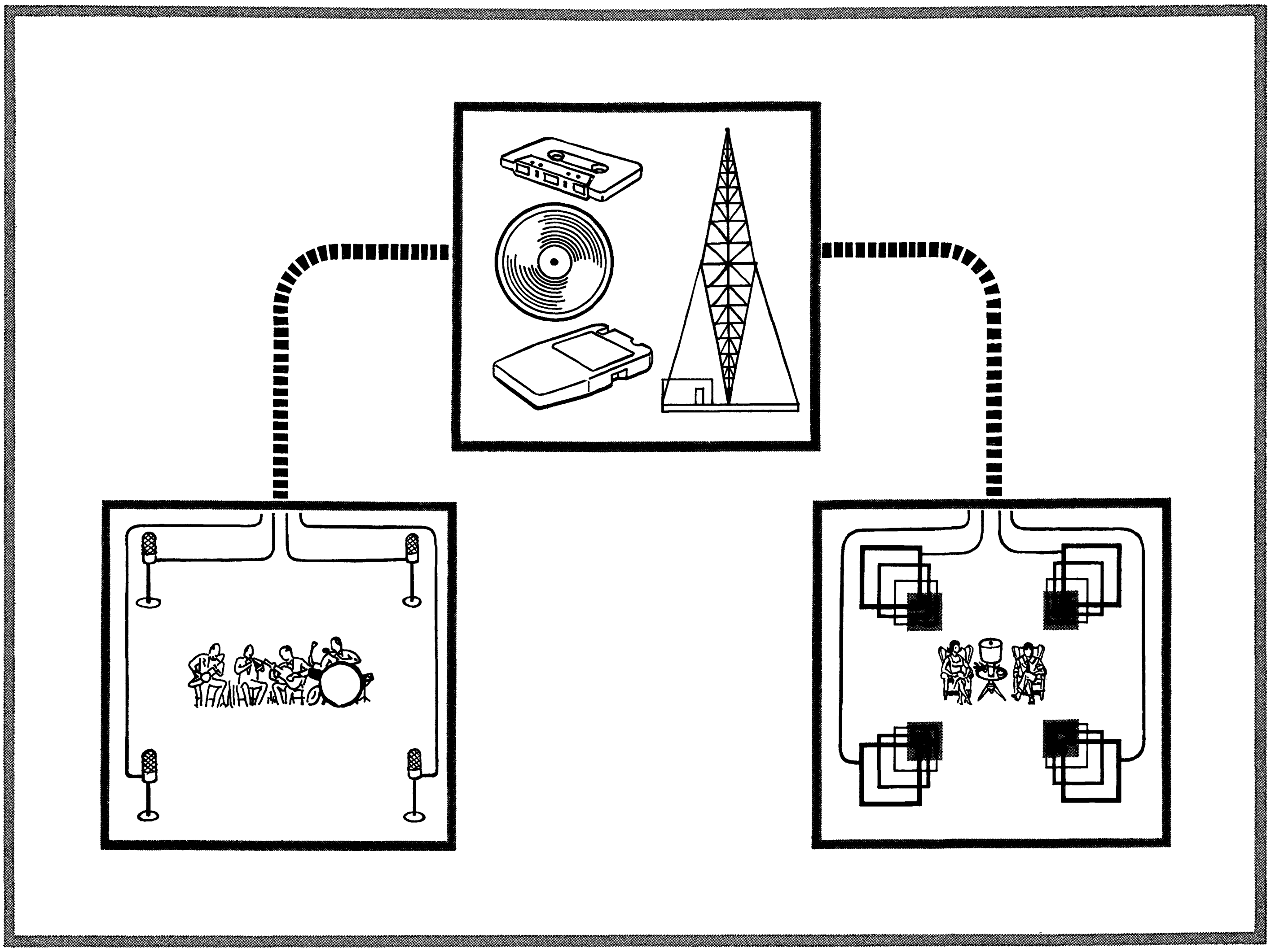
HF-31

HF-31

ZENITH®

SERVICE MANUAL



MODULAR AND CONSOLE AUDIO PRODUCTS

ZENITH RADIO CORPORATION

1900 N. AUSTIN AVENUE CHICAGO, ILLINOIS 60639

HF 31
25M — RR

PRINTED IN U.S.A.
AUGUST, 1975

PART NO. 923-848
$2.50

To the Service Technician

PRODUCT SAFETY SERVICING GUIDELINES FOR ALL AUDIO AMPLIFIERS AND RADIO RECEIVERS

CAUTION: No modification of the circuit should be attempted. Service work should be performed only after you are thoroughly familiar with all of the following precautions. To do otherwise increases the risk of potential hazards and injury to the user.

SAFETY CHECKS

SUBJECT: Fire & Shock Hazard

1. Be sure that all components are positioned in such a way to avoid possibility of adjacent components shorts. This is especially important on those chassis which are transported to and from the repair shop.

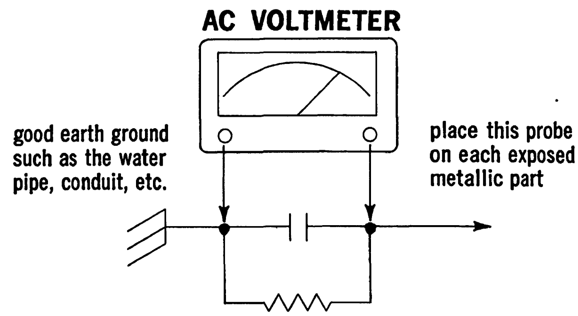
2. Always replace all protective devices such as insulators and barriers after working on a set.

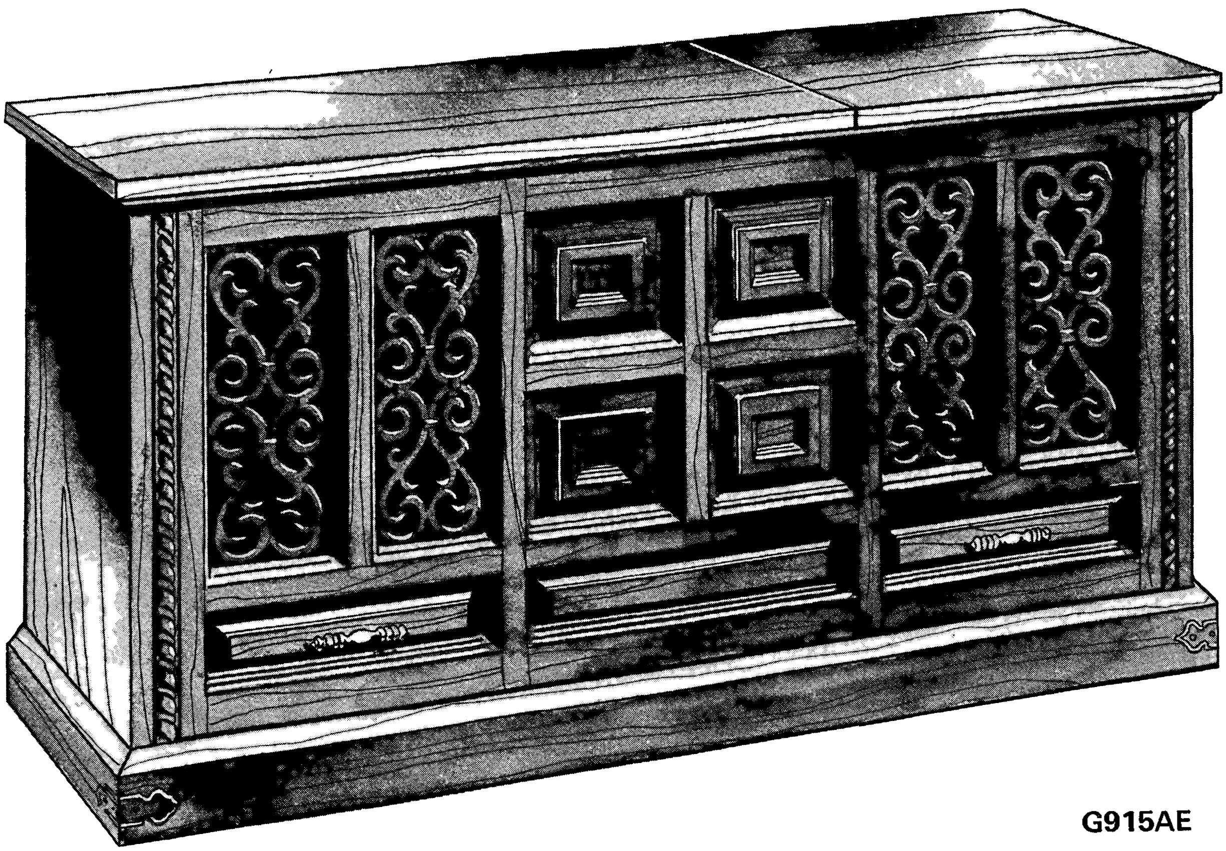
3. Check for frayed insulation on wires including the AC cord.

4. Check across-the-line components for damage and replace if necessary.

5. After re-assembly of the set always perform an AC leakage test on the exposed metallic parts of the cabinet such as the knobs, antenna terminals, etc. to be sure the set is safe to operate without danger of electrical shock. Do not use a line isolation transformer during this test. Use an AC voltmeter having 5000 ohms per volt or more sensitivity in the following manner: Connect a 1500 ohm 10 watt resistor, paralleled by .15 mfd. AC type capacitor, between a known good earth ground (water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination 1500 ohm resistor and .15 mfd. capacitor. Reverse the AC plug on the set and repeat AC voltage measurements again for each exposed metallic part. Voltage measured must not exceed .3 volts RMS. This corresponds to 0.2 milliamp AC.

Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.





G915AE

REPRESENTATIVE MODEL ILLUSTRATION

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HF 28 is Part No. 923-718 — **HF 28S1 is Part No. 923-734** — **HF 29 is Part No. 923-740**
HF 29S1 is Part No. 923-762 — **HF 29S2 is Part No. 923-784** — **HF 30 is Part No. 923-809**
HF 30S1 is Part No. 923-841

Solid State Device Theory and Circuit Applications are found in the following Service Manuals:

HF 18: Theory – Diodes (Including Zener and SCR), Transistors, (PNP, NPN, Darlington, and JFET). Applications – Chassis 29AT24 (JFET FM-RF, Multiplex, Electronic Touch Switching), Complementary Symmetry, Chassis 11ZT27 (Electronic Filter).

HF 22: Theory – JFET, IGFET, MOSFET, Applications – Dual Gate MOSFET FM-RF, JFET Biplex Detector, Quasi-Complementary Symmetry.

HF 23: Applications – Model C9029/Chassis 15WCA10 Four Channel Decoder.

HF 26: Applications – Chassis 15WDR51 (JFET Meter Circuit, Multiplex IC, Four Channel Decoding).

HF 27: Applications – Model SD2568 Speaker Switching Circuitry.

HF 28: Applications – Model D9013W Allegro Speaker System.

HF 29: Theory – Light Emitting Diodes (LED), Applications – Three Light Tuning (Target Tuning), Multiplex IC.

HF 29S1: Applications – Snap-off Escutcheon and Out Front Chassis Removal, "E" Line Models.

HF 30: Applications – Snap-off Escutcheon and Out Front Chassis Removal, "F" Line Models.

HF 31: Theory and Applications – Chassis 12WGR59 (Ceramic Filters, IF IC, Quadrature Detector, Interstation Muting, P LL Multiplex IC), General Product Information – Audio Circuitry (including Two on Two Speaker Matrix, Allegro Speaker Systems), Disassembly Procedures.

PRODUCT FEATURES
SEE NOTES ON PAGE 4

CABINET			CHASSIS		SPEAKERS			RECORD CHANGER	OTHER FEATURES		
MODEL	COLOR	NOTE A	MODEL	TYPE	PART NUMBER	IMPED. (In Ohms)	QTY. AND SIZE (In Inches)	PART NUMBER	TAPE PROVISION NOTE B	SPEAKER PROVISION NOTE C	MISC. NOTE D
G584W1	Walnut	M,LL	3WGR52	FM/AM/Phono	Note C	–	–	169-511	TM	2 on 2, A1,A2,A3	DGL, H, PL
G587W2	Walnut	M,LL	3WGR52	FM/AM/Phono/ Tape	Note C	–	–	169-511	8TK-P 169-492	2 on 2, A1,A2,A3	DGL, H, PL
GR587W1	Walnut	M,LL	3WGR52	FM/AM/Phono/ Tape	Note C	–	–	169-511	8TK-R/P 169-472	2 on 2, A1,A2,A3	DGL, H, PL
G590W	Walnut	M,LL	6WGR57	FM/AM/Phono/ Tape	Note C	–	–	169-512	8TK-P 169-510 or 169-510A or 169-510B	2 on 2, A1,A2,A3	AUX,DGL, F, H, PL,T
GR590W	Walnut	M,LL	6WGR57	FM/AM/Phono/ Tape	Note C	–	–	169-512	8TK-R/P 169-507 or 169-507A	2 on 2, A1,A2,A3	AUX,DGL, F,H,PL,T
GR591W	Walnut	M,LL	6WGR57	FM/AM/Phono/ Tape	Note C	–	–	169-512	Cass.-R/P 169-519	2 on 2, A1,A2,A3	AUX,DGL, F,H,PL,T
G596W	Walnut	M,LL	12WGR59	FM/AM/Phono/ Tape	Note C	–	–	169-513	8TK-P 169-505 or 169-505A	2 on 2, A1,A2,A3	AUX,F,H, PL,T
GR596W	Walnut	M,LL	12WGR59	FM/AM/Phono/ Tape	Note C	–	–	169-513	8TK-R/P 169-506	2 on 2, A1,A2,A3	AUX,F,H, PL,T
G680W2	Walnut	M	3WGR54	FM/AM/Tape	Note C	–	–	–	8TK-P 169-492	2 on 2, A1,A2,A3	DGL,H,PL
GR684W	Walnut	M	6WGR56	FM/AM/Tape	Note C	–	–	–	8TK-R/P 169-507 or 169-507A	2 on 2, A1,A2,A3	AUX,DGL, H,PL
G904P	Pecan	C,LL	5WFR50	FM/AM/Phono/ Tape	49-1224-01 49-1094	8 45	2-6x9 2-3½	169-502	8TK-P 169-490 or 169-490A	2 on 2 A1,A2,A3	H,RS
G914P	Pecan	C,LL	3WGR50	FM/AM/Phono/ Tape	49-1261-01 49-1237	8 8	2-8 2-3	169-515	8TK-P 169-521 or 169-521A	2 on 2 A1,A2,A3	A,H,PL, RS
G915AE	Antique Oak	C,LL	3WGR50	FM/AM/Phono/ Tape	49-1261-01 49-1237	8 8	2-8 2-3	169-515	8TK-P 169-521 or 169-521A	2 on 2 A1,A2,A3	A,H,PL, RS
G916M	Maple	C,LL	3WGR50	FM/AM/Phono/ Tape	49-1261-01 49-1237	8 8	2-8 2-3	169-515	8TK-P 169-521 or 169-521A	2 on 2 A1,A2,A3	A,H,PL, RS
G920AE	Antique Oak	C,LL	6WGR55	FM/AM/Phono/ Tape	49-1217 49-1166	8 8	2-10 2-3½	169-516	8TK-P 169-521 or 169-521A	2 on 2 A1,A2,A3	A,AUX, H,PL,T, RS

PRODUCT FEATURES
SEE NOTES ON PAGE 4

CABINET			CHASSIS		SPEAKERS			RECORD CHANGER	OTHER FEATURES		
MODEL	COLOR	NOTE A	MODEL	TYPE	PART NUMBER	IMPED. (In Ohms)	QTY. AND SIZE (In Inches)	PART NUMBER	TAPE PROVISION NOTE B	SPEAKER PROVISION NOTE C	MISC. NOTE D
G921P	Pecan	C,LL	6WGR55	FM/AM/Phono/ Tape	49-1217 49-1166	8 8	2-10 2-3½	169-516	8TK-P 169-521 or 169-521A	2 on 2 A1,A2,A3	A,AUX, H,PL,T, RS
G922M	Maple	C,LL	6WGR55	FM/AM/Phono/ Tape	49-1217 49-1166	8 8	2-10 2-3½	169-516	8TK-P 169-521 or 169-521A	2 on 2 A1,A2,A3	A,AUX, H,PL,T, RS
GR936AE	Antique Oak	C,LL	12WGR58	FM/AM/Phono/ Tape	49-1217 49-1166	8 8	2-10 2-3½	169-513	8TK-R/P 169-523 or 169-487	2 on 2 A1,A2,A3	A,F,H, PL,T, RS
GR937P	Pecan	C,LL	12WGR58	FM/AM/Phono/ Tape	49-1217 49-1166	8 8	2-10 2-3½	169-513	8TK-R/P 169-523 or 169-487	2 on 2 A1,A2,A3	A,F,H, PL,T, RS
G1000W	Walnut	M,SP	–	–	49-1249 49-1168	8 8	1-6½ 1-3½	–	–	–	A1
G2000W	Walnut	M,SP	–	–	49-1254-01 49-1168	8 8	1-8 1-3½	–	–	–	A2
G3000W	Walnut	M,SP	–	–	49-1265 49-1168	8 8	1-10 1-3½	–	–	–	A3
G9019W	Walnut	M,SP	–	–	49-1241 49-1168	8 8	1-10 1-3½	–	–	–	A
G9026W	Walnut	M	–	–	–	–	–	169-512	–	–	–

PRODUCT FEATURES
RECORD CHANGER FEATURES

Part No.	Mfg. Code	Stylus Pressure - Grams -	Cartridge & Stylus	45 RPM Adapter	Turntable		Record Size/ Selector	Record Stack Capacity	Base-Plate Color	Turntable Pad Color	Pressure Arm Color	Misc. Features
					Speeds RPM	Diameter Inches						
169-502	VM 1272	2-2.9	142-167 D-S S-82621	S-82964	16, 33, 45, 78	11"	7, 10, 12, M Manual	1/2"	Black	Black	Black	Cue Lever
169-511	BSR	2-2.9	142-182 D 56-632	S-72910	33, 45, 78	11"	7, 10, 12 Manual	1/2"	Black	Black	Black	Cue Lever
169-512	BSR	2-2.9	142-182 D 56-632	S-72910	33, 45, 78	11"	7, 10, 12 Manual	1/2"	Black	Black	Black	Cue Lever
169-513	BSR	2-2.9	142-182 D 56-632	S-72910	33, 45, 78	11"	7, 10, 12 Manual	1/2"	Black	Black	Black	Cue Lever
169-515	VM	2-2.9	142-182 D 56-632	S-82964	16, 33, 45, 78	11"	7, 10, 12 Auto	1/2"	Black	Black	Black	Cue Lever
169-516	VM	2-2.9	142-182 D 56-632	S-82964	16, 33, 45, 78	11"	7, 10, 12 Auto	1/2"	Black	Black	Black	Cue Lever

NOTE: All record changers have 120VAC motors. See "Misc Features" for those with overwinds. D = Diamond, S = Manufactured Sapphire.

NOTES

NOTE A – CABINET STYLE:
C = Console, M = Modular, LL = Lift Lid, SP = Speaker System.

NOTE B – TAPE INPUT AND OUTPUT PROVISION:
Factory Installed: 8 TK = Eight Track Cartridge,
Cass = Cassette, P = Play, R = Record,
TM = Top of Set Model for installation with the designated console of modular models:
Model F635 - Cartridge Tape Player.
Model E637 - Cassette Tape Player/ Recorder.
Model F638 - Cartridge Tape Player/Recorder.

NOTE C – SPEAKER PROVISIONS:
2 on 2 = Speaker Matrix or Conventional Stereo Extension Speaker System Provisions.
A1 = Model G1000W Allegro 1000 Speaker System may be used.
A2 = Model G2000W Allegro 2000 Speaker System may be used.
A3 = Model G3000W Allegro 3000 Speaker System may be used.
NOTE: Models G1000W, G2000W, and G3000W (and the prior E9012 series) are 8 ohm Allegro Speaker Systems. Allegro Models in the E9014 and E9018 series were 16 ohm systems.

NOTE D – MISCELLANEOUS FEATURES:
A = Speaker System is Allegro.
A1 = Speaker System is Allegro 1000.
A2 = Speaker System is Allegro 2000.
A3 = Speaker System is Allegro 3000.
AUX = Auxiliary input accepts Record Changer Model E9026W or Tape Units listed under Note B.
DGL = Digilite Dial Scale.
F = Flywheel Tuning.
H = Headphone Jack (Stereo).
HH = Headphone Jack (Four Channel).
PL = Power Indicator Light.
RS = Record Storage.
T = Tuning Meter.

SECTION TWO
GENERAL INFORMATION

THEORY

From time to time Zenith includes the use of new components and circuit applications in product design. Theory and explanation of such components and circuits is included in various manuals. Refer to the index on page 1 for further information.

CIRCUIT BOARD COMPONENT IDENTIFICATION

In order to assist the Service Technician, most circuit boards are marked to identify the location of components, test points, etc., using the schematic reference symbols and numbers. We have also prepared a drawing of the foil side of the circuit board showing the relationship between the components and the foil. This will aid the Technician in quickly tracing circuits, as not only are the components shown, but also the voltages at various check points. Components are identified by a letter/number combination. A letter prefix to indicate the type of component: C=Capacitor, L=Coil, R=Resistor, CR=Diode, etc. The numbers are assigned, in blocks, to identify the circuit in which it is used:

Block	Stage	Example
1 - 99	FM Tuner	R1, C1, L1.
101 - 199	AM Tuner	R101, C101, L101.
201 - 299	IF	R201, C201, L201.
301 - 399	Multiplex	R301, C301, L301.
401 - 449	Audio, Right Channel	R401, C401, L401.
451 - 499	Audio, Left Channel	R451, C451, L451.
501 - 599	Power Supply	R501, C501, L501.
601 - 699	Switching Circuits	R601, C601, L601.
701 - 799	Special Applications	R701, C701, L701.
801 - 849	Audio, Right Back Channel	R801, C801, L801.
851 - 899	Audio, Left Back Channel	R851, C851, L851.

POWER AMPLIFIERS

When servicing these products, the Service Technician must consider the following:

1. Each channel of the following amplifiers use a pair of matched power transistors in the final output stage. Therefore, should one transistor fail, both transistors must be replaced simultaneously, since they will not perform properly unless matched. (In chassis using complementary symmetry circuits a matched pair consists of one NPN and one PNP transistor.): 3WGR50, 3WGR52, 3WGR54, 5WFR50, 6WGR55, 6WGR56, 6WGR57, 12WGR58, 12WGR59.
2. When a power transistor is replaced the insulator (when used) between the transistor and the heat sink should also be replaced. On the following be certain to apply Dow Corning No. 340 heat conductive grease between the transistor and the insulator. Also between the insulator and the chassis. The Dow Corning grease can be obtained in 1 c.c. quantities by ordering Part No. 205-5 1: 3WGR50, 3WGR52, 3WGR54, 5WFR50, 6WGR55, 6WGR56, 6WGR57, 12WGR58, 12WGR59.
3. Do not operate these amplifiers without their proper speaker load.
4. Do not short out the audio output of either channel when the amplifier is operating.
5. Should a power transistor fail (short) be certain to replace the emitter resistors for the specific channel. Also be certain to check the condition of the silicon diode rectifiers, and driver transistors.
6. Remove plug-in transistors from their sockets before doing any soldering to the socket lugs.

SIGNAL STRENGTH CHART

There are certain minimum voltages necessary for proper stereo FM reception. To help determine if there is sufficient signal available, the following developed AGC voltage versus microvolt input voltage charts have been compiled. Since the desired FM Station may not always be operating in the stereo mode when an installation is made, these AGC voltage measurements have been taken with a monaural FM signal. The point "*" of minimum AGC voltage necessary for good stereo FM reception has been indicated on these charts.

AGC voltages are to be measured with a V.T.V.M. connected to the following Test Points.

Chassis 3WGR50, 3WGR52, 3WGR54, 5WFR50 – Test Point "C" at base of Q1; located between Transistors Q101 (A.M. Converter) and Q201 (1st I.F.)

Chassis 6WGR55, 6WGR56, 6WGR57 – Test Point at junction of R2 and R229; either end of orange wire at pulley end of gang.

Chassis 12WGR58 – Test Point at junction of R2 and R229; either end of violet wire at pulley end of gang.

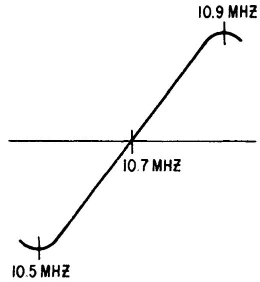
Chassis 12WGR59 – AGC voltages do not provide significant information.

Chassis 3WGR50, 3WGR52, 3WGR54, 5WFR50		Chassis 6WGR55, 6WGR56, 6WGR57		Chassis 12WGR58	
Micro Volts Input	Voltage AGC Voltage at Test Point "C"	Micro Volts Input	Reverse AGC Voltageq At Gate 2 of FM RF	Micro Volts Input	Reverse AGC Voltage At Gate 2 of FM RF
0	1.23	0	5.4	0	5.7
25	1.10	25	4.5	25	4.5
100	0.88	100	3.3	100	2.8
200	0.79	200	2.85	200	2.2
500	0.71	500	2.5	500	1.5
1K	*0.67	1K	*2.1	1K	*−0.96
5K	0.60	5K	1.22	5K	−0.22
50K	0.12	50K	0.15	50K	−1.10
100K	0.06	100K	−0.08	100K	−1.20

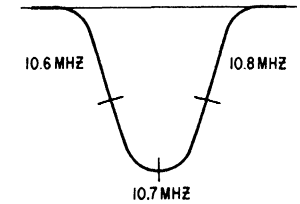
MINIMUM RATED POWER OUTPUT PER CHANNEL INTO 8 OHMS (SINE WAVE CONTINUOUS AVERAGE POWER - OFTEN CALLED RMS POWER)

Chassis	Number of Channels	Watts Per Channel	Power Bandwidth	Total Harmonic Distortion (THD) No More Than
3WGR50	2	2.5	100Hz - 10kHz	1.0%
3WGR52	2	2.5	100Hz - 10kHz	1.0%
3WGR54	2	2.5	100Hz - 10kHz	1.0%
6WGR55	2	6.0	80Hz - 12kHz	1.0%
6WGR56	2	6.0	80Hz - 12kHz	1.0%
6WGR57	2	6.0	80Hz - 12kHz	1.0%
12WGR58	2	12.0	40Hz - 15kHz	1.0%
12WGR59	2	12.0	40Hz - 15kHz	0.5%

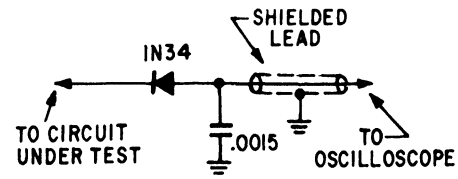
SECTION THREE
FM/AM/MULTIPLEX ALIGNMENT



Scope Pattern A — Ratio Detector
Adjust for maximum amplitude while maintaining linearity and symmetry. 10.7 MHZ marker must be on the curve at base line.



Scope Pattern-B — IF
10.6 and 10.8 MHZ markers must be symmetrically positioned with 10.7 MHZ at center of curve. This point must be adjusted for maximum.



Detector Probe - C
If your oscilloscope is not equipped with a detector probe, one can easily be constructed. For best results the probe should be shielded.

GENERAL

These receivers have been properly aligned at the factory and normally will not require further adjustment. As a result, it is not recommended that any attempt be made to alter the stages. If any components are replaced or if anyone tampers with the adjustments, realignment may be necessary.

FM ALIGNMENT

Because of the wide band pass required in a FM Multiplex tuner, it is desirable to use an FM signal generator having a deviation of 400 kHz as well as an oscilloscope, when aligning both the FM IF and RF portions of this receiver. It is not only necessary to obtain maximum amplitude in the IF amplifier stages, but also necessary to maintain symmetry. It is desirable to use 10.6, 10.7 and 10.8 Megahertz markers in obtaining IF curve symmetry.

Capacitors mentioned in the alignment procedure should be as small in size as possible and the ground lead of the generator must be connected to ground as close as possible to the point of injection.

AM ALIGNMENT

A V.T.V.M. on low AC scale connected across the speaker voice coil output terminals (either left or right channels), will be satisfactory for AM, IF and RF adjustments.

MULTIPLEX ALIGNMENT

Before any attempt is made to align, or service, FM Multiplex circuitry, the technician must be certain that the RF, IF, and Detector alignment is correct, and that the receiver functions normally on monaural signals.

Most Multiplex generators are excellent troubleshooting devices because they provide a composite Multiplex signal as well as an RF signal (which is FM modulated by the composite multiplex signal). The composite signal is very useful since it can be used in signal tracing the Multiplex portion of the receiver. We do not recommend that Multiplex alignment be made using the composite signal injected at the output terminal of the Detector since there is always some phase shift occurring in the RF, IF or Detector circuits. As a result, Multiplex alignment made by a signal injected at the Ratio Detector input would not be correct. For proper Multiplex alignment the composite signal must FM modulate the RF carrier and then be fed into the FM antenna terminals. With the signal injected in this manner, the Multiplex alignment would then be the best that could possibly be obtained.

RF signals should be injected at a point in the FM band where no signal is present. If at all possible this should be at a frequency near the middle of the FM band. Tune the FM receiver to this point and adjust the RF frequency adjustment on the generator to this same frequency. The AGC voltage developed in the receiver should be maximum. AGC voltage substantially less than this may indicate the RF frequency adjustment is tuned to an image.

GENERAL TROUBLE-SHOOTING PROCEDURE

Should a problem arise in aligning the FM Multiplex portion of the receiver, the technician must determine whether the difficulty lies in the RF, IF, and Detector portions of the receiver, or whether the difficulty lies in the Multiplex portion. The composite output of the multiplex generator can be injected at the output of the Detector to help determine the area of difficulty. To reduce possible extraneous signals coming through a Ratio Detector, short the Ratio Detector primary with a jumper lead. The wave forms and their magnitude may vary slightly from chassis to chassis, however, they are quite indicative of what will be seen when signal tracing the Multiplex circuitry.

If all the waveforms are similar in form and magnitude to those indicated, it can be assumed that the Multiplex portion of the receiver is functioning properly and the problem lies ahead of this in the FM receiver. If any of the waveforms are missing at a latter point but are apparent at a previous point, circuitry between the two test points should be checked.

RF AND IF ALIGNMENT PROCEDURE

CHASSIS 3WGR50, 3WGR52, 3WGR54, 5WFR50, 6WGR55, 6WGR56, 6WGR57

STEP	CONNECT GENERATOR TO	DUMMY ANTENNA	CONNECT VTVM/ SCOPE TO	INPUT SIGNAL FREQUENCY	SET DIAL TO	ADJUST	PURPOSE
NOTE: For AM Alignment Use A Signal With 400 Hertz Modulation, Bandswitch In AM.							
1	One turn loosely coupled to wavemagnet.	None	VTVM Speaker Voice Coil	455 KHz	600 KHz	L203, L204 (T202) L207 (T204) L210 (T206)	Align IF channel for maximum output.
2				1600 KHz	1600 KHz	C1G	Set Oscillator to dial scale.
3				600 KHz	600 KHz	T101	
4				Repeat Steps No. 2 & 3 for minimum change.			
5				1400 KHz	1400 KHz	C1D	Align Antenna stage.
NOTE: For FM Alignment Use A Signal With 400 KHz Deviation, Bandswitch In FM. AFC "Off".							
6	Term. No. 5 of T205 3rd IF Trans. Test Point "G"	47 ohm in shunt with gen. output. Then from hot lead a 27 ohm in series with a .001 MF capacitor.	Scope Ratio Detector Test Point "H"	10.7 MHz	Gang Closed	L212 (T207)	Adjust Primary and Secondary of Ratio Detector for maximum amplitude and symmetry as shown in Scope Pattern "A".
7						L214 (T207)	
8	Term. No. 3 of T203 2nd IF Trans. Test Point "F"		Scope Last FM IF Test Point "G"			L208 & L209 (T205)	Align I.F. transformer for maximum output and symmetry. This pattern is not necessarily identical to the overall Scope Pattern "B".
9	Term. No. 3 of T201 1st IF Trans. Test Point "E"					L205 & L206 (T203)	
10	Test Point "D"					L201 & L202 (T201)	
11						Readjust L201, L202, L205, L206, L208, L209	Align I.F. transformer for maximum output and symmetry as indicated in Scope Pattern "B".
NOTE: In Steps 10 and 11 Generator Ground MUST be Connected On Braid As Close To Gang As Possible.							
12	FM Antenna Post (Disconnect Antenna) Test Point "A"	300 ohm	Scope Last FM IF Test Point "G"	106 MHz	106 MHz	C13	Set Oscillator to dial scale.
13				90 MHz	90 MHz	L4	
14				Repeat Steps 12 and 13 for minimum change.			
15				106 MHz	106 MHz	C1A	Align FM Detector stage for maximum.
16				90 MHz	90 MHz	L2 if necessary	
17				106 MHz	106 MHz	C1H	Align FM Antenna stage for maximum.
18				90 MHz	90 MHz	L1 if necessary	
19				Repeat Steps 15 thru 18 for minimum change.			
NOTE: The Following Applies Only To Chassis 6WGR55, 6WGR56, 6WGR57, No Signal Input.							
20	None	None	None	None	None	R233	Zero center tuning meter.

MULTIPLEX ALIGNMENT PROCEDURE

CHASSIS 3WGR50, 3WGR52, 3WGR54, 5WFR50, 6WGR55, 6WGR56, 6WGR57

Before Aligning or Servicing Multiplex Circuits Be Certain That RF, IF And Ratio Detector Are Correctly Aligned And That Operation Is Normal On Monaural FM Signals.

STEP	CONNECT GENERATOR TO	DUMMY ANTENNA	CONNECT SCOPE AND/OR ACVTVM	INPUT SIGNAL FREQUENCY	SET DIAL TO	ADJUST	PURPOSE
NOTE: Place Bandswitch In FM STEREO Position.							
1	FM Antenna Post (Disconnect Antenna) Test Point "A"	300 ohm	Test Point "M"	98 MHz 10% Pilot	98 MHz	T301	Adjust 19 kHz Amp for maximum.
						NOTE: — Stereo Indicator Lamp may be on or off during the above steps.	
2				98 MHz 5% Pilot		R302	Adjust mute control to point where stereo lamp lights up.
						NOTE: — Stereo Indicator Lamp must remain on during the following steps.	
3			"L" Tape Output	98 MHz 10% Pilot L+R, L—R, (Mod. L. Only)		T302	Adjust for maximum L Channel Reading
4			"R" Tape Output			T302 if necessary	Adjust for minimum R Channel Reading
5				Repeat Steps 4 and 5 for minimum change.			To provide maximum separation.

RF AND IF ALIGNMENT PROCEDURE – CHASSIS 12WGR58

STEP	CONNECT GENERATOR TO	DUMMY ANTENNA	CONNECT VTVM/ SCOPE TO	INPUT SIGNAL FREQUENCY	SET DIAL TO	ADJUST	PURPOSE
NOTE: For AM Alignment Use A Signal With 400 Hertz Modulation, Bandswitch In AM.							
1	One turn loosely coupled to wavemagnet.	None	VTVM Speaker Voice Coil	455 KHz	600 KHz	L203, L204 (T202) L207, L215 (T204) L210 (T206)	Align IF channel for maximum output.
2				1600 KHz	1600 KHz	C1K	Set Oscillator to dial scale.
3				600 KHz	600 KHz	L103 (T102)	
4				Repeat Steps No. 2 and 3 for minimum change.			
5				1400 KHz	1400 KHz	C1H	
6				600 KHz	600 KHz	L106 (T101)	Align RF stage.
7				Repeat Steps No. 5 and 6 for minimum change.			
8				1400 KHz	1400 KHz	C1F	Align antenna stage.
NOTE: For FM Alignment Use A Signal With 400 KHz Deviation, Bandswitch In FM, AC "Off".							
9	Term. No. 5 of T205 3rd IF Trans. Test Point "G"	47 ohm in shunt with generator output. Then from hot lead a 27 ohm in series with a .001 MF Capacitor.	Scope Ratio Detector Test Point "H"	10.7 MHz	Gang Closed	L212 (T207)	Adjust Primary and Secondary of Ratio Detector for maximum amplitude and symmetry, as shown in Scope Pattern "A".
10						L214 (T207)	
11	Term. No. 3 of T203 2nd IF Trans. Test Point "F"		Scope Last FM IF Test Point "G"			L208 & L209 (T205)	Align I.F. Transformer for maximum output and symmetry. This pattern is not necessarily identical to the overall Scope Pattern "B".
12	Term. No. 4 of T201 1st IF Trans. Test Point "E"					L205 & L206 (T203)	
13	Test Point "D"					L201 & L202 (T201)	
14						Readjust L201, L202, L205, L206, L208 & L209	Align I.F. Transformer for maximum output and symmetry as indicated in Scope Pattern "B".
NOTE: In Steps 13B and 14B Generator Ground Must Be Connected On Braid As Close To Gang As Possible.							
15	FM Antenna Post (Disconnect Antenna) Test Point "A"	300 ohm	Scope Last FM IF Test Point "G"	106 MHz	106 MHz	C13	Set Oscillator to dial scale.
16				90 MHz	90 MHz	L4	
17				Repeat Steps 15 and 16 for minimum change.			
18				106 MHz	106 MHz	C1C	Align FM Detector stage for maximum.
19				90 MHz	90 MHz	L2 if necessary	
20				106 MHz	106 MHz	C1A	Align FM Antenna stage for maximum.
21				90 MHz	90 MHz	L1 if necessary	
22				Repeat Steps 15 thru 21 for minimum change.			
23	None	None	None	None	None	R233	Zero center tuning meter.

FM–MULTIPLEX ALIGNMENT PROCEDURE – CHASSIS 12WGR58

Before Aligning Or Servicing Multiplex Circuits Be Certain That RF, IF, And Ratio Detector Are Correctly Aligned And That Operation Is Normal On Monaural FM Signals.

STEP	CONNECT GENERATOR TO	DUMMY ANTENNA	CONNECT SCOPE AND/ OR VTVM	INPUT SIGNAL FREQUENCY	SET DIAL TO	ADJUST	PURPOSE
NOTE: Place Bandswitch In FM Position And Stereo/Mono Switch In Stereo.							
1	FM Antenna Post (Disconnect Antenna) Test Point "A"	300 ohm	VTVM(DC) Doubler Test Point "N"	98 MHz, 10% Pilot	98 MHz	T301, T302, R308	Adjust 19 kHz Amp and Doubler for maximum.
						NOTE:—Adjust this step with Test Point "T" Shorted Adjust mute control at same time so voltage does not exceed —.2 volt. Voltage must be kept at minimum for proper alignment. If stereo indicator lamp lights up, readjust mute control to extinguish lamp and continue adjustment of transformers for maximum.	
2				98 MHz, 5% Pilot		R308	Adjust mute control to point where stereo lamp lights up.
3			VTVM(AC) "L" Audio Output (After 38kHz filter)	98 MHz, 10% Pilot L+R, L—R, (Mod. L Only)		T303	Adjust 38 kHz Detector for maximum at "L" Output. NOTE:— "L" Output should be approximately 10 (or greater) times "R" Output.
4			VTVM(AC) "R" Audio Output (After 38kHz filter)	Check "R" channel output.			

RF, IF AND MPX ALIGNMENT PROCEDURE FOR CHASSIS 12WGR59

STEP	CONNECT GENERATOR TO	DUMMY ANTENNA	CONNECT VTVM/ SCOPE TO	INPUT SIGNAL FREQ.	SET DIAL TO	ADJUST	PURPOSE
NOTE: For AM Alignment Use A Signal With 400 Hertz Modulation, Bandswitch In AM.							
1	One Turn Loosely coupled to AM Wave magnet Antenna	None	VTVM Speaker Voice Coil	455 KHz	Gang Closed	L203, L204 (T202)	Align IF for maximum output.
2						L207, L208 (T203)	
3						L209 (T204)	
4				1600 KHz	1600 KHz	C109	Set Oscillator to dial scale.
5				600 KHz	600 KHz	L105 (T102)	
6				Repeat Steps No. 4 & 5 for minimum change.			
7				1400 KHz	1400 KHz	C1H	Align RF stage.
8				600 KHz	600 KHz	L103 (T101)	
9				Repeat Steps No. 7 & 8 for minimum change.			
10				1400 KHz	1400 KHz	C1F	Align Antenna stage.
11				600 KHz	600 KHz	L101 if necessary	
12				Repeat Steps 10 & 11 for minimum change.			
NOTE: For FM IF Alignment Use A Signal Of 250 KHz Deviation, 50 Hertz Modulation For Full Bandpass Display. FM In MONO, AFC OFF, Preset R213, R308 and R317 To Mid Rotation Before Connecting Generator. Connect Generator Cable Ground To Gang Frame.							
13	Test Point "D" FM IF Input	47 Ohm in shunt with gen. output. Then from hot lead a 27 Ohm in series with a .01 MF capacitor. See Fig. 1.	Scope Test Point "G" Thru Diode Detector Probe, See Fig. 2.	10.7 MHz	Gang Closed	L201, L202 (T201)	Align I.F. transformer for maximum output and symmetry as indicated in Scope Pattern "B".
NOTE: For FM Detector Alignment Use A Signal Of 75 KHz Deviation, 1 KHz Modulation. Also Connect Generator Modulation Frequency To Scope Horizontal. Adjust Generator IF Frequency To Center Total Bandpass Waveform. Do Not Change Generator IF Frequency For Remainder Of IF Alignment. (If Your Generator Does Not Provide Output For Audio Modulation Frequency Use Horizontal Output From Generator, Or Scope Horizontal Sweep, And Follow Step 14C.) Minimum Distortion Can Only Be Achieved By Use Of Step 14A Below.							
14	Test Point "D" FM IF Input	47 Ohm in shunt with gen. output. Then from hot lead a 27 Ohm in series with a .01 MF capacitor.	A. Distortion Analyzer (thru a 100 usec de-emphasis network) and/or Scope. See Fig. 3. B. Scope C. Scope Test Point "H"	Center Frequency of Ceramic Filters Y201 and Y202. See Fig. 4.	Gang Closed	L205	A. Preferred Method: Distortion Analyzer at Test Point "H" should read minimum distortion, approx. 50 to 55 dB below 0 dB set level. B. Alternate Method: Adjust L205 for linear scope trace - no curve at ends of trace. Disregard meter reading. C. Alternate Method: Adjust L205 for maximum length and symmetry, Similar to Scope Pattern "A".
15						R213	Adjust for center reading on Tuning Meter.
16	Test Point "A" FM Antenna Post (Disconnect Antenna)	300 Ohm		106 MHz	106 MHz	C15	Set Oscillator to dial scale.
17				90 MHz	90 MHz	L4	
18				Repeat Steps 16 & 17 for minimum change.			
19				106 MHz	106 MHz	C1C	Align FM Detector stage for maximum.
20				90 MHz	90 MHz	L2 if necessary	
21				106 MHz	106 MHz	C1A	Align FM Antenna stage for maximum.
22				90 MHz	90 MHz	L1 if necessary	
23				Repeat Steps 19 thru 22 for minimum change.			

RF, IF, AND MPX ALIGNMENT PROCEDURE FOR CHASSIS 12WGR59 – CONT'D.

STEP	CONNECT GENERATOR TO	DUMMY ANTENNA	CONNECT VTVM/ SCOPE TO	INPUT SIGNAL FREQ.	SET DIAL TO	ADJUST	PURPOSE
NOTE: Apply Sufficient Signal Level — Approx. 100 Microvolts — To Obtain Full Limiting At Point Near 98 MHz.							
24	Test Point "A" FM Antenna Post (Disconnect Antenna)	300 Ohm	Scope Test Point "H"	98 MHz	98 MHz	—	Turn Modulation "ON". Adjust generator RF frequency to obtain center indication on Tuning Meter. Adjust VTVM for "O" dB reading.
25							Turn modulation "OFF". Reduce RF level to get -4.5 dB quieting (approx. 3 to 4 microvolts).
26						R308	Turn Mute "ON". Rotate R308 (Mute) full clockwise. Audio will mute. Slowly adjust R308 counter-clockwise until audio just turns "ON". Do not over adjust. This will be approximately 45 dB S/N. To check, tune generator off frequency and then back on frequency from both sides.
27			Frequency Counter and/ or Scope Test Point "M"	No Signal Input. Mute "ON".		R317	A. Frequency Counter should read 19 KHz, ± 100 Hz. B. Alternate Method: Connect Test Point "M" Signal to scope vertical and an accurate 19 KHz signal to scope horizontal input. Adjust R317 for one square synchronized waveform.
28			Scope and/or AC VTVM Left Tape Output	98 MHz 10% Pilot (L+R) (L-R) (L Only)		—	Check for separation. Maximum left output.
29			Right Tape Output.				Check for separation. Minimum right output.
NOTE: Do Not Readjust Control R317 After Step 27.							

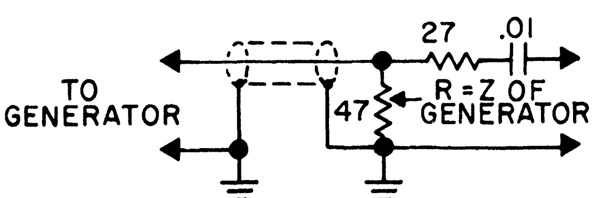


FIGURE 1 – RF INPUT PROBE

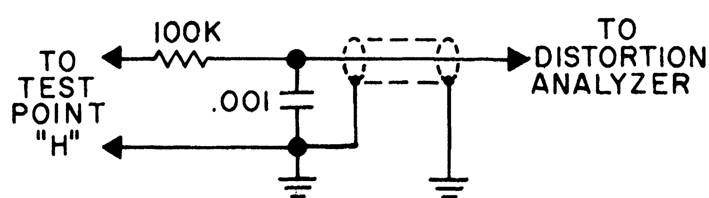


FIGURE 3 – DE-EMPHASIS PROBE

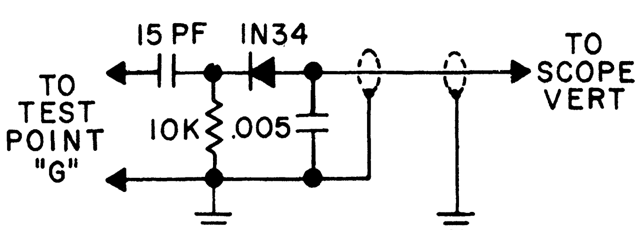


FIGURE 2 – DIODE DETECTOR PROBE

CERAMIC FILTERS – CHASSIS 12WGR59			
PART NO.	COLOR CODE	NOMINAL CENTER FREQUENCY	FREQUENCY RANGE
224-1	Black	10.64 MHz	10.61 to 10.67 MHz
224-1-01	Blue	10.67 MHz	10.64 to 10.70 MHz
224-1-02	Red	10.70 MHz	10.67 to 10.73 MHz
224-1-03	Orange	10.73 MHz	10.70 to 10.76 MHz
224-1-04	White	10.76 MHz	10.73 to 10.79 MHz

FIGURE 4 – CERAMIC FILTER TABLE

NOTES

SECTION FOUR

THEORY AND APPLICATIONS

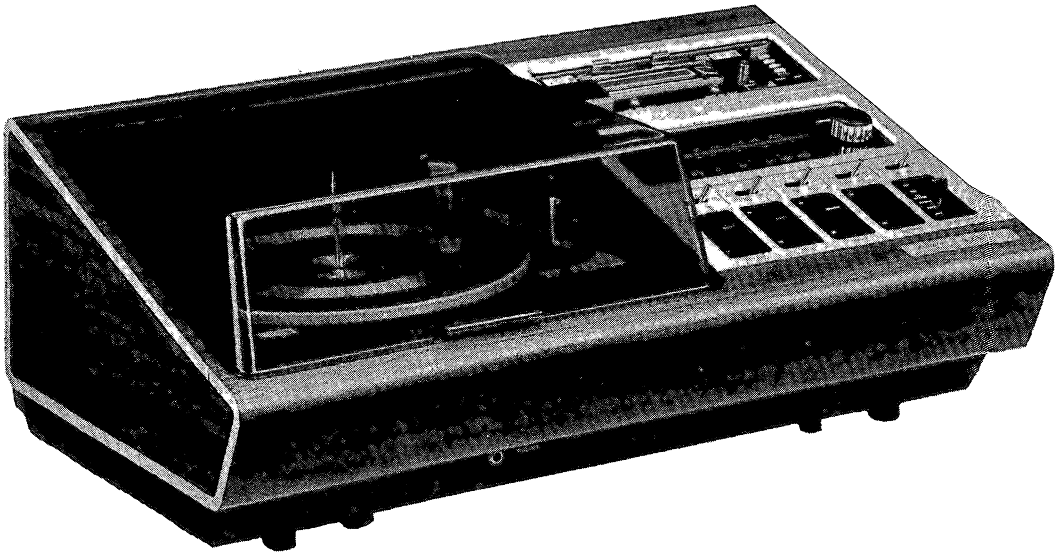


FIGURE 1 – MODEL GR596W

INTRODUCTION

Chassis 12WGR59 (Used in Models G596W and GR596W) incorporates several features which are new to Zenith's Stereo Audio Product Line. These features include:

1. Cabinet Styling (See Figure 1).
2. Separate IF circuits for AM and FM (See Block Diagrams in Figures 2 and 3).
3. Improved Sensitivity and Selectivity.
4. AM Oscillator Trimmer mounted separately (C109).
5. FM IF uses Two Ceramic Filters (Y201 and Y202 and only one IF Transformer - T201).
6. FM IF Gain Block in IC201.
7. FM IF Limiter and Quadrature Detector in IC202 (only one coil, - L205).
8. FM Interstation Muting.
9. Phase Locked Loop (PPL) Multiplex Detector (IC301) (one variable resistor adjustment - R317).

AM RF/IF/AGC

As shown in the Block Diagrams of Figures 2 and 3 and the partial Schematic of Figure 5, the AM and FM no longer share common IF circuitry. The AM has one NPN transistor used in a common emitter TRF circuit (Q101) and a second NPN transistor used as Converter (Q102). This is followed by a conventional, two NPN transistor, AM IF circuit (Q202, Q203). A voltage divider consisting of R219, R220, etc., connected between AM B+ and ground, establishes a reference bias for the RF and IF transistors under no signal conditions. In addition to being AM Detector, Diode CR205 also provides AM AGC voltage for the base of the 1st AM IF transistor (Q202). Voltage developed at the emitter of Q202 is fed via R106 providing reverse AGC to the base of AM RF transistor Q101.

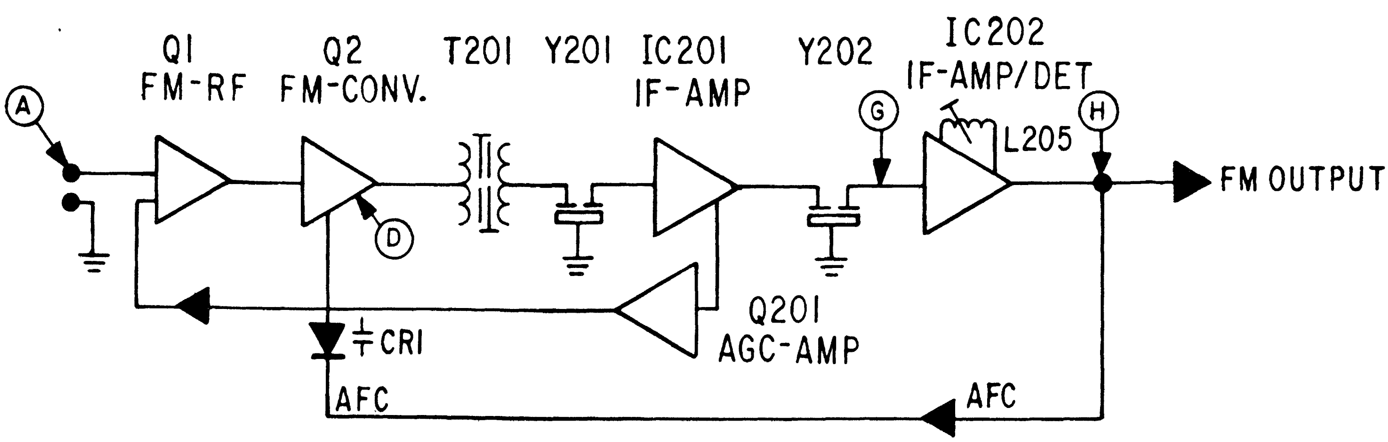


FIGURE 2 – CHASSIS 12WGR59 – FM RF/IF BLOCK DIAGRAM

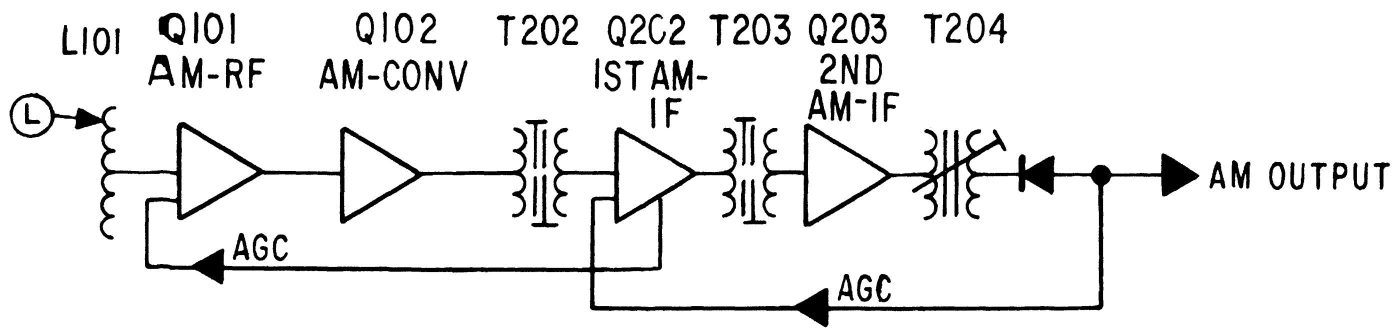


FIGURE 3 – CHASSIS 12WGR59 AM RF/IF BLOCK DIAGRAM

When B + is applied to the AM RF / IF, a portion of that voltage is applied via R107 and R318 to forward bias CR303, placing a positive voltage on pin 14 of IC301. This will turn off the oscillator in the FM Multiplex Chip IC301, thereby preventing possible "birdies" when turned to AM.

FM - RF

Q1, the RF amplifier, is a Dual Insulated Gate MOS Field Effect Transistor (See Figure 5). FM Antenna coil (L1), FM RF coil (L2), and Oscillator coil (L4) are all precisely tuned to insure that the tuner will reject unwanted and undesired combinations of RF signals present in many areas due to today's complex communication systems. Coil L3 is part of a 10.7 Megahertz trap in the emitter lead to the Converter transistor (Q2).

Under no signal conditions voltages are applied as follows to the MOSFET elements. Resistors R3 and R6 form a voltage divider across the B+ line providing a fixed bias to Gate 1 (G1). The FM RF signal from L1 is also applied to G1. A second voltage divider consisting of R15, R201, and R202 associated with the voltage doubler circuit of CR202 and CR203 provides fixed bias of 5.6 volts, via R203 and R2 to Gate 2 (G2) under no signal conditions. Drain voltage is applied, from B+ via the RF coil L2.

At this point lets recap the existing voltage conditions:

Gate 1 to Source - approx. –0.3 volts

Gate 2 to Source - approx. +3.6 volts

Drain to Source - approx. +7.8 volts

Drain current - approx. 10 milliamp.

(A variation can be expected due to circuit component tolerances.)

As the gain of the IF stages increases, reverse AGC voltage will be developed at diodes CR202 and CR203, and applied to the Gate terminal (G2) of the FET. This increasing AGC voltage, when added to the gate bias voltage, will cause the gate voltages to be more negative, driving the FET toward cut-off. When this occurs, the current flow is reduced, thereby reducing the FET's gain. This stage is designed for optimum circuit performance and minimum noise. In this application, the drain current is at approximately one-half of the saturation current (IDSS).

MOSFET PROTECTION

When these devices are being handled out of circuit, it is possible for static charges to build up between gate and source. This charge could reach a value which would exceed the gate breakdown voltage. To reduce this condition, MOSFET'S of early design would be shipped with all leads twisted together, or with a wire wrapped around all leads. Since all leads were shorted together, there should be no impedance across which a voltage could develop.

While the above method was effective, it could be eliminated if protection were included within the FET package. A schematic of the internal configuration of such a package is shown in Figure 4. You will note back-to-back zener diodes connected from each gate to the source. These back-to-back diodes are diffused into the FET while it is being constructed. When a voltage of sufficient value is developed across the zeners, they will conduct, bypassing voltage transients which approach the gate breakdown voltage. This protects the gate structure, while allowing the FET to retain the wide dynamic signal range capability.

Even though gate protection has been included in the design of these devices, certain precautions should be observed while handling either MOSFETS or MOS Integrated Circuits:

A. Do not generate static.

B. Keep relative humidity above 60%.

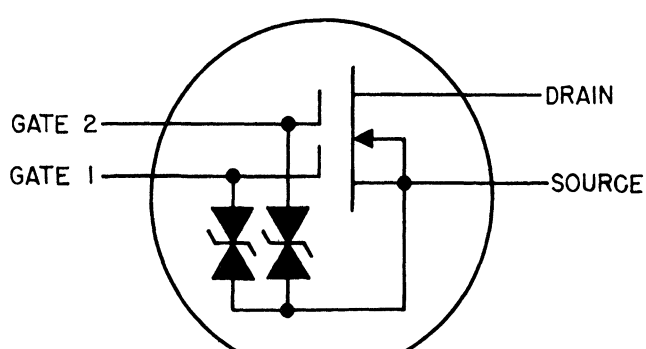


FIGURE 4 – MOSFET GATE PROTECTION

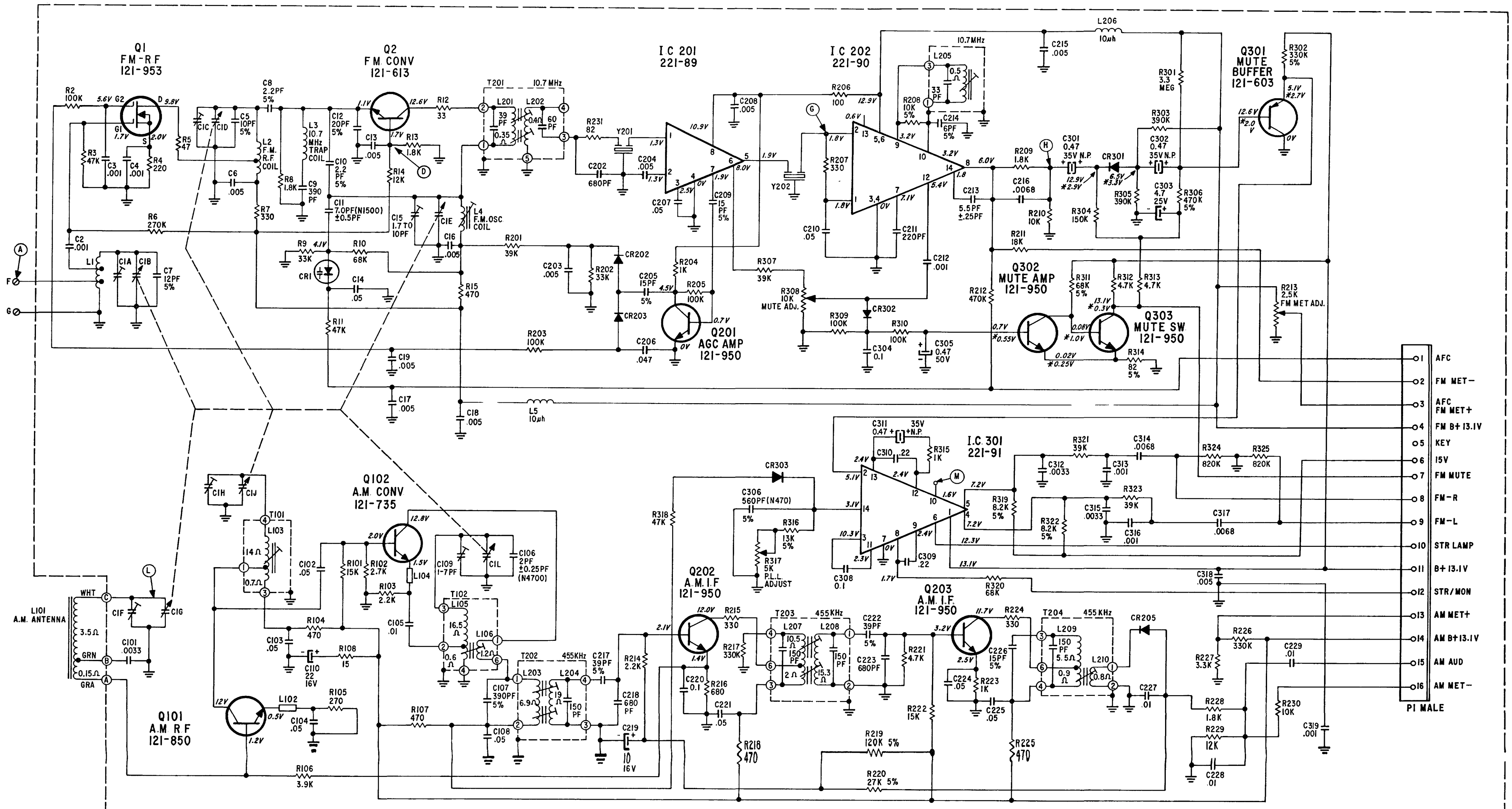


FIGURE 5 — CHASSIS 12WGR59 RF/IF/MPX SCHEMATIC

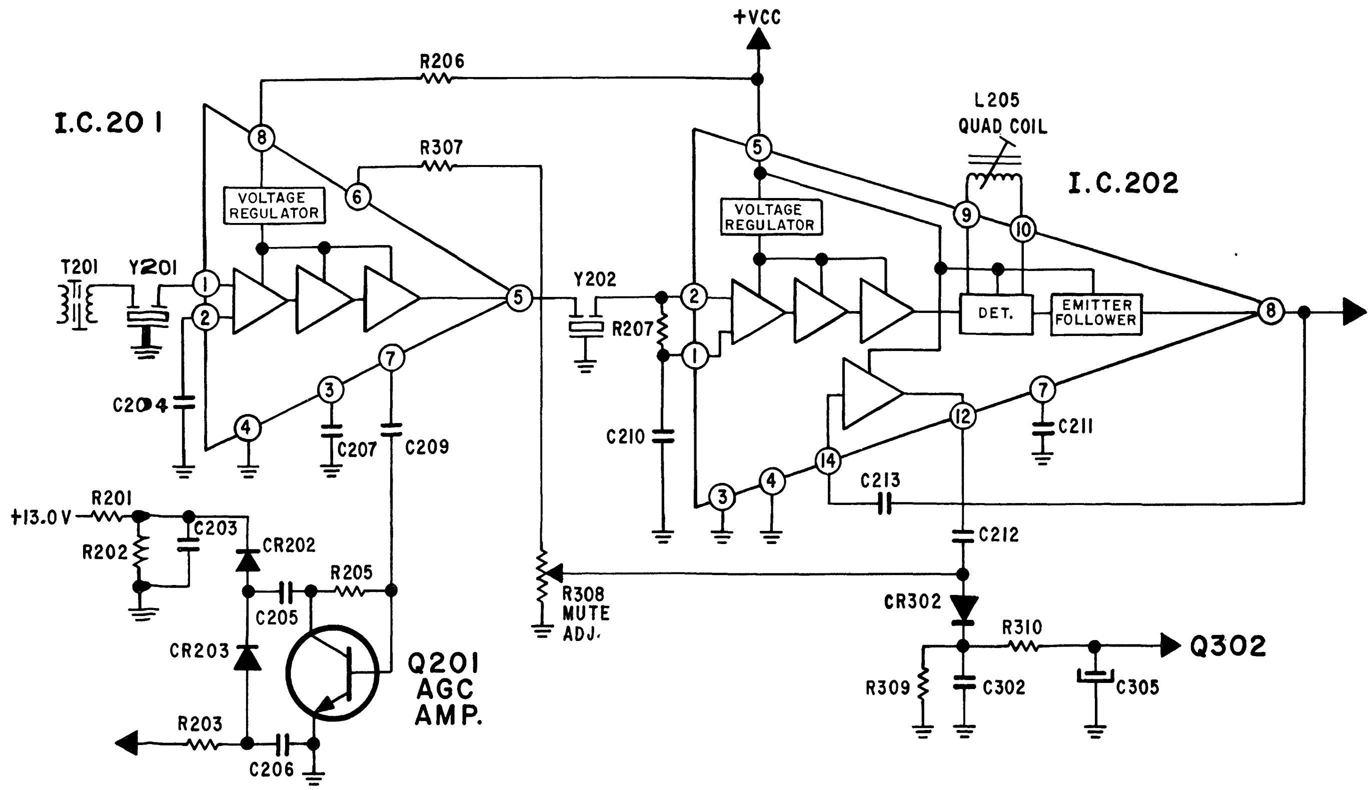


FIGURE 6 – CHASSIS 12WGR59 FM-IF

C. Do not have rugs (especially nylon) in the service area.
D. Do not use nylon or polyester pants, shirts or jackets.
E. Do not wear rubber gloves. Cotton is recommended.
F. Do not insert MOS devices in foam plastic holders.
G. Leave MOS devices in their protective carriers (if supplied) until used in a circuit.
H. Benches and soldering irons should be grounded.

FM – AFC

Oscillator stability is important, therefore it is desirable to provide Automatic Frequency Control (A.F.C.) which is guided by a voltage directly related to oscillator frequency shift. This is accomplished by taking a DC voltage from pin 8 of IC202 (which is a limiter and detector) and feeding it back to voltage controlled diode CR1 (See Figure 5). This diode is connected across the oscillator tuned circuit and acts as a frequency controlling device. If the oscillator shifts frequency, it causes a change in detector output voltage which is fed back changing the diode capacitance, automatically adjusting the frequency of the oscillator circuit to compensate for the original oscillator frequency shift. There is a possibility that some component may fail in the oscillator circuit, shifting the frequency beyond the +/–.8 Megahertz control range of the diode. In addition, an AFC disabling switch has been provided, should it be desired to receive a weak FM station within the AFC pull-in range of a strong FM station. In the AFC-OFF position a fixed DC voltage is applied to the AFC line from B+, via FM meter adjust (213) and AFC Switch (SW3).

FM – IF

This chassis incorporates several new technological advances, in the FM-IF, including the use of Ceramic Filters; Integrated Circuits for gain, limiting, and audio detection; a Quadrature Detector; and Interstation Muting (See Figure 6).

CERAMIC FILTERS

Referring to Figures 2 and 5, there are only two tuneable LC devices in the FM-IF. One is the 1st IF Transformer (T201) and the other is the Quadrature Coil (L205). Y201 and Y202 are the two ceramic filters used in the FM-IF. This reduction of tuneable circuits should simplify alignment in the field, if it becomes necessary. Being highly selective, ceramic filters provide approximately 90% of the IF selectivity. Ceramic filters, as manufactured are fixed frequency devices and fall into one of five overlaping groups, based on the center frequency of each filter. Figure 7 shows the nominal center frequency of each filter and its frequency range, etc. It is most important to remember that if a ceramic filter is changed, both filters must be of the same part number and color code. For example; if you remove a filter with a red dot (224-1-02) you must install a filter with a red dot. As an alternate, you can use two other filters if they are of the same group, that is, two with blue dots or two with orange dots, etc. and of course the same part number. When you align this IF, follow the instructions in the alignment procedure. Remember, you must set the signal generator to the frequency of the ceramic filters, then align the chassis (T201, L205, etc.) Do not assume that your generator is at the correct center frequency until you have checked.

CERAMIC FILTERS – CHASSIS 12WGR59			
PART NO.	COLOR CODE	NOMINAL CENTER FREQUENCY	FREQUENCY RANGE
224-1	Black	10.64 MHz	10.61 to 10.67 MHz
224-1-01	Blue	10.67 MHz	10.64 to 10.70 MHz
224-1-02	Red	10.70 MHz	10.67 to 10.73 MHz
224-1-03	Orange	10.73 MHz	10.70 to 10.76 MHz
224-1-04	White	10.76 MHz	10.73 to 10.79 MHz

FIGURE 7 – CERAMIC FILTER TABLE

FM – IF

IC201 and IC202 are the two Integrated Circuits used in the FM-IF. IC201 consists of three gain stages, providing a total of approximately 50db gain, which are powered by a common voltage regulator. Outputs of IC201 are:

1. AGC source.
2. IF Output.
3. A regulated voltage, to be used for the FM Interstation Muting.

FM–AGC

AGC Amplifier Q201, together with the voltage doubler consisting of CR202 and CR203, controls the gain of Q1 (the FM-RF amp.). A voltage divider consisting of R15, R201 and R202 connected from the FM B+ forms the initial bias of +5.6 volts at G2 of Q1. This represents the optimum gain condition for Q1. FM signals are sampled at pin 7 of IC201, via C209 to the base of Q201 where the signal is amplified and coupled through C205 to the junction of CR202 and CR203. When the signal reaches sufficient amplitude, diodes CR202 and CR203 conduct, lowering Q1's G2 voltage from +5.6 volts, thereby lowering the gain of Q1.

FM-LIMITER/DETECTOR

Comparison of IC201 and IC202 (in Figure 6) shows that IC202 contains three gain/limiter stages and a voltage regulator similar to IC201. In addition, IC202 also contains:

1. A Quadrature Detector (Differential Peak Detector).
2. An Emitter Follower.
3. A Voltage Amplifier.

Figure 8 is a partial schematic of the detector. Output of the amplified and limited IF signals appear at IC202 pin 9. Connected externally between pins 9 and 10 is the quad coil (L205). Voltage appearing across the ends of L205 is a function of the signal frequencies appearing at pins 9 and 10. These two pins will be 90 degrees apart, resulting in this circuit being called a quad detector. Signals at the center frequency will produce equal voltages at pins 9 and 10, while signals off center frequency will create different voltage on pins 9 and 10. Being a differential circuit, only the difference of the signals appearing at pins 9 and 10 will be amplified. Identical signals on those pins will not. The amplified signal goes through the emitter follower to pin 8, where it is available as:

1. AFC Source.
2. Mute Source.
3. Composite Audio.
4. FM Tuning Meter Source.

FM – INTERSTATION MUTING

Noise present at pin 8 of IC202 is coupled via C213 to pin 14. This noise is amplified approximately 20db in IC202, then appears on pin 12, from there it is coupled via C212 to diode CR302. CR302 detects this signal and provides a positive voltage to the base of Q302 (the mute amplifier). Normally Q302 is cut off. When the positive voltage is applied to the base of Q302, it conducts, collector voltage drops, lowering the voltage applied to the base of Q303, turning off Q303. A high positive voltage appears on the cathode of CR301, reverse biasing the diode, opening the signal path to Q301. Q301 is a buffer stage, providing impedance matching, between the output of diode switch CR301 and the input of the multiplex decoder (IC301).

On medium to strong signals there will be approximately +2 volts on the base of Q301. When off station, or on a very weak signal, the base will be approximately +12.6 volts, cutting off Q301. The Mute control R308 is adjusted to prebias Mute Amplifier Q302 for threshold setting at approximately 42db S/N quieting. This will result in approximately +2 volts on the base of Q301.

