

NOTES ON TROUBLE
CIRCUIT FUNCTIONS,
VARIOUS MODELS
AMPEX
MODEL 300 RECORDERS

As a result of improvements, Ampex has put out three types of Model 300 Recorders. The difference between these three are as follows:

The first model uses A.C. operated relays and solenoids.

Relays K401 and K402 were two poles each.

The second model was the same except that relay K401 had three poles.

The last model uses all D.C. operated relays and solenoids, and the relays K801 and K802 were three poles each.

The Control Circuit diagrams as supplied by Ampex can be confusing. Therefore, as there are three operational functions of the recorder, namely, PLAY, REWIND, and FAST FORWARD, a simplified diagram has been made up for each of these operations, showing only what components are in use during each operation.

There are three diagrams for each of the different Model 300 Recorders, and with each of these sets is an explanation of the function of the Control Circuit which consists of the Mode Selector Switch and the relays.

The Mode Selector Switch has two decks and six poles. Of these six poles, only five are used. Each pole has three contacts. The poles are numbered from "1" to "5", and the contacts are lettered "A" or PLAY position, "B" or REWIND position, "C" or FAST FORWARD position.

The following entitled, "Circuit Functions of the Mode Selector Switch", contains information as to what each section, and contacts of each section do as part of the Control Circuit. The sections and contacts are identified by number and letter, the same as the diagram, for easy cross reference.

Set #1 (Early Model)

CIRCUIT FUNCTION OF THE MODE SELECTOR SWITCH

Switch Section #1: Controls the Capstan Idler Solenoid.

In "A" Position - Supplies the line actuating voltage to this solenoid through pole 1 of relay K402. Also when in this position it supplies the line actuating voltage to the record relay, through the record switch.

Positions "B" and "C" are not used, as the solenoid is not actuated in these two positions, and neither is the record relay.

Section II-2(b)

Section #2: Controls the REWIND Motor.

- In "A" or PLAY position - Supplies a regulated line voltage through resistor R401 to the rewind motor, through pole 1 of relay K402.
- In "B" or REWIND position - Supplies a full line voltage to rewind motor, through pole 1 of relay K402.
- In "C" or FAST FORWARD position - Supplies a regulated reduced line voltage through resistor R402, to the rewind motor through pole 1 of relay K402.

Section #3: Controls the TAKE-UP Motor.

- In "A" or PLAY position - Supplies a regulated line voltage through resistor R403 to the take-up motor, through pole 1 of relay K402.
- In "B" or REWIND position - Supplies a regulated reduced line voltage to the take-up motor through resistor R402 through pole 1 of relay K402.
- In "C" or FAST FORWARD position - Supplies a full line voltage to the take-up motor, through pole 1 of relay K402.

NOTE: A regulated line voltage is adjusted by resistor R401 and R403 until a pull of 5 to 6 ounces is secured at the hub of a standard NAB reel.

A reduced line voltage is adjusted by resistor R402, and varies from 25 to 45 volts. Its purpose is to provide a drag on the inoperative motor. Sometimes, to improve the start of active motor in Rewind and Fast Forward positions the slider of resistor R402 was lifted resulting in a "0" voltage condition on the inoperative motor.

Section #4: Controls the Coil of Relay K402.

- In "A" or PLAY position - Supplies the line actuating voltage for the coil of relay K402, from line through pole 1 of relay K401.
- In "B" or REWIND position - Supplies the line actuating voltage for the coil of relay K402, from the line itself.
- In "C" or FAST FORWARD position - Is the same as in "B".

Section #5: Controls the Coil of Relay K401.

- In "A" or PLAY position - Supplies the line actuating voltage for the coil of relay K401, from the line itself.

As this relay K401 is actuated only in the PLAY position, there is no connection on "B" and "C".

Set #1

CIRCUIT FUNCTION OF THE RELAYS

Relay K401: In effect, this is the system starting starting relay. The coil of this relay is actuated in PLAY position only. It is controlled by selector switch section #5. Thus it is actuated only when section #5 is in "A" position.

POLE 1: Supplies line voltage to "A" of switch section #4, which in turn actuates relay K402. Its hold is pole 2.

Relay K402: The coil of this relay is actuated in all positions of the mode selector switch.

