1 & 4, JOIN 1 TO 3 & 4 TO 6
- 50 OHMS CONNECT TO 2 & 4, JOIN 2 TO 3 & 4 TO 5

FIG. 8

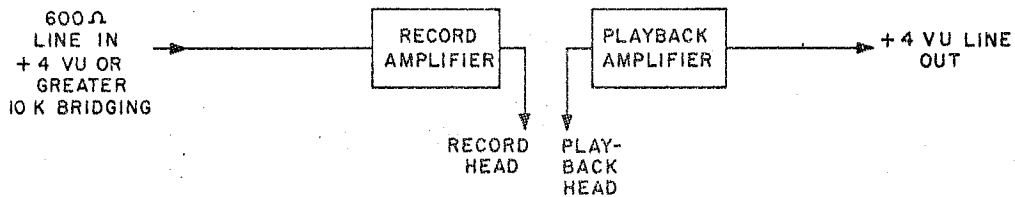




(A) LAYOUT FOR BRIDGING METER CONTROL PANEL



(B) LAYOUT FOR MATCHING METER CONTROL PANEL

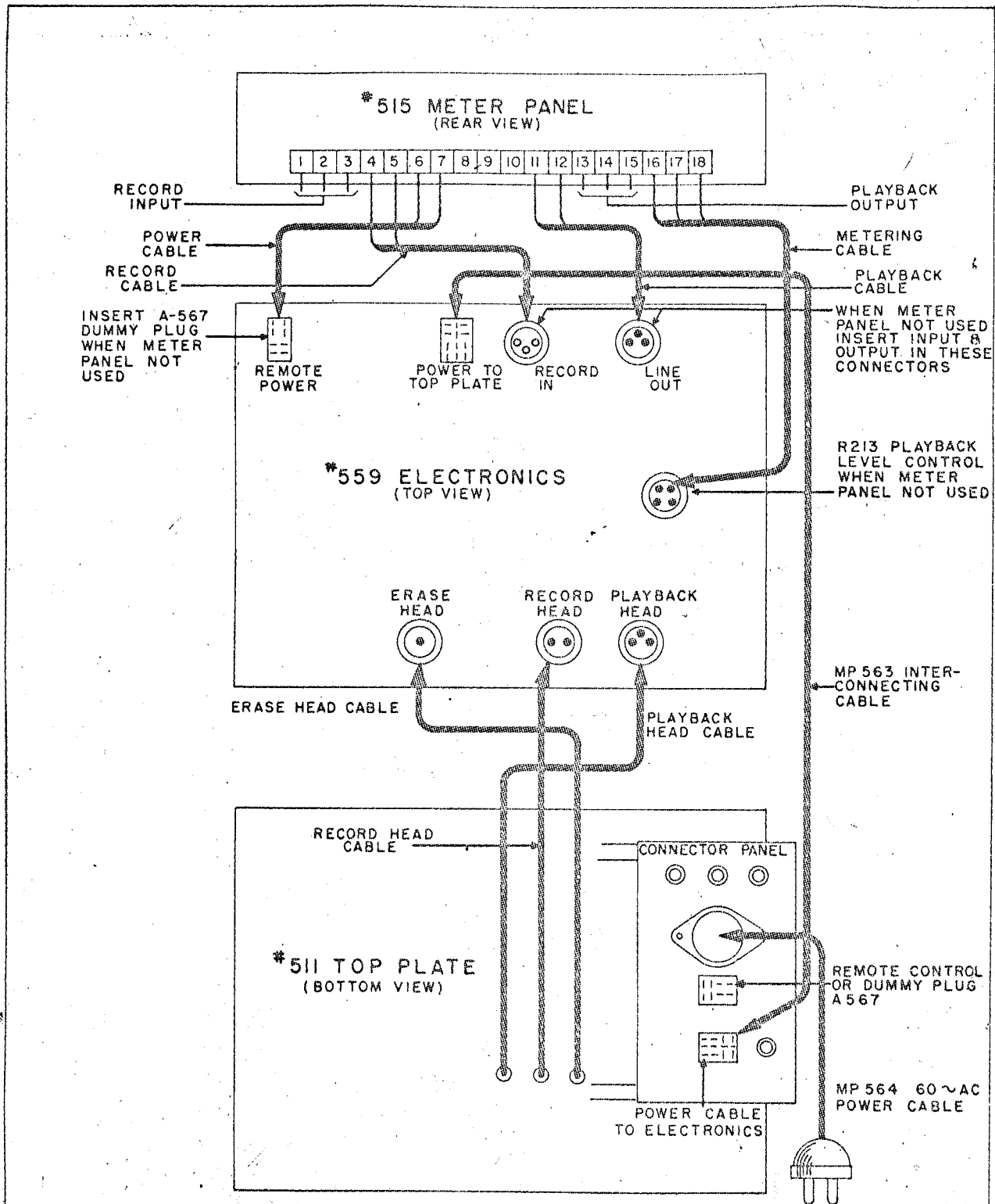


(C) LAYOUT OF ELECTRONICS WITHOUT METER CONTROL PANEL

NOTE: 1. SCREW DRIVER GAIN SETS ON RECORD & PLAYBACK AMPLIFIER CHASSIS WILL ADJUST FOR INPUT LEVELS OF -20 VU TO +8VU & OUTPUT LEVELS FROM 0 TO +8VU.
 2. ALL ABOVE UNITS MOUNTED ON METER CONTROL PANEL ARE ENCLOSED IN CIRCLE.

