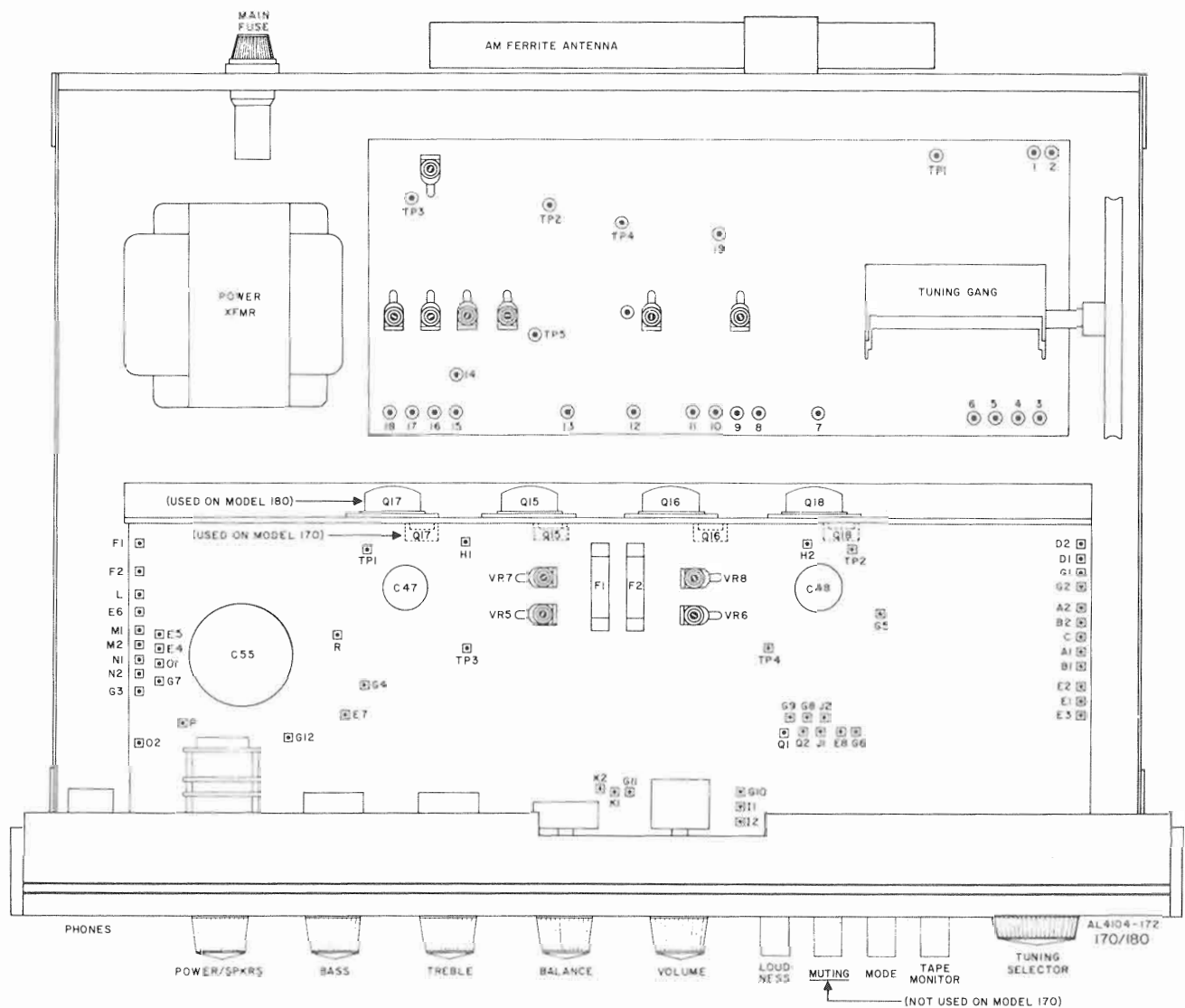


## CHASSIS LAYOUT



### IDLE CURRENT ADJUSTMENT

**NOTE:** This adjustment is very sensitive to changes in ambient temperature. Warm set up for at least 10 minutes before proceeding.

- (1) Turn VOLUME control to minimum.
- (2) Connect DC VTVM between terminals TP2 and G5 (Gnd) on the AUDIO/POWER board.
- (3) Adjust VR8 (R Idle Adjust) for 15-35 mV on the VTVM.
- (4) Move the VTVM to TP1 and G4 (Gnd) on AUDIO/POWER board.
- (5) Adjust VR7 for 15-35 mV on the VTVM.

### DRIVE SYMMETRY ADJUSTMENT

#### CAUTION:

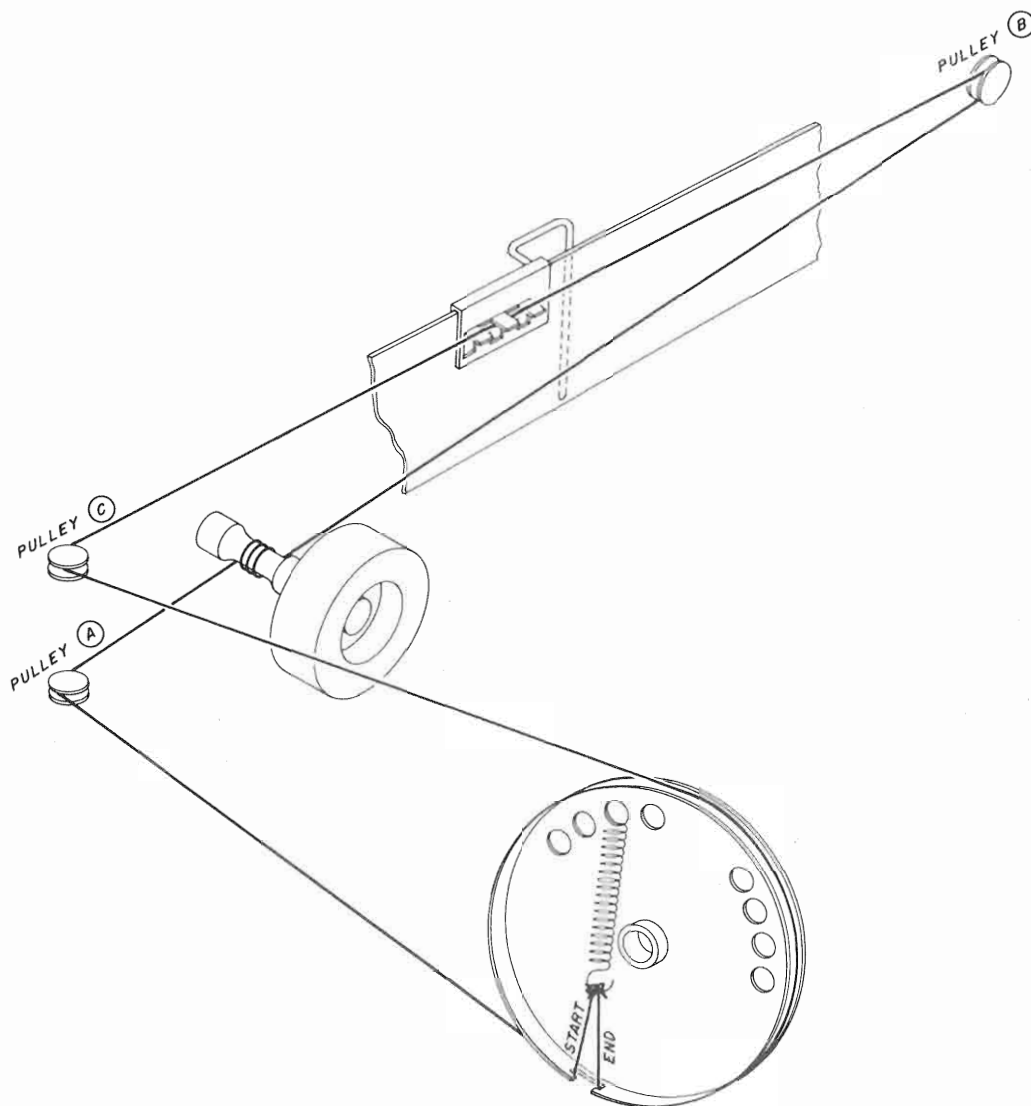
Use a load resistor with at least 50 watt dissipation rating.