In "A" or PLAY position - It secures the actuating voltage from line thru' pole 1 of relay K401 then thru' selector switch section #4 contact "A".

In "B" or REWIND position:- It secures the line actuating voltage direct from line through selector switch section #4 contact "B".

In "C" or FAST FORWARD position - Same as above only through contact "C".

POLE 1: In all positions of the mode selector switch, it supplies line voltage to selector switch sections #1, #2, #3. It also supplies the actuating voltages for the brake solenoids of the REWIND and TAKE-UP motors. These are actuated in all positions of the selector switch.

NOTE: When the brake solenoids are not actuated, the brakes are on.

Set #2

AMPEX MODEL #300 RECORDERS

This is the second Model #300, which uses the three (3) pole relay in K401 position.

As the control circuit of the first Model #300 should be better understood by now, and as the control circuit for this model is similar to that of the first, the following will deal with only the changes which have been made which make this the second model.

This model provides a different method of supplying the line actuating voltage to the Capstan Idler solenoid, when the table is in "A" or PLAY position.

It also provides a different method of supplying the regulated reduced line voltage to the Rewind motor in "B" or Rewind position, and the Take-UP motor in "C" or Fast Forward position.

Section II-2(b)

As the Capstan Idler solenoid is actuated only in "A" or Play position, by referring to diagram #1 of this set, it will be noted that the line actuating voltage for this solenoid is still fed thru pole 1 of relay K402, but then after leaving this pole, it goes to and thru the center pole of relay K401 to the "A" contact of switch section #1 of the mode selector, as in the first model.

(The reason for this three pole relay in K401 position is in short, to eliminate any possibility of the Capstan Idler solenoid receiving a momentary voltage before relay K402 opens, when the table is switched from Rewind to Play position.)

When the table is in "B" or Rewind position, a regulated reduced line voltage to the Take-Up motor is supplied thru both resistors R401 and R402 in series.

When the table is in "C" or Fast Forward position, a regulated reduced line voltage to the Rewind motor is supplied thru the same resistors R401 and R402 in series.

In all cases, the same switch sections control the same components as in the first model.

Set #3

AMPEX MODEL #300 RECORDERS

This set provides drawings and information on the Model #300 Recorder now being shipped by Ampex.

The entire control circuit has been modified, and re-designed for D.C. operated Relays and Solenoids. Therefore, this model now contains a source of D.C. supply.

By modification of the circuit, and using two, three pole relays, it was possible to use only three sections of the six section Mode Selector Switch. In the other two models, five sections were used.

The following entitled "Function of the Control Circuit", explains what each section, and contacts of each section of the Mode Selector Switch, as well as the relays and their poles, do as part of the control circuit, in each of the three recorder positions, PLAY, REWIND AND FAST FORWARD. The same coding of contacts, sections and relay poles is used for easy cross reference.

AMPEX MODEL #300 RECORDERS

FUNCTION OF THE CONTROL CIRCUIT

THE MODE SELECTOR SWITCH:

General

1 - Switch sections #1 and #2 are in the AC line circuit, and in conjunction with Resistors R801, R802, and R803 are used to select the various AC operating voltages required by the REWIND and TAKE-UP MOTORS, in the three different operating positions of the recorder.

2 - Switch section #3 is used to select which relay coil will receive a D.C. actuating voltage, in the three different operating positions of the recorder.

NOTE: The output of the selenium rectifier will hereafter be called "D.C. Line".

Switch Section #1

A full AC line voltage is fed to the swinger of this section, at all times, and it receives this line voltage from the safety switch, thru and from pole 1 of Relay K802.

In "A" or PLAY position, it selects and supplies thru resistor R801, a REGULATED line voltage to the REWIND MOTOR.

In "B" or REWIND position, it selects and supplies a FULL line voltage to the REWIND MOTOR. (Also in this position a full line voltage is fed to a resistive circuit of R801, R802, and R803 in series, to provide the necessary voltage drop so that a REGULATED REDUCED line voltage is supplied to the TAKE-UP MOTOR.)

In "C" or FAST FORWARD position, this section is not used.

Switch Section #2

A full AC line voltage is fed to the swinger of this section, at all times, and it receives this line voltage from the safety switch, thru and from pole 1 of Relay K802.

