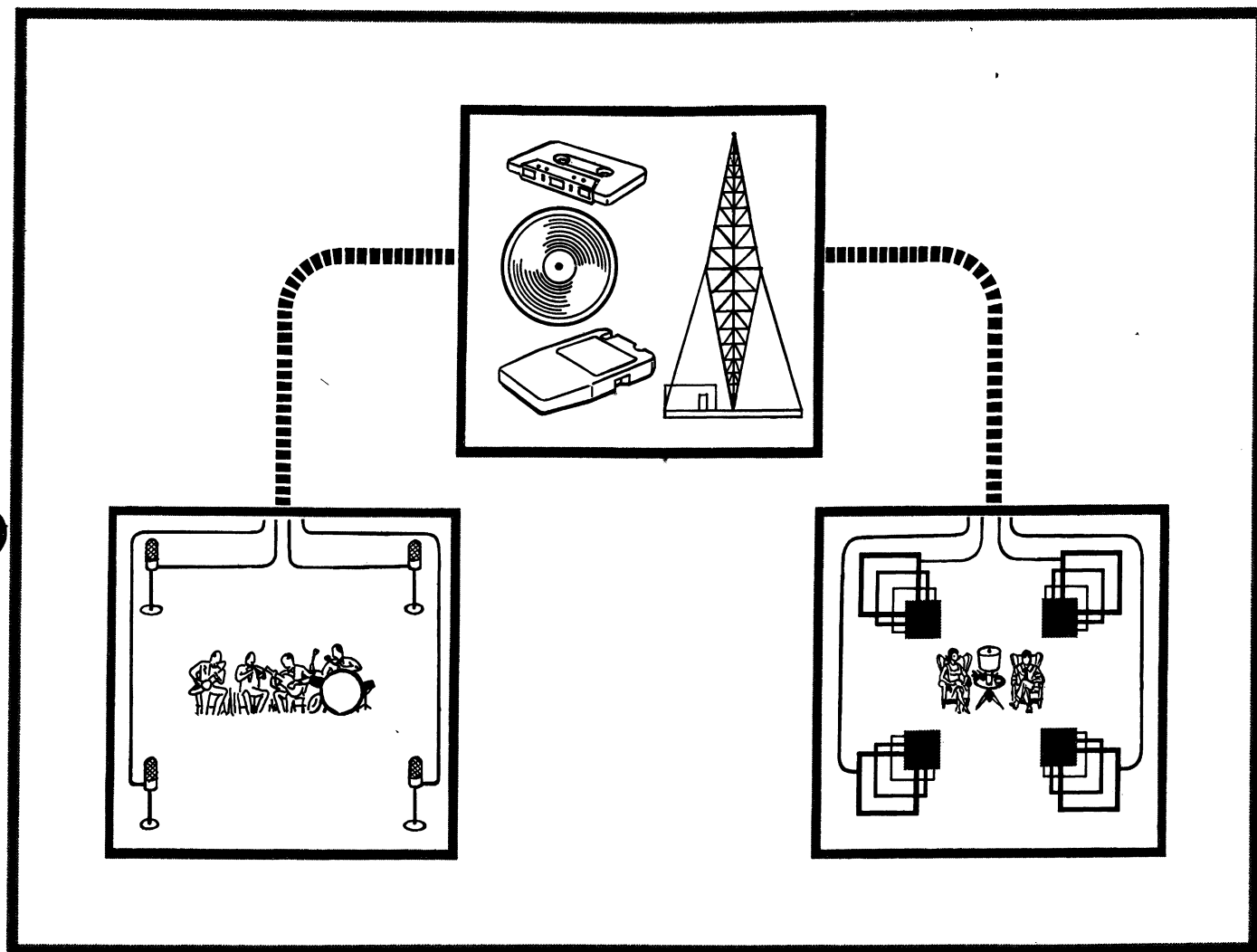


HF-32

HF-32

ZENITH

SERVICE MANUAL



MODULAR AND CONSOLE AUDIO PRODUCTS

ZENITH RADIO CORPORATION

1900 N. AUSTIN AVENUE

CHICAGO, ILLINOIS 60639

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.

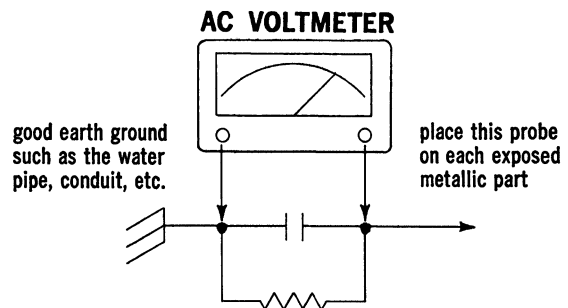


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TECHNICAL APPLICATIONS INDEX

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 Bilex 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), "G" Line Disassembly Procedures.
- HF31S2: Applications — Four Channel Sound Reproduction Input Vs. Output, Repairing Push Button Switches, Record Changer and Phono Cartridge Inter Changeability, Chassis 12WGR59 Accessibility.
- HF 32: Applications — "H" Line Disassembly Procedures, Part Number Identification, Record Changer and Phono Cartridge Interchangeability, Allegro Speaker Systems and Repair Procedures.

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15WER55	—	HF 29, 29S1, 29S2, 30, 30S1	E9029W	—	HF 29S1
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 HF 25 is Part No. 923-669
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 HF 29S1 is Part No. 923-762
 HF 30S1 is Part No. 923-841
 HF 31S1 is Part No. 923-864

HF 18S1 is Part No. 923-576
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 HF 23 is Part No. 923-646
 HF 26 is Part No. 923-702
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 HF 31S2 is Part No. 923-864

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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 NOTE B	TAPE PROVISION NOTE C	SPEAKER PROVISION NOTE D	MISC. NOTE E
H548W	Walnut	M, LL	3WHR52	FM/AM/Phono	Note D2	—	—	169-511C	—	2 on 2 A1,A2,A3	DL, H, PL, TIO, UNI
H587W	Walnut	M, LL	3WHR52	FM/AM/Phono/Tape	Note D2	—	—	169-511C	8TK-P 169-520A or 169-492 or 169-458	2 on 2 A1,A2,A3	DL, H, PL, TIO, UNI
HR587W	Walnut	M, LL	3WHR52	FM/AM/Phono/Tape	Note D2	—	—	169-511C	8TK-R/P 169-509B	2 on 2 A1,A2,A3	DL, H, PL, TIO, UNI
H590W	Walnut	M, LL	6WHR57	FM/AM/Phono/Tape	Note D2	—	—	169-512A	8TK-P 169-510C or 169-510E	2 on 2 A1,A2,A3	AUX, DL, F, H, PL, T, TIO, UNI
HR590W	Walnut	M, LL	6WHR57	FM/AM/Phono/Tape	Note D2	—	—	169-512A	8TK-R/P 169-507C or 169-507	2 on 2 A1,A2,A3	AUX, DL, F, H, PL, T, TIO, UNI
HR590W1	Walnut	M, LL	6WHR57	FM/AM/Phono/Tape	Note D2	—	—	169-512A	8TK-R/P 169-507-02	2 on 2 A1,A2,A3	AUX, DL, F, H, PL, T, TIO, UNI
HR591W	Walnut	M, LL	6WHR57	FM/AM/Phono/Tape	Note D2	—	—	169-512A	Cass-R/P 169-539	2 on 2 A1,A2,A3	AUX, DL, F, H, PL, T, TIO, UNI
H596W	Walnut	M, LL	12WHR29	FM/AM/Phono/Tape	Note D2	—	—	169-513A	8TK-P 169-505B or 169-505D or 169-505A	2 on 2 A2,A3	AUX, DL, F, H, PL, T, TIO
HR596W	Walnut	M, LL	12WHR29	FM/AM/Phono/Tape	Note D2	—	—	169-513A	8TK-R/P 169-506B or 169-506 or 169-506C	2 on 2 A2,A3	AUX, DL, F, H, PL, T, TIO
HR684W	Walnut	M	6WHR56	FM/AM/Tape	Note D2	—	—	—	8TK-R/P 169-507C or 169-507	2 on 2 A1,A2,A3	AUX, F, H, PL, T, TIO, UNI
HR684W1	Walnut	M	6WHR56	FM/AM/Tape	Note D2	—	—	—	8TK-R/P 169-507-02	2 on 2 A1,A2,A3	AUX, F, H, PL, T, TIO, UNI
H736W1	Walnut	M, LL	6WGR91	FM/AM/Phono/Tape	Note D2	—	—	169-512A	8TK-2/4P 169-518 or 169-471	A1,A2,A3	AUX, HH, PL, UNI
H901P	Pecan	C, LL	1WGR50	FM/AM/Phono/Tape	49-1094 49-1153-01	45 16	2-3½ 2-6x9	169-535A	8TK-P 169-536	—	DL, H, RS
H901P11	Pecan	C, LL	1WGR50	FM/AM/Phono/Tape	49-1094 41-1153-01	45 16	2-3½ 2-6x9	169-541	8TK-P 169-536	—	DL, H, RS
HR901P	Pecan	C, LL	1WGR50	FM/AM/Phono/Tape	49-1094 49-1153-01	45 16	2-3½ 2-6x9	169-535A	8TK-R/P 169-537	—	DL, H, RS
HR901P11	Pecan	C, LL	1WGR50	FM/AM/Phono/Tape	49-1094 49-1153-01	45 16	2-3½ 2-6x9	169-541	8TK-R/P 169-537	—	DL, H, RS
HR902P	Pecan	C, LL	1WGR50	FM/AM/Phono/Tape	49-1094 49-1153-01	45 16	2-3½ 2-6x9	169-535A	8TK-R/P 169-537	—	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 NOTE B	TAPE PROVISION NOTE C	SPEAKER PROVISION NOTE D	MISC. NOTE E
HR902P11	Pecan	C, LL	1WGR50	FM/AM/Phono/ Tape	49-1094 49-1153-01	45 16	2-3½ 2-6x9	169-541	8TK-R/P 169-537	—	DL, H, RS
HR903PN	Pine	C, LL	1WGR50	FM/AM/Phono/ Tape	49-1094 49-1153-01	45 16	2-3½ 2-6x9	169-535A	8TK-R/P 169-537	—	DL, H, RS
HR903PN11	Pine	C, LL	1WGR50	FM/AM/Phono/ Tape	49-1094 49-1153-01	45 16	2-3½ 2-6x9	169-541	8TK-R/P 169-537	—	DL, H, RS
H914P	Pecan	C, LL	3WHR50	FM/AM/Phono/ Tape	49-1251-01 49-1261-01	8 8	2-3 2-8	169-515	8TK-P 169-521B or 169-521D or 169-521E or 169-521F or 169-486	2 on 2 A1,A2,A3	A, DL, H, PL, RS, TIO
H915AE	Antique Oak	C, LL	3WHR50	FM/AM/Phono/ Tape	49-1251-01 49-1261-01	8 8	2-3 2-8	169-515	8TK-P 169-521B or 169-521D or 169-521E or 169-521F or 169-486	2 on 2 A1,A2,A3	A, DL, H, PL, RS, TIO
H916M	Maple	C, LL	3WHR50	FM/AM/Phono/ Tape	49-1251-01 49-1261-01	8 8	2-3 2-8	169-515	8TK-P 169-521B or 169-521D or 169-521E or 169-521F or 169-486	2 on 2 A1,A2,A3	A, DL, H, PL, RS, TIO
SR917M	Maple	C, LL	1WGR50	FM/AM/Phono/ Tape	49-1166 49-1269	8 16	2-3½ 2-10	169-540	8TK-P/R 169-537	—	DL, H, RS
SR918P	Pecan	C, LL	1WGR50	FM/AM/Phono/ Tape	49-1166 49-1269	8 16	2-3½ 2-10	169-540	8TK-P/R 169-537	—	DL, H, RS
HR920AE	Antique Oak	C, LL	6WHR55 or 6WGR55	FM/AM/Phono/ Tape	49-1166 49-1217	8 8	2-3½ 2-10	169-516	8TK-R/P 169-508B or 169-508C or 169-508	2 on 2 A1,A2,A3	A, AUX, DL, H, RS, T, TIO
HR921P	Pecan	C, LL	6WHR55 or 6WGR55	FM/AM/Phono/ Tape	49-1166 49-1217	8 8	2-3½ 2-10	169-516	8TK-R/P 169-508B or 169-508C or 169-508	2 on 2 A1,A2,A3	A, AUX, DL, H, RS, T, TIO
HR922M	Maple	C, LL	6WHR55 or 6WGR55	FM/AM/Phono/ Tape	49-1166 49-1217	8 8	2-3½ 2-10	169-516	8TK-R/P 169-508B or 169-508C or 169-508	2 on 2 A1,A2,A3	A, AUX, DL, H, RS, T, TIO

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 NOTE B	TAPE PROVISION NOTE C	SPEAKER PROVISION NOTE D	MISC. NOTE E
HR936AE1	Antique Oak	C, LL	12WGR58	FM/AM/Phono/Tape	49-1166 49-1217	8 8	2-3½ 2-10	169-513A	8TK-R/P 169-523	2 on 2 A1,A2,A3	A, DL, F, H, PL, RS, T
HR937P	Pecan	C, LL	12WGR58	FM/AM/Phono/Tape	49-1166 49-1217	8 8	2-3½ 2-10	169-513A	8TK-R/P 169-523	2 on 2 A1,A2,A3	A, DL, F, H, PL, RS, T
HR966P	Pecan	C, LL	12WHR29	FM/AM/Phono/Tape	49-1166 49-1271	8 8	2-3½ 2-12	169-513A	8TK-R/P 169-506-01A	2 on 2 A2, A3	AUX, DL, F, H, PL, RS, T
H1000W	Walnut	M, SP	—	—	49-1249 49-1251-01	8 8	1-6½ 1-3	—	—	—	A1
H1000W1	Walnut	M, SP	—	—	49-1251-01 49-1254-01	8 8	1-3 1-8	—	—	—	A1
H1000W2	Walnut	M, SP	—	—	49-1251-01 49-1254-01	8 8	1-3 1-8	—	—	—	A1
H1000W3	Walnut	M, SP	—	—	49-1249 49-1251-01	8 8	1-6½ 1-3	—	—	—	A1
H2000W	Walnut	M, SP	—	—	49-1166 49-1261-02	8 8	1-3½ 1-8	—	—	—	A2
H2000W3	Walnut	M, SP	—	—	49-1166 49-1261-02	8 8	1-3½ 1-8	—	—	—	A2
H3000W	Walnut	M, SP	—	—	49-1166 49-1270	8 8	1-3½ 1-10	—	—	—	A3
H3000W3	Walnut	M, SP	—	—	49-1166 49-1270	8 8	1-3½ 1-10	—	—	—	A3
H9026W	Walnut	M	—	—	—	—	—	169-513A	—	—	—

NOTE A — CABINET STYLE: :

C = Console, M = Modular, LL = Lift Lid, SP = Speaker System.

NOTE B — RECORD CHANGERS

Record Changers having alpha suffixes (ie. 169-511A) denote variations of internal mechanical and/or electrical components (refer to Record Changer Features charts on page 5) but otherwise are interchangeable with other alpha suffix and non-suffix versions.

NOTE C — TAPE INPUT AND OUTPUT PROVISIONS:

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.

Tape Units having alpha suffixes (ie. 169-510A) denote variations of internal mechanical and/or electrical components (refer to Tape Unit Features charts on pages 6 and 7) but are otherwise interchangeable with other alpha suffix and non-suffix versions. Units having numeric (ie. 169-506-01) or numeric/alpha (ie. 169-506-01A) suffixes may have a one way interchangeability under some conditions (refer to Product Features charts on pages 2, 3 and 4).

NOTE D — SPEAKER PROVISIONS:

NOTE D1: 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 D2: "H" Line Modular Models may use either H1000W, H2000W, or H3000W series models. (See Speaker Provision).

NOTE D3: 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.

2 on 2 - Speaker Matrix or Conventional Stereo Extension Speaker System Provisions.

A1 = Model H1000W Allegro 1000 Speaker System may be used.

A2 = Model H2000W Allegro 2000 Speaker System may be used.

A3 = Model H3000W Allegro 3000 Speaker System may be used.

NOTE E — 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.

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.

TIO = Tape Input/Output.

UNI = Uniband Dial Scale Light.

RECORD CHANGER FEATURES

SEE NOTES BELOW

Part No.	Mfg. Code	Stylus Pressure - Grams -	Cartridge & Stylus	45 RPM Adapter	Turntable		Function Selector	Record Size/ Selector	Record Stack Capacity	Base-Plate Color	Turntable Pad Color	Pressure Arm Color	Misc. Features
					RPM Selector	Diameter Inches							
169-502	VM 1272	2-2.9	142-167 S-82621 D-S	S-82964	16, 33, 45 78 Slide	10"	Off, On, Rej. Slide	7, 10, 12, M Manual Slide	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 Slide	11"	Stop, Start, Auto Slide	7, 10, 12 Manual Slide	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 Slide	11"	Stop, Start, Auto Slide	7, 10, 12 Manual Slide	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 Slide	10-1/8"	Stop, Start, Auto Slide	7, 10, 12 Manual Slide	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 Slide	11"	Stop, Start, Auto Slide	7, 10, 12 Manual Slide	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 Slide	11"	Stop, Start, Auto Slide	7, 10, 12 Manual Slide	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 Slide	11"	Stop, Start, Auto Slide	7, 10, 12 Manual Slide	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 Slide	11"	Stop, Start, Auto Slide	7, 10, 12 Manual Slide	See Note 2	Black	Black	Black	Viscous Cue Lever, Stylus Brush
169-513A	BSR	2.0-3.5	142-185 56-638 D	S-72910	33, 45, 78 Slide	11"	Stop, Start, Auto Slide	7, 10, 12 Manual Slide	See Note 2	Black	Black	Black	Viscous Cue Lever, Stylus Brush
169-515	VM	2-2.9	142-182 56-632 D	S-82964	16, 33, 45 78 Slide	11"	Off, On, Rej. Slide	7, 10, 12, M Manual Slide	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 Slide	11"	Off, On, Rej. Slide	7, 10, 12, M Manual Slide	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 Slide	11"	Stop, Start, Auto Slide	7, 10, 12 Manual Slide	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 Slide	10-1/8"	Stop, Start, Auto Slide	7, 10, 12 Manual Slide	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 Slide	11"	Off, On, Rej. Slide	7, 10, 12, M Manual Slide	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 Slide	10"	Off, On, Rej. Slide	7, 10, 12, M Manual Slide	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/MF/Z	8-Track	2	—	—	AC	—	C	A1,C1
169-490B	AMI/MF/Z	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/MF/Z	8-Track	2	—	—	AC	—	W	A2,C1
169-505D	AMI/EE	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
169-506B	AMI/ML	8-Track	2	2	Full	DC/M	Full	W	A2,C1,FF,I, M,P2,R
169-506C	AMI/MC/Z	8-Track	2	2	Full	DC/M	Full	W	A1,C1,FF,I, M,P1,R
169-506D	AMI/MC/Z	8-Track	2	2	Full	DC/M	Full	W	A2,C1,FF,I, M,P1,R
169-506-01A	AMI/ML	8-Track	2	2	Full	DC/M	Full	C	A2,C1,FF,I, M,P2,R
169-506-01B	AMI/MC	8-Track	2	2	Full	DC/M	Full	C	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/MC/Z	8-Track	2	2	Full	DC/M	Full	M	A2,C1,FF,I, M,P1,R
169-507-02	AMI/ML	8-Track	2	2	Full	DC/M	Full	M	A2,C1,FF,I, M,P2,R
169-508	AMI/MF	8-Track	2	2	ALC	AC	Four	C	A2,C1,I,R
169-508B	AMI/ML	8-Track	2	2	ALC	DC/M	Four	C	A2,C1,I,R
169-509B	AMI/ML	8-Track	2	2	ALC	DC/M	Four	M	A2,C1,I,R
169-510	AMI/MF	8-Track	2	—	—	AC	—	M	A2,C1
169-510A	AMI/MC/Z	8-Track	2	—	—	AC	—	M	A2,C1
169-510B	AMI/MC/Z	8-Track	2	—	—	AC	—	M	A2,C1
169-510E	AMI/EE	8-Track	2	—	—	AC	—	M	A2,C1
169-510F	AMI/MF/Z	8-Track	2	—	—	AC	—	M	A2,C1
169-510G	AMI/MF/Z	8-Track	2	—	—	AC	—	M	A2,C1
169-518	AMI/MF	8-Track	2/4	—	—	AC	—	M	A2,C1,Q

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					
169-519	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
169-520C	AMI/EE	8-Track	2	—	—	AC	—	M	A2,C1
169-520D	AMI/MF/Z	8-Track	2	—	—	AC	—	M	A2,C1
169-521	AMI/MF	8-Track	2	—	—	AC	—	C	A2,C1
169-521A	AMI/MF/Z	8-Track	2	—	—	AC	—	C	A2,C1
169-521D	AMI/EE	8-Track	2	—	—	AC	—	C	A2,C1
169-521E	AMI/MF/Z	8-Track	2	—	—	AC	—	C	A1,C1
169-521F	AMI/MF/Z	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
169-539	AMI/CA	Cassette	2	2	ALC	DC/E	Tape	M	A2,C1,E,FF, I,P2,T

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 continuously (in both Play and Record modes). Selected by three position slide control.

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 (Push-Push Type).

I = Interlocked Record Button.

M = Record Level Meter (Illuminated).

P1 = Pause Button (Push In, Slide Left to Lock).

P2 = Pause Button (Push-Push).

Q = Automatic 2/4 Channel Switching, with mode indicator.

R = Ready Light or Auto Stop Light.

T = Tape Run 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, 3WHR50, 3WHR52, 6WHR55, 6WHR56, 6WHR57, 6WGR91, 12WGR58, 12WHR29.
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: 3WHR50, 3WHR52, 6WHR55, 6WHR56, 6WHR57, 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 equip) 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 micro-volt 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, 3WHR50, 3WHR52 — Test Point "C" at base of Q1; located between Transistors Q101 (A.M. Converter) and Q201 (1st I.F.)

Chassis 6WHR55, 6WHR56, 6WHR57 — Test Point at junction of R2 and R229; either end of orange wire at 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 12WHR29 — AGC voltages do not provide significant information.

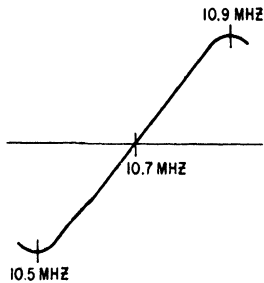
Chassis 1WGR50, 3WHR50, 3WHR52		Chassis 6WHR55, 6WHR56, 6WHR57		Chassis 6WGR91	
Micro Volts Input	Voltage AGC Voltage at Test Point "C"	Micro Volts Input	Reverse AGC Voltage At Gate 2 of FM RF	Micro Volts Input	Reverse AGC Voltage At Gate 2 of FM RF (Junction R2 & R226)
0	1.23	0	5.4	0	5.5
25	1.10	25	4.5	25	5.0
100	0.88	100	3.3	100	3.5
200	0.79	200	2.85	200	2.9
500	0.71	500	2.5	500	2.3
1K	*0.67	1K	*2.1	1K	*1.9
5K	0.60	5K	1.22	5K	0.2
50K	0.12	50K	0.15	50K	-1.3
100K	0.06	100K	-0.08	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)**

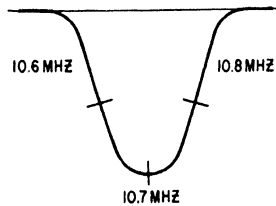
Chassis	Number of Channels	Watts Per Channel	Power Bandwidth	Total Harmonic Distortion (THD) No More Than
3WHR50	2	2.5	100Hz - 10kHz	1.0%
3WHR52	2	2.5	100Hz - 10kHz	1.0%
6WHR55	2	6.0	80Hz - 12kHz	1.0%
6WHR56	2	6.0	80Hz - 12kHz	1.0%
6WHR57	2	6.0	80Hz - 12kHz	1.0%
6WGR91	4	6.0	80Hz - 12kHz	1.0%
12WGR58	2	12.0	40Hz - 15kHz	1.0%
12WHR29	2	12.0	40Hz - 18kHz	0.5%

FM/AM/MULTIPLEX ALIGNMENT



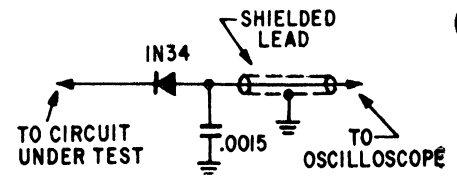
Scope Pattern A — Ratio Detector

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, 3WHR50, 3WHR52, 6WHR55, 6WHR56, 6WHR57**

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				535KHz	Gang Closed	T101	Set Oscillator to dial scale.	
3				1630KHz	Gang Open	C1G		
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	Base of Q2 Test Point "D"		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						L205 & L206 (T203)		
10						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 6WHR55, 6WHR56, 6WHR57, No Signal Input.								
20	None	None	None	None	None	R233	Zero center tuning meter.	

MULTIPLEX ALIGNMENT PROCEDURE

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.

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.			
2				98 MHz 5% Pilot		R302	Adjust mute control to point where stereo lamp lights up.			
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, IF AND MPX ALIGNMENT PROCEDURE FOR CHASSIS 12WHR29

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

RF, IF, AND MPX ALIGNMENT PROCEDURE FOR CHASSIS 12WHR29 — CONT'D.

