

# 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 the circuit should be attempted. Service work should be performed only after you are thoroughly familiar with all of the following precautions. To do otherwise increases the risk of potential hazards and injury to the user.

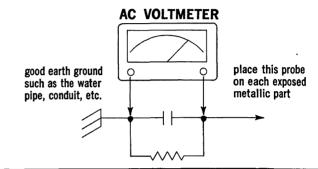
#### **SAFETY CHECKS**

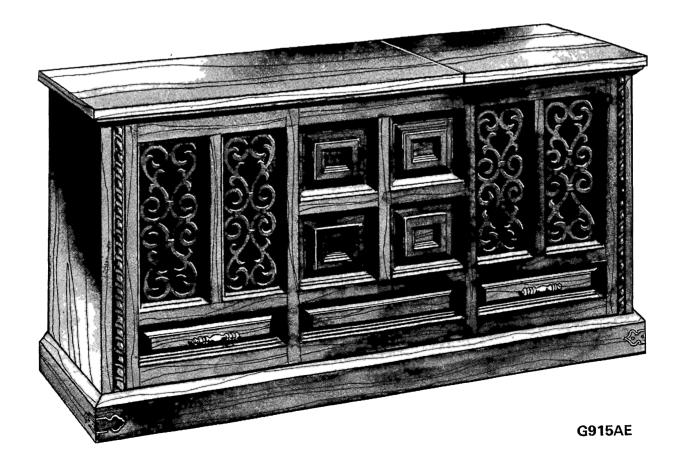
#### **SUBJECT: Fire & Shock Hazard**

- 1. Be sure that all components are positioned in such a way to avoid possibility of adjacent components shorts. This is especially important on those chassis which are transported to and from the repair shop.
- 2. Always replace all protective devices such as insulators and barriers after working on a set.
- 3. Check for frayed insulation on wires including the AC cord.
- 4. Check across-the-line components for damage and replace if necessary.
- 5. After re-assembly of the set always perform an AC leakage test on the exposed metallic parts of the cabinet such as the knobs, antenna terminals, etc. to be sure the set is safe to operate without danger of electrical shock. Do not use a line isolation transformer during this test. Use an AC voltmeter having 5000 ohms per volt or more sensitivity in the following

manner: Connect à 1500 ohm 10 watt resistor, paralleled by .15 mfd. AC type capacitor, between a known good earth ground (water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination 1500 ohm resistor and .15 mfd. capacitor. Reverse the AC plug on the set and repeat AC voltage measurements again for each exposed metallic part. Voltage measured must not exceed .3 volts RMS. This corresponds to 0.2 milliamp AC.

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





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HF 18 is Part No. 923-558	HF 18S1 is Part No. 923-576	HF 18S2 is Part No. 923-592
HF 19 is Part No. 923-606	HF 20 is Part No. 923-610	HF 21 is Part No. 9223-626
HF 22 is Part No. 923-642	HF 23 is Part No. 923-646	HF 24 is Part No. 92_3-653
HF 25 is Part No. 923-669	HF 26 is Part No. 923-702	HF 27 is Part No. 92_3-707
HF 28 is Part No. 923-718	HF 28S1 is Part No. 923-734	HF 29 is Part No. 92_3-740
HF 29S1 is Part No. 923-762	HF 29S2 is Part No. 923-784	HF 30 is Part No. 92_3-809
HF 30\$1 is Part No. 923-841		

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

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

- HF 22: Theory JFET, IGFET, MOSFET, Applications Dual Gate MOSFET FM-RF, JFET Biplex Detector, Quasi-Complementary Symmetry.
- HF 23: Applications Model C9029/Chassis 15WCA10 Four Channel Decoder.
- HF 26: Applications Chassis 15WDR51 (JFET Meter Circuit, Multiplex IC, Four Channel Decoding).
- HF 27: Applications Model SD2568 Speaker Switching Circuitry. HF 28: Applications Model D9013W Allegro Speaker System.
- HF 29: Theory Light Emitting Diodes (LED), Applications Three Light Tuning (Target Tuning), Multiplex IC. HF 29S1: Applications Snap-off Escutcheon and Out Front Chassis Removal, "E" Line Models.
- HF 30: Applications Snap-off Escutcheon and Out Front Chassis Removal, "F" Line Models.
- HF 31: Theory and Applications Chassis 12WGR59 (Ceramic Filters, IF IC, Quadrature Detector, Interstation Muting, P LL Multiplex IC), General Product Information - Audio Circuitry (including Two on Two Speaker Matrix, Allegro Speaker Systems), Disassembly Procedures.

# PRODUCT FEATURES SEE NOTES ON PAGE 4

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MODEL	COLOR	NOTE A	MODEL	TYPE	PART NUMBER	IMPED. (In Ohms)	QTY. AND SIZE (In Inches)	PART NUMBER	TAPE PROVISION NOTE B	SPEAKER PROVISION NOTE C	MISC. NOTE D
G584W1	Walnut	M,LL	3WGR52	FM/AM/Phono	Note C	_	-	169-511	ТМ	2 on 2, A1,A2,A3	DGL, H, PL
G587W2	Walnut	M,LL	3WGR52	FM/AM/Phono/ Tape	Note C	_	_	169-511	8TK-P 169-492	2 on 2, A1,A2,A3	DGL, H, PL
GR587W1	Walnut	M,LL	3WGR52	FM/AM/Phono/ Tape	Note C	_	_	169-511	8TK-R/P 169-472	2 on 2, A1,A2,A3	DGL, H, PL
G590W	Walnut	M,LL	6WGR57	FM/AM/Phono/ Tape	Note C	_	_	169-512	8TK-P 169-510 or 169-510A or 169-510B	2 on 2, A1,A2,A3	AUX,DGL, F, H, PL,T
GR590W	Walnut	M,LL	6WGR57	FM/AM/Phono/ Tape	Note C	_	-	169-512	8TK-R/P 169-507 or 169-507A	2 on 2, A1,A2,A3	AUX,DGL, F,H,PL,T
GR591W	Walnut	M,LL	6WGR57	FM/AM/Phono/ Tape	Note C	_	-	169-512	CassR/P 169-519	2 on 2, A1,A2,A3	AUX,DGL, F,H,PL,T
G596W	Walnut	M,LL	12WGR59	FM/AM/Phono/ Tape	Note C		_	169-513	8TK-P 169-505 or 169-505A	2 on 2, A1,A2,A3	AUX,F,H, PL,T
GR596W	Walnut	M,LL	12WGR59	FM/AM/Phono/ Tape	Note C	1	_	169-513	8TK-R/P 169-506	2 on 2, A1,A2,A3	AUX,F,H, PL,T
G680W2	Walnut	М	3WGR54	FM/AM/Tape	Note C		_	_	8TK-P 169-492	2 on 2, A1,A2,A3	DGL,H,PL
GR684W	Walnut	M	6WGR56	FM/AM/Tape	Note C	ſ	-	<del>-</del>	8TK-R/P 169-507 or 169-507A	2 on 2, A1,A2,A3	AUX,DGL, H,PL
G904P	Pecan	C,LL	5WFR50	FM/AM/Phono/ Tape	49-1224-01 49-1094	8 45	2-6x9 2-3½	169-502	8TK-P 169-490 or 169-490A	2 on 2 A1,A2,A3	H,RS
G914P	Pecan	C,LL	3WGR50	FM/AM/Phono/ Tape	49-1261-01 49-1237	8	2-8 2-3	169-515	8TK-P 169-521 or 169-521A	2 on 2 A1,A2,A3	A,H,PL, RS
G915AE	Antiqu <b>e</b> Oak	C,LL	3WGR50	FM/AM/Phono/ Tape	49-1261-01 49-1237	8	2-8 2-3	169-515	8TK-P 169-521 or 169-521A	2 on 2 A1,A2,A3	A,H,PL, RS
G916M	Maple	C,LL	3WGR50	FM/AM/Phono/ Tape	49-1261-01 49-1237	8	2-8 2-3	169-515	8TK-P 169-521 or 169-521A	2 on 2 A1,A2,A3	A,H,PL, RS
G920AE	Antiqu e Oak	C,LL	6WGR55	FM/AM/Phono/ Tape	49-1217 49-1166	8	2-10 2-3½	169-516	8TK-P 169-521 or 169-521A	2 on 2 A1,A2,A3	A,AUX, H,PL,T, RS

# PRODUCT FEATURES SEE NOTES ON PAGE 4

C	ABINET		СН	ASSIS	SF	PEAKER	S	RECORD CHANGER	отн	ER FEATU	RES
MODĚL	COLOR	NOTE A	MODEL	ТҮРЕ	PART NUMBER	IMPED. (In Ohms)	QTY. AND SIZE (In Inches)	PART NUMBER	TAPE PROVISION NOTE B	SPEAKER PROVISION NOTE C	MISC. NOTE D
G921P	Pecan	C,LL	6WGR55	FM/AM/Phono/	49-1217	8	2-10	169-516	8TK-P	2 on 2	A,AUX,
				Tape	49-1166	8	2-3½		169-521 <b>c</b> or	A1,A2,A3	H,PL,T,
									169-521 🕰		RS
G922M	Maple	C,LL	6WGR55	FM/AM/Phono/	49-12 17	8	2-10	169-516	8TK-P	2 on 2	A,AUX,
				Tape	49-1166	8	2-3½		169-521 <b>-</b> or	A1,A2,A3	H,PL,T,
			}						169-521 <i>F</i> A		RS
GR936AE	Antique	C,LL	12WGR58	FM/AM/Phono/	49-1217	8	2-10	169-513	8TK-R/P	2 on 2	A,F,H,
	Oak			Tape	49-1166	8	2-3½		169-523 <b>-</b> or	A1,A2,A3	PL,T,
1			,						169-487		RS
GR937P	Pecan	C,LL	12WGR58	FM/AM/Phono/	49-1217	8	2-10	169-513	8TK-R/P	2 on 2	A,F,H,
				Tape	49-1166	8	2-3½		169-523 or	A1,A2,A3	PL,T,
									169-487		RS
G1000W	Walnut	м,ѕР	_	_	49-1249	8	1-6½	_	_	_	A1
:					49-1168	8	1-3½				
G2000W	Walnut	M,SP	_		49-1254-01	8	1-8		_	_	A2
					49-1168	8	1-3½				
G3000W	Walnut	M,SP	_	_	49-1265	8	1-10	_	_	-	А3
					49-1168	8	1-3½				
G9019W	Walnut	M,SP	-	-	49-1241	8	1-10	_	_		А
					49-1168	8	1-3½				
G9026W	Walnut	М	-	_	_	_	-	169-512	_	_	_

# PRODUCT FEATURES RECORD CHANGER FEATURES

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

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

#### NOTES

#### NOTE A - CABINET STYLE:

 $C = Consol_{\bigoplus}$ , M = Modular, LL = Lift Lid, SP = Speaker System.

#### NOTE B - TAPE INPUT AND OUTPUT PROVISION:

Factory Installed: 8 TK = Eight Track Cartridge,

Cass = Cassette, P = Play, R = Record,

TM = Top of Set Model for installation with the designated console of ma odular models:

Model F635 - Cartridge Tape Player.

Model E637 - Cassette Tape Player/ Recorder.

Model F638 - Cartridge Tape Player/Recorder.

#### NOTE C - S PEAKER PROVISIONS:

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

A1 = Model G1000W Allegro 1000 Speaker System may be used.

A2 = Model G2000W Allegro 2000 Speaker System may be used.

A3 = Model G3000W Allegro 3000 Speaker System may be used.

NOTE: Mod els G1000W, G2000W, and G3000W (and the prior E9012 series) are 8 ohm Allegro Speaker Systems. Allegro Models in the E9014 and E9018 series were 16 ohm systems.

#### NOTE D - MISCELLANEOUS FEATURES:

A = Speaker System is Allegro.

A1 = Speaker System is Allegro 1000.

A2 = Speaker System is Allegro 2000.

A3 = Speaker System is Allegro 3000.

AUX = Auxiliary input accepts Record Changer Model E9026W or Tape Units listed under Note B.

DGL = Digilite Dial Scale.

= Flywheel Tuning.

H = Headphone Jack (Stereo).

HH = Headphone Jack (Four Channel).

PL = Power Indicator Light.

RS = Record Storage.

T = Tuning Meter.

# SECTION TWO GENERAL INFORMATION

#### **THEORY**

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

#### CIRCUIT BOARD COMPONENT IDENTIFICATION

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

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

#### **POWER AMPLIFIERS**

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

- Each channel of the following amplifiers use a pair of matched power transistors in the final output stage. Therefore, should one transistor fail, both transistors must be replaced simultaneously, since they will not perform properly unless matched. (In chassis using complementary symmetry circuits a matched pair consists of one NPN and one PNP transistor.): 3WGR50, 3WGR52, 3WGR54, 5WFR50, 6WGR55, 6WGR56, 6WGR57, 12WGR58, 12WGR59.
- 2. When a power transistor is replaced the insulator (when used) between the transistor and the heat sink should also be replaced. On the following be certain to apply Dow Corning No. 340 heat conductive grease between the

transistor and the insulator. Also between the insulator and the chassis. The Dow Corning grease can be obtained in 1 c.c. quantities by ordering Part No. 205-5 1: 3WGR50, 3WGR52, 3WGR54, 5WFR50, 6WGR55 6WGR55, 12WGR58, 12WGR59.

- Do not operate these amplifiers without their proper speaker load.
- 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 di ode rectifiers, and driver transistors.
- Remove plug-in transistors from their sockets before doing any soldering to the socket lugs.

#### SIGNAL STRENGTH CHART

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

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

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

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

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

Chassis 12WGR59 - AGC voltages do not pro-vide significant information.

Chassis	3WGR	50, 3V	VGR52,
3W	GR54	5WFR	50

#### Chassis 6WGR55, 6WGR56, 6WGR57

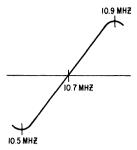
#### Chassis 12WGR58

Micro Volts Input	Voltage AGC Voltage at Test Point "C"	Micro Volts Input	Reverse AGC Voltageq At Gate 2 of FM RF	Micro Volts Input	Reverse AGC Voltage At Gate 2 of FM RF
0	1.23	0	5.4	0	5.7
25	1.10	25	4.5	25	4.5
100	0.88	100	3.3	100	2.8
200	0.79	200	2.85	200	2.2
500	0.71	500	2.5	500	1.5
1K	*0.67	1K	*2.1	1K	*-0.96
5K	0.60	5K	1.22	5K	-0.22
50K	0.12	50K	0.15	50K	-1.10
100K	0.06	100K	-0.08	100K	-1.20

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

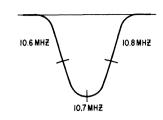
Chassis	Number of Channels	Watts Per Channel	Power Bandwidth	Total Harmonic Distortion (THD) No More Than
3WGR50	2	2.5	100Hz - 10kHz	1.0%
3WGR52	2	2.5	100Hz - 10kHz	1.0%
3WGR54	2	2.5	100Hz - 10kHz	1.0%
6WGR55	2	6.0	80Hz - 12kHz	1.0%
6WGR56	2	6.0	80Hz - 12kHz	1.0%
6WGR57	2	6.0	80Hz - 12kHz	1.0%
12WGR58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

# SECTION THREE FM/AM/MULTIPLEX ALIGNMENT



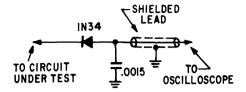
Scope Pattern A - Ratio Detector

Adjust for maximum amplitude while maintaining linearity and symmetry. 10.7 MHZ marker must be on the curve at base line.



#### Scope Pattern-B - IF

10.6 and 10.8 MHZ markers must be symmetrically positioned with 10.7 MHZ at center of curve. This point must be adjusted for maximum.



#### Detector Probe - C

If your oscilloscope is not equipped with a detector probe, One can easily be constructed. For best results the probe should be shielded.