In "A" or PLAY position, it selects and supplies thru resistor R803, a REGULATED line voltage to the TAKE-UP MOTOR.

In "B" or REWIND position, this section is not used.

In "C" or FAST FORWARD position, it selects, and supplies a FULL line voltage to the TAKE-UP MOTOR. (Also in this position a full line voltage is fed to a resistive circuit of R803, R802, and R801 in series, to provide the necessary voltage drop so that a REGULATED REDUCED line voltage is supplied to the REWIND MOTOR.)

Switch Section #3

The D.C. line is connected to the swinger of this section at all times.

In "A" or PLAY position, it selects and supplies the D.C. line to actuate the coil of RELAY K801.

NOTE: Relay K801 is actuated in PLAY POSITION ONLY.

In "B" or REWIND position, it selects and supplies the D.C. line to actuate the coil of RELAY K802.

In "C" or FAST FORWARD position, it selects and supplies the D.C. line to actuate the coil of RELAY K802.

Section II-2(b)

RELAYS

RELAY K801

This relay is actuated in PLAY position ONLY. It receives its D.C. line actuating voltage thru MODE SWITCH SECTION #3, CONTACT "A".

POLE #1: The D.C. line is supplied thru this pole to actuate the coil of Relay K802.

POLE #2: This pole HOLDS relay K801, and connected in the Neutral bus. The swinger of this pole is connected to the coil of relay K-801, and one section of the START switch.

POLE #3: The D.C. line is supplied thru this pole (from and thru pole 3 of relay K802), to actuate the CAPSTAN IDLER SOLENOID, and to supply the actuating voltage for the RECORD relay, when the record switch is pressed.

