
AMPEX ELECTRIC CORPORATION

HOWARD AVENUE AT LAUREL • SAN CARLOS, CALIFORNIA

22 August 1949

Gentlemen:

Enclosed is SERVICE BULLETIN No. 1 for the AMPEX Model 300 Magnetic Tape Recorder. This is the first in a series of bulletins which we will publish to keep you informed of the latest advances in the art of magnetic recording, and to provide all information possible to keep your Model 300 operating in first class condition.

These will not alone give detailed information of any mechanical or electronic modifications which we have found advisable in models already released, but will also, in so far as possible, review uses and applications for the equipment which are outside of its normal employment.

If at any time you should encounter any operating problems or difficulties with your AMPEX equipment, we would greatly appreciate your calling it to our attention. If the problem is of such a nature as to be of general interest to other Model 300 users, it will be discussed in future service bulletins.

Sincerely yours

AMPEX ELECTRIC CORPORATION

President

AMPoniatoff:fj

SERVICE BULLETIN, NO. 1, MODEL 300

1. Head Magnetization. In order to realize the full dynamic range of type 111 tape, it is extremely important that the heads be free of magnetization. 111 tape is very sensitive to the slightest amount of magnetization on the record head, so that unless care is exercised it is very easy to raise the noise level 5 to 10 db. The Model 300 has been designed so that with normal and proper usage, the heads will not become magnetized. However, it must be remembered that any phenomena which tends to put an unbalanced pulse through the record head will magnetize it. Such pulses can be caused by appearing in the form of signal or by causing a pulse in the power supply voltage. If the following precautions are taken, no difficulty should be experienced with record head magnetization.

a. 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.

b. Do not pull any tubes in the record amplifier, or connect head leads or input leads, while the machine is in the Record position. In some cases it has been found wise not to start or stop recording while there is a saturating signal fed into the record amplifier.

c. Do not switch speeds while recording. (No harm is done by changing speeds while playing back.)

In the event that the head does become magnetized, follow the procedure outlined in the Instruction Book under HEAD DEMAGNETIZATION. If a head is powerfully magnetized, as when tested with an ohmmeter, the demagnetizing process may have to be repeated several times. AMPEX will soon have available a simple demagnetizer that connects to any 115 v. A.C. line.

2. Erase. In all production machines, C119 has been changed to .003 mfd. for proper erase current. The erase current is adjusted to 200 to 210 m.a. instead of the 250 m.a. originally stated in the Instruction Book. Actually, 180 m.a. will erase peak recording level within specifications. In checking erase, always check with both record and erase heads connected, as the bias on the record head provides part of the erase.

3. Reels. It has been found in some isolated cases that when the tape is allowed to run all the way out at the end of a fast wind, a section over a foot long will be broken off the end. Upon investigation, this was found to be due to the sharp edges on the slot opening of the reel hub through which the tape is threaded. The sharp edges apparently provided high friction and did not allow the end of the tape to run out freely. When these sharp edges were filed off, the breakage no longer occurred. This information is being forwarded to the N A B Sub-Committee for the standardization of reels.

Difficulty has also been experienced with the reels not being properly centered. When inserting the hold-down knob, the knob should be pushed down with one hand, and the reel held with the other hand. As the hold-down comes into contact with the reel, agitate the reel slightly with the other hand to make sure that the hold-down moves into the exact center of the opening, then push the knob down firmly. The hold-down knob is being re-designed so as to prevent the possibility of locking the reel off-center.

4. Threading. In threading the tape, be sure to remove any adhesive that may have been used to seal the end. If this adhesive is not removed, the first layer may stick and cause the end to break off at the end of Rewind.

AMPEX ELECTRIC CORPORATION

MJS:fj

14 September 1949

Gentlemen:

Enclosed is AMPEX Service Bulletin No. 1A.

It will be our policy to send out Service Bulletins covering any information concerned with the performance or maintenance of the Model 300 recorder. All bulletins which will be of interest to all machine owners will have consecutive numbers. Those bulletins which are of interest only to service personnel and distributors will have a letter following the number, as the one enclosed. Thus if the next bulletin were for service personnel only, it would be numbered 1B. If it were for general distribution, it would become number 2.

Sincerely yours

AMPEX ELECTRIC CORPORATION

A.M. Poniatoff
President

AMPoniatoff:fj

SERVICE BULLETIN NO. 1A, MODEL 300

1. Solenoids. Some difficulty has been experienced with the humming or buzzing of the solenoid which operates the capstan idler, K501. Investigation of the cause of this noise has disclosed that if the linkage has not been adjusted properly, the force required of the solenoid will be greatly increased and therefore cause it to hum.

Looking at the drive assembly from the bottom, the linkage of the capstan idler solenoid can be seen. The link rod A passes through a hole in the arm B that it operates, and there is a rubber washer (C) and adjusting nut (D) on the end. When the solenoid is operated, the rod pulls the rubber washer against the arm to operate it. When the solenoid is seated, the angle E between the rod and the arm should be less than 90°. If this is so, the effective contact point of the washer is on the outside. If the angle between the rod and the arm is greater than 90° when the solenoid is seated, the contact point of the washer on the arm is on the inside, effectively reducing the moment arm by a considerable amount, and therefore requiring much greater force to be exerted by the solenoid.

The importance of maintaining the above angle E below 90° was only recently discovered, and it is possible that some machines have been shipped in which this angle might be too great. While no machines have been shipped with noisy solenoids, it is possible that if the above adjustment is not proper the solenoids may become noisy in use. Should this be the case, the adjustment can be corrected as follows:

It will be noted that the capstan idler arm shaft F is connected to the operating shaft G below through a U-shaped torque link H. If the bottom (or shorter) arm of this link H is bent in a clockwise direction (when looking at the link from the bottom or short arm end), this will effectively reduce the angle E. In order to bend this arm, it is necessary to remove link H and hold it in a vice. The link can be removed by forcing off the spring-lock washers which position the lower arm (I and J) and which attach the return spring at the top (K). The proper value for the angle E is approximately 85°, or when the arm B is perpendicular to the plane of the solenoid base plate.

If the angle E is changed, it will be necessary to re-set the capstan idler adjustment D. This adjustment is set so that when the capstan idler just touches the capstan, the solenoid is 1/8 inch shy of seating. A simple way of making this setting is to place a piece of material 1/8 inch thick between the solenoid armature and body and clamp the armature down on it. Then tighten the nut D until the capstan idler just touches the capstan.

It may also be necessary to reset the capstan idler solenoid

Stop L. This stop should be set so that at no time during fast winding does the tape touch the capstan idler.

2. Playback Amplifier. It has been found that some of the early machines were shipped with ground wires connected to pin number 1 of the input stage and the following stage that were of insufficient strength and length to allow the tube socket to flex without breaking. Unfortunately, several of these wires have opened up in the field. The result is an excessive amount of hum pickup in the first stage of the amplifier.

To replace this broken connection, unscrew the Playback Amplifier from the chassis frame. When the Playback Amplifier is lifted up, the ground connections are readily accessible.

3. Brakes. The brakes have been adjusted to work properly with the standard NAB double flanged reel. If small RMA reels or hubs only are used, the brakes will not necessarily stop without slack forming when fast winding onto the small reel or hub. This is because with normal brake settings, the inertia of the reel that is taking up the tape serves to tension the tape, and if the brakes are set tight enough to stop a small reel without slack, the tension on the tape will be excessive when using the regular reel.

4. Cabinet. The four feet of the console cabinet are adjustable, so that the cabinet may be leveled on any floor by merely screwing the feet to the proper position.

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INDEX of SECTIONS, CIRCUITS and DRAWINGS

Section I

1. Specifications
2. Unpacking and Installing

Section II

1. Mechanical Operation
2. Electronic Operation

Section III

1. Electronics Alignment
2. Electronics Special Considerations

Section IV

1. Head Housing
2. Head Alignment
3. Head Demagnetization

Section V

Drive System

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

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:

(a) Bridging with Meter Control Panel

(b) Matching with Meter Control Panel

(c) Bridging or Matching without Meter Control Panel

FIGURE 11—Inter-Unit Connection Diagram

FIGURE 12—Meter Control Panel Schematic (Bridging)

FIGURE 13—Meter Control Panel Schematic (Matching)

SPECIFICATIONS FOR MODEL 300

All performance characteristics of the Model 300 Magnetic Tape Recorder equal or exceed the standards recommended by the NAB Subcommittee on Magnetic Recording.

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. 50 — 15,000 cycles.
At 7.5 inches, ± 2 db. 50 — 7,500 cycles.

Signal-to-Noise Ratio: Over 60 db., as defined by the proposed NAB standards. By 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 r.m.s. 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% r.m.s., measuring all flutter components from 0 to 300 cycles, using a tone of 3,000 cycles. At 7.5 inches, under 0.2%.

Separate record and playback heads and amplifiers for simultaneous monitoring of the tape.

Playback Timing Accuracy: 0.2%.

Playing Time: 33 minutes at 15 inch speed on proposed standard NAB reel, 66 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 NAB reel.

Controls: Start, Stop and Record are push-button, 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.

Record Amplifier: Bridging input, normally set up for + 4 V.U. in.

Playback Amplifier: Normally + 4 V.U. output. Will deliver 20 d.b.m. without exceeding 1% total harmonic distortion at any frequency from 30-15,000 cycles.

Dimensions: Mechanical unit on 24 $\frac{1}{2}$ " panel for standard rack mounting. Electronic unit on 12 $\frac{1}{4}$ " panel for standard rack mounting.

Mounting: Rack, Console, or Portable Cases.

Meter Control Panel available at extra cost with features outlined below:

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

Output step control will adjust level up to +8 V.U. regardless of tape level — 600 ohm or 150 ohm balanced or unbalanced line.

V.U. meter will meter playback output while recording or playing back.

Output key (line or cue).

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

UNPACKING AND INSTALLING

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 the rubber mountings have not been damaged. A properly mounted chassis floats freely on the rubber cushions.

3. Unpack the interconnecting cables and install. The twelve conductor cable connects the mechanical and electronic units. See Fig. 1 and Fig. 9 for location of plugs.

