Zenith Radio Corp.

Model: 12H094	Chassis:	Year: Pre 1948
Power:	Circuit:	IF:
Tubes:		
Bands:		

Resources
Riders Volume 18 - CHANGES 18-13
Riders Volume 15 - ZENITH 15-87, 88
Riders Volume 15 - ZENITH 15-89
Riders Volume 15 - ZENITH 15-90
Riders Volume 15 - ZENITH 15-91, 92
Riders Volume 15 - ZENITH 15-93
Riders Volume 15 - ZENITH 15-94
Riders Volume 15 - ZENITH 15-95

TELETONE 139, 140, 141, 149, 157, 163, 164, Chassis H

These models are the same as Model 135, Chassis H, appearing on *Misc. Page 16-11 of Rider's Volume XVI.*

Teletone 161, 167, 168, 171, 174, Chassis T

These models are all the same as Model 150, Chassis T, appearing on *pages 17-2 and 17-3 of Rider's Volume XVII.*

Wells-Gardner 7A41-593

This model is the same as Model 7A41-704 appearing on *pages 12-8 to 12-11* of *Rider's Volume XII.*

Truetone D-696

This model is the same as Model D-727, which appears as Model 175 on *Detrola page* 9-1 *of Rider's Volume IX.*

Truetone D1118B

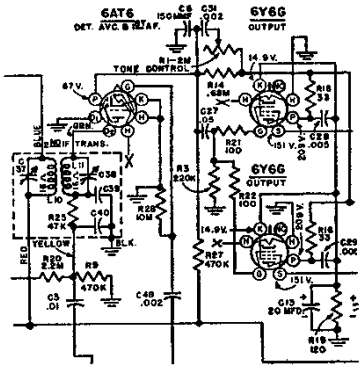
This model is similar to the D1118A model, shown on *pages 13-68 and 13-69 of Rider's Volume XIII* except for the following changes: The antenna trimmer (C2), part number 17A1116, mounted on the loop aerial assembly in the issue A model has been removed. The 1400-kc adjustment as given in the alignment procedure is omitted. The 1400-kc adjustment is made at the factory and need not be made in the field.

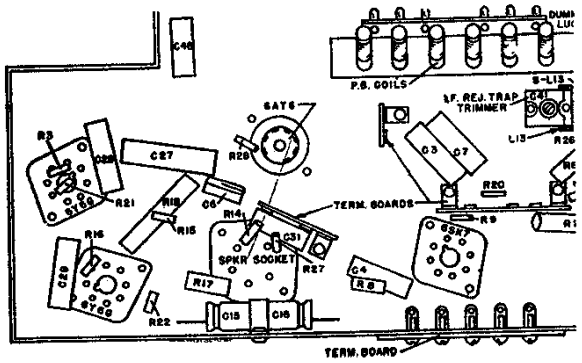
Westinghouse H-110A, H-111A, H-137A, and H-138A, Chassis V-2102-2

These models are the same as Model H-104 on *pages 15-1 to 15-4 of Rider's Volume XV,* except that the tone control circuit has been modified and a 6AT6 miniature tube replaces the 6SF7 tube used originally. The tube layout is the same, but certain components have been added, as may be seen in the accompanying diagrams.

The following parts should be added to the parts list.

Part No.	Description
RCP10W6202A	Capacitor, 0.002 μf, 600 v. (C48)
RC10AE474M	Resistor, 470K ¼ w, (R27)
RC10AE106M	Resistor, 10M ¼ w. (R28)

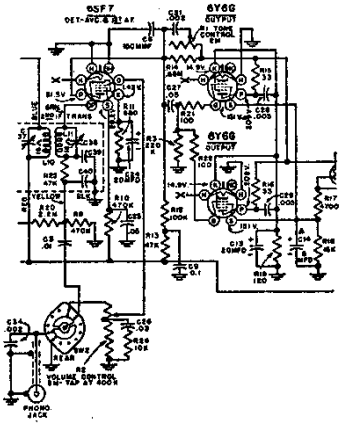




Changes in the tone control circuit, above, and in the parts layout, left, of the Westinghouse Chassis V-2102-2.

Westinghouse H-110, H-111, H-137, and H-138, Chassis V-2102-1

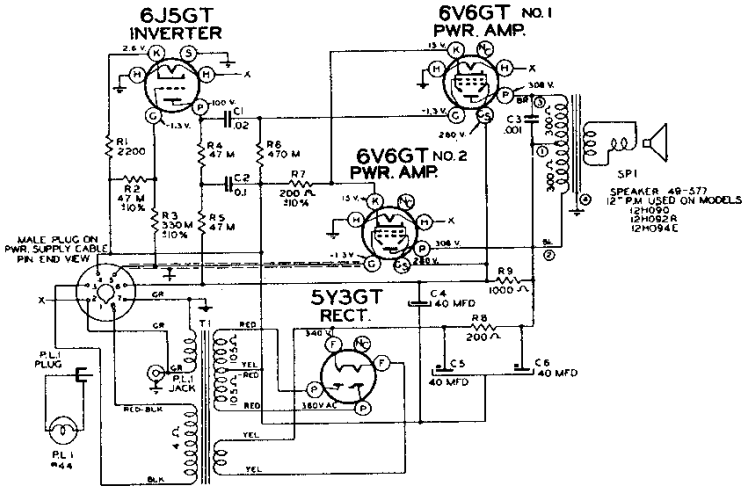
These models are the same as Model H-104 on *pages 15-1 to 15-4 of Rider's Volume XV,* except that the tone control circuit has been modified. This change is illustrated in the accompanying diagram.



