

SERVICE MANUAL

The Fisher®

434

**4/2-Channel
Stereo Receiver**



WORLD LEADER IN HIGH QUALITY STEREO

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REQUIRED TEST EQUIPMENT

The following test equipment is required to completely test and align the Tuner Section and the CD-4 Demodulator Section of the 434 Receiver.

- Line Voltage Autotransformer or Voltage Regulator
- AC DC Multimeter
- Accurately Calibrated AC Voltmeter
- Oscilloscope (Flat to 100 kHz Minimum)
- Low-Distortion Audio Oscillator
- Harmonic Distortion Analyzer
- CD-4 Generator (Fisher 3109 or equivalent)
- Frequency Indicator, Fisher
- Model 3129 OR Frequency Counter
- Four (4) Load Resistors, 8-ohms, 250 Watts (Minimum Rating)
- Low-Distortion AM-FM Signal Generator
- 10.7 MHz Sweep Generator
- 455 kHz Sweep Generator
- Multiplex Generator
- Two (2) RCA Shorting Plugs

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

CHASSIS PARTS LIST

Ref. Des.	Description	Part Number	Ref. Des.	Description	Part Number
	FRONT PANEL				
—	Jacks, Earphone (4)	JK20627-5	—	Fuse Holder	EA51408
—	Knob, TUNING	EK20049	—	Fuse, 2-1/2A, 125V, Slo-Bo	FL51313-5
—	Knobs (2), Control	EK20048	—	Fuses (4), 1-1/2A, 125V, Slo-Bo	FL51313-20
—	Dual Knobs (4), (Top)	EK20051	—	Strain Relief	EM21116-8
—	Dual Knobs (4), (Bottom)	EK20053	—	Line Cord	W50023-1
—	Knobs (7), Pushbutton	EK20046-4	—	Circuit Breaker (85°C)	8M51455
—	Knob	EK20060-2	—	Antenna Support Assembly	AS4130-140
—	Knob	EK20058-2	—	Ferrite Antenna	LA51417-2
—	Knob	EK20059-2	—	Antenna Support Bracket	AB51465
—	Balance Control (Joy Stick)	RP50160-315			
—	Knob, Lever	EK20050-1			
—	Dress Panel Assembly	AS4119-120	—	PRINTED CIRCUIT BOARDS	
—	Window	AD23116	—	PCB, Power Amplifier	PB2379-1
—	Spring, Window Retainer	AN51427	—	PCB, Regulated Power Supply	PB2380-1
—	End Strip, Right	AD23083-6	—	PCB, SQ Decoder & Preamp	PB2381-6
—	End Strip, Left	AD23083-5	—	PCB, Audio Control	PB2389-1
CR508	L.E.D. STEREOBEACON	TR19001	—	PCB, FM-AM Tuner	PB2385-1
—	Tuning Shaft Assembly	AS20734	—	PCB, Dial Lamp	PB2390-1
—	Pointer Assembly (Plastic)	AS20512	—	PCB, Decoder Lamp Assembly	PB2395-2
1910	Lamp, Pointer	LM21442-1	—	PCB, SQ Logic	PB2382-6
—	Dial Plate	AS4119-109-2			
1901 through 909	Lamps, Dial (9), 2112D	LM21421-6			
1101 through 1104	Lamps, SQ, CD-4/4-CH, CD-MATIC, and MUTING	LM21421-7			
M1	Meter, Signal	MC21627-1			
M2	Meter, Center of Channel	MC21628-1			
—	Meter Clip	AB4130-123	—	MISCELLANEOUS	
—	Pulley Bracket Assembly (FRONT)	AS4130-134	—	Terminal Strip, 1G1	E114T1G1
—	Pulley Bracket (Front Top)	AS4130-119	—	Terminal Strip, 1N1	E114T1N1
—	Pulley Bracket Assembly (Left Side)	AS4119-119	—	Terminal Strip	E114T2G3
—	Pulley Bracket	AB4119-112	—	Terminal Strip, 2N1	E114T2N1
—	Pulley Bracket Assembly (Left Side)	AS4130-136	—	Terminal Strip, 2N2	E114T2N2
—	Pulley Bracket	AS4130-121	—	Terminal Strip	E114T2G2
—	Pulley Idlers	E50540-3 & -2	—	Terminal Strip, 2G4G2	E114T2G4G2
	REAR CHASSIS		—	Terminal Strip	AS51470
—	Shorting Plug Assembly	AS25020	—	Dial Cord and Spring Assy.	AS4130-139-2
—	Plug	EG25021-1	—	Shaft Extension Assembly	AS4130-138
—	15 Jack Connector	JK25007	—	Selector Switch (Speakers)	SR4130-155
—	AC Receptacle	JK25009	—	Selector Switch (Input)	SR4130-151
—	Plate Fuse Holder	AM51409	—	Connector, Housing	EM25004-4
			—	Connector, Housing	EM25004-6
			—	Receptacle (Crimp Snap-In)	HH25005-1
			—	Receptacle	AM20670
			—	Receptacle Lead Assembly	AS25016
			—	Cabinet	KK4130-114
			—	Grille	EA51406
			—	Foot (w/Pad)	EM51492
			—	Leg, Plastic	E51172
			—	Bottom Cover	AA4130-116

Note: Chassis mounted components may also be listed on the parts list of the circuit with which they function electrically.

HARMONIC DISTORTION TEST

CAUTION: Limit the following tests to no more than ten minutes each. Use 8-ohm resistors with a minimum power rating of 250 watts when connecting a load across the speaker terminals. Remove the SPKR FUSES from the receiver rear panel and replace them with 10 ampere fuses of the same rating.

Control Settings: Unplug the AC power cord and set the front panel controls as follows:

BASS, TREBLE, and MASTER BALANCE controls to center positions.

SPEAKERS switch to AC OFF.

SELECTOR switch to AUX.

MODE SELECTOR "CD-4/4-CH" pushbutton depressed.

LOUDNESS pushbutton out (not depressed).

VOLUME control to MIN.

ONE CHANNEL DRIVEN:

1) Connect a low distortion frequency generator to AUX IN FRONT LEFT jack. Set generator frequency to 1 kHz and output to minimum.

2) Connect an 8-ohm load resistor between FRONT SPEAKERS LEFT and COM terminals. Connect a Harmonic Distortion Analyzer and an AC VTVM in parallel across the 8-ohm load.

3) Connect the AC power cord and set the SPEAKERS switch to [4]. Increase VOLUME control to MAX.

4) Increase generator to 18 watts RMS (12.0 volts RMS across the 8-ohm load). The meter on the Harmonic Distortion Analyzer should read less than 1.0%.

5) Repeat steps 1 through 4 for FRONT SPEAKERS RIGHT, REAR SPEAKERS LEFT, and REAR SPEAKERS RIGHT channels.

ALL CHANNELS DRIVEN:

1) Connect an 8-ohm load resistor across all of the SPEAKER output terminals.

2) Depress the MODE SELECTOR "MONO" pushbutton.

3) Check for distortion of 1.0% or less at 16 watts RMS (11.35 volts RMS) on each channel with all channels driven simultaneously.

4) Disconnect all test equipment. Remove the 10 ampere fuses installed at the beginning of the test and replace the original fuses.

TUNER ALIGNMENT PROCEDURES

FM ALIGNMENT – BASS, TREBLE, and MASTER BALANCE controls to center positions, SPEAKERS switch to PHONES position, MODE SELECTOR "2-CH" pushbutton depressed, SELECTOR switch to FM position, and VOLUME control to MIN position.

Maintain generator output as low as possible for suitable indication.

ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
Note: The FM IF circuit utilizes a non-tunable ceramic filter which establishes the IF bandpass. To insure symmetrical tuning and selectivity, the IF must be aligned precisely to the center of the filter bandpass, rather than to 10.7 MHz as in conventional LC circuits.				
1. IF ALIGNMENT	Connect 10.7 MHz Sweep Generator to pin 63, ground to pin 5Y. Markers are not required. Set generator output to -10db (300mv).	Position of non-interference. Connect jumper from pin 26 to pin 5R on Tuner board.	Scope vertical input to pin 57, ground to pin 5U. Set vertical sensitivity to 0.5v/cm.	Adjust Z502 top and bottom slugs for maximum gain and best symmetry. See figure for FM IF.
2. PRELIMINARY DETECTOR ALIGNMENT	Same as above. Adjust for S-curve display. Generator output to -20 db.	Position of non-interference.	Scope vertical input to pin 58.	Adjust Z503 top slug for maximum gain and best linearity. Adjust Z503 bottom slug for minimum gain and best linearity. See figure for FM DETECTOR ALIGNMENT. Note: Harmonic Distortion test must be performed as part of detector alignment. Remove jumper from between pins 26 and 5R on Tuner board.
Note: Connect 120-ohm composition resistors in series with each lead from the RF generator to match the 50-ohm output to the 300-ohm input impedance. Generator output voltage is reduced to one-half at antenna terminals. Signal voltages specified in this table are generator output levels, not antenna voltages.				
3. FRONT END ALIGNMENT		Tuning knob fully counterclockwise.		Center dial pointer on "0" and cement.
4.	FM generator to FM Antenna terminals through 120-ohm resistors. Set to 90 MHz. Adjust output for approximately 2 on Field Strength meter.	Center of 90 MHz calibration mark on dial.	Front panel Field Strength meter (M1) and Center of Channel meter (M2).	Adjust L504, L502, and Z501 for maximum deflection on Field Strength meter (M1) and zero deflection of (M2). Reduce generator output to keep Field Strength meter indication at approximately 2.
5.	Set to 106 MHz.	Center of 106 MHz calibration mark on dial.	Same as above.	Adjust C503, C509, and C518 for maximum deflection on Field Strength meter (M1) and zero deflection of (M2). Reduce generator output to keep Field Strength meter indication at approximately 2. Repeat steps 4 and 5 for optimum alignment.

