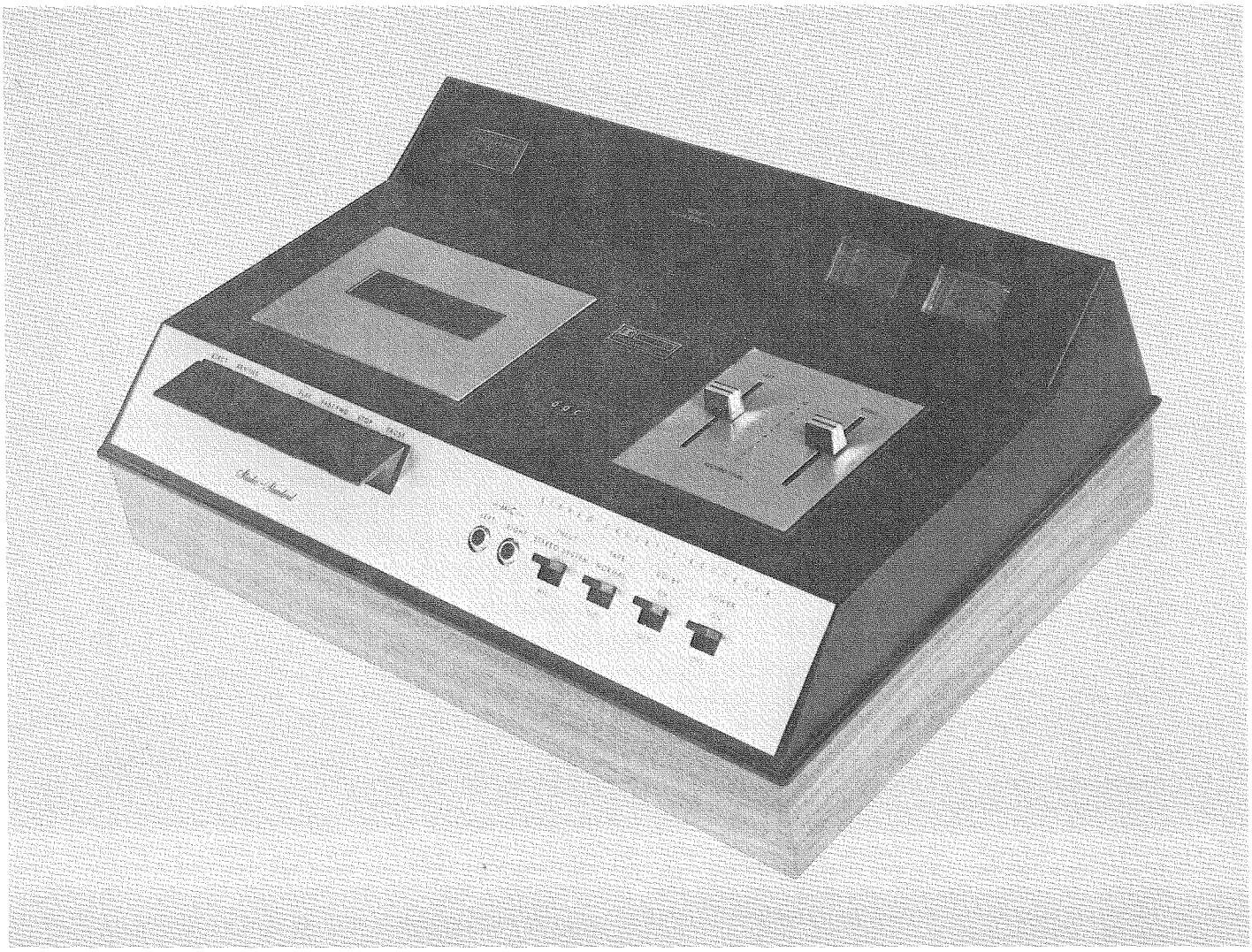
SERVICE MANUAL

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

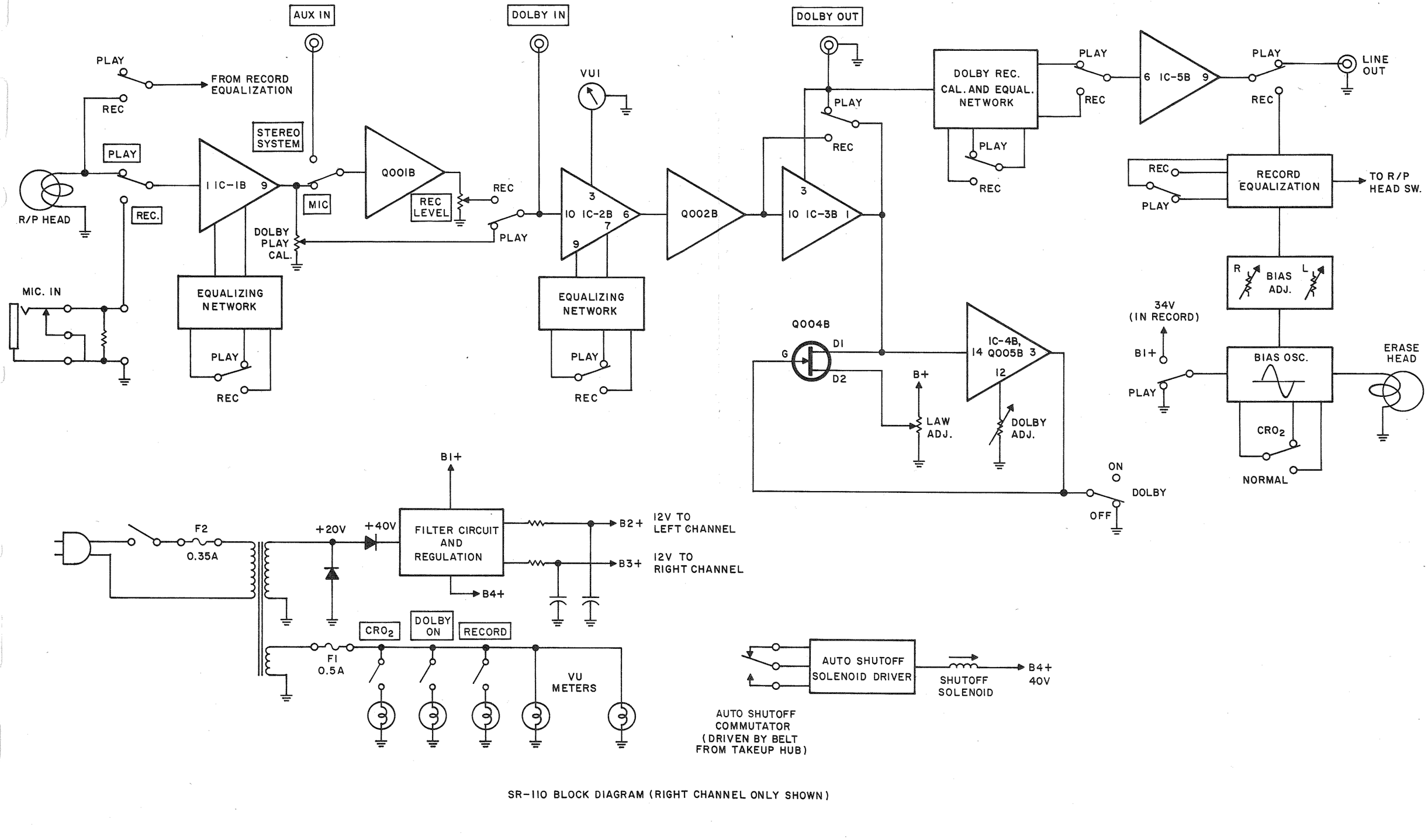
SOLID-STATE DEVICES: Integrated Circuits contain the equivalent of many circuit parts, including transistors, diodes, resistors, and capacitors. The preferred troubleshooting procedure requires isolating the trouble to one stage using AC signal tracing methods. Once the suspected stage is located the 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 ± 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.