- (1) Connect 4-ohm 50 watt load resistor between L MAIN SPKR and COM, and between R MAIN SPKR and COM. Connect vertical input of scope across left load resistor. Set SELECTOR switch to AUX.
- (2) Connect a low distortion sine wave signal generator to Left AUX input jack. Set output of generator to 1000 Hz, 400 mV.
- (3) Observe the sine wave on scope while turning VOLUME control up until the sine wave barely begins to clip. Adjust VR5 (Drive Sym. Adjust) until the clip level is identical for each half-cycle cycle.
- (4) Repeat above procedure for Right channel, adjusting VR6 until the clip level is even on both halves of the cycle.

## CAUTION:

- (A) Measure one channel at a time.
- (B) Limit measurements to 10 minutes.
- (C) Use a load resistor with a minimum rating of 50 watts.
- (1) Set BASS, MIDRANGE, and TREBLE controls flat, SELECTOR switch to AUX 1, and POWER/SPKRS switch to AC OFF.
- (2) Connect a low-distortion sine wave signal generator between L AUX IN jack and chassis ground. Set the generator output at 1000 Hz, minimum output.
- (3) Connect the 4-ohm load resistor between L MAIN SPKR and COM terminals. Connect an AC VTVM, scope, and harmonic distortion analyzer across the 4-ohm load.
- (4) Set POWER/SPKRS switch to MAIN. Turn VOLUME control slowly to maximum.
- (5a) FOR MODELS 170, 173, 177: Adjust the generator output until VTVM indicates 8 volts RMS. The distortion analyzer should indicate less than 1% harmonic distortion.
- (5b) FOR MODELS 180, 185, 187: Adjust the generator output until VTVM indicates 9 volts RMS. The distortion analyzer should indicate less than 1% harmonic distortion.
- (6) Repeat steps (1) through (5) for the right channel.

- (1) Remove screws securing cabinet to chassis and remove cabinet. Place receiver face down on bench, with top toward technician, bottom leaning back against a firm support.
- (2) Remove dial cord from tabs on dial pointer. Leave dial pointer on its rail.
- (3) Rotate tuning knob fully clockwise (88 MHz).
- (4) Remove old dial cord after marking which hole secures spring to drum.
- (5) Tie end of new cord to end of dial spring. Make sure dial spring is hooked to drum as shown in illustration.
- (6) Guide dial cord out of drum, through upper side of rim opening, toward rear of chassis, down under drum and around pulley (A). Wind dial cord counterclockwise three times around tuning shaft, around pulley (B), then around pulley (C).
- (7) Guide dial cord to drum, and inside, through rim opening.
- (8) Pull dial cord taut and hook cord temporarily to end of dial cord spring.
- (9) Rotate tuning knob clockwise, then counterclockwise, to distribute the tension evenly.
- (10) Repeat steps (8) and (9) until spring and cord are evenly tensioned. Then tie dial cord securely to end of spring.
- (11) Place dial cord over, under, and over the tabs on dial pointer.
- (12) Turn tuning knob fully counterclockwise. Slide pointer to indicate zero on tuning dial while holding drum fully counterclockwise (rim opening up).



# Fisher 170, 173, 177, 180, 185, 187

## SEMICONDUCTORS

ITEM	PART NO.	TYPE
(TUNER)		
CR1	TR4083-2337011	1S2076
CR2	TR4083-2337011	1S2076
CR3	TR4083-2337011	1S2076
CR4	TR4031-0575002	1N34A
CR5	TR4031-0575002	1N34A
CR6	TR4104-0575019	1N60(P)
CR7	TR4104-0575019	1N60(P)
CR8	TR4104-0575019	1N60(P)
FET1	TR4104-2327431	3SK45
IC1	TR4083-2327312	HA1201
IC2	TR4104-2327411	HA1202
IC3	TR4104-2327421	HA1115
Q1	TR4031-0573510	2SC535(B)
Q2	TR4031-0573507	2SC461(B)
Q3	TR4031-0573486	2SC400(B)
Q4	TR4031-0573486	2SC400(B)
Q5	TR4104-0573491	2SC454(B)
Q6	TR4031-2320063	2SC458(C)
Q7	TR4031-2320063	2SC458(C)
Q8	TR4031-0573486	2SC400(B)

## (AUDIO/POWER;COMMON)

CR1	TR4083-2337071	HV-26G
CR2	TR4083-2337071	HV-26G
CR3	TR4083-2337071	HV-26G
CR4	TR4083-2337071	HV-26G
CR5	TR4031-2327077	AW-01-16
CR6	TR4031-2327031	VO-3C
CR7	TR4031-2327031	VO-3C
CR8	TR4031-2327031	VO-3C
CR9	TR4031-2327031	VO-3C
CR11	TR4083-2337071	HV-26G
CR12	TR4083-2337071	HV-26G
Q1	TR4031-2320073	2SC458
Q2	TR4031-2320073	2SC458
Q3	TR4104-2327363	2SC1345(E)
Q4	TR4104-2327363	2SC1345(E)
Q5	TR4031-2320073	2SC458
Q6	TR4031-2320073	2SC458
Q7	TR4083-2327283	2SA673A
Q8	TR4083-2327283	2SA673A
Q19	TR4031-2327153	2SC1061(C)

## (AUDIO/POWER;MODEL 170)

CR10	TR4031-2337063	AW-01-22
Q9	TR4031-2327293	2SC1213A(C)
Q10	TR4031-2327293	2SC1213A(C)
Q11	TR4031-2327293	2SC1213A(C)
Q12	TR4031-2327293	2SC1213A(C)
Q13	TR4083-2327283	2SA673A(C)
Q14	TR4083-2327283	2SA673A(C)
Q15	TR4031-2327153	2SC1061(C)
Q16	TR4031-2327153	2SC1061(C)
Q17	TR4031-2327153	2SC1061(C)
Q18	TR4031-2327153	2SC1061(C)
Q20	TR4105-2327022	2SC984(C)

## (AUDIO/POWER;MODEL 180)

CR10	TR4031-2337077	AW-01-33
Q9	TR4105-2337403	2SC1212A(C)
Q10	TR4105-2337403	2SC1212A(C)
Q11	TR4105-2337403	2SC1212A(C)
Q12	TR4105-2337403	2SC1212A(C)
Q13	TR4105-2337393	2SA744A(C)
Q14	TR4105-2337393	2SA744A(C)
Q15	TR4105-2327053	2SC1010(C)
Q16	TR4105-2327053	2SC1010(C)
Q17	TR4105-2327053	2SC1010(C)
Q18	TR4105-2327053	2SC1010(C)
Q20	TR4083-0573557	2SC1212A(H)

## ELECTROLYTIC/VARIABLE CAPS

ITEM	PART NO.	VALUE
(TUNER)		
C30	CE4104-1252515	4.7uf 16V
C31	CE4104-1252515	4.7uf 16V
C32	CE4104-1252811	1uf 50V
C33	CE4104-1252515	4.7uf 16V
C46	CE4104-1252811	1uf 50V
C47	CE4031-0252613	3.3uf 25V
C52	CE4031-0152525	47uf 16V
C56	CE4031-0252613	3.3uf 25V
C57	CE4031-0252613	3.3uf 25V
C58	CE4031-0252613	3.3uf 25V
C59	CE4042-0252332	220uf 16V
C62	CE4104-1252811	1uf 50V
C63	CE4104-1252811	1uf 50V
C64	CE4031-0152525	47uf 16V
C85	CE4104-1252811	1uf 50V
TC3	CT4104-0283115	Trimmer
VC1	CV4104-0281172	Tuning Gang

## (AUDIO/POWER;COMMON)

C1	CE4104-1252613	3.3uf 25V
C2	CE4104-1252613	3.3uf 25V
C3	CE4104-1252621	10uf 25V
C4	CE4104-1252621	10uf 25V
C13	CE4104-1252522	22uf 16V

- (1) Models 170, 173 & 177.  
(2) Models 180, 185 & 187.

