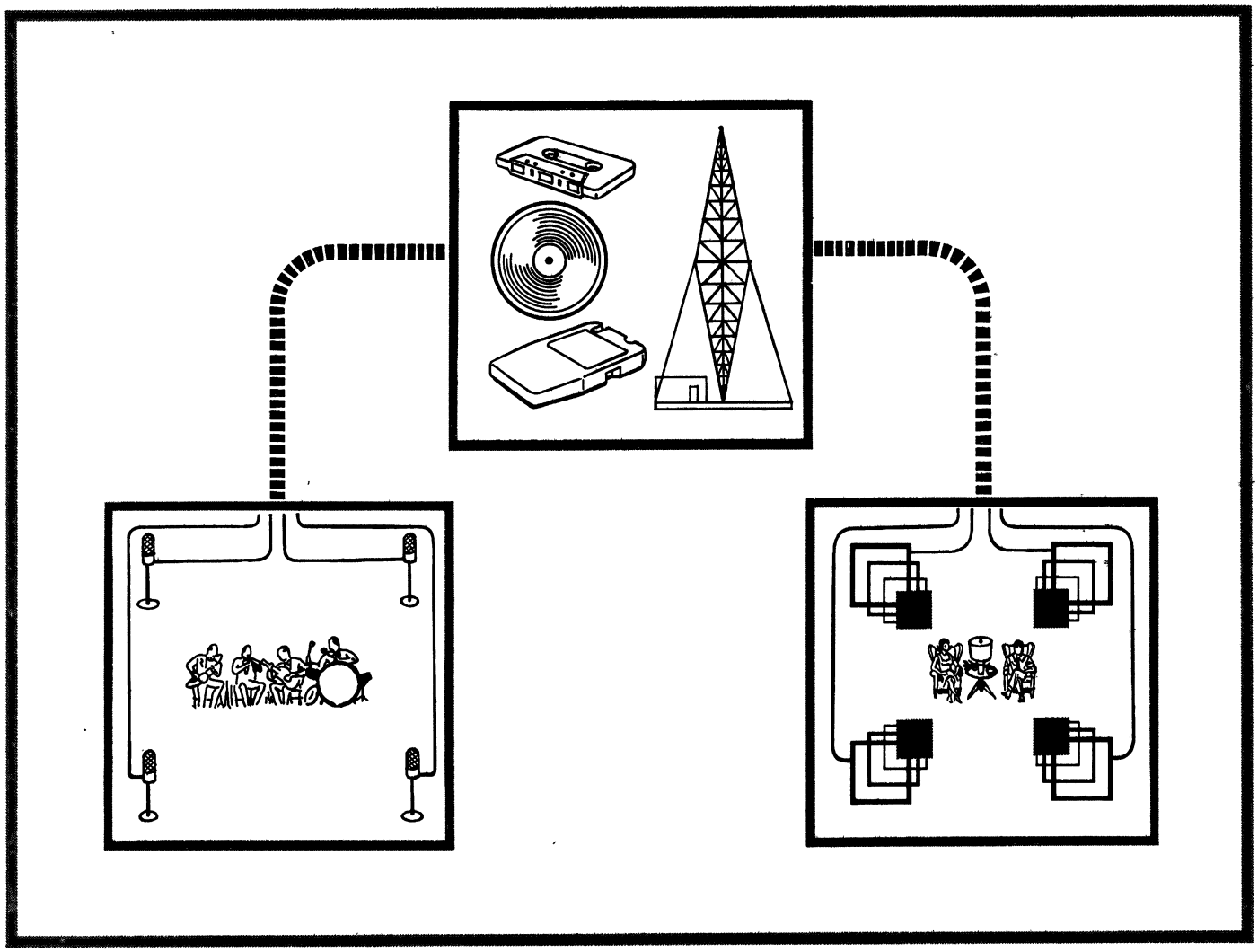
HF-31S2

HF-31S2

ZENITH

SERVICE MANUAL



MODULAR AND CONSOLE AUDIO PRODUCTS

ZENITH RADIO CORPORATION

1900 N. AUSTIN AVENUE CHICAGO, ILLINOIS 60639

HF-31S2
25M – RR

PRINTED IN U.S.A.
FEBRUARY, 1976

PART NO. 923-864
$1.95

To the Service Technician

PRODUCT SAFETY SERVICING GUIDELINES FOR ALL AUDIO AMPLIFIERS AND RADIO RECEIVERS

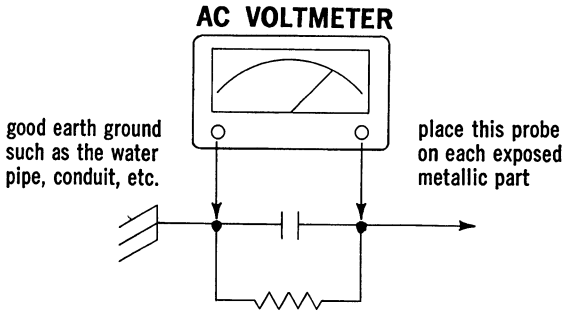
CAUTION: No modification of any circuit should be attempted. Service work should be performed only after you are thoroughly familiar with all of the following safety checks and servicing guidelines. To do otherwise increases the risk of potential hazards and injury to the user.

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 receiver.
3. Check for frayed insulation on wires including the AC cord. Also check across-the-line components for damage and replace if necessary.
4. All fuses and certain resistors and capacitors which are of the flameproof type (shaded on the schematic diagrams and parts lists) must be replaced with exact Zenith types to prevent potential fire hazard.
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, (63-10401-76) paralleled by a .15 mfd, AC type capacitor (22-4384) 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 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.



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TECHNICAL APPLICATIONS INDEX

Various "HF" series service manuals contain information relating to solid state device theory, operation and circuit applications as introduced into our products. In addition, service procedures are also explained, if required, in the appropriate service manuals. Such information has been included 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, PLL Multiplex IC, Audio). General Product Information – Audio Circuitry (including Two on Two Speaker Matrix, Allegro Speaker Systems), Disassembly Procedures.

HF 31S2: Applications – Four Channel Sound Reproduction Input Vs. Output, Repairing Push Button Switches, Record Changer and Phono Cartridge Inter Changeability, Chassis 12WGR59 Accessibility.

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HF 18 is Part No. 923-558
HF 19 is Part No. 923-606
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HF 25 is Part No. 923-669
HF 28 is Part No. 923-718
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PRODUCT FEATURES

SEE NOTES ON PAGE 4

CABINET			CHASSIS		SPEAKERS			RECORD CHANGER	OTHER FEATURES		
MODEL	COLOR	STYLE 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 C2	–	–	169-511 or 169-511A or 169-511B or 169-511C	TM	2 on 2, A1,A2,A3	DGL, H, PL
G584W2	Walnut	M, LL	3WGR52	FM/AM/Phono	Note C2	–	–	169-511B	TM	2 on 2, A1,A2,A3	DGL, H, PL
G587W2	Walnut	M, LL	3WGR52	FM/AM/Phono/ Tape	Note C2	–	–	169-511 or 169-511A or 169-511B or 169-511C	8TK-P 169-492	2 on 2, A1,A2,A3	DGL, H, PL
G587W3	Walnut	M, LL	3WGR52	FM/AM/Phono/ Tape	Note C2	–	–	169-511B	8TK-P 169-492	2 on 2, A1,A2,A3	DGL, H, PL
GR587W1	Walnut	M, LL	3WGR52	FM/AM/Phono/ Tape	Note C2	–	–	169-511 or 169-511A or 169-511B or 169-511C	8TK-R/P 169-472	2 on 2, A1,A2,A3	DGL, H, PL
GR587W2	Walnut	M, LL	3WGR52	FM/AM/Phono/ Tape	Note C2	–	–	169-511B	8TK-R/P 169-472	2 on 2, A1,A2,A3	DGL, H, PL
G590W	Walnut	M, LL	6WGR57	FM/AM/Phono/ Tape	Note C2	–	–	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 C2	–	–	169-512 or 169-512A	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 C2	–	–	169-512 or 169-512A	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 C2	–	–	169-513 or 169-513A	8TK-P 169-505 or 169-505A	2 on 2, A1,A2,A3	AUX,DL, F,H, PL, T
GR596W	Walnut	M, LL	12WGR59	FM/AM/Phono Tape	Note C2	–	–	169-513 or 169-513A	8TK-R/P 169-506	2 on 2, A1,A2,A3	AUX,DL, F,H,PL,T
G680W2	Walnut	M	3WGR54	FM/AM/Tape	Note C2	–	–	–	8TK-P 169-492	2 on 2, A1,A2,A3	AUX,DGL, H, PL
GR684W	Walnut	M	6WGR56	FM/AM/Tape	Note C2	–	–	–	8TK-R/P 169-507 or 169-507A	2 on 2, A1,A2,A3	AUX,DGL, F, H, PL
G736W	Walnut	M, LL	6WGR91	FM/AM/Phono/ Tape	Note C2	–	–	169-512 or 169-512A	8TK-P 169-518 or 169-491 or 169-471	A1,A2,A3	AUX,DGL, HH, PL
G901P1	Pecan	C, LL	1WGR50	FM/AM/Phono/ Tape	49-1153-01 49-1094	16 45	2-6x9 2-3½	169-535 or 169-535A	8TK-P 169-536	–	DL, H, RS
H901P	Pecan	C, LL	1WGR50	FM/AM/Phono/ Tape	49-1153-01 49-1094	16 45	2-6x9 2-3½	169-535A	8TK-P 169-536	–	DL, H, RS

PRODUCT FEATURES

SEE NOTES ON PAGE 4

CABINET			CHASSIS		SPEAKERS			RECORD CHANGER	OTHER FEATURES		
MODEL	COLOR	STYLE 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
H901P11	Pecan	C, LL	1WGR50	FM/AM/Phono/ Tape	49-1153-01 49-1094	16 45	2-6x9 2-3½	169-541	8TK-P 169-536	–	DL,H, RS
GR901P1	Pecan	C, LL	1WGR50	FM/AM/Phono/ Tape	49-1153-01 49-1094	16 45	2-6x9 2-3½	169-535 or 169-535A	8TK-R/P 169-537	–	DL, H, RS
HR901P	Pecan	C, LL	1WGR50	FM/AM/Phono/ Tape	49-1153-01 49-1094	16 45	2-6x9 2-3½	169-535A	8TK-R/P 169-537	–	DL, H, RS
HR901P11	Pecan	C, LL	1WGR50	FM/AM/Phono/ Tape	49-1153-01 49-1094	16 45	2-6x9 2-3½	169-541	8TK-R/P 169-537	–	DL, H, RS
HR902P	Pecan	C, LL	1WGR50	FM/AM/Phono/ Tape	49-1153-01 49-1094	16 45	2-6x9 2-3½	169-535A	8TK-R/P 169-537	–	DL, H, RS
HR902P11	Pecan	C, LL	1WGR50	FM/AM/Phono/ Tape	49-1153-01 49-1094	16 45	2-6x9 2-3½	169-541	8TK-R/P 169-537	–	DL, H, RS
HR903PN	Pine	C, LL	1WGR50	FM/AM/Phono/ Tape	49-1153-01 49-1094	16 45	2-6x9 2-3½	169-535A	8TK-R/P 169-537	–	DL, H, RS
HR903PN11	Pine	C, LL	1WGR50	FM/AM/Phono/ Tape	49-1153-01 49-1094	16 45	2-6x9 2-3½	169-541	8TK-R/P 169-537	–	DL, H, RS
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	DL, H, RS
G914P G914P11	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, DL, H, RS
G915AE G915AE11	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, DL, H, RS
G916M G916M11	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, DL, H, RS
SR917M	Maple	C, LL	1WGR50	FM/AM/Phono/ Tape	49-1269 49-1166	16 8	2-10 2-3½	169-540	8TK-R/P 169-537	–	DL, H, RS
SR918P	Pecan	C, LL	1WGR50	FM/AM/Phono/ Tape	49-1269 49-1166	16 8	2-10 2-3½	169-540	8TK-R/P 169-537	–	DL, H, 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,DL, H, RS, T
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,DL, H, RS, T
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,DL, H, RS, T
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,DL,F,H, PL,RS,T
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,DL,F,H, PL,RS,T
G941P	Pecan	C, LL	6WGR90	FM/AM/Phono/ Tape	49-1261-01 49-1237	8 8	4-8 4-3	169-516	8TK-P 169-522 or 169-485	Note C3	A, DGL, HH, PL, RS, T
G942M	Maple	C, LL	6WGR90	FM/AM/Phono/ Tape	49-1261-01 49-1237	8 8	4-8 4-3	169-516	8TK-P 169-522 or 169-485	Note C3	A, DGL, HH, PL, RS, T
G946AE (AES)	Antique Oak	C, LL	6WGR90	FM/AM/Phono/ Tape	49-1217 49-1168 49-1243-01 49-1168	8 8 8 8	2-10 2-3½ 2-10 2-3½	169-513 or 169-513A	8TK-P 169-522 or 169-485	Note C3	A, DGL, HH, PL, RS, T

PRODUCT FEATURES

SEE NOTES BELOW

CABINET			CHASSIS		SPEAKERS			RECORD CHANGER	OTHER FEATURES		
MODEL	COLOR	STYLE 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
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
G2000W11	Walnut	M, SP	–	–	49-1261-02 49-1166	8 8	1-8 1-3½	–	–	–	A2
G3000W	Walnut	M, SP	–	–	49-1265 49-1168	8 8	1-10 1-3½	–	–	–	A3
G3000W11	Walnut	M, SP	–	–	49-1270 49-1166	8 8	1-10 1-3½	–	–	–	A3
G9012W1	Walnut	M, SP	–	–	49-1249 49-1168	8 8	1-6½ 1-3½	–	–	–	A1
G9014W	Walnut	M, SP	–	–	49-1254-01 49-1168	8 8	1-8 1-3½	–	–	–	A2
G9019W	Walnut	M, SP	–	–	49-1241 49-1168	8 8	1-10 1-3½	–	–	–	A
G9026W	Walnut	M	–	–	–	–	–	169-512	–	–	–

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 or modular models:
Model F635 - Cartridge Tape Player.
Model E637 - Cassette Tape Player/Recorder.
Model F638 - Cartridge Tape Player/Recorder.

NOTE C – SPEAKER PROVISIONS:

NOTE C1: Models G1000W, G2000W, W11, G3000W, W11, G9012W1, G9014W and G9019W (and the prior E9012 series) are 8 ohm Allegro Speaker Systems. Allegro Models in the E9014 and E9018 series were 16 ohm systems.

NOTE C2: "G" Line Modular Models may use either G1000W, G2000W, or G3000W series models.

NOTE C3: Models G941P and G942M contain a complete Four Channel speaker system. In addition, Models G941P and G942M have two jacks to which an external speaker system may be connected so the external speaker system may be used for the back channels of a Four Channel system. Model G946AE has two jacks to which the G946AES speaker system is connected.

NOTE C – SPEAKER PROVISIONS CONTINUED:

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 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 G9026W or Tape Units listed under Note B.
DGL = Digilite Dial Scale Light.
DL = Dial Scale Light.
F = Flywheel Tuning.
H = Headphone Jack (Stereo).
HH = Headphone Jack (Four Channel).
PL = Power Indicator Light (other than Dial Scale Light).
RS = Record Storage.
T = Tuning Meter.

RECORD CHANGER FEATURES

SEE NOTES BELOW

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 S-82621 D-S	S-82964	16, 33, 45 78	11"	7, 10, 12, M Manual	See Note 2	Black	Black	Black	Cue Lever
169-511	BSR	2.5-4.0	142-182 56-632 D	S-72910	33, 45, 78	11"	7, 10, 12 Manual	See Note 2	Black	Black	Black	Cue Lever
169-511A	BSR	2.5-4.0	142-185 56-638 D	S-72910	33, 45, 78	11"	7, 10, 12 Manual	See Note 2	Black	Black	Black	Cue Lever
169-511B	BSR	2.5-4.0	142-185 56-638 D	S-72910	33, 45, 78	10-1/8"	7, 10, 12 Manual	See Note 2	Black	Black	Black	Cue Lever
169-511C	BSR	2.5-4.0	142-185 56-638 D	S-72910	33, 45, 78	11"	7, 10, 12 Manual	See Note 2	Black	Black	Black	Cue Lever
169-512	BSR	2.5-4.0	142-182 56-632 D	S-72910	33, 45, 78	11"	7, 10, 12 Manual	See Note 2	Black	Black	Black	Cue Lever, Stylus Brush
169-512A	BSR	2.5-4.0	142-185 56-638 D	S-72910	33, 45, 78	11"	7, 10, 12 Manual	See Note 2	Black	Black	Black	Cue Lever, Stylus Brush
169-513	BSR	2.0-3.5	142-182 56-632 D	S-72910	33, 45, 78	11"	7, 10, 12 Manual	See Note 2	Black	Black	Black	Cue Lever, Stylus Brush
169-513A	BSR	2.0-3.5	142-185 56-638 D	S-72910	33, 45, 78	11"	7, 10, 12 Manual	See Note 2	Black	Black	Black	Cue Lever, Stylus Brush
169-515	VM	2-2.9	142-182 56-632 D	S-82964	16, 33, 45 78	11"	7, 10, 12 Manual	See Note 2	Black	Black	Black	Cue Lever
169-516	VM	2-2.9	142-182 56-632 D	S-82964	16, 33, 45 78	11"	7, 10, 12 Manual	See Note 2	Black	Black	Black	Cue Lever, Stylus Brush
169-535	BSR	3.5-4.5	142-186 56-639 D-S	S-72910	33, 45, 78	11"	7, 10, 12 Manual	See Note 2	Black	Black	Black	Cue Lever
169-535A	BSR	3.5-4.5	142-186 56-639 D-S	S-72910	33, 45, 78	10-1/8"	7, 10, 12 Manual	See Note 2	Black	Black	Black	Cue Lever
169-540	VM	3.5-4.5	142-187 56-639 D-S	S-82964	16, 33, 45 78	11"	7, 10, 12 Manual	See Note 2	Black	Black	Black and Silver	Cue Lever, Stylus Brush
169-541	VM	3.5-4.5	142-187 56-639 D-S	S-82964	16, 33, 45 78	10"	7, 10, 12 Manual	See Note 2	Black	Black	Black and Silver	Cue Lever

NOTE: 1. All record changers have 120VAC 60Hz motors. See "Misc. Features" for those with overwinds.

2. All record changers will play as many as five (flat and unwarped) records in 12-inch, 10-inch or 7-inch size. Sizes cannot be intermixed.

3. D = Diamond, S = Manufactured Sapphire.

4. Stylus 56-632 and 56-638 are dual radius diamond stylus with universal truncated tip for playing both LP (33 and 45 RPM) and 78 RPM discs.

TAPE UNIT FEATURES

SEE NOTES ON PAGE 7

Part No.	Mfg. Code	8-Track/ Cassette	Channels		ALC/Full Feature Note A	Motor Note B	Auto Stop Note C	Use Note D	Misc. Features Note E
			Play	Record					
169-458	AMI/MC	8-Track	2	–	–	AC	–	M	A1, C1
169-463	Maruco	Cassette	2	2	ALC	DC/E	Tape	M	A1,B,C1,E,FF, I,P2
169-464	AMI/MC	8-Track	2	–	–	AC	–	C	A1,C1
169-469	AMI/MC	8-Track	2	2	Full	DC/M	Full	M	A1,C1,FF,I, M,P1,R
169-471	AMI/MC	8-Track	2/4	–	–	AC	–	M	A1,C1,Q
169-472	AMI/MC	8-Track	2	2	Full	DC/M	Full	M	A1,C1,FF,I, M,P1,R
169-473	AMI/MC	8-Track	2	–	–	AC	–	M	A1,C1
169-485	AMI/MF	8-Track	2/4	–	–	AC	–	C	A1,C1,Q
169-486	AMI/MF	8-Track	2	–	–	AC	–	C	A1,C1
169-487	AMI/MC	8-Track	2	2	Full	DC/M	Full	C	A1,C1,FF,I, M,P1,R
169-489	AMI/MF	8-Track	2	–	–	AC	–	M	A1,C1
169-490	AMI/MF	8-Track	2	–	–	AC	–	C	A1,C1
169-490A	AMI/Z/MF	8-Track	2	–	–	AC	–	C	A1,C1
169-490B	AMI/Z/MF	8-Track	2	–	–	AC	–	C	A1,C1
169-491	AMI/MF	8-Track	2/4	–	–	AC	–	M	A1,C1,Q
169-492	AMI/MF	8-Track	2	–	–	AC	–	M	A1,C1
169-494	JVC	Cassette	2	2	ALC	DC/M	Tape	M	A1,B,C1,E,FF, I,P2
169-494-01	JVC	Cassette	2	2	ALC	DC/M	Tape	M	A1,B,C1,E,FF, I,P2
169-505	AMI/MF	8-Track	2	–	–	AC	–	W	A2,C1
169-505A	AMI/Z/MF	8-Track	2	–	–	AC	–	W	A2,C1
169-506	AMI/MC	8-Track	2	2	Full	DC/M	Full	W	A2,C1,FF,I M,P1,R
169-506D	AMI/Z/MC	8-Track	2	2	Full	DC/M	Full	W	A2,C1,FF,I M,P1,R
169-507	AMI/MC	8-Track	2	2	Full	DC/M	Full	M	A2,C1,FF,I M,P1,R
169-507A	AMI/Z/MC	8-Track	2	2	Full	DC/M	Full	M	A2,C1,FF,I M,P1,R
169-510	AMI/MF	8-Track	2	–	–	AC	–	M	A2,C1

TAPE UNIT FEATURES

SEE NOTES BELOW

Part No.	Mfg. Code	8-Track Cassette	Channels		ALC/Full Feature Note A	Motor Note B	Auto Stop Note C	Use Note D	Misc. Features Note E
			Play	Record					
169-510A	AMI/Z/MC	8-Track	2	–	–	AC	–	M	A2,C1
169-510B	AMI/Z/MF	8-Track	2	–	–	AC	–	M	A2,C1
169-518	AMI/MF	8-Track	2/4	–	–	AC	–	M	A2,C1,Q
169-519	JVC	Cassette	2	2	ALC	DC/M	Tape	M	A2,B,C1,E,FF, I,P2
169-520	AMI/MF	8-Track	2	–	–	AC	–	M	A2,C1
169-521	AMI/MF	8-Track	2	–	–	AC	–	C	A2,C1
169-521A	AMI/Z/MF	8-Track	2	–	–	AC	–	C	A2,C1
169-522	AMI/MF	8-Track	2/4	–	–	AC	–	C	A2,C1,Q
169-523	AMI/MC	8-Track	2	2	Full	DC/M	Full	C	A2,C1,FF,I, M,P1,R
169-536	AMI/ML	8-Track	2	–	–	DC/M	–	C	A2,C2
169-537	AMI/ML	8-Track	2	2	ALC	DC/M	Four	C	A2,C2,I,R

NOTES

NOTE A – RECORD
ALC = Automatic Level Control
Full = Full Feature with Record Level Controls and Meters.

NOTE B – MOTOR
E = Electronic Governor
M = Mechanical Governor
AC Motors require conversion kit if used on 50Hz.

NOTE C – AUTO STOP
Full = Stops after each program, fourth program or runs continously (in both Play and Record modes).
Four = Stops after fourth program in Record only.
Tape = Tape tension sensor at end of stop.

NOTE D – USED IN
C = Console
M = Modular
W = Wedge Modular

NOTE E – MISC. FEATURES
A1 = Parallel Blade AC Connector.
A2 = Molex Type AC Connector.
B = Bias Frequency Switch.
C1 = RCA Type Audio Connector.
C2 = Spade Lug Audio Connector.
E = Eject
FF = Fast Forward Button.
I = Interlocked Record Button.
M = Record Level Meter.
P1 = Pause Button (Push In, Slide Left to Lock).
P2 = Pause Button (Push-Push).
Q = Automatic 2/4 Channel Switching.
R = Ready Light or Auto Stop Light.

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 inside front cover 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.): 1WGR50, 3WGR50, 3WGR52, 3WGR54, 5WFR50, 6WGR55, 6WGR56, 6WGR57, 6WGR90, 6WGR91, 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. 205-51: 3WGR50, 3WGR52, 3WGR54, 5WFR50, 6WGR55, 6WGR56, 6WGR57, 6WGR90, 6WGR91, 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.

7. Check bias adjustment control (on chassis so equipt) if any components have been changed in the pre-driver thru output stages. See schematic for added information.

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 1WGR50, 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 6WGR90 – Test Point at Q101 end of purple wire going around pulley end of gang.

Chassis 6WGR91 – Test Point at junction of R2 and R226; gang end of R226.

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 1WGR50, 3WGR50, 3WGR52, 3WGR54, 5WFR50

Micro Volts Input	Voltage AGC Voltage at Test Point "C"
0	1.23
25	1.10
100	0.88
200	0.79
500	0.71
1K	*0.67
5K	0.60
50K	0.12
100K	0.06

Chassis 6WGR55, 6WGR56, 6WGR57

Micro Volts Input	Reverse AGC Voltage At Gate 2 of FM RF
0	5.4
25	4.5
100	3.3
200	2.85
500	2.5
1K	*2.1
5K	1.22
50K	0.15
100K	−0.08

Chassis 6WGR90

Micro Volts Input	Reverse AGC Voltage at Test Point "C"
0	5.00
25	4.20
100	2.80
200	2.40
500	1.70
1K	*1.10
5K	0.05
50K	−2.40
100K	−3.20

Chassis 6WGR91

Micro Volts Input	Voltage AGC Voltage At Gate 2 of FM RF (Junction R2 & R226)
0	5.5
25	5.0
100	3.5
200	2.9
500	2.3
1K	*1.9
5K	0.2
50K	−1.3
100K	−1.4

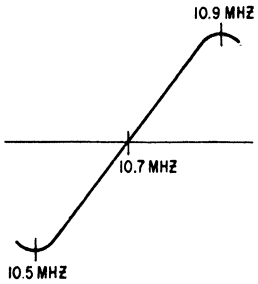
Chassis 12WGR58

Micro Volts Input	Reverse AGC Voltage At Gate 2 of FM RF
0	5.7
25	4.5
100	2.8
200	2.2
500	1.5
1K	*−0.96
5K	−0.22
50K	−1.10
100K	−1.20

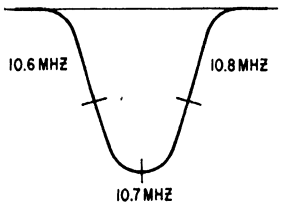
MINIMUM RATED POWER OUTPUT PER CHANNEL INTO 8 OHMS (SINE WAVE CONTINUOUS AVERAGE POWER - OFTEN CALLED RMS POWER)

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%
6WGR90	4	6.0	80Hz - 12kHz	1.0%
6WGR91	4	6.0	80Hz - 12kHz	1.0%
12WGR58	2	12.0	40Hz - 15kHz	1.0%
12WGR59	2	12.0	40Hz - 15kHz	0.5%

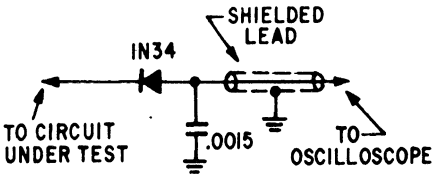
FM/AM/MULTIPLEX ALIGNMENT



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 1WGR50, 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 1WGR50, 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 6WGR90

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, L208 (T204) L211, L212 (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 & 3 for minimum change.			
5				1400 KHz	1400 KHz	C1H	Align RF stage.
6				600 KHz	600 KHz	L106 (T101)	
7				Repeat Steps No. 5 & 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, AFC "Off".							
9	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	L213 (T207)	Adjust Primary & Secondary of Ratio Detector for Maximum amplitude & symmetry as shown in Scope Pattern "A."
10						L215 (T207)	
11	Term. No. 3 of T203 2nd IF Trans. Test Point "F"		Scope Last FM IF Test Point "G"			L209 & L210 (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, L209 & L210	Align I.F. Transformer for maximum output and symmetry as indicated in Scope Pattern "B".
NOTE: In Steps 13 and 14 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 & 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.			