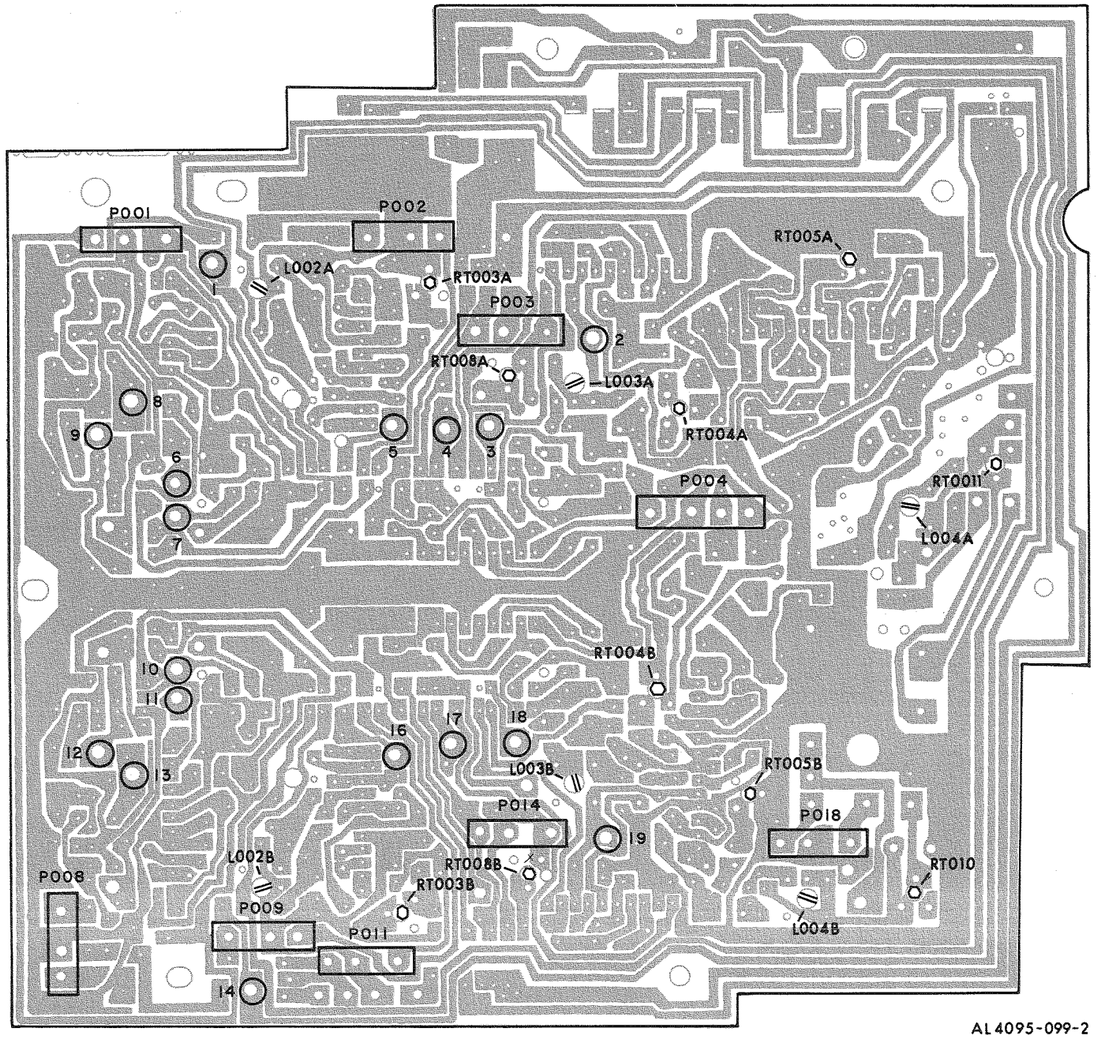
ALIGNMENT PROCEDURES: DO NOT attempt realignment unless the required test equipment is available, and the alignment procedure is thoroughly understood.