C14	CE4104-1252522	22uf 16V
C15	CE4104-1252621	10uf 25V
C16	CE4104-1252621	10uf 25V
C23	CE4104-1252313	3.3uf 50V
C24	CE4104-1252313	3.3uf 50V
C25	CE4104-1252815	4.7uf 50V
C26	CE4104-1252815	4.7uf 50V
C29	CE4104-1252811	1uf 50V
C30	CE4104-1252811	1uf 50V
C35	CE4104-1252825	47uf 50V
C36	CE4104-1252825	47uf 50V
C37	CE4104-1252613	3.3uf 25V
C38	CE4104-1252613	3.3uf 25V
C39	CE4104-1252831	100uf 50V
C40	CE4104-1252831	100uf 50V
C41	CE4104-1252831	100uf 50V
C42	CE4104-1252831	100uf 50V
C51	CE4104-1252831	100uf 50V
C52	CE4104-1252831	100uf 50V
C53	CE4104-1252631	100uf 25V
C54	CE4084-0252632	220uf 25V
C55	CE4104-0252639	2200uf 63V
C59	CE4104-1252621	10uf 25V
C60	CE4104-1252621	10uf 25V

## CONTROLS/SPECIAL RESISTORS

ITEM	PART NO.	DESCRIPTION
(AUDIO/POWER;COMMON)		
R95	BP4083-0119127	.47 ohms 2W
R96	BP4083-0119127	.47 ohms 2W
R97	BP4083-0119127	.47 ohms 2W
R98	BP4083-0119127	.47 ohms 2W
VR1	RV4104-0156601	200K Dual Treble
VR2	RV4104-0156601	200K Dual Bass
VR3	RV4104-0153234	200K Balance
VR4	RV4104-0153710	100K Dual Volume
VR5	RV4083-0151226	100K Left Drive Symmetry
VR6	RV4083-0151226	100K Right Drive Symmetry
VR7	RV4083-0151223	200 ohm Left Idle Current
VR8	RV4083-0151223	200 ohm Right Idle Current

## (AUDIO/POWER;MODEL 180)

R99	RP4083-0119127	.47 ohms 2W
R100	RP4083-0119127	.47 ohms 2W
R121	RP4083-0119127	.47 ohms 2W
R122	RP4083-0119127	.47 ohms 2W

## (TUNER)

VR1	RV4104-0151281	20K FM Level
VR2	RV4104-0151282	1000 ohms Separation
VR3	RV4104-0151224	10K AM Level
VR4	RV4104-0151283	5000 ohms AM Meter Adjust
VR5	RV4104-0151283	5000 ohms FM Meter Adjust
VR6	RV4104-0151225	47K Muting

## COILS/TRANSFORMERS

ITEM	PART NO.	
Power, 120V		
	TD4104-2217135 (1)	L8 LC4031-2134204
	TD4105-2217152 (2)	L9 LC4104-2134372
Power, 120/240V		
	TE4104-2217085 (1)	T1 ZZ4104-2154171
	TE4105-2217342 (2)	T2 ZZ4104-0322203
L1	LC4104-2134411	T3 ZZ4104-0322203
L2	LC4104-2134412	T4 ZZ4104-2154183
L3	LC4104-2227081	T5 ZZ4104-0322203
L4	LC4104-2134413	T6 ZZ4104-2154161
L5	LC4104-2227033	T7 ZZ403-2140242
L6	LC4104-2134392	T8 ZZ4104-2154121
L7	LC4104-2134373	T9 ZZ4104-0322203

## MISCELLANEOUS

ITEM	NAME	PART NO.
(CHASSIS)		
F3	Fuse, Main Power, 2A	FL51313-13A
F4	Fuse, Meter, 2A	FL51313-37
SW1	Switch, Power/Spkr	SR4104-261782
SW2	Switch, Selector	SR4105-2617251
SW3	Switch, Loudness	SU4104-2337263
SW4	Switch, Mute	SU4104-2337263
SW5	Switch, Mode	SU4104-2337263
SW6	Switch, Tape Monitor	SU4104-2337263

## (TUNER)

CP1	Component Combination	EP4104-0150501
CP2	Component Combination	EP4104-0185041
CP3	Component Combination	EP4104-0186051
CP4	Component Combination	EP4104-0186051
CP5	Component Combination	EP4104-0186031

## CABINET PARTS

NAME	PART NO.
Cabinet, Receiver	AS4104-4927241
Panel, Dress, Model 170	AS4104-3241794
Panel, Dress, Model 173	AS4104-324021
Panel, Dress, Model 177	AS4104-324022
Panel, Dress, Model 180	AS4105-3241793
Panel, Dress, Model 185	AS4105-3242023
Panel, Dress, Model 187	AS4105-3242024

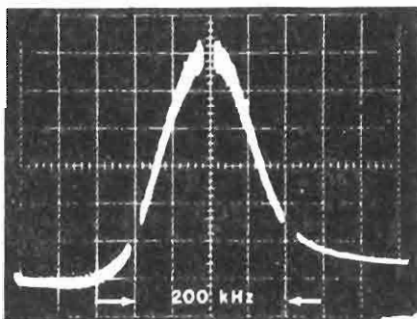
# TUNER ALIGNMENT

FM ALIGNMENT—FM MUTING OFF TONE CONTROLS and BALANCE to center. SPEAKER/PHONES Switch to PHONES, MODE to STEREO, SELECTOR to FM, VOLUME to MIN, TAPE MONITOR OFF.

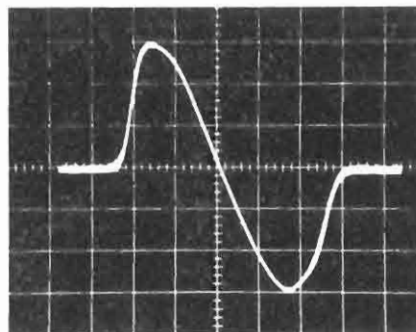
Maintain generator output as low as possible for suitable indication.

ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
<b>Note:</b> 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 to 10.7 MHz sweep through 2 pF capacitor and 22K resistor to TP1 (FM IN). Connect ground lead to rear of chassis. Markers are not required.	Position of non-interference.	Scope vertical input to TP2 (FM OUT). Ground lead to rear of chassis.	Short FM oscillator variable capacitor (section nearest L4) with a clip lead as shown in alignment layout. Detune T9 by turning core up (CCW).  Adjust T5, T3, T2, T1, for curve as shown in photograph. Repeat as required to obtain best shape.  Adjust T9 for best shape (widest bandpass, not for max amplitude).
2. PRELIMINARY DETECTOR ALIGNMENT	Readjust generator output to 100 $\mu$ V. Reduce output amplitude as much as possible throughout this procedure.		Connect scope vert input through a 100K resistor to TP3 (DISCRI).	Adjust T7 top and bottom for best gain and symmetry. S-curve should appear as shown in photograph.
<b>Note:</b> 120-ohm composition resistors in series with each lead from the RF generator 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 CCW.		Center dial pointer on 0 and cement it in place.
4.	Connect FM RF generator through two 120-ohm resistors to FM ANT screw terminals. Set generator to position of non-interference near 90 MHz, modulate with 400 Hz to provide $\pm 75$ kHz deviation. Output amplitude should be sufficient to provide reading on receiver front panel meter of 3.	Position of non-interference near 90 MHz.	Receiver front panel meter.  Caution: To ensure that meter is not indicating a local broadcast station connect scope for step 5, below.	Adjust L4 for maximum gain.  Adjust L2, then L7 for maximum gain.  Repeat the two steps above as required.
5.	Change generator setting to position of non-interference near 106 MHz.	Position of non-interference near 106 MHz.		Adjust TC3 for maximum gain.  Adjust TC1, then TC2, for maximum gain.  Repeat the two steps above as required.
6. FINAL DETECTOR ALIGNMENT	As above, except set to position of non-interference near 100 MHz. Set output amplitude to 1 mV (500 mV at receiver antenna terminals).	Position of non-interference near 100 MHz.	Distortion meter to RCDR OUT jack. DC VTVM through 100K resistor to TP3 (DISCRI).	Adjust top core of T7 for zero point on 0.1 V scale.  Adjust bottom core of T7 for minimum distortion (should be below 1%) on distortion meter.
7. FM OUTPUT	As above (100 MHz), deviation set to $\pm 22.5$ kHz.	Position of non-interference near 100 MHz.	VTVM and scope to RCDR OUT jack.	Adjust VR1 (FM Level Adjust) for 350 mV RCDR OUT jack.

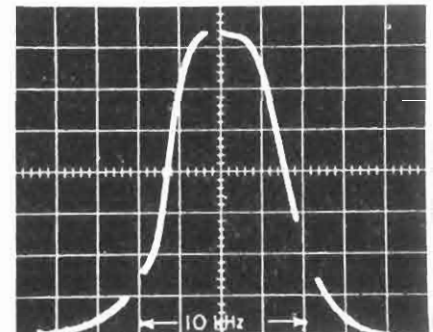
ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
8. FM METER ADJUSTMENT	As above; set amplitude of generator output to 1 Millivolt.	Position of non-interference near 100 MHz.	Receiver front panel meter.	Adjust VR5 (FM Meter Drive Adjust) so the front panel meter reads 4.
9a. MUTING LEVEL ADJUSTMENT (180 only)	Same except generator output set to 16 $\mu$ V.		VTVM and scope to RCDR OUT jack.	Set MUTING ON-OFF switch on receiver front panel to ON.  Adjust VR6 (Muting Adjust) until generator output signal overcomes MUTING (until signal shows on scope)
9b. (170 only)	Same except modulation changed to 19 kHz, amplitude sufficient to cause deviation of $\pm 6$ kHz.			Adjust VR7 (STEREO-BEACON adjust) until the STEREOBEACON lights.  Decrease generator output slowly, STEREOBEACON should go out at slightly lower output.  Check by increasing and decreasing generator output slightly to turn STEREO-BEACON ON and OFF.
10. STEREO SEPARATION	As above, except amplitude increased to 1.		Move VTVM and scope to TP5 (19 kHz) and GND.  Move VTVM and scope to TP6 (38 kHz).	A. Set VR2 (Separation adjust) to the middle of its rotation.  B. Adjust L6 and L9 (19 kHz) for maximum output.  Adjust L7 for maximum.
11.	Change amplitude of 19 kHz modulation to 8%, and modulate with 400 Hz main signal, (Left) amplitude sufficient to produce deviation 42 kHz.		Scope and VTVM to Right RCDR OUT jack.	Adjust L9 for maximum output. If L9 requires more than $\frac{1}{2}$ turn, readjust L6, then L9, several times to get best settings for maximum.  Adjust VR2 for minimum.
12.	As above, except 19 kHz amplitude to produce 3.75 kHz deviation.		Move scope and VTVM to Left RCDR OUT jack.	Adjust VR7 so the STEREO-BEACON just lights. Reduce amplitude of modulation until the STEREOBEACON just goes out. Note the amount of deviation. Increase the deviation until the light comes ON again. The STEREOBEACON should light and go out between 3 and 4.