RELAY K802

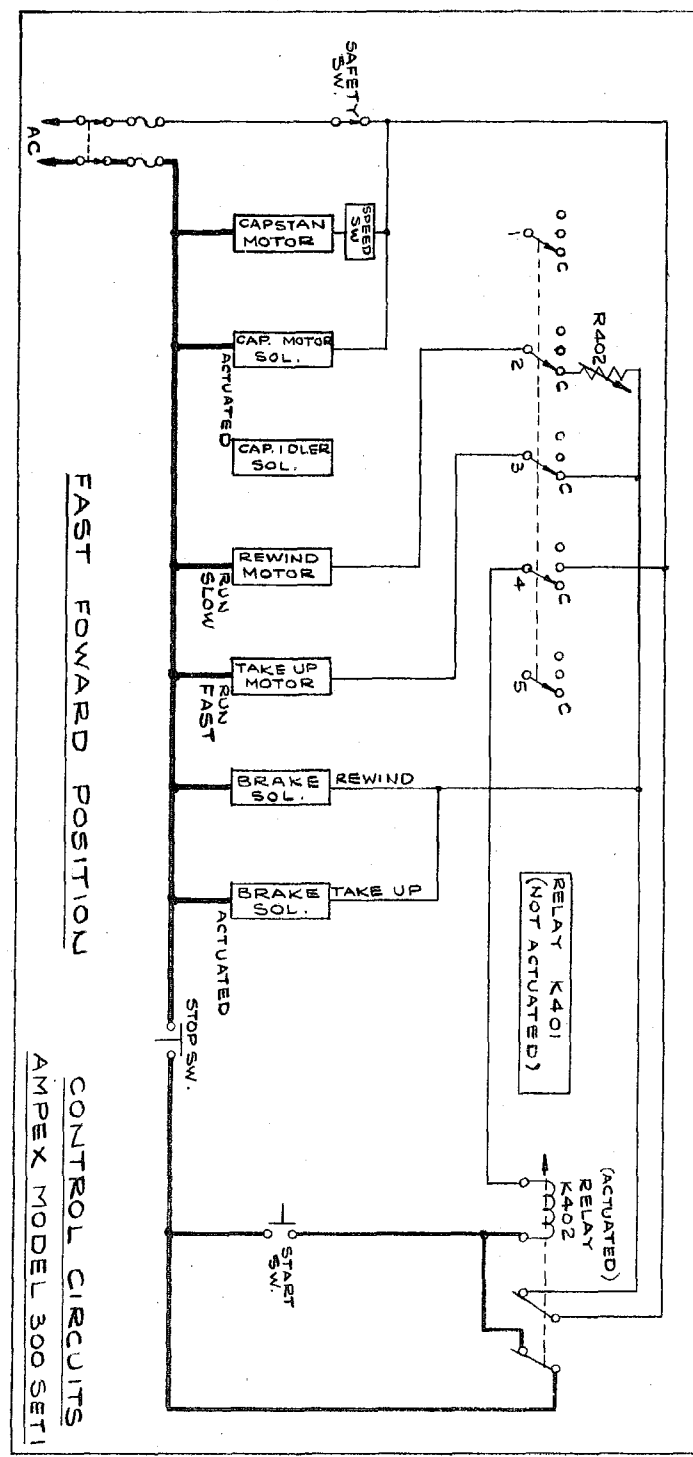
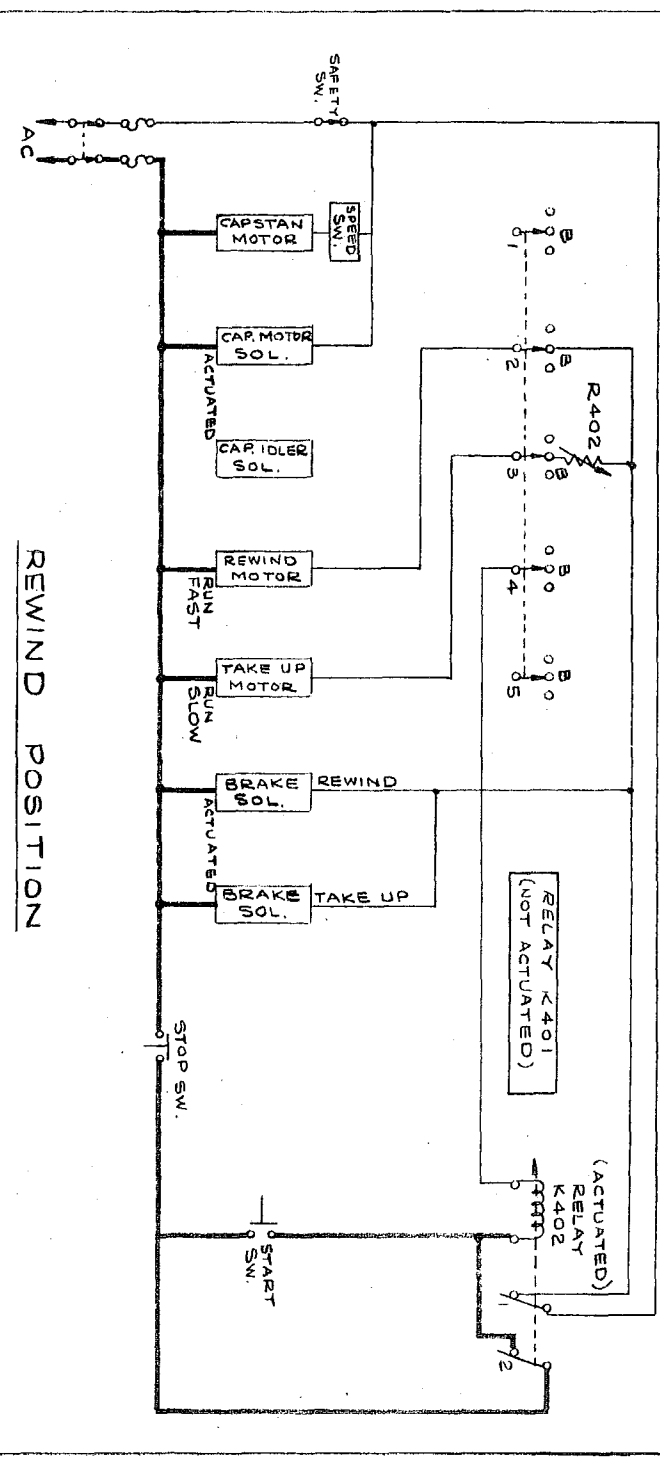