SIGNAL FLOW

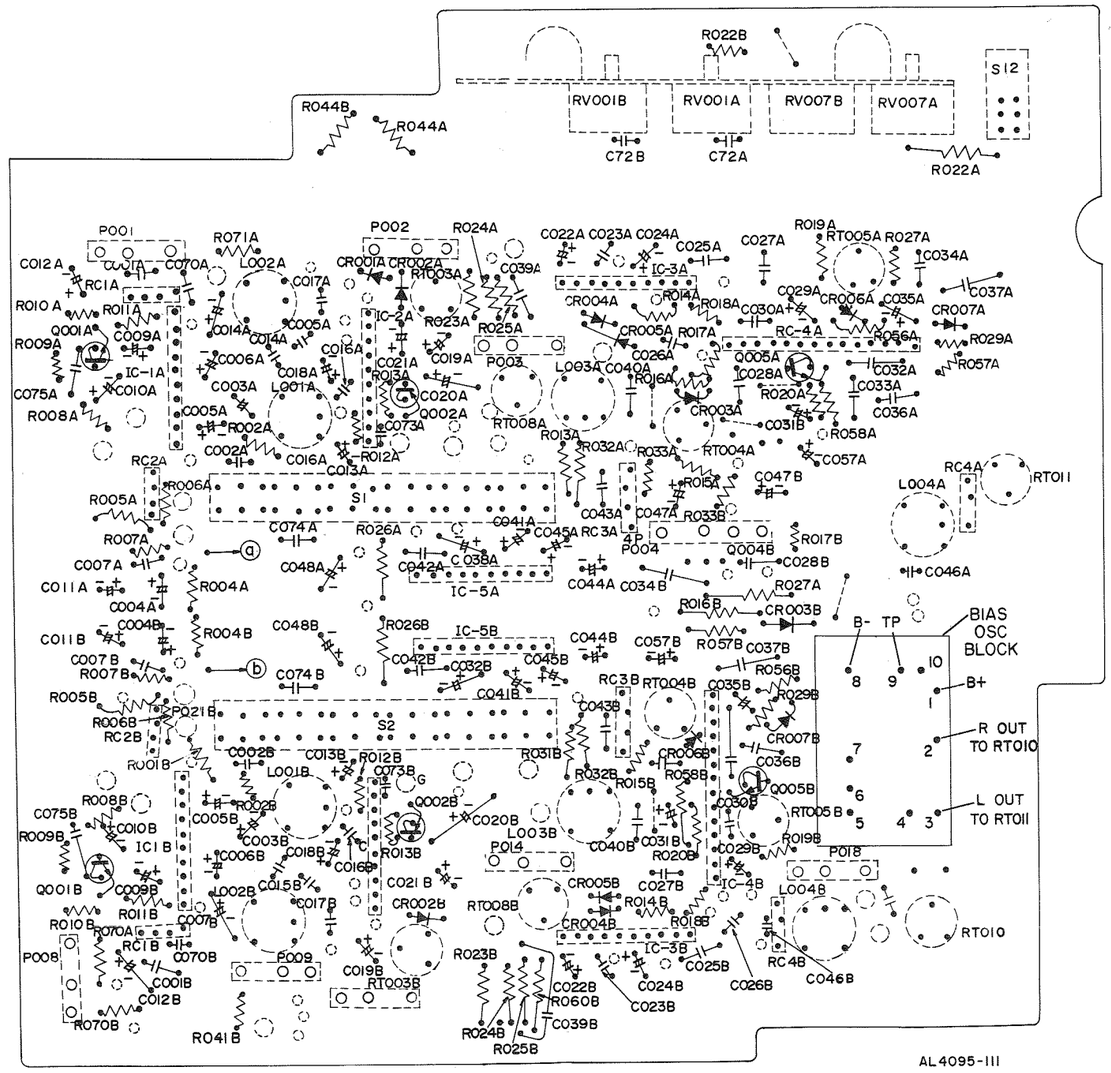


SR-110 BLOCK DIAGRAM (RIGHT CHANNEL ONLY SHOWN)

MAIN BOARD



MAIN BOARD CONNECTIONS (VIEWED FROM PRINTED CIRCUIT SIDE)



SR-110 MAIN BOARD
(VIEWED FROM FOIL SIDE)

TEST AND ADJUSTMENTS

REMOVAL OF TAPE DECK FROM CABINET

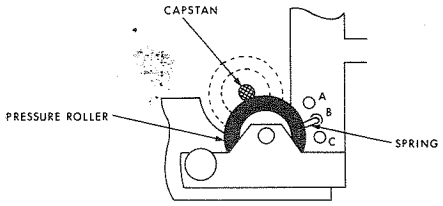
1. Turn set upside down on protective surface.
2. Remove Philips head screws which secure rubber feet.
3. Remove two screws which secure square wood washers.
4. Lift wood cabinet off and thread AC line cord out through hole in cabinet.
5. Remove the four Philips head screws from the corners of the chassis.
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 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.



CAPSTAN/PRESSURE ROLLER ADJUSTMENT

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 hu 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 ± 5 KHz.

BIAS CURRENT

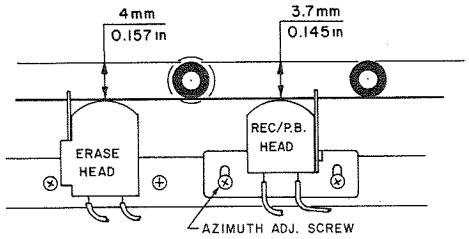
1. Set up as above, with VTVM across R/P head.
2. Bias current should produce 6 V AC across head.
3. Adjust RT010 (lower right corner) and RT011 (center, extreme right) for 6 V.

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.

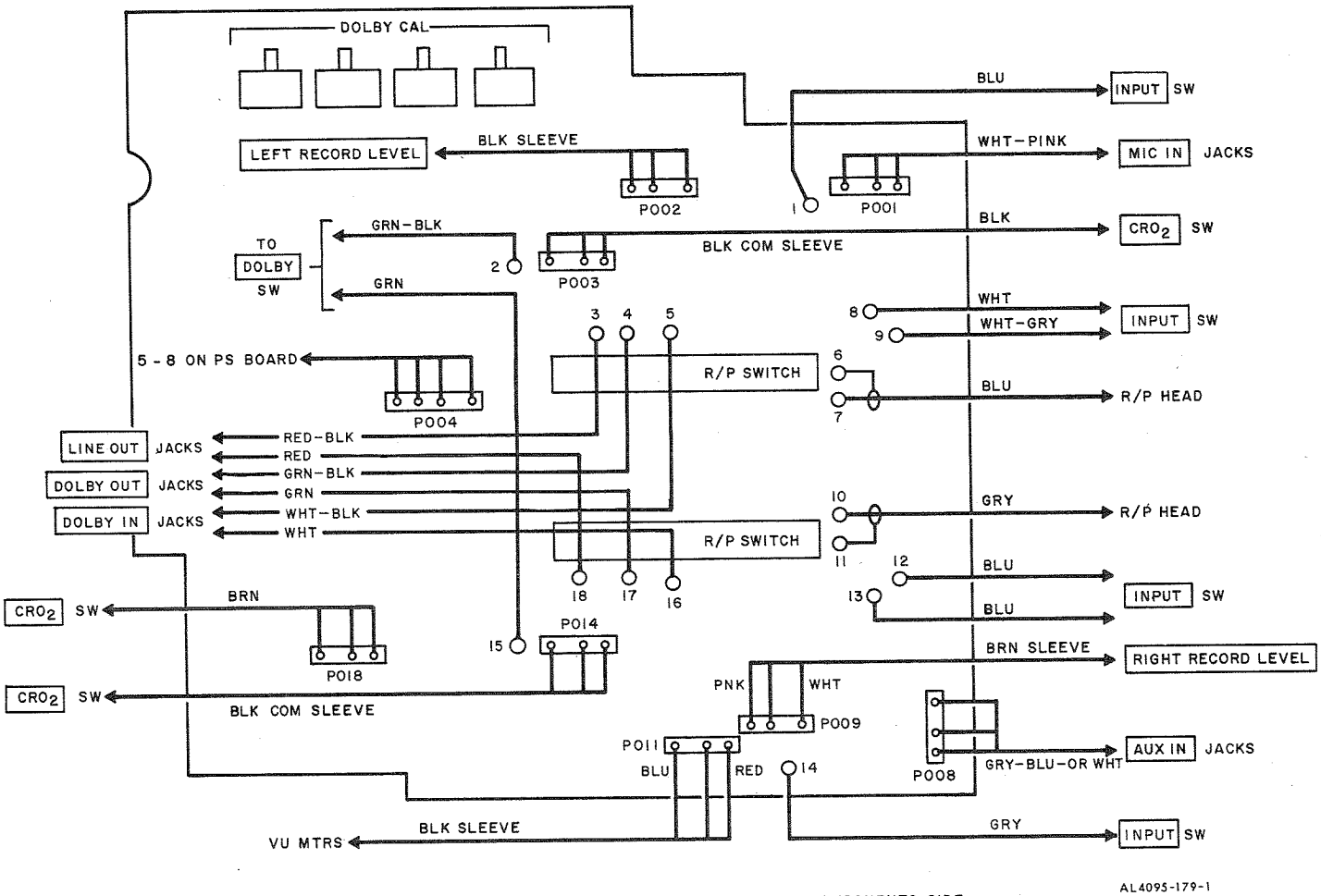
REGULAR TAPE BIAS

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.

CRO_2 TAPE BIAS

1. As above, except CRO_2 switch ON.
2. Adjust RT008A (near top, middle below P003) and RT008B near bottom, middle) for 485 mV on VTVM.