FM IF



FM DETECTOR



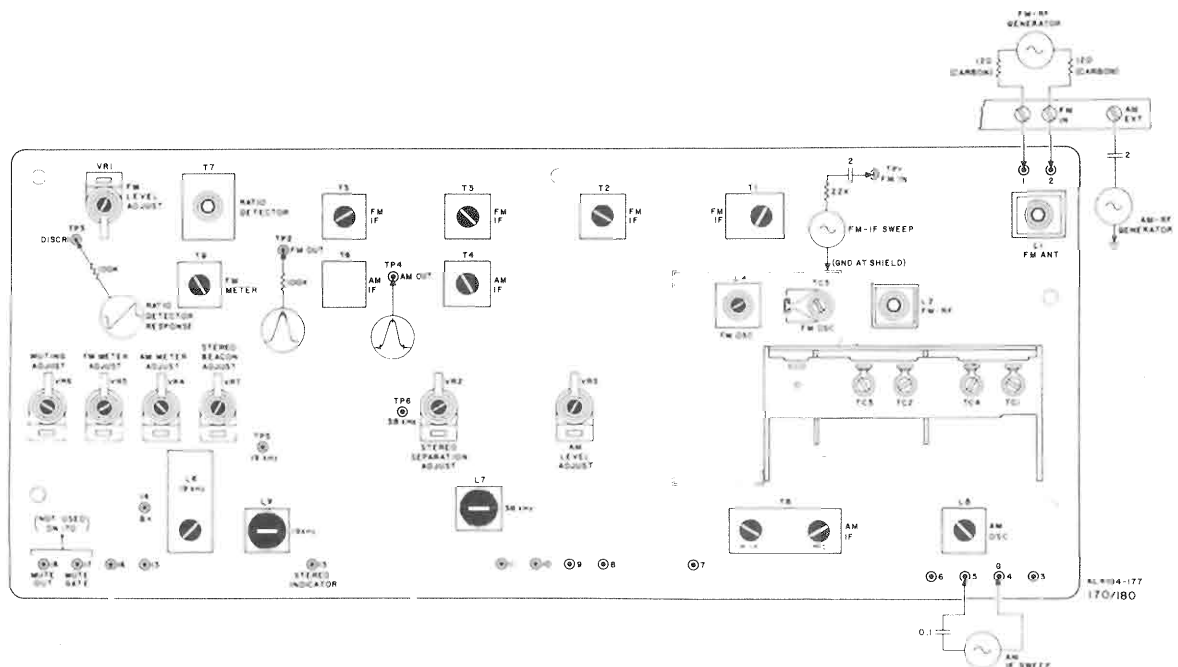
AM IF

# TUNER ALIGNMENT

AM ALIGNMENT—SAME FRONT PANEL SETTINGS as FM ALIGNMENT EXCEPT SELECTOR SET to AM

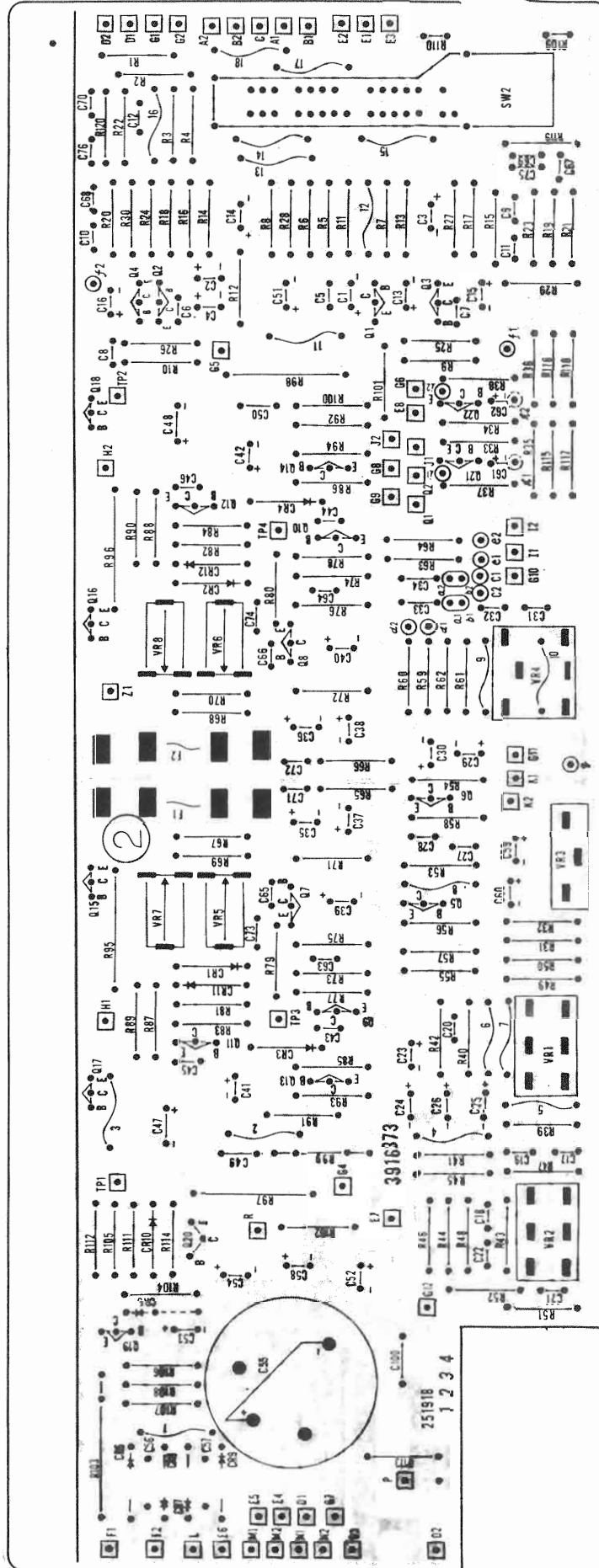
Maintain generator output as low as possible for suitable indication.

ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
1. AM IF	Connect 445 kHz sweep generator to AM EXT ANT terminals.  Note: After each adjustment reduce generator output as required to keep front panel meter near 2.5.	Position of non-interference.	Scope vertical input to TP4 (AM OUT).	Adjust T8 for maximum gain.  Adjust T4 for maximum.  Repeat above two steps as required.
2. AM RF	Connect RF AM generator to antenna terminals and set output position of non-interference near 550 kHz, modulated 30% with 1 kHz audio, amplitude 5 mV.	Position of non-interference near 550 kHz.	Scope and VTVM to RCDR OUT jack.	Adjust L8 (AM Osc) for maximum.
3.	Change the RF output frequency to position of non-interference near 1,600 kHz.	Position of non-interference near 1,600 kHz.		Adjust TC5 for maximum.
4.	Reset the output frequency to position of non-interference near 600 kHz.	Position of non-interference near 600 kHz.		Repeat steps 2 and 3, above for maximum at both 600 and 1,400 kHz.
5.	Reset output to 1,400 kHz.	Position of non-interference near 1,400 kHz.		Remove tape from ferrite antenna case and adjust slide for maximum gain signal.  Repeat steps 4 and 5.
6. AM OUTPUT	Reset generator output to position of non-interference near 1,000 kHz, amplitude 5 mV.	Position of non-interference near 1,000 kHz.		Adjust VR3 (AM Output) for 315 mV.
7. AM METER ADJUSTMENT	Reset generator output to position of non-interference near 1,000 kHz, amplitude 5 mV.	Position of non-interference near 1,000 kHz.	Receiver front panel meter.	Adjust VR4 (AM Meter Adjust) so that signal meter reads 4.