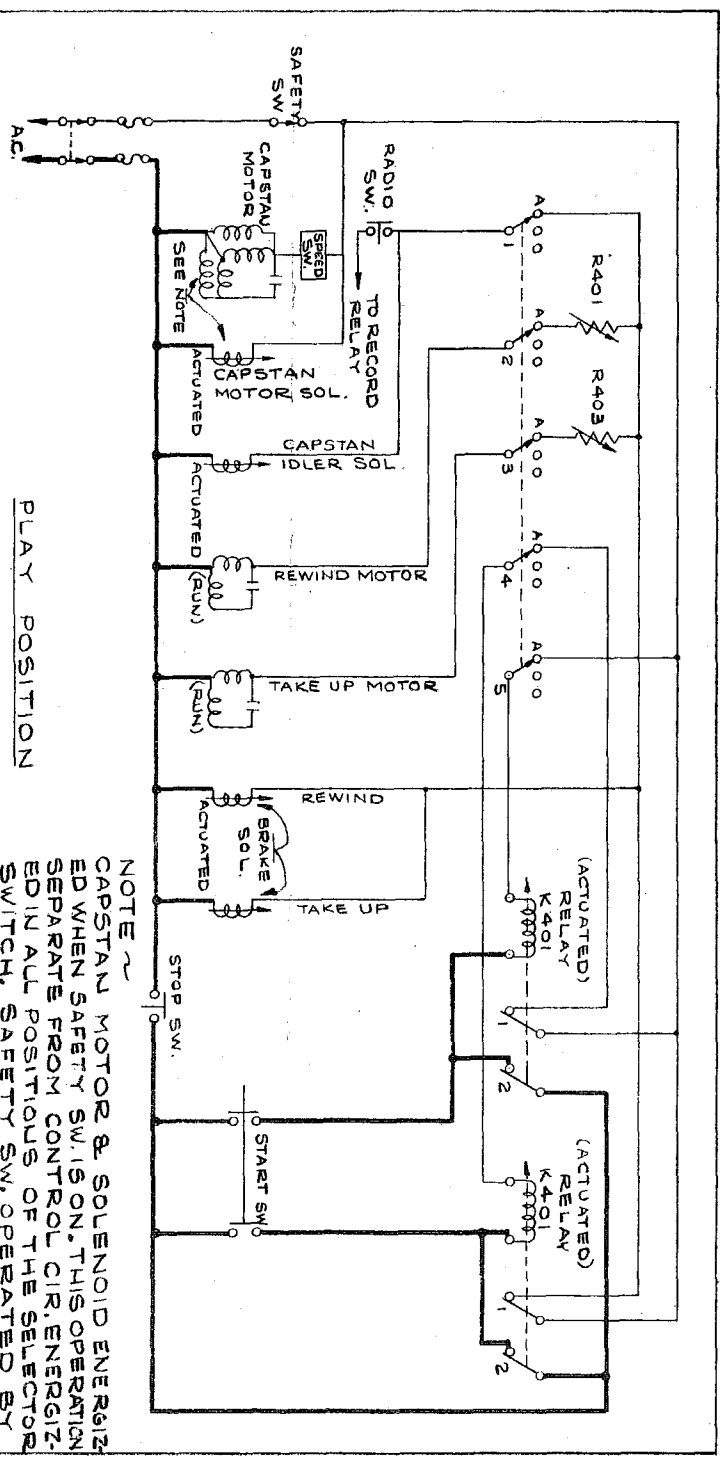
This relay is actuated in ALL positions of the MODE SWITCH.