4. Unpack the tubes and install them in their respective sockets. **WARNING! BE VERY CAREFUL WITH THE 12SJ7 TUBE AS IT IS HAND SELECTED FOR LOW NOISE AND MAY BE DAMAGED BY CARELESS HANDLING.** See ELECTRONICS SPECIAL CONSIDERATIONS, II, before turning on power.

5. Release capstan drive motor shipping binding. This is the wire which holds the motor away from the rubber-tired flywheel. Do not make any adjustments on the drive system at this time. No adjustments need be made unless damage has occurred during shipping.

6. Connect input and output circuits to the machine. See ELECTRONICS OPERATION.

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

8. The capstan speed should be checked with the stick-on stroboscope provided. Place stroboscope on capstan shaft with 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. Increasing pressure will slow the capstan, decreasing pressure will speed the capstan. Adjust for no rotation of the stroboscope spokes.

9. 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.

10. A reel hold-down or editing knob should be placed on each reel spindle and pushed down firmly. To remove the hold-down, raise the tongue on the side of the knob with the finger and lift off. Do not touch the tongue when placing the hold-down on.

The machine is now ready to operate.

MECHANICAL OPERATION

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. 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.

ELECTRONIC OPERATION

(WHEN SET UP AS IN ELECTRONIC ALIGNMENT)

I. Machine Without Meter Control Panel:

A. Feed machine with $+ 4$ V.U., machine output $+ 4$ V.U., see Fig. 10C.

II. Machine With Bridging Input Meter Control Panel:

A. See Fig. 10A.

B. Level is set by adjusting Playback Level step control to 14, and adjusting Record Level step control until output level meter reads $+ 4$ V.U. operating level.

C. Input level must be greater than -10 V.U.

D. On Playback, any tape from any machine can be played back at $+ 4$ V.U. by adjusting Playback step control.

III. Machine With Matching Input Meter Control Panel:

A. See Fig. 10B.

B. For inputs equal or greater than $+ 4$ V.U.:

Adjust Record Level step control for program level on meter switched to input or for program level on meter switched to output of playback with playback set as in II.

C. For inputs less than $+ 4$ V.U.:

Adjust R101 with Record step control wide open and meter on playback as in II.

ELECTRONIC ALIGNMENT

The following alignment procedure has been executed at the factory prior to shipping. No further adjustments should be necessary unless alterations occur in shipment or as required by routine maintenance.

A standard tape is available for alignment purposes and contains the following frequency run recorded at 15" per second:

1 Kc for level adjustment (recorded 10 db. below recommended operating point).	
15 Kc	6400 cycles
14 "	3200 "
13 "	1600 "
12 "	800 "
11 "	400 "
10 "	200 "
9 "	100 "
8 "	70 "
	50 "

I. (A) Alignment of Playback Circuits on Machines Without Meter Control Panel— Must Be Performed in Order Indicated:*

1. Thread standard tape on machine.
2. Connect 600 ohms termination on output with your program VI meter across termination.
3. Turn on A.C. power.
4. Set machine in PLAY position and 15 inch speed and push Start button.
5. Adjust output of 1 Kc. tone with Playback gain control R213 to read operating level on your meter.
6. Align playback head (see HEAD ALIGNMENT) on 15 Kc. tone for maximum output.
7. Adjust Playback HF Equalizer C205 for flat overall response (± 2 db. 50 cycles to 15,000 cycles).
8. Set playback level 10 db. lower because standard tape level is 10 db. below operating level.

(B) Playback Electronic Alignment With Bridging or Matching Meter Control Panel:

1. Thread standard tape on machine.
2. Turn on A.C. power.
3. Set Playback Level control to 4. (This allows you to make frequency runs at operating level on meter instead of -10 d.b.)
4. Start tape.
5. Adjust R213 (now on panel) so panel VI reads 0 on 1 Kc. test tone.
6. Align playback head gap on 15 Kc. tone. (See HEAD ALIGNMENT.)
7. Adjust Playback Equalizer (C205) for flat response.
8. Set Playback Level control at 14. (This drops amplifier gain 10 db. for normal operation.)

II. Alignment of Record Circuits (After Playback Alignment) — With or Without Meter Control Panel:

1. PRELIMINARY

A. Units without Meter Control Panel:

Connect monitor amplifier, 600 ohms termination, and meter on output of Playback.

B. Units with Meter Control Panel:

Connect monitor amplifier and termination to Meter Control Panel Line Out terminals, and set Line Cue switch on line.

A. & B. Place blank reel of M.M.M. 111 tape on machine and set into operation on the 15 inch per second Record position.

*NOTE: All step controls located on Meter Control Panel.

2. NOISE TEST:

Detach record cable from Record Amplifier. Place a 1 microfarad condenser across 600 ohm output termination on playback amplifier. This is to remove 70 Kc. components from noise measurements. Noise should read 40 db. below standard tape level (50 db. below operating level). If noise is too high and is crackling in nature, demagnetize heads — especially playback head (see HEAD DEMAGNETIZATION). Noise can be measured by using a Hewlett-Packard noise and distortion analyzer, VTVM type 400 A, or any approved method. (If noise with machine standing is higher than above, check input tube of Playback Amplifier.)

3. 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 erase head will not erase 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 Erase Cable from Record Chassis plug (J103P).
- B. Make adapter plug by inserting 10 ohm resistor in series with ground side of erase cable.
- C. Insert adapter in J103P, insert cable into adapter.
- D. Place VTVM such as Hewlett-Packard 400A across 10-ohm resistor. Set on 3 volt scale. Full scale will read 300 Ma. record current.
- E. Loosen Erase Trimmer C120 for minimum capacity and slowly increase capacity until meter indicates 200 Ma. erase current. The erase is now properly adjusted.

4. BIAS ADJUSTMENT:

- A. Plug in record head.
- B. Remove 1 microfarad condenser from output.
- C. Connect audio oscillator to input of machine. Turn oscillator on and set to 1 Kc.
- D. Set record level so that it reads approximately standard tape level.
- E. Turn Bias Control (R126) fully counter-clockwise. Then turn in a clockwise direction slowly (increasing bias), until the 1 Kc. tone is recorded at its highest level. Increase further until 1 Kc. drops 2 db. in level. This is the correct bias adjustment.

5. RECORD NOISE ADJUSTMENT (D.C. BALANCE):

- A. Replace 1 microfarad condenser across 600 ohm termination on playback output.
- B. Remove audio oscillator from input and short record input terminals.
- C. Adjust Noise Balance control (R117) until crackling disappears. If noise is not at least 40 db. below standard tape level (50 db. below operating level), demagnetize playback head and record head.

6. RECORD EQUALIZER:

- A. Remove 1 microfarad condenser from playback output.
- B. Reconnect audio oscillator to input of Record Amplifier.
- C. Adjust Record Level (R101) so that standard tape level is effected on output of playback amplifier. This is the level at which all frequency response measurements should be made in order to prevent tape saturation.
- D. Set oscillator at 15 Kc. and align record head for maximum output. (See HEAD ALIGNMENT.)
- E. In order that frequency runs not be made on the insensitive range of the VI meter, playback gain may be raised 10 db. and returned to normal after run as in I.
- F. Sweep the oscillator across audio spectrum and adjust Record H.F. Equalizer C103 on Record Chassis for flat response (± 2 db., 50 - 15,000 cycles) as read on playback output.

7. RECORD LEVEL ADJUSTMENT:

In all cases, connect audio oscillator to the input of the machine and adjust level to + 4 V.U. program level at 1 Kc. On machines with a Meter Control Panel, the input of the machine is at the Line In terminals on the Meter Control Panel terminal strip.

A. *Units without Meter Control Panel:*

With machine running at 15 inch speed in Record, set Record Level control (R101) so that correct operating level is read on playback.

B. *Units with matching Meter Control Panel:*

Same as A. with Record Level step control wide open.

C. *Units with bridging Meter Control Panel:*

Same as A. with Record Level step control set at 14. When adjusted in this manner, proper record level can be obtained from a -10 V.U. line by turning the Record Level step control on the Meter Control Panel wide open.

ELECTRONICS SPECIAL CONSIDERATIONS

I. Do not remove any tube from the Record Amplifier while the machine is recording, as the record head may become magnetized. Should this occur it will be necessary to demagnetize same.

II. Warning! The input tube in the playback amplifier is D.C. heated by returning the B supply through its heater. F101 (fuse) is selected to protect the input tube against abnormal heater surges. A101 (Neon indicator) will light in the event of failure of the playback input tube heater or the $\frac{1}{4}$ ampere protective fuse F101. **SHOULD THIS HAPPEN, THE CAN OF THE INPUT 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 INSULATED COVER.** F101 and A101 are located on top of Record Amplifier and Power Supply 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 fuse will blow.

III. Setting of Bleeder Resistor R120:

The current through the high voltage supply is 145 Ma.

During Playback, pole 3 of Record relay K101 transfers the B supply from the Erase oscillator circuit to bleeder resistor R120 (located on underside of Record Amplifier and Power Supply Chassis), which should be adjusted to maintain the same current in playback as when recording.

IV. Dummy Plugs:

There are two plugs type A567 which have pins 1 and 2 jumpered and also pins 7 and 8 jumpered. These plugs must be used in order for the machine to operate properly. The first must be plugged in the Remote Control Socket located on the Power Outlet Panel underneath the top plate (Fig. 1). The second plugs in socket J105S located on the top rear of the Record and Power Supply Chassis, which is clearly marked in Fig. 9. The latter of these plugs is to be removed only in the event of connection to this power supply of the AMPEX mixer pre-amplifier used on the portable model. The former is to be removed only in the event that a remote control cable is used, and then this in turn must be left in the socket.

V. Playback Cable:

Do not attempt to lengthen or change playback cable for any reason because cable capacity is used to resonate the playback head. Serious frequency discrimination will occur if this is disregarded.

VI. When disconnecting any solenoid or motor, observe polarity of the leads, as all leads have been arranged so as to produce the minimum hum fields.

HEAD HOUSING

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.

HEAD ALIGNMENT

Remove the top cover from the head housing by removing the two screws from the top of same, 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 requires no adjustment, and should not be touched.