FM–MULTIPLEX ALIGNMENT PROCEDURE – CHASSIS 6WGR90

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)		T303	Adjust for maximum L Channel reading.
4			"R" Tape Output			T303 if necessary	Adjust for minimum R Channel reading.
5				Repeat Steps 4 and 5 for minimum change.			To provide max. separation.

RF AND IF ALIGNMENT PROCEDURE – CHASSIS 6WGR91

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, L208 (T204) L211 (T206)	Align IF channel for maximum output.
2				1600 KHz	1600 KHz	C1H	Set Oscillator to dial scale.
3				600 KHz	600 KHz	T101	
4				Repeat Steps No. 2 and 3 for minimum change.			
5				1400 KHz	1400 KHz	C1F	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 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	L214 (T207)	Adjust Primary and Secondary of Ratio Detector for maximum amplitude and symmetry as shown in Scope Pattern "A".
7						L215 (T207)	
8	Term. No. 3 of T203 2nd IF Trans. Test Point "F".		Scope Last FM IF Test Point "G"			L209 & L210 (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, L209, L210	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	C1C	Align FM Detector stage for maximum.
16				90 MHz	90 MHz	L2 if necessary	
17				106 MHz	106 MHz	C1A	Align FM Antenna stage for maximum.
18				90 MHz	90 MHz	L1 if necessary	
19				Repeat Steps 15 thru 18 for minimum change.			

FM–MULTIPLEX ALIGNMENT PROCEDURE – CHASSIS 6WGR91

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		R301	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.

TECHNICAL APPLICATIONS

FOUR CHANNEL SOUND SYSTEMS

From time to time, we receive inquiries regarding the different "Four Channel" encoding systems that are in use, and how our audio products reproduce those systems. In an effort to simplify explanation, we have prepared the adjacent tables describing the output signal with various combinations of input signal sources, vs. Four Channel operating or decoding modes (switch positions). While the tables were prepared primarily for those of our models having Four Channel circuitry using low level electronic decoding, part of the tables (see Note #4) are applicable to those of our stereo models containing a high level Speaker Matrix decoding system which we call "Two On Two" (formerly "Two Plus Two"). Although Speaker Matrix decoding is a convenient method by which to achieve "Four Channel" sound (it simply requires the addition of two speaker systems – Left Back and Right Back – to certain stereo models), it cannot provide the flexibility of the low level electronic decoding circuitry currently used in our Four Channel models. "Two On Two" Speaker Matrix usually includes switching provisions so the added speaker systems can be used as regular extension speakers, if so desired.

Four Channel circuitry and decoding has been explained in the following recent service manuals:

HF26, pages 29 through 40 – Low Level Electronic Decoding.

HF31, pages 26 through 27 – High Level Speaker Matrix Decoding.

FOUR CHANNEL GLOSSARY

As technology advances, terminology becomes more complex, and the meaning of various terms may become unclear. For this reason, we are including a glossary of some terms as used in the adjacent tables.

AMBIENT – Surrounding; encompassing; sounds which may be in both channels but of different amplitudes, phases, frequencies or time delays.

CARRIER – A frequency which is modulated by audio information (used in the "CD-4" system).

CD-4 – Discrete Four Channel phonograph disc system using an FM modulated carrier, ("CD-4" is a trademark of JVC).

DECODE – 1. To recover information and recreate "Four Channel" sound. 2. A switch position on certain Four Channel models to activate decoding circuitry.

DECODER – Circuitry used to recover encoded signals ("Stereo-4", "SQ", "QS" records, etc.).

DEMODULATOR – Circuitry used to recover special modulation signals on "CD-4" records.

DISCRETE – Separate, distinct.

ELECTRONIC DECODING – Decoding by use of active components in Zenith's low level decoding systems. Also see "Low Level".

ENCODE – To combine four separate channels of information into two so they can be placed on phonograph records.

ENCODER – Circuitry used to encode signals ("Stereo-4," "SQ", "QS" records, etc.).

ENHANCE – 1. Refers to the "enhanced" or "surround" sound derived from the recovery of ambient signals. 2. A switch position on certain Four Channel models to activate decoding circuitry (primarily for decoding "Stereo-4" encoded or ambient signals).

E-V – A matrix system of Four Channel encoding and decoding (See "Stereo-4").

FOUR CHANNEL – 1. A discrete system having four separate and distinct channels (as in four channel tape). 2. A matrix system in which four channels are combined and conveyed by a stereo source.

HIGH LEVEL – Refers to decoding done in a circuit having a high signal level (as in a speaker circuit). Also see Speaker Matrix.

LOW LEVEL – Refers to decoding done in a circuit having a low signal level (as at preamp level). Also see Electronic Decoding.

MATRIX, MATRIX I, MATRIX II, MATRIX DECODE – Switch positions on certain models used to activate decoding circuitry.

MATRIX – Circuit used to combine signals to be encoded or to separate encoded signals. As opposed to discrete. Also see Speaker Matrix.

(Glossary continued on page 16.)

NOTES FOR TABLES 1 AND 2

(See page 15)

NOTE #1 – Back channels operate at lower level than front to provide front source illusion on Models D715, E725, F941, F942, F946, F947, G941, G942, and G946.

NOTE #2 – CD-4 encoded records require use of a CD-4 cartridge and a special demodulator system for proper reproduction. CD-4 records *may* be reproduced as explained for stereo input, subject to possible record wear caused by non CD-4 cartridge and stylus. This record wear can result in loss of four channel information encoded on CD-4 records.

NOTE #3 – If C9029 or E9029 Four Channel Decoder Adaptors are used with any model having a Speaker Matrix Switch ("2 On 2", formerly "2 Plus 2") connect rear speaker to C9029/E9029 and use its Decoder Switch. Place main unit Speaker Matrix switch in "Stereo", *not* "Matrix", for best performance. This arrangement will also permit use with discrete Four Channel sources (such as Model D762 2/4 Channel 8 Track Tape Player).

NOTE #4 – Models with "2 On 2" (formerly "2 Plus 2") Speaker Matrix feature will reproduce Mono and Stereo sources as described under Discrete (when Speaker Matrix switch is in "Stereo") and Enhance (when Speaker Matrix switch is in "Matrix").

OUTPUT EFFECTS OF FOUR CHANNEL SYSTEMS INCLUDING SPEAKER MATRIX SYSTEMS

Table 1 describes the output effect that will occur when different Four Channel operating modes (Discrete, Enhance, Decode) are selected, via the decoder switch or pushbutton, using various types of Input Signal Sources. Table 2 describes the decoder switch, or pushbutton, positions on given models to obtain Discrete or Matrix (Enhance or Decode) Four Channel operating modes. These two charts are used together as follows:

1. Select the Input Signal Source at the left of Table 1 and follow horizontal row to right to desired output effect.
2. Follow vertical column containing output effect down to corresponding column in Table 2. Applicable Four Channel operating modes (Discrete, Enhance or Decode) are identified at top of columns.
3. Select model number at left of Table 2 and follow model number row to the right to previously selected vertical column.
4. Intersection of row and column indicates switch or pushbutton position.

EXAMPLE:

1. To reproduce a "Stereo-4" encoded record in the recommended operating mode you would enter Table 1 at "Four Channel Encoded Stereophonic" and follow that row to the right to the box for "Stereo-4" (which is under "Enhance").
2. Follow "Enhance" column down to Table 2.
3. Assume Model G941 and go right in that row to the column "Enhance".
4. Proper setting of "Decode Mode Switch" is "Matrix II".

TABLE 1 – OUTPUT EFFECT – INPUT SIGNAL VS. OPERATING MODES

INPUT SIGNAL SOURCE	OPERATING MODES: DISCRETE	ENHANCE	DECODE
MONOPHONIC	MONOPHONIC (NOTE #1)		
STEREOPHONIC	STEREOPHONIC (NOTE #1)	QUASI – FOUR CHANNEL Recommended for any stereo source containing detectable ambient information.	QUASI – FOUR CHANNEL Reproduces similar to Stereophonic input in "Enhance" mode.
FOUR CHANNEL ENCODED STEREOPHONIC (Including "STEREO-4", "SQ", "QS")	STEREOPHONIC Encoded material plays in stereophonic. (NOTE # 1)	QUASI – FOUR CHANNEL Recommended for "STEREO-4" encoded.	QUASI – FOUR CHANNEL Recommended for "SQ" and "QS". "QS" will exhibit slightly different location than "SQ".
QUADRAPHONIC (Discrete Four Channel Tape (NOTE #2)	QUADRAPHONIC Recommended for discrete Four Channel Source.	QUASI-FOUR CHANNEL Not discrete. Rear channels are decoded in these positions.	

TABLE 2 – DECODER SWITCH POSITION – MODEL VS. OPERATING MODES

MODELS	OPERATING MODES: DISCRETE	ENHANCE	DECODE
C9029, E9029 (NOTE #3)	DECODER SWITCH AT "OFF"	DECODER SWITCH AT "ON"	NOT USED
D715, E725	MODE SWITCH AT "OFF"	MODE SWITCH AT "ENHANCE"	MODE SWITCH AT "DECODE"
F941, F942, F946, F947, G941, G942, G946	DECODE MODE SWITCH AT "DISCRETE"	DECODE MODE SWITCH AT "MATRIX II"	DECODE MODE SWITCH AT "MATRIX I"
F712, F736, G736	MATRIX DECODE PUSHBUTTON "OUT"	NOT USED	MATRIX DECODE PUSHBUTTON "IN"
SPEAKER MATRIX (NOTE #4)	"STEREO"	"MATRIX"	NOT USED

MODULATOR – A circuit used to encode signals ("CD-4" records).

MONOPHONIC – One sound source.

QUADRAPHONIC – Four separate and distinct sound sources.

QUASI-FOUR CHANNEL – Refers to the simulated "Four Channel" sound pattern achieved by use of a decoder.

QS – A matrix system of Four Channel encoding in which signals are varied by phase (180°, +/–90°). ("QS" is a trademark of Sansui Electric Co).

SQ – A matrix system of Four Channel encoding in which signals are varied in level and phase (180°, +/– 90°). ("SQ" is a trademark of CBS Laboratories, Inc.)

STEREO – A switch position on certain stereo models having "Two On Two" Speaker Matrix circuitry.

STEREO-4 – A matrix system of Four Channel, encoding in which signals are varied in level and phase (180°). ("Stereo-4" is a trademark of Electro-Voice, Inc.).

SPEAKER MATRIX – Refers to those systems in which enhancing is achieved in a speaker circuit. Also see High Level.

REPAIRING PUSH BUTTON SWITCHES USED IN THE 5WER52 SERIES AND 6WGR91 CHASSIS

Models in the F712W, F736W and G73W series (using Chassis 5WER52, 52Z1, 52Z2, 52Z3 and 6WGR91) contain a multi-section push button switch assembly (Part Number 85-1403). Six switch sections are interlocked to provide selection of AM, FM, FM Stereo, Phono, Tape and Aux. The other two sections are of the push-push non-interlock type selecting Decode Off-On and AFC Off-On.

Lets consider the primary defect catagories, such as: intermittent, noisy or latching malfunction. We will look at the latching failures later; but first we will deal with the intermittent and noisy catagories because of their common nature, both as to area of cause and also the method of correction. Your first step should be to determine if the defect is caused by a bad external connection (including soldering to the circuit board or a fault in the foil).

If you determine that there is a fault in the bandswitch, examine the switch assembly more closely (See Figure 1). You will note that the switches have two sets of terminals. Terminals of the standard solder lug type are on the side away from the circuit board, (and are not normally used in this application), while lance type terminals on the other side of the switch are inserted into the circuit board. One might think that it would be necessary to unsolder the entire switch assembly (approximately 115 solder connections between the circuit board and switch), remove the switch assembly and install a new one before the switch is repaired. Not really! It may be possible to replace a single switch section, which is not only much faster than replacing the entire switch assembly, but also greatly reduces possible damage to the circuit board.

A replacement switch assembly can be examined, then used to practice the following disassembly procedures, before repairing a switch in the chassis.
Figure 1 illustrates a complete switch assembly, while Figure 2 shows how a switch section is mounted in the switch frame. Note that each section is mounted in the frame and that four tabs of the frame are bent down over each switch section to secure that section. If a switch section must be replaced, proceed as follows:

1. Straighten the four tabs.

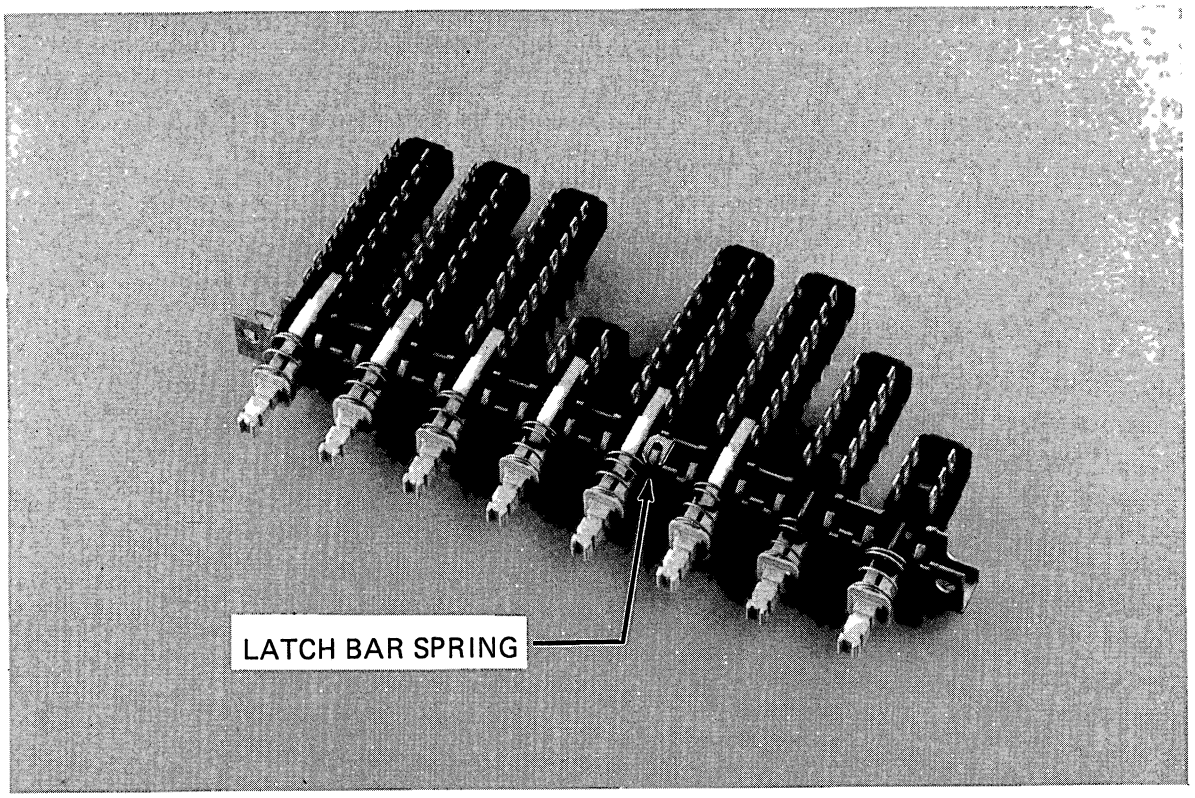


FIGURE 1 – BANDSWITCH ASSEMBLY (PART NUMBER 85-1403)

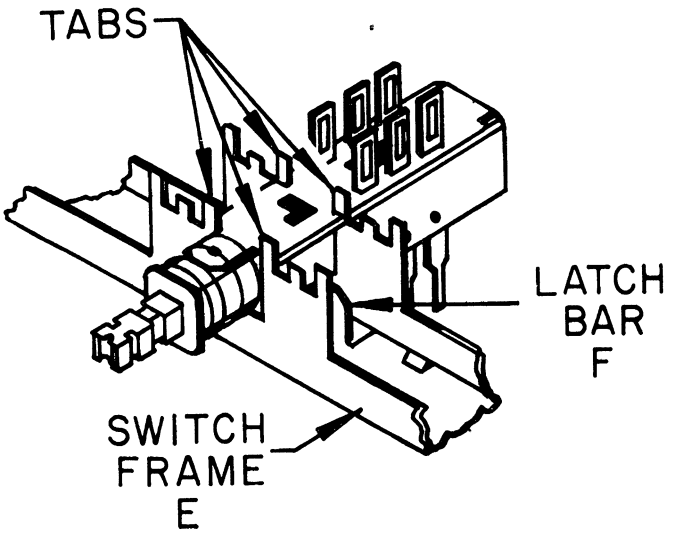


FIGURE 2 – SWITCH SECTION MOUNTING

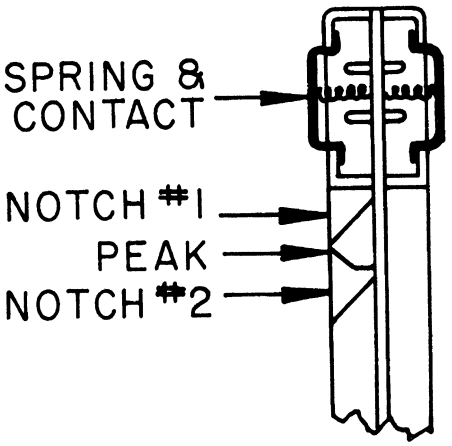


FIGURE 3 – INTERLOCK ACTION

2. Carefully unsolder the switch terminals on the foil side of the circuit board. (A solder sucker would be helpful).
3. Remove the switch section from the circuit board and frame.
4. Be certain that the holes in the circuit board are open and free of solder.
5. Install the new switch section so the lance type terminals fit into the proper circuit board holes and that the switch body is fully seated into the frame.
6. Once the new switch is fully seated, bend the four tabs down to secure switch in position.
7. Solder the terminals on the foil side.
8. Check switch for proper operation.

Switch sections may fail to latch. In push-push switches, a broken or missing locking pin or damage to the plunger could cause a latching failure. Interlocking switch sections may fail to latch if the latch bar spring (located on top of the switch assembly-normally on top of a middle switch section, see Figure 1) is weak or missing, or if the latch bar or switch frame is deformed. A burred or bent contact or improper lubrication may result in a switch that operates roughly.

Operation of the interlock feature is as follows (See Figure 3). Depressing the pushbutton will cause a notch in the plunger to engage the latch bar, which in turn presses against the latch bar spring (See Figure 1). The peak between the plunger notches will press against the latch bar, in turn causing release of the other switches in the interlocked group. As the plunger is depressed further, the latch bar spring will cause the latch bar to engage the second plunger notch, locking the plunger in the "in" position.

Repair of a latching malfunction could range from adjusting tension on the latch bar spring (located on top of the switch assembly in Figure 1), to removal of one or more switch sections (if a latch bar or frame were deformed).

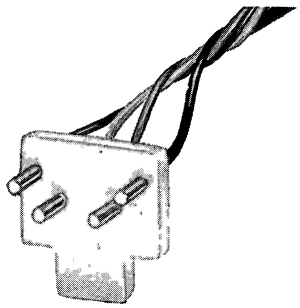
By following the above instructions, a service technician can repair many of the common switch malfunctions without removing a complete switch from a circuit board. This way it is possible for a technician to effect a repair with minimal time and effort.

RECORD CHANGER AND PHONO CARTRIDGE INTERCHANGEABILITY

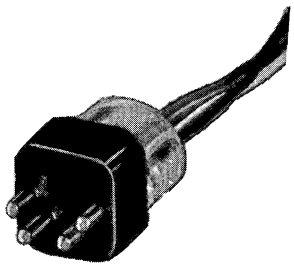
Record changers in the 169-511, 169-512 and 169-513 series (used in "G" model stereo products) may use either a 142-182 or a 142-185 phono cartridge. While these cartridges provide the same basic electrical performance and will fit the same mounting, they are not directly interchangeable because the four contacts are positioned differently. This results in the use of different connector and cable assemblies. Figure 4 illustrates the connector appearance and pin configuration of both connectors. You will note that the spacing between pins is closer on the connector part of cable assembly #906-11235-0, than on #906-11234-9.

The following table details the part number identification and family relationship of the above record changers, phono cartridges and cable assemblies.

RECORD CHANGER	169-511 169-512 169-513	169-511A 169-512A 169-513A
CARTRIDGE	142-182	142-185
STYLUS	56-632	56-638
CABLE ASSEMBLY WITH CONNECTOR	906-11234-9	906-11235-0



906-11234-9
USED WITH 142-182



906-11235-0
USED WITH 142-185
AND 142-186

FIGURE 4 – CARTRIDGE CONNECTORS

CHASSIS 12WGR59 ACCESSIBILITY FOR SERVICING AND ALIGNMENT

Once the bottom cover has been removed from Models G596W and GR596W (as described on pages 28 thru 31 of Service Manual HF31), you will see that there is ready accessibility to the foil sides of both the tuner and the combined power supply/power amplifier chassis for servicing and also some alignment points (See Figure 5 for bottom view). But, what if you want to make adjustments on the gang, or at other points not accessible from the foil side? In most cases it is not necessary to remove the tuner chassis! Just remove the snap-off escutcheon as explained on page 30 of HF 31.

Once the escutcheon is removed, locate the dial light well "EE" (See Figure 6).

1. Rotate the tuning shaft "AA" counter-clockwise (gang closed).
2. Remove two screws "BB" holding dial pointer background strip "CC".
3. Remove five screws "DD" holding dial light well "EE".
4. Lift dial light well "EE" and move it out of way, being careful not to create a short.

You now have access to most components on the component side of the tuner circuit board (without the time required to remove the chassis) for alignment, visual inspection and limited parts replacement. This unique service tip will save considerable time when servicing this area of Chassis 12WGR59.