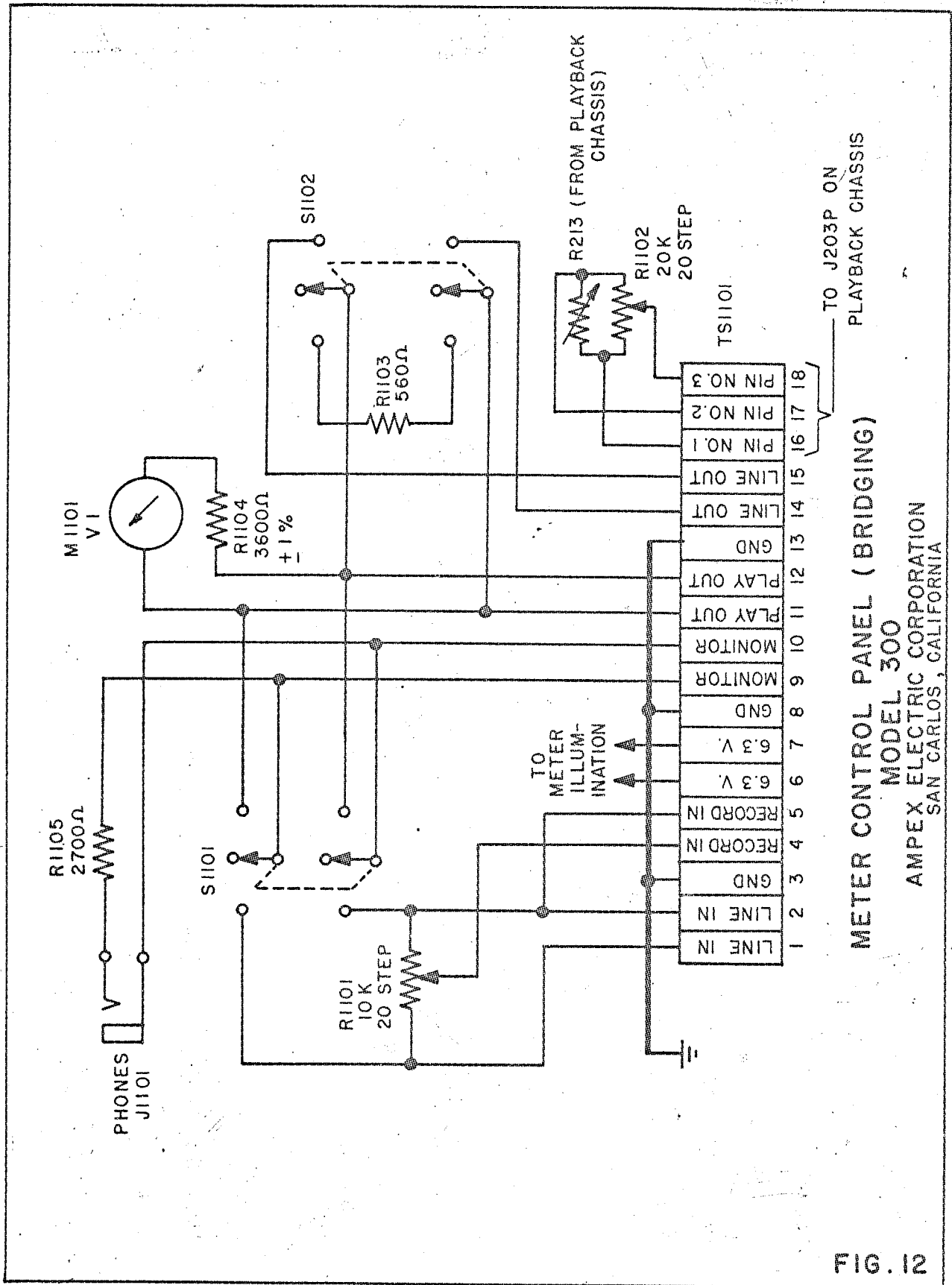
RECOMMENDED LAYOUTS
 MODEL 300

AMPEX ELECTRIC CORPORATION
 SAN CARLOS, CALIFORNIA



INTER UNIT CONNECTION DIAGRAM
 MODEL 300
 AMPEX ELECTRIC CORP.
 REDWOOD CITY, CALIF.