In "A" or PLAY position, it receives its D.C. line actuating voltage for the coil, from and thru pole 1 of Relay K801. In "B" or REWIND position, it receives its D.C. line actuating voltage for the coil, from Mode switch section #3 contact "B". In "C" or FAST FORWARD position, it receives its D.C. line actuating voltage for the coil, from MODE switch section #3, contact "C".

POLE #1: Supplies AC line voltage from safety switch, to MODE SWITCH sections #1 and #2.

POLE #2: This pole HOLDS relay K802, and connected in the Neutral bus. The swinger of this pole is connected to the coil of relay K802, and one section of the START switch.

POLE #3: Supplies the D.C. line actuating voltage from the D.C. line, thru this pole, to actuate the REWIND and TAKE-UP MOTOR BRAKE SOLENOIDS, IN ALL POSITIONS. When the table is in PLAY position, in addition to the above, it supplies the D.C. line voltage to pole #3 of relay K801 (and is connected to the swinger) which controls the Capstan Idler Solenoid, and the Record relay circuit.



ASSOC. DWGS.

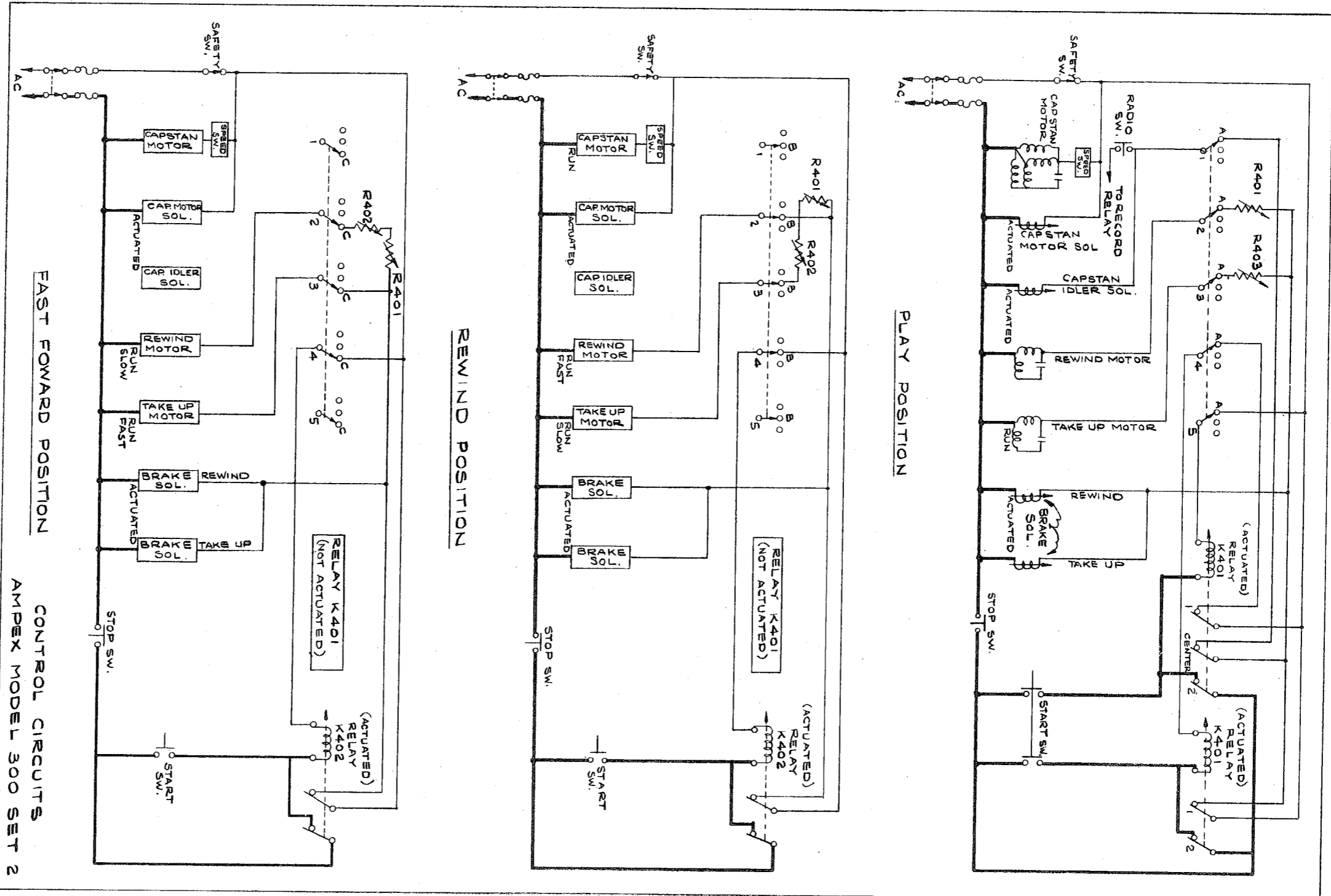
AMPX BULLETIN
CONTROL CIRCUITS
AMPX MODEL 300 SET 1

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SAME SIZE AND TRIM AROUND PHANTOM LINE



