

MR 80 Performance Specifications

USABLE SENSITIVITY
13.2dBf (2.5 μ V) IHF (Mono)

QUIETING SENSITIVITY
14.7dBf (3.0 μ V) for 50 dB quieting (mono)

SIGNAL TO NOISE RATIO
75dB minimum

HUM AND NOISE
75dB minimum

MUTING THRESHOLD
11.3dBf (20 μ V) to 65dBf (1000 μ V) adjustable, for 70dB noise reduction between stations.

FREQUENCY RESPONSE
 \pm 1dB 20Hz to 15kHz, mono or stereo (de-emphasis provide for 25, 50, and 75 μ S)

HARMONIC DISTORTION
0.2% maximum, 20Hz to 15kHz, mono or stereo, typically .08% at 1kHz.

INTERMODULATION DISTORTION
0.15% maximum for any combination of frequencies from 20Hz to 15kHz.

CAPTURE RATIO
1.5dB

ADJACENT CHANNEL SELECTIVITY
Narrow 8dB, Super Narrow 60dB

ALTERNATE CHANNEL SELECTIVITY
Narrow > 90dB, Super Narrow >>110dB

SPURIOUS RESPONSE RATIO
110dB

IMAGE REJECTION
90dB

IF RESPONSE
> 120dB

RF INTERMODULATION
84dB for two signals 1MHz apart. Tuner intercept point is -10dBm. Maximum input signal for no increase in harmonic or intermodulation distortion is 8 volts at 75 ohm input or 1 watt.

STEREO SEPARATION
50dB at 1kHz

SCA REJECTION
60dB minimum

STEREO FILTER
10dB noise reduction

ANTENNA INPUTS
300 ohm balanced and two 75 ohm unbalanced

AUDIO OUTPUT LEVEL
Variable 2.5 volts into 5K ohms
Fixed 1 volt into 5K ohms

TUNING RANGE
88Hz to 108MHz

POWER REQUIREMENT
120 Volts, 50 / 60Hz, 25 Watts

SEMICONDUCTOR COMPLEMENT
58 Bipolar Transistors
7 Field Effect Transistors
91 Diodes
66 Integrated Circuits
4 7-Segment LED's
18 LED's
4 IC Voltage Regulators
6 Diode Bridges
10 Dual-Tuning Diodes

MECHANICAL INFORMATION
Size: Front panel measures 16 inches wide (40.6cm) by 5-7/16 inches high (13.8cm). Chassis measures 14-3/4 inches wide (37.5cm) by 4-13/16 inches high (12.2cm) by 13 inches deep (33cm), including connectors. Knob clearance required is 1-1/4 inches (3.2cm) in front of mounting panel. Finish: Front panel is anodized gold and black with special gold/teal nomenclature illumination. Chassis is black.
Mounting: Exclusive McIntosh developed professional PANLOC.
Weight: 27 pounds (12.2kg) net, 39 pounds (17.7kg) in shipping carton.

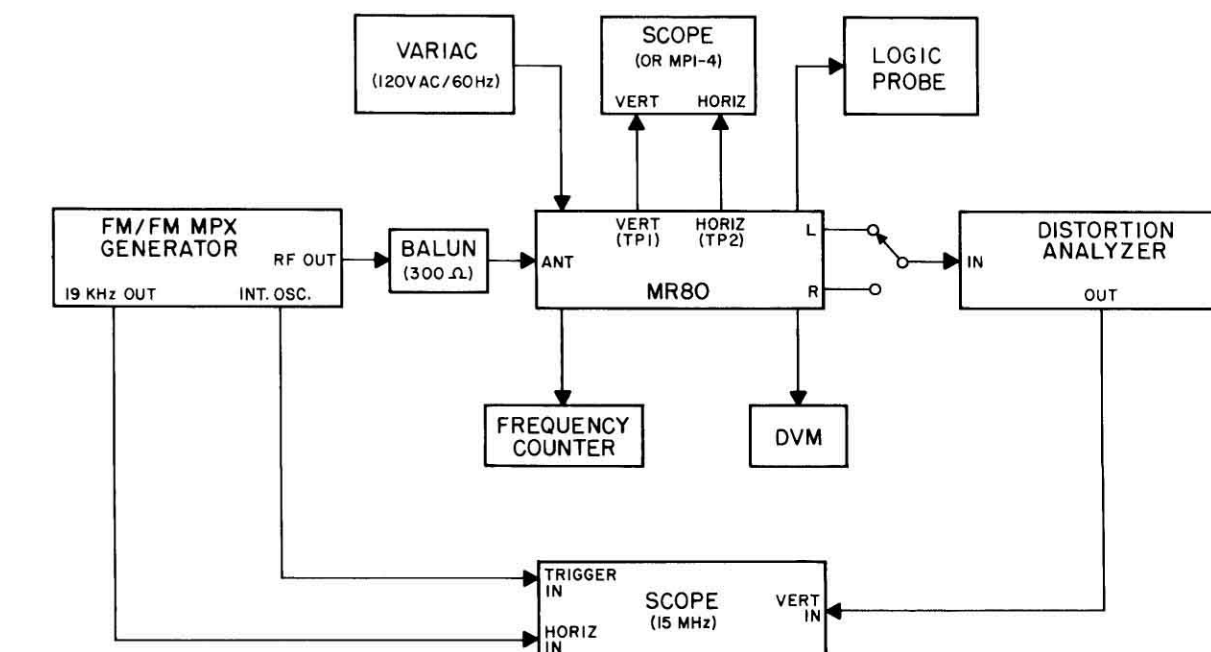
TEST EQUIPMENT REQUIRED

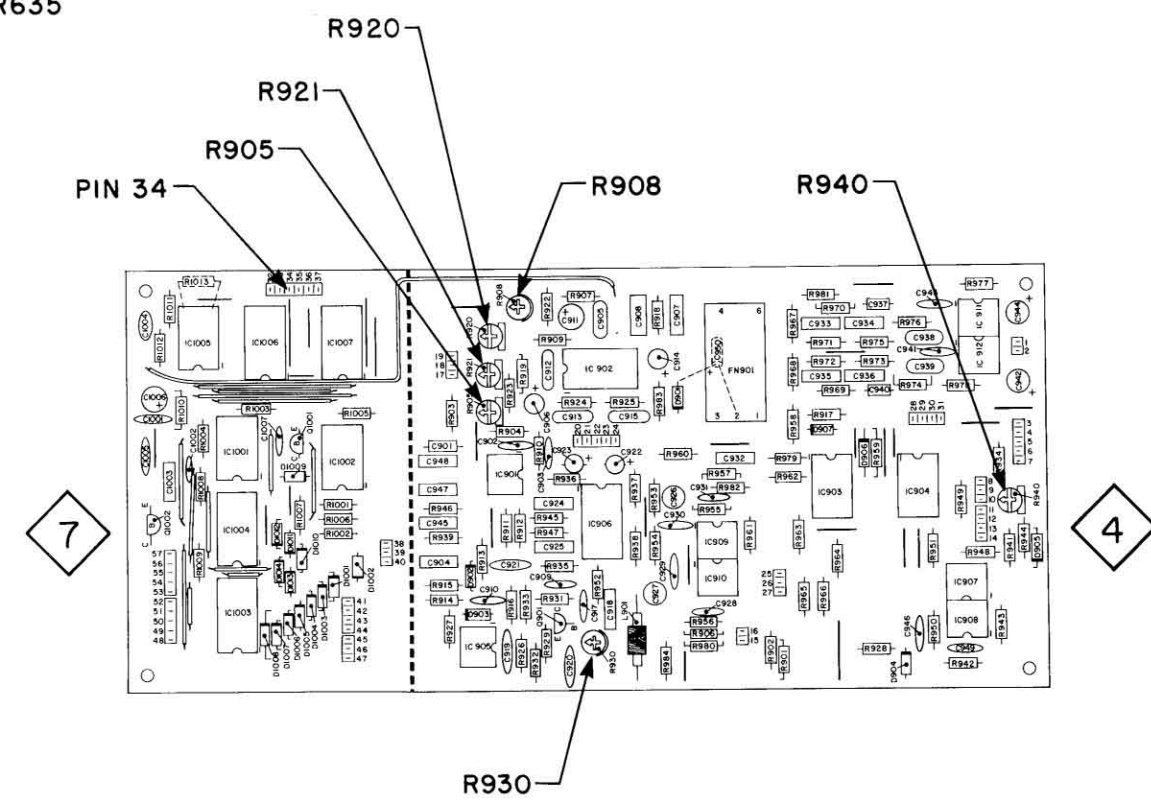
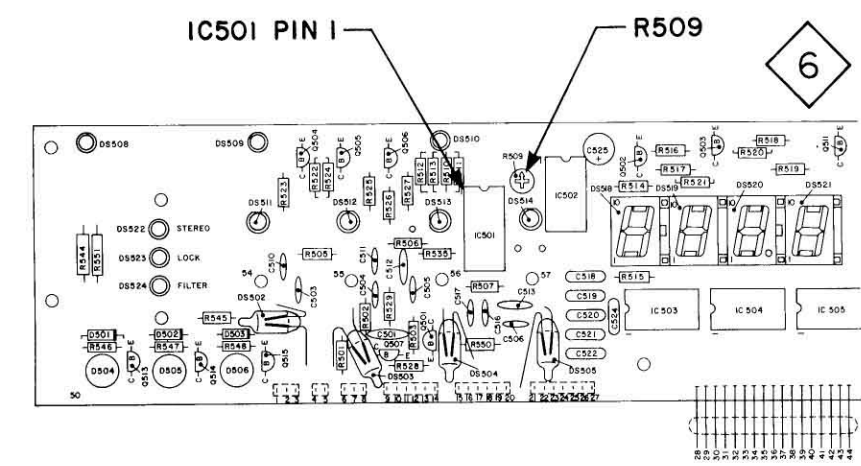
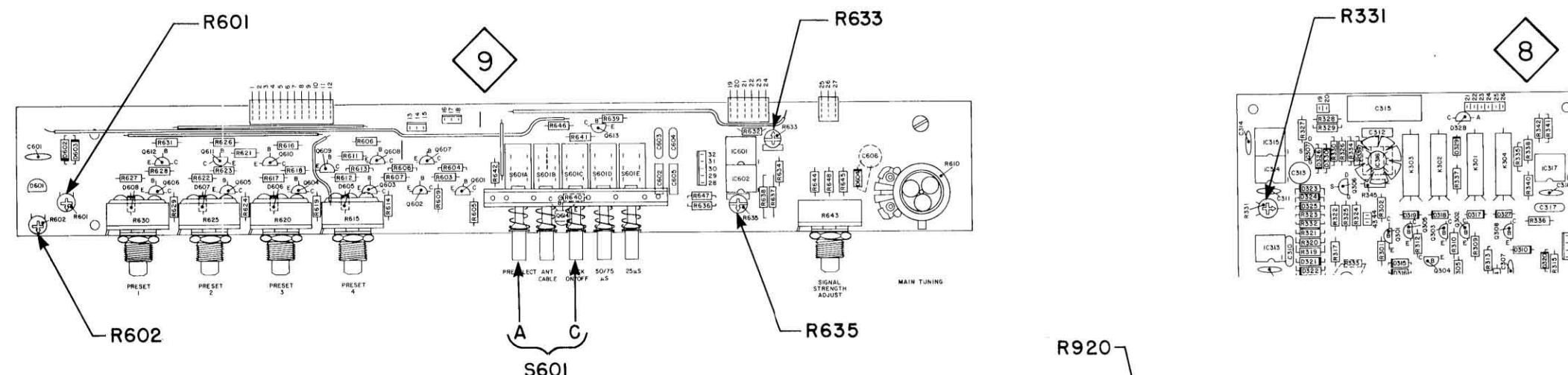
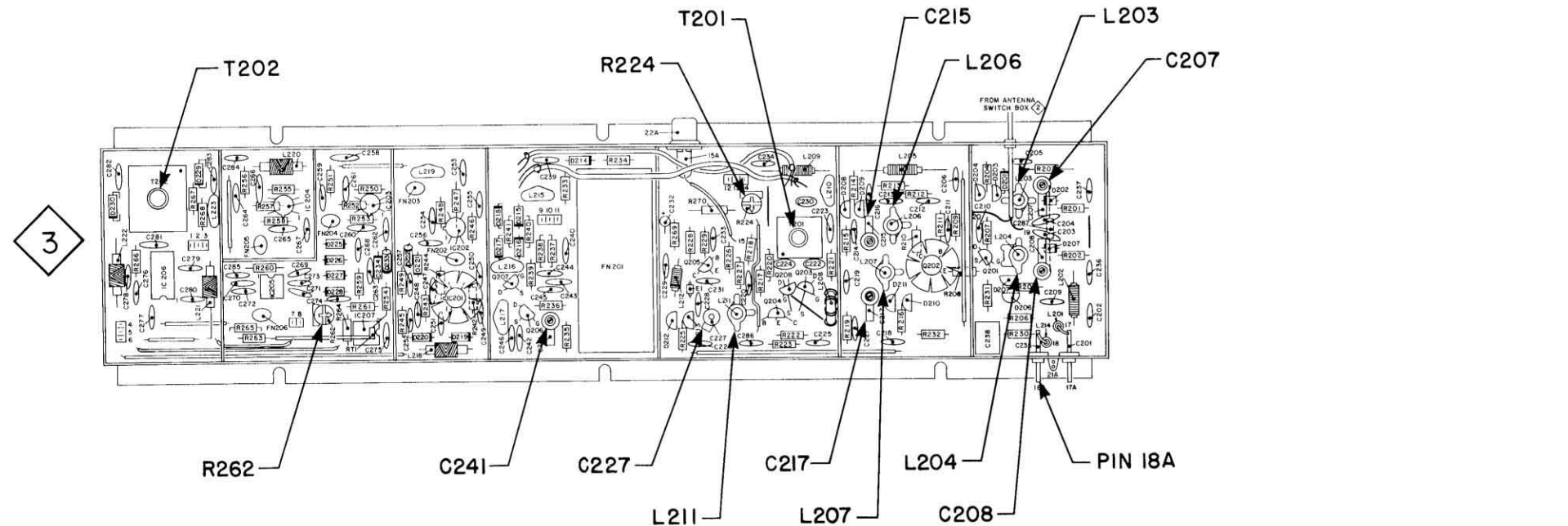
The following test equipment is required for servicing the MR 80 (or other test equipment of equivalent performance).

FM Signal Generator — Sound Technology 1000A
Multiplex Generator — Sound Technology 1000A
Distortion Analyzer — Sound Technology 1700A
Digital Volt Meter — Fluke 8012A
Frequency Counter — Fluke 1910A
Oscilloscope (Dual Trace) — Tektronics T-922
Logic Probe — Continental Specialties LP-3
Variac — General Radio W10MT3W
Nonferrous Alignment Tools

TEST EQUIPMENT CONNECTION

Connect the MR80 to the test equipment as shown below.





PREALIGNMENT PROCEDURE

The prealignment procedure below should only be followed when the tuner is completely out of alignment, or an unauthorized alignment has been attempted. For normal alignment, skip this section and start with the Alignment Procedure on the opposite page.

Remove the top rear cover, top control panel and bottom cover as described by the removal instructions on page 0-10. It is not necessary to remove the front panel.

The initial adjustment position for all PC board potentiometers, coils, and trimmer capacitors:

1. Set the FILTER OFFSET ADJUST (R331—Section 8) to midway position.
2. Set the TOUCH SENSITIVITY ADJUST (R509—Section 6) to midway position.
3. Set the BOTTOM OF BAND LIMIT ADJUST (R602—Section 9) to midway position.
4. Set the TOP OF BAND LIMIT ADJUST (R601—Section 9) to midway position.
5. Set the SCAN DOWN LIMIT ADJUST (R635—Section 9) to maximum CCW position.
6. Set the SCAN UP LIMIT ADJUST (R633—Section 9) to maximum CW position.
7. Set the SIGNAL STRENGTH ADJUST (R262—Section 3) to midway position.
8. Set the MIXER BIAS ADJUST (R224—Section 3) to maximum CW position.
9. Set the LEFT SEPARATION ADJUST (R921—Section 4) to midway position.
10. Set the FM OUTPUT LEVEL ADJUST (R905—Section 4) to midway position.
11. Set the RIGHT SEPARATION ADJUST (R920—Section 4) to midway position.
12. Set the 19kHz ADJUST (R908—Section 4) to midway position.
13. Set the MUTING ADJUST (R930—Section 4) to maximum CCW position.
14. Set the FILTER LEVEL ADJUST (R940—Section 4) to midway position.

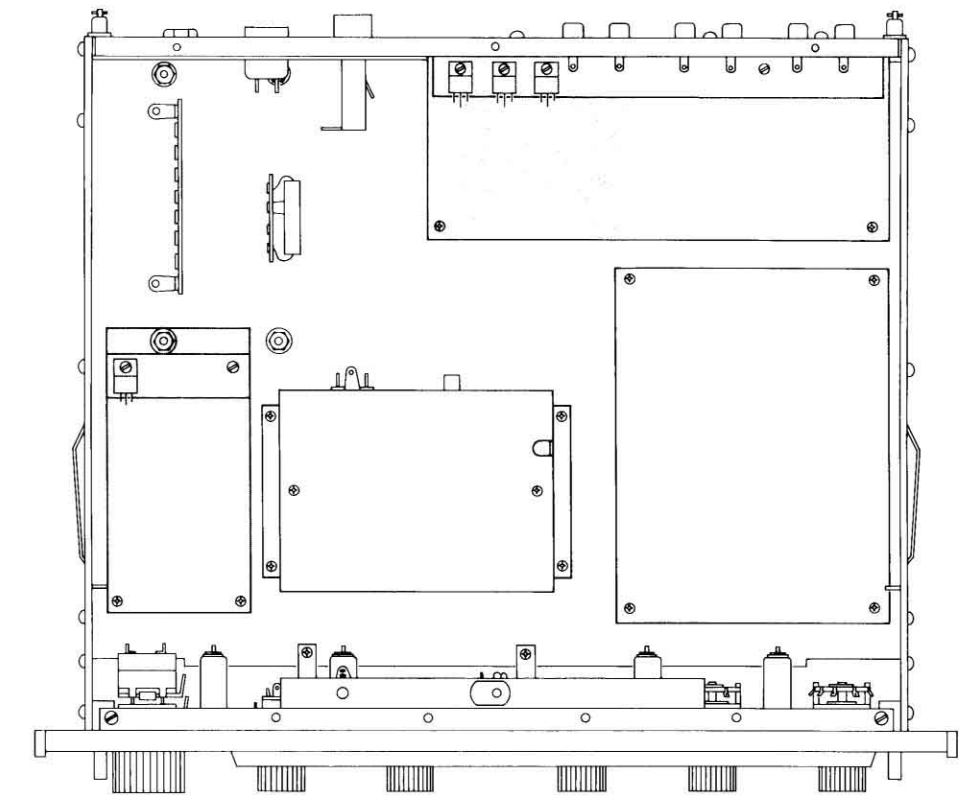
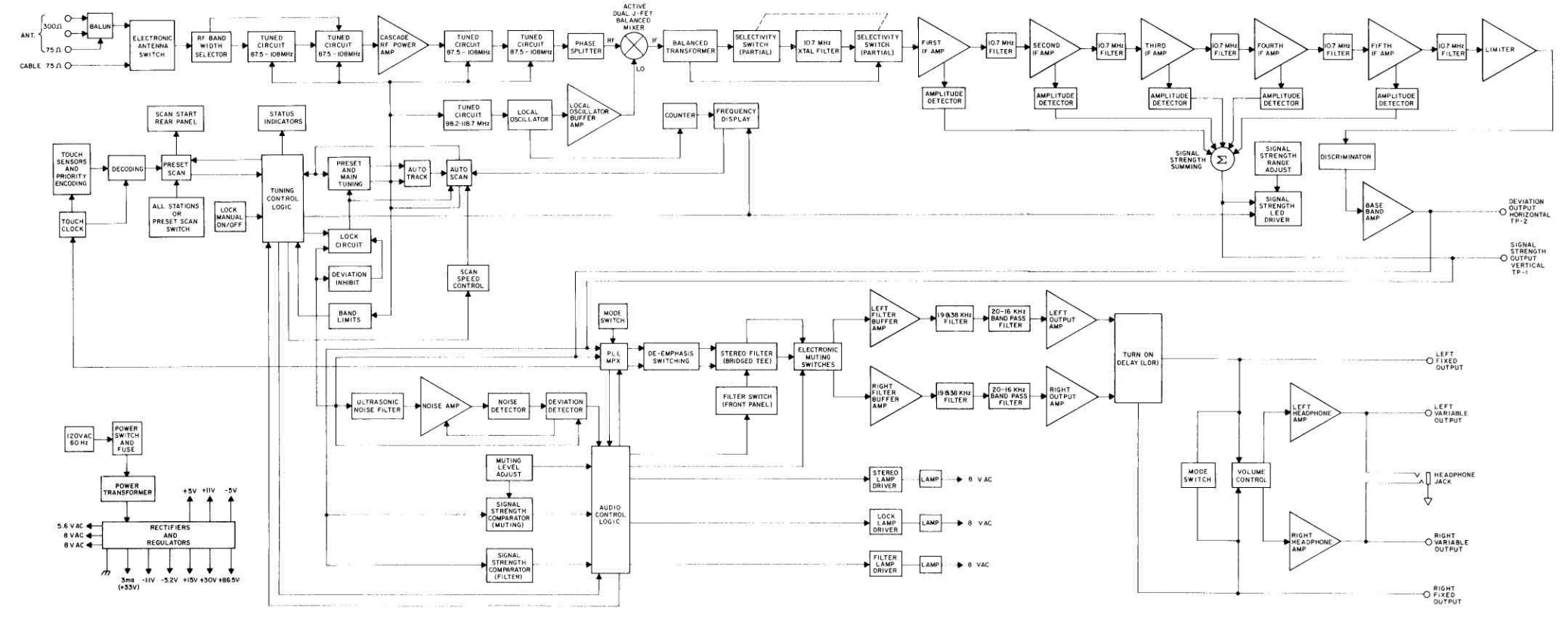
15. Set the slugs in the following coils of Section 3:
 - a. L211, 2 turns (.1" or 2.5mm) below top of coil form.
 - b. L206, 2-1/2 turns (.1" or 2.5mm) below top of coil form.
 - c. L207, 4-1/2 turns (.165" or 4.2mm) below top of coil form.
 - d. L203, 5 turns (.175" or 4.4mm) below top of coil form.
 - e. L204, 5 turns (.165" or 4.2mm) below top of coil form.

16. Set the slugs in the following trimmer capacitors of Section 3:
 - a. C241, 4 turns (.2" or 5.1mm) above top.
 - b. C215, 2 turns (.175" or 4.4mm) above top.
 - c. C217, 4 turns (.23" or 5.8mm) above top.
 - d. C207, 3 turns (.165" or 4.2mm) above top.
 - e. C208, 4 turns (.23" or 5.8mm) above top.

17. Set C227 in Section 3 fully closed (maximum capacitance).

18. Set the slugs in the following transformers of Section 3:
 - a. T201 top slug, 10 turns (.325" or 8.3mm) from top.
 - b. T201 bottom slug, 10-1/2 turns (.375" or 9.5mm) from bottom.
 - c. T202 top slug, 7 turns (.25" or 6.4mm) from top.
 - d. T202 bottom slug, 11-1/2 turns (.625" or 15.9mm) from bottom.

BLOCK DIAGRAM



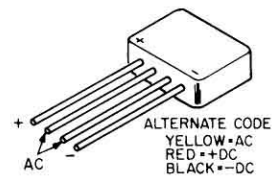
SECTION LOCATION - BOTTOM VIEW

SECTION 11 NOTES

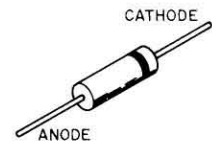
1. If one of the regulated supplies is not within the 5% voltage tolerances, or the unregulated supplies are not within the 20% voltage tolerances some defective component may be drawing excessive current, thereby pulling down the supply. To aid in that event, the connections to Power Supply PCB 2 are grouped together in a single connector for each circuit section so you can unplug one section feed at a time. (e.g. Pins 40, 39, 38, 37, 36 and 35 go to Section 8. Pins 23, 22 and 21 go to Section 6).
2. The -5.2V supply is regulated to $\pm 0.26V$
 The -15.0V supply is regulated to $\pm 0.75V$
 The +5.0V supply is regulated to $\pm 0.25V$
 The +15.0V supply is regulated to $\pm 0.75V$
 The +30.0V supply is regulated to $\pm 1.5V$

 The -10V, +10V and +86.5V supplies are not regulated and can vary $\pm 20\%$.