The record and playback heads should be aligned only after reading and fully understanding the procedure under ELECTRONICS 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. This is accomplished by first playing the standard tape and adjusting the playback head until maximum response is obtained on the 15,000 cycle tone. The record head is then aligned with the playback head by recording 15,000 cycles on a blank tape, and adjusting the record head for maximum playback output.

HEAD DEMAGNETIZATION

Occasionally the heads become magnetized through some electrical fault which may occur in the amplifiers or by coming into physical contact with a magnetized object. In order to demagnetize these heads completely in such events, a demagnetizer should be used. A demagnetizer suitable for this purpose is manufactured by AMPEX as an accessory item. In the event, however, 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 $\frac{1}{4}$ " 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 $\frac{1}{4}$ ". 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 more carefully.

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.

DRIVE SYSTEM

The drive system employs three motors. Two induction motors with solenoid operated brakes are used for take-up 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 R401, R402 and R403 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. R402 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. If this motor has oil cups it is a sleeve bearing type and requires S.A.E. 30 oil at three month intervals. If motor is a sealed ball bearing motor, no service is required. This motor is mounted on a ball bearing hinge which is moved by a solenoid to engage the motor and the capstan flywheel. The motor is pulled away from the flywheel by spring "A" in Fig. 1. In the rack mounted position the additional spring "B" must be attached.

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. This bearing must be oiled with S.A.E. 30 motor oil. This should be done every six months, more frequently if desired. 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 and neoprene washer which cover the oil hole. Remove these washers and oil through the larger of the two holes exposed. Fill until no more oil will enter! Replace as disassembled.

The mechanism of the capstan idler is operated by solenoid "E" in Fig. 1. Capstan idler pressure is set so that it will just deform 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. A drop of oil on all bearing surfaces of this mechanism at six month intervals is recommended, but not essential. **WARNING!** Under no conditions should any oil be allowed to come in contact with the rubber surfaces of the capstan idler and flywheel.

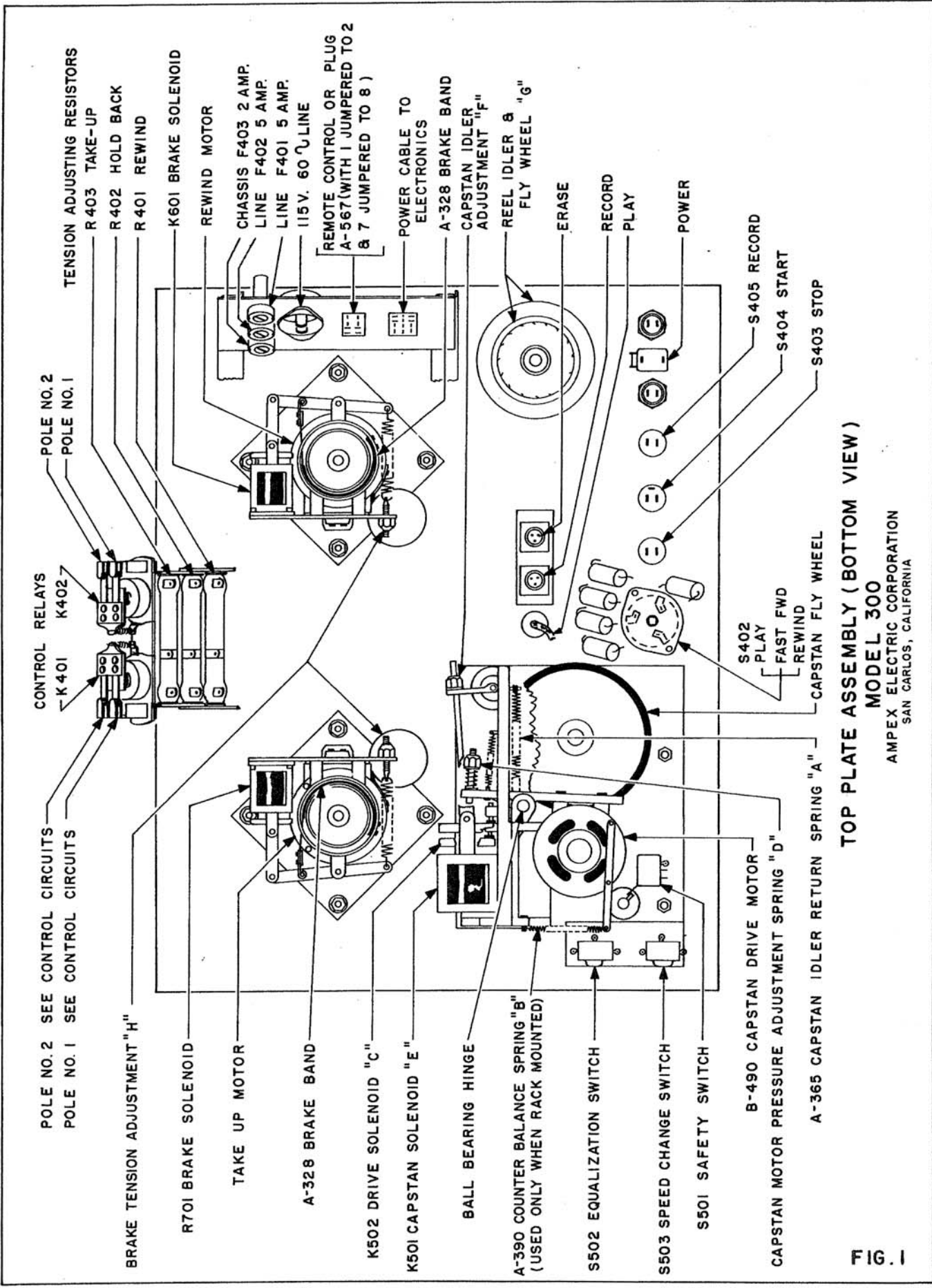
The reel idler is shown in Fig. 1 at "G". This shaft has two single shielded ball bearings which are lubricated at the factory and should not need oil more frequently than twice a year. If more frequent oiling seems advisable they may be oiled as follows: Remove fan and flywheel by loosening set screws in each respectively. Remove spanner nut holding bearing housing in top plate and remove housing. The shaft may now be pulled out of the housing allowing oil to be applied to the bearings. Apply one drop of Lubriplate No. 4 to each bearing. The top bearing is oiled by dropping the oil through the hole in the lower bearing while holding the housing upside down. The lower bearing may be oiled in a reverse manner. Reassemble, being sure to leave very slight freedom between lower bearing and flywheel so the bearings do not bind. For positioning, see Fig. 3.

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.

Daily attention should be given to cleaning of the following:

1. Capstan shaft
2. Head faces
3. Tape guides

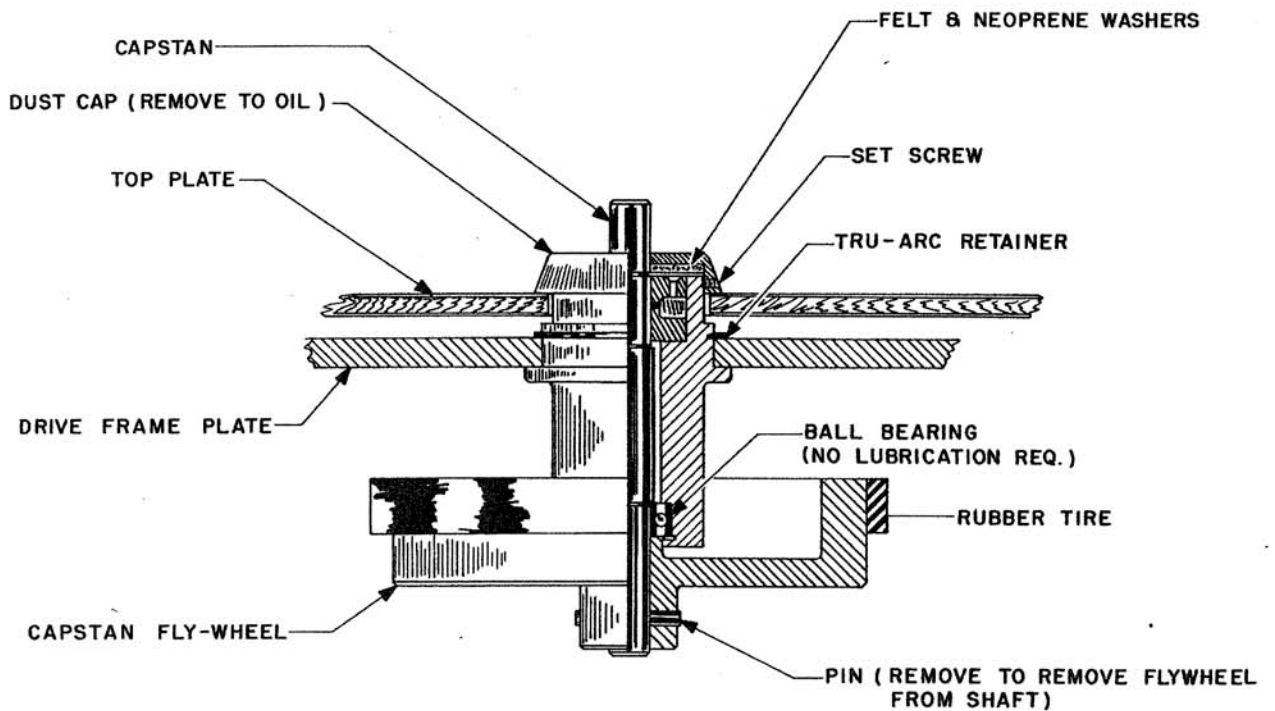
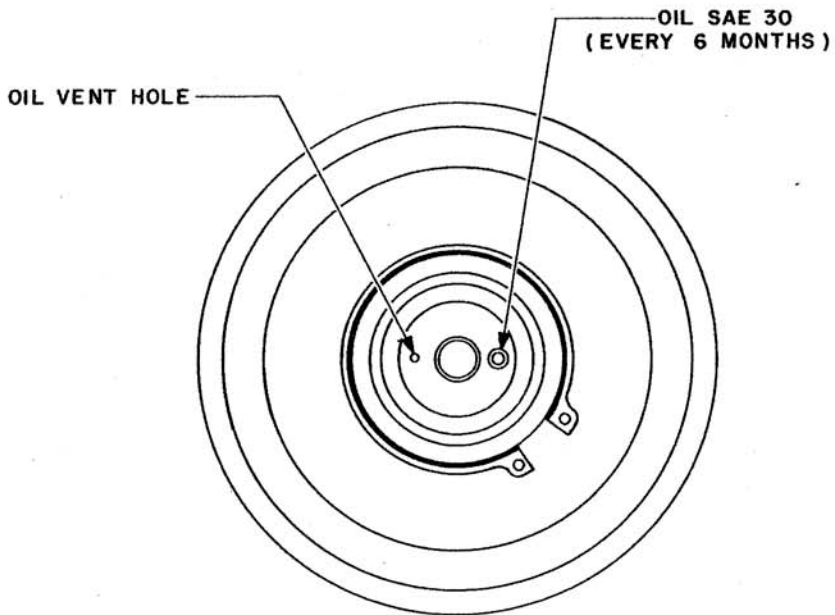
Clean all surfaces of the above with carbon tetrachloride applied with a soft cloth.