MAIN BOARD INTERCONNECTIONS



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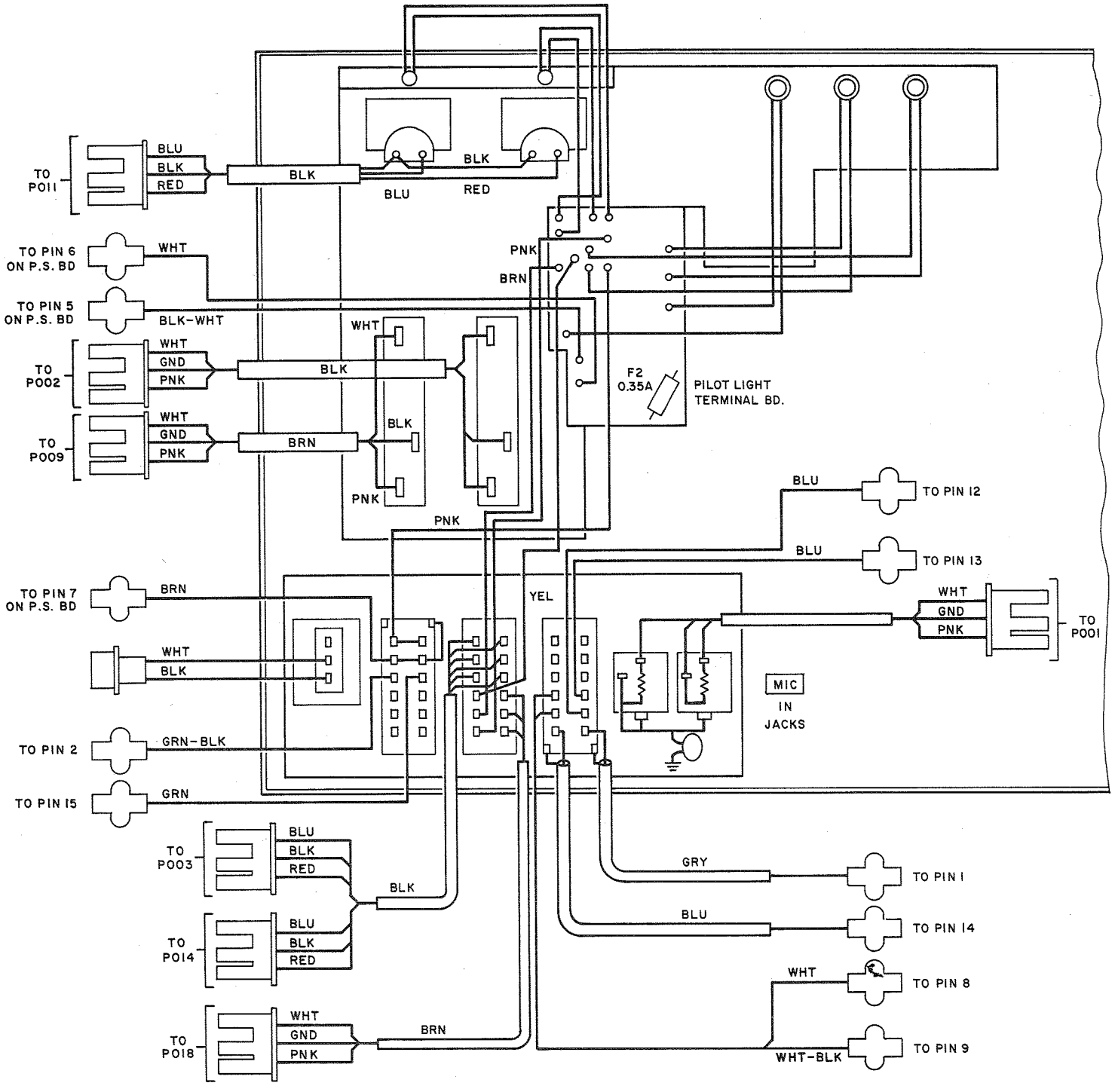
SR-110 MAIN BOARD CONNECTIONS, VIEWED FROM COMPONENTS SIDE

INTERCONNECTIONS TOP (CONTROL PANEL)