The modified tone control circuit of the Westinghouse Chassis V-2102-1.

Zenith 12H090, 12H091, 12H092, 12H093, 12H094, Chassis 11C21Z

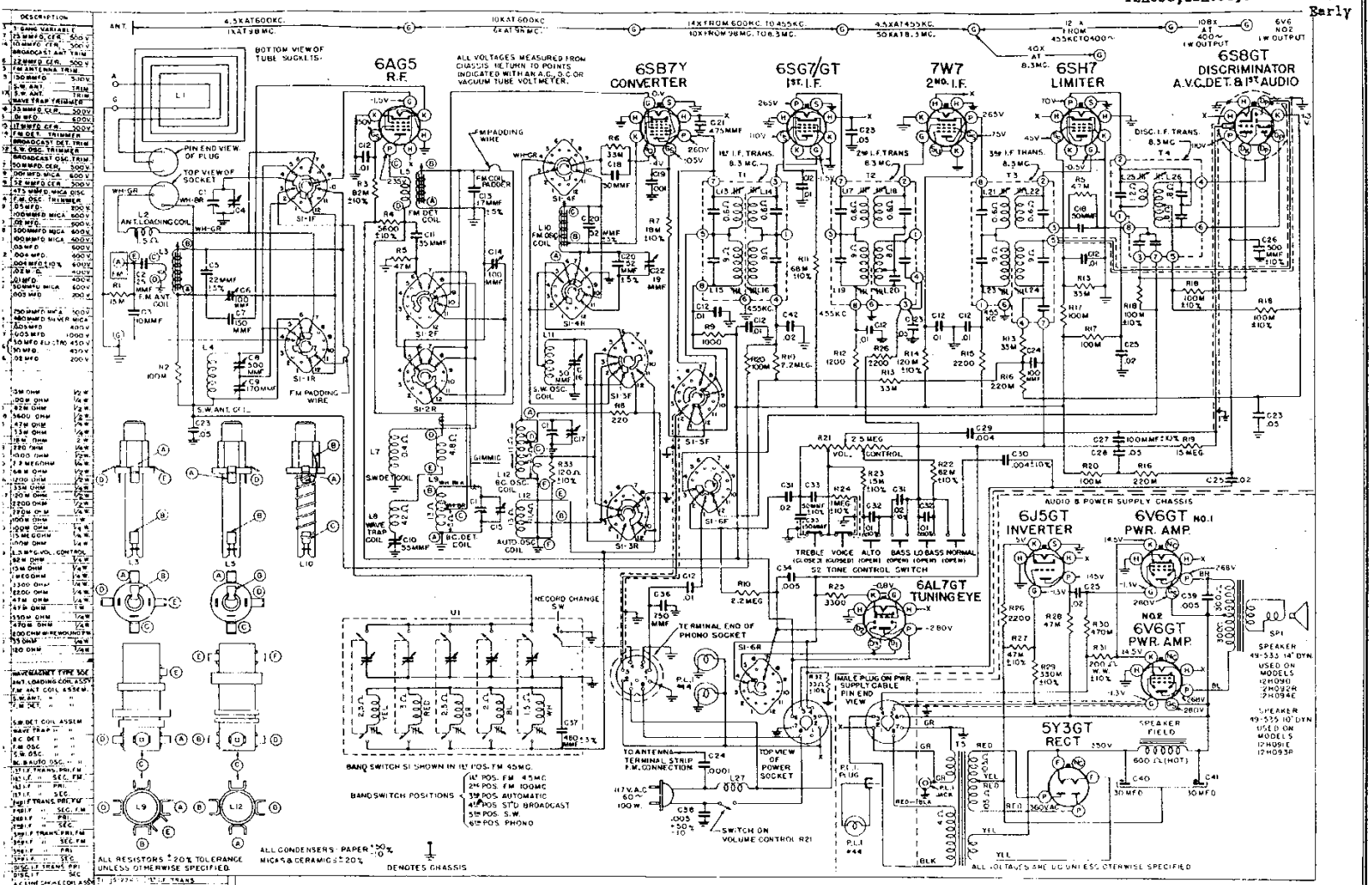
These models are similar to Model 12H090, Chassis 11C21, on *pages 15-87 to 15-94 of Rider's Volume XV.* The difference between these chassis appears in the power supply and the audio section. Chassis 11C21 uses an electro-dynamic speaker and the field of the speaker is used as a choke in the power-supply filter circuit. Chassis 11C21Z uses a permanent magnet speaker. To convert Chassis 11C21 to 11C21Z, it is necessary to replace the speaker field with a 200-ohm, 5-watt resistor (R8 in the accompanying diagram). A 40-μf capacitor must be connected from the center tap of the power transformer to pin number 6 of the power-supply cable plug, as shown in the diagram. C40 and C41 must be changed from 30μf to 40μf (they appear as C5 and C6 in the 11C21Z chassis). A 1000-ohm, 3-watt resistor (R9) must be connected between the screen grid of the first beam-power output tube and the center tap of the output transformer. The capacitor shown as C3 in the accompanying diagram is capacitor C39 in the schematic on *page 15-87, 88 of Rider's Volume XV.*



The audio section and power supply of the Zenith chassis 11C21Z

ZENITH RADIO CORP.