TUNER ALIGNMENT (CONT'D)

ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
6. FINAL DETECTOR ALIGNMENT (MINIMUM THD)	Set generator to receiver frequency. Modulate with 400 Hz ± 75 kHz deviation. Connect generator to FM Antenna terminals.	Tune receiver to position of non-interference.	Scope vertical input to OUT TO RECORDER FRONT LEFT jack on rear panel of receiver.	Reduce generator output for noise to be visible on sine wave. Readjust generator frequency to center noise on positive and negative half cycles. See figure for SYMMETRICAL TUNING RESPONSE. Note: Do not change generator or receiver tuning; proceed with Harmonic Distortion test.
7.	Same as above. Increase generator output to 2 mV.	Same as above.	Connect AC VTVM and Harmonic Distortion Analyzer to OUT TO RECORDER FRONT LEFT jack on rear panel of receiver.	Adjust Z503 top slug for center of channel indication on M2. Adjust bottom slug for minimum THD. (Typically 0.2%.)
8A. MPX OSC ADJUSTMENT	Same as above with CW output of 2 mV.	Same as above.	Connect frequency counter to pin 72.	Adjust R559 for indication of 19 kHz ± 100 Hz.
8B. ALTERNATE MPX OSC ADJUSTMENT	Same as above.	Same as above.	Scope vertical input to pin 72. Scope horizontal input to MPX generator 19 kHz pilot output.	Adjust R559 for a stable Lissajou display as shown on figure for MPX OSC ALIGNMENT.

AM ALIGNMENT – BASS, TREBLE, and MASTER BALANCE controls to center position, SPEAKERS switch to PHONES position, MODE SELECTOR "2-CH" pushbutton depressed, SELECTOR switch to FM position, and VOLUME control to MIN position.

Maintain generator output as low as possible for suitable indication.

ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
1. IF ALIGNMENT	455 kHz sweep generator to pin 70, ground to pin 5X.	Position of non-interference near 1400 kHz.	Scope vertical input to pin 61 ground to pin 5U. Set vertical sensitivity to 0.2v/cm.	Connect a jumper between pin 67 and pin 5Z. Adjust Z302, Z303, and Z304 top and bottom slugs for maximum gain and best symmetry. Keep signal low enough for noise on response as shown in figure for AM IF ALIGNMENT. Disconnect jumper.
2. FRONT END ALIGNMENT	AM generator to EXT AM ANT and GND terminals. Open GND link. Set to 600 kHz. Modulate with 400 Hz, 30% modulation.	Center of 600 kHz calibration mark on dial.	Front panel Field Strength meter (M1).	Adjust Z301 and L300 (antenna) for maximum Field Strength meter indication. Reduce generator output to keep meter reading below 3.
3.	Set to 1400 kHz.	Center of 1400 kHz calibration mark on dial.	Front panel Field Strength meter (M1).	Adjust C303 and C304 for maximum deflection. Keep meter reading below 3. Repeat steps 2 and 3 until optimum alignment is reached.

TUNER PARTS LIST

Ref. Des.	Description	Part Number	Ref. Des.	Description	Part Number
C302	Ceramic, 39pF, N330, 50V	CK22344-22	L504	Coil, FM Oscillator	LC21833-1
C303, 304	P/O C505		L505	Choke, 22uH	L50848-18
C305	Ceramic, 3pF, ±0.25pF, N470	CK22346-4	M1	Signal Meter	MC21627-1
C306, 501, 513	Ceramic, 15pF, 5%, N750, 50V	CK22344-2	M2	Center-of-Channel Meter	MC21628-1
C307	Ceramic, 270pF, 10%, 50V	CK22350-5	Q301, 302	Transistor, NPN (A494/BF194)	TR01027
C308, 319, 324, 539, 549, 553, 555	Electrolytic, 1uF, 50V	CE22342-2	Q303, 305, 505, 506, 509	Transistor, NPN (BC239C)	TR01014
C309, 311, 521, 522, 525, 532	Ceramic, 0.02uF, +80-20%, 50V	CK22354-2	Q304	Transistor, NPN (BF199)	TR01074
C312, 321, 327	Electrolytic, 10uF, 50V	CE22342-4	Q501	Transistor, Dual-Gate MOSFET	TR08004
C313, 316, 325, 537	Electrolytic, 47uF, 16V	CE22342-8	Q502	Transistor, PNP (SP871)	TR02012
C314	Mylar, 0.022uF, 10%, 50V	CY22356-9	Q503	Transistor, N-Channel FET	TR06014
C317, 329	Electrolytic, 22uF, 35V	CE22342-6	Q504	Transistor, NPN (BF198)	TR01073
C318, 323	Polystyrene, 2200pF, 5%, 33V	C51256-30	Q507, 508	Transistor, PNP (2N4250)	TR02020-2
C320, 326	Ceramic, 560pF, 10%, 50V	CK22350-9	Q511, 512	Transistor, NPN	TR01015
C322, 524, 533	Ceramic, 0.1uF, +80-20%, 50V	CK22354-3	R301	330K	RF25DC334J
C328, 502, 506, 507, 511, 512, 515, 519, 523, 526, 528, 531, 541, 551	Ceramic, 0.01uF, +80-20%, 50V	CK22354-1	R302	68	RF25DC680J
C332	Mylar, 0.1uF, 10%, 50V	CY22356-11	R303, 305, 312, 315, 329, 513	1.5K	RF25DC152J
C503	P/O C505		R304, 311, 511, 556, 575, 576	4.7K	RF25DC472J
C504, 527, 534, 557	Ceramic, 1000pF, 10%, 50V	CK22350-12	R306, 307, 532, 573, 574	6.8K	RF25DC682J
C505 A, B, C, D, E	Tuning Gang Assembly	CV21015	R308	5.6	RF25DC5R6J
C508	Ceramic, 21pF, 10%, N750, 50V	CK22345-15	R309, 506	2.2K	RF25DC222J
C509	P/O C505		R310, 322, 325, 554, 565, 571	1K	RF25DC102J
C510	Tubular, 4pF, ±0.25pF, N3300	CT22336-11	R313, 523	15K	RF25DC153J
C514	Ceramic, 8pF, 5%, NPO, 50V	CK22344-5	R314, 321	22	RF25DC220J
C516	Tubular, 18pF, ±5%, N470	CT22336-12	R316, 508	1.2K	RF25DC122J
C518	Trimmer, 1-6pF	C50B938-5	R318	8.2K	RF25DC822J
C529, 535, 538, 543	Electrolytic, 4.7uF, 50V	CE22342-3	R319, 529, 531	2.7K	RF25DC272J
C536	Ceramic, 150pF, 10%, 50V	CK22350-2	R320, 507	3.9K	RF25DC392J
C542	Ceramic, 4700pF, 10%, 50V	CK22347-22	R324, 330, 519, 530, 534, 552, 578, 581	100K	RF25DC104J
C544	Silvered Mica, 470pF, 5%, 50V	CA22313-1	R326, 328, 515, 536	820	RF25DC821J
C545, 547	Mylar, 0.22uF, 10%, 50V	CY22356-12	R331, 504, 524, 543, 544	100	RF25DC101J
C546	Mylar, 0.47uF, 10%, 50V	CY22356-13	R332, 501, 521, 526, 527, 538, 541, 547, 548	10K	RF25DC103J
C548	Polyester, 0.05uF, 10%, 100V	CY22335-5	R333, 502, 545, 551, 561, 588, 589	220K	RF25DC224J
C552	Electrolytic, 100uF, 16V	CE22342-12	R503, 518, 535	150K	RF25DC154J
C554, 556	Mylar, 0.018uF, 5%, 50V	CY22356-3	R505, 512	220	RF25DC221J
C558	Electrolytic, 100uF, 35V	CE22342-10	R509	150	RF25DC151J
C559, 561	Tantalum, 0.33uF, 35V	CL22305-9	R514, 557, 579, 582, 583, 585	5.6K	RF25DC562J
CF501	Filter, ceramic, 10.7 MHz	ZK22110	R525	3.3K	RF25DC332J
CR301, 502	Diode, Germanium (AA119)	TR12001-4	R533	68K	RF25DC683J
CR302, 501, 503, 504, 505, 506, 507	Diode, Silicon	TR13006-2	R537, 577	120K	RF25DC124J
CR508	Light Emitting Diode	TR19001	R546, 558	16K	RF25DC163J
IC501	I.C., FM IF	TR09018	R549, 553, 562, 566	22K	RF25DC223J
IC502	I.C., MPX Decoder	TR09027	R555	270K	RF25DC274J
L300	Antenna, AM Ferrite	LA51417-2	R559	Variable, 10K, 20%	RV50150-23
L301, 503, 506	Choke, 3.3uH	LC21814-2			
L501	Choke, 1.2uH	LC21822-2			
L502	Coil, FM Mixer	LC21833-2			