TOP PLATE ASSEMBLY (BOTTOM VIEW)
 MODEL 300

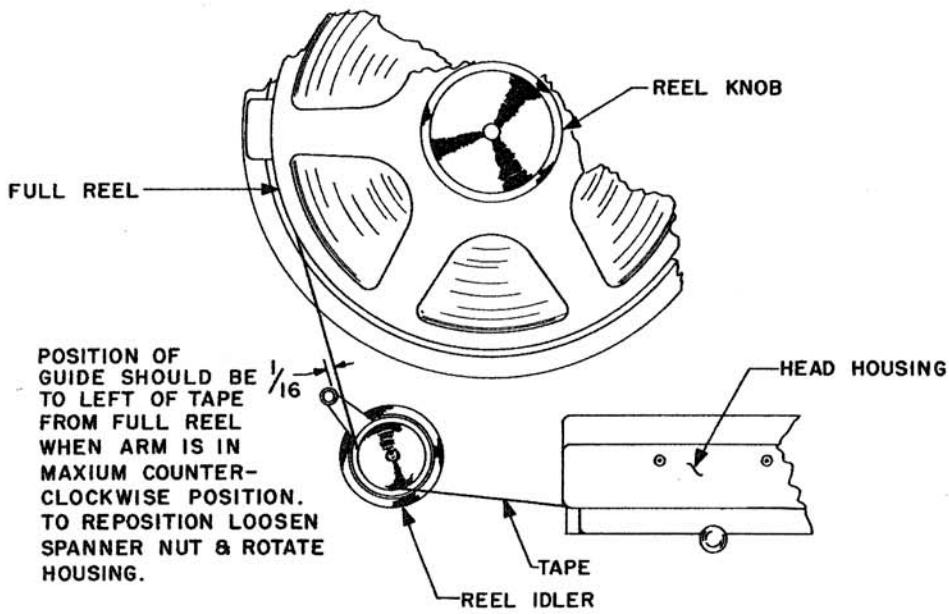
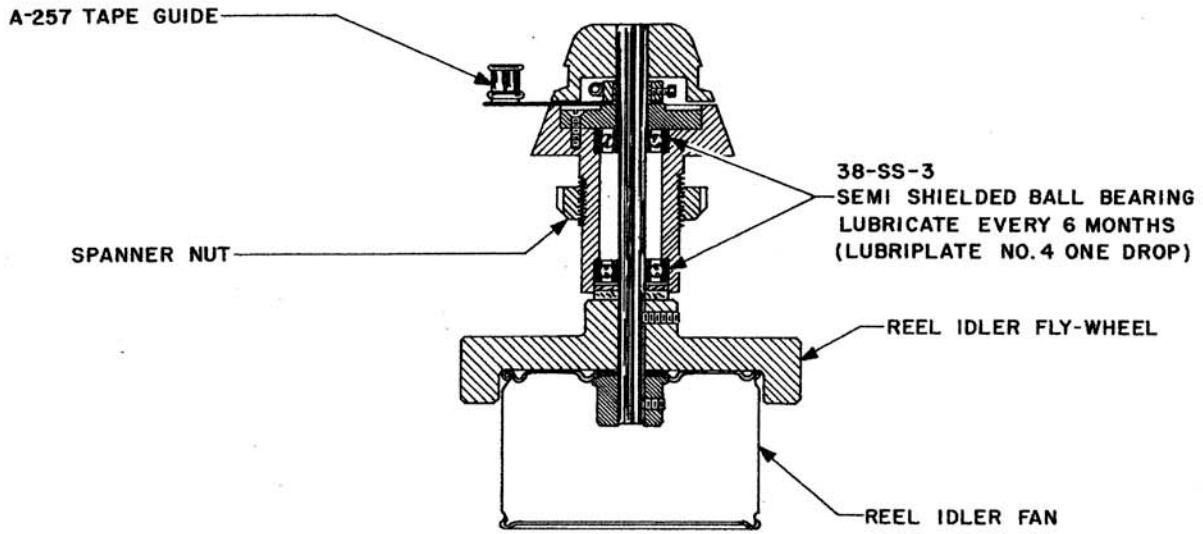
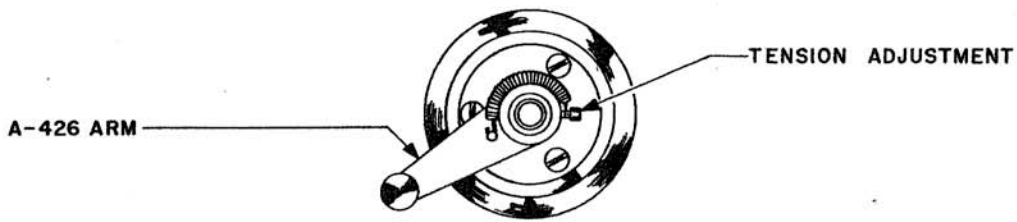
AMPEX ELECTRIC CORPORATION
 SAN CARLOS, CALIFORNIA