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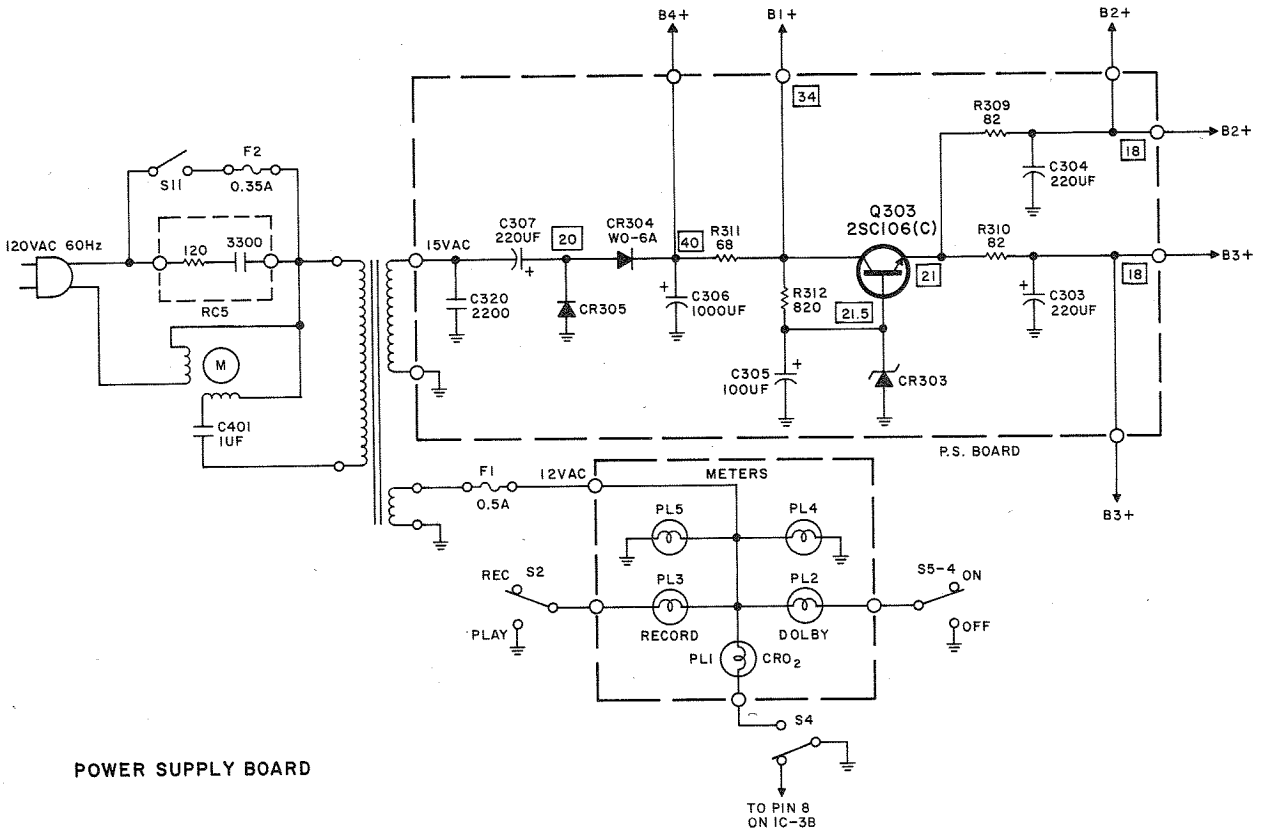
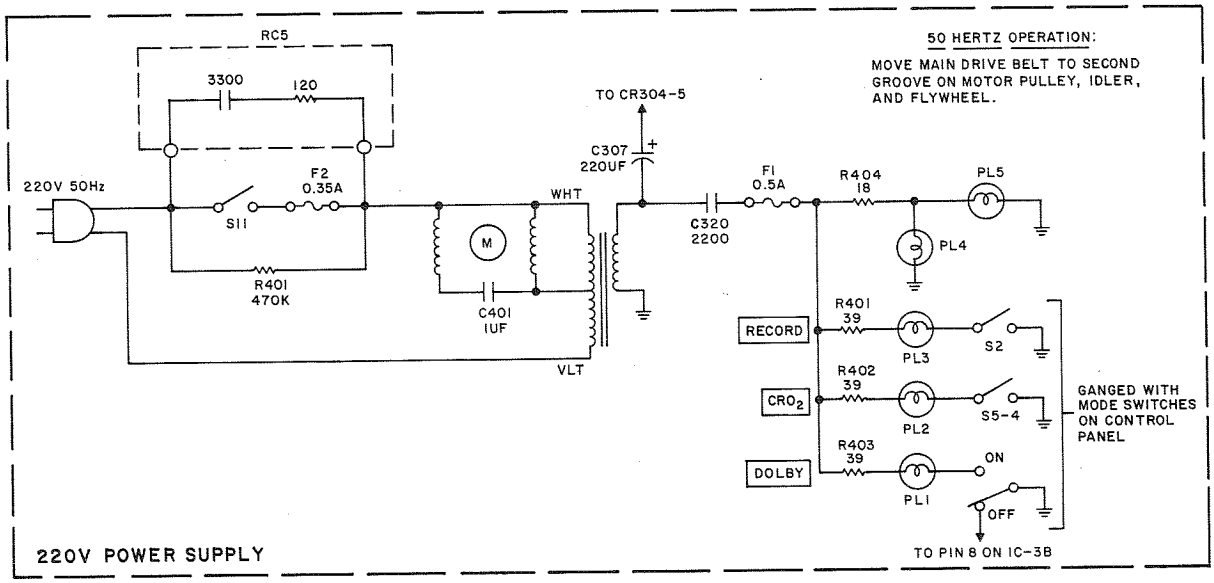
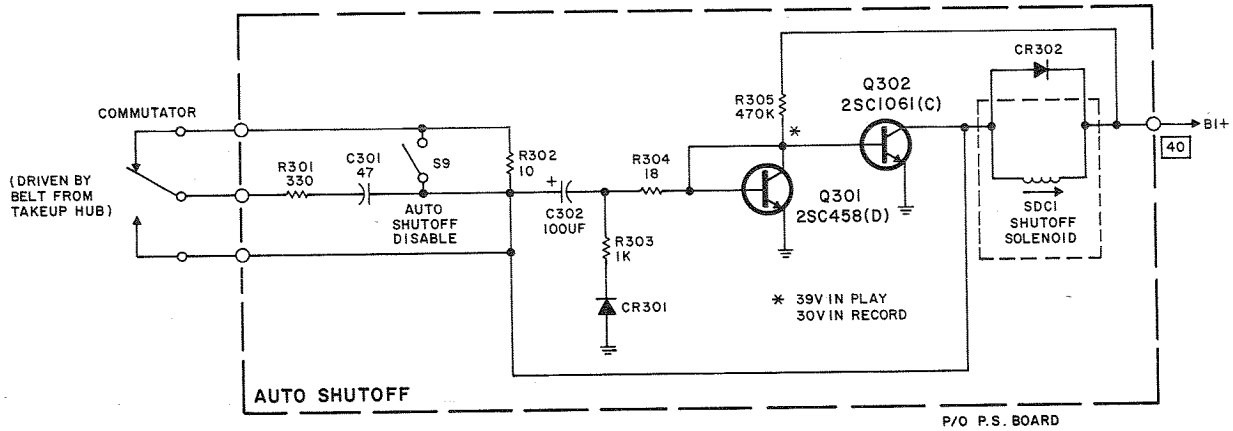
SR-110 TOP CONTROL PANEL INTERCONNECTIONS