FIG. II



METER CONTROL PANEL (BRIDGING)
 MODEL 300
 AMPEX ELECTRIC CORPORATION
 SAN CARLOS, CALIFORNIA

FIG. 12

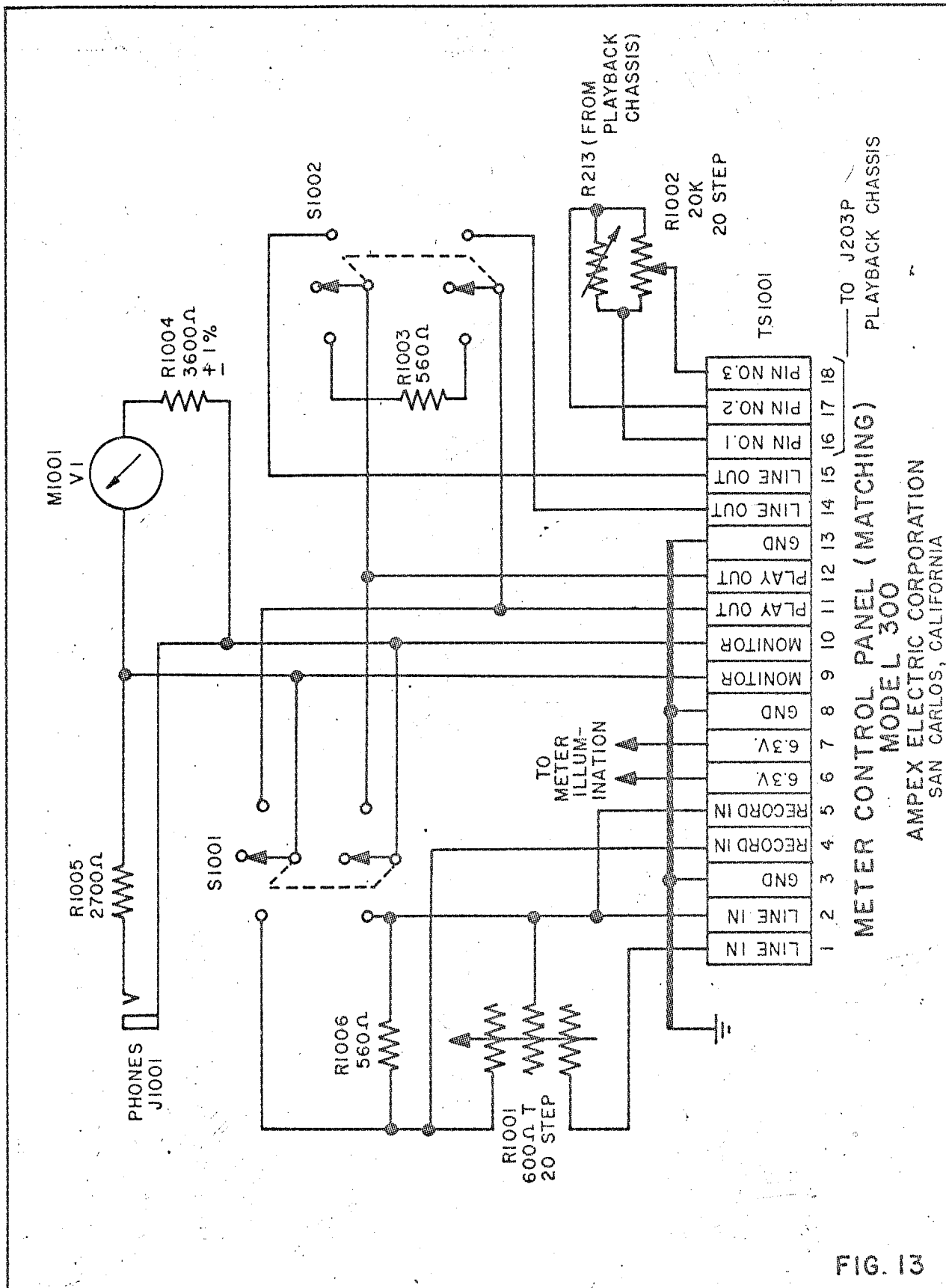
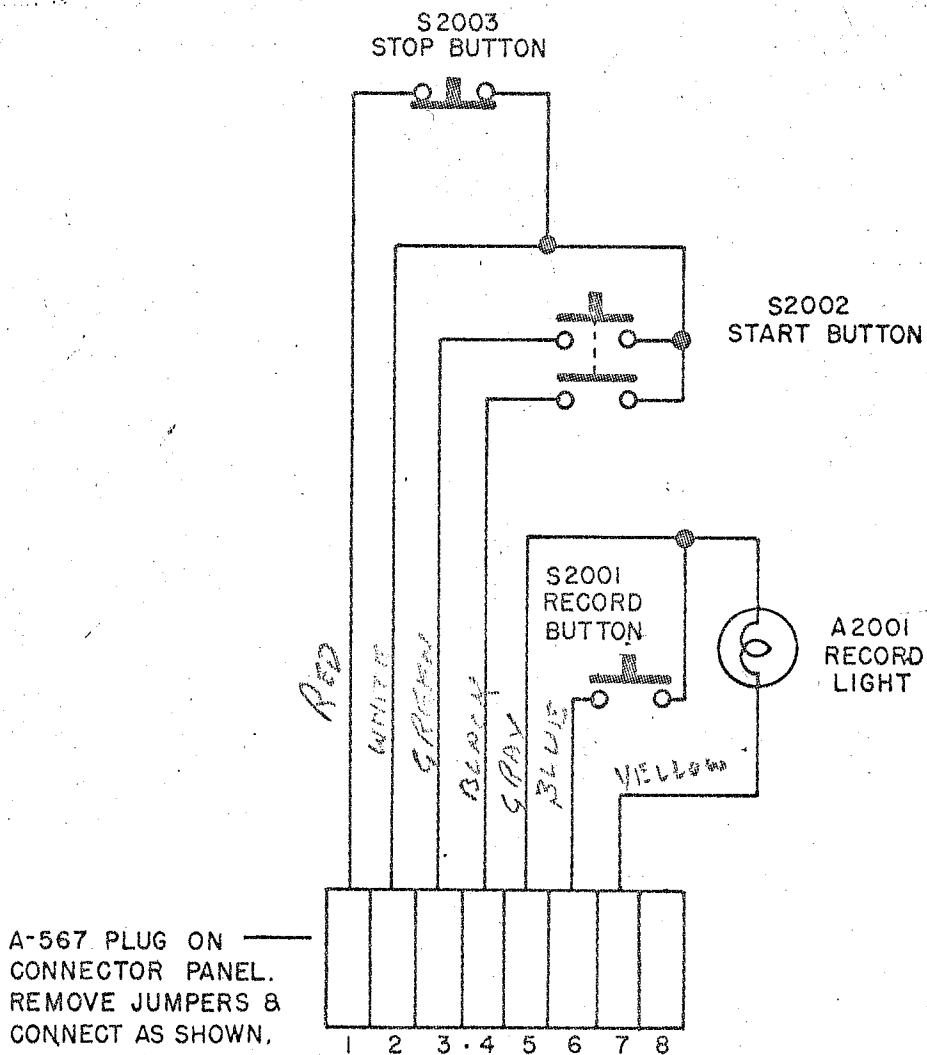