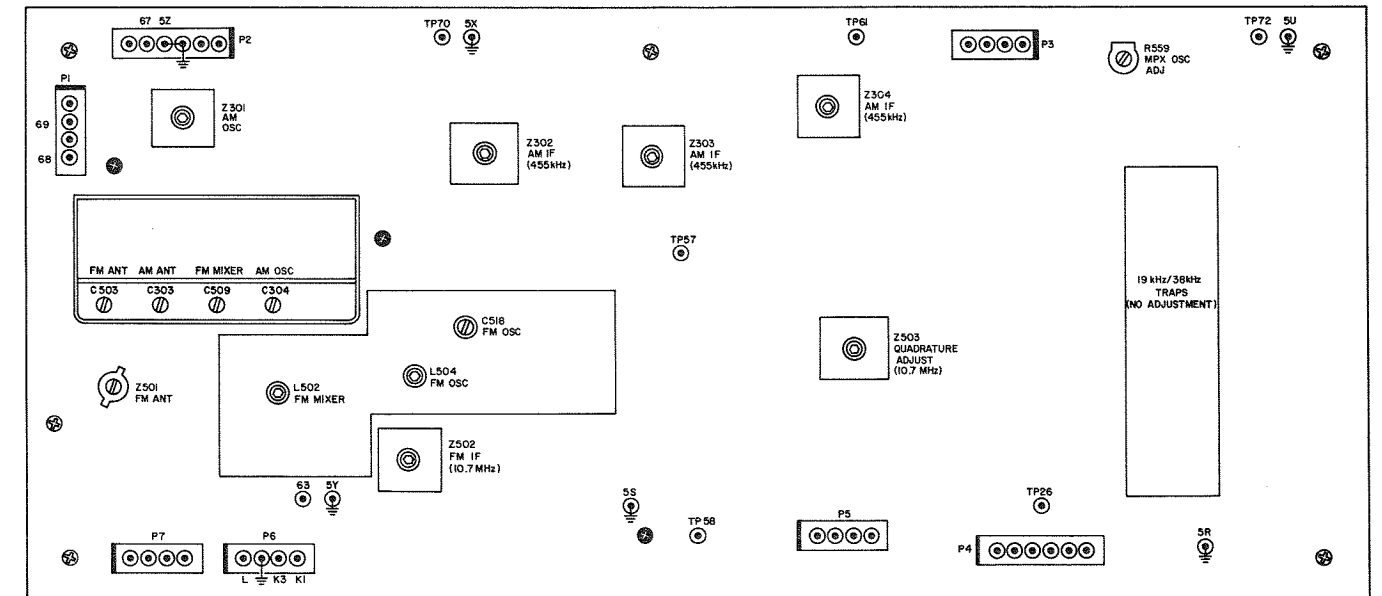
TUNER PARTS LIST

(CONTINUED)

Ref. Des.	Description	Part Number	Ref. Des.	Description	Part Number
R563	82K	RF25DC823J	Z302	Transformer, 455 KHz IF	ZZ50210-161
R564	39K	RF25DC393J	Z303	Transformer, 455 KHz IF	ZZ50210-156
R567	180	RF25DC181J	Z304	Transformer, 455 KHz IF	ZZ50210-159
R572	Composition, 510, 5%, 1/2W	RC20BF511J	Z501	Coil, FM Antenna	LC21832
R584, 586	390	RF25DC391J	Z502	Transformer, 10.7 MHz IF	ZZ50210-146
S11	Switch, SELECTOR	SR4130-151	Z503	Transformer, 10.7 MHz IF	ZZ50210-180
S101	Switch, MODE SELECTOR	SP50200-72-1	Z504	Coil, 19 kHz/38 xHz Trap	ZZ50210-190
S277	Switch, MUTING	SP50200-60	-	Terminal Board, Antenna (FM ANT, Ext AM Ant.)	ET51459
Z301	Coil, AM Oscillator	ZZ50210-181			

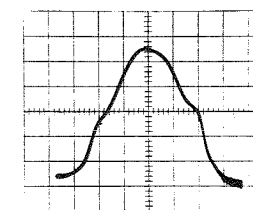
All resistors are deposited film, 5%, 1/4 Watt unless otherwise noted. K = Kilohm.

TUNER BOARD LAYOUT

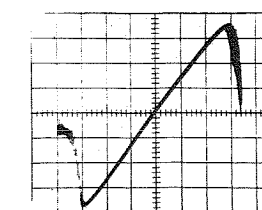


NOTE: CHASSIS GROUNDS ARE COMPLETED THROUGH MOUNTING SCREWS (⊙). TIGHTEN BEFORE ATTEMPTING ALIGNMENT.

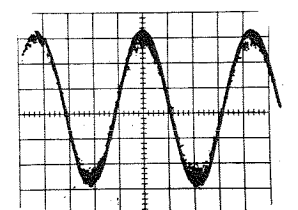
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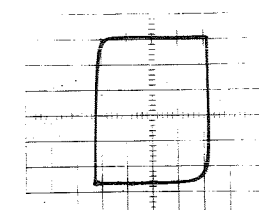
FM IF ALIGNMENT.



