Models 72, 72A

Radio Receivers

Specifications

Frequency Range:

Buff—.528 to 1.530 megacycles
Green—1.408 to 3.965 megacycles
Red—2.960 to 9.375 megacycles
Blue—7.20 to 20.75 megacycles

I.F.:

462.5 K.C.

Tubes:

Type	Position
56	Oscillator
58	1st Detector
58	1st I.F. Amplifier
58	2nd I.F. Amplifier
2A6	2nd Detector; A.V.C.; 1st A.F. Amplifier
2A5	Output Amplifier
80	Power Rectifier

Power Supply:

Model 72—105 to 125 volts A.C. 60 cycle
Model 72A—105 to 125 volts A.C. 25 and 60 cycles

A.V.C.:

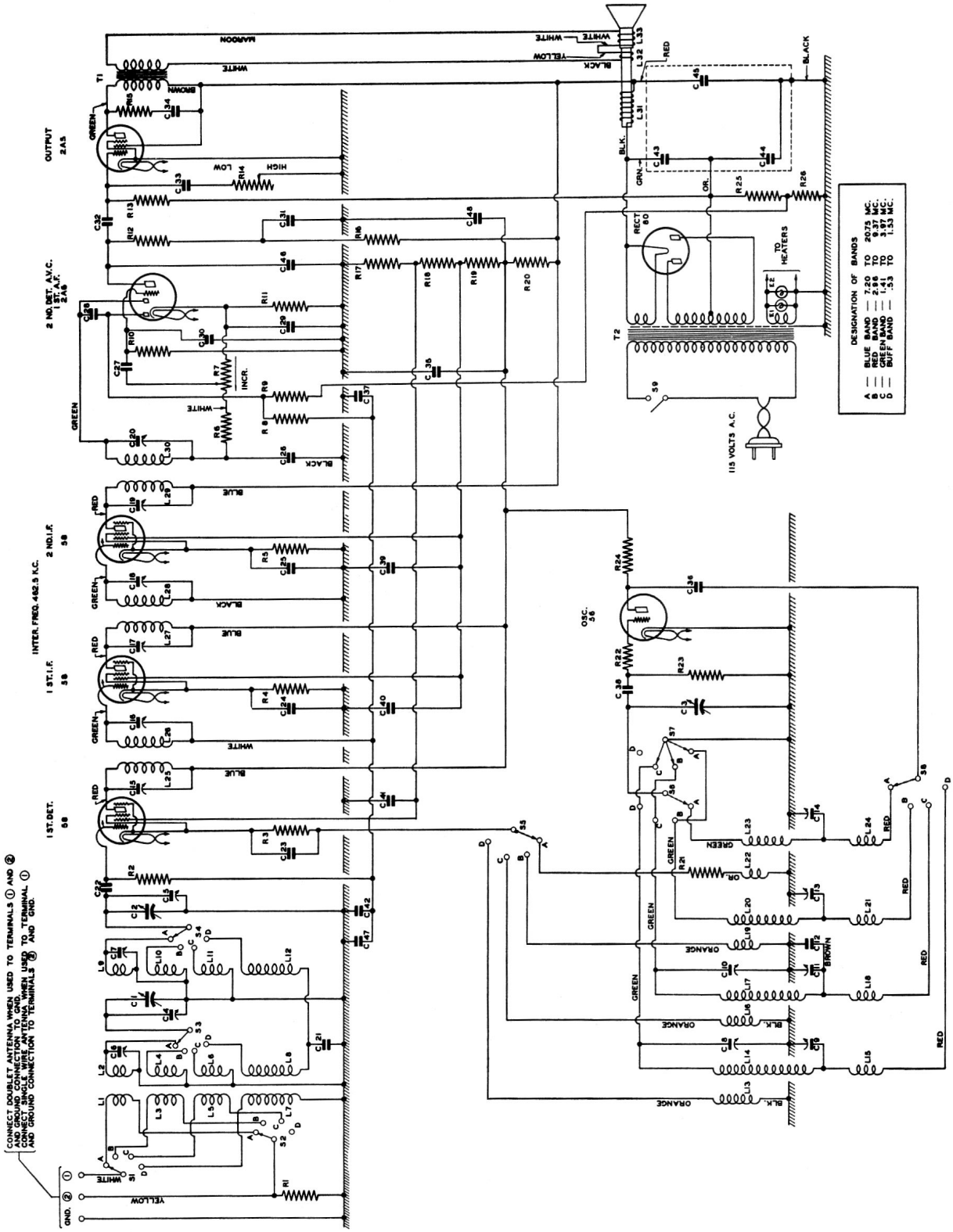
Tube type 2A6 supplies A.V.C. action on 1st Detector and 1st I.F. tubes