MODELS 12H090,12H091,12H092,
12H093,12H094,Chassis 11C21
Early



MODELS 12H090 – 12H091 – 12H092 – 12H093 – 12H094

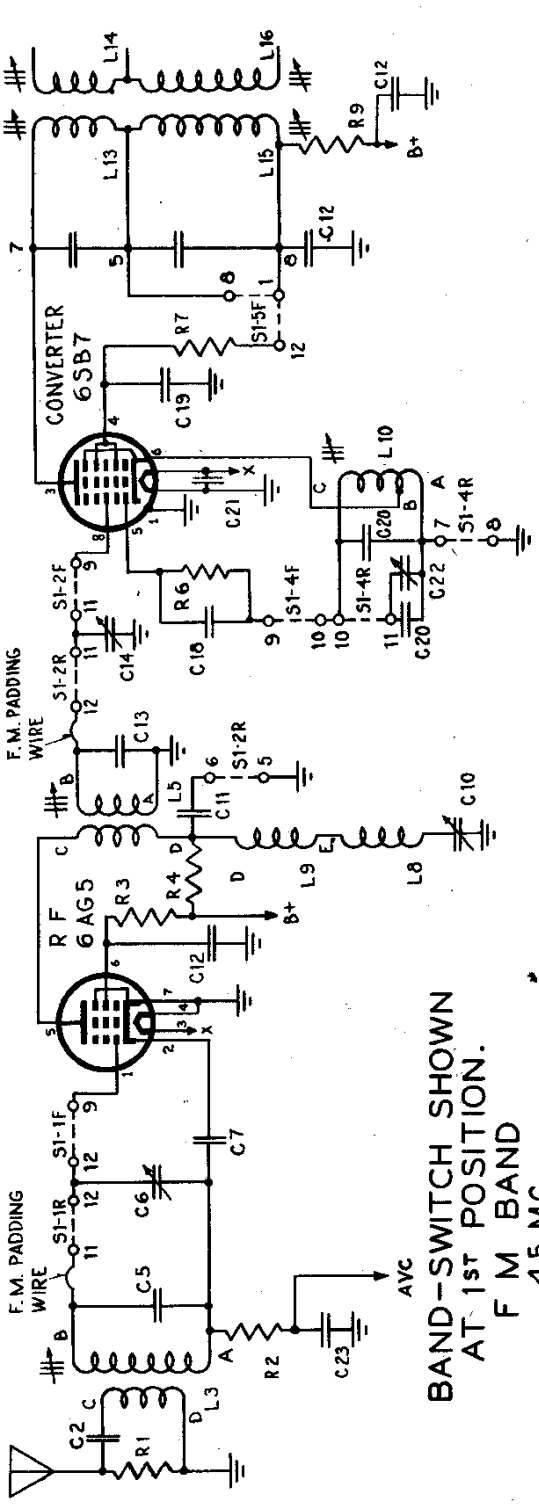
CHASSIS No. 11C21

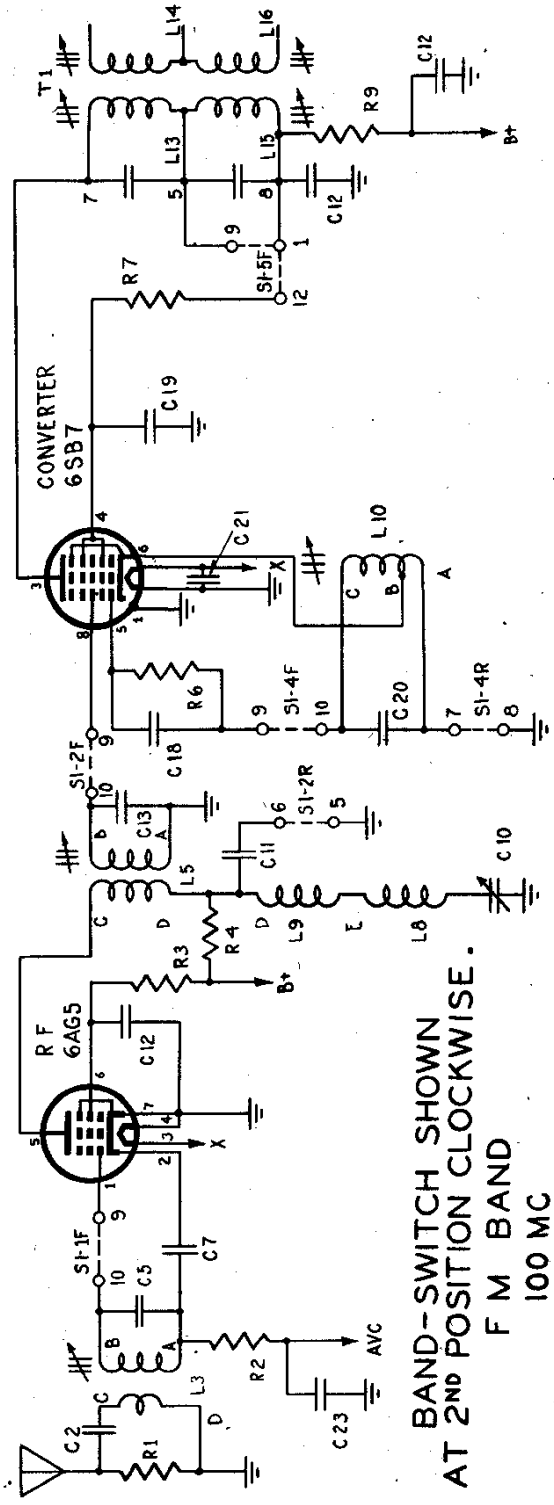
Rider

Record Changer: Zenith Model S-11680 For Alignment, see Pp.15-93,15-94

ZENITH RADIO CORP.

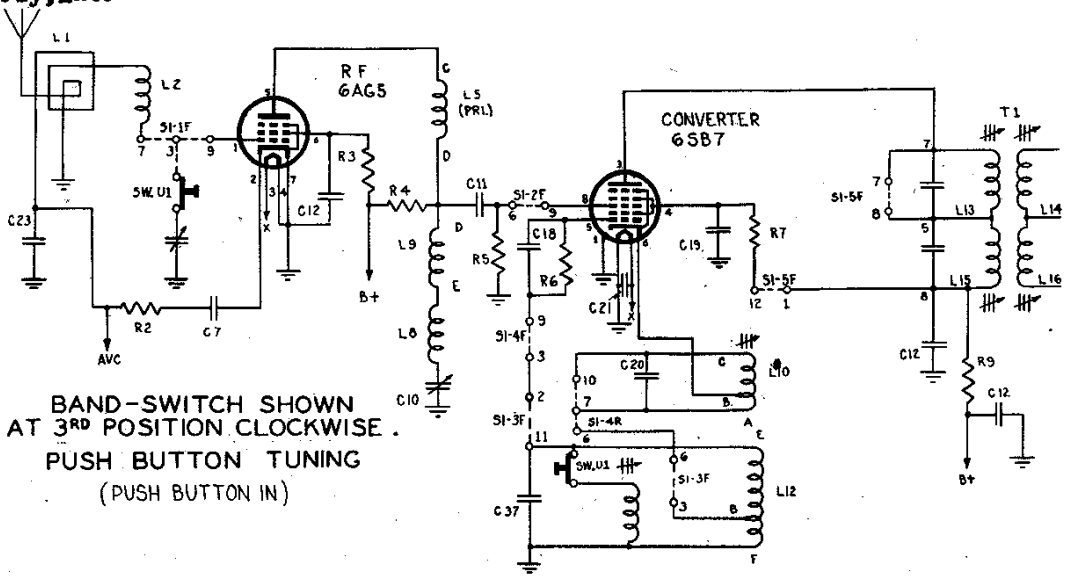
MODELS 12H090,12H091,
12H092,12H093,12H094
Early,Late