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

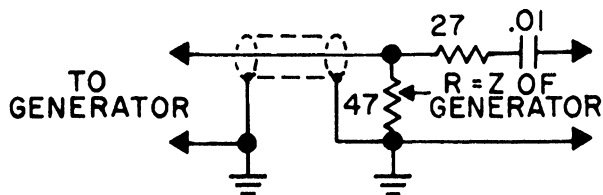


FIGURE 1 — RF INPUT PROBE

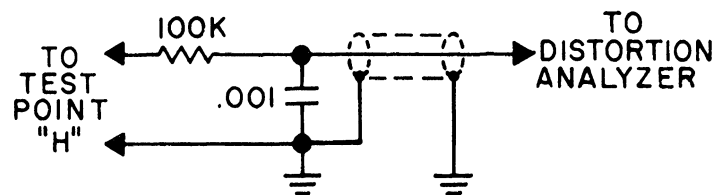


FIGURE 3 — DE-EMPHASIS PROBE

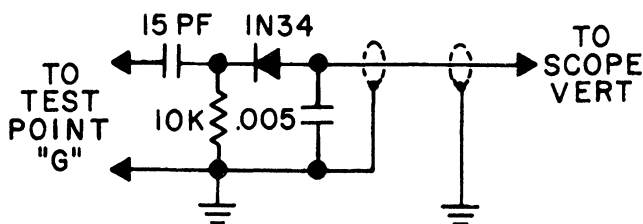


FIGURE 2 — DIODE DETECTOR PROBE

CERAMIC FILTERS — CHASSIS 12WHR29			
PART NO.	COLOR CODE	NOMINAL CENTER FREQUENCY	FREQUENCY RANGE
224-1	Black	10.64 MHz	10.61 to 10.67 MHz
224-1-01	Blue	10.67 MHz	10.64 to 10.70 MHz
224-1-02	Red	10.70 MHz	10.67 to 10.73 MHz
224-1-03	Orange	10.73 MHz	10.70 to 10.76 MHz
224-1-04	White	10.76 MHz	10.73 to 10.79 MHz

FIGURE 4 — CERAMIC FILTER TABLE

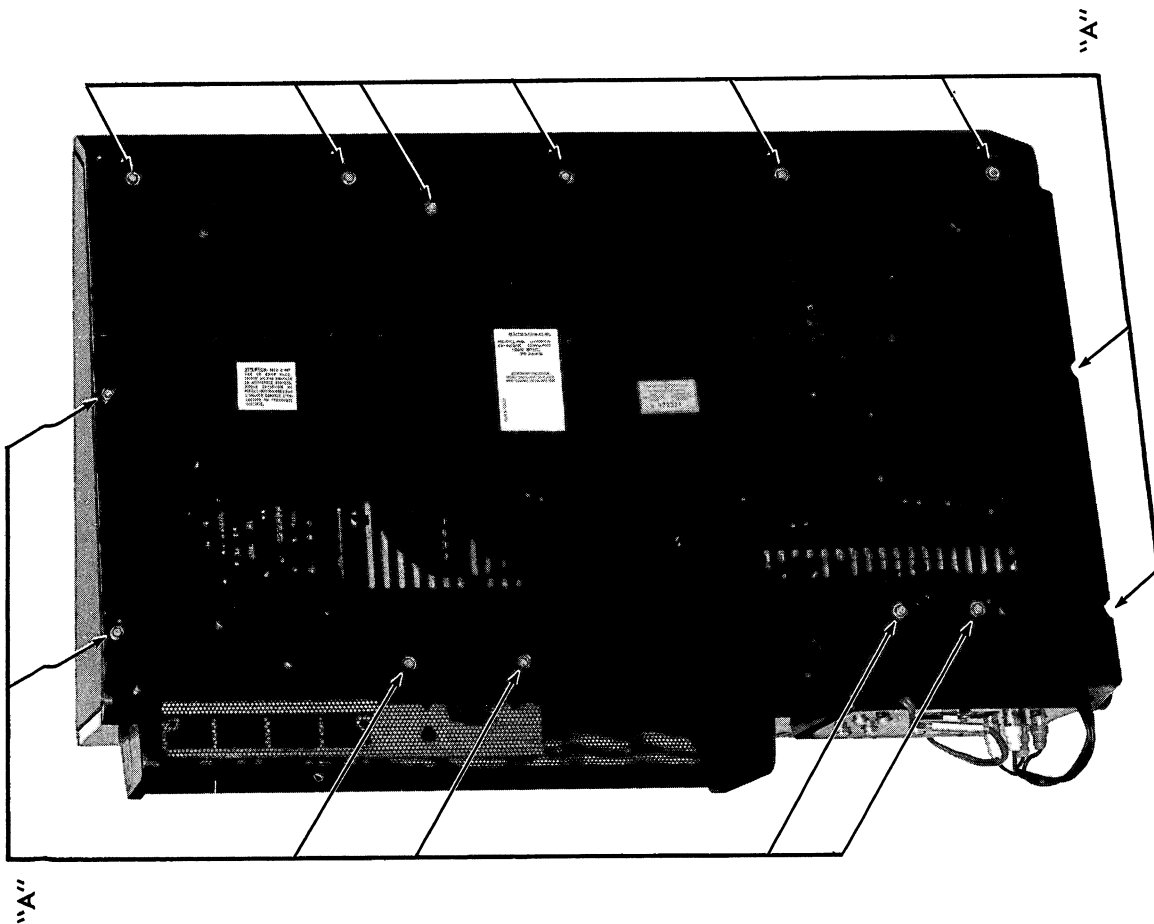


FIGURE 1 — MODELS H596W AND HR596W
CABINET BOTTOM SCREW LOCATIONS

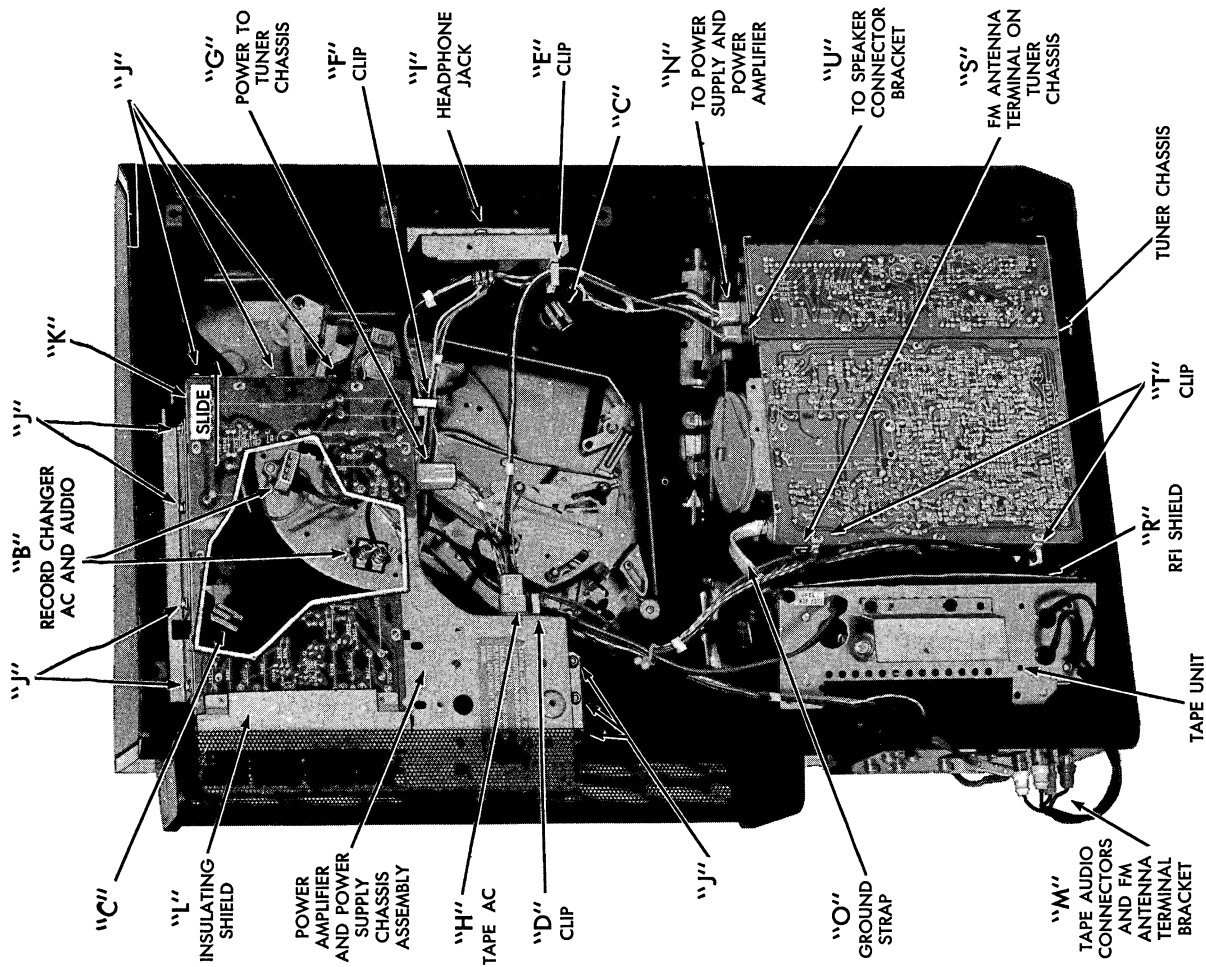


FIGURE 2 — MODELS H596W AND HR596W
CABINET BOTTOM REMOVED

TECHNICAL APPLICATIONS

DISASSEMBLY PROCEDURE MODELS H596W AND HR596W

Basic disassembly procedure for the above models, using Chassis 12WHR29, is simplified due to modular construction techniques with the use of convenient cable connectors. This is illustrated by the accompanying photos, in Figures 1 through 4. The procedure is the same as for their "G" line counterparts.

CABINET BOTTOM REMOVAL

1. With power disconnected, place main unit on right side (as viewed from front) on top of a soft clean surface.
2. Remove fourteen (14) screws holding bottom cover ("A" in Figure 1).

RECORD CHANGER REMOVAL

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

POWER SUPPLY/AMPLIFIER REMOVAL

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

TAPE UNIT REMOVAL

1. Proceed as for "Cabinet Bottom Removal".
2. Unclip and disconnect tape unit audio cables at rear panel connectors ("M" in Figure 2).
3. Unclip and disconnect tape unit AC cables at power supply chassis ("D" and "H" in Figure 2).
4. Disconnect ground strap between tape unit and tuner chassis ("O" in Figure 2).
5. The tape unit mounting screws are covered by a "snap off" escutcheon. A notch will be found at the center of the outer edge of the escutcheon ("P" in Figure 3). Insert a thin blade screwdriver into this notch between the escutcheon and the cabinet proper, being careful not to mar the surface. Force the escutcheon upward, causing it to disengage the first stud. Grasp the escutcheon along the top, lifting to disengage second stud. Remove escutcheon.
6. Remove (4) screws holding tape unit to front panel ("Q" in Figure 4).
7. Slide tape unit out through front panel (noting location of RFI shield on Model HR596W — "R" in Figure 2).
CAUTION: When replacing tape unit in Model HR596W be certain RFI shield is in proper location.
NOTE: Main unit should be in horizontal position when reinstalling tape unit.

TUNER CHASSIS REMOVAL

1. Proceed as for "Cabinet Bottom Removal".
2. Remove four (4) screws holding FM Antenna and Tape Bracket ("M" in Figure 2).
3. Unclip and disconnect cables ("D", "G", "N", and "U" in Figure 2).
4. Disconnect ground strap between tape and tuner chassis ("O" in Figure 2).
5. Remove six (6) knobs ("V" in Figure 3).
6. The tuner chassis mounting screws are covered by a "snap-off" escutcheon. Two notches will be found on the bottom of the outer edge of the escutcheon ("W" in Figure 3). Insert a thin blade screwdriver into these notches between the escutcheon and the cabinet proper, being careful not to mar any surface. Force the escutcheon upward, causing it to disengage first two studs. Grasp the escutcheon along the top, lifting to disengage second two studs.
7. Remove four (4) screws holding tuner chassis to front panel ("X" in Figure 4).

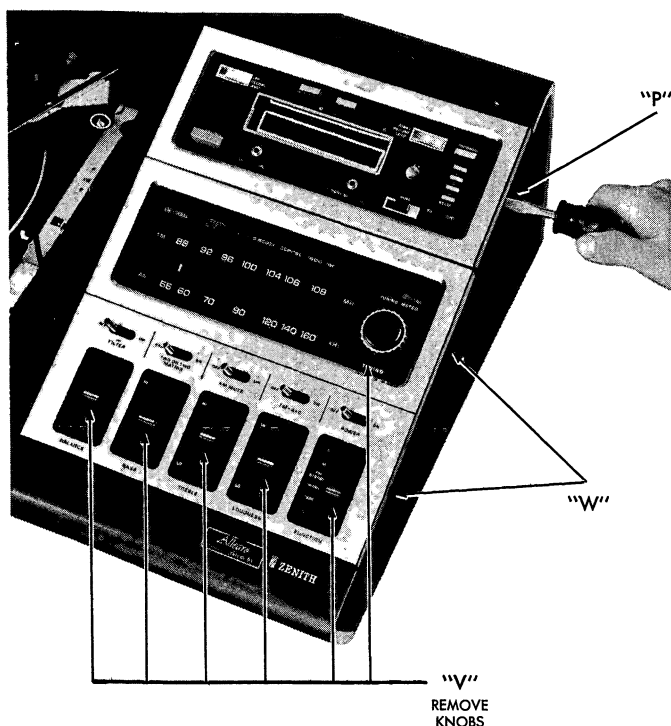


FIGURE 3 – MODELS H596W AND HR596W
ESCUTCHEON REMOVAL

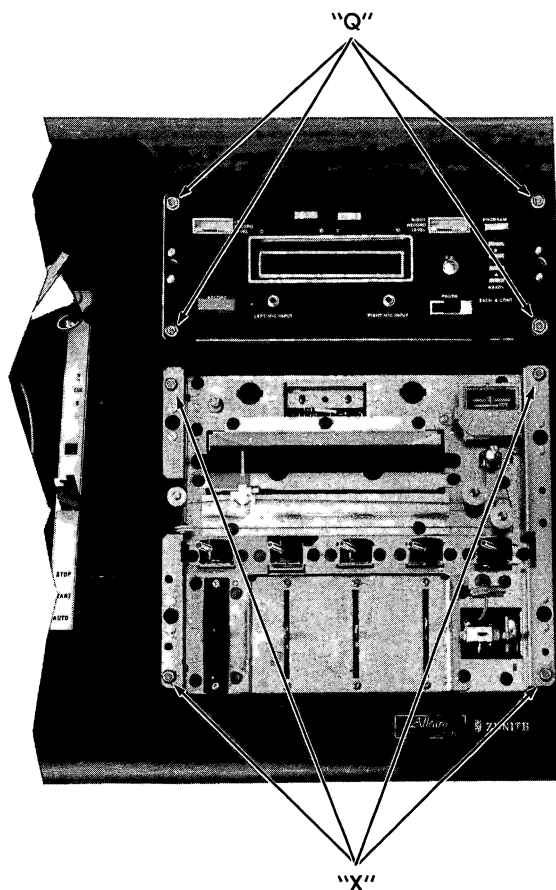


FIGURE 4 – MODELS H596W AND HR596W
TAPE UNIT AND TUNER CHASSIS
MOUNTING SCREWS

8. Slide tuner chassis out through front panel (noting location of RFI shield on Model HR596W – “R” in Figure 2).

CAUTION: When replacing tuner chassis in Model HR596W be certain RFI shield is in proper location.

NOTE: Main unit should be in horizontal position when reinstalling tuner chassis.

CHASSIS 12WHR29 ACCESSIBILITY FOR SERVICING AND ALIGNMENT

Once the bottom cover has been removed from Models H596W and HR596W, 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 2 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!

Once the escutcheon is removed, locate the dial light well “EE” (See Figure 5).

1. Rotate the tuning shaft “AA” counter-clockwise (gang closed).

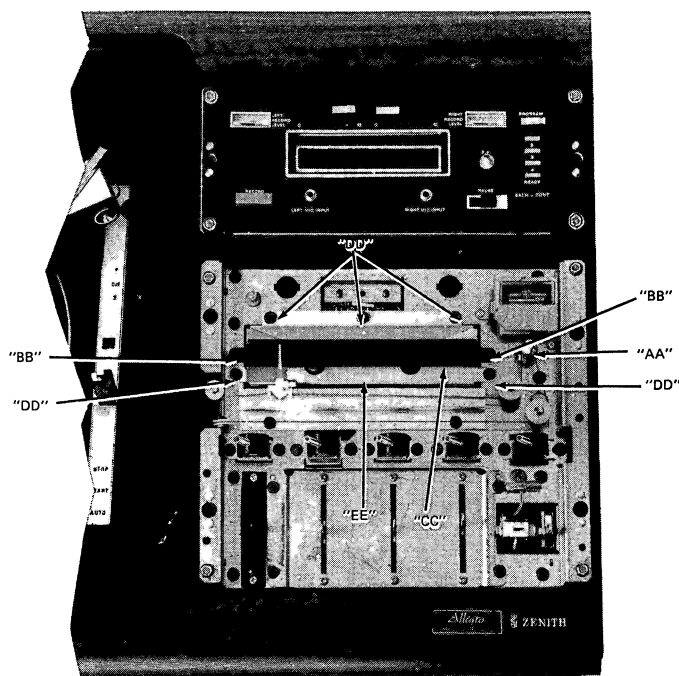


FIGURE 5 – MODELS H596W AND HR596W
ACCESSIBILITY TO CHASSIS 12WHR29

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 chasses) for alignment, visual inspection and limited parts replacement. This unique service tip will save considerable time when servicing this area of Chassis 12WHR29.

ADDITIONAL DISASSEMBLY PROCEDURES

In addition to the disassembly procedure for Models H596W and HR596W outlined above, there are two other procedures (Groups "B" and "C" below) which apply to various "G" and "H" line models that also use the snap-off escutcheon and the outfront chassis removal concepts of the "E" and "F" line. On such models the escutcheon is held in place by three (or more depending on model) studs and clips. This method facilitates access for cleaning the back side of the escutcheon lens and also for access to chassis mounting screws. The chassis (and/or some tape units) may be removed thru the front of modular models, or thru the top mounting panel of console models.

GROUP "B" models include:

CHASSIS 5WFR50	CHASSIS 3WGR54
MODEL G904P	MODEL G680W2
CHASSIS 1WGR50	CHASSIS 6WGR55
MODELS G901P	MODEL G920AE
GR901P1	G921P
H901P, P11	G922M
HR901P, P11	CHASSIS 3WHR50
HR902P, P11	MODELS H914P
HR903PN, PN11	H915AE
SR917M	H916M
SR918P	
CHASSIS 3WGR50	CHASSIS 3WHR52
MODELS G914P, P11	MODELS H584W
G915AE, AE11	H587W
G916M, M11	HR587W
CHASSIS 3WGR52	CHASSIS 6WHR55
MODELS G584W1, W2	MODELS HR920AE
G587W2, W3	HR921P
GR587W1, W2	HR922M

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

CHASSIS 5WER50	CHASSIS 15WER55
MODELS E902W	MODELS E911W
ET902W	E912M, M1
E903M, M2	E913DE, DE1
ET903M, M2	E913P, P1
E904DE	ET914W, W1
ET904DE, DE2	ET915DE
	ET915P, P1, P21
CHASSIS 5WER51	E921DE
MODELS E584W, W1	E921P
E587W, W1	E922M
E588W	
CHASSIS 5WER53	CHASSIS 15WER56
MODELS E445W	MODELS E585J, J1
E680W	E586W, X
E685W	E589W, W1
	E594W, W1
CHASSIS 5WFR50	CHASSIS 15WFR55
MODELS F902W, W1	MODELS ET914W3
F903M	F914W
F904DE	ET915DE3
F904P	ET915P3
	F915DE
CHASSIS 5WFR51	F915P
MODELS F584W	F915DE1
F587W	F915P1
F588W	F916M
	F916PN
CHASSIS 5WFR53	CHASSIS 15WFR57
MODELS F445W, W1	MODELS F585W
F680W	F586X
F685W	F589W
	F589X
CHASSIS 15WFR51	F594W
MODELS F941DE	
F941P	
F942M	
F946AE	
F947P	

Model H584W is representative of those models which have the above features, and will be used in the following explanation.

ESCUTCHEON REMOVAL — GROUP "B"

Figure 6 illustrates the technique used:

1. Remove all knobs (except AFC) from the control panel.
2. Rotate tuning shaft so that the "flat" is vertical, and the cut-away portion is facing the headphone jack.

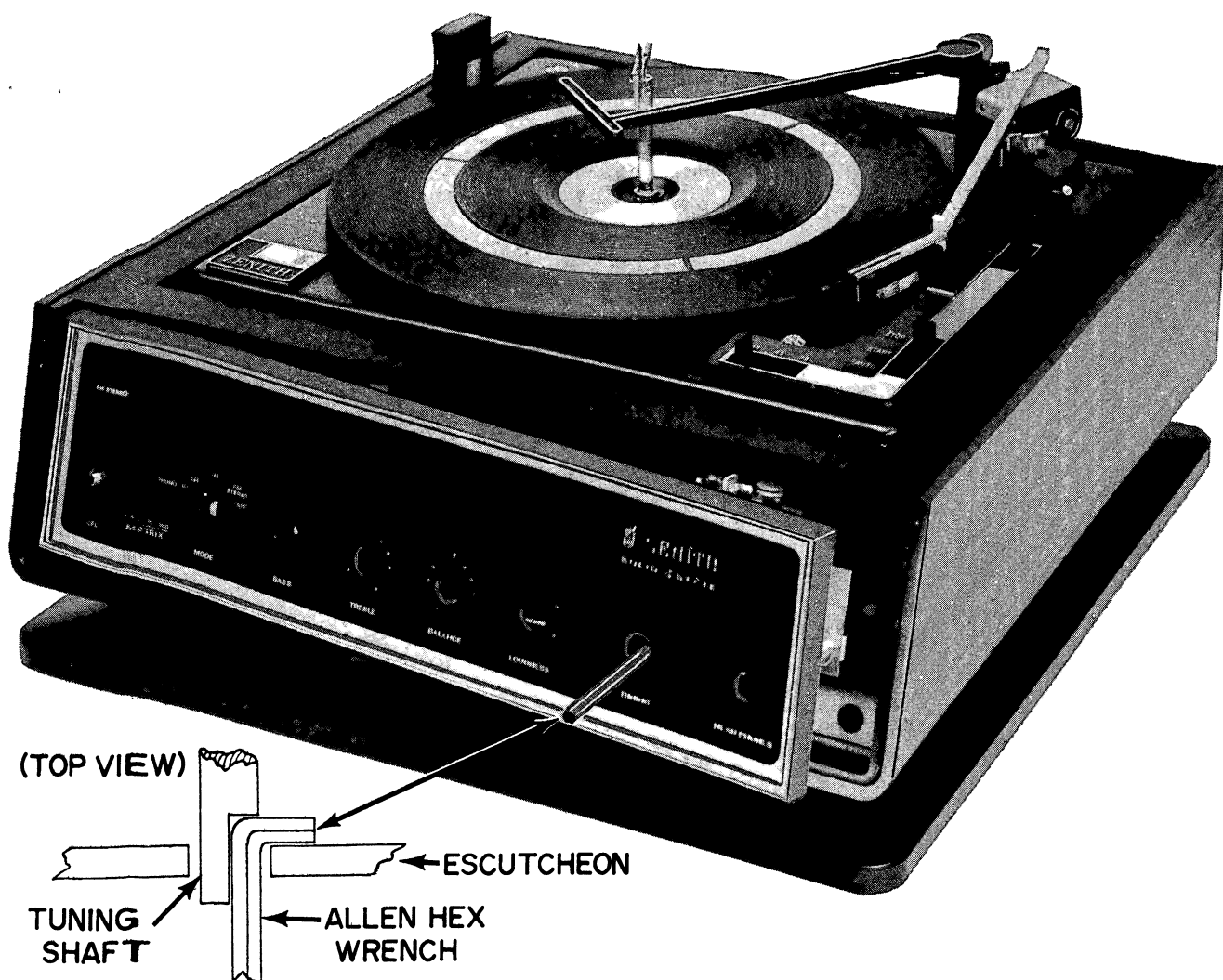


FIGURE 6 – ESCUTCHEON REMOVAL – GROUP "B"

3. Referring to the top view in Figure 6, insert the short end of a 1/8" (size may vary) "L" shaped Allen hex wrench between the shaft and the escutcheon.
4. Position the short end of the wrench behind the escutcheon, with the wrench against the step of the shaft.
5. Moving wrench to left will apply pressure to the back of the escutcheon, causing the nearest stud and clip to disengage.
6. Remove wrench.
7. Grasp loosened end of escutcheon and firmly pull escutcheon outward until all studs and clips are disengaged.

CAUTION – Refer to Figure 7. On some models the Stereo Indicator and Uniband Dial Scale lamps are mounted in grommets on the chassis, while on other models these lamps (in grommets) are fitted into the escutcheon.

8. Escutcheon is now removed.

OUT FRONT CHASSIS REMOVAL – GROUP "B"

Figure 7 identifies the location of certain components involved. While Model H584W is representative of the disassembly procedure for the above models, there are some minor variations that must be noted. These variations will be denoted with the model number and variation shown in ().

1. Remove escutcheon as explained above.
2. Remove screws holding cabinet back and remove back (E584W, E585J, J1, E586W, X, F584W, F585W, F586X, G584W1, H584W – Remove screws holding cabinet bottom, and remove bottom).
3. Unmount both the Speaker Jack Assembly Bracket and the Antenna/Tape/Phono Connector Assembly Bracket from the cabinet back.

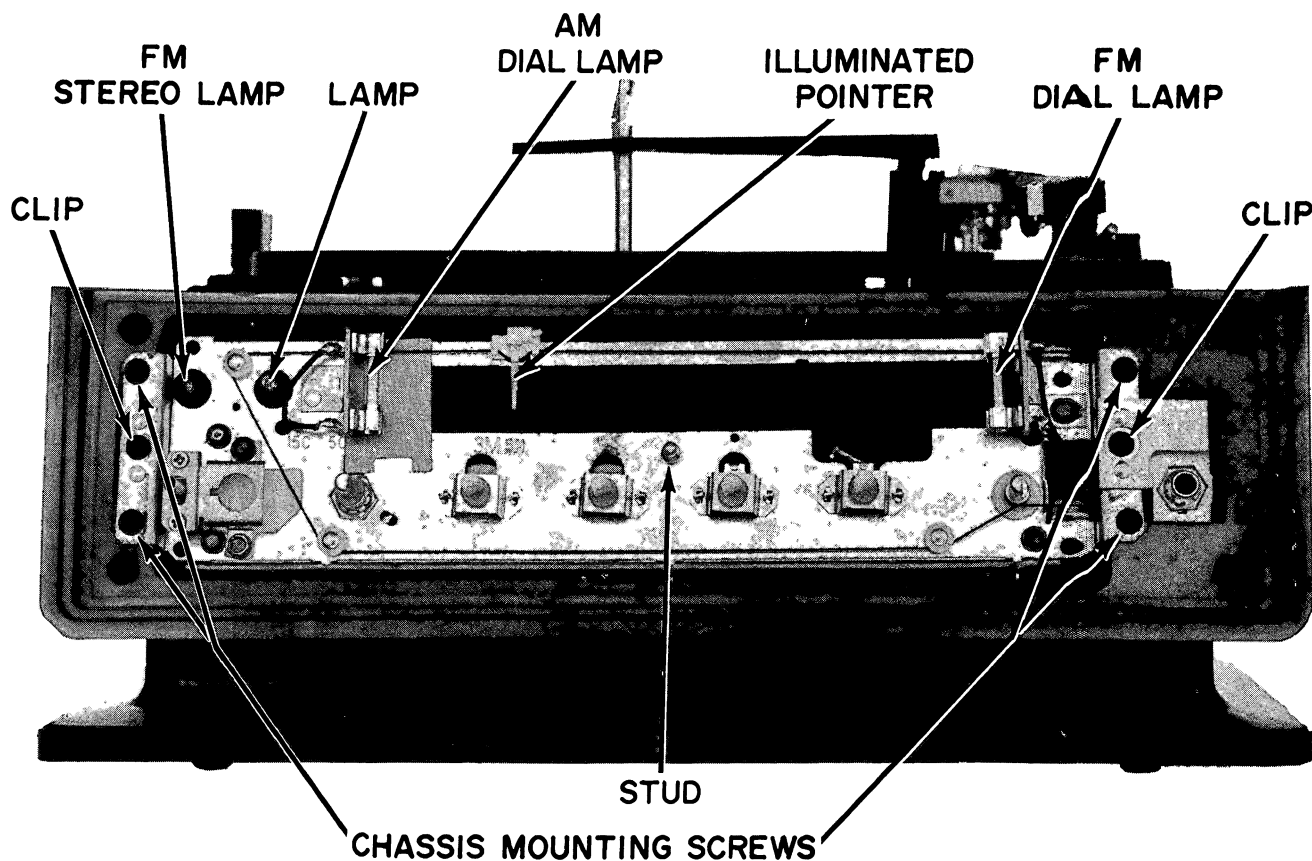


FIGURE 7 – OUT FRONT CHASSIS REMOVAL – GROUP “B”

4. Untie cable retainers. (Disconnect record changer and tape unit cables when used.)
5. Remove one screw from bottom of cabinet under center of chassis (E584W, – Two screws.) (E585J, J1, E586W, X, F584W, F585W, F586W, G584W1, H584W – Four screws to remove bottom base, then two screws under chassis.) (E587W, W1, E680W, F587W, F680W, G587W2, GR587W1, G680W2, H587W, HR587W – Also four screws under tape assembly.)
6. Remove four screws from front of chassis. (E587W, W1, E680W, F587W, F680W, G587W2, GR587W1, G680W2, H587W, HR587W – Tape unit is secured to radio chassis with a bracket. There are two additional screws to the left of the tape unit.)
7. Slide radio chassis (E587W, W1, E680W, F587W, F680W, G680W, G587W2, GR587W1, G680W2, H587W, HR587W – Tape unit is mounted to radio chassis with a bracket), with attached brackets and cables, out thru front of cabinet.