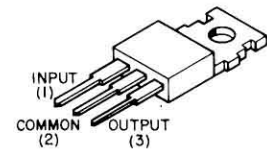
SEMICONDUCTOR IDENTIFICATION



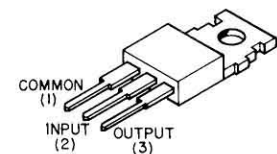
D701, D702
D704



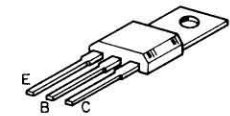
D703



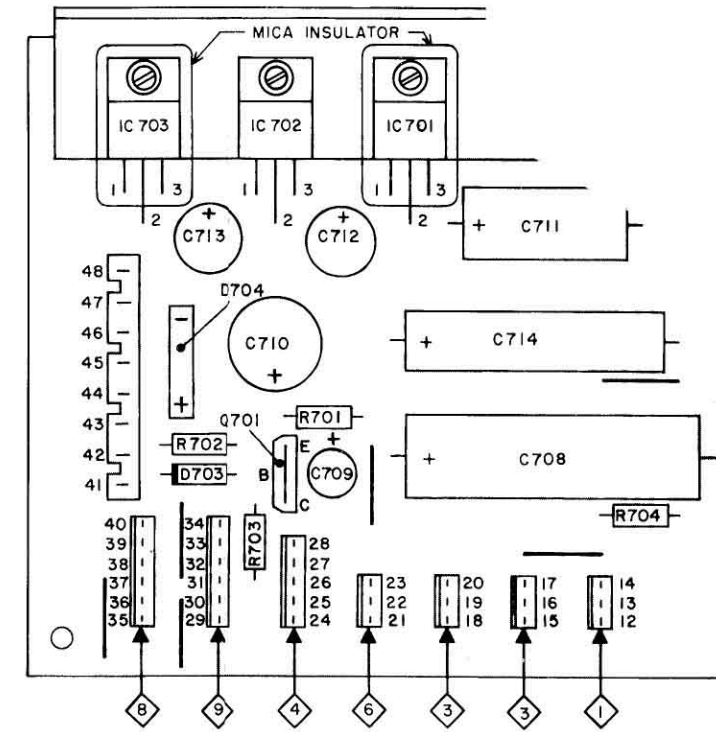
IC701, IC702



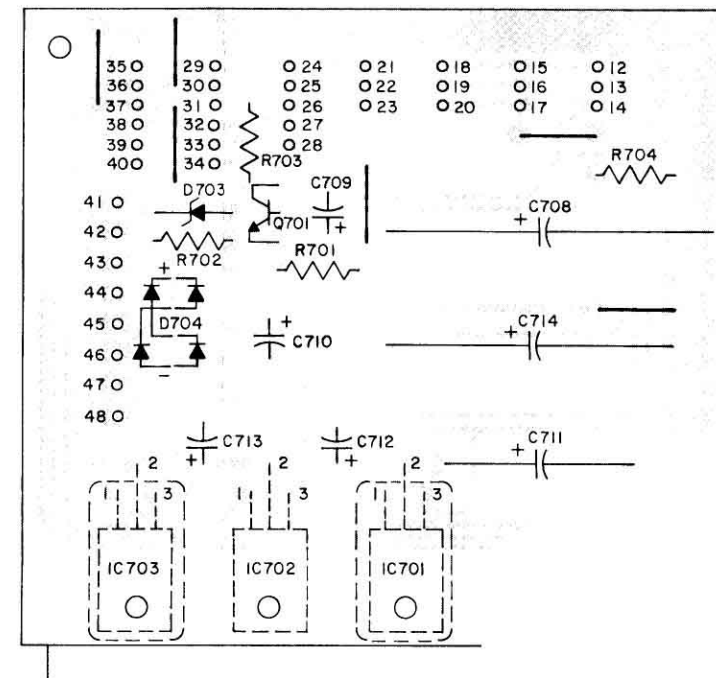
IC703, IC704



Q701

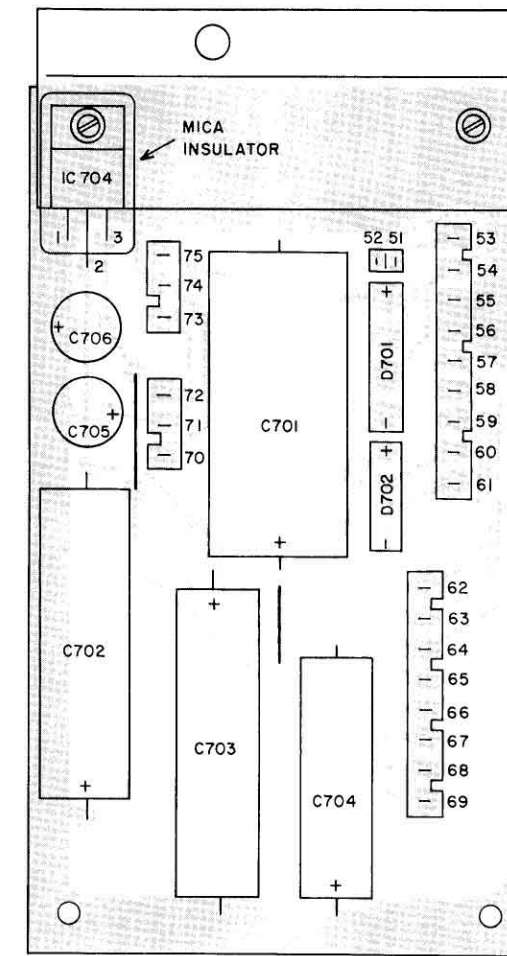


PC BOARD 045682 (Power Supply # 2)



CIRCUIT SIDE

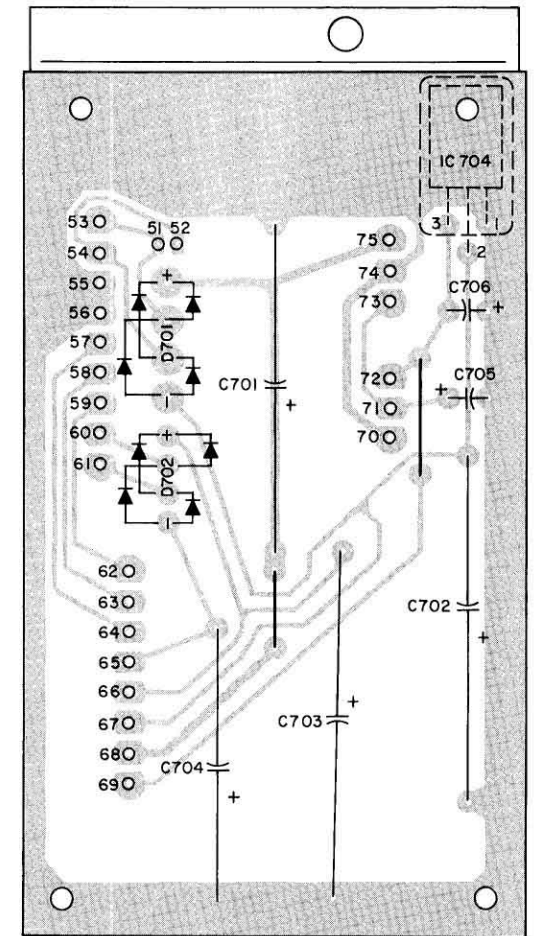
COMPONENT SIDE
(Circuit pattern shown is on the other side of the board)



COMPONENT SIDE

(Circuit pattern shown is on the other side of the board)

PC BOARD 045503
(Power Supply # 1)



CIRCUIT SIDE

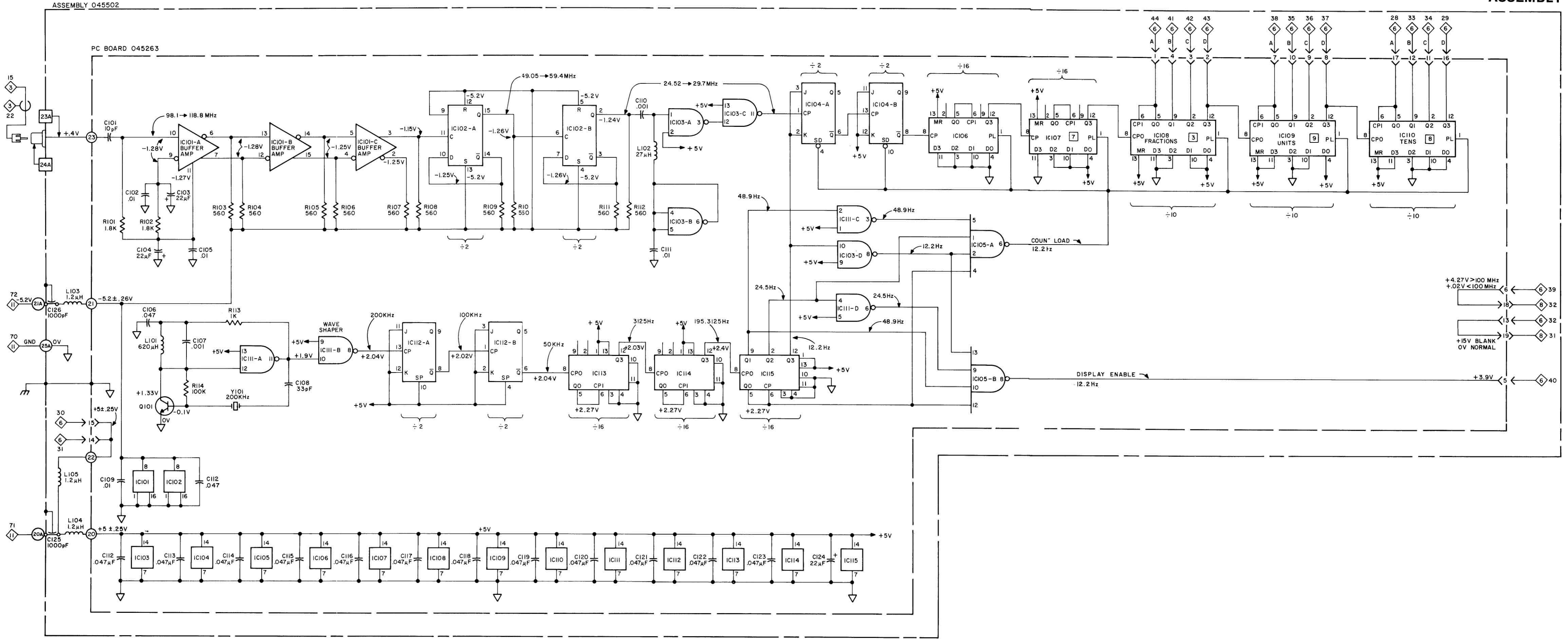
SECTION 10 PARTS LIST

Symbol No.	Part No.	Name/Description	Serial No.	Ref. No.
CAPACITORS (Elect = Electrolytic, CD = Ceramic Disc)				
C101	061009	CD, 10pF, 20%, NPO		
C102	061159	CD, .01μF, +80 - 20%, 50V		
C103	066241	Elect, 22μF, 6V		
C104	066241	Elect, 22μF, 6V		
C105	066159	CD, .01μF, +80 - 20%, 50V		
C106	061161	CD, .047μF, +80 - 20%, 50V		
C107	061106	CD, .001μF, 10%		
C108	061016	CD, 33pF, 10%, NPO		
C109	061159	CD, .01μF, +80 - 20%, 50V		
C110	061106	CD, .001μF, 10%		
C111	061159	CD, .01μF, +80 - 20%, 50V		
C112	061161	CD, .047μF, +80 - 20%, 50V		
C113	061161	CD, .047μF, +80 - 20%, 50V		
C114	061161	CD, .047μF, +80 - 20%, 50V		
C115	061161	CD, .047μF, +80 - 20%, 50V		
C116	061161	CD, .047μF, +80 - 20%, 50V		
C117	061161	CD, .047μF, +80 - 20%, 50V		
C118	061161	CD, .047μF, +80 - 20%, 50V		
C119	061161	CD, .047μF, +80 - 20%, 50V		
C120	061161	CD, .047μF, +80 - 20%, 50V		
C121	061161	CD, .047μF, +80 - 20%, 50V		
C122	061161	CD, .047μF, +80 - 20%, 50V		
C123	061161	CD, .047μF, +80 - 20%, 50V		
C124	066241	Elect, 22μF, 6V		
*C125	061101	Feed-Thru, 1000pF, GMV		
*C126	061101	Feed-Thru, 1000pF, GMV		
INTEGRATED CIRCUITS				
*IC101	133061	Triple Line Receiver, ECL, MC10116		
*IC102	133025	Dual Type D Flip-Flop, ECL, MC10131		
*IC103	133059	Quad 2-Input "Nand" Gate, Schottky, 74LS00		
*IC104	133062	Dual J-K Flip-Flop, Schottky, 74LS113		
*IC105	133072	Dual 4-Input "Nand" Gate, Schottky, 74LS20		
*IC106	133058	4-Bit Binary Counter, Schottky, 74LS197		
*IC107	133058	4-Bit Binary Counter, Schottky, 74LS197		
*IC108	133060	Decade Counter, Schottky, 74LS196		
*IC109	133060	Decade Counter, Schottky, 74LS196		
*IC110	133060	Decade Counter, Schottky, 74LS196		
*IC111	133059	Quad 2-Input "Nand" Gate, Schottky, 74LS00		
*IC112	133062	Dual J-K Flip-Flop, Schottky, 74LS113		
*IC113	133058	4-Bit Binary Counter, Schottky, 74LS197		
*IC114	133058	4-Bit Binary Counter, Schottky, 74LS197		
*IC115	133058	4-Bit Binary Counter, Schottky, 74LS197		

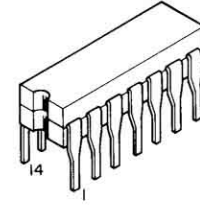
Symbol No.	Part No.	Name/Description	Serial No.	Ref. No.
INDUCTORS/COILS				
*L101	122195	Coil, 620μH		
*L102	122186	Coil, 27μH		
*L103	122011	Inductor, 1.2μH		
*L104	122011	Inductor, 1.2μH		
*L105	122011	Inductor, 1.2μH		
TRANSISTORS				
*Q101	132092	Silicon, NPN, BC-238C		
RESISTORS (CF = Carbon Film)				
R101	141055	CF, 1.8K, 5%, 1/4W		
R102	141055	CF, 1.8K, 5%, 1/4W		
R103	141043	CF, 560, 5%, 1/4W		
R104	141043	CF, 560, 5%, 1/4W		
R105	141043	CF, 560, 5%, 1/4W		
R106	141043	CF, 560, 5%, 1/4W		
R107	141043	CF, 560, 5%, 1/4W		
R108	141043	CF, 560, 5%, 1/4W		
R109	141043	CF, 560, 5%, 1/4W		
R110	141043	CF, 560, 5%, 1/4W		
R111	141043	CF, 560, 5%, 1/4W		
R112	141043	CF, 560, 5%, 1/4W		
R113	141049	CF, 1K, 5%, 1/4W		
R114	141096	CF, 100K, 5%, 1/4W		
CRYSTALS				
*Y101	180021	Crystal, 200kHz		

Parts marked with an asterisk () are replacement parts stocked by our Service Department and can be ordered only by part number from McIntosh Parts not marked can be obtained from electronic parts suppliers.

FREQUENCY COUNTER ASSEMBLY



SEMICONDUCTOR IDENTIFICATION



IC103, IC111
IC105

IC106, IC107
IC113, IC115
IC114

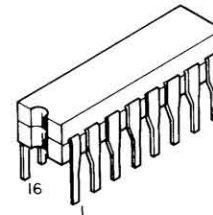
Logic Diagram 8

IC108-IC110

Logic Diagram 6

IC104, IC112

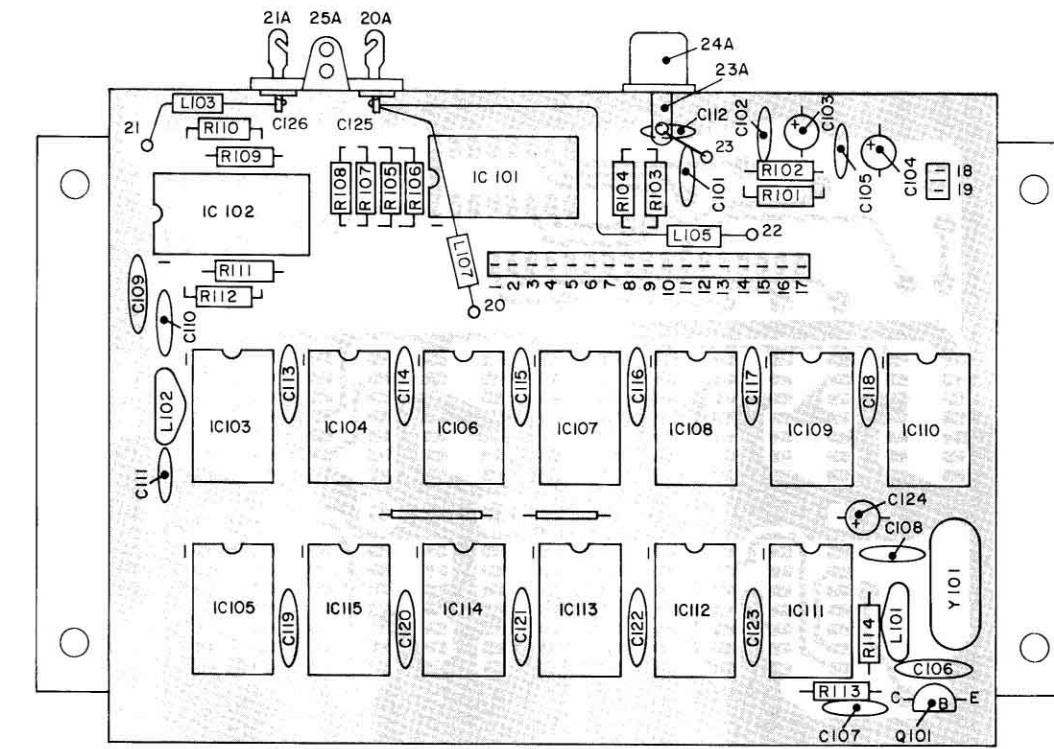
Logic Diagram 3



IC101, IC102

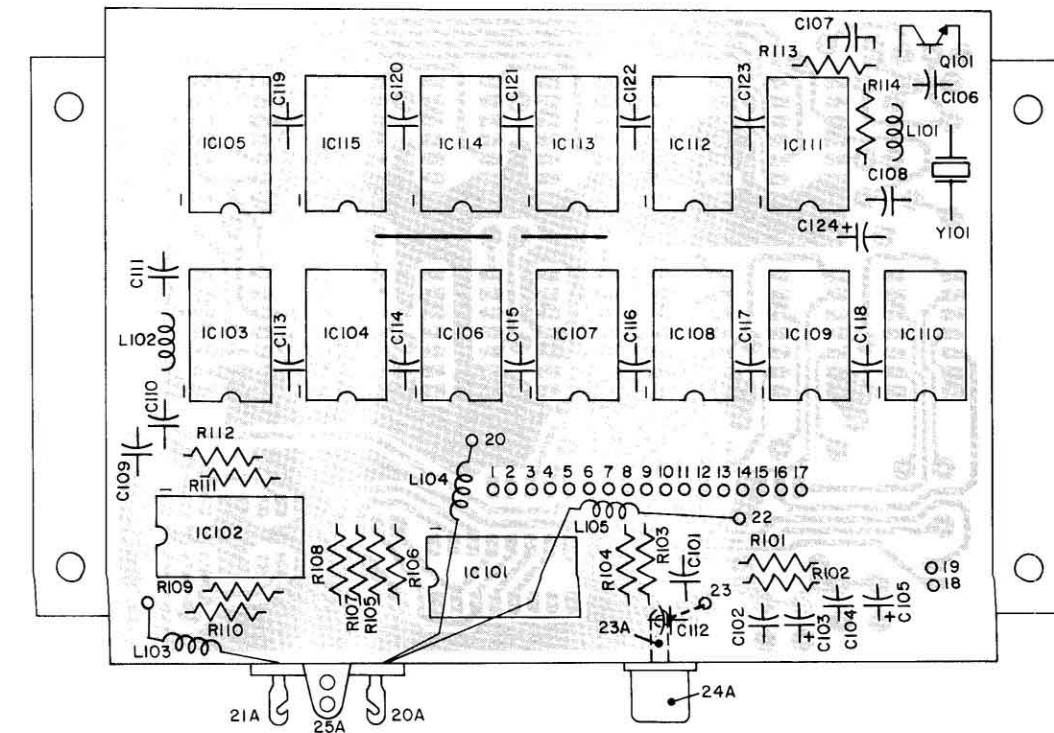


Q101



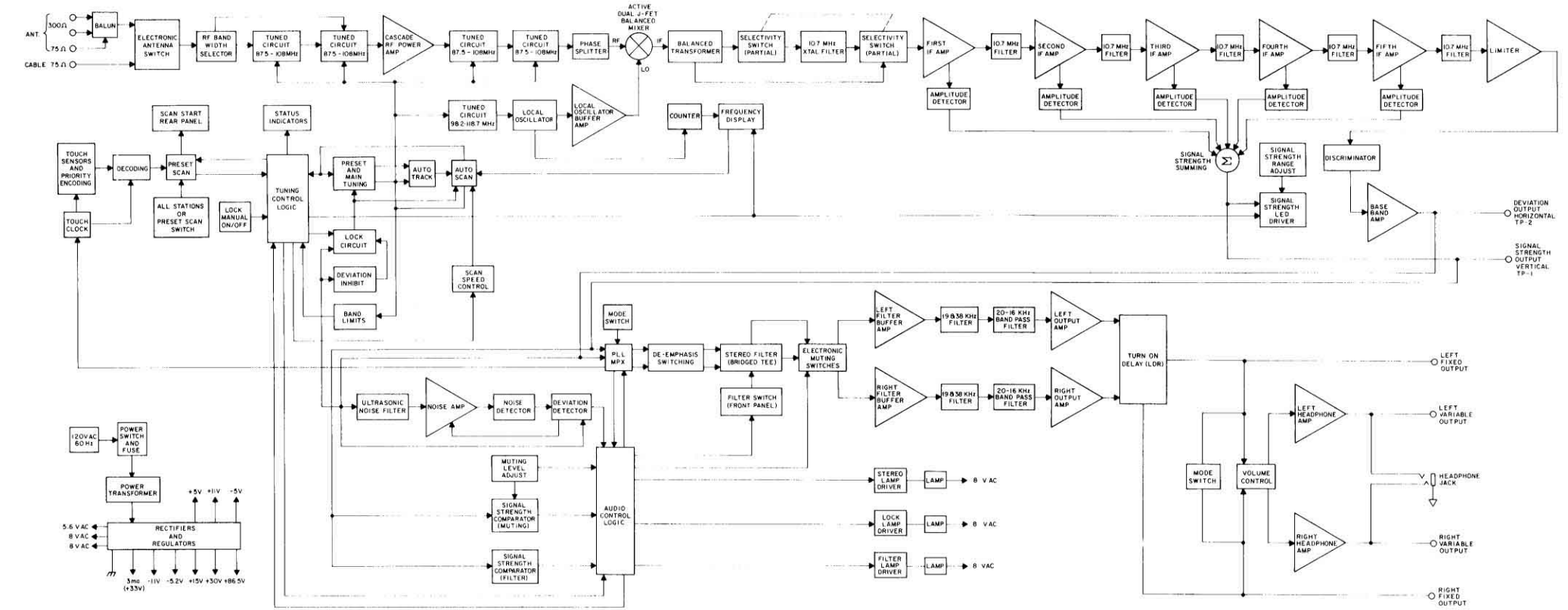
COMPONENT SIDE

PC BOARD 045263



CIRCUIT SIDE

BLOCK DIAGRAM



SECTION 10 NOTES

1. A signal from an FM generator (use CW mode) can be connected to the frequency counter input Pin 23A. The frequency counter displayed frequency is always the input frequency minus 10.7 MHz (e.g. when the FM generator is tuned to 107.0MHz, - 10.7MHz will produce 96.3MHz on the display). The sensitivity of the frequency counter is 20kμV (typical sensitivity is 15 KμV).
2. Disconnect the input to the frequency Pin 23A and plug in a shorting plug. The frequency display should indicate 89.3MHz which is the tet pre-load number.
3. To test the counter pre-load number (7398), remove IC104, the frequency display should be 89.3MHz.
The counter pre-load numbers are:
IC107 is loaded with 7 base 16
IC108 is loaded with 3
IC109 is loaded with 9
IC110 is loaded with 8
4. The flat ribbon cable may be unplugged from the PC board to work on the circuits. The LED frequency display will be turned off when the ribbon cable is unplugged.
5. When checking for Figures 10-1 and 10-2, use a 10/1 scope probe.

6. IC115 Pin 12, IC105A Pin 6 and IC105B Pin 8 outputs are all 12.2Hz rectangular waves, however they have different duty cycles (See Figures 10-1 and 10-2).

The pulse duration time of the 12.2Hz output at Pin 12 of IC115 is 40.98mS during the positive portion of the rectangular wave and the same duration for the negative portion. The positive gating pulse of 40.98mS from IC115 Pin 12 is used to gate on IC104A via Pins 2 and 3; the negative pulse of 40.98mS is used to gate off IC104A.

The pulse duration time of the 12.2Hz outputs at Pins 6 and 8 of IC105A and B is 75.96mS during the positive portion of the rectangular wave and 6mS during the negative portion. The 6 mS gating pulse of IC105A Pin 6 is used to reset the counters IC104, IC106, IC107, IC108, IC109 and IC110, and the other 6mS gating pulse of IC105B Pin 8 is used to enable the display (Section 6 IC503, IC504 and IC505). Refer to circuit operation Section 10 for a complete description.
7. To verify if the counter circuits are functioning, short to ground Pin 8 of IC105B (the display enable Out). The frequency display should show a flashing display of 188.8MHz. The

display latch is enabled and the counters are counting up at a 12Hz rate. The counter can also be checked by shorting to ground Pin 6 of IC105A (the count load gating pulse), the frequency display should read the count load number.