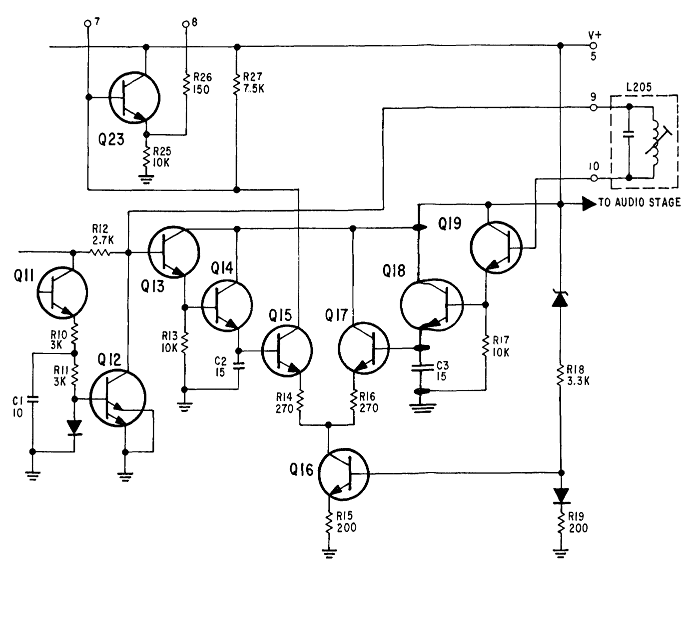


FIGURE 8 – QUADRATURE DETECTOR

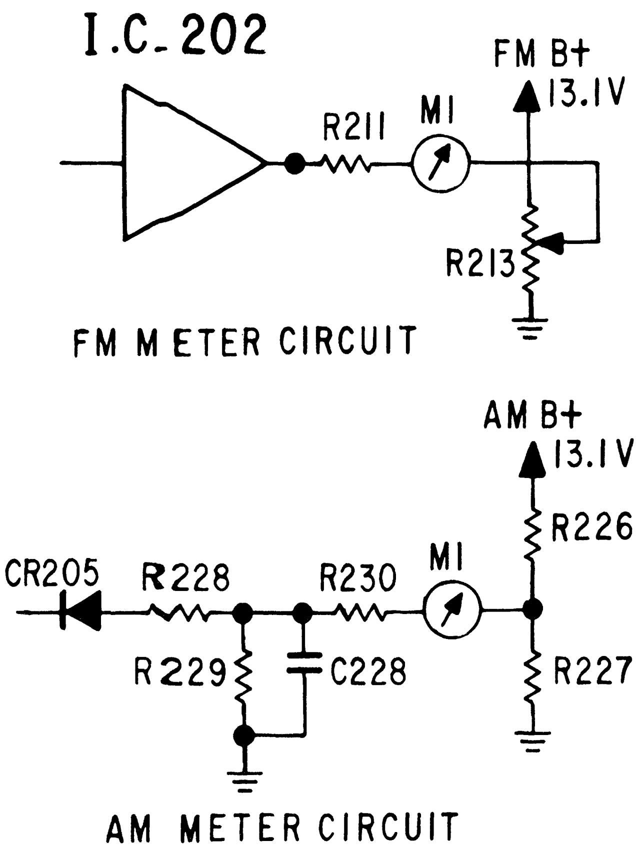


FIGURE 9 – TUNING METER

A front panel control is available, should it be desired to override the mute circuit. When the Mute Control is in the OFF position, the collector of Q303 is at ground, permitting Q303 to conduct.

TUNING METER

Tuning meter (M1) reads maximum on AM and zero center on FM. Meter Adjustment R213 is adjusted for zero center as part of the FM IF alignment. As mentioned previously when we discussed ceramic filters, alignment of this chassis requires that you set your generator to the frequency of the ceramic filters, then align the IF transformer (T201), the Quad Detector (L205), then Meter Adjustment R213 (See Figure 9).

FM – B+ SWITCHING

To reduce the possibility of "pop" in the speaker when switching to FM, two transistors (Q501, Q502) have been included (See Figure 10). When the selector switch is placed in FM, the +13.1 volts B+ is connected, via switch contacts SW1-R2 and 4 to the base of Q502. Electrolytic C512 begins to charge, causing Q502 to gradually conduct. As Q502 conducts, its collector voltage will begin to drop. This voltage drop will appear at the base of Q501, via R512, causing Q501 to conduct, resulting in B+ being fed from the +13.1 volt source via the emitter and collector of Q501 to pin 4 of connector P1 and then to the RF/IF/MPX circuit board.

FM–MULTIPLEX

For years we have used a multiplex decoder (either discreet components or an integrated circuit) which would amplify the incoming 19kHz pilot signal, then multiply it to 38kHz,

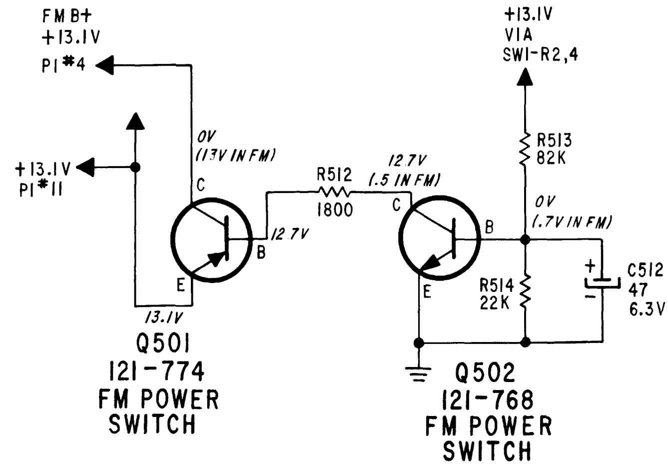


FIGURE 10 – FM B+ SWITCHING

reinsert the 38kHz into the difference (L-R) signal and matrix that signal with the sum (L+R) signal to recover the L and R audio signals.

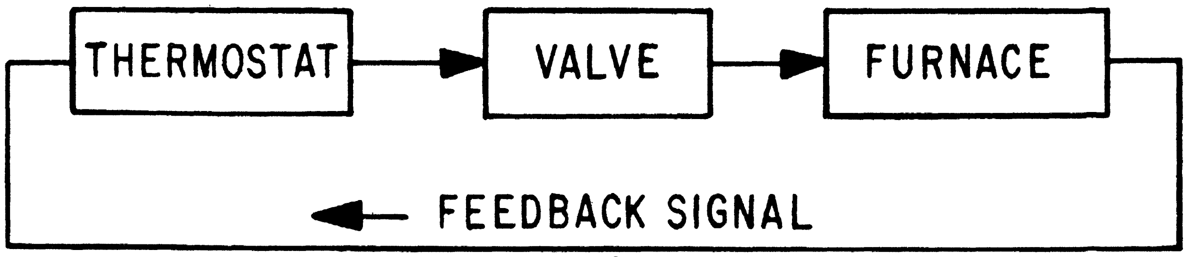
Chassis 12WGR59 makes use of a circuit called a Phase Locked Loop (PPL), which can be compared to a thermostat controlled heating system. Figure 11A illustrates a basic heating system in which the furnace will generate heat. The thermostat will sense the temperature and compare it with the thermostat's manual setting. The thermostat will turn the fuel supply valve on or off, connecting or disconnecting the fuel source to the furnace, controlling heat generation from the furnace. This system functions in a closed loop.

Figure 11B illustrates the basic concept of a Phase Locked Loop (PPL). A Voltage Controlled Oscillator (VCO) is tuned to a given free running frequency. A portion of the VCO output is fed back to a phase detector, which also receives an external signal (19kHz in this case). These signals are compared for frequency and phase. Any difference is fed to a filter, the output of which will be a correction voltage applied to the VCO. This voltage keeps the VCO output on frequency and in phase with the input signal.

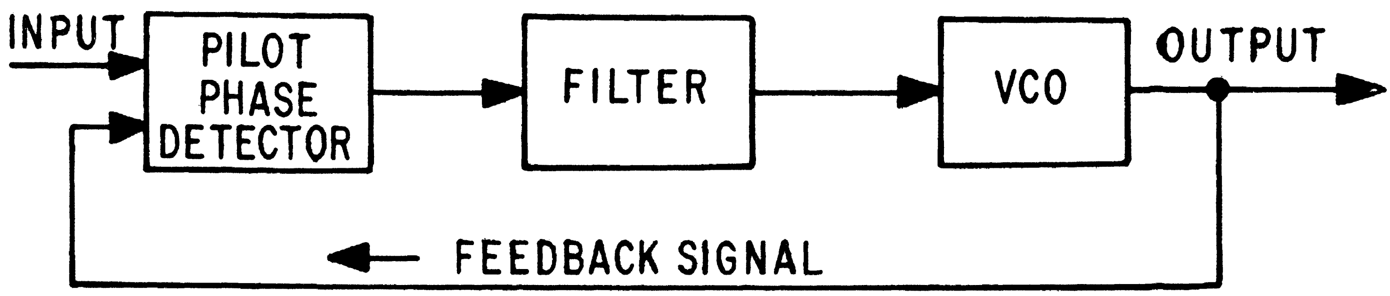
Figure 12 is a block diagram of the multiplex decoder (IC301). The three basic functions of IC301 include:

1. Regeneration of the 38kHz subcarrier frequency.
2. Stereo indicator switch.
3. Decoding (matrixing the L+R, and L–R/38kHz to provide the L and R outputs).

At the left in the upper row of Figure 12 is the input amplifier connected between pins 2 and 3. There are three outputs of this amplifier: The first output is to the Demodulator which we will discuss later. At pin 3 the signal is coupled via C308 to pin 11 at which point the signal goes to both the Phase Detector and the Amplitude Detector. Lets move three stages to the right of the Phase Detector where we find the 76kHz VCO who's free running frequency is controlled by C306, R316 and R317. Output of the VCO



A



B

FIGURE 11 – PHASE LOCKED LOOP CONCEPT

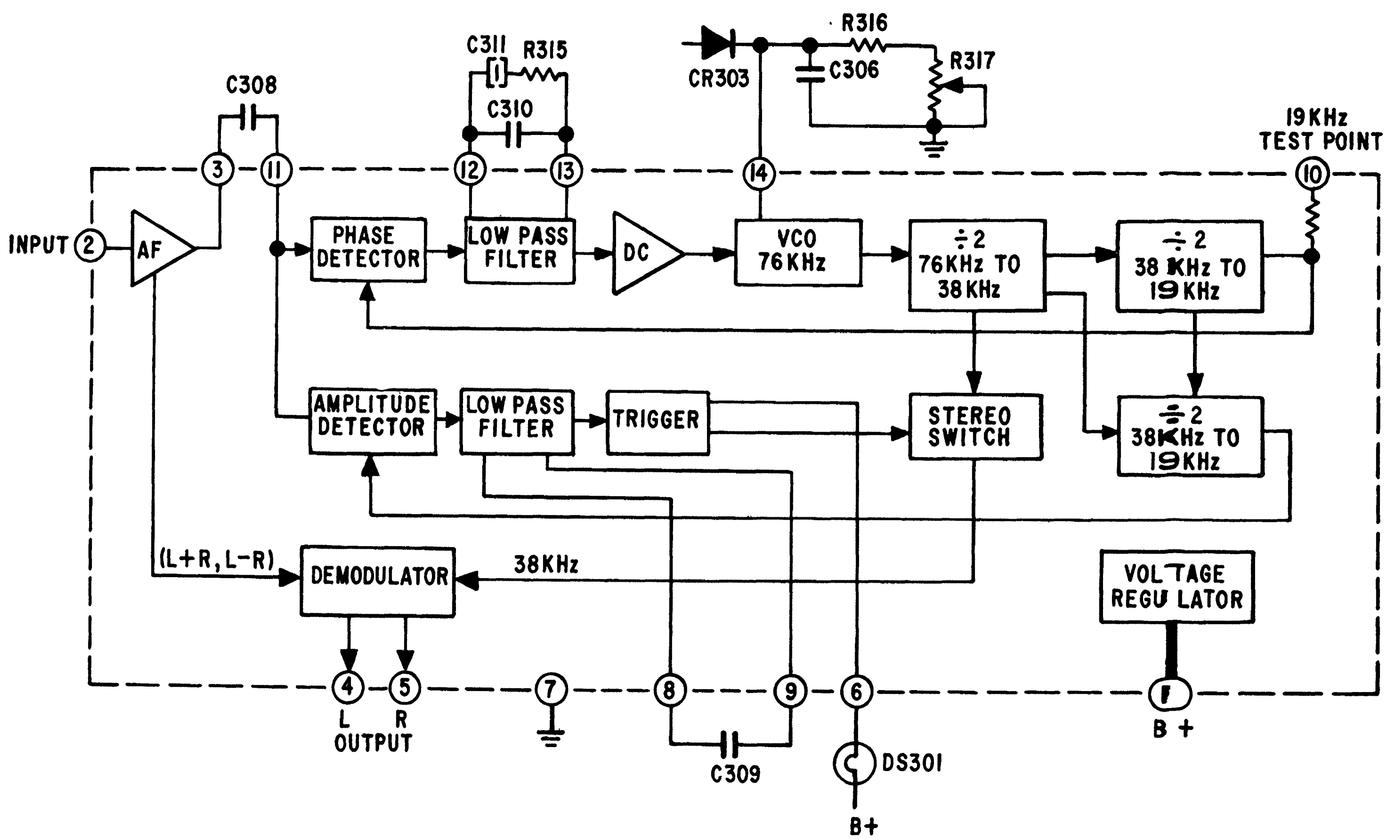
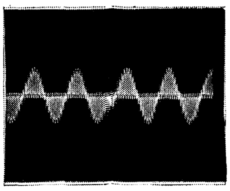
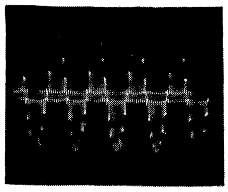


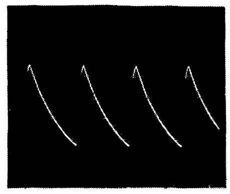
FIGURE 12 – MULTIPLEX DECODER BLOCK DIAGRAM



PIN 2-COMPOSITE INPUT
L+R, L–R (1 K HZ LEFT ONLY),
19 KHZ PILOT 10%
0.5V P/P (0 .5 MILLISEC.)

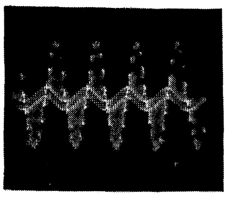


PINS 3 AND 11-
COMPOSITE AMPLIFIED
L+R, L–R (1 KHZ LEFT ONLY),
19 KHZ PILOT 10%
1.4V P/P (0.5 MILLISEC.)

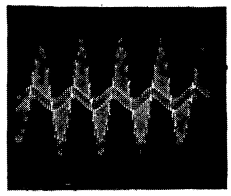


PIN 14-VOLTAGE CONTROLLED
OSCILLATOR ADJUSTMENT
3.5V P/P (5.0 MICROSEC.)

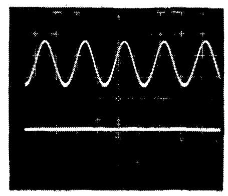
PIN 10-19 KHZ TEST POINT
2.7V P/P (10.0 MICROSEC.)



PINS 12 AND 13-FILTER-
PHASE DETECTOR
0.14V P/P (0.5 MILLISEC.)



PINS 8 AND 9-FILTER-
AMPLITUDE DETECTOR
0.47V P/P (0.5 MILLISEC.)



AT PLUG P1
P1, #9-(UPPER) LEFT OUTPUT
0.57V P/P (0.5 MILLISEC.)
P1, #8-(LOWER) RIGHT OUTPUT
0.05V P/P (0.5 MILLISEC.)

FIGURE 13 – MULTIPLEX DECODER WAVEFORMS

goes to two divide by two stages, resulting in outputs of 38kHz and 19kHz respectively. This 19kHz is available for external measurement at pin 10, as well as being fed back to the Phase Detector, where the phase and frequency of this 19kHz is compared with the input 19kHz. Any difference is fed to the low pass filter, and converted to a DC correction voltage, to be applied to the VCO if the VCO changes frequency.

Also at pin 11 is the Amplitude Detector which receives the input 19kHz and also the 19kHz output from a third divide by two stage. The Amplitude Detector will sense the level of the incoming 19kHz pilot level. If the level exceeds minimum, it will have an output which will be applied to the low pass filter and to the trigger stage. The trigger stage will activate the Stereo Indicator Light and also permits the Stereo Switch to pass 38kHz to the Demodulator.

In the demodulator the Sum (L+R), difference (L–R) and 38kHz are combined to derive the L and R outputs.

A regulator located in IC301 is connected to pin 1 (the +13.1 volt supply) and supplies most stages, while the unregulated +13.1 volts powers certain circuits.

Diode CR303 is connected to the AM B+ point at pin 14. When AM is turned on a positive voltage forward biases CR303, applies a positive voltage to pin 14, turning off the VCO. This prevents "birdies" from appearing on the AM band.

Proper adjustment of the VCO should be made by connecting a frequency counter to pin 10 and adjust R317 for 19kHz. In an emergency, if a frequency counter is not available, you might try the following: Tune in a station broadcasting stereo and adjust R317 until the stereo indicator turns on, then adjust control R317 to the center of the turn-on range .

"G" LINE AUDIO CIRCUITRY

Circuitry in the "G" line chassis families, while similar to "F" line chassis, contain circuit changes designed to reduce distortion. Current "G" line chassis families include the following:

1. 3WGR50, 3WGR52, 3WGR54.
2. 6WGR55, 6WGR56, 6WGR57.
3. 12WGR58
4. 12WGR59

COMPLEMENTARY SYMMETRY

As a review, in the past most output stages contained two transistors which were connected in a class "B" amplifier circuit. Both were normally a matched pair consisting of either two NPN or two PNP types. The class "B" circuit provides greater efficiency in the use of current supplied to the output stage than would be true in the use of current supplied to the output stage of class "A" amplifiers.

Normal class "B" circuits have some limitations of frequency response due to the driver and output transformer. A further limitation is cross-over distortion caused by one output transistor going into cut-off before the other output transistor has started to conduct. Cross-over distortion and the point of conduction are determined by the bias on the output stage.

Many bias circuits consisted only of a resistance divider network and when supply voltage varies so would bias voltage. This supply voltage change became critical in battery operated amplifiers but must still be considered when operating on AC power lines. Another factor that adds to the problem of controlling bias is temperature change, which will cause reduced base-emitter junction voltage and an increase in collector current. This bias voltage variation results in a change of operating voltages accompanied by a change in distortion.

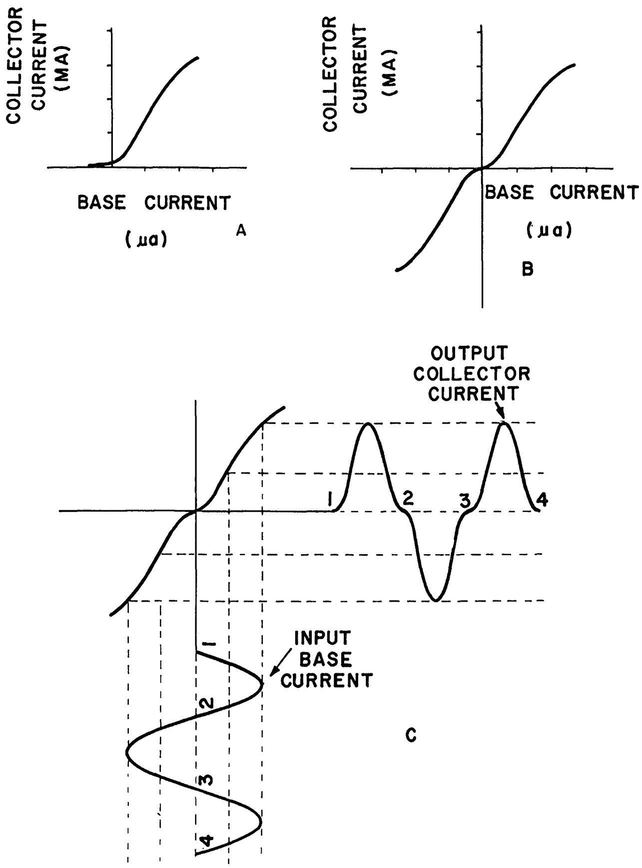


FIGURE 14 – CROSSOVER DISTORTION

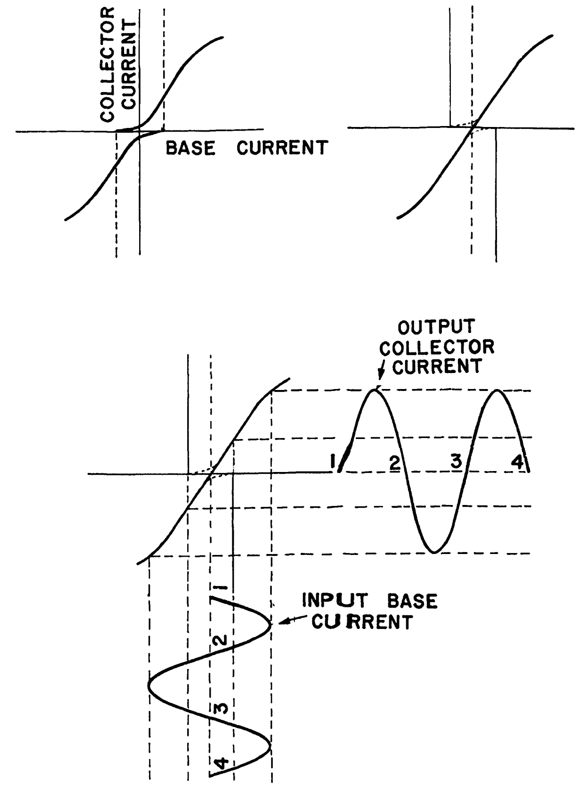


FIGURE 15 – DISTORTION REMOVED

Cross-over distortion is heard due to high order harmonics and may be recognized as a discordant sound. When viewed on a scope, the waveform may appear as a sinewave with straight sides or with a step between positive and negative half cycles. The latter is most common. (See Figure 14). This distortion can be greatly reduced or elimated by applying forward bias to the output stage. Forward bias will cause a small current to flow in the base circuit of each transistor and the bias voltage causes a shift in the zero base current points (of each transistor), resulting in a smooth crossover between conduction of each output transistor (See Figure 15).

With the development of complementary symmetry circuits, we have eliminated the driver and output transformers. This improves the frequency response of the amplifier. These transformers have provided the phase relationship required to permit the class "B" push-pull output circuit to operate correctly. Proper signal phase relationship will be developed by the output transistors. Since one output transistor is NPN and the other is PNP, they will conduct on alternate half cycles, much the same as if a center tapped transformer were used to provide identical transistors with signals 180 degrees out of phase.

COMPLEMENTARY SYMMETRY - CHASSIS 3WGR50

A brief look at the complementary symmetry circuit of Chassis 3WGR50 (See Figure 16) will reveal direct coupling between the collector of the driver transistor (Q453) and the base of the output transistor nearest ground (Q455). Direct coupling will decrease distortion and provide consistent output measurements. The output circuit design is such that there is a center point between the emitters of Q454 and Q455. This point has a DC voltage which, under no-signal conditions, is equal to approximately one-half of the voltage on the collector of the transistor (Q454) nearest the high side of the supply voltage. Connected to this center point are:

1. A feedback loop (via resistors R468 and R473) to the emitter of the pre-driver (Q452).
2. A feedback loop via resistor R466 to the base of the driver transistor.
3. An output coupling capacitor (C472) to the speaker.

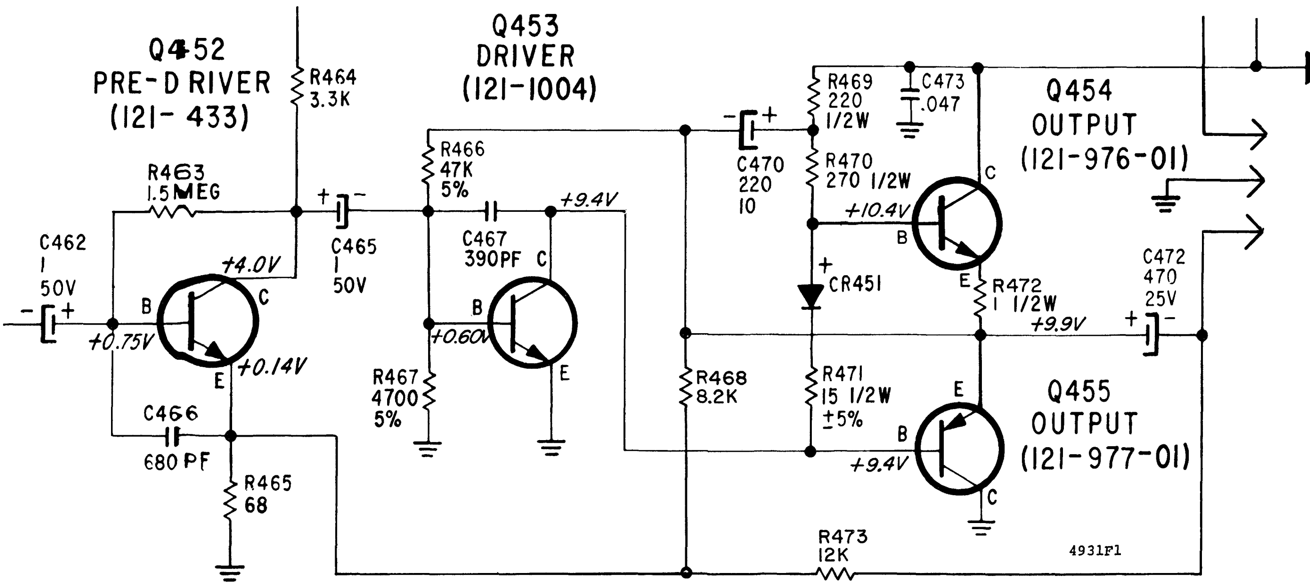


FIGURE 16 – CHASSIS 3WGR50 AUDIO OUTPUT CIRCUIT

Between the base of each output transistor there is a series connected resistor-diode circuit (R471, CR451). Bias voltage is developed across this resistor-diode combination and controls idling current in the output stage. Under no signal conditions voltage drops across the resistor-diode are equal to base-emitter voltages of the output transistors, plus the voltage drop across emitter resistor R472. Due to the very low value of the emitter resistor, and the voltage drop across it, voltage on the emitter can be considered to be same as the center point voltage. While many refer to this as a class "B" circuit, it should be called class "AB" due to the idling current. Bias diode CR451 has non-linear voltage/current relationships resulting in the following characteristics:

1. Voltage across the diode changes more slowly than current flowing through it.
2. Current is approximately proportional to supply voltage.
3. Voltage across the diode will decrease with rising temperature.

This non-linear diode voltage/current curve is similar to that of the output transistors allowing a near linear temperature relationship to exist between diode and transistors. Under no-signal conditions, both the diode and transistors will show similar effects due to any temperature change. If there is an increase in temperature, both the diode and transistors will show increased current flow. The added current flow in the diode will offset increased flow in the transistor and stabilize bias voltage. Since this diode has a low AC resistance, any changes in current of the driver stage results in less effect on the output stage than would be true with only biasing resistors.

Operating conditions for the driver transistor are determined by base-emitter voltage and driver transistor beta. Also effecting the operating point are values of the driver base resistor, feedback resistor to driver base, and two resistors in the driver's collector circuit. All these factors will effect voltage at the previously mentioned center point.

When a negative going signal is applied to the driver base, current gain of the driver is reduced. At the same time, however, the charge on the electrolytic (C470) will maintain a near constant current through resistor R470 connected in the base circuit of the upper output transistor (Q454). This will cause voltage across the resistor to maintain an almost constant value, which in turn determines base-emitter bias of transistor Q454. Notice that current flow from this bias resistor not only goes through the diode and collector circuit of the driver transistor but also goes to base of transistor Q454. Current in this base circuit will determine the amount of transistor gain. When transistor Q454 is conducting, Q455 is cut-off since it is reversed biased.

When a positive going signal is applied to the base of the driver (Q453), its collector current will increase. The electrolytic (C470) will still maintain a near constant voltage across the bias resistor of the upper transistor. Under these conditions the upper transistor (Q454) is now reverse biased to cut-off, and the lower transistor (Q455) is conducting.

Since each output transistor conducts on alternating halves of each cycle, voltage change at the center point will result in an output signal that will duplicate input. Use of complementary symmetry circuitry results in lower distortion and better frequency response.

QUASI COMPLEMENTARY SYMMETRY - CHASSIS 12WGR58

Transistors Q453, Q454 and Q455 of Figure 16, (complementary symmetry as used in Chassis 3WGR50) can be compared with Q453, Q455, and Q456 respectively of Figure 17 (quasi complementary symmetry as used in Chassis 12WGR58). Voltage changes on the collector of Q453 of Figure 17 appear on the base of Q456 (directly) and via Q454 to the base of Q455. AC signals will see Q454 as a short circuit.

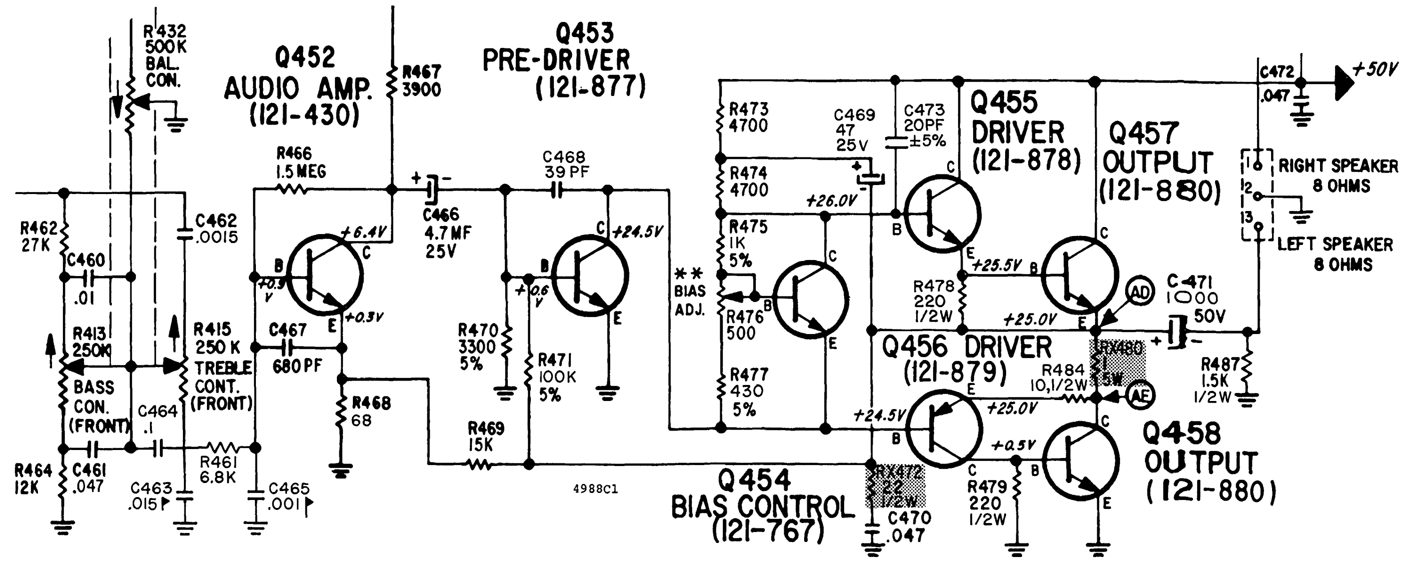


FIGURE 17 – CHASSIS 12WGR58 AUDIO OUTPUT CIRCUIT

When a positive going voltage appears on the base of Q455, a similar change occurs on its emitter, and also on the base of Q457 which is then forward biased into conduction. During this time, the positive going voltage will bias Q456 to cut off, and neither Q456 nor Q458 will conduct. When the base voltage on Q455 goes in a negative direction, Q455 will be biased towards cut off, while Q456 will be forward biased and in turn causes Q458 to conduct.

Operation of Chassis 12WGR58 in Figure 17 is similar to Chassis 3WGR50 in Figure 16 plus the addition of power output transistors Q457 and Q458. It should also be noted that Q456 provides phase inversion while Q455 is an emitter follower with no inversion.

Bias on output transistors Q454 and Q455 (Figure 16) is determined by diode CR451 connected between their bases. CR451 has temperature characteristics similar to the output transistors. When an increase in temperature causes an increase in transistor current, a similar voltage decrease occurs across the diode providing compensation by changing the base to base bias voltage of Q454 and Q455.

Quasi complementary symmetry circuit of Figure 17 uses a transistor (Q454) for bias control, instead of a diode. Q454 not only serves to stabilize base voltage, but also has the advantage of allowing manual presetting of the bias. Bias control (R476) is part of the voltage divider network (R475, R477) between collector and emitter of Q454. Setting R476 determines the bias on Q454, which in turn sets the bias and idling current of the output transistors. Q454 is subject to the same temperature changes as the output transistors. Any increase in temperature that causes increased current flow in Q454 will offset the increased current flow in the other transistors and will stabilize bias voltages.

Proper idling current in the output circuit of Chassis 12WGR58 is obtained when Bias Control (R476) is set to provide 0.010 to 0.015 volts across the 1 ohm resistor (R480).

Only one bias adjustment is required in each output channel of Chassis 12WGR58. Basic adjustment procedure consists of monitoring a DC voltage between two test points and adjusting the bias control for the correct voltage. Since voltage is in the millivolt range, it has been found that a digital voltmeter provides the best reading.

Recommended bias adjustment procedure for Chassis 12WGR58 includes the following considerations:

1. The set should be at room temperature prior to adjustment.
2. Bias adjustment should be made after the set has been on, permitting B+ voltages to stabilize.

Proceed as follows for Chassis 12WGR58:

1. With the set turned off, be certain that the power supply that belongs with the chassis is properly connected.
2. Turn both bias adjustment controls thru the full range and set to minimum (counterclockwise).
3. Turn loudness control to minimum (counter clockwise) and short input to ground.
4. Connect meter to the set of test points in one channel.
5. Turn set on.
6. After B+ has stabilized adjust bias control for channel to obtain a reading of 10 to 15 millivolt on your meter.
7. Turn set off.
8. Repeat steps 4 through 7.

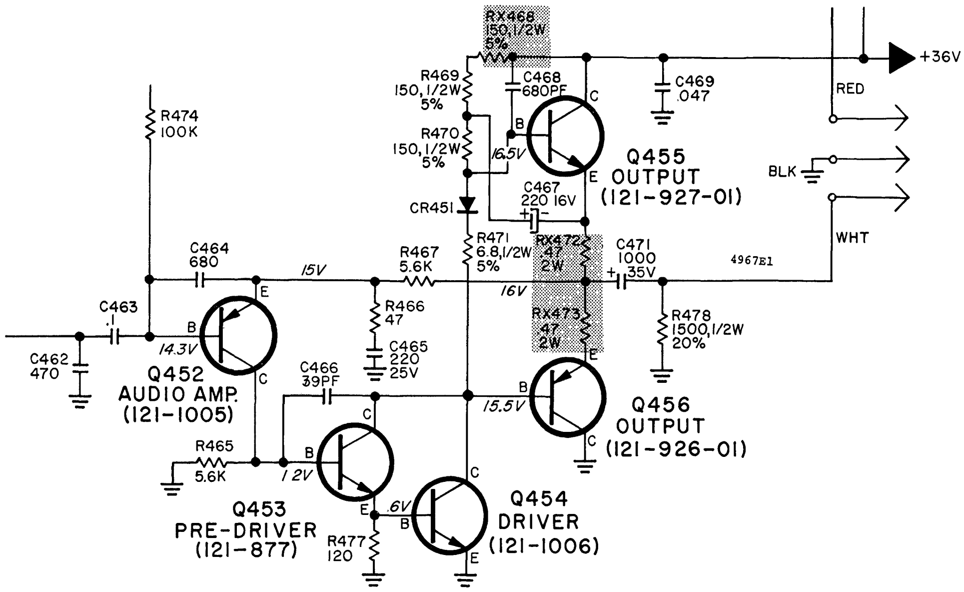


FIGURE 18 – CHASSIS 6WGR55 AUDIO OUTPUT CIRCUIT

AUDIO CIRCUITRY – CHASSIS 6WGR55 FAMILY

Figure 18 illustrates most of the audio circuitry used in Chassis 6WGR55, 6WGR56, and 6WGR57. This circuit is somewhat similar to the basic complementary symmetry circuit shown in Figure 16 for Chassis 3WGR50. Amplifier transistor Q452 is now direct coupled to the pre-driver Q453. Q453 and Q454 are effectively a class A Darlington circuit which will be explained shortly. Resistors R465 and R477 serve as collector loads for Q452 and Q453 respectively. Collectors of Q453 and Q454 are dc coupled to the base of Q456 (directly) and also to the base of Q455 (via resistor R471 and bias diode CR451). AC signals will see CR451 as a short circuit. Boot strap capacitor C467 is now connected directly to the emitter of Q455, instead of at the center point (juncion of RX472 and RX473). At the center point are:

1. Output coupling capacitor C471 and bleeder resistor R478. The bleeder resistor provides protection should the set accidentaly be operated without any load.

2. A feedback circuit to the emitter of Q452, consisting of voltage divider R466 and R467, determines the AC feedback to Q452. Capacitor C465 is included for dc insolation because the circuit is direct coupled.

R474, at the base of Q452, determines the center point dc voltage. C468 provides added high frequency stability. Operation of this circuit is the same as explained for Chassis 3WGR50 shown in Figure 16.

DARLINGTON CIRCUIT

Lets briefly review the operation of a Darlington type transistor. Examination of the schematic symbol in Figure 19 shows that, as used on Chassis 12WGR59 which follows, it is really two NPN transistors existing within one package. The 12WGR59 also uses a PNP Darlington in the output.

Operation of this device is the same as two transistors in separate packages but has such added advantages as reduced size, fewer external circuit components required and extremely high input impedance. Briefly the operation is as follows. Assume separate NPN transistors which we refer to as Q1 and Q2 (Figure 19). Since there are three external terminals identified with the conventional terms (emitter, base, and collector) voltages are applied as normal for NPN transistor (in this example), that is, the base is positive with respect to the emitter. The base and collector voltages are consecutively more in the positive direction. With DC bias voltages established the AC signal voltage is applied to the base of Q1. A positive going signal will increase the forward bias causing an increase in current flow in the collector-emitter circuit. This increased current flow also goes through the base-emitter junction of Q2 in series with Q1's base-emitter junction. Current in the Q2 collector-emitter circuit will also increase. A negative signal to the base of Q1 will cause current reduction in the output of Q2. For a common emitter amplifier circuit there will also be a phase reversal between input (base of Q1) and output (collector of Q2) terminals. The Darlington circuit has been seen at Q453 and Q454 in Figure 18 (Chassis 6WGR55) where separate transistors were used, and in Figure 20 (Chassis 12WGR59) where the Output transistors are internally a Darlington.

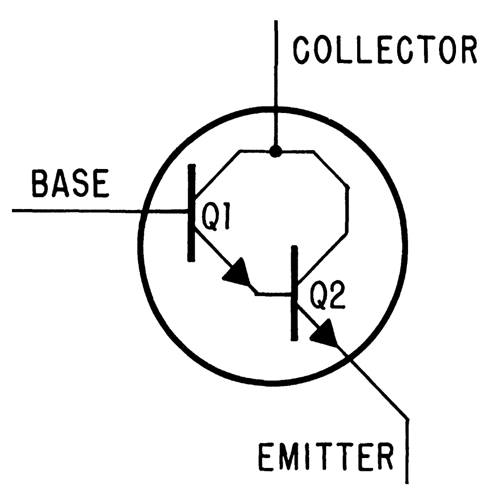


FIGURE 19 – DARLINGTON TRANSISTOR

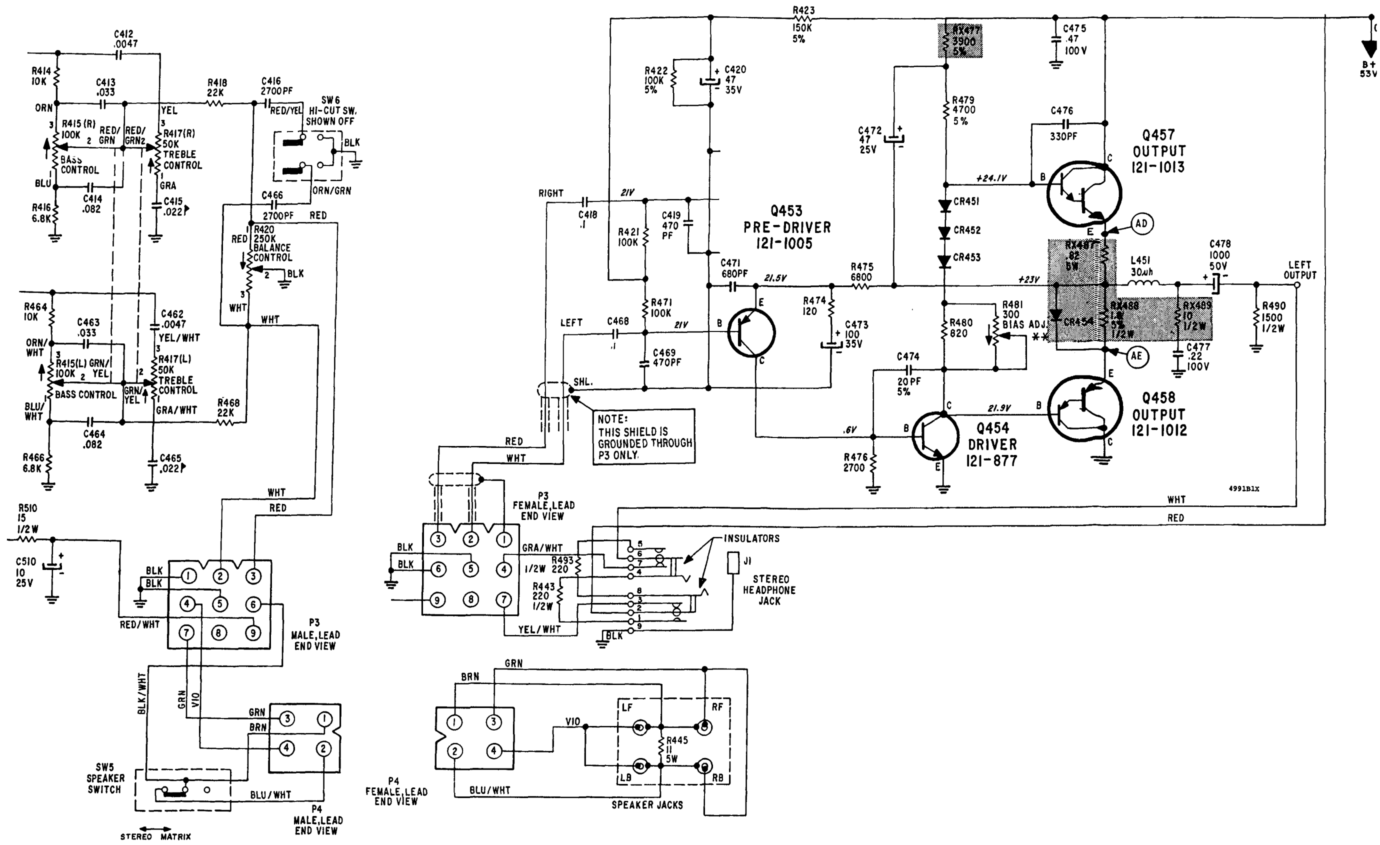


FIGURE 20 – CHASSIS 12WGR59 AUDIO OUTPUT CIRCUIT

AUDIO CIRCUITRY - CHASSIS 12WGR59

Figure 20 shows most of one channels audio circuitry for chassis 12WGR59 (except for Q451 and Q452). Q451 is an emitter follower stage followed by the Loudness Control, then a common emitter stage (Q452), the Bass, Treble and Balance controls. Connected at this point is a new control - the Hi Cut Switch (SW6). When this switch is in the "on" position a small value capacitor (C416 and C466) shunt the higher frequencies to ground.

Pre-driver transistor (Q453) is direct coupled to the driver (Q454), with R476 connected to ground from the junction of the collector of Q453 and the base of Q454. The collector of Q454 is connected directly to the base of output transistor Q458 (a Darlington). Q454 is also connected to the base of output transistor Q457, via the resistor-diode circuit of R480, R481, CR451, CR452 and CR453 (R481 being a variable Bias Adjustment control across R480). Bias voltage is developed across this combination and controls idling current in the output stage. If the bias is too low, crossover distortion will occur, and if the bias is too high there will be excess current and overheating. Under no signal conditions, the sum of the voltage drops across the resistors and diodes are equal to the base - emitter voltages of the output transistors, plus the voltage drops across the emitter resistors (RX487, RX488). Because of the low values of these resistors the emitter voltage may be considered to be the same as the centerpoint voltage. As you will note, resistors R480 and Bias Control R481 are paralleled, permitting smoother adjustment of the bias voltage.

Operating conditions for the driver transistor are determined by base-emitter voltage and driver transistor beta. Also effecting the operating point are values of the driver base resistor (R476-collector load for Q453), feedback resistor (R475) to the pre-driver base, four resistors in the output bias circuit (RX477, R479, R480, R481) and R471 connected to B+. All these factors effect voltage at the center point.

Connected at the center point are the following:

1. A feedback loop (via R475) to the emitter of the pre-driver Q453. R474 and R475 determine the AC feedback to Q453, while C473 provides DC isolation.
2. Output circuit consisting of:
   - A. L451, RX489 and C477 comprise a high frequency roll-off circuit.
   - B. Output coupling capacitor C478.
   - C. Load resistor R490 will drain any charge off of C478, providing protection if the output does not have the proper load.
3. Between center point and emitter of Q458 are the parallel combination of CR454 and RX488. When the circuit is operating at low output power the diode is not forward biased, therefore it is in effect open, and RX488 is in the circuit limiting the output stage current. When the output power reaches a given value, the diode is forward biased, effectively shorting the resistor, permitting higher output power.

When a negative going signal is applied to the driver base, current gain of the driver is reduced. At the same time, the charge on electrolytic C472 will maintain a near constant current through resistor R479 connected in the base circuit of the upper output transistor (Q457). This will cause voltage across resistor R479 to maintain an almost constant value, which in turn determines base-emitter bias of transistor Q457. Notice that current flow through bias resistor R479 goes not only through the resistor - diode circuit and the collector of driver transistor Q454 but also to the base of transistor Q457. Current in this base circuit will determine the amount of transistor gain. As transistor Q457 is conducting, Q458 is cut-off because it is reversed biased.

When a positive going signal is applied to the base of the driver (Q454), collector current of the driver will increase. The electrolytic (C472) will still maintain a near constant voltage across the bias resistor of Q457. Under these conditions, the upper transistor (Q457) is now reverse biased to cut-off, but the lower transistor (Q458) is conducting. Since each output transistor conducts on alternating halves of each cycle, voltage change at the center point will result in an output signal duplicating the input.

Proper idling current in the output circuit of Chassis 12WGR59 is obtained when Bias Control R481 is set to provide 0.025 to 0.030 volts across resistors (RX487, RX488).

Only one bias adjustment is required in each output channel of Chassis 12WGR59. Basis adjustment procedure consists of monitoring a DC voltage between two test points and adjusting the control for the correct voltage. Since voltage is in the millivolt range, it has been found that a digital voltmeter provides the best reading.

Recommended bias adjustment procedure for Chassis 12WGR59 includes the following considerations:

1. The set should be at room temperature prior to adjustment.
2. Bias adjustment should be made after the set has been on, permitting B+ to stabilize.

Proceed as follows for Chassis 12WGR59:

1. Turn both bias adjustment controls thru the full range and set to minimum (counterclockwise).
2. Turn loudness control to minimum (counterclockwise).
3. Connect meter to the set of the test points in one channel.
4. Turn set on. Line should be at 120 VAC +/–2%.
5. After B+ has stabilized, adjust bias control for channel to obtain a reading of 25 to 30 millivolts on your meter.
6. Turn set off.
7. Repeat steps 3 through 6.

TWO ON TWO SPEAKER MATRIX

All "G" line stereo modular and console models incorporate a speaker matrix decoder system called "Two On Two". This system is classified as a high level (at speaker level) decoder as compared with the low level electronic decoding used in certain chassis. Models having the "Two On Two" feature incorporate a switch identified "MATRIX-STEREO" (See Figure 21).

When speaker systems are connected to both rear or external speaker jacks, it is possible to connect those speakers in parallel with the front speakers (switch in "STEREO" position). This will allow better sound distribution in a large room, or the external speakers can distribute the same sound to another room.

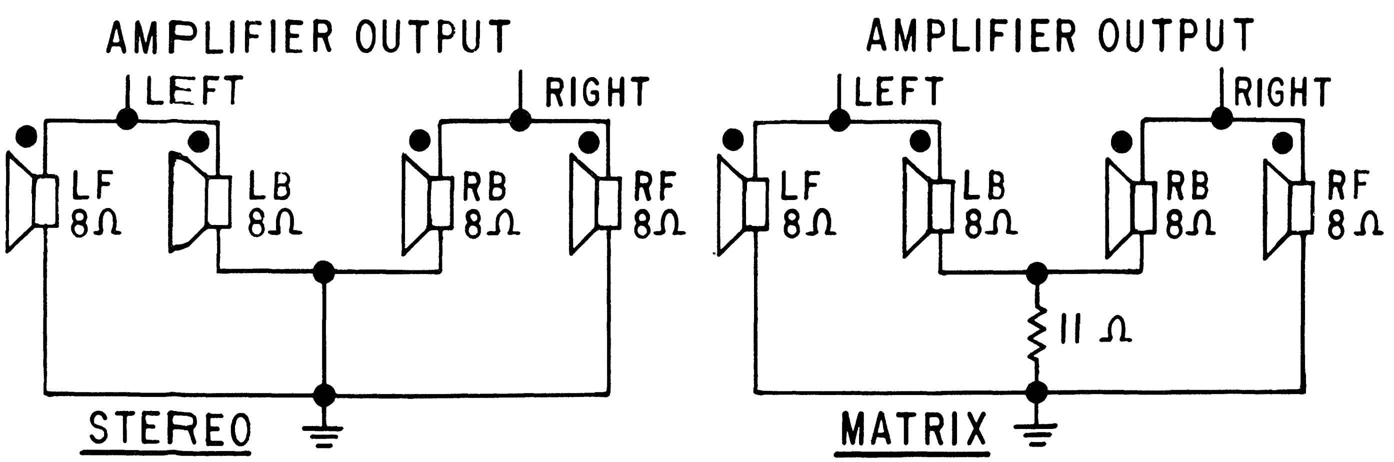


FIGURE 21 – TWO ON TWO SPEAKER MATRIX

In the "MATRIX" position a resistor is connected in the circuit resulting in a matrixing action. This results in reproduction of simulated four channel sound from records encoded in the various matrix concepts, or from many standard stereo records. The latter is possible because many stereo records contain ambient information having a phase difference between the left and right channels.

Some models also include a third position , "EXT", on the "STEREO-MATRIX" switch. In the "EXT" (external) position speakers connected to the rear or external jacks will play, but the front or internal speakers will be disconnected. It is therefore possible to play the stereo through speakers in another room without operating the "front" speakers.

ALLEGRO SPEAKER SYSTEMS

Speaker systems in the "G" line fall into three basic groups:

1. Allegro in Model G9019W and all consoles except G904P.
2. Allegro 1000 (Model G1000W), Allegro 2000 (Model G2000W) and Allegro 3000 (Model G3000W) which are the speaker systems designed as the main units for the "G" line modular models as well as extermal speaker systems for use with the modular and console models having the "Two On Two" speaker matrix feature.
3. Non-Allegro system in Model G904P.

Allegro speaker system, Model G9019W, is of the bass reflex type. Figure 22 is the schematic, while Figure 23 illustrates the cabinet design. As you will note, the enclosure has two openings in the front, one for each speaker. In the past, most bass reflex enclosures had a port on the front, with the remaining walls being solid. Model G9019W, as illustrated in Figure 23, has a port in the rear panel of the enclosure, instead of the front.

It is interesting to note that a bass reflex speaker enclosure can be described as a tuned enclosure in which air in the port will resonate with the air in the main area of the cabinet, at a given frequency. This frequency determines the effective low frequency cutoff of the system (cabinet and enclosure combined). Below the selected frequency (45 Hz in the G9019W) the response drops very rapidly (approximately 18 db/octave).

It could also be described as an acoustical phase inverter. That is, at some frequency, within its normal operating range, the air in the port is moving in an outward direction (to the back), while the speaker cone is also moving in an outward direction (to the front). These two movements would occur at the same instant.

A basic advantage of the bass reflex system, as compared to a closed box enclosure, is that in a bass reflex system the designer can either extend the frequency response, while maintaining the same level of efficiency; or retain the frequency response while raising the efficiency approximately 3 - 4 db. In designing the Allegro system, it was decided to improve the frequency response beyond that of an earlier model (S9017).

Sound level of signals radiated thru the port (in the 40-70 Hz range) is comparable to the sound level radiated by the woofer (in the range of 70 Hz to 1 kHz). This requires that the 2-5/8" diameter port (in Model G9019W) must "pulsate" air at a much higher velocity than the woofer, which is approximately 8" in diameter. Several factors must be considered in order to maintain the required port velocity.

A. The woofer uses a highly efficient magnetic structure making it comparable to a powerful electrical motor. This forces air, in the port, to move at high velocities, even though the air in the box is attempting to stop motion of the speaker cone.

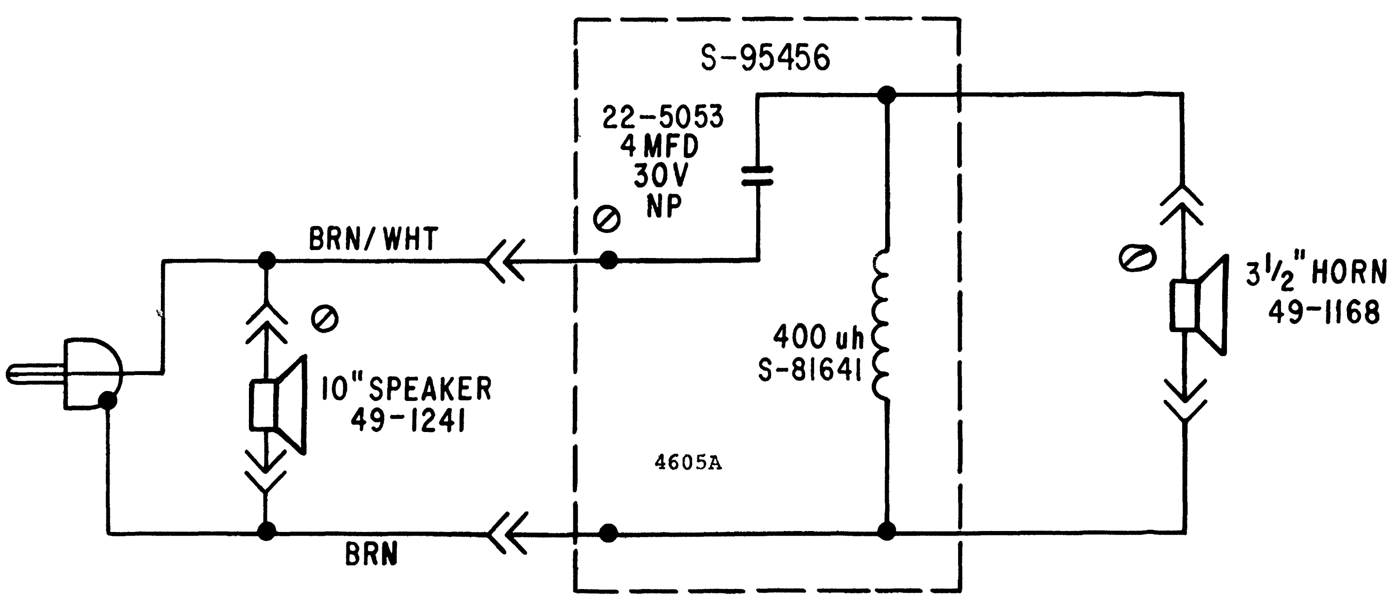


FIGURE 22 — MODEL G9019W SCHEMATIC

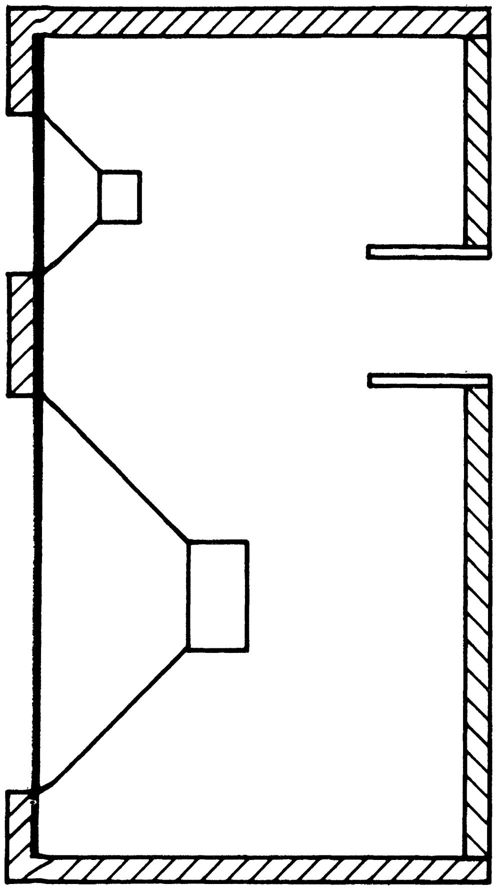


FIGURE 23 – MODEL G9019W SPEAKER ENCLOSURE

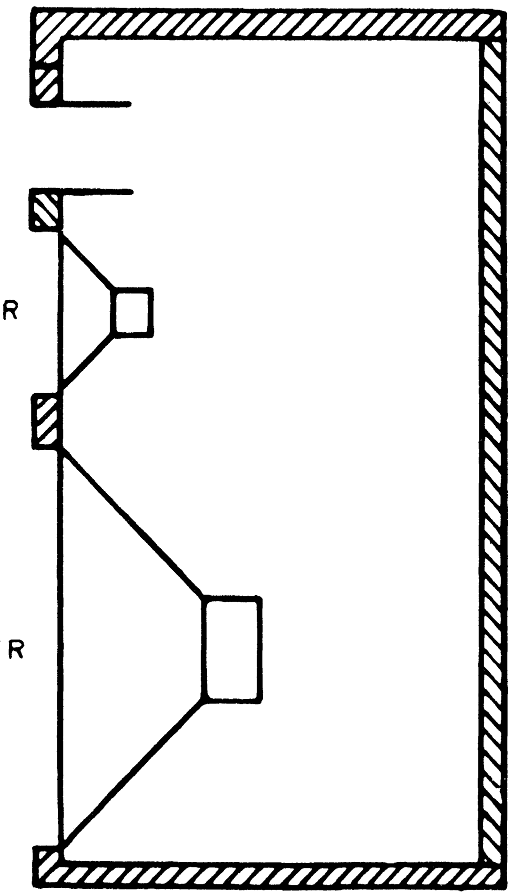


FIGURE 24 – MODEL G1000W SPEAKER ENCLOSURE

B. The internal air pressure in a bass reflex enclosure is much higher than that found in a conventional closed-box enclosure, therefore mechanical construction of a bass reflex enclosure must be more substantial than that of an air suspension type. All panels, walls and joints must be extremely rigid to withstand these air pressures.

C. Speakers (and other components) must be securely fastened to prevent air leaks. Leaks or loose components can result in losses which cause a deterioration of performance.

In order to effectively increase cabinet volume, and also to dampen internal resonances of the enclosure, three acoustic pads of variable density are placed adjacent to the internal walls. The area of each pad that has the highest density is adjacent to the wall surface. These pads must not obstruct the port.

When serving these units (or for that matter most speaker enclosures) several precautions must be taken:

A. When removing the back, be careful when handling the acoustical pads (they may tear easily).

B. All speakers must be securely fastened to prevent leaks and rattles.

C. If the front grille is removed, be certain that the baffle is tightly captivated by the mounting screws when reinstalled.

D. When replacing the back, be certain that the acoustic pads don't interfere with the port.

E. The screws holding the back must be secured by using a sufficient amount of torque in order to prevent air leaks.

Normal positioning of this enclosure in a listening room would be near a wall. While whis would be normal, in fact desirable, caution must be taken to avoid placing this enclosure in any position that would obstruct the port, as this would result in degraded bass response. The desired positioning would be one which allows at least 1½ inches between the back of the enclosure and the wall of the room (or similar obstruction).

Speaker enclosures for Models G1000W, G2000W and G3000W are also of the bass reflex type and are similar in design to the model described above except for the forward facing part. Figure 24 is a cross section view of this latter group.

DISASSEMBLY PROCEDURE MODELS G596W and GR596W

Basic disassembly procedure for the above models, using Chassis 12WGR59, is simplified due to modular construction techniques with the use of convenient cable connectors. This is illustrated by the accompanying photos, in Figures 25 through 28.

CABINET BOTTOM REMOVAL

1. With power disconnected, place main unit on right side (as viewed from front) on top of a soft clean surface.

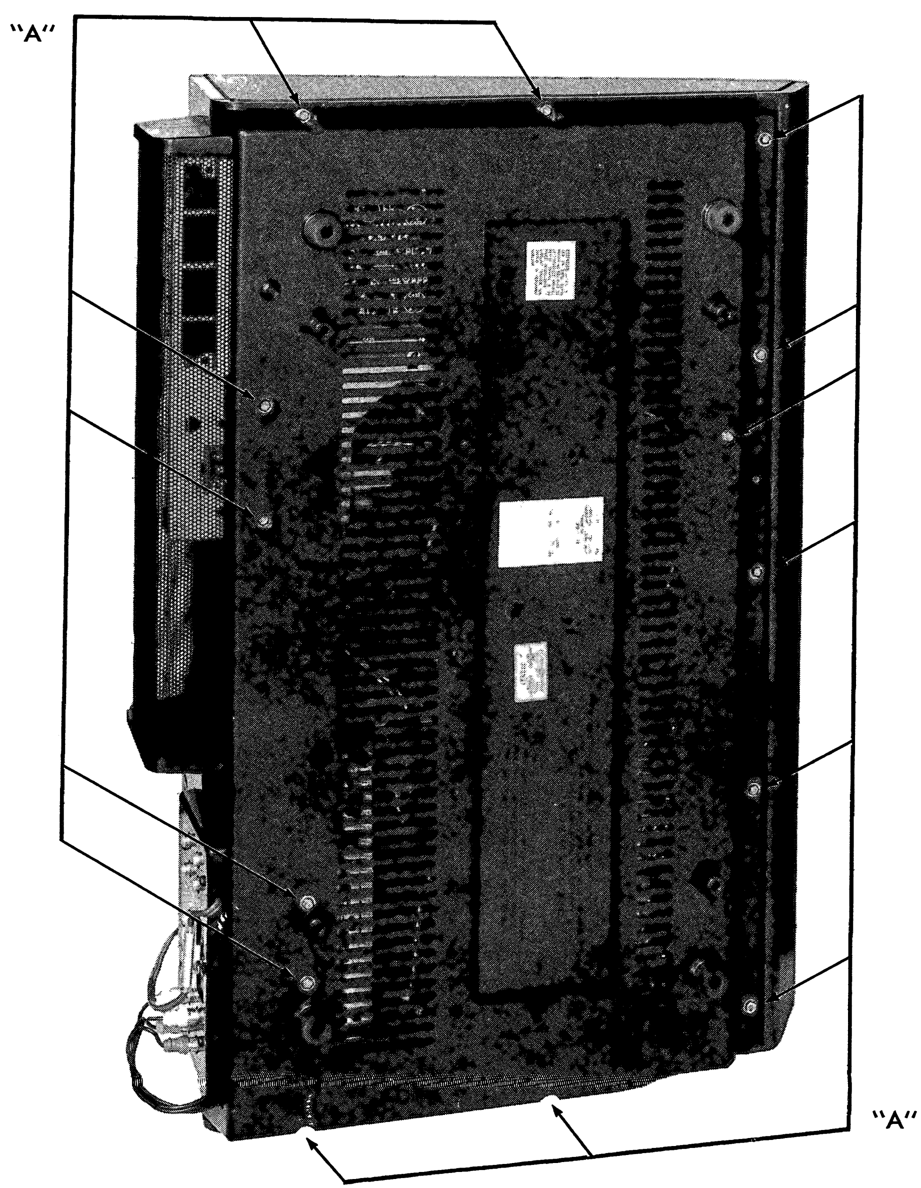


FIGURE 25 – MODELS G596W AND GR596W
CABINET BOTTOM SCREW LOCATIONS

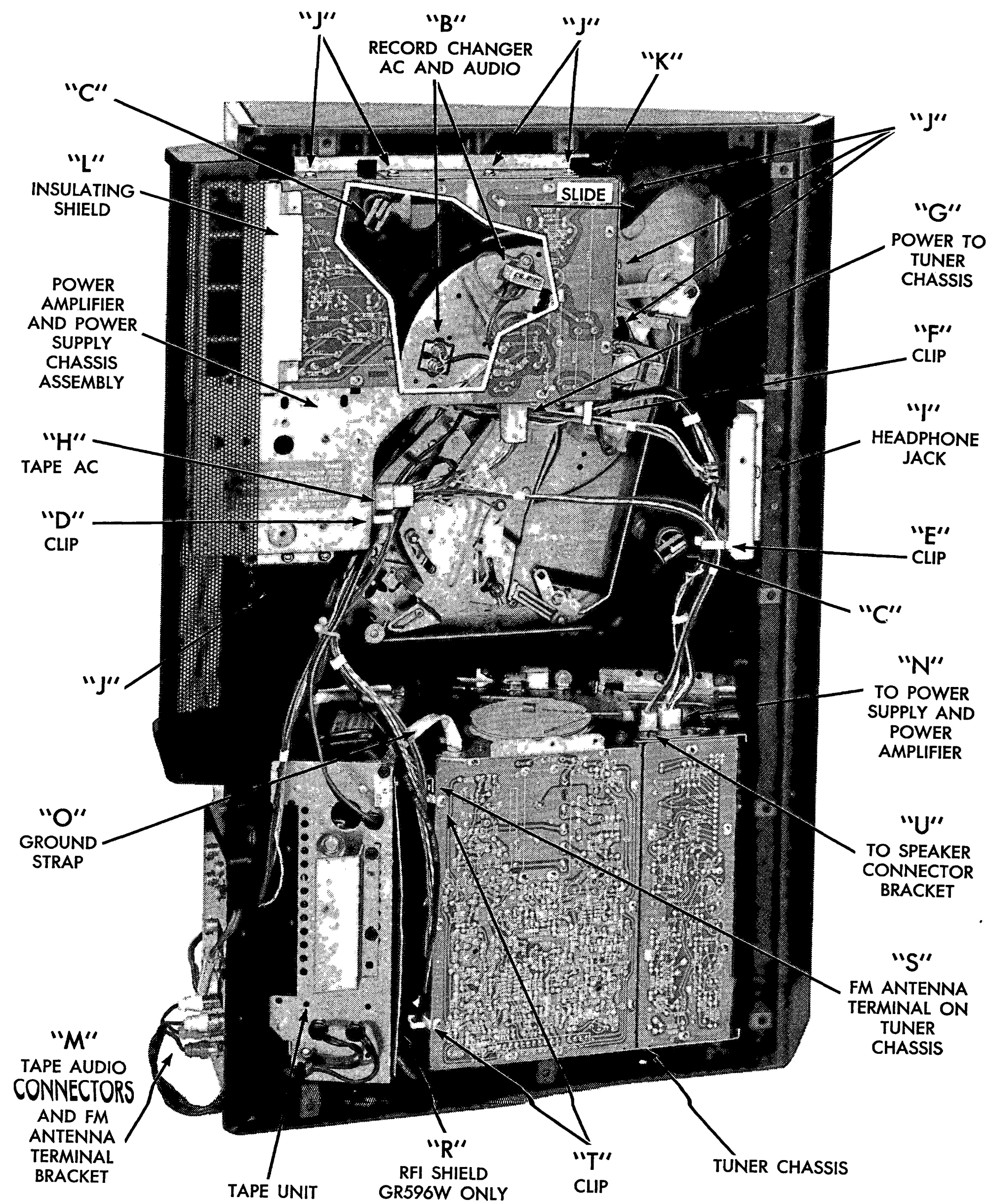


FIGURE 26 – MODELS G596W AND GR596W
CABINET BOTTOM REMOVED

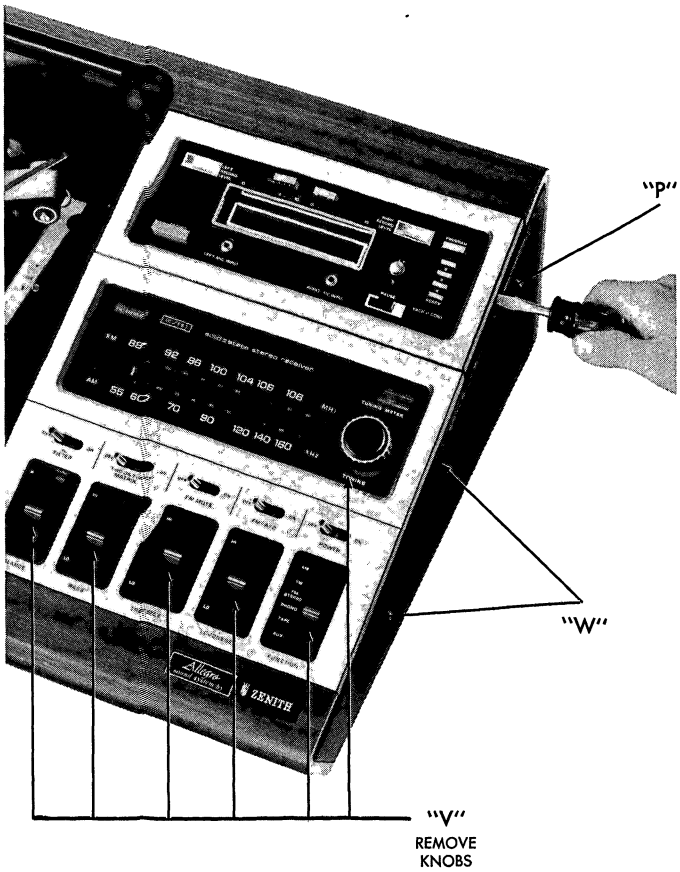


FIGURE 27 – MODELS G596W AND GR596W ESCUTCHEON REMOVAL

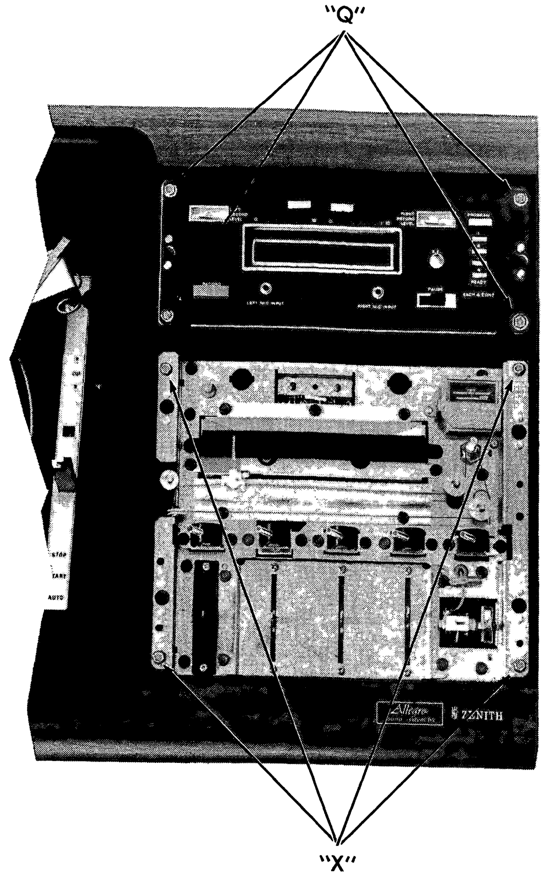


FIGURE 28 – MODELS G596W AND GR596W TAPE UNIT AND TUNER CHASSIS MOUNTING SCREWS

2. Remove fourteen (14) screws holding bottom cover ("A" in Figure 25).

RECORD CHANGER REMOVAL

1. Proceed as for "Cabinet Bottom Removal".
2. Release one (1) record changer mounting clip (located above headphone jack —"C" in Figure 26).
3. Lift record changer upward and disconnect AC and audio cables at record changer (visible above amplifier chassis – "B" in Figure 26).
4. Using caution, slide record changer forward while lifting outward to remove.