FIG. 1

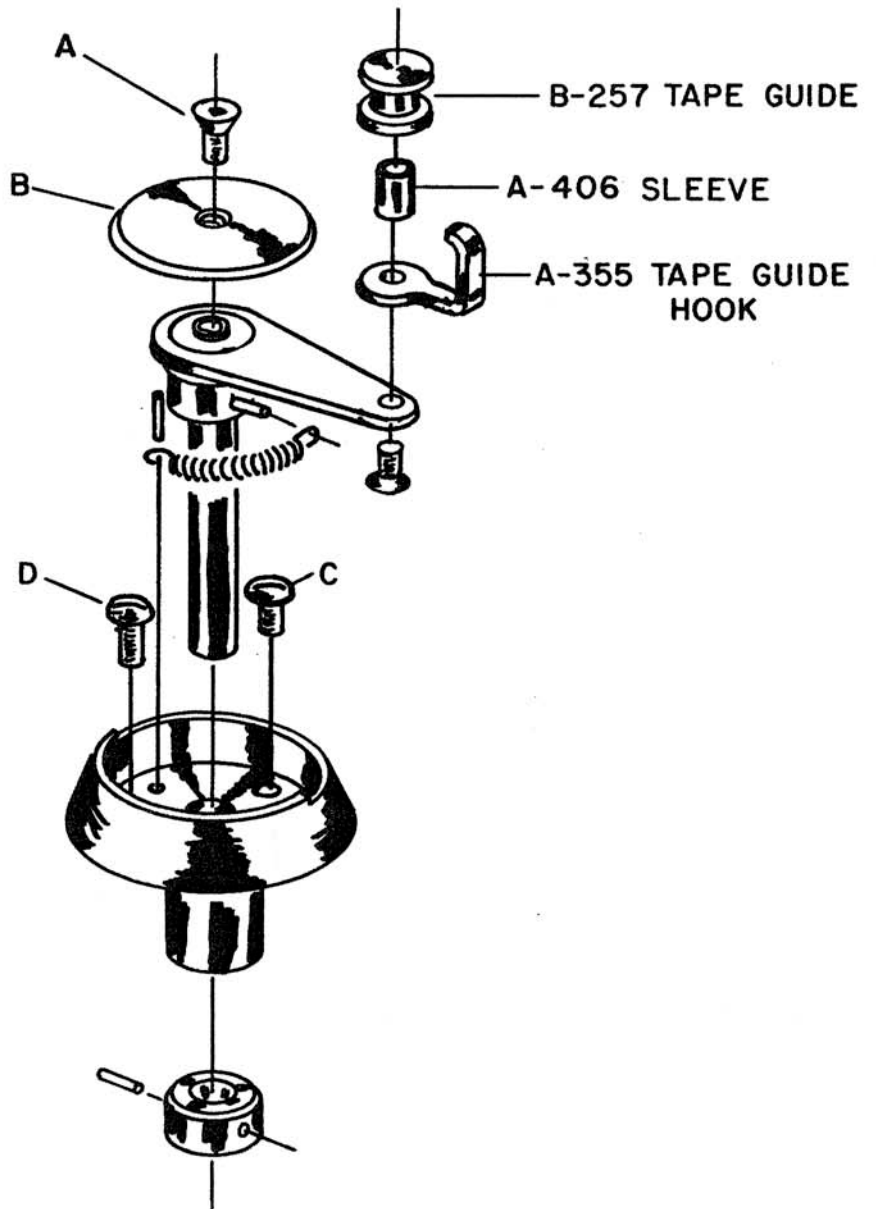


C-366
CAPSTAN ASSEMBLY
MODEL 300
 AMPEX ELECTRIC CORPORATION
 SAN CARLOS, CALIFORNIA

FIG. 2



MP-354
REEL IDLER ASSEMBLY
MODEL 300
 AMPEX ELECTRIC CORPORATION
 SAN CARLOS, CALIFORNIA

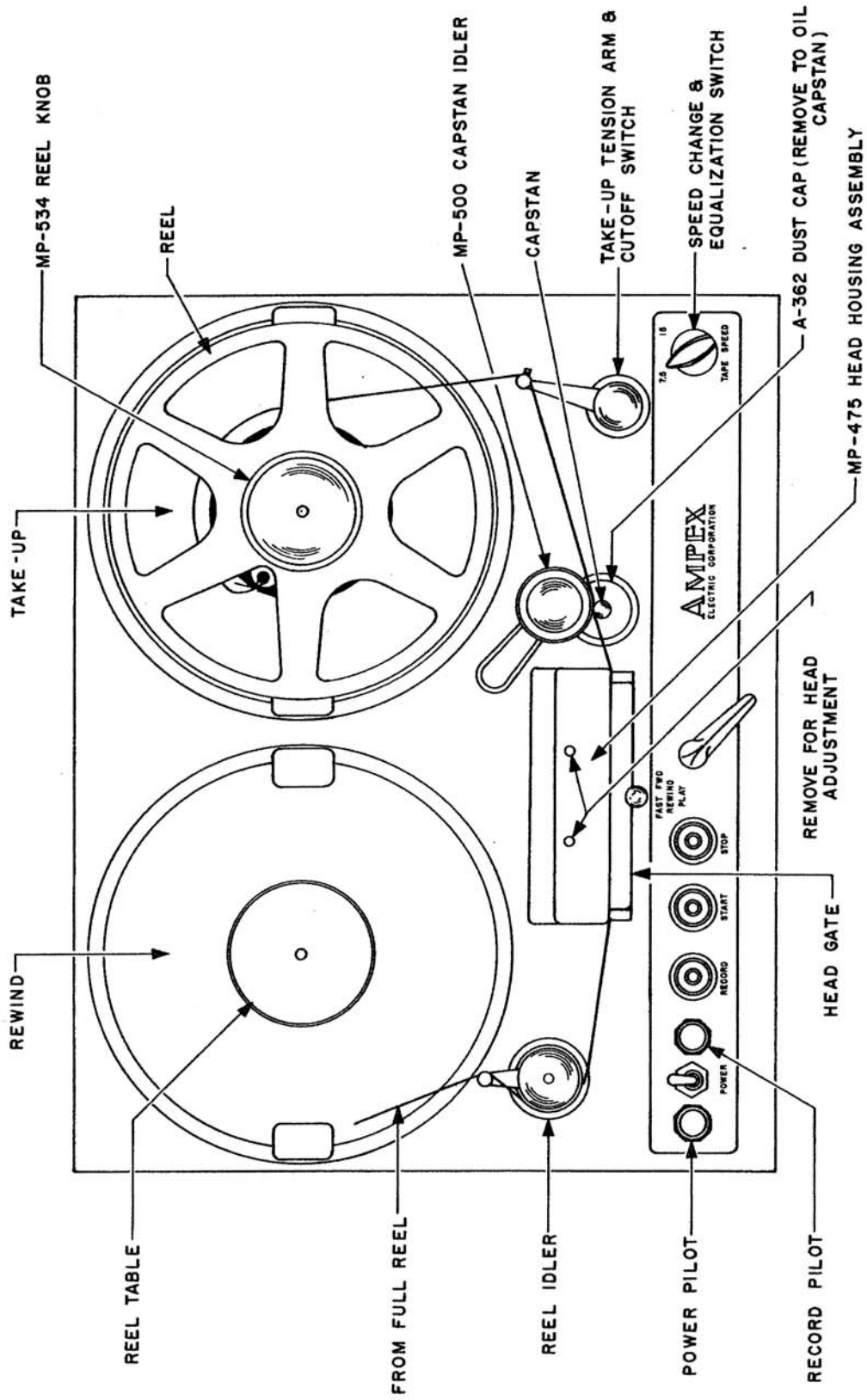


TO REMOVE ASSEMBLY FROM TOP PLATE REMOVE
SCREW A, DISC B & SCREWS C & D. LIFT OUT.

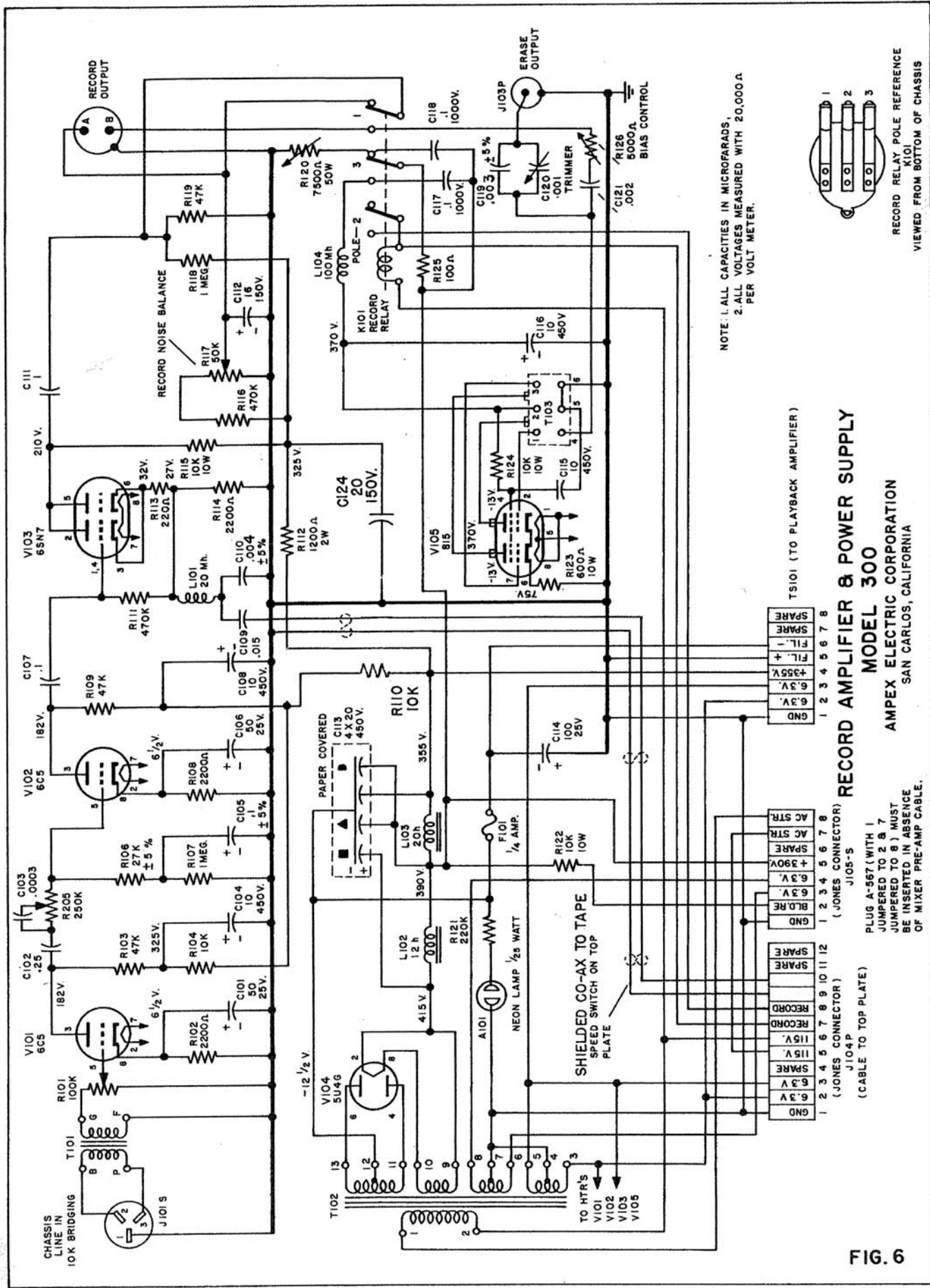
DO NOT OIL ASSEMBLY

MP-425
TAKE-UP TENSION ARM ASSEMBLY
MODEL 300
AMPEX ELECTRIC CORPORATION
SAN CARLOS, CALIFORNIA

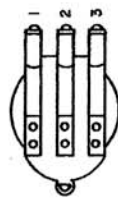
FIG. 4



MP-511
 TOP PLATE ASSEMBLY (TOP VIEW)
 MODEL 300
 AMPEX ELECTRIC CORPORATION
 SAN CARLOS, CALIFORNIA



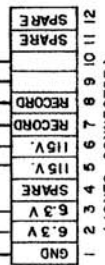
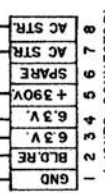
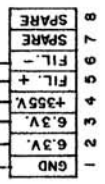
NOTE: 1. ALL CAPACITIES IN MICROFARADS.
 2. ALL VOLTAGES MEASURED WITH 20,000 Ω PER VOLT-METER.



RECORD RELAY POLE REFERENCE
 VIEWED FROM BOTTOM OF CHASSIS

RECORD AMPLIFIER & POWER SUPPLY MODEL 300

AMPEX ELECTRIC CORPORATION
 SAN CARLOS, CALIFORNIA



PLUG A-567 (WITH 1 JUMPED TO 2 & 7 JUMPED TO 8) MUST BE INSERTED IN ABSENCE OF MIXER PRE-AMP CABLE.