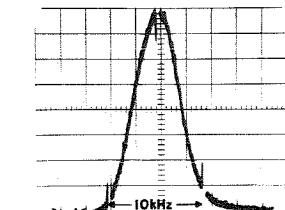
FM DETECTOR ALIGNMENT



SYMMETRICAL TUNING



MPX OSC ADJUSTMENT



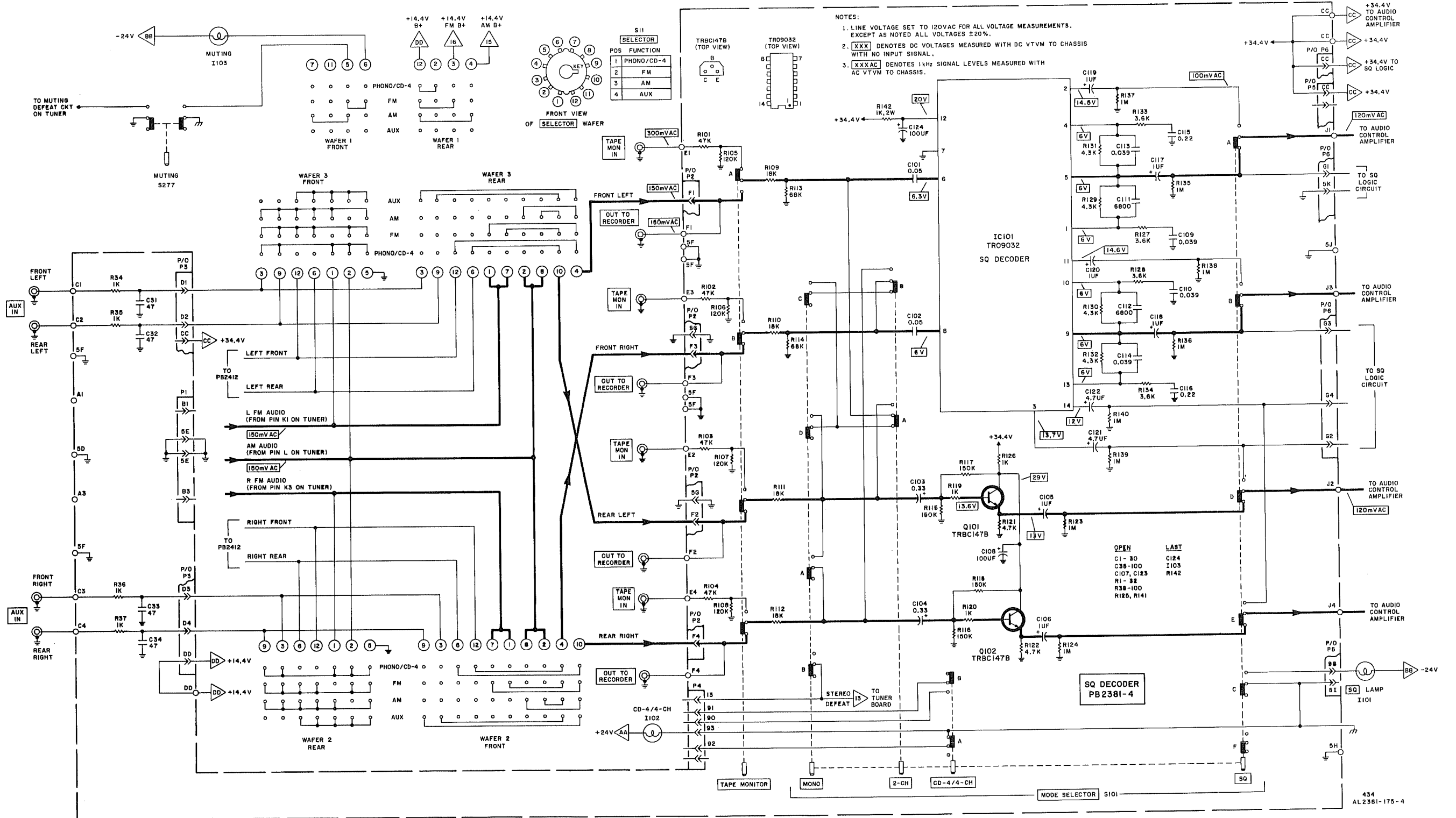
AM IF ALIGNMENT

SQ DECODER SCHEMATIC

SQ DECODER PARTS LIST

Ref. Des.	Description	Part Number
C31, 32, 33, 34	Ceramic, 47pF, 10%, 50V	CK22345-9
C101, 102	Ceramic, 0.05uF, +80-20%, 100V	CK22362-4
C103, 104	Sintered Aluminum, 0.33uF, 25V	CS22340-3
C105, 106	Tantalum, 1.0uF, 35V	CL22305-3
C108, 124	Electrolytic, 100uF, 35V	CE22342-10
C109, 110, 113, 114	Mylar, 0.039uF, 5%, 50V	CY22356-16
C111, 112	Mylar, .0068uF, 5%, 50V	CY22356-2
C115, 116	Mylar, 0.22uF, 5%, 50V	CY22356-17
C117, 118, 119, 120	Sintered Aluminum, 1uF, 25V	CS22340-5
C121, 122	Sintered Aluminum, 4.7uF, 25V	CS22340-6
Q101, 102	Transistor, BC147B	TRBC147B
IC101	IC, SQ Decoder	TR09032
R34, 35, 36, 37, 119, 120, 126	1K	RF25DC102J
R101, 102, 103, 104	47K	RF25DC473J
R105, 106, 107, 108	120K	RF25DC124J
R109, 110, 111, 112	18K	RF25DC183J
R113, 114	68K	RF25DC683J
R115, 116, 117, 118	150K	RF25DC154J
R121, 122	4.7K	RF25DC472J
R123, 124, 135-140	1M	RF25DC105J
R127, 128, 133, 134	3.6K	RF25DC362J
R129, 130, 131, 132	4.3K	RF25DC432J
R142	Wirewound, 1K, 2w, 5%	RW200W102J

All resistors are deposited film, 5%, 1/4W unless otherwise noted. K = Kilohm.

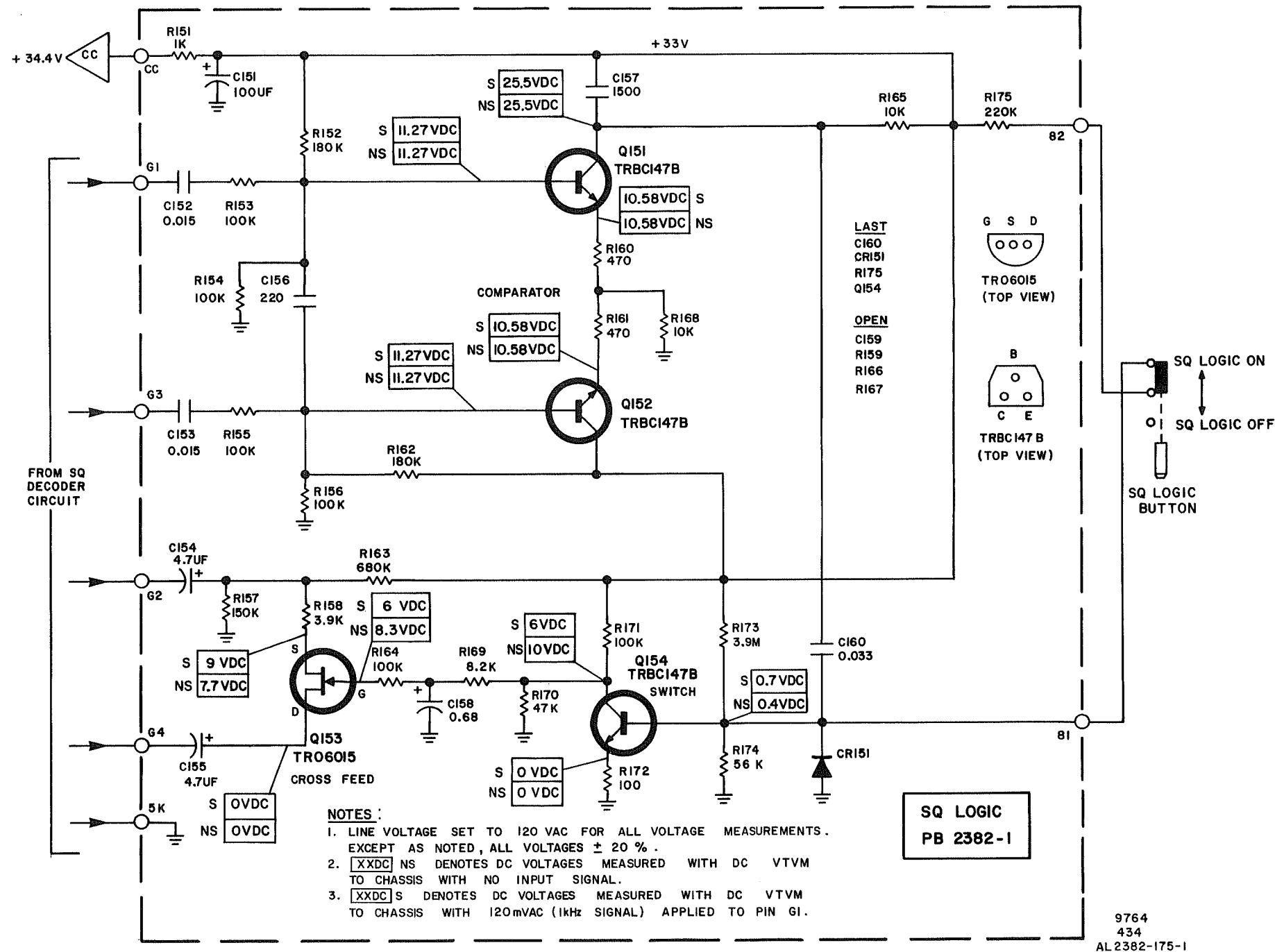


SQ LOGIC SCHEMATIC

SQ LOGIC PARTS LIST

Ref. Des.	Description	Part Number
C151	Electrolytic, 100uF, 50V	CE22342-9
C152, 153	Mylar, 0.015uF, 5%, 50V	CY22356-5
C154, 155	Sintered Aluminum, 4.7uF, 25V	CS22340-6
C156	Ceramic, 220pF, 10%, 50V	CK22350-4
C157	Ceramic, 1500pF, 10%, 50V	CK22351-8
C158	Tantalum, 0.68uF, 35V	CL22305-2
C160	Mylar, 0.033uF, 5%, 50V	CY22356-19
CR151	Diode, Silicon	TR13006-2
Q151, 152, 154	Transistor, NPN (BC147B)	TRBC147B
Q153	Transistor, N-Channel FET	TR06015
R151	1K	RF25DC102J
R152, 162	180K	RF25DC184J
R153, 154, 155, 156, 164, 171	100K	RF25DC104J
R157	150K	RF25DC154J
R158	3.9K	RF25DC392J
R160, 161	470	RF25DC471J
R163	680K	RF25DC684J
R165, 168	10K	RF25DC103J
R169	8.2K	RF25DC822J
R170	47K	RF25DC473J
R172	100	RF25DC101J
R173	Composition, 3.9M, 10%, 1/2W	RC20BF395K
R174	56K	RF25DC563J
R175	220K	RF25DC224J

All resistors are deposited film, 5%, 1/4W unless otherwise noted. K = Kilohm, M = Megohm.



- NOTES:
1. LINE VOLTAGE SET TO 120 VAC FOR ALL VOLTAGE MEASUREMENTS. EXCEPT AS NOTED, ALL VOLTAGES $\pm 20\%$.
 2. [XXDC] NS DENOTES DC VOLTAGES MEASURED WITH DC VTVM TO CHASSIS WITH NO INPUT SIGNAL.
 3. [XXDC] S DENOTES DC VOLTAGES MEASURED WITH DC VTVM TO CHASSIS WITH 120mVAC (1kHz SIGNAL) APPLIED TO PIN G1.