POWER SUPPLY/AMPLIFIER REMOVAL

1. Proceed as for "Cabinet Bottom Removal".
2. Release interconnecting cables from retainers ("D" and "E" in Figure 26).
3. Unplug record changer AC cable at record changer ("B" in Figure 26).
4. Unplug two connectors on this chassis ("G" and "H" in Figure 26).
5. Unplug connector on tuner chassis ("N" in Figure 26).
6. Disconnect FM antenna connector ("M" in Figure 26).
7. Dismount headphone jack ("I" in Figure 26) from bracket.
8. Remove nine (9) screws holding chassis assembly and mounting brackets ("J" in Figure 26).
9. Remove chassis by sliding in direction of arrow ("K" in Figure 26).
10. When replacing chassis be certain that insulating shield ("L" in Figure 26) is between chassis and rear grille.

TAPE UNIT REMOVAL

1. Proceed as for "Cabinet Bottom Removal".
2. Unclip and disconnect tape unit audio cables at rear panel connectors ("M" in Figure 26).
3. Unclip and disconnect tape unit AC cables at power supply chassis ("D" and "H" in Figure 26).
4. Disconnect group strap between tape unit and tuner chassis ("O" in Figure 26).
5. The tape unit mounting screws are covered by a "snap off" escutcheon. A notch will be found on the center of the outer edge of the escutcheon ("P" in Figure 27). Insert a thin blade screwdriver into this notch between the escutcheon and the cabinet proper being careful not to mar the surface. Force the escutcheon upward, causing it to disen-

gage the first stud. Grasp the escutcheon along the top, lifting to disengage second stud. Remove escutcheon.

6. Remove (4) screws holding tape unit to front panel ("Q" in Figure 28).

7. Slide tape unit out through front panel (noting location of RFI shield on Model GR596W – "R" in Figure 26).
   CAUTION: When replacing tape unit in Model GR596W be certain RFI shield is in proper location.
   NOTE: Main unit should be in horizontal position when reinstalling tape unit.

TUNER CHASSIS REMOVAL

1. Proceed as for "Cabinet Bottom Removal".

2. Remove four (4) screws holding FM Antenna and Tape Bracket ("M" in Figure 26).

3. Unclip and disconnect cables ("D", "G", "N", and "U" in Figure 26).

4. Disconnect ground strap between tape and tuner chassis ("O" in Figure 26).

5. Remove six (6) knobs ("V" in Figure 27).

6. The tuner chassis mounting screws are covered by a "snap-off" escutcheon. Two notches will be found on the bottom of the outer edge of the escutcheon ("W" in Figure 27). Insert a thin blade screwdriver into these notches between the escutcheon and the cabinet proper being careful not to mar any surface. Force the escutcheon upward, causing it to disengage first two studs. Grasp the escutcheon along the top, lifiting to disengage second two studs.

7. Remove four (4) screws holding tuner chassis to front panel ("X" in Figure 28).

8. Slide tuner chassis out through front panel (noting location of RFI shield on Model GR596W – "R" in Figure 26).
   CAUTION: When replacing tuner chassis in Model GR596W be certain RFI shield is in proper location.
   NOTE: Main unit should be in horizontal position when reinstalling tuner chassis.

ADDITIONAL DISASSEMBLY PROCEDURES

In addition to the disassembly procedure for Models G596W and GR596W outlined above, there are two other procedures (Groups "B" and "C" below) which apply to various "G" line models that also use the snap-off escutcheon and the out-front chassis removal concepts of the "E" and "F" line. On such models the escutcheon is held in place by three (or more depending on model) studs and clips. This method facilitates access for cleaning the back side of the escutcheon lens and also for access to chassis mounting screws. The chassis (and/or some tape units) may be removed thru the front of modular models, or thru the top mounting panel of console models.

GROUP "B" models include:

CHASSIS 3WGR50
MODELS G914P, G915AE, G916M

CHASSIS 3WGR52
MODELS G584W1, G587W2, GR587W1

CHASSIS 3WGR54
MODEL G680W2

CHASSIS 5WFR50
MODEL G904P

CHASSIS 6WGR55
MODEL G920AE, G922M

NOTE: In addition, the following "E" and "F" chassis and models follow the Group "B" procedure with one exception. Some models in Group "B" have screws holding the escutcheon from the inside. It would be necessary to remove such screws before attempting to remove the escutcheon. The use of these additional screws can be determined by viewing the escutcheon from the rear.

CHASSIS 5WER50
MODELS E902W, ET902W, E903M, M2, ET903M, M2, E904DE, ET904DE, DE2

CHASSIS 5WER51
MODELS E584W, W1, E587W, W1, E588W

CHASSIS 5WER53
MODELS E445W, E680W, E685W

CHASSIS 5WFR50
MODELS F902W, W1, F903M, F904DE, F904P

CHASSIS 5WFR51
MODELS F584W, F587W, F588W

CHASSIS 5WFR53
MODELS F445W, W1, F680W, F685W

CHASSIS 15WFR51
MODELS F941DE, F941P, F942M, F946AE, F947P

CHASSIS 15WER55
MODELS E911W, E912M, M1, E913DE, DE1, E913P, P1, ET914W, W1, ET915DE, ET915P, P1, P21, E921DE, E921P, E922M

CHASSIS 15WER56
MODELS E585J, J1, E586W, X, E589W, W1, E594W, W1

CHASSIS 15WFR55
MODELS ET914W3, F914W, ET915DE3, ET915P3, F915DE, F915P, F915DE1, F915P1, F916M, F916PN

CHASSIS 15WFR57
MODELS F585W, F586X, F589W, F589X, F594W

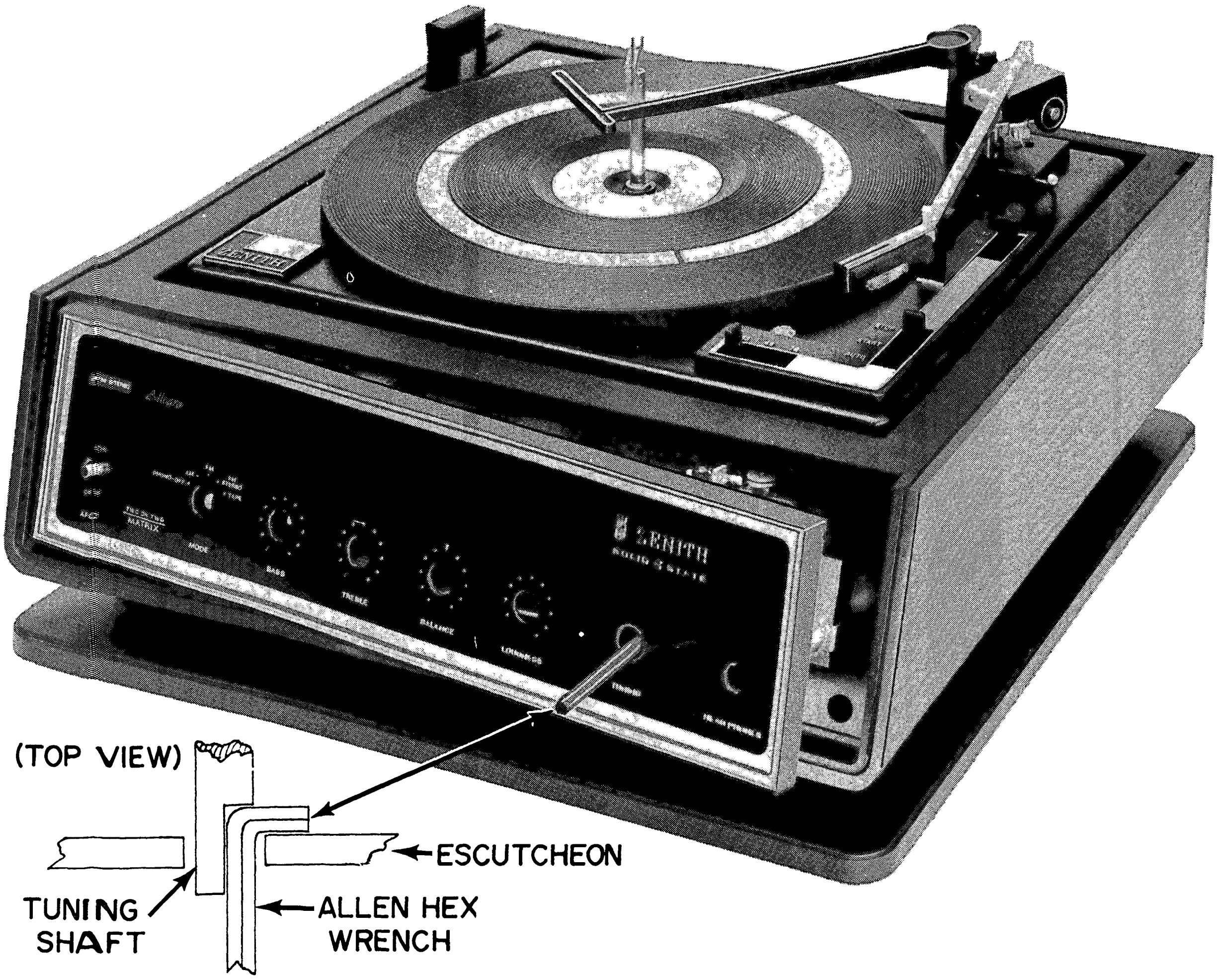


FIGURE 29 – ESCUTCHEON REMOVAL – GROUP "B"

Model G584W1 is representative of those models which have the above features, and will be used in the following explanation.

ESCUTCHEON REMOVAL – GROUP "B"

Figure 29 illustrates the technique used:

1. Remove all knobs (except AFC) from the control panel.
2. Rotate tuning shaft so that the "flat" is vertical, and the cut-away portion is facing the headphone jack.
3. Referring to the top view in Figure 29, insert the short end of a 1/8" (size may vary) "L" shaped Allen hex wrench between the shaft and the escutcheon.
4. Position the short end of the wrench behind the escutcheon, with the wrench against the step of the shaft.
5. Moving wrench to left will apply pressure to the back of the escutcheon, causing the nearest stud and clip to disengage.
6. Remove wrench.
7. Grasp loosened end of escutcheon, and firmly pull escutcheon outward until all studs and clips are disengaged.

CAUTION – Refer to Figure 30. On some models the Stereo Indicator and Digilite Indicator lamps are mounted in grommets on the chassis, while on other models these lamps (in grommets) are fitted into the escutcheon.

8. Escutcheon is now removed.

OUT FRONT CHASSIS REMOVAL – GROUP "B"

Figure 30 identifies the location of certain components involved. While Model G584W1 is representative of the disassembly procedure for the above models, there are some minor variations that must be noted. These variations will be denoted with the model number and variation shown in ( ).

1. Remove escutcheon as explained above.
2. Remove screws holding cabinet back and remove back (E584W, E585J, J1, E586W, X, F584W, F585W, F586X, G584W1 – Remove screws holding cabinet bottom, and remove bottom).
3. Unmount both the Speaker Jack Assembly Bracket and the Antenna/Tape/Phono Connector Assembly Bracket from the cabinet back.

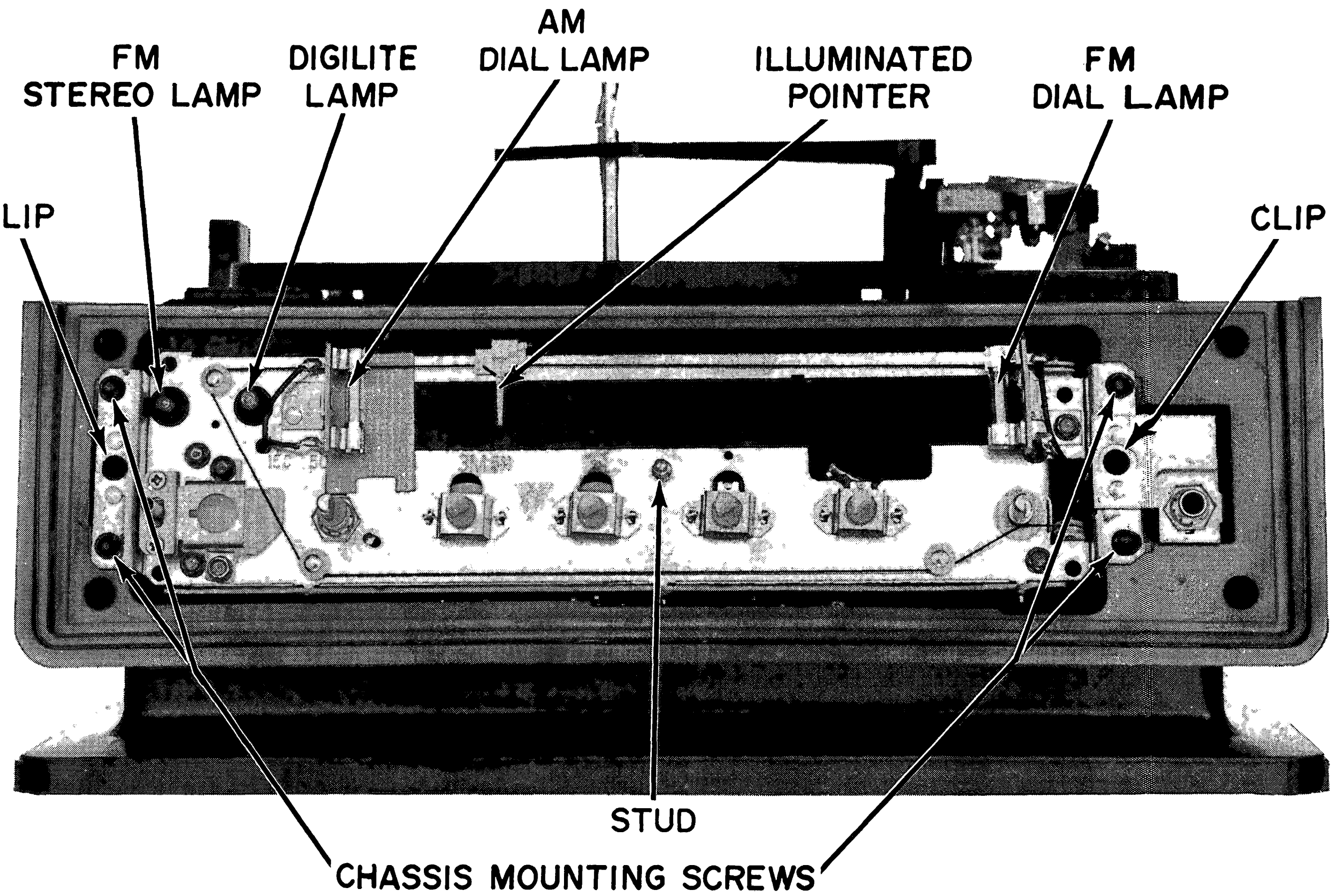


FIGURE 30 – OUT FRONT CHASSIS REMOVAL – GROUP "B"

4. Untie cable retainers. (Disconnect record changer and tape unit cables when used.)

5. Remove one screw from bottom of cabinet under center of chassis (E584W, – Two screws.) (E585J, J1, E586W, X, F584W, F585W, F586W, G584W1 – Four screws to remove bottom base, then two screws under chassis.) (E587W, W1, E680W, F587W, F680W, G587W2, GR587W1, G680W2 – Also four screws under tape assembly.)

6. Remove four screws from front of chassis. (E587W, W1, E680W, F587W, F680W, G587W2, GR587W1, G680W2 – Tape unit is secured to radio chassis with a bracket. There are two additional screws to the left of the tape unit.)

7. Slide radio chassis (E587W, W1, E680W, F587W, F680W, G680W, G587W2, GR587W1, G680W2 – Tape unit is mounted to radio chassis with a bracket), with attached brackets and cables, out thru front of cabinet.

This completes chassis removal.

When reinstalling chassis, be certain to reconnect cables, retie cable retainers, etc.

ESCUTCHEON REMOVAL — GROUP "C"

CHASSIS	6WGR56	CHASSIS	6WGR57
MODEL	GR684W	MODELS	G590W GR590W GR591W

Models identified in Group "C" have access provisions similar to those in Group "B" above, with the significant difference being in the method of escutcheon removal.

Figure 31 illustrates the technique used :

1. Remove all knobs (except Power, AFC and Matrix). Also remove the nut on the headphone jack.

2. Group "C" models have three notches formed into the under side of the escutcheon (visible from the bottom).

3. Insert screwdriver blade into this notch, between the escutcheon and the cabinet proper, being careful not to mar the surface. Force the escutcheon outward, causing it to disengage each stud.

4. Remove the escutcheon.

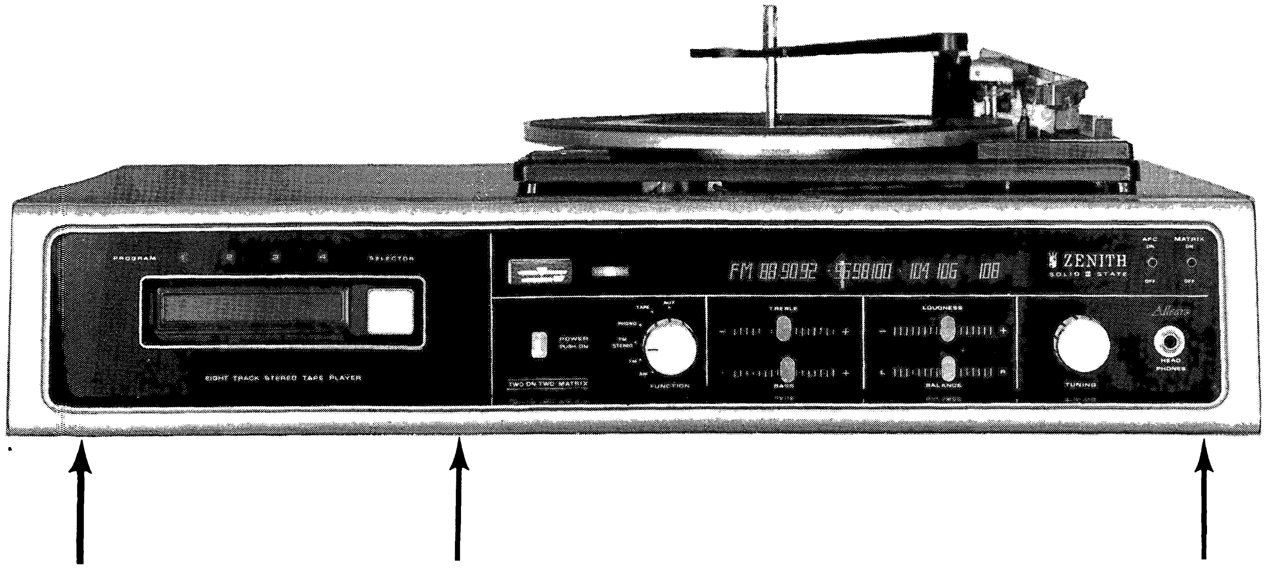


FIGURE 31 – ESCUTCHEON REMOVAL – GROUP "C"

OUT FRONT CHASSIS REMOVAL – GROUP "C"

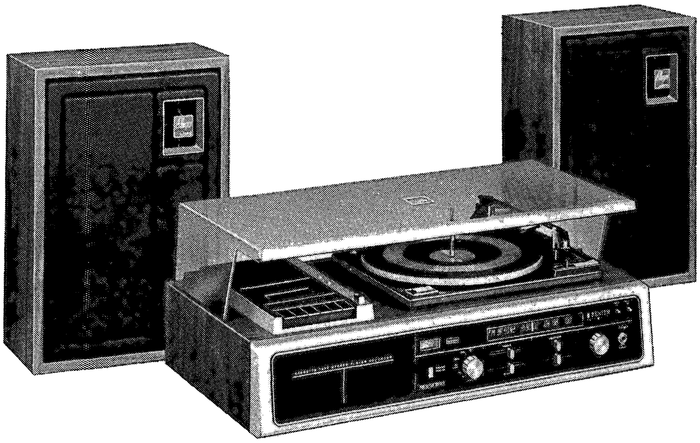
1. Remove escutcheon as explained above.
2. Remove screws holding cabinet back, and remove back.
3. Unmount both the Speaker Jack Assembly Bracket and the Antenna/Tape/Phone Connector Assembly Bracket from the cabinet back.
4. Untie cable retainers. (Disconnect record changer and tape unit cables when used.)
5. Remove three screws from bottom of cabinet under tuner chassis, then four screws under tape assembly.
6. Remove three screws from front of chassis. Tape unit is secured to radio chassis with a bracket (G590W, GR590W, GR684W).
7. Slide radio chassis (Tape unit is mounted to radio chassis with a bracket), with attached brackets and cables, out thru front of cabinet.

This completes chassis removal.

When reinstalling chassis, be certain to reconnect cables, retie cable retainers, etc.

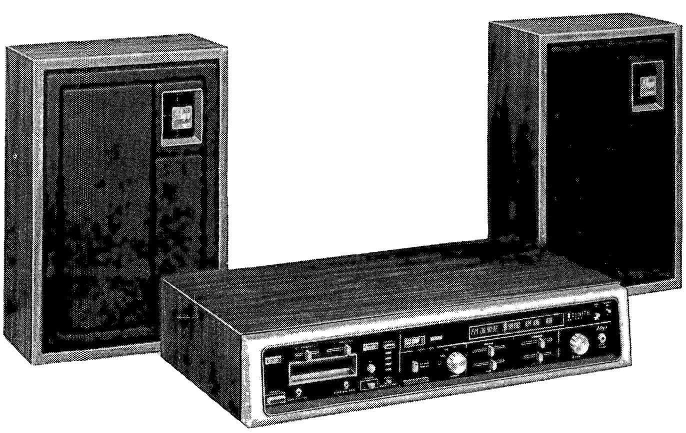
7. This comple

GR590W



GR591W

G680W



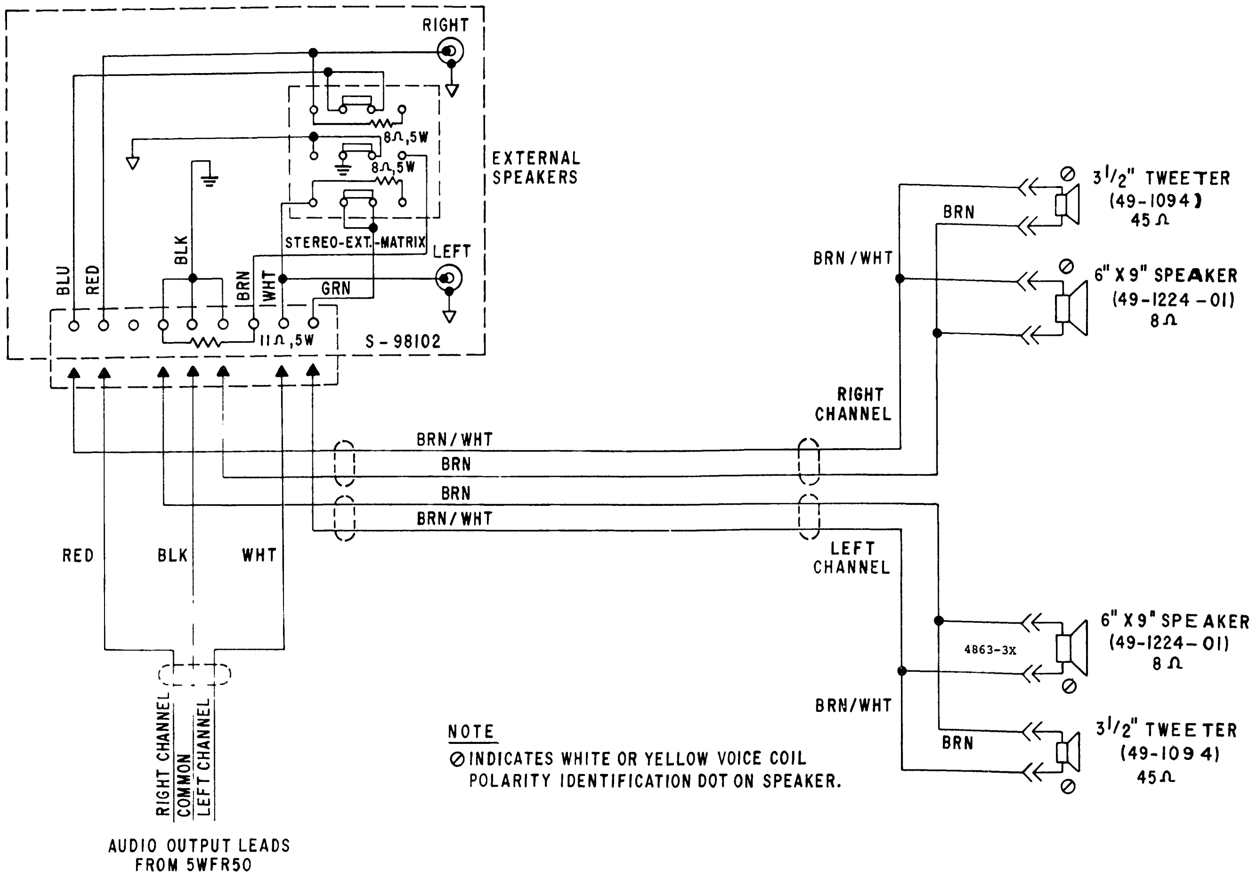
GR684W

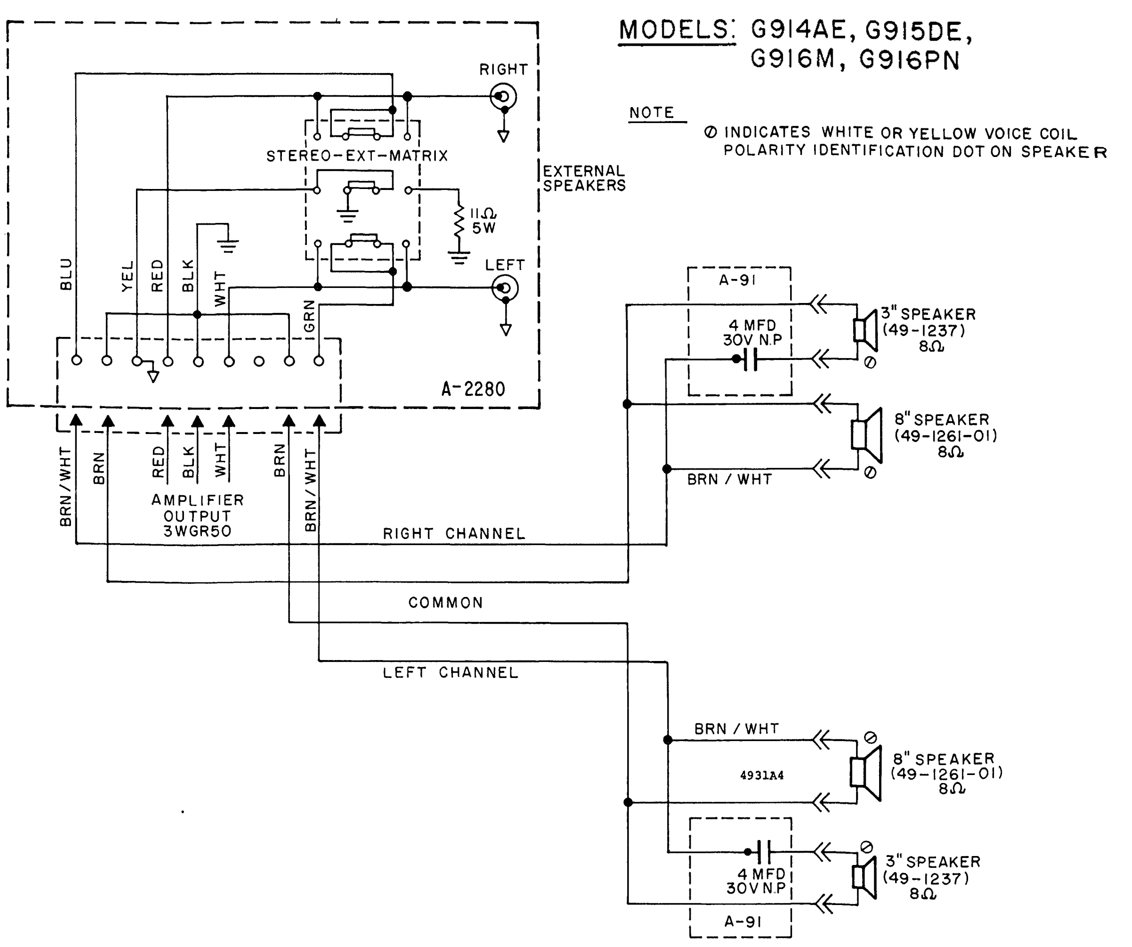
G9026W

NOTE – MODULAR MODELS
ARE SHOWN WITH OPTIONAL
ALLEGRO SPEAKER SYSTEMS.

REPRESENTATIVE MODEL ILLUSTRATIONS

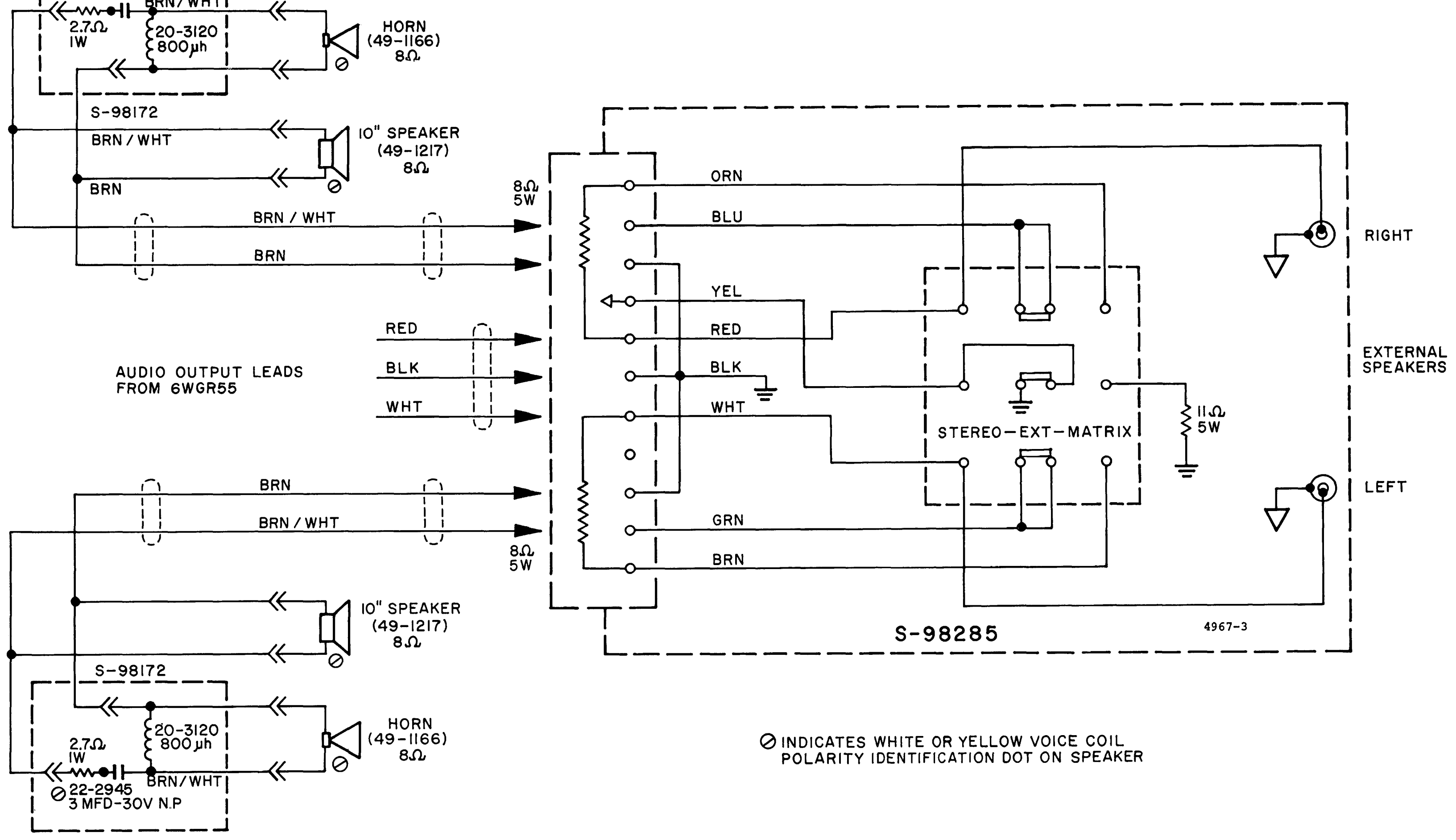
F902W , F903M , F904DE , F904P , G904P





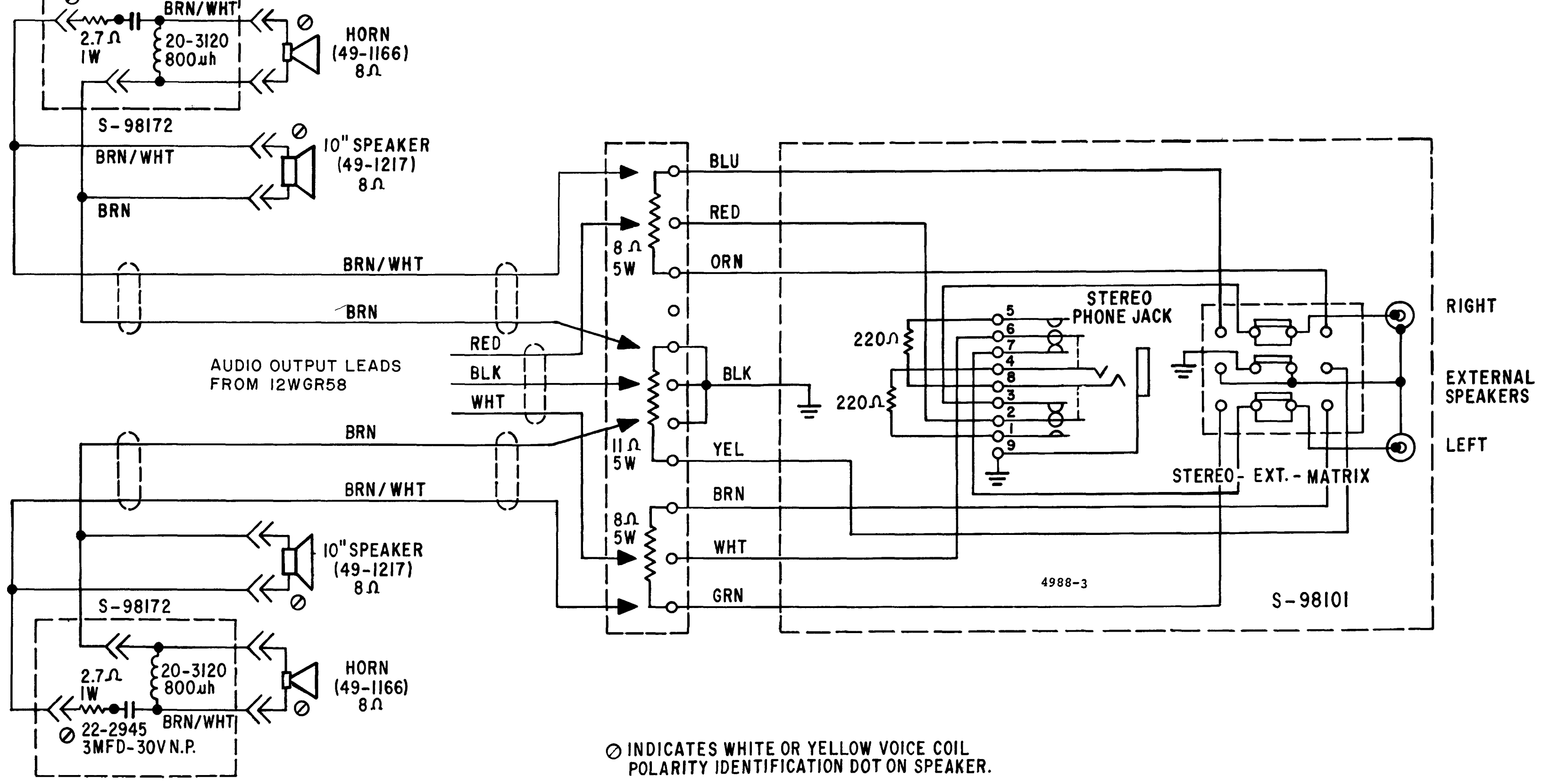
SPEAKER WIRING SCHEMATICS

MODELS: G920AE, G921P, G921DE, G922M, G922PN



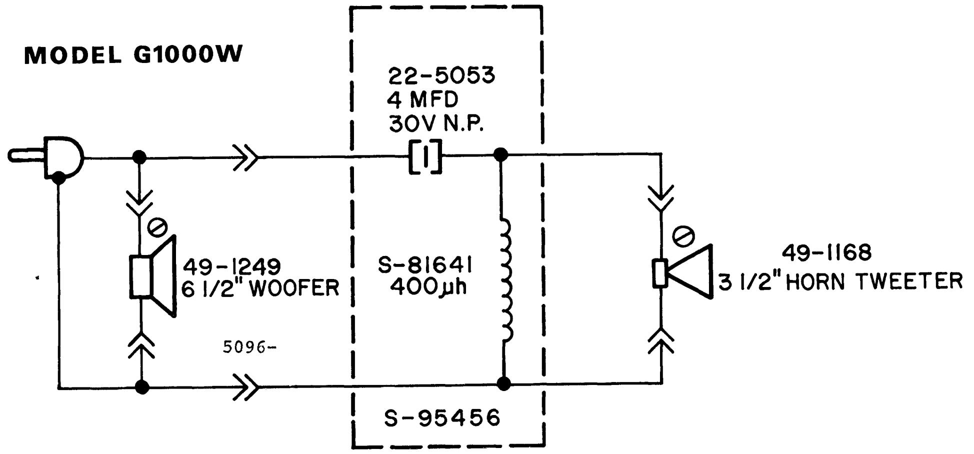
⊘ INDICATES WHITE OR YELLOW VOICE COIL POLARITY IDENTIFICATION DOT ON SPEAKER

MODELS: GR923W, GR924M, GR925DE, GR925P, GR936AE, GR937P.

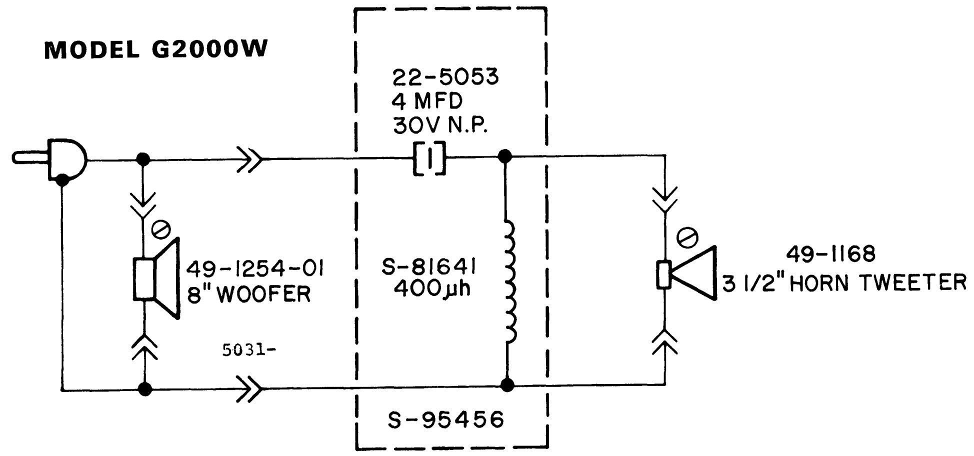


⊘ INDICATES WHITE OR YELLOW VOICE COIL POLARITY IDENTIFICATION DOT ON SPEAKER.

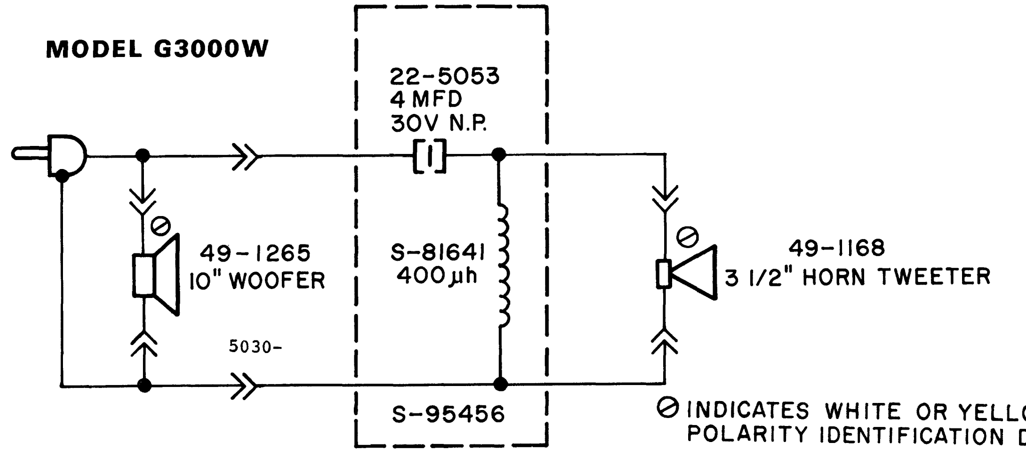
MODEL G1000W



MODEL G2000W

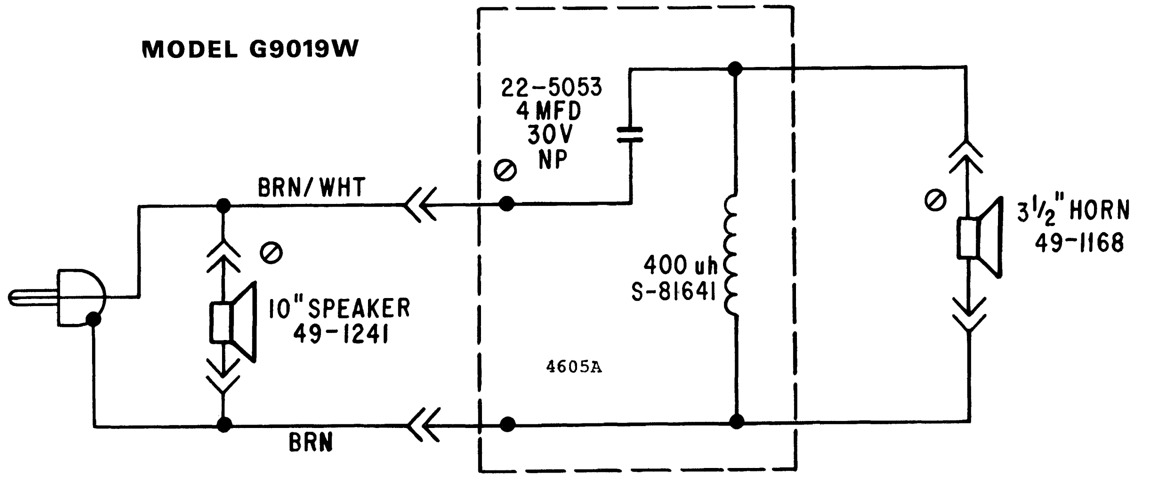


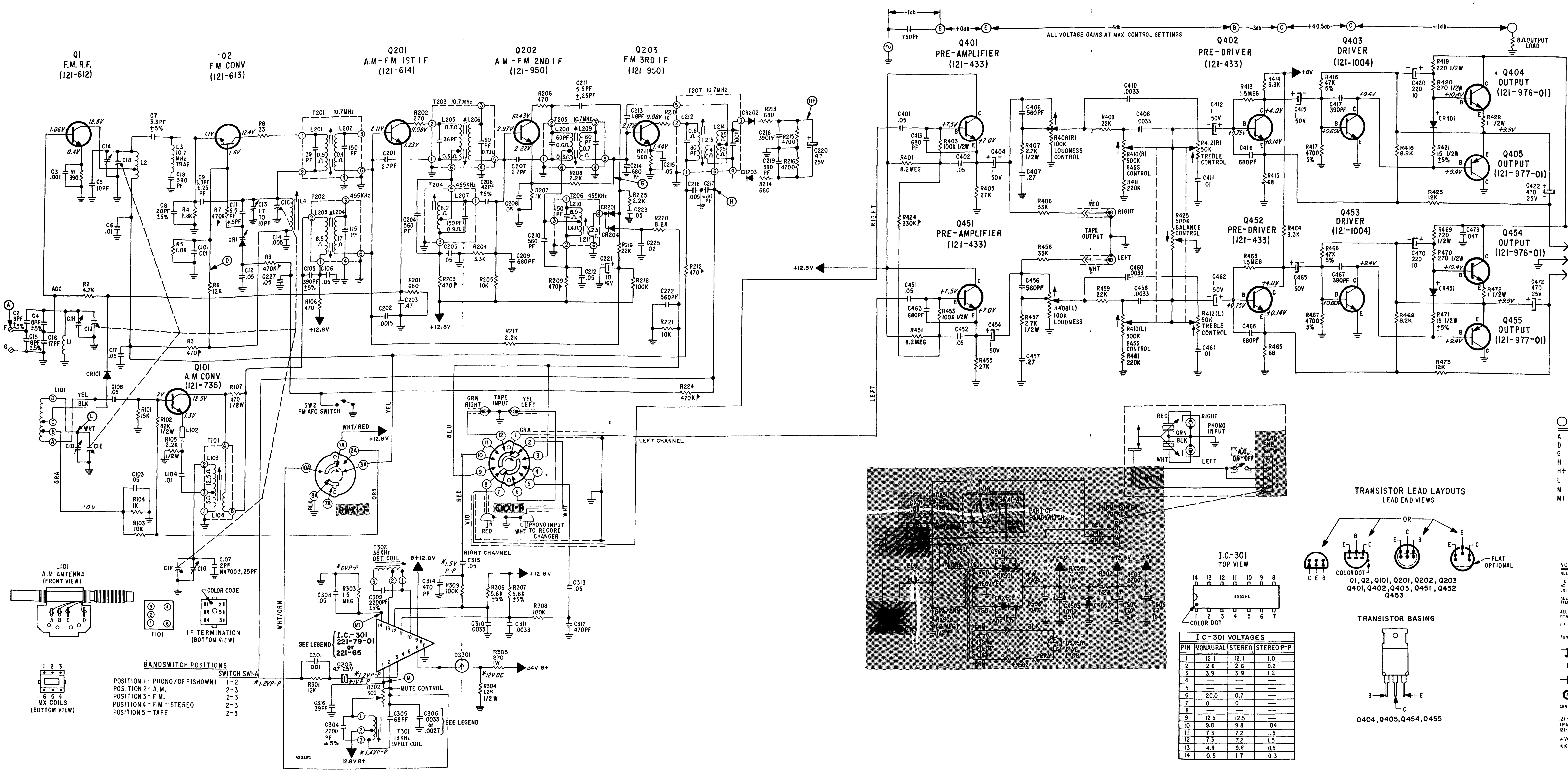
MODEL G3000W



⊘ INDICATES WHITE OR YELLOW VOICE COIL POLARITY IDENTIFICATION DOT ON SPEAKER.

MODEL G9019W





BANDSWITCH POSITIONS

	SWITCH SW1-A
POSITION 1 - PHONO/OFF (SHOWN)	1-2
POSITION 2 - A.M.	2-3
POSITION 3 - F.M.	2-3
POSITION 4 - F.M. - STEREO	2-3
POSITION 5 - TAPE	2-3

IMPORTANT SAFETY NOTICE

WHEN SERVICING THIS CHASSIS, UNDER NO CIRCUMSTANCES SHOULD THE ORIGINAL DESIGN BE MODIFIED OR ALTERED WITHOUT PERMISSION FROM THE ZENITH RADIO CORPORATION. ALL COMPONENTS SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL CIRCUIT, AND THEIR PHYSICAL LOCATION, WIRING AND LEAD DRESS MUST CONFORM TO ORIGINAL LAYOUT UPON COMPLETION OF REPAIRS.

SPECIAL CIRCUITS ARE ALSO USED TO PREVENT SHOCK AND FIRE HAZARD. THESE CRITICAL AREAS ARE SHADED ON THE SCHEMATIC FOR EASY IDENTIFICATION. THE LETTER "X" INCLUDED IN THE ITEM NUMBER DESIGNATES SPECIAL FAIL SAFE COMPONENTS IN THESE AREAS WHICH ARE REQUIRED TO MAINTAIN SAFE PERFORMANCE. NO DEVIATIONS ARE ALLOWED WITHOUT PRIOR APPROVAL BY THE PRODUCT SAFETY ENGINEERING DEPARTMENT.

THIS CIRCUIT DIAGRAM MAY OCCASIONALLY DIFFER FROM THE ACTUAL CIRCUIT USED. THIS WAY, IMPLEMENTATION OF THE LATEST SAFETY AND PERFORMANCE IMPROVEMENT CHANGES INTO THE SET IS NOT DELAYED UNTIL THE NEW SERVICE LITERATURE IS PRINTED.

TEST POINTS

- A F.M. ANTENNA INPUT
- D IST F.M. I.F INPUT
- G 3RD F.M. OUTPUT
- H F.M. DETECTOR OUTPUT
- H+ RATIO DETECTOR PRIMARY TUNING
- L A.M. R.F & I.F INPUT
- M 19KHz A.C GAIN
- M1 19KHz D.C GAIN

I C.-301 VOLTAGES			
PIN	MONAURAL	STEREO	STEREO P-P
1	12.1	12.1	1.0
2	2.6	2.6	0.2
3	3.9	3.9	1.2
4	—	—	—
5	—	—	—
6	20.0	0.7	—
7	0	0	—
8	—	—	—
9	12.5	12.5	—
10	9.8	9.8	04
11	7.3	7.2	1.5
12	7.3	7.2	1.5
13	4.8	9.8	0.5
14	0.5	1.7	0.3

NOTES:

ALL VOLTAGES ARE D C UNLESS OTHERWISE SPECIFIED.

D C VOLTAGES SHOWN ARE MEASURED FROM CHASSIS, WITH NO SIGNAL INPUT, LOUDNESS CONTROL AT MINIMUM, LINE VOLTAGE 120V.A.C USING A HIGH IMPEDANCE V.T.V.M.

ALL RESISTORS IN OHMS, 1/4 WATT CARBON OR CARBON FILM ±10% UNLESS OTHERWISE SPECIFIED.

ALL CAPACITORS ARE IN MICROFARADS ±10% UNLESS OTHERWISE SPECIFIED

I F FREQUENCY: A M 455KHz
F M 10.7MHz

TUNING RANGE A M 540-1600KHz
F M 88-108MHz

INDICATES CHASSIS GROUND

INDICATES ±20% TOLERANCE

INDICATES VOLTAGE

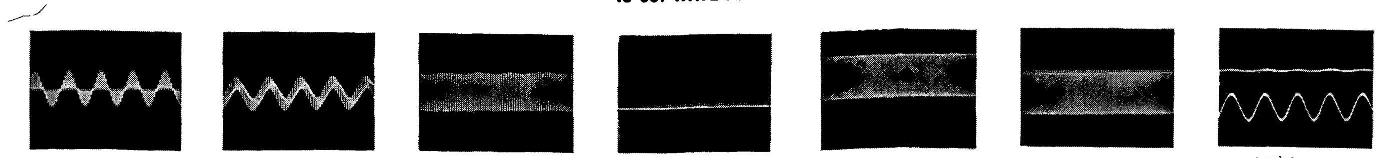
(A) INDICATES TEST POINTS.

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION.

121-976-01 IS INSULATED FROM CHASSIS. OUTPUT TRANSISTORS IN EACH CHANNEL SHALL BE A PAIR 121-976-01 & 121-977-01.

* VOLTAGES MEASURED IN THE F.M. STEREO POSITION.
** RIPPLE VOLTAGE MEASURED WITH NO SIGNAL INPUT.

IC 301 WAVE FORMS



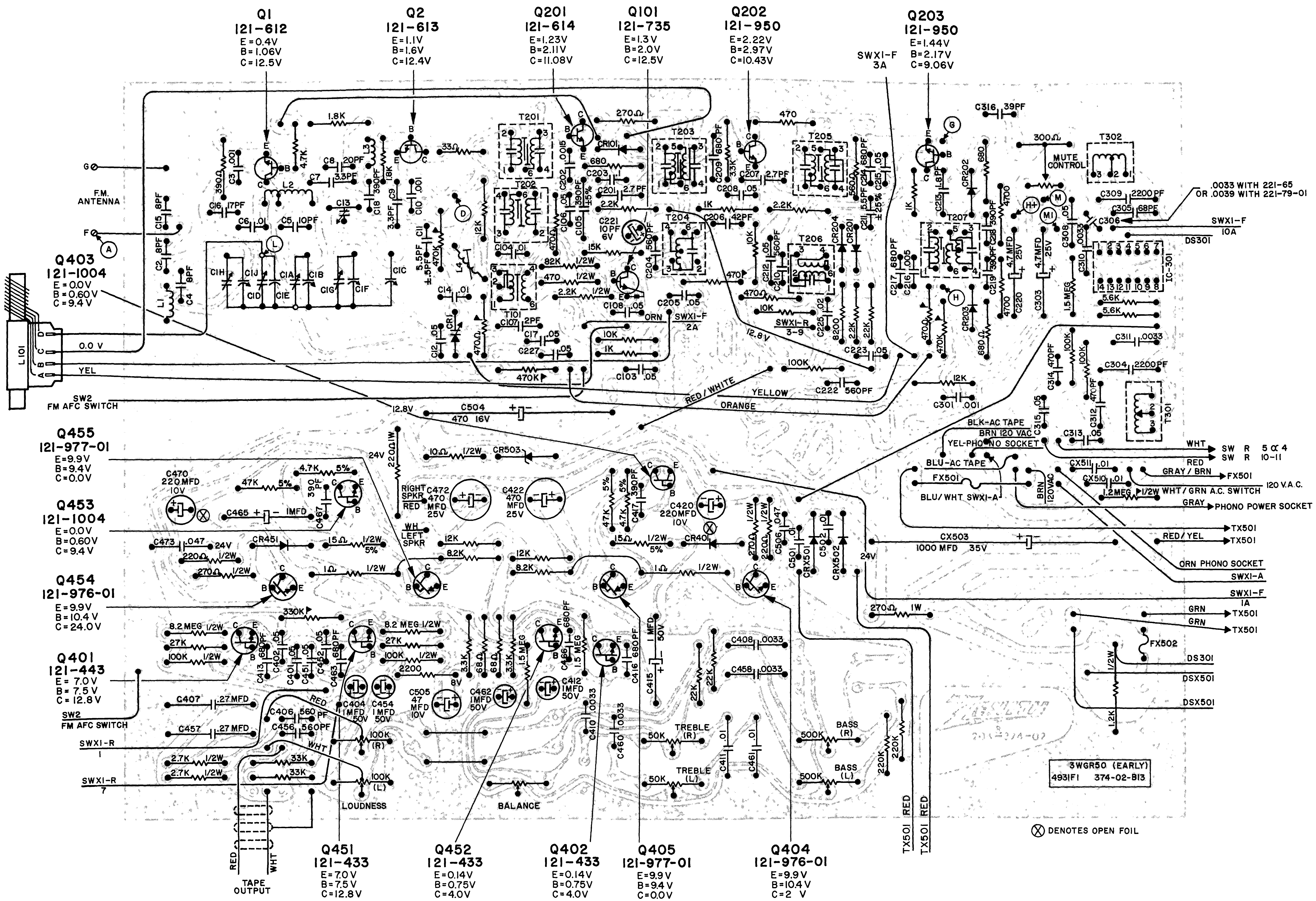
PIN 3 COMPOSITE L&R, L-R (1KHZ LEFT ONLY) 19 KHZ PILOT 10% 1 V P/P — PIN 2 19 KHZ (WITH L ONLY) 200 MV P/P — PIN 1 19 KHZ 1.2V P/P — PIN 10 38KHZ PULSES 80MV P/P — 38 KHZ TANK END 38 KHZ 13V P/P — PIN 13 38 KHZ 1.4V P/P — PIN 12 (UPPER) RIGHT OUTPUT PIN 11 (LOWER) LEFT OUTPUT (L INPUT ONLY) 1 V P/P

CHASSIS LEGEND 3WGR50

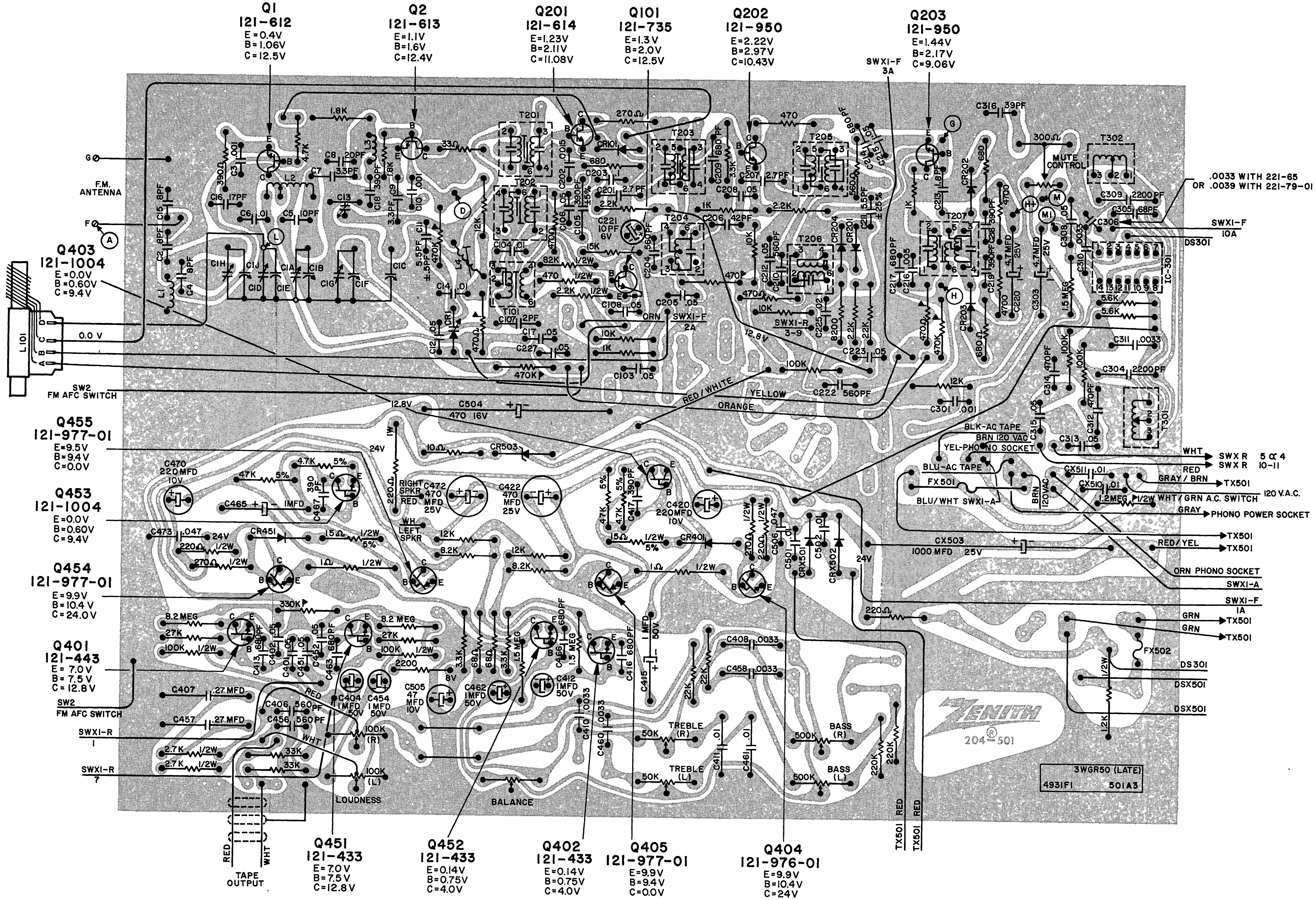
ITEM NO.	PART NUMBER	DESCRIPTION
C1A		FM DETECTOR TRIMMER
C1B		FM DETECTOR TUNING
C1C		FM OSCILLATOR TUNING
C1D		AM ANTENNA TRIMMER
C1E	22-7134	AM ANTENNA TUNING
C1F		AM OSCILLATOR TUNING
C1G		AM OSCILLATOR TRIMMER
C1H		FM ANTENNA TRIMMER
C1J		FM ANTENNA TUNING
C2	22-2481	8 PF DISC ± 0.5% 500V
C3	22-2729	.001 MFD DISC 25V
C4	22-2481	8 PF DISC ± 0.5% 500V
C5	22-3675	10 PF DISC ± 5% 500V
C6	22-3393	.01 MFD DISC 25V
C7	22-3541	3.3 PF GIMMICK ± 5% 500V
C8	22-3751	20 PF DISC ± 5% 500V
C9	22-5879	3.3 PF DISC ± .25 PF 25V
C10	22-2729	.001 MFD DISC 25V
C11	22-5878	5.5 PF DISC ± 0.5 PF 25V
C12	22-3034	.05 MFD DISC 25V
C13	22-4855	1.7 TO 10 PF CERAMIC TRIMMER
C14	22-3080	.005 MFD DISC 25V
C15	22-2481	8 PF DISC ± 0.5% 500V
C16	22-3792	17 PF DISC ± 5% 500V
C17	22-3034	.05 MFD DISC 25V
C18	22-3177	390 PF DISC 500V
C103	22-3034	.05 MFD DISC 25V
C104	22-3393	.01 MFD DISC 25V
C105	22-5972	390 PF ± 5% POLYSTYRENE 125V
C106	22-3034	.05 MFD DISC 25V
C107	22-4819	2 PF N4700 ± .25 PF 500V
C108	22-3034	.05 MFD DISC 25V
C201	22-3310	2.7 PF GIMMICK ± 10% 500V
C202	22-5483	.0015 MFD DISC 500V
C203	22-5487	.47 MFD DISC 3V
C204	22-5481	560 PF DISC 500V
C205	22-3034	.05 MFD DISC 25V
C206	22-3791	42 PF DISC ± 5% 500V
C207	22-3310	2.7 PF GIMMICK ± 10% 500V
C208	22-3034	.05 MFD DISC 25V
C209	22-5482	680 PF DISC 500V
C210	22-5481	560 PF DISC 500V
C211	22-3770	5.5 PF DISC ± .25 PF 500V
C212	22-3034	.05 MFD DISC 25V
C213	22-2428	1.8 PF GIMMICK ± 10% 500V
C214	22-5482	680 PF DISC 500V
C215	22-3034	.05 MFD DISC 25V
C216	22-3080	.005 MFD DISC 25V
C217	22-5482	680 PF DISC 500V
C218	22-3177	390 PF DISC 500V
C219	22-3177	390 PF DISC 500V
C220	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C221	22-7151-04	10 MFD ELECTROLYTIC 16V
C222	22-3362	500 PF DISC 500V
C223	22-3034	.05 MFD DISC 25V
C225	22-3033	.02 MFD 25V
C227	22-3034	.05 MFD DISC 25V
C301	22-2729	.001 MFD DISC 25V
C303	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C304	22-5782	2200 PF POLYSTYRENE ± 5% 500V
C305	22-3608	68 PF DISC 500V
C306	22-13	.0033 MFD DISC (USED WITH 221-79-01) 500V
	OR 22-7191	.0027 MFD DISC (USED WITH 221-65) 500V
C308	22-3034	.05 MFD DISC 25V
C309	22-5782	2200 PF POLYSTYRENE ± 5% 500V
C310	22-13	.0033 MFD DISC 500V
C311	22-13	.0033 MFD 500V
C312	22-16	470 PF DISC 500V
C313	22-3034	.05 MFD DISC 25V
C314	22-16	470 PF DISC 500V
C315	22-3034	.05 MFD DISC 25V
C316	22-3381	39 PF ± 5% DISC 500V
C401	22-3034	.05 MFD DISC 25V
C402	22-3034	.05 MFD DISC 25V
C404	22-7153	1 MFD ELECTROLYTIC 50V
C406	22-5481	560 PF DISC 500V
C407	22-5964	.27 MFD MYLAR 50V
C408	22-13	.0033 MFD DISC 500V
C410	22-13	.0033 MFD DISC 500V
C411	22-3513	.01 MFD DISC 500V
C412	22-7153	1 MFD ELECTROLYTIC 50V
C413	22-2939	680 PF DISC 500V
C415	22-7143	1 MFD ELECTROLYTIC 50V
C416	22-2939	680 PF DISC 500V
C417	22-3177	390 PF DISC 500V
C420	22-7150-09	220 MFD ELECTROLYTIC 10V
C422	22-7152-11	470 MFD ELECTROLYTIC 25V
C451	22-3034	.05 MFD DISC 25V
C452	22-3034	.05 MFD DISC 25V
C454	22-7153	1 MFD ELECTROLYTIC 50V
C456	22-5481	560 PF DISC 500V
C457	22-5964	.27 MFD MYLAR 50V
C458	22-13	.0033 MFD DISC 500V
C460	22-13	.0033 MFD DISC 500V
C461	22-3513	.01 MFD DISC 500V
C462	22-7153	1 MFD ELECTROLYTIC 50V
C463	22-2939	680 PF DISC 500V
C465	22-7143	1 MFD ELECTROLYTIC 50V
C466	22-2939	680 PF DISC 500V
C467	22-3177	390 PF DISC 500V
C470	22-7150-09	220 MFD ELECTROLYTIC 10V
C472	22-7152	470 MFD ELECTROLYTIC 25V
C473	22-6447-01	.047 MFD MYLAR 100V
C501	22-4617	.01 MFD DISC 500V
C502	22-4617	.01 MFD DISC 500V
CX503	22-7144-12	1000 MFD ELECTROLYTIC 35V
C504	22-7141-11	470 MFD ELECTROLYTIC 16V
C505	22-7150-07	47 MFD ELECTROLYTIC 10V
C506	22-6447-01	.047 MFD MYLAR 100V
CX510	22-6005	.01 MFD DISC 150 VAC
CX511	22-6005	.01 MFD DISC 150 VAC
R1	63-9921-62	390 OHM 5% (ALT 63-7768 1/2W 10%)
R2	63-4213	4.7K OHM
R3	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R4	63-9921-78	1.8K OHM 5% (ALT 63-7796 1/2W 10%)
R5	63-9921-78	1.8K OHM 5% (ALT 63-10183-78 1/2W 10%)
R6	63-9921-98	12K OHM 5% (ALT 63-7831 1/2W 10%)
R7	63-9922-36	470K OHM 5% (ALT 63-7898 1/2W 10%)
R8	63-4122	33 OHM
R9	63-9922-36	470 K OHM 5% (ALT 63-7898 1/2W 20%)
R101	63-9922	15K OHM 5% (ALT 63-7834 1/2W 10%)
R102	63-1866	82K OHM 1/2W
R103	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R104	63-9921-72	1K OHM 5% (ALT 63-7785 1/2W 10%)
R105	63-1799	2.2K OHM 1/2W
R106	63-9921-64	470 OHM 5% (ALT 63-7771 1/2W 10%)
R107	63-1771	470 OHM 1/2W
R201	63-9921-68	680 OHM 5% (ALT 63-7778 1/2W 10%)
R202	63-9921-58	270 OHM 5% (ALT 63-7761 1/2W 10%)
R203	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R204	63-9921-84	3.3K OHM 5% (ALT 63-7806 1/2W 10%)
R205	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R206	63-9921-64	470 OHM 5% (ALT 63-7771 1/2W 10%)
R207	63-9921-72	1K OHM 5% (ALT 63-7785 1/2W 10%)
R208	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2W 10%)
R209	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R210	63-9921-72	1K OHM 5% (ALT 63-10183-72 1/4W 10%)
R211	63-9921-66	560 OHM 5% (ALT 63-7775 1/2W 10%)
R212	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R213	63-9921-68	680 OHM 5% (ALT 63-7778 1/2W 10%)
R214	63-9921-68	680 OHM 5% (ALT 63-7778 1/2W 10%)
R215	63-9921-88	4.7K OHM 5% (ALT 63-7813 1/2W 10%)
R216	63-9921-88	4.7K OHM 5% (ALT 63-7813 1/2W 10%)
R217	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2W 10%)