(CABLE TO TOP PLATE)

FIG. 6

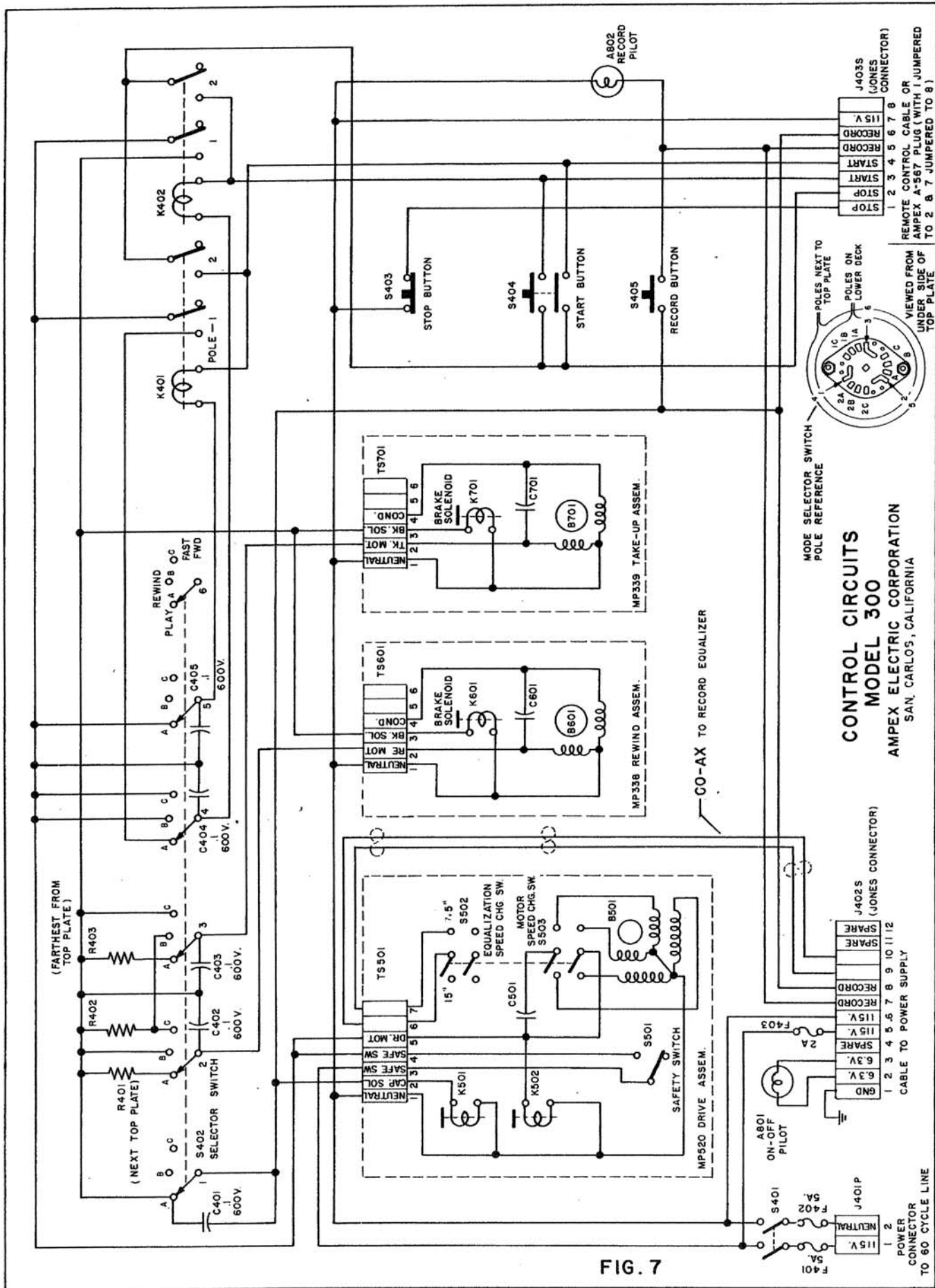
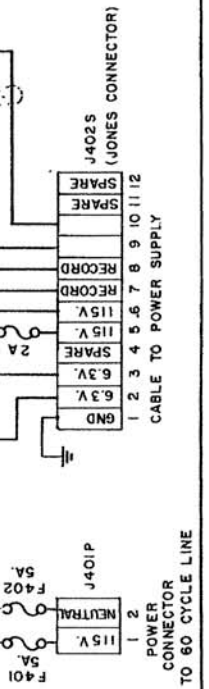
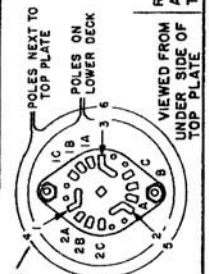


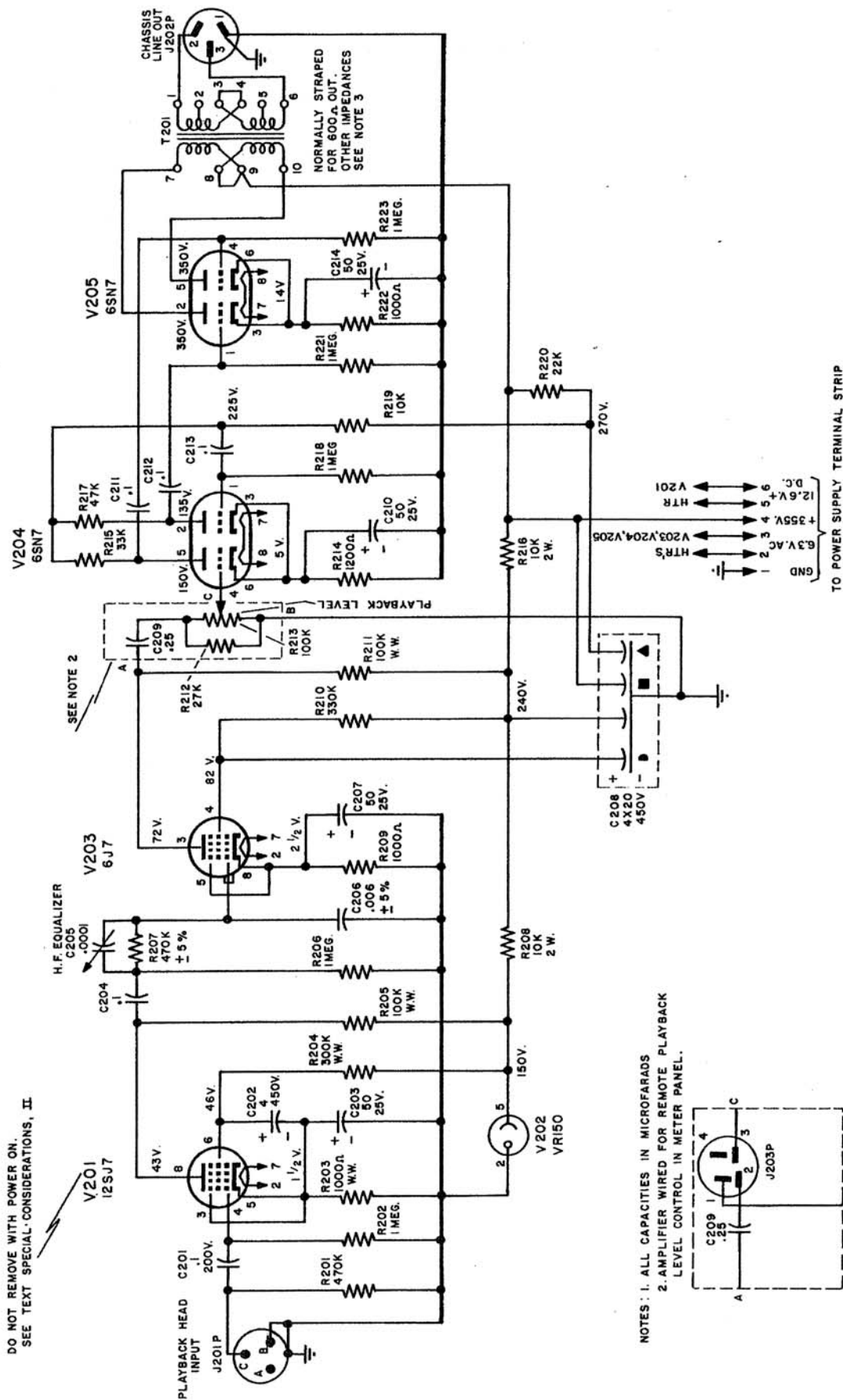
FIG. 7

**CONTROL CIRCUITS
MODEL 300**
AMPEX ELECTRIC CORPORATION
SAN CARLOS, CALIFORNIA

CO-AX TO RECORD EQUALIZER

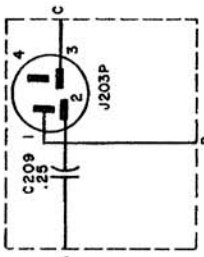


DO NOT REMOVE WITH POWER ON.
SEE TEXT SPECIAL CONSIDERATIONS, II



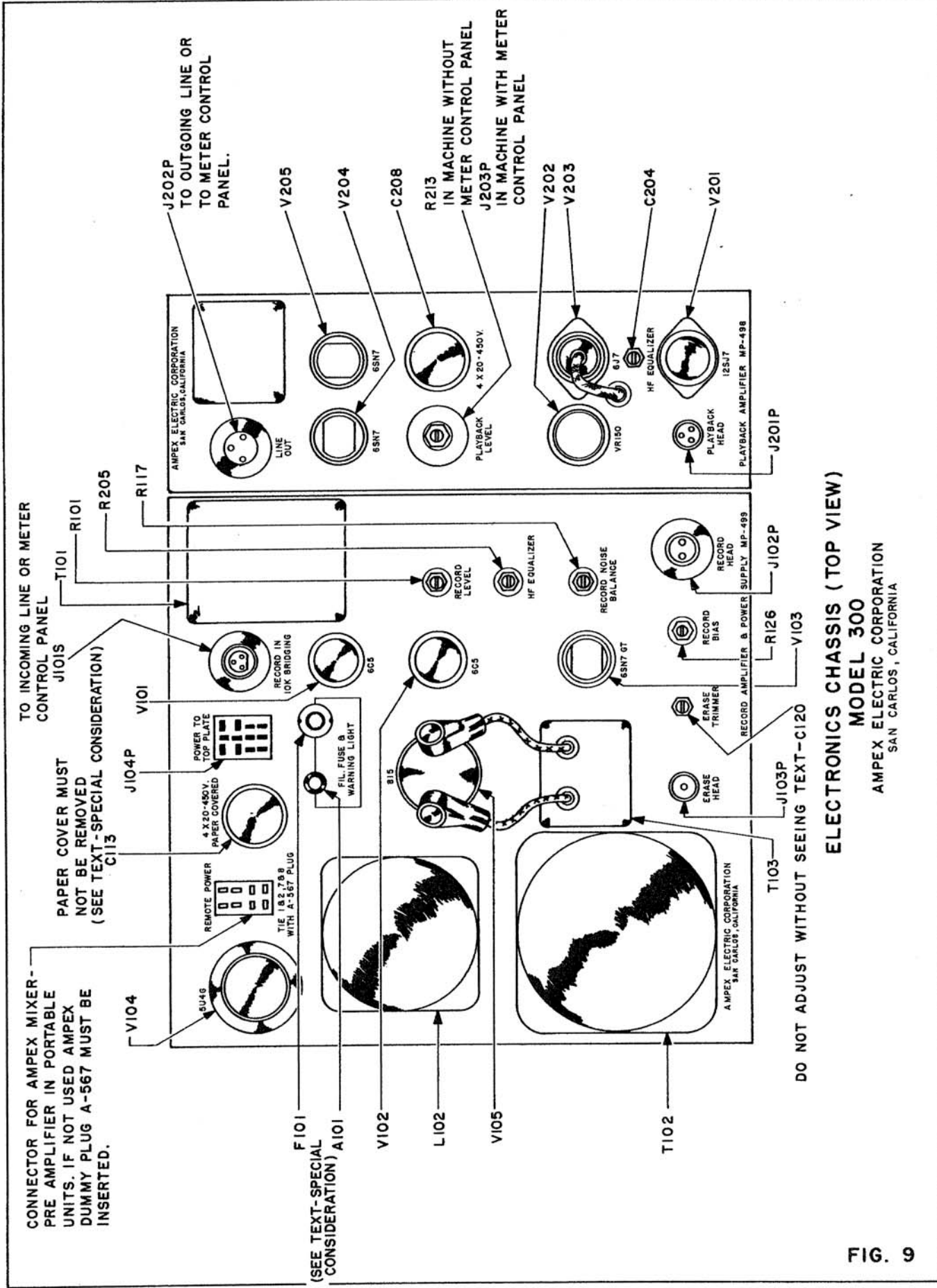
**PLAYBACK AMPLIFIER
MODEL 300**
AMPEX ELECTRIC CORPORATION
SAN CARLOS, CALIFORNIA