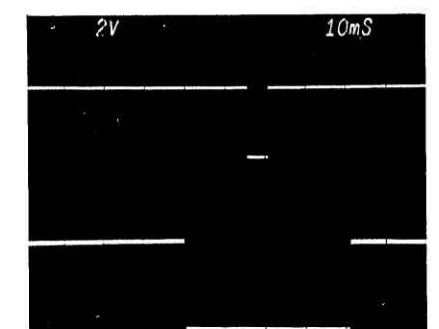


Figure 10-1. UPPER TRACE - the display enable gating pulse at pin 8 of IC105. LOWER TRACE - the counter input gating pulse at pin 12 of IC115.

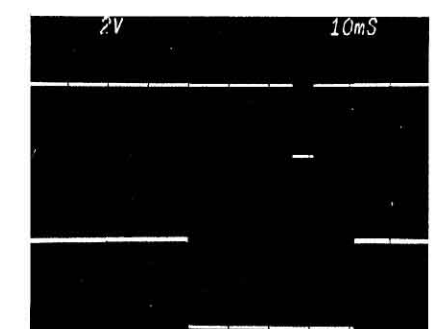
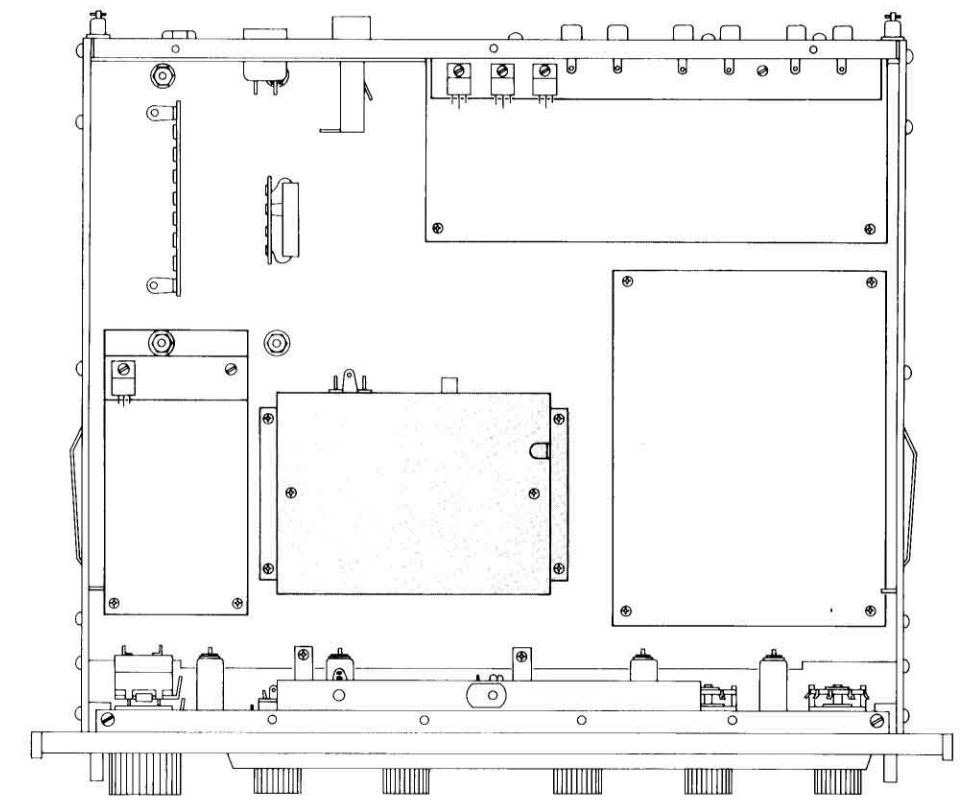
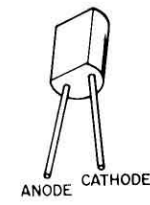


Figure 10-2. UPPER TRACE - count load gating pulse at pin 6 of IC105A. LOWER TRACE - counter input gating pulse at pin 12 of IC115.

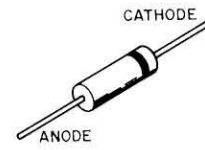


SECTION LOCATION - BOTTOM VIEW

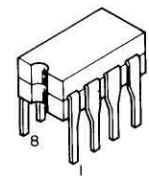
SEMICONDUCTOR IDENTIFICATION



D601



D602-D608



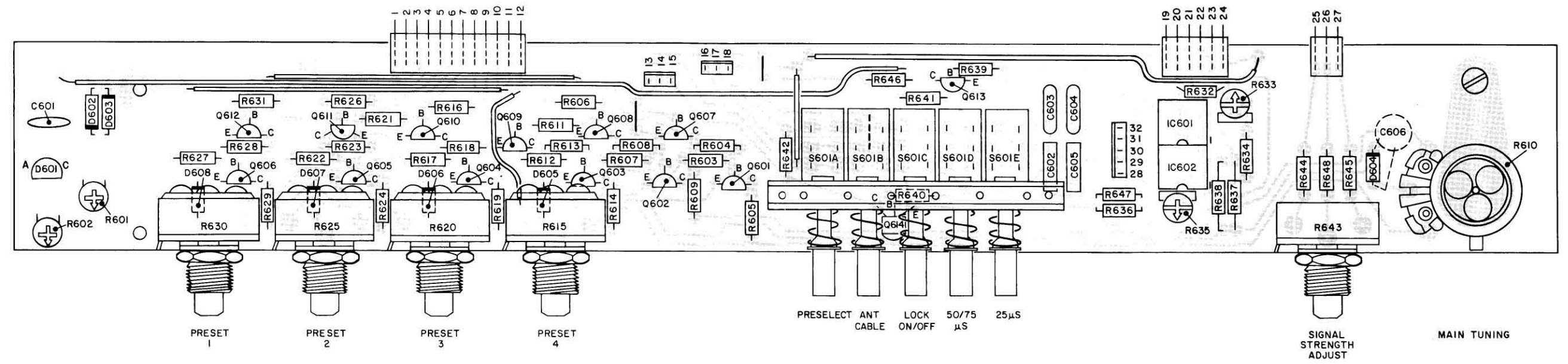
IC601, IC602



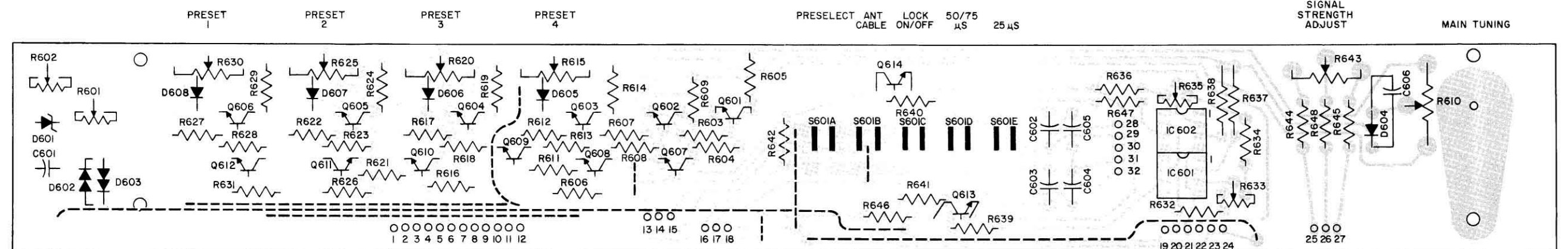
Q601-Q614

COMPONENT SIDE

(Circuit pattern shown is on the other side of the board)

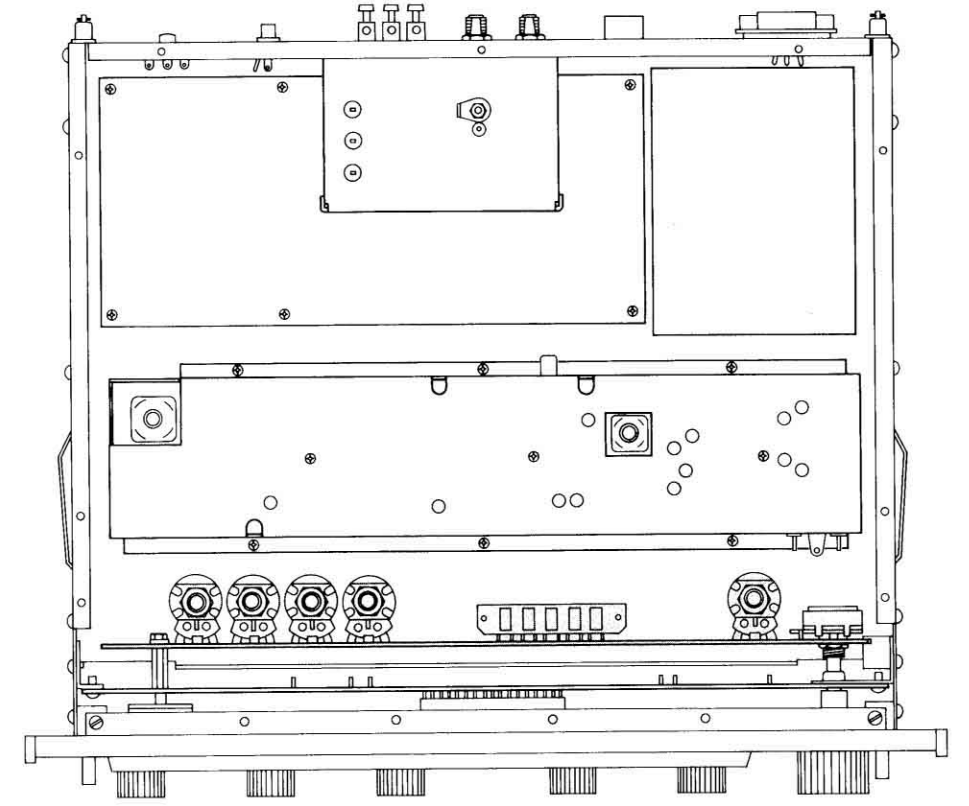
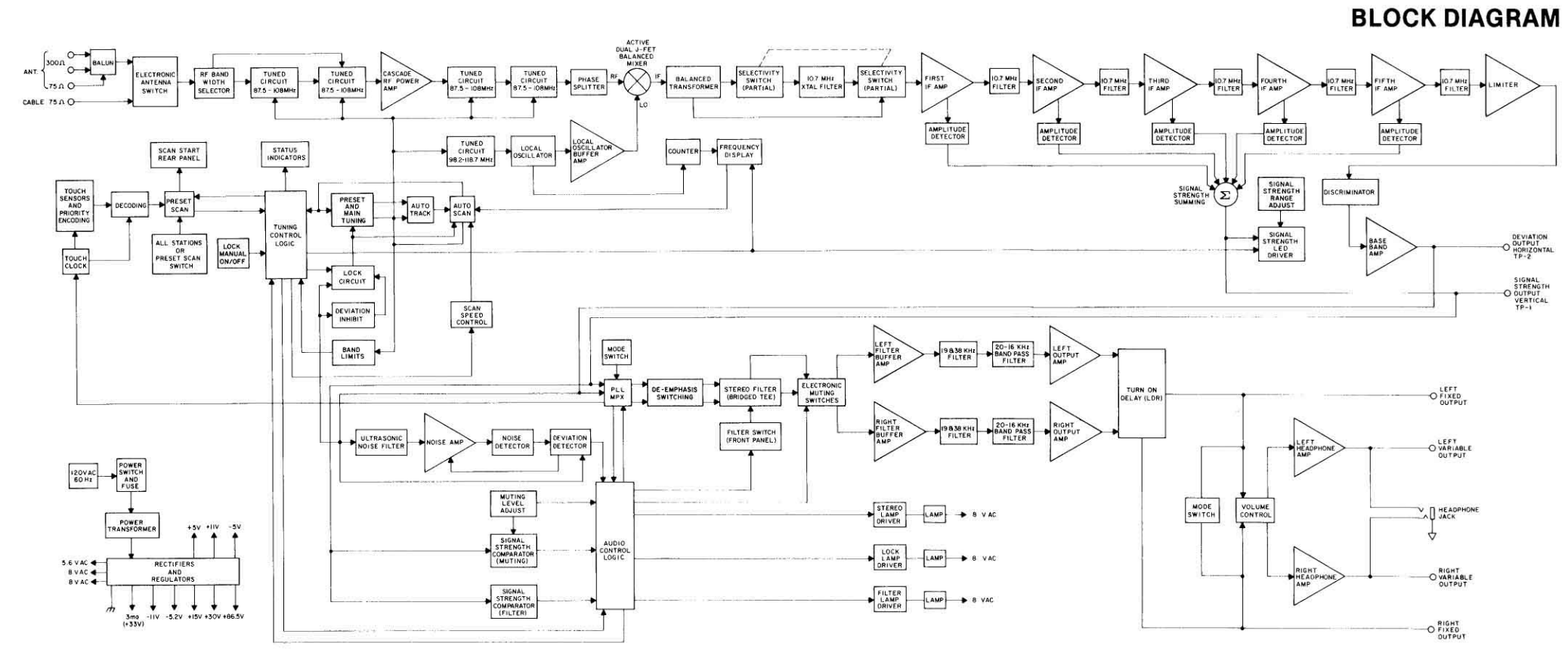


PC BOARD 045345



CIRCUIT SIDE

TOP COVER CONTROLS, BAND LIMITS, MAIN TUNING and PRESET TUNING

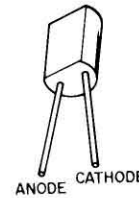


SECTION 9 NOTES

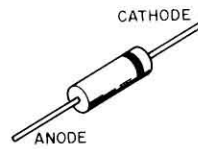
1. Zener diode D 601 regulates the tuning voltage for main and preset tuning. The +33V measured at the cathode of D 601 is regulated to $\pm 1.65V$.

SECTION LOCATION - TOP VIEW

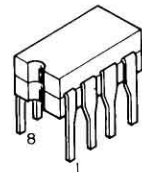
SEMICONDUCTOR IDENTIFICATION



D601



D602-D608



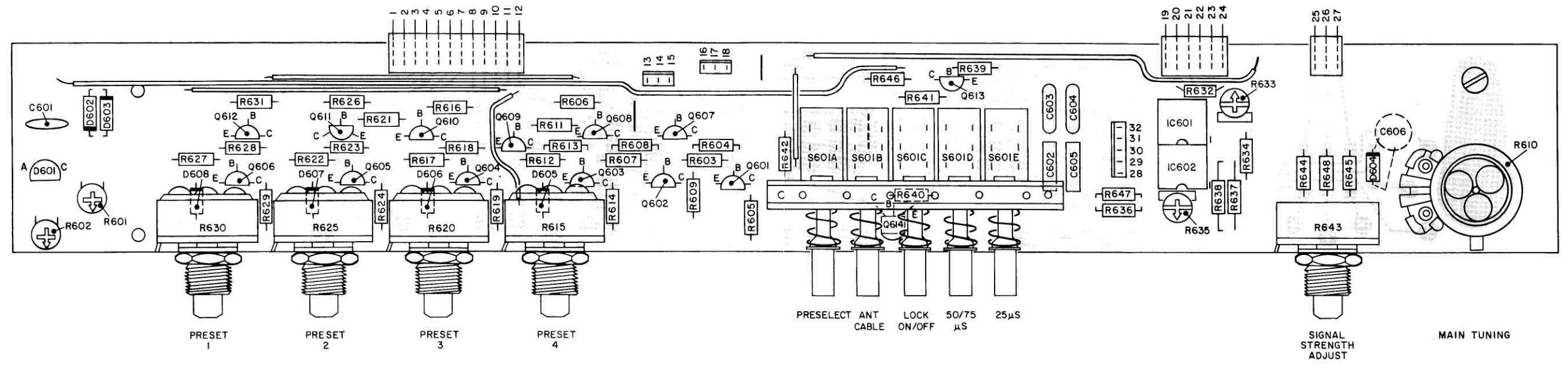
IC601, IC602



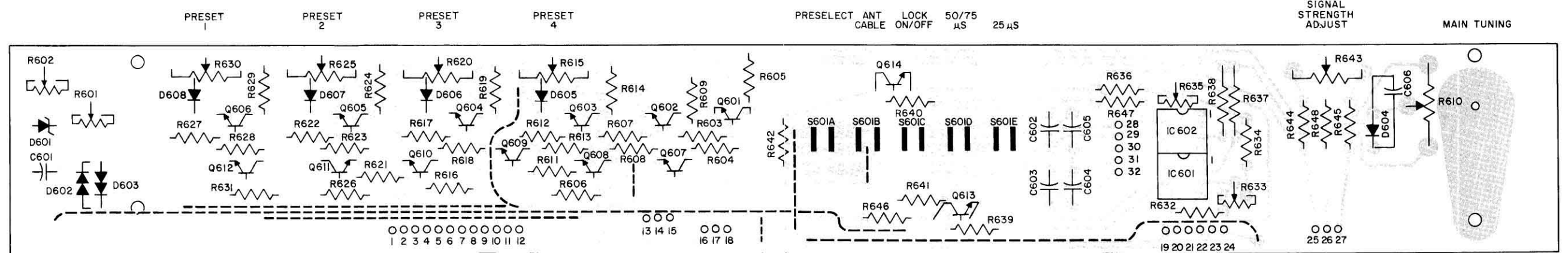
Q601-Q614

COMPONENT SIDE

(Circuit pattern shown is on the other side of the board)



PC BOARD 045345



CIRCUIT SIDE

SECTION 8 PARTS LIST

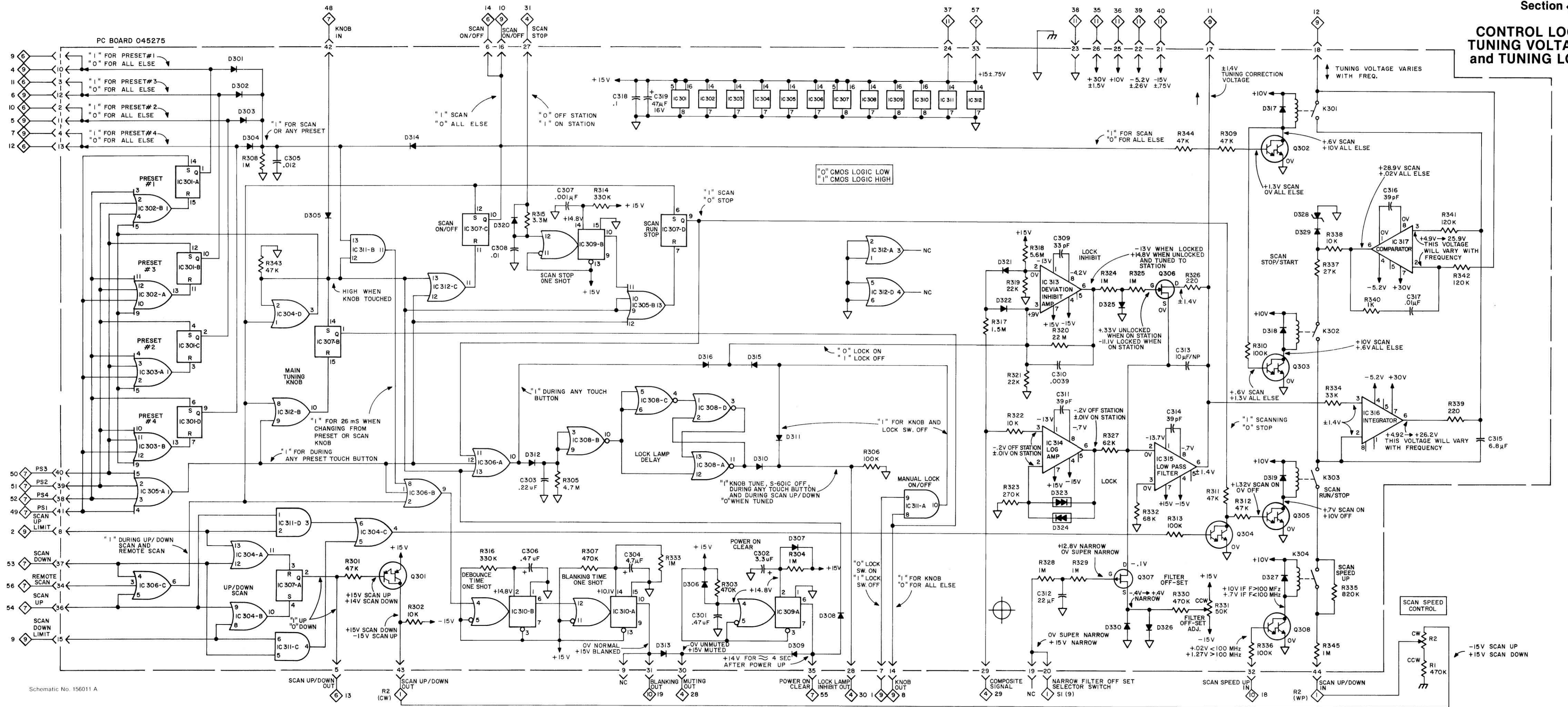
Symbol No.	Part No.	Name/Description	Serial No.	Ref. No.
CAPACITORS (Elect = Electrolytic, MPE = Metalized Polyester, MPC = Metalized Polycarbonate, CD = Ceramic Disc)				
C301	066289	Elect, 4.7 μ F, 10%, 25V		
C302	066238	Elect, 3.3 μ F, 50V		
*C303	064258	MPE, .22 μ F, 10%, 63V		
C304	066289	Elect, 4.7 μ F, 10%, 25V		
*C305	064243	MPE, .012 μ F, 10%, 63V		
C306	066244	Elect, .47 μ F, 50V		
C307	061106	CD, .001 μ F, 10%		
*C308	064242	MPE, .01 μ F, 10%, 63V		
C309	061016	CD, 33pF, 10%, NPO		
*C310	064237	MPE, .0039 μ F, 10%, 63V		
C311	061017	CD, 39pF, 10%, N330		
*C312	064258	MPE, .22 μ F, 10%, 100V		
C313	066173	Elect, 10 μ F, 35V, NPO		
C314	061017	CD, 39pF, 10%, N330		
*C315	064282	MPC, 6.8 μ F, 10%, 63V		
C316	061017	CD, 39pF, 10%, N330		
*C317	064242	MPE, .01 μ F, 10%, 63V		
C318	061113	CD, .1 μ F, + 80 - 20%, 100V		
C319	066215	Elect, 47 μ F, 16V		
DIODES				
*D301	070047	Silicon, 1N4148		
*D302	070047	Silicon, 1N4148		
*D303	070047	Silicon, 1N4148		
*D304	070047	Silicon, 1N4148		
*D305	070047	Silicon, 1N4148		
*D306	070047	Silicon, 1N4148		
*D307	070047	Silicon, 1N4148		
*D308	070047	Silicon, 1N4148		
*D309	070047	Silicon, 1N4148		
*D310	070047	Silicon, 1N4148		
*D311	070047	Silicon, 1N4148		
*D312	070047	Silicon, 1N4148		
*D313	070047	Silicon, 1N4148		
*D314	070047	Silicon, 1N4148		
*D315	070047	Silicon, 1N4148		
*D316	070047	Silicon, 1N4148		
*D317	070047	Silicon, 1N4148		
*D318	070047	Silicon, 1N4148		
*D319	070047	Silicon, 1N4148		
*D320	070047	Silicon, 1N4148		
*D321	070047	Silicon, 1N4148		
*D322	070047	Silicon, 1N4148		
*D323	070046	Silicon, Stabistor, 1.344V, 2% @ 10mA, MZ2361		
*D324	070046	Silicon, Stabistor, 1.344V, 2% @ 10mA, MZ2361		
*D325	070047	Silicon, 1N4148		
*D326	070047	Silicon, 1N4148		
*D327	070047	Silicon, 1N4148		
*D328	070088	Zener, 5.1V, 10%		
*D329	070047	Silicon, 1N4148		
*D330	070047	Silicon, 1N4148		

Symbol No.	Part No.	Name/Description	Serial No.	Ref. No.
INTEGRATED CIRCUITS				
*IC301	133075	CMOS Quad "Nor" R-S Latch, CD4043B		
*IC302	133074	CMOS Dual 4-Input "Or" Gate, CD4072B		
*IC303	133074	CMOS Dual 4-Input "Or" Gate, CD4072B		
*IC304	133073	CMOS Quad 2-Input "Or" Gate, CD4071B		
*IC305	133074	CMOS Dual 4-Input "Or" Gate, CD4072B		
*IC306	133077	CMOS Triple 3-Input "Or" Gate, CD4075B		
*IC307	133075	CMOS Quad "Nor" R-S Latch, CD4043B		
*IC308	133064	CMOS Quad 2-Input "Nor" Gate, CD4001B		
*IC309	133078	CMOS Dual Monostable Multivibrator, CD4528B		
*IC310	133078	CMOS Dual Monostable Multivibrator, CD4528B		
*IC311	133076	CMOS Quad 2-Input "And" Gate, CD4081B		
*IC312	133073	CMOS Quad 2-Input "Or" Gate, CD4071B		
*IC313	133068	Op Amp, LM201A		
*IC314	133068	Op Amp, LM201A		
*IC315	133068	Op Amp, LM201A		
*IC316	133054	MOS-FET Op Amp, CA3140S		
*IC317	133043	J-FET Input Op Amp, LF-356-IM		
RELAYS				
*K301	087023	Reed, SPST		
*K302	087023	Reed, SPST		
*K303	087023	Reed, SPST		
*K304	087023	Reed, SPST		
TRANSISTORS				
*Q301	132182	Silicon, PNP, Darlington, MPS-A64		
*Q302	132090	Silicon, NPN, Darlington, MPS-A14		
*Q303	132090	Silicon, NPN, Darlington, MPS-A14		
*Q304	132090	Silicon, NPN, Darlington, MPS-A14		
*Q305	132090	Silicon, NPN, Darlington, MPS-A14		
*Q306	132097	N Channel J-FET, 2N5245		
*Q307	132170	P Channel J-FET, MPF970		
*Q308	132090	Silicon, NPN, Darlington, MPS-A14		
RESISTORS (CF = Carbon Film, CC = Carbon Composition, Pot = Potentiometer)				
R301	141088	CF, 47K, 5%, 1/4W		
R302	141072	CF, 10K, 5%, 1/4W		
R303	141112	CF, 470K, 5%, 1/4W		

Symbol No.	Part No.	Name/Description	Serial No.	Ref. No.
R304	141120	CF, 1M, 5%, 1/4W		
R305	141128	CF, 4.7M, 5% 1/4W		
R306	141096	CF, 100K, 5%, 1/4W		
R307	141112	CF, 470K, 5%, 1/4W		
R308	141120	CF, 1M, 5%, 1/4W		
R309	141088	CF, 47K, 5%, 1/4W		
R310	141096	CF, 100K, 5%, 1/4W		
R311	141088	CF, 47K, 5%, 1/4W		
R312	141088	CF, 47K, 5% 1/4W		
R313	141096	CF, 100K, 5%, 1/4W		
R314	141108	CF, 330K, 5%, 1/4W		
R315	141126	CF, 3.3M, 5%, 1/4W		
R316	141108	CF, 330K, 5%, 1/4W		
R317	141122	CF, 1.5M, 5%, 1/4W		
R318	136557	CC, 5.6M, 10%, 1/4W		
R319	141080	CF, 22K, 5%, 1/4W		
R320	136477	CC, 22M, 10%, 1/4W		
R321	141080	CF, 22K, 5%, 1/4W		
R322	141072	CF, 10K, 5%, 1/4W		
R323	141106	CF, 270K, 5%, 1/4W		
R324	141120	CF, 1M, 5%, 1/4W		
R325	141120	CF, 1M, 5%, 1/4W		
R326	141033	CF, 220, 5%, 1/4W		
R327	141091	CF, 62K, 5%, 1/4W		
R328	141120	CF, 1M, 5%, 1/4W		
R329	141120	CF, 1M, 5%, 1/4W		
R330	141112	CF, 470K, 5%, 1/4W		
*R331	134324	Pot, 50K, Linear		
R332	141092	CF, 68K, 5%, 1/4W		
R333	141120	CF, 1M, 5%, 1/4W		
R334	141084	CF, 33K, 5%, 1/4W		
R335	141118	CF, 820K, 5%, 1/4W		
R336	141096	CF, 100K, 5%, 1/4W		
R337	141082	CF, 27K, 5%, 1/4W		
R338	141072	CF, 10K, 5%, 1/4W		
R339	141033	CF, 220, 5%, 1/4W		
R340	141049	CF, 1K, 5%, 1/4W		
R341	141098	CF, 120K, 5%, 1/4W		
R342	141098	CF, 120K, 5%, 1/4W		
R343	141088	CF, 47K, 5%, 1/4W		
R344	141088	CF, 47K, 5%, 1/4W		
R345	141120	CF, 1M, 5%, 1/4W		

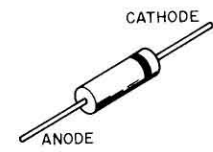
Parts marked with an asterisk () are replacement parts stocked by our Service Department and can be ordered only by part number from McIntosh. Parts not marked can be obtained from electronic parts suppliers.