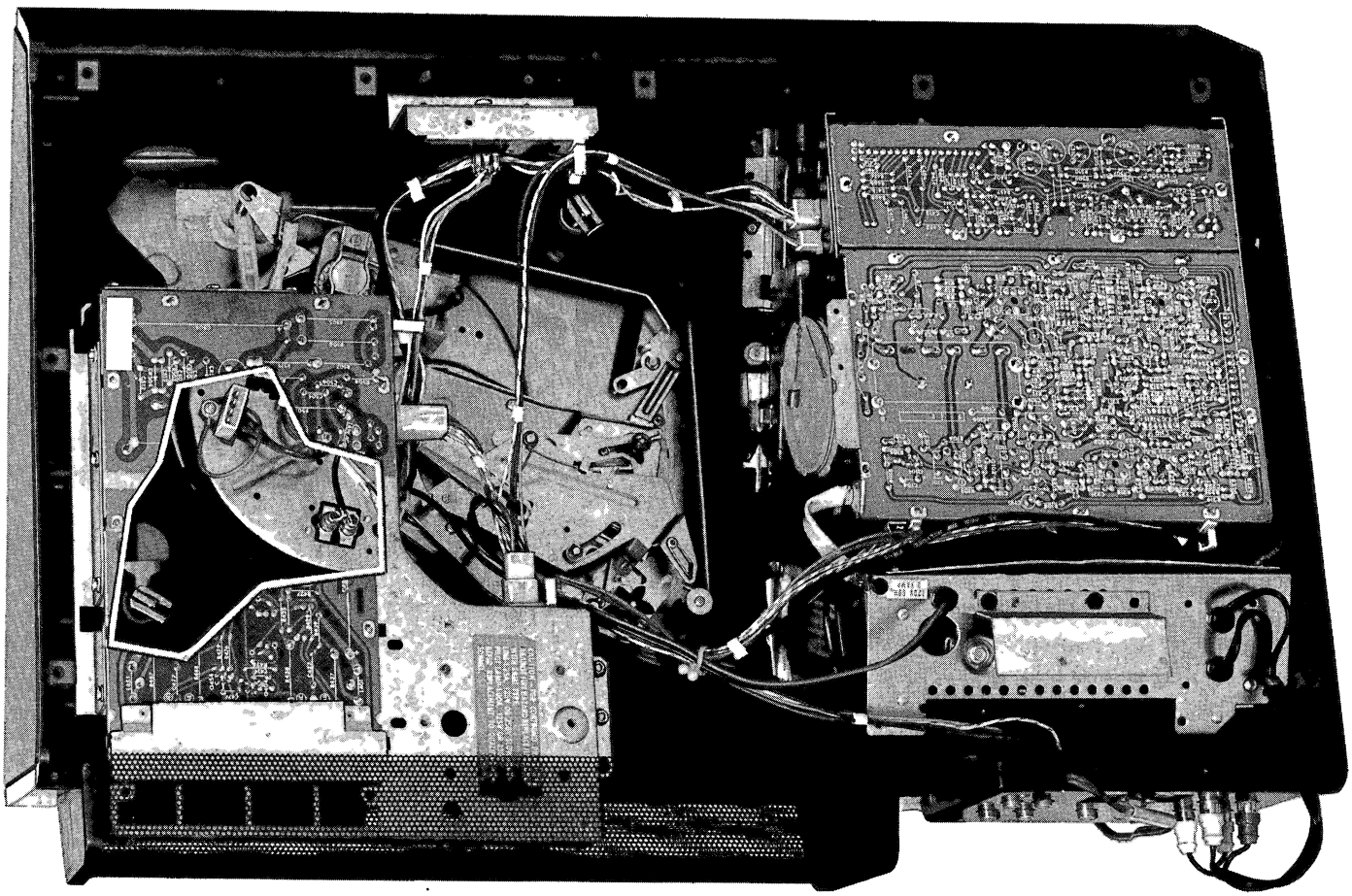


FIGURE 5 – CHASSIS 12WGR59

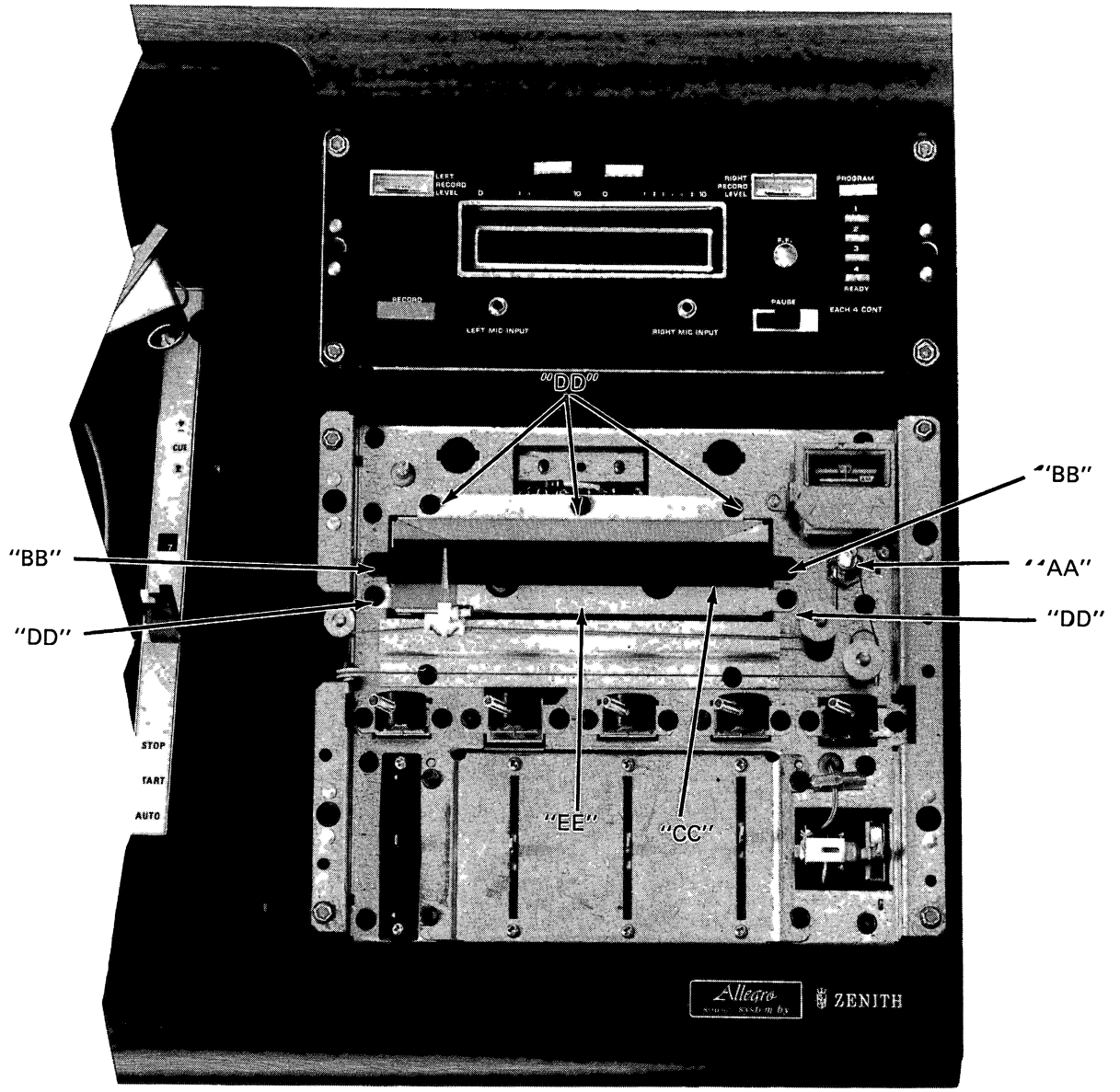
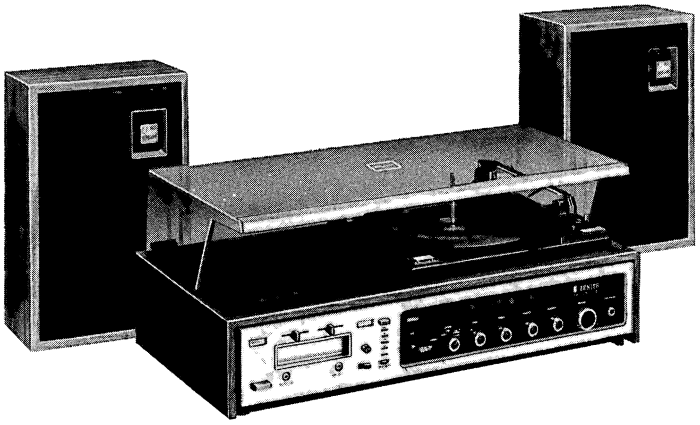


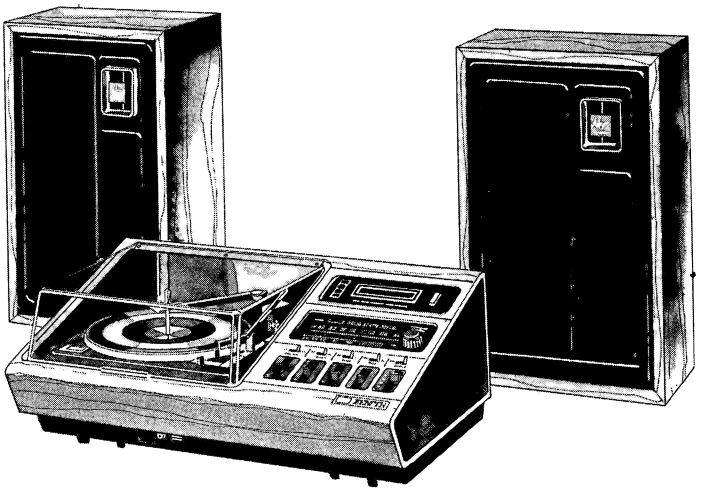
FIGURE 6 – CHASSIS 12WGR59

G584W



GR587W

G590W



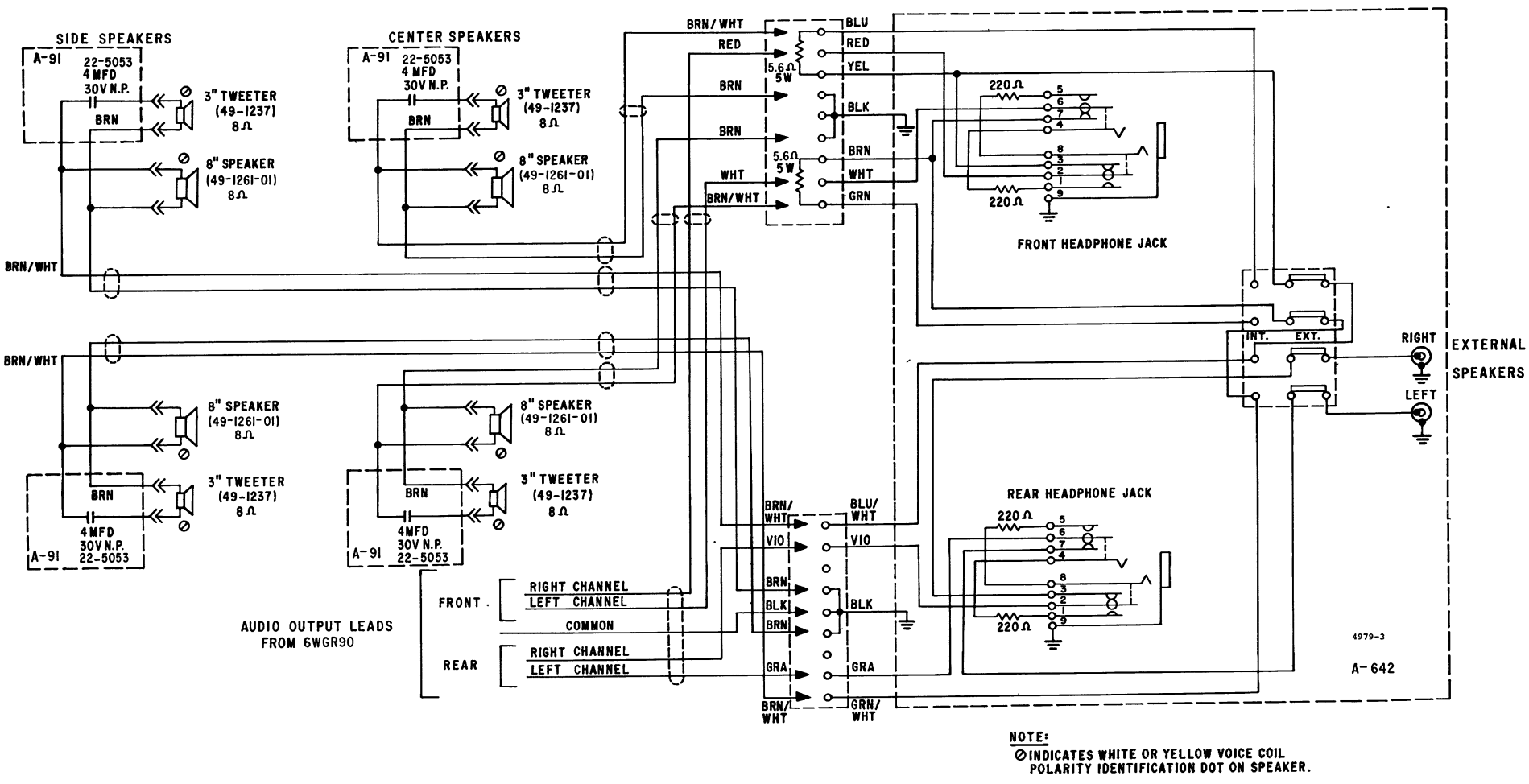
G596W

G736W

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

REPRESENTATIVE MODEL ILLUSTRATIONS

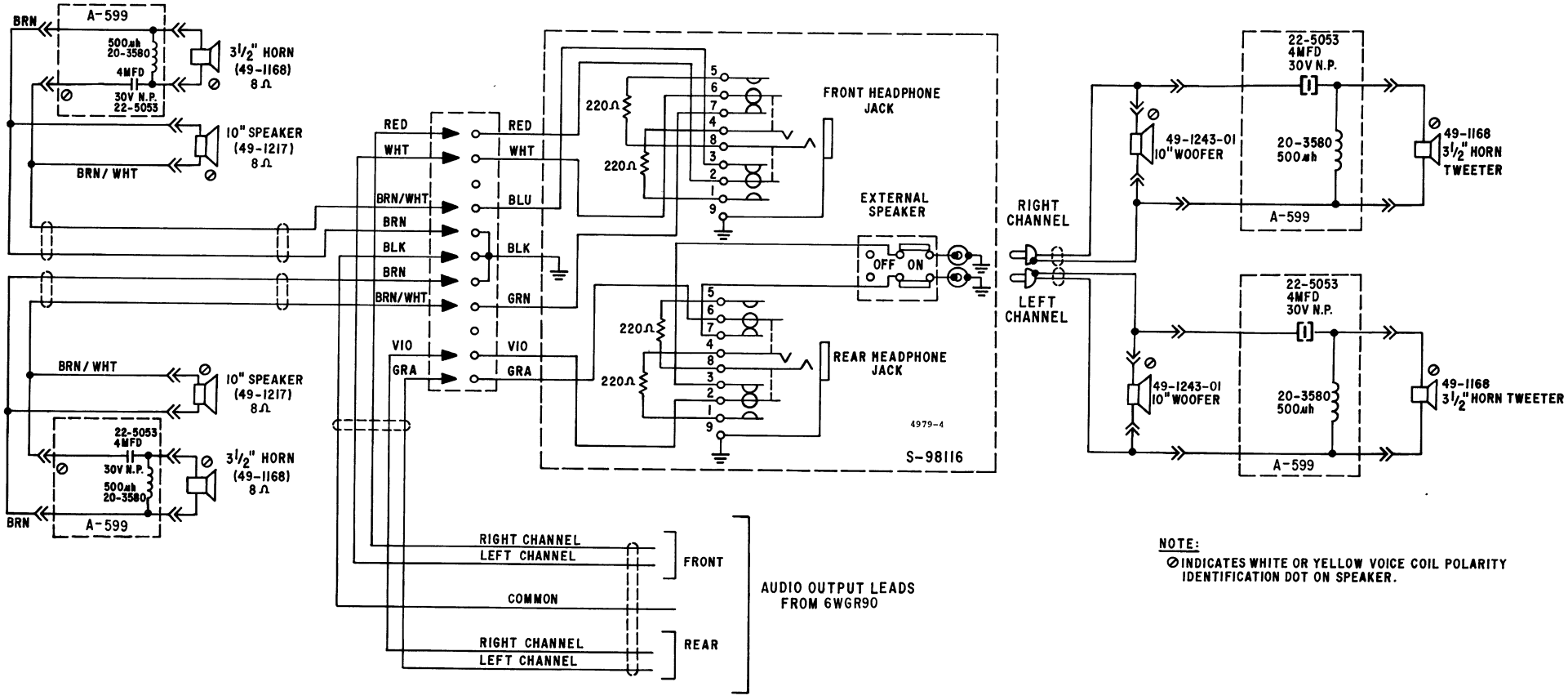
G941DE , G941P , G942M



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

SPEAKER WIRING DRAWINGS

G946AE

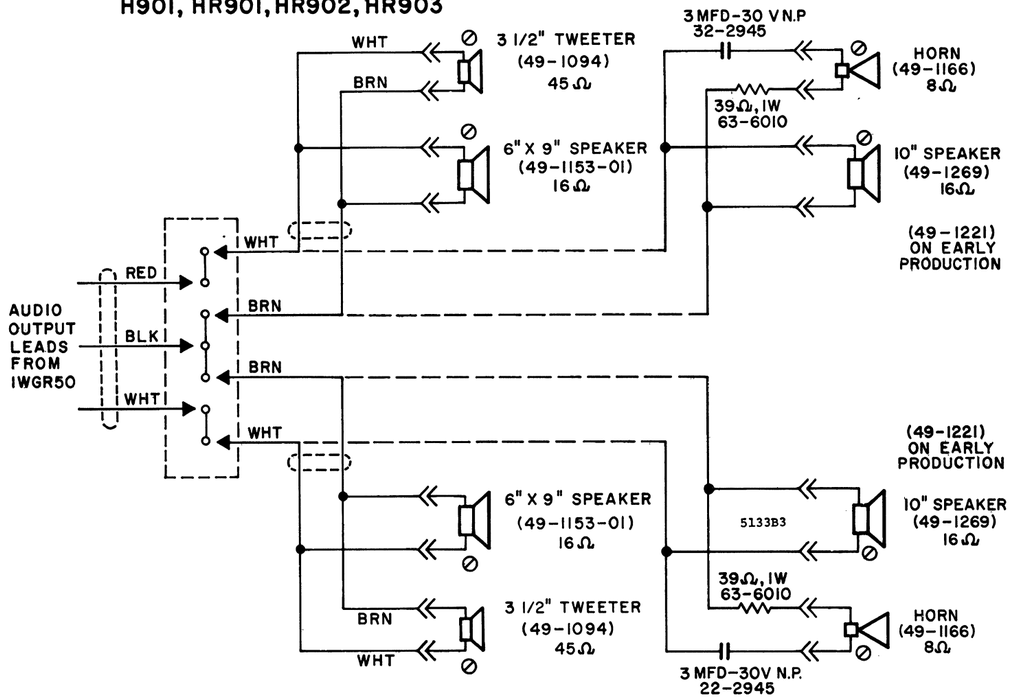


NOTE:
⊘ INDICATES WHITE OR YELLOW VOICE COIL POLARITY IDENTIFICATION DOT ON SPEAKER.

SPEAKER WIRING DRAWINGS

MODELS: G901-1, GR901-1
H901, HR901, HR902, HR903

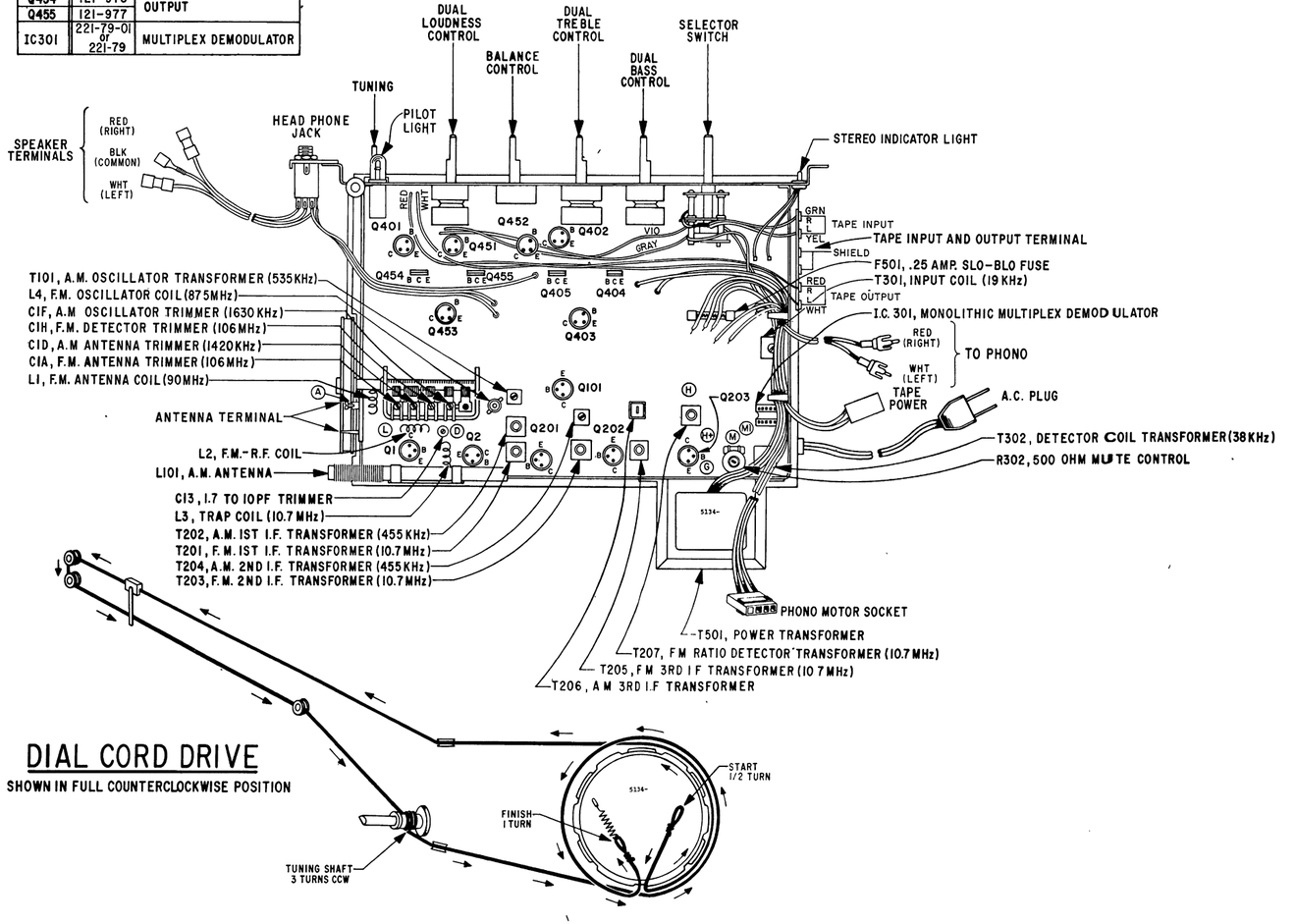
MODELS: SR917, SR918



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

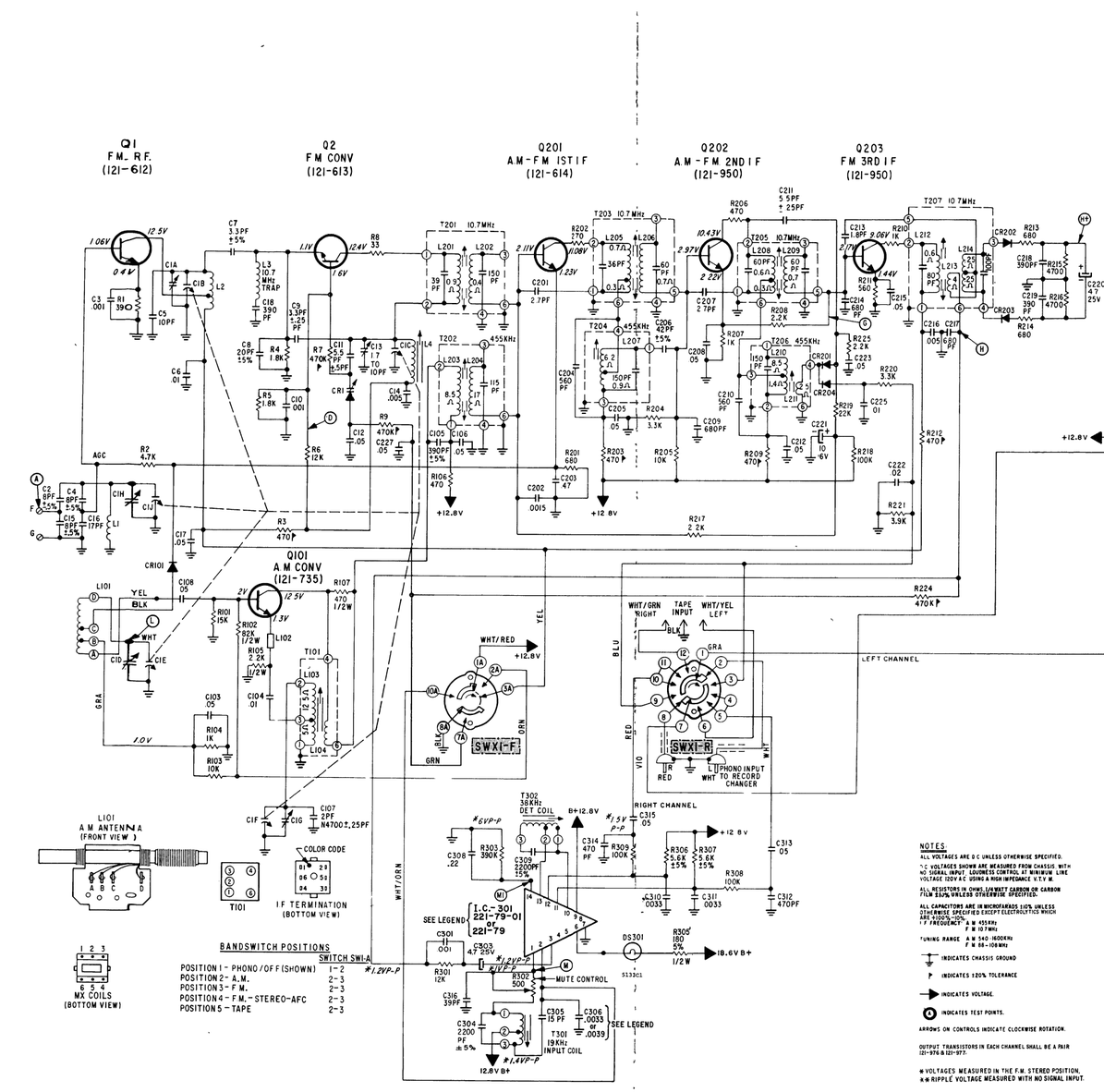
TRANSISTORS		
No.	PART No.	DESCRIPTION
Q1	121-612	F.M.-R.F.
Q2	121-613	F.M. CONVERTER
Q101	121-735	A.M. CONVERTER
Q201	121-614	A.M.-F.M. 1st I.F.
Q202	121-950	A.M.-F.M. 2nd I.F.
Q203		F.M. 3rd I.F.
Q401	121-975	PRE-AMPLIFIER
Q402	121-433	PRE-DRIVER
Q403	121-975	DRIVER
Q404	121-976	OUTPUT
Q405	121-977	
Q451	121-975	PRE-AMPLIFIER
Q452	121-433	PRE-DRIVER
Q453	121-975	DRIVER
Q454	121-976	OUTPUT
Q455	121-977	
IC301	221-79-01 or 221-79	MULTIPLEX DEMODULATOR

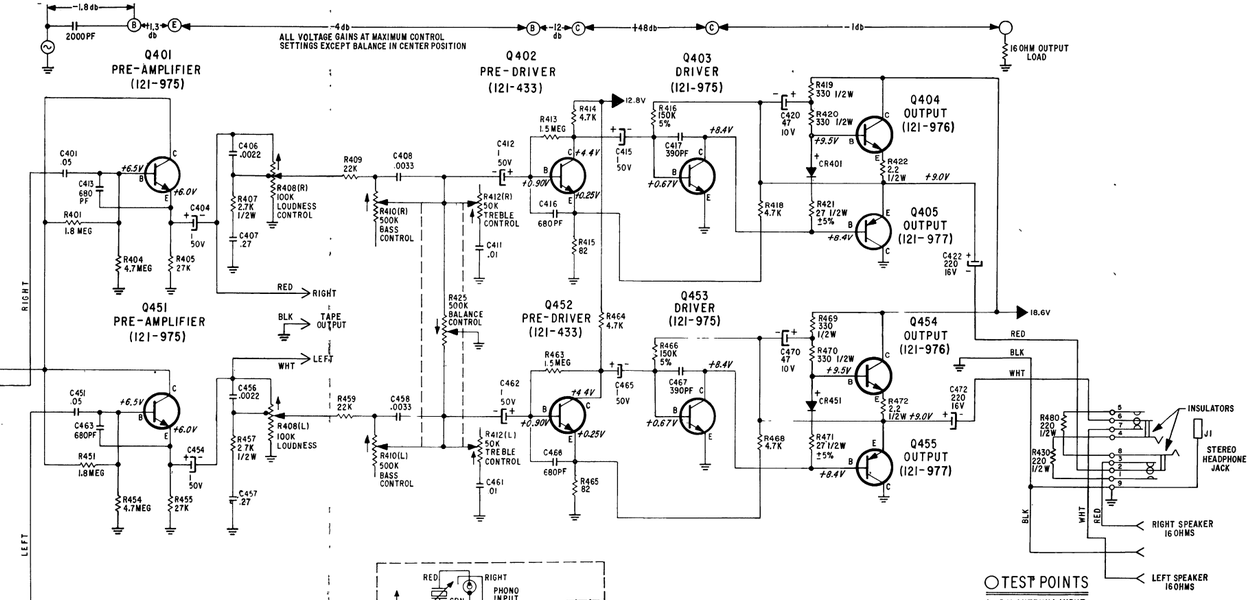
TEST POINTS	
A	F.M. ANTENNA INPUT
D	1st F.M. I.F. INPUT
G	3rd F.M. OUTPUT
H	F.M. DETECTOR OUTPUT
H+	RATIO DETECTOR PRIMARY TUNING
L	A.M. R.F. & I.F. INPUT
M	19KHz A.C. GAIN
M1	19KHz D.C. GAIN

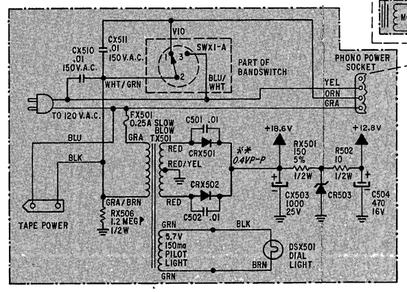


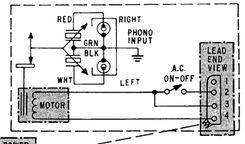
DIAL CORD DRIVE

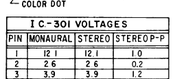
SHOWN IN FULL COUNTERCLOCKWISE POSITION





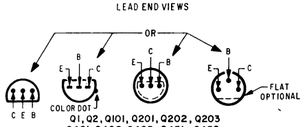






IC-301 VOLTAGES

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	18.6	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

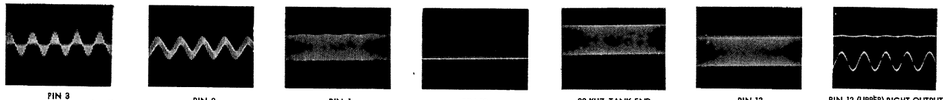


TEST POINTS

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

NOTES:
ALL VOLTAGES ARE D C UNLESS OTHERWISE SPECIFIED.
* 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, 1/2 WATT CARBON OR CARBON FILM ±10% UNLESS OTHERWISE SPECIFIED.
ALL CAPACITORS ARE IN MICROFARADS ±10% UNLESS OTHERWISE SPECIFIED EXCEPT ELECTROLYTICS WHICH ARE RATED IN VOLTS.
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.
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 (19KHz 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

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.