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
- 333 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



CONNECTOR FOR AMPEX MIXER-
PRE AMPLIFIER IN PORTABLE
UNITS. IF NOT USED AMPEX
DUMMY PLUG A-567 MUST BE
INSERTED.

PAPER COVER MUST
NOT BE REMOVED
(SEE TEXT-SPECIAL CONSIDERATION)
C113

REMOTE POWER
TIE 18, 5, 7, 9
WITH A-567 PLUG

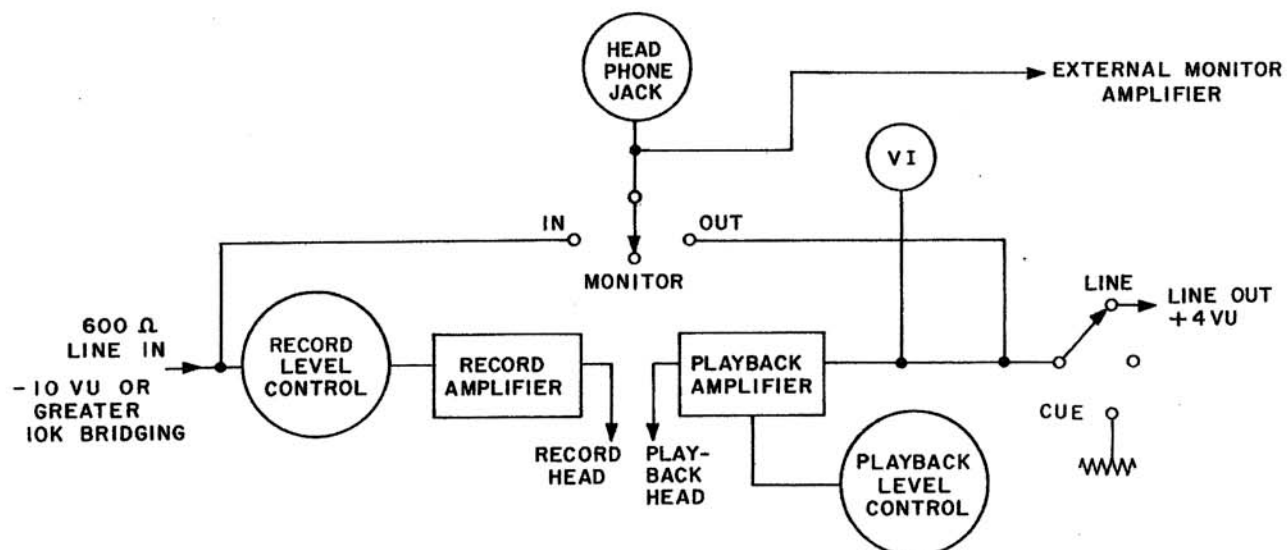
POWER TO
TOP PLATE
PAPER COVERED
4 X 20-450V.

(SEE TEXT-SPECIAL
CONSIDERATION) A101

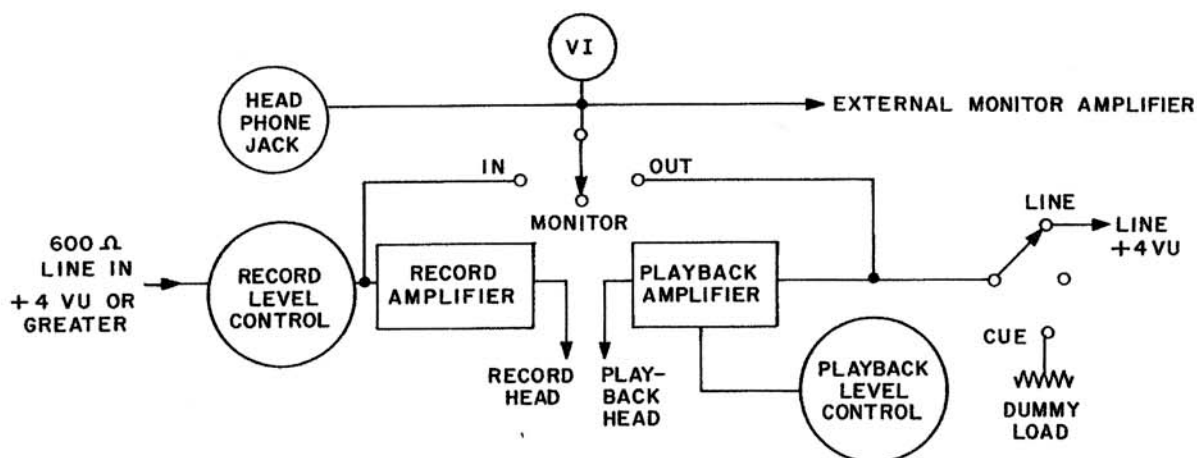
DO NOT ADJUST WITHOUT SEEING TEXT-C120

ELECTRONICS CHASSIS (TOP VIEW)
MODEL 300
AMPEX ELECTRIC CORPORATION
SAN CARLOS, CALIFORNIA

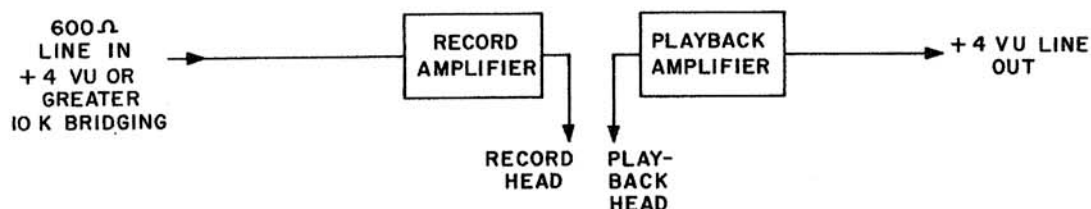
FIG. 9



(A) LAYOUT FOR BRIDGING METER CONTROL PANEL



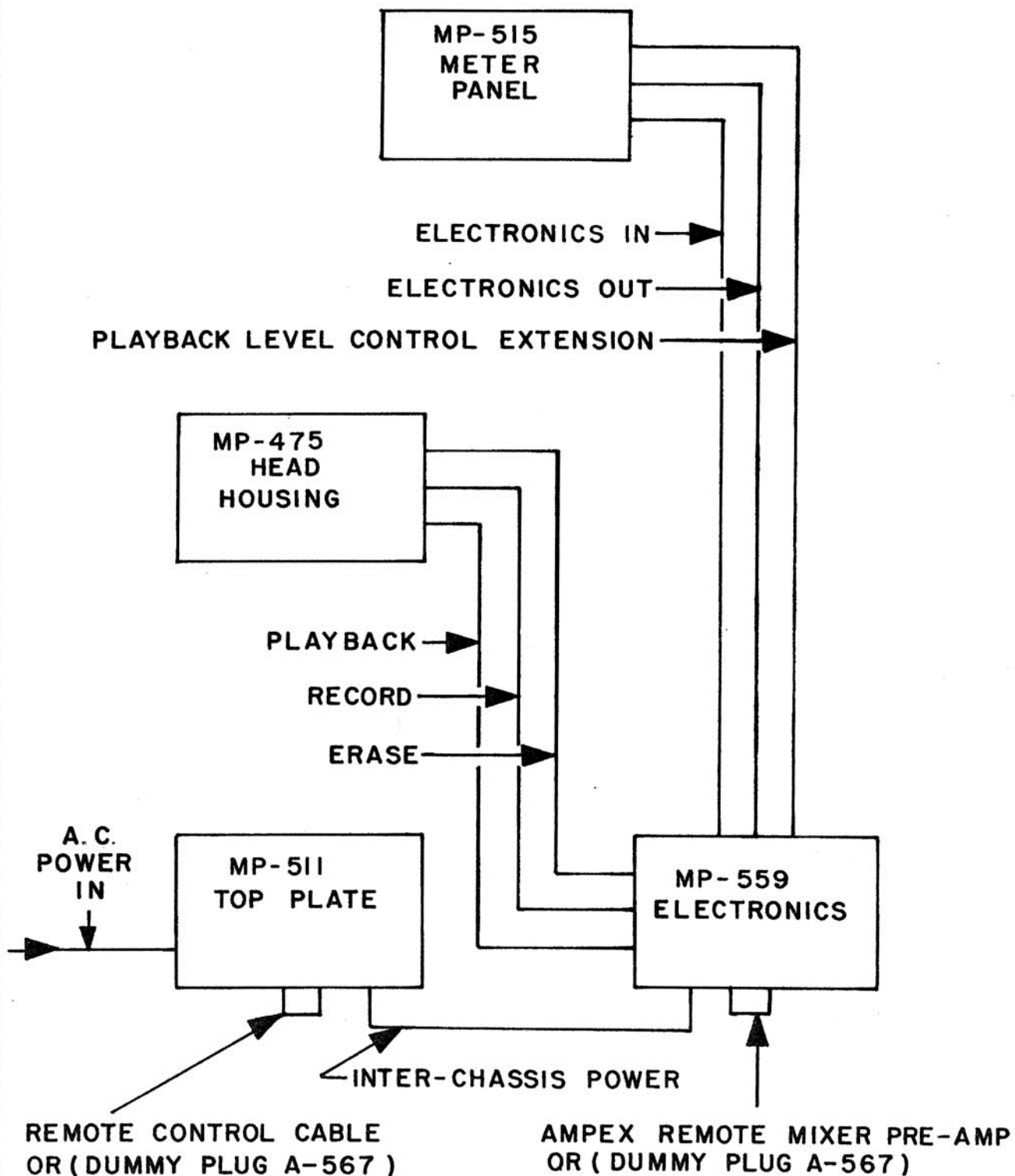
(B) LAYOUT FOR MATCHING METER CONTROL PANEL