POWER SCHEMATICS

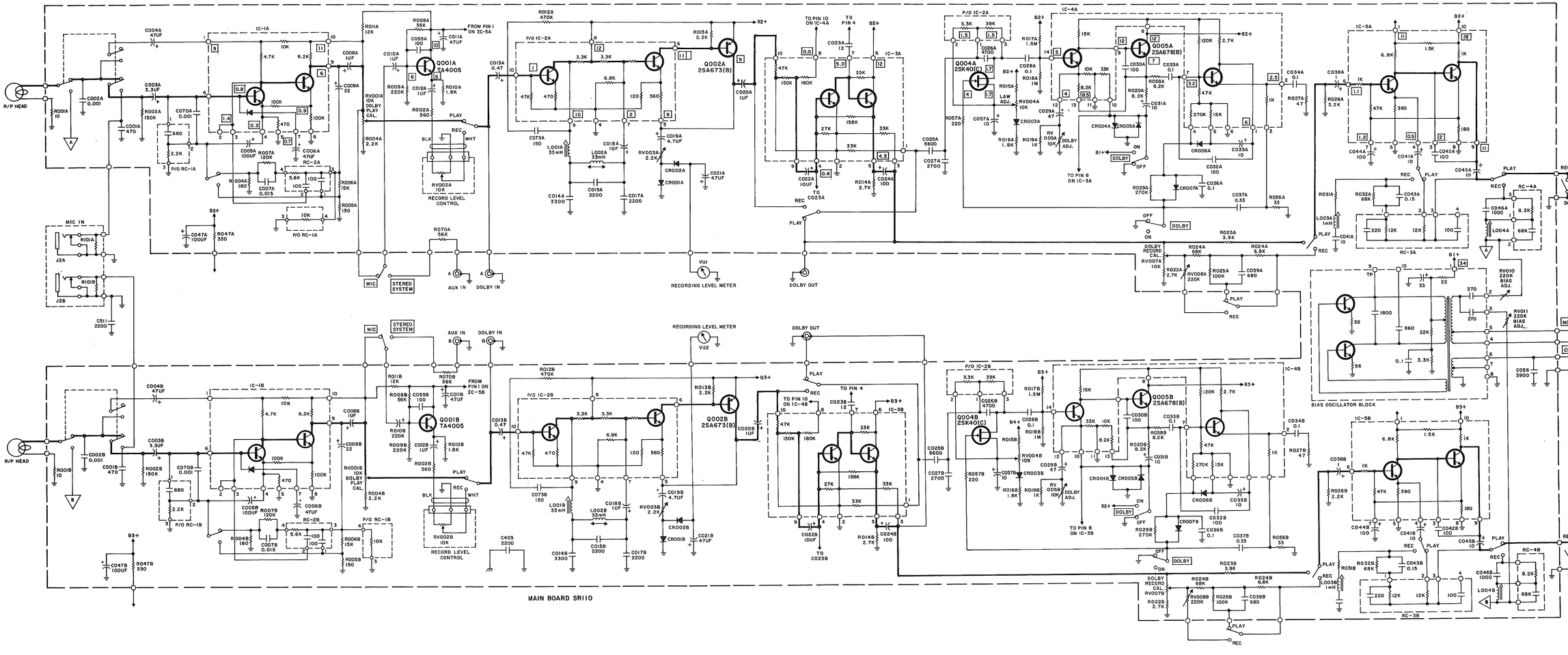


POWER SUPPLY BOARD

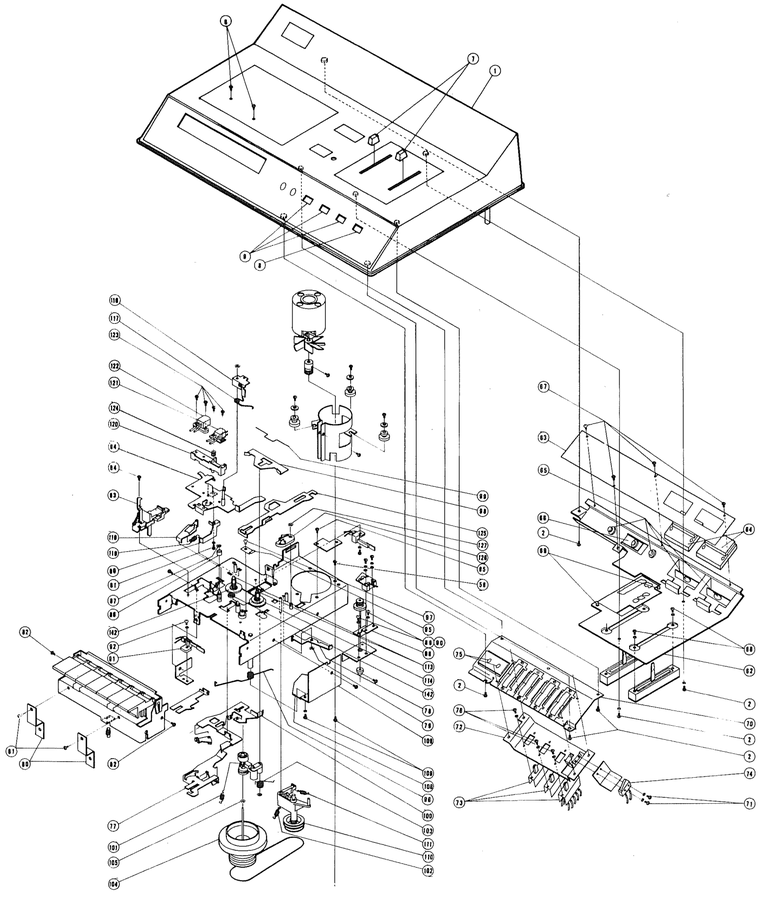


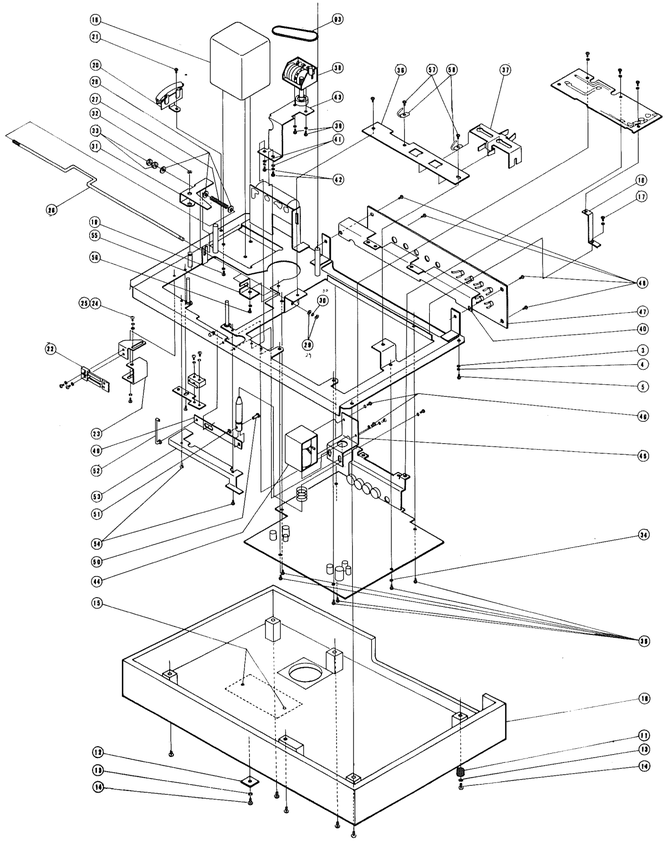


MAIN BOARD


R/P HEAD
MIC IN
J2A
J2B
MIC
STEREO SYSTEM
AUX IN
DOLBY IN
RECORDING LEVEL METER
DOLBY OUT
RECORD LEVEL CONTROL
IC-1A
IC-1B
IC-2A
IC-2B
IC-3A
IC-3B
IC-4A
IC-4B
IC-5A
IC-5B
RC-2A
RC-2B
RC-3A
RC-3B
RC-4A
RC-4B
BIAS OSCILLATOR BLOCK
ERASE HEAD (2?VAC IN RECORD MODE)
REC. MUTE
LINE OUT
NORMAL
PLAY
REC
DOLBY
MAIN BOARD SR110