This completes chassis removal.

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

ESCUTCHEON REMOVAL – GROUP “C”

CHASSIS 6WGR56	CHASSIS 6WHR56
MODEL GR684W	MODEL HR684W, W1
CHASSIS 6WGR57	CHASSIS 6WHR57
MODELS G590W	MODEL H590W
GR590W	HR590W, W1
GR591W	HR591W

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

Figure 8 illustrates the technique used:

1. Remove all knobs (except Power, AFC and Matrix). Also remove the nut on the head phone jack.
2. Group “C” models have three notches formed into the under side of the escutcheon (visible from the bottom).
3. Insert screwdriver blade into this notch, between the escutcheon and the cabinet proper, being careful not to mar the surface. Force the escutcheon outward, causing it to disengage each stud.
4. Remove the escutcheon.

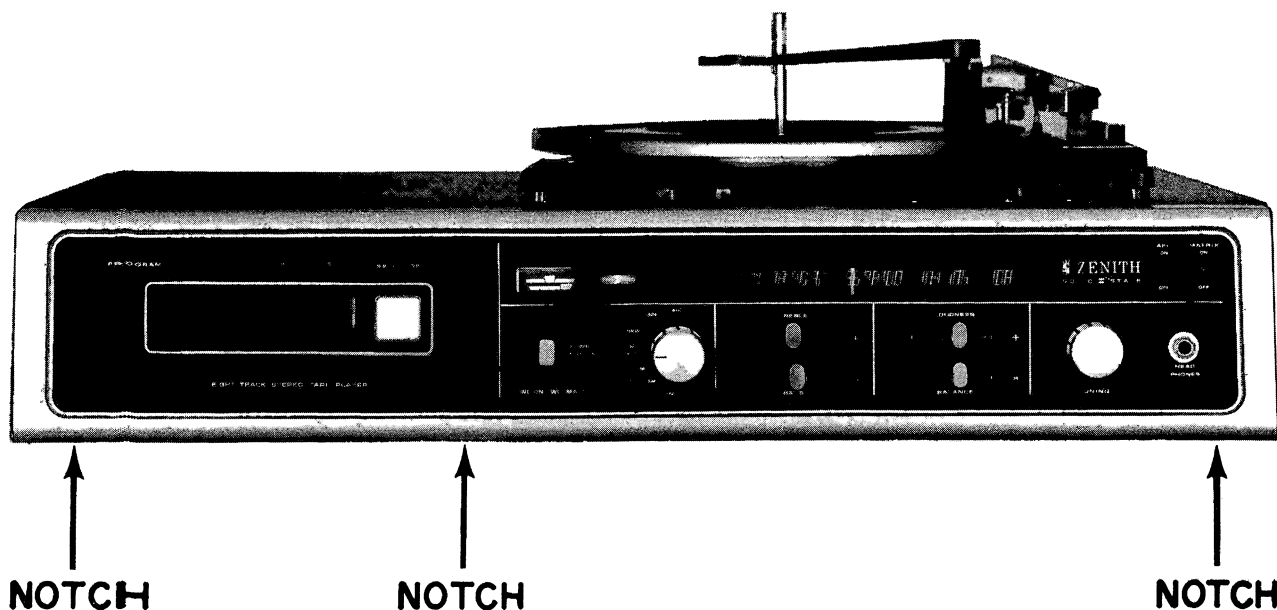


FIGURE 8 – ESCUTCHEON REMOVAL – GROUP “C”

OUT FRONT CHASSIS REMOVAL – GROUP “C”

1. Remove escutcheon as explained above.
2. Remove screws holding cabinet back, and remove back.
3. Unmount both the Speaker Jack Assembly Bracket and the Antenna/Tape/Phone Connector Assembly Bracket from the cabinet back.
4. Untie cable retainers. (Disconnect record changer and tape unit cables when used.)
5. Remove three screws from bottom of cabinet under tuner chassis, then four screws under tape assembly.
6. Remove three screws from front of chassis. Tape unit is secured to radio chassis with a bracket (G590W, GR590W, GR684W, H590W, HR590W, W1, HR591W, H684W, W1).
7. Slide radio chassis (Tape unit is mounted to radio chassis with a bracket), with attached brackets and cables, out thru front of cabinet.

This completes chassis removal.

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

COMPONENT PART NUMBER IDENTIFICATION

Knowledge of Zenith's component part numbering system can help you locate the correct part and can also aid you in identifying interchangeable components.

Part numbers normally fall into two basic categories:

1. Component assemblies consisting of two or more components have a single digit alpha prefix. Examples include:

PREFIX	DESCRIPTION	EXAMPLE
A	Switch Assembly	A-2280
S	AM Antenna Assembly	S-88463

2. Individual components are identified by a one, two or three digit numeric prefix (base group). Examples include:

PREFIX	DESCRIPTION	EXAMPLE
2	Cabinet Back	2-3742
63	Resistor	63-10135
100	Lamp	100-249
221	Integrated Circuit	221-91

- There are some exceptions to categories 1 and 2 above in that a numeric **prefix** (base group) is used for certain specific types of assemblies. Examples include:

PREFIX	DESCRIPTION	EXAMPLE
169	Record Changer	169-511
169	Tape Player/Recorder	169-506

In addition, some part numbers contain alpha, numeric or numeric-alpha suffixes. While the following is the basic part number assignment concept used in audio products, there may be times when a design change may occur, after assignment of a part number, which could limit interchangeability. This must be taken into consideration when using substitute components. Always refer to the latest parts and service data for interchangeability information.

- A part number having only an alpha suffix normally indicates that it is interchangeable with a part having the same number, with or without an alpha suffix.
- A part number with only a numeric suffix indicates that the component is:
 - Not interchangeable with a component without a numeric suffix, or
 - In some cases it might be a one way replacement for a component having either no numeric suffix or having a lower numeric suffix. **Refer to the latest parts and service data for correct usage.**
- Rules 1 and 2 would be applied to a part number having both alpha and numeric suffixes in the order used.

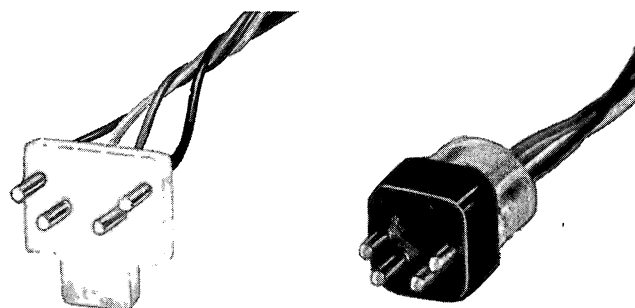
For example:

GROUP A	GROUP B
BASE – NUMBER & SUFFIX	BASE – NUMBER – SUFFIX
169-506	169-506-01
169-506A	169-506-01A
169-506B	169-506-01B

Components within group A or within group B could be interchanged with other components in the same group, but components in group A cannot be interchanged with components in group B. In some cases, components with numeric suffixes (as in group B) might be a replacement for components without a numeric suffix (as in group A) or for those having a lower numeric suffix. **Refer to parts and service data for correct usage.**

While the basic external mechanical and electrical specifications of alpha suffix components are such that either may be used, there may be internal differences which require different components, should service be required. Refer to the correct parts and service publications for replacement component information.

To assist the service technician, "HF" series service manuals contain expanded feature charts for record changers and tape units (see pages 5 thru 7).



906-11234-9
USED WITH 142-182

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

FIGURE 9 – CARTRIDGE CONNECTORS

RECORD CHANGER AND PHONO CARTRIDGE INTERCHANGEABILITY

Record changers in the 169-511, 169-512 and 169-513 series (used in "G" and "H" line 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 connector contacts are positioned differently. This results in the use of different connector and cable assemblies. Figure 9 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 No. 906-11235-0, then on No. 906-11234-9.

Table A details the part number identification and family relationship of the above record changers, phono cartridges and cable assemblies.

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

ALLEGRO SPEAKER SYSTEMS

"H" line speaker systems can be divided into three basic groups as follows:

- Allegro 1000 (Model H1000W), Allegro 2000 (Model H2000W) and Allegro 3000 (Model H3000W) are the modular speaker systems designed for use with the "H" line modular as well as for external usage with the "H" line modular and those "H" line consoles having the "Two On Two" speaker matrix feature, or external speaker jacks.

2. Allegro in all consoles except H901P, P11, HR901P, P11, HR902P, P11, HR903PN, PN11, SR917M, SR918P.
3. Non-Allegro System in models excluded by Allegro Systems in category 2 above.

Since a detailed explanation of the design and operation of Allegro Speaker Systems appeared in Service Manual HF31 (starting on page 27) we won't discuss that aspect here. Instead, we will look at those areas which make the "H" line Allegro Speaker Systems different from their recent counterparts. Among the new features are:

1. 8 ohm impedances on "G" and "H" line Allegro 1000, 2000 and 3000 Series Systems.
2. Larger enclosures.
3. A Brilliance Switch (on Models H2000W and H3000W).
4. "Sealed Back" enclosure and repair techniques (Models H1000W2, W3, H2000W3 and H3000W3).

For proper sound output level, the speaker systems must have the correct impedance matching. That is, use an 8 ohm system with those sets that require 8 ohm loads and a 16 ohm system with those calling for a 16 ohm load. Models E9014W and E9018W were 16 ohm systems. Load requirements may be determined from the information on the rear of the main unit, speaker data in the Product Feature Charts and schematics for the respective models. Table B lists the Allegro Speaker Systems used in the "E" through "H" lines, along with the impedance of the various models. "E" line Allegro Speaker Systems were also used with "F" line models.

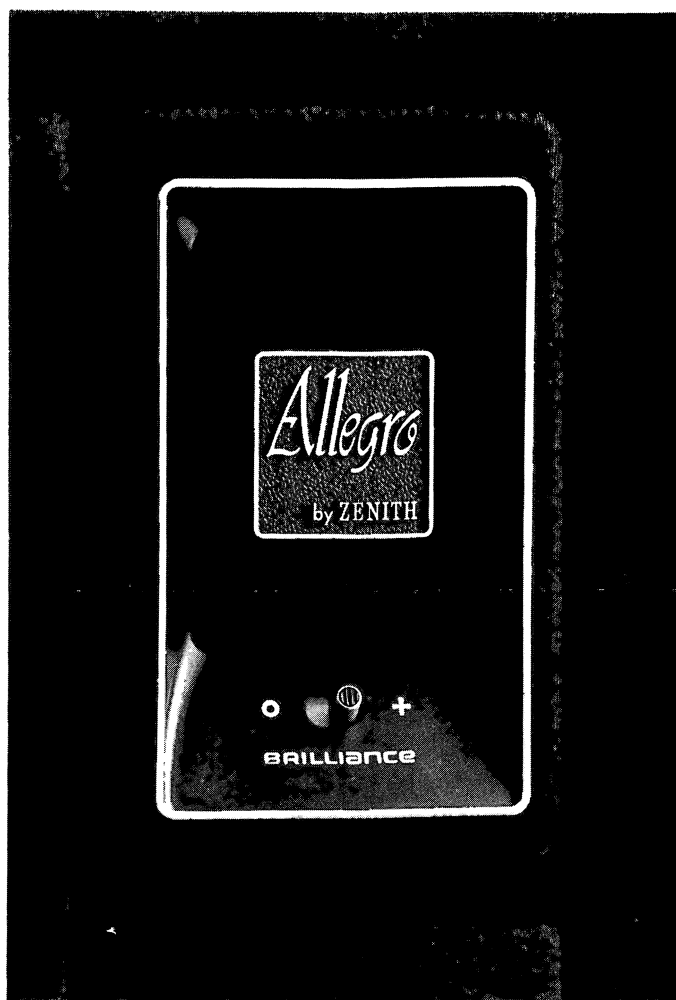


FIGURE 10 – BRILLIANCE SWITCH

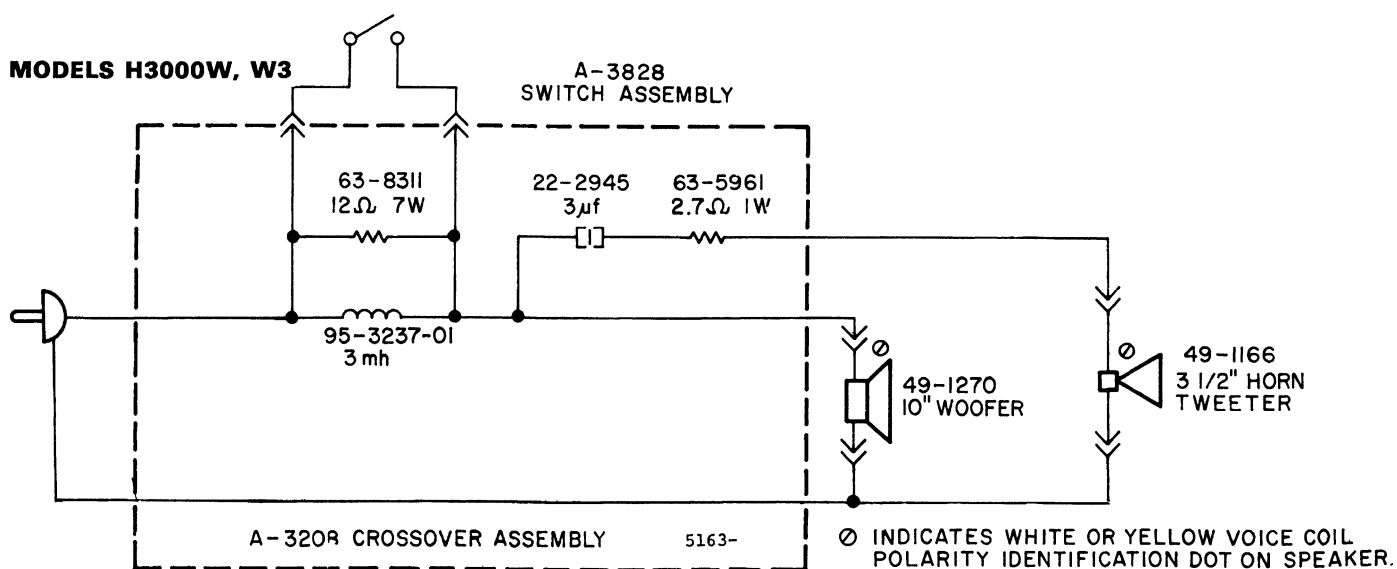


FIGURE 11 – SCHEMATIC FOR MODEL H3000W ALLEGRO SPEAKER SYSTEM

TABLE B – ALLEGRO SPEAKER SYSTEM MODELS		
IMPEDANCE SERIES	8 OHM	16 OHM
Allegro 1000	E9012W, E9012W1, G1000W, G9012W1, H1000W, H1000W1, H1000W2, H1000W3,	—
Allegro 2000	G2000W, G2000W11, G9014W, H2000W, H2000W3	E9014W, E9014W1, E9014X, E9014X1
Allegro 3000	G3000W, G3000W11, G9018W, H3000W, H3000W3	E9018W, E9018W1, E9018X1
Allegro	G9019W	—

Table C compares the sizes of the "G" and "H" line modular Allegro enclosures.

TABLE C – SPEAKER ENCLOSURE SIZE		
MODEL LINE ALLEGRO SERIES	"G"	"H"
1000	16-1/2" h, 10-1/2" w, 7-1/2" d	18" h, 10-1/2" w, 7-1/2" d
2000	18-5/8" h, 12-3/8" w, 7-7/8" d	20-5/8" h, 13" w, 7-7/8" d
3000	22-3/4" h, 14-1/4" w, 8-7/8" d	24-3/4" h, 15-5/8" w, 10" d

Models H2000W and H3000W are provided with a two position Brilliance Switch located adjacent to the Allegro port on the front of each enclosure (See Figure 10). When the switch is in the "+" position the system will reproduce higher frequencies at a higher sound power output level, than previous Allegro Systems, resulting in the increased brilliance. When the switch is in the "0" position the speaker system operates at a "flat" curve equivalent to the response of the "G" line Allegro 3000 Speaker Systems. Figure 11 is a schematic of the H3000W circuit showing the Brilliance Switch connected across a 12 ohm resistor and a 3mH inductor. The resistor and inductor are shorted when the switch is in the "+" position, but are in the circuit when the switch is in the "0" position. H2000W operation is similar to that just described for the H3000W.

SERVICE PROCEDURES FOR "CAPTIVATED BACK" ALLEGRO SPEAKER SYSTEMS (MODELS H1000W2, H1000W3, H2000W3 and H3000W3)

Models listed above have "captivated backs" and require a service technique that is different from that used with present speaker enclosures having removable backs (such as current Models H1000W, W1, H2000W and H3000W). To gain access to the inside of these "captivated back" enclosures it is necessary to cut-out a portion of the existing back, make the required repairs (replace a speaker, etc.) and then install a replacement back.

Proceed as follows:

1. Place speaker enclosure on a firm work surface protected by felt or similar non-abrasive material. It may be desirable to construct a padded framework to hold the speaker enclosure during the following steps.

CAUTION: To protect the cabinet and grille from damage position the enclosure so the grille and Allegro port (which protrude in front of the cabinet) will not touch any surface in the work area.

CAUTION: Do not permit enclosure to slide while performing these steps, as this may scratch or otherwise mar the cabinet's finish.

2. Draw four (4) straight lines on existing cabinet back as illustrated (by dash lines) in Figure 12. The lines must be at least 2" from, and parallel with, the outer edges of side, top and bottom panels.

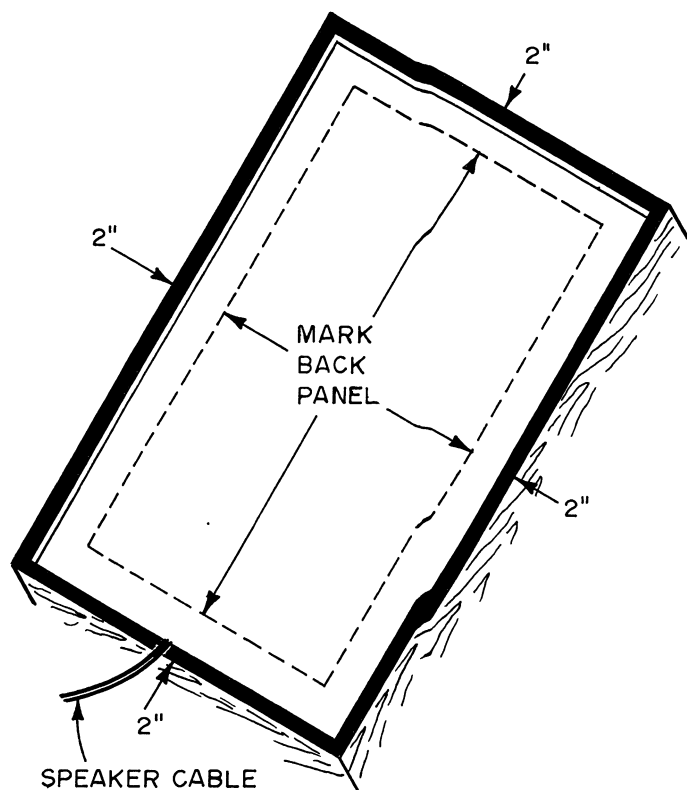


FIGURE 12 – MARKING BACK PANEL

Referring to Figure 13, cut along the four (4) lines marked in step 2, using a sabre saw or router.
CAUTION: All holes required to start cut, and the cut itself, must be made to side of line nearest the center of cabinet back, so as to avoid possible damage to portion of cabinet back that remains in cabinet. Control depth of cut to avoid cutting either speaker wire or acoustic pads inside enclosure (back is approximately 3/8" thick).

Remove and discard cut-out portion of back.

Acoustic material might be stapled to inside of some enclosures. If this material must be removed, first remove staples (if used) being certain loose staples do not lodge inside enclosure. Acoustic material must be replaced in same location after completing repairs (a "U" shape with bottom edge near inside bottom of cabinet).

Repair (replace speakers, etc.) as needed.

Position replacement back panel on that portion of back still remaining (See Figure 14).

NOTE: Be certain speaker cable is fed out through slot provided at bottom edge of replacement back.

Replacement back has predrilled holes.

Using replacement back as a template, drill holes in portion of remaining back using 3/32" bit. These will be pilot holes for screws that hold replacement back.

Remove back and clean all chips, shavings, dust or other foreign material from enclosure.

11. Apply a strip of tape (Zenith part number 140-313) to the surface of the back, remaining in the enclosure, against which the replacement back will rest (See shaded area in Figure 15). This tape must be used to prevent air leaks.

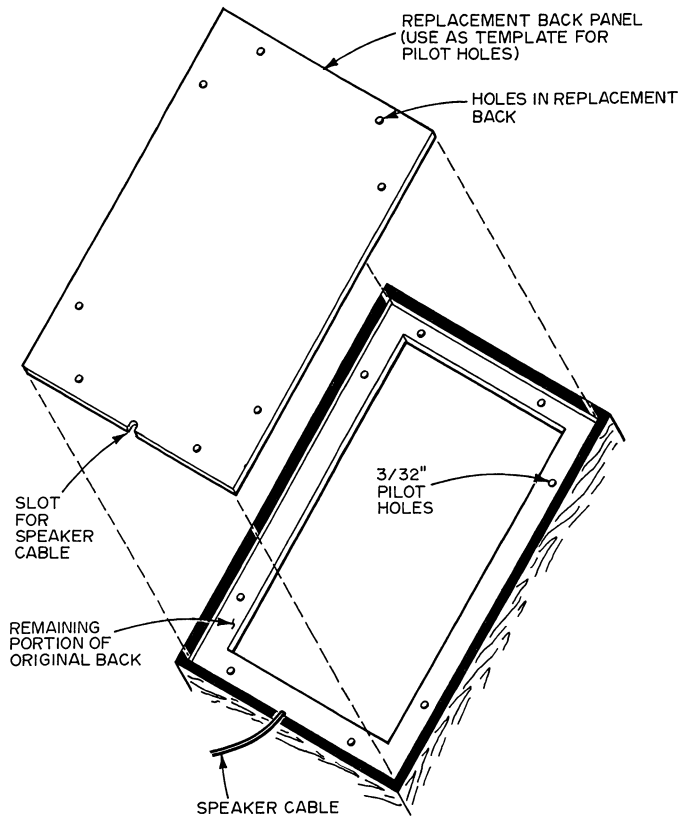
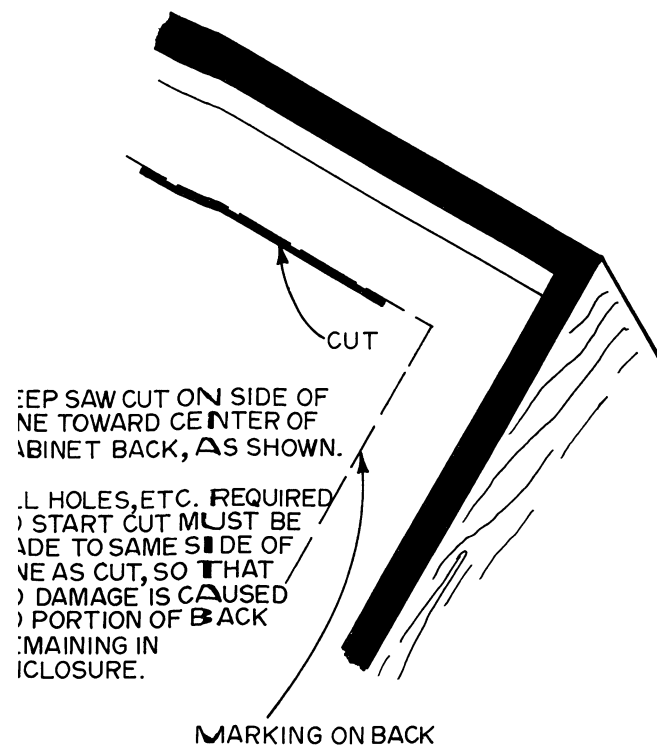


FIGURE 14 – PILOT HOLES



SABRE SAW CUT ON SIDE OF LINE TOWARD CENTER OF CABINET BACK, AS SHOWN.

MARKING ON BACK

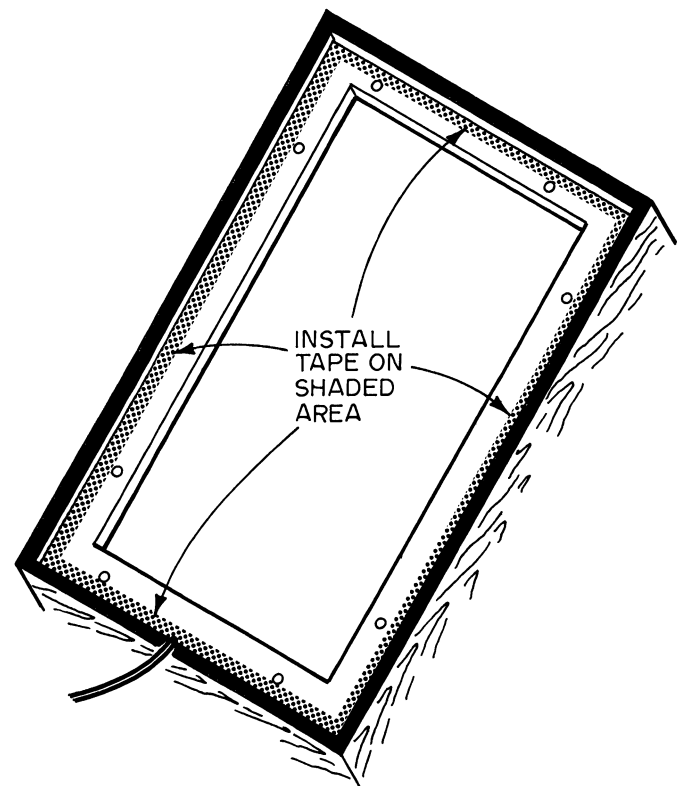


FIGURE 15 – INSTALLING TAPE

12. Position replacement back on portion of back remaining in enclosure.

CAUTION: Be certain speaker cable is fed out through slot provided at bottom edge of replacement back.