ITEM NO.	PART NUMBER	DESCRIPTION
R218	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R219	63-9922-04	22K OHM 5% (ALT 63-7841 1/2W 10%)
R220	63-9921-94	8.2K OHM 5% (ALT 63-7824 1/2W 10%)
R221	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R224	63-9922-36	470K OHM 5% (ALT 63-7898 1/2W 20%)
R225	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2W 10%)
R301	63-9921-98	12K OHM 5% (ALT 63-7831 1/2W 10%)
R302	63-8328	300 OHM MUTE CONTROL
R303	63-9924-48	1.5 MEG OHM (ALT 63-7918 1/2W 10%)
R304	63-1789	1.2K OHM 1/2W 10%
R305	63-6045	270 OHM 1W
R306	63-9921-90	5.6K OHM 5% (ALT 63-7816 1/2W 5%)
R307	63-9921-90	5.6K OHM 5% (ALT 63-7816 1/2W 5%)
R308	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R309	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R401	63-7950	8.2 MEG OHM 1/2W
R403	63-1869	100K OHM 1/2W
R405	63-9922-06	27K OHM 5% (ALT 63-7845 1/2W 10%)
R406	63-9922-08	33K OHM 5% (ALT 63-7848 1/2W 10%)
R407	63-1803	2.7K OHM 1/2W
R408R, R408L	63-9255	100K DUAL LOUDNESS CONTROL (ALT 63-10160)
R409	63-9922-04	22K OHM 5% (ALT 63-7841 1/2W 10%)
R410R, R410L	63-9257	500K DUAL BASS CONTROL (ALT 63-10162)
R411	63-9922-28	220K OHM 5% (ALT 63-7883 1/2W 10%)
R412R, R412L	63-9256	50K DUAL TREBLE CONTROL (ALT 63-10161)
R413	63-9924-48	1.5 MEG OHM (ALT 63-7918 1/2W 10%)
R414	63-9921-84	3.3K OHM 5% (ALT 63-7806 1/2W 10%)
R415	63-9921-44	68 OHM 5% (ALT 63-7736 1/2W 10%)
R416	63-9922-12	47K OHM 5% (ALT 63-7854 1/2W 5%)
R417	63-9921-88	4.7K OHM 5% (ALT 63-7812 1/2W 5%)
R418	63-9921-94	8.2K OHM 5% (ALT 63-7824 1/2W 10%)
R419	63-9946-56	220 OHM 1/2W 5% (ALT 63-7757 1/2W 10%)
R420	63-9946-58	270 OHM 1/2W 5% (ALT 63-7761 1/2W 10%)
R421	63-9946-28	15 OHM 1/2W 5% (ALT 63-7707 1/2W 5%)
R422	63-4501	1 OHM 1/2W
R423	63-9921-98	12K OHM 5% (ALT 63-7831 1/2W 10%)
R424	63-9922-32	330K OHM 5% (ALT 63-7891 1/2W 20%)
R425	63-9254	500K BALANCE CONTROL (ALT 63-10159)
R430	63-1757	220 OHM 1/2W
R451	63-7950	8.2 MEG OHM 1/2W
R453	63-1869	100K OHM 1/2W
R455	63-9922-06	27K OHM 5% (ALT 63-7845 1/2W 10%)
R456	63-9922-08	33K OHM 5% (ALT 63-7848 1/2W 10%)
R457	63-1803	2.7K OHM 1/2W
R459	63-9922-04	22K OHM 5% (ALT 63-7841 1/2W 10%)
R461	63-9922-28	220K OHM 5% (ALT 63-7883 1/2W 10%)
R463	63-9924-48	1.5 MEG OHM (ALT 63-7918 1/2W 10%)
R464	63-9921-84	3.3 OHM 5% (ALT 63-7806 1/2W 10%)
R465	63-9921-44	68 OHM 5% (ALT 63-7736 1/2W 10%)
R466	63-9922-12	47K OHM 5% (ALT 63-7854 1/2W 5%)
R467	63-9921-88	4.7K OHM 5% (ALT 63-7812 1/2W 5%)
R468	63-9921-94	8.2K OHM 5% (ALT 63-7824 1/2W 10%)
R469	63-9946-56	220 OHM 1/2W 5% (ALT 63-7757 1/2W 10%)
R470	63-9946-58	270 OHM 1/2W 5% (ALT 63-7761 1/2W 10%)
R471	63-9946-28	15 OHM 1/2W 5% (ALT 63-7707 1/2W 5%)
R472	63-4501	1 OHM 1/2W
R473	63-9921-98	12K OHM 5% (ALT 63-7831 1/2W 10%)
R480	63-1757	220 OHM 1/2W
RX501	63-6042	220 OHM 1W
R502	63-9546-24	10 OHM 1/2W (ALT. 63-7701 1/2W 10%)
R503	63-9921-80	2.2K OHM 5% (ALT. 63-7799 1/2W 10%)
RX506	63-10526-03	1.2 MEG OHM ± 20% 1/2W
L1	20-3291	FM ANTENNA COIL
L2	20-1648	FM RF COIL
L3	20-1631	TRAP COIL 10.7 MHz
L4	20-3597	FM OSCILLATOR COIL
L101	S-93292-01	AM ANTENNA ASSEMBLY
L102	149-311	FERRITE CORE SLEEVE
L103	1N T101	AM OSCILLATOR TRANS. PRI.
L104	1N T101	AM OSCILLATOR TRANS. SEC.
L201	1N T201	1ST IF TRANSFORMER 10.7 MHz PRI.
L202	1N T201	1ST IF TRANSFORMER 10.7 MHz SEC.
L203	1N T202	1ST IF AM 455 KHz PRI.
L204	1N T202	1ST IF AM 455 KHz SEC.
L205	1N T203	2ND IF TRANSFORMER 10.7 MHz PRI.
L206	1N T203	2ND IF TRANSFORMER 10.7 MHz SEC.
L207	1N T204	2ND IF AM 455 KHz
L208	1N T205	3RD IF TRANSFORMER 10.7 MHz PRI.
L209	1N T205	3RD IF TRANSFORMER 10.7 MHz SEC.
L210	1N T206	3RD IF AM 455 KHz PRI.
L211	1N T206	3RD IF AM 455 KHz SEC.
L212	1N T207	RATIO DETECTOR TRANS. 10.7 MHz PRI.
L213	1N T207	RATIO DETECTOR TRANS. 10.7 MHz TERTIARY
L214	1N T207	RATIO DETECTOR TRANS. 10.7 MHz SEC.
T101	95-3077	AM OSCILLATOR TRANSFORMER
T201	95-2546	FM 1ST IF TRANSFORMER 10.7 MHz
T202	95-2541	AM 1ST IF AM 455 KHz
T203	95-2547	FM 2ND IF TRANSFORMER 10.7 MHz
T204	95-2542	AM 2ND IF AM 455 KHz
T205	95-2548	FM 3RD IF TRANSFORMER 10.7 MHz
T206	95-2689	AM 3RD IF AM 455 KHz
T207	95-2545	FM RATIO DETECTOR 10.7 MHz
T301	95-3021	INPUT COIL 19 KHz
T302	95-3023	DETECTOR COIL 38 KHz
TX501	95-2653	POWER TRANSFORMER
SWX1	85-1370-01	BAND SWITCH
SW2	85-1372-01	AFC SWITCH (SLIDE SP-DT)
J1	78-2137-01	STEREO HEADPHONE JACK
CR1	103-47 OR 103-189	AFC DIODE
CR101	103-142-01	SILICON DIODE
CR201	103-23-01	GERANIUM DIODE
CR202	103-90	GERANIUM DIODES (MATCHED PAIR)
CR203	103-90	GERANIUM DIODES (MATCHED PAIR)
CR204	103-23	GERANIUM DIODE
CR401	103-222	DIODE
CR451	103-222	DIODE
CRX501	212-76	SILICON RECTIFIER
CRX502	212-76	SILICON RECTIFIER
CR503	103-96	DIODE
IC-301	221-79-01 OR. 221-65	MONOLITHIC MULTIPLEX DEMODULATOR (SEE C306)
DSX501	100-249	PILOT LIGHT
DS301	100-611	STEREO INDICATOR LIGHT
PC	204-501	PRINTED CIRCUIT BOARD
FX501	136-117-10	.25 AMP SLO BLO FUSE
FX502	136-115-12	.5 AMP REGULAR FUSE

4931F2



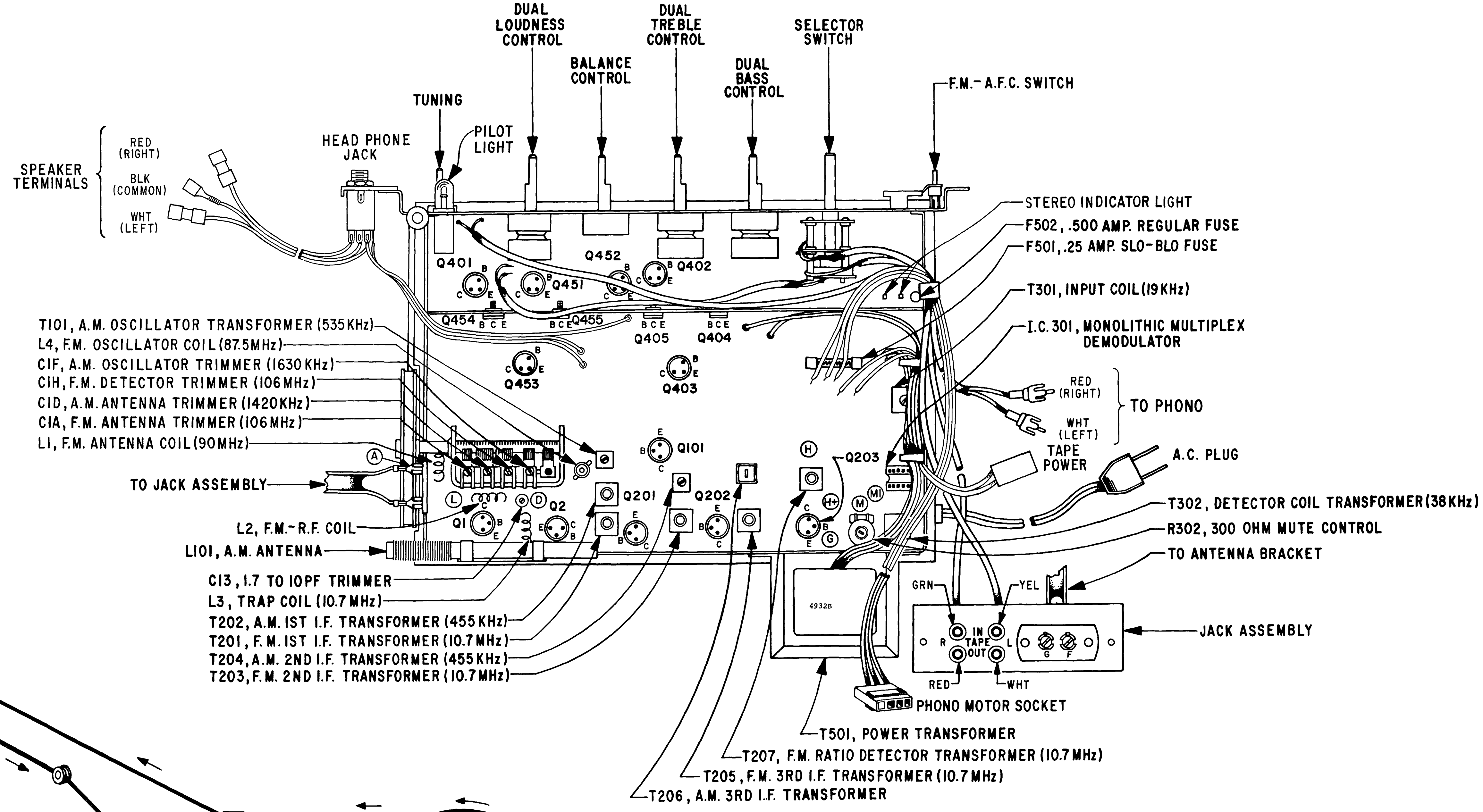
CHASSIS 3WGR50 – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE – EARLY PRODUCTION

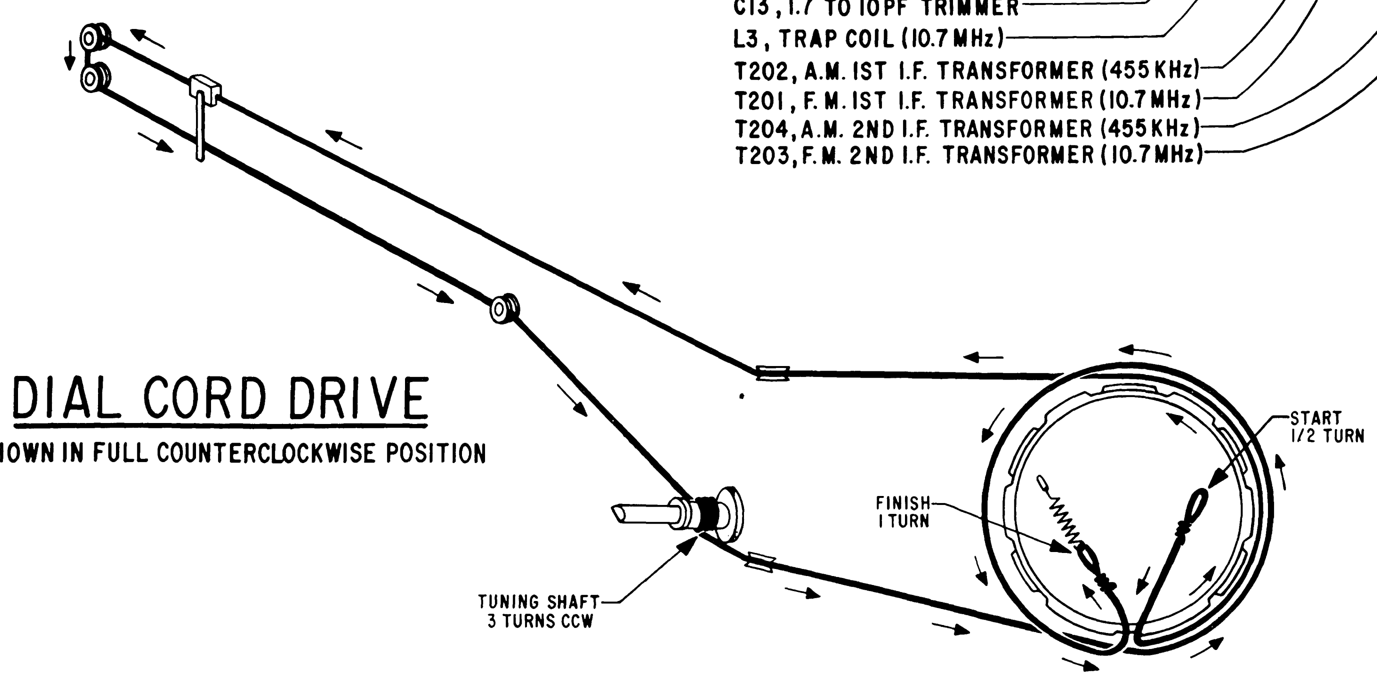


CHASSIS 3WGR50 – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE – LATE PRODUCTION

TRANSISTORS		
No.	PART No.	DESCRIPTION
Q1	121-612	F.M.-R.F.
Q2	121-613	F.M. CONVERTER
Q101	121-735	A.M. CONVERTER
Q201	121-614	A.M.-F.M. 1st I.F.
Q202	121-950	A.M.-F.M. 2nd I.F.
Q203		F.M. 3rd I.F.
Q401	121-433	PRE-AMPLIFIER
Q402		PRE-DRIVER
Q403	121-1004	DRIVER
Q404	121-976-01	OUTPUT
Q405	121-977-01	
Q451	121-433	PRE-AMPLIFIER
Q452		PRE-DRIVER
Q453	121-1004	DRIVER
Q454	121-976-01	OUTPUT
Q455	121-977-01	
IC3 01	221-79-01 or 221-65	MULTIPLEX DEMODULATOR

TEST POINTS	
A	F.M. ANTENNA INPUT
D	1st F.M. I.F. INPUT
G	3rd F.M. OUTPUT
H	F.M. DETECTOR OUTPUT
H+	RATIO DETECTOR PRIMARY TUNING
L	A.M. R.F. & I.F. INPUT
M	19KHz A.C. GAIN
MI	19KHz D.C. GAIN



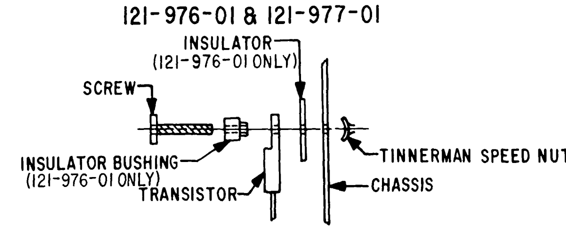


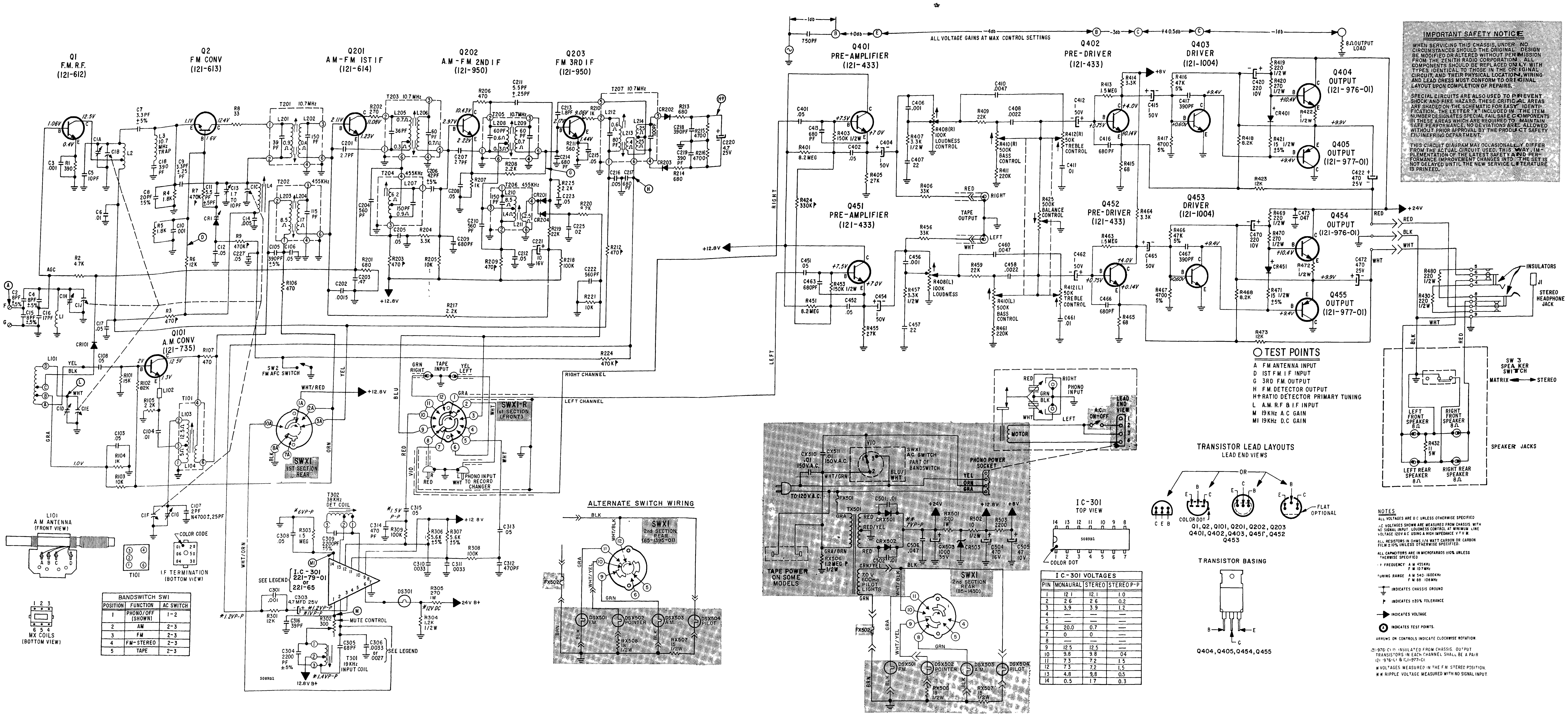
DIAL CORD DRIVE

SHOWN IN FULL COUNTERCLOCKWISE POSITION

TRANSISTOR MOUNTING VIEW

121-976-01 & 121-977-01





IMPORTANT SAFETY NOTICE

WHEN SERVICING THIS CHASSIS, UNDER NO CIRCUMSTANCES SHOULD THE ORIGINAL DESIGN BE MODIFIED OR ALTERED WITHOUT PERMISSION FROM THE ZENITH RADIO CORPORATION. ALL COMPONENTS SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL CIRCUIT, AND THEIR PHYSICAL LOCATION, WIRING AND LEAD DRESS MUST CONFORM TO ORIGINAL LAYOUT UPON COMPLETION OF REPAIRS.

SPECIAL CIRCUITS ARE ALSO USED TO PREVENT SHOCK AND FIRE HAZARD. THESE CRITICAL AREAS ARE SHADED ON THE SCHEMATIC FOR EASY IDENTIFICATION. THE LETTER "X" INCLUDED IN THE ITEM NUMBER DESIGNATES SPECIAL FAIL SAFE COMPONENTS IN THESE AREAS WHICH ARE REQUIRED TO MAINTAIN SAFE PERFORMANCE. NO DEVIATIONS ARE ALLOWED WITHOUT PRIOR APPROVAL BY THE PRODUCT SAFETY ENGINEERING DEPARTMENT.

THIS CIRCUIT DIAGRAM MAY OCCASIONALLY DIFFER FROM THE ACTUAL CIRCUIT USED. THIS WAY, IMPLEMENTATION OF THE LATEST SAFETY AND PERFORMANCE IMPROVEMENT CHANGES INTO THE SET IS NOT DELAYED UNTIL THE NEW SERVICE LITERATURE IS PRINTED.

TEST POINTS

- A FM ANTENNA INPUT
- D 1ST F.M. I.F. INPUT
- G 3RD F.M. OUTPUT
- H F.M. DETECTOR OUTPUT
- H+ RATIO DETECTOR PRIMARY TUNING
- L A.M. R.F. & I.F. INPUT
- M 19KHz A.C GAIN
- M1 19KHz D.C GAIN

BANDSWITCH SW1		
POSITION	FUNCTION	AC SWITCH
1	PHONO/OFF (SHOWN)	1-2
2	AM	2-3
3	FM	2-3
4	FM-STEREO	2-3
5	TAPE	2-3

I C-301 VOLTAGES			
PIN	MONAURAL	STEREO	STEREO P-P
1	12.1	12.1	1.0
2	2.6	2.6	0.2
3	3.9	3.9	1.2
4	—	—	—
5	—	—	—
6	20.0	0.7	—
7	0	0	—
8	—	—	—
9	12.5	12.5	—
10	9.8	9.8	04
11	7.3	7.2	1.5
12	7.3	7.2	1.5
13	4.8	9.8	0.5
14	0.5	1.7	0.3

NOTES

ALL VOLTAGES ARE D C UNLESS OTHERWISE SPECIFIED

D.C VOLTAGES SHOWN ARE MEASURED FROM CHASSIS, WITH NO SIGNAL INPUT, LOUDNESS CONTROL AT MINIMUM LINE VOLTAGE 120V A C USING A HIGH IMPEDANCE V T V M.

ALL RESISTORS IN OHMS, 1/4 WATT CARBON OR CARBON FILM ±10% UNLESS OTHERWISE SPECIFIED.

ALL CAPACITORS ARE IN MICROFARADS ±10% UNLESS OTHERWISE SPECIFIED

I F FREQUENCY A M 455KHz
F M 10 7MHz

TUNING RANGE A M 540-1600KHz
F M 88-108MHz

INDICATES CHASSIS GROUND

INDICATES ±20% TOLERANCE

INDICATES VOLTAGE

INDICATES TEST POINTS.

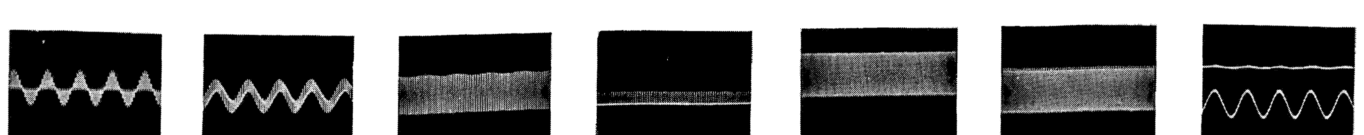
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION.

121-976-01 IS INSULATED FROM CHASSIS. OUTPUT TRANSISTORS IN EACH CHANNEL SHALL BE A PAIR 121-976-01 & 121-977-01.

* VOLTAGES MEASURED IN THE F.M. STEREO POSITION.

** RIPPLE VOLTAGE MEASURED WITH NO SIGNAL INPUT.

IC 301 WAVE FORMS



PIN 3 COMPOSITE L&R, L-R (1 KHZ LEFT ONLY) 19 KHZ PILOT 10% 1 V P/P — PIN 2 19 KHZ (WITH L ONLY) 200 MV P/P — PIN 1 19 KHZ 1.2V P/P — PIN 10 38KHZ PULSES 80MV P/P — 38 KHZ TANK END 38 KHZ 13V P/P — PIN 13 38 KHZ 1.4V P/P — PIN 12 (UPPER) RIGHT OUTPUT PIN 11 (LOWER) LEFT OUTPUT (L INPUT ONLY) 1 V P/P

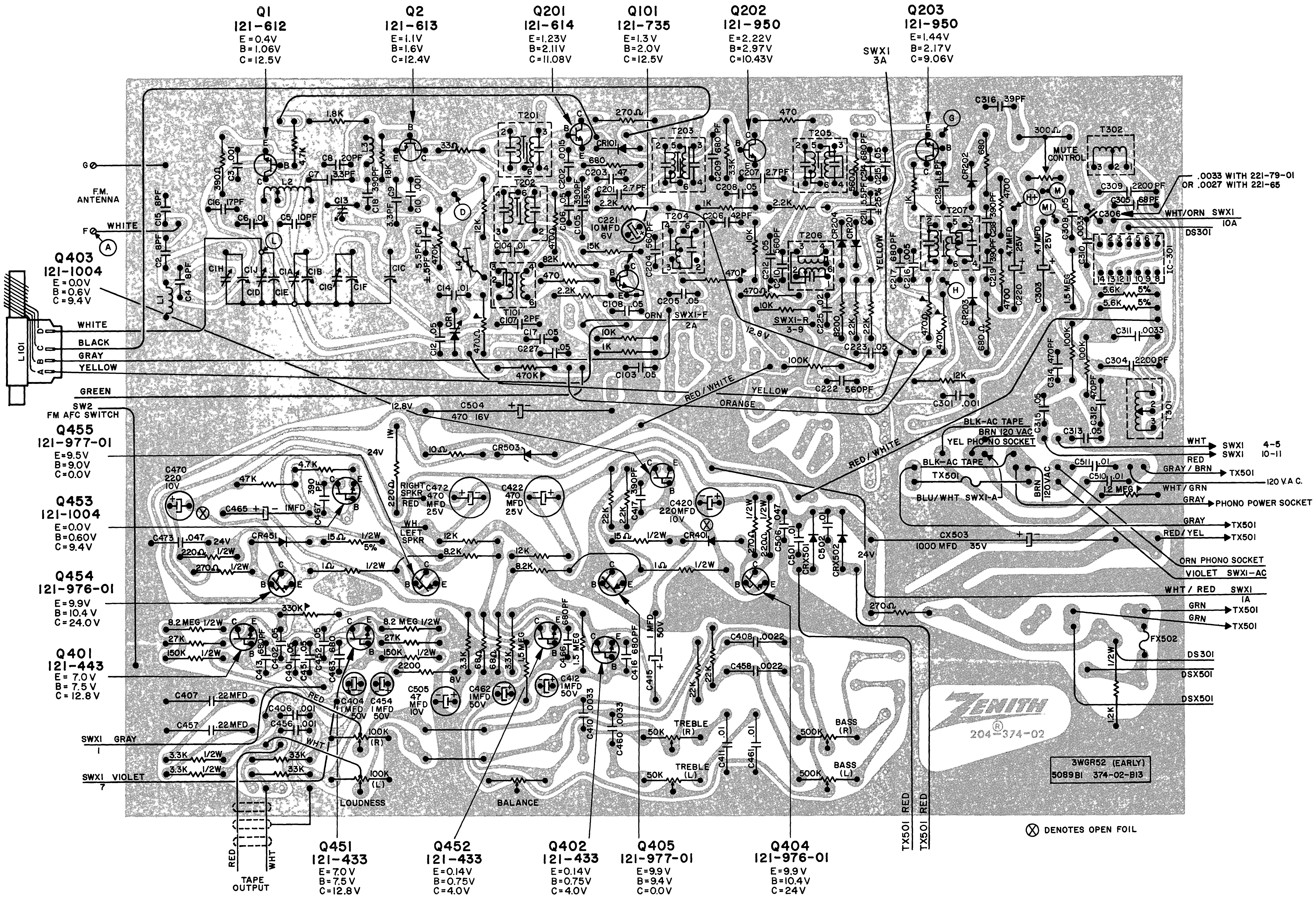
CHASSIS 3WGR52 — SCHEMATIC

CHASSIS LEGEND 3WGR52

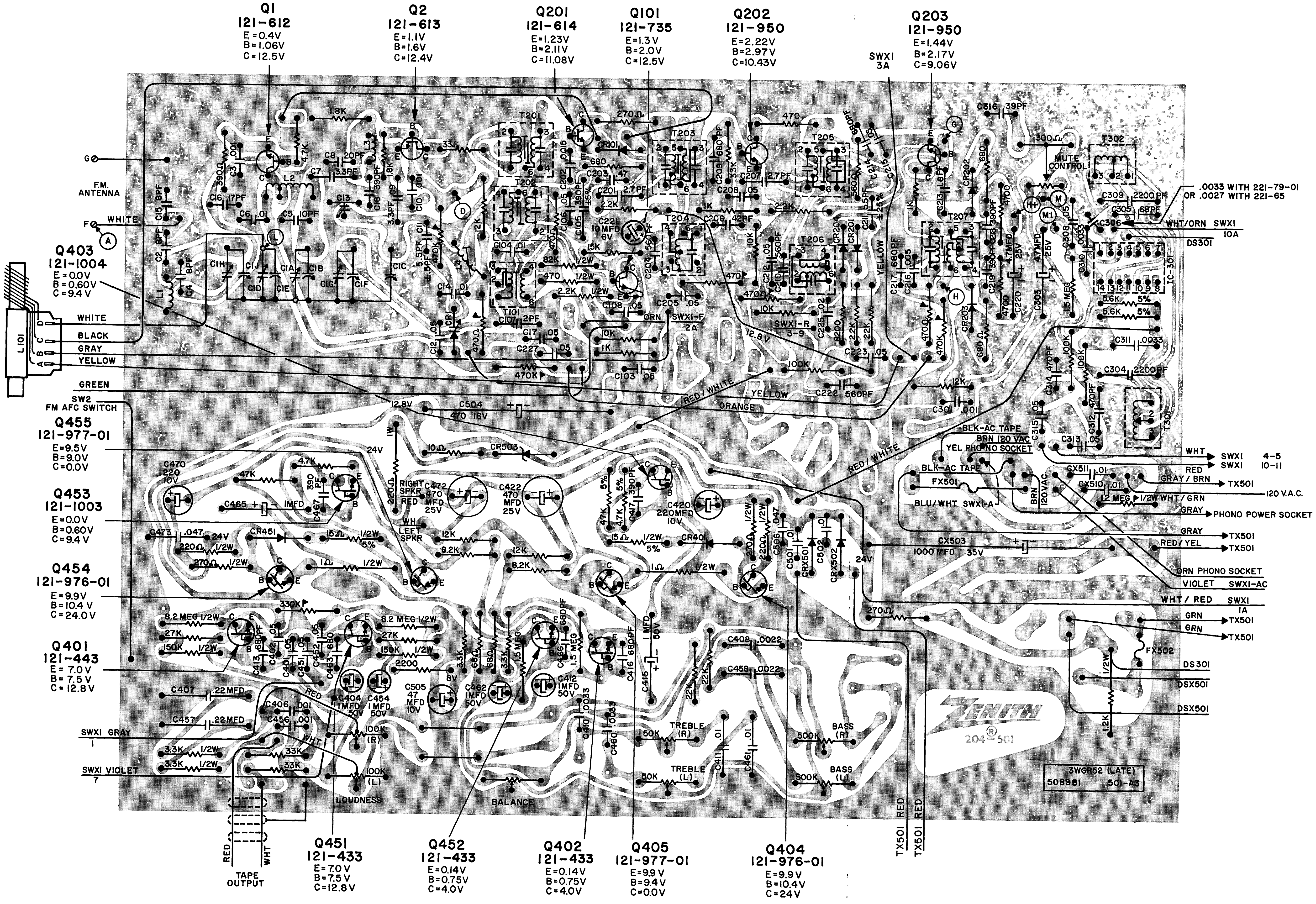
ITEM NO.	PART NUMBER	DESCRIPTION
CIA		FM DETECTOR TRIMMER
CIB		FM DETECTOR TUNING
CIC		FM OSCILLATOR TUNING
CID		AM ANTENNA TRIMMER
CIE		AM ANTENNA TUNING
CIF	22-7134	AM OSCILLATOR TUNING
CIG		AM OSCILLATOR TRIMMER
CIH		FM ANTENNA TRIMMER
CIJ		FM ANTENNA TUNING
C2	22-2481	8 PF DISC ± 0.5% 500V
C3	22-2729	.001 MFD DISC 25V
C4	22-2481	8 PF DISC ± 0.5% 500V
C5	22-3675	10 PF DISC ± 5% 500V
C6	22-3393	.01 MFD DISC 25V
C7	22-3541	3.3 PF GIMMICK ± 5% 500V
C8	22-3751	20 PF DISC ± 5% 500V
C9	22-5879	3.3 PF DISC ± .25 PF 25V
C10	22-2729	.001 MFD DISC 25V
C11	22-5878	5.5 PF DISC ± 0.5 PF 25V
C12	22-3034	.05 MFD DISC 25V
C13	22-4856	1.7 TO 10 PF CERAMIC TRIMMER
C14	22-3080	.005 MFD DISC 25V
C15	22-2481	8 PF DISC ± 0.5% 500V
C16	22-3792	17 PF DISC ± 5% 500V
C17	22-3034	.05 MFD DISC 25V
C18	22-3177	390 PF DISC 500V
C103	22-3034	.05 MFD DISC 25V
C104	22-3393	.01 MFD DISC 25V
C105	22-5972	390 PF ± 5% POLYSTYRENE 125V
C106	22-3034	.05 MFD DISC 25V
C107	22-4819	2 PF N4700 ± .25 PF 500V
C108	22-3034	.05 MFD DISC 25V
C201	22-3310	2.7 PF GIMMICK ± 10% 500V
C202	22-5483	.0015 MFD DISC 500V
C203	22-5487	.47 MFD DISC 3V
C204	22-5481	560 PF DISC 500V
C205	22-3034	.05 MFD DISC 25V
C206	22-3791	42 PF DISC ± 5% 500V
C207	22-3310	2.7 PF GIMMICK ± 10% 500V
C208	22-3034	.05 MFD DISC 25V
C209	22-5482	680 PF DISC 500V
C210	22-5481	560 PF DISC 500V
C211	22-3770	5.5 PF DISC ± .25 PF 500V
C212	22-3034	.05 MFD DISC 25V
C213	22-2428	1.8 PF GIMMICK ± 10% 500V
C214	22-5482	680 PF DISC 500V
C215	22-3034	.05 MFD DISC 25V
C216	22-3080	.005 MFD DISC 25V
C217	22-5482	680 PF DISC 500V
C218	22-3177	390 PF DISC 500V
C219	22-3177	390 PF DISC 500V
C220	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C221	22-7151-04	10 MFD ELECTROLYTIC 16V
C222	22-3362	560 PF DISC 500V
C223	22-3034	.05 MFD DISC 25V
C225	22-3033	.02 MFD 25V
C227	22-3034	.05 MFD DISC 25V
C301	22-2729	.001 MFD DISC 25V
C303	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C304	22-5782	2200 PF POLYSTYRENE ± 5% 500V
C305	22-3608	68 PF DISC 500V
C306	22-13 OR 22-7191	.0033 MFD DISC (USED WITH 221-79-01) 500V .0027 MFD DISC (USED WITH 221-65) 500V
C308	22-3034	.05 MFD DISC 25V
C309	22-5782	2200 PF POLYSTYRENE ± 5% 500V
C310	22-13	.0033 MFD DISC 500V
C311	22-13	.0033 MFD 500V
C312	22-16	470 PF DISC 500V
C313	22-3034	.05 MFD DISC 25V
C314	22-16	470 PF DISC 500V
C315	22-3034	.05 MFD DISC 25V
C316	22-3381	39 PF ± 5% DISC 500V
C401	22-3034	.05 MFD DISC 25V
C402	22-3034	.05 MFD DISC 25V
C404	22-7153	1 MFD ELECTROLYTIC 50V
C406	22-5688	.001 MFD DISC 500V
C407	22-6048	.22 MFD MYLAR 50V
C408	22-5687	.0022 MFD DISC 500V
C410	22-14	.0047 MFD DISC 500V
C411	22-3513	.01 MFD DISC 500V
C412	22-7153	1 MFD ELECTROLYTIC 50V
C413	22-2939	680 PF DISC 500V
C415	22-7143	1 MFD ELECTROLYTIC 50V
C416	22-2939	680 PF DISC 500V
C417	22-3177	390 PF DISC 500V
C420	22-7150-09	220 MFD ELECTROLYTIC 10V
C422	22-7152-11	470 MFD ELECTROLYTIC 25V
C451	22-3034	.05 MFD DISC 25V
C452	22-3034	.05 MFD DISC 25V
C454	22-7153	1 MFD ELECTROLYTIC 50V
C456	22-5688	.001 MFD DISC 500V
C457	22-6048	.22 MFD MYLAR 50V
C458	22-5687	.0022 MFD DISC 500V
C460	22-14	.0047 MFD DISC 500V
C461	22-3513	.01 MFD DISC 500V
C462	22-7153	1 MFD ELECTROLYTIC 50V
C463	22-2939	680 PF DISC 500V
C465	22-7143	1 MFD ELECTROLYTIC 50V
C466	22-2939	680 PF DISC 500V
C467	22-3177	390 PF DISC 500V
C470	22-7150-09	220 MFD ELECTROLYTIC 10V
C472	22-7152-11	470 MFD ELECTROLYTIC 25V
C473	22-6447-01	.047 MFD MYLAR 100V
C501	22-4617	.01 MFD DISC 500V
C502	22-4617	.01 MFD DISC 500V
CX503	22-7144-12	1000 MFD ELECTROLYTIC 35V
C504	22-7141-11	470 MFD ELECTROLYTIC 16V
C505	22-7150-07	47 MFD ELECTROLYTIC 10V
C506	22-6447-01	.047 MFD MYLAR 100V
CX510	22-6006	.01 MFD DISC 150VAC
CX511	22-6005	.01 MFD DISC 150VAC
R1	63-9921-62	390 OHM 5% (ALT 63-7768 1/2 W 10%)
R2	63-4213	4.7K OHM
R3	63-9921-64	470 OHM 5% (ALT 63-7772 1/2 W 20%)
R4	63-9921-78	1.8K OHM 5% (ALT 63-7796 1/2 W 10%)
R5	63-9921-78	1.8K OHM 5% (ALT 63-10183-78 1/4 W 10%)
R6	63-9921-98	12K OHM 5% (ALT 63-7831 1/2 W 10%)
R7	63-9922-36	470K OHM 5% (ALT 63-7898 1/2 W 10%)
R8	63-4122	33 OHM
R9	63-9922-36	470K OHM 5% (ALT 63-7898 1/2 W 20%)
R101	63-9922	15K OHM 5% (ALT 63-7834 1/2 W 10%)
R102	63-1866	82K OHM 1/2 W
R103	63-9921-96	10K OHM 5% (ALT 63-7827 1/2 W 10%)
R104	63-9921-72	1K OHM 5% (ALT 63-7785 1/2 W 10%)
R105	63-1799	2.2K OHM 1/2 W
R106	63-9921-64	470 OHM 5% (ALT 63-7771 1/2 W 10%)
R107	63-1771	470 OHM 1/2 W
R201	63-9921-68	680 OHM 5% (ALT 63-7778 1/2 W 10%)
R202	63-9921-58	270 OHM 5% (ALT 63-7761 1/2 W 10%)
R203	63-9921-64	470 OHM 5% (ALT 63-7772 1/2 W 20%)
R204	63-9921-84	3.3K OHM 5% (ALT 63-7806 1/2 W 10%)
R205	63-9912-96	10K OHM 5% (ALT 63-7827 1/2 W 10%)
R206	63-9921-64	470 OHM 5% (ALT 63-7771 1/2 W 10%)
R207	63-9921-72	1K OHM 5% (ALT 63-7785 1/2 W 10%)
R208	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2 W 10%)
R209	63-9921-64	470 OHM 5% (ALT 63-7772 1/2 W 20%)
R210	63-9921-72	1K OHM 5% (ALT 63-10183-72 1/4 W 10%)
R211	63-9921-66	560 OHM 5% (ALT 63-7775 1/2 W 10%)
R212	63-9921-64	470 OHM 5% (ALT 63-7772 1/2 W 20%)
R213	63-9921-68	680 OHM 5% (ALT 63-7778 1/2 W 10%)
R214	63-9921-68	680 OHM 5% (ALT 63-7778 1/2 W 10%)
R215	63-9921-88	4.7K OHM 5% (ALT 63-7813 1/2 W 10%)
R216	63-9921-88	4.7K OHM 5% (ALT 63-7813 1/2 W 10%)
R217	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2 W 10%)
R218	63-9922-20	100K OHM 5% (ALT 63-7869 1/2 W 10%)
R219	63-9922-04	22K OHM 5% (ALT 63-7841 1/2 W 10%)
R220	63-9921-94	8.2K OHM 5% (ALT 63-7824 1/2 W 10%)
R22[illegible]	63-9921-96	10K OHM 5% (ALT 63-7827 1/2 W 10%)
R224	63-9922-36	470K OHM 5% (ALT 63-7898 1/2 W 20%)
R225	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2 W 10%)

ITEM NO.	PART NUMBER	DESCRIPTION
R301	63-9921-98	12K OHM 5% (ALT 63-7831 1/2 W 10%)
R302	63-8328	300 OHM MUTE CONTROL
R303	63-9924-48	1.5 MEG OHM (ALT 63-7918 1/2 W 10%)
R304	63-1789	1.2K OHM 1/2 W 10%
R305	63-6045	270 OHM 1 W
R306	63-9921-90	5.6K OHM 5% (ALT 63-7816 1/2 W 5%)
R307	63-9921-90	5.6K OHM 5% (ALT 63-7816 1/2 W 5%)
R308	63-9922-20	100K OHM 5% (ALT 63-7869 1/2 W 10%)
R309	63-9922-20	100K OHM 5% (ALT 63-7869 1/2 W 10%)
R401	63-9922-66	8.2 MEG OHM 5% (ALT 63-7950 1/2 W 10%)
R403	63-1876	150K OHM 1/2 W
R405	63-9922-06	27K OHM 5% (ALT 63-7845 1/2 W 10%)
R406	63-9922-08	33K OHM 5% (ALT 63-7848 1/2 W 10%)
R407	63-1806	3.3K OHM 1/2 W
R408R R408L	63-9255	100K DUAL LOUDNESS CONTROL (ALT 63-10160)
R409	63-9922-04	22K OHM 5% (ALT 63-7841 1/2 W 10%)
R410R R410L	63-9257	500K DUAL BASS CONTROL (ALT 63-10162)
R411	63-9922-28	220K OHM 5% (ALT 63-7883 1/2 W 10%)
R412R R412L	63-9256	50K DUAL TREBLE CONTROL (ALT 63-10161)
R413	63-9924-48	1.5 MEG OHM (ALT 63-7918 1/2 W 10%)
R414	63-9921-84	3.3K OHM 5% (ALT 63-7806 1/2 W 10%)
R415	63-9921-44	68 OHM 5% (ALT 63-7736 1/2 W 10%)
R416	63-9922-12	47K OHM 5% (ALT 63-7854 1/2 W 5%)
R417	63-9921-88	4.7K OHM 5% (ALT 63-7812 1/2 W 5%)
R418	63-9921-94	8.2K OHM 5% (ALT 63-7824 1/2 W 10%)
R419	63-9946-56	220 OHM 1/2 W 5% (ALT 63-7757 1/2 W 10%)
R420	63-9946-58	270 OHM 1/2 W 5% (ALT 63-7761 1/2 W 10%)
R421	63-9946-28	15 OHM 1/2 W 5% (ALT 63-7707 1/2 W 5%)
R422	63-4501	1 OHM 1/2 W
R423	63-9921-98	12K OHM 5% (ALT 63-7831 1/2 W 10%)
R424	63-9922-32	330K OHM 5% (ALT 63-7891 1/2 W 20%)
R426	63-9254	500K BALANCE CONTROL (ALT 63-10159)
R430	63-1757	220 OHM 1/2 W
R431	63-10282	8 OHM 5 W
R432	63-10135	11 OHM 5 W
R451	63-9922-66	8.2 MEG OHM 5% (ALT 63-7950 1/2 W 10%)
R453	63-1876	150K OHM 1/2 W
R455	63-9922-06	27K OHM 5% (ALT 63-7845 1/2 W 10%)
R456	63-9922-08	33K OHM 5% (ALT 63-7848 1/2 W 10%)
R457	63-1806	3.3K OHM 1/2 W
R459	63-9922-04	22K OHM 5% (ALT 63-7841 1/2 W 10%)
R461	63-9922-28	220K OHM 5% (ALT 63-7883 1/2 W 10%)
R463	63-9924-48	1.5 MEG OHM 10% (ALT 63-7918 1/2 W 10%)
R464	63-9921-84	3.3K OHM 5% (ALT 63-7806 1/2 W 10%)
R465	63-9921-44	68 OHM 5% (ALT 63-7736 1/2 W 10%)
R466	63-9922-12	47K OHM 5% (ALT 63-7854 1/2 W 5%)
R467	63-9921-88	4.7K OHM 5% (ALT 63-7812 1/2 W 5%)
R468	63-9921-94	8.2K OHM 5% (ALT 63-7824 1/2 W 10%)
R469	63-9946-56	220 OHM 1/2 W 5% (ALT 63-7757 1/2 W 10%)
R470	63-9946-58	270 OHM 1/2 W 5% (ALT 63-7761 1/2 W 10%)
R471	63-9946-28	15 OHM 1/2 W 5% (ALT 63-7701 1/2 W 5%)
R472	63-4501	1 OHM 1/2 W
R473	63-9921-98	12K OHM 5% (ALT 63-7831 1/2 W 10%)
R480	63-1757	220 OHM 1/2 W
R481	63-10282	8 OHM 5 W
RX501	63-6042	220 OHM 1 W
R502	63-9946-24	10 OHM 1/2 W (ALT. 63-7701 1/2 W 10%)
R503	63-9921-80	2.2K OHM 5% (ALT. 63-7799 1/2 W 10%)
RX506	63-10526-03	1.2 MEG OHM ± 20% 1/2 W
RX507	63-1708	15 OHM 1/2 W
RX508	63-1712	18 OHM 1/2 W
L1	20-3291	FM ANTENNA COIL
L2	20-1648	FM RF COIL
L3	20-1631	TRAP COIL 10.7 MHz
L4	20-3597	FM OSCILLATOR COIL
L101	S-93292-01	AM ANTENNA ASSEMBLY
L102	149-311	FERRITE CORE SLEEVE
L103	IN T101	AM OSCILLATOR TRANS. PRI
L104	IN T101	AM OSCILLATOR TRANS. SEC.
L201	IN T201	1ST IF TRANS. 10.7 MHz PRI.
L202	IN T201	1ST IF TRANS. 10.7 MHz SEC.
L203	IN T202	1ST IF AM 455 KHz PRI.
L204	IN T202	1ST IF AM 455 KHz SEC.
L205	IN T203	2ND IF TRANS. 10.7 MHz PRI.
L206	IN T203	2ND IF TRANS. 10.7 MHz SEC.
L207	IN T204	2ND IF AM 455 KHz
L208	IN T205	3RD IF TRANS. 10.7 MHz PRI.
L209	IN T205	3RD IF TRANS. 10.7 MHz SEC.
L210	IN T206	3RD IF AM 455 KHz PRI.
L211	IN T206	3RD IF AM 455 KHz SEC.
L212	IN T207	RATIO DETECTOR TRANS. 10.7 MHz PRI.
L213	IN T207	RATIO DETECTOR TRANS. 10.7 MHz TERITIARY
L214	IN T207	RATIO DETECTOR TRANS. 10.7 MHz SEC.
T101	95-3077	AM OSCILLATOR TRANSFORMER
T201	95-2546	FM 1ST IF TRANS. 10.7 MHz
T202	95-2541	AM 1ST IF AM 455 KHz
T203	95-2547	FM 2ND IF TRANS. 10.7 MHz
T204	95-2542	AM 2ND IF AM 455 KHz
T205	95-2548	FM 3RD IF TRANS. 10.7 MHz
T206	95-2689	AM 3RD IF AM 455 KHz
T207	95-2545	FM RATIO DETECTOR 10.7 MHz
T301	95-3021	INPUT COIL 19 KHz
T302	95-3023	DETECTOR COIL 38 KHz
TX501	95-3212	POWER TRANSFORMER
SWX1	85-1430	BAND SWITCH (ALT. 85-1395-01)
SW2	85-1372-01	AFC SWITCH (SLIDE SP-DT)
SW3	85-1410	SPEAKER SWITCH (SLIDE 3P-DT)
J1	78-2137-01	STEREO HEADPHONE JACK
CR1	103-47 OR 103-189	AFC DIODE
CR101	103-142-01	SILICON DIODE
CR201	103-23-01	GERMANIUM DIODE
CR202	103-90	GERMANIUM DIODES (MATCHED PAIR)
CR203	103-90	
CR204	103-23	GERMANIUM DIODE
CR401	103-222	DIODE
CR451	103-222	DIODE
CRX501	212-76	SILICON RECTIFIER
CRX502	212-76	SILICON RECTIFIER
CR503	103-96	DIODE
IC-301	221-79-01 OR 221-65	MONOLITHIC MULTIPLEX DEMODULATOR (SEE C306)
DSX501	100-604	FM DIAL LIGHT
DSX502	100-625	POINTER LIGHT
DSX503	100-604	AM DIAL LIGHT
DSX504	100-610	PILOT LIGHT
DS301	100-611	STEREO INDICATOR LIGHT
PC	204-501	PRINTED CIRCUIT BOARD
FX501	136-117-10	.25 AMP SLO-BLO FUSE
FX502	136-115-16	1 AMP REGULAR FUSE

5089B2



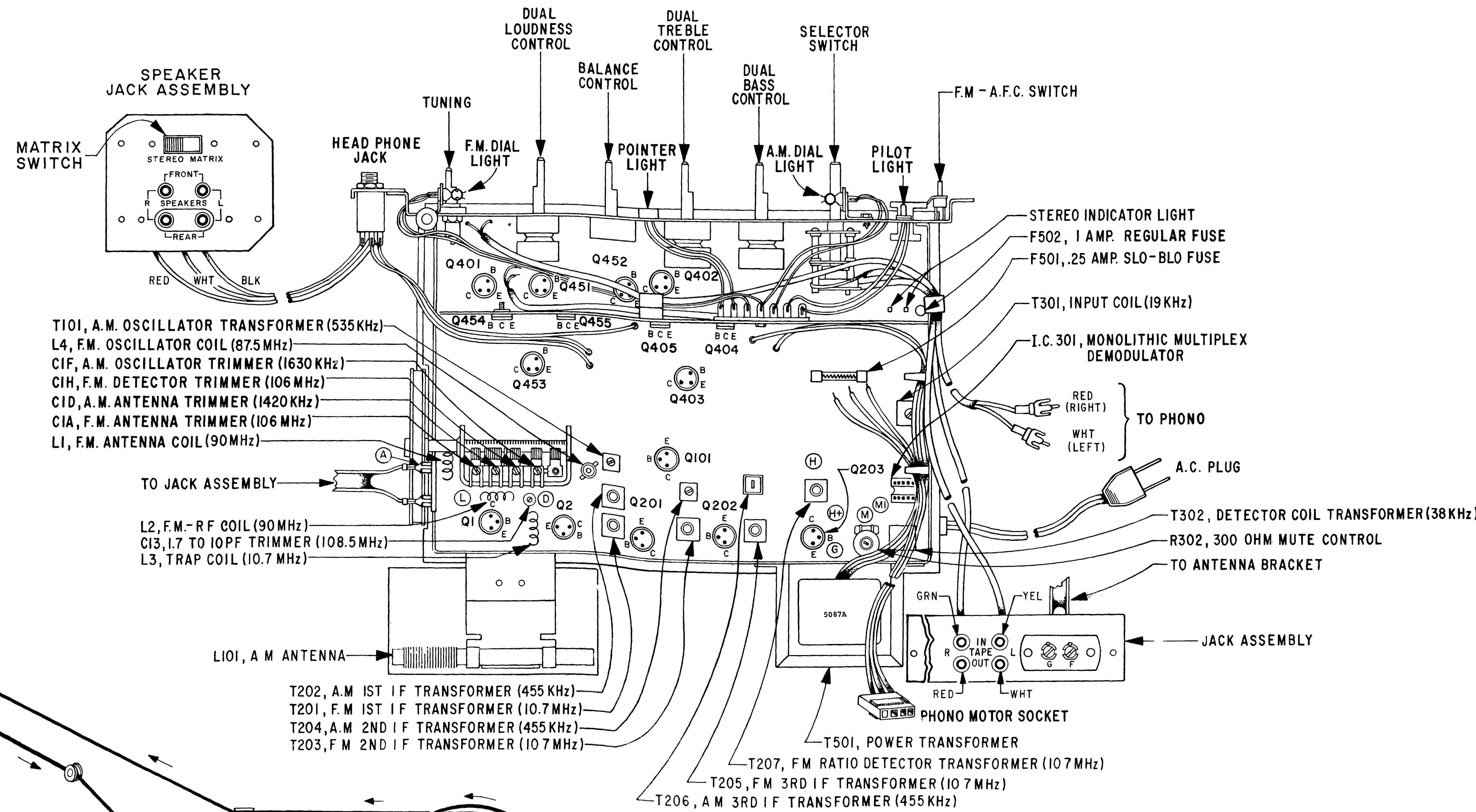
CHASSIS 3WGR52 – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE – EARLY PRODUCTION

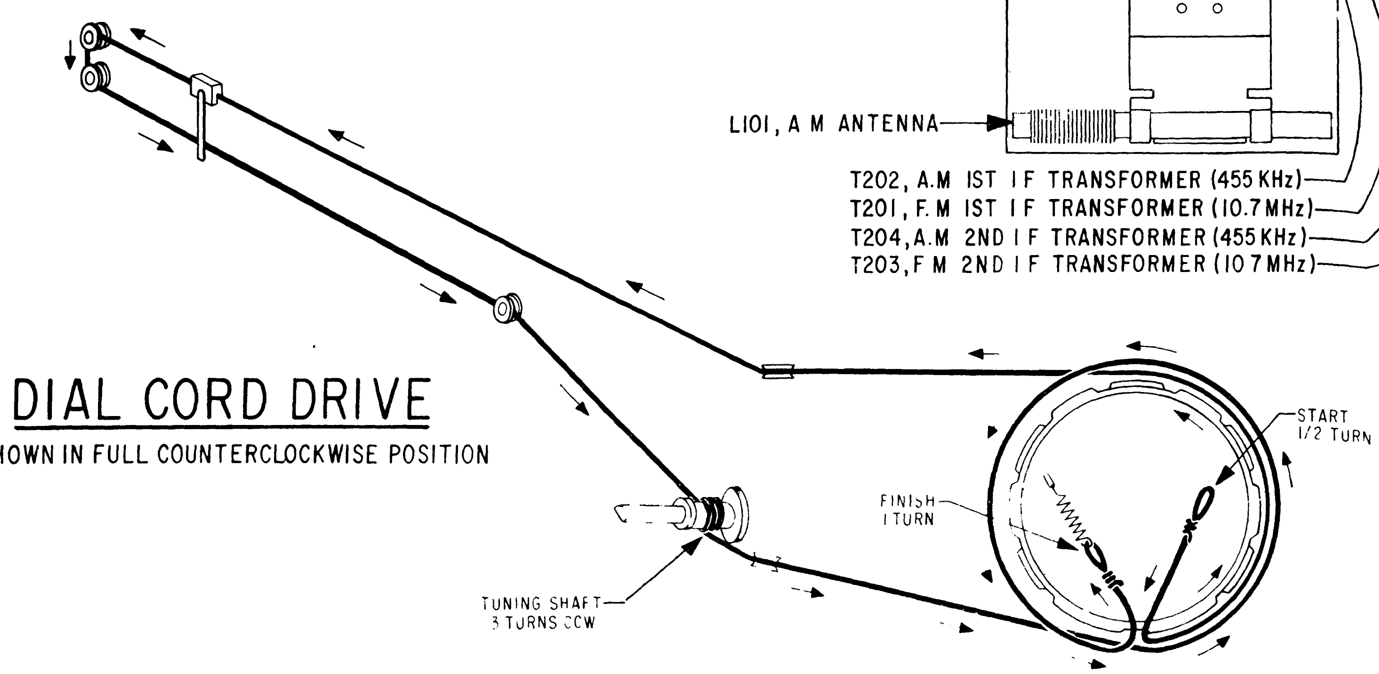


CHASSIS 3WGR52 – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE – LATE PRODUCTION

TRANSISTORS		
No.	PART No.	DESCRIPTION
Q1	121-612	F.M.-R.F.
Q2	121-613	F.M. CONVERTER
Q101	121-735	A.M. CONVERTER
Q201	121-614	A.M.-F.M. 1st I.F.
Q202	121-950	A.M.-F.M 2nd I.F.
Q203		F.M. 3rd I.F.
Q401	121-433	PRE-AMPLIFIER
Q402		PRE-DRIVER
Q403	121-1004	DRIVER
Q404	121-976	OUTPUT
Q405	121-977	
Q451	121-433	PRE-AMPLIFIER
Q452		PRE-DRIVER
Q453	121-1004	DRIVER
Q454	121-976-01	OUTPUT
Q455	121-977-01	
IC3 01	221-79-01 or 221-65	MULTIPLEX DEMODULATOR

TEST POINTS	
A	F.M. ANTENNA INPUT
D	1st F.M. I.F INPUT
G	3rd F.M. OUTPUT
H	F.M. DETECTOR OUTPUT
H+	RATIO DETECTOR PRIMARY TUNING
L	A.M. R.F. & I.F. INPUT
M	19KHz A.C. GAIN
MI	19KHz D.C. GAIN



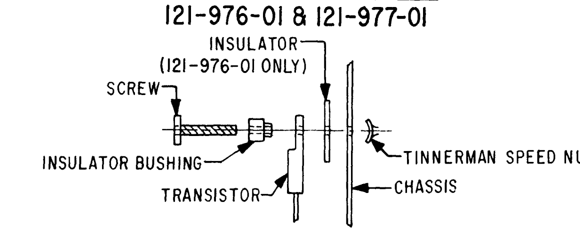


DIAL CORD DRIVE

SHOWN IN FULL COUNTERCLOCKWISE POSITION

TRANSISTOR MOUNTING VIEW

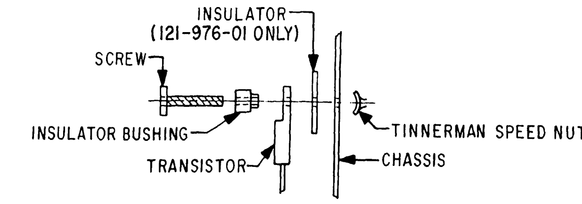
121-976-01 & 121-977-01

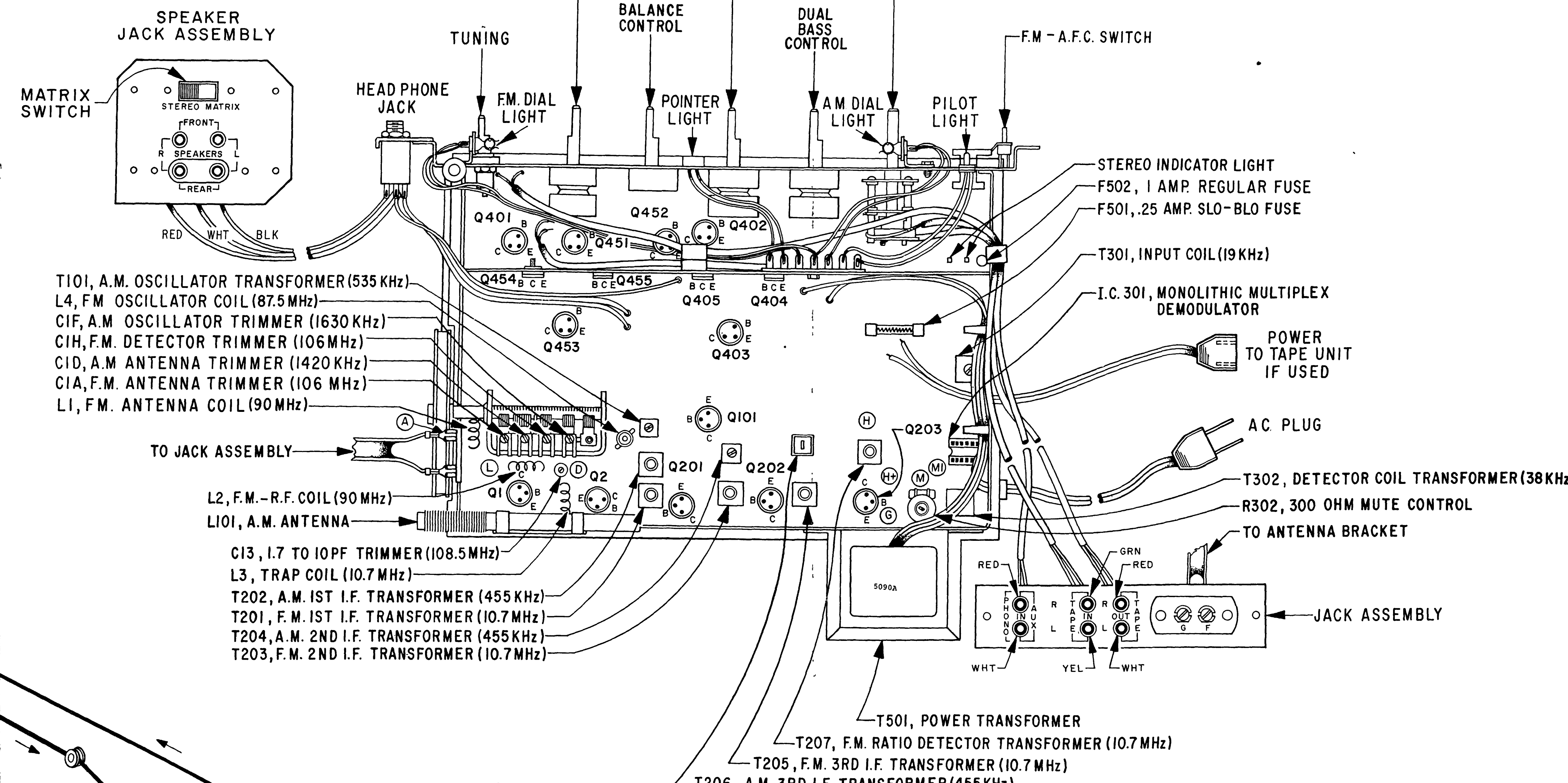


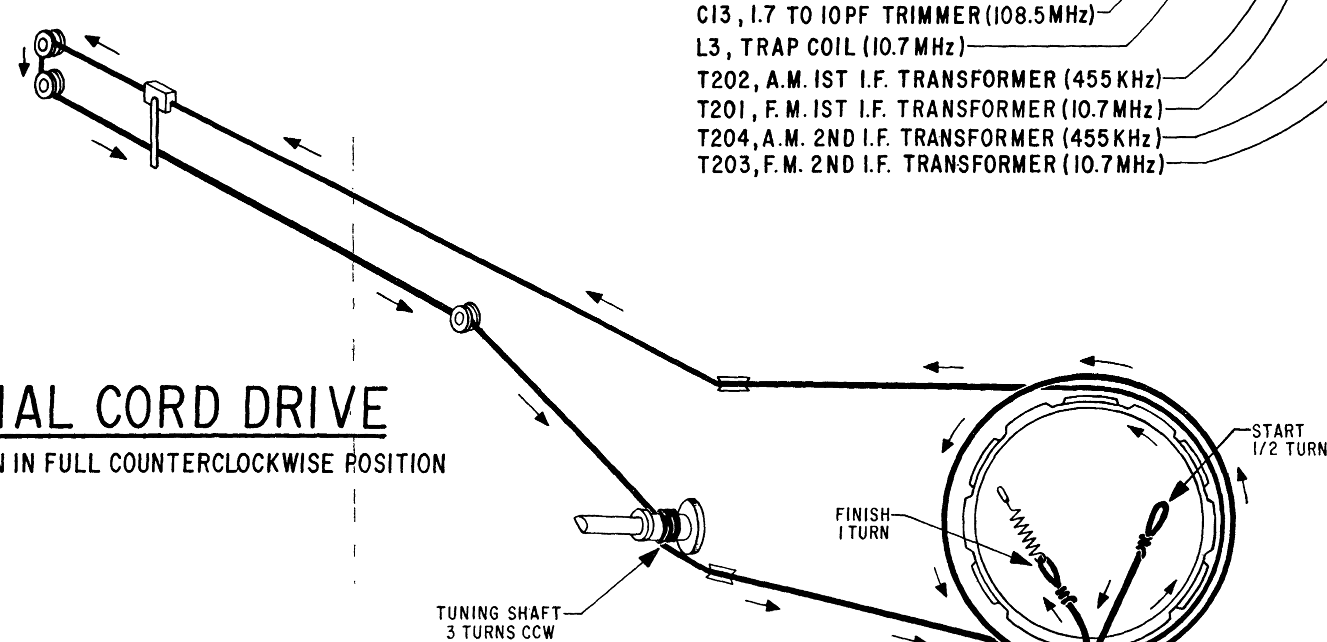
TRANSISTORS		
No.	PART No.	DESCRIPTION
Q1	121-612	F.M.-R.F.
Q2	121-613	F.M. CONVERTER
Q101	121-735	A.M. CONVERTER
Q201	121-614	A.M.-F.M. 1st I.F.
Q202	121-950	A.M.-F.M. 2nd I.F.
Q203		F.M. 3rd I.F.
Q401	121-433	PRE-AMPLIFIER
Q402		PRE-DRIVER
Q403	121-1004	DRIVER
Q404	121-976-01	OUTPUT
Q405	121-977-01	
Q451	121-433	PRE-AMPLIFIER
Q452		PRE-DRIVER
Q453	121-1004	DRIVER
Q454	121-976-01	OUTPUT
Q455	121-977-01	
IC301	221-79-01 or 221-65	MULTIPLEX DEMODULATOR

TEST POINTS	
A	F.M. ANTENNA INPUT
D	1st F.M. I.F. INPUT
G	3rd F.M. OUTPUT
H	F.M. DETECTOR OUTPUT
H+	RATIO DETECTOR PRIMARY TUNING
L	A.M. R.F. & I.F. INPUT
M	19KHz A.C. GAIN
M1	19KHz D.C. GAIN

TRANSISTOR MOUNTING VIEW
121-976-01 & 121-977-01

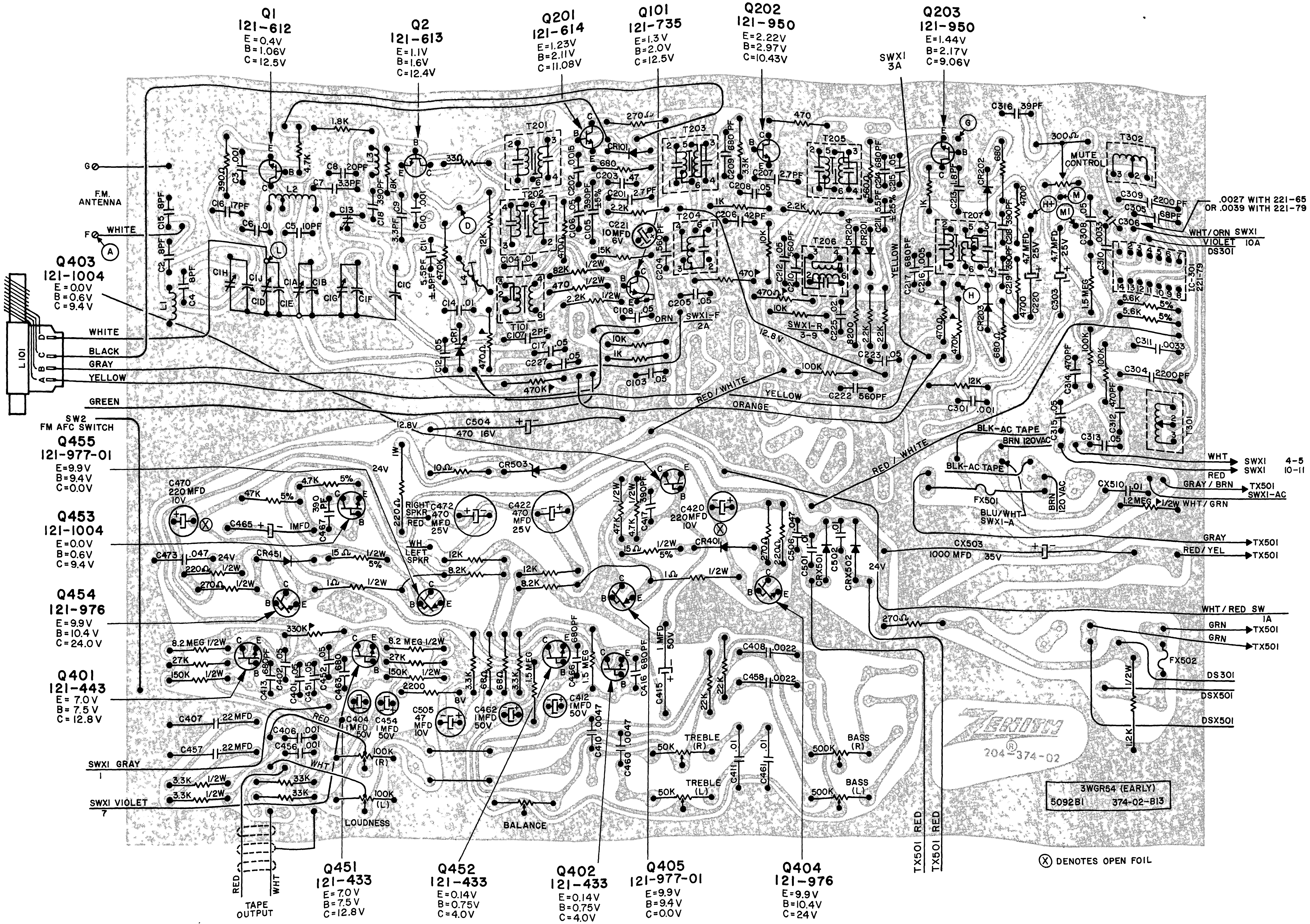




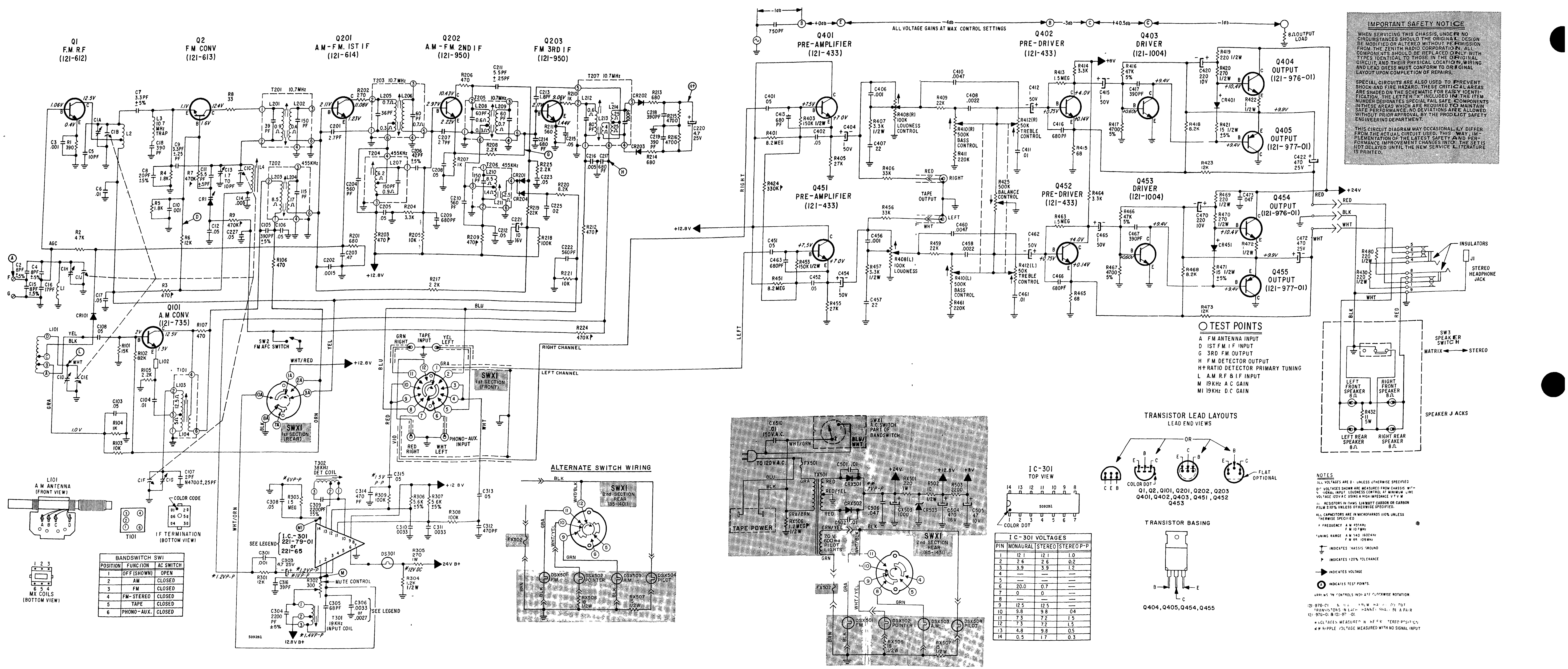


DIAL CORD DRIVE

SHOWN IN FULL COUNTERCLOCKWISE POSITION



CHASSIS 3WGR54 – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE – EARLY PRODUCTION



IMPORTANT SAFETY NOTICE

WHEN SERVICING THIS CHASSIS, UNDER NO CIRCUMSTANCES SHOULD THE ORIGINAL DESIGN BE MODIFIED OR ALTERED WITHOUT PERMISSION FROM THE ZENITH RADIO CORPORATION. ALL COMPONENTS SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL CIRCUIT, AND THEIR PHYSICAL LOCATION, WIRING AND LEAD DRESS MUST CONFORM TO ORIGINAL LAYOUT UPON COMPLETION OF REPAIRS.

SPECIAL CIRCUITS ARE ALSO USED TO PREVENT SHOCK AND FIRE HAZARD. THESE CRITICAL AREAS ARE SHADED ON THE SCHEMATIC FOR EASY IDENTIFICATION. THE LETTER "X" INCLUDED IN THE ITEM NUMBER DESIGNATES SPECIAL FAIL SAFE COMPONENTS IN THESE AREAS WHICH ARE REQUIRED TO MAINTAIN SAFE PERFORMANCE. NO DEVIATIONS ARE ALLOWED WITHOUT PRIOR APPROVAL BY THE PRODUCT SAFETY ENGINEERING DEPARTMENT.

