3-5. The SIGNAL meter operation and the i-f amplifier gain can be checked as follows:

a. Connect the signal generator, set to 10.7 mc, to pin 5 of V3, the mixer grid.

b. Set the PRECEDENT R-F Gain Control at maximum CW. See table 3-2.

Table 3-2. Signal Meter I-F Amplifier Gain Check.

SCALE DEFLECTION	SIGNAL INPUT LEVEL - uv
	40
1/4	300
1/2	1,200
3/4	4,000
Full	

To check signal meter and gain from the antenna terminal, connect the signal generator to the unbalanced 75-ohm connection of the antenna terminal, and set the tuner to 100 megacycles.

Table 3-3. Signal Meter Overall Gain Check.

SCALE DEFLECTION	SIGNAL INPUT LEVEL - uv
	3
1/4	18
1/2	80
3/4	440
Full	

The measurements are average, and assume proper alignment of all tuned circuits.

3-6. ALIGNMENT OF PRE-LIMITERS AND LIMITERS.

3-7. If it is found necessary to realign the tuner after making the above checks, or if a replacement is made of some component such as a transformer or capacitor, carefully follow the procedure given in table 3-4. Equipment required includes:

a. VTVM with crystal diode r-f probe, RCA Senior Voltohmyst, Model WV-97A with WG-264 probe, or equal.

b. Signal Generator, Measurements Corporation Model 80, or equal.

Table 3-4. Pre-limiter and Limiters. Alignment.

STEP	CONNECT INSTRUMENT TO	ADJUST	INDICATION
a.	R-f probe of VTVM to pin 1, V12		
b.	Signal generator to pin 1, V10		
c.		Signal generator to 10.7 mc, with just enough output to get VTVM indication	
d.		Z12	Maximum on VTVM; but do not exceed 0.5 V rf
e.		Z13	

STEP	CONNECT INSTRUMENT TO	ADJUST	INDICATION
f	Signal generator to pin 1, V9		
g		Reduce signal generator level	
h		Z11	Maximum on VTVM; but do not exceed 0.5 V rf.
i	Signal generator to pin 1, V8		
j		Reduce signal generator level	
k		Z10	"
l	Signal generator output for VTVM indication of 0.5V should be not greater than 500 uv.		
m		Increase signal generator output to obtain increased VTVM reading	1.5V on VTVM
n	Signal generator output should be not greater than 3,200 uv. See figure 13.		
o	R-f probe of VTVM to pin 5, V13		
p		Signal generator output to lowest possible level required for indicated VTVM reading	1.5V on VTVM
q		Repeak Z13	Maximum on VTVM; but do not exceed 1.5 V
r		Z14	
s	Remove all test equipment		

3-8. ALIGNMENT OF DISCRIMINATOR.

3-9. Table 3-5 gives instructions for discriminator alignment, with the same equipment used in section 3-7.

Table 3-5. Discriminator Alignment.

STEP	CONNECT INSTRUMENT TO	ADJUST	INDICATION
a	D-c probe of VTVM to CR9 or CR10 output		
b	Signal generator to pin 1, V11		
c		Signal generator to 10.7 mc	
d		C63	Maximum on VTVM

STEP	CONNECT INSTRUMENT TO	ADJUST	INDICATION
e	Remove VTVM probe	C64 for zero-center reading on TUNE meter	Zero-center
f			

Check balance of discriminator. The TUNE meter pointer should move to points equi-distant from the zero-center for equal changes in frequency above and below 10.7 mc.

g		Signal generator to 10.940 mc	
h			TUNE meter pointer should move to large division mark to right of zero-center
i		Signal generator to 10.460 mc	
j			TUNE meter pointer should move to large division mark to left of zero-center
k	Remove all test equipment.		

3-10. ALIGNMENT OF SELECTIVE I-F AMPLIFIER.

3-11. Table 3-6 gives instructions for selective if amplifier alignment, with the same equipment used in section 3-7.

Table 3-6. Selective IF Amplifier Alignment.