13. Insert 7/8" long flat head, Phillips type screws through the pre-drilled holes in the replacement back. Tighten the screws so the back is firmly secured to the portion of the back remaining in the enclosure (See Figure 16).

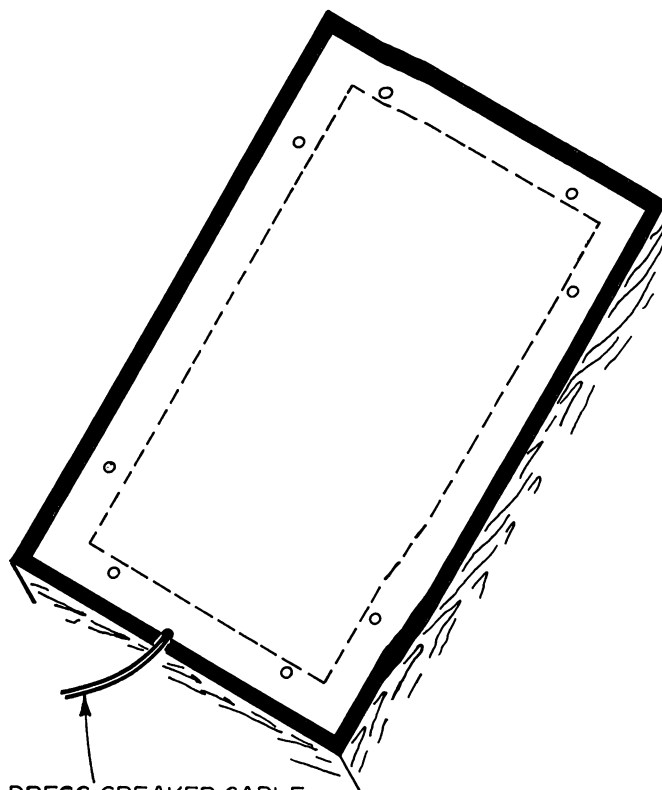
14. Test completed unit.

CABINET REPAIR TIPS

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

- A. When removing the back, handle the acoustical pads carefully (they may tear easily).
- B. Speakers (and other components) must be securely fastened to prevent air leaks, and loose components can result in rattles. Air leaks and rattles can result in a deterioration of performance.
- C. When replacing the back, be certain that the acoustic pads don't obstruct the port.
- D. All screws holding the back must be secured by using a sufficient amount of torque, in order to prevent air leaks.

POSITION REPLACEMENT BACK PANEL ON REMAINING PORTION OF THE ORIGINAL BACK AND SECURE WITH 7/8" PHILLIPS FLAT HEAD SCREWS THROUGH PREDRILLED HOLES IN REPLACEMENT BACK PANEL



DRESS SPEAKER CABLE THROUGH SLOT IN REPLACEMENT BACK

FIGURE 16 – SECURING NEW PANEL



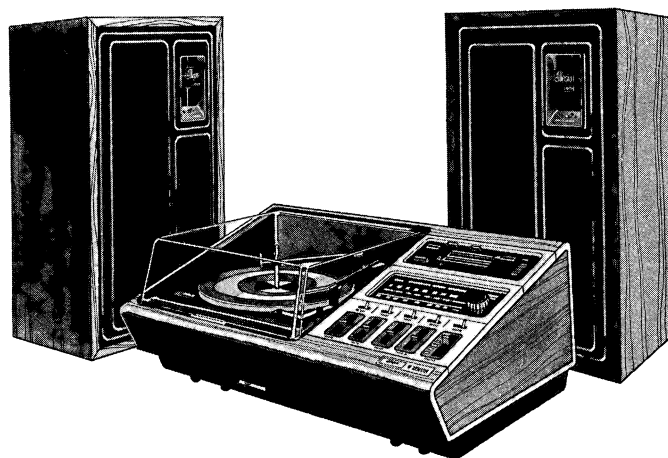
H584W



HR587W



H590W



HR596W



HR684W

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

REPRESENTATIVE MODEL ILLUSTRATION

REVISIONS

Change information will follow the format illustrated below. Each chart heading will list Chassis and/or Model identification and reference to the appropriate Service Manual, such as "Refer to HF31". Change information will normally consist of: schematic reference number (i.e. C304), action taken (omit, add, or alternate usage), part number and description of components, and a partial schematic of the circuit or other appropriate drawing.

CHASSIS 1WGR50 MODELS G901P, GR901P1, H901P, H901P11, HR901P, HR901P11, HR902P, HR902P11, HR903PN, HR903PN11, SR917M, SR918P				1WGR50 CHASSIS MODELS
COMPONENT CHANGES			REFER TO HF31S1, HF31S2	DRAWING CHANGES
(5133D1, B2)				
T101	OMIT	95-3077	AM Oscillator Transformer	
	ADD	95-3271	AM Oscillator Transformer	
T301	OMIT	95-3021	Input Coil 19kHz	
	ADD	95-3248	Input Coil 19kHz	

CHASSIS 3WGR50 MODELS G914P, P11, G915AE, AE11, G916M, M11			3WGR50 CHASSIS MODELS
COMPONENT CHANGES		REFER TO HF31	DRAWING CHANGES
(4531H1, H2)			
Q454	NOTE	—	HF31, Page 40 - 121-977-01 should read 121-976-01

CHASSIS 3WGR52 MODELS G584W1, W2, G587W2, W3, GR587W1, W2			3WGR52 CHASSIS MODELS
COMPONENT CHANGES		REFER TO HF31	DRAWING CHANGES
(5089C1, C2, 5087B)			
Q404/ Q405	NOTE	—	HF31, Page 45 - Transistor Chart - 121-976 should read 121-976-01 121-977 should read 121-977-01
Q453	NOTE	—	HF31, Page 44 - 121-1003 should read 121-1004

CHASSIS 3WGR54 MODEL G680W2			3WGR54 CHASSIS MODELS	
COMPONENT CHANGES			REFER TO HF31	DRAWING CHANGES
(5092 D1, D2)				
C222	NOTE	22-3362	HF31, Page 49 - Legend - should read 560PF	
Q454	NOTE	—	HF31, Page 47 - 121-976 should read 121-976-01	

REVISIONS

CHASSIS 6WGR55 MODELS G920AE, G921P, G922M

6WGR55 CHASSIS MODELS

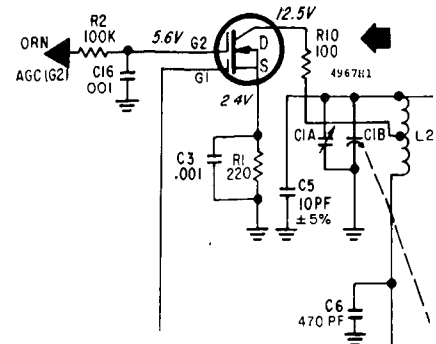
COMPONENT CHANGES

REFER TO HF31, HF31S1

DRAWING CHANGES

(4967H1, H2)

R10	OMIT	63-4133	56 Ohm 10% 1/4W
	ADD	63-4142	100 Ohm 5% 1/4W
R303	NOTE	—	Alternate Part Number should read 63-7918



CHASSIS 6WGR56 MODEL GR684W

6WGR56 CHASSIS MODELS

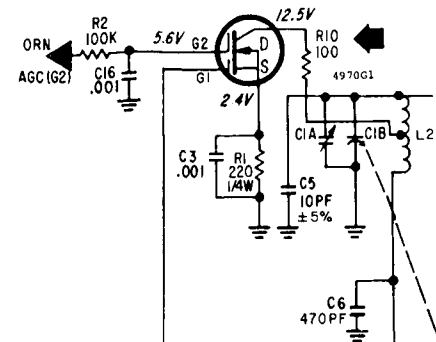
COMPONENT CHANGES

REFER TO HF31, HF31S1

DRAWING CHANGES

(4970G1, G2)

R10	OMIT	63-4133	56 Ohm 10% 1/4W
	ADD	63-4142	100 Ohm 5% 1/4W



CHASSIS 6WGR57 MODELS G590W, GR590W, GR591W

6WGR57 CHASSIS MODELS

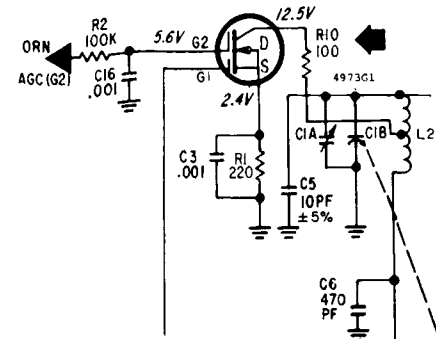
COMPONENT CHANGES

REFER TO HF31, HF31S1

DRAWING CHANGES

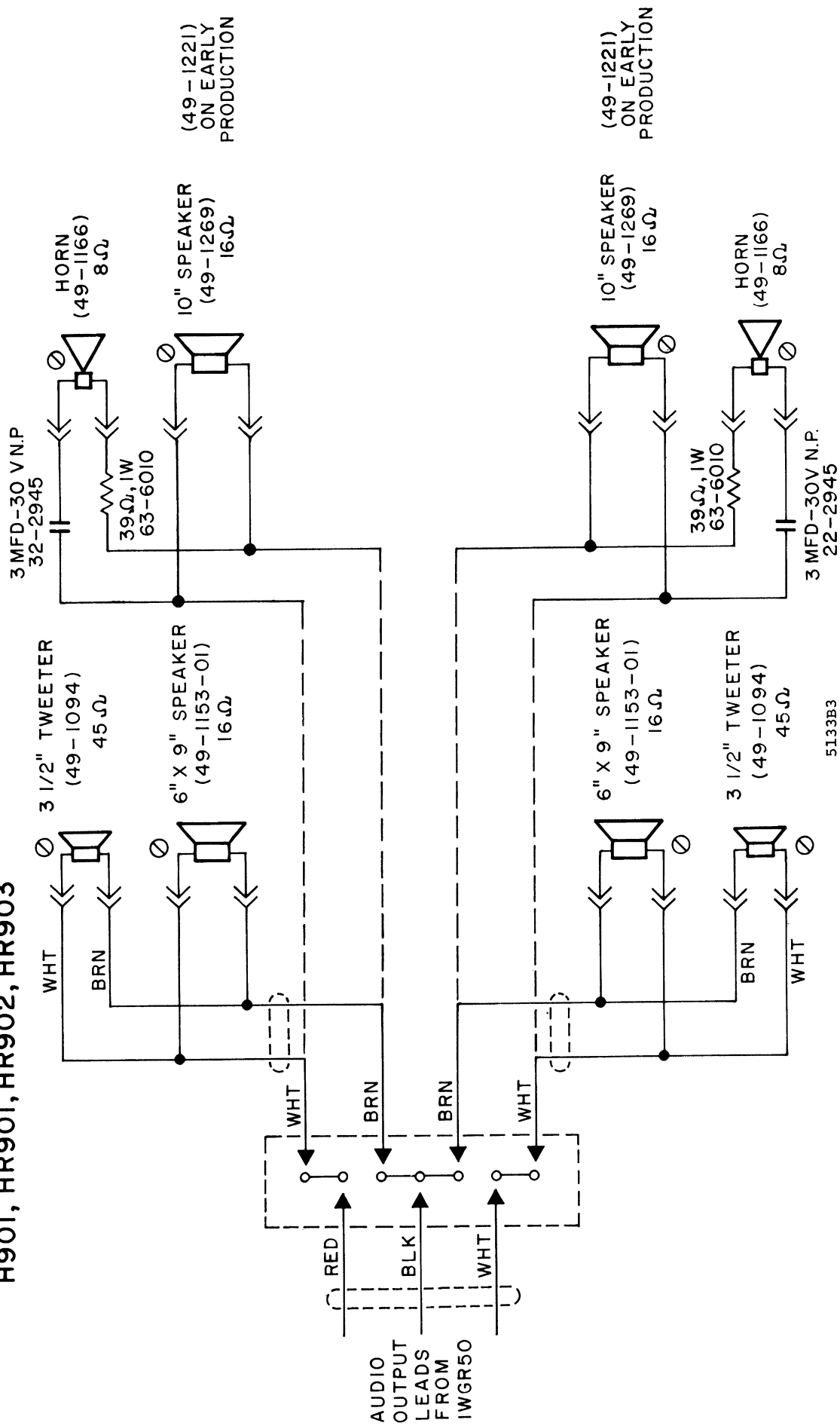
(4973G1, G2)

R10	OMIT	63-4133	56 Ohm 10% 1/4W
	ADD	63-4142	100 Ohm 5% 1/4W



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

MODELS: SR917, SR918

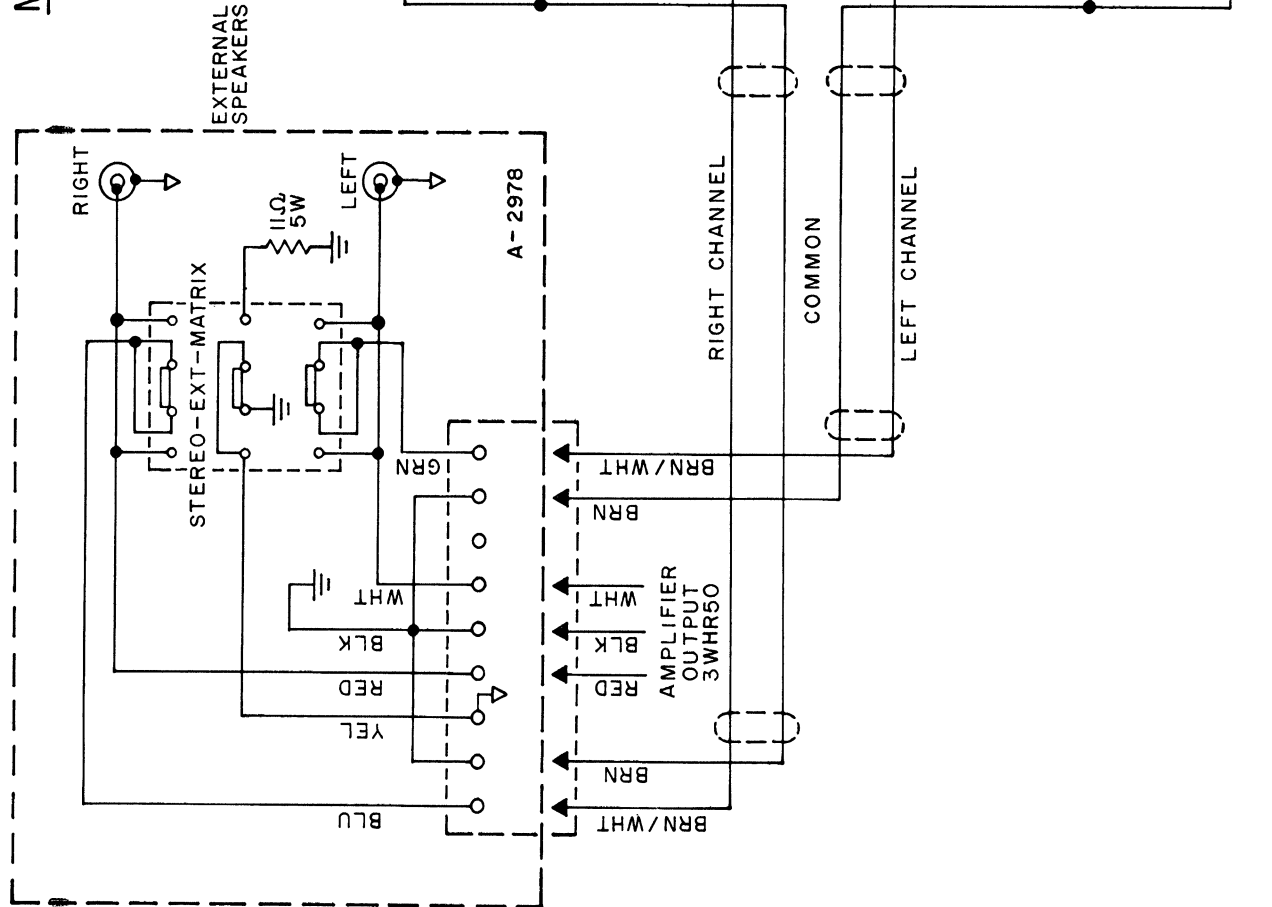


⊗ INDICATES WHITE OR YELLOW VOICE COIL POLARITY IDENTIFICATION DOT ON SPEAKER.

MODELS: H914, H915, H916

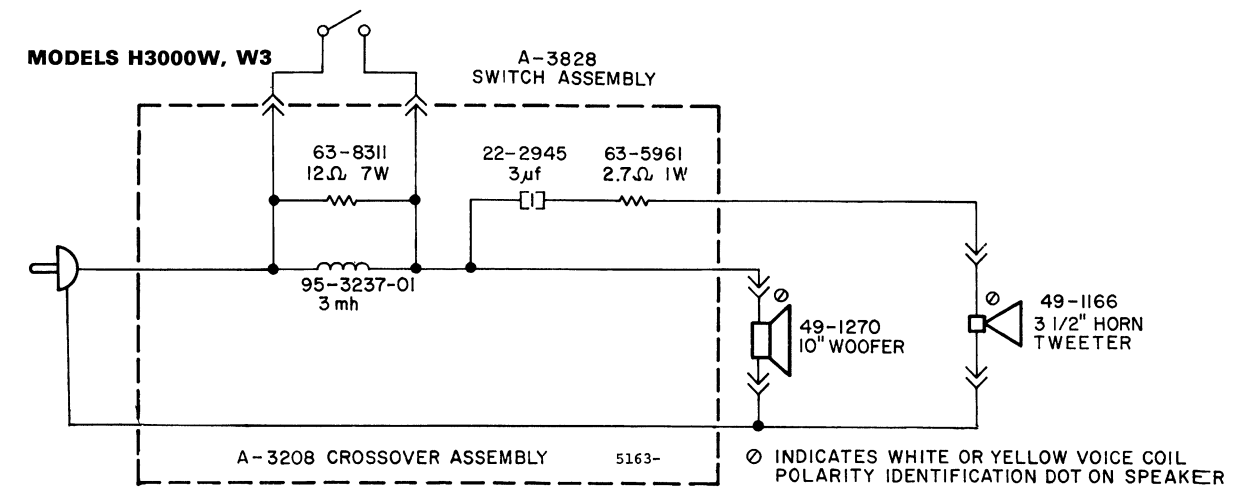
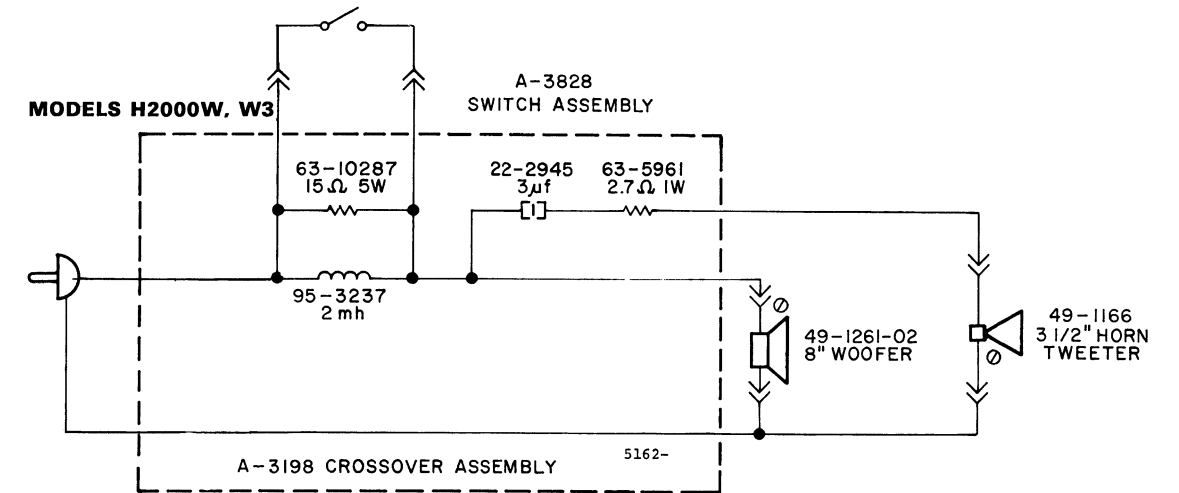
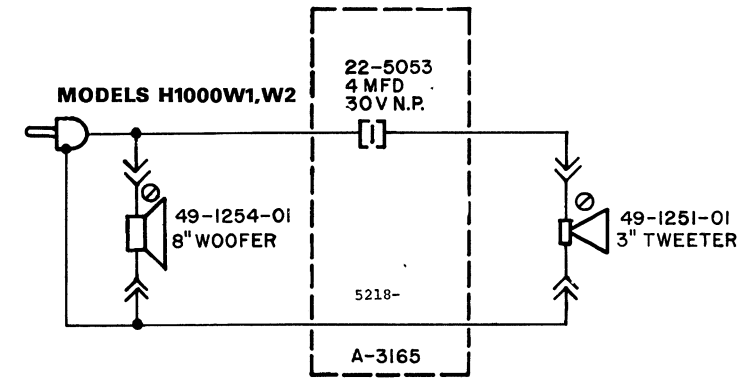
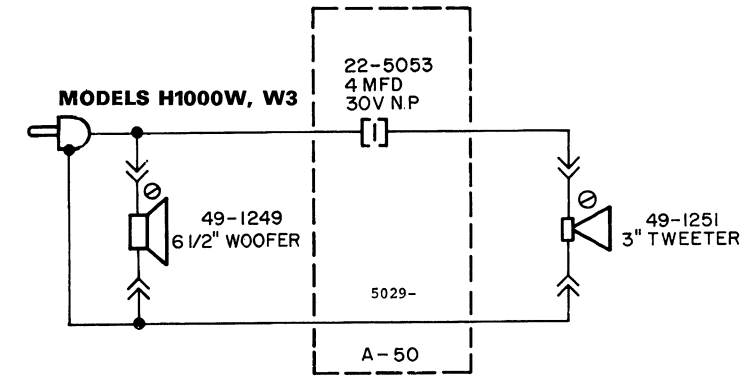
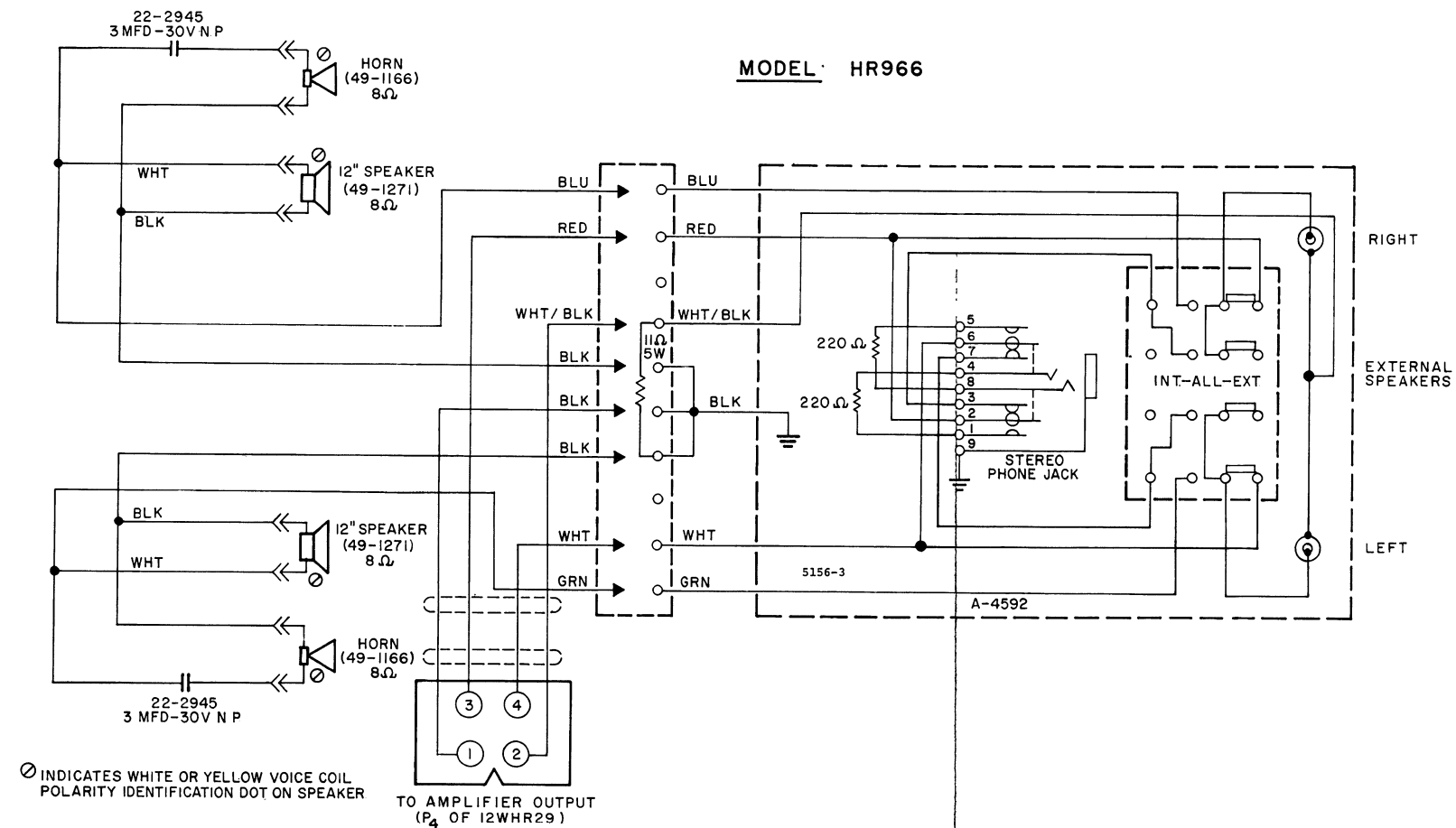
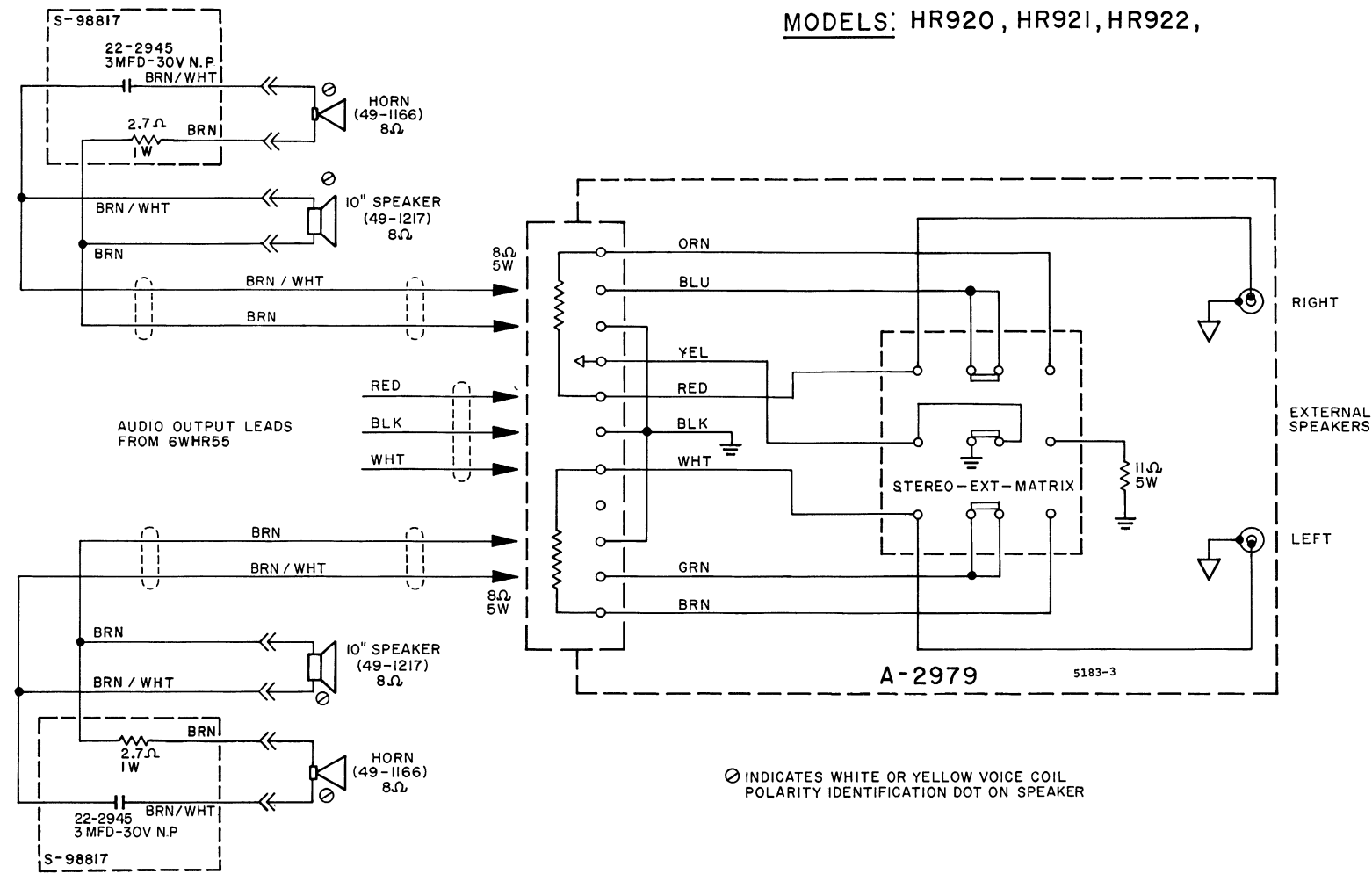
NOTE:

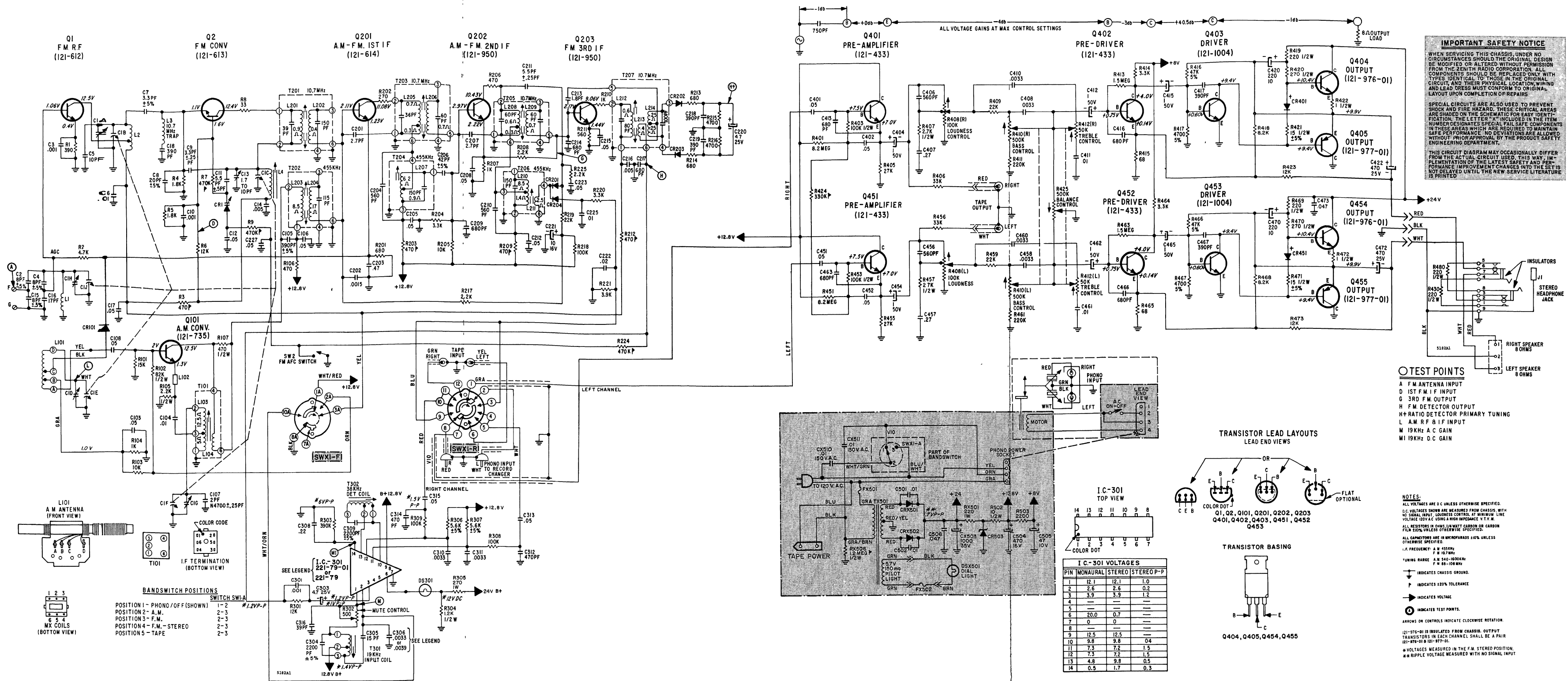
⊙ INDICATES WHITE OR YELLOW VOICE COIL
POLARITY IDENTIFICATION DOT ON SPEAKER.



SPEAKER WIRING SCHEMATICS

MODELS: HR920 , HR921, HR922,





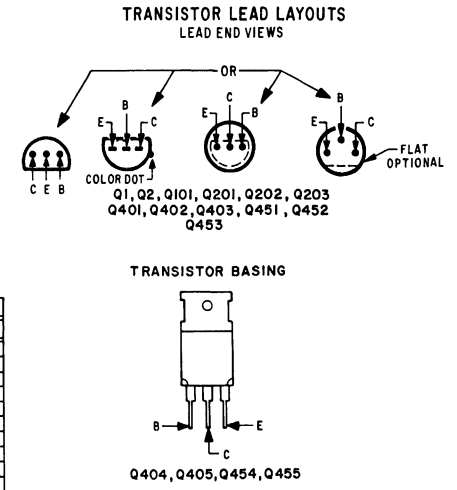
IMPORTANT SAFETY NOTICE

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 SHADDED ON THE SCHEMATIC FOR EASY IDENTIFICATION. THE LETTER "X" INCLUDED IN THE ITEM NUMBER DESIGNATES SPECIAL FAIL-SAFE COMPONENTS IN THESE AREAS WHICH ARE REQUIRED TO MAINTAIN SAFE PERFORMANCE. NO DEVIATIONS ARE ALLOWED WITHOUT PRIOR APPROVAL BY THE PRODUCT SAFETY ENGINEERING DEPARTMENT.

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

- TEST POINTS**
- A FM ANTENNA INPUT
 - D 1ST 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.

D.C. VOLTAGES SHOWN ARE MEASURED FROM CHASSIS, WITH NO SIGNAL INPUT. LOUDNESS CONTROL AT MINIMUM LINE VOLUME 100V A.C. USING A HIGH IMPEDANCE V.T.V.M.

ALL RESISTORS IN OHMS UNLESS OTHERWISE SPECIFIED.

ALL CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.

F.R. FREQUENCY: A = 555KHz F = 107KHz

TUNING RANGE: A = 140-160KHz F = 88-108KHz

↑ INDICATES CHASSIS GROUND.

⤴ INDICATES 100% TOLERANCE

⤵ INDICATES VOLTAGE

⊙ INDICATES TEST POINTS.

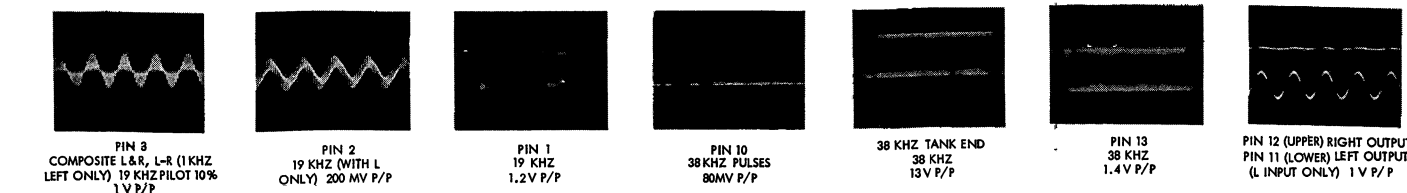
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION.

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

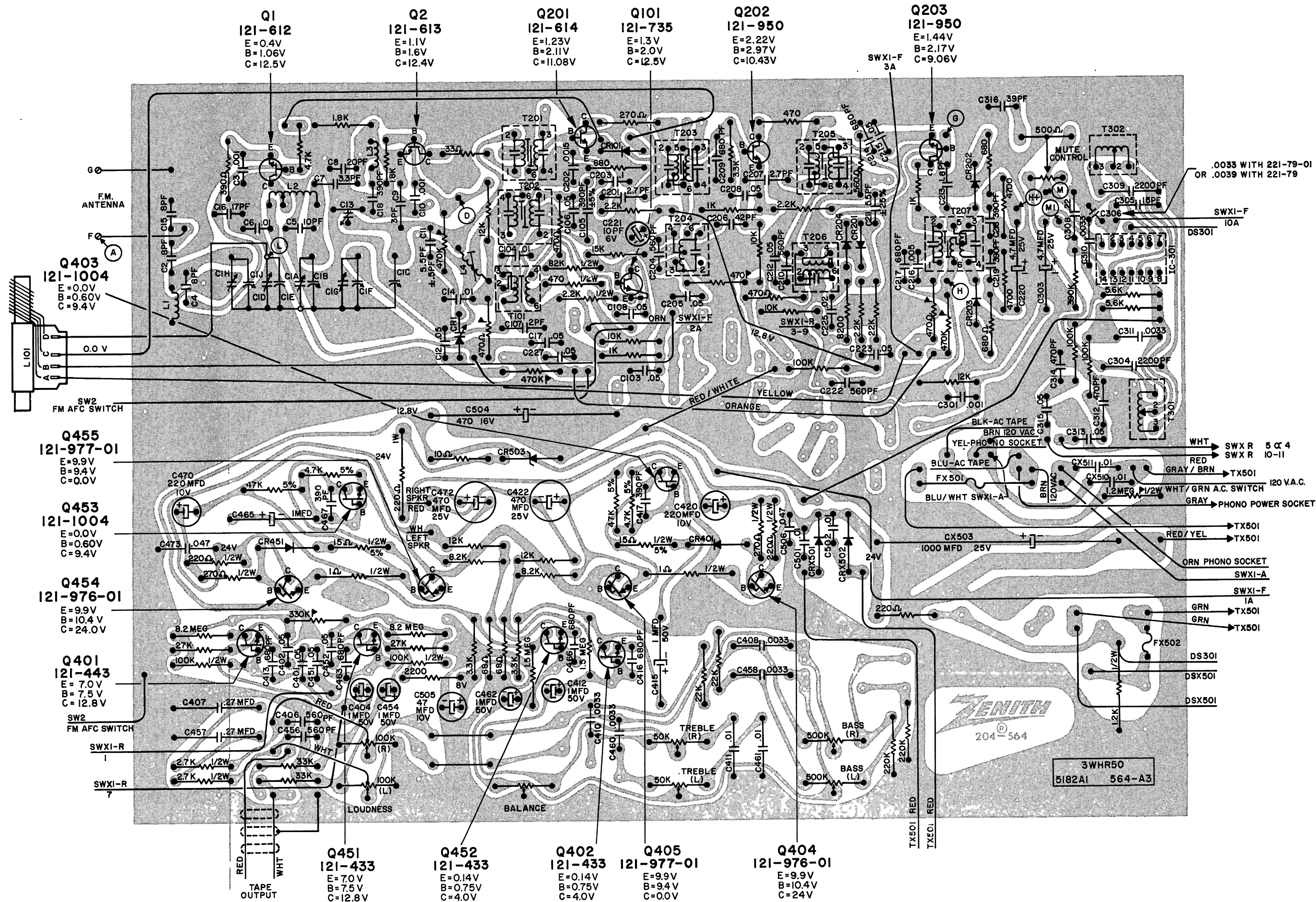
* VOLTAGES MEASURED IN THE F.M. STEREO POSITION.

** RIPPLE VOLTAGE MEASURED WITH NO SIGNAL INPUT.

IC 301 WAVE FORMS

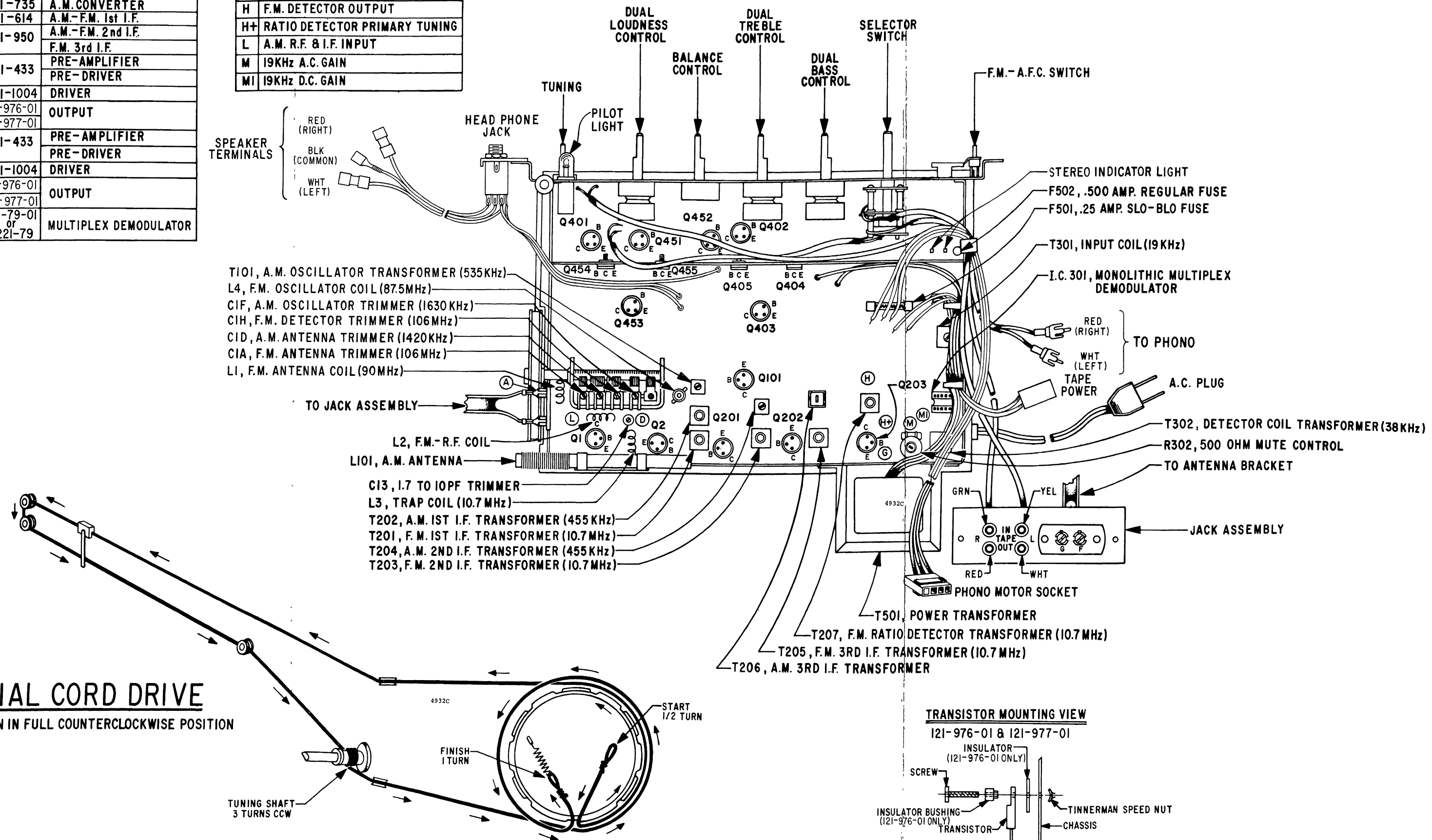


CHASSIS LEGEND 3WHR50									
ITEM NO.	PART NUMBER	DESCRIPTION	ITEM NO.	PART NUMBER	DESCRIPTION				
C1A	25-100	100 PF DISC TRIMMER	R463	Q3-924-48	1.5 MEG OHM 1/2W EALT 63-7379 120V				
C1B	25-100	100 PF DISC TRIMMER	R464	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1C	25-100	100 PF DISC TRIMMER	R465	Q3-902-44	3 OHM 1/2W EALT 63-7379 120V				
C1D	25-100	100 PF DISC TRIMMER	R466	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1E	25-100	100 PF DISC TRIMMER	R467	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1F	25-100	100 PF DISC TRIMMER	R468	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1G	25-100	100 PF DISC TRIMMER	R469	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1H	25-100	100 PF DISC TRIMMER	R470	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1I	25-100	100 PF DISC TRIMMER	R471	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1J	25-100	100 PF DISC TRIMMER	R472	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1K	25-100	100 PF DISC TRIMMER	R473	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1L	25-100	100 PF DISC TRIMMER	R474	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1M	25-100	100 PF DISC TRIMMER	R475	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1N	25-100	100 PF DISC TRIMMER	R476	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1O	25-100	100 PF DISC TRIMMER	R477	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1P	25-100	100 PF DISC TRIMMER	R478	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1Q	25-100	100 PF DISC TRIMMER	R479	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1R	25-100	100 PF DISC TRIMMER	R480	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1S	25-100	100 PF DISC TRIMMER	R481	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1T	25-100	100 PF DISC TRIMMER	R482	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1U	25-100	100 PF DISC TRIMMER	R483	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1V	25-100	100 PF DISC TRIMMER	R484	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1W	25-100	100 PF DISC TRIMMER	R485	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1X	25-100	100 PF DISC TRIMMER	R486	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1Y	25-100	100 PF DISC TRIMMER	R487	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C1Z	25-100	100 PF DISC TRIMMER	R488	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2A	25-100	100 PF DISC TRIMMER	R489	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2B	25-100	100 PF DISC TRIMMER	R490	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2C	25-100	100 PF DISC TRIMMER	R491	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2D	25-100	100 PF DISC TRIMMER	R492	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2E	25-100	100 PF DISC TRIMMER	R493	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2F	25-100	100 PF DISC TRIMMER	R494	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2G	25-100	100 PF DISC TRIMMER	R495	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2H	25-100	100 PF DISC TRIMMER	R496	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2I	25-100	100 PF DISC TRIMMER	R497	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2J	25-100	100 PF DISC TRIMMER	R498	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2K	25-100	100 PF DISC TRIMMER	R499	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2L	25-100	100 PF DISC TRIMMER	R500	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2M	25-100	100 PF DISC TRIMMER	R501	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2N	25-100	100 PF DISC TRIMMER	R502	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2O	25-100	100 PF DISC TRIMMER	R503	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2P	25-100	100 PF DISC TRIMMER	R504	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2Q	25-100	100 PF DISC TRIMMER	R505	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2R	25-100	100 PF DISC TRIMMER	R506	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2S	25-100	100 PF DISC TRIMMER	R507	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2T	25-100	100 PF DISC TRIMMER	R508	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2U	25-100	100 PF DISC TRIMMER	R509	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2V	25-100	100 PF DISC TRIMMER	R510	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2W	25-100	100 PF DISC TRIMMER	R511	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2X	25-100	100 PF DISC TRIMMER	R512	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2Y	25-100	100 PF DISC TRIMMER	R513	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C2Z	25-100	100 PF DISC TRIMMER	R514	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3A	25-100	100 PF DISC TRIMMER	R515	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3B	25-100	100 PF DISC TRIMMER	R516	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3C	25-100	100 PF DISC TRIMMER	R517	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3D	25-100	100 PF DISC TRIMMER	R518	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3E	25-100	100 PF DISC TRIMMER	R519	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3F	25-100	100 PF DISC TRIMMER	R520	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3G	25-100	100 PF DISC TRIMMER	R521	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3H	25-100	100 PF DISC TRIMMER	R522	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3I	25-100	100 PF DISC TRIMMER	R523	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3J	25-100	100 PF DISC TRIMMER	R524	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3K	25-100	100 PF DISC TRIMMER	R525	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3L	25-100	100 PF DISC TRIMMER	R526	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3M	25-100	100 PF DISC TRIMMER	R527	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3N	25-100	100 PF DISC TRIMMER	R528	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3O	25-100	100 PF DISC TRIMMER	R529	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3P	25-100	100 PF DISC TRIMMER	R530	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3Q	25-100	100 PF DISC TRIMMER	R531	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3R	25-100	100 PF DISC TRIMMER	R532	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3S	25-100	100 PF DISC TRIMMER	R533	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3T	25-100	100 PF DISC TRIMMER	R534	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3U	25-100	100 PF DISC TRIMMER	R535	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3V	25-100	100 PF DISC TRIMMER	R536	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3W	25-100	100 PF DISC TRIMMER	R537	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3X	25-100	100 PF DISC TRIMMER	R538	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3Y	25-100	100 PF DISC TRIMMER	R539	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C3Z	25-100	100 PF DISC TRIMMER	R540	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4A	25-100	100 PF DISC TRIMMER	R541	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4B	25-100	100 PF DISC TRIMMER	R542	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4C	25-100	100 PF DISC TRIMMER	R543	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4D	25-100	100 PF DISC TRIMMER	R544	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4E	25-100	100 PF DISC TRIMMER	R545	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4F	25-100	100 PF DISC TRIMMER	R546	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4G	25-100	100 PF DISC TRIMMER	R547	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4H	25-100	100 PF DISC TRIMMER	R548	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4I	25-100	100 PF DISC TRIMMER	R549	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4J	25-100	100 PF DISC TRIMMER	R550	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4K	25-100	100 PF DISC TRIMMER	R551	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4L	25-100	100 PF DISC TRIMMER	R552	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4M	25-100	100 PF DISC TRIMMER	R553	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4N	25-100	100 PF DISC TRIMMER	R554	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4O	25-100	100 PF DISC TRIMMER	R555	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4P	25-100	100 PF DISC TRIMMER	R556	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4Q	25-100	100 PF DISC TRIMMER	R557	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4R	25-100	100 PF DISC TRIMMER	R558	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4S	25-100	100 PF DISC TRIMMER	R559	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4T	25-100	100 PF DISC TRIMMER	R560	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4U	25-100	100 PF DISC TRIMMER	R561	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4V	25-100	100 PF DISC TRIMMER	R562	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4W	25-100	100 PF DISC TRIMMER	R563	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4X	25-100	100 PF DISC TRIMMER	R564	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4Y	25-100	100 PF DISC TRIMMER	R565	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C4Z	25-100	100 PF DISC TRIMMER	R566	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5A	25-100	100 PF DISC TRIMMER	R567	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5B	25-100	100 PF DISC TRIMMER	R568	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5C	25-100	100 PF DISC TRIMMER	R569	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5D	25-100	100 PF DISC TRIMMER	R570	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5E	25-100	100 PF DISC TRIMMER	R571	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5F	25-100	100 PF DISC TRIMMER	R572	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5G	25-100	100 PF DISC TRIMMER	R573	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5H	25-100	100 PF DISC TRIMMER	R574	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5I	25-100	100 PF DISC TRIMMER	R575	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5J	25-100	100 PF DISC TRIMMER	R576	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5K	25-100	100 PF DISC TRIMMER	R577	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5L	25-100	100 PF DISC TRIMMER	R578	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5M	25-100	100 PF DISC TRIMMER	R579	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5N	25-100	100 PF DISC TRIMMER	R580	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5O	25-100	100 PF DISC TRIMMER	R581	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5P	25-100	100 PF DISC TRIMMER	R582	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5Q	25-100	100 PF DISC TRIMMER	R583	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5R	25-100	100 PF DISC TRIMMER	R584	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5S	25-100	100 PF DISC TRIMMER	R585	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5T	25-100	100 PF DISC TRIMMER	R586	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5U	25-100	100 PF DISC TRIMMER	R587	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5V	25-100	100 PF DISC TRIMMER	R588	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5W	25-100	100 PF DISC TRIMMER	R589	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5X	25-100	100 PF DISC TRIMMER	R590	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5Y	25-100	100 PF DISC TRIMMER	R591	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C5Z	25-100	100 PF DISC TRIMMER	R592	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C6A	25-100	100 PF DISC TRIMMER	R593	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C6B	25-100	100 PF DISC TRIMMER	R594	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C6C	25-100	100 PF DISC TRIMMER	R595	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C6D	25-100	100 PF DISC TRIMMER	R596	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C6E	25-100	100 PF DISC TRIMMER	R597	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C6F	25-100	100 PF DISC TRIMMER	R598	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C6G	25-100	100 PF DISC TRIMMER	R599	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C6H	25-100	100 PF DISC TRIMMER	R600	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C6I	25-100	100 PF DISC TRIMMER	R601	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C6J	25-100	100 PF DISC TRIMMER	R602	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C6K	25-100	100 PF DISC TRIMMER	R603	Q3-902-44	10 OHM 1/2W EALT 63-7379 120V				
C6L	25-100	100 PF DISC TRIMMER	R604	Q					