Ref. Des.	Description	Part Number
C100, 101, 174, 175	Tantalum, 0.68uF, 35V	CL22305-2
C102, 103	Tantalum, 10uF, 25V	CL22305-17
C104, 105	Mylar, 5000pF, 5%	CY22356-28
C106, 107	Ceramic, 5pF, 5% NPO, 50V min.	CK22344-1
C108, 109	Tantalum, 2.7uF, 35V	CL22305-4
C110, 114, 208	Electrolytic, 100uF, 16V	CE22342-12
C111	Electrolytic, 200uF, 16V	CE22342-15
C112, 113, 120, 121, 129, 130, 131, 132, 158, 159, 180, 181, 182, 183, 207, 210	Ceramic, 1000pF, 10%, 50V	CK22350-12
C115, 116, 137, 138, 168, 169	Mylar, 0.0012, 10%, 100V	CY22335-23
C117, 124	Mylar, 0.0015, 10%, 100V	CY22335-24
C118, 119	Mylar, 0.0033, 10%, 100V	CY22335-7
C122, 123, 125, 126, 142, 143, 148, 149	Sintered Aluminum, 4.7uF, 25V	CS22340-6
C128	Electrolytic, 100uF, 35V	CE22342-10
C133, 134, 139, 140, 188, 189, 190, 191	Mylar .01, 10%, 100V	CY22335-1
C135, 136	Ceramic, 330pF, 10%, 50V	CK22350-6
C144, 145	Mylar, 0.012, 10%, 100V	CY22335-10
C146, 147, 203, 204, 215, 216	Sintered Aluminum, 0.47uF, 25V	CS22340-4
C150, 151, 166, 167, 170, 171, 213, 218	Mylar, 0.022, 10%, 100V	CY22335-12
C152, 153	Mylar, 0.0068, 10%, 100V	CY22335-9
C154, 155	Mylar, 0.1, 10%, 100V	CY22335-18
C156, 157, 209, 211, 212, 214	Sintered Aluminum, 1uF, 25V	CS22340-6
C160, 161	Electrolytic, 4.7uF, 50V	CE22342-3
C162, 163, 178, 179	Mylar, 0.0082, 10%, 100V	CY22335-25
C164, 165	Mylar, 0.047, 10%, 100V	CY22335-22
C172, 173, 192	Electrolytic, 10uF, 25V	CE22342-28
C176, 177	Mylar, 0.15, 10%, 100V	CY22335-19
C184, 185, 186, 187	Mylar, 0.0039, 10%, 100V	CY22335-4
C193, 194	Sintered Aluminum, 2.2uF, 25V	CS22340-10
C195, 196	Mylar, .015, 10%, 100V	CY22335-2
C197, 198	Mylar, 0.033, 10%, 100V	CY22335-14
C199, 200, 201, 202	Ceramic, 560pF, 10%, 50V	CK22350-9
C205, 206	Mylar, 0.039, 10%, 100V	CY22335-15
CR100 through CR108	Silicon Diodes	TR13006-2
L100 through L105	Inductor, audio, 22mH	LC21834-2

CD-4 DEMODULATOR PARTS LIST

(CONTINUED)

Ref. Des.	Description	Part Number	Ref. Des.	Description	Part Number
L106, 107	Inductor, audio, 160mH	LC21834-1	R135, 142,	3.9K	RF25DC392J
IC100, 101	CD-4 IC Demodulator	TR09035	147, 160,		
Q102, 103,	Transistor, PNP (2N4250)	TR02020-2	201, 204,		
114, 115			225, 230,		
Q104, 105	Transistor, NPN	TR01015	239, 246		
Q106	Transistor, (BC239C)		R136, 138,	47K	RF25DC473J
through			223, 234		
113, 116			R139, 148,	1.2K	RF25DC122J
through			199, 200,		
124		TR01014	241, 250		
Q126	Transistor, NPN	TR01053-5	R143, 144,	2.7K	RF25DC272J
R100, 101,	1K	RF25DC102J	227, 232		
167, 174			R145, 150,	5.6K	RF25DC562J
R102, 103	1M	RF25DC105J	173, 176		
R104, 105	120K	RF25DC124J	191, 192,		
R106, 107,	82K	RF25DC823J	197, 198		
215, 222			R149, 156,	220K	RF25DC224J
R108, 109	820	RF25DC821J	157, 162		
R110, 249,	100K	RF25DC104J	R151, 153,	3.3K	RF25DC332J
251, 257,			154, 158,		
258			209, 212,		
R111, 114,	10K	RF25DC103J	213, 216,		
115, 121,			221, 228,		
122, 137,			207, 210,		
141, 146,			211, 214,		
152, 171,			219, 220,		
172, 255			226, 245,		
R112, 113	820K	RF25DC824J	247, 254,		
R116, 117,	56K	RF25DC563J	256		
131, 132,			R159, 164	Resistor, variable, 100K	RV50150-23-8
133, 140,			R165, 170	1.5M	RF25DC155J
177, 181,			R168, 169,	330	RF25DC331J
182, 189,			187, 188		
190, 193,			R175, 178	33K	RF25DC333J
194, 195,			R179, 180	39K	RF25DC393J
196, 260			R183, 184	Resistor, variable, 10K	RV50150-23-7
R118, 119	1.8K	RF25DC182J	R185, 186	22K	RF25DC223J
R120, 126	82, 1/2W	RF50DC820J	R202, 203	390	RF25DC391J
R127, 128,	100	RF25DC101J	R205, 208	12K	RF25DC123J
229, 231,			R217, 224	18K	RF25DC183J
236, 238			R233, 235,	1.5K	RF25DC152J
R129, 134	27K	RF25DC273J	240, 242		
R130, 161,	2.2K	RF25DC222J	R237, 244	8.2K	RF25DC822J
166, 206,			R248	470	RF25DC471J
218, 243,					
252					

All resistors are deposited film, 5%, 1/4W unless otherwise noted. K = Kiloohm; M = Megohm.

CD-4 ALIGNMENT PROCEDURES

APPLICABLE CONTROL SETTINGS — Set the applicable controls on the front panel of the 434 receiver as follows:

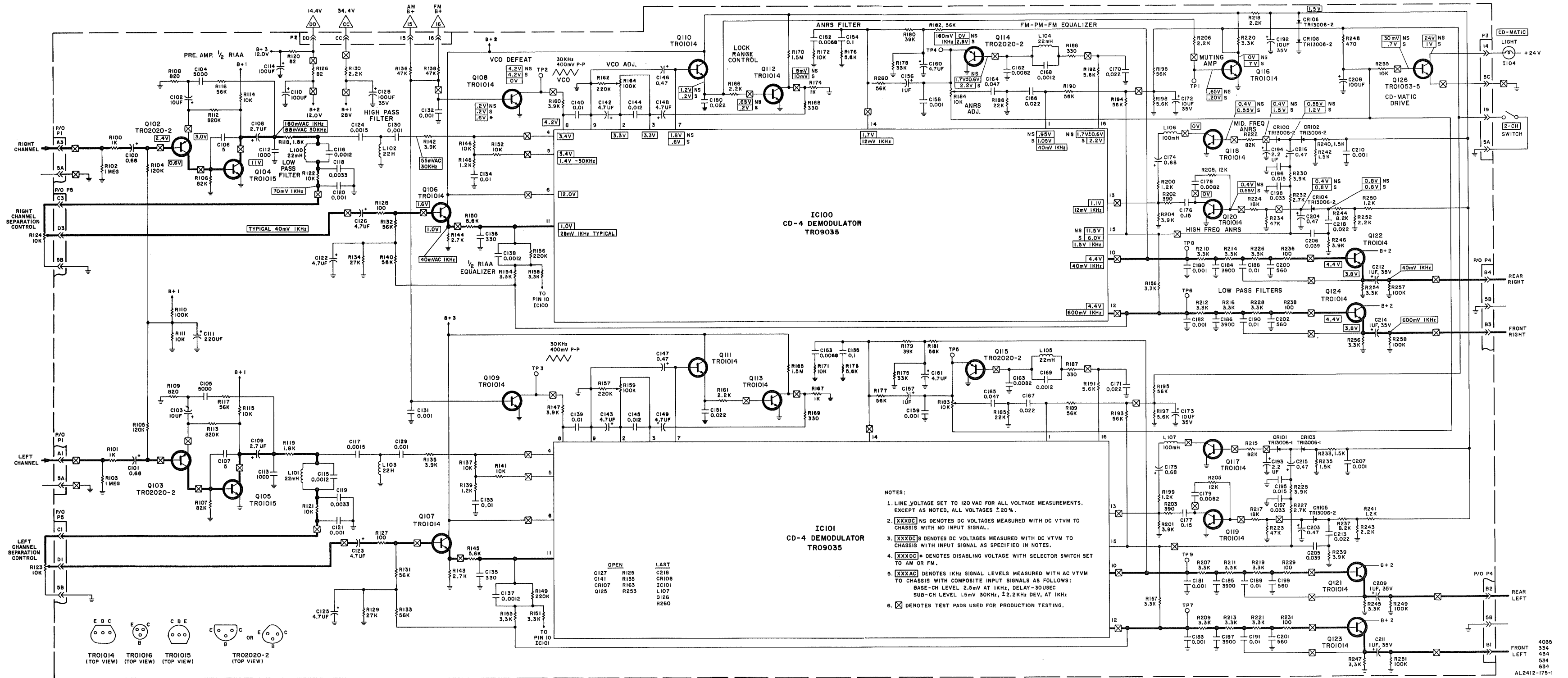
SELECTOR switch to PHONO/CD-4, **MODE SELECTOR** CD-4/4-CH pushbutton depressed, and **VOLUME** control to MIN.