#### **GENERAL**

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

#### **FM ALIGNMENT**

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

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

#### AM ALIGNMENT

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

#### MULTIPLEX ALIGNMENT

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

Most Multiplex generators are excellent troubleshooting devices because they provide a composite Multiplex signal as well as an RF signal (which is FM modulated by the composite multiplex signal). The composite signal is very useful since it can be used in signal tracing the Multiplex portion of the receiver. We do not recommend that Multiplex alignment be

made using the composite signal injected at the output terminal of the Detector since there is always some phase shift occurring in the RF, IF or Detector circuits. As a result, Multiplex alignment made by a signal injected at the Ratio Detector input would not be correct. For proper Multiplex alignment the composite signal must FM modulate the RF carrier and then be fed into the FM antenna terminals. With the signal injected in this manner, the Multiplex alignment would then be the best that could possibly be obtained.

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

#### GENERAL TROUBLE-SHOOTING PROCEDURE

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

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

#### RF AND IF ALIGNMENT PROCEDURE CHASSIS 3WGR50, 3WGR52, 3WGR54, 5WFR50, 6WGR55, 6WGR56, 6WGR57

STEP	CO-NNECT GEN ERATOR TO	DUMMY ANTENNA	CONNECT VTVM/ SCOPE TO	INPUT SIGNAL FREQUENCY	SET DIAL TO	ADJUST	PURPOSE
NOTE:	For AM Alignment Us	e A Signal Wil	th 400 Hertz !	Modulation, Band	switch In AM.		
1	One term loosely compled to wav emagnet.	None	VTVM Speaker Voice Coil	455 KHz	600 KHz	L203, L204 (T202) L207 (T204) L210 (T206)	Align IF channel for maximum output.
2				1600 KHz	1600 KHz	C1G	Set Oscillator to dial scale.
3				600 KHz	600 KHz	T101	
4				Repeat Steps No	o. 2 & 3 for minir	mum change.	
5				1400 KHz	1400 KHz	C1D	Align Antenna stage.
NOTE:	For FM Alignment Use	A Signal Wit	h 400 KHz De	viation, Bandswi	tch In FM. AFC '	'Off".	
6	Term. No. 5 of T205 3rd 1F Trans. Test Point "G"	47 ohm in shunt with gen, output.	Scope Ratio Detector	10.7 MHz	Gang Closed	L212 (T207)	Adjust Primary and Secondary of Ratio Detector for maximum ampli- tude and symmetry as shown in Scope
7	, 33, 7 0,	Then from hot lead a 27 ohm	Test Point "H"			L214 (T207)	Pattern "A".
8	Term. No. 3 of T203 2nd 1F Trans. Test Point "F"	in series with a .001 MF capacitor.	Scope Last FM IF Test Point			L208 & L209 (T205)	Align I.F. transformer for maximum output and symmetry. This pattern is not necessarily identical to the overall Scope Pattern "B".
9	Term. No. 3 of T201 1st IF Trans. Test Point "E"		"G"			L205 & L206 (T203)	
10	Test Point "D"					L201 & L202 (T201)	
11	1					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 Ger	nerator Groun	nd MUST be C	onnected On Brai	id As Close To G	ang As Possible.	
12	FM A Intenna Post	300 ohm	Scope	106 MHz	106 MHz	C13	Set Oscillator to dial scale.
13	(Disconnect	300 0000	Last FM	90 MHz	90 MHz	L4	
14	A intenna) Test Point "A"		∤F Test	Repeat Steps 12	and 13 for minir	num change.	
15	, 550 + 51		Point	106 MHz	106 MHz	C1A	Align FM Detector stage for maximum.
16			"G"	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 mini	mum change.	
NOTE:	The Foll owing Applies	Only To Cha	ssis 6WGR55	, 6WG R56, 6WG	R57, No Signal I	nput.	
20	None	None	None	None	None	R233	Zero center tuning meter.

MULTIPLEX ALIGNMENT PROCEDURE
CHASSIS 3WGR50, 3WGR52, 3WGR54, 5WFR50, 6WGR55, 6WGR56, 6WGR57
Before Al igning or Servicing Multiplex Circuits Be Certain That RF, IF And Ratio Detector Are Correctly Aligned And That Operation Is

STEP	CONNECT GENERATOR TO	DUMMY ANTENNA	CONNECT SCOPE AND/OR ACVTVM	INPUT SIGNAL FREQUENCY	SET DIAL TO	ADJUST	PURPOSE		
NOTE:	Place Ba ndswitch in Fi	M STEREO P	osition.						
1	FM A Intenna Post (D ii sconnect	300 ohm	Test Point	98 MHz 10% Pilot	98 MHz	T301	Adjust 19 kHz Amp for maximum.		
	A ntenna) Test Point "A"						tereo Indicator Lamp may be on or off uring the above steps.		
2				98 MHz 5% Pilot		R302	Adjust mute control to point where stereo lamp lights up.		
							reo Indicator Lamp must remain on ing the following steps.		
3			"L" Tape Output	98 MHz 10% Pilot L+R, L—R,		Т302	Adjust for maximum L Channel Reading		
4			"R" Tape Output	(Mod. L. Only)		T302 if necessary	Adjust for minimum R Channel Reading		
5				Repeat Steps 4 a	nd 5 for minim	To provide maximum separation.			

#### RF AND IF ALIGNMENT PROCEDURE - CHASSIS 12WGR58

STEP	CONNECT GENERATOR TO	DUMMY ANTENNA	CONNECT VTVM/ SCOPE TO	INPUT SIGNAL FREQUENCY	SET DIAL TO	ADJUST	<b>P</b> URPOSE			
NOTE:	For AM Alignment Us	e A Signal Wit	h 400 Hertz N	lodulation, Bands	witch In AM.					
1	One turn loosely coupled to wavemagnet.	None	VTVM Speaker Voice Coll	455 KHz	600 KHz	L203, L204 (T202) L207, L215 (T204) L210 (T206)	Align IF channel for maximum output.			
2				1600 KHz	1600 KHz	C1K	Set Oscillator to dial scale.			
3				600 KHz	600 KHz	L103 (T102)				
4				Repeat Steps No						
5				1400 KHz	1400 KHz	C1H				
6				600 KHz	600 KHz	L106 (T101)	Align RF stage.			
7				Repeat Steps No	. 5 and 6 for mi	nimum change.	7 (19) (1 3.09 - 1			
8				1400 KHz	1400 KHz	C1F	Align antenna stage.			
NOTE: For FM Alignment Use A Signal With 400 KHz Deviation, Bandswitch In FM, AC "Off".										
9	Term. No. 5 of T205 3rd IF Trans.	47 ohm in shunt with	Scope Ratio	10.7 MHz	Gang Closed	L212 (T207)	Adjust Primary and Secondary of Ratio Detector for m aximum amplitude and			
10	Test Point "G"	generator output. Then	Detector Test Point			L214 (⊤207)	symmetry, as <b>s</b> hown in Scope Pattern "A".			
	Term. No. 3 of T203	from hot lead	"H"			L208 & L209	Align I.F. Tran sformer for maximum			
11	2nd IF Trans. Test Point "F"	a 27 ohm in series with a .001	Scope Last FM			(T205)	output and symmetry. This pattern is not necessarily identical to the over-			
12	Term. No. 4 of T201 1st IF Trans. Test Point ''E''	MF Capacitor.	IF Test Point "G"			L205 & L206 (T203)	all Scope Patte rn "B".			
13	Test Point "D"					L201 & L202 (T201)				
14						Readjust L201, L202, L205, L206, L208 & L209	Align I.F. Transformer for maximum output and symmetry as indicated in Scope Pattern "B".			
	In Steps 13B and 14B	Generator Gr	ound Must Be	Connected On Br	aid As Close To	Gang As Possible				
15	FM Antenna Post	300 ohm	Scope	106 MHz	106 MHz	C13	Set Oscillator to dial scale.			
16	(Disconnect	300 0	Last FM	90 MHz	90 MHz	L4				
17	Antenna) Test Point "A"		IF Took Point	Repeat Steps 15						
18	103t Folint		Test Point	106 MHz	106 MHz	C1C	Align FM Detector stage for maximum.			
19			G	90 MHz	90 MHz	L2 if necessary				
20				106 MHz	106 MHz	C1A	Align FM Antenna stage for maximum.			
21		·		90 MHz	90 MHz	L1 if necessary				
22	None	Ness	None	Repeat Steps 15			Zona combon ha ming areata			
23	None	None	None	None	None	R233	Zero center tu ning meter.			

#### FM-MULTIPLEX ALIGNMENT PROCEDURE - CHASSIS 12WGR58

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

STEP	CONNECT GENERATOR TO	DUMMY ANTENNA	CONNECT SCOPE AND/ OR VTVM	INPUT SIGNAL FREQUENCY	SET DIAL TO	ADJUST	₽URPOSE
NOTE:	Place Bandswitch In F	M Position A	nd Stereo/Mon	o Switch In Stered	)		
1	FM Antenna Post (Disconnect Antenna) Test Point "A"	300 ohm	VTVM(DC) Doubler Test Point "N"	98 MHz, 10% Pilot	98 MHz	Adjust mute co	Adjust 19 kHz Amp and Doubler for maximum.  It this step with Test Point "T" Shorted on trol at same tirme so voltage does not to Voltage must be kept at minimum
						readjust mute c	ment. If stereo indicator lamp lights up, ontrol to extinguish lamp and continue ransformers for maximum.
2				98 MHz, 5% Pilot		R308	Adjust mute control to point where stereo lamp lights up.
3			VTVM(AC) "L" Audio Output (After 38kHz filter)	98 MHz, 10% Pilot L+R, L—R, (Mod. L Only)		Т303	Adjust 38 kHz Detector for maximum at "L" Output _ NOTE:— "L" Output should be approximately 10 (or greater) times "R"
4			VTVM(AC) "R"Audio Output (After 38kHz filter)	Check "R" chan	nel output.		Output.

#### RF, IF AND MPX ALIGNMENT PROCEDURE FOR CHASSIS 12WGR59

TEP	CONNECT GENERATOR TO	DUMMY ANTENNA	CONNECT VTVM/ SCOPE TO	INPUT SIGNAL FREQ.	SET DIAL TO	ADJUST	PURPOSE
OTE:	For AM Alignment Use	e A Signal Wit	h 400 Hertz M	odulation, Bandsv	vitch In AM.		
1	One Turn Loosely coupled to AM	None	VTVM Speaker	455 KHz	Gang Closed	L203, L204 (T202)	Align IF for maximum output.
2	Wave magnet Antenna		Voice Coil			L207, L208 (T203)	
3						L209 (T204)	
4	í		1	1600 KHz	1600 KHz	C109	Set Oscillator to dial scale.
5				600 KHz	600 KHz	L105 (T102)	
6	•			Repeat Steps N	lo. 4 & 5 for mi	nimum change.	
7	1			1400 KHz	1400 KHz	C1H	Align RF stage.
8				600 KHz	600 KHz	L103 (T101)	
9				Repeat Steps P	lo. 7 & 8 for m	inimum change.	
10				1400 KHz	1400 KHz	C1F	Align Antenna stage.
11				600 KHz	600 KHz	L101 if necessary	
12				Repeat Steps	10 & 11 for mi	nimum change.	1

13 Test Point "C	·		Gang Closed	L201, L202 (T201)	Align I.F. transformer for maximum output and symmetry as indicated in Scope Pattern "B".
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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 I F 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"	47 Ohm in	A. Distortion	Center	Gang	L205	A. Preferred Method: Distortion
	FM IF Input	shunt with gen. output. Then from hot lead a 27 Ohm in series with a .01 MF capacitor.	Analyzer (thru a 100 usec de- emphasis network) and/or Scope. See Fig. 3.	Frequency of Ceramic Filters Y201 and Y202. See Fig. 4.	Closed		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 Test Point				C. Alternate Method: Adjust L205 for maximum length and symmetry, Similar to Scope Pattern "A",
15						R213	Adjust for center reading on Tuning Meter.
16	Test Point "A"	300 Ohm		106 MHz	106 MHz	C15	Set Oscillator to dial scale.
_ 17	FM Antenna Post		1 1	90 MHz	90 MHz	L4	
18	(Disconnect Antenna)				16 & 17 for min		
19			l L	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			L	Repeat Steps 1	9 thru 22 for m	inimum change.	

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

STEP	CONNECT GENERATOR TO	DUMMY ANTENNA	CONNECT VTVM/ SCOPE TO	INPUT SIGNAL FREQ.	SET DIAL TO	ADJUST	PURPOSE
NOTE	: Apply Sufficient Sign	nal Level — A	prox. 100 Mic	rovolts — To Obt	ain Full Limitin	g At Point Near	98 MHz.
24	Test Point "A" FM Antenna Post (Disconnect Antenna)	300 Ohm	Scope Test Point "H"	98 MHz	98 MHz	_	Turn Modulation "ON". Adjust generator RF frequency to obtain center indication on Tuning Meter. Adjust VTVM for "O" dB reading.
25							Turn modulation "OFF". Reduce RF level to get -4-5 dB quieting (approx. 3 to 4 microvolts).
26						R308	Turn Mute "ON". Rotate R308 (Mute) full clock wise. Audio will mute. Slowly adjust R308 counterclockwise 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/	No Signal Input.		R317	A. Frequency Counter should read 19 KHz, ± 100 Hz.
· İ			or Scope Test Point "M"	Mute "ON".			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 synchroni≥ed 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 Con	trol R317 Aft	er Step 27.				

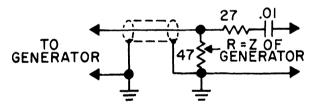


FIGURE 1 - RF INPUT PROBE

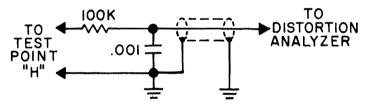


FIGURE 3 - DE-EMPHASIS PROBE

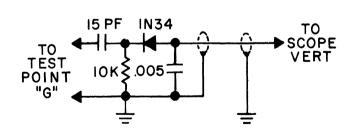


FIGURE 2 - DIODE DETECTOR PROBE

CERAMIC FILTERS - CHASSIS 12WGR59						
PART NO.	COLOR CODE	NOMINAL CENTER FREQUENCY	FREQUENCY RANGE			
224-1	Black	10.64 MH z	10.61 to 10.67 MHz			
224-1-01	Blue	10.67 MH z	10.64 to 10.70 MHz			
224-1-02	Red	10.70 MH z	10.67 to 10.73 MHz			
224-1-03	Orange	10.73 MH z	10.70 to 10.76 MHz			
224-1-04	White	10.76 MH 2	10.73 to 10.79 MHz			

FIGURE 4 - CERAMIC FI LTER TABLE

# **NOTES**

#### **SECTION FOUR**

#### THEORY AND APPLICATIONS

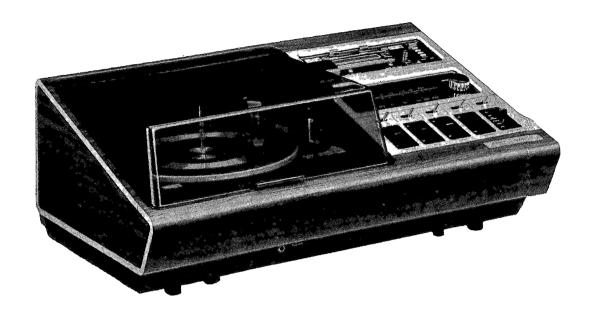


FIGURE 1 - MODEL GR596W

#### INTRODUCTION

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

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

9. Phase Locked Loop (PPL) Multiple× Detector (IC301) (one variable resistor adjustment - R317).

#### AM RF/IF/AGC

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

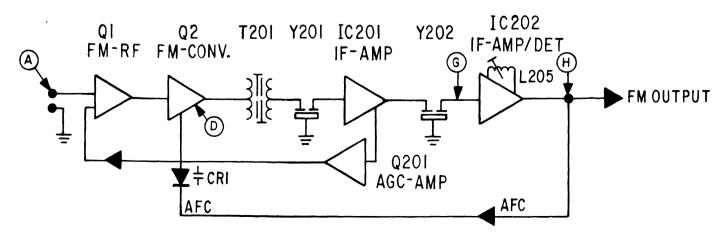


FIGURE 2 - CHASSIS 12WGR59 - FM RF/IF BLOCK DIAGRAM

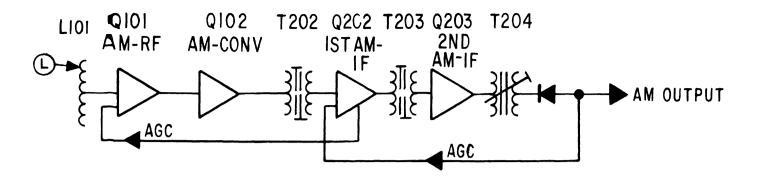


FIGURE 3 - CHASSIS 12WGR59 AM RF/IF BLOCK DIAGRAM

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

#### FM - RF

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

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

At this point lets recap the existing voltage conditions:

Gate 1 to Source - approx. −0.3 volts

Gate 2 to Source - approx. +3.6 volts

Drain to Source - approx. +7.8 volts

Drain current - approx. 10 milliamp.