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

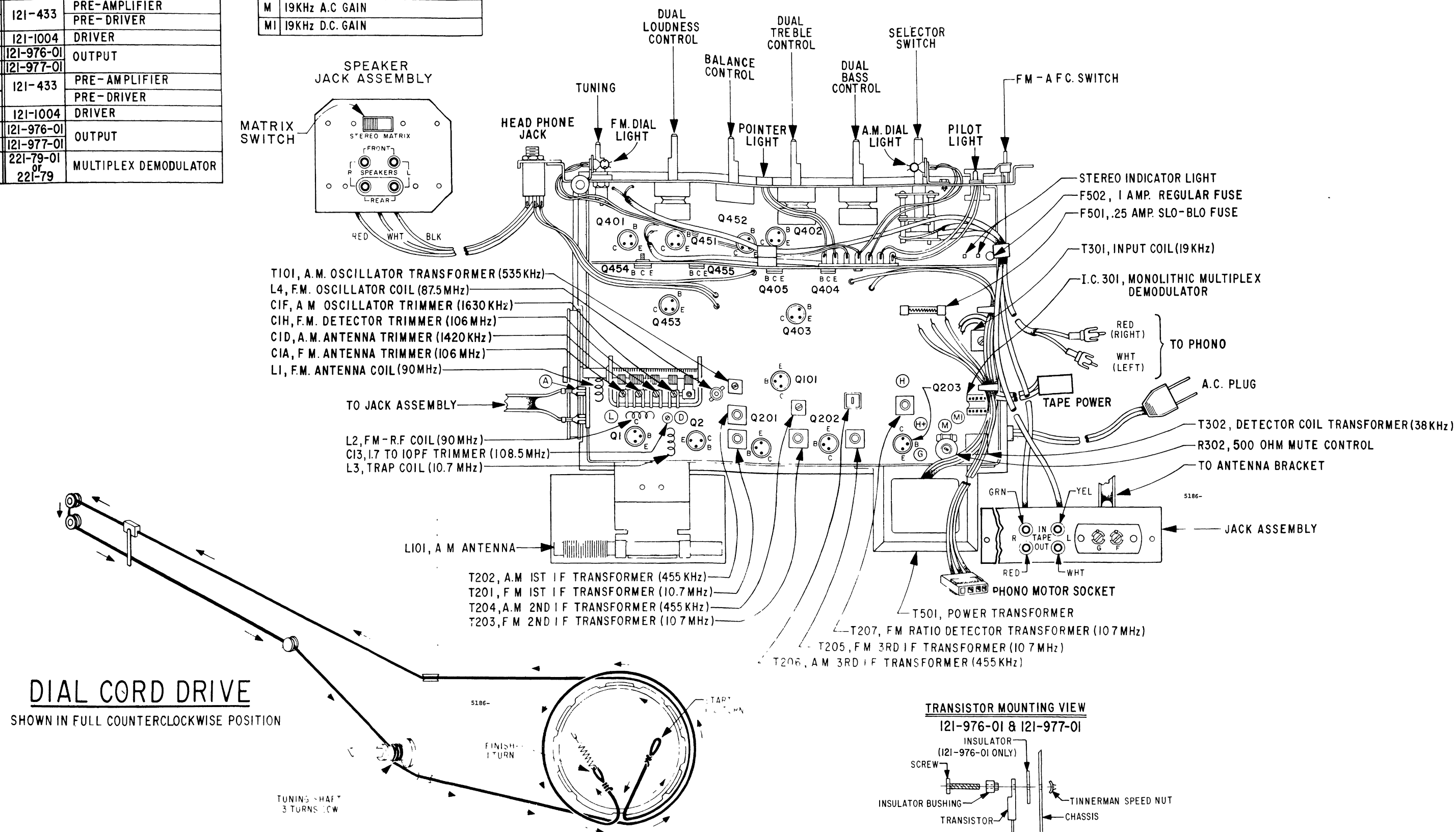
TEST POINTS	
A	F.M. ANTENNA INPUT
D	1st F.M. I.F. INPUT
G	3rd F.M. OUTPUT
H	F.M. DETECTOR OUTPUT
H+	RATIO DETECTOR PRIMARY TUNING
L	A.M. R.F. & I.F. INPUT
M	19KHz A.C. GAIN
MI	19KHz D.C. GAIN

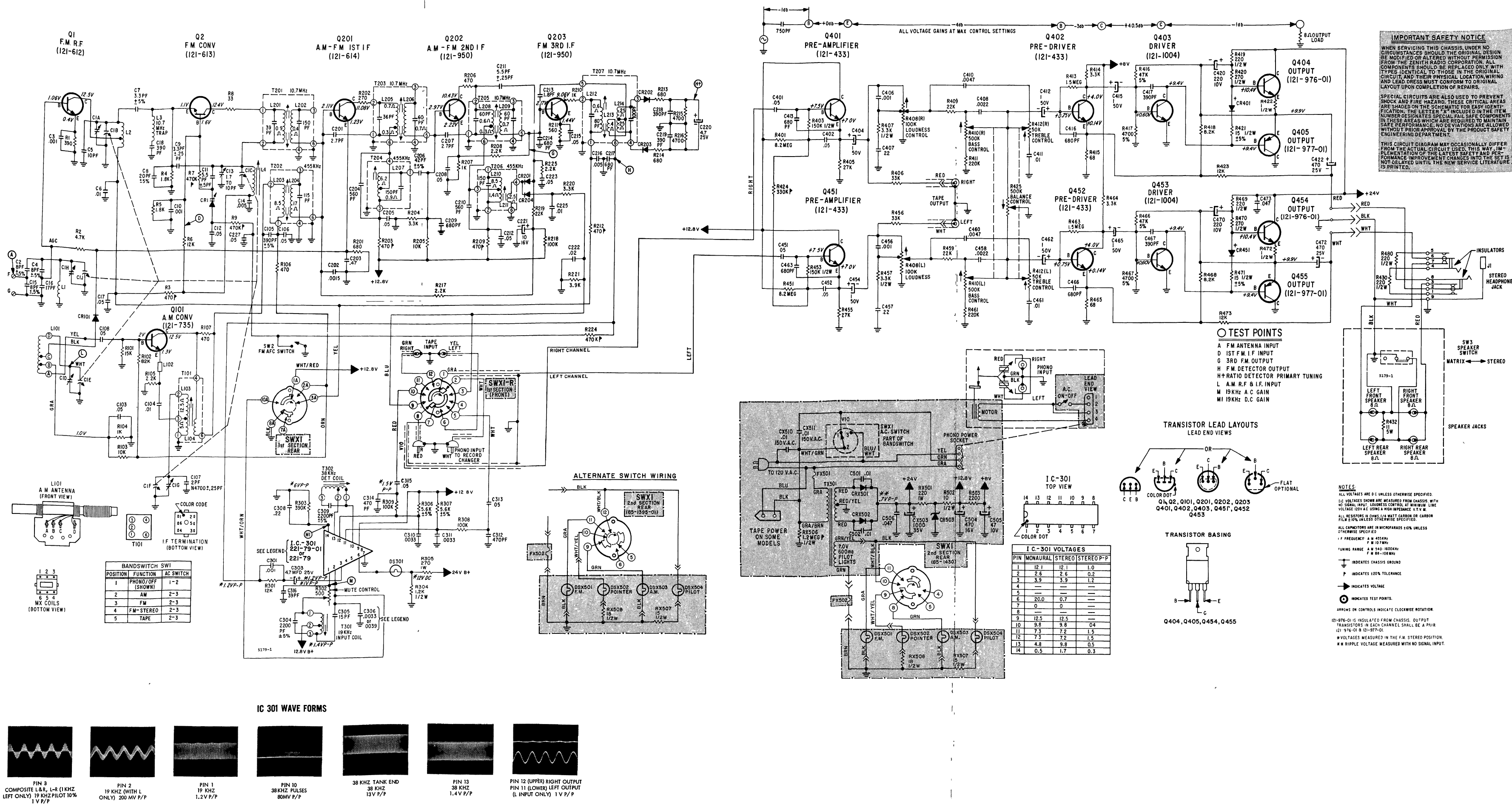


CHASSIS 3WHR50 - CHASSIS LAYOUT

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

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



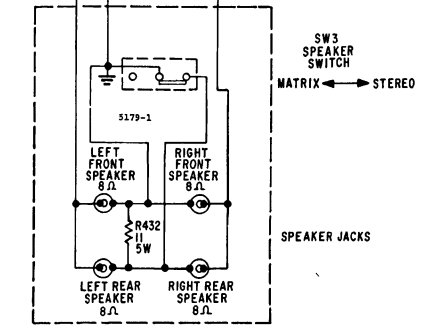


IMPORTANT SAFETY NOTICE

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 SHOWN 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.
 D.C. VOLTAGES SHOWN ARE MEASURED FROM CHASSIS, WITH NO SIGNAL INPUT. LOUDNESS CONTROL AT MINIMUM. LINE VOLTAGE 120V A.C. USING A HIGH-IMPEDANCE V.T.V.M.
 ALL RESISTORS IN OHMS, UNLESS OTHERWISE SPECIFIED.
 ALL CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.

† F. FREQUENCY A.M. 455KHz; F.M. 10.7MHz
 TUNING RANGE A.M. 540-1600KHz; F.M. 88-108MHz

⊥ INDICATES CHASSIS GROUND
 ± INDICATES 100% TOLERANCE
 → INDICATES VOLTAGE
 ○ INDICATES TEST POINTS

ARROWS ON CONTROLS INDICATE COUNTERCLOCKWISE ROTATION

121-976-01 IS INSULATED FROM CHASSIS. OUTPUT TRANSISTORS IN EACH CHANNEL SHALL BE A PAIR 121-976-01 & 121-977-01.
 * VOLTAGES MEASURED IN THE F.M. STEREO POSITION.
 ** RIPPLE VOLTAGE MEASURED WITH NO SIGNAL INPUT.

IC-301 TOP VIEW

COLOR DOT

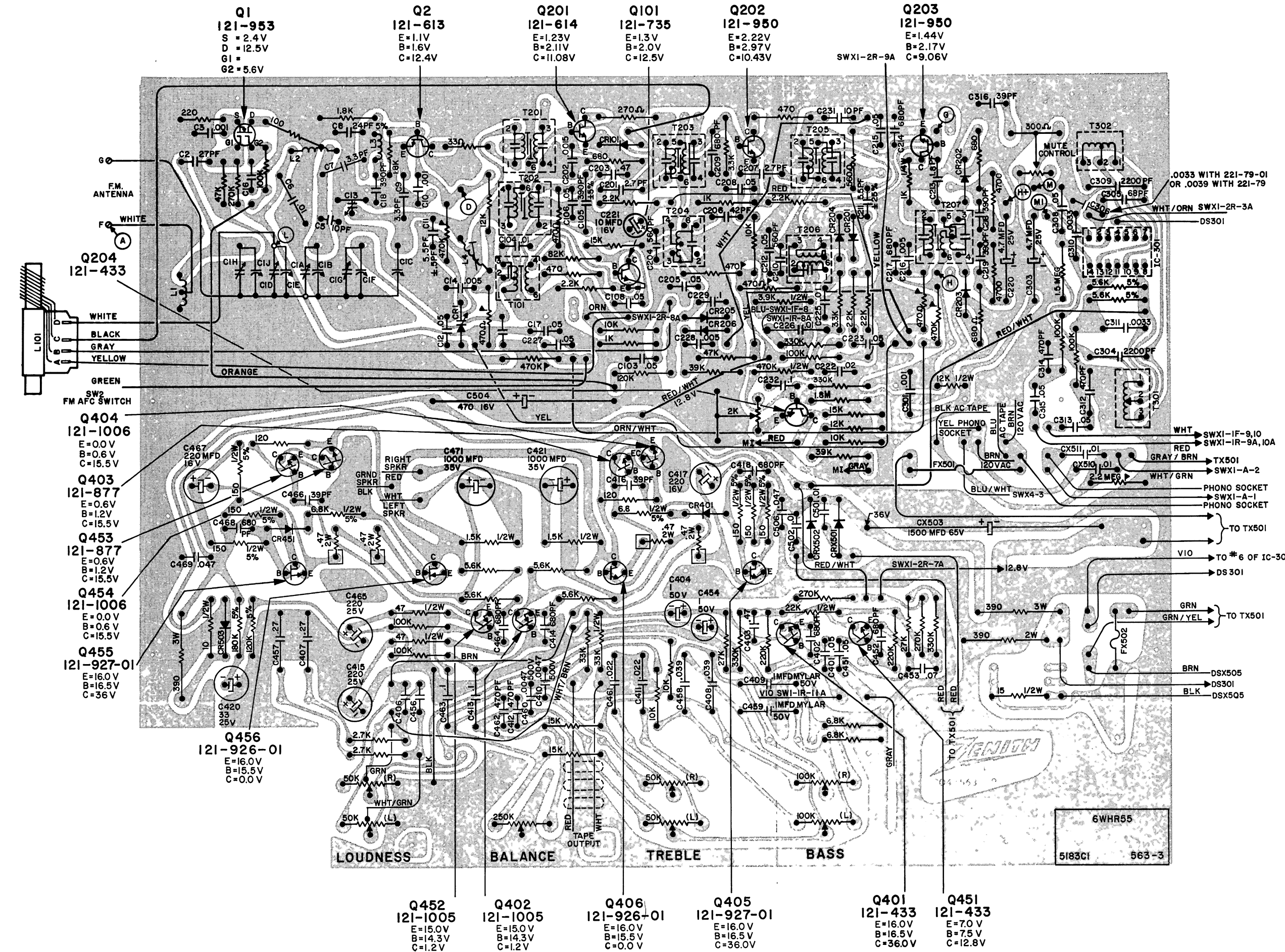
PIN	MONAURAL	STEREO	STEREO P-P
1	12.1	12.1	1.0
2	2.6	2.6	0.2
3	3.9	3.9	1.2
4	—	—	—
5	—	—	—
6	20.0	0.7	—
7	0	0	—
8	—	—	—
9	12.5	12.5	—
10	9.8	9.8	0.4
11	7.3	7.2	1.5
12	7.3	7.2	1.5
13	4.8	4.8	0.5
14	0.5	1.7	0.3

CHASSIS LEGEND 3WHR52

ITEM NO.	PART NUMBER	DESCRIPTION	ITEM NO.	PART NUMBER	DESCRIPTION	ITEM NO.	PART NUMBER	DESCRIPTION
C1A	22-7134	FM DETECTOR TRIMMER	C472	22-7152-11	470 MFD ELECTROLYTIC 25V	R403	63-9924-48	1.5 MEG OHM 10% (ALT 63-7818 1/2W 10%)
C1B		FM DETECTOR TUNING	C473	22-6447-01	.047 MFD MYLAR 100V	R404	63-9921-94	3.3K OHM 5% (ALT 63-7808 1/2W 10%)
C1C		FM DETECTOR TUNING				R405	63-9921-44	68 OHM 5% (ALT 63-7738 1/2W 10%)
C1D		FM DETECTOR TUNING				R406	63-9922-12	47K OHM 5% (ALT 63-7854 1/2W 10%)
C1E		FM DETECTOR TUNING				R407	63-9921-88	4.7K OHM 5% (ALT 63-7812 1/2W 10%)
C1F		FM DETECTOR TUNING				R408	63-9921-94	6.2K OHM 5% (ALT 63-7824 1/2W 10%)
C1G		FM DETECTOR TUNING				R409	63-9944-56	520 OHM 1/2W 5% (ALT 63-7757 1/2W 10%)
C1H		FM DETECTOR TUNING				R470	63-9944-58	270 OHM 1/2W 5% (ALT 63-7761 1/2W 10%)
C1I		FM DETECTOR TUNING				R471	63-9944-28	15 OHM 1/2W 5% (ALT 63-7707 1/2W 10%)
C1J		FM DETECTOR TUNING				R472	63-10585	1 OHM 1/2W
C1K		FM DETECTOR TUNING				R473	63-9921-68	12K OHM 5% (ALT 63-7831 1/2W 10%)
C1L		FM DETECTOR TUNING				R480	63-1757	220 OHM 1/2W
C1M		FM DETECTOR TUNING						
C1N		FM DETECTOR TUNING						
C1O		FM DETECTOR TUNING						
C1P		FM DETECTOR TUNING						
C1Q		FM DETECTOR TUNING						
C1R		FM DETECTOR TUNING						
C1S		FM DETECTOR TUNING						
C1T		FM DETECTOR TUNING						
C1U		FM DETECTOR TUNING						
C1V		FM DETECTOR TUNING						
C1W		FM DETECTOR TUNING						
C1X		FM DETECTOR TUNING						
C1Y		FM DETECTOR TUNING						
C1Z		FM DETECTOR TUNING						
C2A		FM DETECTOR TUNING						
C2B		FM DETECTOR TUNING						
C2C		FM DETECTOR TUNING						
C2D		FM DETECTOR TUNING						
C2E		FM DETECTOR TUNING						
C2F		FM DETECTOR TUNING						
C2G		FM DETECTOR TUNING						
C2H		FM DETECTOR TUNING						
C2I		FM DETECTOR TUNING						
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C2K		FM DETECTOR TUNING						
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C2T		FM DETECTOR TUNING						
C2U		FM DETECTOR TUNING						
C2V		FM DETECTOR TUNING						
C2W		FM DETECTOR TUNING						
C2X		FM DETECTOR TUNING						
C2Y		FM DETECTOR TUNING						
C2Z		FM DETECTOR TUNING						
C3A		FM DETECTOR TUNING						
C3B		FM DETECTOR TUNING						
C3C		FM DETECTOR TUNING						
C3D		FM DETECTOR TUNING						
C3E		FM DETECTOR TUNING						
C3F		FM DETECTOR TUNING						
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C3I		FM DETECTOR TUNING						
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C3N		FM DETECTOR TUNING						
C3O		FM DETECTOR TUNING						
C3P		FM DETECTOR TUNING						
C3Q		FM DETECTOR TUNING						
C3R		FM DETECTOR TUNING						
C3S		FM DETECTOR TUNING						
C3T		FM DETECTOR TUNING						
C3U		FM DETECTOR TUNING						
C3V		FM DETECTOR TUNING						
C3W		FM DETECTOR TUNING						
C3X		FM DETECTOR TUNING						
C3Y		FM DETECTOR TUNING						
C3Z		FM DETECTOR TUNING						
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C4T		FM DETECTOR TUNING						
C4U		FM DETECTOR TUNING						
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C4Z		FM DETECTOR TUNING						
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C5U		FM DETECTOR TUNING						
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CHASSIS LEGEND 6WHR55

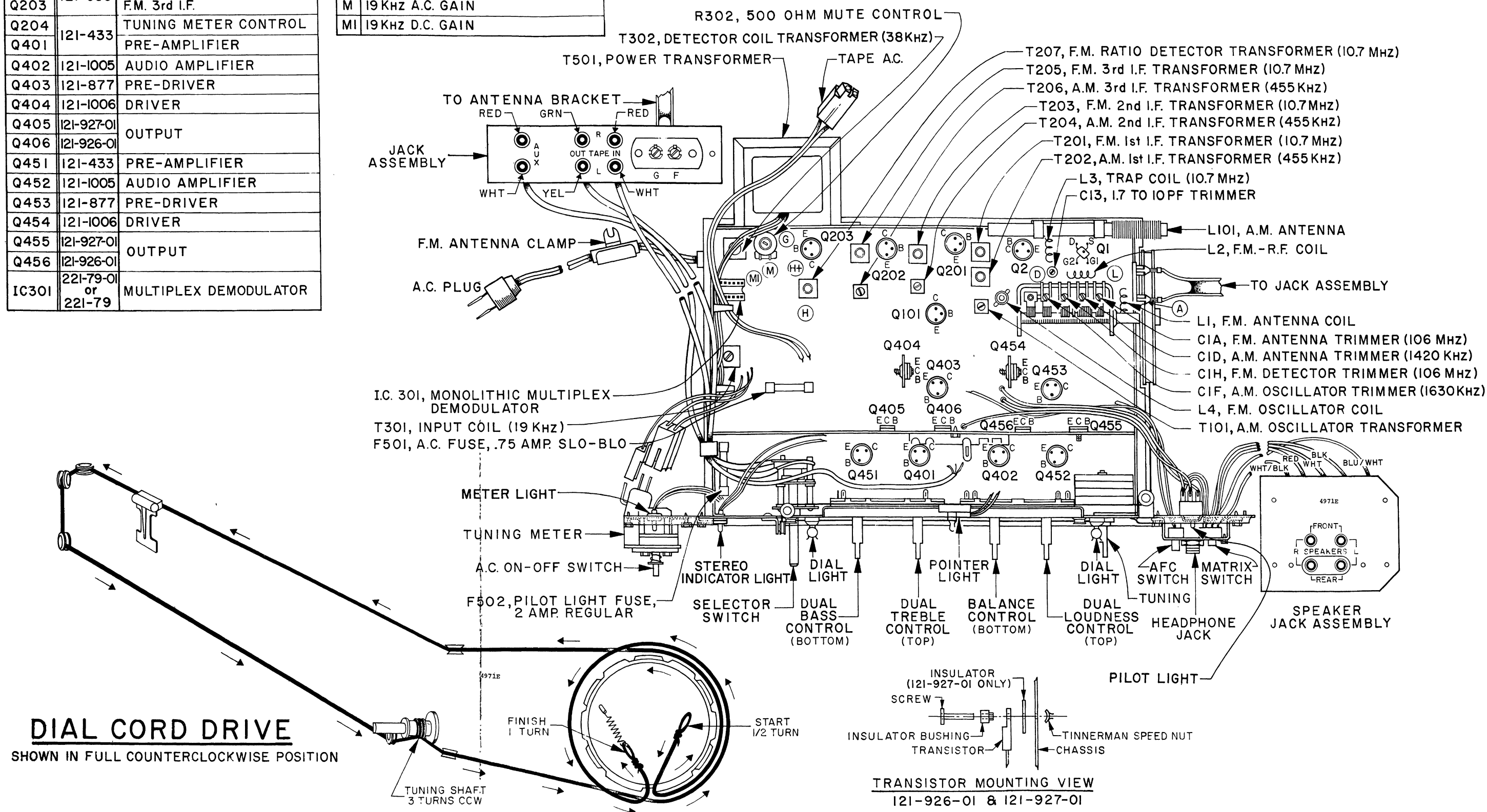
ITEM NO.	PART NUMBER	DESCRIPTION	ITEM NO.	PART NUMBER	DESCRIPTION	ITEM NO.	PART NUMBER	DESCRIPTION
C1A		FM DETECTOR TRIMMER	C471	22-1164-12	1000 MFD ELECTROLYTIC 35V	R430	63-1757	220 OHM
C1B		FM DETECTOR TUNING	C472	22-1164-12	1000 MFD DISC 500V	R431	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C1C		OSCILLATOR TUNING	C473	22-1164-12	1000 MFD DISC 500V	R432	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C1D		AM ANTENNA TRIMMER	C474	22-1164-12	1000 MFD DISC 500V	R433	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C1E	22-7134	OSCILLATOR TUNING	C475	22-1164-12	1000 MFD DISC 500V	R434	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C1F		OSCILLATOR TUNING	C476	22-1164-12	1000 MFD DISC 500V	R435	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C1G		AM ANTENNA TRIMMER	C477	22-1164-12	1000 MFD DISC 500V	R436	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C1H		FM ANTENNA TRIMMER	C478	22-1164-12	1000 MFD DISC 500V	R437	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C1J		FM ANTENNA TUNING	C479	22-1164-12	1000 MFD DISC 500V	R438	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C21	22-2296	27 PF DISC 500V	R1	93-9121-86	220 OHM 5% (ALT: 63-10184-2 14W 10%)	R439	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C22	22-2729	.001 MFD DISC 25V	R2	93-9122-20	100K OHM 5% (ALT: 63-10184-2 14W 10%)	R440	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C23	22-3978	10 PF DISC 500V	R3	93-9122-20	100K OHM 5% (ALT: 63-10184-2 14W 10%)	R441	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C24	22-3541	3.3 PF DISC .50V 500V	R4	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R442	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C25	22-3541	3.3 PF DISC .50V 500V	R5	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R443	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C26	22-6579	3.3 PF DISC 1.50V 25V	R6	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R444	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C27	22-6579	3.3 PF DISC 1.50V 25V	R7	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R445	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C28	22-6579	3.3 PF DISC 1.50V 25V	R8	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R446	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C29	22-6579	3.3 PF DISC 1.50V 25V	R9	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R447	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C30	22-6579	3.3 PF DISC 1.50V 25V	R10	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R448	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C31	22-6579	3.3 PF DISC 1.50V 25V	R11	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R449	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C32	22-6579	3.3 PF DISC 1.50V 25V	R12	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R450	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C33	22-6579	3.3 PF DISC 1.50V 25V	R13	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R451	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C34	22-6579	3.3 PF DISC 1.50V 25V	R14	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R452	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C35	22-6579	3.3 PF DISC 1.50V 25V	R15	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R453	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C36	22-6579	3.3 PF DISC 1.50V 25V	R16	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R454	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C37	22-6579	3.3 PF DISC 1.50V 25V	R17	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R455	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C38	22-6579	3.3 PF DISC 1.50V 25V	R18	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R456	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C39	22-6579	3.3 PF DISC 1.50V 25V	R19	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R457	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C40	22-6579	3.3 PF DISC 1.50V 25V	R20	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R458	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C41	22-6579	3.3 PF DISC 1.50V 25V	R21	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R459	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C42	22-6579	3.3 PF DISC 1.50V 25V	R22	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R460	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C43	22-6579	3.3 PF DISC 1.50V 25V	R23	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R461	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C44	22-6579	3.3 PF DISC 1.50V 25V	R24	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R462	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C45	22-6579	3.3 PF DISC 1.50V 25V	R25	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R463	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C46	22-6579	3.3 PF DISC 1.50V 25V	R26	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R464	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C47	22-6579	3.3 PF DISC 1.50V 25V	R27	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R465	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C48	22-6579	3.3 PF DISC 1.50V 25V	R28	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R466	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C49	22-6579	3.3 PF DISC 1.50V 25V	R29	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R467	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C50	22-6579	3.3 PF DISC 1.50V 25V	R30	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R468	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C51	22-6579	3.3 PF DISC 1.50V 25V	R31	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R469	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C52	22-6579	3.3 PF DISC 1.50V 25V	R32	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R470	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C53	22-6579	3.3 PF DISC 1.50V 25V	R33	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R471	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C54	22-6579	3.3 PF DISC 1.50V 25V	R34	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R472	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C55	22-6579	3.3 PF DISC 1.50V 25V	R35	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R473	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C56	22-6579	3.3 PF DISC 1.50V 25V	R36	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R474	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C57	22-6579	3.3 PF DISC 1.50V 25V	R37	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R475	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C58	22-6579	3.3 PF DISC 1.50V 25V	R38	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R476	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C59	22-6579	3.3 PF DISC 1.50V 25V	R39	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R477	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C60	22-6579	3.3 PF DISC 1.50V 25V	R40	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R478	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C61	22-6579	3.3 PF DISC 1.50V 25V	R41	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R479	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C62	22-6579	3.3 PF DISC 1.50V 25V	R42	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R480	63-1767	220 OHM 1/2W
C63	22-6579	3.3 PF DISC 1.50V 25V	R43	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R481	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C64	22-6579	3.3 PF DISC 1.50V 25V	R44	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R482	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C65	22-6579	3.3 PF DISC 1.50V 25V	R45	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R483	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C66	22-6579	3.3 PF DISC 1.50V 25V	R46	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R484	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C67	22-6579	3.3 PF DISC 1.50V 25V	R47	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R485	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C68	22-6579	3.3 PF DISC 1.50V 25V	R48	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R486	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C69	22-6579	3.3 PF DISC 1.50V 25V	R49	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R487	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C70	22-6579	3.3 PF DISC 1.50V 25V	R50	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R488	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C71	22-6579	3.3 PF DISC 1.50V 25V	R51	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R489	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C72	22-6579	3.3 PF DISC 1.50V 25V	R52	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R490	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C73	22-6579	3.3 PF DISC 1.50V 25V	R53	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R491	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C74	22-6579	3.3 PF DISC 1.50V 25V	R54	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R492	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C75	22-6579	3.3 PF DISC 1.50V 25V	R55	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R493	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C76	22-6579	3.3 PF DISC 1.50V 25V	R56	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R494	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C77	22-6579	3.3 PF DISC 1.50V 25V	R57	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R495	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C78	22-6579	3.3 PF DISC 1.50V 25V	R58	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R496	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C79	22-6579	3.3 PF DISC 1.50V 25V	R59	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R497	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C80	22-6579	3.3 PF DISC 1.50V 25V	R60	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R498	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C81	22-6579	3.3 PF DISC 1.50V 25V	R61	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R499	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C82	22-6579	3.3 PF DISC 1.50V 25V	R62	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R500	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C83	22-6579	3.3 PF DISC 1.50V 25V	R63	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R501	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C84	22-6579	3.3 PF DISC 1.50V 25V	R64	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R502	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C85	22-6579	3.3 PF DISC 1.50V 25V	R65	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R503	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C86	22-6579	3.3 PF DISC 1.50V 25V	R66	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R504	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C87	22-6579	3.3 PF DISC 1.50V 25V	R67	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R505	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C88	22-6579	3.3 PF DISC 1.50V 25V	R68	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R506	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C89	22-6579	3.3 PF DISC 1.50V 25V	R69	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R507	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C90	22-6579	3.3 PF DISC 1.50V 25V	R70	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R508	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C91	22-6579	3.3 PF DISC 1.50V 25V	R71	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R509	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C92	22-6579	3.3 PF DISC 1.50V 25V	R72	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)	R510	63-9822-30	270K OHM 5% (ALT: 63-7887 1/2W 10%)
C93	22-6579	3.3 PF DISC 1.50V 25V	R73	93-9122-4	10K OHM 5% (ALT: 63-7772 1/2W 20%)</			