STEP	CONNECT INSTRUMENT TO	ADJUST	INDICATION
a	R-f probe of VTVM to pin 1, V9		
b		RF Gain to maximum	
c	Signal generator to pin 5, V3		
d		Signal generator to 10.7 mc, with just enough output to get VTVM indication	
e		Z5 top and bottom	
f		Z6 top and bottom	Maximum on
g		Z7 top and bottom	VTVM, but
h		Z8 top and bottom	do not exceed
i		Z9 top and bottom	1.0V rf
j	Signal generator output for VTVM indication of 1.0V should be not greater than 500 uv. See selectivity curve, figure 7.		

3-12. ALIGNMENT OF R-F HEAD.

3-13. In making alignment adjustments on the r-f head, the dial calibration and oscillator tuning range must be checked, and adjusted if necessary. The threaded carriage drive shaft rotates 6-1/2 turns as the carriage moves the tuning slugs through their normal travel of 13/16-inches. The stops for the carriage are made on the shaft and are fixed.

3-14. When the slugs are at their maximum "out" position, and the carriage is against the back stop, the dial pointer should be about 3/16-inches above the 108 end of the dial scale. When the slugs are at the maximum "in" position, and the carriage is against the front stop, the dial pointer should be about 3/16-inches below the 88 end of the dial scale. If the gold dial panel is removed, the correct high-frequency end (108) position of the pointer can be seen as a small hole in the black plate on which the pointer travels. The pointer should be directly over this hole. The cord arrangements for the dial pointer drive cord and the main dial drive cord are shown in figure 9.

3-15. If it is necessary to replace or reset the oscillator tuning slug, turn the tuning knob until the carriage rests against the rear stop (108). Set the slug so that the measurement from the grid end of the winding to the end of the slug is 1-1/32 inches, as shown in figure 14, and solder into position. Move the tuning knob so that the pointer is at 106. Connect a signal generator to the antenna terminals and feed in a signal of 106 mc. Adjust C22 until the 106 mc signal gives a peak reading on the SIGNAL meter, and the TUNE meter is on zero center. Set the signal generator to 90 mc. The test signal should now tune in at 90 on the dial scale. If the test signal tunes in higher than 90, the value of inductance of the small trimmer inductance must be increased. This is done by compressing the turns of the coils for a shorter coil length. Return the dial pointer and the signal generator to 106. Tune in the signal by adjusting C22 while observing the SIGNAL and TUNE meters. Then recheck the 90 point by setting the signal generator and dial pointer to 90. If the test signal tunes in at a point below 90 on the dial, the trimmer inductance must be decreased in value. This is done by spreading the turns of the coil for a longer coil length. By increasing the inductance in the trimmer inductance, the amount of change of inductance for a given slug travel in the main coil is decreased. Conversely, by decreasing the inductance in the trimmer inductance, the amount of change of inductance for a given slug travel in the main coil is increased. The 88 and 108 points can now be checked. If either end is set and the above procedure for setting the 106 and 90 points is followed, the other end will be correct. Set the dial pointer to 88 and tune the signal generator to the tuner, observing the SIGNAL and TUNE meters. If the signal generator frequency is found to be high, the oscillator tuning slug should be set slightly farther out, and the 106-90 procedure repeated. If the signal generator frequency is found to be low, the oscillator tuning slug should be set slightly farther in and the 106-90 procedure repeated. The tuning slugs for the two coils that make up the double-tuned interstage transformer should be positioned for a distance of one inch from the end of the coil to the wire end of the slug. Then solder the wire to the eyelet in the bakelite strip. To align these coils, set the dial to 98 and adjust the signal generator to this frequency by observing the SIGNAL and TUNE meters. With a low signal level input, adjust C9 and C16 for a peak reading on the SIGNAL meter.

3-16. The antenna transformer, Z1, is a broad-band transformer, essentially flat from 88 to 108 mc when the capacitor C5 is properly set. The terminals which connect to A-A of the antenna connector properly match a 300-ohm transmission line. To use a 72-ohm coaxial transmission line instead of the 300-ohm balanced line, the coaxial line will be properly matched by connecting from either A terminal to ground. To set C5, feed a signal of 98 mc at the antenna connector terminal and adjust C5 for a peak reading on the SIGNAL meter.