FIG. 13

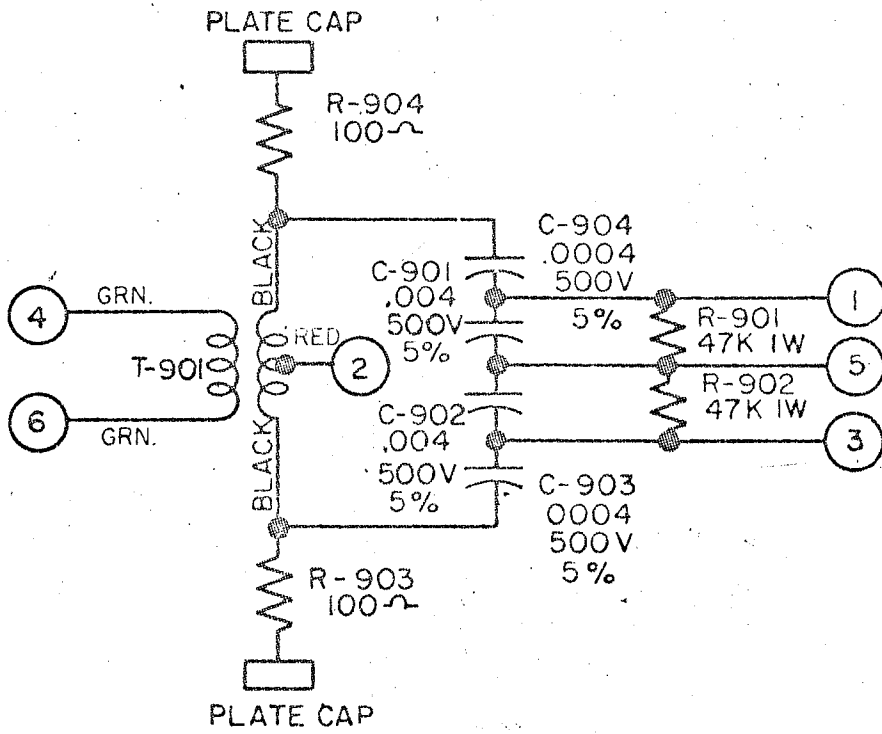
METER CONTROL PANEL (MATCHING)
 MODEL 300
 AMPEX ELECTRIC CORPORATION
 SAN CARLOS, CALIFORNIA



- A2001 120 VOLT, 6 WATT LAMP
- S2001 SNAP ACTION PUSH BUTTON SWITCH, NORMALLY OPEN. 1 AMP. 115 V.
- S2002 DOUBLE MAKE SNAP ACTION PUSH BUTTON SWITCH, NORMALLY OPEN. 1 AMP. 115 V.
- S2003 SNAP ACTION PUSH BUTTON SWITCH, NORMALLY CLOSED. 1 AMP. 115 V.