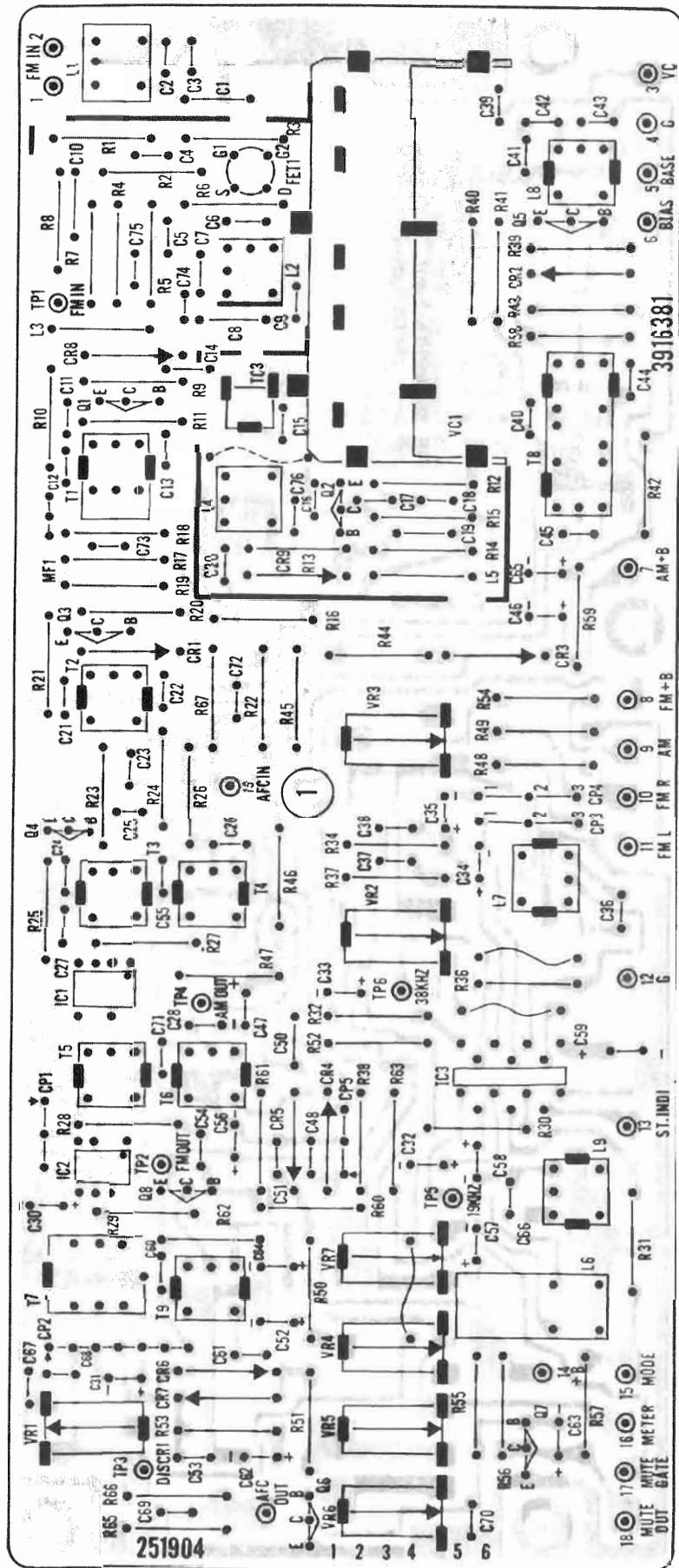
# AUDIO/POWER

Fisher 170, 173, 177, 180, 185, 187



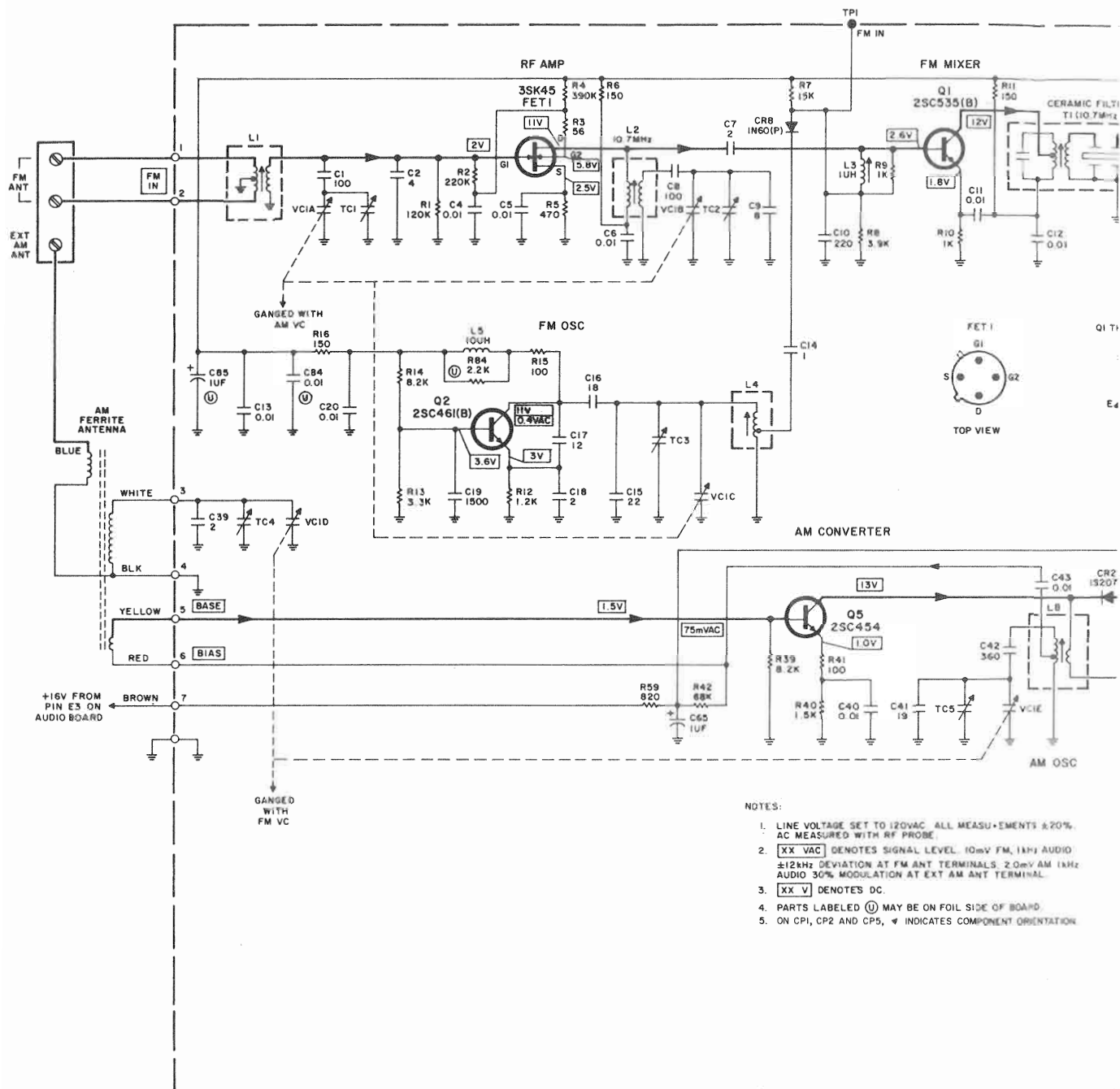
AL4104-III-2  
170/180

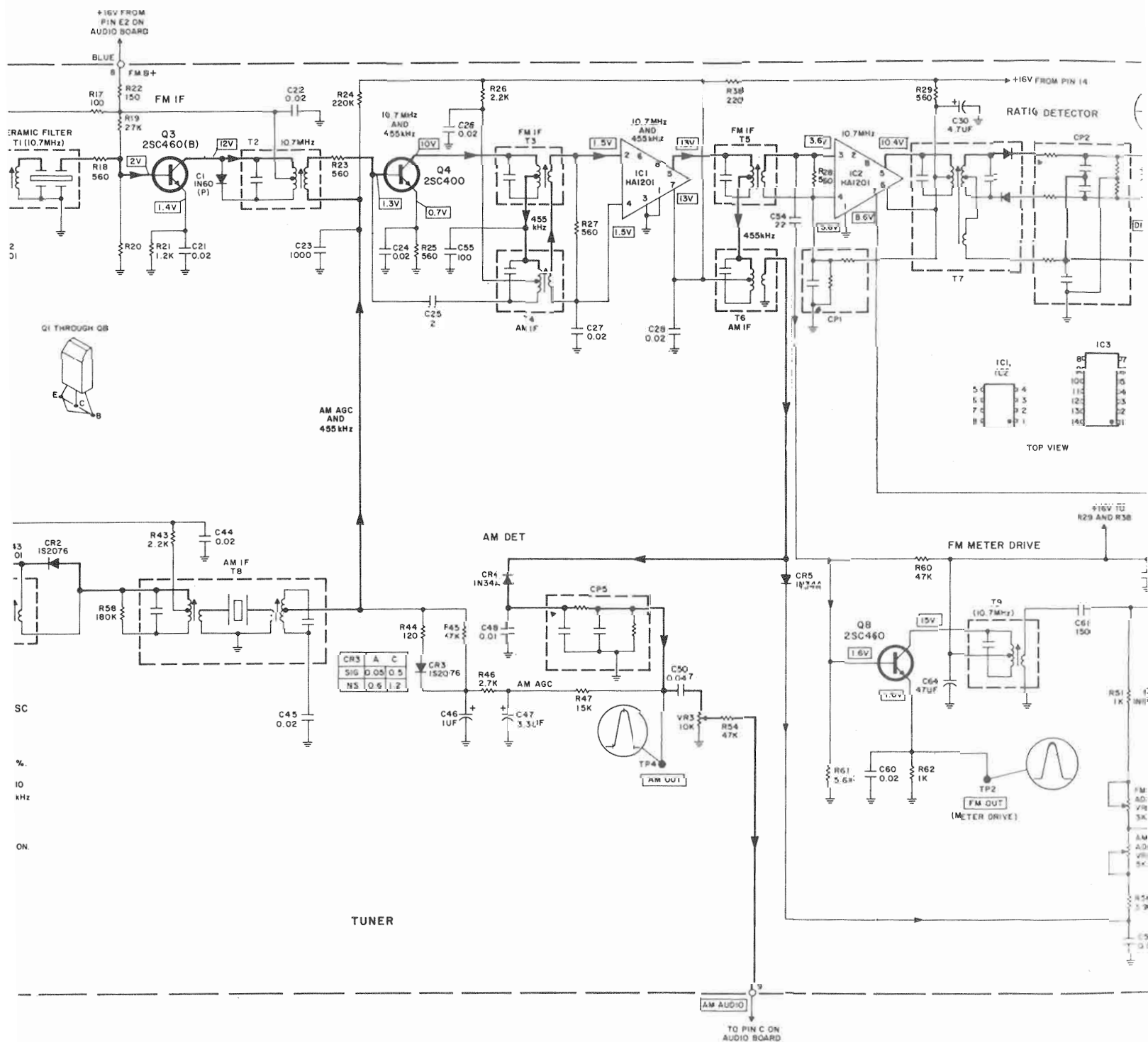