THIS CIRCUIT DIAGRAM MAY OCCASIONALLY DIFFER FROM THE ACTUAL CIRCUIT USED. THIS WAY, IMPLEMENTATION OF THE LATEST SAFETY AND PERFORMANCE IMPROVEMENT CHANGES INTO THE SET IS NOT DELAYED UNTIL THE NEW SERVICE LITERATURE IS PRINTED.

○ TEST POINTS

- A FM ANTENNA INPUT
- D 1ST F.M. I F INPUT
- G 3RD F.M. OUTPUT
- H F M. DETECTOR OUTPUT
- H+ RATIO DETECTOR PRIMARY TUNING
- L A.M. R.F & I.F INPUT
- M 19KHz A.C GAIN
- M1 19KHz D.C GAIN

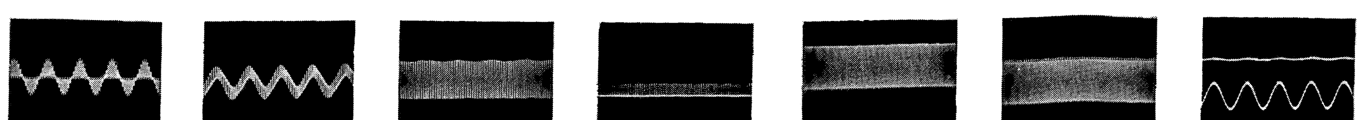
BANDSWITCH SW1

POSITION	FUNCTION	AC SWITCH
1	OFF (SHOWN)	OPEN
2	AM	CLOSED
3	FM	CLOSED
4	FM-STEREO	CLOSED
5	TAPE	CLOSED
6	PHONO-AUX.	CLOSED

I C-301 VOLTAGES

PIN	MONAURAL	STEREO	STEREO P-P
1	12 1	12.1	1.0
2	2 6	2 6	0.2
3	3.9	3.9	1.2
4	—	—	—
5	—	—	—
6	20.0	0.7	—
7	0	0	—
8	—	—	—
9	12.5	12.5	—
10	9.8	9.8	04
11	7.3	7 2	1 5
12	7 3	7.2	1.5
13	4.8	9.8	0.5
14	0.5	1.7	0.3

IC 301 WAVE FORMS



PIN 3 COMPOSITE L&R, L-R (1 KHZ LEFT ONLY) 19 KHZ PILOT 10% 1 V P/P

PIN 2 19 KHZ (WITH L ONLY) 200 MV P/P

PIN 1 19 KHZ 1.2V P/P

PIN 10 38 KHZ PULSES 80MV P/P

38 KHZ TANK END 38 KHZ 13V P/P

PIN 13 38 KHZ 1.4V P/P

PIN 12 (UPPER) RIGHT OUTPUT PIN 11 (LOWER) LEFT OUTPUT (L INPUT ONLY) 1 V P/P

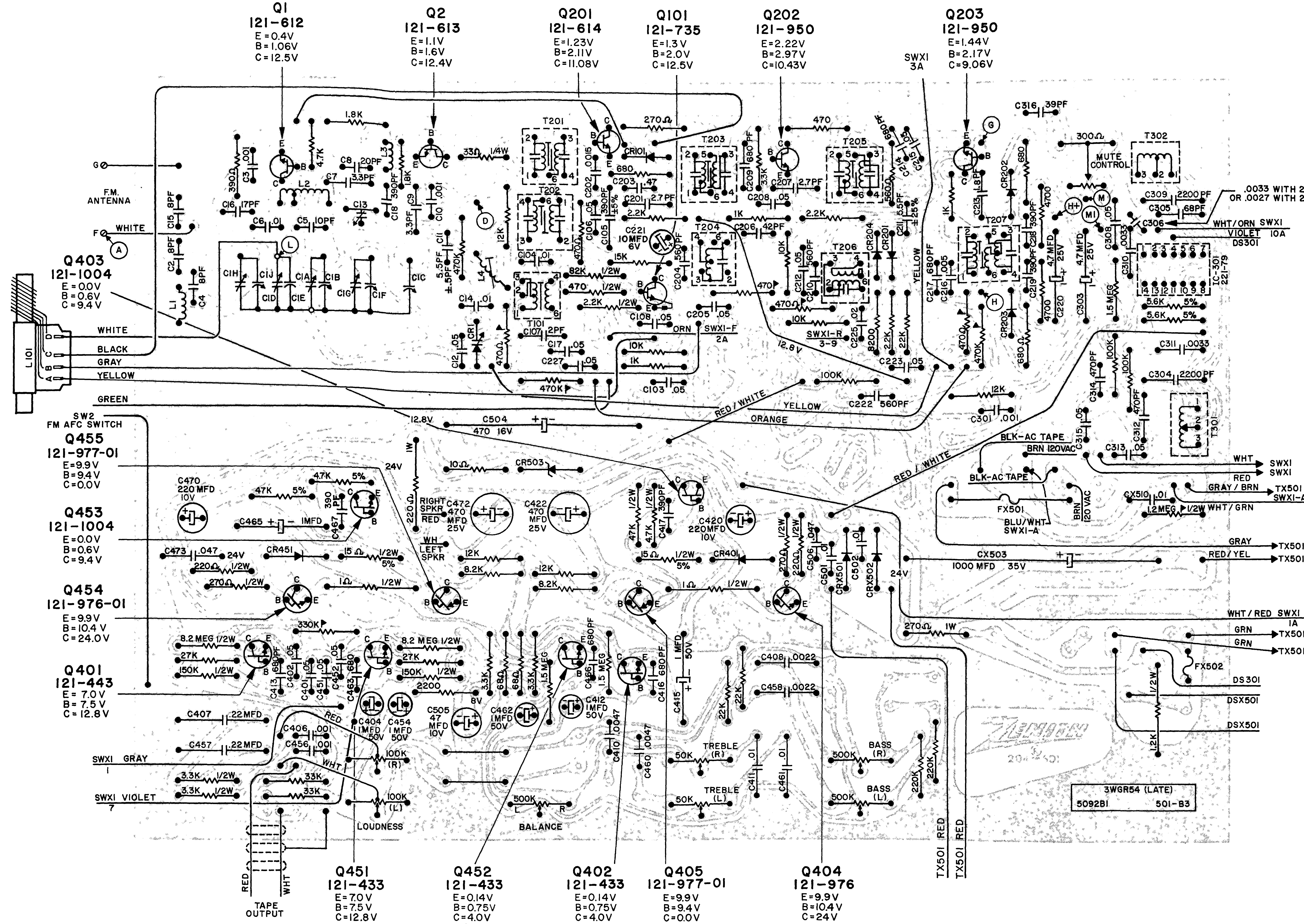
CHASSIS 3WGR54 – SCHEMATIC

LEGEND CHASSIS 3WGR54

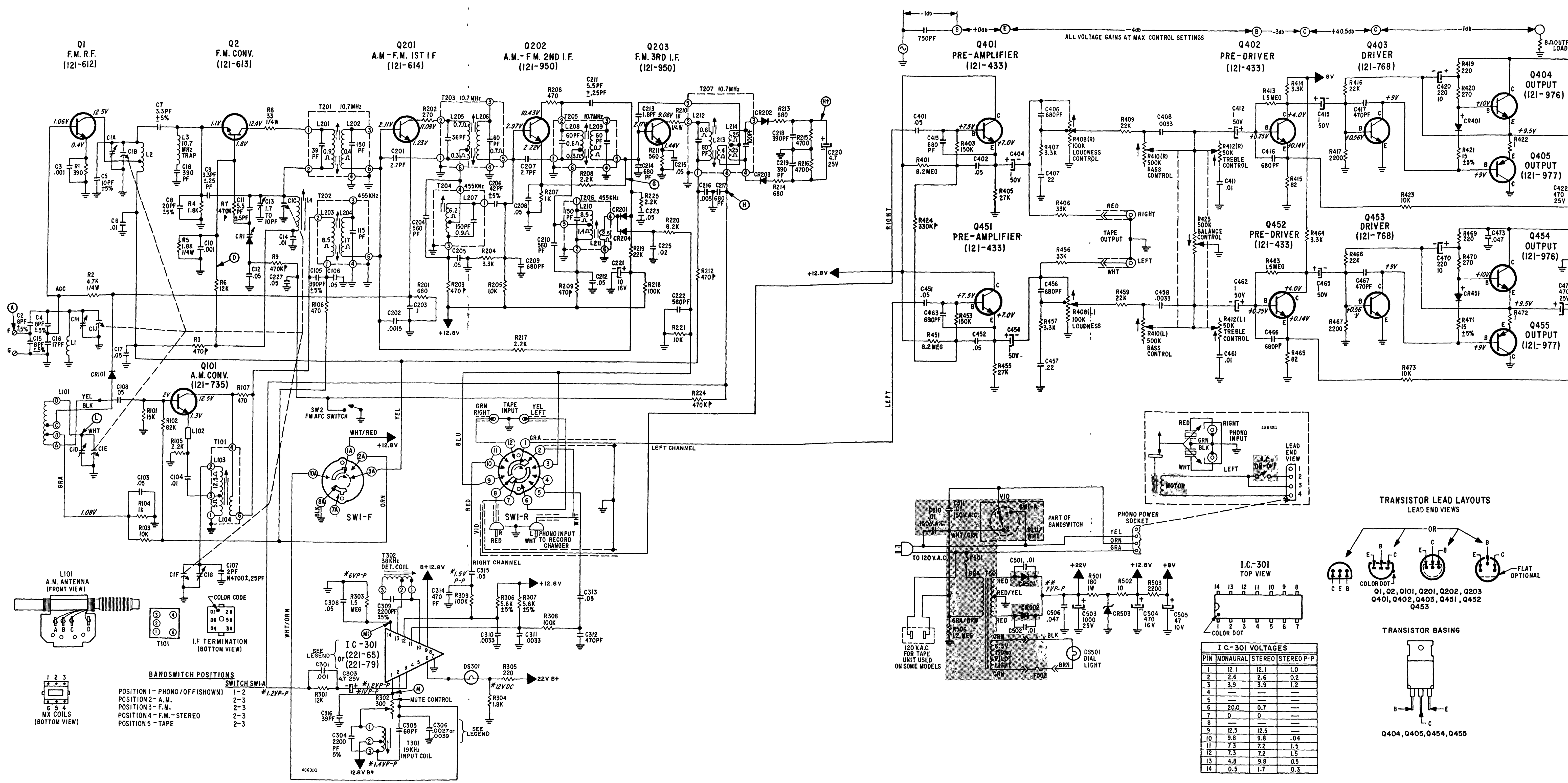
ITEM NO.	PART NUMBER	DESCRIPTION
C1A	22-7134	F.M. DETECTOR TRIMMER
C1B	22-7134	F.M. DETECTOR TUNING
C1C	22-7134	F.M. OSCILLATOR TUNING
C1D	22-7134	A.M. ANTENNA TRIMMER
C1E	22-7134	A.M. ANTENNA TUNING
C1F	22-7134	A.M. OSCILLATOR TUNING
C1G	22-7134	A.M. OSCILLATOR TRIMMER
C1H	22-7134	F.M. ANTENNA TRIMMER
C1J	22-7134	F.M. ANTENNA TUNING
C2	22-2481	8 PF DISC ± 0.5% 500V
C3	22-2729	.001 MFD DISC 25V
C4	22-2481	8 PF DISC ± 0.5% 500V
C5	22-3675	10 PF DISC ± 5% 500V
C6	22-3393	.01 MFD DISC 25V
C7	22-3541	3.3 PF GIMMICK ± 5% 500V
C8	22-3751	20 PF DISC ± 5% 500V
C9	22-5879	3.3 PF DISC ± .25 PF 25V
C10	22-2729	.001 MFD DISC 25V
C11	22-5878	5.5 PF DISC ± 0.5 PF 25V
C12	22-3034	.05 MFD DISC 25V
C13	22-4355	1.7 TO 10 PF CERAMIC TRIMMER
C14	22-3080	.005 MFD DISC 25V
C15	22-2481	8 PF DISC ± 0.5% 500V
C16	22-3792	17 PF DISC ± 5% 500V
C17	22-3034	.05 MFD DISC 25V
C18	22-3177	390 PF DISC 500V
C103	22-3034	.05 MFD DISC 25V
C104	22-3393	.01 MFD DISC 25V
C105	22-5972	390 PF ± 5% POLYSTYRENE 125V
C106	22-3034	.05 MFD DISC 25V
C107	22-4819	2 PF N4700 ± .25 PF 500V
C108	22-3034	.05 MFD DISC 25V
C201	22-3310	2.7 PF GIMMICK ± 10% 500V
C202	22-5483	.0015 MFD DISC 500V
C203	22-5487	.47 MFD DISC 3V
C204	22-5481	560 PF DISC 500V
C205	22-3034	.05 MFD DISC 25V
C206	22-3791	42 PF DISC ± 5% 500V
C207	22-3310	2.7 PF GIMMICK ± 10% 500V
C208	22-3034	.05 MFD DISC 25V
C209	22-5482	680 PF DISC 500V
C210	22-5481	560 PF DISC 500V
C211	22-3770	5.5 PF DISC ± .25 PF 500V
C212	22-3034	.05 MFD DISC 25V
C213	22-2428	1.8 PF GIMMICK ± 10% 500V
C214	22-5482	680 PF DISC 500V
C215	22-3034	.05 MFD DISC 25V
C216	22-3080	.005 MFD DISC 25V
C217	22-5482	680 PF DISC 500V
C218	22-3177	390 PF DISC 500V
C219	22-3177	390 PF DISC 500V
C220	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C221	22-7151-04	10 MFD ELECTROLYTIC 16V
C222	22-3362	560 PF DISC 500V
C223	22-3034	.05 MFD DISC 25V
C225	22-3033	.02 MFD 25V
C227	22-3034	.05 MFD DISC 25V
C301	22-2729	.001 MFD DISC 25V
C303	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C304	22-5782	2200 PF POLYSTYRENE ±5% 500V
C305	22-3608	68 PF DISC 500V
C306	22-13	.0033 MFD DISC (USED WITH 221-79-01) 500V
	OR	
	22-7191	.0027 MFD DISC (USED WITH 221-65) 500V
C308	22-3034	.05 MFD DISC 25V
C309	22-5782	2200 PF POLYSTYRENE ± 5% 500V
C310	22-13	.0033 MFD DISC 500V
C311	22-13	.0033 MFD 500V
C312	22-16	470 PF DISC 500V
C313	22-3034	.05 MFD DISC 25V
C314	22-16	470 PF DISC 500V
C315	22-3034	.05 MFD DISC 25V
C316	22-3381	39 PF ± 5% DISC 500V
C401	22-3034	.05 MFD DISC 25V
C402	22-3034	.05 MFD DISC 25V
C404	22-7153	1 MFD ELECTROLYTIC 50V
C406	22-5688	.001 MFD DISC 500V
C407	22-6048	.22 MFD MYLAR 50V
C408	22-5687	.0022 MFD DISC 500V
C410	22-14	.0047 MFD DISC 500V
C411	22-3513	.01 MFD DISC 500V
C412	22-7153	1 MFD ELECTROLYTIC 50V
C413	22-2939	680 PF DISC 500V
C415	22-7143	1 MFD ELECTROLYTIC 50V
C416	22-2939	680 PF DISC 500V
C417	22-3177	390 PF DISC 500V
C420	22-7150-09	220 MFD ELECTROLYTIC 10V
C422	22-7152-11	470 MFD ELECTROLYTIC 25V
C451	22-3034	.05 MFD DISC 25V
C452	22-3034	.05 MFD DISC 25V
C454	22-7153	1 MFD ELECTROLYTIC 50V
C456	22-5688	.001 MFD DISC 500V
C457	22-6048	.22 MFD MYLAR 50V
C458	22-5687	.0022 MFD DISC 500V
C460	22-14	.0047 MFD DISC 500V
C461	22-3513	.01 MFD DISC 500V
C462	22-7153	1 MFD ELECTROLYTIC 50V
C463	22-2939	680 PF DISC 500V
C465	22-7143	1 MFD ELECTROLYTIC 50V
C466	22-2939	680 PF DISC 500V
C467	22-3177	390 PF DISC 500V
C470	22-7150-09	220 MFD ELECTROLYTIC 10V
C472	22-7152-11	470 MFD ELECTROLYTIC 25V
C473	22-6447-01	.047 MFD MYLAR 100V
C501	22-4617	.01 MFD DISC 500V
C502	22-4617	.01 MFD DISC 500V
CX503	22-7144-12	1000 MFD ELECTROLYTIC 35V
C504	22-7141-11	470 MFD ELECTROLYTIC 16V
C505	22-7150-07	47 MFD ELECTROLYTIC 10V
C506	22-6447-01	.047 MFD MYLAR 100V
CX510	22-6005	.01 MFD DISC 150 VAC
R1	63-9921-62	390 OHM 5% (ALT 63-7768 1/2 W 10%)
R2	63-4213	4.7K OHM
R3	63-9921-64	470 OHM 5% (ALT 63-7772 1/2 W 20%)
R4	63-9921-78	1.8K OHM 5% (ALT 63-7796 1/2 W 10%)
R5	63-9921-78	1.8K OHM 5% (ALT 63-10183-78 1/4 W 10%)
R6	63-9921-98	12K OHM 5% (ALT 63-7831 1/2 W 10%)
R7	63-9922-36	470K OHM 5% (ALT 63-7898 1/2 W 10%)
R8	63-4122	33 OHM
R9	63-9922-36	470K OHM 5% (ALT 63-7898 1/2 W 20%)
R101	63-9922	15K OHM 5% (ALT 63-7834 1/2 W 10%)
R102	63-1866	82K OHM 1/2 W
R103	63-9921-96	10K OHM 5% (ALT 63-7827 1/2 W 10%)
R104	63-9921-72	1K OHM 5% (ALT 63-7785 1/2 W 10%)
R105	63-1799	2.2K OHM 1/2 W
R106	63-9921-64	470 OHM 5% (ALT 63-7771 1/2 W 10%)
R107	63-1771	470 OHM 1/2 W
R201	63-9921-68	680 OHM 5% (ALT 63-7778 1/2 W 10%)
R202	63-9921-58	270 OHM 5% (ALT 63-7761 1/2 W 10%)
R203	63-9921-64	470 OHM 5% (ALT 63-7772 1/2 W 20%)
R204	63-9921-84	3.3K OHM 5% (ALT 63-7806 1/2 W 10%)
R205	63-9921-96	10K OHM 5% (ALT 63-7827 1/2 W 10%)
R206	63-9921-64	470 OHM 5% (ALT 63-7771 1/2 W 10%)
R207	63-9921-72	1K OHM 5% (ALT 63-7785 1/2 W 10%)
R208	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2 W 10%)
R209	63-9921-64	470 OHM 5% (ALT 63-7772 1/2 W 20%)
R210	63-9921-72	1K OHM 5% (ALT 63-10183-72 1/4 W 10%)
R211	63-9921-66	560 OHM 5% (ALT 63-7775 1/2 W 10%)
R212	63-9921-64	470 OHM 5% (ALT 63-7772 1/2 W 20%)
R213	63-9921-68	680 OHM 5% (ALT 63-7778 1/2 W 10%)
R214	63-9921-68	680 OHM 5% (ALT 63-7778 1/2 W 10%)
R215	63-9921-88	4.7K OHM 5% (ALT 63-7813 1/2 W 10%)
R216	63-9921-88	4.7K OHM 5% (ALT 63-7813 1/2 W 10%)
R217	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2 W 10%)
R218	63-9922-20	100K OHM 5% (ALT 63-7869 1/2 W 10%)
R219	63-9922-04	22K OHM 5% (ALT 63-7841 1/2 W 10%)
R220	63-9921-94	8.2K OHM 5% (ALT 63-7824 1/2 W 10%)
R221	63-9921-96	10K OHM 5% (ALT 63-7827 1/2 W 10%)
R224	63-9922-36	470K OHM 5% (ALT 63-7898 1/2 W 20%)
R225	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2 W 10%)

ITEM NO.	PART NUMBER	DESCRIPTION
R301	63-9921-98	12K OHM 5% (ALT 63-7831 1/2 W 10%)
R302	63-6328	300 OHM MUTE CONTROL
R303	63-9924-48	1.5 MEG OHM (ALT 63-7918 1/2 W 10%)
R304	63-1789	1.2K OHM 1/2 W 10%
R305	63-6045	270 OHM 1 W
R306	63-9921-90	5.6K OHM 5% (ALT 63-7816 1/2 W 5%)
R307	63-9921-90	5.6K OHM 5% (ALT 63-7816 1/2 W 5%)
R308	63-9922-20	100K OHM 5% (ALT 63-7869 1/2 W 10%)
R309	63-9922-20	100K OHM 5% (ALT 63-7869 1/2 W 10%)
R401	63-7950	8.2 MEG OHM 1/2 W
R403	63-1876	150K OHM 1/2 W
R405	63-9922-06	27K OHM 5% (ALT 63-7845 1/2 W 10%)
R406	63-9922-08	33K OHM 5% (ALT 63-7848 1/2 W 10%)
R407	63-1806	3.3K OHM 1/2 W
R408R, R408L	63-9255	100K DUAL LOUDNESS CONTROL (ALT 63-10160)
R409	63-9922-04	22K OHM 5% (ALT 63-7841 1/2 W 10%)
R410R, R410L	63-9257	500K DUAL BASS CONTROL (ALT 63-10162)
R411	63-9922-28	220K OHM 5% (ALT 63-7883 1/2 W 10%)
R412R, R412L	63-9256	50K DUAL TREBLE CONTROL (ALT 63-10161)
R413	63-9924-48	1.5 MEG OHM (ALT 63-7918 1/2 W 10%)
R414	63-9921-84	3.3K OHM 5% (ALT 63-7806 1/2 W 10%)
R415	63-9921-44	68 OHM 5% (ALT 63-7736 1/2 W 10%)
R416	63-9922-12	47K OHM 5% (ALT 63-7854 1/2 W 5%)
R417	63-9921-88	4.7K OHM 5% (ALT 63-7812 1/2 W 5%)
R418	63-9921-94	8.2K OHM 5% (ALT 63-7824 1/2 W 10%)
R419	63-9946-56	220 OHM 1/2 W 5% (ALT 63-7757 1/2 W 10%)
R420	63-9946-58	270 OHM 1/2 W 5% (ALT 63-7761 1/2 W 10%)
R421	63-9946-28	15 OHM 1/2 W 5% (ALT 63-7707 1/2 W 5%)
R422	63-4501	1 OHM 1/2 W
R423	63-9921-98	12K OHM 5% (ALT 63-7831 1/2 W 10%)
R424	63-9922-32	330K OHM 5% (ALT 63-7891 1/2 W 20%)
R425	63-9254	500K BALANCE CONTROL (ALT 63-10159)
R430	63-1757	220 OHM 1/2 W
R432	63-10135	11 OHM 5 W
R451	63-7950	8.2 MEG OHM 1/2 W
R453	63-1876	150K OHM 1/2 W
R455	63-9922-06	27K OHM 5% (ALT 63-7845 1/2 W 10%)
R456	63-9922-08	33K OHM 5% (ALT 63-7848 1/2 W 10%)
R457	63-1806	3.3K OHM 1/2 W
R459	63-9922-04	22K OHM 5% (ALT 63-7841 1/2 W 10%)
R461	63-9922-28	220K OHM 5% (ALT 63-7883 1/2W 10%)
R463	63-9924-48	1.5 MEG OHM 10% (ALT 63-7918 1/2 W 10%)
R464	63-9921-84	3.3K OHM 5% (ALT 63-7806 1/2 W 10%)
R465	63-9921-44	68 OHM 5% (ALT 63-7736 1/2 W 10%)
R466	63-9922-12	47K OHM 5% (ALT 63-7854 1/2 W 5%)
R467	63-9921-88	4.7K OHM 5% (ALT 63-7812 1/2 W 5%)
R468	63-9921-94	8.2K OHM 5% (ALT 63-7824 1/2 W 10%)
R469	63-9946-56	220 OHM 1/2 W 5% (ALT 63-7757 1/2 W 10%)
R470	63-9946-58	270 OHM 1/2 W 5% (ALT 63-7761 1/2 W 10%)
R471	63-9946-28	15 OHM 1/2 W 5% (ALT 63-7707 1/2 W 5%)
R472	63-4501	1 OHM 1/2 W
R473	63-9921-98	12K OHM 5% (ALT 63-7831 1/2 W 10%)
R480	63-1757	220 OHM 1/2 W
RX501	63-6042	220 OHM 1 W
R502	63-9946-24	10 OHM 1/2 W (ALT 63-7701 1/2 W 10%)
R503	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2 W 10%)
RX506	63-10626-03	1.2 MEG OHM ± 20% 1/2 W
RX507	63-1708	15 OHM 1/2 W
RX508	63-1712	18 OHM 1/2 W
L1	20-3291	FM ANTENNA COIL
L2	20-1648	FM RF COIL
L3	20-1631	TRAP COIL 10.7 MHz
L4	20-3597	FM OSCILLATOR COIL
L101	S-93292-01	AM ANTENNA ASSEMBLY
L102	149-311	FERRITE CORE SLEEVE
L103	IN T101	AM OSCILLATOR TRANS. PRI.
L104	IN T101	AM OSCILLATOR TRANS. SEC
L201	IN T201	1ST IF TRANS. 10.7 MHz PRI.
L202	IN T201	1ST IF TRANS. 10.7 MHz SEC.
L203	IN T202	1ST IF AM 455 KHz PRI.
L204	IN T202	1ST IF AM 455 KHz SEC.
L205	IN T203	2ND IF TRANS. 10.7 MHz PRI.
L206	IN T203	2ND IF TRANS. 10.7 MHz SEC.
L207	IN T204	2ND IF AM 455 KHz
L208	IN T205	3RD IF TRANS. 10.7 MHz PRI
L209	IN T205	3RD IF TRANS. 10.7 MHz SEC.
L210	IN T206	3RD IF AM 455 KHz PRI.
L211	IN T206	3RD IF AM 455 KHz SEC.
L212	IN T207	RATIO DETECTOR TRANS. 10.7 MHz PRI.
L213	IN T207	RATIO DETECTOR TRANS. 10.7 MHz TERTIARY
L214	IN T207	RATIO DETECTOR TRANS. 10.7 MHz SEC.
T101	95-3077	AM OSCILLATOR TRANSFORMER
T201	95-2546	FM 1ST IF TRANS. 10.7 MHz
T202	95-2541	AM 1ST IF AM455 KHz
T203	95-2547	FM 2ND IF TRANS. 10.7 MHz
T204	95-2542	AM 2ND IF AM 455 KHz
T205	95-2548	FM 3RD IF TRANS. 10.7 MHz
T206	94-2689	AM 3RD IF AM 455 KHz
T207	95-2545	FM RATIO DETECTOR 10.7 MHz
T301	95-3021	INPUT COIL 19 KHz
T302	95-3023	DETECTOR COIL 38 KHz
TX501	95-3212	POWER TRANSFORMER
SWX1	85-1431	BAND SWITCH (ALT. 85-1401-01)
SW2	85-1372-01	AFC SWITCH (SLIDE SP-DT)
SW3	85-1466	SPEAKER SWITCH (SLIDE 3P-DT)
J1	78-2137-01	STEREO HEADPHONE JACK
CR1	103-47 OR 103-189	AFC DIODE
CR101	103-142-01	SILICON DIODE
CR201	103-23-01	GERMANIUM DIODE
CR202	103-90	GERMANIUM DIODES (MATCHED PAIR)
CR203	103-90	GERMANIUM DIODES (MATCHED PAIR)
CR204	103-23	GERMANIUM DIODE
CR401	103-222	DIODE
CR451	103-222	DIODE
CRX501	212-76	SILICON RECTIFIER
CRX502	212-76	SILICON RECTIFIER
CR503	103-96	DIODE
IC-301	221-79-01 OR 221-65	MONOLITHIC MULTIPLEX DEMODULATOR (SEE C306)
DSX501	100-604	FM DIAL LIGHT
DSX502	100-625	POINTER LIGHT
DSX503	100-604	AM DIAL LIGHT
DSX504	100-610	PILOT LIGHT
DS301	100-611	STEREO INDICATOR LIGHT
PC	204-601	PRINTED CIRCUIT BOARD
FX501	136-117-10	.25 AMP SLO-BLO FUSE
FX502	136-116-15	1 AMP REGULAR FUSE

509282



CHASSIS 3WGR54 – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE – LATE PRODUCTION



I C.-301 VOLTAGES			
PIN	MONAURAL	STEREO	STEREO P-P
1	12.1	12.1	1.0
2	2.6	2.6	0.2
3	3.9	3.9	1.2
4	—	—	—
5	—	—	—
6	20.0	0.7	—
7	0	0	—
8	—	—	—
9	12.5	12.5	—
10	9.8	9.8	.04
11	7.3	7.2	1.5
12	7.3	7.2	1.5
13	4.8	9.8	0.5
14	0.5	1.7	0.3

IMPORTANT SAFETY NOTICE

WHEN SERVICING THIS CHASSIS, UNDER NO CIRCUMSTANCES SHOULD THE ORIGINAL DESIGN BE MODIFIED OR ALTERED WITHOUT PERMISSION FROM THE ZENITH RADIO CORPORATION. ALL COMPONENTS SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL CIRCUIT. SPECIAL COMPONENTS ARE USED TO PREVENT SHOCK AND FIRE HAZARD. THESE CRITICAL COMPONENTS ARE SHADED ON THE SCHEMATIC AND PARTS LISTS FOR EASY IDENTIFICATION.

THIS CIRCUIT DIAGRAM MAY OCCASIONALLY DIFFER FROM THE ACTUAL CIRCUIT USED. THIS WAY, IMPLEMENTATION OF THE LATEST SAFETY AND PERFORMANCE IMPROVEMENT CHANGES INTO THE SET IS NOT DELAYED UNTIL THE NEW SERVICE LITERATURE IS PRINTED.

○ TEST POINTS

A F.M. ANTENNA INPUT
D 1ST F.M. I.F INPUT
G 3RD F.M. OUTPUT
H F.M. DETECTOR OUTPUT
H+ RATIO DETECTOR PRIMARY TUNING
L A.M. RF & I F INPUT
M 19KHz A C GAIN
M1 19KHz D C GAIN

NOTES:

ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.

D.C. VOLTAGES SHOWN ARE MEASURED FROM CHASSIS, WITH NO SIGNAL INPUT, LOUDNESS CONTROL AT MINIMUM LINE VOLTAGE 120V.A.C USING A HIGH IMPEDANCE V.T.V.M.

ALL RESISTORS IN OHMS, 1/2 WATT CARBON, ±10% UNLESS OTHERWISE SPECIFIED.

ALL CAPACITORS ARE IN MICROFARADS ±10% UNLESS OTHERWISE SPECIFIED.

I.F. FREQUENCY: A.M 455KHz
F.M. 10.7MHz

TUNING RANGE A.M. 540–1600KHz
F.M. 88–108MHz

INDICATES CHASSIS GROUND.

INDICATES ±20% TOLERANCE.

INDICATES VOLTAGE.

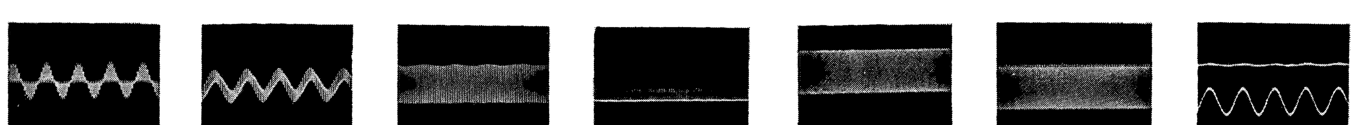
INDICATES TEST POINTS.

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION.

121-976 IS INSULATED FROM CHASSIS. OUTPUT TRANSISTORS IN EACH CHANNEL SHALL BE A PAIR 121-976 & 121-977

*VOLTAGES MEASURED IN THE F.M. STEREO POSITION.
**RIPPLE VOLTAGE MEASURED WITH NO SIGNAL INPUT.

IC 301 WAVE FORMS



PIN 3 COMPOSITE L&R, L-R (1 KHZ LEFT ONLY) 19 KHZ PILOT 10% 1 V P/P — PIN 2 19 KHZ (WITH L ONLY) 200 MV P/P — PIN 1 19 KHZ 1.2V P/P — PIN 10 38KHZ PULSES 80MV P/P — 38 KHZ TANK END 38 KHZ 13V P/P — PIN 13 38 KHZ 1.4V P/P — PIN 12 (UPPER) RIGHT OUTPUT PIN 11 (LOWER) LEFT OUTPUT (L INPUT ONLY) 1 V P/P

CHASSIS 5WFR50 – SCHEMATIC

LEGEND CHASSIS 5WFR50

ITEM NO.	PART NUMBER	DESCRIPTION
C1A		FM DETECTOR TRIMMER
C1B		FM DETECTOR TUNING
C1C		FM OSCILLATOR TUNING
C1D		AM ANTENNA TRIMMER
C1E		AM ANTENNA TUNING
C1F	22-7134	AM OSCILLATOR TUNING
C1G		AM OSCILLATOR TRIMMER
C1H		FM ANTENNA TRIMMER
C1J		FM ANTENNA TUNING
C2	22-2481	8 PF DISC ± 0.5% 500V
C3	22-2729	.001 MFD DISC 25V
C4	22-2481	8 PF DISC ± 0.5% 500V
C5	22-3675	10 PF DISC ± 5% 500V
C6	22-3393	.01 MFD DISC 25V
C7	22-3541	3.3 PF GIMMICK ± 5% 500V
C8	22-3751	20 PF DISC ± 5% 500V
C9	22-5879	3.3 PF DISC ± .25 PF 25V
C10	22-2729	.001 MFD DISC 25V
C11	22-5878	5.5 PF DISC ± 0.5 PF 25V
C12	22-3034	.05 MFD DISC 25V
C13	22-4855	1.7 TO 10 PF CERAMIC TRIMMER
C14	22-3393	.01 MFD DISC 25V
C15	22-2481	8 PF DISC ± 0.5% 500V
C16	22-3792	17 PF DISC ± 5% 500V
C17	22-3034	.05 MFD DISC 25V
C18	22-3177	390 PF DISC 500V
C103	22-3034	.05 MFD DISC 25V
C104	22-3393	.01 MFD DISC 25V
C105	22-5972	390 PF ± 5% POLYSTYRENE 125V
C106	22-3034	.05 MFD DISC 25V
C107	22-4819	2 PF N4700 ± .25 PF 500V
C108	22-3034	.05 MFD DISC 25V
C201	22-3310	2.7 PF GIMMICK ± 10% 500V
C202	22-5483	.0015 MFD DISC 500V
C203	22-5487	.47 MFD DISC 3V
C204	22-5481	560 PF DISC 500V
C205	22-3034	.05 MFD DISC 25V
C206	22-3791	42 PF DISC ± 5% 500V
C207	22-3310	2.7 PF GIMMICK ± 10% 500V
C208	22-3034	.05 MFD DISC 25V
C209	22-5482	680 PF DISC 500V
C210	22-5481	560 PF DISC 500V
C211	22-3770	5.5 PF DISC ± .25 PF 500V
C212	22-3034	.05 MFD DISC 25V
C213	22-2428	1.8 PF GIMMICK ± 10% 500V
C214	22-5482	680 PF DISC 500V
C215	22-3034	.05 MFD DISC 25V
C216	22-3080	.005 MFD DISC 25V
C217	22-2939	680 PF DISC 500V
C218	22-3177	390 PF DISC 500V
C219	22-3177	390 PF DISC 500V
C220	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C221	22-7151-04	10 MFD ELECTROLYTIC 16V
C222	22-3362	560 PF DISC 500V
C223	22-3034	.05 MFD DISC 25V
C225	22-3033	.02 MFD 25V
C227	22-3034	.05 MFD DISC 25V
C301	22-2729	.001 MFD DISC 25V
C303	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C304	22-5782	2200 PF POLYSTYRENE ± 5% 500V
C305	22-3608	68 PF DISC 500V
C306	22-7191 OR 22-6581	.0027 MFD DISC 500V (USED WITH 221-65) .0039 MFD DISC 500V (USED WITH 221-79)
C308	22-3034	.05 MFD DISC 25V
C309	22-5782	2200 PF POLYSTYRENE ± 5% 500V
C310	22-13	.0033 MFD DISC 500V
C311	22-13	.0033 MFD DISC 500V
C312	22-16	470 PF DISC 500V
C313	22-3034	.05 MFD DISC 25V
C314	22-16	470 PF DISC 500V
C315	22-3034	.05 MFD DISC 25V
C316	22-3381	39 PF ± 5% DISC 500V
C401	22-3034	.05 MFD DISC 25V
C402	22-3034	.05 MFD DISC 25V
C404	22-7153	1 MFD ELECTROLYTIC 50V
C406	22-2939	680 PF DISC 500V
C407	22-6048	.22 MFD MYLAR 50V
C408	22-13	.0033 MFD DISC 500V
C411	22-3513	.01 MFD DISC 500V
C412	22-7153	1 MFD ELECTROLYTIC 50V
C413	22-2939	680 PF DISC 500V
C415	22-7143	1 MFD ELECTROLYTIC 50V
C416	22-2939	680 PF DISC 500V
C417	22-16	.00047 MFD DISC 500V
C420	22-7150-09	220 MFD ELECTROLYTIC 10V
C422	22-7152-11	470 MFD ELECTROLYTIC 25V
C451	22-3034	.05 MFD DISC 25V
C452	22-3034	.05 MFD DISC 25V
C454	22-7153	1 MFD ELECTROLYTIC 50V
C456	22-2939	680 PF DISC 500V
C457	22-6048	.22 MFD MYLAR 50V
C458	22-13	.0033 MFD DISC 500V
C461	22-3513	.01 MFD DISC 500V
C462	22-7153	1 MFD ELECTROLYTIC 50V
C463	22-2939	680 PF DISC 500V
C465	22-7143	1 MFD ELECTROLYTIC 50V
C466	22-2939	680 PF DISC 500V
C467	22-16	.00047 MFD DISC 500V
C470	22-7150-09	220 MFD ELECTROLYTIC 10V
C472	22-7152-11	470 MFD ELECTROLYTIC 25V
C473	22-6447-01	.047 MFD MYLAR 20% 100V
C501	22-4617	.01 MFD DISC 500V
C502	22-4617	.01 MFD DISC 500V
C503	22-7142-12	1000 MFD ELECTROLYTIC 25V
C504	22-7141-11	470 MFD ELECTROLYTIC 16V
C505	22-7150-07	47 MFD ELECTROLYTIC 10V
C506	22-6447-01	.047 MFD MYLAR 20% 100V
C510	22-6005	.01 MFD DISC 150VAC
C511	22-6005	.01 MFD DISC 150VAC
R1	63-1768	390 OHM
R2	63-4213	4.7K OHM 1/4W
R3	63-1772	470 OHM 20%
R4	63-1796	1.8K OHM
R5	63-4196	1.8K OHM 1/4W
R6	63-1831	12K OHM
R7	63-1898	470K OHM 20%
R8	63-4122	33 OHM 1/4W
R9	63-1898	470K OHM 20%
R101	63-1834	15K OHM
R102	63-1866	82K OHM
R103	63-1827	10K OHM
R104	63-1785	1K OHM
R105	63-1799	2.2K OHM
R106	63-1771	470 OHM
R107	63-1771	470 OHM
R201	63-1778	680 OHM
R202	63-1761	270 OHM
R203	63-1772	470 OHM 20%
R204	63-1806	3.3K OHM
R205	63-1827	10K OHM
R206	63-1771	470 OHM
R207	63-1785	1K OHM
R208	63-1799	2.2K OHM
R209	63-1772	470 OHM 20%
R210	63-4185	1K OHM 1/4W
R211	63-1775	560 OHM
R212	63-1772	470 OHM 20%

ITEM NO.	PART NUMBER	DESCRIPTION
R213	63-1778	680 OHM
R214	63-1778	680 OHM
R215	63-1813	4700 OHM
R216	63-1813	4700 OHM
R217	63-1799	2.2K OHM
R218	63-1869	100K OHM
R219	63-1841	22K OHM
R220	63-1824	8200 OHM
R221	63-1827	10K OHM
R224	63-1898	470K OHM 20%
R225	63-1799	2.2K OHM
R301	63-1831	12K OHM
R302	63-8328	300 OHM MUTE CONTROL
R303	63-1918	1.5 MEG OHM
R304	63-1796	1.8K OHM
R305	63-1757	220 OHM
R306	63-1816	5.6K OHM 5%
R307	63-1816	5.6K OHM 5%
R308	63-1869	100K OHM
R309	63-1869	100K OHM
R401	63-1950	8.2 MEG OHM
R403	63-1876	150K OHM
R405	63-1845	27K OHM
R406	63-1848	33K OHM
R407	63-1806	3.3K OHM
R408R, R408L	63-9255	100K DUAL LOUDNESS CONTROL (ALTERNATE 63-10160)
R409	63-1841	22K OHM
R410R, R410L	63-9257	500K DUAL BASS CONTROL (ALTERNATE 63-10162)
R412R, R412L	63-9256	50K DUAL TREBLE CONTROL (ALTERNATE 63-10161)
R413	63-1918	1.5 MEG OHM
R414	63-1806	3.3K OHM
R415	63-1740	82 OHM
R416	63-1841	22K OHM
R417	63-1799	2200 OHM
R419	63-1757	220 OHM
R420	63-1761	270 OHM
R421	63-1707	15 OHM 5%
R422	63-4501	1 OHM
R423	63-1827	10K OHM
R424	63-1891	330K OHM 20%
R425	63-9254	500K BALANCE CONTROL (ALTERNATE 63-10159)
R430	63-1757	220 OHM
R451	63-1950	8.2 MEG OHM
R453	63-1876	150K OHM
R455	63-1845	27K OHM
R456	63-1848	33K OHM
R457	63-1806	3.3K OHM
R459	63-1841	22K OHM
R463	63-1918	1.5 MEG OHM
R464	63-1806	3.3K OHM
R465	63-1740	82 OHM
R466	63-1841	22K OHM
R467	63-1799	2200 OHM
R469	63-1757	220 OHM
R470	63-1761	270 OHM
R471	63-1707	15 OHM 5%
R472	63-4501	1 OHM
R473	63-1827	10K OHM
R480	63-1757	220 OHM
R501	63-6038	180 1W
R502	63-1701	10 OHM
R503	63-1799	2.2K OHM
R506	63-1915	1.2 MEG OHM
L1	20-3291	FM ANTENNA COIL
L2	20-1648	FM RF COIL
L3	20-1631	TRAF COIL 10.7 MHz
L4	20-3597	FM OSCILLATOR COIL
L101	S-93292	AM ANTENNA ASSEMBLY
L102	149-311	FERRITE CORE SLEEVE
L103	IN T101	AM OSCILLATOR TRANS. PRI.
L104	IN T101	AM OSCILLATOR TRANS. SEC.
L201	IN T201	1ST IF 10.7 MHz PRI.
L202	IN T201	1ST IF 10.7 MHz SEC.
L203	IN T202	1ST IF 455 KHz PRI.
L204	IN T202	1ST IF 455 KHz SEC.
L205	IN T203	2ND IF 10.7 MHz PRI.
L206	IN T203	2ND IF 10.7 MHz SEC.
L207	IN T204	2ND IF 455 KHz
L208	IN T205	3RD IF 10.7 MHz PRI.
L209	IN T205	3RD IF 10.7 MHz SEC.
L210	IN T206	3RD IF 455 KHz PRI.
L211	IN T206	3RD IF 455 KHz SEC.
L212	IN T207	RATIO DETECTOR 10.7 MHz PRI.
L213	IN T207	RATIO DETECTOR 10.7 MHz TERTIARY
L214	IN T207	RATIO DETECTOR 10.7 MHz SEC.
T101	95-3077	AM OSCILLATOR
T201	95-2546	FM 1ST IF 10.7 MHz
T202	95-2541	AM 1ST IF 455 KHz
T203	95-2547	FM 2ND IF 10.7 MHz
T204	95-2542	AM 2ND IF 455 KHz
T205	95-2548	FM 3RD IF 10.7 MHz
T206	95-2689	AM 3RD IF 455 KHz
T207	95-2545	FM RATIO DETECTOR 10.7 MHz
T301	95-3021	INPUT COIL 19 KHz
T302	95-3023	DETECTOR COIL 38KHz
T501	95-2651	POWER TRANSFORMER
SW1	85-1370	BAND SWITCH
SW2	85-1372	AFC SWITCH (SLIDE SP-DT)
J1	78-2137-01	STEREO HEADPHONE JACK
CR1	103-47 OR 103-189	AFC DIODE
CR101	103-142	SILICON DIODE
CR201	103-23	GERMANIUM DIODE
CR202	103-90	GERMANIUM DIODES (MATCHED PAIR)
CR203	103-90	
CR204	103-23	GERMANIUM DIODE
CR401	103-222	DIODE
CR451	103-222	DIODE
CR501	212-76	SILICON RECTIFIER
CR502	212-76	SILICON RECTIFIER
CR503	103-96	DIODE
IC301	221-65 OR 221-79	MONOLITHIC MULTIPLEX DEMODULATOR
DS301	100-611	STEREO INDICATOR LIGHT
DS501	100-249	PILOT LIGHT NO. 1847
PC	204-374-02	PRINTED CIRCUIT BOARD
F501	136-101	.25 AMP SLO-BLO FUSE
F502	136-107	.5 AMP REGULAR FUSE

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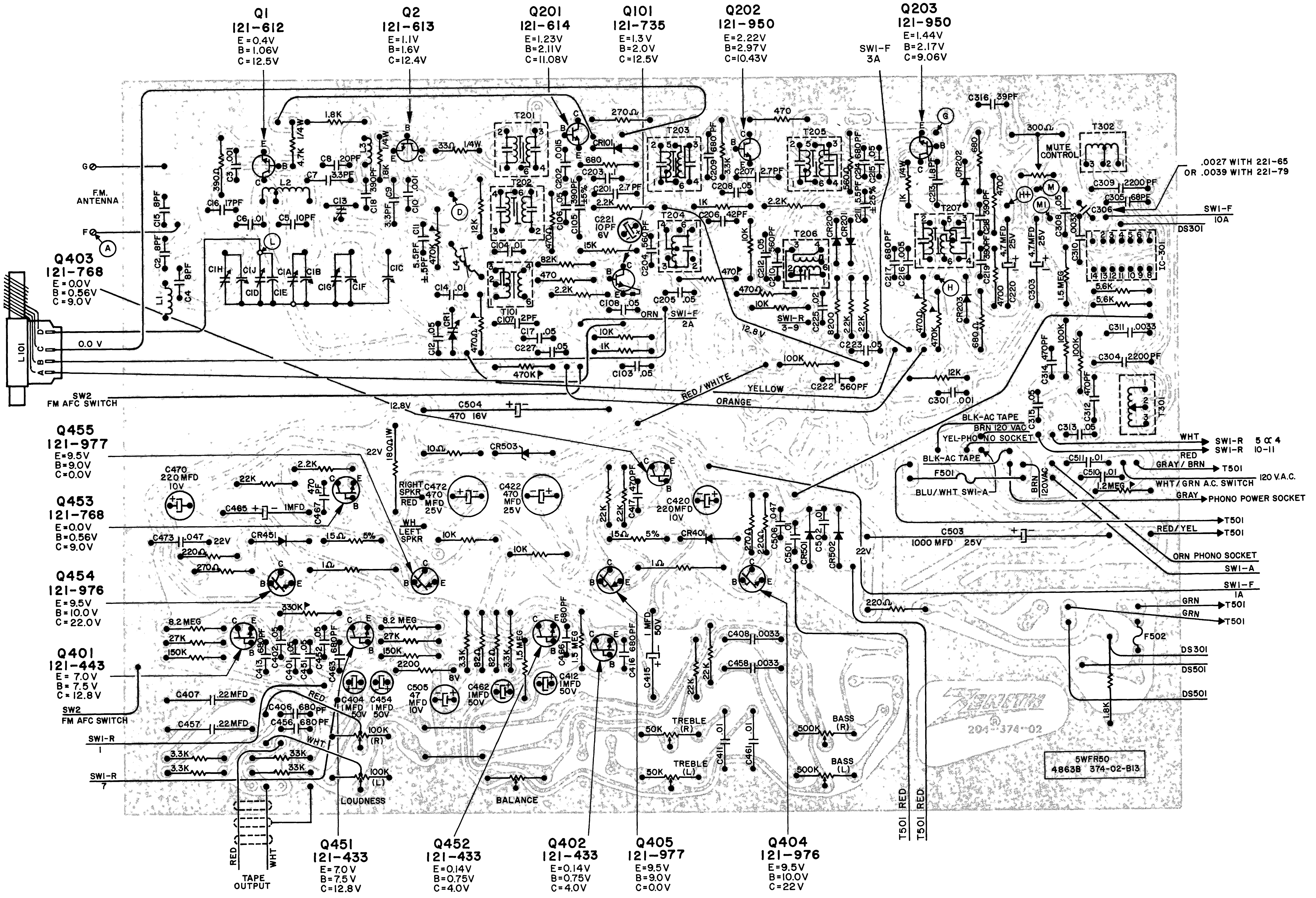
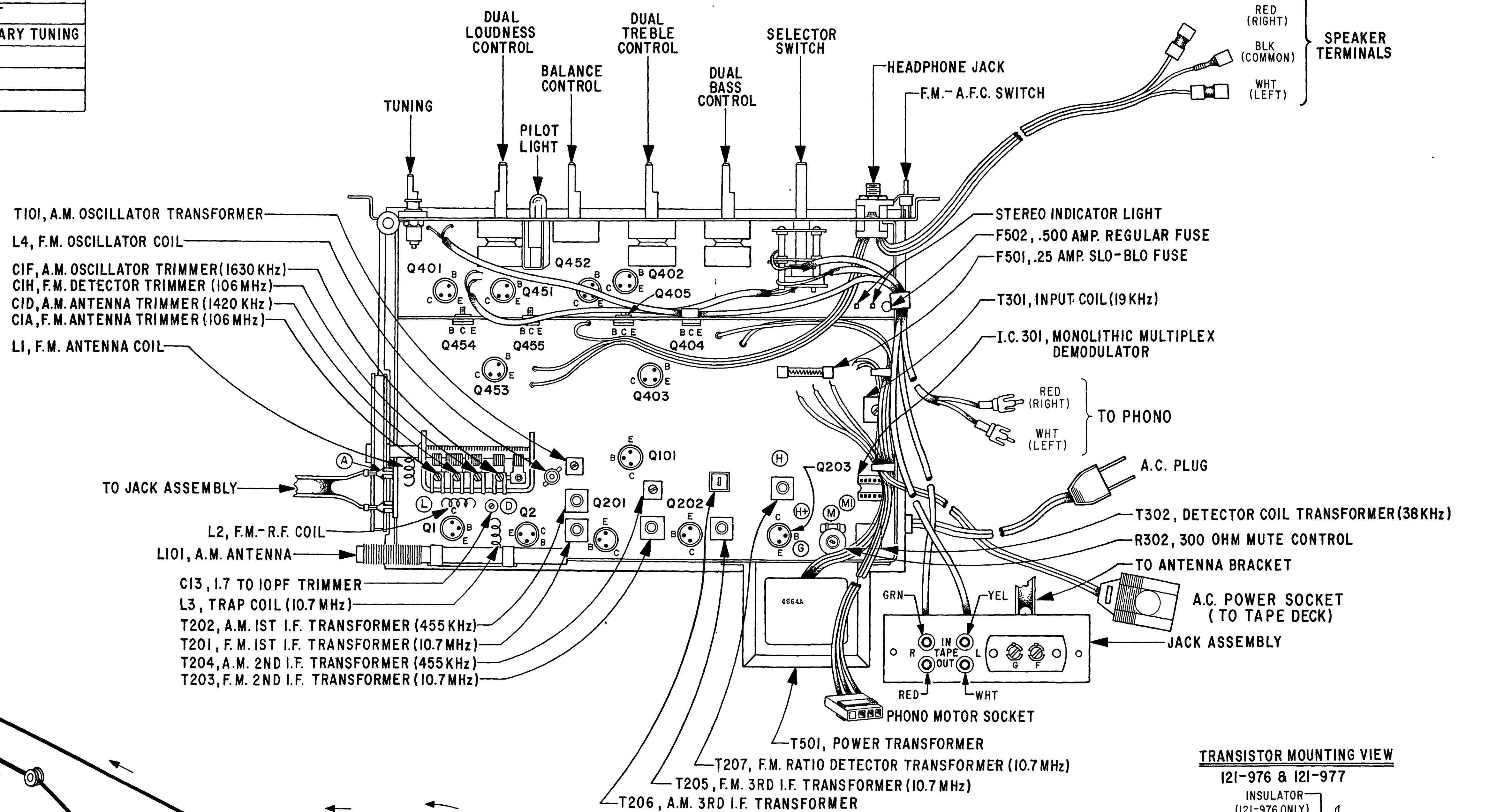
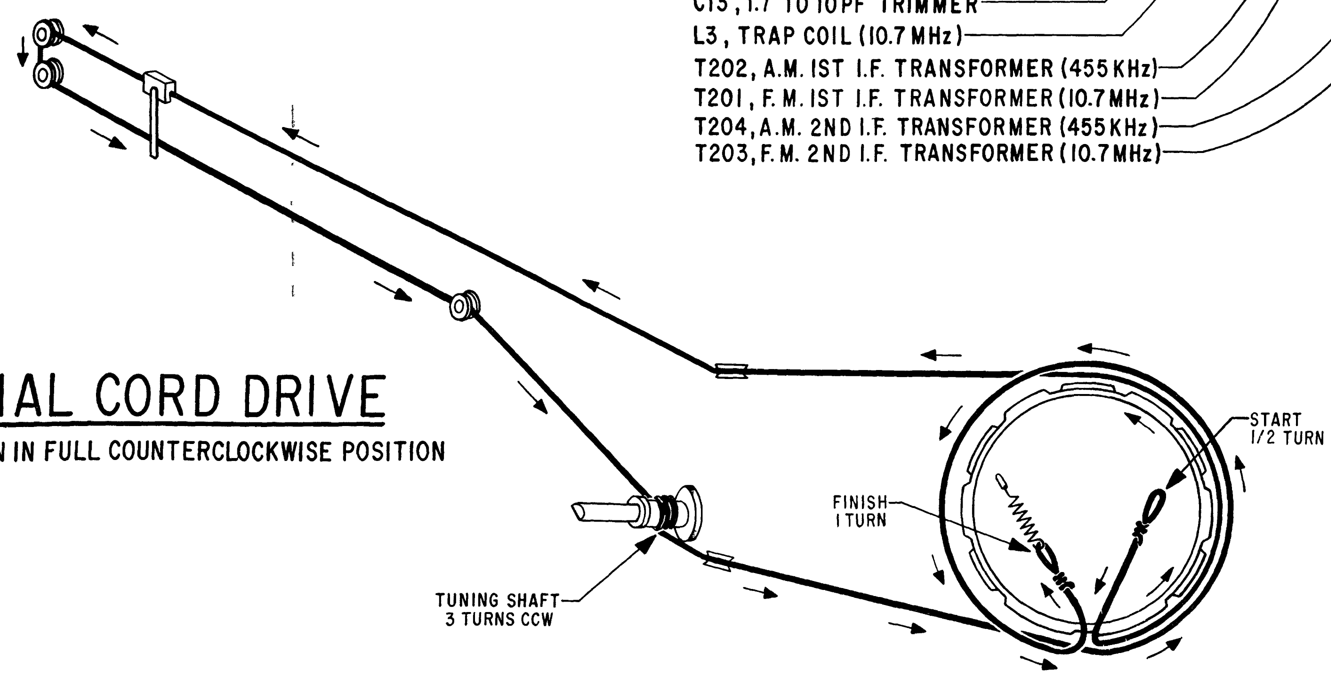


CHASSIS 5WFR50 – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE

TRANSISTORS		
No.	PART No.	DESCRIPTION
Q1	121-612	F.M.-R.F.
Q2	121-613	F.M. CONVERTER
Q101	121-735	A.M. CONVERTER
Q201	121-614	A.M.-F.M. 1st I.F.
Q202	121-950	A.M.-F.M. 2nd I.F.
Q203		F.M. 3rd I.F.
Q401	121-433	PRE-AMPLIFIER
Q402		PRE-DRIVER
Q403	121-768	DRIVER
Q404	121-976	OUTPUT
Q405	121-977	
Q451	121-433	PRE-AMPLIFIER
Q452		PRE-DRIVER
Q453	121-768	DRIVER
Q454	121-976	OUTPUT
Q455	121-977	
IC301	221-65	MULTIPLEX DEMODULATOR
	221-79	

TEST POINTS	
A	F.M. ANTENNA INPUT
D	1st F.M. I.F. INPUT
G	3rd F.M. OUTPUT
H	F.M. DETECTOR OUTPUT
H+	RATIO DETECTOR PRIMARY TUNING
L	A.M. R.F. & I.F. INPUT
M	19KHz A.C. GAIN
M1	19KHz D.C. GAIN



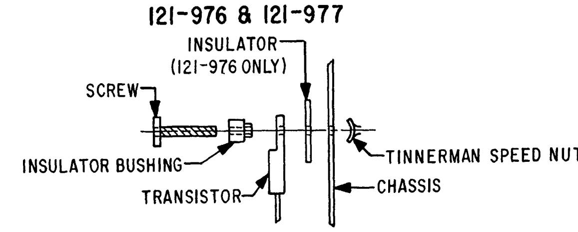


DIAL CORD DRIVE

SHOWN IN FULL COUNTERCLOCKWISE POSITION

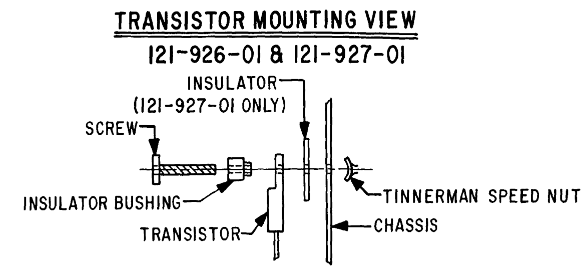
TRANSISTOR MOUNTING VIEW

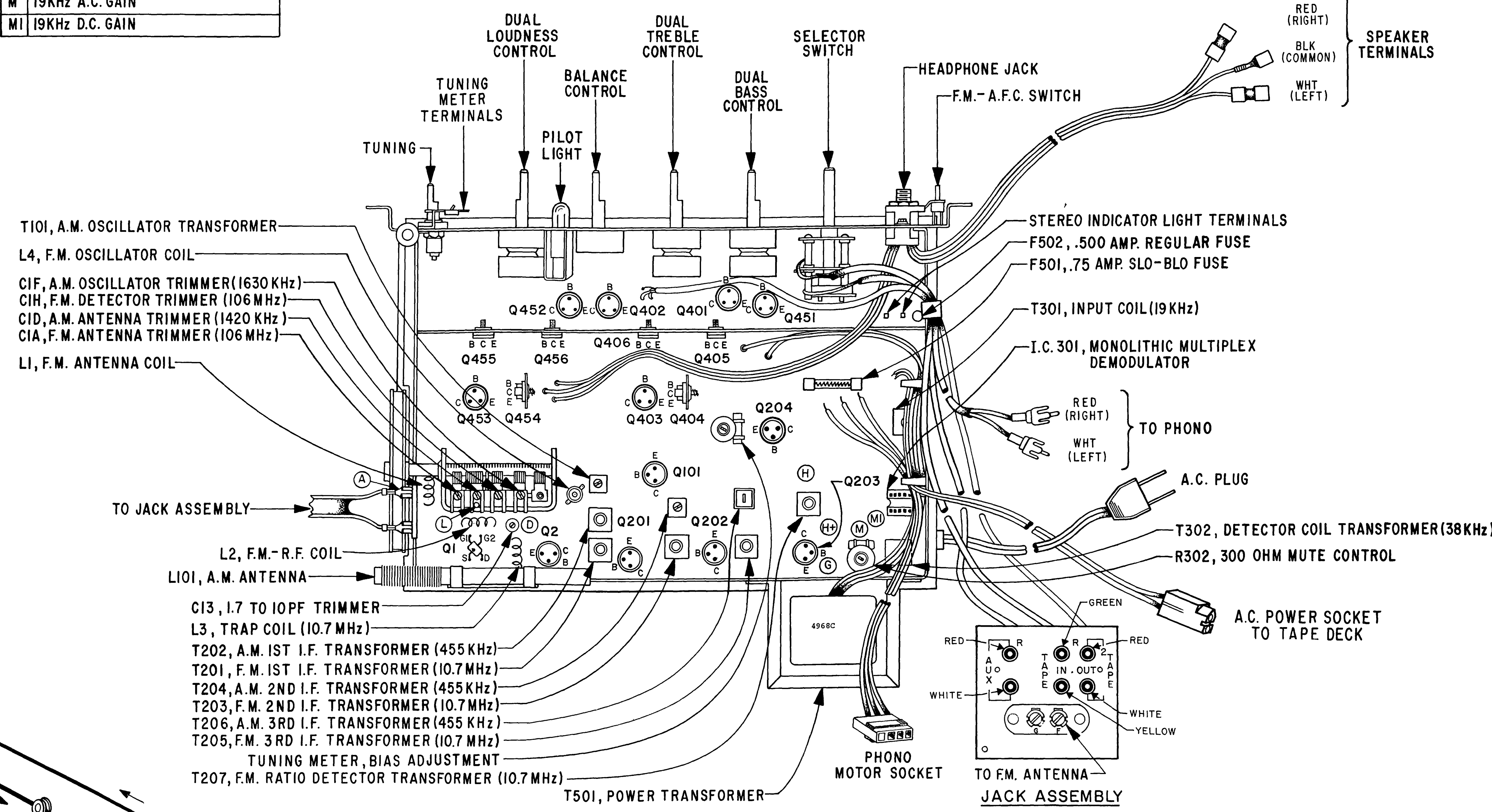
121-976 & 121-977

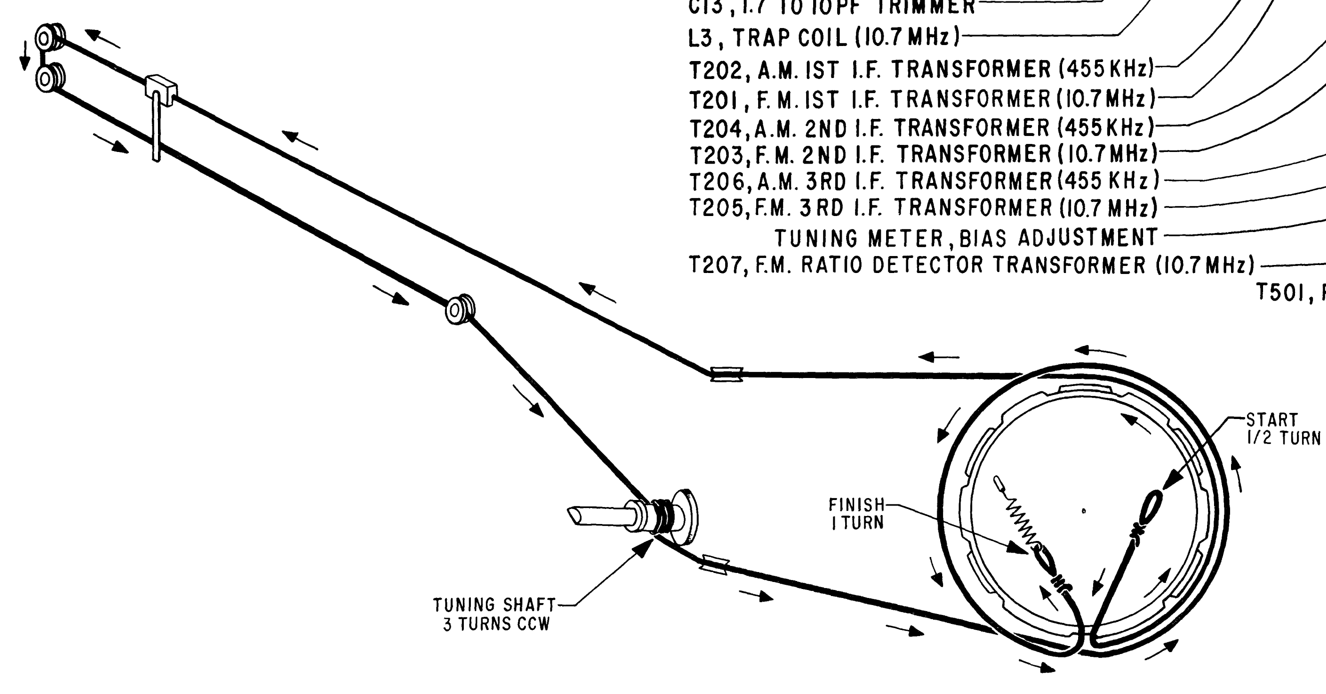


TRANSISTORS		
No.	PART No.	DESCRIPTION
Q1	121-953	F.M.-R.F.
Q2	121-613	F.M. CONVERTER
Q101	121-735	A.M. CONVERTER
Q201	121-614	A.M.-F.M. 1st I.F.
Q202	121-950	A.M.-F.M. 2nd I.F.
Q203		F.M. 3rd I.F.
Q204	121-433	TUNING METER CONTROL
Q401		PRE-AMPLIFIER
Q402	121-1005	AUDIO AMPLIFIER
Q403	121-877	PRE-DRIVER
Q404	121-1006	DRIVER
Q405	121-927-01	OUTPUT
Q451	121-433	PRE-AMPLIFIER
Q452	121-1005	AUDIO AMPLIFIER
Q453	121-877	PRE-DRIVER
Q454	121-1006	DRIVER
Q455	121-927-01	OUTPUT
Q406	121-926-01	
Q456		
IC301	221-79-01 or 221-65	MULTIPLEX DEMODULATOR

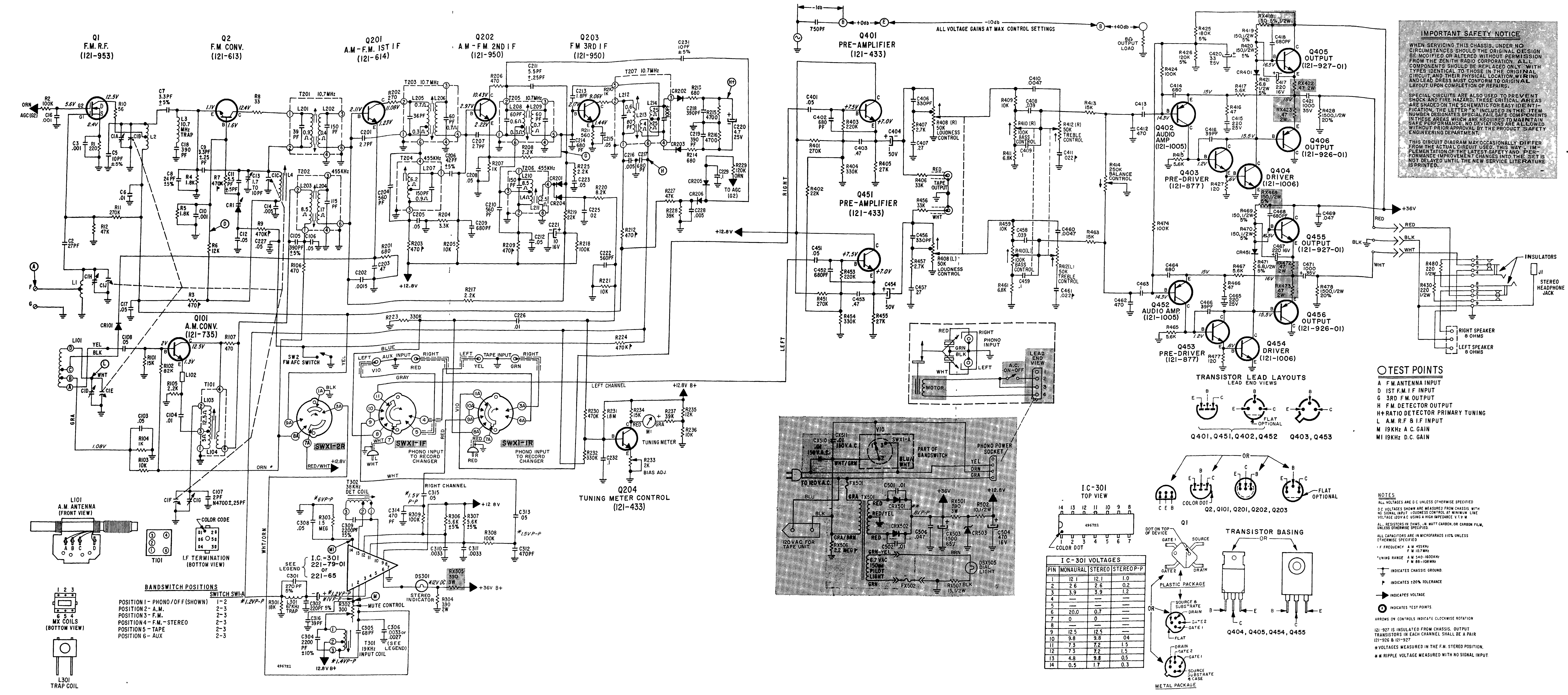
TEST POINTS	
A	F.M. ANTENNA INPUT
D	1st F.M. I.F. INPUT
G	3rd F.M. OUTPUT
H	F.M. DETECTOR OUTPUT
H+	RATIO DETECTOR PRIMARY TUNING
L	A.M. R.F. & I.F. INPUT
M	19KHz A.C. GAIN
M1	19KHz D.C. GAIN







CHASSIS 6WGR55 – CHASSIS LAYOUT



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WHEN SERVICING THIS CHASSIS, UNDER NO CIRCUMSTANCES SHOULD THE ORIGINAL DESIGN BE MODIFIED OR ALTERED WITHOUT PERMISSION FROM THE ZENITH RADIO CORPORATION. ALL COMPONENTS SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL CIRCUIT, AND THEIR PHYSICAL LOCATION, WIRING AND LEAD DRESS MUST CONFORM TO ORIGINAL LAYOUT UPON COMPLETION OF REPAIRS.

SPECIAL CIRCUITS ARE ALSO USED TO PREVENT SHOCK AND FIRE HAZARD. THESE CRITICAL AREAS ARE SHADED ON THE SCHEMATIC FOR EASY IDENTIFICATION. THE LETTER "X" INCLUDED IN THE ITEM NUMBER DESIGNATES SPECIAL FAIL SAFE COMPONENTS IN THESE AREAS WHICH ARE REQUIRED TO MAINTAIN SAFE PERFORMANCE. NO DEVIATIONS ARE ALLOWED WITHOUT PRIOR APPROVAL BY THE PRODUCT SAFETY ENGINEERING DEPARTMENT.

THIS CIRCUIT DIAGRAM MAY OCCASIONALLY DIFFER FROM THE ACTUAL CIRCUIT USED. THIS WAY, IMPLEMENTATION OF THE LATEST SAFETY AND PERFORMANCE IMPROVEMENT CHANGES INTO THE SET IS NOT DELAYED UNTIL THE NEW SERVICE LITERATURE IS PRINTED.

○ TEST POINTS

- A F.M. ANTENNA INPUT
- D 1ST F.M. I.F INPUT
- G 3RD F.M. OUTPUT
- H F.M. DETECTOR OUTPUT
- H+ RATIO DETECTOR PRIMARY TUNING
- L A.M. R.F & I.F INPUT
- M 19KHz A.C. GAIN
- M1 19KHz D.C. GAIN

BANDSWITCH POSITIONS

	SWITCH SW1-A
POSITION 1 - PHONO/OFF (SHOWN)	1-2
POSITION 2 - A.M.	2-3
POSITION 3 - F.M.	2-3
POSITION 4 - F.M. - STEREO	2-3
POSITION 5 - TAPE	2-3
POSITION 6 - AUX	2-3

I C.-301 VOLTAGES

PIN	MONAURAL	STEREO	STEREO P-P
1	12.1	12.1	1.0
2	2.6	2.6	0.2
3	3.9	3.9	1.2
4	—	—	—
5	—	—	—
6	20.0	0.7	—
7	0	0	—
8	—	—	—
9	12.5	12.5	—
10	9.8	9.8	04
11	7.3	7.2	1.5
12	7.3	7.2	1.5
13	4.8	9.8	0.5
14	0.5	1.7	0.3

NOTES

ALL VOLTAGES ARE D C UNLESS OTHERWISE SPECIFIED

D C VOLTAGES SHOWN ARE MEASURED FROM CHASSIS, WITH NO SIGNAL INPUT LOUDNESS CONTROL AT MINIMUM LINE VOLTAGE 120V A C USING A HIGH IMPEDANCE V.T.V M.