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

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

#### MOSFET PROTECTION

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

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

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

- A. Do not generate static.
- B. Keep relative humidity above 60%.

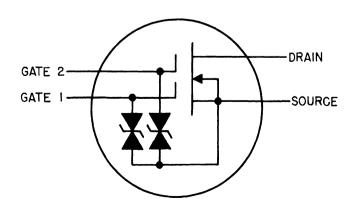
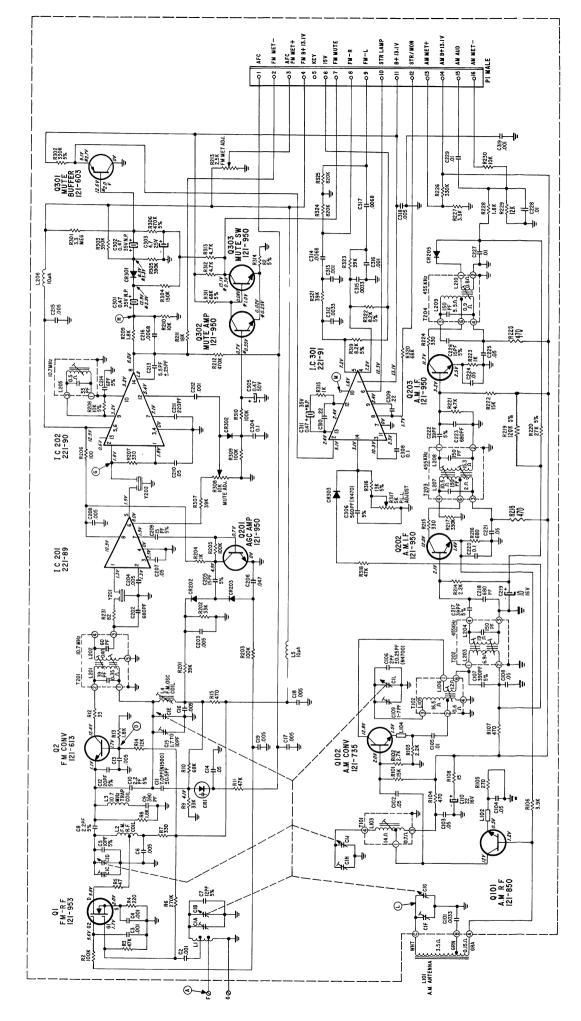


FIGURE 4 - MOSFET GATE PROTECTION



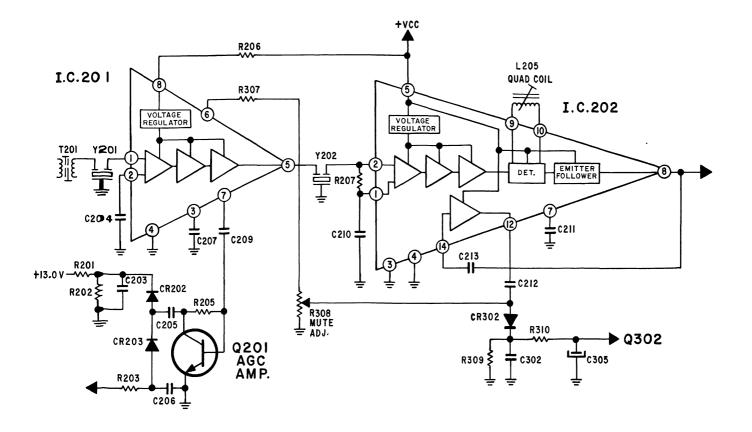


FIGURE 6 - CHASSIS 12WGR59 FM-IF

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

#### FM - AFC

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

#### FM - IF

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

#### **CERAMIC FILTERS**

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

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

FIGURE 7 - CERAMIC FILTER TABLE

#### FM - IF

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

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

#### FM-AGC

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

#### FM-LIMITER/DETECTOR

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

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

Figure 8 is a partial schematic of the detector. Output of the amplified and limited IF signals appear at IC202 pin 9. Connected externally between pins 9 and 10 is the quad coil (L205). Voltage appearing across the ends of L205 is a function of the signal frequencies appearing at pins 9 and 10. These two pins will be 90 degrees apart, resulting in this circuit being called a quad detector. Signals at the center

frequency will produce equal voltages at pins 9 and 10, while signals off center frequency will create different voltage on pins 9 and 10. Being a differential circuit, only the difference of the signals appearing at pins 9 and 10 will be amplified. Identical signals on those pins will not. The amplified signal goes through the emitter follower to pin 8, where it is available as:

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

#### FM - INTERSTATION MUTING

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

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

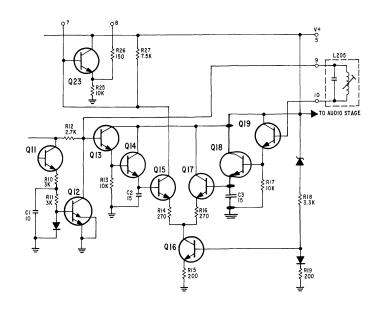


FIGURE 8 - QUADRATURE DETECTOR

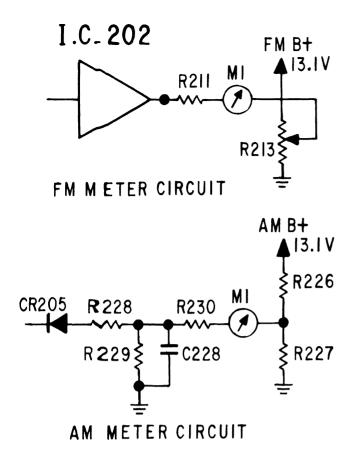


FIGURE 9 - TUNING METER

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

#### **TUNING METER**

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

#### FM - B+ SWITCHING

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

#### FM-MULTIPLEX

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

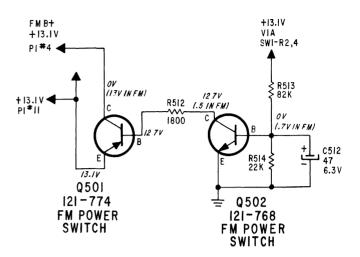


FIGURE 10 - FM B+ SWITCHING

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

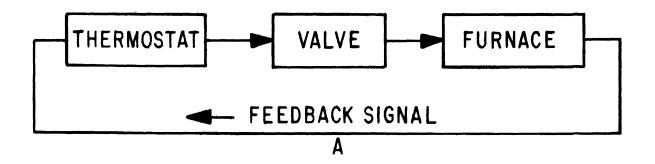
Chassis 12WGR59 makes use of a circuit called a Phase Locked Loop (PPL), which can be compared to a thermostat controlled heating system. Figure 11A illustrates a basic heating system in which the furnace will generate heat. The thermostat will sense the temperature and compare it with the thermostat's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

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

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

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

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



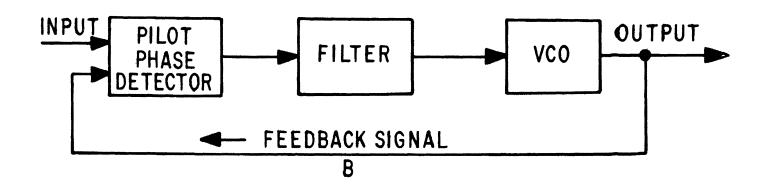


FIGURE 11 - PHASE LOCKED LOOP CONCEPT

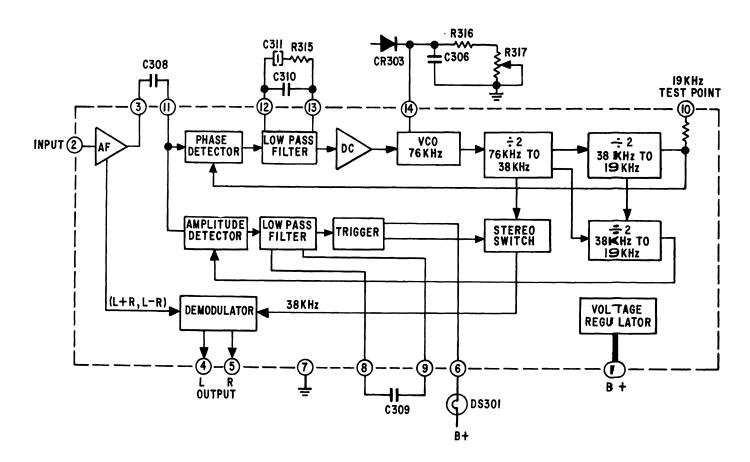
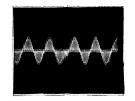
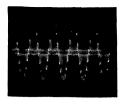


FIGURE 12 - MULTIPLEX DECODER BLOCK DIAGRAM



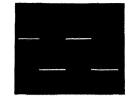
PIN 2-COMPOSITE INPUT L+R, L-R (1 K HZ LEFT ONLY). 19 KHZ ₱ILOT 10% 0.5V P/P (0.5 MILLISEC.)



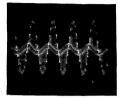
PINS 3 AND 11-**COMPOSITE AMPLIFIED** L+R, L-R (1 KHZ LEFT ONLY), **19 KHZ PILOT 10%** 1.4V P/P (0.5 MILLISEC.)



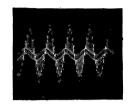
PIN 14-VOLTAGE CONTROLLED PIN 10-19 KHZ TEST POINT OSCILLATOR ADJUSTMENT 3.5V P/P (5.0 MICROSEC.)



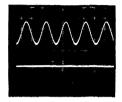
2.7V P/P (10.0 MICROSEC.)



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



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



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

#### FIGURE 13 - MULTIPLEX DECODER WAVEFORMS

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

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

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

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

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

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

#### "G" LINE AUDIO CIRCUITRY

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

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

#### **COMPLEMENTARY SYMMETRY**

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

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

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

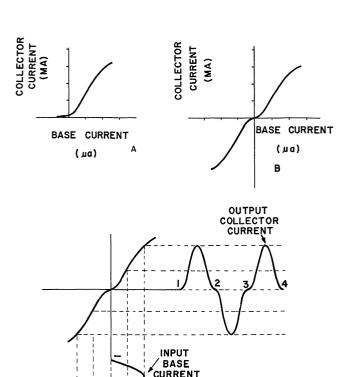
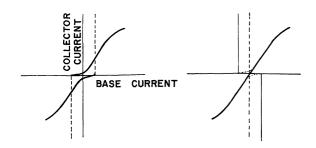


FIGURE 14 - CROSSOVER DISTORTION

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

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



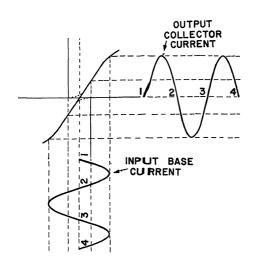


FIGURE 15 - DISTORTION REMOVED

## COMPLEMENTARY SYM METRY - CHASSIS 3WGR50

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

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

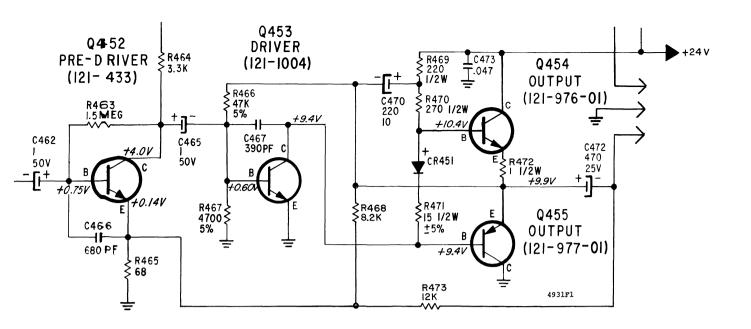


FIGURE 16 - CHASSIS 3WGR50 AUDIO OUTPUT CIRCUIT

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

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

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

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

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

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

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

### QUASI COMPLEMENTARY SYMMETRY - CHASSIS 12WGR58

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

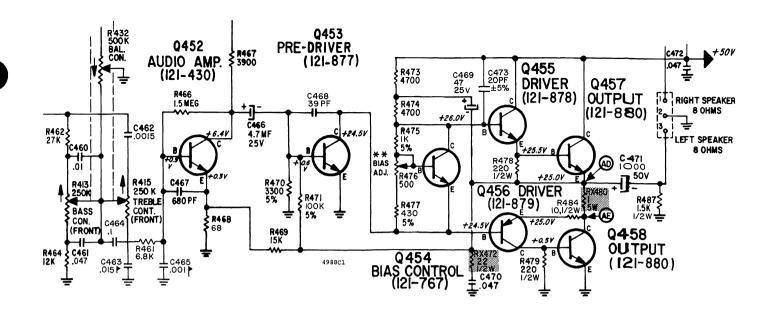


FIGURE 17 - CHASSIS 12WGR58 AUDIO OUTPUT CIRCUIT

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

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

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

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

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

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

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

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

#### Proceed as follows for Chassis 12WGR58:

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

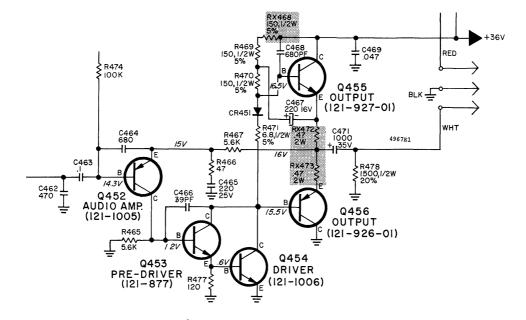


FIGURE 18 - CHASSIS 6WGR55 AUDIO OUTPUT CIRCUIT

### AUDIO CIRCUITRY — CHASSIS 6WGR55 FAMILY

Figure 18 illustrates most of the audio circuitry used in Chassis 6WG R55, 6WGR56, and 6WGR57. This circuit is somewhat similar to the basic complementary symmetry circuit shown in Figure 16 for Chassis 3WGR50. Amplifier transistor Q452 is now direct coupled to the pre-driver Q453. Q453 and Q454 are effectively a class A Darlington circuit which will be explained shortly. Resistors R465 and R477 serve as collector loads for Q452 and Q453 respectively. Collectors of Q453 and Q454 are dc coupled to the base of Q456 (directly) and also to the base of Q455 (via resistor R471 and bias diode CR451). AC signals will see CR451 as a short circuit. Boot strap capacitor C467 is now connected directly to the emitter of Q455, instead of at the center point (juncion of RX472 and RX473). At the center point are:

- 1. Output coupling capacitor C471 and bleeder resistor R478. The bleeder resistor provides protection should the set a ccidentaly be operated without any load.
- A feedback circuit to the emitter of Q452, consisting of voltage divider R466 and R467, determines the AC feedback to Q452. Capacitor C465 is included for do insolation because the circuit is direct coupled.