(C) LAYOUT OF ELECTRONICS WITHOUT METER CONTROL PANEL

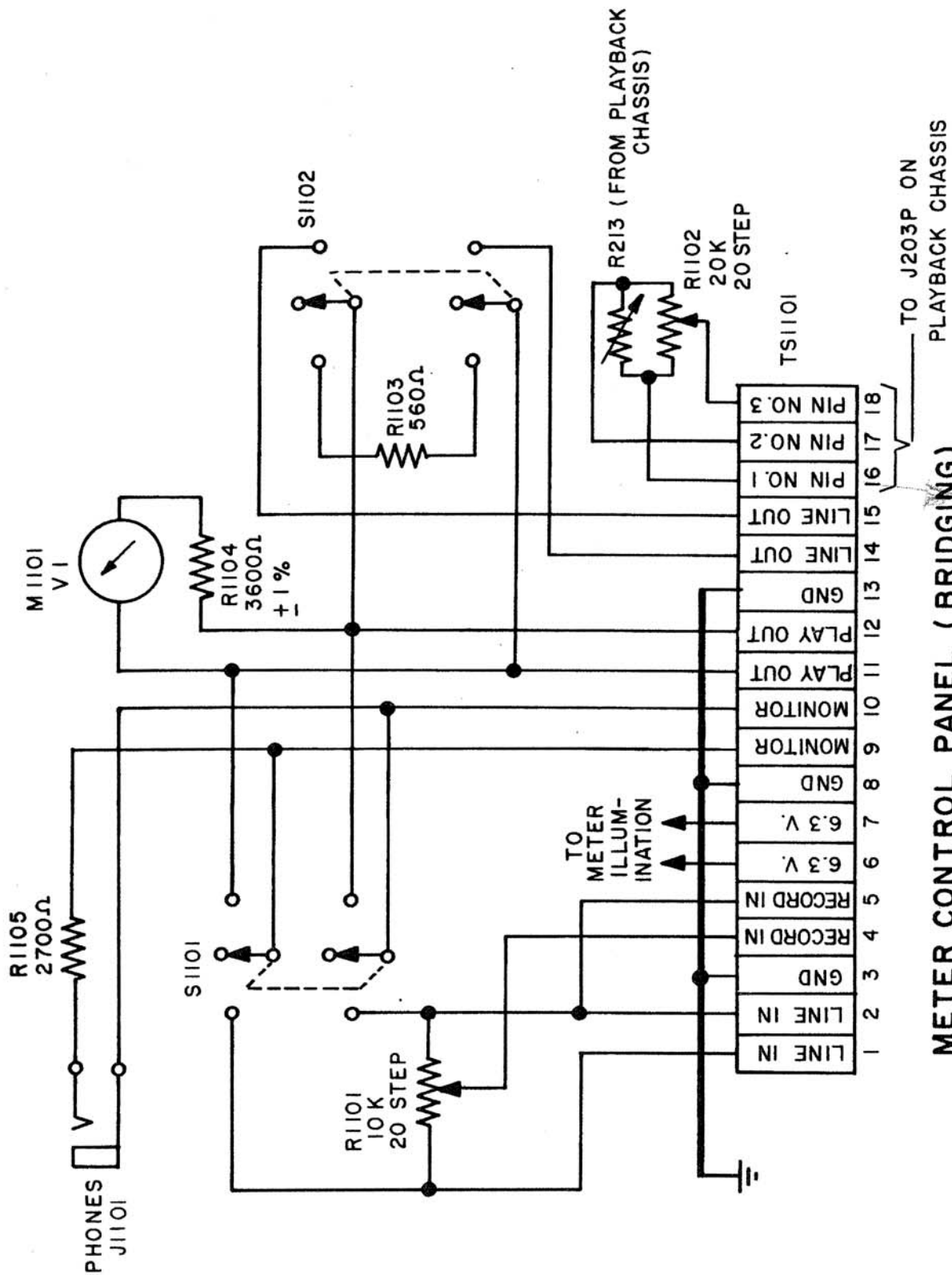
NOTE: 1. SCREW DRIVER GAIN SETS ON RECORD & PLAYBACK AMPLIFIER CHASSIS WILL ADJUST FOR INPUT LEVELS OF -20 VU TO +8VU & OUTPUT LEVELS FROM 0 TO +8VU.
 2. ALL ABOVE UNITS MOUNTED ON METER CONTROL PANEL ARE ENCLOSED IN CIRCLE.

RECOMMENDED LAYOUTS
 MODEL 300
 AMPEX ELECTRIC CORPORATION
 SAN CARLOS, CALIFORNIA



**INTER UNIT CONNECTION DIAGRAM
MODEL 300**

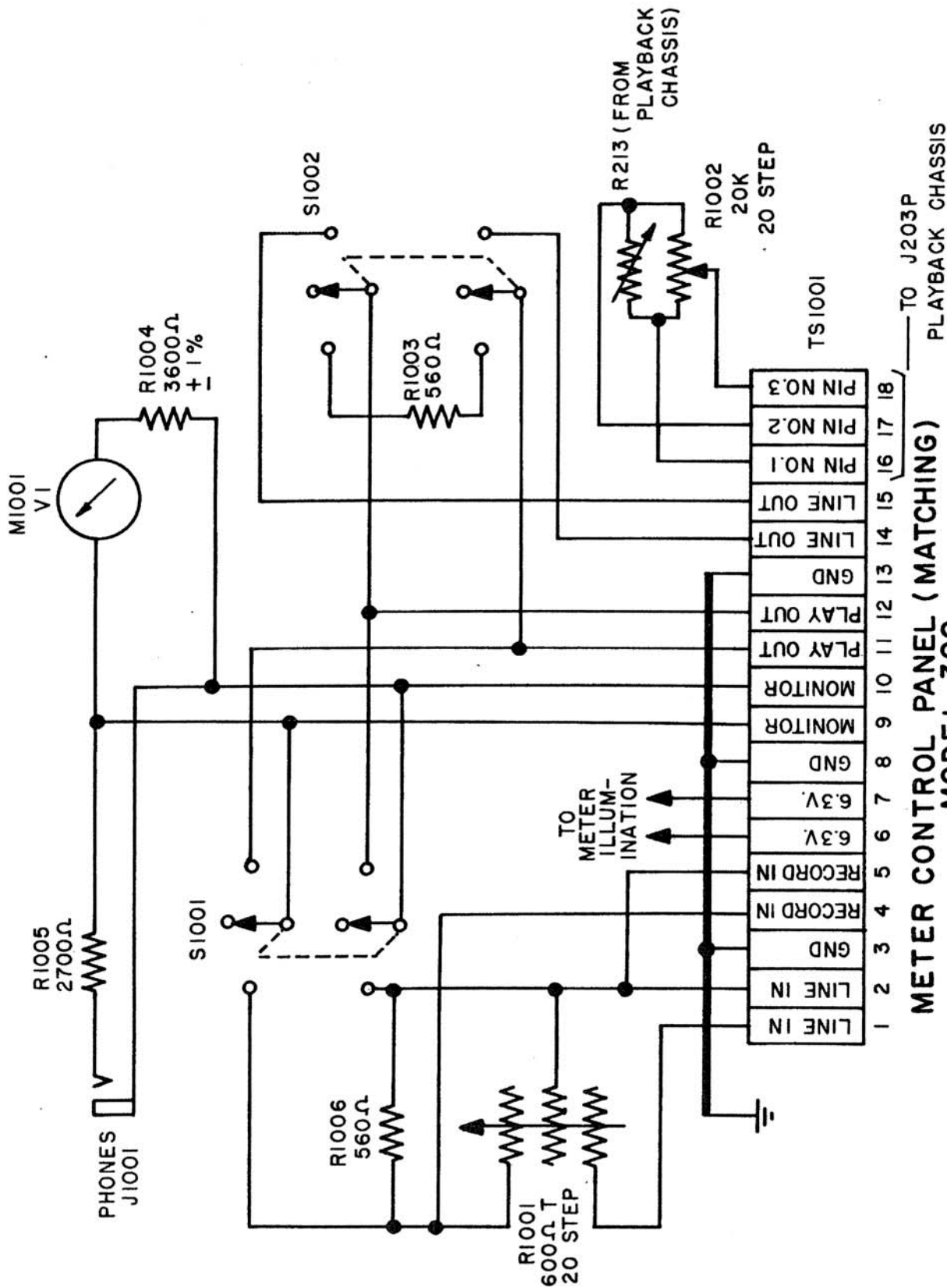
AMPEX ELECTRIC CORPORATION
SAN CARLOS, CALIFORNIA



METER CONTROL PANEL (BRIDGING)
MODEL 300

AMPEX ELECTRIC CORPORATION
 SAN CARLOS, CALIFORNIA

FIG. 12



**METER CONTROL PANEL (MATCHING)
MODEL 300**

AMPEX ELECTRIC CORPORATION
SAN CARLOS, CALIFORNIA

FIG. 13