ALL RESISTORS IN OHMS, 1/4 WATT CARBON, OR CARBON FILM, UNLESS OTHERWISE SPECIFIED.

ALL CAPACITORS ARE IN MICROFARADS ±10% UNLESS OTHERWISE SPECIFIED

I F FREQUENCY A M 455KHz
F M 10.7MHz

TUNING RANGE A M 540-1600KHz
F M 88-108MHz

INDICATES CHASSIS GROUND.

INDICATES ±20% TOLERANCE

INDICATES VOLTAGE.

INDICATES TEST POINTS.

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION

121-927 IS INSULATED FROM CHASSIS. OUTPUT TRANSISTORS IN EACH CHANNEL SHALL BE A PAIR 121-926 & 121-927

✱ VOLTAGES MEASURED IN THE F.M. STEREO POSITION.

✱✱ RIPPLE VOLTAGE MEASURED WITH NO SIGNAL INPUT.

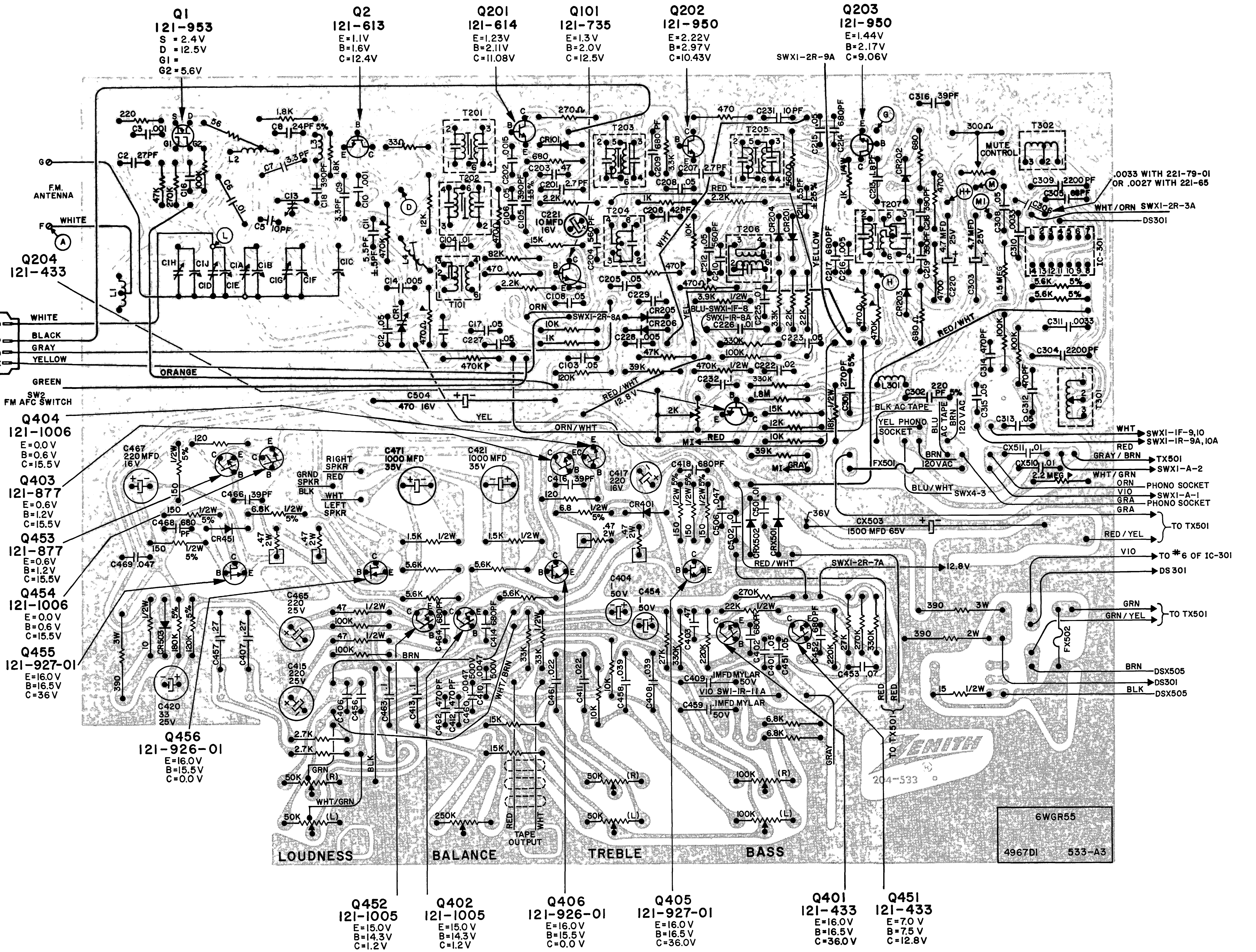
IC 301 WAVE FORMS

PIN 3 COMPOSITE L&R, L-R (1 KHZ LEFT ONLY) 19 KHZ PILOT 10% 1 V P/P — PIN 2 19 KHZ (WITH L ONLY) 200 MV P/P — PIN 1 19 KHZ 1.2 V P/P — PIN 10 38 KHZ PULSES 80MV P/P — 38 KHZ TANK END 38 KHZ 13 V P/P — PIN 13 38 KHZ 1.4 V P/P — PIN 12 (UPPER) RIGHT OUTPUT PIN 11 (LOWER) LEFT OUTPUT (L INPUT ONLY) 1 V P/P

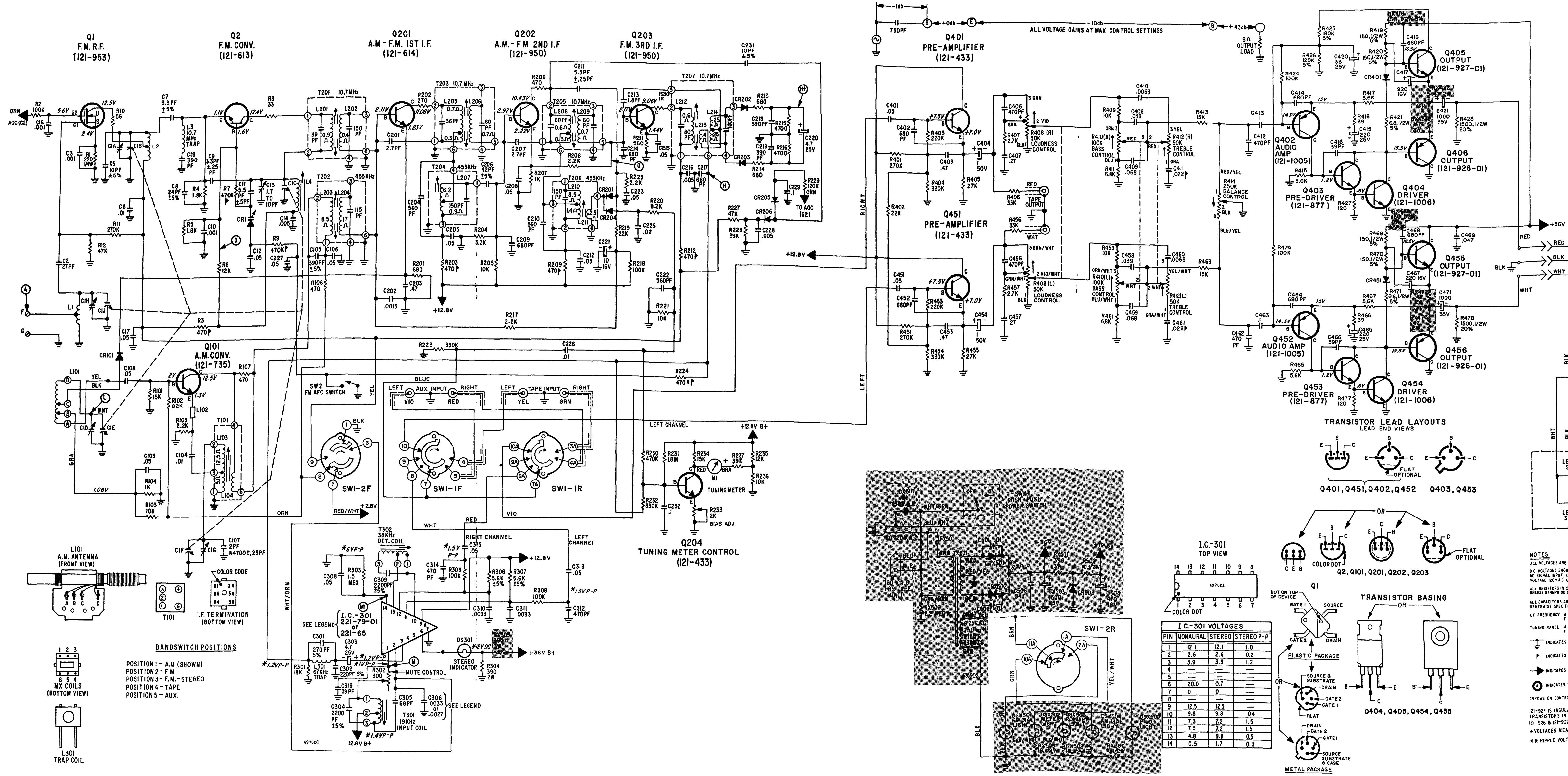
CHASSIS LEGEND 6WGR55

ITEM NO.	PART NUMBER	DESCRIPTION
C1A		FM DETECTOR TRIMMER
C1B		FM DETECTOR TUNING
C1C		FM OSCILLATOR TUNING
C1D		AM ANTENNA TRIMMER
C1E		AM ANTENNA TUNING
C1F	22-7134	AM OSCILLATOR TUNING
C1G		AM OSCILLATOR TRIMMER
C1H		FM ANTENNA TRIMMER
C1J		FM ANTENNA TUNING
C2	22-2396	27 PF DISC 500V
C3	22-2729	.001 MFD DISC 25V
C5	22-3675	10 PF DISC ± 5% 500V
C6	22-3393	.01 MFD DISC 25V
C7	22-3541	3.3 PF GIMMICK ± 5% 500V
C8	22-2515	24 PF DISC ± 5% 500V
C9	22-5879	3.3 PF DISC ± .25 PF 25V
C10	22-2729	.001 MFD DISC 25V
C11	22-5878	5.5 PF DISC ± 0.5 PF 500V
C12	22-3034	.05 MFD DISC 25V
C13	22-4855	1.7 TO 10 PF CERAMIC TRIMMER
C14	22-3080	.005 MFD DISC 25V
C16	22-2729	.001 MFD DISC 25V
C17	22-3034	.05 MFD DISC 25V
C18	22-3177	390 PF DISC 500V
C103	22-3034	.05 MFD DISC 25V
C104	22-3393	.01 MFD DISC 25V
C105	22-5972	390 PF ± 5% POLYSTYRENE 125V
C106	22-3034	.05 MFD DISC 25V
C107	22-4819	2 PF N4700 ± .25 PF 500V
C108	22-3034	.05 MFD DISC 25V
C201	22-3310	2.7 PF GIMMICK ± 10% 500V
C202	22-5483	.0015 MFD DISC 500V
C203	22-5487	.47 MFD DISC 3V
C204	22-5481	560 PF DISC 500V
C205	22-3034	.05 MFD DISC 25V
C206	22-3791	42 PF DISC ± 5% 500V
C207	22-3310	2.7 PF GIMMICK + 10% 500V
C208	22-3034	.05 MFD DISC 25V
C209	22-5482	680 PF DISC 500V
C210	22-5481	560 PF DISC 500V
C211	22-3770	5.5 PF DISC ± .25 PF 500V
C212	22-3034	.05 MFD DISC 25V
C213	22-2428	1.8 PF GIMMICK ± 10% 500V
C214	22-5482	680 PF DISC 500V
C215	22-3034	.05 MFD DISC 25V
C216	22-3080	.005 MFD DISC 25V
C217	22-5482	680 PF DISC 500V
C218	22-3177	390 PF DISC 500V
C219	22-3177	390 PF DISC 500V
C220	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C221	22-7151-04	10 MFD ELECTROLYTIC 16V
C222	22-3362	560 PF DISC 500V
C223	22-3034	.05 MFD DISC 25V
C225	22-3033	.02 MFD DISC 25V
C226	22-3393	.01 MFD DISC 25V
C227	22-3034	.05 MFD DISC 25V
C228	22-3080	.005 MFD DISC 25V
C229	22-3652	1 MFD DISC 10V
C231	22-3675	10 PF DISC ± 5% 500V
C232	22-3652	1 MFD DISC 10V
C301	22-5780	270 PF POLYSTYRENE ± 5% 500V
C302	22-2976	220 PF DISC N750 ± 5% 500V
C303	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C304	22-5782	2200 PF POLYSTYRENE ± 5% 500V
C305	22-3608	68 PF DISC 500V
C306	22-13 OR 22-7191	.0033 MFD DISC 500V (USED WITH 221-79-01) / .0027 MFD DISC 500V (USED WITH 221-65)
C308	22-3034	.05 MFD DISC 25V
C309	22-5782	2200 PF POLYSTYRENE ± 5% 500V
C310	22-13	0033 MFD DISC 500V
C311	22-13	0033 MFD DISC 500V
C312	22-16	470 PF DISC 500V
C313	22-3034	.05 MFD DISC 25V
C314	22-16	470 PF DISC 500V
C315	22-3034	.05 MFD DISC 25V
C316	22-3381	39 PF ± 5% DISC 500V
C401	22-3034	.05 MFD DISC 25V
C402	22-2939	680 PF DISC 500V
C403	22-5487	.47 MFD DISC 3V
C404	22-7153	1 MFD ELECTROLITIC 50V
C406	22-3255	330 PF DISC 500V
C407	22-5964	.27 MFD MYLAR 50V
C408	22-7202	.039 MFD MYLAR 50V
C409	22-6905	1 MFD MYLAR 50V
C410	22-14	.0047 MFD DISC 500V
C411	22-5814	.022 MFD MYLAR 20% 100V
C412	22-16	470 PF DISC 500V
C413	22-6905	1 MFD MYLAR 10% 50V
C414	22-2939	680 PF DISC 500V
C415	22-7152-9	220 MFD ELECTROLYTIC 25V
C416	22-3381	39 PF DISC + 5% 500V
C417	22-7151-9	220 MFD ELECTROLYTIC 16V
C418	22-2939	680 PF DISC 500V
C420	22-7152-6	33 MFD ELECTROLYTIC 25V
C421	22-7154-12	1000 MFD ELECTROLYTIC 35V
C451	22-3034	.05 MFD DISC 25V
C452	22-2939	680 PF DISC 500V
C453	22-5487	.47 MFD DISC 3V
C454	22-7153	1 MFD ELECTROLYTIC 50V
C456	22-3255	330 PF DISC 500V
C457	22-5964	.27 MFD MYLAR 50V
C458	22-7202	.039 MFD MYLAR 50V
C459	22-6905	1 MFD MYLAR 50V
C460	22-14	.0047 MFD DISC 500V
C461	22-5814	.022 MFD MYLAR 20% 100V
C462	22-16	470 PF DISC 25V
C463	22-6905	1 MFD MYLAR 10% 50V
C464	22-2939	680 PF DISC 500V
C465	22-7152-9	220 MFD ELECTROLYTIC 25V
C466	22-3381	39 PF DISC ± 5% 500V
C467	22-7151-9	220 MFD ELECTROLYTIC 16V
C468	22-2939	680 PF DISC 500V
C469	22-7326	.047 MYLAR ± 20% 100V
C471	22-7154-12	1000 MFD ELECTROLYTIC 35V
C501	22-4617	.01 MFD DISC 500V
C502	22-4617	.01 MFD DISC 500V
CX503	22-7113	1500 MFD ELECTROLYTIC 65V
C504	22-7141-11	470 MFD ELECTROLYTIC 16V
C506	22-7326	.047 MFD MYLAR ± 20% 100V
CX510	22-6005	.01 MFD DISC 150VAC
CX511	22-6005	.01 MFD DISC 150 VAC
R1	63-9921-56	220 OHM 5% (ALT 63-10183-56 1/4W 10%)
R2	63-9922-20	100K OHM 5% (ALT 63-10184-20 1/4W 10%)
R3	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R4	63-9921-78	1.8K OHM 5% (ALT 63-7796 1/2W 10%)
R5	63-4196	1.8K OHM 1/2W
R6	63-9921-98	12K OHM 5% (ALT 63-7831 1/2W 10%)
R7	63-9922-36	470K OHM 5% (ALT 63-7898 1/2W 20%)
R8	63-4122	33 OHM 1/2W
R9	63-9922-36	470K OHM 5% (ALT 63-7898 1/2W 20%)
R10	63-4133	56 OHM 1/4W
R11	63-9922-30	270K OHM 5% (ALT 63-10184-30 1/4W 10%)
R12	63-9922-12	47K OHM 5% (ALT 63-10184-12 1/4W 10%)
R101	63-9922-00	15K OHM 5% (ALT 63-7834 1/2W 10%)
R102	63-9922-18	82K OHM 5% (ALT 63-7866 1/2W 10%)
R103	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R104	63-9921-72	1K OHM 5% (ALT 63-7785 1/2W 10%)
R105	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2W 10%)
R106	63-1771	470 OHM 1/2W
R107	63-9921-64	470 OHM 5% (ALT 63-7771 1/2W 10%)
R201	63-1778	680 OHM 5% (ALT 63-7778 1/2W 10%)
R202	63-1761	270 OHM 5% (ALT 63-7761 1/2W 10%)
R203	63-1772	470 OHM 5% (ALT 63-7772 1/2W 20%)
R204	63-1806	3.3K OHM 5% (ALT 63-7806 1/2W 10%)
R205	63-1827	10K OHM 5% (ALT 63-7827 1/2W 10%)
R206	63-1771	470 OHM 5% (ALT 63-7771 1/2W 10%)
R207	63-9921-72	1K OHM 5% (ALT 63-7785 1/2W 10%)
R208	63-1799	2.2K OHM 1/2W
R209	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R210	63-9921-72	1K OHM 5% (ALT 63-10183-72 1/4W 10%)
R211	63-1775	560 OHM 1/4W
R212	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R213	63-9921-68	680 OHM 5% (ALT 63-7778 1/2W 10%)
R214	63-9921-68	680 OHM 5% (ALT 63-7778 1/2W 10%)
R215	63-9921-88	4700 OHM 5% (ALT 63-7813 1/2W 10%)
R216	63-9921-88	4700 OHM 5% (ALT 63-7813 1/2W 10%)
R217	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2W 10%)
R218	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R219	63-9922-04	22K OHM 5% (ALT 63-7841 1/2W 10%)
R220	63-9921-94	8.2K OHM 5% (ALT 63-7824 1/2W 10%)
R221	63-1827	10K OHM 1/2W
R223	63-1890	330K OHM 1/2W
R224	63-9921-64	470K OHM 5% (ALT 63-7772 1/2W 20%)
R225	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2W 10%)
R227	63-9922-12	47K OHM 5% (ALT 63-7855 1/2W 10%)
R228	63-9922-10	39K OHM 5% (ALT 63-7852 1/2W 10%)
R229	63-9922-22	120K OHM 5% (ALT 63-7873 1/2W 10%)
R230	63-1897	470K OHM 1/2W
R231	63-9924-50	1.8 MEG OHM 10% (ALT 63-7922 1/2W 10%)
R232	63-9922-32	330K OHM 5% (ALT 63-7890 1/2W 10%)
R233	63-6250	2K OHM METER CONTROL
R234	63-9922-00	15K OHM 5% (ALT 63-7834 1/2W 10%)
R235	63-9922-98	12K OHM 5% (ALT 63-7831 1/2W 10%)
R236	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R237	63-9922-10	39K OHM 5% (ALT 63-7852 1/2W 10%)
R301	63-1838	18K OHM
R302	63-8328	300 OHM MUTE CONTROL
R303	63-9924-48	1.5 MEG OHM 5% (ALT 63-79) 8 1/2W 10%)
R304	63-1458	390 OHM 2W
RX305	63-10430-86	390 OHM 3W
R306	63-9921-90	5.6K OHM ± 5% (ALT 63-7816 1/2W 5%)
R307	63-9921-90	5.6K OHM ± 5% (ALT 63-7816 1/2W 5%)
R308	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R309	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R401	63-9922-30	270K OHM 5% (ALT 63-7887 1/2W 10%)
R402	63-1841	22K OHM
R403	63-9922-28	220K OHM 5% (ALT 63-7883 1/2W 10%)
R404	63-9922-32	330K OHM 5% (ALT 63-7890 1/2W 10%)
R405	63-9922-06	27K OHM 5% (ALT 63-7845 1/2W 10%)
R406	63-1848	33K OHM
R407	63-9921-82	2.7K OHM 5% (ALT 63-7803 1/2W 10%)
R408R / R408L	63-9955	50K DUAL LOUDNESS CONTROL
R409	63-9921-96	10K OHM (ALT 63-7827 1/2W 10%)
R410R / R410L	63-9956	100K DUAL BASS CONTROL
R411	63-9921-92	6.8K OHM 5% (ALT 63-7820 1/2W 10%)
R412R / R412L	63-9256	50K DUAL TREBLE CONTROL
R413	63-9922-00	15K OHM 5% (ALT 7834 1/2W 10%)
R414	63-9953	250K BALANCE CONTROL
R415	63-9921-90	5.6K OHM 5% (ALT 63-7817 1/2W 10%)
R416	63-1729	47 OHM
R417	63-9921-90	5.6K OHM 5% (ALT 63-7817 1/2W 10%)
RX418	63-9946-52	150 OHM ± 5% 1/2W (ALT 63-7748 1/2W 5%)
R419	63-1749	150 OHM ± 5% 1/2W (ALT 63-7749 1/2W 5%)
R420	63-9946-52	150 OHM ± 5% 1/2W 1/2W (ALT 63-7749 1/2W 5%)
R421	63-9946-20	6.8 OHM ± 5% 1/2W (ALT 63-7968 1/2W 5%)
RX422	63-9784	.47 OHM 2W
RX423	63-9784	.47 OHM 2W
R424	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R425	63-9922-26	180K OHM ± 5% (ALT 63-7879 1/2W 5%)
R426	63-9922-22	120K OHM ± 5% (ALT 63-7872 1/2W 5%)
R427	63-9921-50	120 OHM 5% (ALT 63-7747 1/2W 10%)
R428	63-9946-76	1500 OHM 5% 1/2W (ALT 63-7763 1/2W 20%)
R430	63-1757	220 OHM
R451	63-9922-30	270K OHM 5% (ALT 63-7887 1/2W 10%)
R453	63-9922-28	220K OHM 5% (ALT 63-7883 1/2W 10%)
R454	63-9922-32	330K OHM 5% (ALT 63-7890 1/2W 10%)
R455	63-9922-06	27K OHM 5% (ALT 63-7845 1/2W 10%)
R456	63-9922-08	33K OHM 5% (ALT 63-7848 1/2W 10%)
R457	63-9921-82	2.7K OHM 5% (ALT 63-7803 1/2W 10%)
R459	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R461	63-9921-92	6.8K OHM 5% (ALT 63-7820 1/2W 10%)
R463	63-9922-00	15K OHM 5% (ALT 63-7834 1/2W 10%)
R465	63-9921-90	5.6K OHM 5% (ALT 63-7817 1/2W 10%)
R466	63-1729	47 OHM
R467	63-9921-90	5.6K OHM 5% (ALT 63-7817 1/2W 10%)
RX468	63-9946-52	150 OHM ± 5% 1/2W (ALT 63-7749 1/2W 5%)
R469	63-9946-52	150 OHM ± 5% 1/2W (ALT 63-7749 1/2W 5%)
R470	63-9946-52	150 OHM ± 5% 1/2W (ALT 63-7749 1/2W 5%)
R471	63-4535	6.8 OHM ± 5% 1/2W
RX472	63-9784	.47 OHM 2W
RX473	63-9784	.47 OHM 2W
R474	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R477	63-9921-50	120 OHM 5% (ALT 63-7747 1/2W 10%)
R478	63-9946-76	1500 OHM 5% 1/2W (ALT 63-7793 1/2W 20%)
R480	63-1757	220 OHM 1/2W
RX501	63-10430-86	390 OHM 3W
R502	53-9946-24	10 OHM 5 1/2W (ALT. 63-7701 1/2W 10%)
RX506	63-10526-01	2.2 MEG OHM ± 20%
RX507	63-9945-28	15 OHM 5 1/2W (ALT. 63-7708 1/2W 10%)
L1	20-3664	FM ANTENNA COIL
L2	20-3665	FM RF COIL
L3	20-1631	TRAP COIL 10.7 MHZ
L4	20-3597	FM OSCILLATOR COIL
L101	S-93292-01	AM ANTENNA ASSEMBLY
L102	149-311	FERRITE CORE SLEEVE
L103	1N-T101	AM OSCILLATOR TRANS. PRI
L104	1N-T101	AM OSCILLATOR TRANS. SEC
L201	1N-T201	1ST IF TRANSFORMER 10.7 MHzPRI.
L202	1N-T201	1ST IF TRANSFORMER 10.7 MHz SEC.
L203	1N-T202	1ST IF AM 455 KHz PRI.
L204	1N-T202	1ST IF 455 KHz SEC.
L205	1N-T203	2ND IF TRANSFORMER 10.7 MHz PRI.
L206	1N-T203	2ND IF TRANSFORMER 10.7 MHz SEC.
L207	1N-T204	2ND IF AM 455 KHz
L208	1N-T205	3RD IF TRANSFORMER 10.7 MHz PRI.
L209	1N-T205	3RD IF TRANSFORMER 10.7 MHz SEC.
L210	1N-T206	3RD IF AM 455 KHz PRI.
L211	1N-T206	3RD IF AM 455 KHz SEC.
L212	1N-T207	RATIO DETECTOR TRANS. 10.7 MHz PRI.
L213	1N-T207	RATIO DETECTOR TRANS. 10.7 MHz TERTIARY
L214	1N-T207	RATIO DETECTOR TRANS. 10.7 MHz SEC.
L301	20-3080	67 KHz TRAP
T101	95-3077	AM OSCILLATOR TRANSFORMER
T201	95-2546	FM 1ST TRANSFORMER 10.7 MHz
T202	95-2541	AM 1ST IF AM 455 KHz
T203	95-2547	FM 2ND IF TRANSFORMER 10.7 MHz
T204	95-2542	AM 2ND IF AM 455 KHz
T205	95-2548	FM 3RD IF TRANSFORMER 10.7 MHz
T206	95-2689	AM 3RD IF AM 455 KHz
T207	95-2545	FM RATIO DETECTOR 10.7 MHz
T301	95-3021	INPUT COIL 19 KHz
T302	95-3023	DETECTOR COIL 38KHz
TX501	95-3174	POWER TRANSFORMER
SWX1	85-1438	BAND SWITCH
SW2	85-1372-01	AFC SWITCH (SLIDE SP-DT)
J1	78-2137-01	STEREO HEADPHONE JACK
CR1	103-47 OR 103-189	AFC DIODE
CR101	103-142-01	SILICON DIODE
CR201	103-23-01	GERANIUM DIODE
CR202	103-90	GERANIUM DIODES (MATCHED PAIR)
CR203	103-90	
CR204	103-23-01	GERANIUM DIODE
CR205	103-23-01	GERANIUM DIODE
CR206	103-23-01	GERANIUM DIODE
CR401	103-222-01	SILICON DIODE
CR451	103-222-01	SILICON DIODE
CRX501	212-76	SILICON RECTIFIER
CRX502	212-76	SILICON RECTIFIER
CR503	103-96	DIODE (ZENER)
IC-301	221-79-01 OR 221-65	MONOLITHIC MULTIPLEX DEMODULATOR (SEE C306)
DS301	100-611	STEREO INDICATOR LIGHT
DSX505	100-249	PILOT LIGHT
PC	204-533	PRINTED CIRCUIT BOARD
FX501	136-117-17	.75 AMP SLO-BLO FUSE
FX502	136-114-12	.5 AMP REGULAR FUSE
M1	122-68 OR 122-68-03	TUNING METER

4967E2

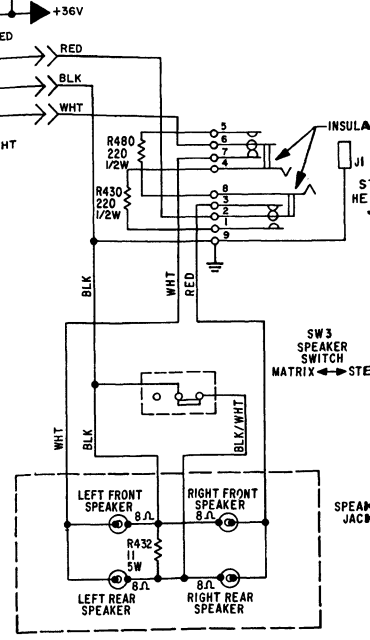


CHASSIS 6WGR55 – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE



O TEST POINTS

- A F.M. ANTENNA INPUT
- D 1ST F.M. I.F. INPUT
- G 3RD F.M. OUTPUT
- H F.M. DETECTOR OUTPUT
- H+ RATIO DETECTOR PRIMARY TUNING
- L A.M. R.F & I.F. INPUT
- M 19KHz A.C. GAIN
- M1 19KHz D.C GAIN



I C.-301 VOLTAGES			
PIN	MONAURAL	STEREO	STEREO P-P
1	12.1	12.1	1.0
2	2.6	2.6	0.2
3	3.9	3.9	1.2
4	—	—	—
5	—	—	—
6	20.0	0.7	—
7	0	0	—
8	—	—	—
9	12.5	12.5	—
10	9.8	9.8	04
11	7.3	7.2	1.5
12	7.3	7.2	1.5
13	4.8	9.8	0.5
14	0.5	1.7	0.3

NOTES

ALL VOLTAGES ARE D C UNLESS OTHERWISE SPECIFIED

D C VOLTAGES SHOWN ARE MEASURED FROM CHASSIS, WITH NO SIGNAL INPUT. LOUDNESS CONTROL AT MINIMUM. LINE VOLTAGE 120V A C USING A HIGH IMPEDANCE V.T.V M.

ALL RESISTORS IN OHMS, 1/4 WATT CARBON, OR CARBON FILM ±10% UNLESS OTHERWISE SPECIFIED.

ALL CAPACITORS ARE IN MICROFARADS ±10% UNLESS OTHERWISE SPECIFIED

I.F. FREQUENCY A M. 455KHz
F M 10.7MHz

TUNING RANGE A.M. 540-1600KHz
F M. 88-108MHz

INDICATES CHASSIS GROUND.

INDICATES ±20% TOLERANCE

INDICATES VOLTAGE.

INDICATES TEST POINTS.

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION.

121-927 IS INSULATED FROM CHASSIS. OUTPUT TRANSISTORS IN EACH CHANNEL SHALL BE A PAIR 121-926 & 121-927

* VOLTAGES MEASURED IN THE F.M. STEREO POSITION.

** RIPPLE VOLTAGE MEASURED WITH NO SIGNAL INPUT.

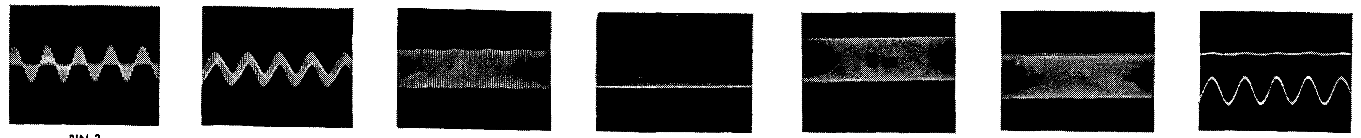
IMPORTANT SAFETY NOTICE

WHEN SERVICING THIS CHASSIS, UNDER NO CIRCUMSTANCES SHOULD THE ORIGINAL DESIGN BE MODIFIED OR ALTERED WITHOUT PERMISSION FROM THE ZENITH RADIO CORPORATION. ALL COMPONENTS SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL CIRCUIT, AND THEIR PHYSICAL LOCATION, WIRING AND LEAD DRESS MUST CONFORM TO ORIGINAL LAYOUT UPON COMPLETION OF REPAIRS.

SPECIAL CIRCUITS ARE ALSO USED TO PREVENT SHOCK AND FIRE HAZARD. THESE CRITICAL AREAS ARE SHADED ON THE SCHEMATIC FOR EASY IDENTIFICATION. THE LETTER "X" INCLUDED IN THE ITEM NUMBER DESIGNATES SPECIAL FAIL SAFE COMPONENTS IN THESE AREAS WHICH ARE REQUIRED TO MAINTAIN SAFE PERFORMANCE. NO DEVIATIONS ARE ALLOWED WITHOUT PRIOR APPROVAL BY THE PRODUCT SAFETY ENGINEERING DEPARTMENT.

THIS CIRCUIT DIAGRAM MAY OCCASIONALLY DIFFER FROM THE ACTUAL CIRCUIT USED. THIS WAY, IMPLEMENTATION OF THE LATEST SAFETY AND PERFORMANCE IMPROVEMENT CHANGES INTO THE SET IS NOT DELAYED UNTIL THE NEW SERVICE LITERATURE IS PRINTED.

IC 301 WAVE FORMS



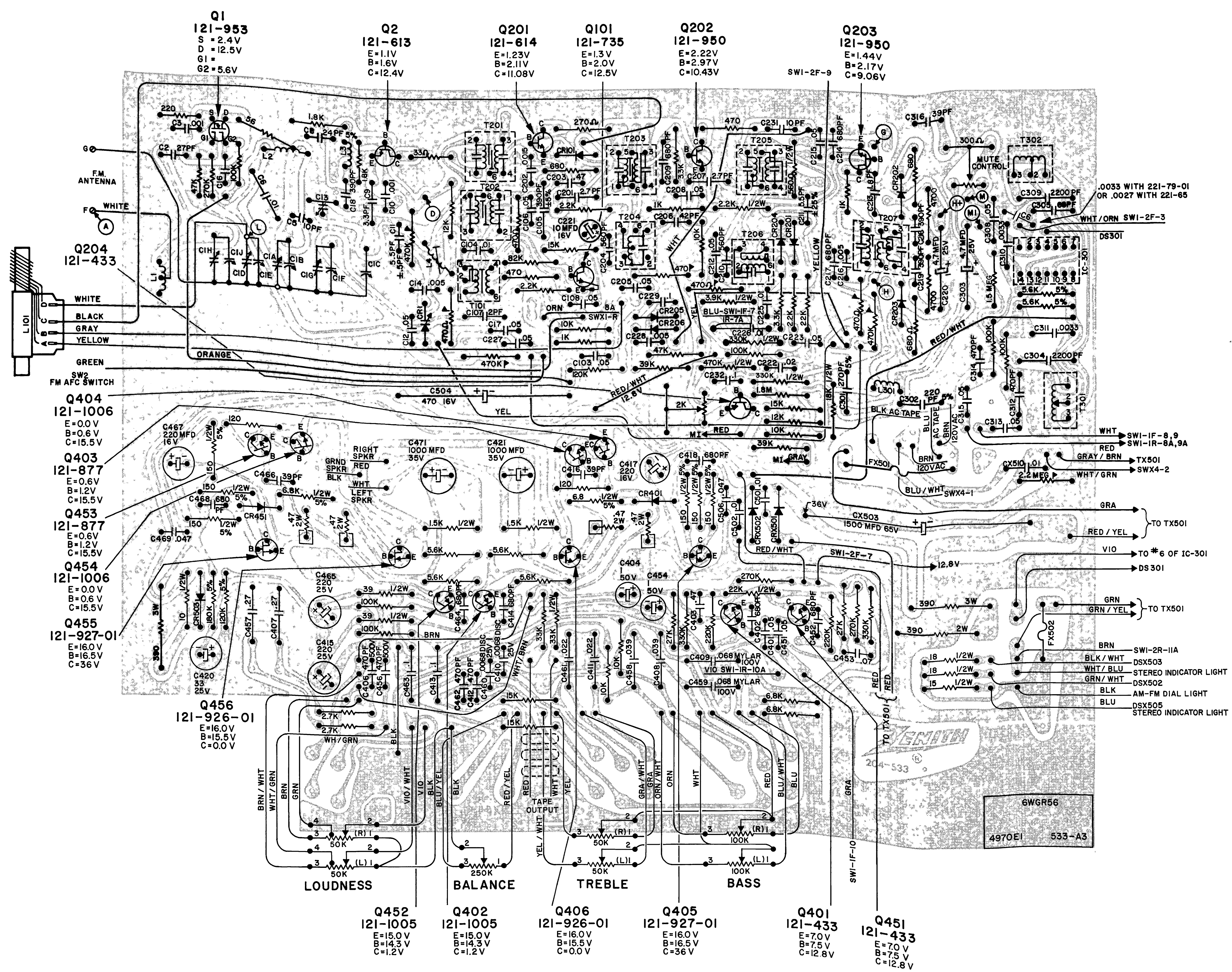
PIN 3 COMPOSITE L&R, L-R (1 KHZ LEFT ONLY) 19 KHZ PILOT 10% 1 V P/P — PIN 2 19 KHZ (WITH L ONLY) 200 MV P/P — PIN 1 19 KHZ 1.2V P/P — PIN 10 38KHZ PULSES 80MV P/P — 38 KHZ TANK END 38 KHZ 13V P/P — PIN 13 38 KHZ 1.4V P/P — PIN 12 (UPPER) RIGHT OUTPUT PIN 11 (LOWER) LEFT OUTPUT (L INPUT ONLY) 1 V P/P

CHASSIS LEGEND 6WGR56

ITEM NO.	PART NUMBER	DESCRIPTION
C1A	22-7134	FM DETECTOR TRIMMER
C1B		FM DETECTOR TUNING
C1C		FM OSCILLATOR TUNING
C1D		AM ANTENNA TRIMMER
C1E		AM ANTENNA TUNING
C1F		AM OSCILLATOR TUNING
C1G		AM OSCILLATOR TRIMMER
C1H		FM ANTENNA TRIMMER
C1J		FM ANTENNA TUNING
C2	22-2396	27 PF DISC 500V
C3	22-2729	.001 MFD DISC 25V
C5	22-3675	10 PF DISC ±5% 500V
C6	22-3393	.01 MFD DISC 25V
C7	22-3541	3.3 PF GIMMICK ±5% 500V
C8	22-2515	24 PF DISC ±5% 500V
C9	22-5879	3.3 PF DISC ±.25PF 25V
C10	22-2729	.001 MFD DISC 25V
C11	22-5878	5.5 PF DISC ±0.5 PF 500V
C12	22-3034	.05 MFD DISC 25V
C13	22-4855	1.7 TO 10 PF CERAMIC TRIMMER
C14	22-3080	.005 MFD DISC 25V
C16	22-2729	.001 MFD DISC 25V
C17	22-3034	.05 MFD DISC 25V
C18	22-3177	390 PF DISC 500V
C103	22-3034	.05 MFD DISC 25V
C104	22-3393	.01 MFD DISC 25V
C105	22-5972	390 PF ±5% POLYSTYRENE 125V
C106	22-3034	.05 MFD DISC 25V
C107	22-4819	2 PF N4700 ±.25PF 500V
C108	22-3034	.05 MFD DISC 25V
C201	22-3310	2.7 PF GIMMICK ±10% 500V
C202	22-5483	.0015 MFD DISC 500V
C203	22-5487	.47 MFD DISC 3V
C204	22-5481	560PF DISC 500V
C205	22-3034	.05 MFD DISC 25V
C206	22-3791	42 PF DISC ±5% 500V
C207	22-3310	2.7 PF GIMMICK ±10% 500V
C208	22-3034	.05 MFD DISC 25V
C209	22-5482	680 PF DISC 500V
C210	22-5481	560 PF DISC 500V
C211	22-3770	5.5 PF DISC ±.25 PF 500V
C212	22-3034	.05 MFD DISC 25V
C213	22-2428	1.8 PF GIMMICK ±10% 500V
C214	22-5482	680 PF DISC 500V
C215	22-3034	.05 MFD DISC 25V
C216	22-3080	.005 MFD DISC 25V
C217	22-5482	680 PF DISC 500V
C218	22-3177	390 PF DISC 500V
C219	22-3177	390 PF DISC 500V
C220	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C221	22-7151-04	10 MFD ELECTROLYTIC 16V
C222	22-3362	560 PF DISC 500V
C223	22-3034	.05 MFD DISC 25V
C225	22-3033	.02 MFD DISC 25V
C226	22-3393	.01 MFD DISC 25V
C227	22-3034	.05 MFD DISC 25V
C228	22-3080	.005 MFD DISC 25V
C229	22-3652	1 MFD DISC 10V
C231	22-3675	10 PF DISC ±5% 500V
C232	22-3652	1 MFD DISC 10V
C301	22-5780	270 PF POLYSTYRENE ±5% 500V
C302	22-2976	220 PF DISC N750 ±5% 500V
C303	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C304	22-5782	2200 PF POLYSTYRENE ±5% 500V
C305	22-3608	68 PF DISC 500V
C306	22-13	.0033 MFD DISC 500V (TO BE USED WITH 221-79-01)
	or 22-7191	.0027 MFD DISC 500V (TO BE USED WITH 221-65)
C308	22-3034	.05 MFD DISC 25V
C309	22-5782	2200 PF POLYSTYRENE ±5% 500V
C310	22-13	.0033 MFD DISC 500V
C311	22-13	.0033 MFD DISC 500V
C312	22-16	470 PF DISC 500V
C313	22-3034	.05 MFD DISC 25V
C314	22-16	470 PF DISC 500V
C315	22-3034	.05 MFD DISC 25V
C316	22-3381	39 PF ±5% DISC 500V
C401	22-3034	.05 MFD DISC 25V
C402	22-2939	680 PF DISC 500V
C403	22-5487	.47 MFD DISC 3V
C404	22-7153	1 MFD ELECTROLYTIC 50V
C406	22-16	470 PF DISC 500V
C407	22-5964	.27 MFD MYLAR 50V
C408	22-7202	.039 MFD MYLAR 50V
C409	22-5722	.068 MFD MYLAR 100V
C410	22-3415	.0068 MFD DISC 25V
C411	22-5814	.022 MFD MYLAR 20% 100V
C412	22-16	470 PF DISC 500V
C413	22-6905	1 MFD MYLAR 10% 50V
C414	22-2939	680 PF DISC 500V
C415	22-7152-9	220 MFD ELECTROLYTIC 25V
C416	22-3381	39 PF DISC ±5% 500V
C417	22-7151-9	220 MFD ELECTROLYTIC 16V
C418	22-2939	680 PF DISC 500V
C420	22-7152-6	33 MFD ELECTROLYTIC 25V
C421	22-7154-12	1000 MFD ELECTROLYTIC 35V
C451	22-3034	.05 MFD DISC 25V
C452	22-2939	680 PF DISC 500V
C453	22-5487	.47 MFD DISC 3V
C454	22-7153	1 MFD ELECTROLYTIC 50V
C456	22-16	470 PF DISC 500V
C457	22-5964	.27 MFD MYLAR 50V
C458	22-7202	.039 MFD MYLAR 50V
C459	22-5722	.068 MFD MYLAR 100V
C460	22-3415	.0068 MFD DISC 25V
C461	22-5814	.022 MFD MYLAR 20% 100V
C462	22-16	470 PF DISC 25V
C463	22-6905	1 MFD MYLAR 10% 50V
C464	22-3939	680 PF DISC 500V
C465	22-7152-9	220 MFD ELECTROLYTIC 25V
C466	22-3381	39PF DISC ±5% 500V
C467	22-7151-9	220 MFD ELECTROLYTIC 16V
C468	22-2939	680 PF DISC 500V
C469	22-7326	.047 MYLAR ±20% 100V
C471	22-7154-12	1000 MFD ELECTROLYTIC 35V
C501	22-4617	.01 MFD DISC 500V
C502	22-4617	.01 MFD DISC 500V
CX503	22-7113	1500 MFD ELECTROLYTIC 65V
C504	22-7141-11	470 MFD ELECTROLYTIC 16V
C506	22-7326	.047 MFD MYLAR ±20% 100V
CX510	22-6005	.01 MFD DISC 150VAC
CX511	22-6005	.01 MFD DISC 150VAC
R1	63-9921-56	220 OHM 5% (ALT 63-10183-56 1/4W 10%)
R2	63-9922-20	100K OHM 5% (ALT 63-10184-20 1/4W 10%)
R3	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R4	63-9921-78	1.8K OHM 5% (ALT 63-7796 1/2W 10%)
R5	63-4196	1.8K OHM 1/2W
R6	63-9921-98	12K OHM 5% (ALT 63-7831 1/2W 10%)
R7	63-9922-36	470K OHM 5% (ALT 63-7898 1/2W 20%)
R8	63-4122	33 OHM 1/2W
R9	63-9922-36	470K OHM 5% (ALT 63-7898 1/2W 20%)
R10	63-4133	56 OHM 1/4W
R11	63-9922-30	270K OHM 5% (ALT 63-10184-30 1/4W 10%)
R12	63-9922-12	47K OHM 5% (ALT 63-10184-12 1/4W 10%)
R101	63-9922-00	15K OHM 5% (ALT 63-7834 1/2W 10%)
R102	63-9922-18	82K OHM 5% (ALT 63-7866 1/2W 10%)
R103	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R104	63-9921-72	1K OHM 5% (ALT 63-7785 1/2W 10%)
R105	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2W 10%)
R106	63-1771	470 OHM 1/2W
R107	63-9921-64	470 OHM 5% (ALT 63-7771 1/2W 10%)
R201	63-9921-68	680 OHM 5% (ALT 63-7778 1/2W 10%)
R202	63-9921-58	270 OHM 5% (ALT 63-7761 1/2W 10%)
R203	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R204	63-9921-84	3.3K OHM 5% (ALT 63-7806 1/2W 10%)
R205	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R206	63-9921-64	470 OHM 5% (ALT 63-7771 1/2W 10%)
R207	63-9921-72	1K OHM 5% (ALT 63-7785 1/2W 10%)
R208	63-1799	2.2K OHM 1/2W
R209	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R210	63-9921-72	1K OHM 5% (ALT 63-10183-72 1/4W 10%)
R211	63-1775	560 OHM 1/4W
R212	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R213	63-9921-68	680 OHM 5% (ALT 7778 1/2W 10%)
R214	63-9921-68	680 OHM 5% (ALT 63-7778 1/2 W 10%)
R215	63-9921-88	4700 OHM 5% (ALT 63-7813 1/2W 10%)
R216	63-9921-88	4700 OHM 5% (ALT 63-7813 1/2W 10%)
R217	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2W 10%)
R218	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R219	63-9922-04	22K OHM 5% (ALT 63-7841 1/2W 10%)
R220	63-9921-94	8.2K OHM 5% (ALT 63-7824 1/2W 10%)
R221	63-1827	10K OHM 1/2W
R223	63-1890	330K OHM 1/2W
R224	63-9921-64	470K OHM 5% (ALT 63-7772 1/2W 20%)
R225	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2W 10%)
R227	63-9922-12	47K OHM 5% (ALT 63-7855 1/2W 10%)
R228	63-9922-10	39K OHM 5% (ALT 63-7852 1/2W 10%)
R229	63-9922-22	120K OHM 5% (ALT 63-7873 1/2W 10%)
R230	63-1897	470K OHM 1/2W
R231	63-9924-50	1.8 MEG OHM 10% (ALT 63-7922 1/2W 10%)
R232	63-9922-32	330K OHM 5% (ALT 63-7890 1/2W 10%)
R233	63-9250	2K OHM METER CONTROL
R234	63-9922-00	15K OHM 5% (ALT 63-7834 1/2W 10%)
R235	63-9921-98	12K OHM 5% (ALT 63-7831 1/2W 10%)

ITEM NO.	PART NUMBER	DESCRIPTION
R236	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R237	63-9922-10	39K OHM 5% (ALT 63-7852 1/2W 10%)
R301	63-1838	18K OHM 1/2W
R302	63-8328	300 OHM MUTE CONTROL
R303	63-9924-48	1.5 MEG OHM 5% (ALT 63-7918 1/2W 10%)
R304	63-1458	390 OHM 2W
RX305	63-10430-86	390 OHM 3W
R306	63-9921-90	5.6K OHM ±5% (ALT 63-7816 1/2W 5%)
R307	63-9921-90	5.6K OHM ±5% (ALT 63-7816 1/2W 5%)
R308	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R309	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R401	63-9922-30	270K OHM 5% (ALT 63-7887 1/2W 10%)
R402	63-1841	22K OHM
R403	63-9922-28	220K OHM 5% (ALT 63-7883 1/2W 10%)
R404	63-9922-32	330K OHM 5% (ALT 63-7890 1/2W 10%)
R405	63-9922-06	27K OHM 5% (ALT 63-7845 1/2W 10%)
R406	63-1848	33K OHM
R407	63-9921-82	2.7K OHM 5% (ALT 63-7803 1/2W 10%)
R408R / R408L	63-10189-01	50K DUAL LOUDNESS CONTROL
R409	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R410R / R410L	63-8982-01	100K DUAL BASS CONTROL
R411	63-9921-92	6.8K OHM 5% (ALT 63-7820 1/2W 10%)
R412R / R412L	63-8983-01	50K DUAL TREBLE CONTROL
R413	63-9922-00	15K OHM 5% (ALT 63-7834 1/2W 10%)
R414	63-8981-01	250 BALANCE CONTROL
R415	63-9921-90	5.6K OHM 5% (ALT 63-7817 1/2W 10%)
R416	63-1726	39 OHM
R417	63-9921-90	5.6K OHM 5% (ALT. 63-7817 1/2W 10%)
RX418	63-9946-52	150 OHM ±5% 1/2W (ALT. 63-7749 1/2W 5%)
R419	63-9946-52	150 OHM ±5% 1/2W (ALT 63-7749 1/2W 5%)
R420		
R420	63-9946-52	150 OHM ±5% 1/2W (ALT 63-7749 1/2W 5%)
R421	63-9946-20	6.8 OHM ±5% 1/2W (ALT 63-7968 1/2W 5%)
RX422	63-9784	.47 OHM 2W
RX423	63-9784	.47 OHM 2W
R424	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R425	63-9922-26	180K OHM ±5% (ALT 63-7879 1/2W 5%)
R426	63-9922-22	120K OHM ±5% (ALT 63-7872 1/2W 5%)
R427	63-9921-50	120 OHM 5% (ALT 63-7747 1/2W 10%)
R428	63-9946-76	1500 OHM ±5% (ALT 63-7793 1/2W 20%)
R430	63-1757	220 OHM
R431		
R432	63-10135	11 OHM 5W
R451	63-9922-30	270K OHM 5% (ALT 63-7887 1/2W 10%)
R453	63-9922-28	220K OHM 5% (ALT 63-7883 1/2W 10%)
R454	63-9922-32	330K OHM 5% (ALT 63-7890 1/2W 10%)
R455	63-9922-06	27K OHM 5% (ALT 63-7845 1/2W 10%)
R456	63-9922-08	33K OHM 5% (ALT 63-7848 1/2W 10%)
R457	63-9921-82	2.7K OHM 5% (ALT 63-7803 1/2W 10%)
R459	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R461	63-9921-92	6.8K OHM 5% (ALT 63-7820 1/2W 10%)
R463	63-9922-00	15K OHM 5% (ALT 63-7834 1/2W 10%)
R465	63-9921-90	5.6K OHM 5% (ALT 63-7817 1/2W 10%)
R466	63-1726	39 OHM
R467	63-9921-90	5.6K OHM 5% (ALT 63-7817 1/2W 10%)
RX468	63-9946-52	150 OHM ±5% 1/2W (ALT. 63-7749 1/2W 5%)
R469	63-9946-52	150 OHM ±5% 1/2W (ALT 63-7749 1/2W 5%)
R470	63-9946-52	150 OHM ±5% 1/2W (ALT 63-7749 1/2W 5%)
R471	63-4535	6.8 OHM ±5% 1/2W
RX472	63-9784	.47 OHM 2W
RX473	63-9784	.47 OHM 2W
R474	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R477	63-9921-50	120 OHM 5% (ALT 63-7747 1/2W 10%)
R478	63-9946-76	1500 OHM 5% (ALT 63-7793 1/2W 20%)
R480	63-1757	220 OHM 1/2W
R481		
RX501	63-10430-86	390 OHM 3W
R502	63-9946-24	10 OHM 5% 1/2W (ALT. 63-7701 1/2W 10%)
R506	63-10526-01	2.2 MEG OHM ±20%
RX507	63-9946-28	15 OHM 5% 1/2 W (ALT. 63-7708 1/2W 10%)
RX508	63-1712	18 OHM
RX509	63-1712	18 OHM
L1	20-3664	FM ANTENNA COIL
L2	20-3665	FM RF COIL
L3	20-1631	TRAP COIL 10.7 MHZ
L4	20-3597	FM OSCILLATOR COIL
L101	S-93292-01	AM ANTENNA ASSEMBLY
L102	149-311	FERRITE CORE SLEEVE
L103	IN T101	AM OSCILLATOR TRANS. PRI
L104	IN T101	AM OSCILLATOR TRANS. SEC.
L201	IN T201	1ST IF TRANSFORMER 10.7 MHz PRI.
L202	IN T201	1ST IF TRANSFORMER 10.7 MHz SEC.
L203	IN T202	1ST IF AM 455 KHz PRI.
L204	IN T202	1ST IF 455 KHz SEC.
L205	IN T203	2ND IF TRANSFORMER 10.7 MHz PRI.
L206	IN T203	2ND IF TRANSFORMER 10.7 MHz SEC.
L207	IN T204	2ND IF AM 455 KHz
L208	IN T205	3RD IF TRANSFORMER 10.7 MHz PRI.
L209	IN T205	3RD IF TRANSFORMER 10.7 MHz SEC.
L210	IN T206	3RD IF AM 455 KHz PRI.
L211	IN T206	3RD IF AM 455 KHz SEC.
L212	IN T207	RATIO DETECTOR TRANS. 10.7 MHz PRI.
L213	IN T207	RATIO DETECTOR TRANS. 10.7 MHz TERTIARY
L214	IN T207	RATIO DETECTOR TRANS. 10.7 MHz SEC.
L301	20-3080	67 KHz TRAP
T101	95-3077	AM OSCILLATOR TRANSFORMER
T201	95-2546	FM 1ST TRANSFORMER 10.7 MHz
T202	95-2541	AM 1ST IF AM 455 KHz
T203	95-2547	FM 2ND IF TRANSFORMER 10.7 MHz
T204	95-2542	AM 2ND IF AM 455 KHz
T205	95-2548	FM 3RD IF TRANSFORMER 10.7 MHz
T206	95-2689	AM 3RD IF AM 455 KHz
T207	95-2545	FM RATIO DETECTOR 10.7 MHz
T301	95-3021	INPUT COIL 19 KHz
T302	95-3023	DETECTOR COIL 38 KHz
TX501	95-3174	POWER TRANSFORMER
SW1	85-1442	BAND SWITCH
SW2	85-1372-01	AFC SWITCH (SLIDE SP-DT)
SW3	85-1372-01	MATRIX SWITCH (SLIDE SPDT,
SWX4	85-1448	PUSH - PUSH POWER SWITCH
J1	78-2137-01	STEREO HEADPHONE JACK
CR1	103-47 or 103-189	AFC DIODE
CR101	103-142-01	SILICON DIODE
CR201	103-23-01	GERMANIUM DIODE
CR202	103-90	GERMANIUM DIODES (MATCHED PAIR)
CR203	103-90	
CR204	103-23-01	GERMANIUM DIODE
CR205	103-23-01	GERMANIUM DIODE
CR206	103-23-01	GERMANIUM DIODE
CR401	103-222-01	SILICON DIODE
CR451	103-222-01	SILICON DIODE
CRX501	212-76	SILICON RECTIFIER
CRX502	212-76	SILICON RECTIFIER
CRX503	103-96	DIODE (ZENER)
IC-301	221-79-01 or 221-65	MONOLITHIC MULTIPLEX DEMODULATOR (SEE C306)
DS301	100-611	STEREO INDCATOR LIGHT
DSX501	100-604	FM DIAL LIGHT
DSX502	100-633	METER LIGHT
DSX503	100-633	POINTER LIGHT
DSX504	100-604	AM DIAL LIGHT
DSX505	100-633	PILOT LIGHT
PC	204-533	PRINTED CIRCUIT BOARD
FX501	136-117-17	.75 AMP SLO-BLO FUSE
FX502	136-114-20	2 AMP REGULAR FUSE
MI	122-72	TUNING METER

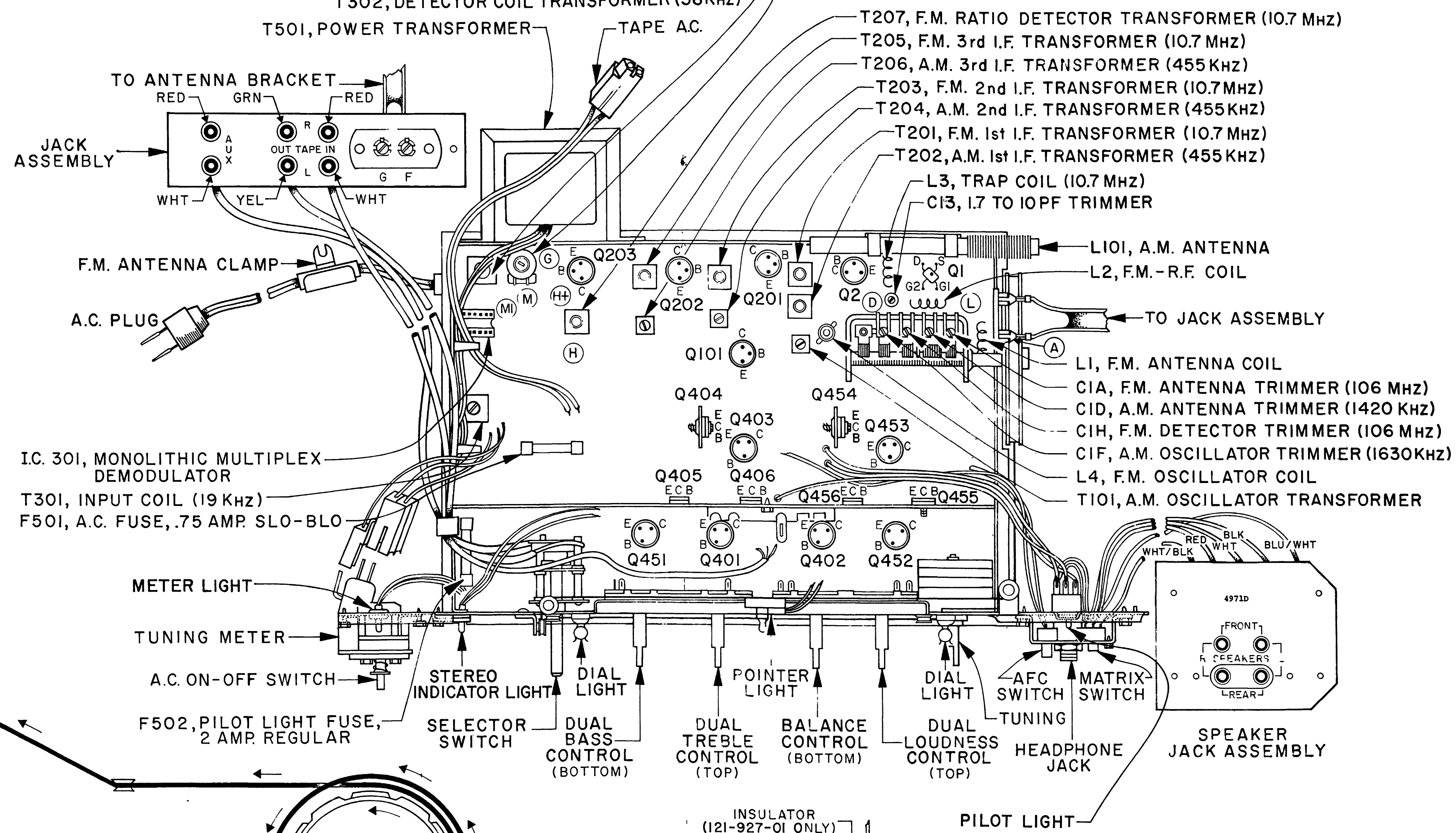
(4970D2)

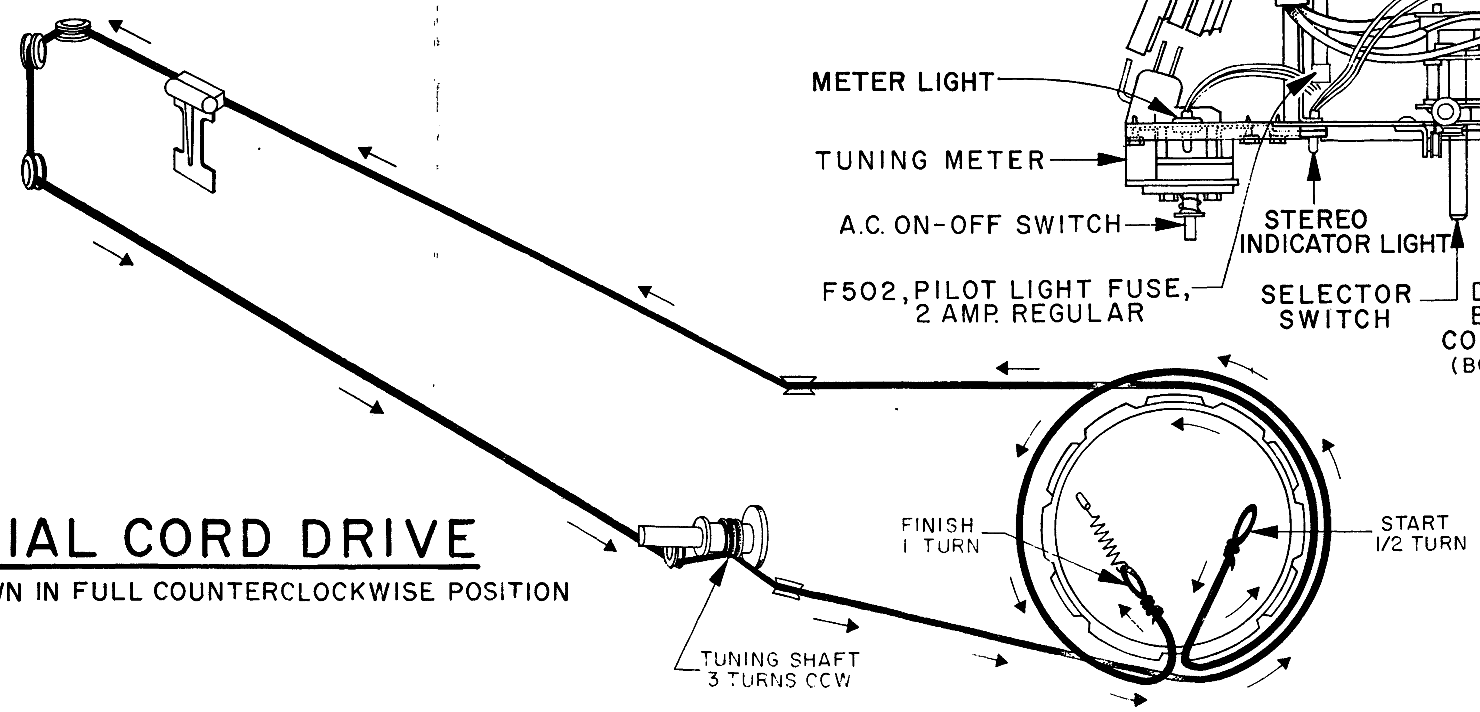


CHASSIS 6WGR56 – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE

TRANSISTORS		
No.	PART No.	DESCRIPTION
Q1	121-953	F.M.-R.F.
Q2	121-613	F.M. CONVERTER
Q101	121-735	A.M. CONVERTER
Q201	121-614	A.M.-F.M. 1st I.F.
Q202	121-950	A.M.-F.M. nd I.F.
Q203		F.M. 3rd I.F.
Q204	121-433	TUNING METER CONTROL
Q401		PRE-AMPLIFIER
Q402	121-1005	AUDIO AMPLIFIER
Q403	121-877	PRE-DRIVER
Q404	121-1006	DRIVER
Q405	121-927-01	OUTPUT
Q406	121-926-01	
Q451	121-433	PRE-AMPLIFIER
Q452	121-1005	AUDIO AMPLIFIER
Q453	121-877	PRE-DRIVER
Q454	121-1006	DRIVER
Q455	121-927-01	OUTPUT
Q456	121-926-01	
IC301	221-79-01 or 221-65	MULTIPLEX DEMODULATOR

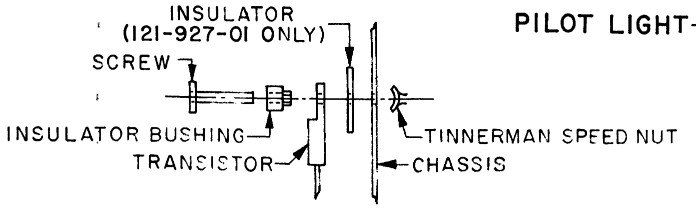
○	TEST POINTS
A	F.M. ANTENNA INPUT
D	1st F.M. I.F. INPUT
G	3rd F.M. OUTPUT
H	F.M. DETECTOR OUTPUT
H+	RATIO DETECTOR PRIMARY TUNING
L	A.M. R.F. & I.F. INPUT
M	19 KHz A.C. GAIN
MI	19 KHz D.C. GAIN





DIAL CORD DRIVE

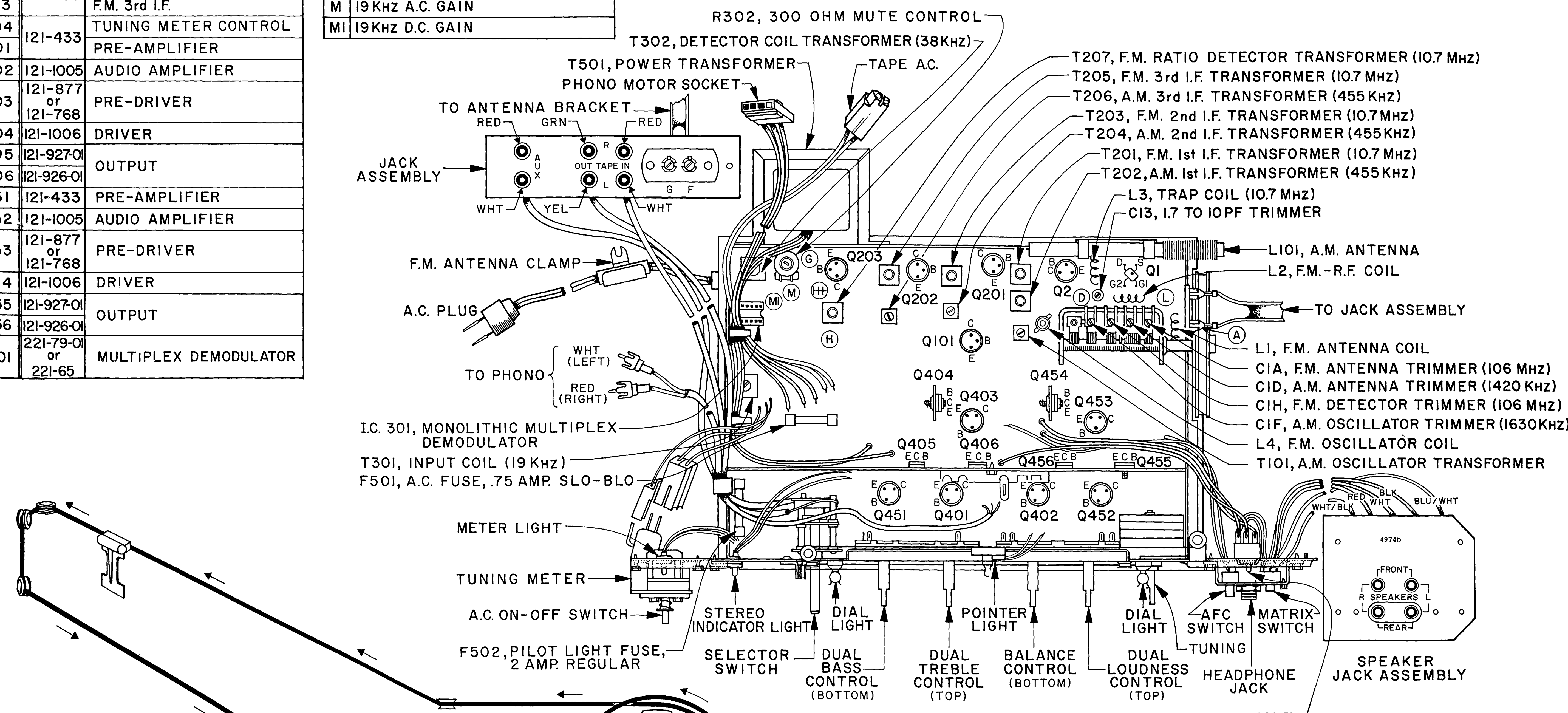
SHOWN IN FULL COUNTERCLOCKWISE POSITION

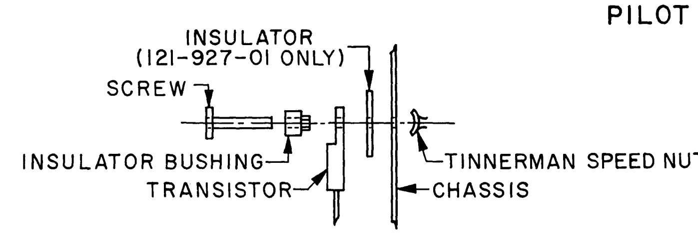


TRANSISTOR MOUNTING VIEW
121-926-01 & 121-927-01

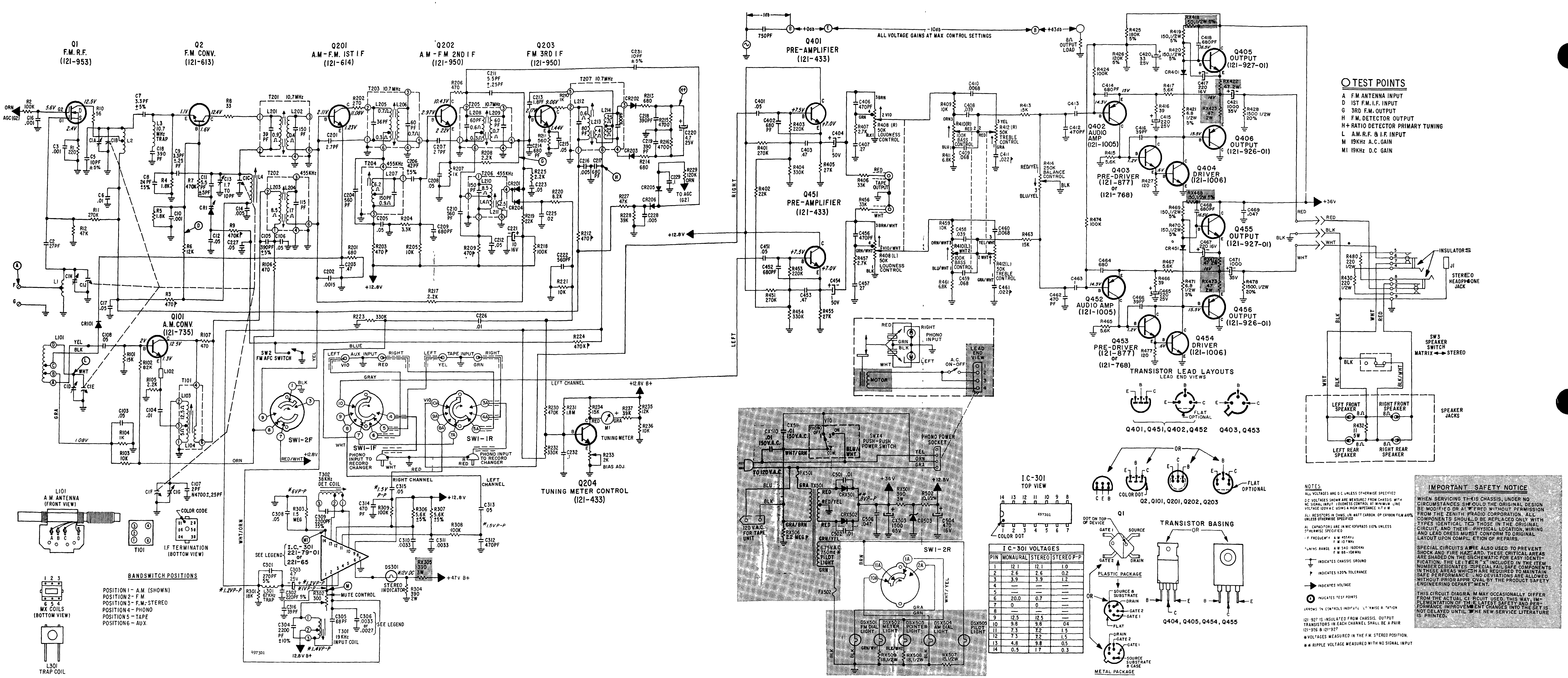
TRANSISTORS		
No.	PART No.	DESCRIPTION
Q1	121-953	F.M.-R.F.
Q2	121-613	F.M. CONVERTER
Q101	121-735	A.M. CONVERTER
Q201	121-614	A.M.-F.M. 1st I.F.
Q202	121-950	A.M.-F.M. nd I.F.
Q203		F.M. 3rd I.F.
Q204	121-433	TUNING METER CONTROL
Q401		PRE-AMPLIFIER
Q402	121-1005	AUDIO AMPLIFIER
Q403	121-877 or 121-768	PRE-DRIVER
Q404	121-1006	DRIVER
Q405	121-927-01	OUTPUT
Q406	121-926-01	
Q451	121-433	PRE-AMPLIFIER
Q452	121-1005	AUDIO AMPLIFIER
Q453	121-877 or 121-768	PRE-DRIVER
Q454	121-1006	DRIVER
Q455	121-927-01	OUTPUT
Q456	121-926-01	
IC301	221-79-01 or 221-65	MULTIPLEX DEMODULATOR

◯	TEST POINTS
A	F.M. ANTENNA INPUT
D	1st F.M. I.F. INPUT
G	3rd F.M. OUTPUT
H	F.M. DETECTOR OUTPUT
H+	RATIO DETECTOR PRIMARY TUNING
L	A.M. R.F. & I.F. INPUT
M	19 KHz A.C. GAIN
M1	19 KHz D.C. GAIN





TRANSISTOR MOUNTING VIEW
121-926-01 & 121-927-01



I C.-301 VOLTAGES			
PIN	MONAURAL	STEREO	STEREO P-P
1	12.1	12.1	1.0
2	2.6	2.6	0.2
3	3.9	3.9	1.2
4	—	—	—
5	—	—	—
6	20.0	0.7	—
7	0	0	—
8	—	—	—
9	12.5	12.5	—
10	9.8	9.8	04
11	7.3	7.2	1.5
12	7.3	7.2	1.5
13	4.8	9.8	0.5
14	0.5	1.7	0.3

NOTES

ALL VOLTAGES ARE D C UNLESS OTHERWISE SPECIFIED

D C VOLTAGES SHOWN ARE MEASURED FROM CHASSIS WITH NO SIGNAL INPUT LOUDNESS CONTROL AT MINIMUM LINE VOLTAGE 120V A C USING A HIGH IMPEDANCE V.T V M

ALL RESISTORS IN OHMS, 1/4 WATT CARBON, OR CARBON FILM ±10% UNLESS OTHERWISE SPECIFIED

ALL CAPACITORS ARE IN MICROFARADS ±10% UNLESS OTHERWISE SPECIFIED

I F FREQUENCY A M 455KHz
F M 10 7MHz

TUNING RANGE A M 540-1600KHz
F M 88-108MHz

INDICATES CHASSIS GROUND

INDICATES ±20% TOLERANCE

INDICATES VOLTAGE

INDICATES TEST POINTS

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION

121-927 IS INSULATED FROM CHASSIS. OUTPUT TRANSISTORS IN EACH CHANNEL SHALL BE A PAIR 121-926 & 121-927

* VOLTAGES MEASURED IN THE F.M. STEREO POSITION.