CONTROL LOGIC, TUNING VOLTAGE, and TUNING LOCK

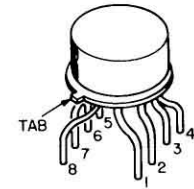


Schematic No. 156011 A

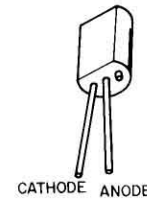
SEMICONDUCTOR IDENTIFICATION



D301-D327
D329, D330



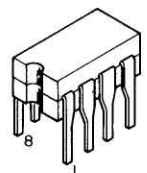
IC316



D328



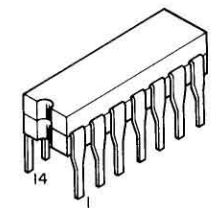
Q301-Q305
Q308



IC313-IC315
IC317



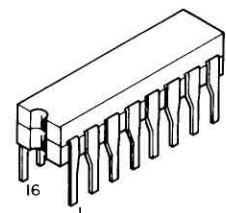
Q306



IC302-IC306
IC308
IC311, IC312



Q307

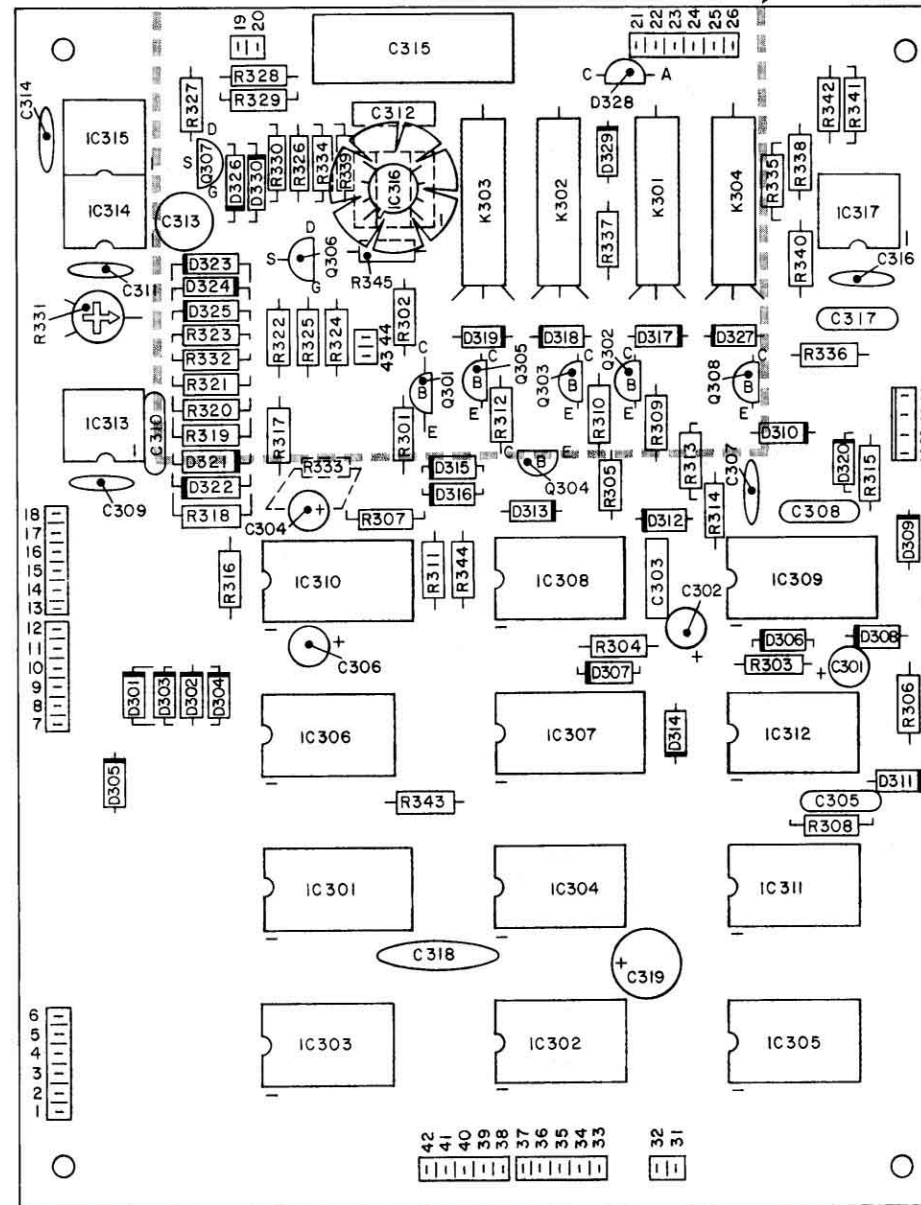


IC301, IC307 Logic Diagram 2
IC309, IC310

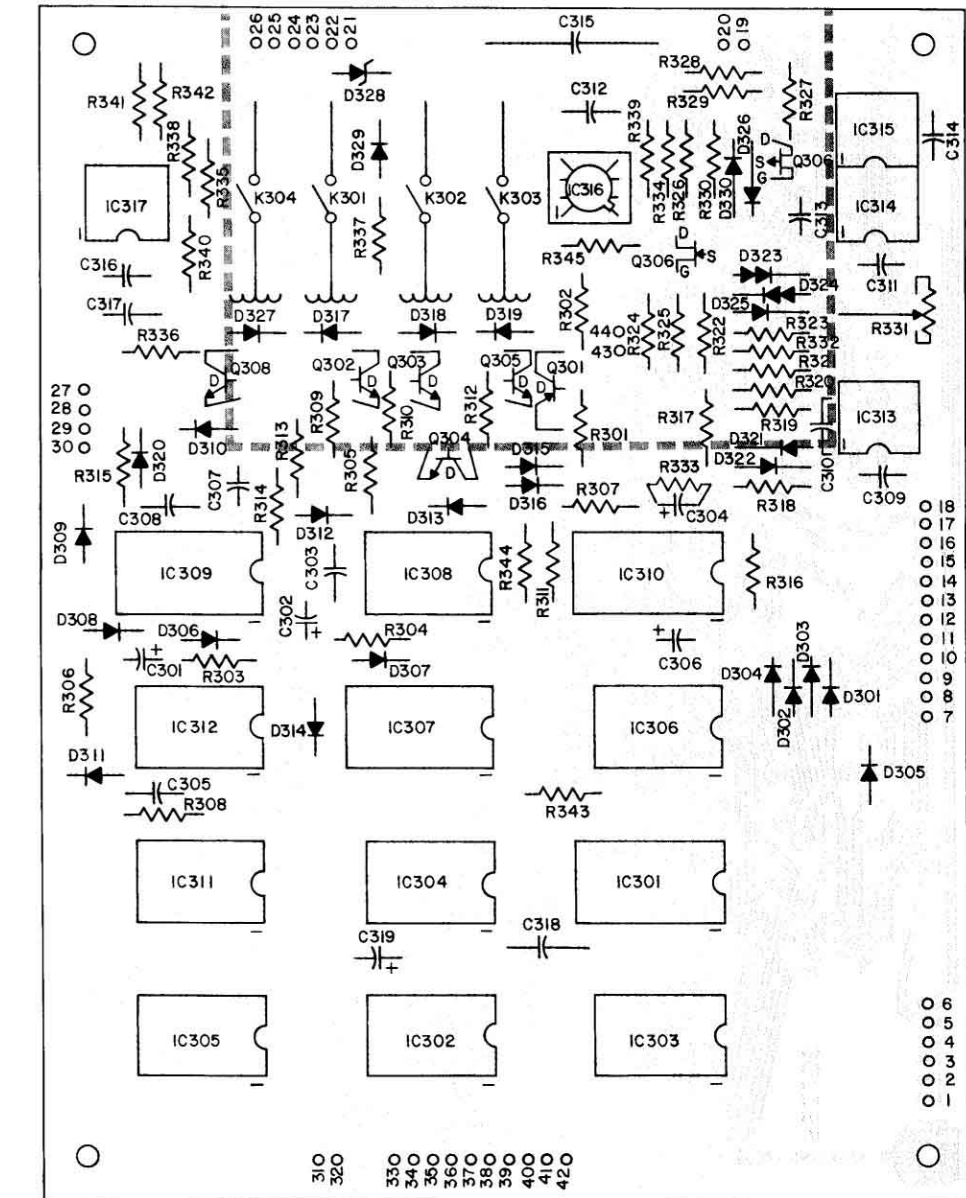
CAUTION: Do not touch these areas of board. Refer to Section 8 note 4.

COMPONENT SIDE

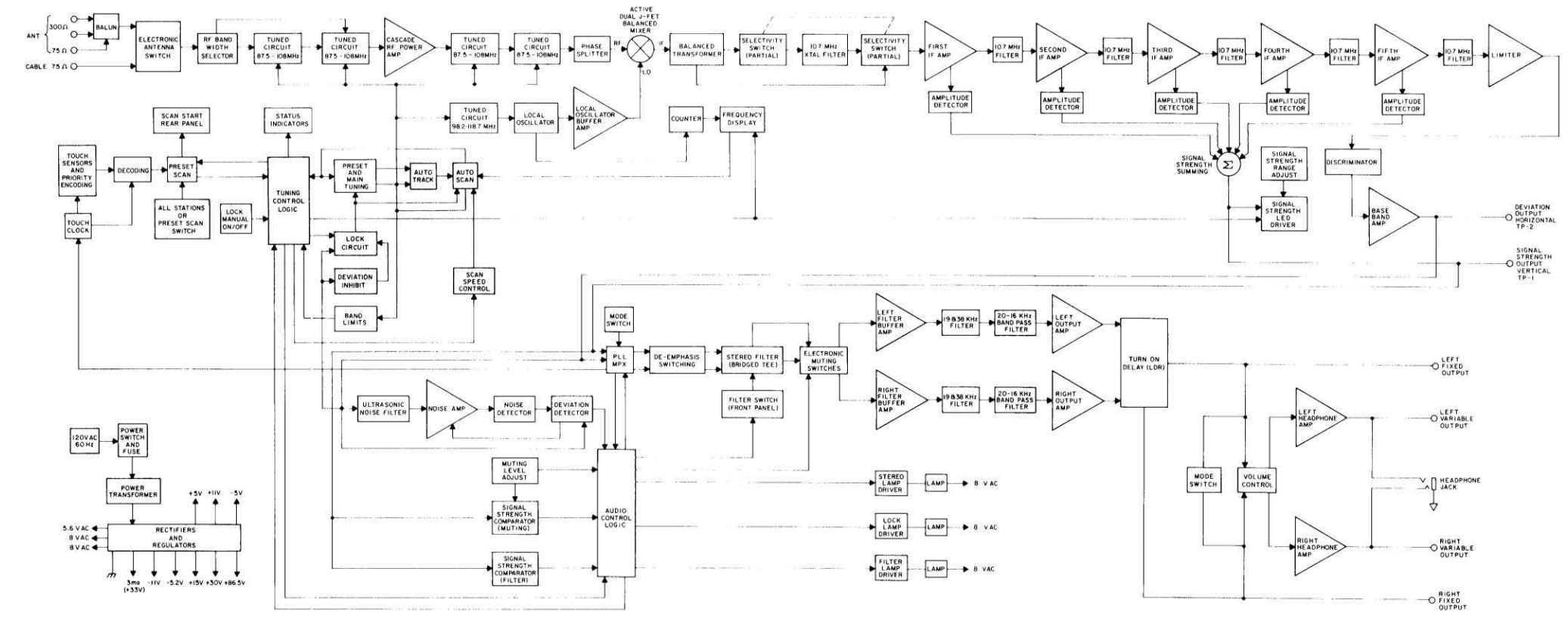
CIRCUIT SIDE



PC BOARD 045275



BLOCK DIAGRAM



SECTION 8 NOTES

1. WARNING! All of the IC's in this section except IC313, IC314, IC315, and IC317 are sensitive to static electricity and can be damaged. Refer to general note 6 for safe handling procedure.
2. CMOS logic levels apply. See general note 4.
3. Relays K301 and K303 are closed and relay K302 is open when in scan mode. Relays K301 and K303 are open and relay K302 is closed when in main tuning knob or preset mode. Relay K304 is open below 100MHz and is closed above 100MHz.
4. CAUTION: You should follow the procedure listed below whenever you handle Section 8 PCB. If you do not follow this procedure, the high impedance circuits and their associated PCB area (outlined in red) may be contaminated by salt and oil from your skin. When this area becomes contaminated, improper scan circuit operation may result.
 - a. Wash your hands with soap and water before you handle Section 8 PCB. Handle the circuit board only by the edges of the non red outlined area.
 - b. When soldering, avoid any excessive accumulation of rosin build up. Whenever

- c. you solder a connection remove any rosin after soldering with rosin solvent.
- In the event that the outlined red area of Section 8 PCB should become contaminated, use a suitable solvent (e.g. denatured alcohol) to remove the contamination.

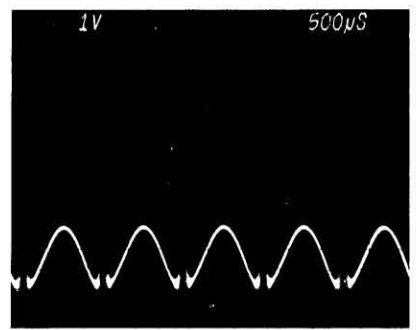


Figure 8-1. Signal at pin 6 of IC314 with lock switch S601D switched OFF. The MR 80 is tuned to 89.9MHz and the FM signal generator is tuned to 90.0MHz, 1000µV (65dBf), in stereo @ 1kHz.

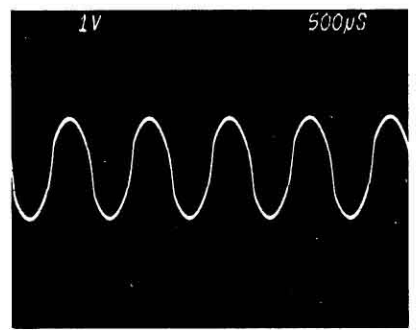
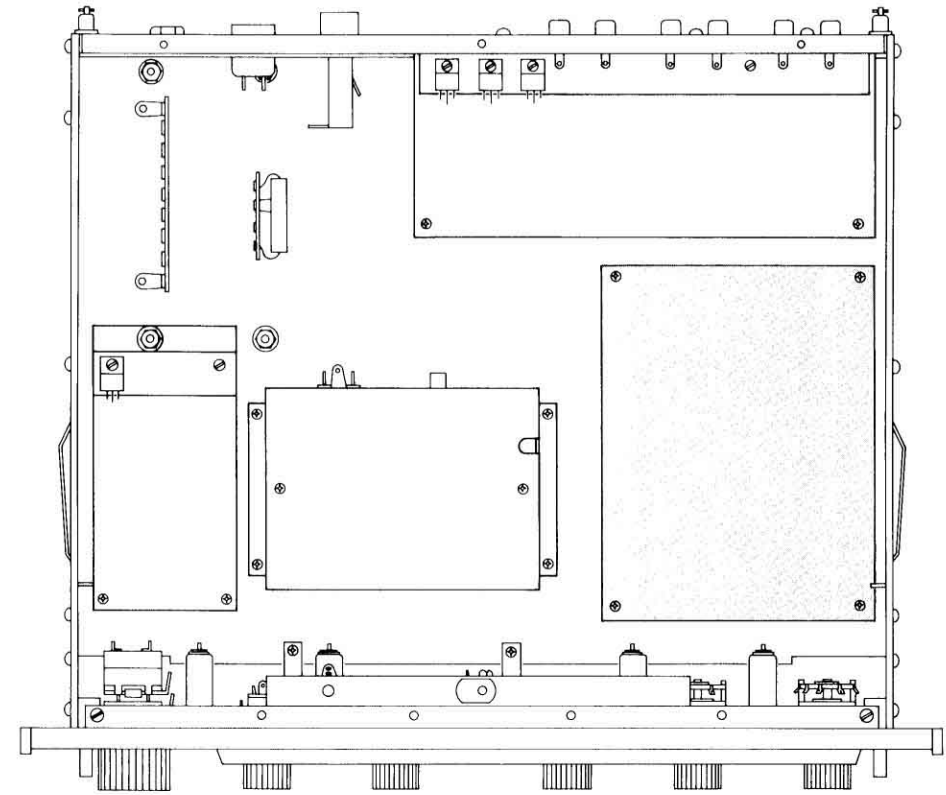
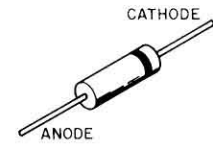


Figure 8-2. Signal at pin 6 of IC314 with lock switch S601D switched ON. The MR 80 is tuned to 89.9MHz and the FM signal generator is tuned to 90.0MHz, 1000µV (65dBf), in stereo @ 1kHz.

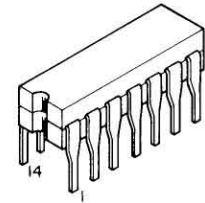


SECTION LOCATION - BOTTOM VIEW

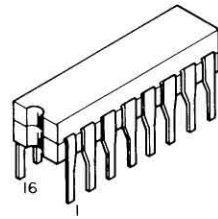
SEMICONDUCTOR IDENTIFICATION



D1001-D1014



IC1001, IC1002
IC1005



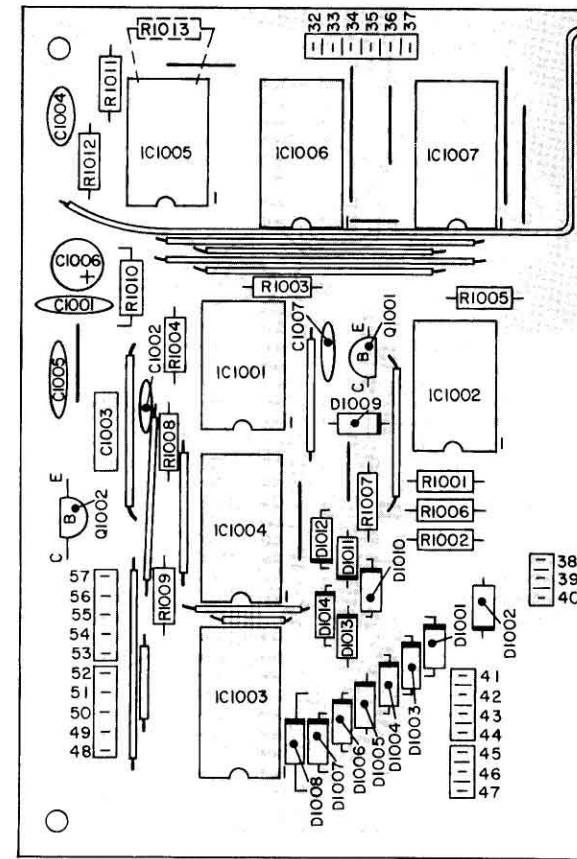
IC1003 Logic Diagram 7
IC1004 Logic Diagram 1
IC1006, IC1007



Q1001



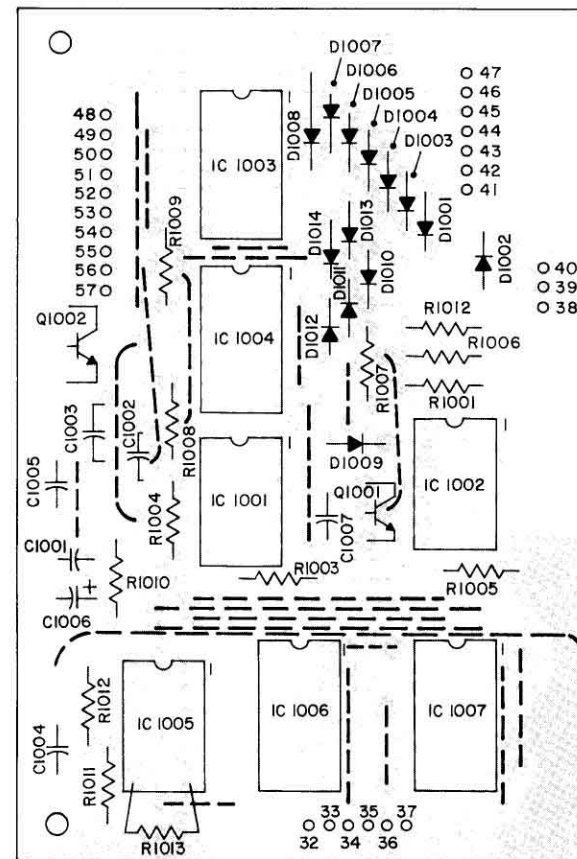
Q1002



COMPONENT SIDE

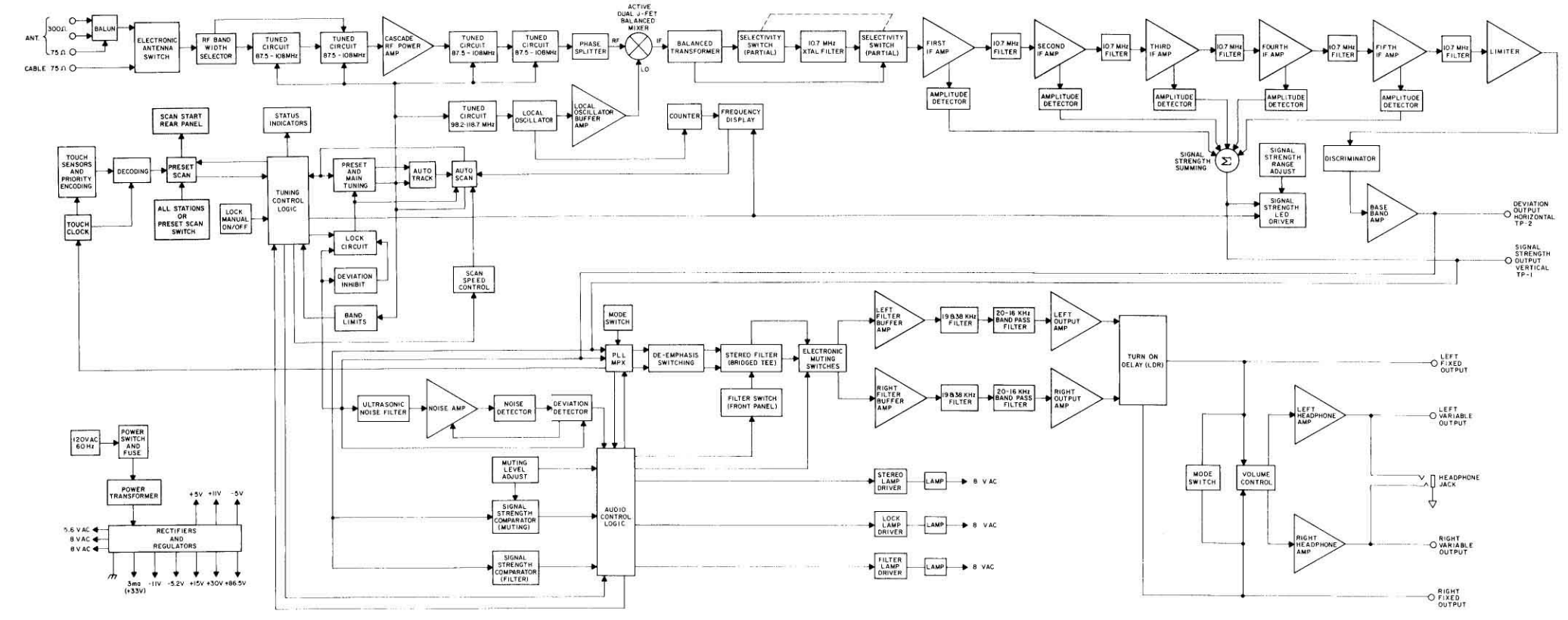
(Circuit pattern shown is on the other side of the board)

PC BOARD 045264



CIRCUIT SIDE

BLOCK DIAGRAM



SECTION 7 NOTES

1. The logic level at cathode of D1009 through D1014 is normally at logic "0". Logic level "1" is at the cathodes when the counter goes from Q0 back to Q3 for an extremely short duration of time and may not be noticed.
2. **WARNING!** IC's 1001, 1002, 1003, 1004, 1005, 1006 and 1007 are sensitive to static electricity and can be damaged. Refer to general note 6 for safe handling procedure.
3. CMOS logic levels apply. See general note 4.
4. When the front panel preset touch buttons do not function, check with a scope to see if there are pulses at PCB Pins 46, 45, 44 and 43 when the appropriate touch button is touched. (e.g. touch front panel preset 2, you should see pulses at PCB Pin 44). If you did not obtain pulses on any of the preset lines, the problem is in Section 6. However, if pulses are present at PCB Pins 46, 45, 44 and 43, switch the remote scan preset switch S3 to the preset position and then short to ground momentarily the remote input phono jack (PCB Pin 40). Should the tuner then function on the presets when using the remote scan input jack, check Q1001 and Q1002. If you find Q1001 and Q1002 functioning properly, remove IC1003 and jumper IC socket Pin 1 to 13, 3 to 12, 5 to 11 and 7 to 10.

