

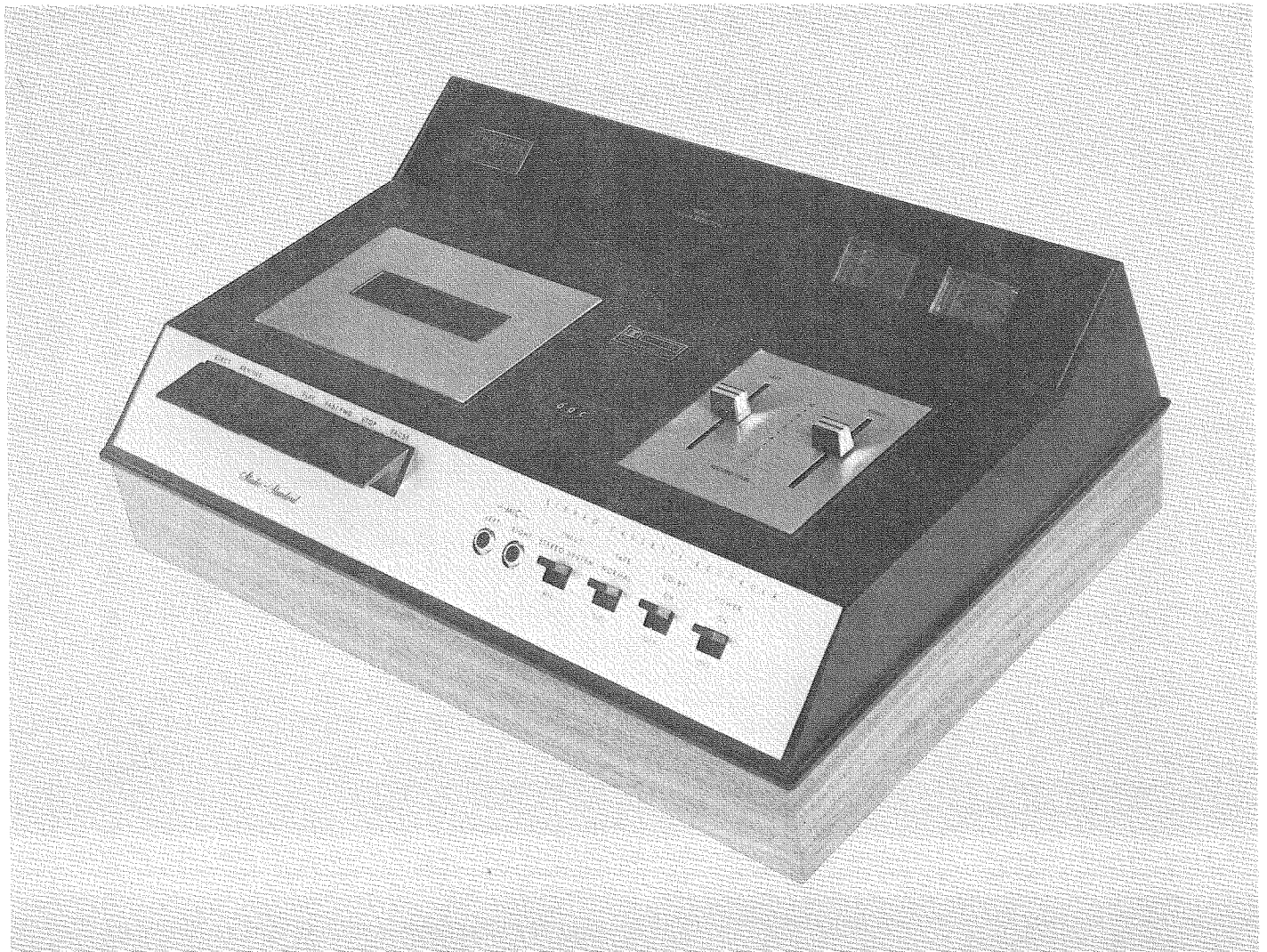
SERVICE MANUAL

PRICE \$2.00

SR-110

SERIAL NUMBERS
BEGINNING 10001

The Fisher® SR-110



Stereo Tape-Cassette Recorder

WORLD LEADER IN HIGH QUALITY STEREO

TEST EQUIPMENT and SERVICE TIPS

The Following equipment is required to repair, calibrate and adjust the SR-110 Tape Deck.

- Line Voltage Autotransformer or Voltage Regulator
- DC Vacuum Tube Voltohmmeter
- Accurately Calibrated AC Vacuum Tube Voltmeter
- Frequency Counter (200 KHz) or Oscilloscope and Low-Distortion Audio (Sine Wave) Generator (110 KHz or more)
- Azimuth adjustment cassette tape such as BASF 455-3, TEAC 116L or equivalent (10 KHz recording @ -zero, -10, or -20 dB)
- Takeup, Rewind tension checking cassette, Robins R36004 (Robins Industries, Commack, N.Y. 11725) or equivalent
- Q-tips and alcohol (rubbing or wood)
- Light machine oil such as Singer sewing machine oil
- Lubricating grease such as Lubriplate
- Tension Gauges:
 - (1) Zero to 100 grams
 - (2) Zero to 700 grams (or Zero to 25 or more ounces)

CAUTION: This precision high-fidelity instrument should be serviced only by qualified personnel, trained in the repair of transistor equipment and printed circuitry.

ELECTRICAL CHARACTERISTICS

Bias and Erase Frequency	105 KHz \pm 5 KHz
Bias Current	6 V across R/P Head (VTVM only)
Erase Current	20 V across Erase Head
Microphone Sensitivity	0.2 mV for Zero VU on recording meters, 1 volt at LINE OUT
AUX Sensitivity	100 mV for Zero VU, 1 volt at LINE OUT.

Many of these items are included only as a reminder — they are normal procedures for experienced technicians. Shortcuts may be taken, but these often cause additional damage to transistors, circuit components, or printed circuit boards.

SOLDERING: A well-tinned, hot, clean soldering iron tip will make soldering easier, without causing damage to the printed circuit board or the components mounted on it. Regular use of a sponge cleaner will maintain a clean soldering surface. The heat available at the tip, (not the wattage of the iron) is important. Some 50-watt irons reach temperatures of 1,000° F, while others will hardly melt solder. Small-diameter tips should be used for single solder connections, pyramid and chisel tips for large areas.

Always disconnect the AC power cord from the line when soldering. Turning the power switch OFF is not sufficient. Power-line leakage paths, through the heating elements of the iron, may destroy transistors.

PARTS REMOVAL: If a part is not being returned for in-warranty factory replacement, it may be cut in half (with diagonal cutting pliers) to make removal easier. Multiple terminal parts, such as IF transformers, or electrolytic capacitors, should be removed using special de-soldering tips made especially for this purpose. Removing solder from terminals, reduces the possibility of breaking the printed circuit board when the part is removed.