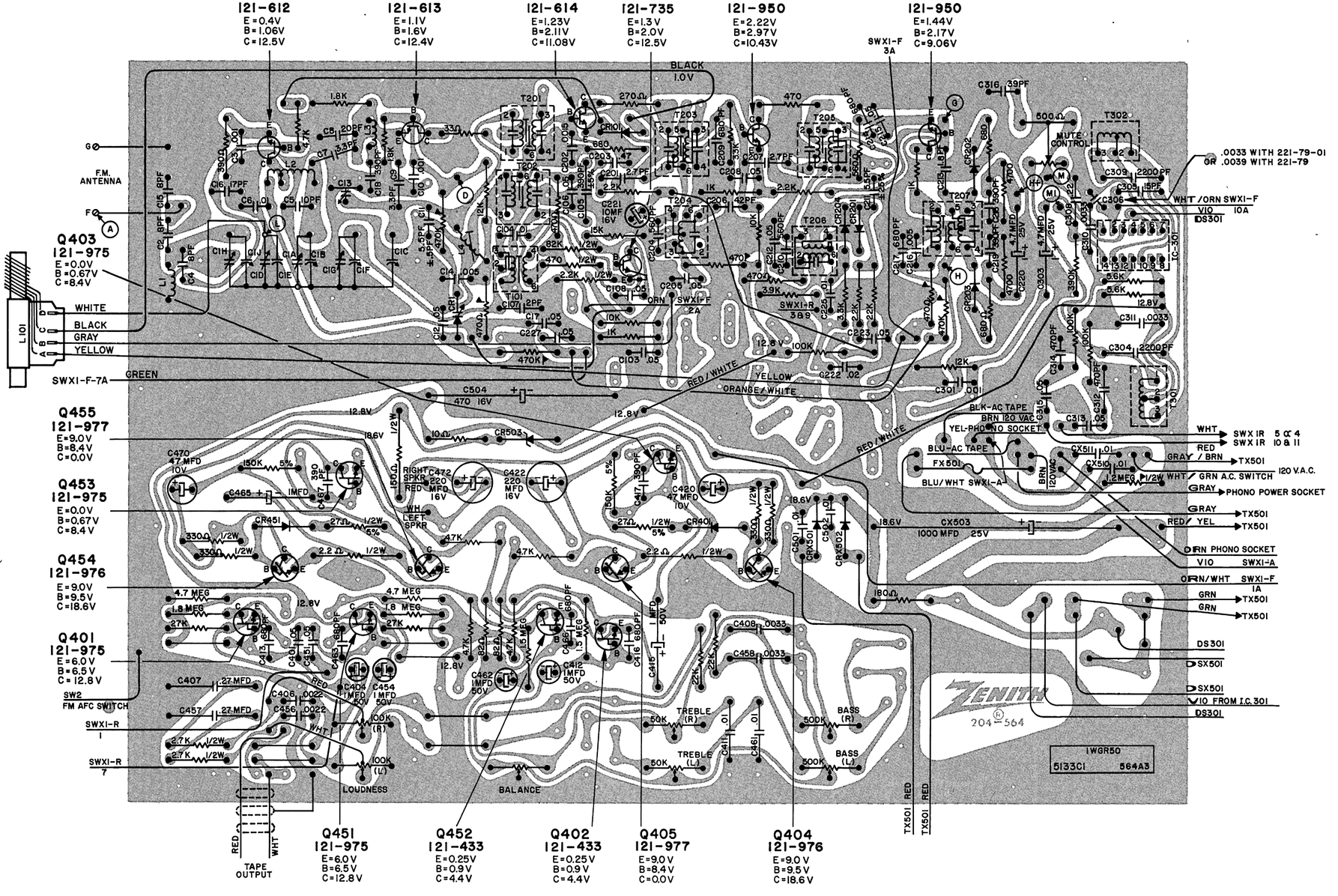
THIS CIRCUIT DIAGRAM MAY OCCASIONALLY DIFFER FROM THE ACTUAL CIRCUIT USED. THIS MAY IMPLEMENTATION OF THE LATEST SAFETY AND PERFORMANCE IMPROVEMENT CHANGES INTO THE SET IS NOT DELAYED UNTIL THE NEW SERVICE LITERATURE IS PRINTED.

CHASSIS LEGEND 1WGR50

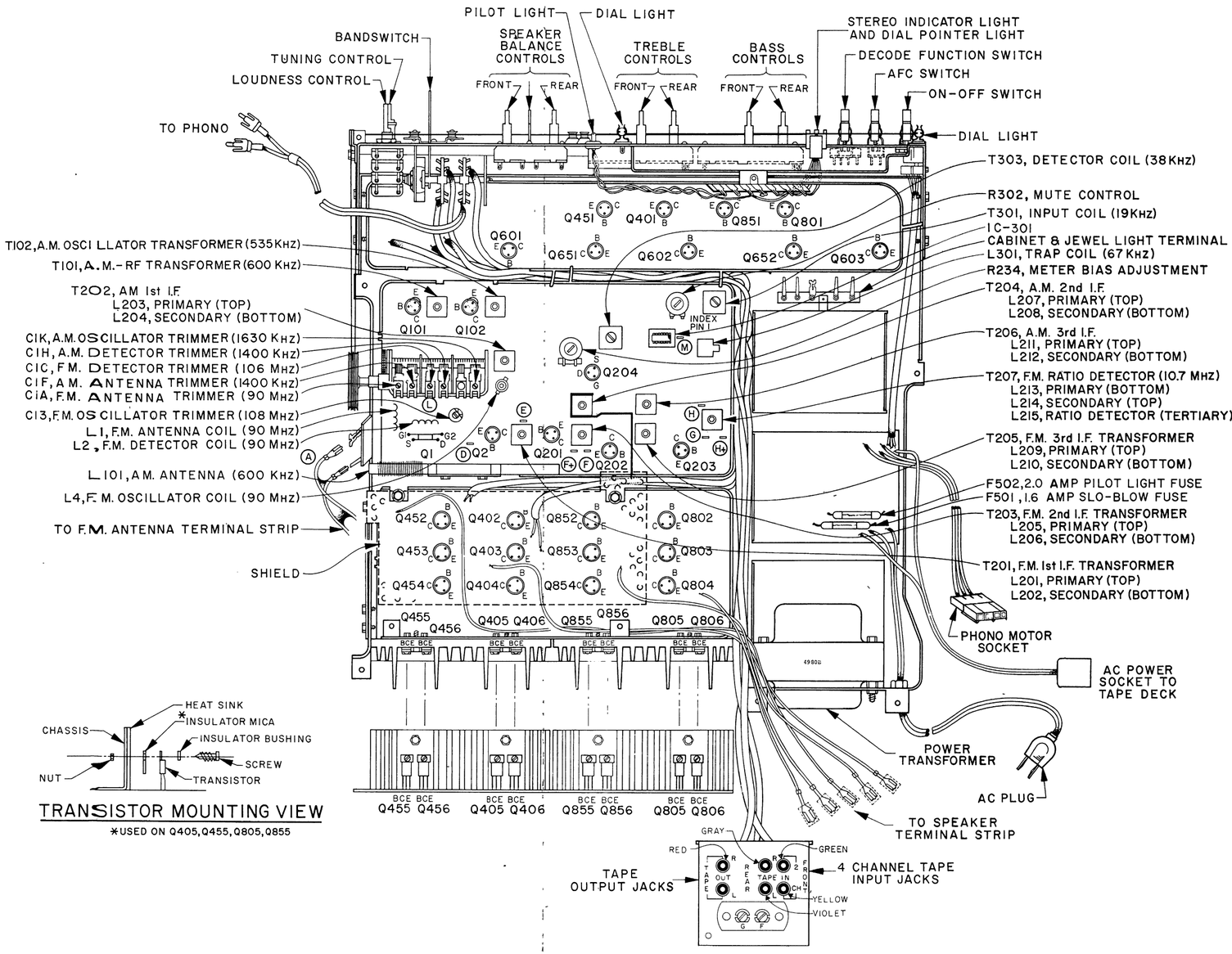
ITEM NO.	PART NUMBER	DESCRIPTION
C1A		FM DETECTOR TRIMMER
C1B		FM DETECTOR TUNING
C1C		FM OSCILLATOR TUNING
C1D		AM ANTENNA TRIMMER
C1E		AM ANTENNA TUNING
C1F	22-7134	AM OSCILLATOR TUNING
C1G		AM OSCILLATOR TRIMMER
C1H		FM ANTENNA TRIMMER
C2		FM ANTENNA TUNING
C3	22-2481	8 PF DISC ±0.5% 500V
C4	22-2729	.001 MFD DISC 25V
C5	22-2681	8 PF DISC ± 0.5% 500V
C6	22-3676	10 PF DISC ± 5% 500V
C7	22-3393	.01 MFD DISC 25V
C8	22-3541	3.3 PF GIMMICK ± 5% 500V
C9	22-3751	20 PF DISC ± 5% 500V
C10	22-5879	3.3 PF DISC ± .25 PF 25V
C11	22-2729	.001 MFD DISC 25V
C12	22-5878	6.5 PF DISC ±0.5 PF 25V
C13	22-3034	.05 MFD DISC 25V
C14	22-4855	1.7 TO 10 PF CERAMIC TRIMMER
C15	22-3060	.005 MFD DISC 25V
C16	22-2481	8 PF DISC ± 0.5% 500V
C17	22-3792	17 PF DISC ± 5% 500V
C18	22-3034	.05 MFD DISC 25V
	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 NH700 ± .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 25V
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	22-3034	.05 MFD DISC 25V
C223	22-3534	.05 MFD DISC 25V
C225	22-7012	.01 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	22-3728	15 PF DISC 500V
C306	22-13	.0033 MFD DISC (USED WITH 221-79-01) 500V
	OR 22-5581	.0039 MFD DISC (USED WITH 221-79) 500V
C308	22-3527	.22 MFD DISC 12V
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
C404	22-7153	1 MFD ELECTROLYTIC 50V
C406	22-5687	.0022 MFD DISC 500V
C407	22-5864	.27 MFD MYLAR 50V
C408	22-13	.0033 MFD DISC 500V
C411	22-7012	.01 MFD DISC 25V
C412	22-7153	1 MFD ELECTROLYTIC 50V
C413	22-2939	680 PF DISC 500V
C414	22-7143	1 MFD ELECTROLYTIC 50V
C415	22-2939	680 PF DISC 500V
C417	22-3177	390 PF DISC 500V
C420	22-7150-07	47 MFD ELECTROLYTIC 10V
C422	22-7151-09	220 MFD ELECTROLYTIC 16V
C451	22-3034	.05 MFD DISC 25V
C454	22-7153	1 MFD ELECTROLYTIC 50V
C456	22-5687	.0022 MFD DISC 500V
C457	22-5864	.27 MFD MYLAR 50V
C458	22-13	.0033 MFD DISC 500V
C461	22-7012	.01 MFD DISC 25V
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
C467	23-3177	390 PF DISC 500V
C470	22-7150-07	47 MFD ELECTROLYTIC 10V
C472	22-7151-09	220 MFD ELECTROLYTIC 16V
C501	22-4817	.01 MFD DISC 500V
C502	22-4817	.01 MFD DISC 500V
C503‡	22-7142-12	1000 MFD ELECTROLYTIC 25V
C504	22-7141-11	470 MFD ELECTROLYTIC 16V

ITEM NO.	PART NUMBER	DESCRIPTION
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
IC301	221-79-01 OR 221-79	MONOLITHIC MULTIPLEX DEMODULATOR (SEE C308)
DS301	100-611	STEREO INDICATOR LIGHT
DS501	100-249	PILOT LIGHT
FX501	138-112-10	0.25 AMP SLO BLO FUSE
PC	226-394	PRINTED CIRCUIT BOARD
Q1	121-612	FM RF TRANSISTOR
Q2	121-613	FM CONV. TRANSISTOR
Q101	121-735	AM CONV. TRANSISTOR
Q201	121-614	AM-FM 1ST IF TRANSISTOR
Q202	121-950	AM-FM 2ND IF TRANSISTOR
Q203	121-950	FM 3RD IF TRANSISTOR
Q401	121-975	PRE-AMPLIFIER TRANSISTOR
Q402	121-433	PRE-DRIVER TRANSISTOR
Q403	121-975	DRIVER TRANSISTOR
Q404	121-976	N.P.N. OUTPUT TRANSISTOR
Q405	121-977	P.N.P. OUTPUT TRANSISTOR
Q451	121-975	PRE-AMPLIFIER TRANSISTOR
Q452	121-433	PRE-DRIVER TRANSISTOR
Q453	121-975	DRIVER TRANSISTOR
Q454	121-976	N.P.N. OUTPUT TRANSISTOR
Q455	121-977	P.N.P. OUTPUT TRANSISTOR
		▲CRITICAL CIRCUIT COMPONENT
R1001▲	63-1748	180 OHM 5% 1/2W
R1002▲	63-9549-01	10 OHM 1/2W (ALT. 63-7701 1/2W 10%)
RX501▲	63-10258-03	1.2 MEG OHM ± 20% 1/2W

ITEM NO.	PART NUMBER	DESCRIPTION
L1	20-3191	FM ANTENNA COIL
L2	20-1648	FM RF COIL
L3	20-1631	TRAP COIL 10.7 MHz
L4	20-3597	FM OSCILLATOR COIL
L101	5-93292-01	AM ANTENNA ASSEMBLY
L102	148-311	FERRITE CORE SLEEVE
L103	20-1790	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 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 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.
T101	95-3077	AM OSCILLATOR TRANSFORMER
T201	95-2546	FM 1ST IF TRANSFORMER 10.7 MHz
T202	95-2641	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	95-2690	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
TX301▲	95-3232	POWER TRANSFORMER
SWX1	55-1470-01	BAND SWITCH
J1	78-2137-01	STEREO HEADPHONE JACK



CHASSIS 1WGR50 — CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE

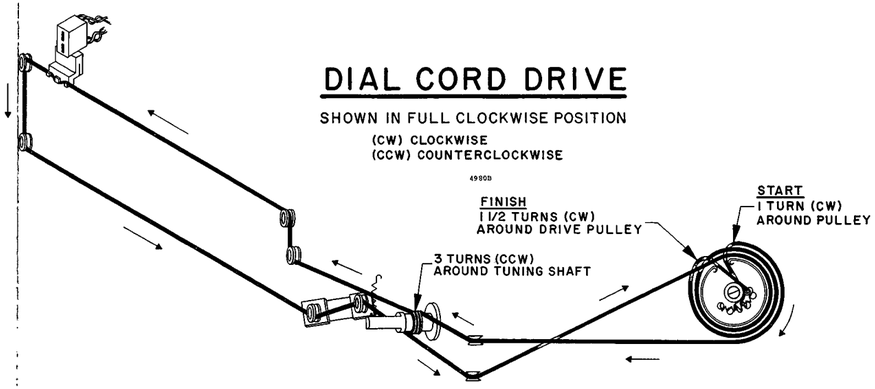


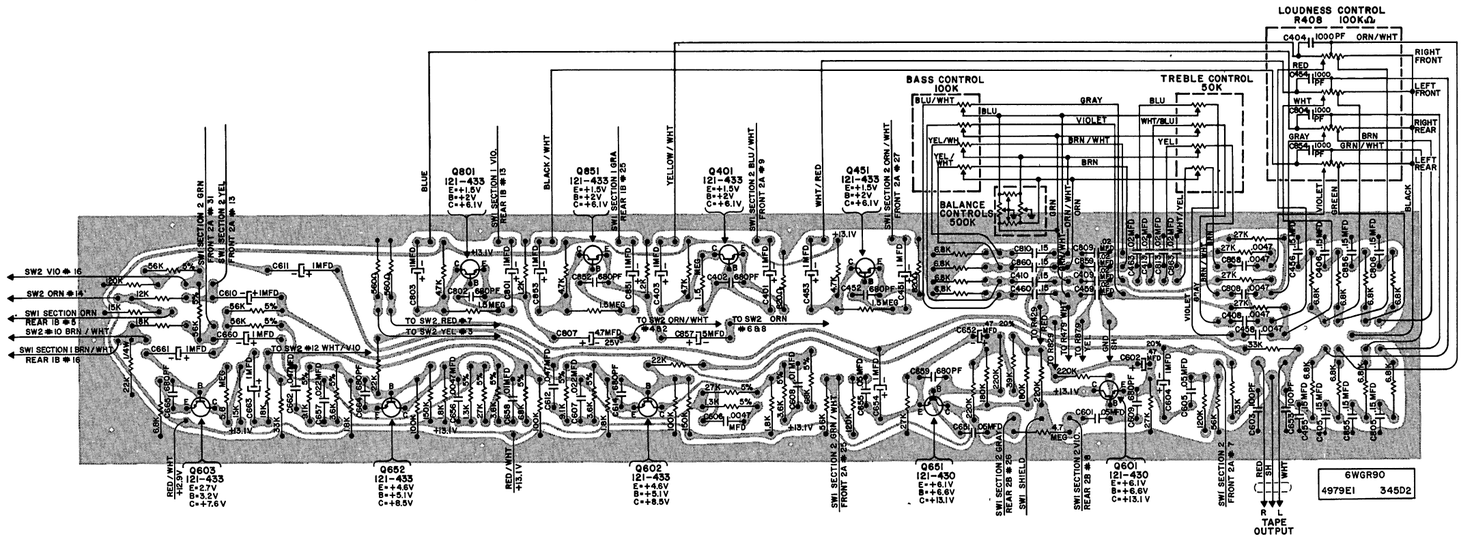
TRANSISTOR MOUNTING VIEW

*USED ON Q405, Q455, Q805, Q855

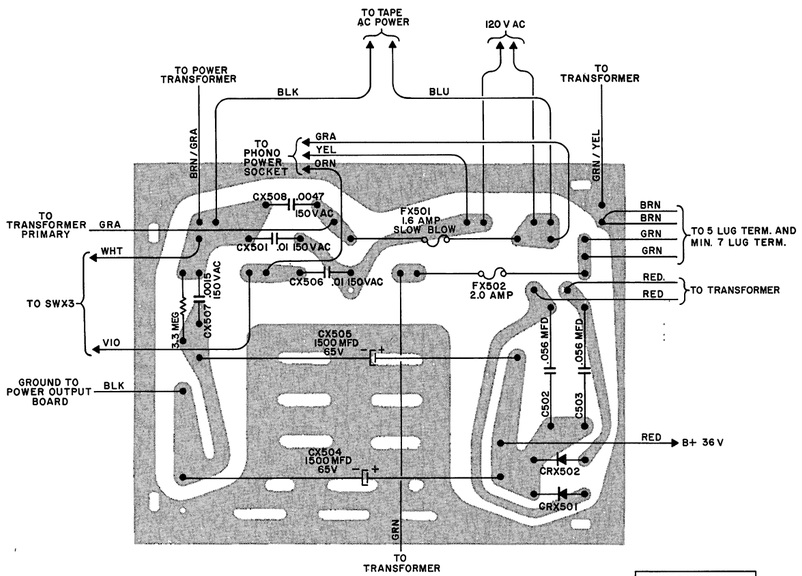
TRANSISTORS			
No.	PART No.	DESCRIPTION	
Q1	121-826	F.M.-R.F.	
Q2	121-613	F.M. CONVERTER	
Q101	121-850	A.M.-R.F.	
Q102	121-714	A.M. CONVERTER	
Q201	121-614	A.M.-F.M. 1st I.F.	
Q202	121-950	A.M.-F.M. 2nd I.F.	
Q203		F.M. 3rd I.F.	
Q204	121-858	TUNING METER	
Q401	121-433	PRE-AMPLIFIER	RIGHT FRONT CHANNEL
Q402	121-1005	AUDIO AMPLIFIER	
Q403	121-877	PRE-DRIVER	
Q404	121-1006	DRIVER	
Q405	121-927-01	OUTPUT NPN	
Q406	121-926-01	OUTPUT PNP	
Q451	121-433	PRE-AMPLIFIER	LEFT FRONT CHANNEL
Q452	121-1005	AUDIO AMPLIFIER	
Q453	121-877	PRE-DRIVER	
Q454	121-1006	DRIVER	
Q455	121-927-01	OUTPUT NPN	
Q456	121-926-01	OUTPUT PNP	
Q601	121-430	PRE-AMPLIFIER	
Q602	121-433	DECODE	
Q603		PHASE INVERTER	
Q651	121-430	PRE-AMPLIFIER	
Q652	121-433	DECODE	
Q801		PRE-AMPLIFIER	RIGHT REAR CHANNEL
Q802	121-1005	AUDIO AMPLIFIER	
Q803	121-877	PRE-DRIVER	
Q804	121-1006	DRIVER	
Q805	121-927-01	OUTPUT NPN	
Q806	121-926-01	OUTPUT PNP	
Q851	121-433	PRE-AMPLIFIER	LEFT REAR CHANNEL
Q852	121-1005	AUDIO AMPLIFIER	
Q853	121-877	PRE-DRIVER	
Q854	121-1006	DRIVER	
Q855	121-927-01	OUTPUT NPN	
Q856	121-926-01	OUTPUT PNP	
IC301	221-79-01 or 221-79	MULTIPLEX INTEGRATED CIRCUIT	

○	TEST POINTS
A	F.M. ANTENNA INPUT
D	1st F.M. I.F. INPUT
E	2nd F.M. I.F. INPUT
F	3rd F.M. I.F. INPUT
F1	RATIO DETECTOR INPUT
G	3rd F.M. OUTPUT
H	F.M. DETECTOR
H+	RATIO DETECTOR PRIMARY TUNING
L	A.M.-R.F. & I.F. INPUT
M	19 KHz ALIGNMENT

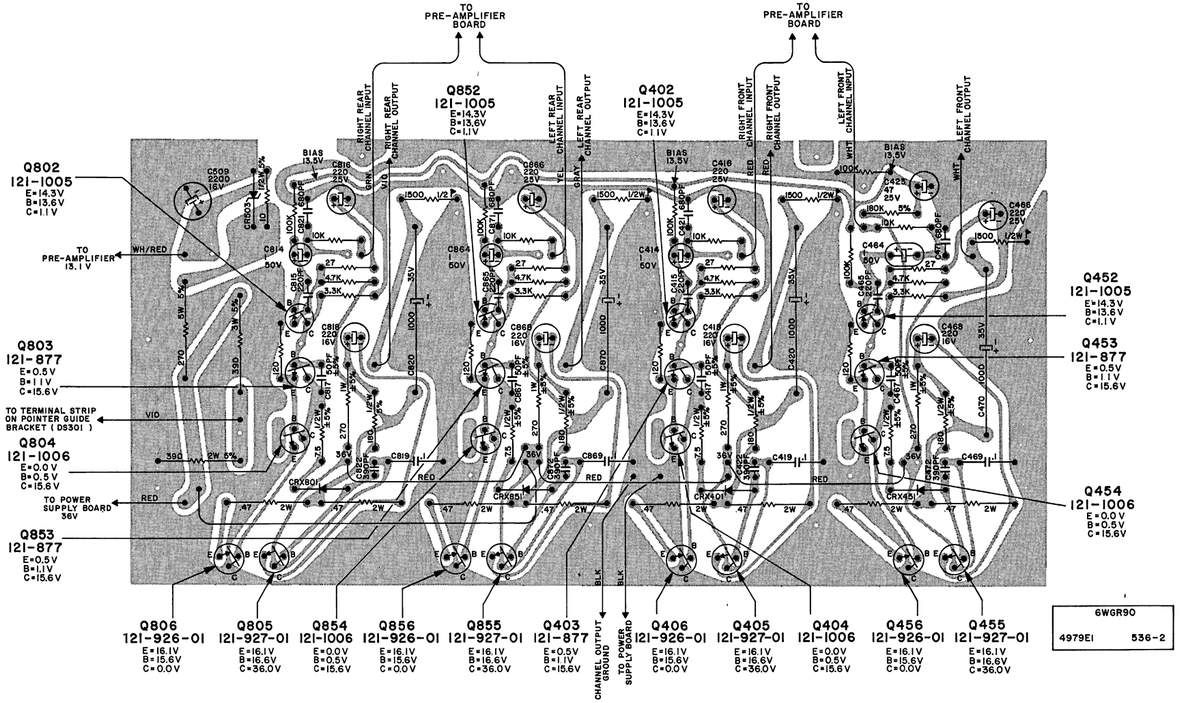




CHASSIS 6WGR90 – PREAMP – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE



CHASSIS 6WGR90 – POWER SUPPLY – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE