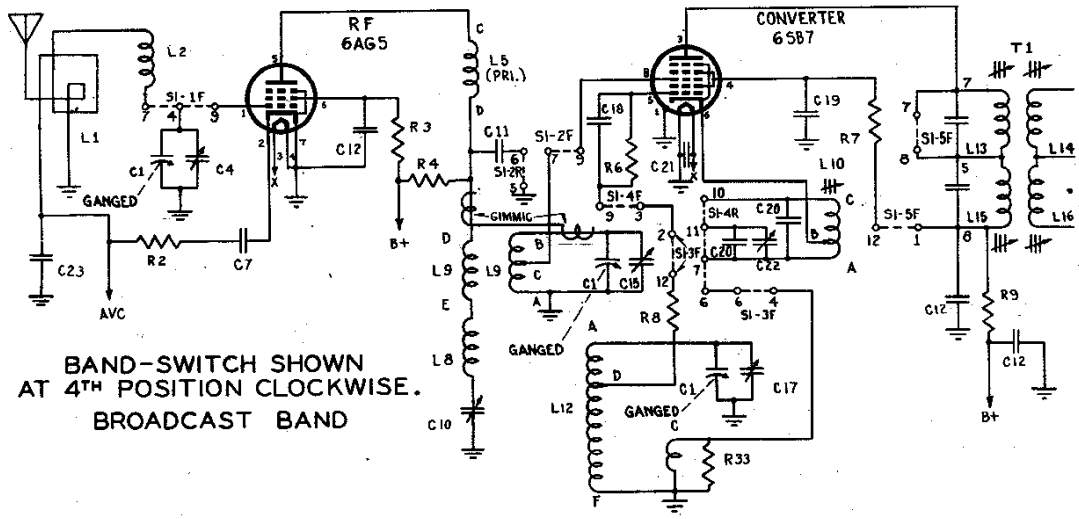


MODELS 12H090,12H091,
12H092,12H093,12H094
Early,Late

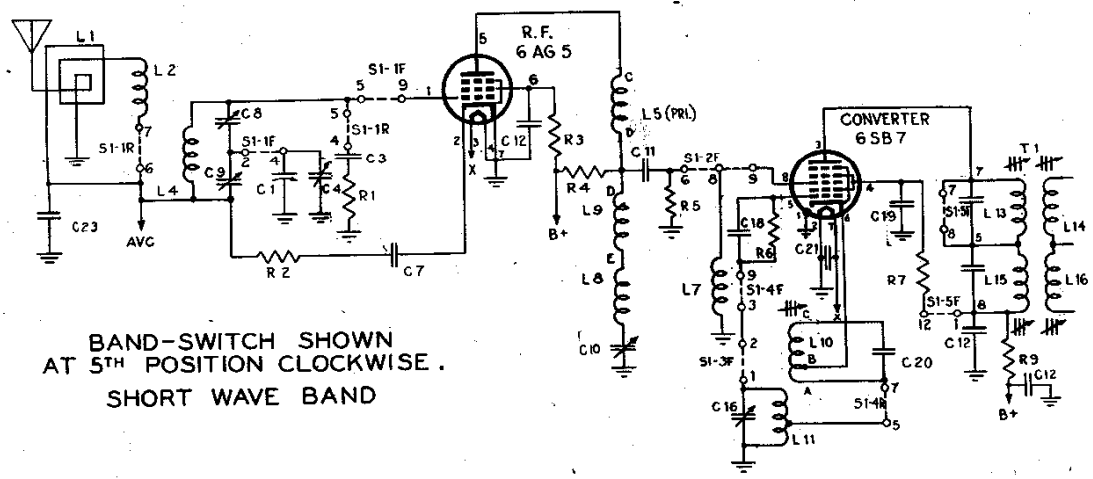
ZENITH RADIO CORP.



BAND-SWITCH SHOWN
AT 3RD POSITION CLOCKWISE.