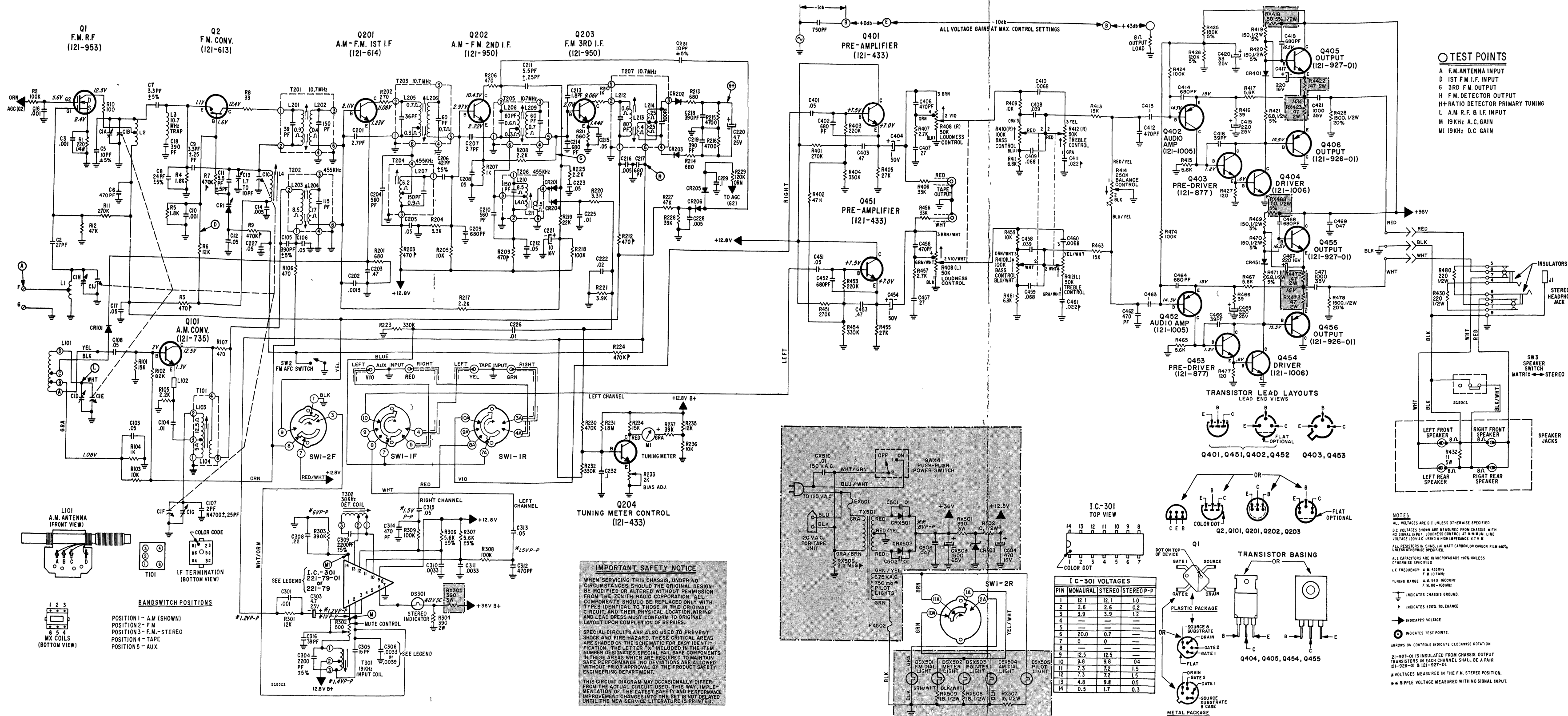


CHASSIS 6WHR55 – CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE

TRANSISTORS		
No.	PART No.	DESCRIPTION
Q1	121-953	F.M.-R.F.
Q2	121-613	F.M. CONVERTER
Q101	121-735	A.M. CONVERTER
Q201	121-614	A.M.-F.M. 1st I.F.
Q202	121-950	A.M.-F.M. 2nd I.F.
Q203		F.M. 3rd I.F.
Q204	121-433	TUNING METER CONTROL
Q401		PRE-AMPLIFIER
Q402	121-1005	AUDIO AMPLIFIER
Q403	121-877	PRE-DRIVER
Q404	121-1006	DRIVER
Q405	121-927-01	OUTPUT
Q406	121-926-01	
Q451	121-433	PRE-AMPLIFIER
Q452	121-1005	AUDIO AMPLIFIER
Q453	121-877	PRE-DRIVER
Q454	121-1006	DRIVER
Q455	121-927-01	OUTPUT
Q456	121-926-01	
IC301	221-79-01 or 221-79	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 19 KHz A.C. GAIN
MI 19 KHz D.C. GAIN





CHASSIS 6WHR56 - SCHEMATIC

IC-301 TOP VIEW

COLOR DOT

PIN	MONAURAL	STEREO	STEREO P-P
1	12.1	12.1	1.0
2	2.6	2.6	0.2
3	3.9	3.9	1.2
4	—	—	—
5	—	—	—
6	20.0	0.7	—
7	0	0	—
8	—	—	—
9	12.5	12.5	—
10	9.8	9.8	0.4
11	7.3	7.2	1.5
12	7.3	7.2	1.5
13	4.8	9.8	0.5
14	0.5	1.7	0.3

NOTES

ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.

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

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

ALL CAPACITORS ARE IN MICROFARADS 10% UNLESS OTHERWISE SPECIFIED.

1. F. FREQUENCY A.M. 455 KHz P.M. 10.7 MHz

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

3. INDICATES CHASSIS GROUND.

4. INDICATES 100% TOLERANCE.

5. INDICATES VOLTAGE.

6. INDICATES TEST POINTS.

ARROWS ON CONTROLS INDICATE COUNTERCLOCKWISE ROTATION.

(121-927-01 IS INSULATED FROM CHASSIS. OUTPUT TRANSISTORS IN EACH CHANNEL SHALL BE A PAIR 121-928-01 B 121-927-01)

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

** RIPPLE VOLTAGE MEASURED WITH NO SIGNAL INPUT.

Q1
121-953
S = 2.4V
D = 12.5V
G1 =
G2 = 5.6V

Q2
121-613
E=1.1V
B=1.6V
C=12.4V

Q201
121-614
E=1.23V
B=2.11V
C=11.08V

Q101
121-735
E=1.3V
B=2.0V
C=12.5V

Q202
121-950
E=2.22V
B=2.97V
C=10.43V

Q203
121-950
E=1.44V
B=2.17V
C=9.06V

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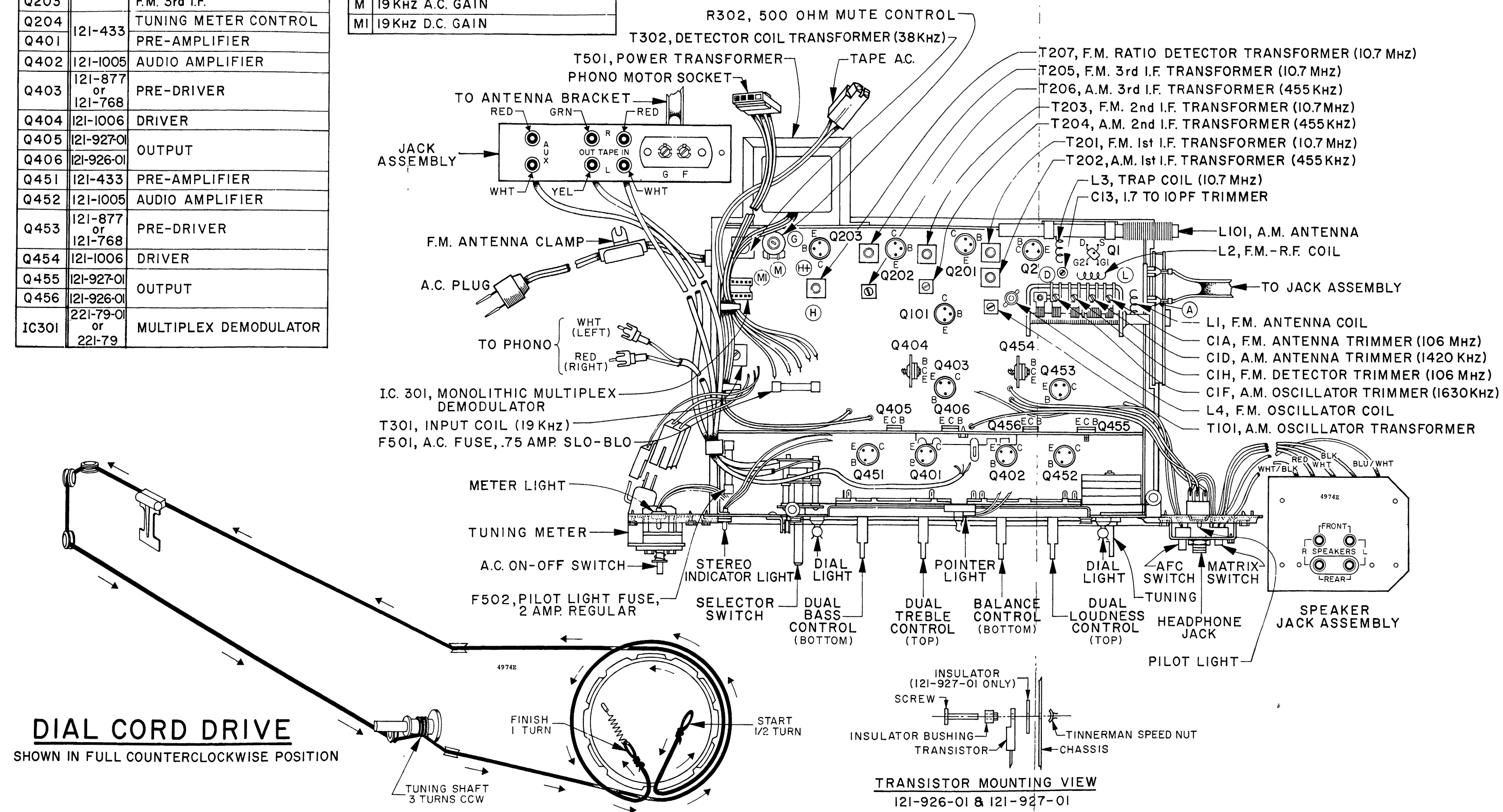
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ITEM NO.	PART NUMBER	DESCRIPTION	ITEM NO.	PART NUMBER	DESCRIPTION	ITEM NO.	PART NUMBER	DESCRIPTION
C1A	F.M. DETECTOR TRIMMER		C471	22-154-12	1000 MFD ELECTROLYTIC 35V	R456	63-9922-08	23K OHM5% (ALT. 63-7848 1/2W 10%)
C1B	F.M. DETECTOR TUNING					R457	63-9921-82	2.7K OHM5% (ALT. 63-7803 1/2W 10%)
C1C	F.M. OSCILLATOR TUNING					R458	63-9921-83	1.5K OHM5% (ALT. 63-7811 1/2W 10%)
C1D	A.M. ANTENNA TRIMMER					R461	63-9921-92	6.8K OHM5% (ALT. 63-7820 1/2W 10%)
C1E	A.M. ANTENNA TUNING					R463	63-9921-92	1K OHM5% (ALT. 63-7834 1/2W 10%)
C1F	A.M. OSCILLATOR TUNING					R464	63-9921-90	6.8K OHM5% (ALT. 63-7811 1/2W 10%)
C1G	A.M. OSCILLATOR TRIMMER					R465	63-1276	39 OHM
C1H	F.M. ANTENNA TRIMMER					R467	63-9921-90	6.8K OHM5% (ALT. 63-7811 1/2W 10%)
C1I	F.M. ANTENNA TUNING					R468	63-9921-90	6.8K OHM5% (ALT. 63-7811 1/2W 10%)
C1J	F.M. ANTENNA TUNING					R469	63-9946-62	150 OHM 1/2W (ALT. 63-7848 1/2W 10%)
C1K	F.M. ANTENNA TUNING					R470	63-9946-62	150 OHM 1/2W (ALT. 63-7848 1/2W 10%)
C1L	F.M. ANTENNA TUNING					R471	63-9946-62	150 OHM 1/2W (ALT. 63-7848 1/2W 10%)
C1M	F.M. ANTENNA TUNING					R472	63-9946-62	150 OHM 1/2W (ALT. 63-7848 1/2W 10%)
C1N	F.M. ANTENNA TUNING					R473	63-9946-62	150 OHM 1/2W (ALT. 63-7848 1/2W 10%)
C1O	F.M. ANTENNA TUNING					R474	63-9946-62	150 OHM 1/2W (ALT. 63-7848 1/2W 10%)
C1P	F.M. ANTENNA TUNING					R475	63-9946-62	150 OHM 1/2W (ALT. 63-7848 1/2W 10%)
C1Q	F.M. ANTENNA TUNING					R476	63-9946-62	150 OHM 1/2W (ALT. 63-7848 1/2W 10%)
C1R	F.M. ANTENNA TUNING					R477	63-9946-62	150 OHM 1/2W (ALT. 63-7848 1/2W 10%)
C1S	F.M. ANTENNA TUNING					R478	63-9946-62	150 OHM 1/2W (ALT. 63-7848 1/2W 10%)
C1T	F.M. ANTENNA TUNING					R479	63-9946-62	150 OHM 1/2W (ALT. 63-7848 1/2W 10%)
C1U	F.M. ANTENNA TUNING					R480	63-1767	220 OHM 1/2W
C1V	F.M. ANTENNA TUNING					R481	63-1767	220 OHM 1/2W
C1W	F.M. ANTENNA TUNING					R482	63-1767	220 OHM 1/2W
C1X	F.M. ANTENNA TUNING					R483	63-1767	220 OHM 1/2W
C1Y	F.M. ANTENNA TUNING					R484	63-1767	220 OHM 1/2W
C1Z	F.M. ANTENNA TUNING					R485	63-1767	220 OHM 1/2W
C20	F.M. ANTENNA TUNING					R486	63-1767	220 OHM 1/2W
C21	F.M. ANTENNA TUNING					R487	63-1767	220 OHM 1/2W
C22	F.M. ANTENNA TUNING					R488	63-1767	220 OHM 1/2W
C23	F.M. ANTENNA TUNING					R489	63-1767	220 OHM 1/2W
C24	F.M. ANTENNA TUNING					R490	63-1767	220 OHM 1/2W
C25	F.M. ANTENNA TUNING					R491	63-1767	220 OHM 1/2W
C26	F.M. ANTENNA TUNING					R492	63-1767	220 OHM 1/2W
C27	F.M. ANTENNA TUNING					R493	63-1767	220 OHM 1/2W
C28	F.M. ANTENNA TUNING					R494	63-1767	220 OHM 1/2W
C29	F.M. ANTENNA TUNING					R495	63-1767	220 OHM 1/2W
C30	F.M. ANTENNA TUNING					R496	63-1767	220 OHM 1/2W
C31	F.M. ANTENNA TUNING					R497	63-1767	220 OHM 1/2W
C32	F.M. ANTENNA TUNING					R498	63-1767	220 OHM 1/2W
C33	F.M. ANTENNA TUNING					R499	63-1767	220 OHM 1/2W
C34	F.M. ANTENNA TUNING					R500	63-1767	220 OHM 1/2W
C35	F.M. ANTENNA TUNING					R501	63-1767	220 OHM 1/2W
C36	F.M. ANTENNA TUNING					R502	63-1767	220 OHM 1/2W
C37	F.M. ANTENNA TUNING					R503	63-1767	220 OHM 1/2W
C38	F.M. ANTENNA TUNING					R504	63-1767	220 OHM 1/2W
C39	F.M. ANTENNA TUNING					R505	63-1767	220 OHM 1/2W
C40	F.M. ANTENNA TUNING							



TRANSISTORS		
No.	PART No.	DESCRIPTION
Q1	121-953	F.M.-R.F.
Q2	121-613	F.M. CONVERTER
Q101	121-735	A.M. CONVERTER
Q201	121-614	A.M.-F.M. 1st I.F.
Q202	121-950	A.M.-F.M. 2nd I.F.
Q203		F.M. 3rd I.F.
Q204	121-433	TUNING METER CONTROL
Q401		PRE-AMPLIFIER
Q402	121-1005	AUDIO AMPLIFIER
Q403	121-877 or 121-768	PRE-DRIVER
Q404	121-1006	DRIVER
Q405	121-927-01	OUTPUT
Q406	121-926-01	OUTPUT
Q451	121-433	PRE-AMPLIFIER
Q452	121-1005	AUDIO AMPLIFIER
Q453	121-877 or 121-768	PRE-DRIVER
Q454	121-1006	DRIVER
Q455	121-927-01	OUTPUT
Q456	121-926-01	OUTPUT
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 19 KHz A.C. GAIN
M1 19 KHz D.C. GAIN

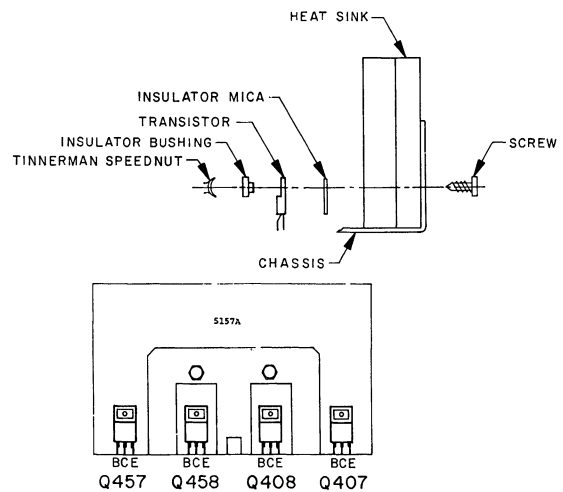
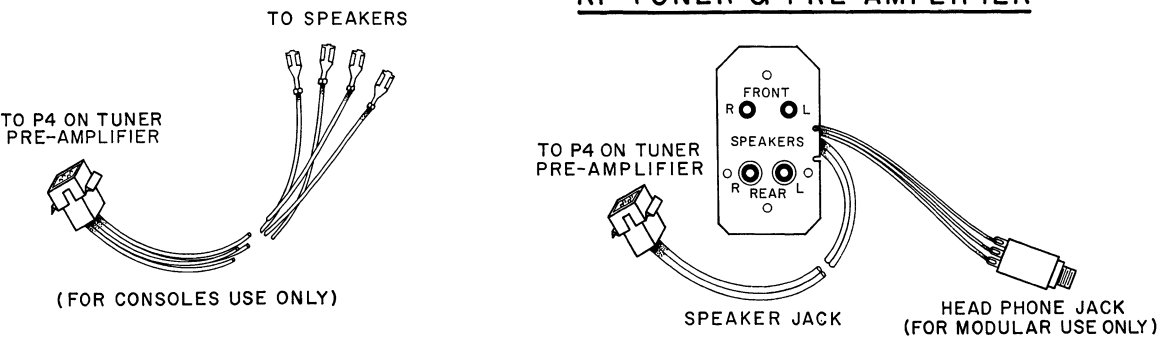
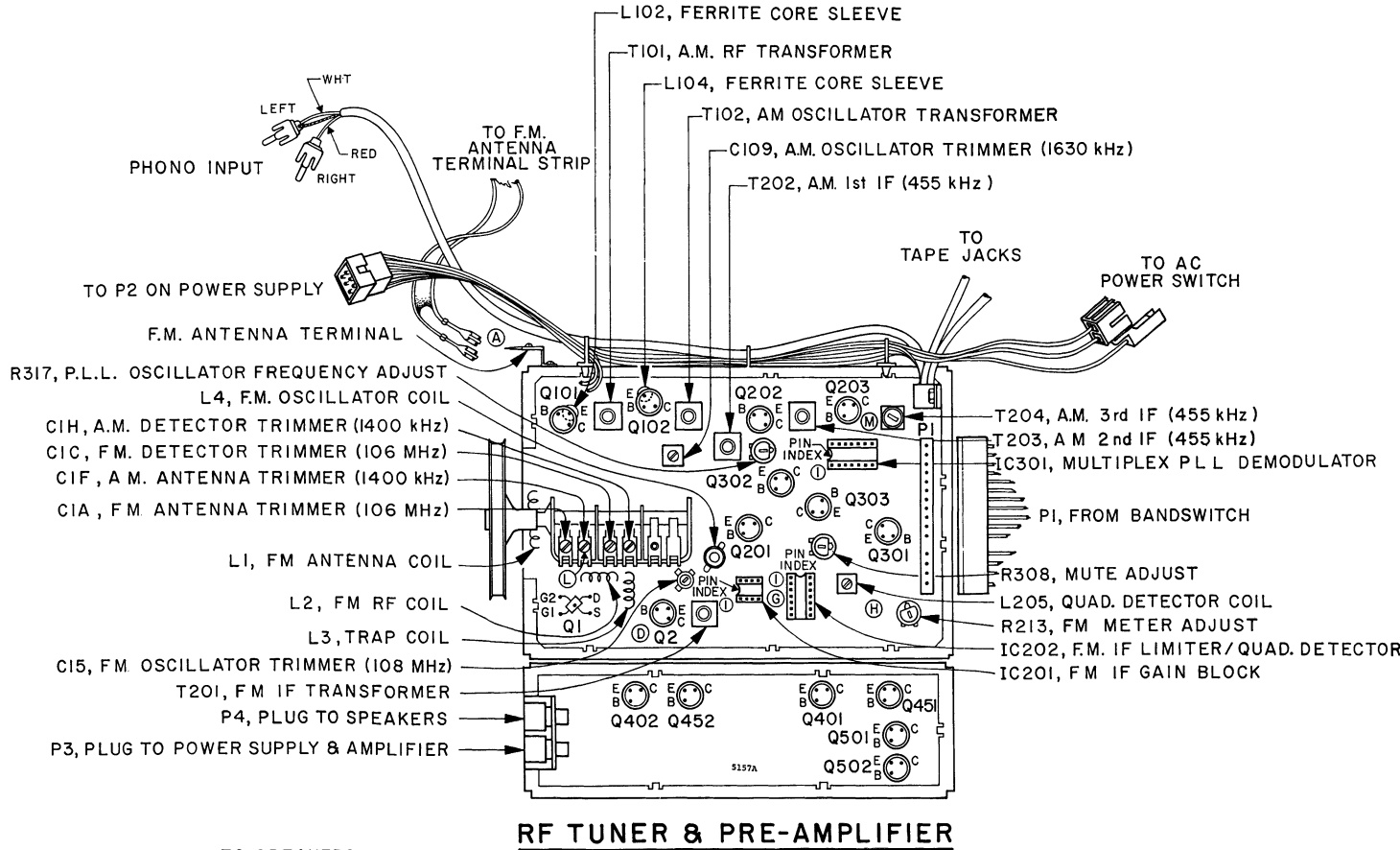
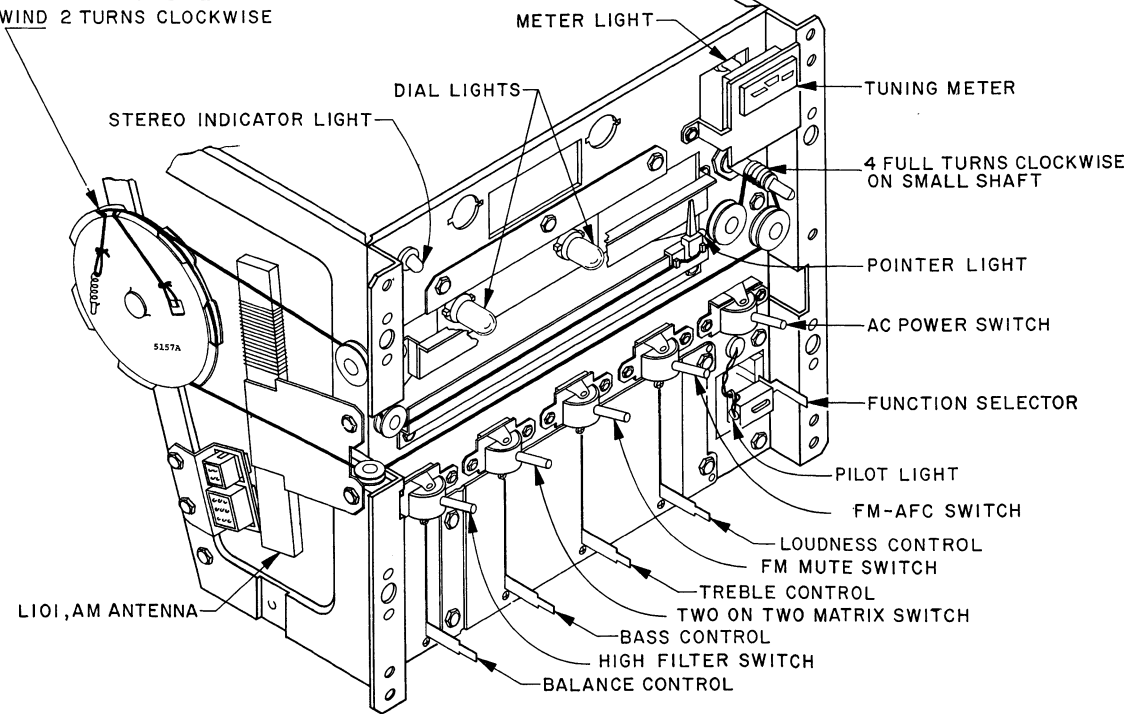