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

#### **DARLINGTON CIRCUIT**

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

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

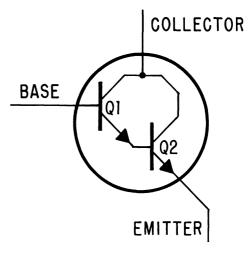


FIGURE 19 - DARLINGTON TRANSISTOR

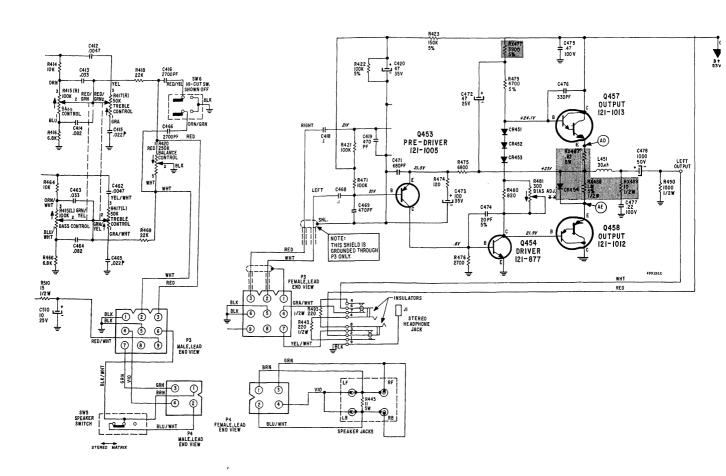


FIGURE 20 -- CHASSIS 12WGR59 AUDIO OUTPUT CIRCUIT

#### **AUDIO CIRCUITRY - CHASSIS 12WGR59**

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

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

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

Connected at the center point are the following:

- 1. A feedback loop (via R475) to the emitter of the pre-driver Q453. R474 and R475 determine the AC feedback to Q453, while C473 provides DC isolation.
- 2. Output circuit consisting of:
  - A. L451, RX489 and C477 comprise a high frequency roll-off circuit.
  - B. Output coupling capacitor C47 8.
  - C. Load resistor R490 will draim any charge off of C478, providing protection if the output does not have the proper load.
- 3. Between center point and emitter of Q458 are the parallel combination of CR454 an d RX488. When the circuit is operating at low output power the diode is not forward biased, therefore it is in effect open, and RX488 is in the circuit limiting tine output stage current. When the output power reachness a given value, the diode is forward biased, effectively shorting the resistor, permitting higher output power.

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

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

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

Only one bias adjustment is required in each output channel of Chassis 12VVGR59. Basis adjustment procedure consists of monitoring a DC voltage between two test points and adjusting the control for the correct voltage. Since voltage is in the millivolt range, it has been found that a digital voltmeter provides the best reading.

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

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

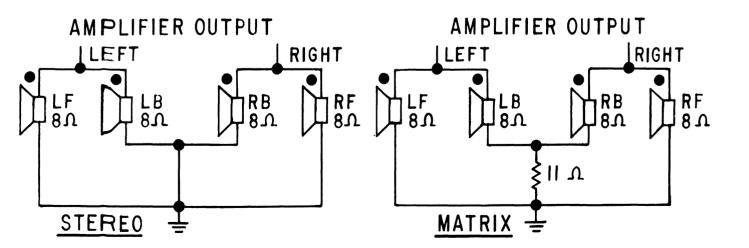
Proceed as follows for Chassis 12WGR59:

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

#### TWO ON TWO SPEAKER MATRIX

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

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



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

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

#### **ALLEGRO SPEAKER SYSTEMS**

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

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

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

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

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

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

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

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

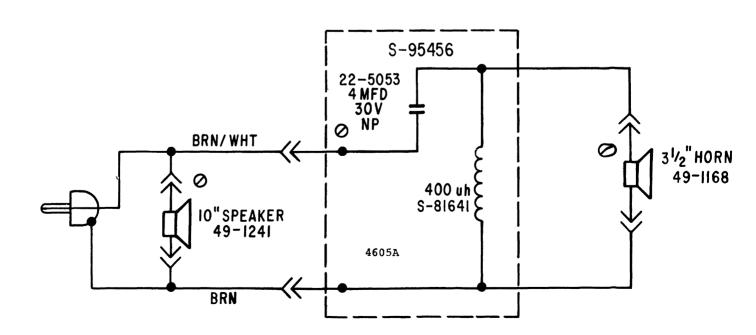


FIGURE 22 - MODEL G9019W SCHEMATIC

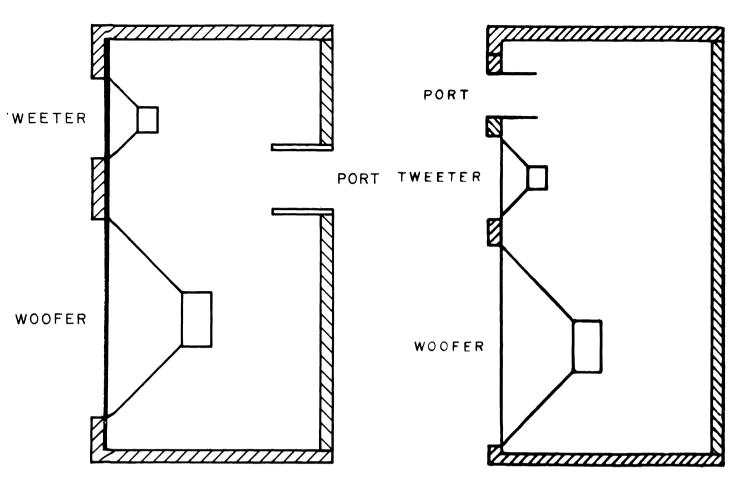


FIGURE 23 – MODEL G9019W SPEAKER ENCLOSURE

- B. The internal air pressure in a bass reflex enclosure is much higher than that found in a conventional closed-box enclosure, therefore mechanical construction of a bass reflex enclosure must be more substantial than that of an air suspension type. All panels, walls and joints must be extremely rigid to withstand these air pressures.
- C. Speakers (and other components) must be securely fastened to prevent air leaks. Leaks or loose components can result in losses which cause a deterioration of performance.

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

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

- A. When removing the back, be careful when handling the acoustical pads (they may tear easily).
- B. All speækers must be securely fastened to prevent leaks and rattles.
- C. If the Front grille is removed, be certain that the baffle is tight y captivated by the mounting screws when reinstalled.

FIGURE 24 – MODEL G1000W SPEAKER ENCLOSURE

- D. When replacing the back, be certain that the acoustic pads don't interfere with the port.
- E. The screws holding the back must be secured by using a sufficient amount of torque in order to prevent air leaks.

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

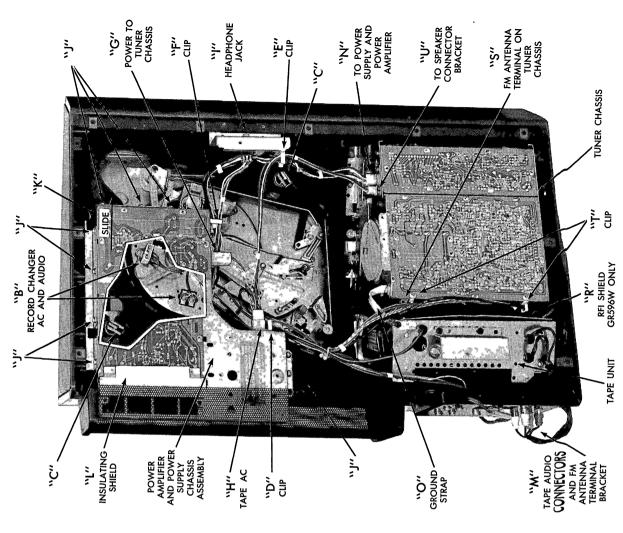
Speaker enclosures for Models G1000W, G2000W and G3000W are also of the bass reflex type and are similar in design to the model described above except for the forward facing part. Figure 24 is a cross section view of this latter group.

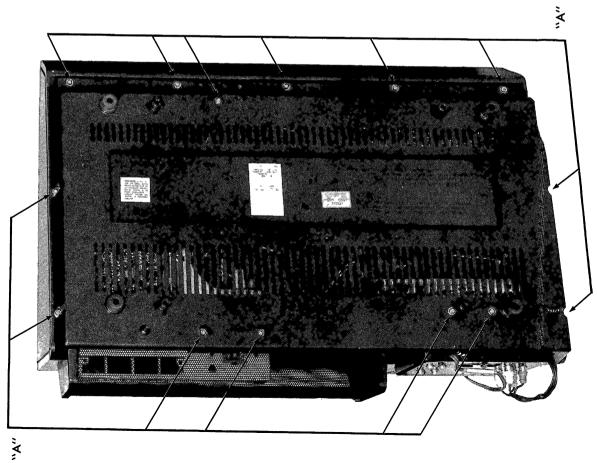
### DISASSEMBLY PROCEDURE MODELS G596W and GR596W

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

#### **CABINET BOTTOM REMOVAL**

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





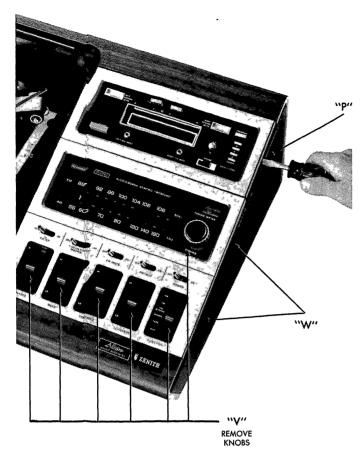


FIGURE 27 — MODELS G596W AND GR596W ESCUTCHEON REMOVAL

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

#### RECORD CHANGER REMOVAL

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

#### POWER SU PPLY/AMPLIFIER REMOVAL

- 1. Proceed as for "Cabinet Bottom Removal".
- 2. Release interconnecting cables from retainers ("D" and "E" in Figure 26).
- Unplug record changer AC cable at record changer ("B" in Figure 26).
- Unplug two connectors on this chassis ("G" and "H" in Figure 26).
- 5. Unplug connector on tuner chassis ("N" in Figure 26).

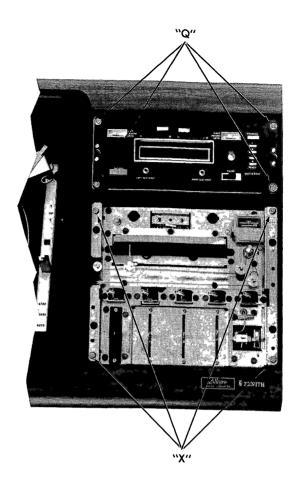


FIGURE 28 -- MODELS G596W AND GR596W TAPE UNIT AND TUNER CHASSIS MOUNTING SCREWS

- 6. Disconnect FM antenna connector ("M" in Figure 26).
- 7. Dismount headphone jack ("I" in Figure 26) from bracket.
- 8. Remove nine (9) screws holding chassis assembly and mounting brackets ("J" in Figure 26).
- 9. Remove chassis by sliding in direction of arrow ("K" in Figure 26).
- 10. When replacing chassis be certain that insulating shield ("L" in Figure 26) is between chassis and rear grille.

#### TAPE UNIT REMOVAL

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

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

- Remove (4) screws holding tape unit to front panel ("Q" in Figure 28).
- 7. Slide tape unit out through front panel (noting location of RFI shield on Model GR596W "R" in Figure 26). CAUTION: When replacing tape unit in Model GR596W be certain RFI shield is in proper location. NOTE: Main unit should be in horizontal position when reinstalling tape unit.

#### **TUNER CHASSIS REMOVAL**

- 1. Proceed as for "Cabinet Bottom Removal".
- Remove four (4) screws holding FM Antenna and Tape Bracket ("M" in Figure 26).
- 3. Unclip and disconnect cables ("D", "G", "N", and "U" in Figure 26).
- 4. Disconnect ground strap between tape and tuner chassis ("O" in Figure 26).
- 5. Remove six (6) knobs ("V" in Figure 27).
- 6. The tuner chassis mounting screws are covered by a "snap-off" escutcheon. Two notches will be found on the bottom of the outer edge of the escutcheon ("W" in Figure 27). Insert a thin blade screwdriver into these notches between the escutcheon and the cabinet proper being careful not to mar any surface. Force the escutcheon upward, causing it to disengage first two studs. Grasp the escutcheon along the top, lifiting to disengage second two studs.
- 7. Remove four (4) screws holding tuner chassis to front panel ("X" in Figure 28).
- Slide tuner chassis out through front panel (noting location of RFI shield on Model GR596W "R" in Figure 26).
   CAUTION: When replacing tuner chassis in Model

CAUTION: When replacing tuner chassis in Mode GR596W be certain RFI shield is in proper location.

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

#### ADDITIONAL DISASSEMBLY PROCEDURES

In addition to the disassembly procedure for Models G596W and GR596W outlined above, there are two other procedures (Groups "B" and "C" below) which apply to various "G" line models that also use the snap-off escutcheon and the 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	3WGR50	CHASSIS	3WGR54
MODELS	G914P G915AE	MODEL	G680W2
	G916M	CHASSIS	5WFR50
CHASSIS	3WGR52	MODEL	G904P
MODELS	G584W1	CHA SSIS	6WGR55
	G587W2 GR587W1	MODEL	G920AE G922M

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

CHASSIS MODELS		CHASSIS MODELS	15WER55 E911W E912M, M1 E913DE, DE1 E913P, P1 ET914W, W1 ET915DE ET915P, P1, P21
CHASSIS MODELS	5WER51 E584W, W1 E587W, W1 E588W		E921DE E921P E922M
CHASSIS		CHASSIS	
MODELS		MOD ELS	E585J, J1 E586W, X E589W, W1 E594W, W1
CHASSIS	5WFR50	CHASSIS	15WFR55
MODELS	F902W, W1 F903M F904DE F904P	MOD ELS	ET914W3 F914W ET915DE3 ET915P3 F915DE
CHASSIS	5WFR51		F915P
MODELS	F584W F587W F588W		F915DE1 F915P1 F916M F916PN
CHASSIS	5WFR53	CHASSIS	15WFR57
MODELS	F445W, W1 F680W F685W	MODELS	F585W F586X F589W
CHASSIS	15WFR51		F589X F594W
MODELS	F941DE F941P F942M F946AE		

F947P

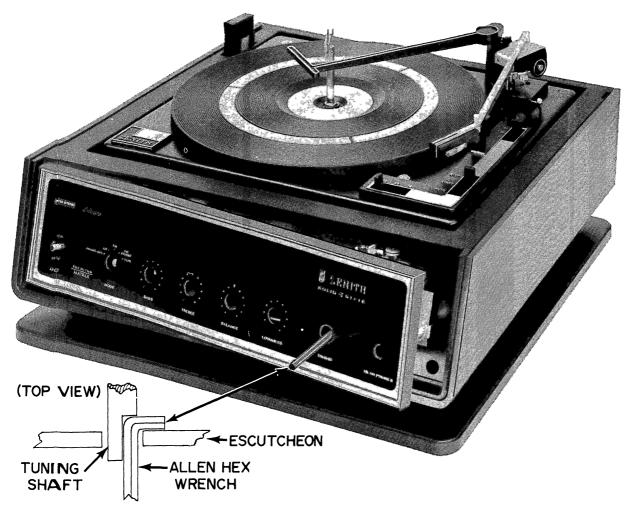


FIGURE 29 -- ESCUTCHEON REMOVAL -- GROUP "B"

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

#### ESCUTC HEON REMOVAL - GROUP "B"

Figure 29 illustrates the technique used:

- 1. Remove all knobs (except AFC) from the control panel.
- 2. Rotate tunin g shaft so that the "flat" is vertical, and the cut-away por tion is facing the headphone jack.
- 3. Referring to the top view in Figure 29, insert the short end of a 1/8' (size may vary) "L" shaped Allen hex wrench between the shaft and the escutcheon.
- Position the short end of the wrench behind the escutcheon, with the wremch against the step of the shaft.
- 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 loosen ed end of escutcheon, and firmly pull escutcheon outward until all studs and clips are disengaged.