EXPLODED VIEW





DESIGNATION ON EXPLODED VIEW	DESCRIPTION	PART NUMBER
1	Control panel cabinet (top) assy.	6217771
	Grommet, motor mounting	7662011
7	Record gain slider knob	6265624
8	Power on/off switch knob	6275091
9	Switch knob, olby, CRO_2, Input	0015330
10	Cabinet bottom (wood)	6152951
11	Rubber foot (4 required)	0971279
18	Power transformer (120 V)	5210643
18	Power transformer (220 V)	5210352
	Motor	5570107
	Motor fan	7185221
	Motor pulley	6342273
	Motor mounting clamp	7771152
	Cassette lid (door)	6171272
	Lid mounting shaft stop (plastic)	6701292
	Cushion, motor supporting	0971120
	Strain relief bushing for AC cord	0043793
	Bracket for strain relief bushing	7256931
20	Fuse mtg. terminal (2 lug) strip	5680512
26	Rec/Play push rod	7258521
27	Spring for above	6324101
29	E retaining ring for above	0637443
30	Fiber washer, mtg., for above	0637119
31	Rec/Play actuating arm (L shaped)	7240291
36	Rec/Play slide support bracket	7254412
37	Rec/Play switch slide assy.	7242743
	Rec/Play switch cushion	7662041
38	3 digit tape counter	5550176
40	Support plate for rear panel	7620371
43	Counter mtg. bracket	7260341
44	Solenoid (auto shutoff) coil assy.	5640032
45	Solenoid mtg. bracket	7256372
	Spacer for rear jack panel	7720851
47	Rear jack panel	5671741
49	Solenoid linkage plate	7259452
	Microphone jack, closed ckt.	5670404
50	Solenoid lock pin	7501782
52	Solenoid linkage rod	7257891
53	Solenoid stop plte	7259441
55	Solenoid stop	7258751
58	Cable clamp	0923972
60	Mode push button assy. support bracket	7254361
64	Recording (VU) meter	5550193
63	Recording meter panel	6217671
62	Record control panel chassis	7260803
	Meter cushion (rubber)	7669702
70	Mode (Dolby, etc.) slide switch holding plate	7260814
72	Mode switch mtg. bracket	7260822
	Mode pilot lamp reflector plate	7261672
	Switch, slide, 12 PDT, for Rec/Play	5620113
73	Switch, 4PDT, Mode, (Dolby, etc.)	0532179
	Switch, leaf, SPST (NO)	5610671
74	Switch, micro, SPDT	56302053
	Switch, 4PDT, push, Dolby Test	5630833
	Switch, DPDT (NC) Muting	5632172
	Bracket, mtg. for muting switch	7254341
	Bracket, mtg., for Dolby Cal. adjust	7257531
	4-Pin socket & cable from Power Supply Board	5651262
	3-pin connector & cable (for P001,P011,014,018, etc.)	5651543
	3-pin connector & cable for Record gain (P002 & P009)	565144
	3-pin connector & cable for Aux In jacks (P008)	5651181
	AC power switch shield plate	7260391
	Fiber insulating piece for AC power switch	7722801
	Record actuating slide	7254653
	Switch function lever	7252851
78	Switch plate	7261191
	Pause slide actuating lever	7252942
	Eject function plate	7252934
	Push button assembly	7237985
82	(Stop, Play, Fst Fwd, etc.)	
83	Eject assembly	7253033
	Eject board holder	7257931
	Bushing, head plate stop	7534421
88,89,90	Auto shutoff commutator assy.	7254691
93	Belt, tape counter	6530961
	Belt, auto-shutoff commutator	6530961
	Belt, main drive	7662011

DESIGNATION ON EXPLODED VIEW	DESCRIPTION	PART NUMBER
	Head plate assembly	7252703
	Head plate guide	7252951
94	Head plate spring	6324533
95	Brake plate	7150331
96	Brake spring	6321564
98	Idler assembly	6725601
99	Idler spring	6324474
	Brake release plate	7253511
101	Brake release spring	6724451
100	Spring, drive idler assy. (short–3/16" x 3/8")	6324444
102	Spring, Rec/Play switch push rod	6324101
	Spring, Brake plate	6321564
	Spring, Head alignment	6321733
	Spring, Fast Forward	6324582
	Spring, Rewind lever	6324602
	Spring, Capstan roller	6324482
	Rec/Play push rod	7258521
	Spring, Stop lever	6323731
	Spring, back tension	6320731
	Spring, Capstan pressure roller	6324482
	Spring, Rec/Play head alignment	6321733
	Spring, Drive idler assy. tension, (5/16 dia., x 3 1/2 t)	6325301
	Spring, Rewind idler	6324474
	Flywheel assembly	63070991
104	Nylon washer for flywheel	7771912
105	Plastic washer for flywheel assy. mtg.	7778183
106	Flywheel bearing plate assy.	7254451
108	Support bracket for no. 106	7252801
	Rewind (hub drive) idler (smaller)	6725591
110	Drive idler, main, assy., with idler	6725593
111	Spring, drive idler assy. (long–3/16" x 1")	6724451
113	Tape hub cap	0930002
114	Takeup hub assy.	7669222
	Supply hub assy.	6712251
115	Capstan pinch roller arm assy.	7252991
118	Record interlock rocker	7252902
119	Spring for 118	6324432
	Head mounting plate	6725691
121	Rec/Play head	5441441
122	Erase head	5441381
	Pilot lamp	5760652
125	Pause slide	7252811
126	Pause lock	6725701

SEMICONDUCTORS

CIRCUIT SYMBOL	DESCRIPTION	PART NUMBER
IC1A,B	Encaps. ckt. FA-6018	5353111
IC2A,B	Encaps. ckt. TA-4005	5356061
IC3A,B	Encaps. ckt. TA-4004	5356051
IC4A,B	Encaps. ckt. TA-4006	5356071
IC4A,B	Encaps. ckt. FA-6019	5353121
Q001A,B	Transistor 2SC458LG(D)	5320024
Q002A,B,005A,B	Transistor 2SA673B	5320592
Q004A,B	Transistor 2SK40C	5320583
Q301, 303	Transistor 2SC458D	5320064
Q302	Transistor 2SC1061C	5320433
CR001A,B,2A,B, 3A,B,6A,B	Diode, IN34A	0575001
CR004A,B,5A,B,7A,B	Diode, IS2076	5330131
CR301,302,304,305	Diode, W-6A	5330341
CR303	Diode, Zener AW01-22	5330059

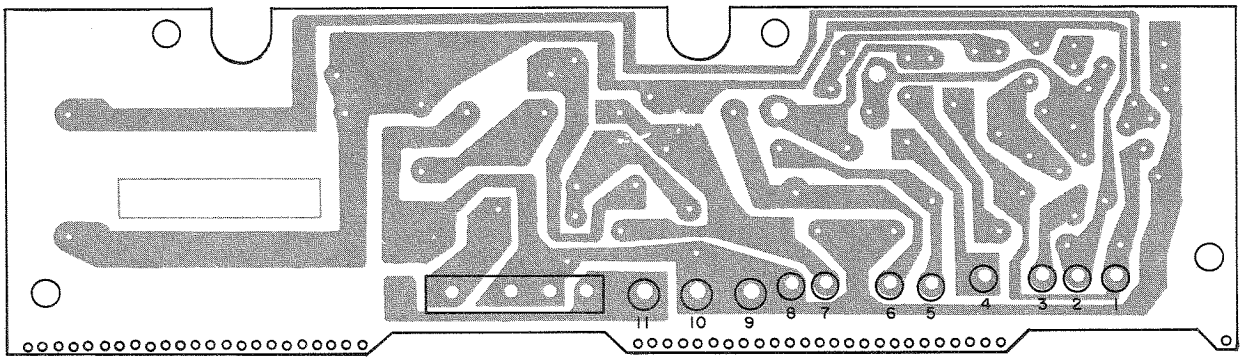
INDUCTORS

L001A,B	Trap, 33 mH	5120302
L002A,B,4A,B	Variable, 33 mH	5270001
L003A,B	Variable, 1.0 mH	5270033

MISCELLANEOUS

RV001A,B,007A,B	10K (B) Potentiometer	0151436
RV002,B	10K (B) Record gain slider	0171536
RV003A,B	2.2K (B) Potentiometer	0151884
RV004A,B,005A,B	10K (B) Potentiometer	0151886
RT001A,B,008A,B, 009A,B	220K (B) Potentiometer	0151890
RC1A,B	Encaps. RC network	0186500
RC2A,B	Encaps. RC network	0186502
RC3A,B	Encaps. RC network	0186504