ACCIDENTAL SHORTS: A clean working area, free of metal particles, screws, etc., is an important preventive in avoiding servicing problems. Screws, removed from the chassis during servicing, should be stored in a box until needed. While a set is operating, it takes only an instant for a base-to-collector short to destroy a transistor (and others direct-coupled to it). In the time it takes for a dropped screw, washer, or screw-

driver, to contact a pair of terminals (or terminal and chassis), a transistor can be ruined.

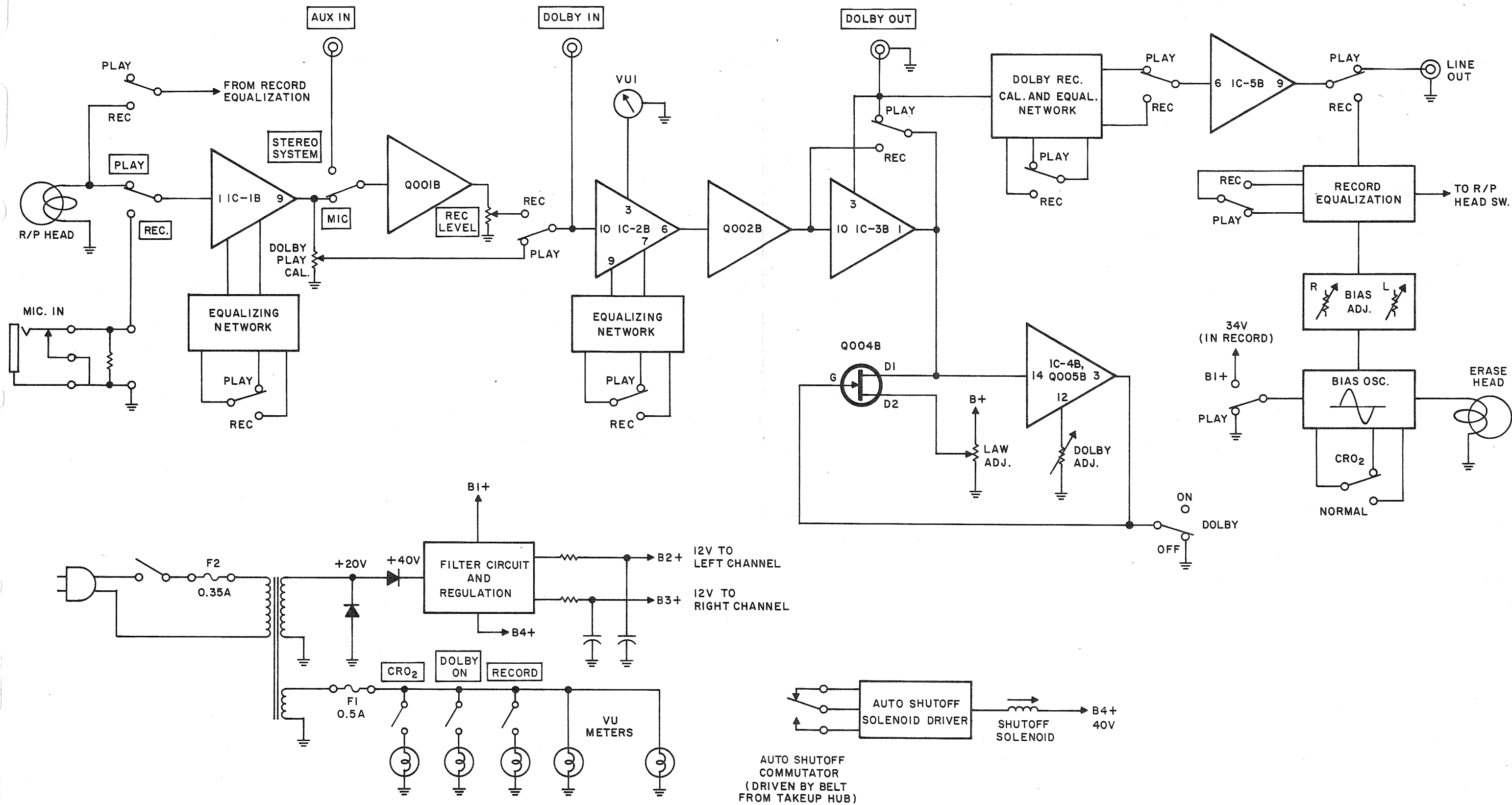
SOLID-STATE DEVICES: Integrated Circuits contain the equivalent of many circuit parts, including transistors, diodes, resistors, and capacitors. The preferred troubleshooting procedure requires isolating the trouble to one stage using AC signal tracing methods. Once the suspected stage is located the DC voltages at the input and output leads are measured to give an accurate indication of the operating conditions of the IC. DO NOT use an ohmmeter, to check continuity with the IC mounted on the printed circuit board. Forward biasing the internal junctions within the IC may burn out the transistors. Do not replace a defective IC until all external resistors, capacitors, and transformers are checked first, to prevent the replacement IC from failing immediately due to a defect in the connecting components. Solder and unsolder each lead separately using a pliers or other heat sink on the lead to prevent damage from excessive heat. Check that the leads are connected to the correct locations on the printed circuit board before turning the set on.

Whenever possible, a transistor tester should be used to determine the condition of a transistor or diode. Ohmmeter checks do not provide conclusive data, and many even destroy the junction(s) within the device.

VOLTAGE MEASUREMENTS: All voltages are measured with the line voltage adjusted to 120 volts. All measured voltages are \pm 20%. DC voltages are measured to chassis with a VTVM, with no signal input unless otherwise noted. AC signal voltages are measured under the conditions specified on the schematic.