Controls:

From left to right—volume control; A.C. switch and tone control; wave change switch; tuning control.

Loudspeaker:

Ten inch electro-dynamic loudspeaker.



Schematic Diagram Model 72 All Wave Receiver

REPLACEMENT PARTS LIST

CAPACITORS:—			Part No.
C-1	Preselector tuning	Main tuning capacitor. Three gang with trimmers 370.7 mmf, max.	K-1372-1
C-2	R.F. coil tuning		
C-3	Oscillator tuning		
C-4	Trimmer for preselector tuning		
C-			
C-5	Trimmer for R. F. coil tuning		
C-6	7.5-20.75 meg. band—preselector trimmer (3-20 mmf)		K-1458-1
C-7	7.5-20.75 meg. band—R.F. coil trimmer; (3-20 mmf)		K-1458-1
C-8	Broadcast band oscillator padding; 7-70 mmf		K-1368-2
C-9	Broadcast band oscillator lagging; 270-700 mmf		K-1368-2
C-10	1.45-3.5 meg. band oscillator padding; 7-70 mmf		K-1368-2
C-11	1.45-3.5 meg. band oscillator lagging (variable), 270-700 mmf		K-1368-2
C-12	1.45–3.5 meg. band oscillator lagging (fixed) 1000 mmf (mica)		K-1611-23
C-13	3.4-9.0 meg. band oscillator lagging; 1000-2000 mmf		K-1028-3
C-14	7.5-20.75 meg. band oscillator lagging; 1000-2000 mmf		K-1028-3
C-15	Trimmer 1st I.F. transformer primary; 20-100 mmf		K-1244-1
C-16	Trimmer 1st I.F. transformer secondary; 20-100 mmf		K-1244-1
C-17	Trimmer 2nd I.F. transformer primary; 20-100 mmf		K-1244-1
C-18	Trimmer 2nd I.F. transformer secondary; 20-100 mmf		K-1244-1
C-19	Trimmer 3rd I.F. transformer primary: 20-100 mmf		K-1244-1
C-20	Trimmer 3rd I.F. transformer secondary; 20-100 mmf		K-1244-1
C-21	Coupling (broadcast band); .05 mf; 175 volts		K-2227-8
C-22	Grid blocking; 100 mmf; mica		K-1611-2
C-23	Cathode bypass; .05 mf; 175 volts		K-2227-8
C-24	Cathode bypass; .05 mf; 175 volts		K-2227-8
C-25	Cathode bypass; .05 mf; 175 volts		K-2227-8
C-26	I.F. bypass; 100 mmf; mica		K-1611-2
C-27	D.C. blocking; .05 mf; 175 volts		K-2227-8
C-28	D.C. blocking (A.V.C. diode coupling); 100 mmf; mica		K-1611-2
C-29	Cathode bypass; .5 mf; 175 volts		K-2227-11
C-30	I.F. bypass; 100 mf; mica		K-1611-2
C-31	A.F. plate bypass; .1 mf; 350 volts		K-2228-9
C-32	D.C. blocking; .002 mf; 350 volts		K-2228-2
C-33	Tone control; .005 mf; 350 volts		K-2228-5
C-34	Impedance equalizer; .02 mf; 175 volts		K-2227-7
C-35	Plate divider bypass; .05 mf; 350 volts		K-2228-8
C-36	Oscillator plate; .05 mf; 350 volts		K-2228-8
C-37	A.V.C. bypass; .05 mf; 175 volts		K-2227-8
C-38	Oscillator grid blocking; 100 mmf; mica		K-1611-2
C-39	Screen divider bypass; .05 mf; 175 volts		K-2227-8
C-40	Screen bypass; .05 mf; 175 volts		K-2227-8