PUSH BUTTON TUNING
(PUSH BUTTON IN)



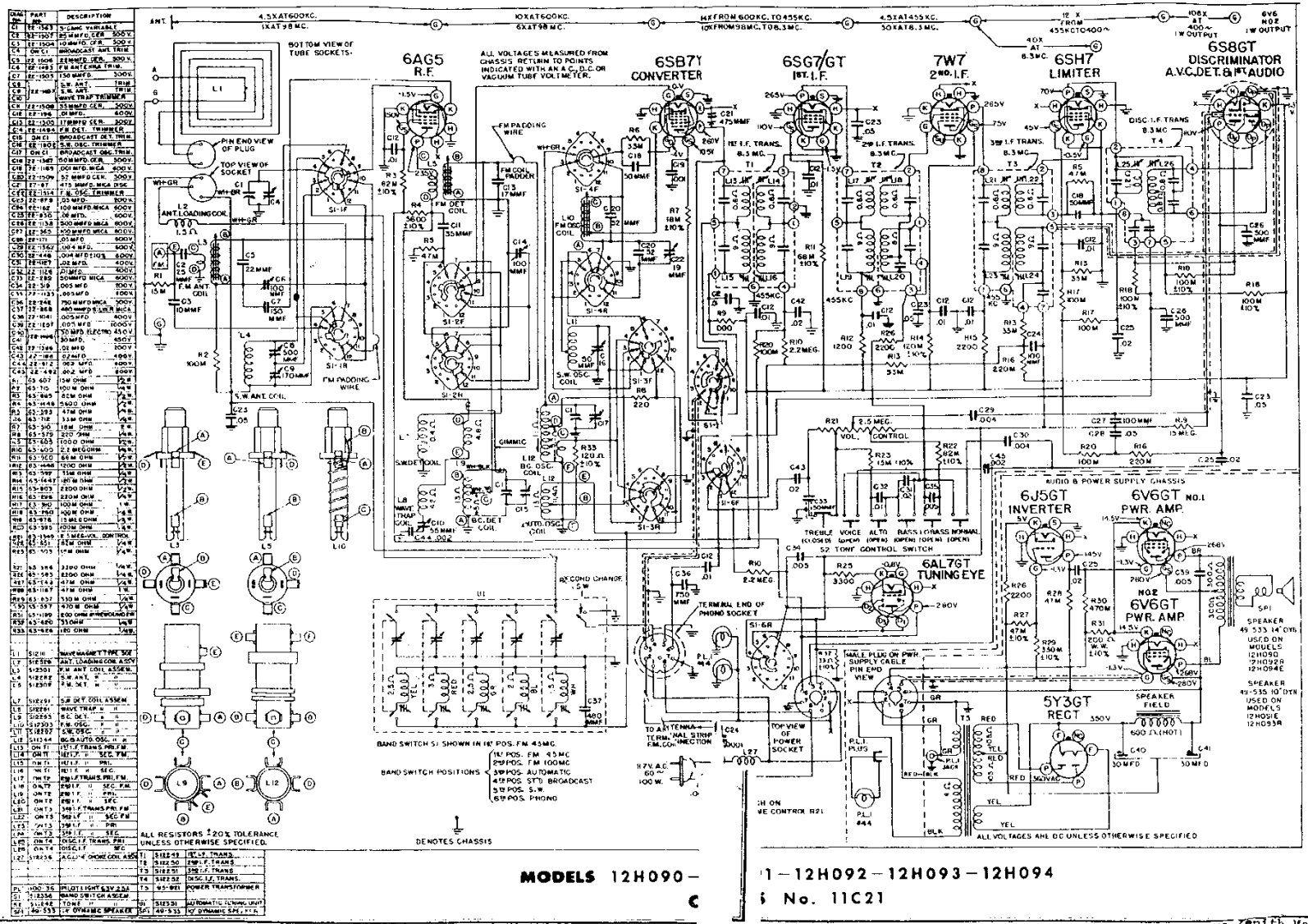
BAND-SWITCH SHOWN
AT 4TH POSITION CLOCKWISE.
BROADCAST BAND



BAND-SWITCH SHOWN
AT 5TH POSITION CLOCKWISE.
SHORT WAVE BAND

ZENITH RADIO CORP.