3-17. AUDIO AMPLIFIER

3-18. Normal discriminator output for a 400 cycle test tone at 100% modulation is 0.16 volts rms. With the audio gain control at maximum, the audio amplifier will deliver 2.0 volts rms at the HI impedance jack on the rear of the tuner, and 0.2 volts rms at the 600-ohm jack. If test tones of higher frequencies are used for checking the audio amplifier, the attenuation of the de-emphasis network will affect the output voltage. A standard de-emphasis curve with a time constant of 75 micro-seconds is given in figure 8. Table 3-7 gives representative values.

Table 3-7. De-emphasis Network Characteristics

FREQUENCY	LEVEL
400 cycles	0 db
1,000 cycles	-.9 db
2,120 cycles	-3.0 db
5,000 cycles	-7.8 db
10,000 cycles	-13.5 db
15,000 cycles	-17.0 db

3-19. If microphonics or hum troubles develop, the 12AU7 tubes should be checked. Defective tubes can also account for loss in gain. Tubes should always be tested before checking other components in the circuit.

3-20. POWER SUPPLY.

3-21. The voltage test points A, B, C, and D are shown on the schematic, figure 1, and are listed in table 3-8. For normal operating conditions, with RF Gain control at maximum, and a line voltage of 117Vac, the voltages at the test points are listed in table 3-8, which gives typical socket voltages for all tubes.

Table 3-8. Test Point Locations.

TEST POINT	LOCATION
A	Junction of L11-R61
B	Junction of R64-C78B
C	Junction of R61-R62
D	Junction of L14-R63

TYPICAL SOCKET VOLTAGES - 646C TUNER - S-1126

RF GAIN CONTROL AT MINIMUM
NO SIGNAL INPUT
AC LINE VOLTAGE = 117 AC

	FUNCTION	TYPE	1	2	3	4	5	6	7	8	9
1	RECTIFIER	5Y3GT		200		note 2 5.0 ac		note 2 5.0 ac		∠200	
2	RF AMPLIFIER	6BK7A	∠170	note 1 -.7	∠90	6.3 ac	Gnd	∠90	0	∠.5	Gnd
3	MIXER/OSCILLATOR	6J6	∠65	∠63	Gnd	6.3 ac	∠80	∠80	Gnd		
4	1ST IF AMPLIFIER	6BH6	0	∠.35	Gnd	6.3 ac	∠80	∠80	Gnd		
5	2ND IF AMPLIFIER	6BH6	0	∠.35	Gnd	6.3 ac	∠80	∠80	Gnd		
6	3RD IF AMPLIFIER	6BH6	0	∠.35	Gnd	6.3 ac	∠80	∠80	Gnd		
7	4TH IF AMPLIFIER	6BH6	0	∠.35	Gnd	6.3 ac	∠80	∠80	Gnd		
8	5TH IF AMPLIFIER	6BH6	0	∠1.0	Gnd	6.3 ac	∠130	∠130	Gnd		
9	1ST PRE-LIMITER	6BH6	-.15	Gnd	Gnd	6.3 ac	∠85	∠85	Gnd		
10	2ND PRE-LIMITER	6BH6	∠.15	Gnd	Gnd	6.3 ac	∠85	∠85	Gnd		
11	3RD PRE-LIMITER	6BH6	∠.15	Gnd	Gnd	6.3 ac	∠85	∠85	Gnd		
12	1ST LIMITER	6BH6	-2.0 dc	Gnd	Gnd	6.3 ac	∠94	∠94	Gnd		
13	2ND LIMITER	6AH6	-2.0	Gnd	Gnd	6.3 ac	∠180	∠56	Gnd		
14	1ST & 2ND AUDIO AMP.	12AU7	∠50	0	∠4.0	6.3 ac	6.3 ac	∠80	0	∠4.2	Gnd
15	AUDIO OUTPUT	12AU7	∠170	∠44	∠60	6.3 ac					Gnd