5. IC1005 A and B are used as a buffer amplifier and wave shaper for the 228kHz signal coming from the MPX—PLL IC in Section 4. IC1005, IC1006 and IC1007 form a divide by 12 circuit to produce the 76kHz reference and 19kHz $\phi 1$, $\phi 2$ signals. Check Figures 7-1, 7-2 and 7-3 for correct wave forms.

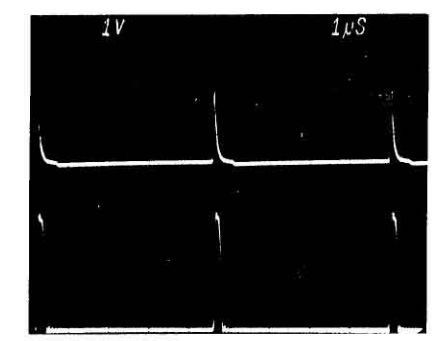


Figure 7-1. UPPER TRACE - input to C1004. LOWER TRACE - pin 11 of IC1005.

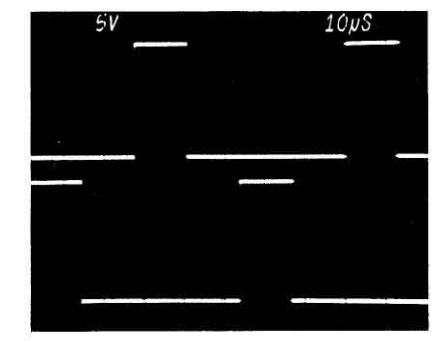


Figure 7-2. UPPER TRACE - 19kHz $\phi 2$ signal at pin 4 of IC1005C. LOWER TRACE - 19kHz $\phi 1$ signal at pin 3 of IC1005D.

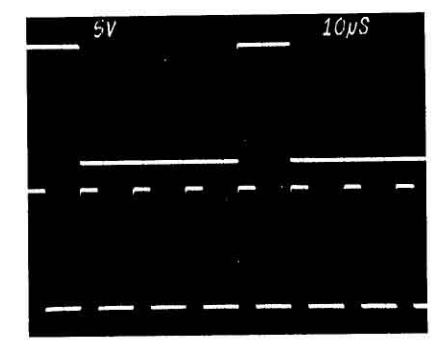
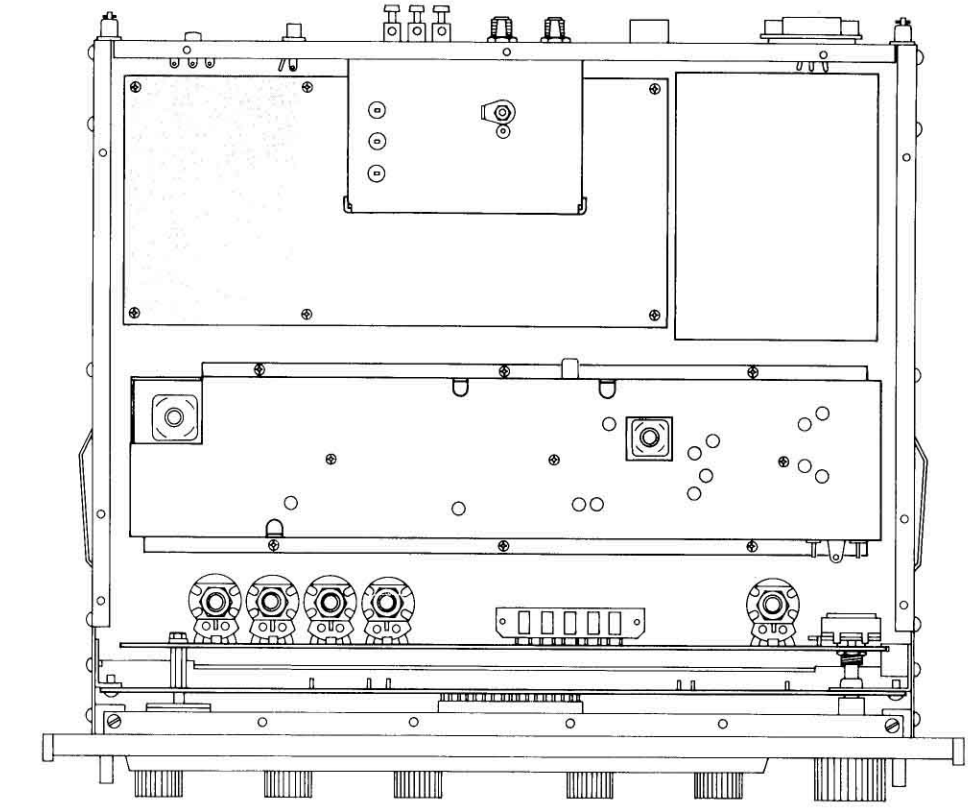


Figure 7-3. UPPER TRACE - 19kHz $\phi 1$ signal at pin 3 of IC1005D. LOWER TRACE - 76kHz reference signal at pin 3 of IC1007B.



SECTION LOCATION - TOP VIEW

SECTION 6 PARTS LIST

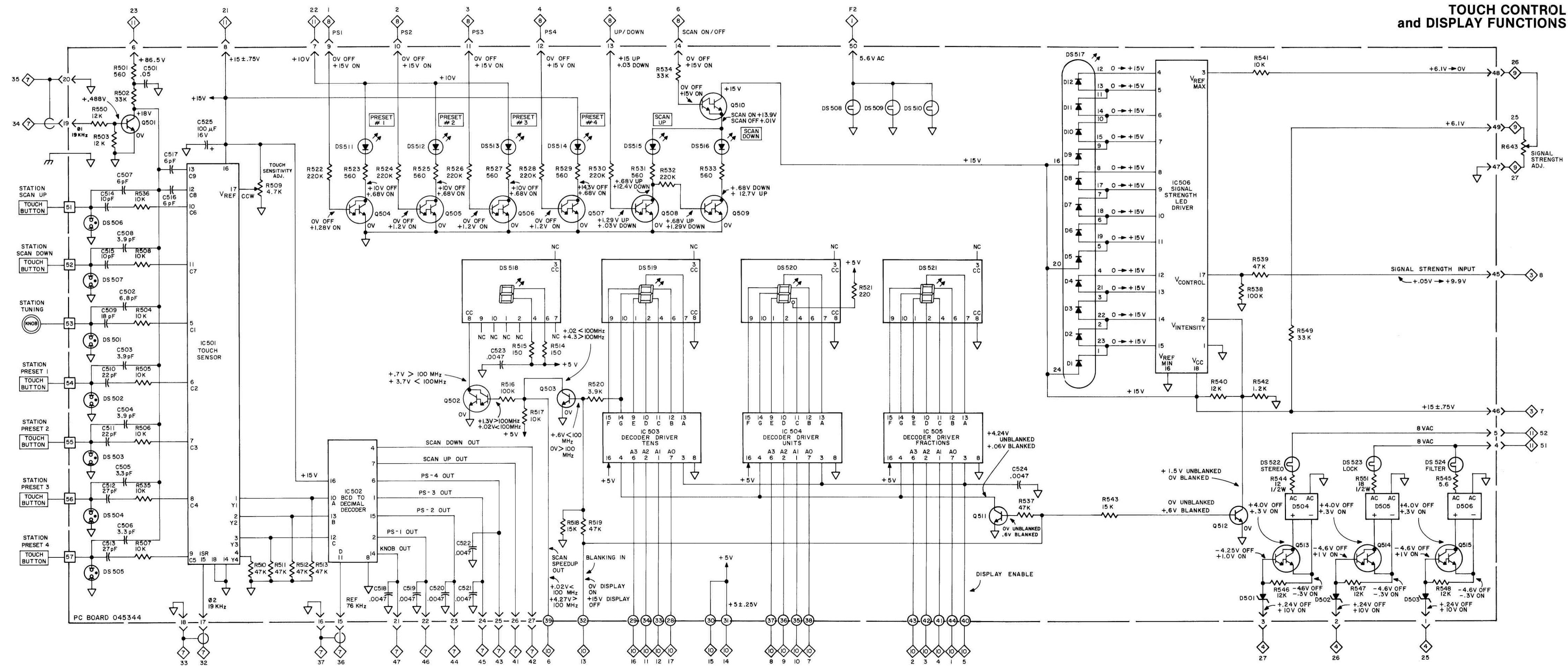
Symbol No.	Part No.	Name/Description	Serial No.	Ref. No.
CAPACITORS (Elect = Electrolytic, PF = Polyester Film DE = Ceramic Disc)				
C501	061048	CD, .05 μ F, +80 -20%		
C502	061008	CD, 6.8pF, 20%, NPO		
C503	061140	CD, 3.9pF, NPO		
C504	061140	CD, 3.9pF, NPO		
C505	061087	CD, 3.3pF, 10%, NPO		
C506	061087	CD, 3.3pF, 10%, NPO		
*C507	061142	CD, 6pF 5%, N470		
C508	061140	CD, 3.9pF, NPO		
C509	061112	CD, 18pF, 10%, NPO		
C510	061014	CD, 22pF, 20%, NPO		
C511	061014	CD, 22pF, 20%, NPO		
C512	061174	CD, 27pF, 10%, 100V, NPO		
C513	061174	CD, 27pF, 10%, 100 V, NPO		
C514	061009	CD, 10pF, 20%, NPO		
C515	061009	CD, 10pF, 20%, NPO		
*C516	061142	CD, 6pF, 5%, N470		
*C517	061142	CD, 6pF, 5%, N470		
*C518	064238	PF, .0047 μ F, 10%, 63V		
*C519	064238	PF, .0047 μ F, 10%, 63V		
*C520	064238	PF, .0047 μ F, 10%, 63V		
*C521	064238	PF, .0047 μ F, 10%, 63V		
*C522	064238	PF, .0047 μ F, 10%, 63V		
*C523	064238	PF, .0047 μ F, 10%, 63V		
*C524	064238	PF, .0047 μ F, 10% 63V		
C525	066226	Elect, 100 μ F, 16V		
DIODES				
*D501	070066	Zener, 9V, 1W, BZX61-C9V1		
*D502	070066	Zener, 9V, 1W, BZX61-C9V1		
*D503	070066	Zener, 9V, 1W, BZX61-C9V1		
*D504	070112	Bridge, 1A, 25V, 75W02M		
*D505	070112	Bridge, 1A, 25V, 75W02M		
*D506	070112	Bridge, 1A, 25V, 75W02M		
INTEGRATED CIRCUITS				
*IC501	133081	Touch Sensor, TMS1976		
*IC502	133082	BCD to Decimal Decoder, CD4028, CMOS		
*IC503	133079	Decoder Driver, 9368, TTL		
*IC504	133079	Decoder Driver, 9368, TTL		
*IC505	133079	Decoder Driver, 9368, TTL		
*IC506	133080	LED Driver, μ AA180		
LIGHTING DEVICES				
DS501	058068	Neon, NE-2		
DS502	058068	Neon, NE-2		
DS503	058068	Neon, NE-2		
DS504	058068	Neon, NE-2		
DS505	058068	Neon, NE-2		
DS506	058068	Neon, NE-2		
DS507	058068	Neon, NE-2		
*DS508	058062	Lamp, 6.3V, 7381		
*DS509	058062	Lamp, 6.3V, 7381		
*DS510	058062	Lamp, 6.3V, 7381		
*DS511	070093	LED, Red, 5082-4658		
*DS512	070093	LED, Red, 5082-4658		
*DS513	070093	LED, Red, 5082-4658		
*DS514	070093	LED, Red, 5082-4658		
*DS515	070093	LED, Red, 5082-4658		
*DS516	070093	LED, Red, 5082-4658		
*DS517	058073	12 Segments FNA12		
*DS518	058072	7 Segments, MAN6780		

Symbol No.	Part No.	Name/Description	Serial No.	Ref. No.
*DS519	058072	7 Segments, MAN6780		
*DS520	058072	7 Segments, MAN6780		
*DS521	058072	7 Segments, MAN6780		
*DS522	058062	Lamp, 6.3V, 7381		
*DS523	058062	Lamp, 6.3V, 7381		
*DS524	058062	Lamp, 6.3V, 7381		
TRANSISTORS				
*Q501	132136	Silicon, NPN, MPSA42		
*Q502	132090	Silicon, NPN, Darlington, MPSA14		
*Q503	132143	Silicon, NPN, MPSD05		
*Q504	132090	Silicon, NPN, Darlington, MPSA14		
*Q505	132090	Silicon, NPN, Darlington, MPSA14		
*Q506	132090	Silicon, NPN, Darlington, MPSA14		
*Q507	132090	Silicon, NPN, Darlington, MPSA14		
*Q508	132090	Silicon, NPN, Darlington, MPSA14		
*Q509	132090	Silicon, NPN, Darlington, MPSA14		
*Q510	132090	Silicon, NPN, Darlington, MPSA14		
*Q511	132143	Silicon, NPN, MPSD05		
*Q512	132143	Silicon, NPN, MPSD05		
*Q513	132090	Silicon, NPN, Darlington, MPSA14		
*Q514	132090	Silicon, NPN, Darlington, MPSA14		
*Q515	132090	Silicon, NPN, Darlington, MPSA14		
RESISTORS (CC = Carbon Composition, CF = Carbon Film, Pot = Potentiometer)				
R501	141043	CF, 560, 5%, 1/4W		
R502	141084	CF, 33K, 5%, 1/4W		
R503	141074	CF, 12K, 5%, 1/4W		
R504	141072	CF, 10K, 5%, 1/4W		
R505	141072	CF, 10K, 5%, 1/4W		
R506	141072	CF, 10K, 5%, 1/4W		
R507	141072	CF, 10K, 5%, 1/4W		
R508	141072	CF, 10K, 5%, 1/4W		
*R509	134307	Pot, 4.7K Trim		
R510	141088	CF, 47K, 5%, 1/4W		
R511	141088	CF, 47K, 5%, 1/4W		
R512	141088	CF, 47K, 5%, 1/4W		
R513	141088	CF, 47K, 5%, 1/4W		
R514	141029	CF, 150, 5%, 1/4W		
R515	141029	CF, 150, 5%, 1/4W		
R516	141096	CF, 100K, 5%, 1/4W		
R517	141072	CF, 10K, 5%, 1/4W		
R518	141076	CF, 15K, 5%, 1/4W		
R519	141088	CF, 47K, 5%, 1/4W		
R520	141062	CF, 3.9K, 5%, 1/4W		
R521	141033	CF, 220, 5%, 1/4W		
R522	141104	CF, 220K, 5%, 1/4W		
R523	141043	CF, 560, 5%, 1/4W		
R524	141104	CF, 220K, 5%, 1/4W		
R525	141043	CF, 560, 5%, 1/4W		

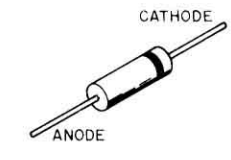
Symbol No.	Part No.	Name/Description	Serial No.	Ref. No.
R526	141104	CF, 220K, 5%, 1/4W		
R527	141043	CF, 560, 5%, 1/4W		
R528	141104	CF, 220K, 5%, 1/4W		
R529	141043	CF, 560, 5%, 1/4W		
R530	141104	CF, 220K, 5%, 1/4W		
R531	141043	CF, 560, 5%, 1/4W		
R532	141104	CF, 220K, 5%, 1/4W		
R533	141043	CF, 560, 5%, 1/4W		
R534	141084	CF, 33K, 5%, 1/4W		
R535	141072	CF, 10K, 5%, 1/4W		
R536	141072	CF, 10K, 5%, 1/4W		
R537	141088	CF, 47K, 5%, 1/4W		
R538	141096	CF, 100K, 5%, 1/4W		
R539	141088	CF, 47K, 5%, 1/4W		
R540	141074	CF, 12K, 5%, 1/4W		
R541	141072	CF, 10K, 5%, 1/4W		
R542	141051	CF, 1.2K, 5%, 1/4W		
R543	141076	CF, 15K, 5%, 1/4W		
R544	136029	CC, 12, 5%, 1/2W		
R545	141019	CF, 5.6, 5%, 1/4W		
R546	141074	CF, 12K, 5%, 1/4W		
R547	141074	CF, 12K, 5%, 1/4W		
R548	141074	CF, 12K, 5%, 1/4W		
R549	141084	CF, 33K, 5%, 1/4W		
R550	141074	CF, 12K, 5%, 1/4W		
R551	136036	CC, 18, 5%, 1/2W		

Parts marked with an asterisk () are replacement parts stocked by our Service Department and can be ordered only by part number from McIntosh. Parts not marked can be obtained from electronic parts suppliers.

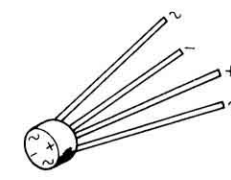
TOUCH CONTROL and DISPLAY FUNCTIONS



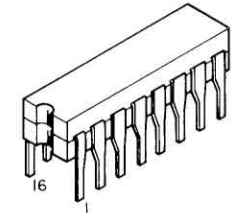
SEMICONDUCTOR IDENTIFICATION



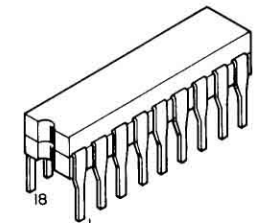
D501-D503



D504-D506



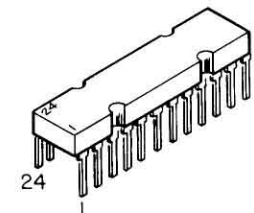
IC502 Logic Diagram 5
IC503-IC505 Logic Diagram 4



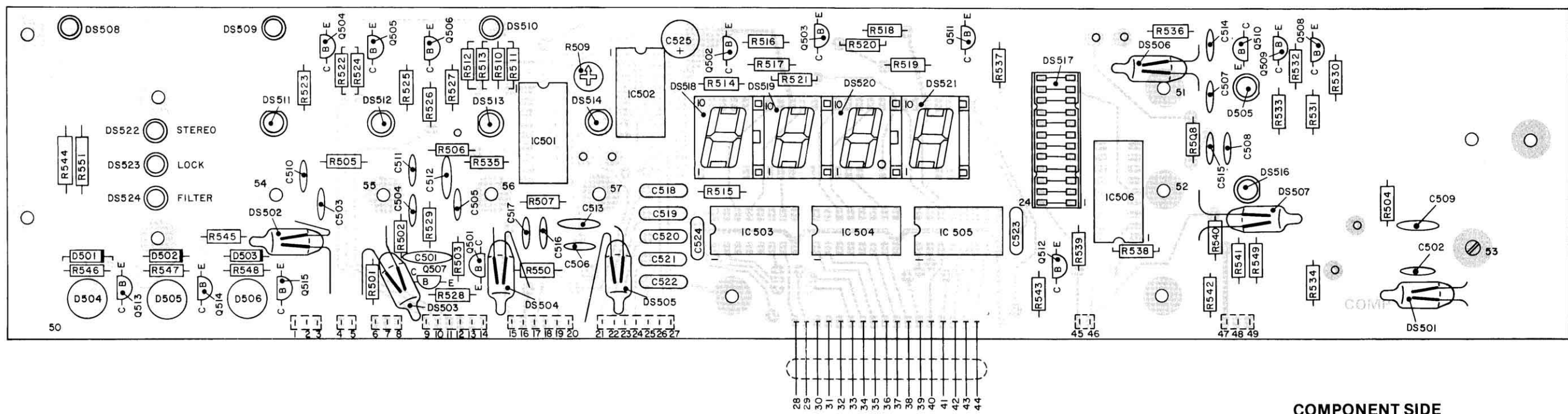
IC501 Logic Diagram 10
IC506 Logic Diagram 9



Q501-Q515

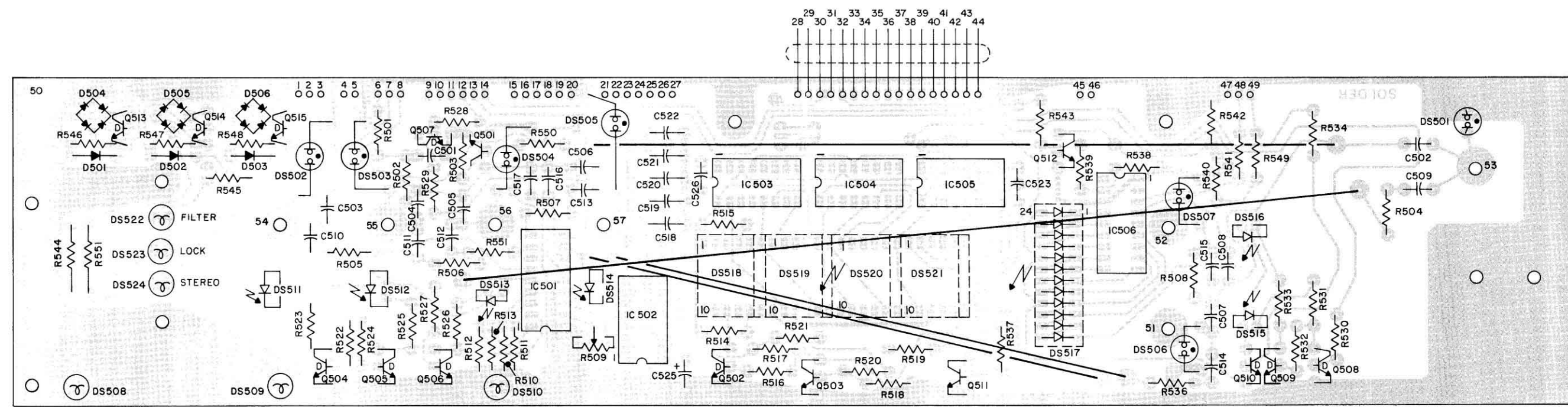


DS517



PC BOARD 045344

COMPONENT SIDE



CIRCUIT SIDE

SECTION 6 NOTES

1. WARNING! IC501 and IC502 are sensitive to static electricity and can be damaged. Refer to general note 6 for safe handling procedure.
2. Turn the MR 80 off, wait 30 seconds and then turn on the MR 80 without touching the main tuning knob or any of the touch buttons. Check with a scope or logic probe IC502 Pins 1, 2, 4, 6, 7, 14 and 15 for 0 volts or TTL logic level "0".
3. Using a logic or scope probe, check for pulses on IC502 Pins 1, 2, 4, 6, 7, 14 and 15 when the appropriate touch button or main tuning knob is touched. See Figures 6-1 & 6-4.