MODELS 12H090, 12H091, 12H092, 12H093, 12H094, Chassis 11C21 Late



DIAG. No.	PART No.	DESCRIPTION
C1	22-1543	5-25MMF VARIABLE
C2	22-1507	85 MMFD. CER. 500 V.
C3	22-1504	10 MMFD. CER. 500 V.
C4	ON C1	BROADCAST ANT. TRIM
C5	22-1506	22 MMFD. CER. 500 V.
C6	22-1493	FM ANT. TRIM.
C7	22-1503	150 MMFD. 500V.
C8	22-1489	S.W. ANT. TRIM
C9		S.W. ANT. WAVE TRAP TRIMMER
C10		
C11	22-1508	33 MMFD. CER. 500V.
C12	22-196	.01 MFD. 600V.
C13	22-1505	17 MMFD. CER. 500V.
C14	22-1494	F.M. DET. TRIMMER
C15	ON C1	BROADCAST DET. TRIM.
C16	22-1502	S.W. OSC. TRIMMER
C17	ON C1	BROADCAST OSC. TRIM.
C18	22-1487	50 MMFD. CER. 500V.
C19	22-1485	.001 MFD. MICA 600 V.
C20	22-1509	52 MMFD. CER. 500V.
C21	22-97	475 MMFD. MICA DISC
C22	22-1514	F.M. OSC. TRIMMER
C23	22-879	.05 MFD. 400 V.
C24	22-162	100 MMFD. MICA 600V.
C25	22-850	.02 MFD. 600V.
C26	22-1158	500 MMFD. MICA 600V.
C27	22-365	100 MMFD. MICA 600V.
C28	22-121	.01 MFD 600V.
C29	22-1562	.004 MFD. 600V.
C30	22-448	.004 MFD. DISC 600V.
C31	22-1427	.02 MFD. 400V.
C32	22-1126	.01 MFD. 600V.
C33	22-289	50 MMFD MICA 600V.
C34	22-319	.005 MFD. 600 V.
C35	22-1133	.005 MFD. 1000V.
C36	22-246	750 MMFD MICA 500V.
C37	22-868	480 MMFD 5% MICA 500V.
C38	22-1041	.005 MFD. 600V.
C39	22-1157	.005 MFD. 1000V.
C40	22-1496	30 MFD. ELECTRO 450V. 30 MFD. 450V.
C41		
C42	22-1396	.01 MFD. 200V.
C43	22-186	.02 MFD. 400V.
C44	22-912	.002 MFD. 600V.
C45	22-492	.002 MFD. 600V.
R1	63-607	15M OHM 2W.
R2	63-710	100M OHM 1/2W.
R3	63-865	62M OHM 1/2W.
R4	63-448	3600 OHM 1/2W.
R5	63-393	47M OHM 1/2W.
R6	63-716	3.3M OHM 1/2W.
R7	63-390	18M OHM 1/2W.
R8	63-379	220 OHM 1/2W.
R9	63-603	1000 OHM 1/2W.
R10	63-400	2.2 MEGOHM 1/2W.
R11	63-760	68 M OHM 1/2W.
R12	63-448	1200 OHM 1/2W.
R13	63-599	35M OHM 1/2W.
R14	63-1447	120K OHM 1/2W.
R15	63-803	2200 OHM 1/2W.
R16	63-596	220M OHM 1/2W.
R17	63-760	100M OHM 1W.
R18	63-760	100M OHM 1/2W.
R19	63-976	15 MEGOHM 1/2W.
R20	63-595	100M OHM 1/2W.
R21	63-1569	2.5 MEGOHM CONTROL
R22	63-851	82M OHM 1/2W.
R23	63-703	15M OHM 1/2W.
R25	63-396	3300 OHM 1/2W.
R26	63-595	2200 OHM 1/2W.
R27	63-1514	47M OHM 1/2W.
R28	63-1187	47M OHM 1W.
R29	63-837	350 M OHM 1/2W.
R30	63-597	470M OHM 1/2W.
R31	63-1199	200 OHM W.W.ADJUSTABLE
R32	63-620	350 OHM 1/2W.
R33	63-686	180 OHM 1/2W.
L1	51211	WAVE MAGNET TYPE 502
L2	51-1526	ANT. LOADING COIL ASSY.
L3	51-2501	S.W. ANT. COIL ASSEM.
L4	51-2282	S.W. ANT. " "
L5	51-2301	S.W. ANT. " "
L7	51-2291	S.W. OSC. COIL ASSEM.
L8	51-2291	WAVE TRAP " "
L9	51-2295	B.C. DET. " "
L10	51-2303	F.M. OSC. " "
L11	51-1507	S.W. OSC. " "
L12	51-2144	B.C. & AUTO. OSC. " "
L13	ON T1	1ST I.F. TRANS. PRI. FM
L14	ON T1	1ST I.F. " SEC. FM
L15	ON T1	1ST I.F. " PRI.
L16	ON T1	1ST I.F. " SEC.
L17	ON T2	2ND I.F. TRANS. PRI. FM
L18	ON T2	2ND I.F. " SEC. FM
L19	ON T2	2ND I.F. " PRI.
L20	ON T2	2ND I.F. " SEC.
L21	ON T3	3RD I.F. TRANS. PRI. FM
L22	ON T3	3RD I.F. " SEC. FM
L23	ON T3	3RD I.F. " PRI.
L24	ON T3	3RD I.F. " SEC.
L25	ON T4	DISC. I.F. TRANS. PRI.
L26	ON T4	DISC. I.F. " SEC.
RC	51-2256	ANT. R.F. CHOKE COIL ASSY.
T1	51-2249	1ST I.F. TRANS.
T2	51-2250	2ND I.F. TRANS.
T3	51-2251	3RD I.F. TRANS.
T4	51-2252	DISC. I.F. TRANS.
T5	95-981	POWER TRANSFORMER
PL	100-36	PILOT LIGHT 6.3V 0.3A
S1	51-2256	BAND SWITCH ASSEM.
VI	51-2248	TONE " "
SPI	49-533	14" DYNAMIC SPEAKER
VI	51-2531	AUTOMATIC TUNING UNIT
SPI	49-535	10" DYNAMIC SPEAKER