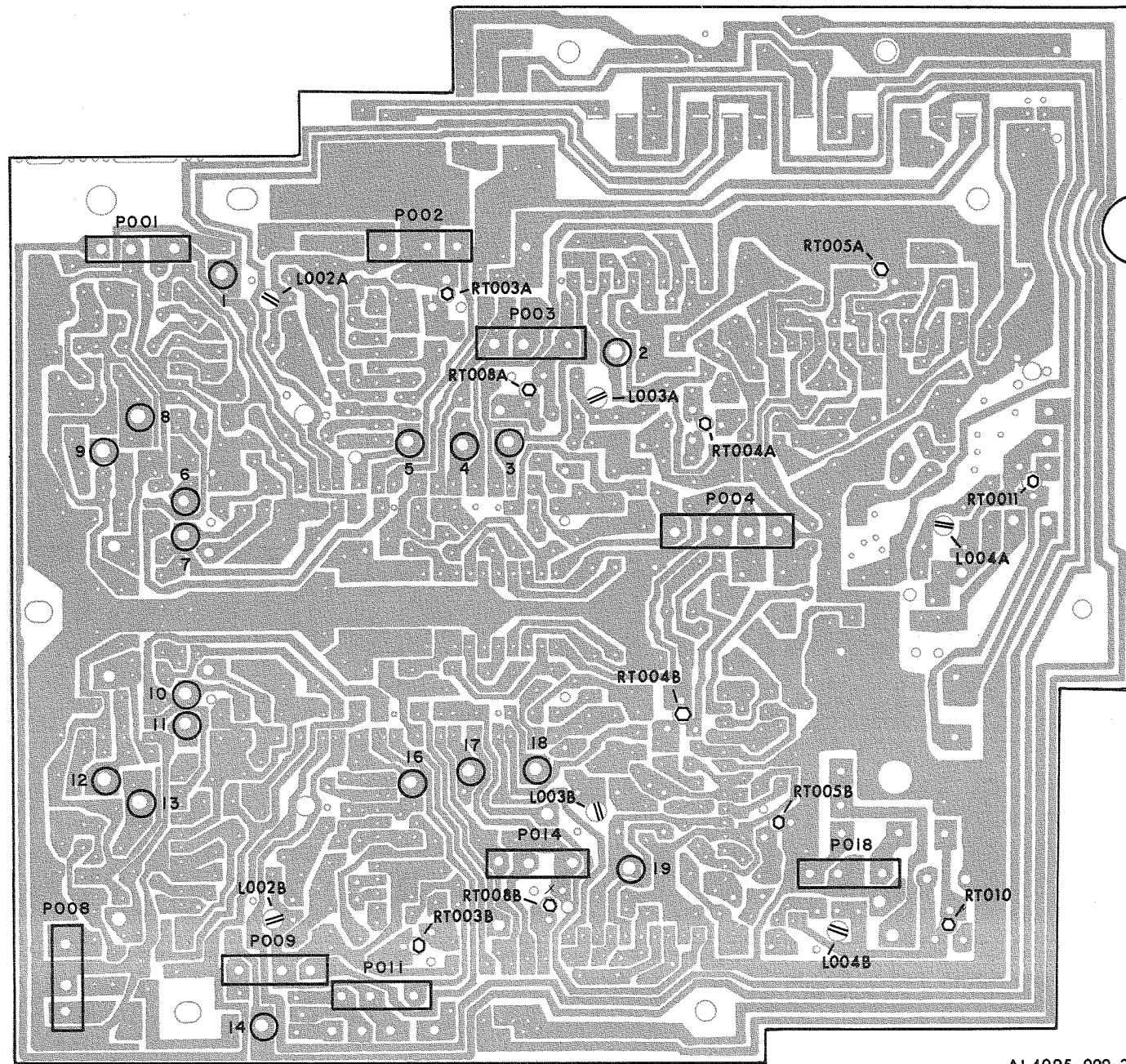
ALIGNMENT PROCEDURES: DO NOT attempt realignment unless the required test equipment is available, and the alignment procedure is thoroughly understood.

SIGNAL FLOW



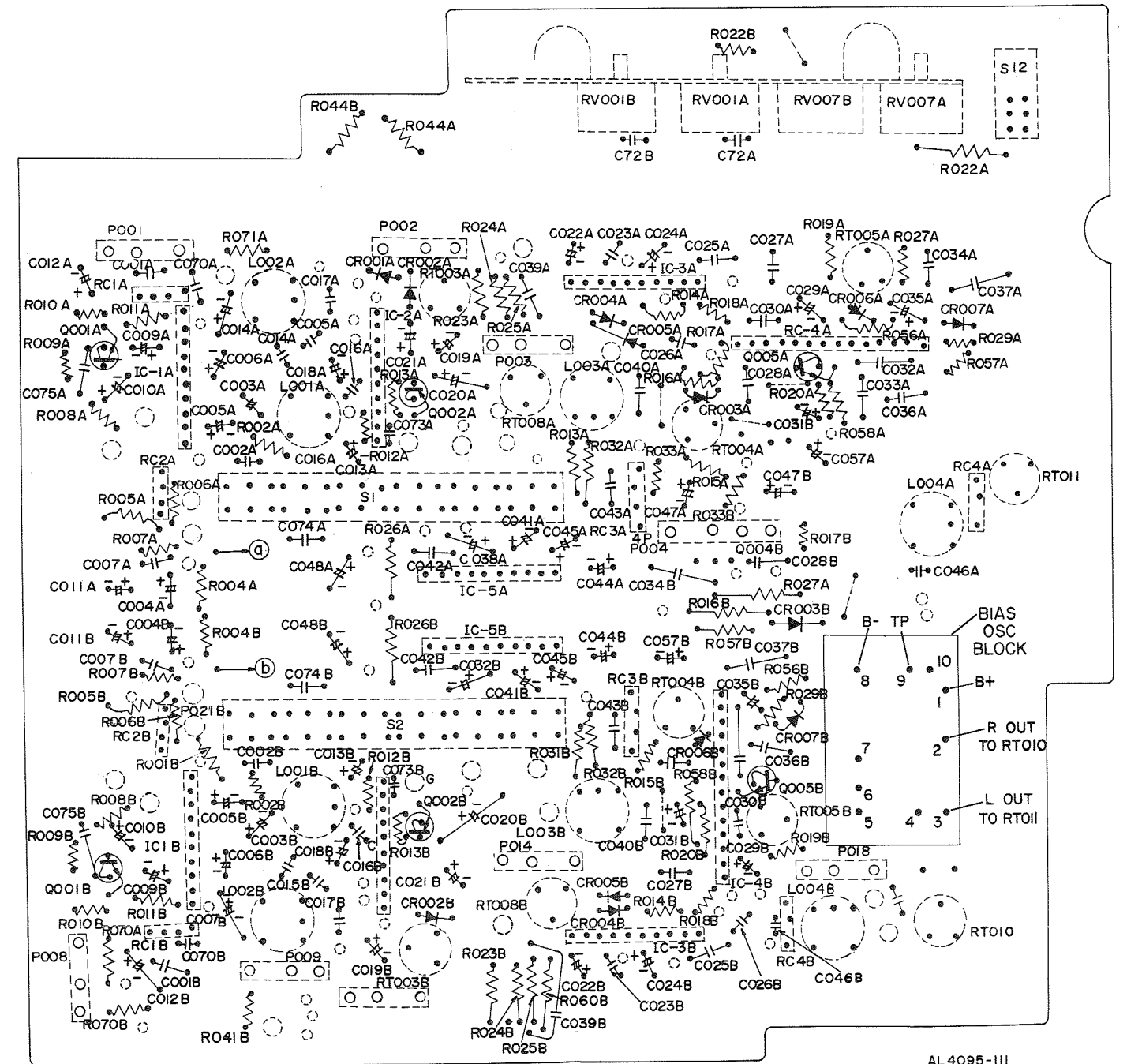
SR-110 BLOCK DIAGRAM (RIGHT CHANNEL ONLY SHOWN)

MAIN BOARD



AL 4095-099-2

MAIN BOARD CONNECTIONS (VIEWED FROM PRINTED CIRCUIT SIDE)



AL 4095-111

SR-110 MAIN BOARD
(VIEWED FROM FOIL SIDE)

TEST AND ADJUSTMENTS

REMOVAL OF TAPE DECK FROM CABINET

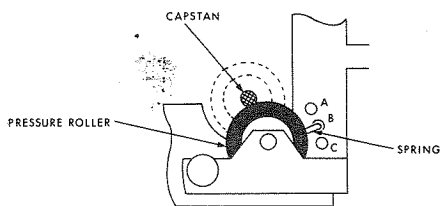
1. Turn set upside down on protective surface.
2. Remove Philips head screws which secure rubber feet.
3. Remove two screws which secure square wood washers.
4. Lift wood cabinet off and thread AC line cord out through hole in cabinet.
5. Remove the four Philips head screws from the corners of the chassis.
6. Holding cabinet top together with metal chassis in both hands, turn entire unit back right side up.
7. Slide cabinet top slightly forward to clear the Function keys, and lift cabinet up slightly. Lift left end of cabinet up and stand top on its right end. It may be necessary to release one or two cables from its cable clamp to accomplish this.