NOTE I - MEASURED BETWEEN TERMINALS 2 AND 3
NOTE II - MEASURED BETWEEN TERMINALS 4 AND 6

TEST POINT VOLTS A∠200 B∠170 C∠80 D-4.0

DATED: 8-31-54

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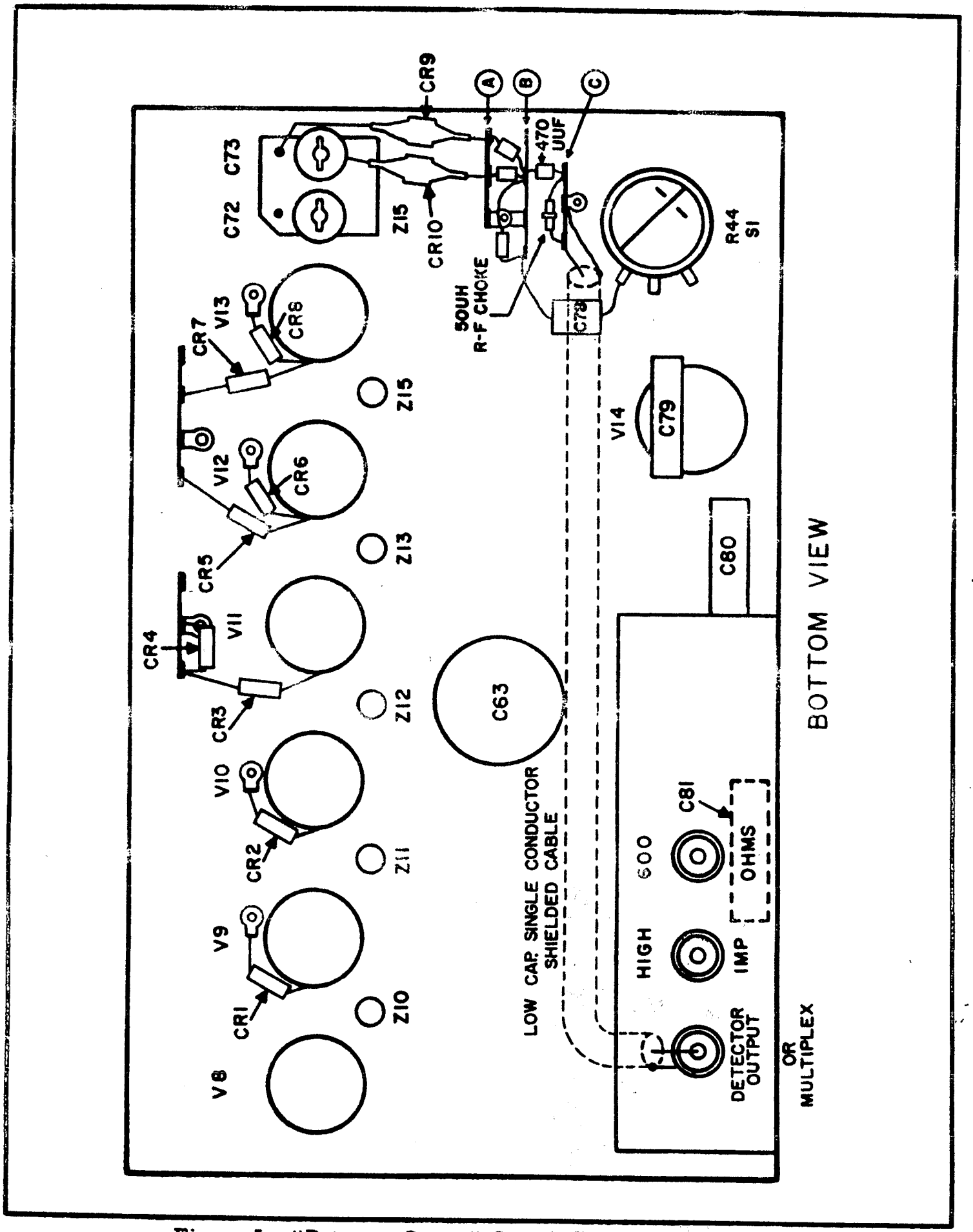

Figure 5. "Detector Output" Circuit Wiring Diagram.