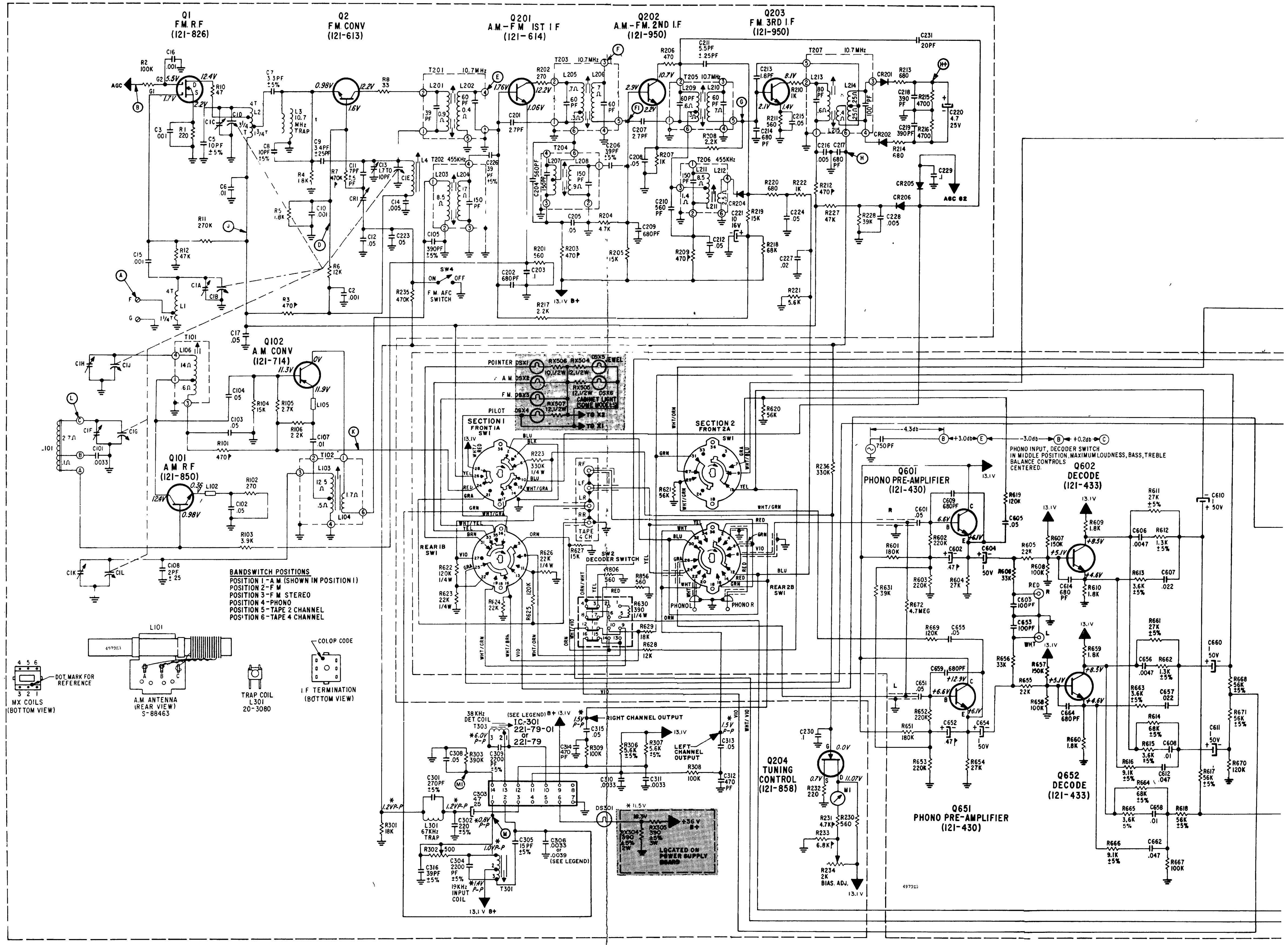


CHASSIS 6WGR90 – POWER AMP – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE

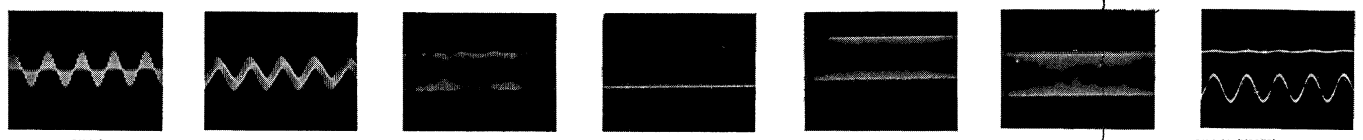
CHASSIS LEGEND 6WGR90

ITEM NO.	PART NUMBER	DESCRIPTION
C1A		FM ANTENNA TRIMMER
C1B		FM ANTENNA TUNING
C1C		FM DETECTOR TRIMMER
C1D		FM DETECTOR TUNING
C1E		FM OSCILLATOR TUNING
C1F	22-6752	AM ANTENNA TRIMMER VARIABLE
C1G		AM ANTENNA TUNING GANG
C1H		AM DETECTOR TRIMMER
C1J		AM DETECTOR TUNING
C1K		AM OSCILLATOR TRIMMER
C1L		AM OSCILLATOR TUNING
C2	22-2729	.001 MFD DISC. 25V
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	22-2592	3.4 PF DISC. ±.25 PF 25V
C10	22-2728	.001 MFD DISC. 25V
C11	22-6344	7 PF DISC ±.5 PF 500V
C12	22-3034	.05 MFD DISC. 25V
C13	22-4855	1.7 PF 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. 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 TUBULAR 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 DISC. ±.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	22-5482	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
C223	22-3034	.05 MFD DISC. 25V
C224	22-3034	.05 MFD DISC. 25V
C226	22-3381	39 PF DISC. ±5% 500V
C227	22-5056	.02 MFD 25V
C228	22-3080	.005 MFD DISC. 10V
C229	22-3652	1 MFD DISC. 10V
C230	22-3652	1 MFD DISC. 10V
C231	22-3751	20 PF DISC. 500V
C301	22-5780	270 PF POLYSTYRENE ±5% 50V
C302	22-2976	220 PF DISC. ±5% 500V
C303	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C304	22-5782	2200 PF POLYSTYRENE ±5% 50V
C305	22-3728	15 PF DISC. ±5% 500V
C306	22-13	.0033 MFD DISC. (USED WITH 221-79-01) 500V
	OR 221-5581	.0039 MFD DISC. (USED WITH 221-79) 500V
C308	22-3034	.05 MFD DISC. 25V
C309	22-5782	2200 PF POLYSTYRENE ±5% 50V
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 DISC. ±5% 500V
C401	22-7143	1 MFD ELECTROLYTIC 50V
C402	22-5482	680 PF DISC. 500V
C403	22-7143	1 MFD ELECTROLYTIC 50V
C404	22-5688	1000 PF DISC. 500V
C405	22-5251	15 MFD DISC. ±20% 10V
C406	22-5251	15 MFD DISC. ±20% 10V
C408	22-14	.0047 MFD DISC. 500V
C409	22-5989	.02 MFD DISC. ±20% 25V
C410	22-5251	15 MFD DISC. ±20% 10V
C413	22-5989	.02 DISC. ±20% 25V
C414	22-7153	1 MFD ELECTROLYTIC 50V
C415	22-2	220 PF DISC. ±20% 50V
C416	22-7152-09	220 MFD ELECTROLYTIC 25V
C417	22-2654	50 PF DISC. ±5% 50V
C418	22-7151-29	220 MFD ELECTROLYTIC 16V
C419	22-5862	0.1 MFD MYLAR 100V
C420	22-7144-12	1000 MFD ELECTROLYTIC 35V
C421	22-2939	680 PF DISC. 500V
C422	22-3177	390 PF DISC. ±10% 500V
C423	22-7152-07	47 MFD ELECTROLYTIC 25V
C451	22-7143	1 MFD ELECTROLYTIC 50V
C452	22-5482	680 PF DISC. 500V
C453	22-7143	1 MFD ELECTROLYTIC 50 V
C454	22-5688	1000 PF DISC. 500V
C455	22-5251	15 MFD DISC. ± 20% 10V
C456	22-5251	15 MFD DISC. ± 20% 10V
C458	22-14	.0047 MFD DISC. 500V
C459	22-5989	.02 MFD DISC. ± 20% 25V
C460	22-5251	15 MFD DISC. ± 20% 10V
C463	22-5989	.02 MFD DISC. ± 20% 25V
C464	22-7153	1 MFD ELECTROLYTIC 50V
C465	22-2	220 PF DISC. ± 20% 500V
C466	22-7152-09	220 MFD ELECTROLYTIC 25V
C467	22-2654	50 PF DISC. ± 5% 500V
C468	22-7151-09	220 MFD ELECTROLYTIC 16V
C469	22-5862	0.1 MFD MYLAR 100V
C470	22-7144-12	1000 MFD ELECTROLYTIC 35V
C471	22-2939	680 PF DISC. 500V
C472	22-3177	390 PF DISC. ± 10% 500V
CX501	22-6005	.01 MFD DISC. 150 VAC
C502	22-4350	.056 MFD MYLAR 200V
C503	22-4350	.056 MFD MYLAR 200V
CX504	22-7113	1500 MFD ELECTROLYTIC 65V
CX505	22-7113	1500 MFD ELECTROLYTIC 65V
CX506	22-6005	.01 MFD DISC. 150 VAC
CX507	22-7431-05	.0015 MFD DISC. 150 VAC
CX508	22-7431-06	.0047 MFD DISC. 150 VAC
C509	22-7151-13	2200 MFD ELECTROLYTIC 16V
C601	22-3034	.05 MFD DISC. 25V
C602	22-7114	.47 MFD TANTALUM 20% 35V
C603	22-2397	100 PF DISC. 500V
C604	22-7143	1 MFD ELECTROLYTIC 50V
C605	22-3034	.05 MFD DISC. 25V
C606	22-5637	.0047 MFD MYLAR 200V
C607	22-7179	.022 MFD MYLAR 200V
C608	22-5863	.01 MYLAR 100V
C609	22-5482	680 PF DISC. 500V
C610	22-7143	1 MFD ELECTROLYTIC 50V
C611	22-7143	1 MFD ELECTROLYTIC 50V
C612	22-7071	.047 MFD MYLAR 50V
C614	22-5482	680 PF DISC. 500V
C651	22-3034	.05 MFD DISC. 25V
C652	22-7114	.47 MFD TANTALUM 20% 35V
C653	22-2397	100 PF DISC. 100V
C654	22-7143	1 MFD ELECTROLYTIC 50V
C655	22-3034	.05 MFD DISC. 25V
C656	22-5637	.0047 MFD MYLAR 200V
C657	22-7179	.022 MFD MYLAR 200V
C658	22-5863	.01 MYLAR 100V
C659	22-5482	680 PF DISC. 500V
C660	22-7143	1 MFD ELECTROLYTIC 50V
C661	22-7143	1 MFD ELECTROLYTIC 50V
C662	22-7071	.047 MFD MYLAR 50V
C663	22-7143	1 MFD ELECTROLYTIC 50V
C664	22-5482	680 PF DISC. 500V
C665	22-5482	680 PF DISC. 500V
C801	22-7143	1 MFD ELECTROLYTIC 50V
C802	22-5482	680 PF DISC. 500V
C803	22-7143	1 MFD ELECTROLYTIC 50V
C804	22-5688	1000 PF DISC. 500V
C805	22-5251	15 MFD DISC. ± 20% 10V
C806	22-5251	15 MFD DISC. ± 20% 10V
C807	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C808	22-14	.0047 MFD DISC. 500V
C809	22-5989	.02 MFD DISC. ± 20% 25V
C810	22-5251	15 MFD DISC. ± 20% 10V
C813	22-5989	.02 MFD DISC. ± 20% 25V
C814	22-7153	1 MFD ELECTROLYTIC 50V
C815	22-2	220 PF ± 20% 500V
C816	22-7152-09	220 MFD ELECTROLYTIC 25V
C817	22-2654	50 PF DISC. ± 5% 500V
C818	22-7151-09	220 MFD ELECTROLYTIC 16V
C819	22-5862	0.1 MFD MYLAR 100V
C820	22-7144-12	1000 MFD ELECTROLYTIC 35V
C821	22-2939	680 PF DISC. 500V
C822	22-3177	390 PF DISC. ± 10% 100V
C851	22-7143	1 MFD ELECTROLYTIC 50V
C852	22-5482	680 PF DISC. 500V
C853	22-7143	1 MFD ELECTROLYTIC 50V
C854	22-5688	1000 PF DISC. 500V
C855	22-5251	.15 MFD DISC. ± 20% 10V
C856	22-5251	.15 MFD DISC. ± 20% 10V
C857	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C858	22-14	.0047 MFD DISC. 500V
C859	22-5989	.02 MFD DISC. ± 20% 25V
C860	22-5251	15 MFD DISC. ± 20% 10V
C863	22-5989	.02 MFD DISC. ± 20% 25V
C864	22-7153	1 MFD ELECTROLYTIC 50V
C865	22-2	220 PF DISC. ± 20% 500V
C866	22-7152-09	220 MFD ELECTROLYTIC 25V
C867	22-2654	50 PF DISC. ± 5% 500V
C868	22-7151-09	220 MFD ELECTROLYTIC 16V
C869	22-5862	0.1 MFD MYLAR 100V
C870	22-7144-12	1000 MFD ELECTROLYTIC 35V
C871	22-2939	680 PF DISC. 500V
C872	22-3177	390 PF ± 10% 500V
R1	63-4157	220 OHM 1/4W
R2	63-4269	100K OHM 1/4W
R3	63-1772	470 OHM 20%
R4	63-1796	1.8K OHM
R5	63-9921-78	1.8K OHM 5% (ALT 63-10183-78 1/2W 10%)
R6	63-4231	12K OHM
R7	63-9922-36	470K OHM 5% (ALT 63-7898 1/2W 20%)
R8	63-9921-36	33 OHM 5% (ALT 63-10183-36 1/4W 10%)
R10	63-4129	47 OHM
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	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R102	63-1761	270 OHM
R103	63-9921-86	3.9K OHM 5% (ALT 63-7810 1/2W 10%)
R104	63-9922-00	15K OHM 5% (ALT 63-7834 1/2W 10%)
R105	63-1803	2.7K OHM
R106	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2W 10%)
R201	63-9921-66	560 OHM 5% (ALT 63-7775 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	63-9921-88	4.7K OHM 5% (ALT 63-7813 1/2W 10%)
R205	63-9922-00	15K OHM 5% (ALT 63-7834 1/2W 10%)
R206	63-1771	470 OHM
R207	63-9921-72	1K OHM 5% (ALT 63-7785 1/2W 10%)
R208	63-1799	2.2K OHM
R209	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R210	63-4185	1K OHM
R211	63-9921-66	560 OHM 5% (ALT 63-7775 1/2W 10%)
R212	63-1772	470 OHM 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	63-1799	2.2K OHM
R218	63-9922-16	68K OHM 5% (ALT 63-7682 1/2W 10%)
R219	63-9922-00	15K OHM 5% (ALT 63-7834 1/2W 10%)
R220	63-9921-68	680 OHM 5% (ALT 63-7778 1/2W 10%)
R221	63-9921-90	5.6K OHM 5% (ALT 63-7817 1/2W 10%)
R222	63-9921-72	1K OHM 5% (ALT 63-7786 1/2W 10%)
R223	63-4290	330K OHM 1/4W
R227	63-9921-12	47K OHM 5% (ALT 63-7855 1/2W 10%)
R228	63-9922-10	39K OHM 5% (ALT 63-7852 1/2W 10%)
R230	63-9921-66	560 OHM 5% (ALT 63-7775 1/2W 10%)
R231	63-9921-88	4.7K OHM 5% (ALT 63-7814 1/2W 20%)
R232	63-9921-56	220 OHM 5% (ALT 63-7757 1/2W 10%)
R233	63-9921-92	6.8K OHM 5% (ALT 63-7821 1/2W 20%)
R234	63-9250	2K BIAS ADJUSTMENT
R235	63-9922-36	470K OHM 5% (ALT 63-7897 1/2W 10%)
R236	63-9922-32	330K OHM 5% (ALT 63-7890 1/2W 10%)
R301	63-9922-02	18K 5% (ALT 63-7838 1/2W 10%)
R302	63-9261	500 OHM POTENTIOMETER
R303	63-9922-34	390K 10% (ALT 63-7894 1/2W 10%)
RX304	63-10420-86	390 OHM 5% 2W
RX305	63-10428-86	390 OHM 5% 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 5%)
R309	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 5%)
R401	63-9924-48	1.5M OHM 1/4W 10% (ALT. 63-7918 1/2W 10%)
R402	63-9921-88	4.7K OHM 5% (ALT 63-7813 1/2W 10%)
R403	63-1782	820 OHM
R404	63-9921-92	6.8K OHM 5% (ALT 63-7820 1/2W 10%)
R405	63-9921-92	6.8K OHM 5% (ALT 63-7820 1/2W 10%)
R408	63-9841	100K LOUDNESS CONTROL
R409	63-9922-06	27K OHM 5% (ALT 63-7845 1/2W 10%)
R410	63-8982	100K OHM BASS CONTROL (FRONT)
R411	63-9921-22	6.8 OHM 5% (ALT. 63-7820 1/2W 10%)
R413	63-8983	50K TREBLE CONTROL (FRONT)
R414	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R415	63-9921-20	3.3K OHM 5% (ALT 63-7806 1/2W 10%)
R416	63-9921-34	27 OHM 5% (ALT 63-7719 1/2W 10%)
R417	63-9921-88	4.7K OHM (ALT 63-7813 1/2W 10%)
RX418	63-604	270 OHM 5% 1W
R419	63-9946-54	180 OHM 5% 1/2W (ALT 63-7753 1/2W 5%)
RX420	63-10565-21	7.5 OHM 5% 1/2W
RX421	63-9784	0.47 OHM 2W
RX422	63-9784	0.47 OHM 2W
R423	63-9922-26	180K OHM 5% (ALT 63-7879 1/2W 5%)
R424	63-9922-20	100K OHM 5% (ALT 63-7868 1/2W 5%)
R425	63-9842	500K FRONT TO REAR BALANCE CONTROL
R426	63-9860	500K FRONT BALANCE CONTROL
R427	63-9946-76	1.5K OHM 5% (ALT. 63-7793 1/2W 20%)
R428	63-9921-50	120 OHM 5% (ALT 63-7747 1/2W 10%)
R429	63-9921-96	10K OHM 5% (ALT 63,7827 1/2W 10%)
R451	63-9924-48	1.5M OHM 1/4W 10% (ALT. 63-7918 1/2W 10%)
R452	63-9921-88	4.7K OHM 5% (ALT 63-7813 1/2W 10%)
R453	63-9921-70	820 OHM 5% (ALT 63-7782 1/2W 10%)
R454	63-9921-92	6.8K OHM 5% (ALT 63-7820 1/2W 10%)
R455	63-9921-92	6.8K OHM 5% (ALT 63-7820 1/2W 10%)
R459	63-9922-06	27K OHM 5% (ALT 63-7845 1/2W 10%)
R461	63-9921-92	6.8K OHM 5% (ALT 63-7820 1/2W 10%)
R464	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R465	63-9921-84	3.3K OHM 5% (ALT. 63-7806 1/2W 10%)
R466	63-9921-34	27 OHM 5% (ALT. 63-7719 1/2W 10%)
R467	63-9921-88	4.7K OHM 5% (ALT. 63-7813 1/2W 10%)
RX468	63-6048	270 OHM 5% 1W
R469	63-9946-54	180 OHM 1/2W 5% (ALT. 63-7753 1/2W 5%)
RX470	63-10565-21	7.5 OHM 1/2W 5%
RX471	63-9784	0.47 OHM 2W
RX472	63-9784	0.47 OHM 2W
R477	63-9946-76	1.5K OHM 1/2W 5% (ALT 63-7793 1/2W 20%)
R478	63-9921-50	120 OHM 5% (ALT 63-7747 1/2W 10%)
R479	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
RX501	63-10526-02	3.3 MEG OHM ± 20%
RX502	63-10442-82	270 OHM 5% 5W
R503	63-9946-24	10 OHM 1/2W 5% (ALT 63-7701 1/2W 10%)
RX504	63-1705	12 OHM
RX505	63-1705	12 OHM
RX506	63-1701	10 OHM
RX507	63-1705	12 OHM
R601	63-9922-26	180K OHM 5% (ALT 63-7880 1/2W 10%)
R602	63-9922-28	220K OHM 5% (ALT 63-7883 1/2W 10%)
R603	63-9922-28	220K OHM 5% (ALT. 63-7883 1/2W 10%)
R604	63-9922-06	27K OHM 5% (ALT 63-7845 1/2W 10%)
R605	63-1841	22K OHM
R606	63-9922-08	33K OHM 5% (ALT. 63-7848 1/2W 10%)
R607	63-9922-24	150K OHM 5% (ALT 63-7876 1/2W 10%)
R608	63-1869	100K OHM
R609	63-9921-78	1.8K OHM 5% (ALT 63-7796 1/2W 10%)
R610	63-1796	1.8K OHM
R611	63-9922-06	27K OHM (ALT. 63-7844 1/2W 5%)
R612	63-9921-75	1.3K OHM 5% (ALT 63-7790 1/2W 5%)
R613	63-9921-85	3.6K OHM 5% (ALT. 63-7808 1/2W 5%)
R614	63-9922-16	68K OHM 5% (ALT. 63-7861 1/2W 5%)
R615	63-9921-85	3.6K OHM 5% (ALT 63-7808 1/2W 5%)
R616	63-9921-95	9.1K OHM 5% (ALT. 63-7825 1/2W 5%)
R617	63-9922-14	56K OHM 5% (ALT. 63-7858 1/2W 5%)
R618	63-9922-14	56K OHM 5% (ALT 63-7858 1/2W 5%)
R619	63-9922-22	120K OHM 5% (ALT. 63-7873 1/2W 10%)
R620	63-9922-14	56K OHM 5% (ALT. 63-7859 1/2W 10%)
R621	63-9922-14	56K OHM 5% (ALT 63-7859 1/2W 10%)
R622	63-4273	120K OHM 1/4W
R623	63-4241	22K OHM 1/4W
R624	63-1841	22K OHM 1/2W
R625	63-4273	120K OHM 1/4W
R626	63-4241	22K OHM 1/4W
R627	63-1834	15K OHM 1/2W
R628	63-9921-98	12K OHM 5% (ALT. 63-7831 1/2W 10%)
R629	63-1838	18K OHM 1/2W
R630	63-4168	390 OHM 1/4W
R631	63-9922-10	39K OHM 5% (ALT 63-7852 1/2W 10%)
R632	63-9921-92	6.8K OHM 5% (ALT. 63-7820 1/2W 10%)
R633	63-9922-08	33K OHM 5% (ALT 63-7848 1/2W 10%)
R634	63-9922-00	15K OHM 5% (ALT. 63-7834 1/2W 10%)
R651	63-9922-26	180K OHM 5% (ALT 63-7880 1/2W 10%)
R652	63-9922-28	220K OHM 5% (ALT 63-7883 1/2W 10%)
R653	63-9922-28	220K OHM 5% (ALT. 63-7883 1/2W 10%)
R654	63-9922-06	27K OHM 5% (ALT. 63-7845 1/2W 10%)
R655	63-1841	22K OHM 1/2W
R656	63-9922-08	33K OHM 5% (ALT 63-7848 1/2W 10%)
R657	63-9922-24	150K OHM 5% (ALT 63-7876 1/2W 10%)
R658	63-9922-20	100K OHM 5% (ALT. 63-7869 1/2W 10%)
R659	63-9921-78	1.8K OHM 5% (ALT 63-7769 1/2W 10%)
R660	63-1796	1.8K OHM 1/2W
R661	63-9922-06	27K OHM 5% (ALT 63-7844 1/2W 5%)
R662	63-9921-75	1.3K OHM 5% (ALT 63-7790 1/2W 5%)
R663	63-9921-85	3.6K OHM 5% (ALT 63-7808 1/2W 5%)
R664	63-9922-16	68K OHM 5% (ALT. 63-7861 1/2W 5%)
R665	63-9921-85	3.6K OHM 5% (ALT 63-7808 1/2W 5%)
R666	63-9921-95	9.1K OHM 5% (ALT 63-7825 1/2W 5%)
R667	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R668	63-9922-14	56K OHM 5% (ALT. 63-7858 1/2W 5%)
R669	63-9922-22	120K OHM 5% (ALT. 63-7873 1/2W 10%)
R670	63-1873	120K OHM 1/2W
R671	63-9922-14	56K OHM 5% (ALT. 63-7858 1/2W 5%)
R672	63-1939	4.7 MEG OHM
R673	63-9922-02	18K OHM 5% (ALT. 63-7838 1/2W 10%)
R674	63-9922-62	5.6 MEG OHM 5% (ALT. 63-7943 1/2W 10%)
R801	63-1918	1.5 MEG OHM 1/2W
R802	63-1813	4.7K OHM 1/2W
R803	63-9921-74	1.2K OHM 5% (ALT. 63-7789 1/2W 10%)
R804	63-9921-92	6.8K OHM 5% (ALT 63-7820 1/2W 10%)
R805	63-9921-92	6.8K OHM 5% (ALT 63-7820 1/2W 10%)
R806	63-1775	560 OHM 1/2W
R809	63-9922-06	27K OHM 5% (ALT. 63-7845 1/2W 10%)
R810	63-8982	100K BASS CONTROL (REAR)
R811	63-9921-92	6.8K OHM 5% (ALT 63-7820 1/2W 10%)
R813	63-8983	50K TREBLE CONTROL (REAR)
R814	63-9922-20	100K OHM 5% (ALT. 63-7869 1/2W 10%)
R815	63-9921-84	3.3K OHM 5% (ALT. 63-7806 1/2W 10%)
R816	63-9921-34	27 OHM 5% (ALT. 63-7719 1/2W 10%)
R817	63-9921-88	4.7K OHM 5% (ALT. 63-7813 1/2W 10%)
RX818	63-6064	270 OHM 5% 1W
R819	63-9946-54	180 OHM 1/2W 5% (ALT. 63-7753 1/2W 5%)
RX820	63-10565-21	7.5 OHM 5% 1/2W
RX821	63-9784	0.47 OHM 2W
RX822	63-9784	0.47 OHM 2W
R826	63-9860	500K OHM REAR BALANCE CONTROL
R827	63-9946-76	1.5K OHM 5% (ALT. 63-7793 1/2W 20%)
R828	63-9921-50	120 OHM 5% (ALT. 63-7747 1/2W 10%)
R829	63-9921-96	10K OHM 5% (ALT. 63-7827 1/2W 10%)
R851	63-9924-48	1.5 MEG 1/4W 10% (ALT 63-7918 1/2W 10%)
R852	63-9921-88	4.7K OHM 5% (ALT 63-7813 1/2W 10%)
R853	63-9921-74	1.2K OHM 5% (ALT 63-7789 1/2W 10%)
R854	63-9921-92	6.8K OHM 5% (ALT 63-7820 1/2W 10%)
R855	63-9921-92	6.8K OHM 5% (ALT 63-7820 1/2W 10%)
R856	63-1775	560 OHM 1/2W
R859	63-9922-06	27K OHM 5% (ALT 63-7845 1/2W 10%)
R861	63-9921-92	6.8K OHM 5% (ALT 63-7820 1/2W 10%)
R864	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R865	63-9921-84	3.3K OHM 5% (ALT 63-7806 1/2W 10%)
R866	63-9921-34	27 OHM 5% (ALT. 63-7719 1/2W 10%)
R867	63-9921-88	4.7K OHM 5% (ALT 63-7813 1/2W 10%)
RX868	63-6046	270 OHM 5% 1W
R869	63-9946-54	180 OHM 5% 1/2W (ALT 63-7753 1/2W 5%)
RX870	63-10565-21	7.5 OHM 5% 1/2W
RX871	63-9784	0.47 OHM 2W
RX872	63-9784	0.47 OHM 2W
R877	63-9946-76	1.5K OHM 5% 1/2W (ALT. 63-7793 1/2W 20%)
R878	63-9921-50	120 OHM 5% (ALT 63-7747 1/2W 20%)
R879	63-9921-96	10K OHM 5% (ALT. 63-7827 1/2W 10%)
L1	20-3076	FM ANTENNA COIL
L2	20-3077	FM DETECTOR COIL
L3	20-1258	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 TRANSFORMER
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 PRI.
L208	IN-T204	2ND AM 455 KHz SEC.
L209	IN-T205	3RD IF TRANSFORMER 10.7 MHz PRI.
L210	IN-T205	3RD IF TRANSFORMER 10.7 MHz SEC.
L211	IN-T206	3RD IF AM 455 KHz PRI.
L212	IN-T206	3RD IF AM 455 KHz SEC.
L213	IN-T207	RATIO DETECTOR TRANS. 10.7 MHz PRI.
L214	IN-T207	RATIO DETECTOR TRANS. 10.7 MHz SEC.
L215	IN-T207	RATIO DETECTOR TRANS. 10.7 MHz TERTIARY
L301	20-3080	67 KHz TRAP COIL
T101	95-2750	BC RF TRANSFORMER
T102	95-2544	AM OSCILLATOR TRANSFORMER
T201	95-2753	FM 1ST IF TRANSFORMER 10.7 MHz
T202	95-2751	AM 1ST IF TRANSFORMER 455 KHz
T203	95-2754	FM 2ND IF TRANSFORMER 10.7 MHz
T204	95-2752	AM 2ND IF TRANSFORMER 455 KHz
T205	95-2755	FM 3RD IF TRANSFORMER 10.7 MHz
T206	95-2543	AM 3RD IF TRANSFORMER 455 KHz
T207	95-2756	FM RATIO DETECTOR 10.7 KHz
T301	95-3021	19 KHz INPUT COIL
T302	95-3023	38 KHz DETECTOR COIL
TX501	95-3191	POWER TRANSFORMER
FX501	136-117-22	1.6 AMP SLO BLOW FUSE
FX502	136-114-20	2.0 AMP FUSE
SW1	85-1333	BAND SWITCH
SW2	85-1309	DECODER SWITCH
SWX3	85-1352	A.C. ON OFF SWITCH
SW4	85-1274	AFC SWITCH
IC301	221-79-01 OR 221-79	MONOLITHIC MULTIPLEX DEMODULATOR (SEE C-306)
CR1	103-47 OR 103-189	AFC DIODE
CR201	103-90	GERMANIUM DIODE } MATCHED PAIR
CR202	103-90	GERMANIUM DIODE } MATCHED PAIR
CR204	103-23-01	GERMANIUM DIODE
CR205	103-23-01	GERMANIUM DIODE
CR206	103-23-01	GERMANIUM DIODE
CRX401	103-222-01	DIODE
CRX451	103-222-01	DIODE
CRX601	103-222-01	DIODE
CRX851	103-222-01	DIODE
CRX501	212-78	SILICON RECTIFIER
CRX502	212-78	SILICON RECTIFIER
CR503	103-96	ZENER DIODE
MI	122-68-01	TUNING METER
	OR 122-68-02	TUNING METER
DSX1	100-610	POINTER LIGHT
DSX2	100-604	A.M. LIGHT
DSX3	100-604	F.M. LIGHT
DSX4	100-610	PILOT LIGHT
DSX5	100-249	JEWEL LIGHT
DSX6	100-249	CABINET LIGHT
DS301	100-611	STEREO INDICATOR LIGHT