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

#### OUT FRONT CHASSIS REMOVAL - GROUP "B"

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

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

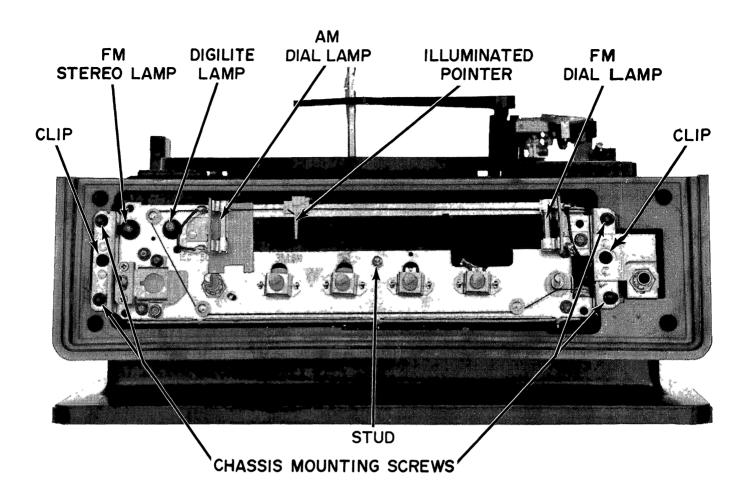


FIGURE 30 - OUT FRONT CHASSIS REMOVAL - GROUP "B"

- 4. Until cable retainers. (Disconnect record changer and tape unit cables when used.)
- Remove one screw from bottom of cabinet under center of chassis (E584W, Two screws.) (E585J, J1, E586W, X, F584W, F585W, F586W, G584W1 Four screws to remove bottom base, then two screws under chassis.) (E587W, W1, E680W, F587W, F680W, G587W2, GR587W1, G680W2 Also four screws under tape assembly.)
- Remove four screws from front of chassis. (E587W, W1, E680W, F587W, F680W, G587W2, GR587W1, G680W2

   Tape unit is secured to radio chassis with a bracket.
   There are two additional screws to the left of the tape unit.)
- 7. Slide radio chassis (E587W, W1, E680W, F587W, F680W, G680W, G587W2, GR587W1, G680W2 Tape unit is mounted to radio chassis with a bracket), with attached brackets and cables, out thru front of cabinet.

This completes chassis removal.

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

#### ESCUTCHEON REMOVAL - GROUP "C"

CHASSIS 6WGR56 CHASSIS 6WGR57
MODEL GR684W MODE LS G590W
GR590W
GR591W

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

Figure 31 illustrates the technique used:

- Remove all knobs (except Power, AFC and Matrix). Also remove the nut on the headphone j ack.
- 2. Group "C" models have three notches formed into the under side of the escutcheon (vis ble 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 escutch con outward, causing it to disengage each stud.
- 4. Remove the escutcheon.

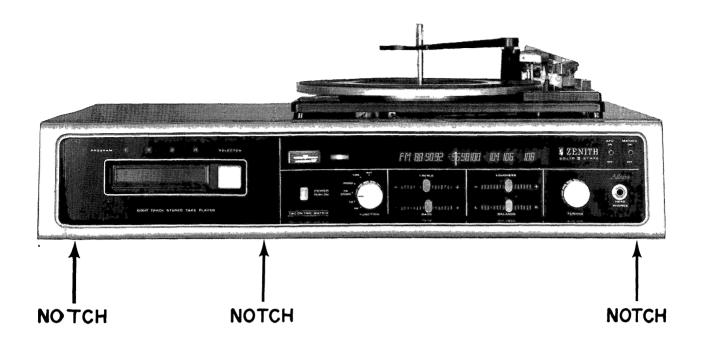


FIGURE 31 - ESCUTCHEON REMOVAL - GROUP "C"

#### OUT FRONT CHASSIS REMOVAL - GROUP "C"

- 1. Remove escutcheon as explained above.
- 2. Remove screws holding cabinet back, and remove back.
- 3. Unmount both the Speaker Jack Assembly Bracket and the Antenna/Tape/Phone Connector Assembly Bracket from the calbinet 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.

- Remove three screws from front of chassis. Tape unit is secured to radio chassis with a bracket (G590W, GR590W, GR684W).
- Slide radio chassis (Tape unit is mounted to radio chassis with a bracket), with attached brackets and cables, out thru front of cabinet.

This completes chassis removal.

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

7. This comple



**GR591W** 



**GR590W** 



**G680W** 

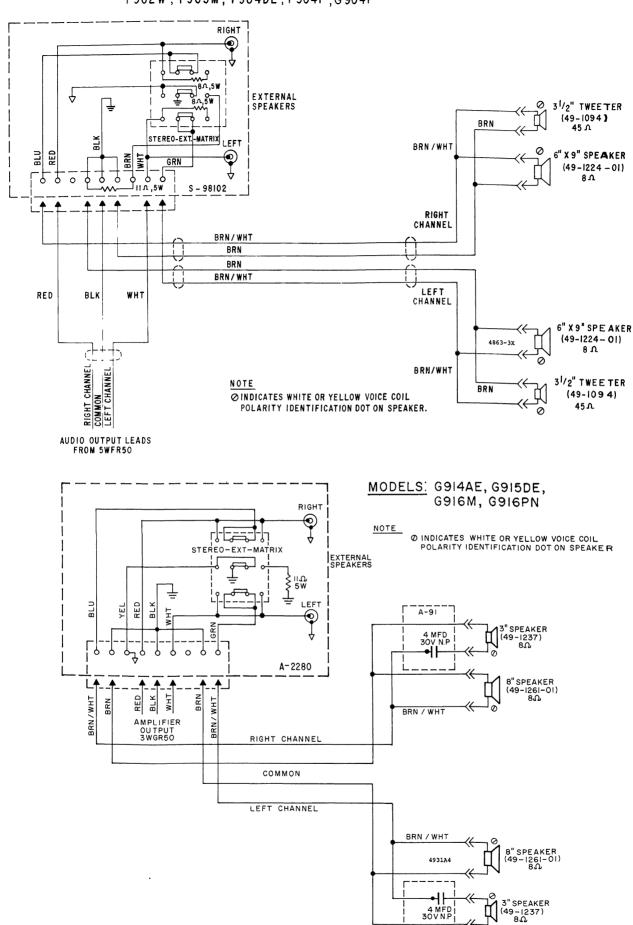


**GR684W** 



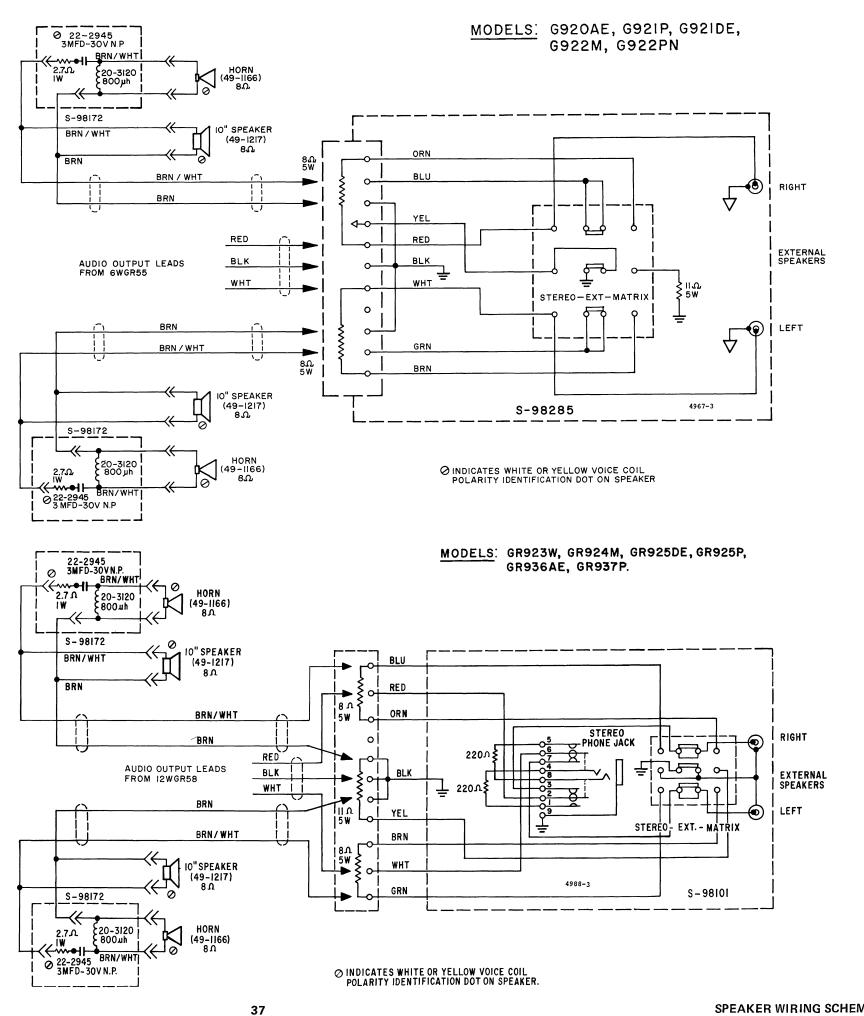
G9026W

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



**SPEAKER WIRING SCHEMATICS** 

A-91



**MODEL G2000W** 22-5053 4 MFD 30V N.P. 49-1168 S-81641 49-1254-01 3 I/2"HORN TWEETER 8" WOOFER 5031-S-95456 **MODEL G3000W** 22-5053 4 MFD 30V N.P. 49-1168 49-1265 S-81641 3 1/2" HORN TWEETER IO" WOOFER hر 400 5030-OINDICATES WHITE OR YELLOW VOICE COIL S-95456 POLARITY IDENTIFICATION DOT ON SPEAKER. S-95456 MODEL G9019W 22-5053 4 MFD 30V i Ø NP **BRN/WHT** 0 31/2"HORN 49-1168 0 400 uh 🖔 S-81641 F 10"SPEAKER 49-1241 4605A