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AMPEX MODEL 300 SET 2

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CONTROL CIRCUITS
AMPEX MODEL 300 SET 2

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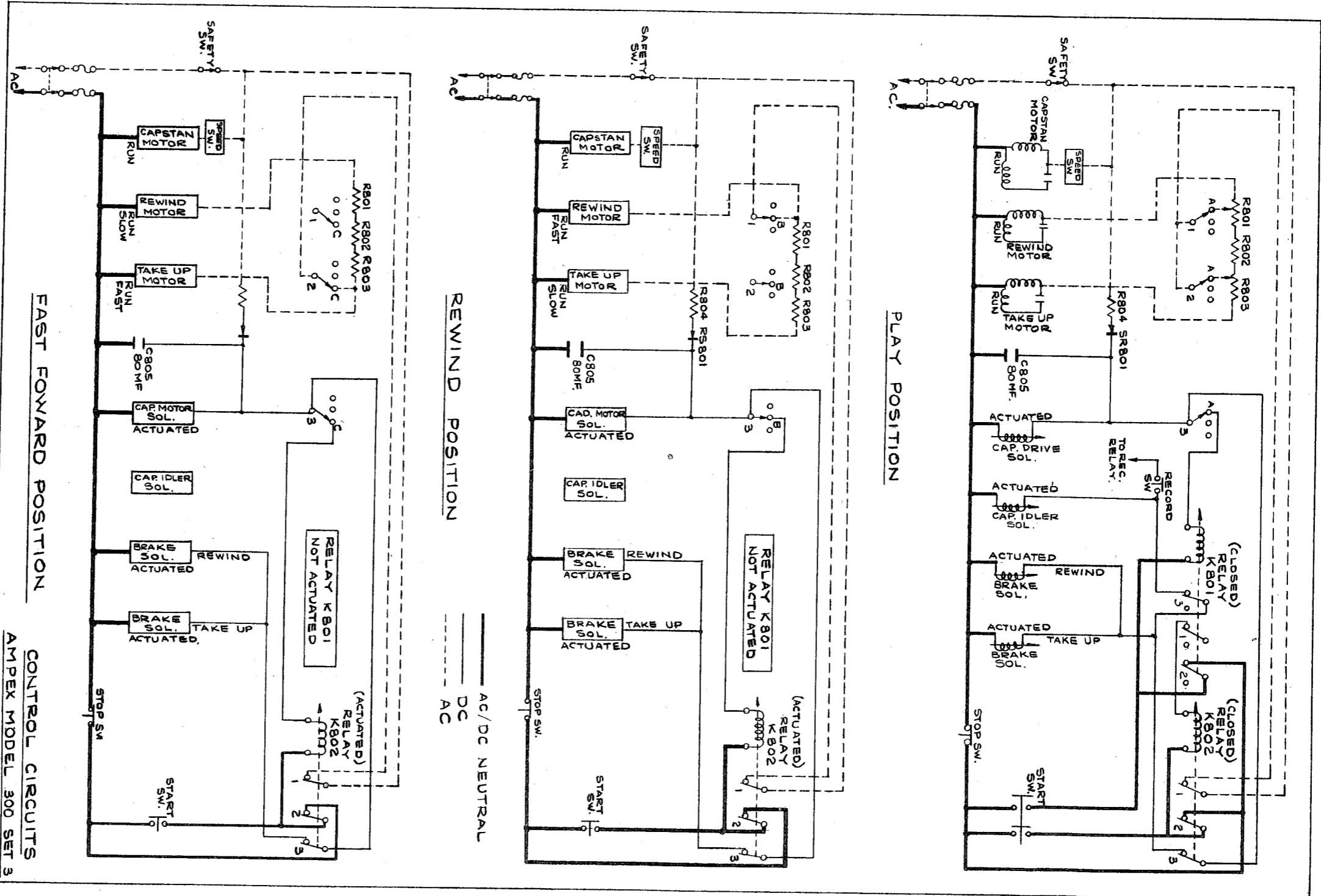
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SAME SIZE AND TRIM
AROUND PHANTOM LINE



FAST FORWARD POSITION

REWIND POSITION

PLAY POSITION

CONTROL CIRCUITS
AMPEX MODEL 300 SET 3

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