# TUNER



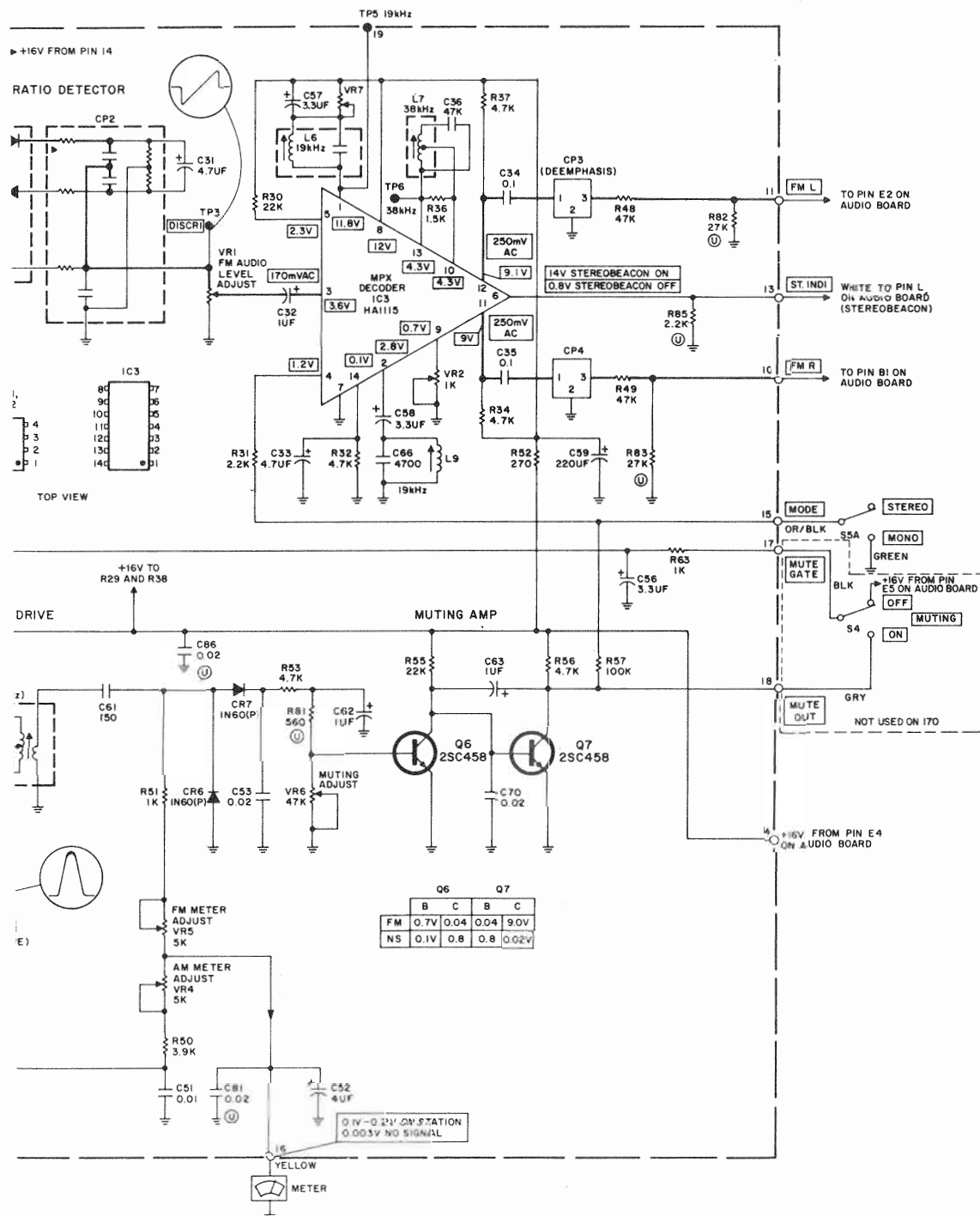
AL4104-III-1  
I70/I80

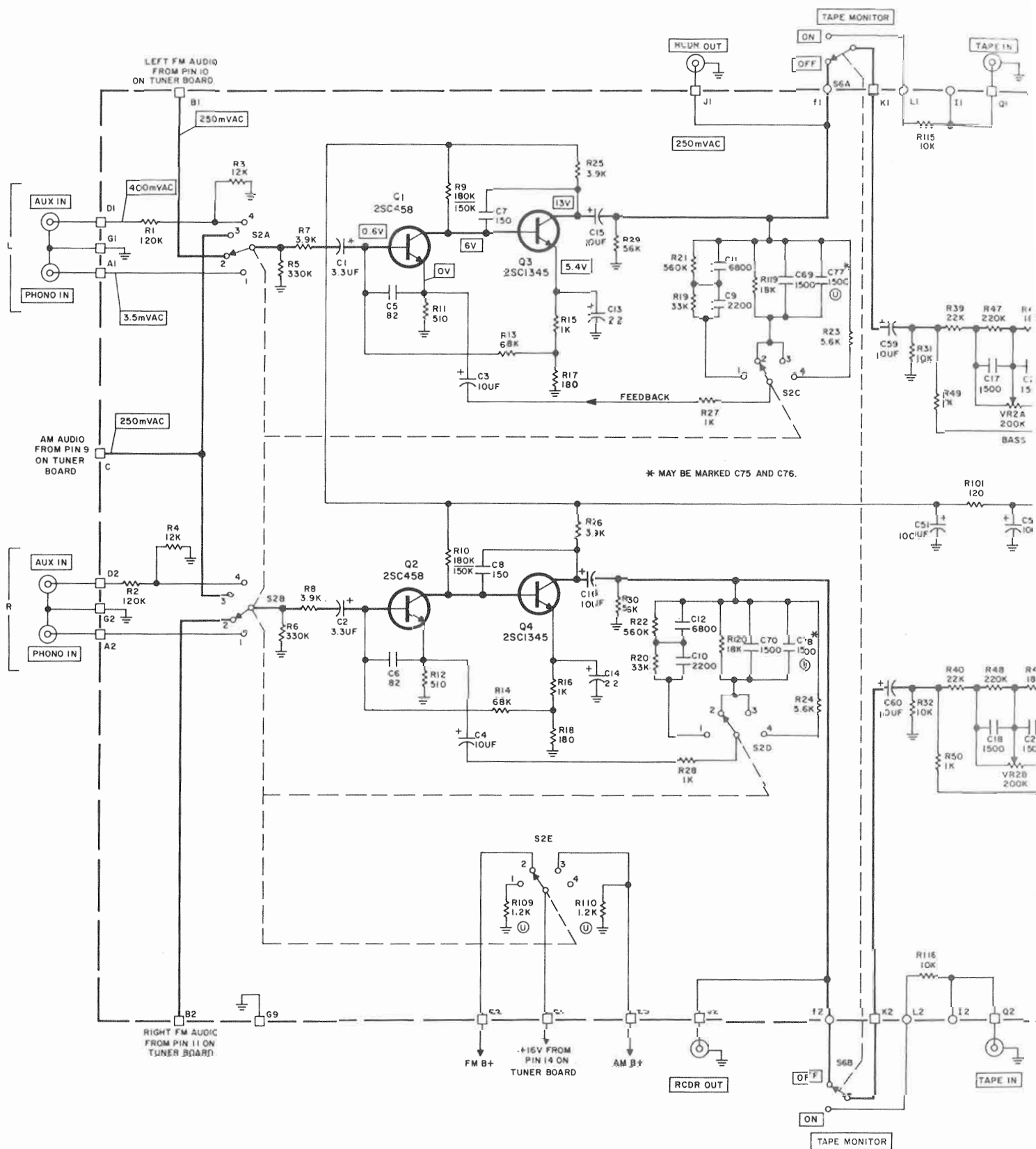


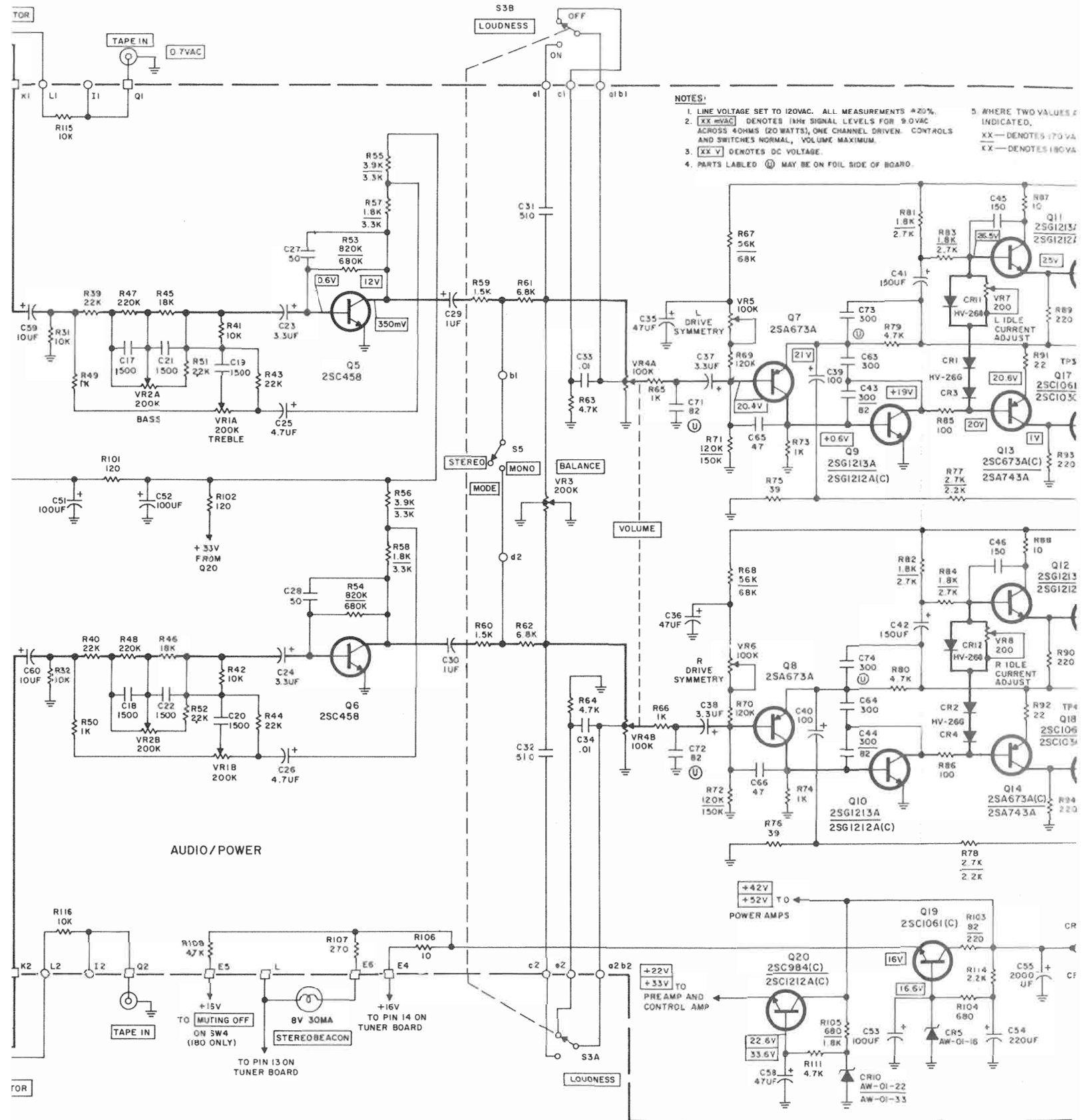