CAPACITORS—continued:—			Part No.
C-41	Screen bypass; .1 mf; 175 volts		K-2227-9
C-42	A.V.C. bypass; .05 mf; 175 volts		K-2227-8
C-43	Power filter; 8 mf; 450 volts	Dry electrolytic	K-1374
C-44	Bias by-pass; 20 mf; 25 volts		
C-45	Power filter; 4 mf; 350 volts		
C-46	A.F. plate by-pass; 100 mmf; mica		K-1611-2
C-47	Extra A.V.C. bypass; .25 mf; 175 volts		K-2227-10
C-48	Divider by-pass; .1 mf; 350 volts		K-2228-9
RESISTORS:—			
R-1	Antenna leak; 1/10 meg.; ½ watt		K-2226-5
R-2	1st detector grid; ½ meg.; ½ watt		K-2226-3
R-3	1st detector cathode bias; 2,000 ohms, ½ watt		K-2226-14
R-4	1st I.F. cathode bias; 1,000 ohms; ½ watt		K-2226-16
R-5	2nd I.F. cathode bias; 1,000 ohms; ½ watt		K-2226-16
R-6	I.F. filter; 50,000 ohms; ½ watt		K-2226-6
R-7	Volume control; ½ meg.; variable		K-1092-7
R-8	A.V.C. filter; ½ meg; ½ watt		K-2226-3
R-9	A.V.C. load; 1 megohm; ½ watt		K-2226-2
R-10	Grid Leak; 1 megohm; ½ watt		K-2226-2
R-11	Cathode bias; 5,000 ohms; ½ watt		K2226-12
R-12	First A.F. plate; ¼ meg.; ½ watt		K-2226-4
R-13	A.F. (output) grid; ½ meg.; ½ watt		K-2226-3
R-14	Tone control; ½ meg.; variable		K-2226-3
R-15	Impedance equaliser; 10,000 ohms; ½ watt		K-2226-10
R-16	Plate filter; 50,000 ohms; ½ watt		K-2226-6
R-17	Divider	Tapped Wirewound 6,000 ohms	K-1174
R-18	Divider	8,000 ohms	
R-19	Divider	12,000 ohms	
R-20	Divider	1,000 ohms	
R-21	Suppressor (blue band); 300 ohms; ½ watt		K-2226-20
R-22	Oscillator grid suppressor; 50 ohms; ½ watt		K-2226-25
R-23	Oscillator grid leak; 20,000 ohms; ½ watt		K-2226-8
R-24	Oscillator plate; 25,000 ohms; 1 watt		K-2363-9
R-25	Main bias; 400 ohms; 5 watt		K-1461-1
R-26	Delay bias; 100 ohms; ½ watt		K-2226-24
COILS:—			
L-1	Antenna; 7.5-20.75 meg. band		K-1453
L-2	Preselector; 7.5-20.75 meg. band		
L-3	Antenna; 3.5-9.0 meg. band		K-1459
L-4	Preselector; 3.5-9.0 meg. band		
L-5	Antenna; 1.45-3.5 meg. band		K-1406
L-6	Preselector; 1.45-3.5 meg. band		
L-7	Antenna; broadcast band		K-1407
L-8	Preselector; broadcast band		
L-9	R.F. coil; 7.5-20.75 meg. band		K-1453
L-10	R.F. coil; 3.5-9.0 meg. band		K-1459
L-11	R.F. coil; 1.45-3.5 meg. band		K-1406
L-12	R.F. coil; broadcast band		K-1404
L-13	Oscillator pick-up coil; broadcast band		K-1454
L-14	Oscillator grid coil; broadcast band		
L-15	Oscillator plate coil; broadcast band		