TRANSISTORS		
No.	PART No.	DESCRIPTION
Q1	121-1024	FM - RF (121-953 USED IN EARLY PRODUCTION)
Q2	121-613	FM CONVERTER
Q101	121-850	AM - RF
Q102	121-735	AM CONVERTER
Q201		AGC AMPLIFIER
Q202	121-950	AM 1st IF
Q203		AM 2nd IF
Q301	121-603	MUTE BUFFER
Q302		MUTE AMPLIFIER
Q303	121-950	MUTE SWITCH
Q401		PRE-AMPLIFIER
Q402	121-433	AUDIO AMPLIFIER
Q403	121-1005	PRE-DRIVER
Q404	121-877	DRIVER
Q407	121-1013	OUTPUT
Q408	121-1012	OUTPUT
Q451	121-433	PRE-AMPLIFIER
Q452		AUDIO AMPLIFIER
Q453	121-1005	PRE-DRIVER
Q454	121-877	DRIVER
Q457	121-1013	OUTPUT
Q458	121-1012	OUTPUT
Q501	121-774	FM POWER SWITCH
Q502	121-768	
IC201	221-89	FM IF GAIN BLOCK
IC202	221-90	FM IF LIMITER/QUAD. DETECTOR
IC301	221-91	MULTIPLEX PLL DEMODULATOR

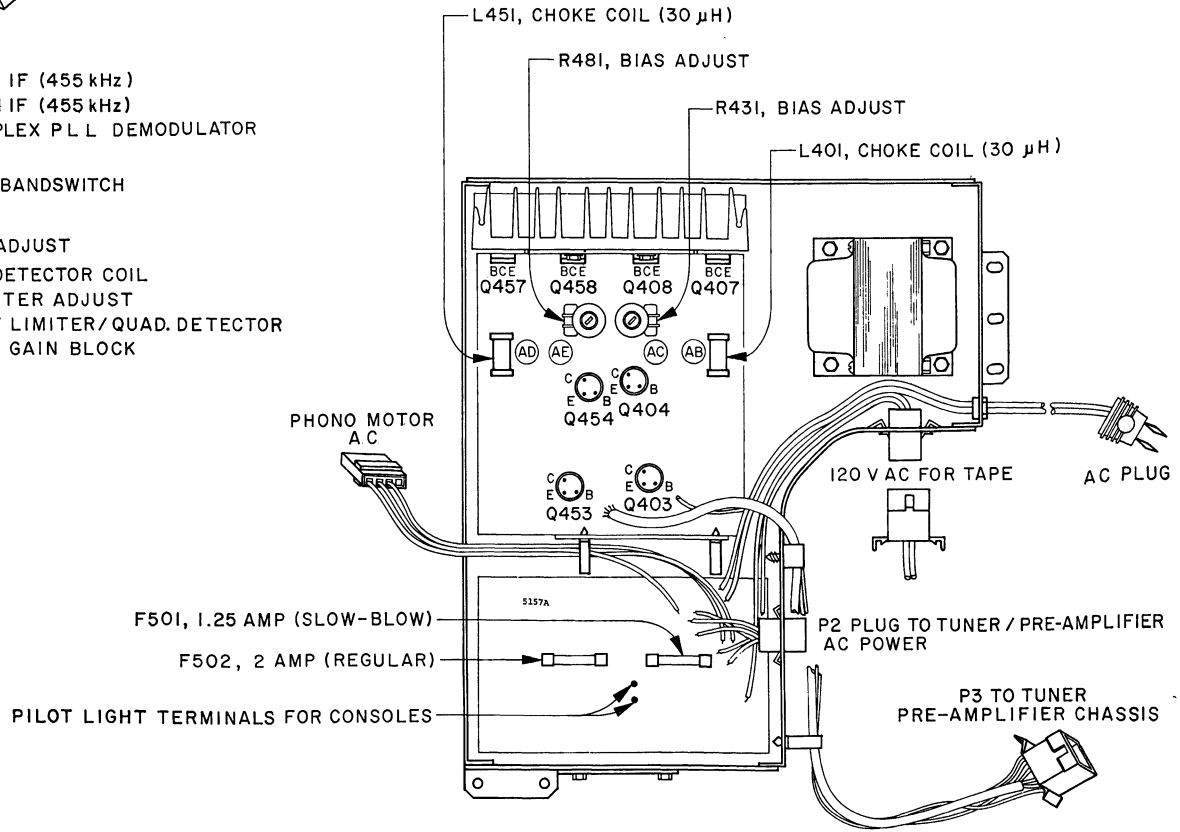
TEST POINTS	
A	FM ANTENNA INPUT
D	FM IF INPUT
G	FM IF OUTPUT
H	FM DETECTOR OUTPUT
L	AM RF INPUT
M	19 kHz OSCILLATOR OUTPUT
AB	
AC	AUDIO BIAS
AD	
AE	

DIAL CORD DRIVE

SHOWN IN FULL CLOCKWISE POSITION
WIND 2 TURNS CLOCKWISE



TRANSISTOR MOUNTING VIEW



AUDIO AMPLIFIER & POWER SUPPLY

CHASSIS LEGEND 12WHR29

ITEM NO.	PART NUMBER	DESCRIPTION	ITEM NO.	PART NUMBER	DESCRIPTION	ITEM NO.	PART NUMBER	DESCRIPTION
C1A		FM ANTENNA TRIMMER	R107	43-0921-46	3.3K OHM .5% 1/4W (ALT. 43-10183-06	R458		
C1C		FM ANTENNA TRIMMER	R107	43-0921-46	470K OHM .5% 1/4W (ALT. 43-10183-04	R459	Q3-9017-18	100K OHM .5% 1/4W (ALT. 43-7778-10K 1/2W)
C1E		FM OSCILLATOR TUNING	R108	43-0921-28	15 OHM .5% 1/4W (ALT. 43-10183-28	R460	Q3-9018-00	200K OHM .5% 1/4W (ALT. 43-7841-10K 1/2W)
C1F	214-051-05	FM ANTENNA TRIMMER	R108	43-0921-28	39K OHM .5% 1/4W (ALT. 43-10183-10	R461	Q3-9022-24	1MEG OHM .5% 1/4W (ALT. 43-7841-10K 1/2W)
C1H		FM ANTENNA TRIMMER	R108	43-0921-28	33K OHM .5% 1/4W (ALT. 43-10183-08	R462	Q3-9014-10	47K OHM .5% 1/4W (ALT. 43-7872-10K 1/2W)
C1J		FM ANTENNA TRIMMER	R108	43-0921-28	100K OHM .5% 1/4W (ALT. 43-10183-08	R463	Q3-9014-08	47K OHM .5% 1/4W (ALT. 43-7872-10K 1/2W)
C2	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R464	Q3-9022-02	100K OHM .5% 1/4W (ALT. 43-7858-10K 1/2W)
C2A	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R465	Q3-9021-00	8.2K OHM .5% 1/4W (ALT. 43-7817-10K 1/2W)
C2B	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R466	Q3-9022-04	22K OHM .5% 1/4W (ALT. 43-7841-10K 1/2W)
C2C	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R467		
C2D	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R468		
C2E	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R469		
C2F	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R470		
C2G	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R471		
C2H	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R472		
C2I	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R473		
C2J	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R474		
C2K	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R475		
C2L	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R476		
C2M	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R477		
C2N	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R478		
C2O	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R479		
C2P	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R480		
C2Q	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R481		
C2R	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R482		
C2S	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R483		
C2T	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R484		
C2U	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R485		
C2V	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R486		
C2W	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R487		
C2X	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R488		
C2Y	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R489		
C2Z	23-027-29	201 MFD DISC .50V	R202	43-0921-72	100K OHM .5% 1/4W (ALT. 43-10183-72	R490		
C301	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R474	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C302	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R475	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C303	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R476	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C304	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R477	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C305	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R478	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C306	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R479	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C307	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R480	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C308	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R481	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C309	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R482	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C310	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R483	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C311	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R484	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C312	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R485	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C313	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R486	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C314	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R487	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C315	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R488	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C316	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R489	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C317	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R490	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C318	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R491	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C319	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R492	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C320	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R493	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C321	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R494	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C322	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R495	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C323	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R496	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C324	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R497	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C325	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R498	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C326	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R499	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C327	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R500	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C328	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R501	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C329	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R502	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C330	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R503	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C331	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R504	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C332	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R505	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C333	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R506	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C334	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R507	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C335	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R508	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C336	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R509	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C337	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R510	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C338	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R511	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C339	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R512	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C340	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R513	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C341	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R514	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C342	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R515	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C343	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R516	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C344	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R517	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C345	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R518	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C346	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R519	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C347	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R520	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C348	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R521	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C349	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R522	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C350	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R523	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C351	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R524	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)
C352	23-130	2033 MFD DISC .500V	R212	43-0922-30	47K OHM .5% 1/4W (ALT. 43-10183-30	R525	Q3-9017-00	120K OHM .5% 1/4W (ALT. 43-7747-10K 1/2W)

○ TEST POINTS

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

NOTES

ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
D.C. VOLTAGES SHOWN ARE MEASURED FROM CHASSIS, WITH
NO SIGNAL INPUT, LOUDNESS CONTROL AT MINIMUM, LINE
VOLTAGE 120 V.A.C. USING A HIGH IMPEDANCE V.T.V.M.
ALL RESISTORS IN OHMS, 1/4 WATT CARBON OR CARBON
FILM, $\pm 10\%$ UNLESS OTHERWISE SPECIFIED.

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

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

 INDICATES CHASSIS GROUND.

▶ INDICATES $\pm 20\%$ TOLERANCE

→ INDICATES VOLTAGE

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTAT

* VOLTAGES MEASURED WITH 110μV SIGNAL INPUT

Ⓐ Ⓑ Ⓒ Ⓓ DIAG. TEST POINTS

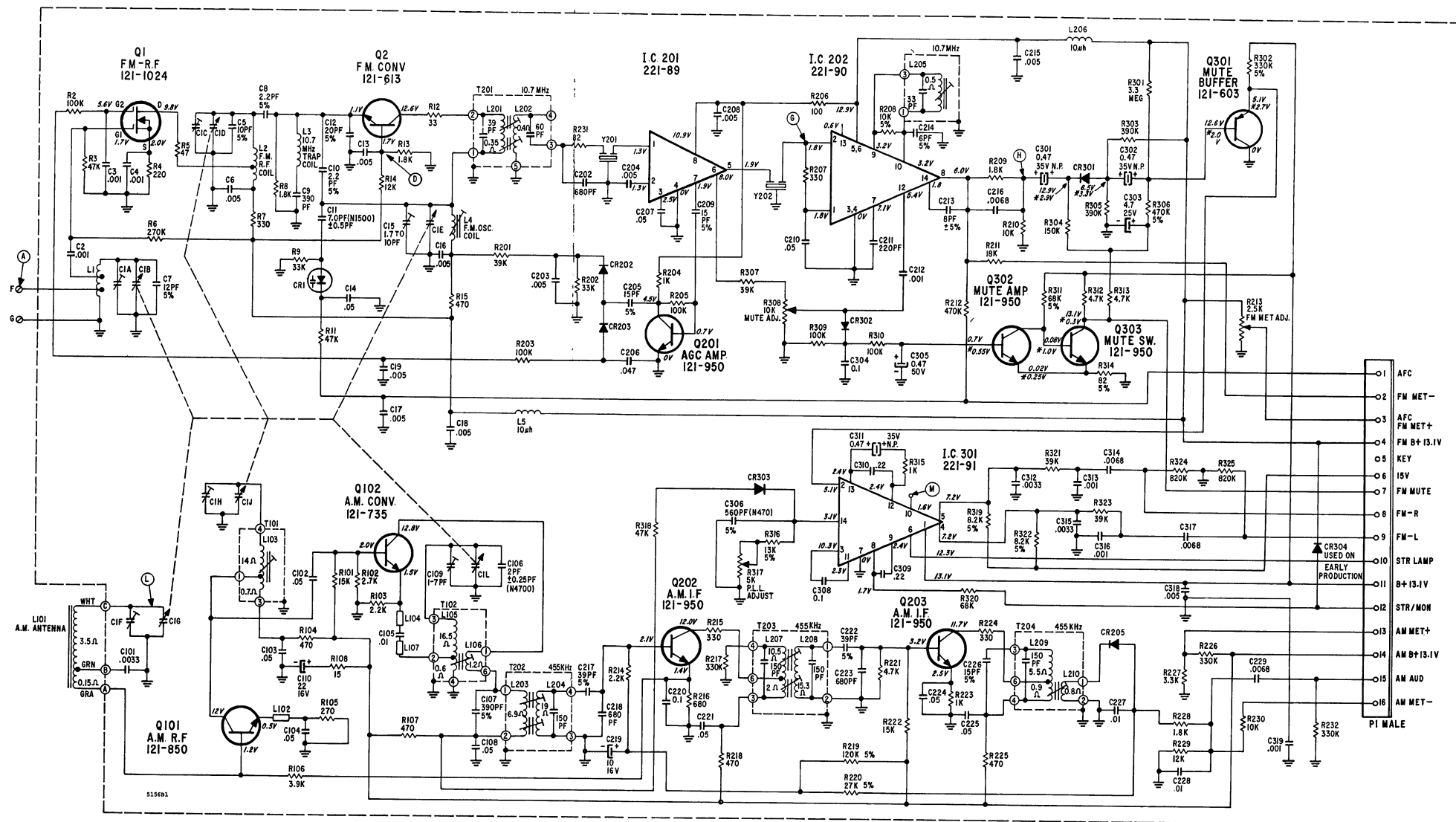
★ ★ TO ADJUST BIAS, SET LINE AT 120V.A.C., LET WARM UP FOR ONE MINUTE WITH NO SIGNAL. C

LOW RANGE VOLTMETER ACROSS TEST POINTS
AND ADJUST R431 FOR .025V TO .030V.

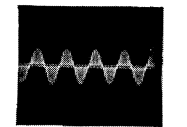
*** RIPPLE VOLTAGE MEASURED WITH NO SIGNAL INPUT

0403 AND 0463 ARE INSULATED FROM CHASSIS

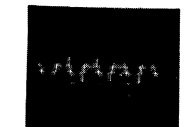
Q407 AND Q437 ARE INSULATED FROM CHASSIS.
Q1-121-953 USED IN EARLY PRODUCTION.



IC 301 WAVE FORMS



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



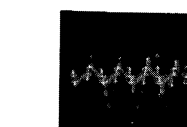
**PINS 3 AND 11-
COMPOSITE AMPLIFIED
L+R, L-R (1 KHZ LEFT ON
19 KHZ PILOT 10%
1.4V P/P (0.5 MILLISEC**



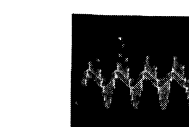
**PIN 14-VOLTAGE CONTR
OSCILLATOR ADJUSTM
, 3.5V P/P (5.0 MICROS**



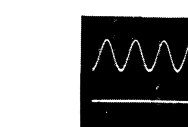
LED PIN 10-19 KHZ TEST
NT 2.7V P/P (10.0 MICRO
C.)



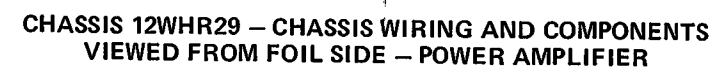
POINT PINS 12 AND 13-FID
EC.) PHASE DETECTOR
0.14V P/P (0.5 MILL

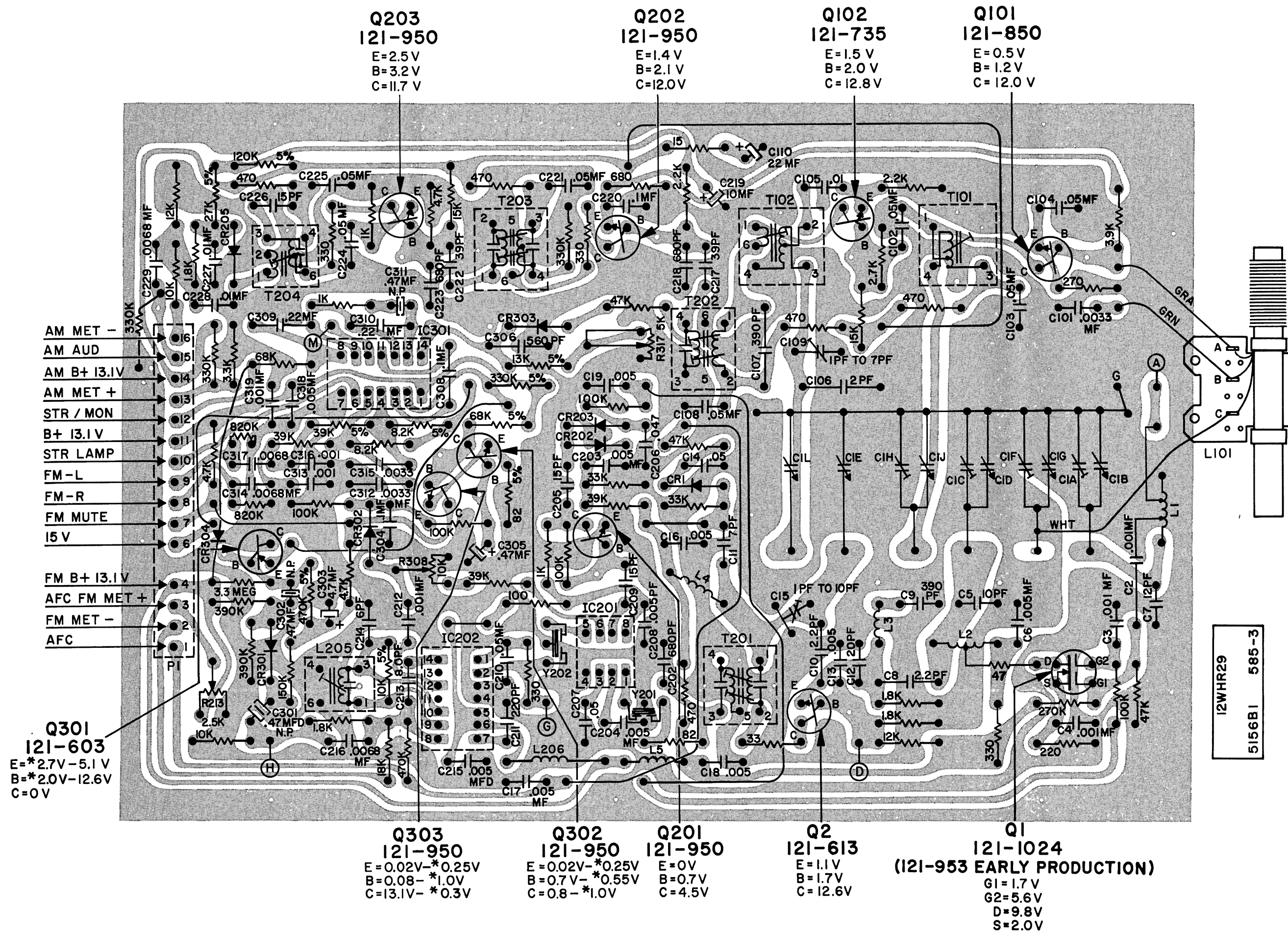


ER- PINS 8 AND 9-FI
AMPLITUDE DETER
EC.) 0.47V P/P (0.5 MID

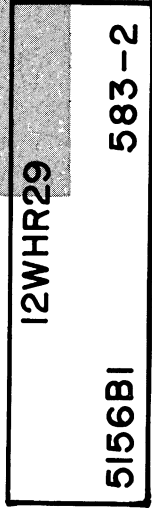


AT PLUG P
P1, #9-(UPPER) LEFT
 0.57V P/P (0.5 M
P1, #8-(LOWER) RIGHT
 0.05V P/P (0.5 M

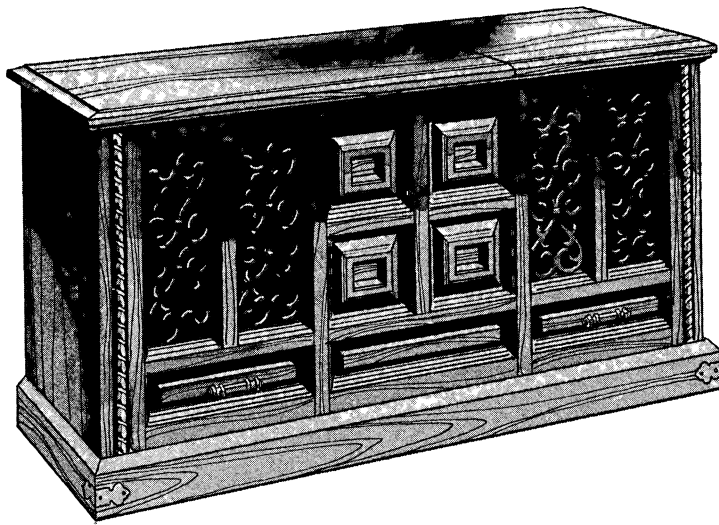




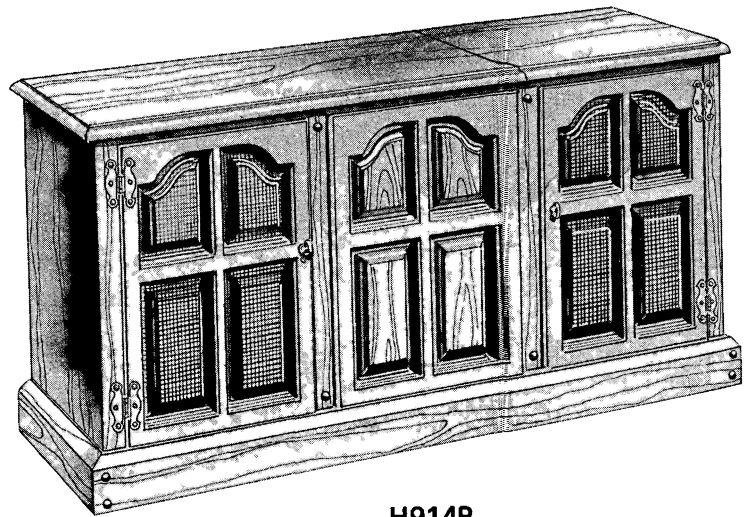
CHASSIS 12WHR29 - CHASSIS WIRING AND COMPONENTS
VIEWED FROM FOIL SIDE - RF/IF/MPX



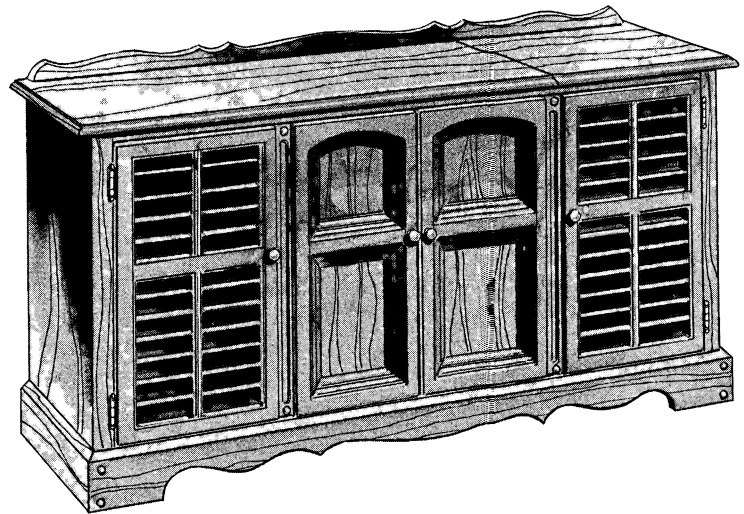
52



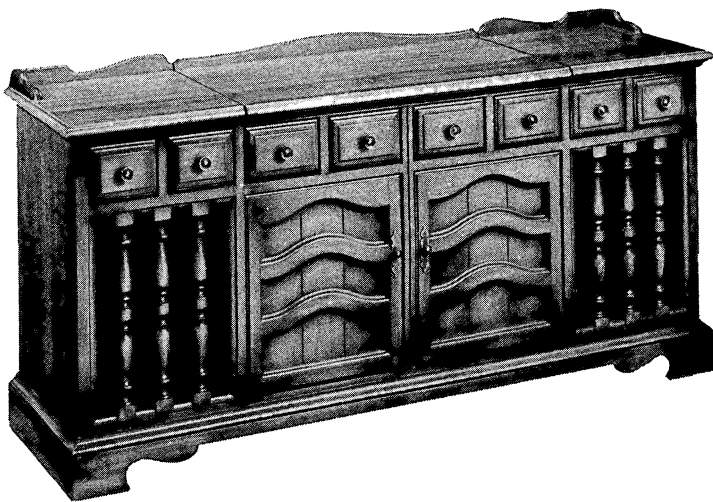
H915AE



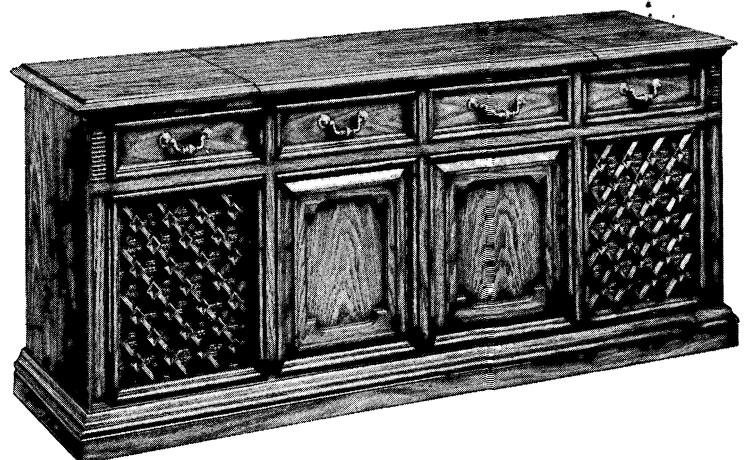
H914P



H916M



SR917M



SR918P

HF-32