# TUNER

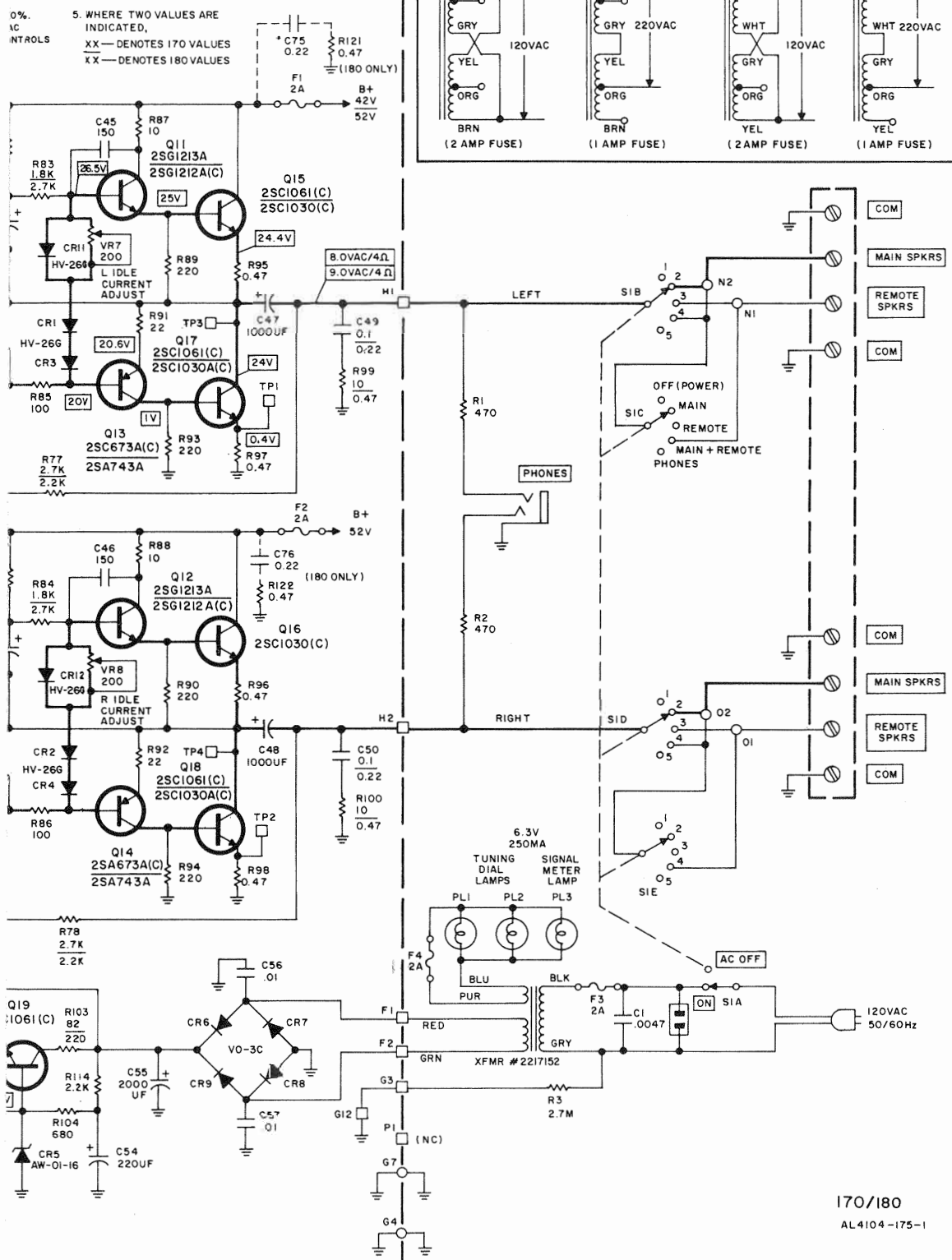






0%  
AC  
INTROLS

5. WHERE TWO VALUES ARE  
INDICATED,  
XX—DENOTES 170 VALUES  
XX—DENOTES 180 VALUES



170/180  
AL4104-175-1