CAUTION: When replacing cabinet top in position on the machine take great care that each cable, particularly the one going to plug P018, directly under the tape counter, is dressed well to the right, so that it will not rub against the drive pulley under the counter. If this caution is not observed the pulley may be slowed down or stopped, causing the machine to turn off (Auto-stop).

MECHANICAL ADJUSTMENTS AND TESTS

CAPSTAN/PINCH ROLLER PRESSURE

1. Main Power ON, depress PLAY key.
2. Hook tension gauge to Point A as shown in Capstan Pressure drawing, and pull pinch roller slowly away from capstan. Take reading when roller barely loses contact with capstan. Pinch roller pressure should be between 550



CAPSTAN/PRESSURE ROLLER ADJUSTMENT

and 650 grams (19 and 22 ounces).

3. To increase pressure against capstan move spring to hole A. To decrease pressure move spring to hole C.

TAKEUP HUB TORQUE

1. Place torque measuring cassette into recorder.
2. Press PLAY and observe indicated torque.
3. Takeup hub torque should be between 40 and 70 grams/cm (0.55–1.0 oz/in.)
4. Reverse cassette and observe supply hub drag. It should be 2 grams/cm or less.

FAST FORWARD TORQUE

1. Place torque measuring cassette into recorder in proper position to measure FORWARD (takeup hub) torque.
2. Press FAST FORWARD and observe indicated torque.
3. Takeup hub torque in FAST FORWARD should be between 70 and 115 grams/cm (1.0–1.75 oz/in.).

REWIND TORQUE

1. Remove and replace torque measuring cassette into recorder in position to measure REWIND torque.
2. Press REWIND and measure supply hub takeup torque (REWIND).
3. REWIND torque should measure between 70 and 115 grams/cm (1.0–1.75 oz/in.).

ELECTRICAL TESTS AND ADJUSTMENTS

19 KHz MULTIPLEX TRAP

1. Feed 19 KHz, 5 mV into left MIC input.
2. Put recorder into RECORD mode.
3. Adjust L002 A (top of board, near left) for minimum reading on VTVM at pin 5 of IC2A (C019A or C020A).
4. Feed 19 KHz, 5 mV into right MIC input.
5. Adjust L002B (lower left corner of board) for minimum on VTVM at pin 5 of IC2B (C019B or C020B).

BIAS FREQUENCY

1. Set recorder to RECORD. Put frequency counter across R/P head.
2. Frequency should be 105 KHz \pm 5 KHz.

BIAS CURRENT

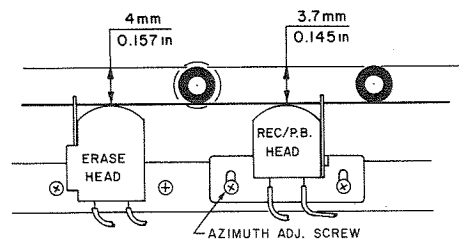
1. Set up as above, with VTVM across R/P head.
2. Bias current should produce 6 V AC across head.
3. Adjust RT010 (lower right corner) and RT011 (center, extreme right) for 6 V.

ERASE CURRENT

1. Set up as above, with VTVM across ERASE head.
2. Erase current should produce at least 20 volts across ERASE head.

CALIBRATION OF VU METERS

1. Feed 1 KHz into AUX IN jacks. VTVM at DOLBY OUT jacks.
2. Set generator amplitude to produce 580 mV on VTVM with RECORD gain sliders set to maximum.
3. Adjust RT003A (top, below P002) and RT003B (bottom, just left of middle) for Zero on VU meters.



HEAD AZIMUTH ADJUSTMENT

HEAD AZIMUTH ADJUSTMENT

1. Put 10 KHz alignment tape into recorder. Set to PLAY.
2. VTVM at LINE OUT jacks.
3. Adjust head azimuth adj. screw for maximum output on VTVM.

HIGH FREQUENCY EQUALIZATION

1. Set RV007 A & B (DOLBY RECORD cal. adj. on rear Panel) to mid-point.
2. Feed 16 KHz, 50 mV to AUX IN jacks. Set RECORD gain sliders to Max. RECORD On.
3. Adjust L003A (upper 1/3, near center) for maximum reading on VTVM at left LINE OUT jack.
4. Adjust L003B (lower 1/3, near center) for maximum at right LINE OUT jack.