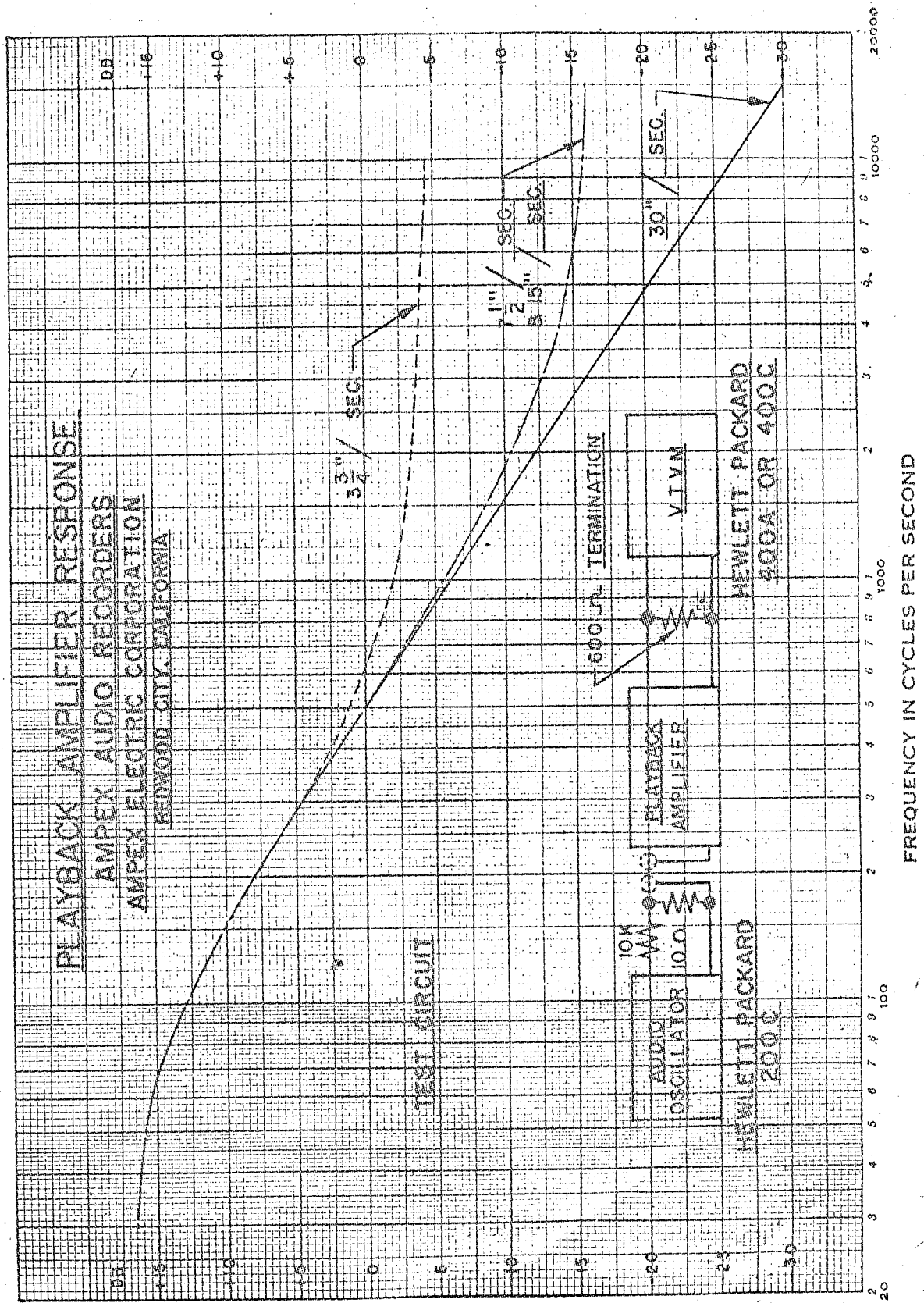
REMOTE CONTROL CIRCUIT
 SERIES 300
 AMPEX ELECTRIC CORPORATION
 REDWOOD CITY, CALIF.

FIG. 14



OSCILLATOR COIL ASSEMBLY
 MODEL 300
 AMPEX ELECTRIC CORPORATION
 REDWOOD CITY, CALIFORNIA

FIG. 15



9-5-52

FIG. 17