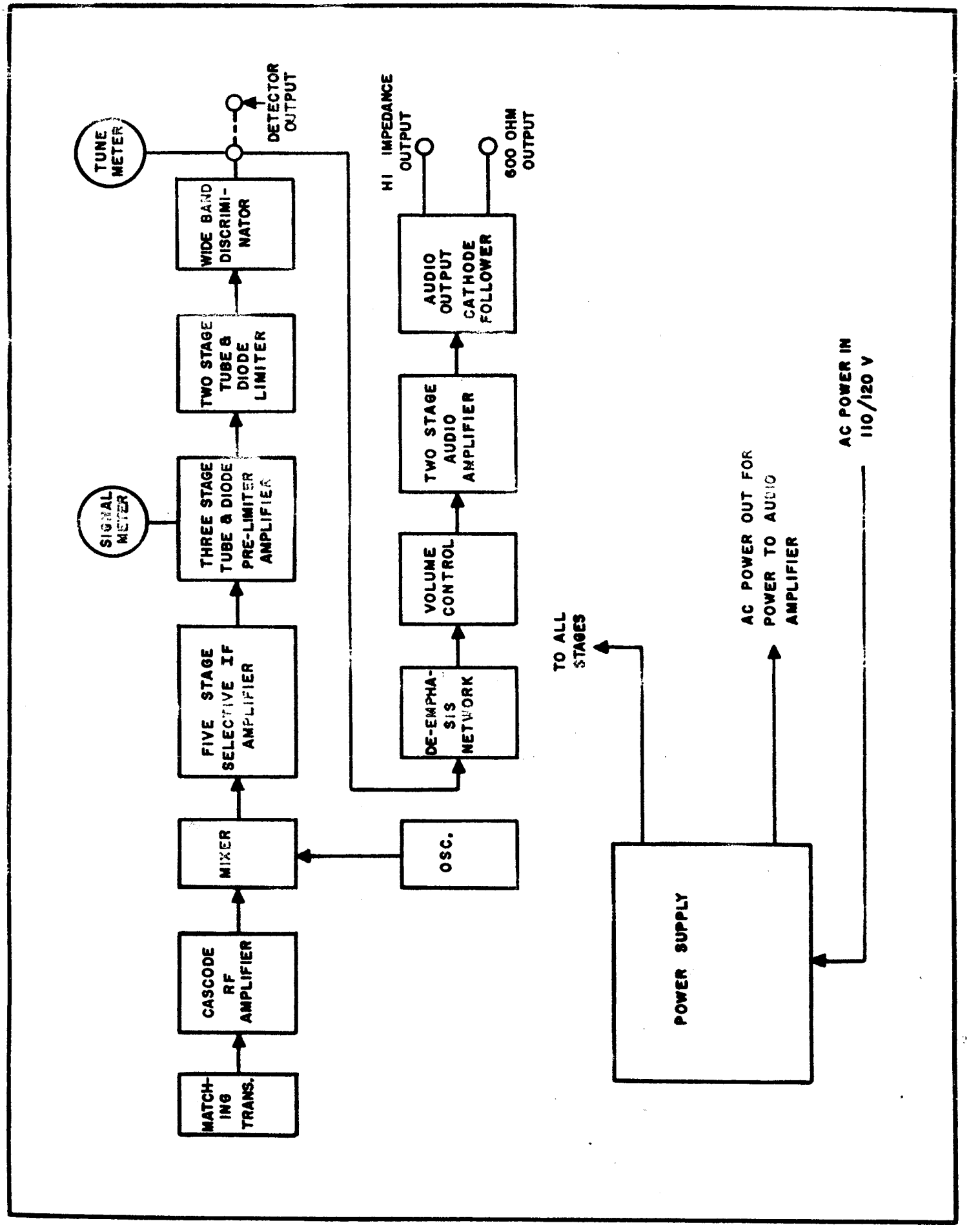

Figure 6. Block Diagram.