If you don't obtain pulses as shown on the upper trace of Figure 6-1, check for correct waveforms as shown in Figure 6-2 (both traces), Figure 6-5 lower trace and Figure 6-3 lower trace. If the 19kHz $\phi 1$, $\phi 2$ and 76kHz signal are not present, refer to Section 7 PCB and check IC1005, IC1006 and IC1007.

4. If the digital frequency display is inoperative, check the signal on Pin 3 of IC503, IC504 and IC505
 - a. A continuous logic level '1' produces a random display
 - b. A continuous logic level '0' produces a flickering display

5. Truth table for the output of IC501

When Touched	Pin 1	Pin 2	Pin 3	Pin 4
Knob	1	0	0	0
PS 1	0	1	0	0
PS 2	1	1	0	0
PS 4	1	0	1	0
Scan Up	0	1	1	0
Scan Down	1	1	1	0

Note: CMOS Logic levels apply.

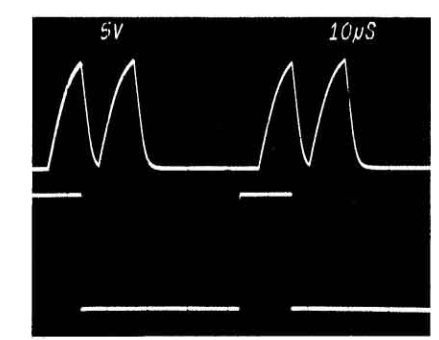
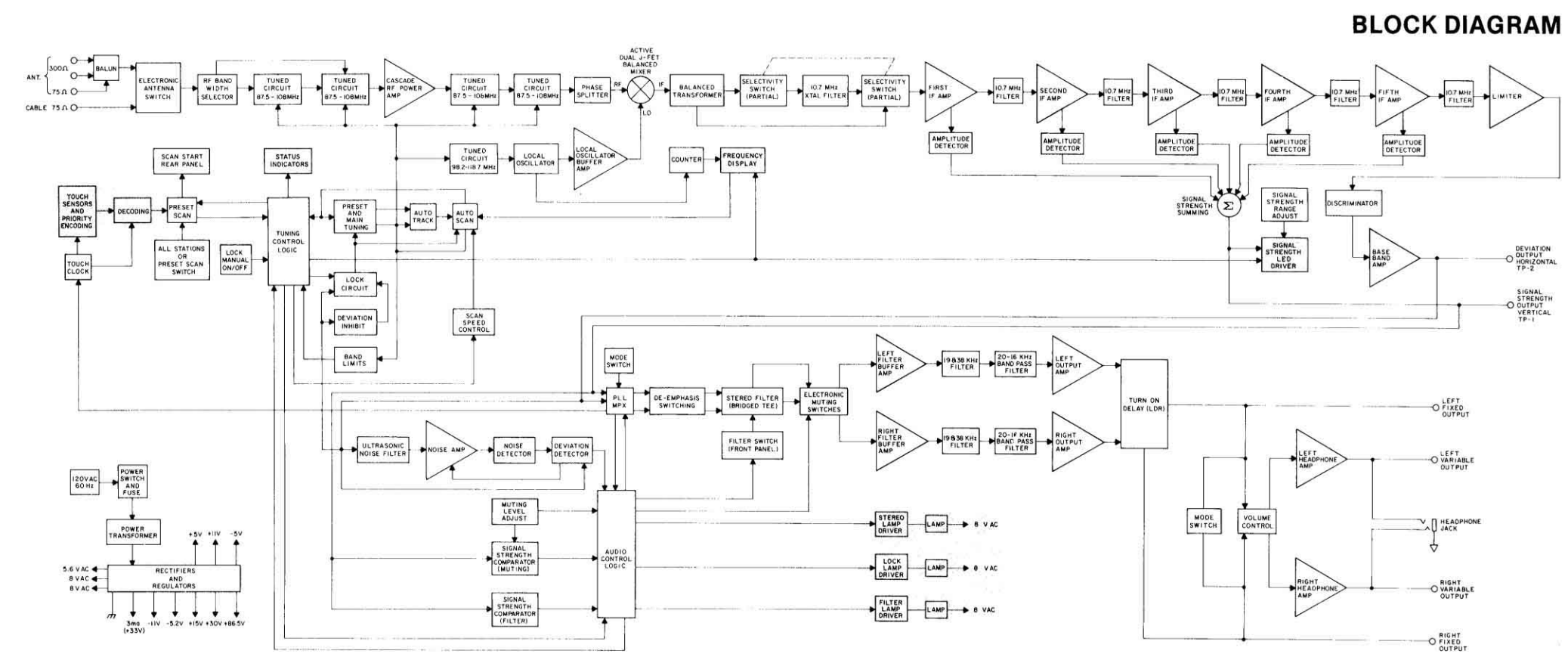


Figure 6-1. UPPER TRACE - pin 14 of IC502 while touching main tuning knob. LOWER TRACE - 19kHz $\phi 2$ signal at pin 15 of IC501.

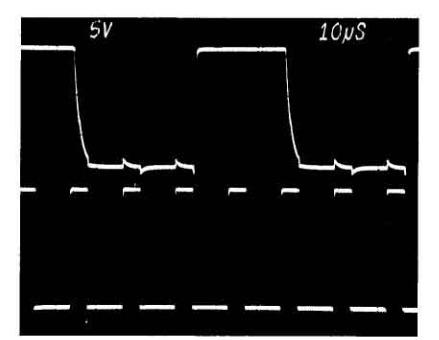


Figure 6-3. UPPER TRACE - pin 1 of IC501 while touching main tuning knob. LOWER TRACE - 76kHz reference signal at pin 11 of IC502.

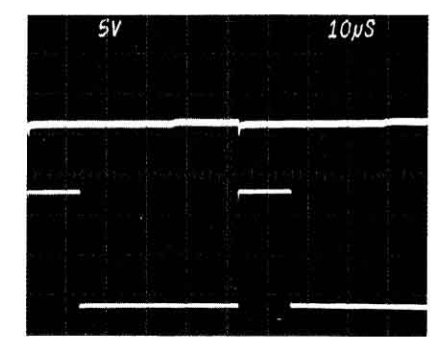


Figure 6-5. UPPER TRACE - at main tuning control shaft (use 10/1 scope probe). Touch main tuning knob with one hand on chassis. LOWER TRACE - 19kHz $\phi 2$ signal at pin 15 of IC501.

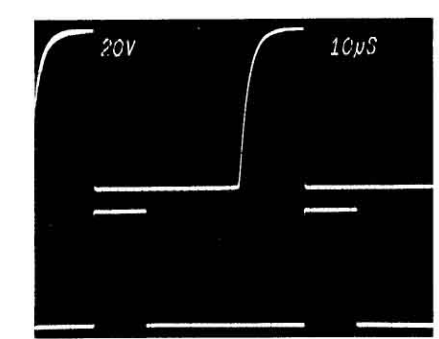


Figure 6-2. UPPER TRACE - waveform at collector of transistor Q501. LOWER TRACE - 19kHz $\phi 1$ signal at PCB pin 19.

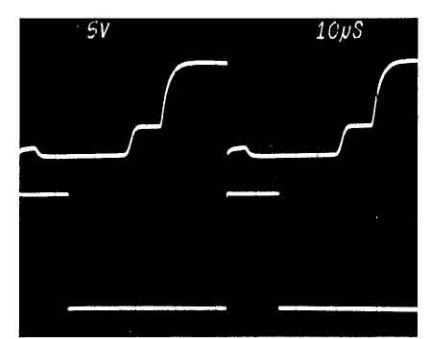
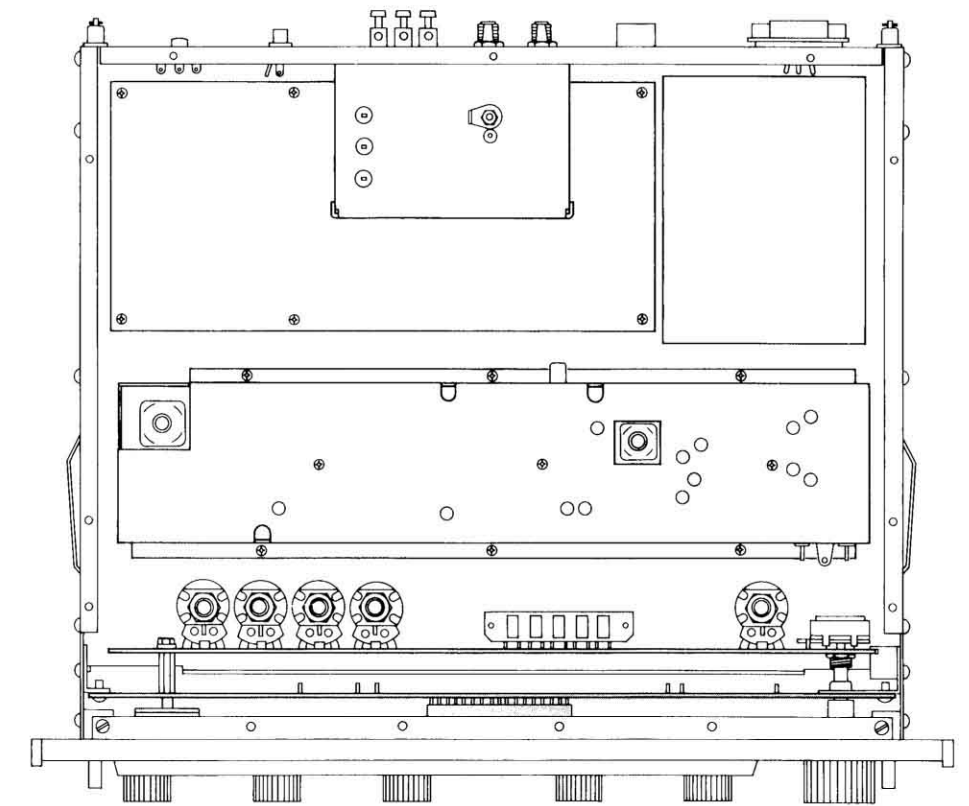
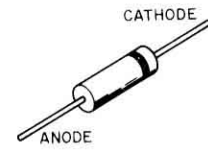


Figure 6-4. UPPER TRACE - at main tuning control shaft (use 10/1 scope probe). LOWER TRACE - 19kHz $\phi 2$ signal at pin 15 of IC501.



SECTION LOCATION - TOP VIEW

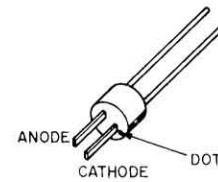
SEMICONDUCTOR IDENTIFICATION



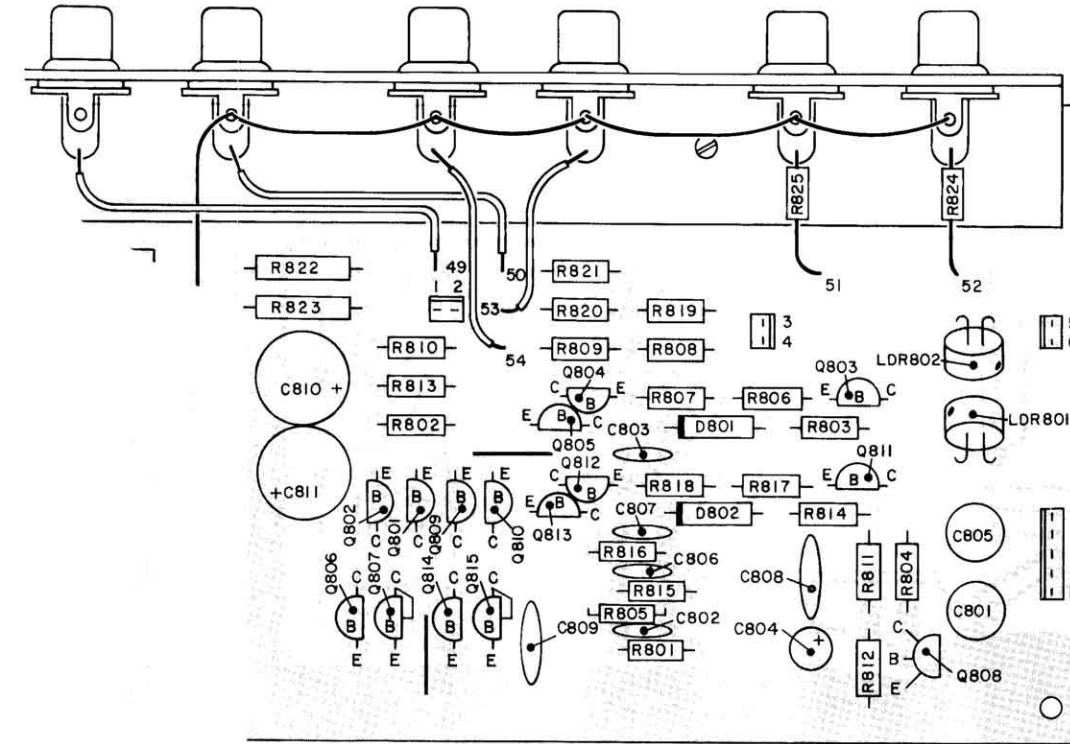
D801, D802



Q801-Q813

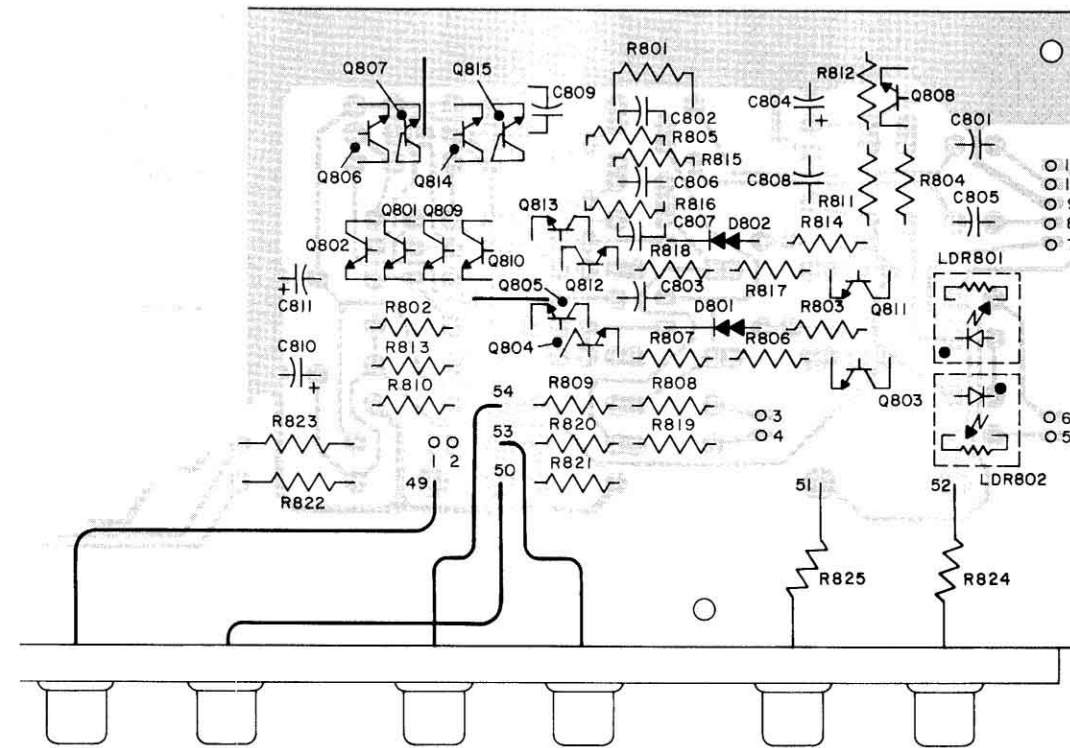


LDR801, LDR802



COMPONENT SIDE
(Circuit pattern shown is on the other side of the board)

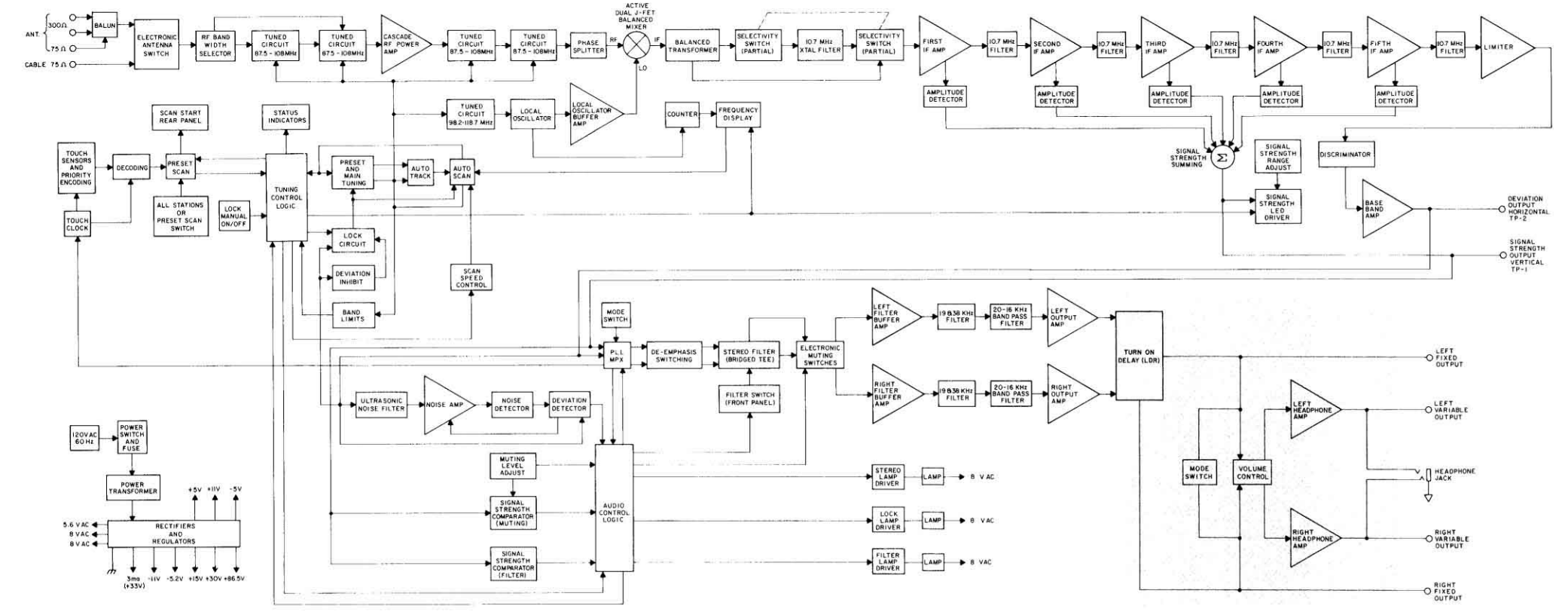
PC BOARD 045682



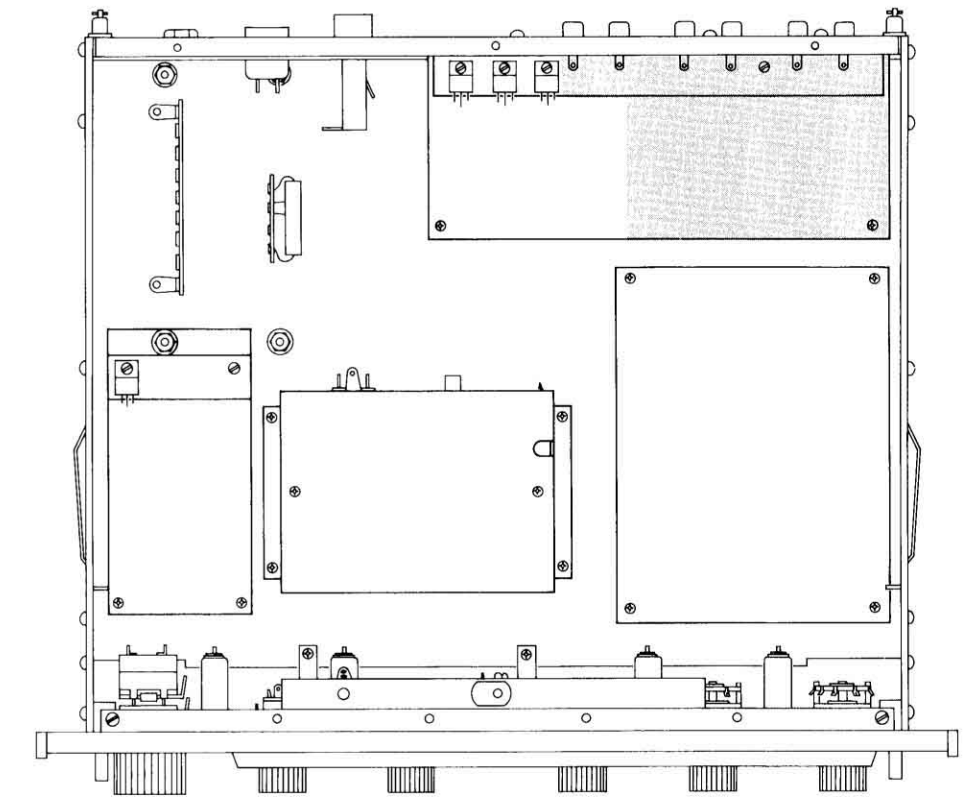
CIRCUIT SIDE

HEADPHONE AMPLIFIER and TURN-ON DELAY

BLOCK DIAGRAM



SECTION 5 NOTES



SECTION LOCATION - BOTTOM VIEW

SECTION 4 PARTS LIST

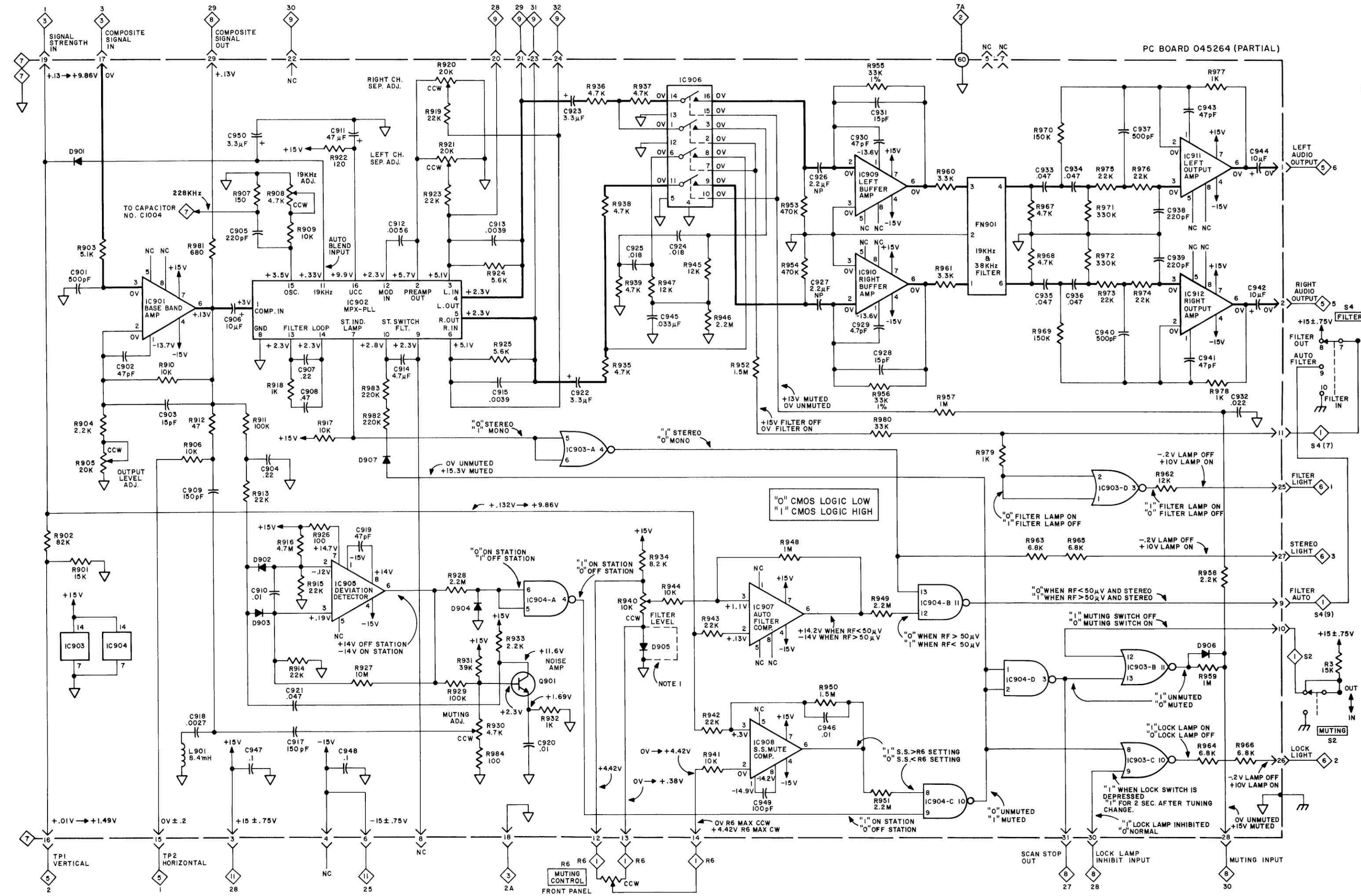
Symbol No.	Part No.	Name/Description	Serial No.	Ref. No.
CAPACITORS (Elect = Electrolytic, MPE = Metalized Polyester, PSR = Polystyrene, PF = Polyester Film, CD = Ceramic Disc, SM = Silver Mica)				
*C901	064140	PSR, 500pF, 5% 33V		
C902	061055	CD, 47pF, 10%, N470		
C903	061011	CD, 15pF, 10%, NPO		
*C904	064190	MPE, .22μF, 5%, 63V		
*C905	063024	SM, 220pF, 5%, 100V		
C906	066211	Elect, 10μF, 16V		
*C907	064190	MPE, .22μF, 5%, 63V		
C908	064194	MPE, .47μF, 5%, 63V		
C909	061024	CD, 150pF, 10%		
C910	061159	CD, .01μF, + 80 - 20%, 50V		
C911	066215	Elect, 47μF, 16V		
*C912	064170	PF, .0056μF, 5%, 100V		
*C913	064168	PF, .0039μF, 5%, 100V		
C914	066289	Elect, 4.7μF, 10%, 25V		
*C915	064168	PF, .0039μF, 5%, 100V		
C916		Not Used		
C917	061024	CD, 150pF, 10%		
*C918	064166	PF, .0027μF, 5%, 100V		
C919	061055	CD, 47pF, 10%, N470		
C920	061159	CD, .01μF, + 80 - 20%, 50V		
C921	061161	CD, .047μF, + 80 - 20%, 50V		
C922	066238	Elect, 3.3μF, 35V		
C923	066238	Elect, 3.3μF, 35V		
*C924	064177	MPE, .018μF, 5%, 63V		
*C925	064177	MPE, .018μF, 5%, 63V		
C926	066302	Elect, 2.2μF, NP, 25V		
C927	066302	Elect, 2.2μF, NP, 25V		
C928	061011	CD, 15pF, 10%, NPO		
C929	061055	CD, 47pF, 10%, N470		
C930	061055	CD, 47pF, 10%, N470		
C931	061011	CD, 15pF, 10%, NPO		
C932	061160	CD, .022μF, 20%, 50V		
*C933	064182	MPE, .047μF, 5%, 63V		
*C934	064182	MPE, .047μF, 5%, 63V		
*C935	064182	MPE, .047μF, 5%, 63V		
*C936	064182	MPE, .047μF, 5%, 63V		
*C937	064140	PSR, 500pF, 5%, 33V		
*C938	063024	SM, 220pF, 5%		
*C939	063024	SM, 220pF, 5%		
*C940	064140	PSR, 500pF, 5%, 33V		
C941	061055	CD, 47pF, 10%, N470		
C942	066239	Elect, 10μF, 35V		
C943	061055	CD, 47pF, 10%, N470		
C944	066239	Elect, 10μF, 35V		
*C945	064180	MPE, .033μF, 5%, 63V		
C946	061159	CD, .01μF, + 80 - 20%, 50V		
*C947	064254	MPE, .1μF, 10%, 63V		
*C948	064254	MPE, .1μF, 10%, 63V		
C949	061022	CD, 100pF, 20%, N1500		
C950	066238	Elect, 3.3μF, 35V		
DIODES				
*D901	070052	Germanium, 1N541 or 1N542		
*D902	070047	Silicon, 1N4148		
*D903	070047	Silicon, 1N4148		
*D904	070047	Silicon, 1N4148		
*D905	070052	Germanium, 1N541 or 1N542		
*D906	070047	Silicon, 1N4148		
*D907	070047	Silicon, 1N4148		