** RIPPLE VOLTAGE MEASURED WITH NO SIGNAL INPUT

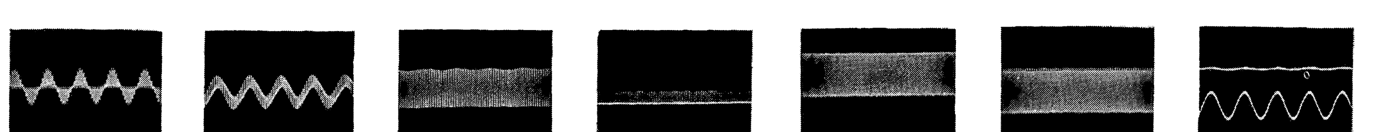
IMPORTANT SAFETY NOTICE

WHEN SERVICING THIS CHASSIS, UNDER NO CIRCUMSTANCES SHOULD THE ORIGINAL DESIGN BE MODIFIED OR ALTERED WITHOUT PERMISSION FROM THE ZENITH RADIO CORPORATION. ALL COMPONENTS SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL CIRCUIT, AND THEIR PHYSICAL LOCATION, WIRING AND LEAD DRESS MUST CONFORM TO ORIGINAL LAYOUT UPON COMPLETION OF REPAIRS.

SPECIAL CIRCUITS ARE ALSO USED TO PREVENT SHOCK AND FIRE HAZARD. THESE CRITICAL AREAS ARE SHADED ON THE SCHEMATIC FOR EASY IDENTIFICATION. THE LETTER "X" INCLUDED IN THE ITEM NUMBER DESIGNATES SPECIAL FAIL SAFE COMPONENTS IN THESE AREAS WHICH ARE REQUIRED TO MAINTAIN SAFE PERFORMANCE. NO DEVIATIONS ARE ALLOWED WITHOUT PRIOR APPROVAL BY THE PRODUCT SAFETY ENGINEERING DEPARTMENT.

THIS CIRCUIT DIAGRAM MAY OCCASIONALLY DIFFER FROM THE ACTUAL CIRCUIT USED. THIS WAY, IMPLEMENTATION OF THE LATEST SAFETY AND PERFORMANCE IMPROVEMENT CHANGES INTO THE SET IS NOT DELAYED UNTIL THE NEW SERVICE LITERATURE IS PRINTED.

IC 301 WAVE FORMS



PIN 3 COMPOSITE L&R, L-R (1KHZ LEFT ONLY) 19 KHZ PILOT 10% 1 V P/P — PIN 2 19 KHZ (WITH L ONLY) 200 MV P/P — PIN 1 19 KHZ 1.2V P/P — PIN 10 38KHZ PULSES 80MV P/P — 38 KHZ TANK END 38 KHZ 13V P/P — PIN 13 38 KHZ 1.4V P/P — PIN 12 (UPPER) RIGHT OUTPUT PIN 11 (LOWER) LEFT OUTPUT (L INPUT ONLY) 1 V P/P

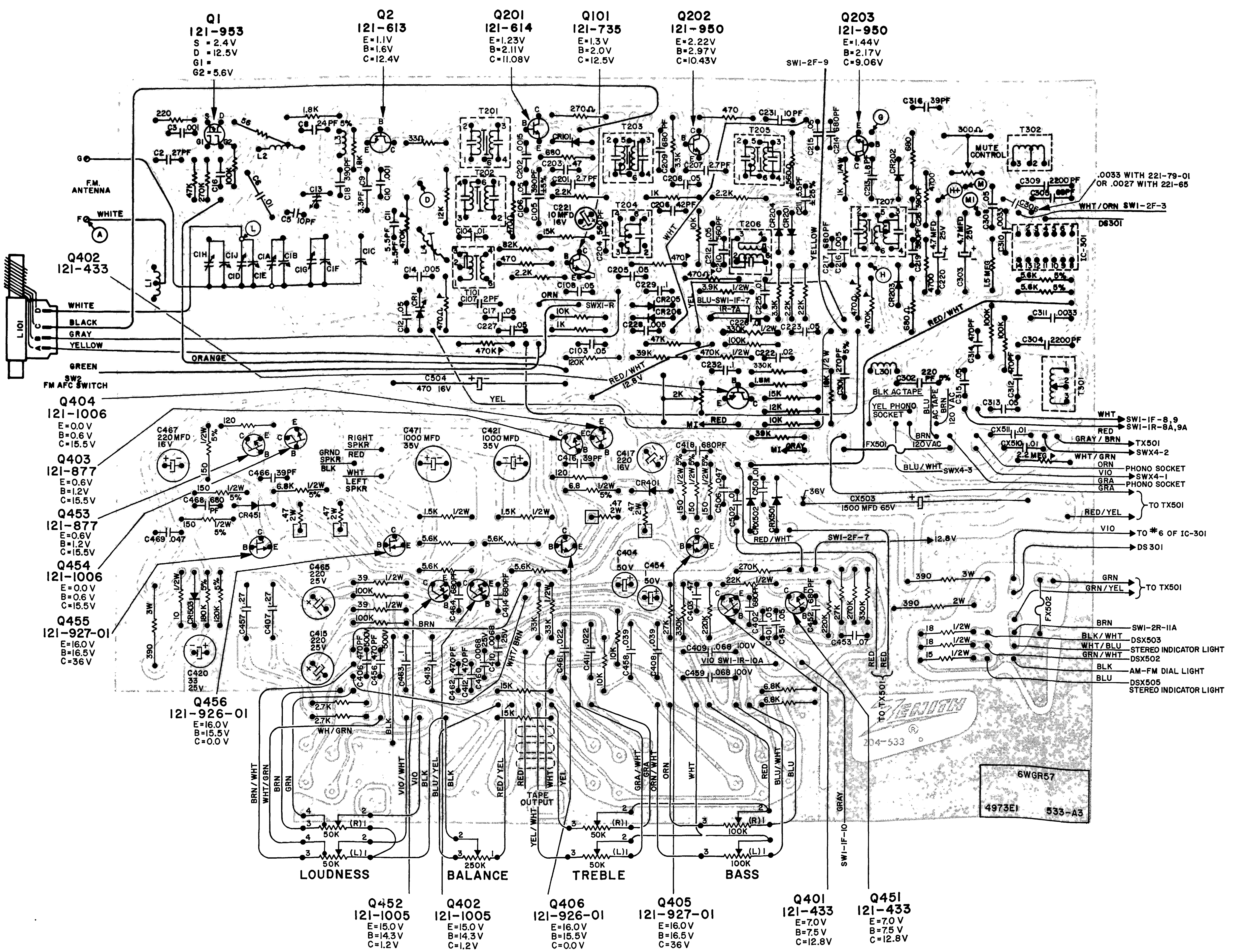
CHASSIS 6WGR57 – SCHEMATIC

CHASSIS LEGEND 6WGR57

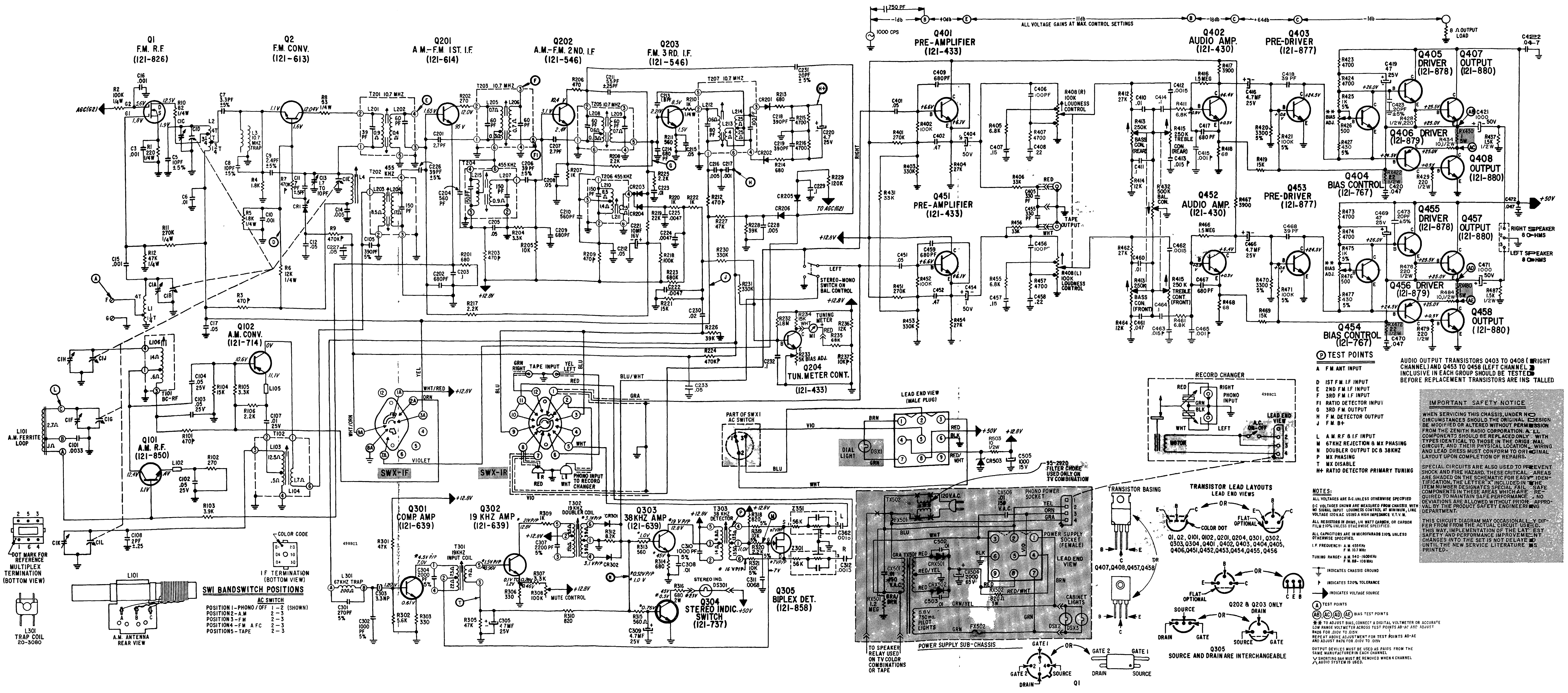
ITEM NO.	PART NUMBER	DESCRIPTION
C1A	22-7134	FM DETECTOR TRIMMER
C1B		FM DETECTOR TUNING
C1C		FM OSCILLATOR TUNING
C1D		AM ANTENNA TRIMMER
C1E		AM ANTENNA TUNING
C1F		AM OSCILLATOR TUNING
C1G		AM OSCILLATOR TRIMMER
C1H		FM ANTENNA TRIMMER
C1J		FM ANTENNA TUNING
C2	22-2396	27 PF DISC 500V
C3	22-2729	.001 MFD DISC 25V
C5	22-3675	10 PF DISC ±5% 500V
C6	22-3393	.01 MFD DISC 25V
C7	22-3541	3.3 PF GIMMICK ±5% 500V
C8	22-2515	24 PF DISC ±5% 500V
C9	22-5879	3.3 PF DISC ± 25 PF 25V
C10	22-2729	.001 MFD DISC 25V
C11	22-5879	5.5 PF DISC ±0.5 PF 500V
C12	22-3034	.05 MFD DISC 25V
C13	22-4555	1.7 TO 10 PF CERAMIC TRIMMER
C14	22-3060	.005 MFD DISC 25V
C16	22-2729	.001 MFD DISC 25V
C17	22-3034	.05 MFD DISC 25V
C18	22-3177	390 PF DISC 500V
C103	22-3034	.05 MFD DISC 25V
C104	22-3034	.01 MFD DISC 25V
C105	22-6972	390 PF ±5% POLYSTYRENE 125V
C106	22-3034	.05 MFD DISC 25V
C107	22-4819	2 PF N4700 ±.25PF 500V
C108	22-3034	.05 MFD DISC 25V
C201	22-3310	2.7 PF GIMMICK ±10% 500V
C202	22-5483	.0015 MFD DISC 500V
C203	22-5487	.47 MFD DISC 3V
C204	22-5481	560 PF DISC 500V
C205	22-3034	.05 MFD DISC 25V
C206	22-3791	42 PF DISC ±5% 500V
C207	22-3310	2.7 PF GIMMICK ±10% 500V
C208	22-3034	.05 MFD DISC 25V
C209	22-5482	680 PF DISC 500V
C210	22-5481	560 PF DISC 500V
C211	22-3770	5.5 PF DISC ±.25 PF 500V
C212	22-3034	.05 MFD DISC 25V
C213	22-2428	1.8 PF GIMMICK ±10% 500V
C214	22-5482	680 PF DISC 500V
C215	22-3034	.05 MFD DISC 25V
C216	22-3080	.005 MFD DISC 25V
C217	22-5482	680 PF DISC 500V
C218	22-3177	390 PF DISC 500V
C219	22-3177	390 PF DISC 500V
C220	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C221	22-7151-04	10 MFD ELECTROLYTIC 16V
C222	22-3362	560 PF DISC 500V
C223	22-3034	.05 MFD DISC 25V
C225	22-3033	.02 MFD DISC 25V
C226	22-3393	.01 MFD DISC 25V
C227	22-3034	.05 MFD DISC 25V
C228	22-3080	.005 MFD DISC 25V
C229	22-3652	1 MFD DISC. 10V
C231	22-3675	10 PF DISC ±5% 500V
C232	22-3652	1 MFD DISC 10V
C301	22-5780	270 PF POLYSTYRENE ±5% 500V
C302	22-2976	220 PF DISC N750 ±5% 500V
C303	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C304	22-5782	2200 PF POLYSTYRENE ±5% 500V
C305	22-3608	63 PF DISC 500V
C306	22-13	.0033 MFD DISC 500V (USED WITH 221-79-01)
	or	
	22-7191	.0027 MFD DISC 500V (USED WITH 221-65)
C308	22-3034	.05 MFD DISC 25V
C309	22-5782	2200 PF POLYSTYRENE ±5% 500V
C310	22-13	.0033 MFD DISC 500V
C311	22-13	.0033 MFD DISC 500V
C312	22-16	470 PF DISC 500V
C313	22-3034	.05 MFD DISC 25V
C314	22-16	470 PF DISC 500V
C315	22-3034	.05 MFD DISC 25V
C316	22-3381	39 PF ±5% DISC 500V
C401	22-3034	.05 MFD DISC 25V
C402	22-2939	680 PF DISC 500V
C403	22-5487	.47 MFD DISC 3V
C404	22-7153	1 MFD ELECTROLYTIC 50V
C406	22-16	470 PF DISC 500V
C407	22-5964	.27 MFD MYLAR 50V
C408	22-7202	.039 MFD MYLAR 50V
C409	22-5722	.068 MFD MYLAR 100V
C410	22-3415	.0068 MFD DISC 25V
C411	22-5814	.022 MFD MYLAR 20% 100V
C412	22-16	470 PF DISC 500V
C413	22-6905	1 MFD MYLAR 10% 50V
C414	22-2939	680 PF DISC 500V
C415	22-7152-9	220 MFD ELECTROLYTIC 25V
C416	22-3381	39 PF DISC ±5% 500V
C417	22-7151-9	220 MFD ELECTROLYTIC 16V
C418	22-2939	680 PF DISC 500V
C420	22-7152-6	33 MFD ELECTROLYTIC 25V
C421	22-7154-12	1000 MFD ELECTROLYTIC 35V
C451	22-3034	.05 MFD DISC 25V
C452	22-2939	680 PF DISC 500V
C453	22-5487	.47 MFD DISC 3V
C454	22-7153	1 MFD ELECTROLYTIC 50V
C456	22-16	470 PF DISC 500V
C457	22-5964	.27 MFD MYLAR 50V
C458	22-7202	.039 MFD MYLAR 50V
C459	22-5722	.068 MFD MYLAR 100V
C460	22-3415	.0068 MFD DISC 25V
C461	22-5814	.022 MFD MYLAR 20% 100V
C462	22-16	470 PF DISC 25V
C463	22-6905	1 MFD MYLAR 10% 50V
C464	22-2939	680 PF DISC 500V
C465	22-7152-9	220 MFD ELECTROLYTIC 25V
C466	22-3381	39 PF DISC ±5% 500V
C467	22-7151-9	220 MFD ELECTROLYTIC 16V
C468	22-2939	680 PF DISC 500V
C469	22-7326	.047 MYLAR ±20% 100V
C471	22-7154-12	1000 MFD ELECTROLYTIC 35V
C501	22-4617	.01 MFD DISC 500V
C502	22-4617	.01 MFD DISC 500V
CX503	22-7113	1500 MFD ELECTROLYTIC 65V
C504	22-7141-11	470 MFD ELECTROLYTIC 16V
C506	22-7326	.047 MFD MYLAR ±20% 100V
CX510	22-6005	.01 MFD DISC 150VAC
CX511	22-6005	.01 MFD DISC 150 VAC
R1	63-9921-56	220 OHM 5% (ALT 63-10183 1/2W 10%)
R2	63-9922-20	100K OHM 5% (ALT 63-10184-20 1/4W 10%)
R3	63-9921-64	470 OHM 5% (ALT 63-7772 1/2 W 20%)
R4	63-9921-78	1.8K OHM 5% (ALT 63-7798 1/2W 10%)
R5	63-4196	1.8K OHM 1/2W
R6	63-9921-98	12K OHM 5% (ALT 63-7831 1/2W 10%)
R7	63-9922-36	470K OHM 5% (ALT 63-7898 1/2W 20%)
R8	63-4122	33 OHM 1/2W
R9	63-9922-36	470K OHM 5% (ALT 63-7898 1/2W 20%)
R10	63-4133	56 OHM 1/4W
R11	63-9922-30	270K OHM 5% (ALT 63-10184-30 1/4W 10%)
R12	63-9922-12	47K OHM 5% (ALT 63-10184-12 1/4W 10%)
R101	63-9922-00	15K OHM 5% (ALT 63-7834 1/2W 10%)
R102	63-9922-18	82K OHM 5% (ALT 63-7866 1/2W 10%)
R103	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R104	63-9921-72	1K OHM 5% (ALT 63-7785 1/2W 10%)
R105	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2W 10%)
R106	63-1771	470 OHM 1/2W
R107	63-9921-64	470 OHM 5% (ALT 63-7771 1/2W 10%)
R201	63-9921-68	680 OHM 5% (ALT 63-7776 1/2W 10%)
R202	63-9921-58	270 OHM 5% (ALT 63-7761 1/2W 10%)
R203	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R204	63-9921-84	3.3K OHM 5% (ALT 63-7806 1/2W 10%)
R205	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R206	63-9921-64	470 OHM 5% (ALT 63-7771 1/2W 10%)
R207	63-9921-72	1K OHM 5% (ALT 63-7785 1/2W 10%)
R208	63-1799	2.2K OHM 1/2W
R209	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R210	63-9921-72	1K OHM 5% (ALT 63-10183-72 1/4W 10%)
R211	63-1775	560 OHM 1/4W
R212	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R213	63-9921-68	680 OHM 5% (ALT 63-7776 1/2W 10%)
R214	63-9921-68	680 OHM 5% (ALT 63-7776 1/2W 10%)
R215	63-9921-88	4700 OHM 5% (ALT 63-7813 1/2W 10%)
R216	63-9921-88	4700 OHM 5% (ALT 63-7813 1/2W 10%)
R217	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2W 10%)
R218	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R219	63-9922-04	22K OHM 5% (ALT 63-7841 1/2W 10%)
R220	63-9921-84	3.3K OHM 5% (ALT 63-7824 1/2W 10%)
R221	63-1827	10K OHM 1/2W
R223	63-1890	330K OHM 1/2W
R224	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R225	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2W 10%)
R226	63-9922-12	47K OHM 5% (ALT 63-7855 1/2W 10%)
R228	63-9922-10	39K OHM 5% (ALT 63-7852 1/2W 10%)
R229	63-9922-22	120K OHM 5% (ALT 63-7873 1/2W 10%)

ITEM NO.	PART NUMBER	DESCRIPTION
R230	63-1897	470K OHM 1/2W
R231	63-9924-60	1.8 MEG OHM 10% (ALT 63-7922 1/2W 10%)
R232	63-9922-32	330K OHM 5% (ALT 63-7890 1/2W 10%)
R233	63-9250	2K OHM METER CONTROL
R234	63-9922-00	15K OHM 5% (ALT 63-7834 1/2W 10%)
R235	63-9921-98	12K OHM 5% (ALT 63-7831 1/2W 10%)
R236	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R237	63-9922-10	39K OHM 5% (ALT 63-7852 1/2W 10%)
R301	63-1838	18K OHM 1/2W
R302	63-8328	300 OHM MUTE CONTROL
R303	63-9924-48	1.5 MEG OHM 5% (ALT 63-7918 1/2W 10%)
R304	63-1458	390 OHM 2W
RX305	63-10430-85	390 OHM 1W
R306	63-9921-90	5.6K OHM ±5% (ALT 63-7818 1/2W 5%)
R307	63-9921-90	5.6K OHM ±5% (ALT 63-7816 1/2W 5%)
R308	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R309	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R401	63-9922-30	270K OHM 5% (ALT 63-7887 1/2W 10%)
R402	63-1841	22K OHM
R403	63-9922-28	220K OHM 5% (ALT 63-7883 1/2W 10%)
R404	63-9922-32	330K OHM 5% (ALT 63-7890 1/2W 10%)
R405	63-9922-06	27K OHM 5% (ALT 63-7845 1/2W 10%)
R406	63-1848	33K OHM
R407	63-9921-82	2.7K OHM 5% (ALT 63-7803 1/2W 10%)
R408R R408L	63-10188-01	50K DUAL LOUDNESS CONTROL
R409	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R410R R410L	63-8982-01	100K DUAL BASS CONTROL
R411	63-9921-92	6.8K OHM 5% (ALT 63-7820 1/2W 10%)
R412R R412L	63-8983-01	50K DUAL TREBLE CONTROL
R413	63-9922-00	15K OHM 5% (ALT 63-7834 1/2W 10%)
R414	63-8961-01	250K BALANCE CONTROL
R415	63-9921-90	5.6K OHM 5% (ALT 63-7817 1/2W 10%)
R416	63-1726	39 OHM
R417	63-9921-90	5.6K OHM 5% (ALT 63-7817 1/2W 10%)
RX418	63-9946-52	150 OHM 5% 1/2W (ALT. 63-7749 1/2W 5%)
R419	63-1749	150 OHM 5% 1/2W (ALT 63-7749 1/2W 5%)
R420	63-9946-52	150 OHM 5% 1/2W (ALT 63-7749 1/2W 5%)
R421	63-9946-20	6.8 OHM 5% 1/2W (ALT 63-7968 1/2W 5%)
RX422	63-9784	.47 OHM 2W
RX423	63-9784	.47 OHM 2W
R424	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R425	63-9922-26	180K OHM ±5% (ALT 63-7879 1/2W 5%)
R426	63-9922-22	120K OHM ±5% (ALT 63-7872 1/2W 5%)
R427	63-9921-50	120 OHM 5% (ALT 63-7747 1/2W 10%)
R428	63-9946-76	1500 OHM 5% (ALT 63-7793 1/2W 20%)
R430	63-1757	220 OHM
R432	63-10135	11 OHM 5W
R451	63-9922-30	270K OHM 5% (ALT 63-7887 1/2W 10%)
R453	63-9922-28	220K OHM 5% (ALT 63-7883 1/2W 10%)
R454	63-9922-32	330K OHM 5% (ALT 63-7890 1/2W 10%)
R455	63-9922-06	27K OHM 5% (ALT 63-7845 1/2W 10%)
R456	63-9922-08	33K OHM 5% (ALT 63-7848 1/2W 10%)
R457	63-9921-82	2.7K OHM 5% (ALT 63-7803 1/2W 10%)
R459	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R461	63-9921-92	6.8K OHM 5% (ALT 63-7820 1/2W 10%)
R463	63-9922-00	15K OHM 5% (ALT 63-7834 1/2W 10%)
R465	63-9921-90	5.6K OHM 5% (ALT 63-7817 1/2W 10%)
R466	63-1726	39 OHM
R467	63-9921-90	5.6K OHM 5% (ALT 63-7817 1/2W 10%)
RX468	63-9946-52	150 OHM ±5% 1/2W (ALT. 63-7749 1/2W 5%)
R469	63-9946-52	150 OHM ±5% 1/2W (ALT 63-7749 1/2W 5%)
R470	63-9946-52	150 OHM ±5% 1/2W (ALT 63-7749 1/2W 5%)
R471	63-4535	6.8 OHM ±5% 1/2W
RX472	63-9784	.47 OHM 2W
RX473	63-9784	.47 OHM 2W
R474	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R477	63-9921-50	120 OHM 5% (ALT 63-7747 1/2W 10%)
R478	63-9946-76	1500 OHM ±5% (ALT 63-7793 1/2W 20%)
R480	63-1757	220 OHM 1/2W
RX501	63-10430-86	390 OHM 3W
R502	63-9946-24	10 OHM 5% 1/2W (ALT. 63-7701 1/2W 10%)
RX506	63-10525-01	2.2 MEG OHM ±20%
RX507	63-9946-28	15 OHM 5% 1/2W (ALT. 63-7708 1/2W 10%)
RX508	63-1712	18 OHM
RX509	63-1712	18 OHM
L1	20-3664	FM ANTENNA COIL
L2	20-3665	FM RF COIL
L3	20-1631	TRAP COIL 10.7 MHz
L4	20-3597	FM OSCILLATOR COIL
L101	S-93292-01	AM ANTENNA ASSEMBLY
L102	149-311	FERRITE CORE SLEEVE
L103	IN T101	AM OSCILLATOR TRANS. PRI.
L104	IN T101	AM OSCILLATOR TRANS. SEC
L201	IN T201	1ST IF TRANSFORMER 10.7 MHz PRI
L202	IN T201	1ST IF TRANSFORMER 10.7 MHz SEC
L203	IN T202	1ST IF AM 455 KHz PRI
L204	IN T202	1ST IF 455 KHz SEC
L205	IN T203	2ND IF TRANSFORMER 10.7 MHz PRI.
L206	IN T203	2ND IF TRANSFORMER 10.7 MHz SEC.
L207	IN T204	2ND IF AM 455 KHz
L208	IN T205	3RD IF TRANSFORMER 10.7 MHz PRI.
L209	IN T205	3RD IF TRANSFORMER 10.7 MHz SEC.
L210	IN T206	3RD IF AM 455 KHz PRI.
L211	IN T206	3RD IF AM 455 KHz SEC.
L212	IN T207	RATIO DETECTOR TRANS. 10.7 MHz PRI.
L213	IN T207	RATIO DETECTOR TRANS. 10.7 MHz TERTIARY
L214	IN T207	RATIO DETECTOR TRANS. 10.7 MHz SEC.
L301	20-3080	67 KHz TRAP
T101	95-3077	AM OSCILLATOR TRANSFORMER
T201	95-2546	FM 1ST TRANSFORMER 10.7 MHz
T202	95-2541	AM 1ST IF AM 455 KHz
T203	95-2547	FM 2ND IF TRANSFORMER 10.7 MHz
T204	95-2542	AM 2ND IF AM 455 KHz
T205	95-2548	FM 3RD IF TRANSFORMER 10.7 MHz
T206	95-2689	AM 3RD IF AM 455 KHz
T207	95-2545	FM RATIO DETECTOR 10.7 MHz
T301	95-3021	INPUT COIL 19 KHz
T302	95-3023	DETECTOR COIL 38 KHz
TX501	95-3174	POWER TRANSFORMER
SW1	85-1441	BAND SWITCH
SW2	85-1372-01	AFC SWITCH (SLIDE SP-DT)
SW3	85-1372-01	MATRIX SWITCH (SLIDE SPDT)
SWX4	85-1448	PUSH - PUSH POWER SWITCH
J1	78-2137-01	STEREO HEADPHONE JACK
CR1	103-47 OR 103-189	AFC DIODE
CR101	103-142	SILICON DIODE
CR201	103-23-01	GERMANIUM DIODE
CR202 CR203	103-90 OR 103-90	GERMANIUM DIODES (MATCHED PAIR)
CR204	103-23-01	GERMANIUM DIODE
CR205	103-23-01	GERMANIUM DIODE
CR206	103-23-01	GERMANIUM DIODE
CR401	103-222-01	SILICON DIODE
CR451	103-222-01	SILICON DIODE
CR501	212-76	SILICON RECTIFIER
CR502	212-76	SILICON RECTIFIER
CR503	103-84	DIODE (ZENER)
I.C.-301	221-79-01 OR 221-65	MONOLITHIC MULTIPLEX DEMODULATOR (SEE C306)
DS301	100-611	STEREO INDICATOR LIGHT
DS501	100-604	FM DIAL LIGHT
DS502	100-633	METER LIGHT
DS503	100-633	POINTER LIGHT
DS504	100-604	AM DIAL LIGHT
DS505	100-633	PILOT LIGHT
PC	204-533	PRINTED CIRCUIT BOARD
FX501	136-117-17	.75 AMP SLO-OLD FUSE
FX502	136-114-20	2 AMP REGULAR FUSE
M1	122-72	TUNING METER

(4973D2)



CHASSIS 6WGR57 – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE



(P) TEST POINTS

- A F.M. ANT. INPUT
- D 1ST F.M. I.F INPUT
- E 2ND F.M. I.F INPUT
- F 3RD F.M. I.F INPUT
- FI RATIO DETECTOR INPUT
- G 3RD F.M. OUTPUT
- H F.M. DETECTOR OUTPUT
- J F.M. B+
- L A.M. R.F & I.F INPUT
- M 67KHZ REJECTION & MX PHASING
- N DOUBLER OUTPUT DC & 38KHZ
- P MX PHASING
- T MX DISABLE
- H+ RATIO DETECTOR PRIMARY TUNING

AUDIO OUTPUT TRANSISTORS Q403 TO Q408 (RIGHT CHANNEL) AND Q453 TO Q458 (LEFT CHANNEL) INCLUSIVE IN EACH GROUP SHOULD BE TESTED BEFORE REPLACEMENT TRANSISTORS ARE INSTALLED

NOTES:

ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED

D.C. VOLTAGES SHOWN ARE MEASURED FROM CHASSIS, WITH NO SIGNAL INPUT LOUDNESS CONTROL AT MINIMUM, LINE VOLTAGE 120V.A.C. USING A HIGH IMPEDANCE V.T.V.M.

ALL RESISTORS IN OHMS, 1/4 WATT CARBON, OR CARBON FILM ±10% UNLESS OTHERWISE SPECIFIED.

ALL CAPACITORS ARE IN MICROFARADS ±10% UNLESS OTHERWISE SPECIFIED.

I.F. FREQUENCY: A.M. 455KHz
F.M. 10.7 MHz

TUNING RANGE: A.M. 540-1600KHz
F.M. 88-108MHz

INDICATES CHASSIS GROUND

INDICATES ±20% TOLERANCE

INDICATES VOLTAGE SOURCE

(A) TEST POINTS

(AB), (AC), (AD), (AE) BIAS TEST POINTS

** TO ADJUST BIAS, CONNECT A DIGITAL VOLTMETER OR ACCURATE LOW RANGE VOLTMETER ACROSS TEST POINTS AB-AC AND ADJUST R426 FOR .010V TO .015V.
REPEAT ABOVE ADJUSTMENT FOR TEST POINTS AD-AE AND ADJUST R476 FOR .010V TO .015V

OUTPUT DEVICES MUST BE USED AS PAIRS FROM THE SAME MANUFACTURER IN EACH CHANNEL

X SHORTING BAR MUST BE REMOVED WHEN 4 CHANNEL AUDIO SYSTEM IS USED.

IMPORTANT SAFETY NOTICE

WHEN SERVICING THIS CHASSIS, UNDER NO CIRCUMSTANCES SHOULD THE ORIGINAL DESIGN BE MODIFIED OR ALTERED WITHOUT PERMISSION FROM THE ZENITH RADIO CORPORATION. ALL COMPONENTS SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL CIRCUIT, AND THEIR PHYSICAL LOCATION, WIRING AND LEAD DRESS MUST CONFORM TO ORIGINAL LAYOUT UPON COMPLETION OF REPAIRS.

SPECIAL CIRCUITS ARE ALSO USED TO PREVENT SHOCK AND FIRE HAZARD. THESE CRITICAL AREAS ARE SHADED ON THE SCHEMATIC FOR EASY IDENTIFICATION. THE LETTER "X" INCLUDED IN THE ITEM NUMBER DESIGNATES SPECIAL FAIL SAFE COMPONENTS IN THESE AREAS WHICH ARE REQUIRED TO MAINTAIN SAFE PERFORMANCE. NO DEVIATIONS ARE ALLOWED WITHOUT PRIOR APPROVAL BY THE PRODUCT SAFETY ENGINEERING DEPARTMENT.

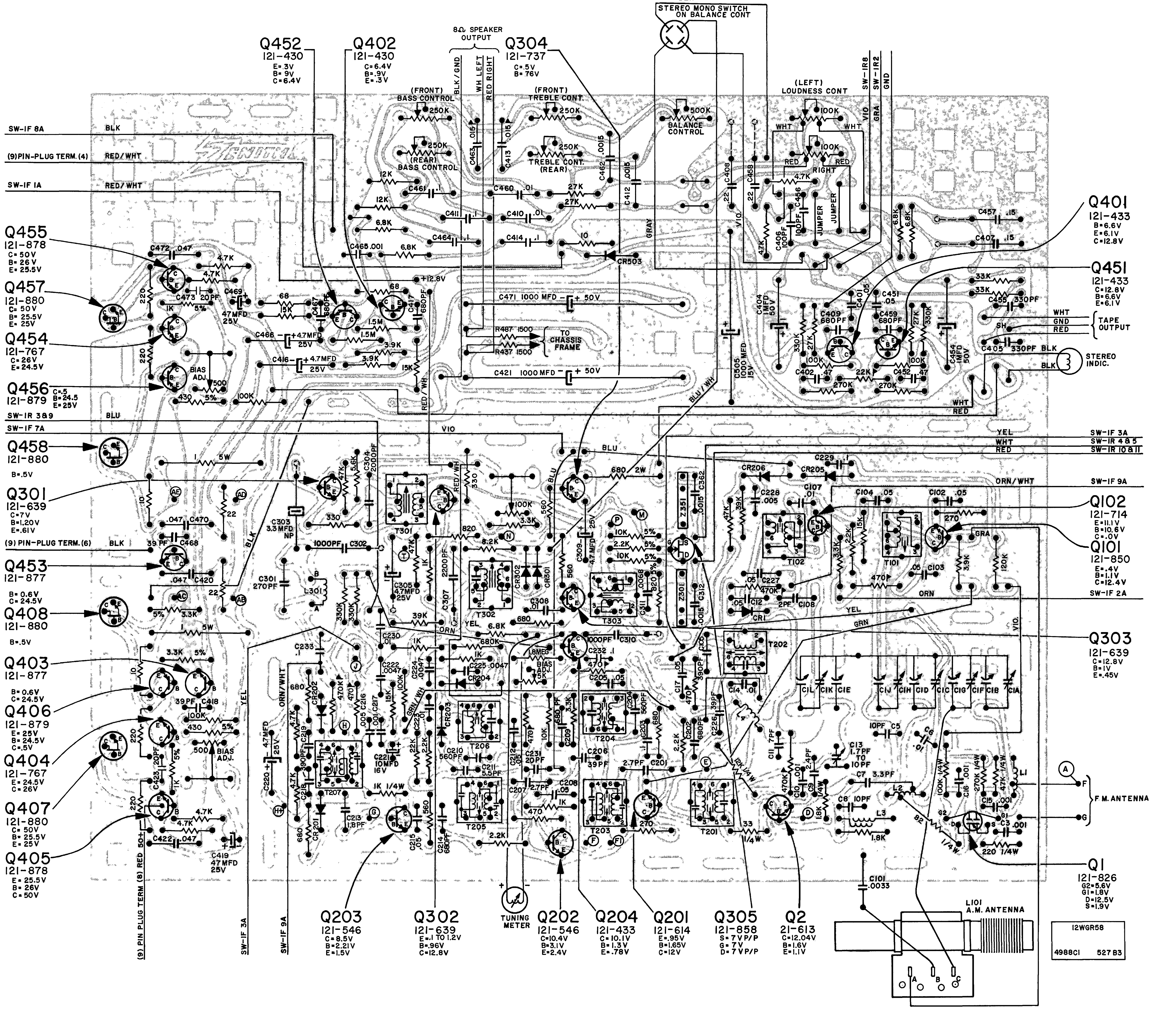
THIS CIRCUIT DIAGRAM MAY OCCASIONALLY DIFFER FROM FROM THE ACTUAL CIRCUIT USED. THIS WAY, IMPLEMENTATION OF THE LATEST SAFETY AND PERFORMANCE IMPROVEMENT CHANGES INTO THE SET IS NOT DELAYED UNTIL THE NEW SERVICE LITERATURE IS PRINTED.

LEGEND CHASSIS 12WGR58

ITEM NO.	PART NUMBER	DESCRIPTION
C1A		FM ANT TRIMMER
C1B		FM ANT TUNING
C1C		FM DETECTOR TRIMMER
C1D		FM DETECTOR TUNING
C1E		FM OSCILLATOR TUNING
C1F	22-6752	AM ANT TRIMMER
C1G		AM ANT TUNING
C1H		AM DETECTOR TRIMMER
C1J		AM DETECTOR TUNING
C1K		AM OSCILLATOR TRIMMER
C1L		AM OSCILLATOR TUNING
C3	22-2729	.001 MFD DISC 25V
C5	22-3675	10 PF DISC ±5% 500V
C6	22-3393	.01 MFD DISC 25V
C7	22-3541	3.3 PF GIMMICK ±5% 500V
C8	22-3675	10 PF DISC ±5% 500V
C9	22-6469	2.4 PF GIMMICK 5% 500V
C10	22-2729	.001 MFD DISC 25V
C11	22-6344	7 PF ±.5 PF 500V
C12	22-3034	.05 MFD DISC 25V
C13	22-4855	1.7 TO 10 PF CERAMIC TRIMMER
C14	22-3080	.005 MFD DISC 25V
C15	22-2729	.001 MFD DISC 25V
C16	22-2729	.001 MFD DISC 25V
C17	22-3034	.05 MFD DISC 25V
C101	22-13	.0033 MFD DISC ±10% 500V
C102	22-3034	.05 MFD DISC 25V
C103	22-3034	.05 MFD DISC 25V
C104	22-3034	.05 MFD DISC 25V
C105	22-5972	390 PF POLYSTYRENE ±5% 125V
C107	22-3393	.01 MFD DISC 25V
C108	22-4819	2 PF ±.25 PF 500V
C201	22-3310	2.7 PF GIMMICK 500V
C202	22-5482	680 PF DISC 500V
C203	22-3652	1 MFD DISC 10V
C204	22-5481	560 PF DISC 500V
C205	22-3034	.05 MFD DISC 25V
C206	22-3381	39 PF DISC ±5% 500V
C207	22-3310	2.7 PF GIMMICK 500V
C208	22-3034	.05 MFD DISC 25V
C209	22-5482	680 PF DISC 500V
C210	22-5481	560 PF DISC 500V
C211	22-3770	5.5 PF DOSC ±.25 PF 500V
C212	22-3034	.05 MFD DISC 25V
C213	22-2428	1.8 PF GIMMICK 500V
C214	22-5482	680 PF DISC 500V
C215	22-3034	.05 MFD DISC 25V
C216	22-3080	.005 MFD DISC 25V
C217	22-2729	.001 MFD DISC 25V
C218	22-3177	390 PF DISC 500V
C219	22-3177	390 PF DISC 500V
C220	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C221	22-7151-04	10 MFD ELECTROLYTIC 16V
C222	22-14	.0047 MFD 500V
C223	22-3393	.01 MFD DISC 500V
C224	22-14	.0047 MFD 500V
C225	22-14	.0047 MFD 500V
C226	22-3381	39 PF DISC ±5% 500V
C227	22-3034	.05 MFD DISC 25V
C228	22-3080	.005 MFD DISC 25V
C229	22-3652	1 MFD DISC 10V
C230	22-5056	.02 MFD DISC 25V
C231	22-3751	20 PF ±5% 500V
C232	22-3652	1 MFD DISC 10V
C233	22-3034	.05 MFD DISC 25V
C301	22-5780	270 PF POLYSTYRENE ±5% 500V
C302	22-5781	1000 PF POLYSTYRENE ±5% 500V
C303	22-6246	3.3 MFD N.P 15V
C304	22-6347	2000 PF ±5% POLYSTYRENE 50V
C305	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C307	22-5782	2200 PF POLYSTYRENE ±5% 500V
C308	22-3393	.01 MFD DISC 25V
C309	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C310	22-5781	1000 PF POLYSTYRENE ±5% 500V
C311	22-3415	.0068 MFD DISC 25V
C312	22-5483	.0015 MFD DISC 100V
C362	22-5483	.0015 MFD DISC 100V
C401	22-3034	.05 MFD DISC 25V
C402	22-5487	.47 MFD DISC 3V
C404	22-7143	1 MFD ELECTROLYTIC 50V
C405	22-3255	330 PF DISC 500V
C406	22-3383	100 PF DISC 100V
C407	22-6134	.15 MFD MYLAR 100V
C408	22-6048	.22 MFD MYLAR 50V
C409	22-5482	680 PF DISC 500V
C410	22-5863	.01 MFD MYLAR 100V
C411	22-5862	.1 MFD MYLAR 100V
C412	22-5483	.0015 MFD DISC 100V
C413	22-5233	.015 MFD MYLAR ±20% 50V
C414	22-5862	.1 MFD MYLAR 100V
C415	22-5688	.001 MFD DISC ±20% 500V
C416	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C417	22-5482	680 PF DISC 500V
C418	22-3381	39 PF DISC ±5% 500V
C419	22-7152-07	47 MFD ELECTROLYTIC 25V
C420	22-5866	.047 MFD MYLAR 100V
C421	22-7143-12	1000 MFD ELECTROLYTIC 50V
C422	22-5866	.047 MFD MYLAR 100V
C423	22-3751	20 PF DISC ±5% 500V
C451	22-3034	.05 MFD DISC 25V
C452	22-5487	.47 MFD DISC 3V
C454	22-7143	1 MFD ELECTROLYTIC 50V
C455	22-3255	330 PF DISC 500V
C456	22-3383	100 PF DISC 100V
C457	22-6134	.15 MFD MYLAR 100V
C458	22-6048	.22 MFD MYLAR 50V
C459	22-5482	680 PF DISC 500V
C460	22-5863	.01 MFD MYLAR 100V
C461	22-5862	.1 MFD MYLAR 100V
C462	22-5483	.0015 MFD DISC 100V
C463	22-5233	.015 MFD MYLAR ±20% 50V
C464	22-5862	.1 MFD MYLAR 100V
C465	22-5688	.001 MFD DISC ±20% 500V
C466	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C467	22-5482	680 PF DISC 500V
C468	22-3381	39 PF DISC ±5% 500V
C469	22-7152-07	47 MFD ELECTROLYTIC 25V
C470	22-5866	.047 MFD MYLAR 100V
C471	22-7143-12	1000 MFD ELECTROLYTIC 50V
C472	22-5866	.047 MFD MYLAR 100V
C473	22-3751	20 PF DISC ±5% 500V
CX501	22-6005	.01 MFD DISC 150VAC
C502	22-4617	.01 MFD DISC 500V
C503	22-4617	.01 MFD DISC 500V
CX504	22-6417	2000 MFD ELECTROLYTIC 75V
C505	22-7141-12	1000 MFD ELECTROLYTIC 16V
CX506	22-6005	.01 MFD DISC 150VAC
R1	63-9921-56	220 OHM 5% (ALT 63-10183-56 1/4W 10%)
R2	63-4269	100K OHM 10% 1/4W
R3	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R4	63-1796	1.8K OHM 10% 1/2W
R5	63-9921-78	1.8K OHM 5% (ALT 63-10183-78 1/4W 10%)
R6	63-4231	12K OHM 10% 1/4W
R7	63-1898	470K OHM 20% 1/2W
R8	63-4122	33 OHM 10% 1/4W
R9	63-9922-36	470K OHM 5% (ALT 63-7898 1/2W 20%)
R10	63-4140	82 OHM 10% 1/4W
R11	63-4287	270K OHM 10% 1/4W
R12	63-4255	47K OHM 10% 1/4W
R101	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R102	63-9921-58	270 OHM 5% (ALT 63-7761 1/2W 10%)
R103	63-9921-86	3.9K OHM 5% (ALT 63-7810 1/2W 10%)
R104	63-9922	15K OHM 5% (ALT 63-7834 1/2W 10%)
R105	63-9921-84	3.3K OHM 5% (ALT 63-7806 1/2W 10%)
R106	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2W 10%)
R201	63-9921-68	680 OHM 5% (ALT 63-7778 10% 1/2W)
R202	63-9921-58	270 OHM 5% (ALT 63-7761 10% 1/2W)
R203	63-9921-64	470 OHM 5% (ALT 63-7772 20% 1/2W)
R204	63-9921-84	3.3K OHM 5% (ALT 63-7806 10% 1/2W)
R205	63-9921-96	10K OHM 5% (ALT 63-7827 10% 1/2W)
R206	63-9921-64	470 OHM 5% (ALT 63-7771 10% 1/2W)
R207	63-9921-72	1K OHM 5% (ALT 63-7785 10% 1/2W)
R208	63-9921-80	2.2K OHM 5% (ALT 63-7799 10% 1/2W)
R209	63-9921-64	470 OHM 5% (ALT 63-7772 20% 1/2W)
R210	63-4185	1K OHM 10% 1/4W
R211	63-9921-66	560 OHM 5% (ALT 63-7775 10% 1/2W)
R212	63-1772	470 OHM 20% 1/2W
R213	63-1778	680 OHM 10% 1/2W
R214	63-9921-68	680 OHM 5% (ALT 63-7778 10% 1/2W)
R215	63-1813	4700 OHM 10% 1/2W
R216	63-1813	4700 OHM 10% 1/2W
R217	63-9921-80	2.2K OHM 5% (ALT 63-7799 10% 1/2W)
R218	63-9922-20	100K OHM 5% (ALT 63-7869 10% 1/2W).
R219	63-9922-04	22K OHM 5% (ALT 63-7841 10% 1/2W)
R220	63-9921-72	1K OHM 5% (ALT 63-7785 10% 1/2W)
R221	63-9922	15K OHM 5% (ALT 63-7834 10% 1/2W)
R222	63-9921-72	1K OHM 5% (ALT 63-7785 10% 1/2W)
R223	63-9922-40	680K OHM 5% (ALT 63-7904 10% 1/2W)
R224	63-9922-36	470K OHM 5% (ALT 63-7898 20% 1/2W)
R225	63-9921-80	2.2K OHM 5% (ALT 63-7799 10% 1/2W)
R226	63-9922-10	39K OHM 5% (ALT 63-7852 10% 1/2W)
R227	63-9922-12	47K OHM 5% (ALT 63-7855 10% 1/2W)
R228	63-9922-10	39K OHM 5% (ALT 63-7852 10% 1/2W)
R229	63-9922-22	120K OHM 5% (ALT 63-7873 10% 1/2W)

ITEM NO.	PART NUMBER	DESCRIPTION
R230	63-9922-32	330K OHM 5% (ALT 63-7890 10% 1/2W)
R231	63-9922-32	330K OHM 5% (ALT 63-7890 10% 1/2W)
R232	63-9924-50	1.8M OHM 5% (ALT 63-7922 10% 1/2W)
R233	63-8708	5K BIAS ADJUST
R234	63-9922	15K OHM 5% (ALT 63-7834 10% 1/2W)
R235	63-9922-16	68K OHM 5% (ALT 63-7862 10% 1/2W)
R236	63-9921-98	12K OHM 5% (ALT 63-7831 10% 1/2W)
R237	63-9921-96	10K OHM 5% (ALT 63-7828 20% 1/2W)
R301	63-9922-12	47K OHM 5% (ALT 63-7855 10% 1/2W)
R302	63-9921-90	5.6K OHM 5% (ALT 63-7817 10% 1/2W)
R303	63-9921-60	330 OHM 5% (ALT 63-7764 10% 1/2W)
R304		
R305	63-9922-12	47K OHM 5% (ALT 63-7855 10% 1/2W)
R306	63-9921-60	330 OHM 5% (ALT 63-7764 10% 1/2W)
R307	63-9921-84	3.3K OHM 5% (ALT 63-7806 10% 1/2W)
R308	63-6495	100K MUTE CONTROL
R309	63-9921-72	1K OHM 5% (ALT 63-7785 10% 1/2W)
R310	63-9921-70	820 OHM 5% (ALT 63-7782 10% 1/2W)
R311		
R312	63-9921-94	8.2K OHM 5% (ALT 63-7824 10% 1/2W)
R313	63-9921-66	560 OHM 5% (ALT 63-7775 10% 1/2W)
R314	63-9921-68	680 OHM 5% (ALT 63-7778 10% 1/2W)
R315	63-9921-66	560 OHM 5% (ALT 63-7775 10% 1/2W)
R316	63-5663	680 OHM 10% 2W
R317		
R318	63-9921-70	820 OHM 5% (ALT 63-7781 5% 1/2W)
R319	63-9921-96	10K OHM 5% (ALT 63-7826 5% 1/2W)
R320	63-9921-80	2.2K OHM 5% (ALT 63-7798 5% 1/2W)
R321	63-9921-96	10K OHM 5% (ALT 63-7826 5% 1/2W)
R401	63-9922-30	270K OHM 5% (ALT 63-7887 10% 1/2W)
R402	63-9922-20	100K OHM 5% (ALT 63-7869 10% 1/2W)
R403	63-9922-32	330K OHM 5% (ALT 63-7890 10% 1/2W)
R404	63-9922-06	27K OHM 5% (ALT 63-7845 10% 1/2W)
R405	63-9921-92	6.8K OHM 5% (ALT 63-7820 10% 1/2W)
R406	63-9922-08	33K OHM 5% (ALT 63-7848 10% 1/2W)
R407	63-9921-88	4700 OHM 5% (ALT 63-7813 10% 1/2W)
R408R, R408L	63-8967-01	100K DUAL LOUDNESS CONTROL
R411	63-9921-92	6.8K OHM 5% (ALT 63-7820 10% 1/2W)
R412	63-9922-06	27K OHM 5% (ALT 63-7845 10% 1/2W)
R413R, R413L	63-8965-01	250K DUAL BASS CONTROL
R414	63-9921-98	12K OHM 5% (ALT 63-7831 10% 1/2W)
R415R, R415L	63-8964-01	250K DUAL TREBLE CONTROL
R416	63-9924-48	1.5 MEG 5% (ALT 63-7918 10% 1/2W)
R417	63-9921-86	3900 OHM 5% (ALT 63-7810 10% 1/2W)
R418	63-9921-44	68 OHM 5% (ALT 63-7736 10% 1/2W)
R419	63-9922	15K OHM 5% (ALT 63-7834 10% 1/2W)
R420	63-9921-84	3.3K OHM 5% (ALT 63-7805 5% 1/2W)
R421	63-9922-20	100K OHM 5% (ALT 63-7868 5% 1/2W)
RX422	63-9946-32	22 OHM 5% 1/2W (ALT 63-7715 10% 1/2W)
R423	63-9921-88	4700 OHM 5% (ALT 63-7813 10% 1/2W)
R424	63-9921-88	4700 OHM 5% (ALT 63-7813 10% 1/2W)
R425	63-9921-72	1000 OHM 5% (ALT 63-7784 5% 1/2W)
R426	63-9261	500 OHM BIAS ADJUST
R427	63-9921-63	430 OHM 5% (ALT 63-7769 5% 1/2W)
R428	63-1757	220 OHM 10% 1/2W
R429	63-1757	220 OHM 10% 1/2W
RX430	63-8424	1 OHM 10% 5W
R431	63-9922-08	33K OHM 5% (ALT 63-7848 10% 1/2W)
R432	63-8966-01	500K BALANCE CONTROL AND SW
R434	63-9946-24	10 OHM 5% 1/2W (ALT 63-7701 10% 1/2W)
R437	63-9946-76	1500 OHM 5% 1/2W (ALT. 63-7792 10% 1/2W)
R451	63-9922-30	270K OHM 5% (ALT 63-7887 10% 1/2W)
R452	63-9922-20	100K OHM 5% (ALT 63-7869 10% 1/2W)
R453	63-9922-32	330K OHM 5% (ALT 63-7890 10% 1/2W)
R454	63-9922-06	27K OHM 5% (ALT 63-7845 10% 1/2W)
R455	63-9921-92	6.8K OHM 5% (ALT 63-7820 10% 1/2W)
R456	63-9922-08	33K OHM 5% (ALT 63-7848 10% 1/2W)
R457	63-9921-88	4700 OHM 5% (ALT 63-7813 10% 1/2W)
R461	63-9921-92	6.8K OHM 5% (ALT 63-7820 10% 1/2W)
R462	63-9922-06	27K OHM 5% (ALT 63-7845 10% 1/2W)
R464	63-9921-98	12K OHM 5% (ALT 63-7831 10% 1/2W)
R465		
R466	63-9924-48	1.5 MEG 5% (ALT 63-7918 10% 1/2W)
R467	63-9921-86	3900 OHM 5% (ALT 63-7810 10% 1/2W)
R468	63-9921-44	68 OHM 5% (ALT 63-7736 10% 1/2W)
R469	63-9922	15K OHM 5% (ALT 63-7834 10% 1/2W)
R470	63-9921-84	3.3K OHM 5% (ALT 63-7805 5% 1/2W)
R471	63-9922-20	100K OHM 5% (ALT 63-7868 5% 1/2W)
RX472	63-9946-32	22 OHM 5% 1/2W (ALT 63-7715 10% 1/2W)
R473	63-9921-88	4700 OHM 5% (ALT 63-7813 10% 1/2W)
R474	63-9921-88	4700 OHM 5% (ALT 63-7813 10% 1/2W)
R475	63-9921-72	1000 OHM 5% (ALT 63-7784 5% 1/2W)
R476	63-9261	500 OHM BIAS ADJUST
R477	63-9921-63	430 OHM 5% (ALT 63-7769 5% 1/2W)
R478	63-1757	220 OHM 10%
R479	63-1757	220 OHM 10%
RX480	63-8424	1 OHM 10% 5W
R484	63-9946-24	10 OHM 5% 1/2W (ALT 63-7701 10% 1/2W)
R487	63-9946-76	1500 OHM 5% 1/2W (ALT. 63-7792 10% 1/2W)
RX501	63-10526-03	1.2 MEG 20%
RX502	63-4694	320 OHM 3W
R503	63-9946-24	10 OHM 5% 1/2W (ALT 63-7701 10% 1/2W)
L1	20-3076	FM ANTENNA COIL
L2	20-3077	FM DETECTOR COIL
L3	20-1256	TRAP COIL 10.7 MHz
L4	20-3545	FM OSCILLATOR COIL
L101	S-88463	AM ANTENNA COIL ASSEMBLY
L102	149-311	FERRITE CORE SLEEVE
L103	IN T102	AM OSCILLATOR TRANS. PRI.
L104	IN T102	AM OSCILLATOR TRANS. SEC.
L105	149-311	FERRITE CORE SLEEVE
L106	IN T101	BC RF TRANS.
L201	IN T201	1ST IF TRANSFORMER 10.7 MHz PRI.
L202	IN T201	1ST IF TRANSFORMER 10.7 MHz SEC.
L203	IN T202	1ST IF AM 455 KHz PRI.
L204	IN T202	1ST IF AM 455 KHz SEC.
L205	IN T203	2ND IF TRANSFORMER 10.7 MHz PRI.
L206	IN T203	2ND IF TRANSFORMER 10.7 MHz SEC.
L207	IN T204	2ND AM 455 KHz
L208	IN T205	3RD IF TRANSFORMER 10.7 MHz PRI.
L209	IN T205	3RD IF TRANSFORMER 10.7 MHz SEC.
L210	IN T206	3RD IF AM 455 KHz PRI.
L211	IN T206	3RD IF AM 455 KHz SEC.
L212	IN T207	RATIO DETECTOR TRANS. 10.7 MHz PRI.
L213	IN T207	RATIO DET TRANS. 10.7 MHz TERITIARY
L214	IN T207	RATIO DETECTOR TRANS. 10.7 MHz SEC.
L215	IN T204	2ND AM 455 KHz PRI.
L301	20-3080	67 KHz TRAP COIL (PREFERRED)
T101	95-2750	B. C. R. F. TRANSFORMER
T102	95-2544	AM OSCILLATOR TRANSFORMER
T201	95-2753	FM 1ST IF TRANSFORMER 10.7 MHz
T202	95-2751	AM 1ST IF AM 455 KHz
T203	95-2754	FM 2ND IF TRANSFORMER 10.7 MHz
T204	95-2752	AM 2ND IF AM 455 KHz
T205	95-2755	FM 3RD IF TRANSFORMER 10.7 MHz
T206	95-2543	AM 3RD IF AM 455 KHz
T207	95-2756	FM RATIO DETECTOR 10.7 MHz
T301	95-2858	INPUT TRANSFORMER 19 KHz
T302	95-2856	DOUBLER TRANSFORMER 19 KHz
T303	95-2757	DETECTOR TRANSFORMER 38 KHz
TX501	95-2965	POWER TRANSFORMER
TX502	95-2920	FILTER CHOKE ON TV COMBINATION POWER SUPPLY ONLY
FX501	136-117-21	1.25 AMP SLOW-BLOW FUSE
FX502	136-114-15	1.0 AMP FUSE (PILOT LIGHT)
SWX-1	85-1423	BAND SWITCH
CR1	103-47	AFC DIODE
CR201	103-90	GERMANIUM DIODE } MATCHED PAIR
CR202	103-90	GERMANIUM DIODE } MATCHED PAIR
CR203	103-23	GERMANIUM DIODE
CR204	103-23	GERMANIUM DIODE
CR205	103-23-01	GERMANIUM DIODE
CR206	103-23-01	GERMANIUM DIODE
CR301	103-23-01	GERMANIUM DIODE
CR302	103-23-01	GERMANIUM DIODE
CRX501	212-76	SILICON RECTIFIER
CRX502	212-76	SILICON RECTIFIER
CR503	103-96	DIODE (ZENER)
Z301	105-107	INTEGNET
Z351	105-107	INTEGNET
DSX1	100-249	PILOT LIGHT # 1847
DSX2	100-249	PILOT LIGHT # 1847
DSX3	100-249	PILOT LIGHT # 1847
DS301	100-507	STEREO INDICATOR LIGHT
M1	122-68 OR 122-68-03	METER (TUNING)

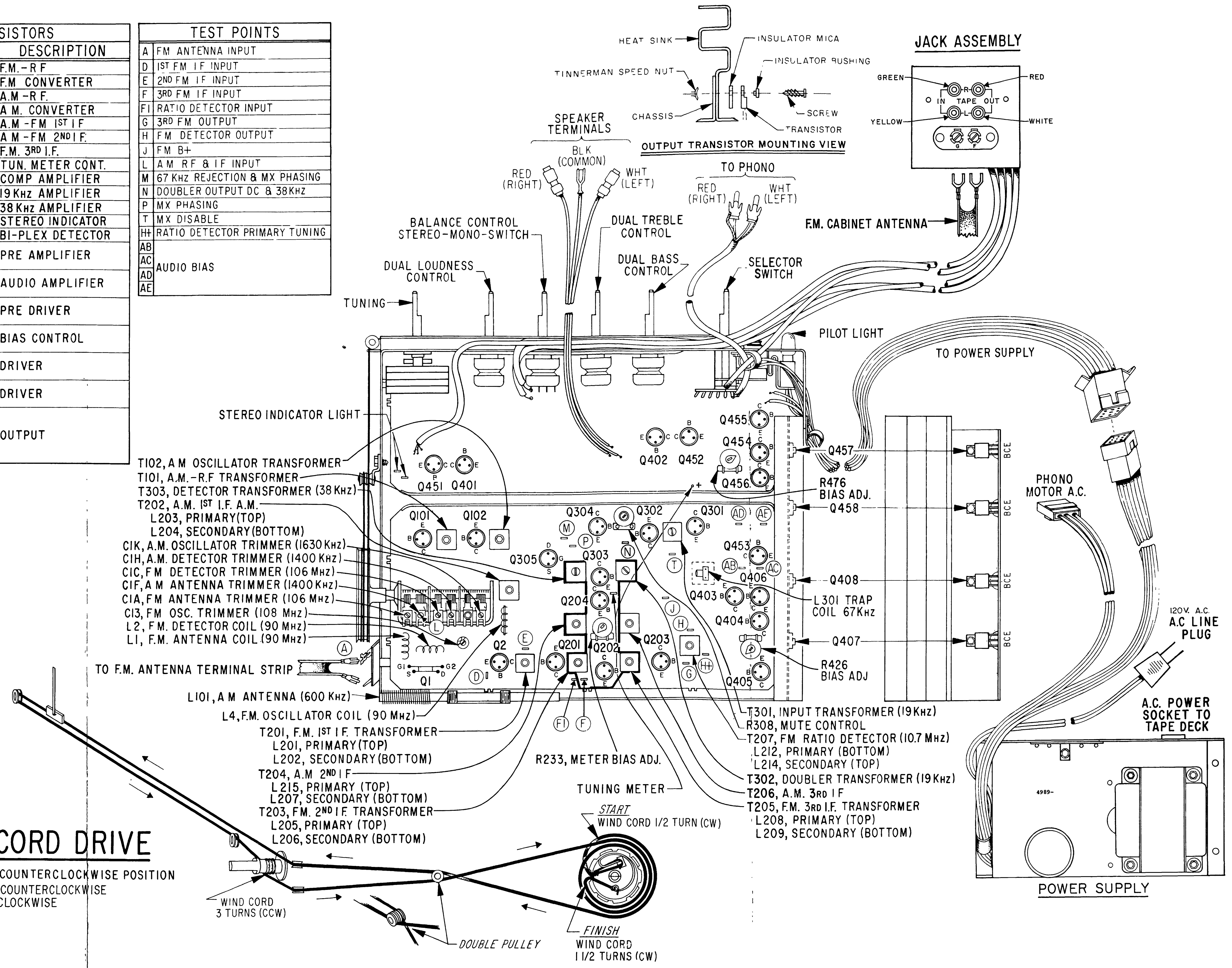
4988C2



CHASSIS 12WGR58 – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE

TRANSISTORS		
No.	PART No.	DESCRIPTION
Q1	121-826	F.M.-R F
Q2	121-613	F.M CONVERTER
Q101	121-850	A.M-R F.
Q102	121-714	A M. CONVERTER
Q201	121-614	A.M-FM 1ST I F
Q202	121-546	A M-FM 2ND I F.
Q203	121-546	F.M. 3RD I.F.
Q204	121-433	TUN. METER CONT.
Q301	121-639	COMP AMPLIFIER
Q302	121-639	19 KHz AMPLIFIER
Q303	121-639	38 KHz AMPLIFIER
Q304	121-737	STEREO INDICATOR
Q305	121-858	BI-PLEX DETECTOR
Q401 Q451	121-433	PRE AMPLIFIER
Q402 Q452	121-430	AUDIO AMPLIFIER
Q403 Q453	121-877	PRE DRIVER
Q404 Q454	121-767	BIAS CONTROL
Q405 Q455	121-878	DRIVER
Q406 Q456	121-879	DRIVER
Q407 Q457 Q408 Q458	121-880	OUTPUT

TEST POINTS	
A	FM ANTENNA INPUT
D	1ST FM I F INPUT
E	2ND FM I F INPUT
F	3RD FM I F INPUT
F1	RATIO DETECTOR INPUT
G	3RD FM OUTPUT
H	FM DETECTOR OUTPUT
J	FM B+
L	AM RF & I F INPUT
M	67 KHz REJECTION & MX PHASING
N	DOUBLER OUTPUT DC & 38 KHz
P	MX PHASING
T	MX DISABLE
H+	RATIO DETECTOR PRIMARY TUNING
AB AC AD AE	AUDIO BIAS



DIAL CORD DRIVE

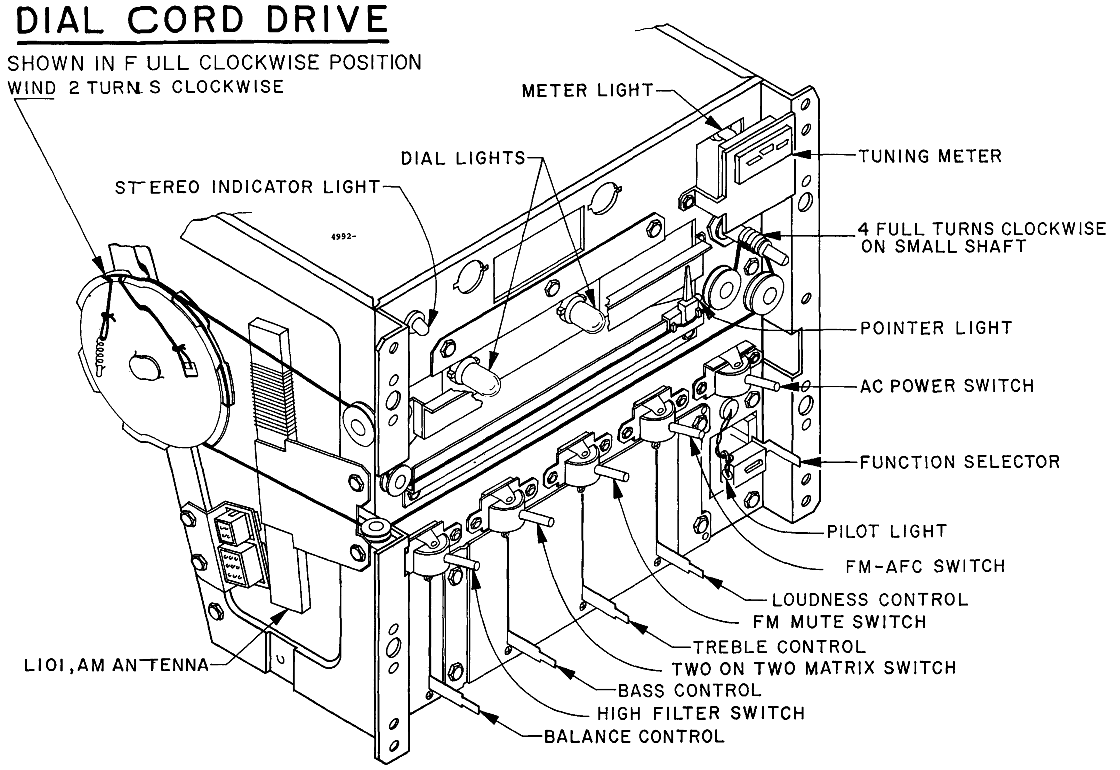
SHOWN IN FULL COUNTERCLOCKWISE POSITION
(CCW) COUNTERCLOCKWISE
(CW) CLOCKWISE

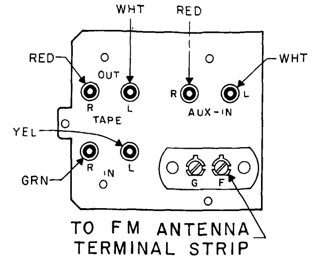
TRANSISTORS		
No.	PART No.	DESCRIPTION
Q1	121 -953	FM-RF
Q2	121 -613	FM CONVERTER
Q101	121 -850	AM-RF
Q102	121 -735	AM CONVERTER
Q201	121 -950	AGC AMPLIFIER
Q202		AM 1st IF
Q203		AM 2nd IF
Q301	121 -603	MUTE BUFFER
Q302	121 -950	MUTE AMPLIFIER
Q303		MUTE SWITCH
Q401	121 -433	PRE-AMPLIFIER
Q402		AUDIO AMPLIFIER
Q403	121 -1005	PRE-DRIVER
Q404	121 -877	DRIVER
Q407	121 -1013	OUTPUT
Q408	121 -1012	
Q451	121 -433	PRE-AMPLIFIER
Q452		AUDIO AMPLIFIER
Q453	121 -1005	PRE-DRIVER
Q454	121 -877	DRIVER
Q457	121 -1013	OUTPUT
Q458	121 -1012	
Q501	121 -774	FM POWER SWITCH
Q502	121 -768	
IC201	221 -89	FM IF GAIN BLOCK
IC202	221 -90	FM IF LIMITER/QUAD. DETECTOR
IC301	221 -91	MULTIPLEX PLL. DEMODULATOR