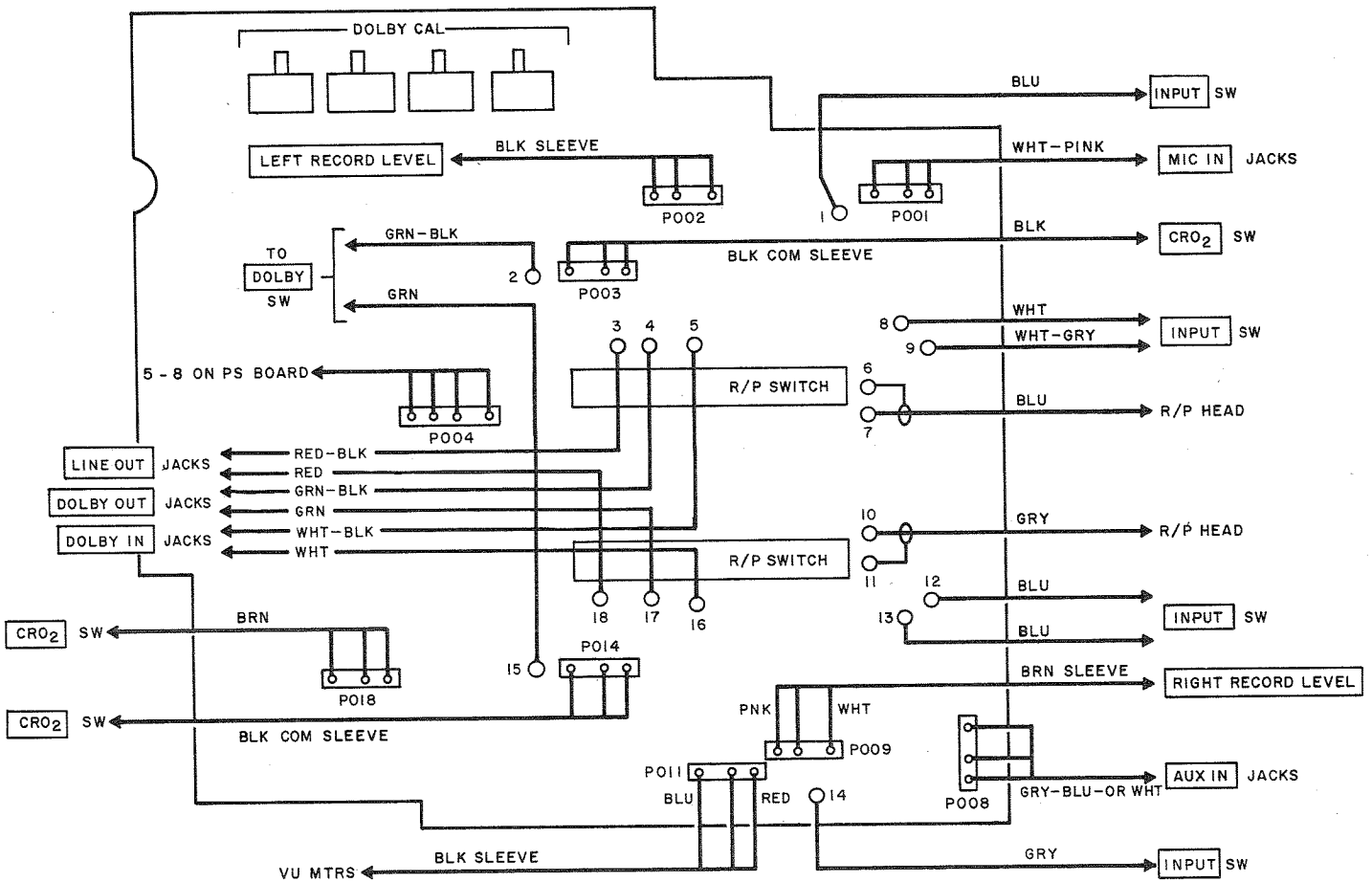
REGULAR TAPE BIAS

1. Apply 100 mV, 1 KHz to LINE IN jacks. RECORD On. VTVM to LINE OUT jack(s).
2. Adjust RV007A & B (Step 1, above) for 365 mV on VTVM.

CRO₂ TAPE BIAS

1. As above, except CRO₂ switch ON.
2. Adjust RT008A (near top, middle below P003) and RT008B near bottom, middle) for 485 mV on VTVM.