ITEM	TEST CONNECTIONS	INDICATOR	PROCEDURE
1. ANRS ALIGNMENT	Connect audio oscillator to T.P. 5 on PB2412 circuit board. Set oscillator output to 25 mV and frequency to 10 kHz.	AC VTVM to OUT TO RECORDER-FRONT LEFT jack on receiver rear panel.	Defeat the muting circuit by grounding T.P. 1 on PB2412 circuit board. Set LEFT and RIGHT SEPARATION controls (R123 and R124) at front panel of receiver to minimum (fully counterclockwise). Adjust R183 for 17.5 mV reading on the meter.

CD-4 ALIGNMENT (CONT'D)

ITEM	TEST CONNECTIONS	INDICATOR	PROCEDURE
2.	Connect audio oscillator to T.P. 4 on PB2412 circuit board. Set oscillator output to 25 mV and frequency to 10 kHz.	AC VTVM to OUT TO RECORDER-FRONT RIGHT jack on receiver rear panel.	Adjust R184 for a reading of 17.5 mV on the meter.
3. VCO ALIGNMENT	Connect oscilloscope and frequency counter to T.P. 3 on PB2412 circuit board.	Scope display will be a triangular waveform 400 mV peak-to-peak.	Retain the ground connection made in step 1 to defeat the muting circuit. Using two RCA shorting plugs, short out PHONO IN LEFT and RIGHT jacks. Adjust R159 for a 30 kHz \pm 200 Hz indication on the frequency counter.
4.	Connect oscilloscope and frequency counter to T.P. 2 on PB2412 circuit board.	Scope display will be a triangular waveform 400 mV peak-to-peak.	Adjust R164 for a 30 kHz \pm 200 Hz indication on the frequency counter.
5. VCO ALIGNMENT (ALTERNATE METHOD)	Connect frequency indicator (Fisher 3129 or equivalent) to T.P. 3 on PB2412 circuit board.		Adjust R159 for full brightness of indicator lamp on the frequency indicator.
6.	Connect frequency indicator to T.P. 2 on PB2412 circuit board.		Adjust R164 for full brightness of indicator lamp on frequency indicator. Remove ground connection from T.P. 1 (muting circuit) and remove shorting plugs from PHONO IN jacks.
7. SEPARATION ALIGNMENT	Connect CD-4 Generator to PHONO IN LEFT and RIGHT jacks on rear panel of receiver. Set generator output as follows: Sub-Channel carrier level 1.5 mV Channel Selector FRONT Deviation 2.2 kHz Base Channel 2.5 mV Input Frequency 1 kHz Delay 40 usec.	Connect AC VTVM to OUT TO RECORDER-REAR LEFT jack on rear panel of receiver. CD-MATIC indicator lamp on front panel of receiver should be illuminated.	Adjust LEFT CD-4 SEPARATION control (R123) at receiver front panel for minimum reading on the meter.
8.	Same as above.	Connect AC VTVM to OUT TO RECORDER-REAR RIGHT jack on rear panel of receiver.	Adjust RIGHT CD-4 SEPARATION control (R124) at receiver front panel for minimum reading on the meter.
9. LEFT CHANNEL SEPARATION	Connect AC VTVM to OUT TO RECORDER-FRONT LEFT jack on rear panel of receiver.	AC VTVM	Meter reading should be 500 mV \pm 150 mV. Record this reading as zero dB.
10.	Connect AC VTVM to OUT TO RECORDER-REAR LEFT jack on rear panel of receiver.	AC VTVM	Meter reading should be at least 20 dB below zero dB reading recorded in step 9.
11. RIGHT CHANNEL SEPARATION	Connect AC VTVM to OUT TO RECORDER-FRONT RIGHT jack on rear panel of receiver.	AC VTVM	Meter reading should be 500 mV \pm 150 mV. Record this reading as zero dB.
12.	Connect AC VTVM to OUT TO RECORDER-REAR RIGHT jack on rear panel of receiver.	AC VTVM	Meter reading should be at least 20 dB below zero dB reading recorded in step 11.
<p>NOTE: Upon completion of CD-4 Alignment disconnect all test equipment and replace RCA shorting plugs in PHONO IN-LEFT and RIGHT jacks.</p>			

CD-4 SCHEMATIC

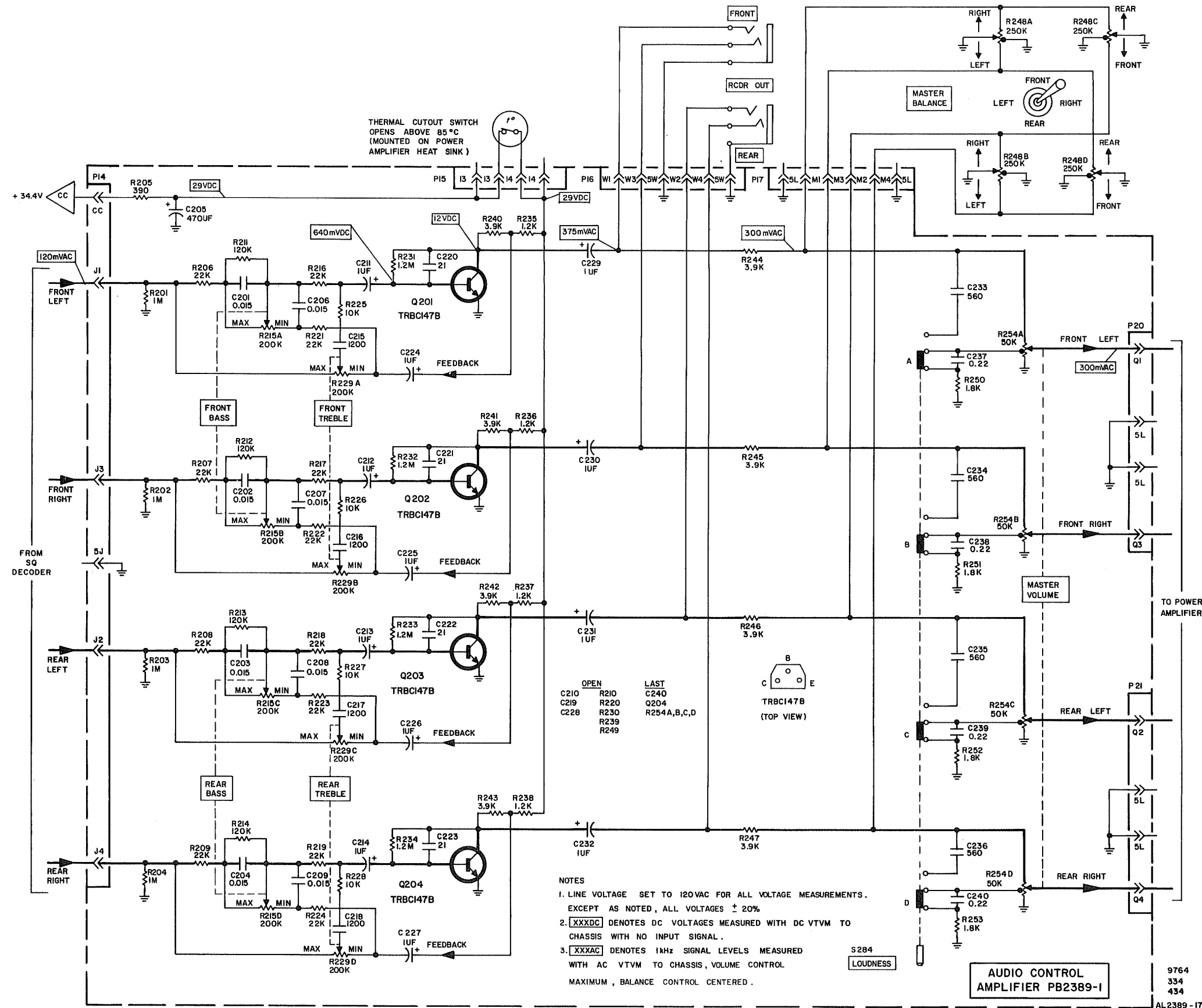


AUDIO CONTROL AMPLIFIER SCHEMATIC

AUDIO CONTROL AMPLIFIER PARTS LIST

Ref. Des.	Description	Part Number
C201, 202, 203, 204, 206, 207, 208, 209	Mylar, 0.015uF, 5%, 50V	CY22356-5
C205	Electrolytic, 470uF, 35V	CE22343-34
C211, 212, 213, 214	Sintered Aluminum, 1uF, 25V	CS22340-5
C215, 216, 217, 218	Ceramic, 1200pF, 10%, 50V	CK22350-17
C220, 221, 222, 223	Ceramic, 21pF, 5%, 50V	CK22344-16
C224, 225, 226, 227, 229, 230, 231, 232	Tantalum, 1uF, 35V	CL22305-3
C233, 234, 235, 236	Ceramic, 560pF, 10%, 50V	CK22350-9
C237, 238, 239, 240	Mylar, 0.22uF, 5%, 50V	CY22356-17
Q201, 202, 203, 204	Transistor, NPN (BC147B)	TRBC147B
R201, 202, 203, 204	1M	RF25DC105J
R205	390, 5%, 1/2 Watt	RF50DC391J
R206, 207, 208, 209, 216, 217, 218, 219, 221, 222, 223, 224	22K	RF25DC223J
R211, 212, 213, 214	120K	RF25DC124J
R215 (A, B, C, D), 229 (A, B, C, D)	Potentiometer, 200K, Rotary (Bass, Treble)	RP50160-313
R225, 226, 227, 228	10K	RF25DC103J
R231, 232, 233, 234	1.2M	RF25DC125J
R235, 236, 237, 238	1.2K	RF25DC122J
R240, 241, 242, 243, 244, 245, 246, 247	3.9K	RF25DC392J
R248 (A, B, C, D)	Control, Master Balance	RP50160-315
R250, 251, 252, 253	1.8K	RF25DC182J
R254 (A, B, C, D)	Potentiometer, 50K, Rotary (Volume)	RP50160-311
S284	Pushbutton Switch (LOUDNESS)	SP50200-77

All resistors are deposited film, 5%, 1/4W unless otherwise noted. K = Kilohm, M = Megohm.