4979E2

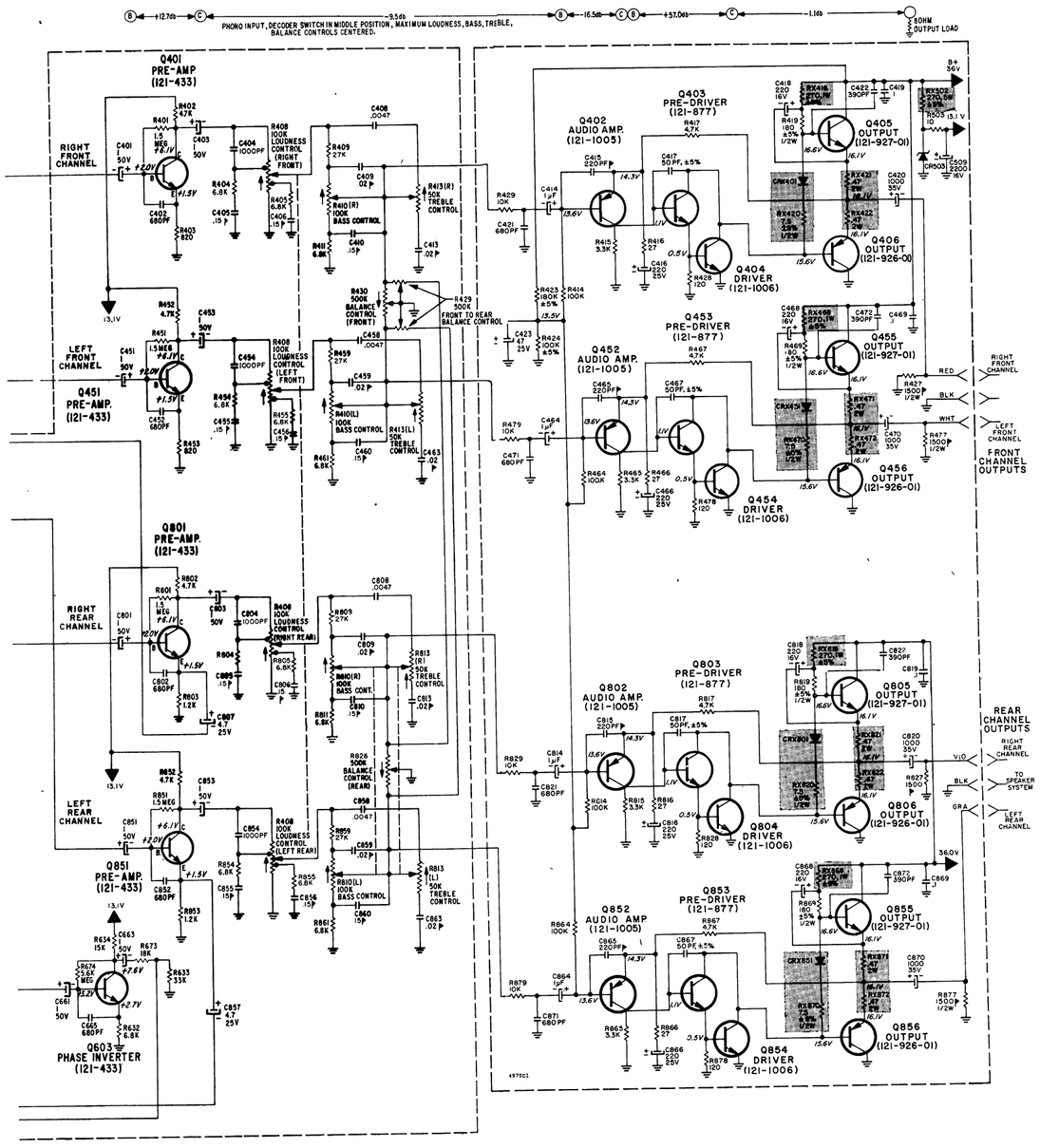


IC 301 WAVE FORMS

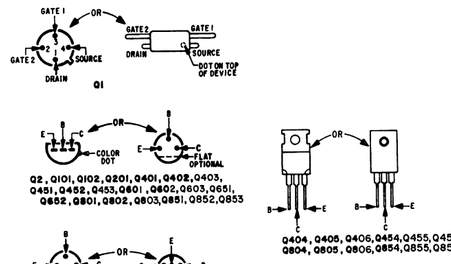


PIN 3 COMPOSITE L&R, L-R (1 KHZ LEFT ONLY) 19 KHZ PILOT 10% 1 V P/P | PIN 2 19 KHZ (WITH L ONLY) 200 MV P/P | PIN 1 19 KHZ 1.2V P/P | PIN 10 38 KHZ PULSES 80MV P/P | 38 KHZ TANK END 38 KHZ 13V P/P | PIN 13 38 KHZ 1.4V P/P | PIN 12 (UPPER) RIGHT OUTPUT PIN 11 (LOWER) LEFT OUTPUT (L INPUT ONLY) 1 V P/P

CHASSIS 6WGR90 – SCHEMATIC



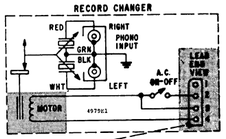
TRANSISTOR LEAD LAYOUTS
LEAD END VIEWS



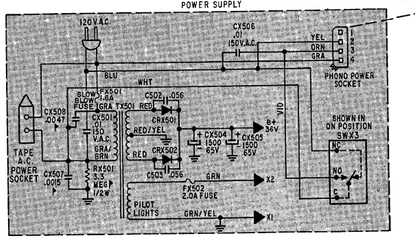
I.C.-301
LEAD END VIEW

I.C.-301 VOLTAGES			
PIN	MONAURAL	STEREO	STEREO P-P
1	12.3	12.3	0.8
2	2.6	2.6	0.2
3	3.9	3.9	1.2
4	—	—	—
5	—	—	—
6	2.0	0.7	—
7	0	0	—
8	—	—	—
9	12.5	12.5	—
10	9.8	9.8	.04
11	7.3	7.2	0.8
12	7.3	7.2	2.3
13	4.8	9.8	0.5
14	0.5	1.7	0.3

RECORD CHANGER



POWER SUPPLY



○ TEST POINTS

A	F.M. ANTENNA INPUT
B	F.M.-R.F.-A.G.C.(REV.)
D	1ST F.M. I.F. INPUT
E	2ND F.M. I.F. INPUT
F1	RATIO DETECTOR INPUT
G	F.M. I.F. OUTPUT
H	F.M. DETECTOR OUTPUT
H+	RATIO DETECTOR PRIMARY TUNING
J	F.M. B+
K	A.M. B+
L	A.M. R.F. INPUT & A.M. I.F. INPUT
F	3RD F.M. I.F. INPUT
M	19 Kʜz A.C. GAIN
M1	19 Kʜz D.C. GAIN

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.

NOTES

ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.

VOLTAGES SHOWN ARE MEASURED FROM CHASSIS IN F.M. STEREO USING NO SIGNAL INPUT, LOUDNESS CONTROL AT MINIMUM, 117 VOLTAGE 120 V.A.C. USING A HIGH IMPEDANCE V.T.V.M.

ALL RESISTOR VALUES ARE IN OHMS, 1/4 WATT CARBON OR CARBON FILM 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.

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

⏚ INDICATES CHASSIS GROUND.

P INDICATES ±20% TOLERANCE.

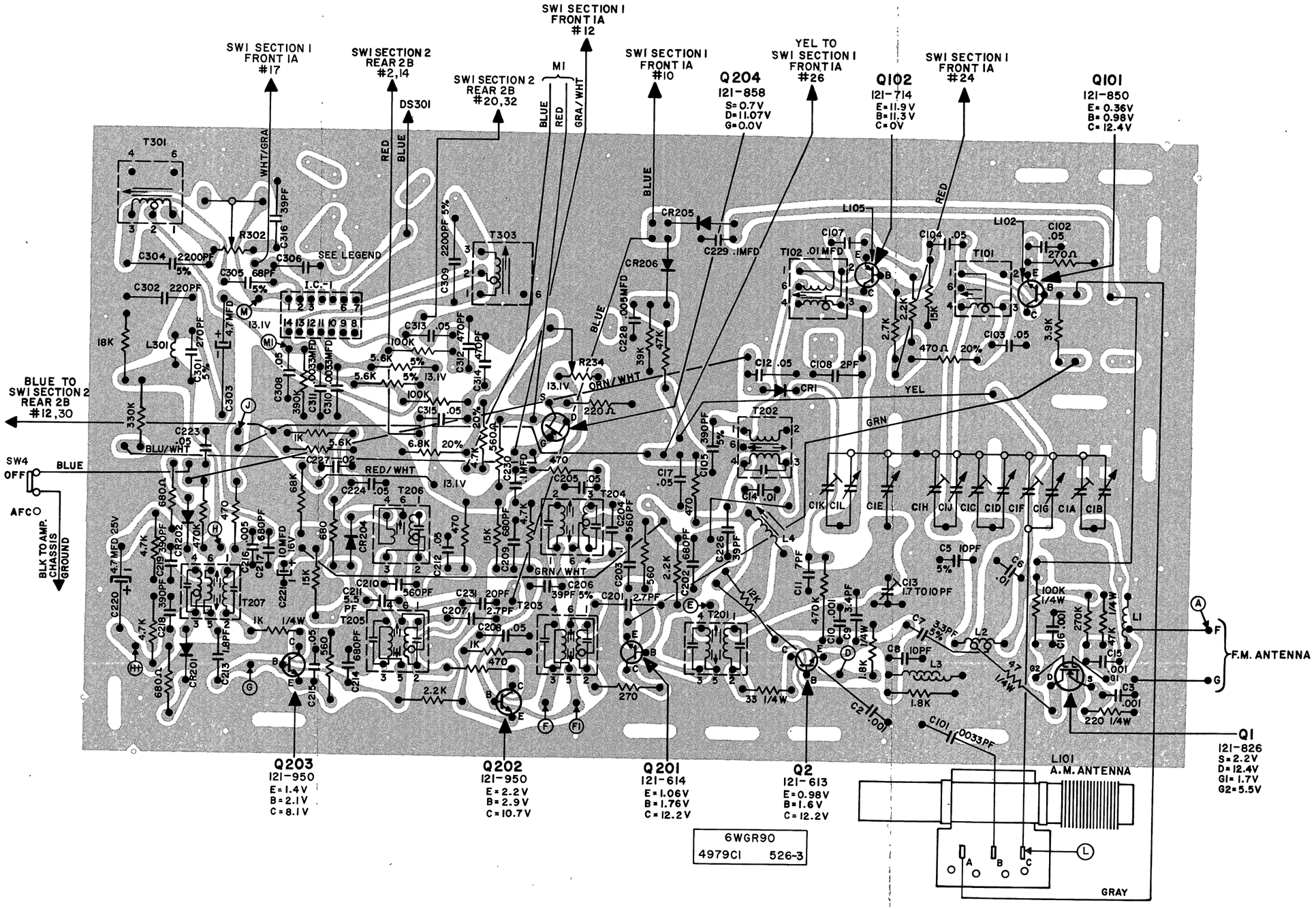
→ INDICATES VOLTAGE.

○ INDICATES TEST POINTS.

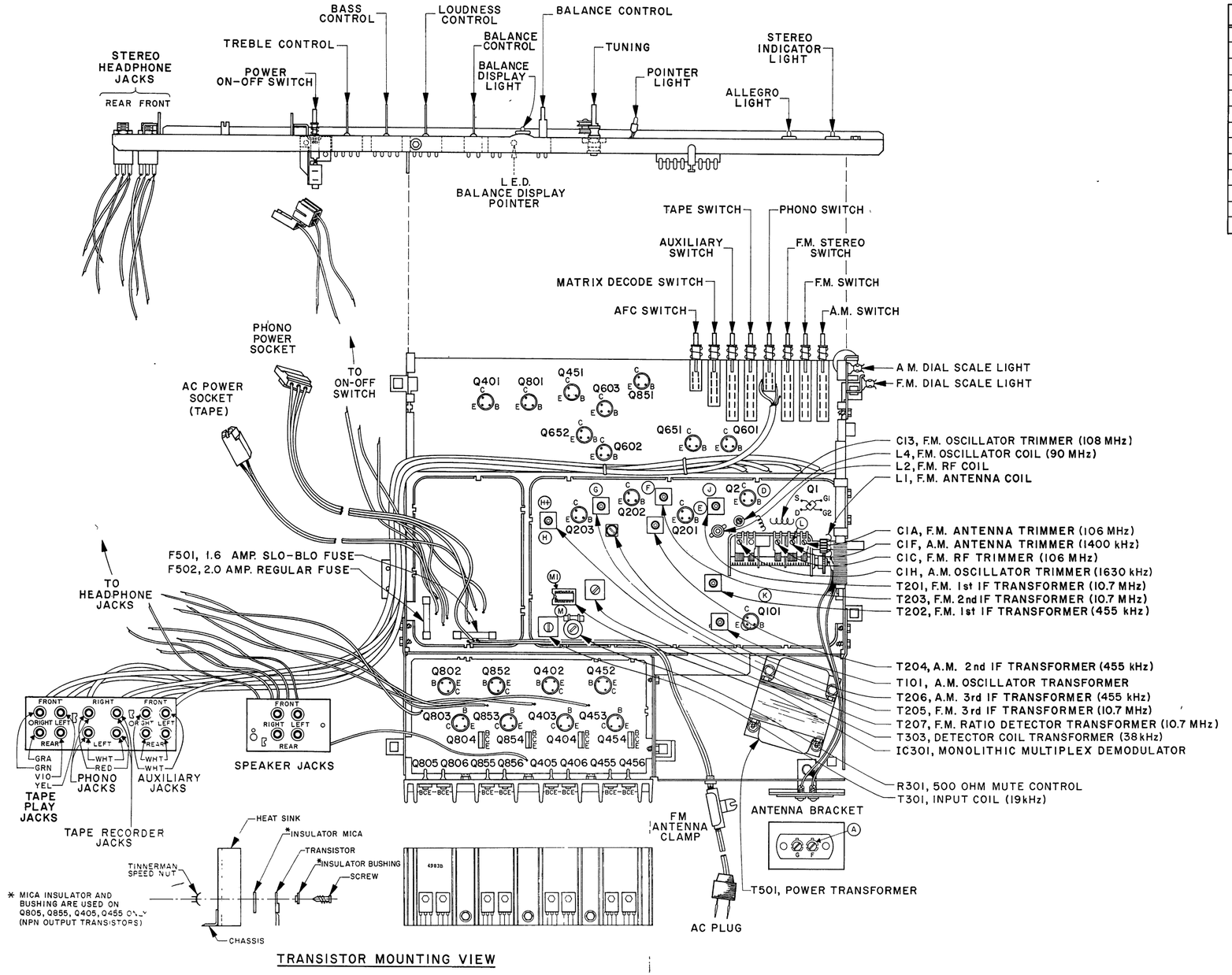
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION.

121-927-01 IS INSULATED FROM CHASSIS.

* VOLTAGES MEASURED WITH STEREO INPUT (10% PILOT, 45% L+R, 45% L−R).



CHASSIS 6WGR90 – RF/IF/MPX – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE



TRANSISTOR MOUNTING VIEW

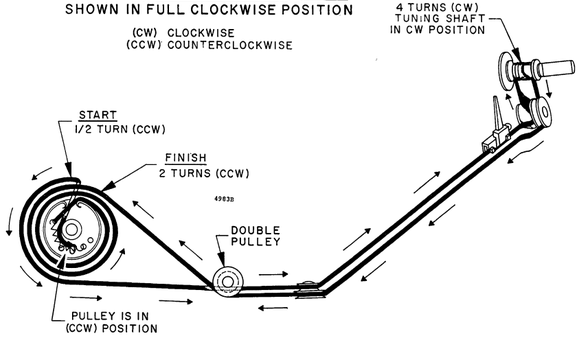
◯	TEST POINTS
A	F.M. ANTENNA INPUT
D	1st F.M. IF INPUT
E	2nd F.M. IF INPUT
F	3rd F.M. IF INPUT
F1	RATIO DETECTOR IF INPUT
G	F.M. IF OUTPUT
H	F.M. DETECTOR OUTPUT
H+	RATIO DETECTOR PRIMARY TUNING
J	F.M. B+
K	A.M. B+
L	A.M. RF INPUT & A.M. IF INPUT
M	19 kHz AC GAIN
M1	19 kHz DC GAIN

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	121-950	A.M.-F.M. 1st IF
Q202		A.M.-F.M. 2nd IF
Q203		F.M. 3rd IF
Q401	121-433	BUFFER 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	BUFFER AMPLIFIER
Q452	121-1005	AUDIO AMPLIFIER
Q453	121-877	PRE-DRIVER
Q454	121-1006	DRIVER
Q455	121-927-01	OUTPUT
Q456	121-926-01	
Q601	121-433	PRE-AMPLIFIER
Q602		DECODE PRE-AMPLIFIER
Q603	121-430	PHASE INVERTER
Q651	121-433	PRE-AMPLIFIER
Q652		DECODE PRE-AMPLIFIER
Q801		BUFFER AMPLIFIER
Q802	121-1005	AUDIO AMPLIFIER
Q803	121-877	PRE-DRIVER
Q804	121-1006	DRIVER
Q805	121-927-01	OUTPUT
Q806	121-926-01	
Q851	121-430	BUFFER AMPLIFIER
Q852	121-1005	AUDIO AMPLIFIER
Q853	121-877	PRE-DRIVER
Q854	121-1006	DRIVER
Q855	121-927-01	OUTPUT
Q856	121-926-01	
IC301	221-79-01 or 221-79	MULTIPLEX DEMODULATOR