22-5053

49-1168

3 I/2"HORN TWEETER

4 MFD 30V N.P.

S-81641 400مh

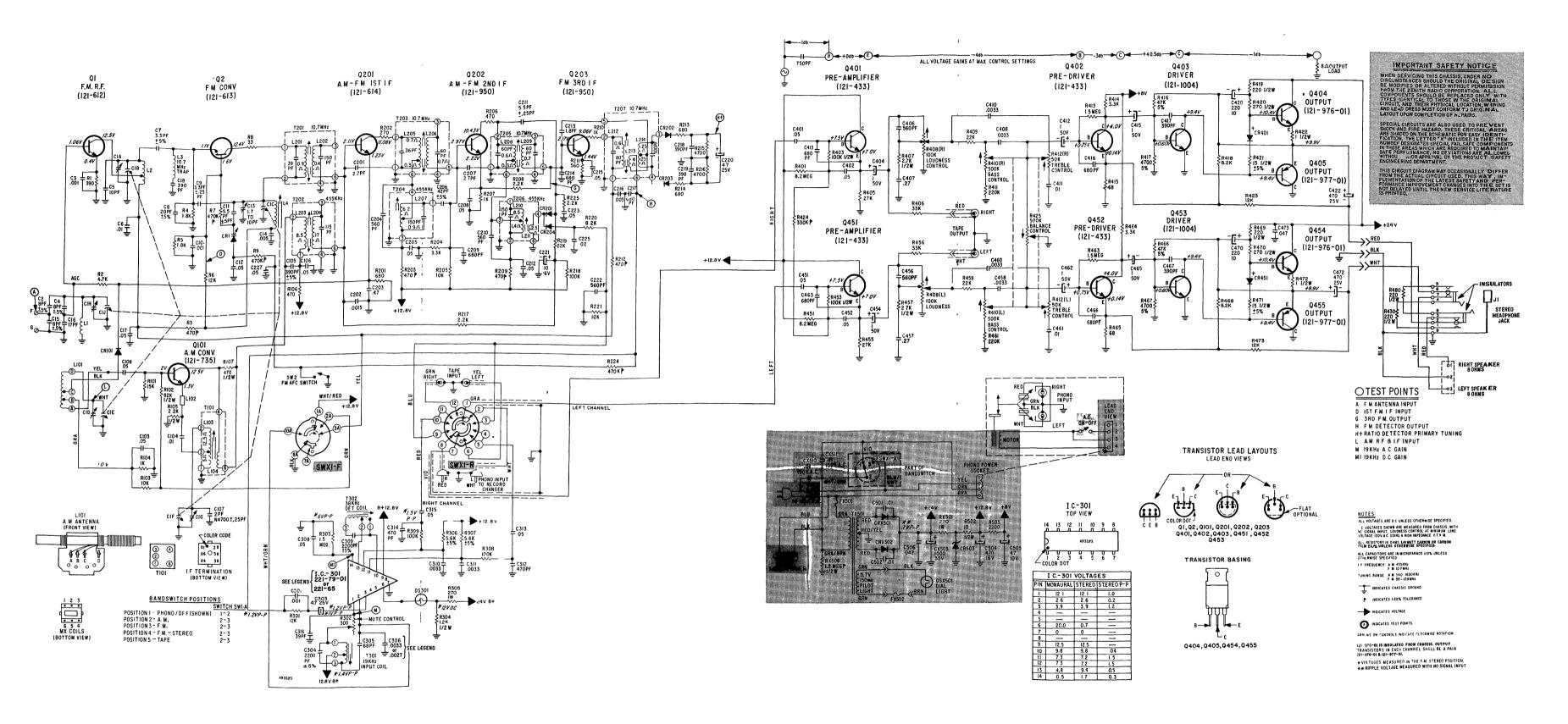
S-95456

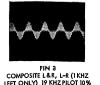
49-1249 6 1/2" WOOFER

5096-

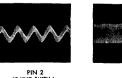
**MODEL G1000W** 

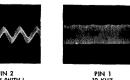
SPEAKER WIRING SCHEMATICS

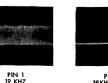




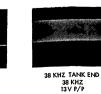




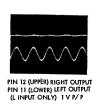




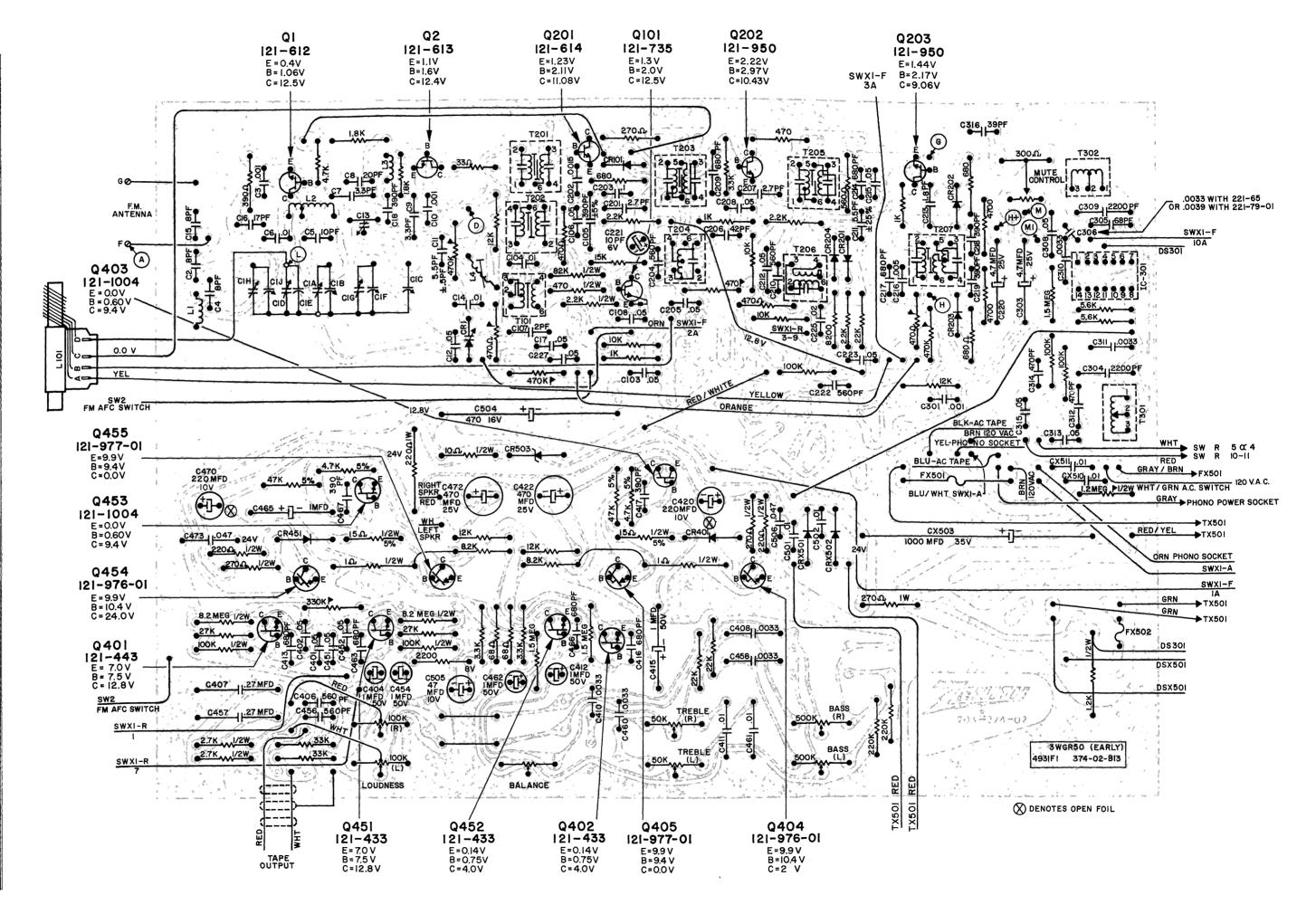


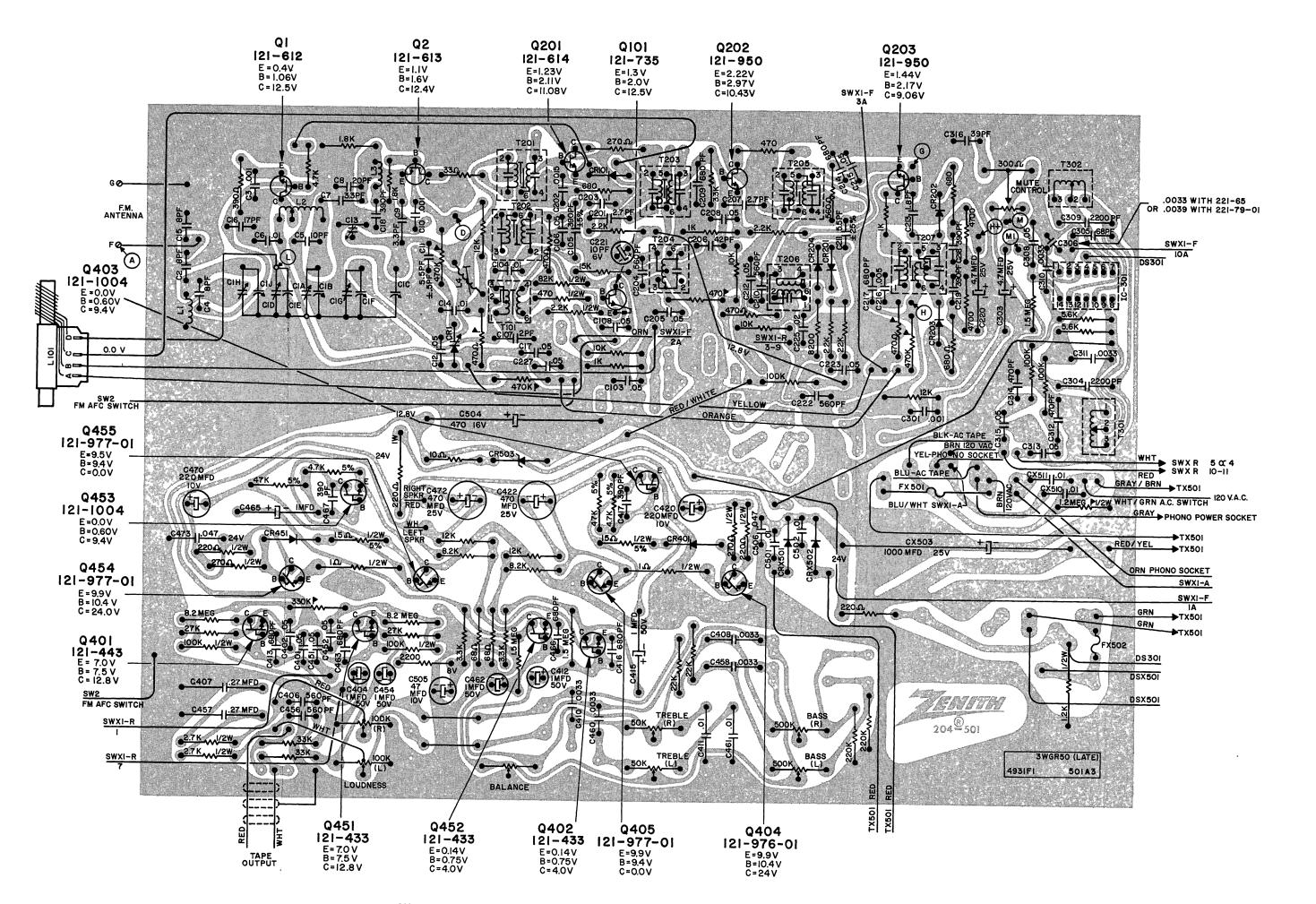




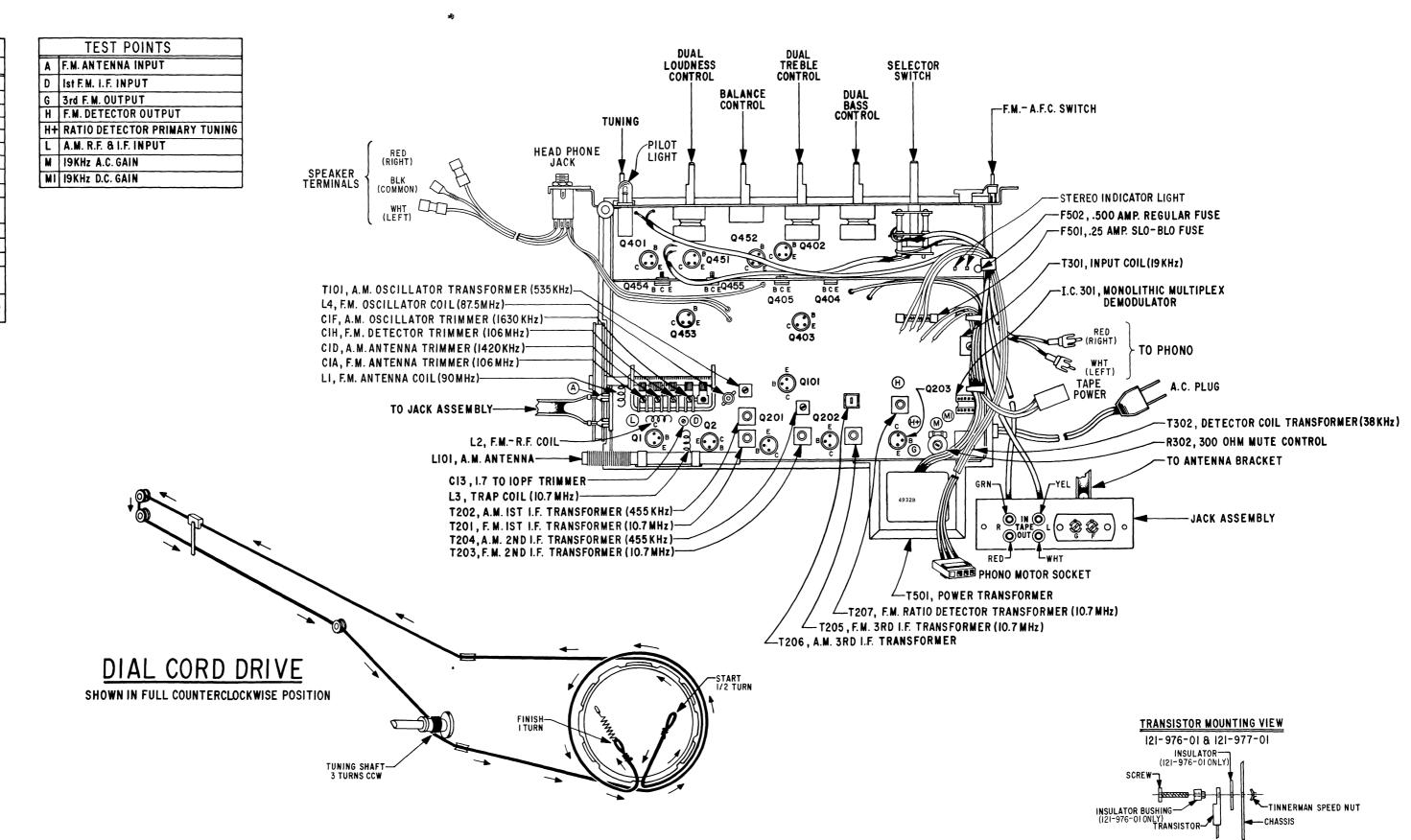


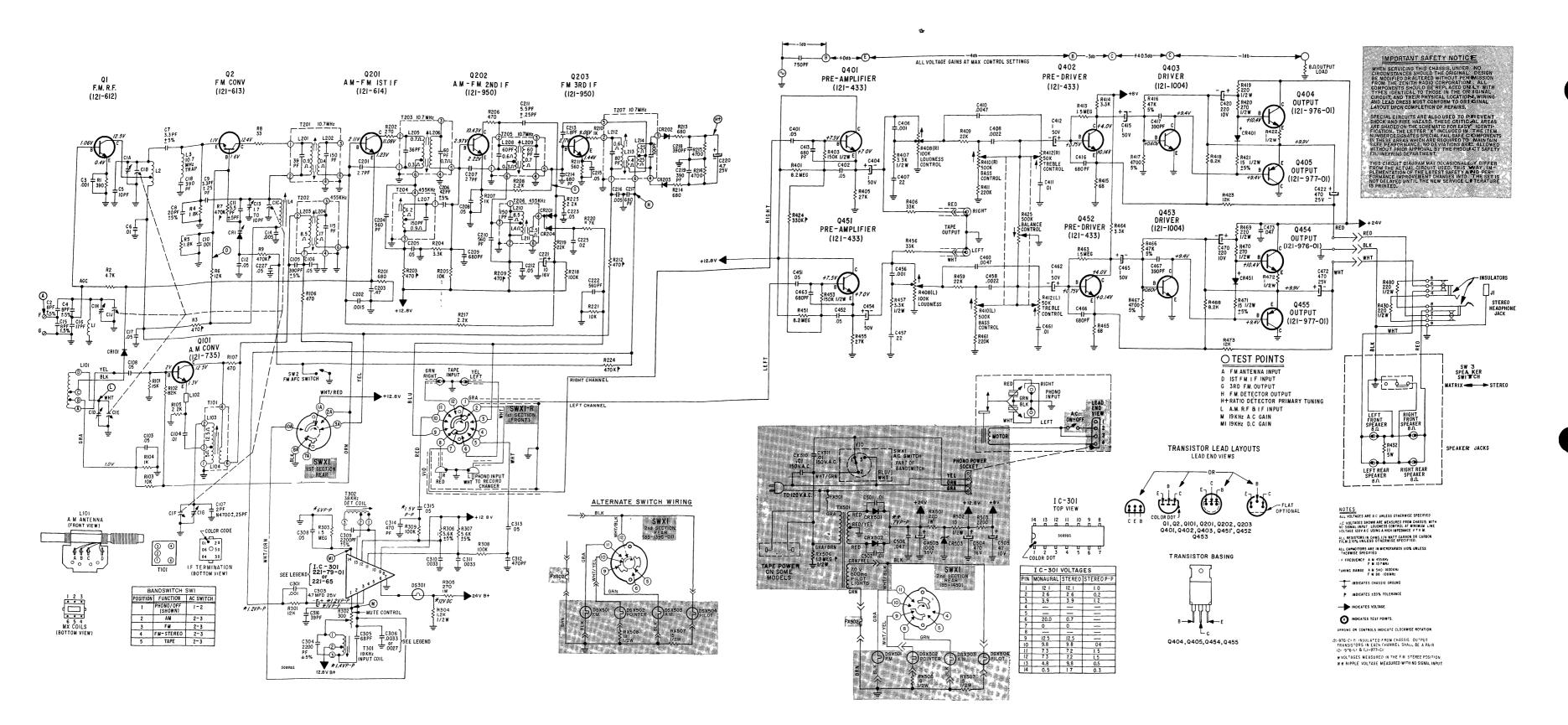
ITEM	PART	CHASSIS LEG	ITEM	PART	
NO.	NUTMBER	, DESCRIPTION FM DETECTOR TRIMMER	NO. R218	NUMBER 63-9922-20	DESCRIPTION 100K OHM 5% (ALT 63-7869 1/2W 109
C1B	[ [	FM DETECTOR TUNING FM OSCILLATOR TUNING	R219 R220	63-9922-04 63-9921-94	22K OHM 5% (ALT 63-7841 1/2W 10%) 8.2K OHM 5% (ALT 63-7824 1/2W 10%)
C1D (	22-7 134	AM ANTENNA TRIMMER AM ANTENNA TUNING	R221 R224	63-9921-96 63-9922-36	10K OHM 5% (ALT 63-7827 1/2W 10% 470K OHM 5% (ALT 63-7898 1/2W 20%
C1F C1G	}	AM OSCILLATOR TUNING AM OSCILLATOR TRIMMER	R225	63-9921-80 63-9921-98	2.2K OHM 5% (ALT 63-7799 1/2W 10% 12K OHM 5% (ALT 63-7831 1/2W 10%
C1H / C1J / C2	22-22481	FM ANTENNA TRIMMER FM ANTENNA TUNING 8 PF DISC ± 0.5% 500V	R301 R302 R303	63-9921-98 63-8328 63-9924-48	300 OHM MUTE CONTROL 1.5 MEG OHM (ALT 63-7918 1/2W 109
C3 C4	22-22729 22-22481	.001 MFD DISC 25V 8 PF DISC ± 0.5% 500V	R304 R305	63-1789 63-6045	1.2K OHM 1/2W 10% 270 OHM 1W
C5 C6	22-33675 22-3393	10 PF DISC ± 5% 500V .01 MFD DISC 25V	R306 R307	63-9921-90 63-9921-90	5.6K OHM 5% (ALT 63-7816 1/2W 5%) 5.6K OHM 5% (ALT 63-7816 1/2W 5%) 100K OHM 5% (ALT 63-7869 1/2W 10%
C7 C8	22-33541 22-33751	3.3 PF GIMMICK ± 5% 500V 20 PF DISC ± 5% 500V	R308 R309	63-9922-20 63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10% 100K OHM 5% (ALT 63-7869 1/2W 10%
C10	22- <b>5</b> 879 22- <b>2</b> 729	3.3 PF DISC ± .25 PF 25V .001 MFD DISC 25V	R401	63-7950 63-1869	8.2 MEG OHM 1/2W 100K OHM 1/2W
C12	225878 223034 224855	5.5 PF DISC ± 0.5 PF 25V .05 MFD DISC 25V 1.7 TO 10 PF CERAMIC TRIMMER	R403 R405 R406	63-9922-06 63-9922-08	27K OHM 5% (ALT 63-7845 1/2W 10% 33K OHM 5% (ALT 63-7848 1/2W 10%
C13 :	22-3080 22-2481	.005 MFD DISC 25V 8 PF DISC ± 0.5% 500V	R407 R408R	63-1803 63-9255	2.7K OHM 1/2W 100K DUAL LOUDNESS CONTROL
C16	22-3792 22-3034	17 PF DISC ± 5% 500V .05 MFD DISC 25V	R408L) R409	63-9255	(ALT 63-10160) 22K OHM 5% (ALT 63-7841 1/2W 10% 500K DUAL BASS CONTROL
C18	22~3177	390 PF DISC 500V	R410R)	63-9257	(ALT 63-10162)
C104	22-3034 22-3393 22-5972	.05 MFD DISC 25V .01 MFD DISC 25V 390 PF ± 5% POLYSTYRENE 125V	R411 R412R	63-9922-28 63-9256	220K OHM 5% (ALT 63-7883 1/2W 10 50K DUAL TREBLE CONTROL (ALT 63-10161)
C106	22-5972 22-3034 22-4819	.05 MFD DISC 25V 2 PF N4700 ± .25 PF 500V	R412L) R413 R414	63-9924-48 63-9921-84	1.5 MEG OHM (ALT 63-7918 1/2W 109 3.3K OHM 5% (ALT 63-7806 1/2W 109
C107 C108	22-4819 22-3034	.05 MFD DISC 25V	R415 R416	63-9921-44	68 OHM 5% (A) T 63,7736 1/2W 10%)
C201   C202	22-3310 22-5483	2.7 PF GIMMICK ± 10% 500V	R417 R418	63-9921-88 63-9921-94	47K OHM 5% (ALT 63-7854 1/2W 5%) 4.7K OHM 5% (ALT 63-7812 1/2W 5%) 8.2K OHM 5% (ALT 63-7824 1/2W 10%
C202 C203 C204	22-5487 22-5481	.47 MFD DISC 3V 560 PF DISC 500V	R419	63-9946-56	(ALT 63-7757 1/2W 10%)
C205 C206	22-3034 22-3791	.05 MFD DISC 25V 42 PF DISC ± 5% 500V 2.7 PF GIMMICK ± 10% 500V	R420	63-9946-58	270 OHM 1/2W 5% (ALT 63-7761 1/2W 10%)
C207 C208	22-3310 22-3034	.05 MFD DISC 25V	R421	63-9946-28	15 OHM 1/2W 5% (ALT 63-7707 1/2W 5%)
C209 C210	22-5482 22-5481	680 PF DISC 500V 560 PF DISC 500V	R422 R423	63-4501 63-9921-98 63-9922-32	1 OHM 1/2W 12K OHM 5% (ALT 63-7831 1/2W 10% 230K OHM 5% (ALT 63-7891 1/2W 20
C211 C212 C213	22-3770 22-3034 22-2428	5.5 PF DISC ± 25 PF 500V .05 MFD DISC 25V 1.8 PF GIMMICK ± 10% 500V	R424 R425	63-9922-32 63-9254	500K BALANCE CONTROL
C214	2-2-5482	680 PF DISC 500V .05 MFD DISC 25V	R430	63-1757	(ALT 63-10159) 220 OHM 1/2W
C215 C216 C217	22-3034 22-3080 22-5482	.005 MFD DISC 25V 680 PF DISC 500V	R451 R453	63-7950 63-1869	8.2 MEG OHM 1/2W 100K OHM 1/2W
C218 C219	2 2:3177 2 2:3177	390 PF DISC 500V 390 PF DISC 500V	R455 R456	63-9922-06 63-9922-08	27K OHM 5% (ALT 63-7845 1/2W 10% 33K OHM 5% (ALT 63-7848 1/2W 10%
C220 C221	2 -2-7142-03 2 -2-7151-04	4.7 MFD ELECTROLYTIC 25V 10 MFD ELECTROLYTIC 16V	R457 R459	63-1803 63-9922-04	2.7K OHM 1/2W 22K OHM 5% (ALT 63-7841 1/2W 10%
C222 C223	2 2-3362 2 2-3034	500 PF DISC 500V .05 MFD DISC 25V	R461 R463	63-9922-28 63-9924-48	220K OHM 5% (ALT 63-7883 1/2W 10 1.5 MEG OHM (ALT 63-7918 1/2W 10
C225 C227	2 2-3033 2 2-3034	.02 MFD 25V .05 MFD DISC 25V	R464 R465	63-9921-84 63-9921-44	3.3 OHM 5% (ALT 63-7806 1/2W 10%) 68 OHM 5% (ALT 63-7736 1/2W 10%) 47K OHM 5% (ALT 63-7854 1/7W 5%)
C301	2 2-2729	.001 MFD DISC 25V 4.7 MFD ELECTROLYTIC 25V	R466 R467 R468	63-9922-12 63-9921-88 63-9921-94	47K OHM 5% (ALT 63-7854 1/2W 5%) 4.7K OHM 5% (ALT 63-7812 1/2W 5%) 8.2K OHM 5% (ALT 63-7824 1/2W 109
C303 C304 C305	2:2-7142-03 2:2-5782 2:2-3608	4.7 MFD ELECTROLYTIC 25V 2200 PF POLYSTYRENE ± 5% 500V 68 PF DISC 500V	R469	63-9946-56	8.2K OHM 5% (ALT 63-7824 1/2W 109 220 OHM 1/2W 5% (ALT 63-7757 1/2W 10%)
C305	22:3608 2:2:13 OR	.0033 MFD DISC (USED WITH 221-79-01) 500V	R470	63-9946-58	270 OHM 1/2W 5% (ALT 63-7761 1/2W 10%)
	2≥2.7191	.0027 MFD DISC (USED WITH 221.65) 500V	R471	63-9946-28	15 OHM 1/2W 5% (ALT 63-7707 1/2W 5%)
C308	22-3034 22-5782	.05 MFD DISC 25V 2200 PF POLYSTYRENE ± 5% 500V	R472 R473	63-4501 63-9921-98	1 QHM 1/2W 12K OHM 5% (ALT 63-7831 1/2W 10%
C310 C311	22:13 22:13	.0033 MFD DISC 500V .0033 MFD 500V	R480	63-1757	220 OHM 1/2W