Symbol No.	Part No.	Name/Description	Serial No.	Ref. No.
FILTERS				
*FN901	180019	19 and 38KHz Notch Filter		
INTEGRATED CIRCUITS				
*IC901	133068	Op Amp, LM201A		
*IC902	133056	FM Stereo Demodulator, TAC4500A		
*IC903	133064	CMOS Quad 2-Input "Nor" Gate, CD4001B		
*IC904	133063	CMOS Quad 2-Input "Nand" Gate, CD4011B		
*IC905	133068	Op Amp, LM201A		
*IC906	133042	FET Quad Analog Switch, AM5011		
*IC907	133068	Op Amp, LM201A		
*IC908	133068	Op Amp, LM201A		
*IC909	133068	Op Amp, LM201A		
*IC910	133068	Op Amp, LM201A		
*IC911	133043	J-FET Input Op Amp, LF-356-IM		
*IC912	133043	J-FET Input Op Amp, LF-356-IM		
INDUCTORS/COILS				
*L901	122015	8.4mH Coil		
TRANSISTORS				
*Q901	132093	Silicon, NPN, BC239C		
RESISTORS (CF = Carbon Film, MF = Metal Film, Pot = Potentiometer)				
R901	141076	CF, 15K, 5%, 1/4W		
R902	141094	CF, 82K, 5%, 1/4W		
R903	141065	CF, 5.1K, 5%, 1/4W		
R904	141057	CF, 2.2K, 5%, 1/4W		
*R905	134371	Pot, 20K Trim Linear		
R906	141072	CF, 10K, 5%, 1/4W		
R907	141029	CF, 150, 5%, 1/4W		
*R908	134307	Pot, 4.7K, 20%, Linear		
R909	141072	CF, 10K, 5%, 1/4W		
R910	141072	CF, 10K, 5%, 1/4W		
R911	141096	CF, 100K, 5%, 1/4W		
R912	141152	CF, 47, 5%, 1/4W		
R913	141080	CF, 22K, 5%, 1/4W		
R914	141080	CF, 22K, 5%, 1/4W		
R915	141080	CF, 22K, 5%, 1/4W		
R916	141128	CF, 4.7M, 5%, 1/4W		
R917	141072	CF, 10K, 5%, 1/4W		
R918	141049	CF, 1K, 5%, 1/4W		
R919	141080	CF, 22K, 5%, 1/4W		
*R920	134371	Pot, 20K Trim Linear		
*R921	134371	Pot, 20K, Trim Linear		
R922	141027	CF, 120, 5%, 1/4W		
R923	141080	CF, 22K, 5%, 1/4W		
R924	141066	CF, 5.6K, 5%, 1/4W		
R925	141066	CF, 5.6K, 5%, 1/4W		
R926	141025	CF, 100, 5%, 1/4W		
R927	141132	CF, 10M, 5%, 1/4W		
R928	141124	CF, 2.2M, 5%, 1/4W		
R929	141096	CF, 100K, 5%, 1/4W		
*R930	134307	Pot, 4.7K, 20%, Linear		
R931	141086	CF, 39K, 5%, 1/4W		
R932	141049	CF, 1K, 5%, 1/4W		
R933	141057	CF, 2.2K, 5%, 1/4W		

Symbol No.	Part No.	Name/Description	Serial No.	Ref. No.
R934	141070	CF, 8.2K, 5%, 1/4W		
R935	141064	CF, 4.7K, 5%, 1/4W		
R936	141064	CF, 4.7K, 5%, 1/4W		
R937	141064	CF, 4.7K, 5%, 1/4W		
R938	141064	CF, 4.7K, 5%, 1/4W		
R939	141064	CF, 4.7K, 5%, 1/4W		
*R940	134372	Pot, 10K, Trim Linear		
R941	141072	CF, 10K, 5%, 1/4W		
R942	141080	CF, 22K, 5%, 1/4W		
R943	141080	CF, 22K, 5%, 1/4W		
R944	141072	CF, 10K, 5%, 1/4W		
R945	141074	CF, 12K, 5%, 1/4W		
R946	141124	CF, 2.2M, 5%, 1/4W		
R947	141074	CF, 12K, 5%, 1/4W		
R948	141120	CF, 1M, 5%, 1/4W		
R949	141124	CF, 2.2M, 5%, 1/4W		
R950	141122	CF, 1.5M, 5%, 1/4W		
R951	141124	CF, 2.2M, 5%, 1/4W		
R952	141122	CF, 1.5M, 5%, 1/4W		
R953	141112	CF, 470K, 5%, 1/4W		
R954	141112	CF, 470K, 5%, 1/4W		
*R955	144015	MF, 33K, 1%, 1/4W		
*R956	144015	MF, 33K, 1%, 1/4W		
R957	141120	CF, 1M, 5%, 1/4W		
R958	141057	CF, 2.2K, 5%, 1/4W		
R959	141120	CF, 1M, 5%, 1/4W		
R960	141060	CF, 3.3K, 5%, 1/4W		
R961	141060	CF, 3.3K, 5%, 1/4W		
R962	141074	CF, 12K, 5%, 1/4W		
R963	141068	CF, 6.8K, 5%, 1/4W		
R964	141068	CF, 6.8K, 5%, 1/4W		
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R966	141068	CF, 6.8K, 5%, 1/4W		
R967	141064	CF, 4.7K, 5%, 1/4W		
R968	141064	CF, 4.7K, 5%, 1/4W		
R969	141100	CF, 150K, 5%, 1/4W		
R970	141100	CF, 150K, 5%, 1/4W		
R971	141108	CF, 330K, 5%, 1/4W		
R972	141108	CF, 330K, 5%, 1/4W		
R973	141080	CF, 22K, 5%, 1/4W		
R974	141080	CF, 22K, 5%, 1/4W		
R975	141080	CF, 22K, 5%, 1/4W		
R976	141080	CF, 22K, 5%, 1/4W		
R977	141049	CF, 1K, 5%, 1/4W		
R978	141049	CF, 1K, 5%, 1/4W		
R979	141049	CF, 1K, 5%, 1/4W		
R980	141084	CF, 33K, 5%, 1/4W		
R981	141045	CF, 680, 5%, 1/4W		
R982	141104	CF, 220K, 5%, 1/4W		
R983	141104	CF, 220K, 5%, 1/4W		
R984	141025	CF, 100, 5%, 1/4W		

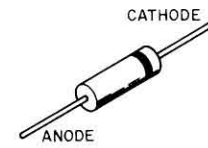
* Parts marked with an asterisk (*) are replacement parts stocked by our Service Department and can be ordered only by part number from McIntosh. Parts not marked can be obtained from electronic parts suppliers.

Section 4
MULTIPLEX, FM MUTING and NOISE FILTER



Schematic No. 156004 A

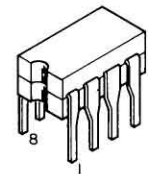
SEMICONDUCTOR IDENTIFICATION



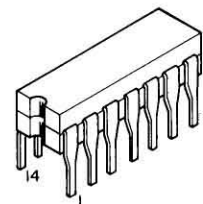
D901-D907



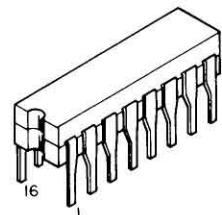
Q901



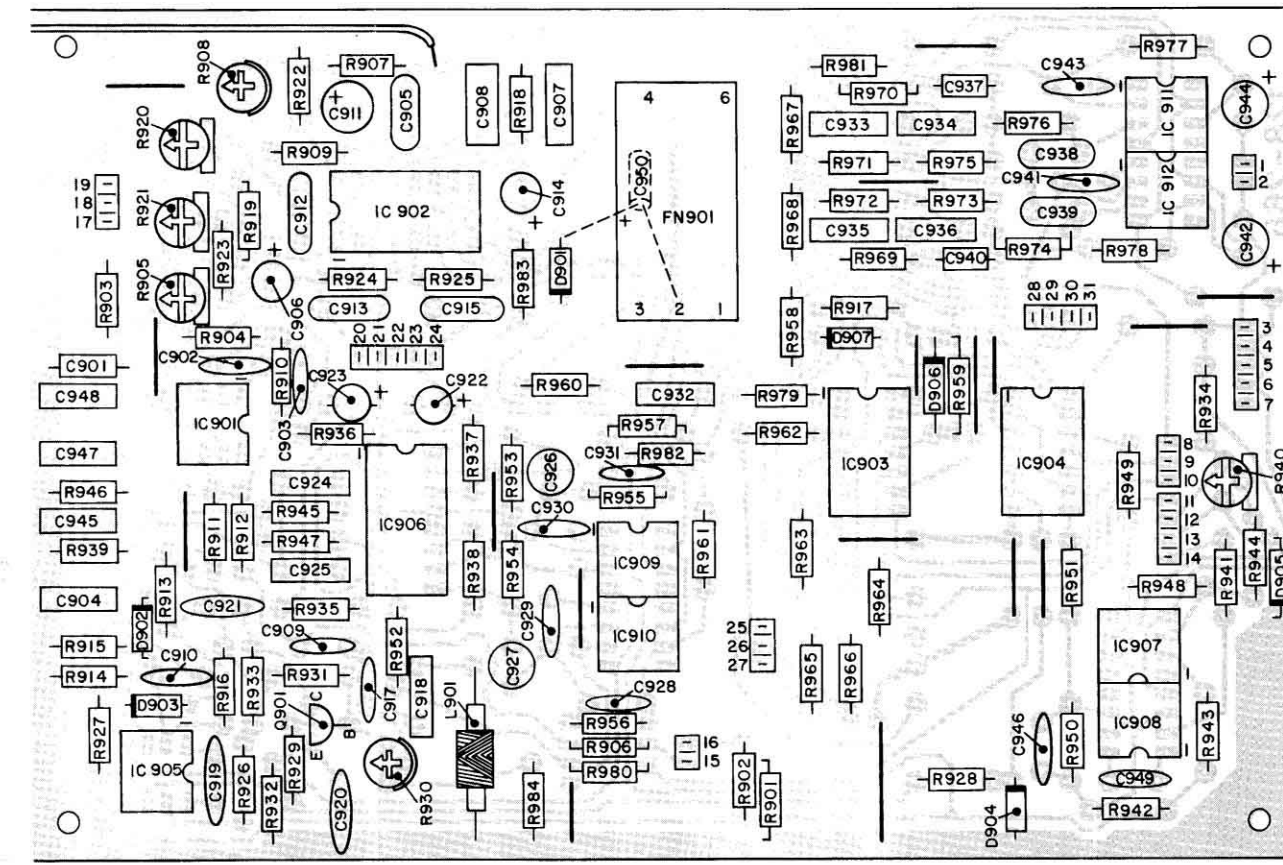
IC901, IC905
IC907-IC912



IC903, IC904



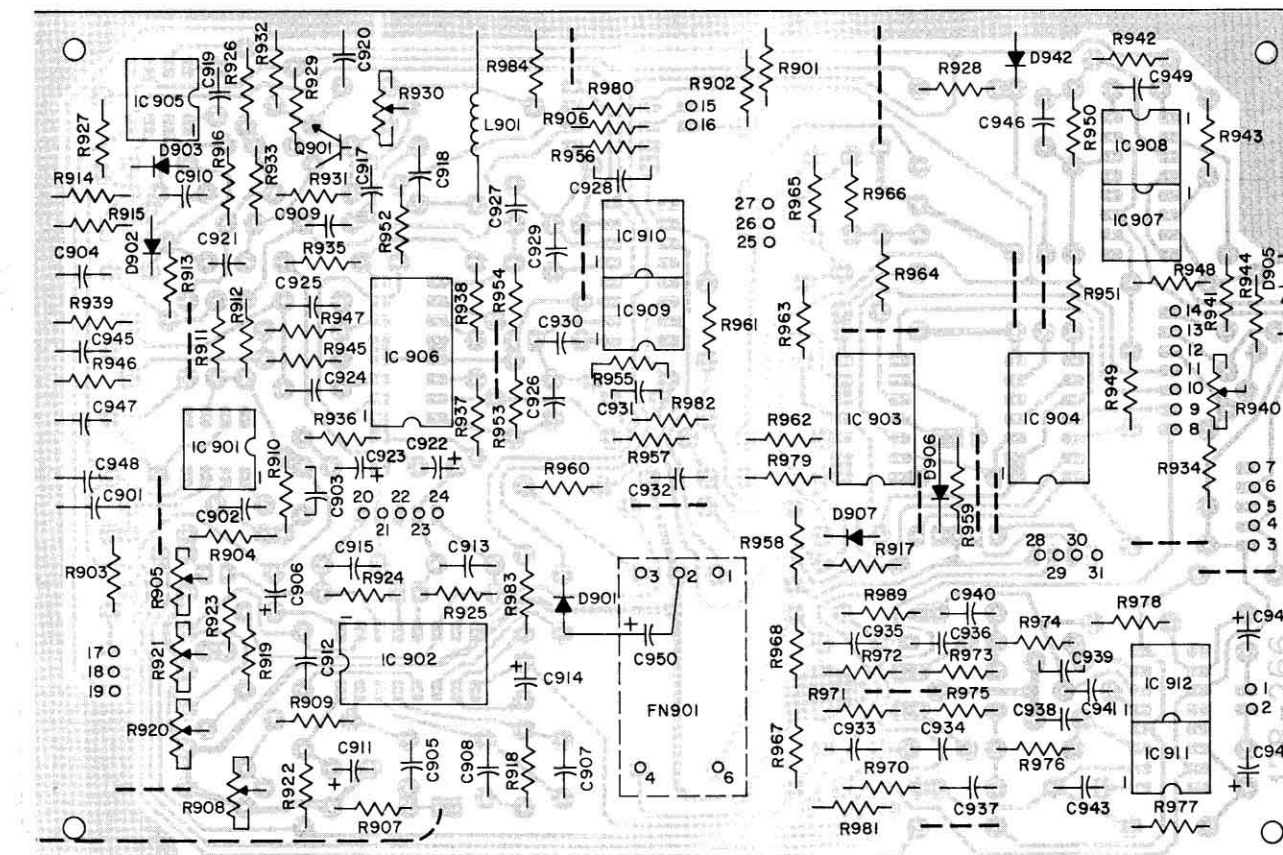
IC902, IC906



COMPONENT SIDE

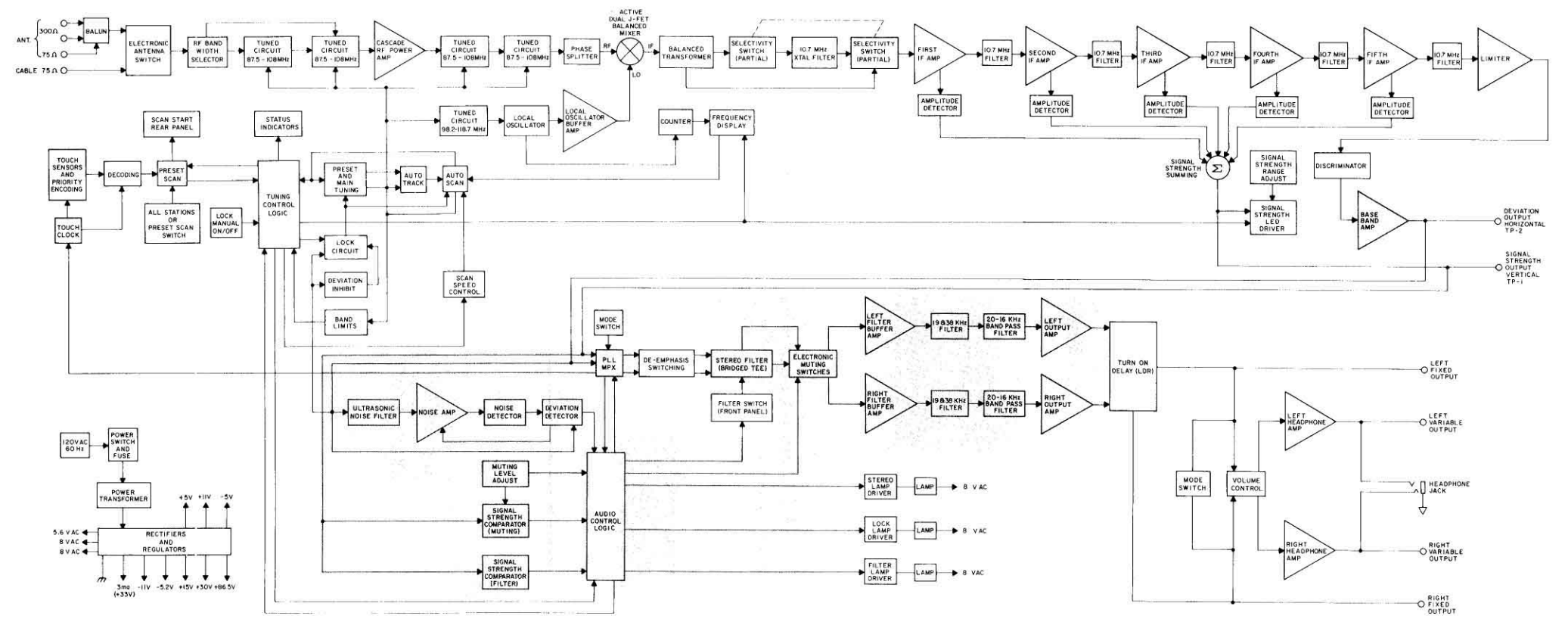
(Circuit pattern shown is on the other side of the board)

PC BOARD 045264



CIRCUIT SIDE

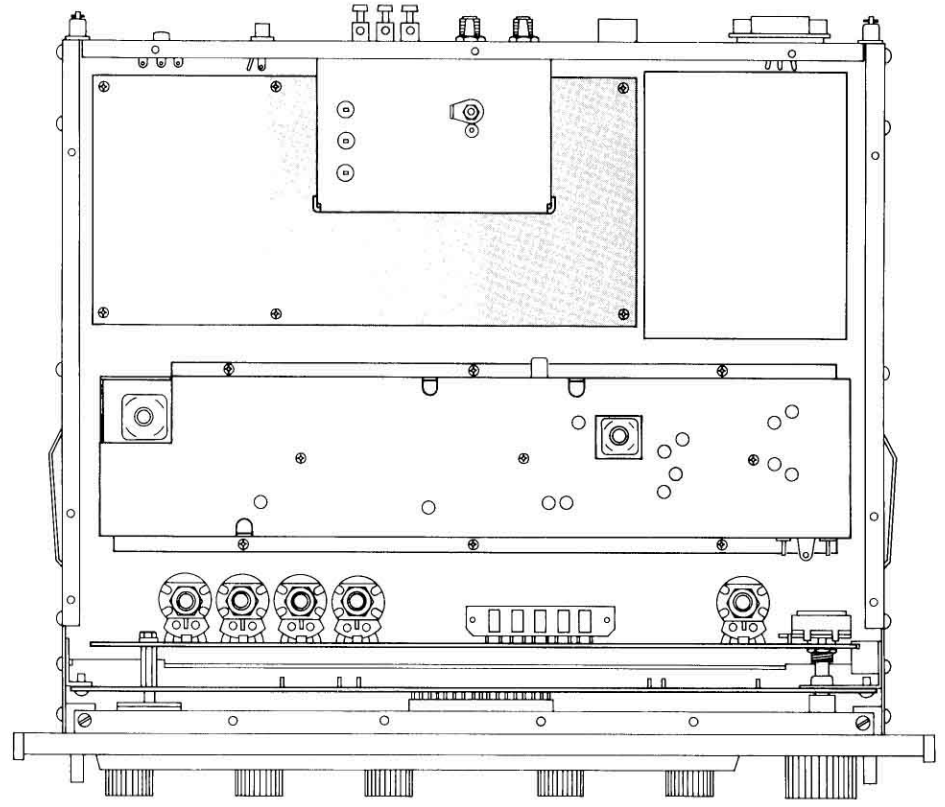
BLOCK DIAGRAM



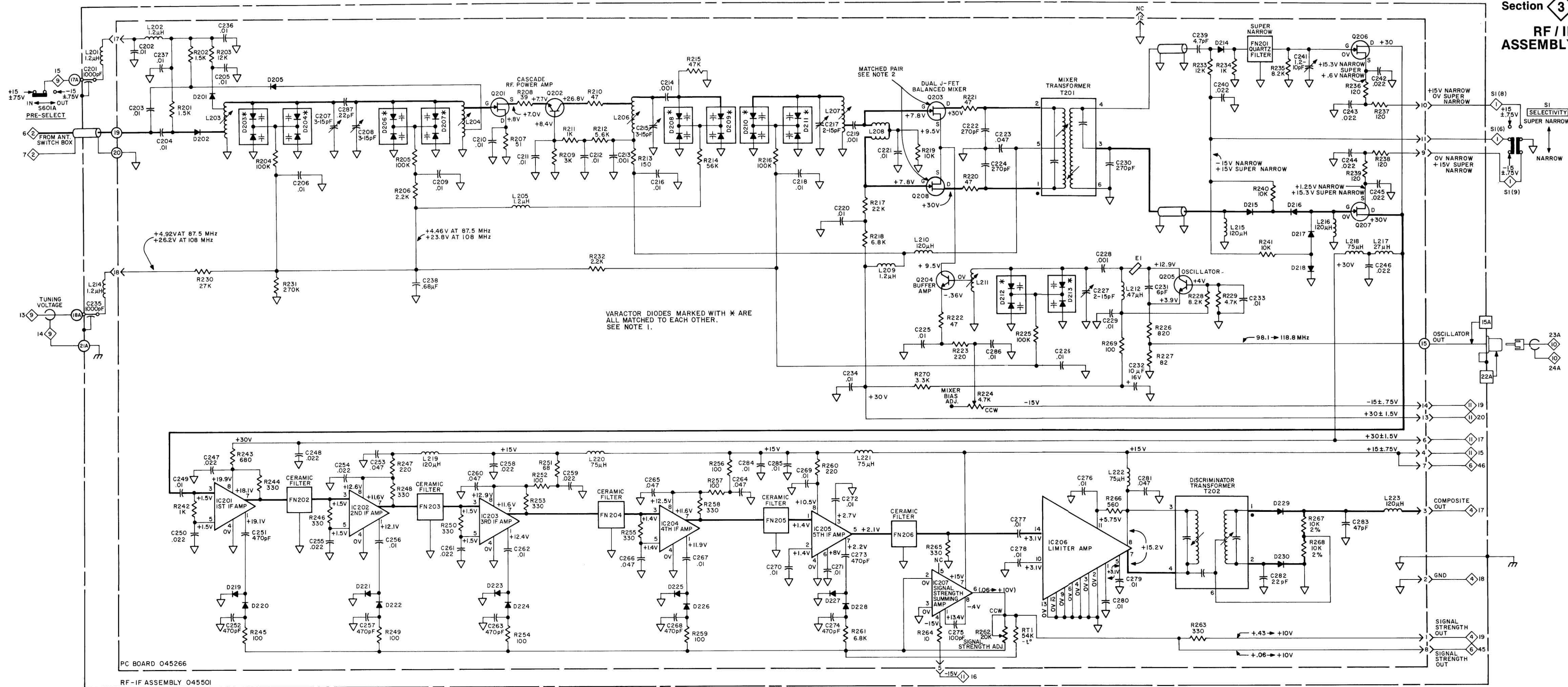
SECTION 4 NOTES

1. Due to varying "IF" noise from the IF strip (in Section 3). D905 may be jumpered in some units to permit proper operation and allow adjustment of the auto filter circuit.
2. WARNING! IC903 and IC904 are sensitive to static electricity and can be damaged. Refer to general note 6 for safe handling procedure.
3. IC903 and IC904 are CMOS devices and operate at CMOS logic levels. See general note 4.
4. The 19kHz signal is not measurable at any of the pins of IC902 (PLL—MPX), however it can be measured at Pin 34 (Section 7 PCB) which is located to the left of Section 4 circuits on the same PCB.
5. If there are problems with the muting circuit check IC905, Q901, IC904A, IC908, IC904C, IC904D, IC903B, IC906 and PCB Pin 28 for the correct logic levels and voltages when tuning on and off station with the main tuning knob. Turn the muting control on the front panel clockwise until it just switches on and switch the lock circuit off.
6. If there are any problems with the auto filter circuit check IC907, IC904B, IC903D and IC906 for the correct logic levels and voltages when vary-

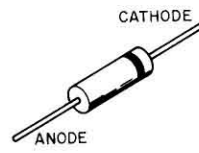
ing the RF level from an FM signal generator (in the stereo mode).