REPLACEMENT PARTS LIST—continued

COILS—continued:—		Part No.
L-16	Oscillator pick-up coil; 1.45-3.5 meg. band	K-1457
L-17	Oscillator grid coil; 1.45-3.5 meg. band	
L-18	Oscillator plate coil; 1.45-3.5 meg. band	
L-19	Oscillator pick-up coil; 3.5-9.0 meg. band	K-1456
L-20	Oscillator grid coil; 3.5-9.0 meg. band	
L-21	Oscillator plate coil; 3.5-9.0 meg. band	
L-22	Oscillator pick-up coil; 7.5-20.75 meg. band	K-1455
L-23	Oscillator grid coil; 7.5-20.75 meg. band	
L-24	Oscillator plate coil; 7.5-20.75 meg. band	
L-25	First I.F. transformer primary	K-1365-3
L-26	First I.F. transformer secondary	
L-27	Second I.F. transformer primary	K-1365-3
L-28	Second I.F. transformer secondary	
L-29	Third I.F. transformer primary	K-1365-4
L-30	Third I.F. transformer secondary	
L-31	Field coil; 1800 ohms 5 watts	Parts for K-1088-2 Loud-speaker — Part of K-1462-1
L-32	Hum bucking coil	Part of K-1462-1
L-33	Voice coil and diaphragm assembly	Part of K-1091

TRANSFORMERS:—		Part No.
T-1	Output transformer	K-1065-5
T-2	Power transformer, 60 cycles	K-1249-4
	25 cycles	K-1249-3

SWITCHES:—		
S-1	Antenna primaries (No. 1 antenna terminal)	K-1377
S-2	Antenna primaries (No. 2 antenna terminal)	
S-3	Preselectors	
S-4	R. F. Coils	
S-5	Oscillator pick-up coils	
S-6	Oscillator grid coils	
S-7	Dead end switch	
S-8	Oscillator plate coils	
S-9	Power "on-off" switch (mounted on tone control)	K-1142-5

NOTE:—On late production of this Model it will be found that a lead coming from the junction of R-25 and R-26 has been taken to a section of the wave change switch. The purpose of this is to provide variable bias on the different bands in such a manner that the first detector and first I.F. tubes will have minimum bias and greater sensitivity on the blue band, while on the remaining switch adjustments the increased bias due to the 100 ohm resistor R-26 will have full effect.

REALIGNING DETAILS

In realigning the Model 72 Receiver, particular care should be exercised to see that any preselector coupling variation which may be necessary is made within very close limits. If care is not taken here, the full sensitivity which this receiver possessed when it left the factory will be lost and the short wave bands rendered useless. Realigning of the short wave bands of this receiver should not be attempted with some of the very questionable oscillators used by many servicemen. The oscillator or signal generator employed should be capable, preferably, of a measured output in fundamentals. Oscillators using harmonic output for short wave realigning will cause uncertainty in the aligning point and result in delay in service repair and mediocre or unsatisfactory short wave results to the user.

An output meter is of course essential. On no account touch the short wave band trimmers without an output meter connected across the voice coil and with a reliable and efficient signal generator at the input.

1. I.F. ALIGNING:—

(*a*) Set signal generator to 462.5 K.C. and connect to control grid 2nd I.F. tube.

(*b*) Align C-19 and C-20.

(*c*) Connect to control grid 1st I.F. tube.

(*d*) Align C-17 and C-18.

(*e*) Connect to control grid first detector tube.

(*f*) Align C-15 and C-16.

2. BROADCAST BAND OSCILLATOR:—

(*a*) Set receiver dial to 1.400 megacycles.