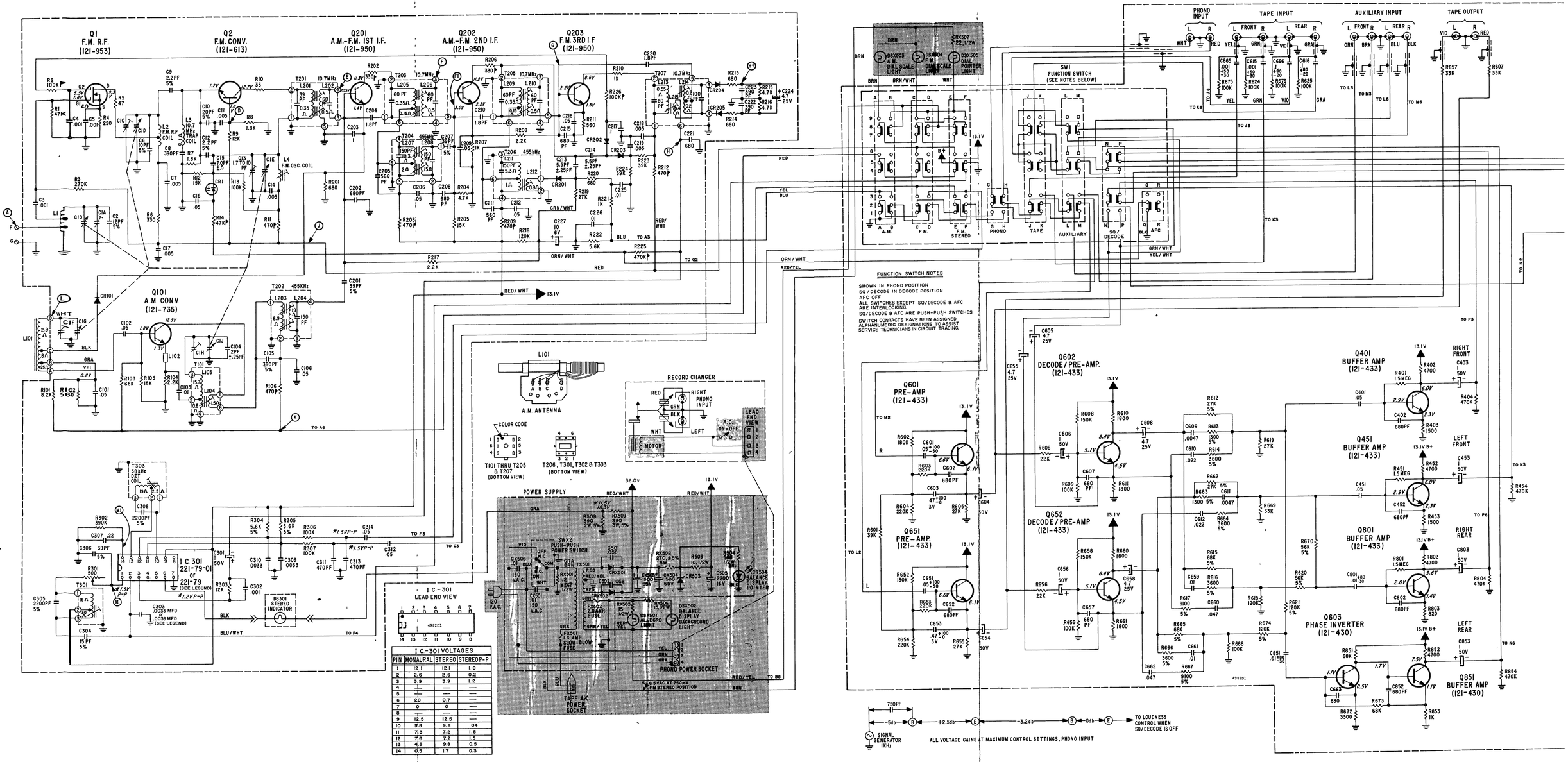
DIAL CORD DRIVE

SHOWN IN FULL CLOCKWISE POSITION

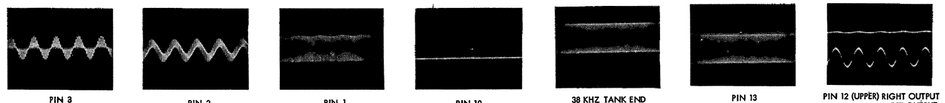
(CW) CLOCKWISE
(CCW) COUNTERCLOCKWISE

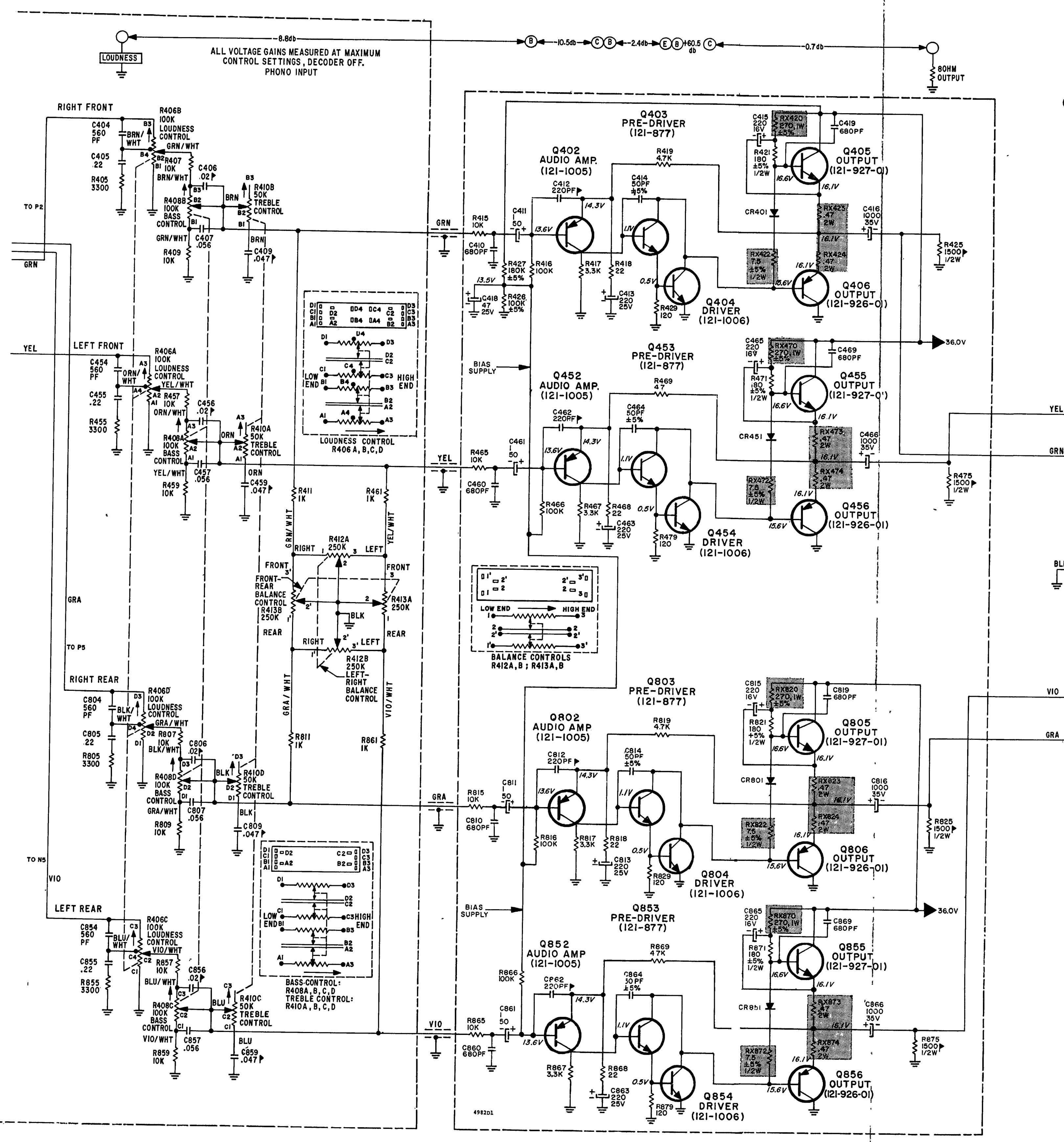


CHASSIS 6WGR91 – CHASSIS LAYOUT



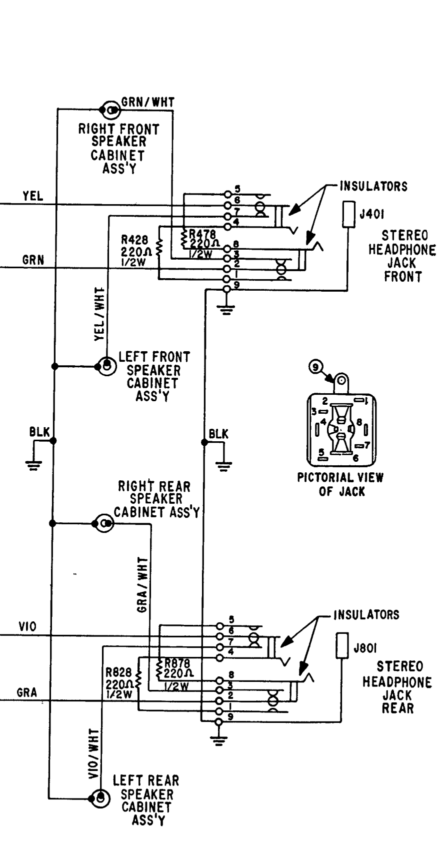
I C - 301 VOLTAGES			
PIN	MONAURAL	STEREO	STEREO P-P
1	12.1	12.1	1.0
2	2.6	2.6	0.2
3	3.9	3.9	1.2
4	—	—	—
5	—	—	—
6	2.0	0.7	—
7	0	0	—
8	—	—	—
9	12.5	12.5	—
10	9.8	9.8	.04
11	7.3	7.2	1.5
12	7.5	7.2	1.5
13	4.8	9.8	0.5
14	0.5	1.7	0.3

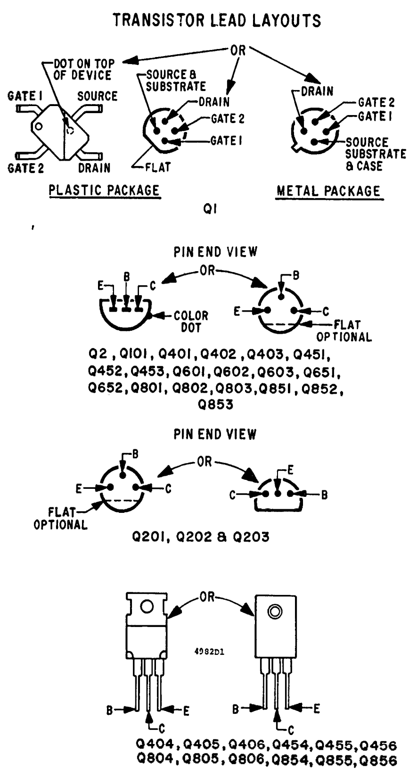




○ TEST POINTS

- A FM ANTENNA INPUT
- D 1ST F.M. I.F INPUT
- E 2ND F.M. I.F INPUT
- FI RATIO DETECTOR INPUT
- G F.M. I.F OUTPUT
- H F.M. DETECTOR OUTPUT
- H+ RATIO DETECTOR PRIMARY TUNING
- J F.M. B+
- K A.M. B+
- L A.M. R.F INPUT & A.M. I.F INPUT
- M 19kHz AC GAIN
- MI 19kHz DC GAIN
- F 3RD F.M. I.F INPUT





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, FUNCTION SWITCH IN F.M. STEREO POSITION, LINE VOLTAGE 120 V.A.C. USING 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. 455KHz
F.M. 10.7MHz

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

▶ INDICATES ±20% TOLERANCE

→ INDICATES VOLTAGE

Ⓐ INDICATES TEST POINTS

ARROWS ON CONTROLS INDICATE MAXIMUM POSITION.

121-927-01 IS INSULATED FROM CHASSIS.

* VOLTAGES MEASURED WITH STEREO INPUT (10% PILOT, 45% L+R, 45% L−R).

⏚ INDICATES CHASSIS GROUND.

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CHASSIS LEGEND 6WGR91

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	22-7214	AM ANTENNA TRIMMER (C1A–C1J: VARIABLE GANG)
C1G		AM ANTENNA TUNING
C1H		AM OSCILLATOR TRIMMER
C1J		AM OSCILLATOR TUNING
C2	22-3035	12 PF DISC ± 5% 500V
C3	22-2729	.001 MFD DISC + 50% 30% 25V
C4	22-2729	.001 MFD DISC + 50% 30% 25V
C5	22-2729	.001 MFD DISC + 50% 30% 25V
C6	22-3675	10 PF DISC ± 5% 500V
C7	22-3080	.005 MFD DISC + 100% 30% 25V
C8	22-3177	390 PF DISC ± 20% 500V
C9	22-2468	2.2 PF DISC ± 5% GIMMICK 500V
C10	22-2593	20 PF DISC ± 5% 500V
C11	22-3080	.005 MFD DISC + 100% 30% 25V
C12	22-2468	2.2 PF DISC ± 5% GIMMICK 500V
C13	22-4855	1.7 PF TO 10 PF CERAMIC TRIMMER
C14	22-3080	.005 MFD DISC + 100% 30% 25V
C15	22-6344	7 PF ± 5% PF DISC N1500 500V
C16	22-3034	.05 MFD DISC + 100% 50% 25V
C17	22-3080	.005 MFD DISC + 100% 30% 25V
C101	22-3034	.05 MFD DISC + 100% 50% 25V
C102	22-3034	.05 MFD DISC + 100% 50% 25V
C103	22-3393	.01 MFD DISC + 80% 30% 25V
C104	22-4819	2 PF ± 0.25 N4700 500V
C105	22-5972	390 PF POLYSTYRENE ± 5% 125V
C106	22-3034	.05 MFD DISC + 100% 50% 25V
C201	22-3381	39 PF ± 5% DISC 500V
C202	22-5482	680 PF DISC 500V
C203	22-3652	1 MFD DISC + 80% 20% 10V
C204	22-2428	1.8 PF GIMMICK 500V
C205	22-5481	560 PF DISC 500V
C206	22-3034	.05 MFD DISC + 100% 50% 25V
C207	22-3381	39 PF DISC ± 5% 500V
C208	22-5482	680 PF DISC 500V
C209	22-3034	.05 MFD DISC + 100% 50% 25V
C210	22-2428	1.8 PF GIMMICK 500V
C211	22-5481	560 PF DISC 500V
C212	22-3034	.05 MFD DISC 25V
C213	22-3770	5.5 PF DISC ± .25 PF 500V
C214	22-3770	5.5 PF DISC ± .25 PF 500V
C215	22-5482	680 PF DISC 500V
C216	22-3034	.05 MFD DISC + 100 50% 25V
C217	22-3852	1 MFD DISC + 80% 20% 10V
C218	22-3080	.005 MFD DISC + 100% 30% 25V
C219	22-3080	.005 MFD DISC + 100% 30% 25V
C220	22-2428	1.8 PF GIMMICK 500V
C221	22-2939	680 PF DISC 500V
C222	22-3177	390 PF DISC ± 20% 500V
C223	22-3177	390 PF DISC ± 20% 500V
C224	22-7142-03	4.7 MFD ELECTROLYTIC 25V
C225	22-3393	.01 MFD DISC + 80% 30% 25V
C226	22-3393	.01 MFD DISC + 80% 30% 25V
C227	22-5486	10 MFD ELECTROLYTIC 6V
C301	22-3687	1 MFD ELECTROLYTIC 50V
C302	22-2729	.001 MFD DISC + 50 30% 25V
C303	22-13	.0033 MFD DISC 500V (USED WITH 221-79-01)
	OR 22-5581	.0039 MFD DISC 500V (USED WITH 221-79)
C304	22-3728	15 PF DISC ± 5% 500V
C305	22-5782	2200 PF POLYSTYRENE ± 5% 50V
C306	22-3381	39 PF ± 5% 25V
C307	22-3527	.22 MFD DISC + 80% 20% 12V
C308	22-5782	2200 PF ± 5% POLYSTYRENE 50V
C309	22-13	.0033 MFD DISC ± 20% 500V
C310	22-13	.0033 MFD DISC ± 20% 500V
C311	22-16	470 PF DISC + 10% 25% 500V
C312	22-3034	.05 MFD DISC + 100% 50% 25V
C313	22-16	470 PF DISC + 10% 25% 500V
C314	22-3034	.05 MFD DISC + 100% 50% 25V
C401	22-3034	.05 MFD DISC 25V
C402	22-2939	680 PF DISC 500V
C403	22-7153	1 MFD ELECTROLYTIC 50V
C404	22-3362	560 PF DISC 500V
C405	22-5639	.22 MFD MYLAR 100V
C406	22-5989	.02 MFD DISC ± 20% 25V
C407	22-5815	.056 MFD MYLAR 100V
C409	22-6447-01	.047 MFD MYLAR ± 20% 100V
C410	22-2939	680 PF DISC 500V
C411	22-7143	1 MFD ELECTROLYTIC 50V
C412	22-2	220 PF DISC ± 20% 500V
C413	22-7152-09	220 MFD ELECTROLYTIC 25V
C414	22-2654	50 PF DISC ± 5% NPO 500V
C415	22-7151-09	220 MFD ELECTROLYTIC 16V
C416	22-7154-12	1000 MFD ELECTROLYTIC 35V
C418	22-7152-07	47 MFD ELECTROLYTIC 25V
C419	22-2939	680 PF DISC 500V
C451	22-3034	.05 MFD DISC 25V
C452	22-2939	680 PF DISC 500V
C453	22-7153	1 MFD ELECTROLYTIC 50V
C454	22-3362	560 PF DISC 500V
C455	22-5639	.22 MFD MYLAR 100V
C456	22-5989	.02 MFD DISC ± 20% 25V
C457	22-5815	.056 MFD MYLAR 100V
C459	22-6447-01	.047 MFD MYLAR ± 20% 100V
C460	22-2939	680 PF DISC 500V
C461	22-7143	1 MFD ELECTROLYTIC 50V
C462	22-2	220 PF DISC ± 20% 500V
C463	22-7152-09	220 MFD ELECTROLYTIC 25V
C464	22-2654	50 PF DISC ± 5% NPO 500V
C465	22-7151-09	220 MFD ELECTROLYTIC 16V
C466	22-7154-12	1000 MFD ELECTROLYTIC 35V
C469	22-2939	680 PF DISC 500V
C501	22-4350	.056 MFD MYLAR 200V
C502	22-4350	.056 MFD MYLAR 200V
CX503	22-7113	1500 MFD ELECTROLYTIC 65V
CX504	22-7113	1500 MFD ELECTROLYTIC 65V
C505	22-7151-13	2200 MFD ELECTROLYTIC 16V
CX506	22-6005	.01 MFD DISC 150 VAC
CX507	22-6005	.01 MFD DISC 150 VAC
C601	22-3034	.05 MFD DISC + 100% 50% 25V
C602	22-2939	680 PF DISC 500V
C603	22-5487	.47 MFD DISC + 100% 0% 3V
C604	22-7153	1 MFD ELECTROLYTIC 50V
C605	22-7152-03	4.7 MFD ELECTROLYTIC 25V
C606	22-7153	1 MFD ELECTROLYTIC 50V
C607	22-2939	680 PF DISC 500V
C608	22-7152-03	4.7 MFD ELECTROLYTIC 25V
C609	22-5637	.0047 MFD MYLAR 200V
C610	22-5632	.022 MFD MYLAR 200V
C611	22-5637	.0047 MFD MYLAR 200V
C612	22-5632	.022 MFD MYLAR 200V
C615	22-2729	.001 MFD DISC + 50% 30% 25V
C616	22-3652	1 MFD DISC + 80% 20% 10V
C651	22-3034	.05 MFD DISC ± 100% 50% 25V
C652	22-2939	680 PF DISC 500V
C653	22-5487	.47 MFD DISC ± 100% 0 3V
C654	22-7153	1 MFD ELECTROLYTIC 50V
C655	22-7152-03	4.7 MFD ELECTROLYTIC 25V
C656	22-7153	1 MFD ELECTROLYTIC 50V
C657	22-2939	680 PF DISC 500V
C658	22-7152-03	4.7 MFD ELECTROLYTIC 25V
C659	22-7161-16	.01 MFD MYLAR 100V
C660	22-5866	.047 MFD MYLAR 100V
C661	22-7161-16	.01 MFD MYLAR 100V
C662	22-5866	.047 MFD MYLAR 100V
C663	22-2939	680 PF DISC 500V
C665	22-2723	.001 MFD DISC + 50% 30% 25V
C666	22-3652	1 MFD DISC + 80% 20% 10V
C801	22-3393	.01 MFD DISC + 80% 30% 25V
C802	22-2939	680 PF DISC 500V
C803	22-7153	1 MFD ELECTROLYTIC 50V
C804	22-3362	560 PF DISC 500V
C805	22-5639	.22 MFD MYLAR 100V
C806	22-5989	.02 MFD DISC ± 20% 25V
C807	22-5815	.056 MFD MYLAR 100V
C809	22-6447-01	.047 MFD MYLAR ± 20% 100V
C810	22-2939	680 PF DISC 500V
C811	22-7143	1 MFD ELECTROLYTIC 50V
C812	22-2	220 PF DISC ± 20% 500V
C813	22-7152-09	220 MFD ELECTROLYTIC 25V
C814	22-2654	50 PF DISC ± 5% NPO 500V
C815	22-7151-09	220 MFD ELECTROLYTIC 16V
C816	22-7154-12	1000 MFD ELECTROLYTIC 35V
C819	22-2939	680 PF DISC 500V
C851	22-3393	.01 MFD DISC + 80% 30% 25V
C852	22-2939	680 PF DISC 500V
C853	22-7153	1 MFD ELECTROLYTIC 50V
C854	22-3362	560 PF DISC 500V
C855	22-5639	.22 MFD MYLAR 100V
C856	22-5989	.02 MFD DISC ± 20% 25V
C857	22-5815	.056 MFD MYLAR 100V
C859	22-6447-01	.047 MFD MYLAR ± 20% 100V
C860	22-2939	680 PF DISC 500V
C861	22-7143	1 MFD ELECTROLYTIC 50V
C862	22-2	220 PF DISC ±10% 500V
C863	22-7152-09	220 MFD ELECTROLYTIC 25V
C864	22-2654	50 PF DISC ± 5% NPO 500V
C865	22-7151-09	220 MFD ELECTROLYTIC 16V
C866	22-7154-12	1000 MFD ELECTROLYTIC 35V
C869	22-2939	680 PF DISC 500V
R1	63-9922-12	47K OHM 5% (ALT 63-7856 1/2W 10%)
R2	63-9922-20	100K OHM 5% (ALT 63-7870 1/2W 20%)
R3	63-9922-30	270K OHM 5% (ALT 63-7887 1/2W 10%)
R4	63-9921-56	220 OHM 5% (ALT 63-7757 1/2W 10%)
R5	63-4129	47 OHM 1/4W
R6	63-9921-60	330 OHM (ALT 63-7764 1/2W 10%)
R7	63-9921-78	1.8K OHM 5% (ALT 63-7796 1/2W 10%)
R8	63-9921-78	1.8K OHM 5% (ALT 63-7796 1/2W 10%)
R9	63-9921-98	12K OHM 5% (ALT 63-7831 1/2W 10%)
R10	63-4122	33 OHM 1/4W
R11	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R12	63-9922	15K OHM 5% (ALT 63-7834 1/2W 10%)
R13	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R14	63-9922-12	47K OHM 5% (ALT 63-7856 1/2W 20%)
R101	63-9921-94	8.2 OHM 5% (ALT 63-7824 1/2W 10%)
R102	63-9921-66	560 OHM 5% (ALT 63-7775 1/2W 10%)
R103	63-9922-16	68K OHM 5% (ALT 63-7862 1/2W 10%)
R104	63-9921-80	2.2K OHM 5% (ALT 63-7799 1/2W 10%)
R105	63-9922	15K OHM 5% (ALT 63-7834 1/2W 10%)
R106	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R201	63-9921-68	680 OHM 5% (ALT 63-7778 1/2W 10%)
R202	63-9921-60	330 OHM 5% (ALT 63-7765 1/2W 20%)
R203	63-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)
R204	63-9921-88	4.7K OHM 5% (ALT 63-7813 1/2W 10%)
R205	63-9922	15K OHM 5% (ALT 63-7834 1/2W 10%)
R206	63-9921-60	330 OHM 5% (ALT 63-7765 1/2W 20%)
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 (ALT 63-7785 1/2W 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%)
R218	63-9922-22	120K OHM 5% (ALT 63-7873 1/2W 10%)
R219	63-1845	27K OHM
R220	63-9921-68	680 OHM 5% (ALT 63-7778 1/2W 10%)
R221	63-9921-72	1K OHM 5% (ALT 63-7785 1/2W 10%)
R222	63-9921-90	5.6K OHM 5% (ALT 63-7817 1/2W 10%)
R223	63-9922-10	39K OHM 5% (ALT 63-7852 1/2W 10%)
R224	63-9922-10	39K OHM 5% (ALT 63-7852 1/2W 10%)
R225	63-9922-36	470K OHM 5% (ALT 63-7897 1/2W 20%)
R226	63-9922-20	100K OHM 5% (ALT 63-7870 1/2W 20%)
R301	63-9261	500 OHM POTENTIOMETER
R302	63-9922-34	390K OHM ± 5% (ALT 63-7894 1/2W 10%)
R303	63-9921-98	12K OHM 5% (ALT 63-7831 1/2W 10%)
R304	63-9921-90	5.6K OHM 5% (ALT 63-7816 1/2W 5%)
R305	63-9921-90	5.6K OHM 5% (ALT 63-7816 1/2W 5%)
R306	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R307	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R401	63-9924-48	1.5 MEG OHM 5% (ALT 63-7818 1/2W 10%)
R402	63-9921-88	4.7K OHM 5% (ALT 63-7813 1/2W 10%)
R403	63-9921-76	1.5K OHM 5% (ALT 63-7792 1/2W 10%)
R404	63-9922-36	470K OHM 5% (ALT 63-7897 1/2W 10%)
R405	63-9921-84	3.3K OHM 5% (ALT 63-7806 1/2W 10%)
R406A	63-10229	100K LOUDNESS CONTROL LEFT FRONT
R406B	63-10229	100K LOUDNESS CONTROL RIGHT FRONT
R406C	63-10229	100K LOUDNESS CONTROL LEFT REAR
R406D	63-10229	100K LOUDNESS CONTROL RIGHT REAR
R407	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R408A	63-10230	100K BASS CONTROL -LEFT FRONT
R408B	63-10230	100K BASS CONTROL RIGHT FRONT
R408C	63-10230	100K BASS CONTROL LEFT REAR
R408D	63-10230	100K BASS CONTROL RIGHT REAR
R409	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R410A	63-10231	50K TREBLE CONTROL LEFT FRONT
R410B	63-10231	50K TREBLE CONTROL RIGHT FRONT
R410C	63-10231	50K TREBLE CONTROL LEFT REAR
R410D	63-10231	50K TREBLE CONTROL RIGHT REAR
R411	63-9921-72	1K OHM 5% (ALT 63-7785 1/2W 10%)
R412A	63-9842-01	250K BALANCE CONTROL (LEFT REAR)
R412B	63-9842-01	250K BALANCE CONTROL (LEFT REAR)
R413A	63-9842-01	250K BALANCE CONTROL (FRONT REAR)
R413B	63-9842-01	250K BALANCE CONTROL (FRONT REAR)
R415	63-9921-98	10K OHM 5% (ALT 63-7927 1/2W 10%)
R416	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R417	63-9921-84	3.3K OHM 5% (ALT 63-7806 1/2W 10%)
R418	63-9921-32	22 OHM 5% (ALT 63-7715 1/2W 10%)
R419	63-9921-88	4.7K OHM 5% (ALT 63-7913 1/2W 10%)
RX420	63-6046	270 OHM ± 5% 1W
R421	63-9946-54	180 OHM 5% 1/2W (ALT 63-7753 1/2W 5%)
RX422	63-10565-21	7.5 OHM ± 5%
RX423	63-9784	.47 OHM 2W
RX424	63-9784	.47 OHM 2W
R425	63-9946-76	1500 OHM 1/2W 20% (ALT 63-7793 1/2W 20%)
R426	63-9922-20	100K OHM 5% (ALT 63-7868 1/2W 5%)
R427	63-9922-26	180K OHM 5% (ALT 63-7879 1/2W 5%)
R428	63-1757	220 OHM
R429	63-9921-50	120 OHM 5% (ALT 63-7747 1/2W 10%)
R451	63-9924-48	1.5 MEG OHM 5% (ALT 63-7918 1/2W 10%)
R452	63-9921-88	4.7K OHM 5% (ALT 63-7813 1/2W 10%)
R453	63-9921-76	1.5K OHM 5% (ALT 63-7792 1/2W 10%)
R454	63-9922-36	470K OHM 5% (ALT 63-7897 1/2W 10%)
R455	63-9921-84	3.3K OHM 5% (ALT 63-7806 1/2W 10%)
R457	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R459	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R461	63-9921-72	1K OHM 5% (ALT 63-7785 1/2W 10%)
R465	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R466	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R467	63-9921-84	3.3K OHM 5% (ALT 63-7806 1/2W 10%)
R468	63-9921-32	22 OHM 5% (ALT 63-7715 1/2W 10%)
R469	63-9921-88	4.7K OHM 5% (ALT 63-7913 1/2W 10%)
RX470	63-6046	270 OHM 5% 1W
R471	63-9946-54	180 OHM 5% 1/2W (ALT 63-7753 1/2W 5%)
RX472	63-10565-21	7.5 OHM ± 5%
RX473	63-9784	.47 OHM 2W
RX474	63-9784	.47 OHM 2W
R475	63-9946-76	1500 OHM ± 20% 1/2W (ALT 63-7793 1/2W 20%)
R478	63-1757	220 OHM
R479	63-9921-50	120 OHM 5% (ALT 63-7747 1/2W 10%)
RX501	63-10526-03	1.2M OHM ± 20%
RX502	63-10442-92	270 OHM ± 5% 5W
R503	63-1701	10 OHM
R504	63-1775	560 OHM
RX505	63-1708	15 OHM
RX506	63-1708	15 OHM
RX507	63-1715	22 OHM
R508	63-10420-86	390 OHM ± 5% 2W
RX509	63-10428-86	390 OHM ± 5% 3W
R601	63-1852	39K OHM
R602	63-9922-26	180K OHM 5% (ALT 63-7880 1/2W 10%)
R603	63-9922-28	220K OHM 5% (ALT 63-7883 1/2W 10%)
R604	63-1883	220K OHM
R605	63-9922-06	27K OHM 5% (ALT 63-7845 1/2W 10%)
R606	63-9922-04	22K OHM 5% (ALT 63-7841 1/2W 10%)
R607	63-9922-08	33K OHM 5% (ALT 63-7848 1/2W 10%)
R608	63-9922-24	150K OHM 5% (ALT 63-7876 1/2W 10%)
R609	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R610	63-9921-78	1.8K OHM 5% (ALT 63-7796 1/2W 10%)
R611	63-9921-78	1.8K OHM 5% (ALT 63-7796 1/2W 10%)
R612	63-9922-06	27K OHM 5% (ALT 63-7844 1/2W 5%)
R613	63-9921-75	1.3K OHM 5% (ALT 63-7790 1/2W 5%)
R614	63-9921-85	3.6K OHM 5% (ALT 63-7808 1/2W 5%)
R615	63-9922-16	68K OHM 5% (ALT 63-7861 1/2W 5%)
R616	63-9921-85	3.6K OHM 5% (ALT 63-7808 1/2W 5%)
R617	63-9921-95	9.1K OHM 5% (ALT 63-7825 1/2W 5%)
R618	63-9922-22	120K OHM 5% (ALT 63-7873 1/2W 10%)
R619	63-9922-06	27K OHM 5% (ALT 63-7845 1/2W 10%)
R620	63-9922-14	56K OHM (ALT 63-7858 1/2W 5%)
R621	63-1872	120K OHM ± 5%
R624	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R625	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R652	63-1880	180K OHM
R653	63-1883	220K OHM
R654	63-1883	220K OHM
R655	63-9922-06	27K OHM 5% (ALT 63-7845 1/2W 10%)
R656	63-9922-04	22K OHM 5% (ALT 63-7841 1/2W 10%)
R657	63-9922-08	33K OHM 5% (ALT 63-7848 1/2W 10%)
R658	63-9922-24	150K OHM 5% (ALT 63-7876 1/2W 10%)
R659	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R660	63-9921-78	1.8K OHM 5% (ALT 63-7796 1/2W 10%)
R661	63-9921-78	1.8K OHM 5% (ALT 63-7796 1/2W 10%)
R662	63-9922-06	27K OHM 5% (ALT 63-7844 1/2W 5%)
R663	63-9921-75	1.3K OHM 5% (ALT 63-7790 1/2W 5%)
R664	63-9921-85	3.6K OHM 5% (ALT 63-7808 1/2W 5%)
R665	63-9922-16	68K OHM 5% (ALT 63-7861 1/2W 5%)
R666	63-1808	3600 OHM ± 5%
R667	63-9921-95	9.1K OHM 5% (ALT 63-7825 1/2W 5%)
R668	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R669	63-9922-08	33K OHM 5% (ALT 63-7848 1/2W 10%)
R670	63-9922-14	56K OHM 5% (ALT 63-7858 1/2W 5%)
R672	63-9921-84	3.3K OHM 5% (ALT 63-7806 1/2W 10%)
R673	63-9922-16	68K OHM 5% (ALT 63-7862 1/2W 10%)
R674	63-9922-22	120K OHM 5% (ALT 63-7872 1/2W 5%)
R675	63-9222-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R676	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R801	63-9924-48	1.5 MEG OHM 5% (ALT 63-7918 1/2W 10%)
R802	63-9921-88	4.7K OHM 5% (ALT 63-7813 1/2W 10%)
R803	63-9921-70	820 OHM 5% (ALT 63-7882 1/2W 10%)
R804	63-9922-36	470K OHM 5% (ALT 63-7897 1/2W 10%)
R805	63-9921-84	3.3K OHM 5% (ALT 63-7806 1/2W 10%)
R807	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R809	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R811	63-9921-72	1K OHM 5% (ALT 63-7785 1/2W 10%)
R815	63-9921-96	10K OHM 5% (ALT 63-7927 1/2W 10%)
R816	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R817	63-9921-84	3300 OHM 5% (ALT 63-7806 1/2W 10%)
R818	63-9921-32	22 OHM 5% (ALT 63-7715 1/2W 10%)
R819	63-9921-88	4700 OHM 5% (ALT 73-7913 1/2W 10%)
RX820	63-6046	270 OHM ± 5% 1W
R821	63-9946-54	180 OHM 5% (ALT. 63-7753 1/2W 5%)
RX822	63-10565-21	7.5 OHM ± 5%
RX823	63-9784	.47 OHM 2W
RX824	63-9784	.47 OHM 2W
R825	63-9946-76	1500 OHM 20% 1/2W (ALT 63-7793 1/2W 20%)
R828	63-1757	220 OHM
R829	63-9921-50	120 OHM 5% (ALT 63-7747 1/2W 10%)
R851	63-9922-16	68K OHM 5% (ALT 63-7862 1/2W 10%)
R852	63-9921-88	4700 OHM 5% (ALT 63-7813 1/2W 10%)
R853	63-9921-72	1K OHM 5% (ALT 63-7785 1/2W 10%)
R854	63-9922-36	470 K OHM 5% (ALT 63-7897 1/2W 10%)
R855	63-9921-84	3300 OHM (ALT 63-7806 1/2W 10%)
R857	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R859	63-9921-96	10K OHM 5% (ALT 63-7827 1/2W 10%)
R861	63-9921-72	1K OHM 5% (ALT 63-7785 1/2W 10%)
R865	63-9921-96	10K OHM 5% (ALT 63-7927 1/2W 10%)
R866	63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%)
R867	63-9921-84	3300 OHM 5% (ALT 63-7806 1/2W 10%)
R868	63-9921-32	22 OHM 5% (ALT 63-7715 1/2W 10%)
R869	63-9921-88	4700 OHM (ALT 63-7913 1/2W 10%)
RX870	63-6046	270 OHM ± 5% 1W
R871	63-9946-54	180 OHM 5% 1/2W (ALT 63-7753 1/2W 5%)
RX872	63-10565-21	7.5 OHM ± 5%
RX873	63-9784	.47 OHM 2W
RX874	63-9784	.47 OHM 2W
R875	63-9946-76	1500 OHM 20% 1/2 (ALT 63-7793 1/2W 20%)
R878	63-1757	220 OHM
R879	63-9921-50	120 OHM 5% (ALT 63-7747 1/2W 10%)
L1	20-3595	FM ANTENNA COIL
L2	20-3594	FM RF COIL
L3	20-1631	TRAP COIL 10.7 MHz
L4	20-3545	FM OSCILLATOR COIL
L101	S-93292	AM ANTENNA COIL 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 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 PRI.
L208	IN T204	2ND AM 455 KHz SEC.
L209	IN T205	3RD IF TRANSFORMER 10.7 MHz PRI.
L210	IN T205	3RD IF TRANSFORMER 10.7 MHz SEC.
L211	IN T206	3RD IF AM 455 KHz PRI.
L212	IN T206	3RD IF AM 455 KHz SEC.
L213	IN T207	RATIO DETECTOR TRANS. 10.7 MHz PRI.
L214	IN T207	RATIO DETECTOR TRANS. 10.7 MHz SEC.
L215	IN T207	RATIO DETECTOR TRANS. 10.7 MHz TERTIARY
T101	95-2544	AM OSCILLATOR TRANSFORMER
T201	95-2753	FM 1ST IF TRANSFORMER 10.7 MHz
T202	95-2751	AM 1ST IF TRANSFORMER 455 KHz
T203	95-2754	FM 2ND IF TRANSFORMER 10.7 MHz
T204	95-2752	AM 2ND IF TRANSFORMER 455 KHz
T205	95-2755	FM 3RD IF TRANSFORMER 10.7 MHz
T206	95-2689	AM 3RD IF TRANSFORMER 455 KHz
T207	95-2756	FM RATIO DETECTOR 10.7 MHz
T301	95-3021	10 KHz INPUT COIL
T303	95-3023	38 KHz DETECTOR COIL
TX501	95-3190-01	POWER TRANSFORMER
FX501	136-117-22	1.6 AMP SLO BLOW FUSE
FX502	136-114-20	2.0 AMP FAST - BLOW
SW1	85-1403	FUNCTION SWITCH
SWX2	85-1429	POWER SWITCH
IC301	221-79-01 OR 221-79	MONOLITHIC MULTIPLEX DEMODULATOR (SEE C303)
CR1	103-47 OR 103-189	AFC DIODE
CR101	103-142	SILICON DIODE
CR201	103-23-01	GERMANIUM DIODE
CR202	103-23-01	GERMANIUM DIODE
CR203	103-23	GERMANIUM DIODE
CR204	103-90	GERMANIUM DIODE (MATCHED PAIR)
CR205	103-90	GERMANIUM DIODE (MATCHED PAIR)
CR401	103-222	BIAS DIODE
CR451	103-222	BIAS DIODE
CRX501	212-76	RECTIFIER DIODE
CRX502	212-76	RECTIFIER DIODE
CR503	103-96	ZENER DIODE
CR504	103-253-02	LIGHT EMITTING DIODE - BALANCE DISPLAY POINTER
CR801	103-222	BIAS DIODE
CR851	103-222	BIAS DIODE
J401	78-2137	STEREO HEADPHONE JACK (FRONT)
J801	78-2137	STEREO HEADPHONE JACK (REAR)
DS301	100-611	STEREO INDICATOR LIGHT
DSX501	100-610	ALLEGRO LIGHT
DSX502	100-610	BALANCE DISPLAY LIGHT
DSX503	100-604	AM DIAL SCALE LIGHT
DSX504	100-604	FM DIAL SCALE LIGHT
DSX505	100-625	DIAL POINTER LIGHT