MODELS 12H090– 1 – 12H092 – 12H093 – 12H094

C i No. 11C21

TO THE SERVICE MAN:

The 11C21 chassis incorporates a superheterodyne circuit with two stages of IF, and one stage of RF amplification on all bands.

AM Alignment: The alignment of this chassis on the short wave and standard broadcast band is conventional. The alignment slugs in the IF transformers are threaded and screw into the coil forms. The slugs are slotted for a small size fiber screw driver. Do not press hard on the aligning tool (fiber screw driver) or the threads in the coil forms will strip and adjustment will be impossible.

FM RF Alignment: The same coil slug arrangement which tunes the 100 MC FM band also tunes the 45 MC band. However, on 45 MC the band switch connects trimmer condensers in parallel and padding wires in series with the 100 MC coils. The tuning slugs are attached to threaded shafts and the slugs are varied in the field of the coils by turning the shafts clockwise or counter-clockwise. After adjustments the shafts must be secured with a drop of speaker cement.

FM IF Alignment: The same type of tuning slugs for aligning the AM IF Amplifier are used for the FM I.F.'s. Observe the same precautions when making adjustments. The second 8.3 Mc IF stage is overcoupled. Overcoupling gives a wide band pass with good sensitivity. When an overcoupled stage is aligned with an unmodulated signal, the stage must be loaded. A 300 ohm carbon resistor soldered across the secondary of the second IF transformer provides a satisfactory load for this circuit. The resistor leads must be kept short to reduce the distributed capacity of the circuit.

When aligning a loaded stage, it will be found that considerable signal from the generator will be required, and that it will tune broadly. THE LOAD RESISTOR MUST BE REMOVED AFTER ALIGNMENT.

If the signal generator used does not have sufficient output to overcome the temporary loss caused by the load resistor, the load resistance may be increased or the signal fed into the preceding stage.

FM Discriminator Alignment: When the secondary of the discriminator is aligned (operation 9) use sufficient signal input to get a good positive and negative indication before setting the slug for zero reading. A center zero indicating meter is recommended for this adjustment, but is not absolutely necessary. Reversing the leads of a non-zero center meter, or observing closely when this meter starts to go to the left (negative) of zero will give the same results.

HUM COMPLAINT: Check for excessive length of the a-c line cord inside the main chassis between the point of entrance and the solder lugs. This slack may be in close proximity of the tone control leads.

DIFFERENCES IN 11C21-11C21Z CHASSIS: Sets using chassis 11C21Z are equipped with PM speakers. PM speakers cannot be used on 11C21 chassis. When ordering speaker replacements specify 11C21 or 11C21Z chassis.

IMPROVING FM RECEPTION: In FM Consoles a cabinet FM antenna may be added in addition to the line antenna. This antenna is made up of two 28-inch lengths of wire. One wire is connected to the FM antenna post, the other to chassis. The two wires are then tacked in the cabinet in opposite directions, and should not come in contact with ground.

HOWL ON FM: FM howl may be caused by the speaker vibrating the oscillator slug. A fiber spacer between the oscillator, and detector slug shafts in the FM tuner will eliminate vibration. A thin rubber band tied to the center of the oscillator slug shaft and upper frame will also eliminate the howl.

INCREASING BASS RESPONSE ON PHONO: To increase the bass response on records, the value of R5 in the phono-preamplifier may be increased. Do not increase the value to over 10,000 ohms or audio howl may be heard.

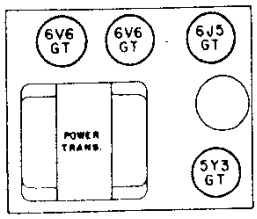
STRIPPED IF THREAD INSERTS: Damaged IF slug thread inserts may be replaced by unscrewing the slug, and pushing out the old insert. Two types of inserts are used, 83-1063 short, and 83-1069 long.