(*b*) Set signal generator to 1400 K.C. and connect to control grid first detector tube through .1 mf. capacitor.

(*c*) Align C-8 (unmarked) (adjust to highest frequency peak where trimmer farthest out).

(*d*) Still with signal generator at 1400 K.C., connect to antenna terminal No. 1 of receiver, through 200 mmf. mica capacitor; re-tune receiver to signal if necessary.

(*e*) Align R.F. transformer secondary capacitors C-4 and C-5. These should not be changed on any other band. They should not be changed at all unless very low sensitivity is indicated. In any case, when adjustment is made, trimmer should be from ½ to one turn open.

(*f*) Set signal generator at 600 and tune receiver dial pointer to 600 K.C. (approximately .6 megacycle). Vary receiver dial pointer within half a channel on either side, at the same time adjust oscillator lag trimmer C-9 so that correct tune obtained.

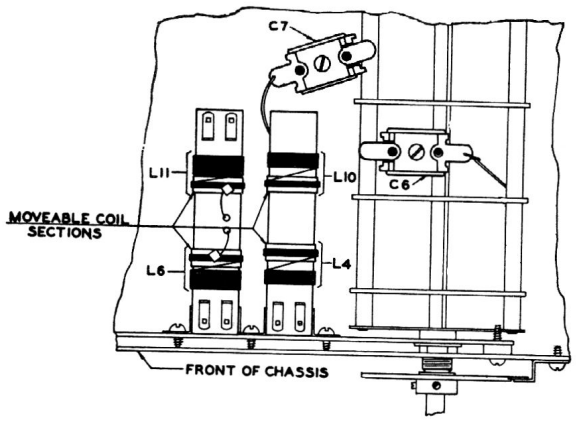
REALIGNING DETAILS—continued

3. SHORT WAVE BAND 1.45 TO 3.5 MEGACYCLES (GREEN BAND):—
   (*a*) Set signal generator to 3 meg. and connect to control grid 1st detector tube through .1 mf. capacitor.
   (*b*) Set receiver dial pointer to 3 meg.
   (*c*) Align C-10 (adjust to highest frequency peak where trimmer farthest out).
   (*d*) Connect signal generator to antenna terminal No. 1 on receiver through 200 mmf. capacitor, strapping No. 2 and No. 3 on terminal strip to ground.
   (*e*) Adjust sliding coils L-11 and L-6. Great care must be exercised in the movement of these two coil sections. Alcohol should be used to loosen the coil from its fixture before any attempt is made to move them. Coils L-11 and L-6 are indicated in Figure 2 of the service manual. They are located on the coil structure to the left of the three coils running parallel with the side of the chassis.
   (*f*) Set signal generator to 1700 K.C. and tune set. Vary receiver dial pointer within ½ channel on either side, at the same time adjusting oscillator lag trimmer C-11 so that correct tune is obtained. It will be found that in some sets the pointer reads about one division low.
4. SHORT WAVE BAND 3.0 TO 9.0 MEGACYCLES (RED BAND):—
   (*a*) Set signal generator and receiver dial pointer to 7.0 megacycles.
   (*b*) Connect signal generator to antenna terminal No. 1 on receiver through .1 mf. capacitor, strapping No. 2 and No. 3 to ground.
   (*c*) Vary coupling between coils L-10 and L-4. As in No. 3 above, great care must be exercised in the movement of the coils. See that coils are loosened with alcohol before any attempt is made to turn them. Coils L-10 and L-4 can be located at the top right-hand coil of the three on the left of the chassis base looking at the wiring with the chassis up-ended.
   (*d*) Set signal generator to 3.4 megacycles and tune receiver.
   (*e*) Align C-13 and vary receiver dial pointer within ½ a channel on either side; at the same time adjust trimmer so that correct tune is obtained.
5. SHORT WAVE BAND 7.5 TO 20.75 MEGACYCLES (BLUE BAND):—
   (*a*) Connect signal generator to antenna terminal No. 1 on receiver through .1 mf. capacitor and strap terminals No. 2 and No. 3 on strip to ground.
   (*b*) Set signal generator to 16 meg. and tune in receiver.
   (*c*) Adjust C-6 and C-7 for maximum output (both trimmers should be on peak of greatest capacity). C-6 and C-7 are the small trimmers mounted inside the chassis.
   (*d*) Set signal generator to 9 meg. and tune in receiver.
   (*e*) Align C-14. Vary pointer within ½ a channel on either side; at the same time adjust trimmers so that correct tune is obtained.