POWER CONNECTION DIAGRAMS



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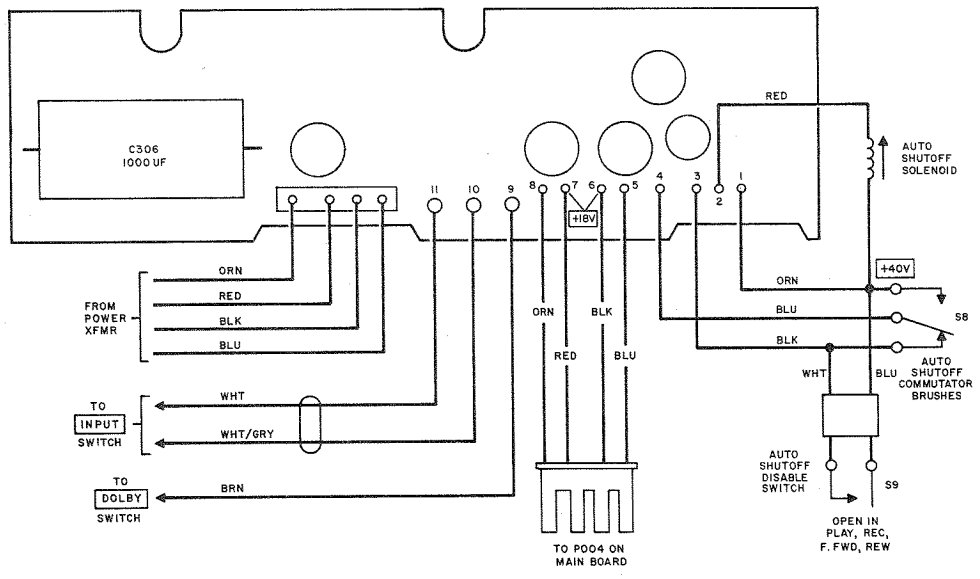
POWER SUPPLY BOARD SHOWING LOCATION OF TERMINALS
(FOIL SIDE)



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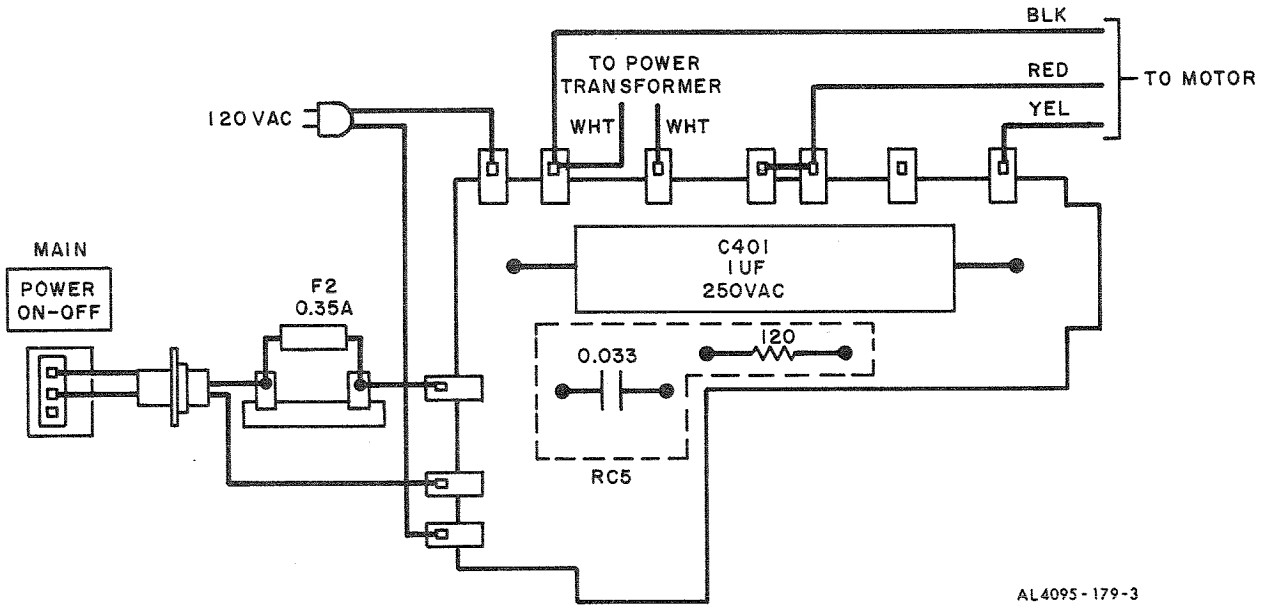
POWER SUPPLY BOARD SHOWING CONNECTIONS (FOIL SIDE)



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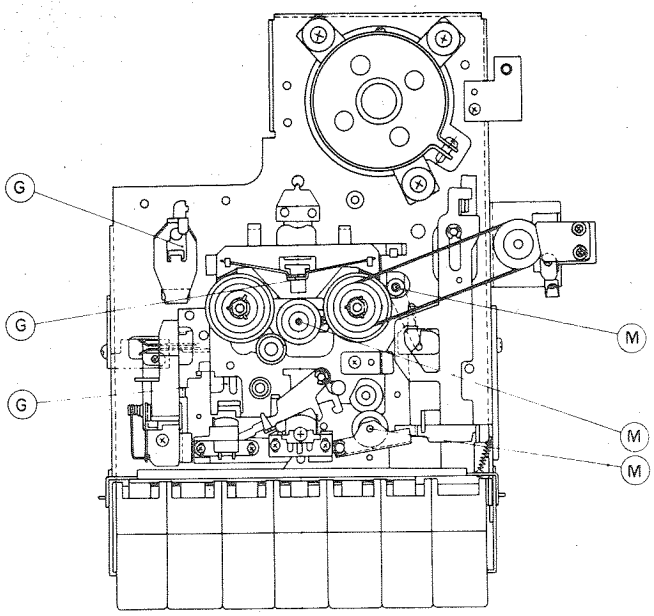
SR-110 AC POWER TERMINAL BOARD
(VIEWED FROM FRONT OF RECORDER)

LUBRICATION



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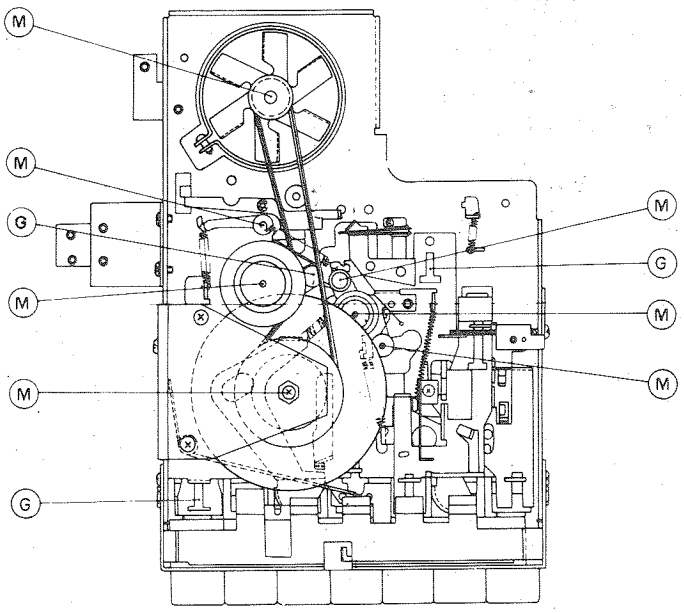
LUBRICATION (CHASSIS TOP)



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.