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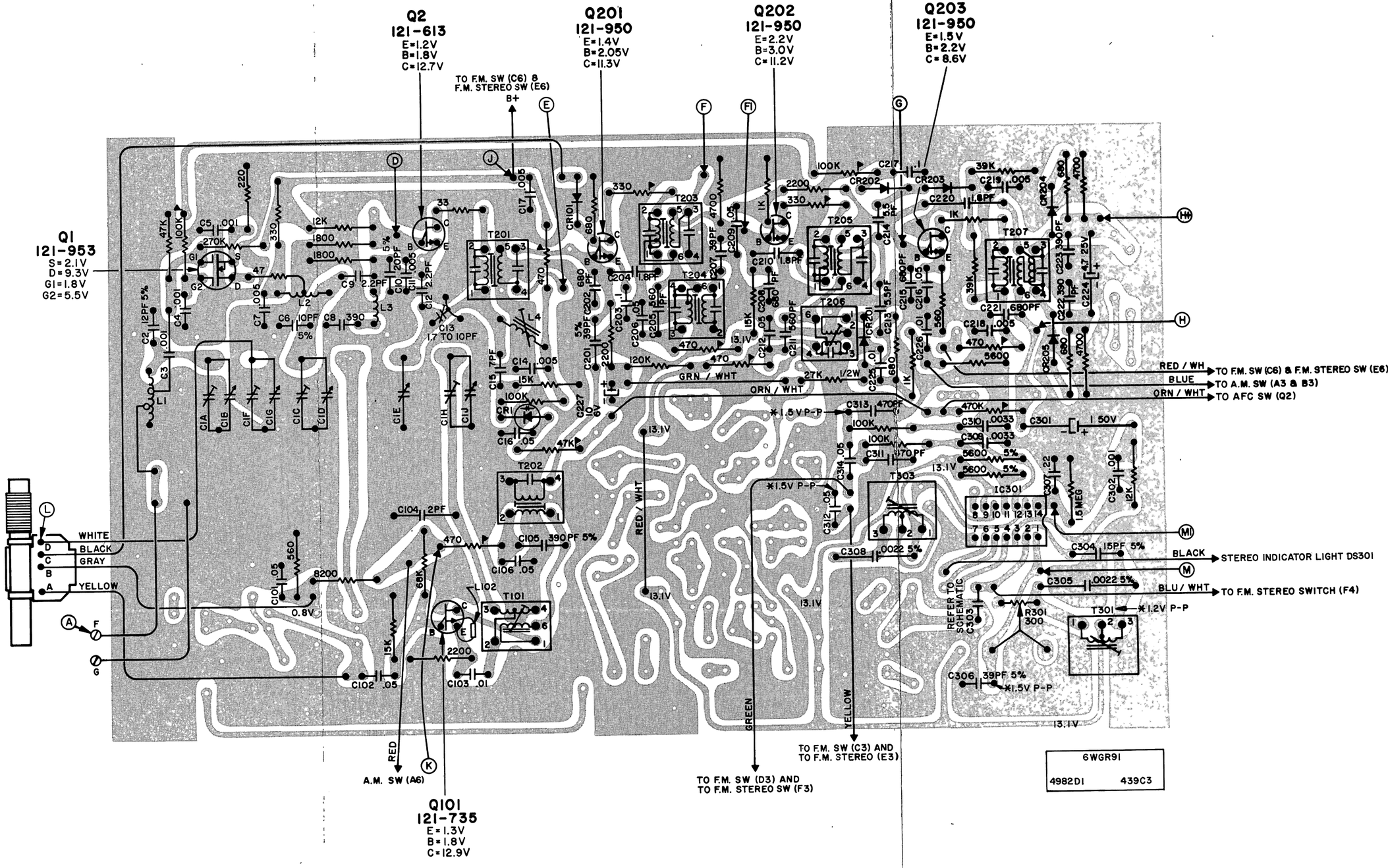
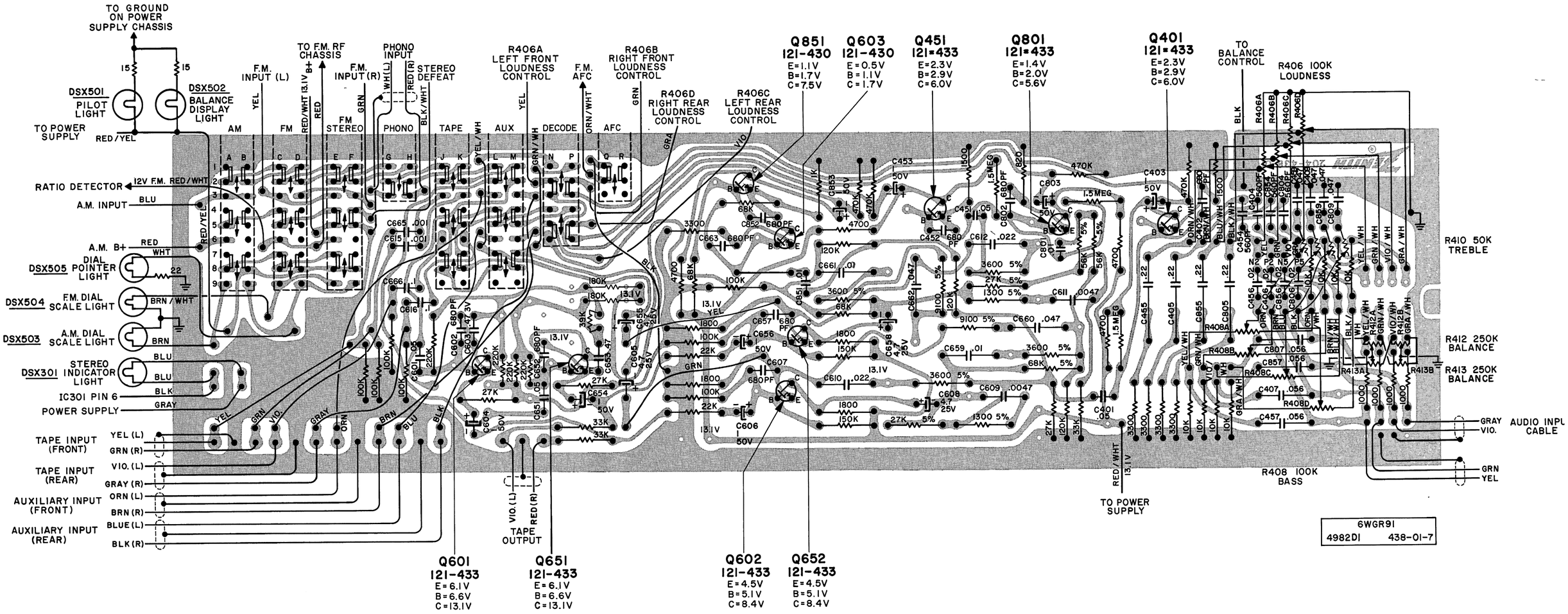
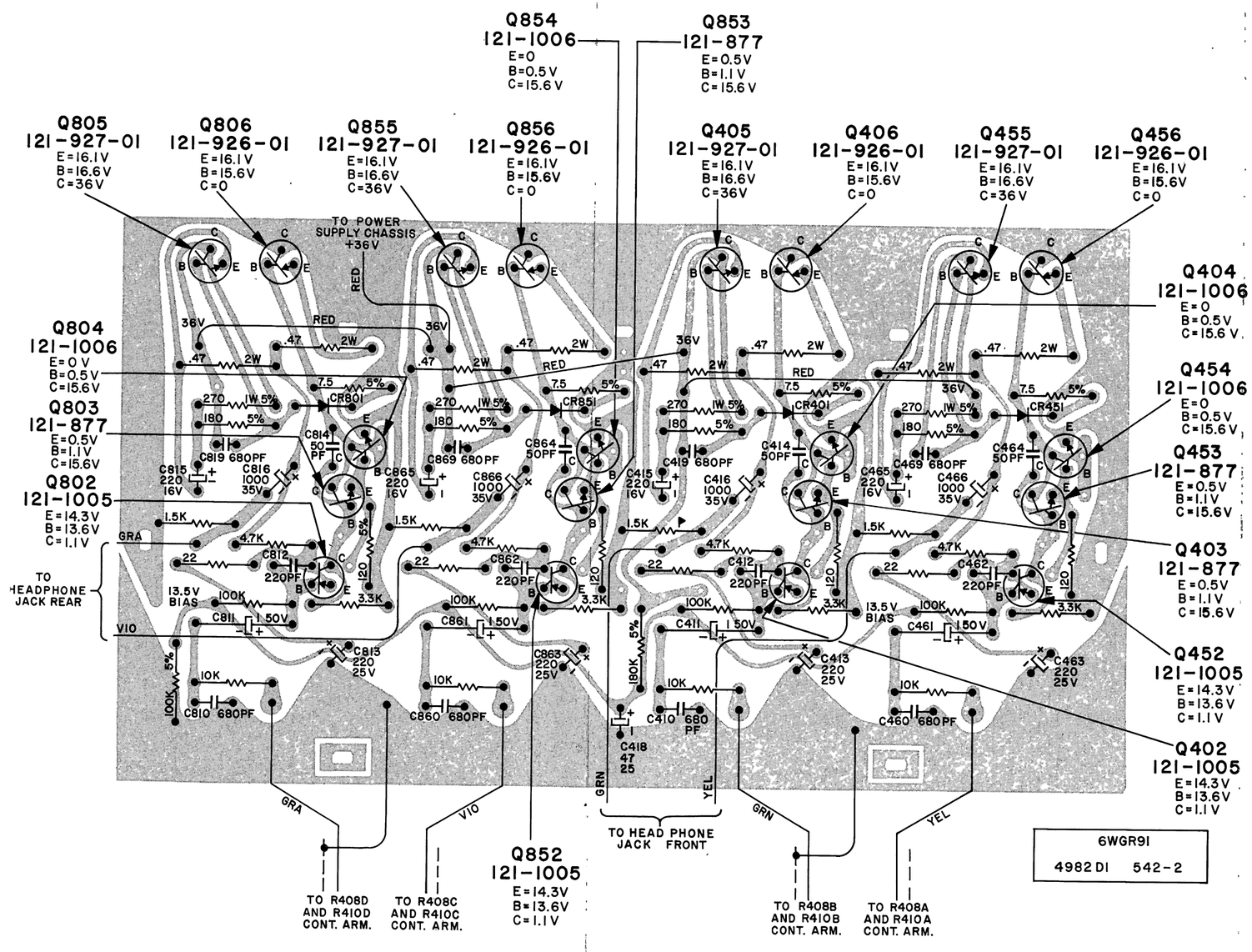


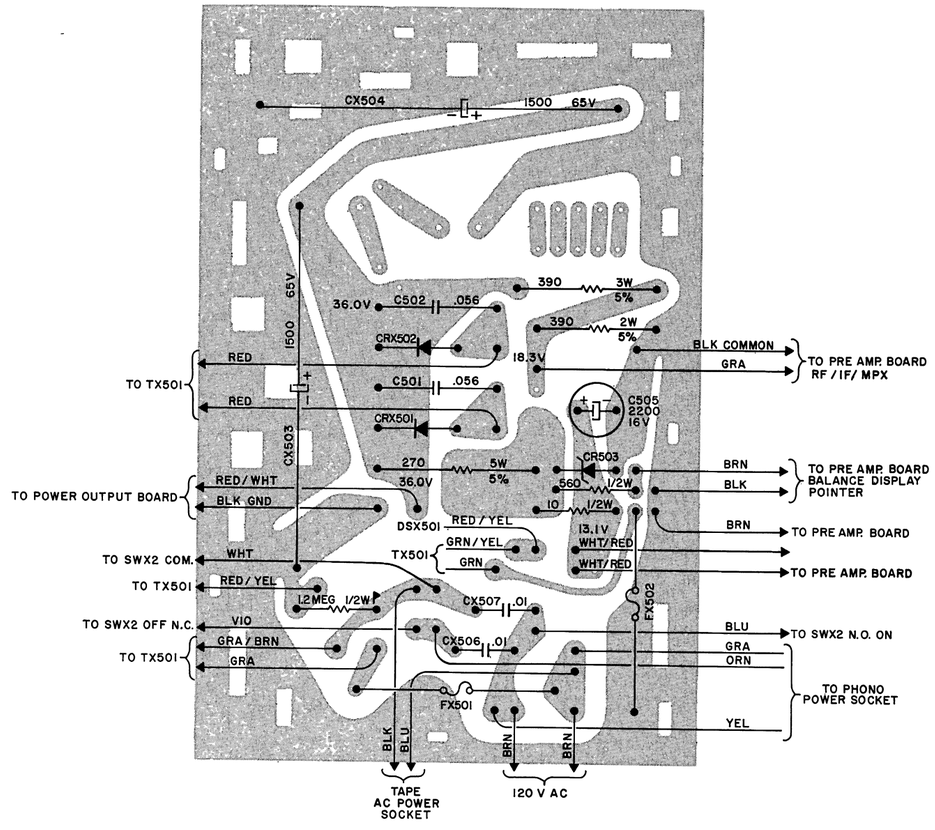
CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE



CHASSIS 6WGR91 — PREAMP — CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE



CHASSIS 6WGR91 – POWER AMP – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE



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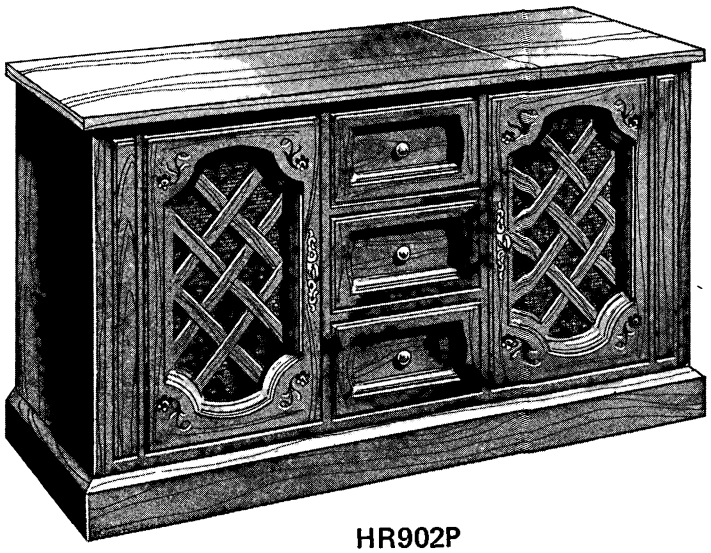
CHASSIS 6WGR91 – POWER SUPPLY – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE



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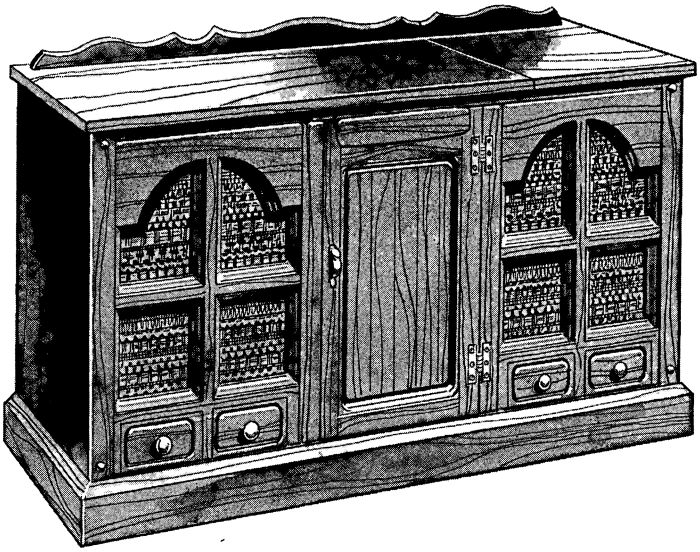

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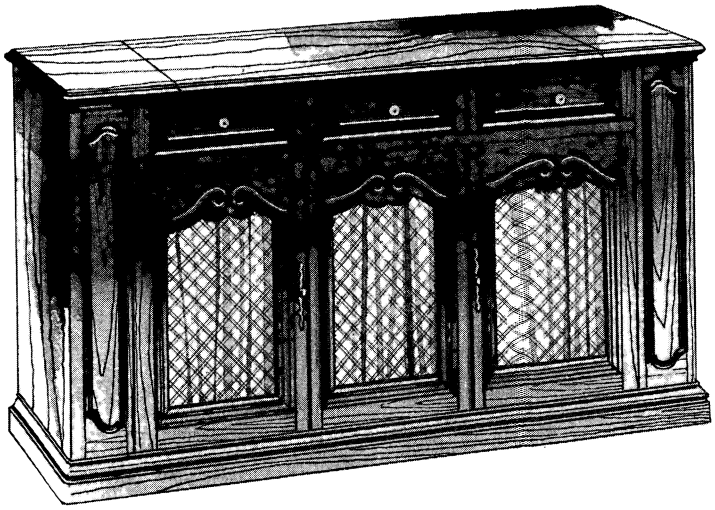

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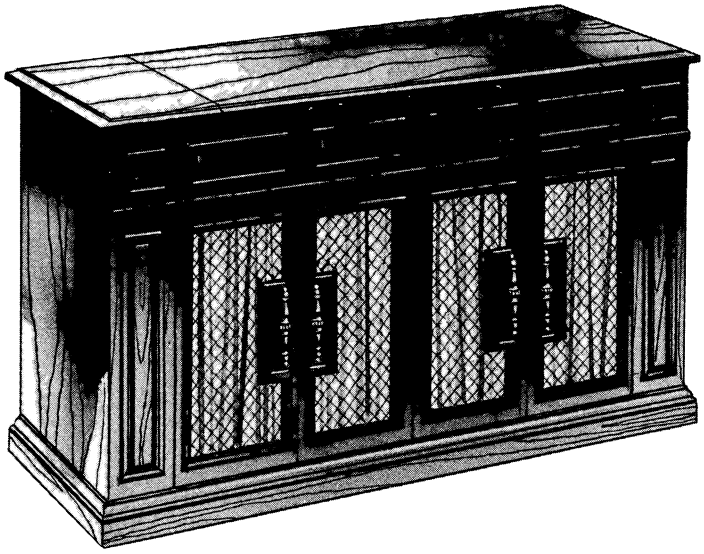

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