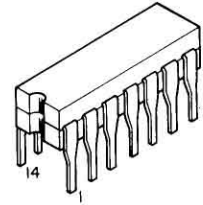
SECTION LOCATION - TOP VIEW



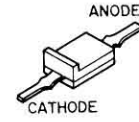
SEMICONDUCTOR IDENTIFICATION



D205
D214-D230



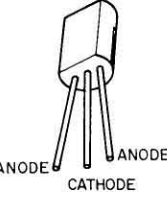
IC206



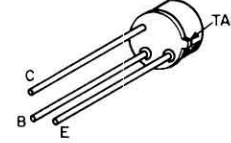
D201, D202



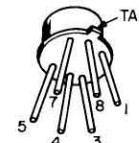
Q201, Q203
Q208



D203, D204
D206-D213



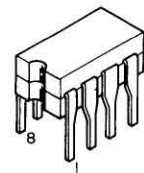
Q202



IC201-IC204



Q204, Q205



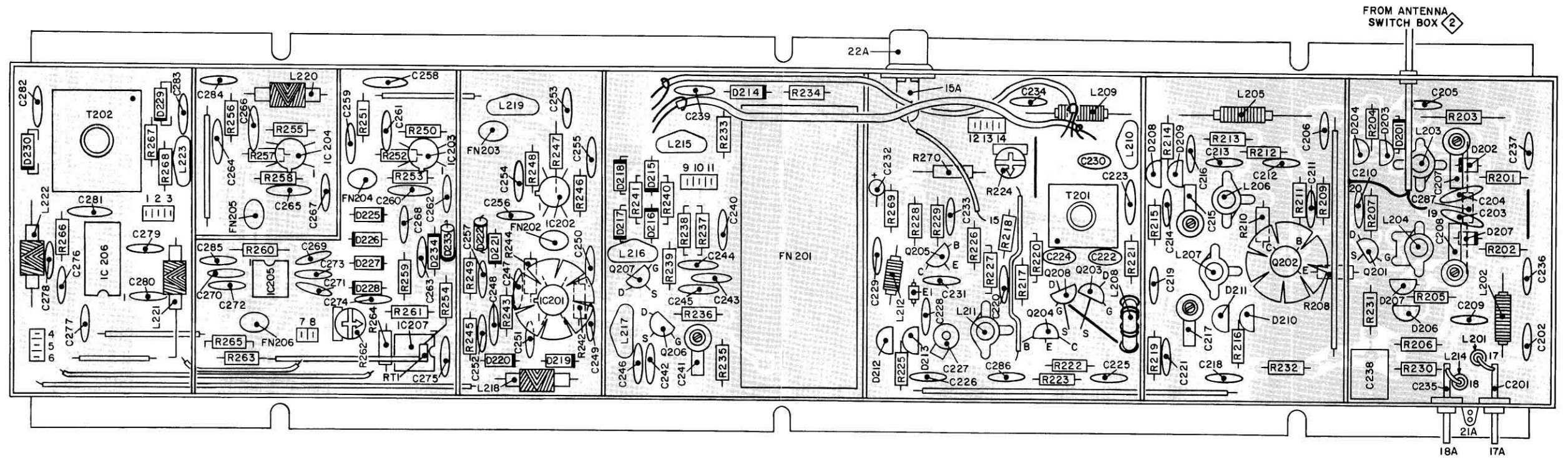
IC205, IC207



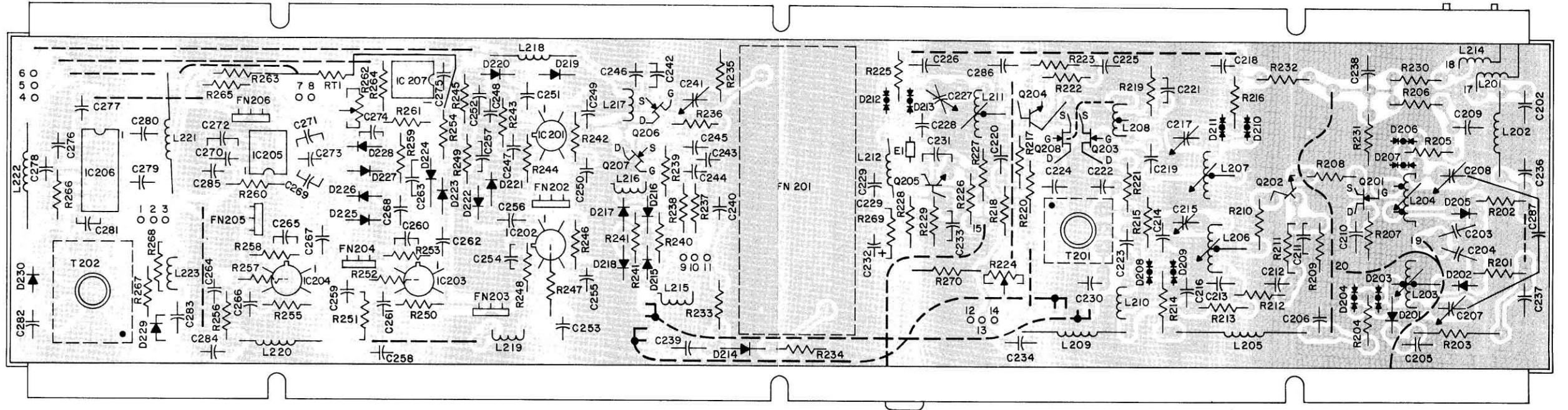
Q206, Q207

COMPONENT SIDE

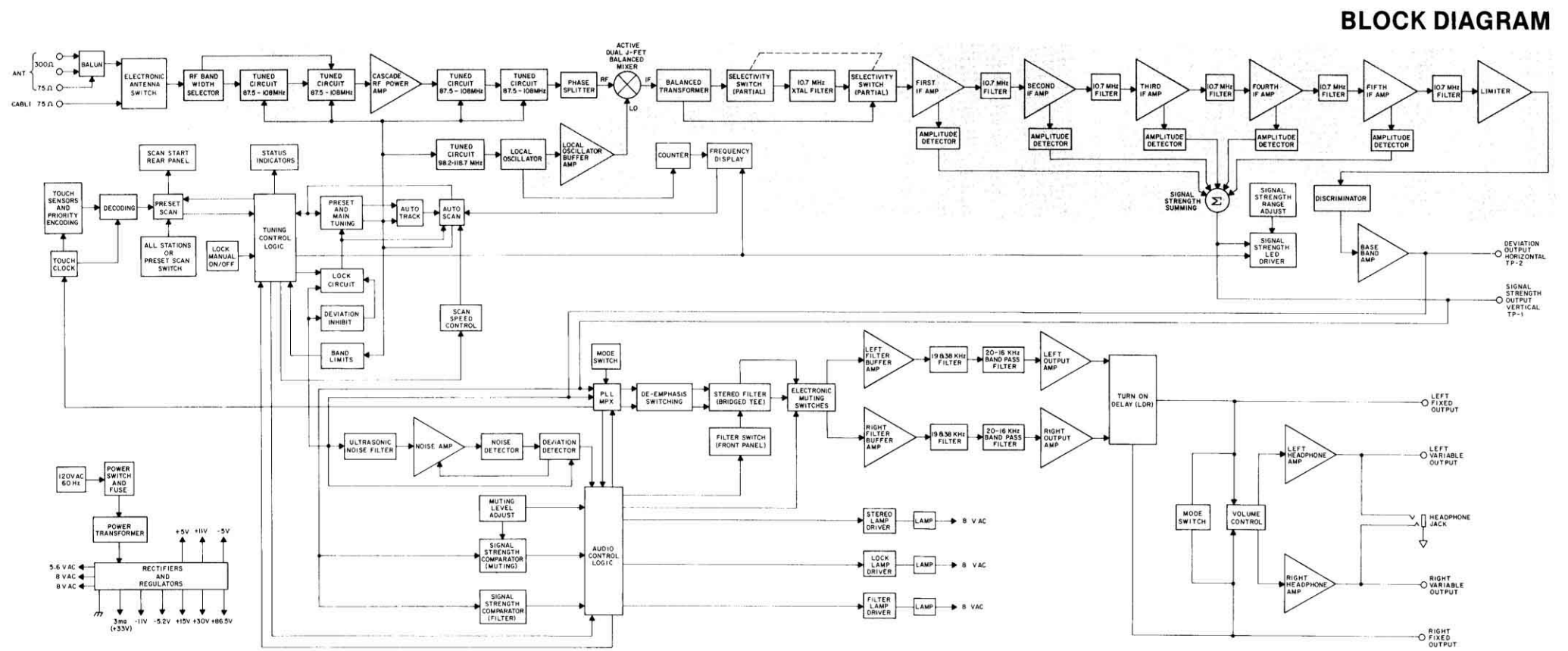
(Circuit pattern shown is on the other side of the board)



PC BOARD 045266



CIRCUIT SIDE



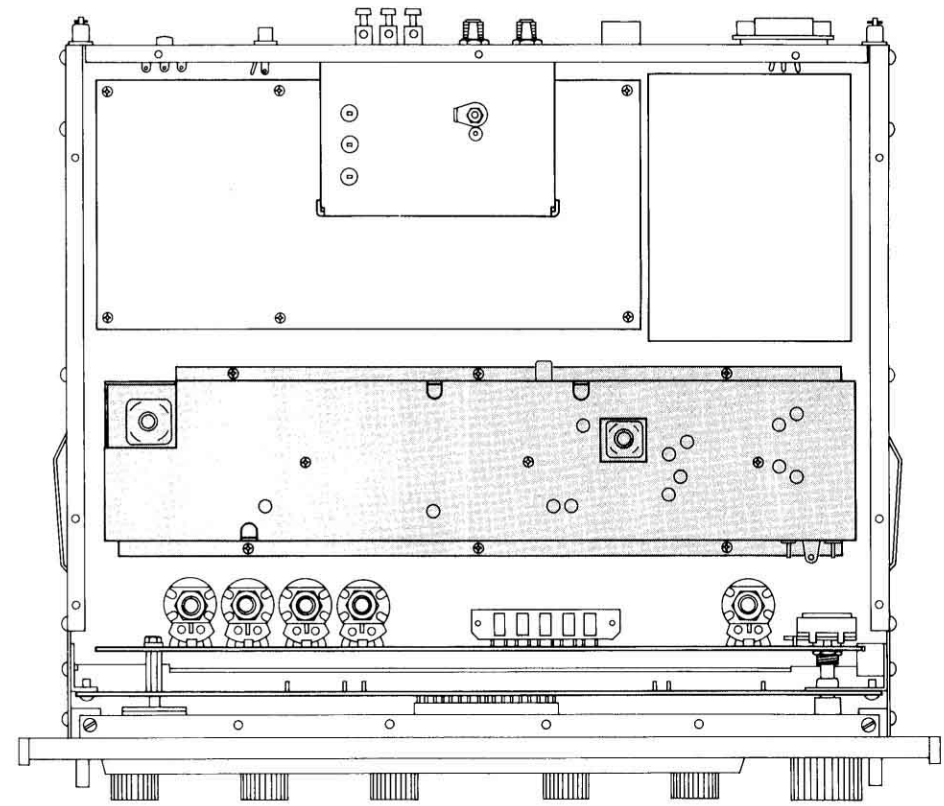
SECTION 3 NOTES

1. The varactor diodes D203, D204, D206, D207, D208, D209, D210, D211, D212 and D213 are all matched to each other so they have the same capacitance at the same voltage (they all track together). If one or more diodes are defective and are needed to be replaced, you MUST REPLACE ALL TEN DIODES at the same time or circuit performance will be affected.
2. Transistors Q203 and Q208 are matched to each other and together they form a balanced mixer circuit. If Q203 and/or Q208 need to be replaced, BOTH Q203 and Q208 MUST BE REPLACED as a matched pair or circuit performance will be affected.
3. In certain cases, when the stereo harmonic distortion specification can not be achieved—perform the following:
 - a. Remove ceramic filter FN206 and install a 0.001 μ F capacitor (P / N 061035) in place of FN206. The ground connection is not used.
 - b. Now perform the alignment procedure starting with D.
4. Diodes D202 and D205 are PIN Diodes. DO NOT SUBSTITUTE as performance will be affected.
5. The output voltage of IC207 (Signal Strength

Summing Amplifier) at Pin 6 varies directly with the incoming RF level as follows:

RF Signal Level	Output Voltage IC207 Pin 6
0 μ V (0dBf)	+ 0.14
0 μ V (15dBf)	+ 0.49
10 μ V (25.5dBf)	+ 0.87
30 μ V (35dBf)	+ 0.99
100 μ V (45.5dBf)	+ 1.50
300 μ V (55dBf)	+ 2.62
1k μ V (65.5dBf)	+ 3.95
3k μ V (75dBf)	+ 4.97
10k μ V (86dBf)	+ 7.09
30k μ V (95dBf)	+ 9.98

Note: Signal Strength Adj. R262 set to maximum clockwise position.



SECTION LOCATION - TOP VIEW

SECTION 1 PARTS LIST

Symbol No.	Part No.	Name/Description	Serial No.	Ref. No.
CAPACITORS (CD = Ceramic Disc)				
*C1	061175	CD, .005μF, 150VRMS		
*C2	061175	CD, .005μF, 150VRMS		
FUSES AND FUSEHOLDERS				
*F1	089020	0.5 Amp, 250V, SLO-BLO		
*F2	089030	5 Amp, 125V, SLO-BLO, Pigtail		
	178106	Fuseholder		
INTEGRATED CIRCUITS				
*1C1	133030	+ 5V Regulator, LM309K		
LIGHTING DEVICES				
*DS1	058014	LAMP, 6.3V, 0.25A, 1866		
*DS2	058014	LAMP, 6.3V, 0.25A, 1866		
*DS3	058014	LAMP, 6.3V, 0.25A, 1866		
*DS4	058014	LAMP, 6.3V, 0.25A, 1866		
RESISTORS (Pot = Potentiometer, CF = Carbon Film, CC = Carbon Composition)				
R1	141112	CF, 470K, 5%, 1/4W		
*R2	134377	Pot, Scan Speed		
R3	141076	CF, 15K, 5%, 1/4W		
R4	141076	CF, 15K, 5%, 1/4W		
R5	141076	CF, 15K, 5%, 1/4W		
*R6/S2	134378	Pot, Muting Control		
R7	136261	CC, 3.9M, 10% 1/2W		
*R8/S6	134379	Pot, Volume Control		
SWITCHES				
*S1	146206	Selectivity Switch		
*S2/R6	134378	Muting Control Switch		
S3	148040	Remote Scan Switch		
*S4	146207	Filter Switch		
*S5	146208	Mode Switch		
*S6/R8	134379	On/Off Main Switch		
TRANSFORMERS				
*T1	045457	Power Transformer		
MISCELLANEOUS				
	084038	Strain Relief		
	170119	Line Cord, 18Ga.		
	*170123	Flat Cable, 17 Conductor		
	*170124	Shielded Cable, 4-1/2", Molded, Right Angle		
	117008	AC Receptacle, Red		
*J1	117049	Headphone Jack, 3/8"		
	*178111	TO-3 Socket		
	178114	Fuseholder		

Parts marked with an asterisk () are replacement parts stocked by our Service Department and can be ordered only by part number from McIntosh. Parts not marked can be obtained from electronic parts suppliers.

FRONT PANEL AND TRIM PARTS LIST

Symbol No.	Part No.	Name/Description	Serial No.	Ref. No.
	*045510	Front Panel, Complete		
	*045654	Front Panel, Glass Only		
	*045616	Bezel W/Adhesive		
	*018160	End Cap, Secure W/101035 Screws		
	*019040	Contact Spring		
	*125270	Touch Button		
	*017246	Pushbutton, Black		
	*044775	Tuning Knob		
	*090157	Selectivity Knob		
	*090157	Filter Knob		
	*090157	Mode Knob		
	*090169	Scan Knob		
	*090169	Muting Knob		
	*090169	Volume Knob		
	*090122	Signal Strength Knob		
	*090122	Preset Knob		
	*104017	Felt Washer, Knobs		
	*018155	Top Panel Rail, Secure W/100007 Screws		
	*043410	Bottom Panel Rail, Secure W/100103 Screws		
	*101054	Tapping Screws, 6-32x1/4, Phillips, Black		

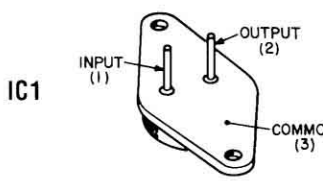
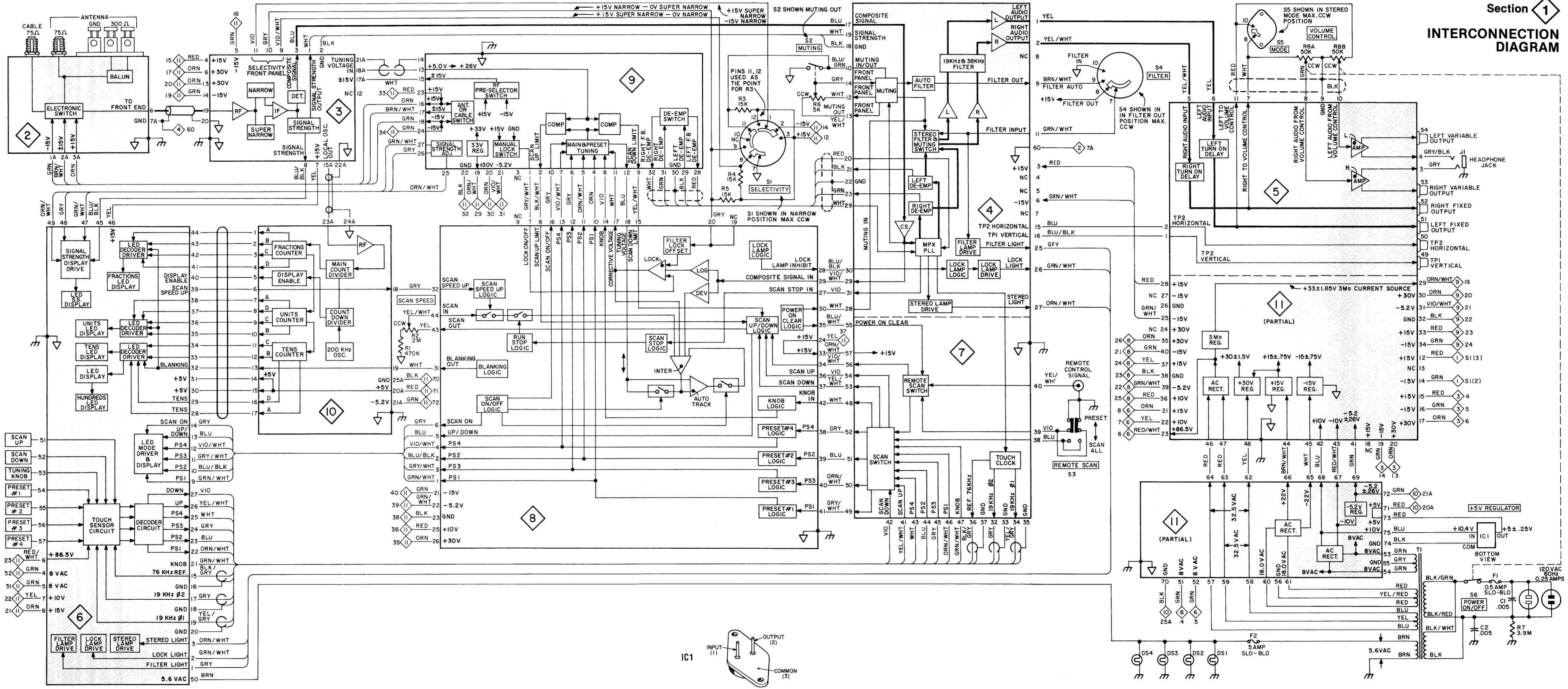
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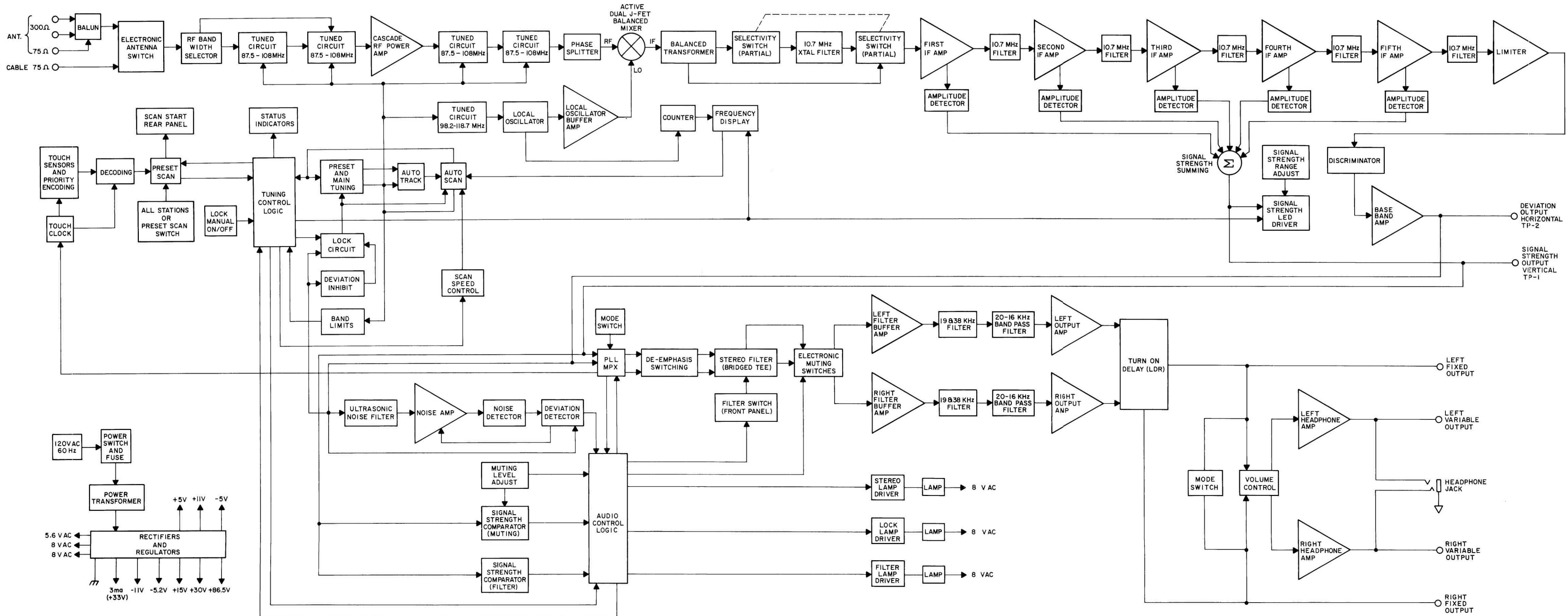
INSTALLATION HARDWARE PARTS LIST

Symbol No.	Part No.	Name/Description	Serial No.	Ref. No.
	*044454	Hardware Package		
	*043401	Mounting Strips		
	170033	FM Dipole		
	170015	Dual Coax Cable, 6'		
	*038179	Mounting Template		
	*045515	Remote Switch Package		
	*043592	Panloc Shelf Bracket, Right		
	*043593	Panloc Shelf Bracket, Left		
	*017156	Plastic Feet, Secure W/101070 Screws		

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INTERCONNECTION DIAGRAM





Schematic No. 156001 A