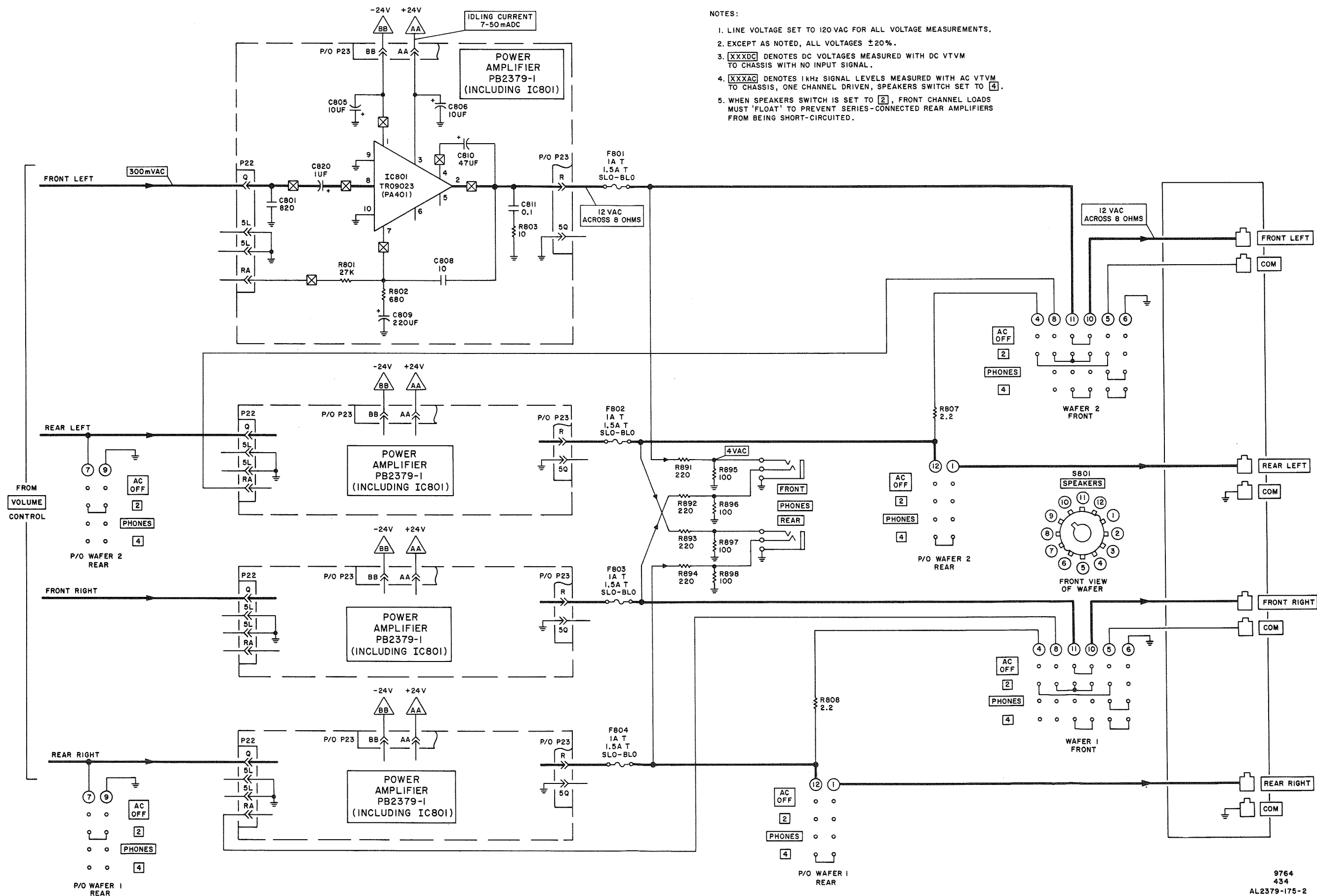


POWER AMPLIFIER PARTS LIST

Ref. Des.	Description	Part Number
C801	Ceramic, 820pF, 10%, 50V	CK22358-11
C802	Sintered Aluminum, 1uF, 25V	CS22340-5
C805, 806	Electrolytic, 10uF, 50V	CE22342-4
C808	Ceramic, 10pF, 50V	CK22360-3
C809	Electrolytic, 220uF, 25V	CE22342-14
C810	Electrolytic, 47uF, 35V	CE22342-7
C811	Ceramic, 0.1uF, ±35%, 100V	C51163
IC801	IC, Power Amplifier (18W/8Ω)	TR09023
R801	27K	RF25DC273J
R802	680Ω	RF25DC681J
R803	10Ω, 1/2W	RF50DC100J
CHASSIS MOUNTED COMPONENTS		
F801, 802, 803, 804	Fuse, 1A, 250V, Slo-Blo	FL51313-3
R807, 808	Wirewound, 2.2, 15W	RP15W2R2J
R891, 892, 893, 894	Wirewound, 220, 2W	RW200W221J
R895, 896, 897, 898	100, 1/2W	RF50DC101J
S801	Switch, SPEAKERS	P/O SR4130-155
-	Jack, PHONES - FRONT, REAR	JK20627-5
-	Terminal Board, Speakers	ET51340-2

All resistors are deposited film, 5%, 1/4W unless otherwise noted. K = Kilohm.