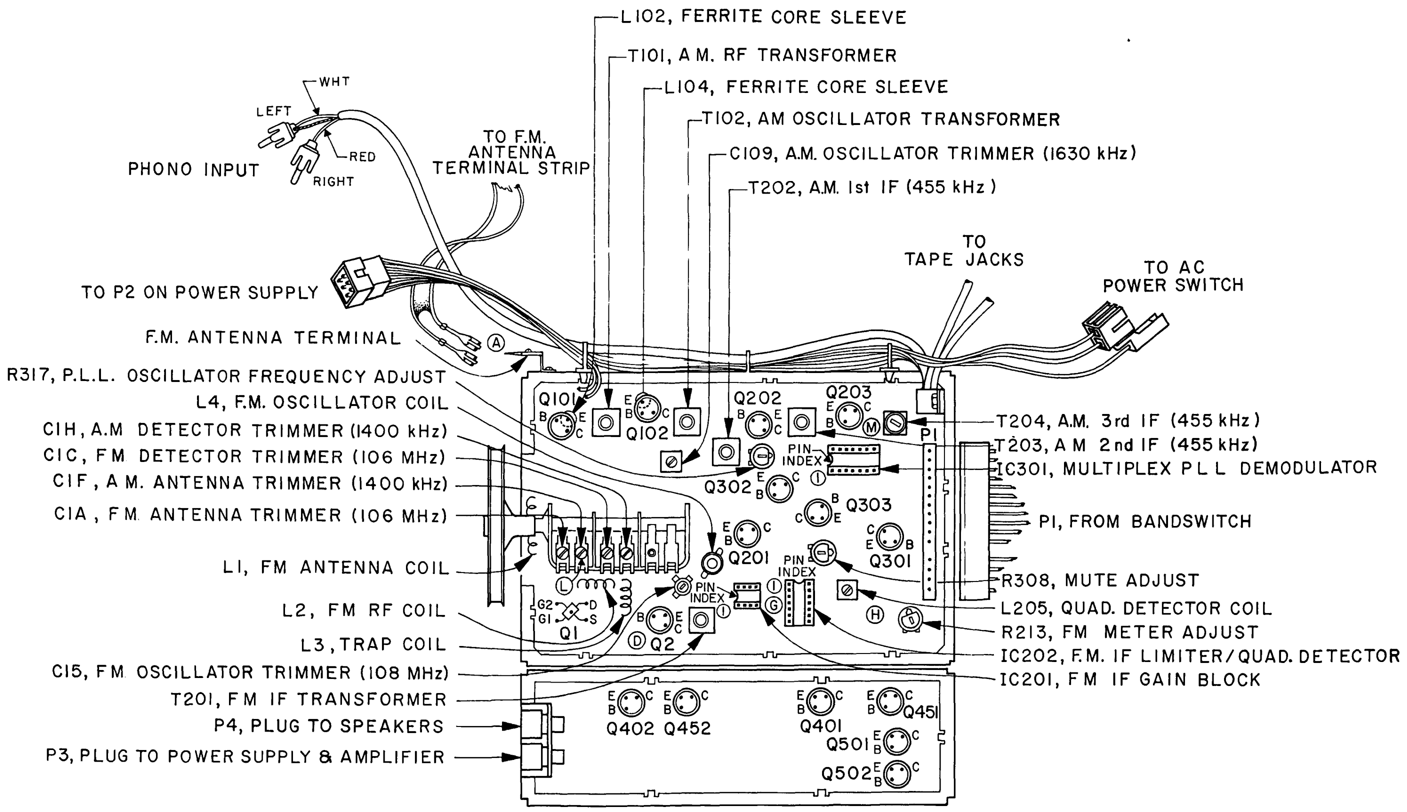
○	TEST POINTS
A	FM ANTENNA INPUT
D	FM IF INPUT
G	FM IF OUTPUT
H	FM DETECTOR OUTPUT
L	AM RF INPUT
M	19 kHz OSCILLATOR OUTPUT
AB	AUDIO BIAS
AC	
AD	
AE	

DIAL CORD DRIVE

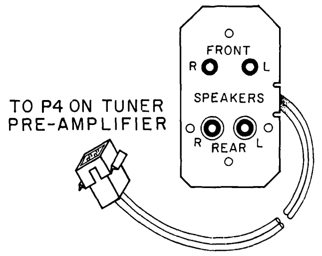
SHOWN IN FULL CLOCKWISE POSITION
WIND 2 TURNS CLOCKWISE



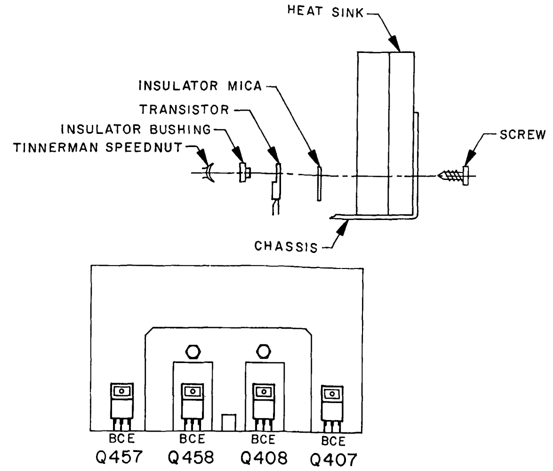




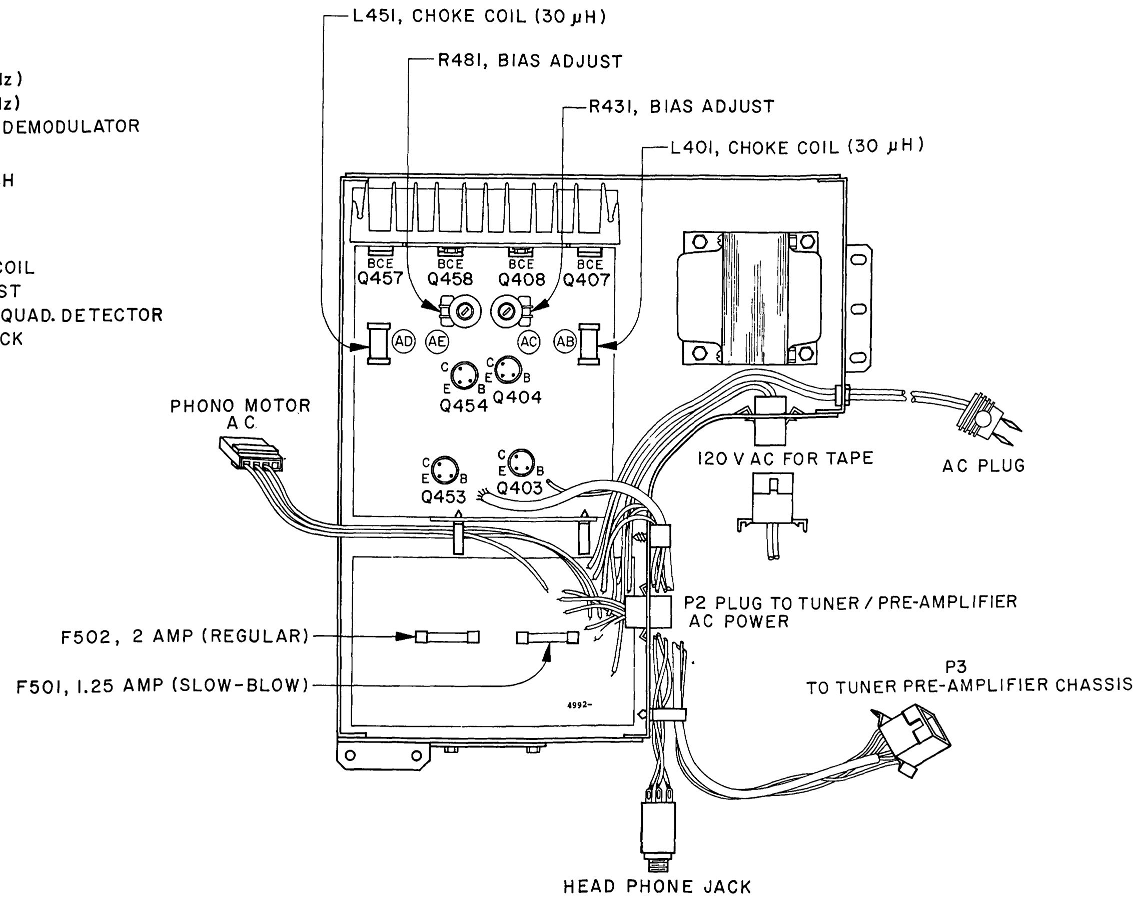
RF TUNER & PRE-AMPLIFIER



SPEAKER JACK



TRANSISTOR MOUNTING VIEW



AUDIO AMPLIFIER & POWER SUPPLY

CHASSIS LEGEND 12WGR59

ITEM NO.	PART NUMBER	DESCRIPTION
C1A		FM ANTENNA TRIMMER
C1B		FM ANTENNA TUNING
C1C		FM RF TRIMMER
C1D		FM RF TUNING
C1E		FM OSCILLATOR TUNING
C1F	22-6245-01	AM ANTENNA TRIMMER
C1G		AM ANTENNA TUNING
C1H		AM RF TRIMMER
C1J		AM RF TUNING
C1L		AM OSCILLATOR TUNING
C2	22-2729	.001 MFD DISC 25V
C3	22-2729	.001 MFD DISC 25V
C4	22-2729	.001 MFD DISC 25V
C5	22-3675	10 PF DISC ±5% 500V
C6	22-3080	.005 MFD DISC 25V
C7	22-3035	12 PF DISC ±5% 500V
C8	22-2468	2.2 PF GIMMICK ±5%
C9	22-3177	390 PF DISC 500V
C10	22-2468	2.2 PF GIMMICK ±5% 500V
C11	22-6344	7 PF DISC ± .5 PF N 1500 500V
C12	22-2593	20 PF DISC ±5% 500V
C13	22-3080	.005 MFD DISC 25V
C14	22-3034	.05 MFD DISC 25V
C15	22-4855	1.7 TO 10 PF CERAMIC TRIMMER
C16	22-3080	.005 MFD DISC 25V
C17	22-3080	.005 MFD DISC 25V
C18	22-3080	.005 MFD DISC 25V
C19	22-3080	.005 MFD DISC 25V
C101	22-13	.0033 MFD DISC 500V
C102	22-3034	.05 MFD DISC 25V
C103	22-3034	.05 MFD DISC 25V
C104	22-3034	.05 MFD DISC 25V
C105	22-3393	.01 MFD DISC 25V
C106	22-4819	2 PF ±0.25 PF N4700 TUB 500V
C107	22-5972	390 PF ±5% POLYSTYRENE TUB. 125V
C108	22-3034	.05 MFD DISC 25V
C109	22-7460	1 PF TO 7 PF AM OSCILLATOR TRIMMER
C110	22-7151-05	22 MFD ELECTROLYTIC 16V
C201		
C202	22-5482	680 PF DISC 500V
C203	22-3080	.005 MFD DISC 25V
C204	22-3080	.005 MFD DISC 25V
C205	22-2642	15 PF DISC ±5% 500V
C206	22-6447-01	.047 MFD MYLAR 100V
C207	22-3034	.05 MFD DISC 25V
C208	22-3080	.005 MFD DISC 25V
C209	22-2642	15 PF DISC ±5% 500V
C210	22-3034	.05 MFD DISC 25V
C211	22-2703	220 PF ±10% DISC 500V
C212	22-2729	.001 MFD DISC 25V
C213	22-3770	5.5 PF ±.25PF DISC 500V
C214	22-2381	6 PF ±5% DISC 500V
C215	22-3080	.005 MFD DISC 25V
C216	22-3415	.0068 DISC 25V
C217	22-3381	39 PF DISC ±5% 500V
C218	22-2939	680 PF DISC 500V
C219	22-7151-04	10 MFD ELECTROLYTIC 16V
C220	22-3652	1 MFD DISC 10V
C221	22-3034	.05 MFD DISC 25V
C222	22-3381	39 PF ±5% DISC 500V
C223	22-2939	680 PF DISC 500V
C224	22-3034	.05 MFD DISC 25V
C225	22-3034	.05 MFD DISC 25V
C226	22-2642	15 PF DISC ±5% 500V
C227	22-3393	.01 MFD
C228	22-3393	.01 MFD DISC 25V
C229	22-3393	.01 MFD DISC 25V
C301	22-7406	.47 MFD NP ELECTROLYTIC 35V
C302	22-7406	.47 MFD NP ELECTROLYTIC 35V
C303	22-7162-03	4.7 MFD ELECTROLYTIC 25V
C304	22-3652	1 MFD DISC 10V
C305	22-7153-25	.47 MFD ELECTROLYTIC 50V
C306	22-7493	560 PF ±5% N470 DISC 500V
C308	22-5907	1 MFD MYLAR 50V
C309	22-3527	.22 MFD DISC 12V
C310	22-3527	.22 MFD DISC 12V
C311	22-7406	.47 MFD NP ELECTROLYTIC 35V
C312	22-5901	.0033 MFD DISC 1000V
C313	22-2729	.001 MFD DISC 25V
C314	22-6285	.0068 MFD DISC ±20% 25V
C315	22-5901	.0033 MFD DISC 1000V
C316	22-2729	.001 MFD DISC 25V
C317	22-6285	.0068 MFD DISC ±20% 25V
C318	22-3080	.005 MFD DISC 25V
C319	22-2729	.001 MFD DISC 25V
C401	22-3034	.05 MFD DISC 25V
C402	22-2939	680 PF DISC 500V
C403	22-5487	.47 MFD DISC 3V
C404	22-7153	1 MFD ELECTROLYTIC 50V
C405	22-3362	560 PF DISC 500V
C407	22-7496	.47 MFD MYLAR 100V
C408	22-3034	.05 MFD DISC 25V
C410	22-2939	680 PF DISC 500V
C411	22-7153	1 MFD ELECTROLYTIC 50V
C412	22-14	.0047 MFD DISC 500V
C413	22-5883	.033 MFD MYLAR 100V
C414	22-5884	.082 MFD MYLAR 100V
C415	22-5814	.022 MFD 20% MYLAR 100V
C416	22-7191	.0027 MFD DISC 500V
C418	22-5862	1 MFD MYLAR 100V
C419	22-16	470 PF DISC 500V
C420	22-7154-07	47 MFD ELECTROLYTIC 35V
C421	22-2939	680 PF DISC 500V
C422	22-7154-07	47 MFD ELECTROLYTIC 35V
C423	22-7154-08	100 MFD ELECTROLYTIC 35V
C424	22-3751	20 PF DISC ±5% 500V
C425	22-7496	.47 MFD MYLAR 100V
C426	22-3255	330 PF DISC 500V
C427	22-5639	.22 MFD MYLAR 100V
C428	22-7143-12	1000 MFD ELECTROLYTIC 50V
C451	22-3034	.05 MFD DISC 25V
C452	22-2939	680 PF DISC 500V
C453	22-5487	.47 MFD CERAMIC DISC 3V
C454	22-7153	1 MFD ELECTROLYTIC 50V
C455	22-3362	560 PF DISC 500V
C457	22-7496	.47 MFD MYLAR 100V
C458	22-3034	.05 MFD DISC 25V
C460	22-2939	680 PF DISC 500V
C461	22-7153	1 MFD ELECTROLYTIC 50V
C462	22-14	.0047 MFD DISC 500V
C463	22-5883	.033 MFD MYLAR 100V
C464	22-5884	.082 MFD MYLAR 100V
C465	22-5814	.022 MFD 20% MYLAR 100V
C466	22-7191	.0027 MFD DISC 500V
C468	22-5862	1 MFD MYLAR 100V
C469	22-16	470 PF DISC 500
C470		
C471	22-2939	680 PF DISC 500V
C472	22-7154-07	47 MFD ELECTROLYTIC 35V
C473	22-7154-08	100 MFD ELECTROLYTIC 35V
C474	22-3751	20 PF DISC ±5% 500V
C475	22-7496	.47 MFD MYLAR 100V
C476	22-3255	300 PF DISC 500V
C477	22-5639	.22 MFD MYLAR 100V
C478	22-7143-12	1000 MFD ELECTROLYTIC 50V
C501	22-4350	.056 MFD MYLAR 200V
C502	22-4350	.056 MFD MYLAR 200V
C503		
CX504	22-7113	1500 MFD ELECTROLYTIC 65V
CX505	22-6005	.01 MFD DISC 150VAC
CX506	22-6005	.01 MFD DISC 150VAC
C507	22-7151-11	470 MFD ELECTROLYTIC 16V
C508	22-7152-09	220 MFD ELECTROLYTIC 25V
C509	22-7152-09	220 MFD ELECTROLYTIC 25V
C510	22-7152-04	10 MFD ELECTROLYTIC 25V
C512	22-7149-07	47 MFD ELECTROLYTIC 63V
R1		
R2	63-9922-20	100K OHM 5% 1/4 W (ALT 63-10184 20 ±10% 1/4W)
R3	63-9922-12	47K OHM ±5% 1/4W (ALT 63-10184 12 ±10% 1/4W)
R4	63-9921-56	220 OHM ±5% 1/4W (ALT 63-10183 56 ±10% 1/4W)
R5	63-4129	47 OHM 10% 1/4W
R6	63-9922-30	270K OHM ±5% 1/4W (ALT 63-10184 30 ±10% 1/4W)
R7	63-9921-60	330 OHM ±5% 1/4W (ALT 63-10183 60 ± 10% 1/4W)
R8	63-9921-78	1.8K OHM ±5% 1/4W (ALT 63-10183 78 ±10% 1/4W)
R9	63-9922-08	33K OHM ±5% 1/4W (ALT 63-10184 08 ±10% 1/4W)
R10	63-9922-16	68K OHM ±5% 1/4W (ALT. 63-10184 16 ±10% 1/4W)
R11	63-4255	47K OHM ±10% 1/4W
R12	63-9921-36	33 OHM ±5% 1/4W (ALT 63-10183 36 ±10% 1/4W)
R13	63-9921-78	1.8K OHM ±5% 1/4W (ALT 63-10183 78 ±10% 1/4W)
R14	63-9921-98	12K OHM ±5% 1/4W (ALT 63-10183- 98 ±10% 1/4W)
R15	63-9921-64	470 OHM ±5% 1/4W (ALT 63-10183 64 ±10% 1/4W)
R101	63-9922	15K OHM ±5% 1/4W (ALT 63-10184 ±10% 1/4W)

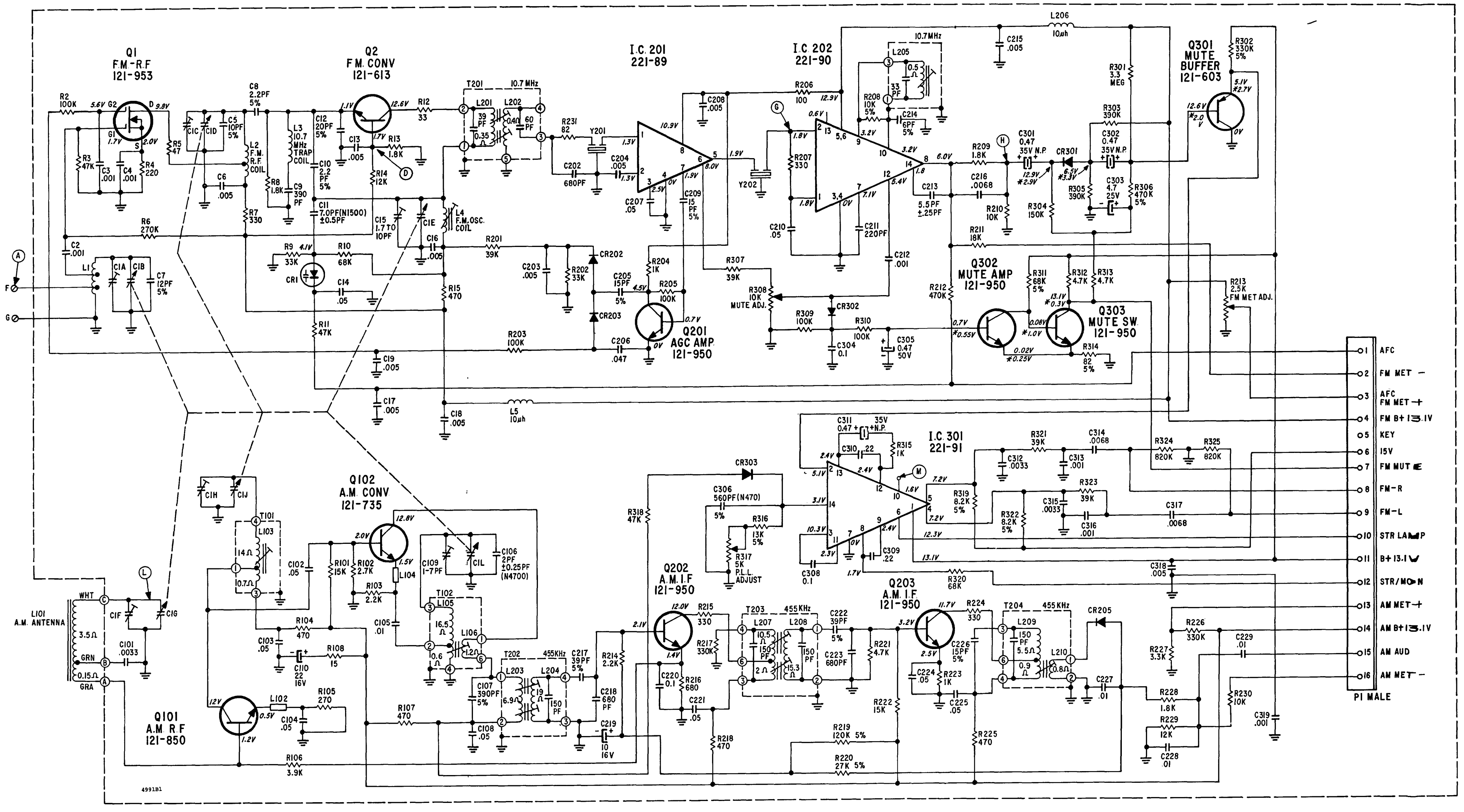
ITEM NO.	PART NUMBER	DESCRIPTION
R102	63-9921-82	2.7K OHM ±5% 1/4W (ALT 63-10183 82 ±10% 1/4W)
R103	63-9921-80	2.2K OHM ±5% 1/4W (ALT. 63-10183 80 ±10% 1/4W)
R104	63-9921-64	470 OHM ±5% 1/4W (ALT 63-10183 64 ±10% 1/4W)
R105	63-9921-58	270 OHM ±5% 1/4W (ALT 63-10183 58 ±10% 1/4W)
R106	63-9921-86	3.9K OHM ±5% 1/4W (ALT 63-10183 86 ±10% 1/4W)
R107	63-9921-64	470 OHM ±5% 1/4W (ALT 63-10183 64 ±10% 1/4W)
R108	63-9921-28	15 OHM ±5% 1/4W (ALT 63-10183 28 ±10% 1/4W)
R201	63-9922-10	39K OHM ±5% 1/4W (ALT 63-10184 10 ±10% 1/4W)
R202	63-9922-08	33K OHM ±5% 1/4W (ALT 63-10184 08 ±10% 1/4W)
R203	63-9922-20	100K OHM ±5% 1/4W (ALT 63-10184 20 ±10% 1/4W)
R204	63-9921-72	1K OHM ±5% 1/4W (ALT 63-10183 72 ±10% 1/4W)
R205	63-9922-20	100K OHM ±5% 1/4W (ALT 63-10184 20 ±10% 1/4W)
R206	63-9921-48	100 OHM ±5% 1/4W (ALT 63-10183-48 ±10% 1/4W)
R207	63-9921-60	330 OHM ±5% 1/4W (ALT 63-10183-60 ±10% 1/4W)
R208	63-9921-96	10K OHM ±5% 1/4W (ALT 63-10181-96 ±5% 1/4W)
R209	63-9921-78	1.8K OHM ±5% 1/4W (ALT 63-10183-78 ±10% 1/4W)
R210	63-9921-96	10K OHM ±5% 1/4W (ALT 63-10183-96 ±10% 1/4W)
R211	63-9922-02	18K OHM ±5% 1/4W (ALT 63-10184-02 ±10% 1/4W)
R212	63-9922-36	470K OHM ±5% 1/4W (ALT 63-10184-36 ±10% 1/4W)
R213	63-10524-03	2.5K OHM FM METER ADJUST
R214	63-9921-80	2.2K OHM ±5% 1/4W (ALT 63-10183-80 ±10% 1/4W)
R215	63-9921-60	330 OHM ±5% 1/4W (ALT 63-10183-60 ±10% 1/4W)
R216	63-9921-68	680 OHM ±5% 1/4W (ALT 63-10183-68 ±10% 1/4W)
R217	63-9922-32	330K OHM ±5% 1/4W (ALT 63-10184-32 ±10% 1/4W)
R218	63-9921-64	470 OHM ±5% 1/4W (ALT 63-10183-64 ±10% 1/4W)
R219	63-9922-22	120K OHM ±5% 1/4W (ALT 63-10182-22 ±5% 1/4W)
R220	63-9922-06	27K OHM ±5% 1/4W (ALT 63-10182-06 ±5% 1/4W)
R221	63-9921-88	4.7K OHM ±5% 1/4W (ALT 63-10183-88 ±10% 1/4W)
R222	63-9922	15K OHM ±5% 1/4W (ALT 63-10184 ±10% 1/4W)
R223	63-9921-72	1K OHM ±5% 1/4W (ALT 63-10183-72 ±10% 1/4W)
R224	63-9921-60	330 OHM ±5% 1/4W (ALT 63-10183-60 ±10% 1/4W)
R225	63-4171	470 OHM ±10% 1/4W)
R226	63-9922-32	330K OHM ±5% 1/4W (ALT 63-10184-32 ±10% 1/4W)
R227	63-9921-84	3.3K OHM ±5% 1/4W (ALT 63-10183-84 ±10% 1/4W)
R228	63-9921-78	1.8K OHM ±5% 1/4W (ALT 63-10183-78 ±10% 1/4W)
R229	63-9921-98	12K OHM ±5% 1/4W (ALT 63-10183-98 ±10% 1/4W)
R230	63-9921-96	10K OHM ±5% 1/4W (ALT 63-10183-96 ±10% 1/4W)
R231	63-9921-46	82 OHM ±5% 1/4W (ALT 63-10183-46 ±10% 1/4W)
R301	63-9924-56	3.3 MEG OHM ±10% 1/4W (ALT 63-10184-56 ±10% 1/4W)
R302	63-9922-32	330K OHM ±5% 1/4W (ALT 63-10182-32 ±5% 1/4W)
R303	63-9922-34	390K OHM ±5% 1/4W (ALT 63-10184-34 ±10% 1/4W)
R304	63-9922-24	150K OHM ±5% 1/4W (ALT 63-10184-24 ±10% 1/4W)
R305	63-9922-34	390K OHM ±5% 1/4W (ALT 63-10184-34 ±10% 1/4W)
R306	63-9922-36	470K OHM ±5% 1/4W (ALT 63-10182-36 ±5% 1/4W)
R307	63-9922-10	39K OHM ±5% 1/4W (ALT 63-10184-10 ±10% 1/4W)
R308	63-10524-01	10K OHM MUTE ADJUST
R309	63-9922-20	100K OHM ±5% 1/4W (ALT 63-10184-20 ±10% 1/4W)
R310	63-9922-20	100K OHM ±5% 1/4W (ALT 63-10184-20 ±10% 1/4W)
R311	63-9922-16	68K OHM ±5% 1/4W (ALT 63-10182-16 ±5% 1/4W)
R312	63-9921-88	4.7K OHM ±5% 1/4W (ALT 63-10183-88 ±10% 1/4W)
R313	63-9921-88	4.7K OHM ±5% 1/4W (ALT 63-10183-88 ±10% 1/4W)
R314	63-9921-46	82 OHM ±5% 1/4W (ALT 63-10182-46 ±5% 1/4W)
R315	63-9921-72	1K OHM ±5% 1/4W (ALT 63-10183-72 ±10% 1/4W)
R316	63-9921-99	13K OHM ±5% 1/4W (ALT 63-10181-99 ±5% 1/4W)
R317	63-10524	5K PHASE LOCKED LOOP ADJUST
R318	63-9922-12	47K OHM ±5% 1/4W (ALT 63-10184-12 ±10% 1/4W)
R319	63-9921-94	8.2K OHM ±5% 1/4W (ALT 63-10181-94 ±5% 1/4W)
R320	63-9922-16	68K OHM ±5% 1/4W (ALT 63-10184-16 ±10% 1/4W)
R321	63-9922-10	39K OHM ±5% 1/4W (ALT 63-10184-10 ±10% 1/4W)
R322	63-9921-94	8.2K OHM ±5% 1/4W (ALT 63-10181-94 ±5% 1/4W)
R323	63-9922-10	39K OHM ±5% 1/4W (ALT 63-10184-10 ±10% 1/4W)
R324	63-4308	820K OHM ±10% 1/4W
R325	63-4308	820K OHM ±10% 1/4W
R401	63-9922-30	270K OHM ±5% 1/4W (ALT 63-7887 ±10% 1/2W)
R402	63-9922-04	22K OHM ±5% 1/4W (ALT 63-7841 ±10% 1/2W)
R403	63-9922-28	220K OHM ±5% 1/4W (ALT 63-7883 ±10% 1/2W)
R404	63-9922-32	330K OHM ±5% 1/4W (ALT 63-7890 ±10% 1/2W)
R405	63-9922-06	27K OHM ±5% 1/4W (ALT 63-7845 ±10% 1/2W)
R407	63-9921-78	1800 OHM ±5% 1/4W (ALT 63-7796 ±10% 1/2W)
R408	63-9922-08	33K OHM ±5% 1/4W (ALT 63-7848 ±10% 1/2W)
R410R, R410L	63-10189	50K OHM DUAL LOUDNESS CONTROL
R411	63-9922-44	1 MEG OHM ±5% 1/4W (ALT 63-7911 ±10% 1/2W)
R412	63-9921-88	4.7K OHM ±5% 1/4W (ALT 63-7813 ±10% 1/2W)
R413	63-9921-70	820 OHM ±5% 1/4W (ALT 63-7782 ±10% 1/2W)
R414	63-9921-96	10K OHM ±5% 1/4W (ALT 63-7827 ±10% 1/2W)
R415R, R415L	63-8982	100K OHM DUAL BASS CONTROL
R416	63-9921-92	6.8K OHM ±5% 1/4W (ALT 63-7820 ±10% 1/2W)
R417R, R417L	63-8983	50K OHM DUAL TREBLE CONTROL
R418	63-9922-04	22K OHM ±5% 1/4W (ALT 63-7841 ±10% 1/2W)
R420	63-8981	250K OHM BALANCE CONTROL
R421	63-9922-20	100K OHM ±5% 1/4W (ALT 63-7869 ±10% 1/2W)
R422	63-9922-20	100K OHM ±5% 1/4W (ALT 63-7868 ±5% 1/2W)
R423	63-9922-24	150K OHM ±5% 1/4W (ALT 63-7875 ±5% 1/2W)
R424	63-9921-50	120 OHM ±5% 1/4W (ALT 63-7747 ±10% 1/2W)
R425	63-9921-92	6800 OHM ±5% 1/4W (ALT 63-7820 ±10% 1/2W)
R426	63-9921-82	2700 OHM ±5% 1/4W (ALT 63-7803 ±10% 1/2W)
RX427	63-9921-86	3900 OHM ±5% 1/4W (ALT. 63-7809 ±5% 1/2W)
R429	63-9921-88	4700 OHM ±5% 1/4W (ALT 63-7812 ±5% 1/2)
R430	63-9921-70	820 OHM ±5% 1/4W (ALT. 63-7782 ±10% 1/2W)
R431	63-8328	300 OHM BIAS ADJUST
RX437	63-10444-22	.82 OHM ±10% 5W
RX438	63-4511	1.8 OHM ±5% 1/2W
RX439	63-10567-24	10 OHM ±5% ½W
R440	63-9946-76	1500 OHM ±5% 1/2W (ALT 63-7792 ±10% 1/2W)
R443	63-1757	220 OHM ±10% 1/2W
R445	63-10135	11 OHM ±10% 5W

ITEM NO.	PART NUMBER	DESCRIPTION
R451	63-9922-30	270K OHM ±5% 1/4W (ALT 63-7887 ±10% 1/2W)
R453	63-9922-28	220K OHM ±5% 1/4W (ALT 63-7883 ±10% 1/2W)
R454	63-9922-32	330K OHM ±5% 1/4W (ALT 63-7890 ±10% 1/2W)
R455	63-9922-06	27K OHM ±5% 1/4W (ALT 63-7845 ±10% 1/2W)
R457	63-9921-78	1800 OHM ±5% 1/4W (ALT 63-7796 ±10% 1/2W)
R458	63-9922-08	33K OHM ±5% 1/4W (ALT 63-7848 ±10% 1/2W)
R461	63-9922-44	1 MEG OHM ±5% 1/4W (ALT 63-7911 ±10% 1/2W)
R462	63-9921-88	4.7K OHM ±5% 1/4W (ALT 63-7813 ±10% 1/2W)
R463	63-9921-70	820 OHM ±5% 1/4W (ALT 63-7782 ±10% 1/2W)
R464	63-9921-96	10K OHM ±5% 1/4W (ALT 63-7827 ±10% 1/2W)
R466	63-9921-92	6.8K OHM ±5% 1/4W (ALT 63-7820 ±10% 1/2W)
R468	63-9922-04	22K OHM ±5% 1/4W (ALT 63-7841 ±10% 1/2W)
R471	63-9922-20	100K OHM ±5% 1/4W (ALT 63-7869 ±10% 1/2W)
R474	63-9921-50	120 OHM ±5% 1/4W (ALT 63-7747 ±10% 1/2W)
R475	63-9921-92	6800 OHM ±5% 1/4W (ALT 63-7820 ±10% 1/2W)
R476	62-9921-82	2700 OHM ±5% 1/4W (ALT 63-7803 ±10% 1/2W)
RX477	63-9921-86	3900 OHM ±5% 1/4W (ALT. 63-7809 ±5% 1/2W)
R479	63-9921-88	4700 OHM ±5% 1/4W (ALT 63-7812 ±5% 1/2W)
R480	63-9921-70	820 OHM ±5% 1/4W (ALT 63-7782 ±10% 1/2W)
R481	63-8328	300 OHM BIAS ADJUST
RX487	63-10444-22	.82 OHM ±10% 5W
RX488	63-4511	1.8 OHM ±5% 1/2W
RX489	63-10624-24	10 OHM ±5% ½W
R490	63-9946-76	1500 OHM ±5% 1/2W (ALT 63-7792 ±10% 1/2W)
R493	63-1757	220 OHM ±10% 1/2W
RX501	63-1701	10 OHM ±10% 1/2W
RX502	63-4536	6.8 OHM ±10% 1/2W
RX503	63-1701	10 OHM ±10% 1/2W
RX504	63-10526-01	2.2 MEG OHM ±20% 1/2W
RX505	63-10449-86	390 OHM ±5% 7W
RX506	63-10451-84	330 OHM ±10% 7W
R507	63-10428-75	130 OHM ±5% 3W
R508	53-9921-36	33 OHM ±5% 1/4W (ALT 63-7722 ±10% 1/2W
R509	63-9921-36	33 OHM ±5% 1/4W (ALT 63-7722 ±10% 1/2W)
R510	63-9946-28	15 OHM ±5% 1/2W (ALT 63-7708 ±10% 1/2W)
R512	63-9921-78	1800 OHM ±5% 1/4W (ALT 63-7796 ±10% 1/2W)
R513	63-9922-18	82K OHM ±5% 1/4W (ALT 63-7866 ±10% 1/2W)
R514	63-9922-04	22K OHM ±5% 1/4W (ALT 63-7841 ±10% 1/2W)
CR1	103-47-01	A1-C DIODE
CR201		
CR202	103-23-01	GERMANIUM DIODE
CR203	103-23-01	GERMANIUM DIODE
CR204		
CR205	103-23-01	GERMANIUM DIODE
CR301	103-142	SILICON DIODE
CR302	103-23-01	GERMANIUM DIODE
CR303	103-142-01	SILICON DIODE
CR401	103-145-01	SILICON DIODE
CR402	103-145-01	SILICON DIODE
CR403	103-145-01	SILICON DIODE
CR404	212-76	SILICON DIODE
CR451	103-145-01	SILICON DIODE
CR452	103-145-01	SILICON DIODE
CR453	103-145-01	SILICON DIODE
CR454	212-76	SILICON DIODE
CRX501	212-76	SILICON RECTIFIER
CRX502	212-76	SILICON RECTIFIER
CR505	103-256	ZENER DIODE
CR506	103-142-01	SILICON DIODE
CR507	103-142-01	SILICON DIODE
L1	20-3595	FM ANTENNA COIL
L2	20-3594	FM RF COIL
L3	20-1631	10.7 MHz TRAP COIL
L4	20-3545	FM OSCILLATOR COIL
L5	20-2033	10 MICROHENRY COIL
L101	A-84	AM ANTENNA COIL ASSEMBLY
L102	149-311	FERRITE CORE SLEEVE
L103	IN-T101	BC-RF TRANSFORMER
L104	149-311	FERRITE CORE SLEEVE
L105	IN-T102	AM OSCILLATOR TRANSFORMER PR.I.
L106	IN-T102	AM OSCILLATOR TRANSFORMER SEC.
L201	IN-T201	1ST IF TRANSFORMER 10.7 MHz PRI.
L202	IN-T201	1ST IF TRANSFORMER 10.7 MHz SEC.
L203	IN-T202	1ST IF AM 455 KHz PRI.
L204	IN-T202	1ST IF AM 455 KHz SEC.
L205	20-3702	10.7 MHz QUAD DETECTOR COIL
L206	20-2033	10 MICROHENRY COIL
L207	IN-T203	2ND IF AM 455 KHz PRI.
L208	IN-T203	2ND IF AM 455 KHz SEC.
L209	IN-T204	3RD IF AM 455 KHz PRI.
L210	IN-T204	3RD IF AM 455 KHz SEC.
L401	20-3716	CHOKE COIL 30 MICROHENRY
L451	20-3716	CHOKE COIL 30 MICROHENRY
L501	20-2033	10 MIDROHENRY COIL
T101	95-2750	BC RF TRANSFORMER
T102	95-2544	AM OSCILLATOR TRANSFORMER
T201	95-2753	FM IF TRANSFORMER 10.7 MHz
T202	95-2751	AM 1ST IF 455 KHz
T203	95-2752	AM 2ND IF 455 KHz
T204	95-2689	AM 3RD IF 455 KHz
TX501	95-3198	POWER TRANSFORMER
FX501	136-117-21	1.25 SLO - BLO FUSE
FX502	136-114-20	2 AMP REGULAR BLOW FUSE
IC201	221-89	FM IF GAIN BLOCK
IC202	221-90	FM IF LIMITER-QUAD DETECTOR
IC301	221-91	MULTIPLEX P.L.L DEMODULATOR
DS301	100-611	STEREO INDICATOR LIGHT
DSX501	100-625	POINTER LIGHT
DSX502	100-610	METER LIGHT
DSX503	100-249	DIAL LIGHT NO. 1847
DSX504	100-249	DIAL LIGHT NO. 1847
DSX505	100-633	PILOT LIGHT
M1	122-72	TUNING METER
J1	78-2137	HEADPHONE JACK
PC	204-537	PRINTED CIRCUIT BOARD RF
PC	204-538	PRINTED CIRCUIT BOARD AUDIO
PC	204-545	PRINTED CIRCUIT BOARD POWER AMPLIFIER
PC	204-546	PRINTED CIRCUIT BOARD POWER SUPPLY
SW1	85-1439	BAND SWITCH
SWX2	85-1458	POWER SWITCH
SW3	85-1446-01	FM AFC SWITCH
SW4	85-1446-01	FM MUTE SWITCH
SW5	85-1446-01	MATRIX SWITCH
SW6	85-1447-01	HIGH FILTER SWITCH
Y201, Y202	224-1	CERAMIC FILTER, 10.64 MHz (BLACK)
	OR	
	224-1-01	CERAMIC FILTER, 10.67 MHz (BLUE)
	OR	
	224-1-02	CERAMIC FILTER, 10.70 MHz (RED)
	OR	
	224-1-03	CERAMIC FILTER, 10.73 MHz (ORANGE)
	OR	
	224-1-04	CERAMIC FILTER, 10.76 MHz (WHITE)

499182

○ TEST POINTS

A F.M ANTENNA INPUT
D F.M I F INPUT
G F M I F OUTPUT
H F M. DETECTOR OUTPUT
L A.M. R.F INPUT
M 19 KHz OSC. OUTPUT



PC1 AM/FM, RF, IF & FM MPX

NOTES:

ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.

D.C. VOLTAGES SHOWN ARE MEASURED FROM CHASSIS, WITH NO SIGNAL INPUT, LOUDNESS CONTROL AT MINIMUM, LINE VOLTAGE 120 V.A.C. USING A HIGH IMPEDANCE V.T.V.M.

ALL RESISTORS IN OHMS, 1/4 WATT CARBON OR CARBON FILM, ±10% UNLESS OTHERWISE SPECIFIED.

ALL CAPACITORS ARE IN MICROFARADS ±10% UNLESS OTHERWISE SPECIFIED, EXCEPT ELECTROLYTICS WHICH ARE +100−10%.

I.F. FREQUENCY: A.M. 455 KHz
F.M. 10.7 MHz APPROXIMATELY

CERAMIC FILTERS MUST BE OF SAME CENTER FREQUENCY GROUPING. T201 AND L205 MUST BE ADJUSTED TO THE SAME FREQUENCY AS THE CERAMIC FILTERS.

TUNING RANGE: A.M. 540−1600 KHz
F.M. 88−108 MHz

INDICATES CHASSIS GROUND.

INDICATES ±20% TOLERANCE

INDICATES VOLTAGE

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION ON ROTARY CONTROLS AND UPWARD OR RIGHT HAND MOVEMENT ON SLIDE CONTROLS.

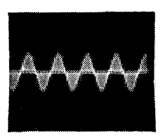
* VOLTAGES MEASURED WITH 110μV SIGNAL INPUT.

AB, AC, AD, AE BIAS TEST POINTS.

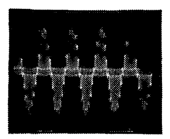
** TO ADJUST BIAS, SET LINE AT 120V.A.C., LET SET WARM UP FOR ONE MINUTE WITH NO SIGNAL. CONNECT LOW RANGE VOLTMETER ACROSS TEST POINTS AB−AC AND ADJUST R431 FOR .025V TO .030V.
REPEAT ABOVE ADJUSTMENT FOR TEST POINTS AD−AE AND ADJUST R481 FOR .025V TO .030V.

*** RIPPLE VOLTAGE MEASURED WITH NO SIGNAL INPUT

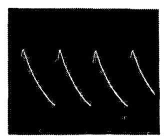
Q407 AND Q457 ARE INSULATED FROM CHASSIS.



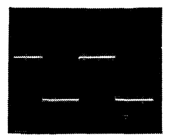
PIN 2-COMPOSITE INPUT
L+R, L−R (1 KHZ LEFT ONLY),
19 KHZ PILOT 10%
0.5V P/P (0.5 MILLISEC.)



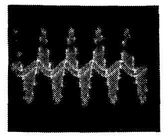
PINS 3 AND 11-
COMPOSITE AMPLIFIED
L+R, L−R (1 KHZ LEFT ONLY),
19 KHZ PILOT 10%
1.4V P/P (0.5 MILLISEC.)



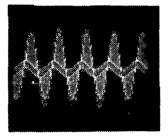
PIN 14-VOLTAGE CONTROLLED
OSCILLATOR ADJUSTMENT
3.5V P/P (5.0 MICROSEC.)



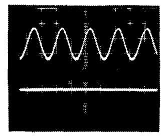
PIN 10-19 KHZ TEST POINT
2.7V P/P (10.0 MICROSEC.)



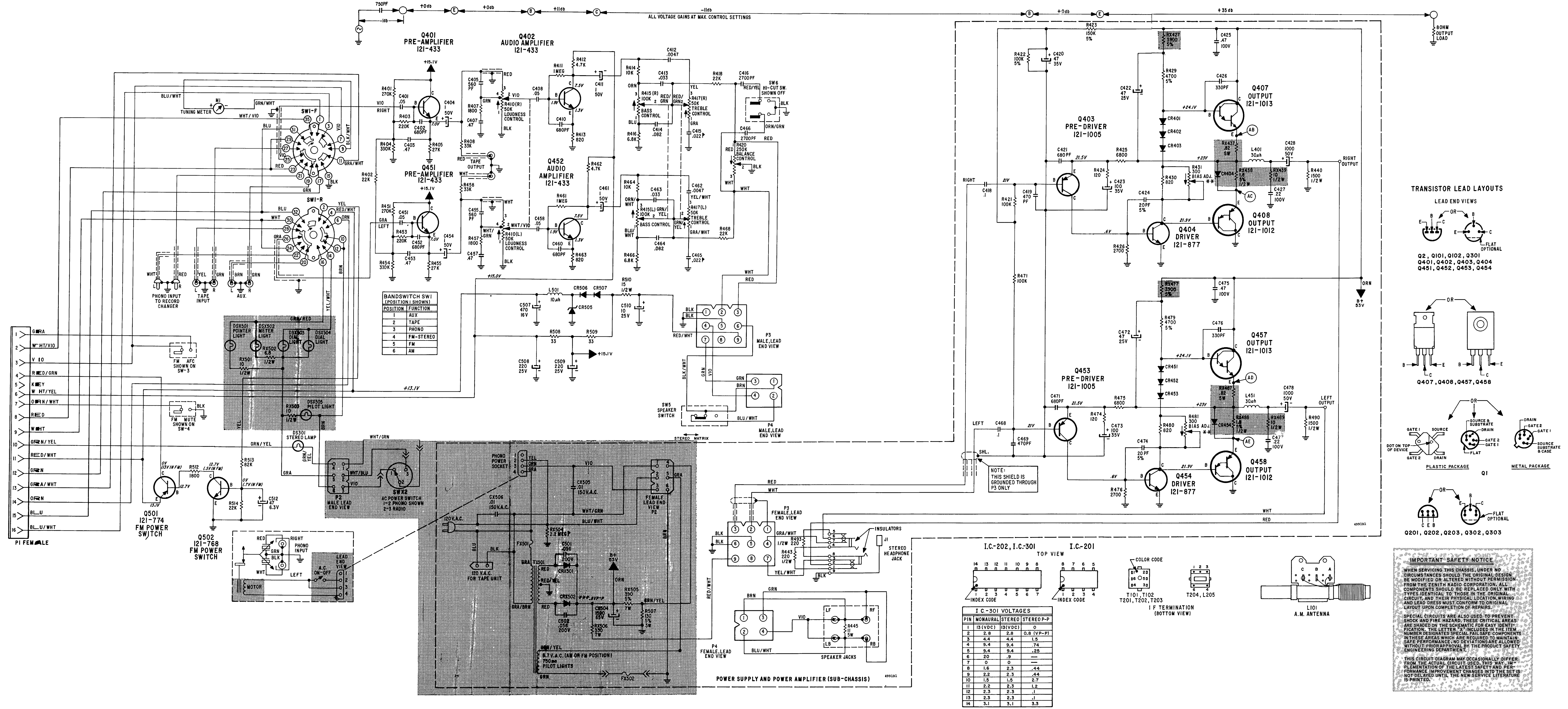
PINS 12 AND 13-FILTER-
PHASE DETECTOR
0.14V P/P (0.5 MILLISEC.)



PINS 8 AND 9-FILTER-
AMPLITUDE DETECTOR
0.47V P/P (0.5 MILLISEC.)



AT PLUG P1
P1, #9-(UPPER) LEFT OUTPUT
0.57V P/P (0.5 MILLISEC.)
P1, #8-(LOWER) RIGHT OUTPUT
0.05V P/P (0.5 MILLISEC.)



BANDSWITCH SW1 (POSITION 1 SHOWN)	
POSITION	FUNCTION
1	AUX
2	TAPE
3	PHONO
4	FM-STEREO
5	FM
6	AM

I.C.-301 VOLTAGES

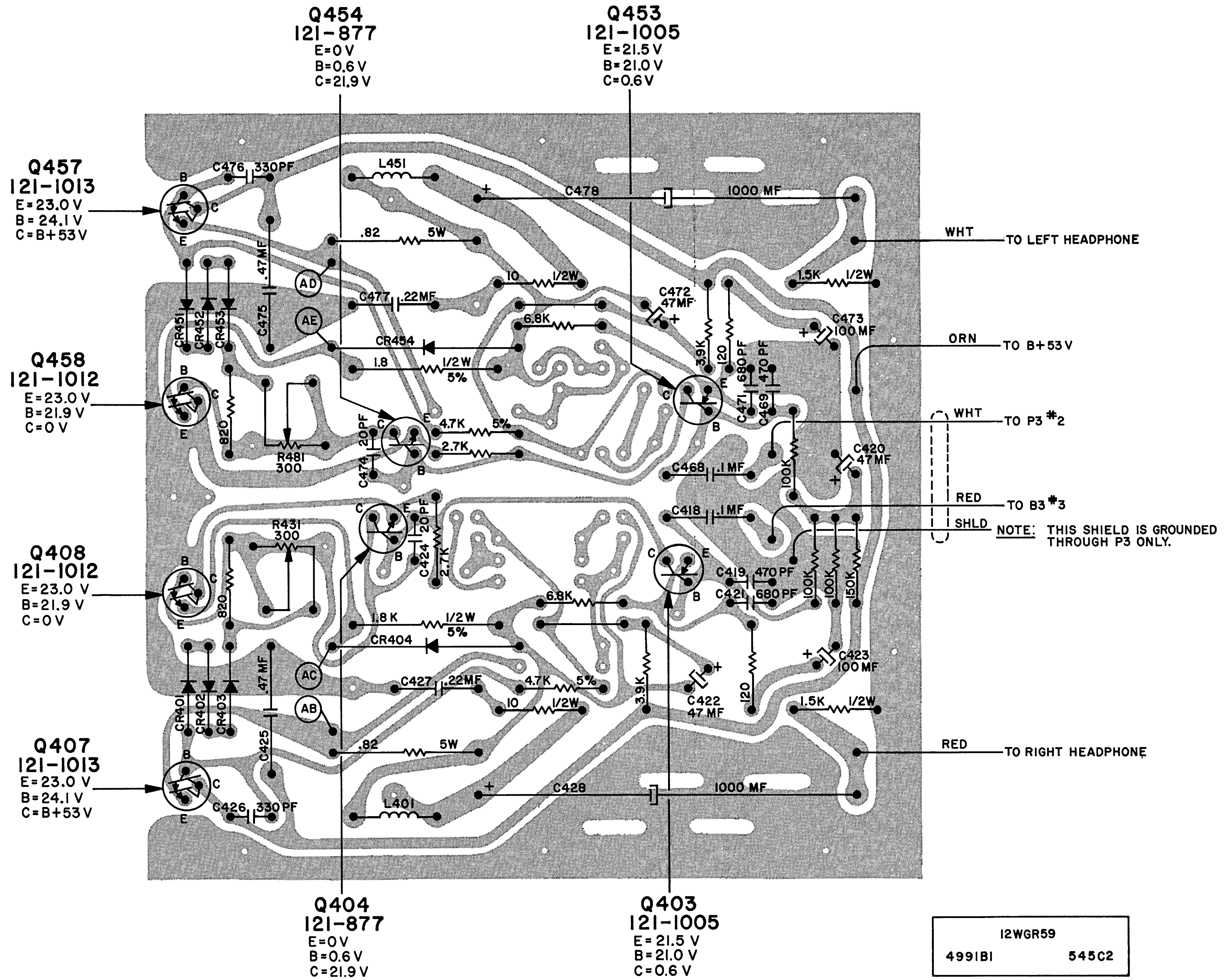
PIN	MONAURAL	STEREO	STEREO P-P
1	13 (VDC)	13 (VDC)	0
2	2.8	2.8	0.8 (VP-P)
3	4.4	4.4	1.5
4	9.4	9.4	.74
5	9.4	9.4	.25
6	20	.9	—
7	0	0	—
8	1.6	2.3	.44
9	2.2	2.3	.44
10	1.5	1.5	2.7
11	2.2	2.3	1.2
12	2.3	2.3	.1
13	2.3	2.3	.1
14	3.1	3.1	3.3

IMPORTANT SAFETY NOTICE

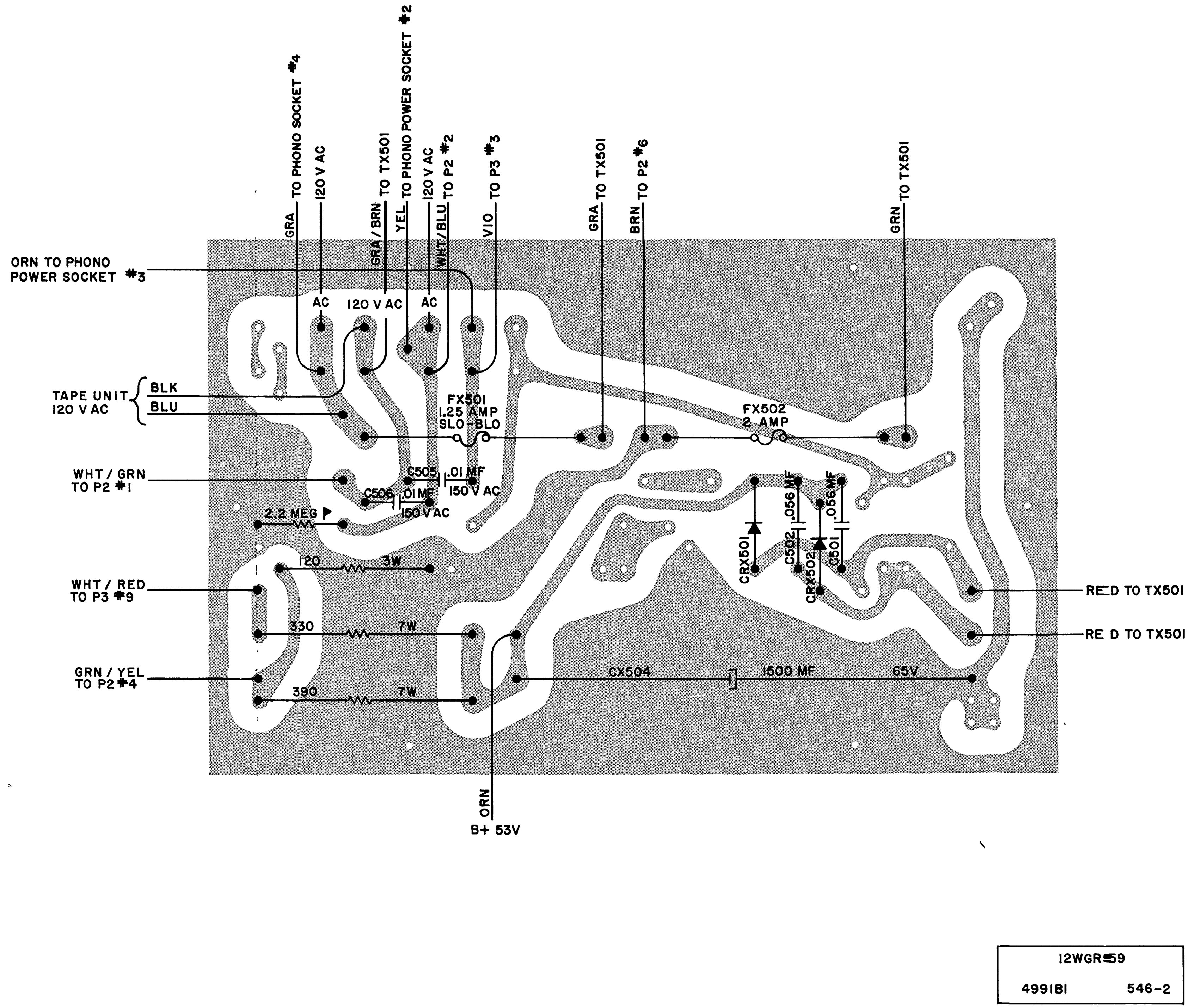
WHEN SERVICING THIS CHASSIS, UNDER NO CIRCUMSTANCES SHOULD THE ORIGINAL DESIGN BE MODIFIED OR ALTERED WITHOUT PERMISSION FROM THE ZENITH RADIO CORPORATION. ALL COMPONENTS SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL CIRCUIT, AND THEIR PHYSICAL LOCATION, WIRING AND LEAD DRESS MUST CONFORM TO ORIGINAL LAYOUT UPON COMPLETION OF REPAIRS.

SPECIAL CIRCUITS ARE ALSO USED TO PREVENT SHOCK AND FIRE HAZARD. THESE CRITICAL AREAS ARE SHADED ON THE SCHEMATIC FOR EASY IDENTIFICATION. THE LETTER "X" INCLUDED IN THE ITEM NUMBER DESIGNATES SPECIAL FAILSAFE COMPONENTS IN THESE AREAS WHICH ARE REQUIRED TO MAINTAIN SAFE PERFORMANCE. NO DEVIATIONS ARE ALLOWED WITHOUT PRIOR APPROVAL BY THE PRODUCT SAFETY ENGINEERING DEPARTMENT.

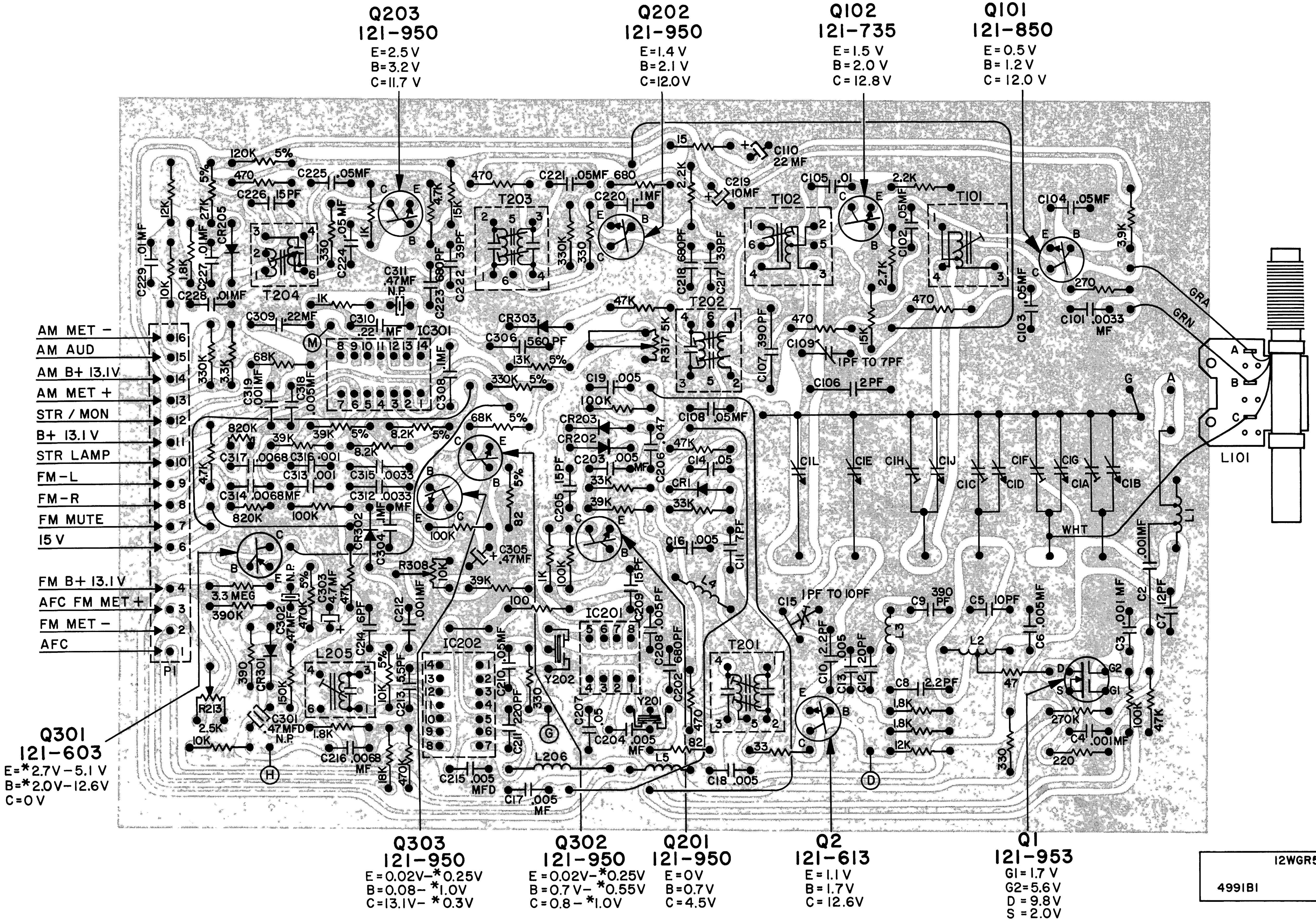
THIS CIRCUIT DIAGRAM MAY OCCASIONALLY DIFFER FROM THE ACTUAL CIRCUIT USED. THIS WAY, IMPLEMENTATION OF THE LATEST SAFETY AND PERFORMANCE IMPROVEMENT CHANGES INTO THE SET IS NOT DELAYED UNTIL THE NEW SERVICE LITERATURE IS PRINTED.



CHASSIS 12WGR59 – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE – POWER AMPLIFIER

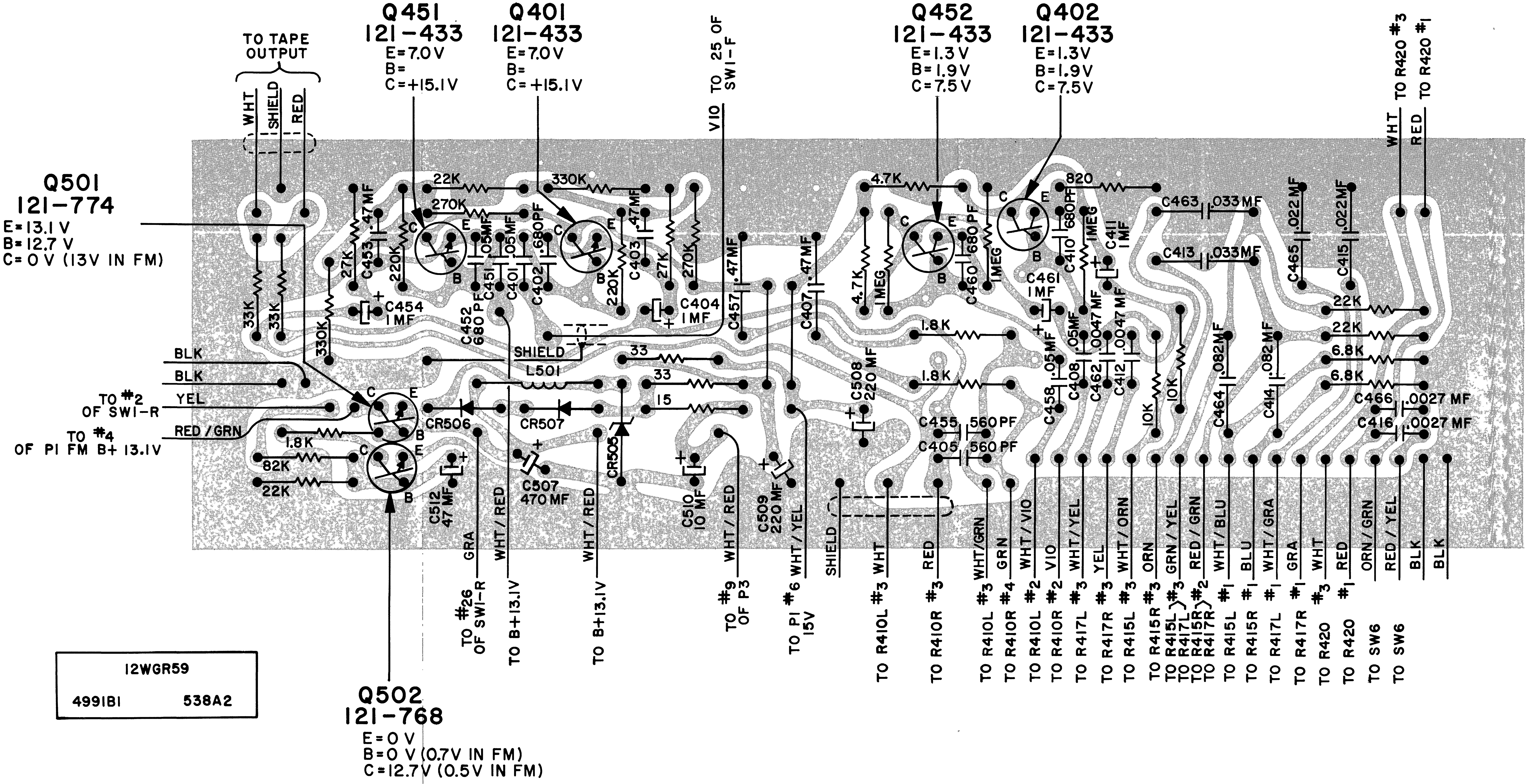


CHASSIS 12WGR59 – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE – POWER SUPPLY

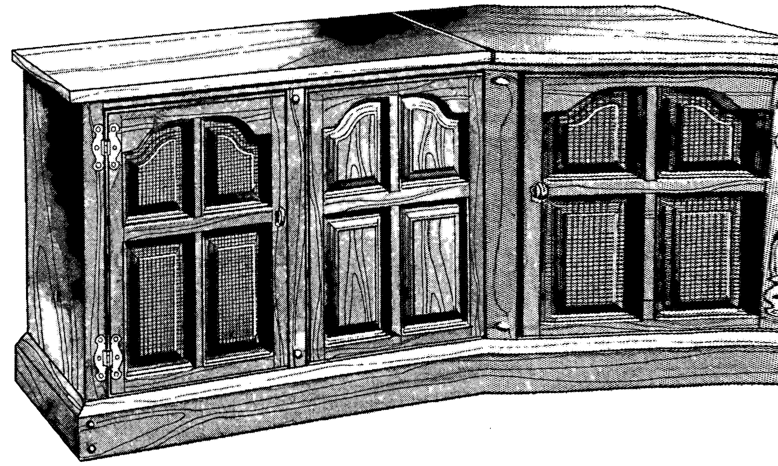


12WGR59	
4991B1	537 B3

CHASSIS 12WGR59 – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE – RF/IF/MPX



CHASSIS 12WGR59 – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE – PREAMPLIFIER



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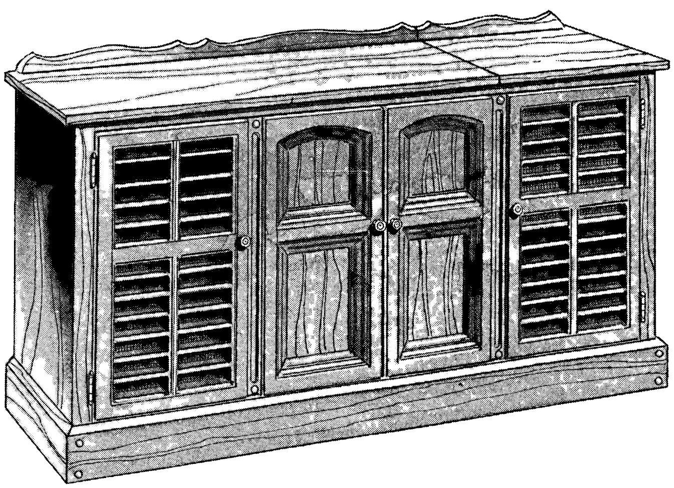

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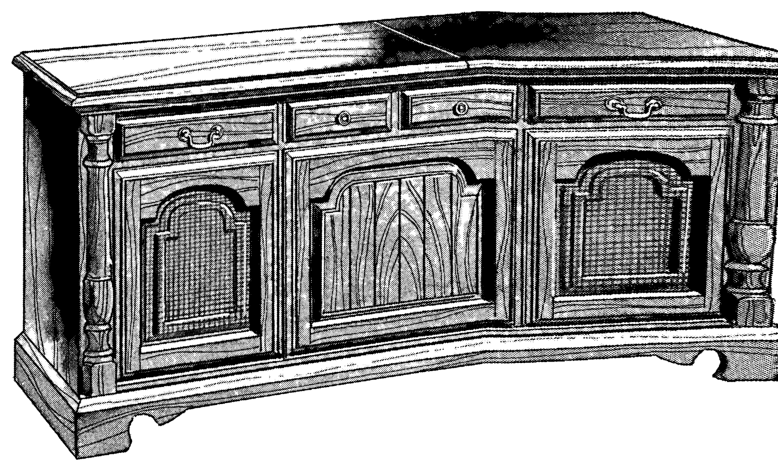
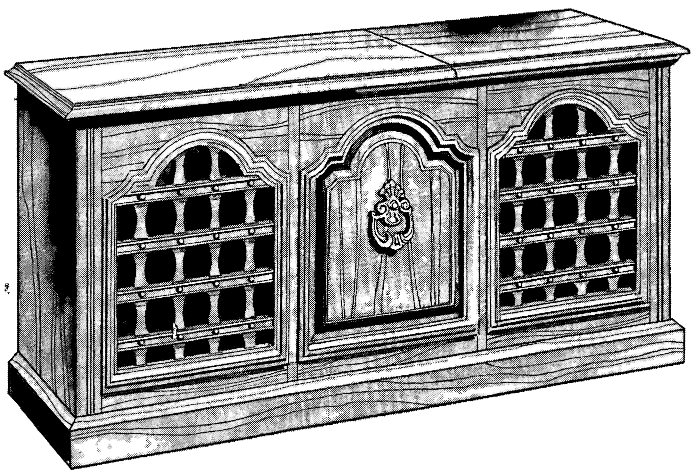
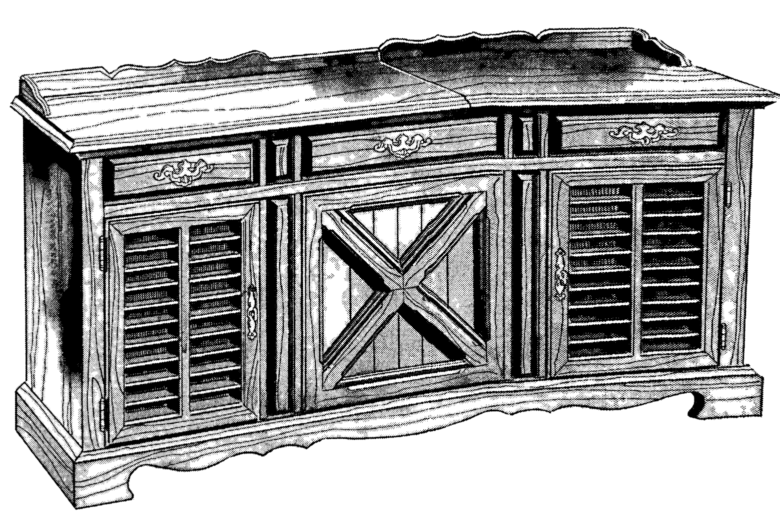


G920AE



G921P



G922M