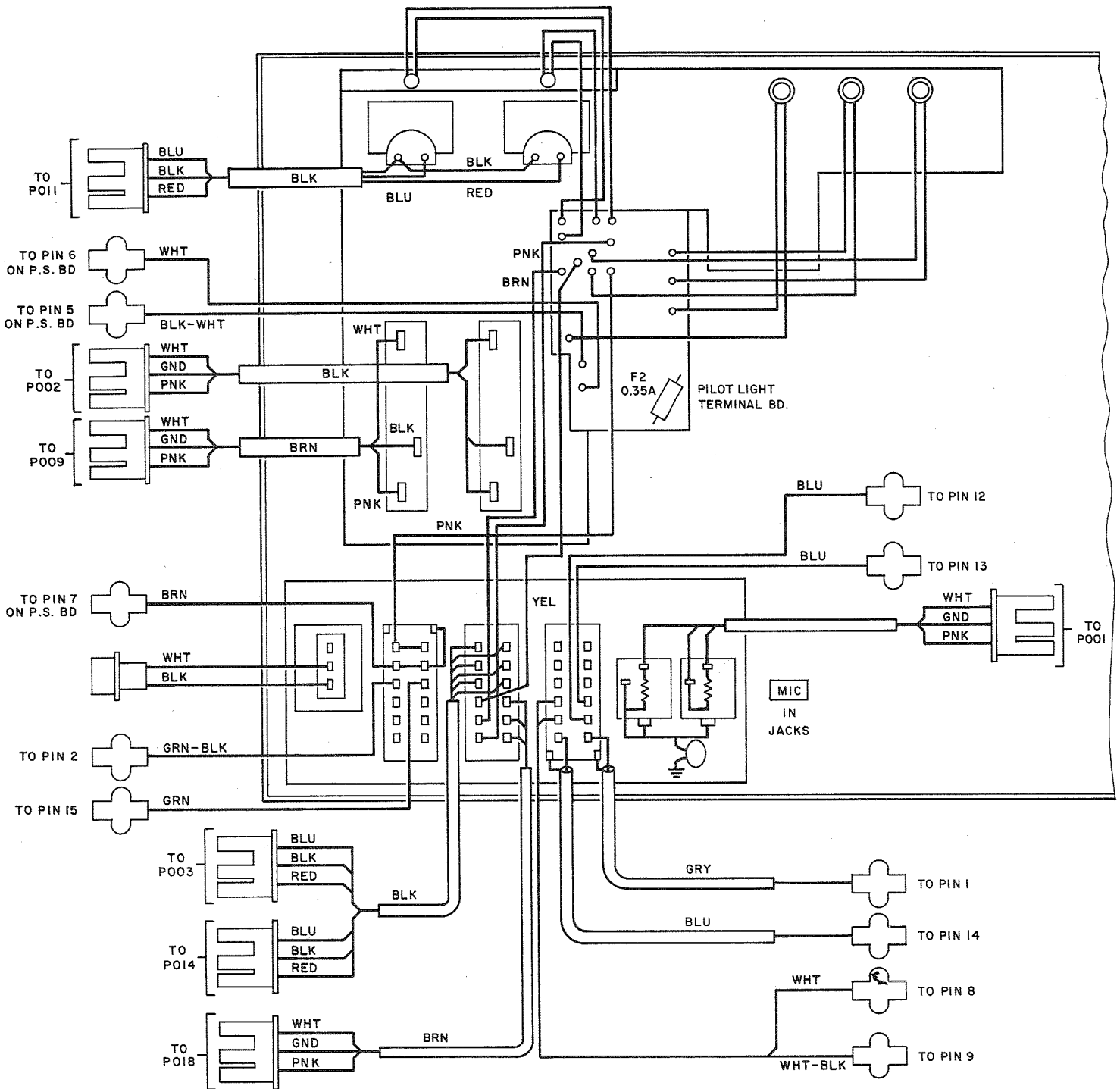
MAIN BOARD INTERCONNECTIONS



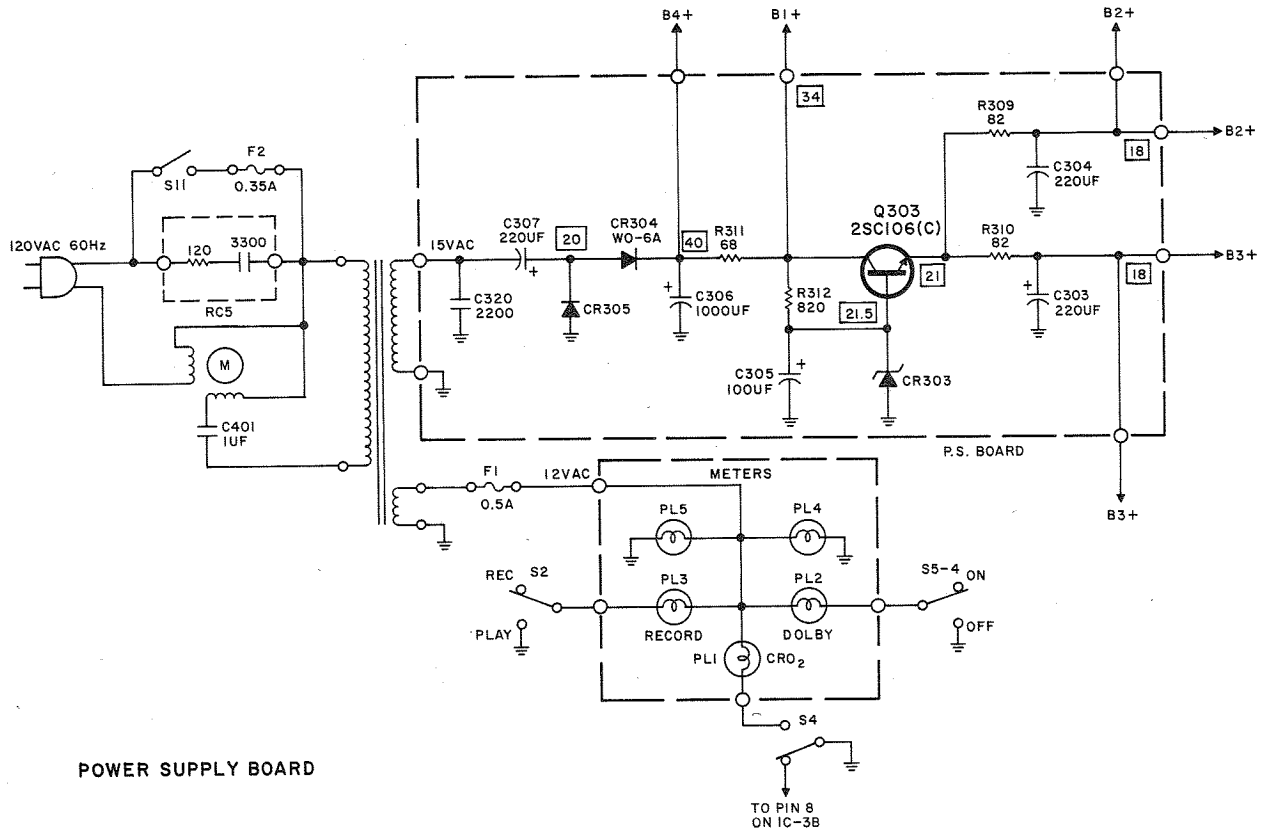
SR-110 MAIN BOARD CONNECTIONS, VIEWED FROM COMPONENTS SIDE

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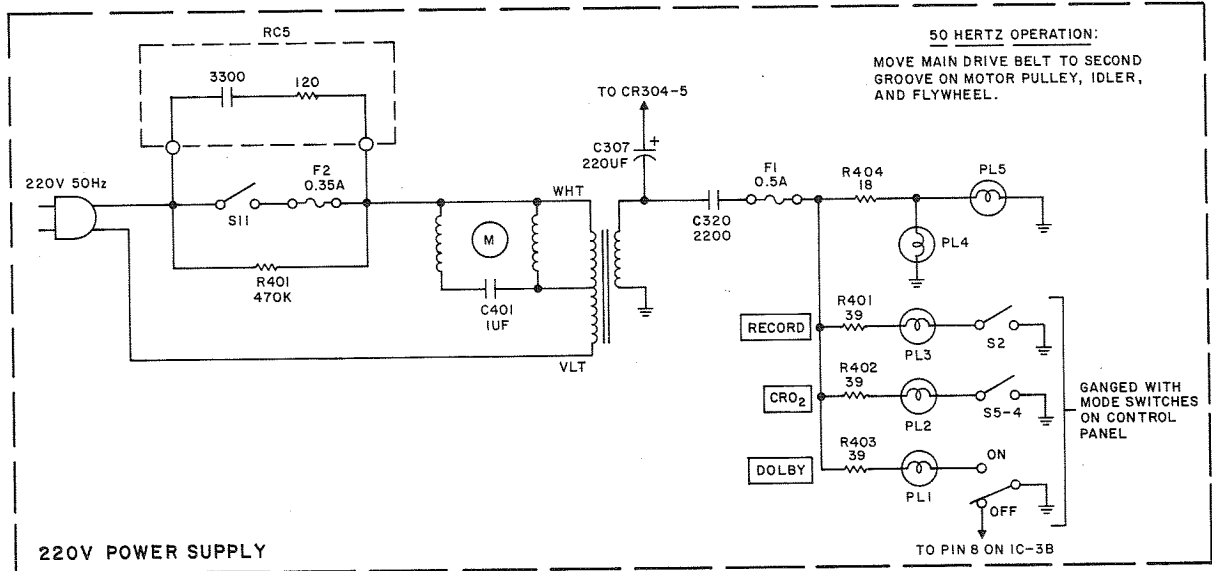
INTERCONNECTIONS TOP (CONTROL PANEL)