WAVE TRAP TRIMMER SHORTS OUT: A .002 mfd 600 volt condenser has been added in series with the grounded side of the wave trap.

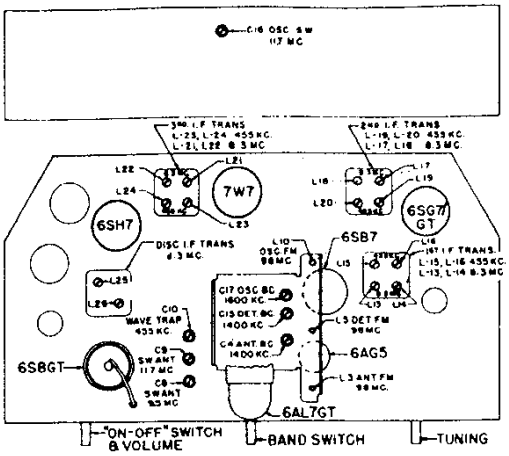
MODELS 12H090,12H091,
12H092,12H093,12H094
Early, Late

ZENITH RADIO CORP.

ALIGNMENT PROCEDURE



AUDIO & POWER SUPPLY



Operation	Connect Oscillator to	Dummy Antenna	Input Signal Frequency	Band	Set Dial To	Adj. Trimmers	Purpose
1	Pin 8 on Converter Tube 6SB7 socket	.05 Mfd.	455 Kc. Modulated	BC	600 Kc.	L15,16,19,20,23 and 24	Align I.F. channel for maximum output
2	Pin 1 on R.F. tube 6AG5 socket	.05 Mfd.	455 Kc. Modulated	Aut.	Press any button on Auto.	C10	Adjust wavetrap to minimum
3	2 Turns loosely coupled to wavemag.		1600 Kc. Modulated	BC	1600 Kc.	C17	Set oscillator to dial scale
4	2 turns loosely coupled to wavemag.		1400 Kc. Modulated	BC	1400 Kc.	C15 & C4	Align det. and ant. stages
5	Antenna Post (Remove line ant.)	400 ohms	11.7 Mc. Modulated	SW	11.7 Mc.	C16	Set oscillator to dial scale
6	Antenna Post (Remove line ant.)	400 ohms	11.7 Mc. Modulated	SW	11.7 Mc.	C9	Align ant. stage
7	Antenna Post (Remove line ant.)	400 ohms	9.7 Mc. Modulated	SW	9.7 Mc.	C8	Align ant. stage Repeat Oper. 6 for maximum output
8 (a)	Pin 4 grid on 6SH7 limiter socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L25 coil slug primary disc.	Align primary of discriminator for maximum reading
9 (b)	Pin 4 grid on 6SH7 limiter socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L26 coil slug sec. of discr.	Adjust secondary of discr. for zero reading
10 (c)	Pin 6 (grid) on 7W7 2nd IF tube socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L21 & L22 prim. & sec. of 3rd IF transformer	Align 3rd IF transformer for maximum reading
11 (c) (d)	Pin 4 (grid) on 6SG7 1st IF tube socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L17 & L18 prim. & sec. of 2nd IF transformer	Align 2nd IF transformer for maximum reading
12 (c) (d)	Pin 8 (grid) on 6SB7 converter tube socket	.05 Mfd.	8.3 Mc. Unmodulated	FM 45		L13 & L14 prim. & sec. of 1st IF transformer	Align 1st IF transformer for maximum reading
13 (c)	Antenna Post (remove line ant.)	270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L10 Osc. coil Slug	Set oscillator to dial scale
14 (c)	Antenna Post (Remove line ant.)	270 ohms	98 Mc. Unmodulated	FM 100	98 Mc.	L5 and L3 Det. and RF coil slugs	Align det. and Ant. stage to maximum reading
15 (c)	Antenna Post (remove line ant.)	270 ohms	45 Mc. Unmodulated	FM 45	45 Mc.	C22	Set oscillator to dial scale
16 (c)	Antenna Post (remove line ant.)	270 ohms	45 Mc. Unmodulated	FM 45	45 Mc.	C14 and C6	Align detector and ant. stages for maximum reading

IMPORTANT: Alignment of this chassis will in most cases be unnecessary unless an IF or RF transformer is replaced or the adjustments have been tampered with.

Correct alignment can only be made if the following procedure is followed:

A vacuum tube voltmeter with an isolation resistor of 200,000 ohms in series with the hot lead will serve for FM adjustments. This lead must be shielded.

An ordinary AC output meter connected across the primary or secondary of the output transformer will be satisfactory for all AM adjustments.

The signal generator output should be kept just high enough to get an indication on the meter.

(a) Vacuum Tube Voltmeter pin 5 on discriminator transformer to chassis (half discriminator load.)
(b) Vacuum Tube Voltmeter pin 7 on discriminator transformer to chassis (full discriminator load).
(c) Vacuum Tube Voltmeter 6SH7 limiter grid (pin 4 to chassis).
(d) 300 ohm ½ watt carbon resistor soldered across the secondary L18 (pin 2 and 3 of 2nd IF trans.). The leads to the resistor must be as short as possible and the resistor removed before operation 13 is started.

ZENITH RADIO CORP

MODEL 6MH081 Hudson

DB46