During aligning, other faults not directly associated with incorrect tune may arise. The following notes are intended to take care of these particular points.

1. Abnormal sensitivity and regeneration. Open capacitor C-47.
2. "Tweets": Resistors on oscillator socket pushed on to antenna leads.
3. Dead Blue Band: Trimmer condensers C-6 or C-7 inside chassis shorting.
4. Dead Green Band: Broken wires on preselector coils.
5. Audio frequency singing: Red lead from 2-A-5 plate getting near green lead on 2-A-6 grid. Keep well separated.
6. For prevention of oscillation, push all red plate leads well into I.F. cans.

On later production models of this receiver, it will be found that a change has been made in the structure of the blue band trimming arrangements by removing L-9 and C-7. Since the preselector coil and its tuning capacitor for the blue band are not in circuit with this arrangement, an increase in sensitivity results on extreme short wave signals. The same realigning details will apply, however, only the adjustment for C-7 being left out.



Section of Model 72 chassis showing movable coils

SOCKET VOLTAGE AND CURRENT READINGS

The following readings were taken on a standard production Model 72 chassis using a Weston Model 566 Analyzer modified for use with the type 666-1A Adapter.

Tube	Position	Filament Volts	Plate Volts	Screen Volts	Bias Volts	Plate Current	
						Normal Bias	Red. Bias (4.5 volt)
56	Oscillator	2.5	90	—	5.0	7.0	9.5
58	First Detector	2.5	225	45	.8	1.5	2.5
58	First I.F.	2.5	225	110	.6	2.5	9.0
58	Second I.F.	2.5	235	110	5.6	14.0	14.5
2A6	2nd Detector; A.V.C.; First A.F.	2.5	(b) 115(a)	—	.2(c)	.35	.65
2A5	Power Output	2.5	250	265	.6(d)	22	22 (e)
80	Power Rectifier	5.2	(f) 390 volts (D.C.) each plate			28 each plate	

Line voltage—114 volts A.C.

(*a*) Triode plate.

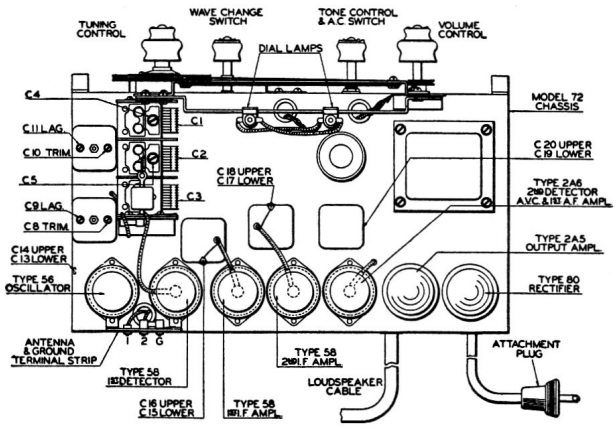
(*b*) No. 3 diode plate (on adapter) zero volts. No. 4 diode plate (on adapter) .2 volts.

(*c*) Bias on audio grid.

(*d*) Maximum available through analyzer, correct reading 16.5 volts (electrostatic meter).

(*e*) No change 4.5 volts bias reduction only.

(*f*) A.C. Volts (filament to plate) 535.



Model 72—Chassis showing tube locations