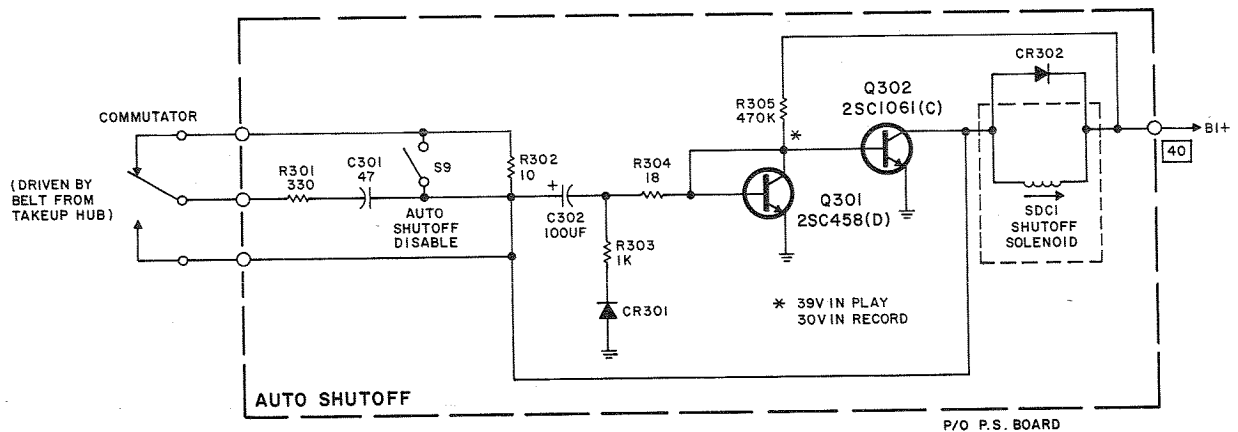
POWER SCHEMATICS



POWER SUPPLY BOARD



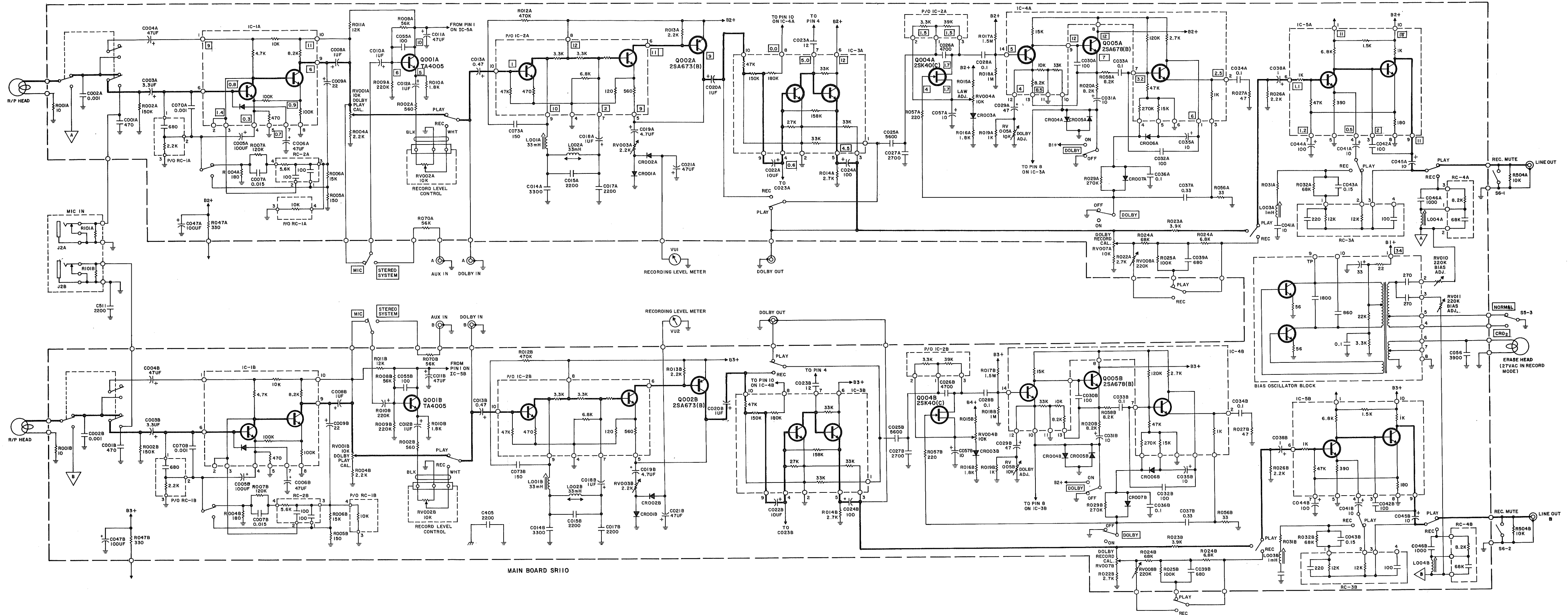
220V POWER SUPPLY



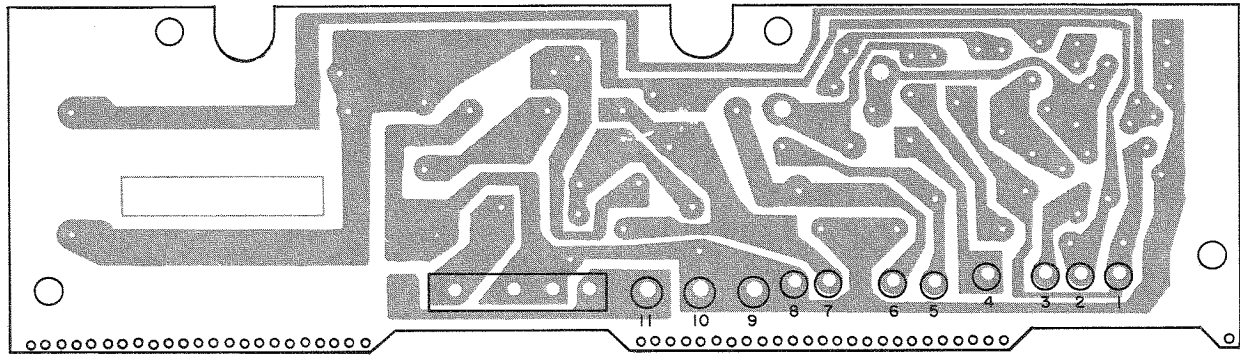
AUTO SHUTOFF

P/O P.S. BOARD

MAIN BOARD

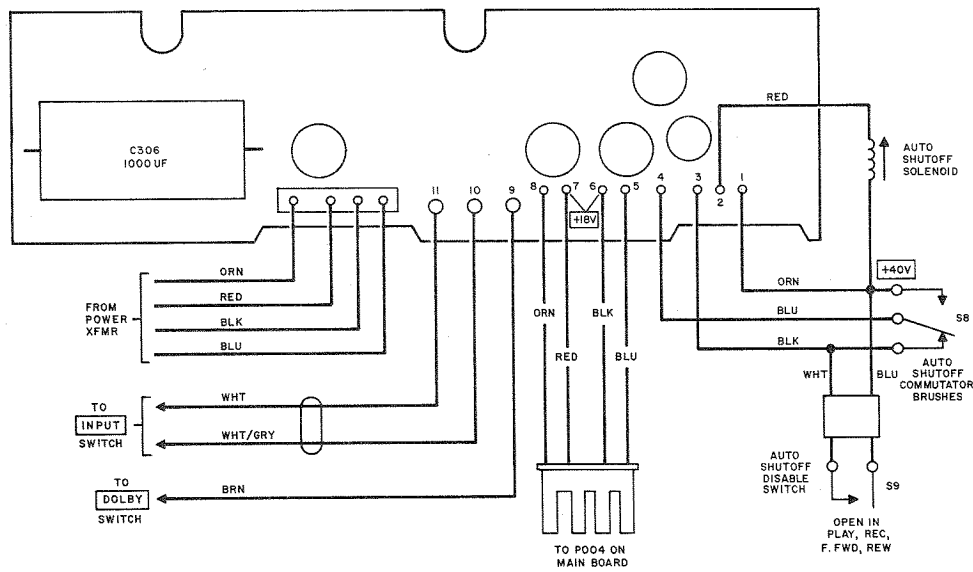


POWER CONNECTION DIAGRAMS



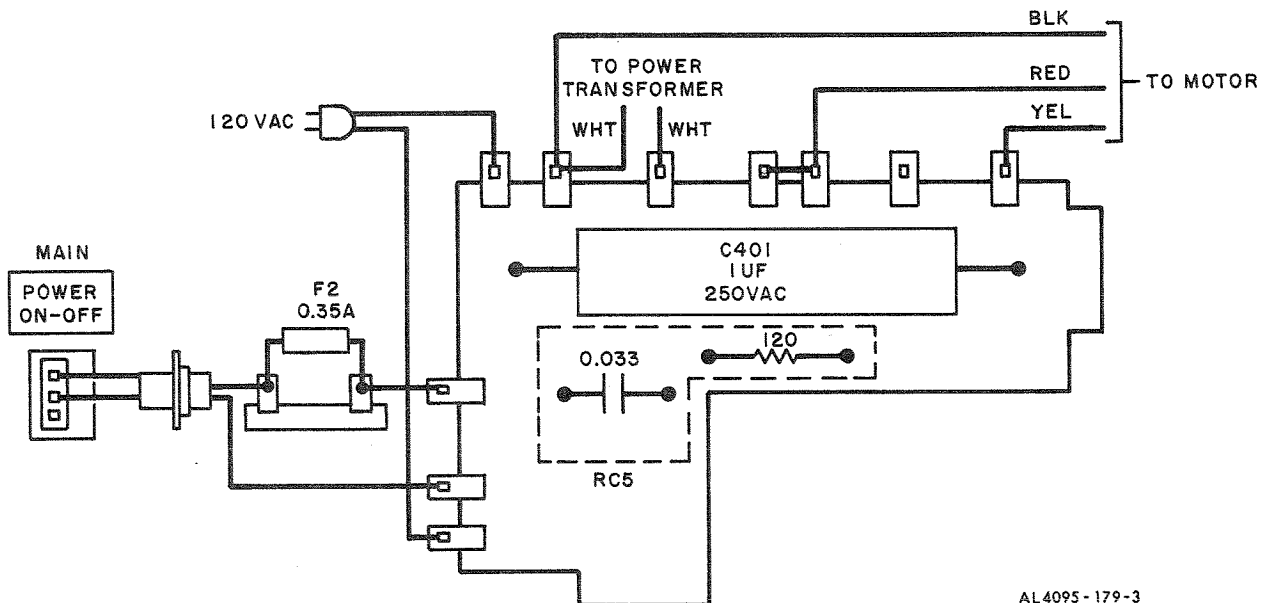
POWER SUPPLY BOARD SHOWING LOCATION OF TERMINALS (FOIL SIDE)

AL4095-099-1



POWER SUPPLY BOARD SHOWING CONNECTIONS (FOIL SIDE)

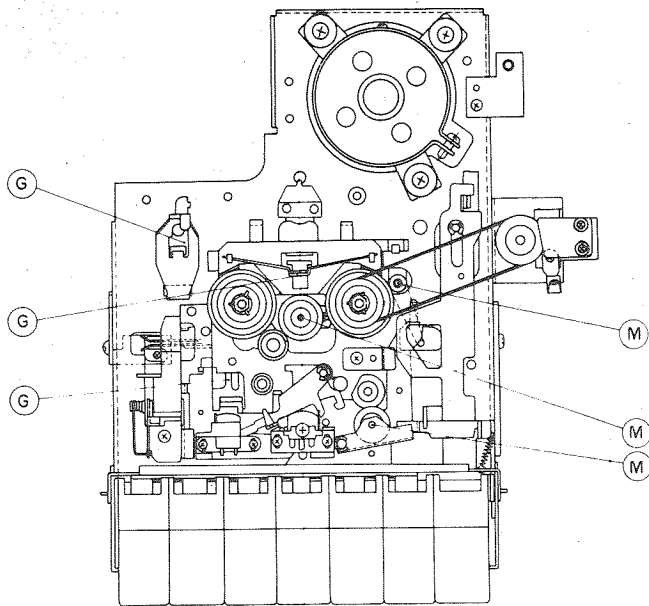
AL4095-099-1



AL4095-179-3

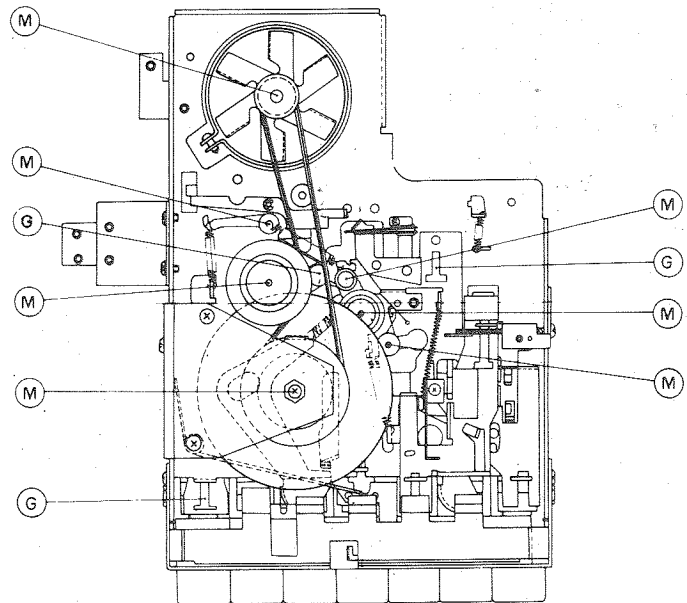
SR-110 AC POWER TERMINAL BOARD (VIEWED FROM FRONT OF RECORDER)

LUBRICATION



AL4095-179-5

LUBRICATION (CHASSIS TOP)



LUBRICATION (CHASSIS BOTTOM)

GENERAL LUBRICATION

Lubricate all points shown in the chassis lubrication illustrations. Use a standard lubricating grease such as Lubriplate at points marked G and light machine oil such as Singer sewing machine oil at points marked M. Take care not to use excessive lubricant. Keep all belts and drive surfaces free of lubricants.

LUBRICATION OF FLYWHEEL BOTTOM BEARING

1. Remove two Philips head screws which secure flywheel bearing bracket.
2. Turn bracket right side up so that the small teflon bearing is visible. Clean out teflon bearing cup and put a small amount of fresh Lubriplate into bottom of bearing cup.
3. Replace cup. Secure bracket with the two screws.

LUBRICATION OF CAPSTAN

1. Lift the small nylon washer (below top of capstan) off.
2. Apply one drop of machine oil to capstan at that point (where washer stays) and replace the nylon washer. Run machine while wiping capstan clean with cloth or Q-tips.
3. Also apply one drop of machine oil to center of capstan pinch roller, clean off excess and run.

LUBRICATION OF MOTOR

1. Turn recorder upside down. Remove nylon drive belt pulley from motor shaft.
2. Remove fan from motor shaft using Allen wrench.
3. Place one drop of machine oil at place where motor shaft enters the bearing. Run motor for a few seconds and clean off excess lubricant.
4. Replace fan and pulley. Replace drive belt, taking care to use same pulley groove belt was removed from. The groove nearest the motor is the one for 60 Hz. The other one is for 50 Hz operation.

Fisher 
We invented high fidelity.

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