C312 C313	22-16 22-3034	470 PF DISC 500V .05 MFD DISC 25V	RX501 R502	63-6042 63-9546-24	220 OHM 1W 10 OHM 1/2W LALT 63,7701 1/2W 10
C314 C315	22·16 22·3034	470 PF DISC 500V .05 MFD DISC 25V	R503 RX506	63-9921-80 63-10526-03	2.2K OHM 5% (ALT. 63-7799 1/2W 10: 1.2 MEG OHM ± 20% 1/2W
C316 C401	⊋2-3381 ⊋2-3034	39 PF ± 5% DISC 500V ,05 MFD DISC 25V	L1 L2	20-3291 20-1648	FM ANTENNA COIL FM RF COIL
C401 C402 C404	22-3034 22-3034 22-7153	.05 MFD DISC 25V 1 MFD ELECTROLYTIC 50V	L3 L4	20-1648 20-1631 20-3597	TRAP COIL 10.7 MHz FM OSCILLATOR COIL
C406 C407	22-7153 222-5481 22-5964	560 PF DISC 500V .27 MFD MYLAR 50V	L 101	S-93292-01	AM ANTENNA ASSEMBLY
C408 C410	22·13 22·13	.0033 MFD DISC 500V .0033 MFD DISC 500V	L 102 L 103	149-317 1N T 101	FERRITE CORE SLEEVE AM OSCILLATOR TRANS, PRI
C411 C412	22-3513 22-7153	.01 MFD DISC 500V 1 MFD ELECTROLYTIC 50V	L104	1N T101	AM OSCILLATOR TRANS, SEC.
C413 C415	22-2939 22-7143 22-2939	680 PF DISC 500V 1 MFD ELECTROLYTIC 50V 680 PF DISC 500V	L201 L202	1N T201 1N T201 1N T202	1ST IF TRANSFORMER 10.7 MHz PRI 1ST IF TRANSFORMER 10.7 MHz SEC 1ST IF AM 455 KHz PRI
C416 C417 C420	22-2939 22-3177 22-7150-09	390 PF DISC 500V 390 PF DISC 500V 220 MFD ELECTROLYTIC 10V	L203 L204 L205	1N T202 1N T202 1N T203	1ST IF AM 455 KHz PHI 1ST IF AM 455 KHz SEC. 2ND IF TRANSFORMER 10.7 MHz PR
C420	22-7152-11	470 MFD ELECTROLYTIC 25V	L206 L207	1N T203 1N T204	2ND IF TRANSFORMER 10.7 MHz SE 2ND IF AM 455 KHz
C451 C452	22-3034 22-3034	.05 MFD DISC 25V .05 MFD DISC 25V	L208 L209	1N T205 1N T205	3RD IF TRANSFORMER 10.7 MHz PR 3RD IF TRANSFORMER 10.7 MHz SE
C454 C456	22-7153 22-5481	1 MFD ELECTROLYTIC 50V 560 PF DISC 500V	L210 L211	1N T206 1N T206	3RD 1F AM 455 KHz PRI. 3RD 1F AM 455 KHz SEC.
C457 C458	22-5964 22-13	.27 MFD MYLAR 50V .0033 MFD DISC 500V .0033 MFD DISC 500V	L212	1N T207	RATIO DETECTOR TRANS. 10,7 MHz PRI.
C460 C461	22-13 22-3513 22-7153	.0033 MFD DISC 500V .01 MFD DISC 500V 1 MFD ELECTROLYTIC 50V	L213	1N T207	RATIO DETECTOR TRANS. 10.7 MHz TERTIARY RATIO DETECTOR TRANS.
C462 C463 C465	22-7153 22-2939 22-7143	1 MFD ELECTROLYTIC 50V 680 PF DISC 500V 1 MFD ELECTROLYTIC 50V	1214	IN 1207	10.7 MHz SEC.
C466 C467	22-7143 22-2939 22-3177	680 PF DISC 500V 390 PF DISC 500V	T101	95-3077	AM OSCILLATOR TRANSFORMER
C470 C472	22-7150-09 22-7152	220 MFD ELECTROLYTIC 10V 470 MFD ELECTROLYTIC 25V	T201 T202	95-2546 95-2541	FM 1ST IF TRANSFORMER 10.7 MHz AM 1ST IF AM 455 KHz
C473 C501	22-6447-01 22-4617	.047 MFD MYLAR 100V .01 MFD DISC 500V	T203	95-2547 95-2542	FM 2ND IF TRANSFORMER 10.7 MH: AM 2ND IF AM 455 KHz
C502 CX503	22-4617	.01 MFD DISC 500V 1000 MFD ELECTROLYTIC 35V	T205 T206	95-2548 95-2689 95-2645	FM 3RD IF TRANSFORMER 10.7 MH: AM 3RD IF AM 455 KHz
C504 C505	22-7141-11 22-7150-07	470 MFD ELECTROLYTIC 16V 47 MFD ELECTROLYTIC 10V	T207	95-2545 95-3021	FM RATIO DETECTOR 10.7 MHz INPUT COIL 19 KHz
C506 CX510 CX511	22-6447-01 22-6005	.047 MFD MYLAR 100V .01 MFD DISC 150 VAC	T301	95-3027 95-3023	DETECTOR COIL 38 KHz
	63-9921-62	01 MFD DISC 150 VAC 390 OHM 5% (ALT 63-7768 1/2W 10%)	TX601	95-2653	POWER TRANSFORMER
R1 R2 R3	63-9921-62 63-4213 63-9921-64	4.7K OHM 470 OHM 5% (ALT 63-7772 1/2W 20%)	SWX1 SW2	85-1370-01 85-1372-01	BAND SWITCH AFC SWITCH (SLIDE SP-DT)
R3 R4 R5	63-9921-78 63-9921-78	1.8K OHM 5% (ALT 63-7796 1/2W 10%) 1.8K OHM 5% (ALT 63-10183-78	Jı	78-2137-01	STEREO HEADPHONE JACK
R6	63-9921-98	1/2W 10%) 12K OHM 5% (ALT 63-7831 1/2W 10%) 470K OHM 5% (ALT 63-7898 1/2W 10%)	CR1	103-47	AFC DIODE
R7 R8	63-9922-36 63-4122	33 OHM	1	OR 103-189	
R9	63-9922-36	478 K OHM 5% (ALT 63-7898 1/2W 20%)	CR101	103-142-01	SILICON DIODE
R101 R102	63-9922 63-1866	15K OHM 5% (ALT 63-7834 1/2W 10%) 82K OHM 1/2W	CR201 CR202	103-23-01	GERANIUM DIODE
R103 R104	63-9921-96 63-9921-72 63-1799	10K OHM 5% (ALT 63-7827 1/2W 10%) 1K OHM 5% (ALT 63-7785 1/2W 10%) 2.2K OHM 1/2W	CR203 CR204	103-90   103-90   103-23	GERANIUM DIODES (MATCHED PAII GERANIUM DIODE
R105 R106 R107	63-1799 63-9921-64 63-1771	2.2K OHM 1/2W 470 OHM 5% (ALT 63-7771 1/2W 10%) 470 OHM 1/2W		103-23	DIODE
R107 R201	63-9921-68		CR451	103-222	DIODE
R202 R203	63-9921-58 63-9921-64	680 OHM 5% (ALT 63-7778 1/2W 10%) 270 OHM 5% (ALT 63-7761 1/2W 10%) 470 OHM 5% (ALT 63-7772 1/2W 20%)	CRX501	212-76	SILICON RECTIFIER
R204 R205	63-9921-84 63-9921-96	3.3K OHM 5% (ALT 63-7806 1/2W 10%) 10K OHM 5% (ALT 63-7827 1/2W 10%)	CRX502 CR503	414-76 103-96	SILICON RECTIFIER DIODE
R206 R207	63-9921-64 63-9921-72	470 OHM 5% (ALT 63-7771 1/2W 10%) 1K OHM 5% (ALT 63-7785 1/2W 10%)	IC-301	221-79-01 OR.	MONOLITHIC MULTIPLEX
R208 R209	63-9921-80 63-9921-64	2.2K OHM 5% (ALT 63-7799 1/2W 10%) 470 OHM 5% (ALT 63-7772 1/2W 20%)		221-65	DEMODULATOR (SEE C306)
R210 R211	63-9921-72	1K OHM 5% (ALT 63-10183-72 1/4W 10%) 560 OHM 5% (ALT 63-7775 1/2W 10%)	D8X501	100-249	PILOT LIGHT
R211 R212 R213	63-9921-64 63-9921-68	470 OHM 5% (ALT 63-7775 1/2W 10%) 470 OHM 5% (ALT 63-7772 1/2W 20%) 680 OHM 5% (ALT 63-7778 1/2W 10%)	DS301	100-611	STEREO INDICATOR LIGHT
R214 R215	63-9921-68 63-9921-88	680 OHM 5% (ALT 63-7778 1/2W 10%) 4.7K OHM 5% (ALT 63-7813 1/2W 10%)	PC	204-501	PRINTED CIRCUIT BOARD
	63-9921-88	4.7K OHM 5% (ALT 63-7813 1/2W 10%)	FX501	136-117-10	.25 AMP SLO BLO FUSE 4931

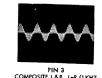




	TRAI	NSISTORS
No.	PART No.	DESCRIPTION
QI	121-612	F.M R.F.
Q2	121-613	F.M. CONVERTER
Q10 I	121 -735	A.M.CONVERTER
Q2O1	121-614	A.M F.M. 1st 1.F.
Q2O2	121-950	A.M.=E.M. 2 nd l.F.
Q2O3	12. 300	F.M. 3rd I.F.
Q4O1	101-477	PRE-AMPLIFIER
Q4O2	121-433	PRE-DRIVER
Q4O3	121-1004	DRIVER
Q4O4	121-976-01	OUTPUT
Q4 <b>Q</b> 5	121-977-01	
Q451	121-433	PRE-AMPLIFIER
Q452	,_,	PRE-DRIVER
Q4 <b>5</b> 3	121-1004	DRIVER
Q454	121-976-01	OUTPUT
Q455	121-977-01	001701
103 01	221-79-01 or 221-65	MULTIPLEX DEMODULATOR