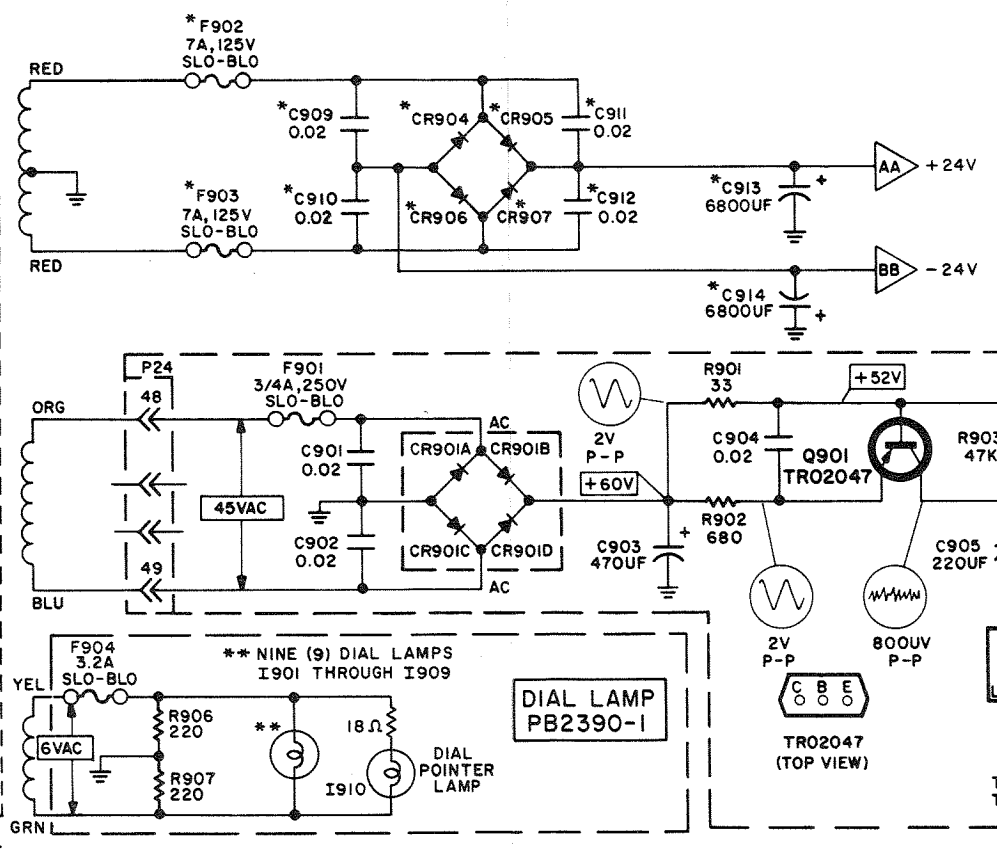
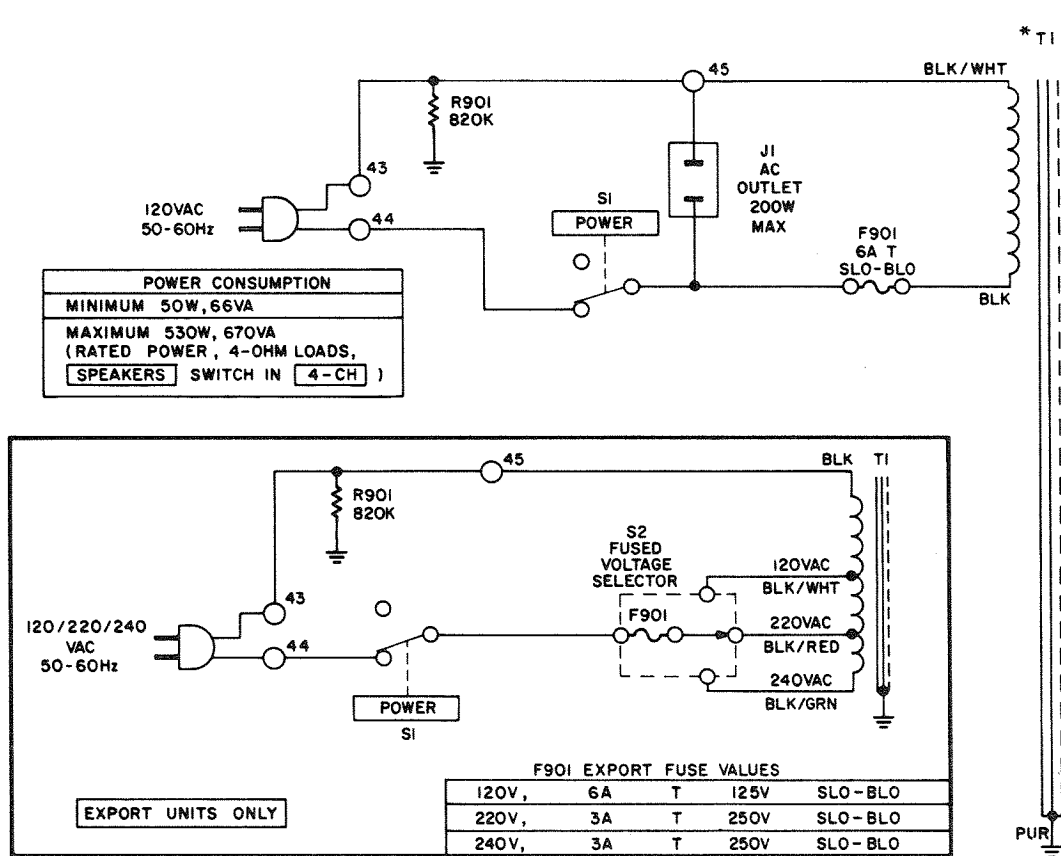
POWER AMPLIFIER SCHEMATIC



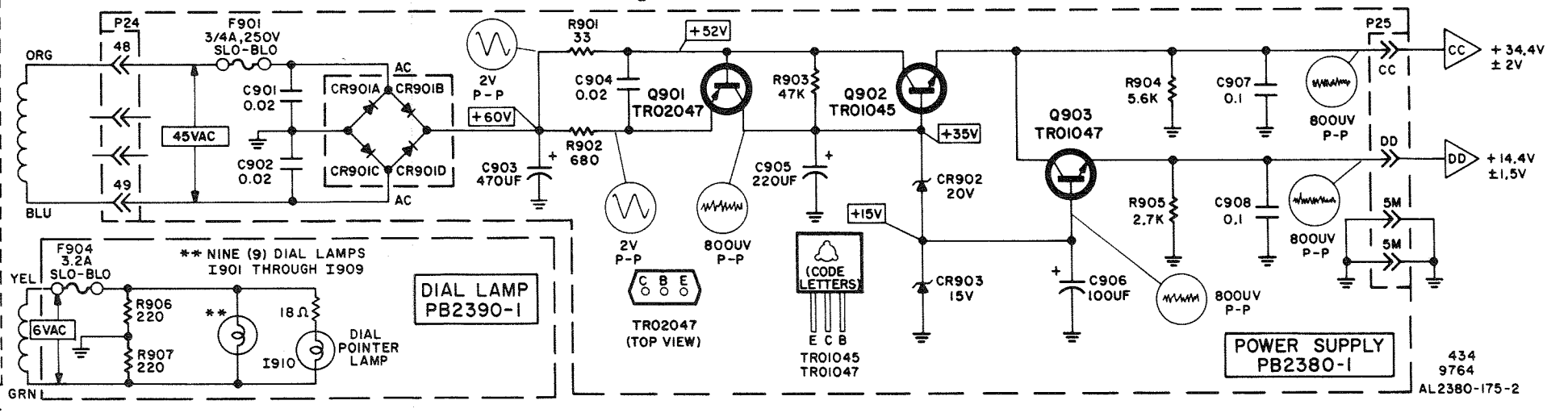
NOTES:

1. LINE VOLTAGE SET TO 120 VAC FOR ALL VOLTAGE MEASUREMENTS.
2. EXCEPT AS NOTED, ALL VOLTAGES $\pm 20\%$.
3. [XXXDC] DENOTES DC VOLTAGES MEASURED WITH DC VTVM TO CHASSIS WITH NO INPUT SIGNAL.
4. [XXXAC] DENOTES 1kHz SIGNAL LEVELS MEASURED WITH AC VTVM TO CHASSIS, ONE CHANNEL DRIVEN, SPEAKERS SWITCH SET TO [4].
5. WHEN SPEAKERS SWITCH IS SET TO [2], FRONT CHANNEL LOADS MUST 'FLOAT' TO PREVENT SERIES-CONNECTED REAR AMPLIFIERS FROM BEING SHORT-CIRCUITED.

POWER SUPPLY/DIAL LAMP SCHEMATIC



- NOTES:
 1. LINE VOLTAGE SET TO 120VAC FOR ALL DC VOLTAGE MEASUREMENTS.
 2. DC VOLTAGES MEASURED WITH VTVM TO CHASSIS.
 3. EXCEPT AS NOTED, ALL VOLTAGES $\pm 20\%$.
 4. * INDICATES CHASSIS MOUNTED COMPONENTS.

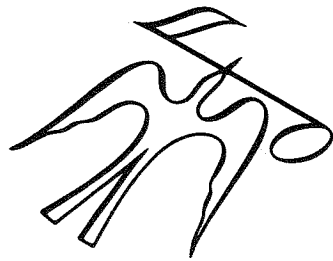


POWER SUPPLY/DIAL LAMP PARTS LIST

Ref. Des.	Description	Part Number
C901, 902, 904	Ceramic, .02 ± 20%, 500V	CK22359-3
C903	Electrolytic, 470uF, 100V Axial	CE22343-44
C905	Electrolytic, 220uF, 50V Axial	CE22343-28
C906	Electrolytic, 100uF, 25V Axial	CE22343-26
C907, 908	Mylar, 0.1uF, 10%, 100V	CY22373-1
CR901A, B, C & D	Bridge Rectifier, 1.5A, 200V	BR51400-1
CR902	Zener, 20V, 5%, 1W	TR14002-4
CR903	Zener, 15V, 5%, 1W	TR14002-2
F901	Fuse, 3/4A, 250V, Slo-Blo	FL51313-7
Q901	Transistor, PNP	TR02047
Q902	Transistor, NPN	TR01045
Q903	Transistor, NPN	TR01047
R901	Wirewound, 33, 5%, 5W	RW5W330J
R902	680	RF50DC681J
R903	47K	RF50DC473J
R904	5.6K	RF50DC562J
R905	2.7K	RF50DC272J
PB2390-1		
F904	Fuse, 3.2A, 125V, Slo-Blo	FL51313-14
I901	Lamp, Dial (2112D)	LM21421-6
through I909		
R906, 907	Composition, 220, 10%, 1/2W	RC20BF221K
CHASSIS MOUNTED COMPONENTS		
C909, 910, 911, 912	Ceramic, .02uF, 20%, 500V	CK22359-3
C913, 914	Electrolytic, 6800uF, 35V	CE22372-3
CR904, 905, 906, 907	Bridge Rectifier, Silicon	BR51401-3
F101	Fuse, 1-1/2A, 125V, Slo-Blo	FL51313-20
F901	Fuse, 3/4A, 250V, Slo-Blo	FL51313-7
F902, 903	Fuse, 7A, 125V, Slo-Blo	FL51313-9
J1	AC Outlet	JK25009
R901	Composition, 820K, 10%, 1/2W	RC20BF824K
S801	Switch, SPEAKERS	P/O SR4130-155
*S1	Switch, Fused Voltage Selector	EA51449
T1	Transformer, Power	TD4130-115
*T1	Transformer, Power	TE4130-215

*Used in Export Units Only.

All resistors are deposited film, 5%, 1/2W unless otherwise noted. K = Kilohm.



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