LEFT ONLY) 19 KHZ PILOT 10% 1 V P/P

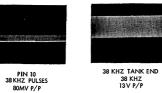










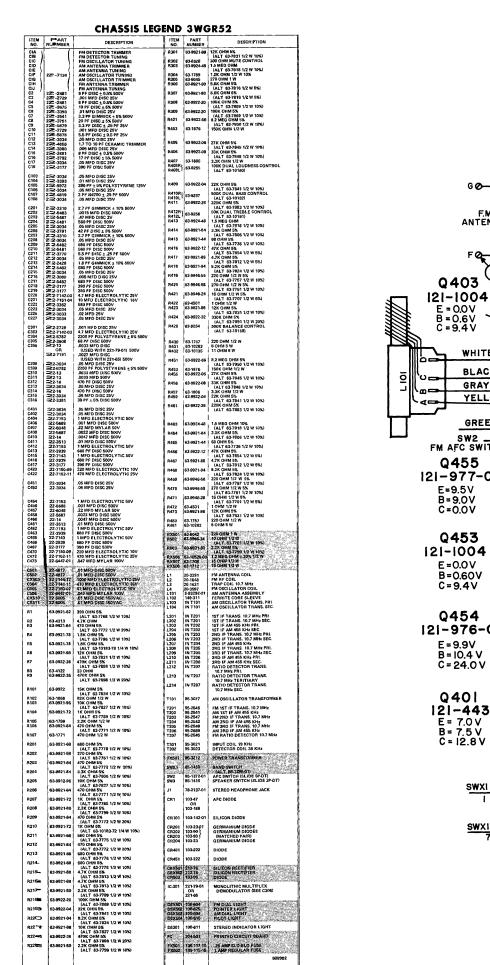


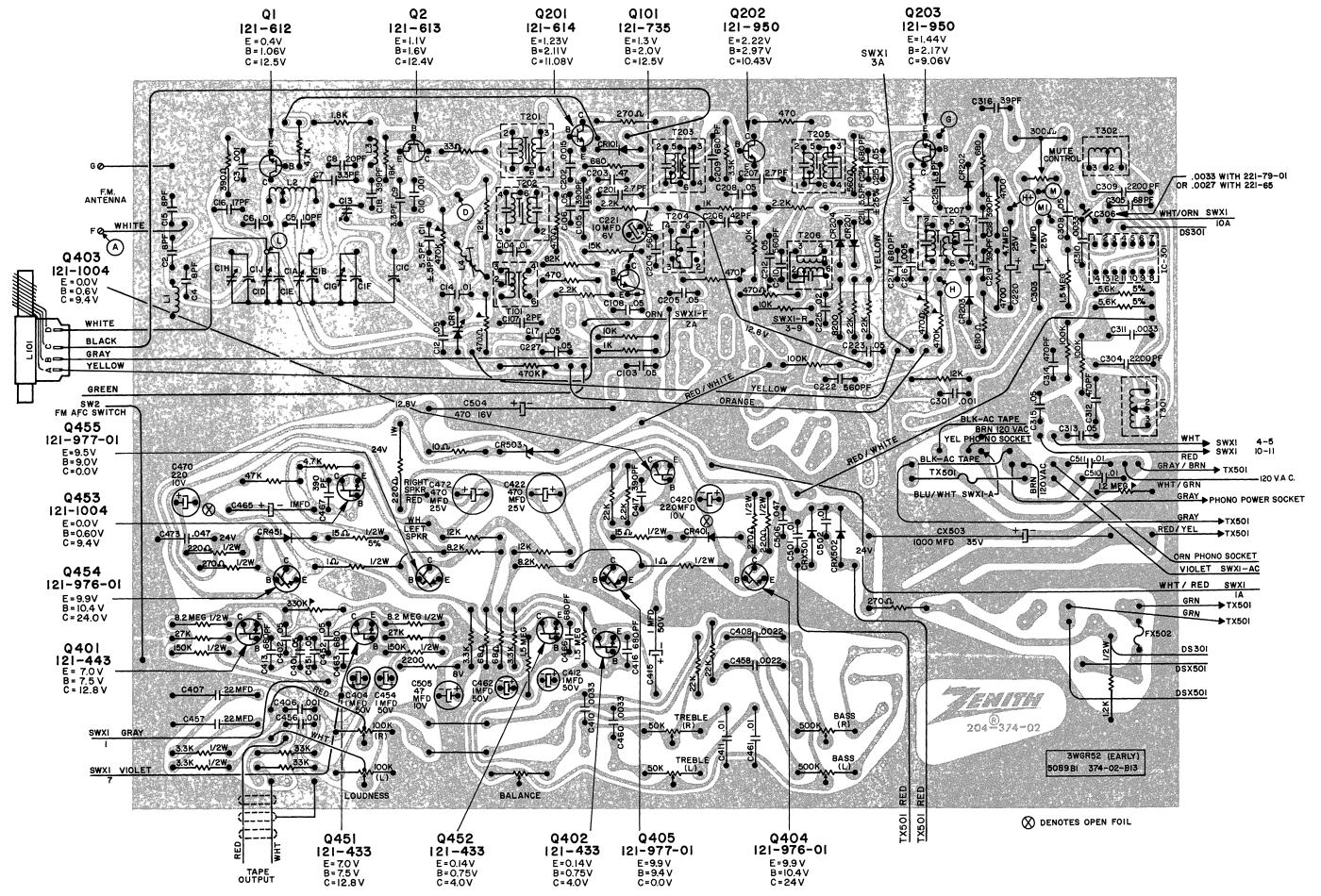




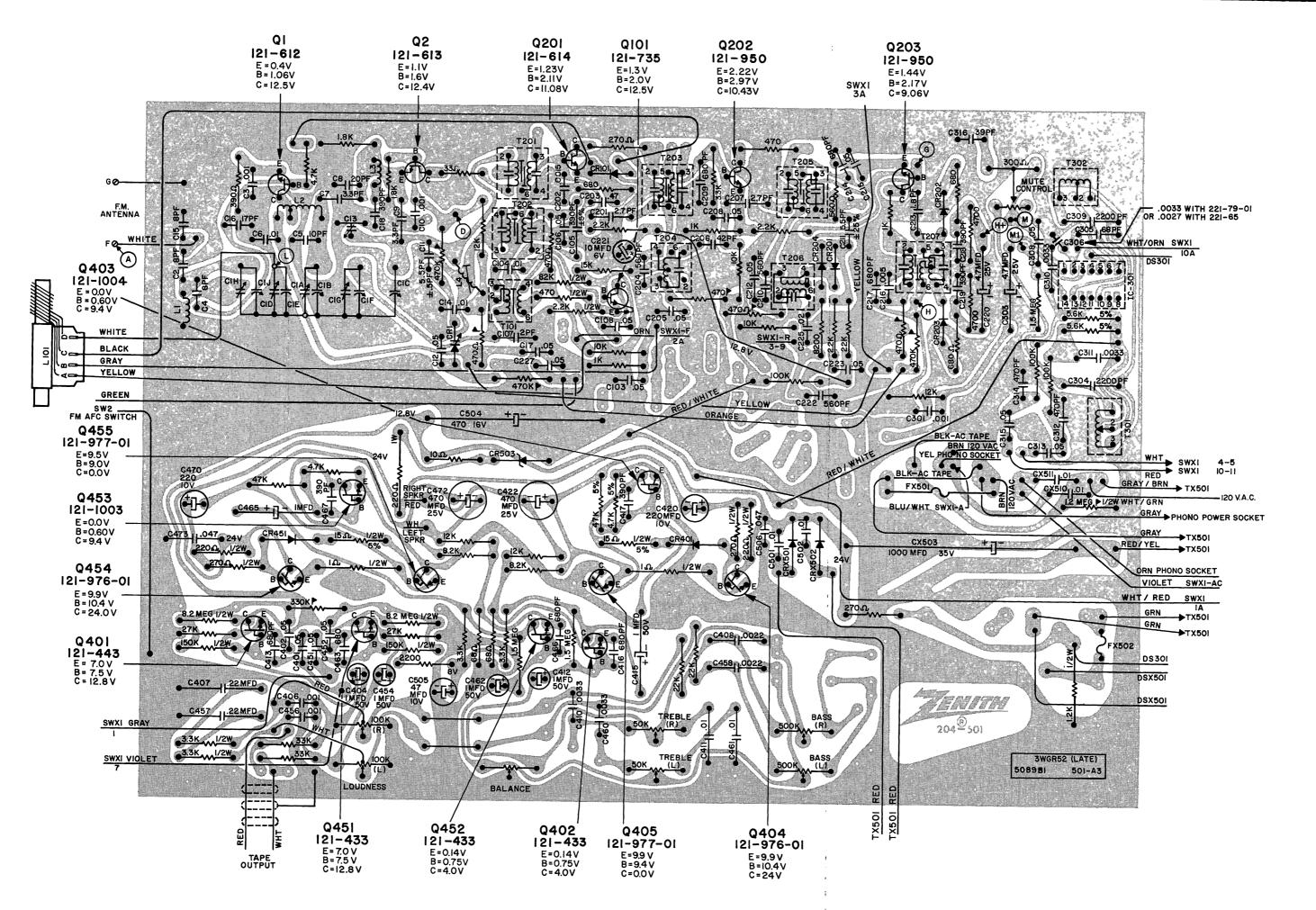
PIN 12 (UPPER) RIGHT OUTPUT PIN 11 (LOWER) LEFT OUTPUT (L INPUT ONLY) 1 V P/P

**CHASSIS 3WGR52 - SCHEMATIC** 

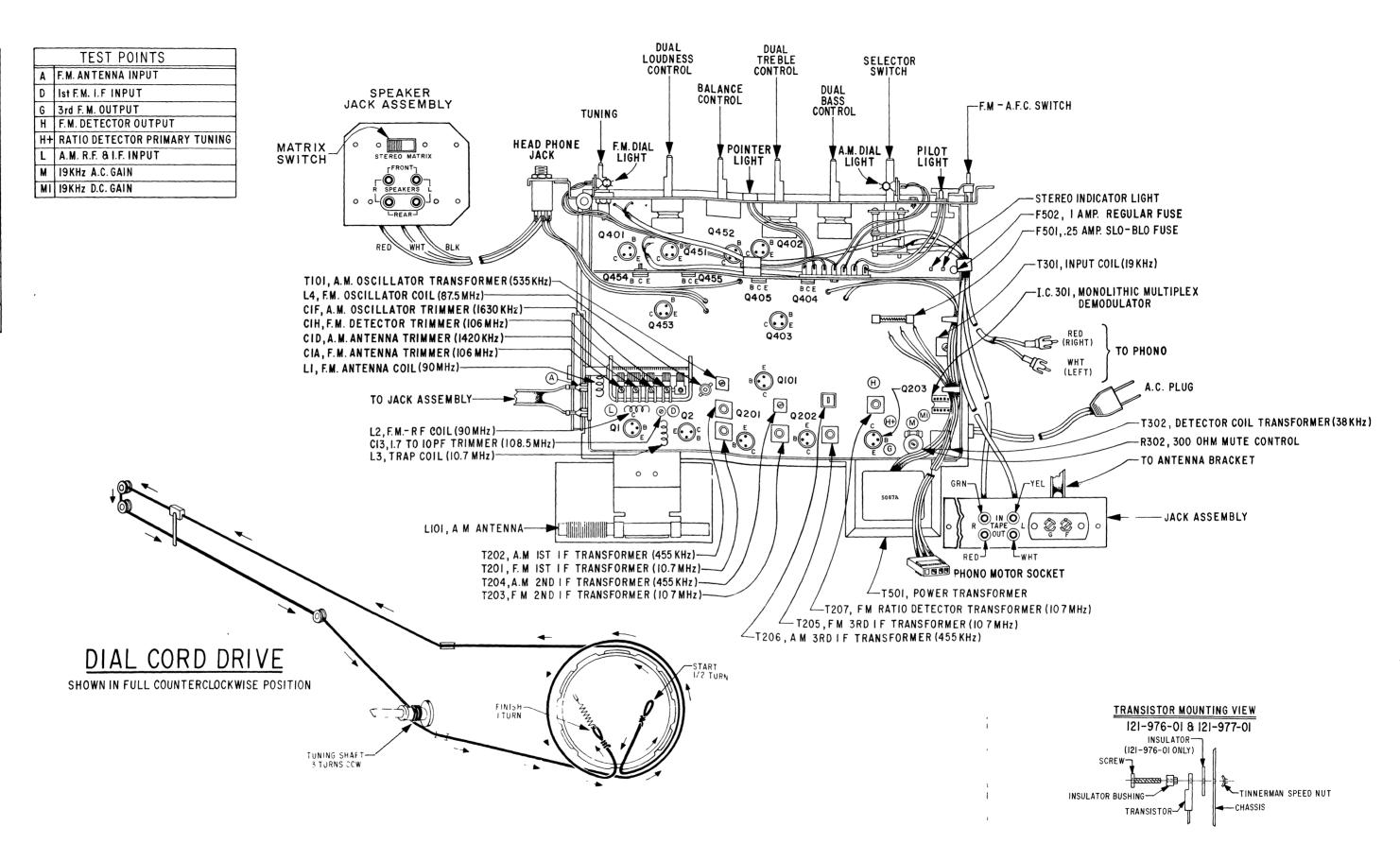




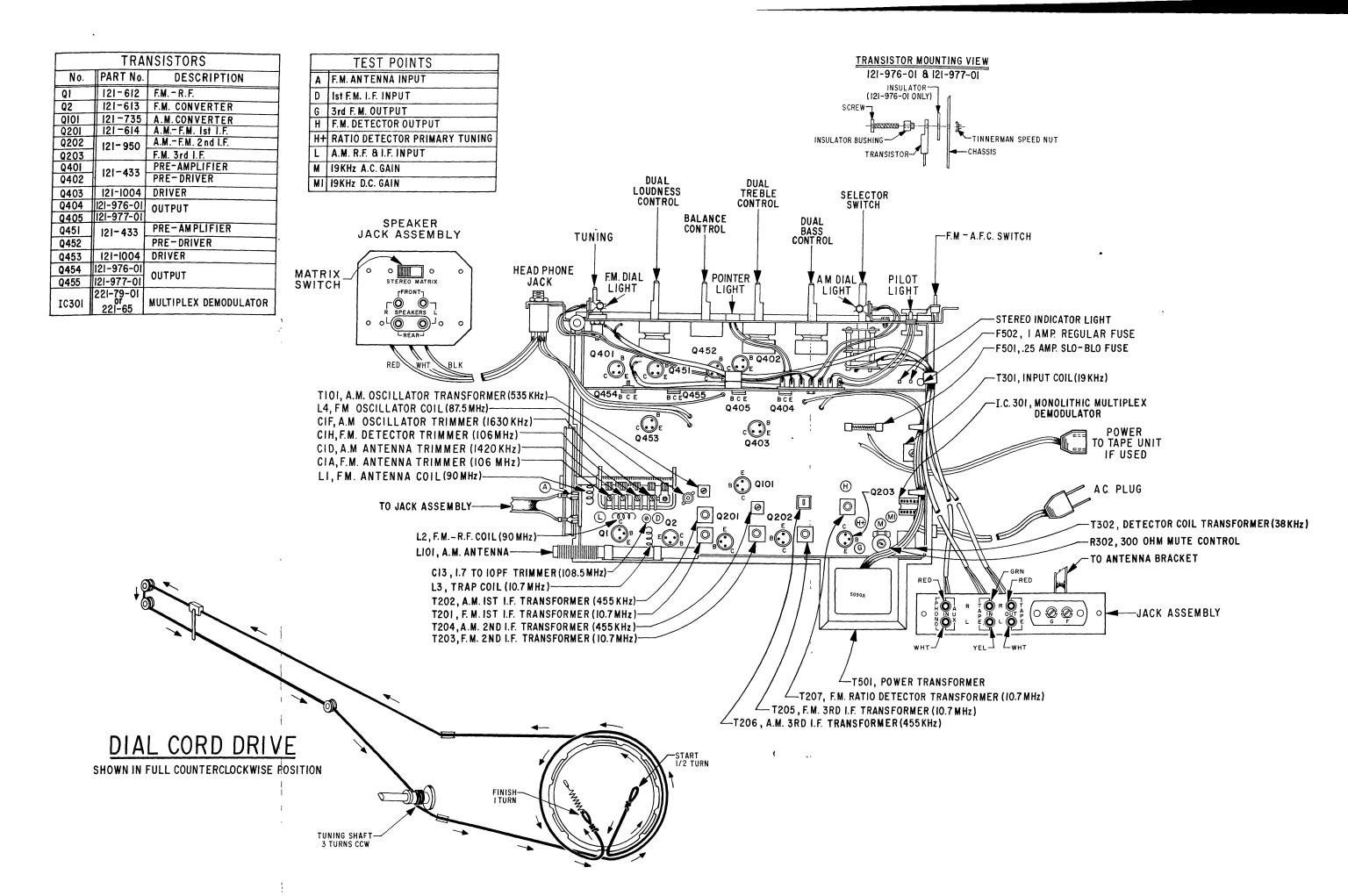
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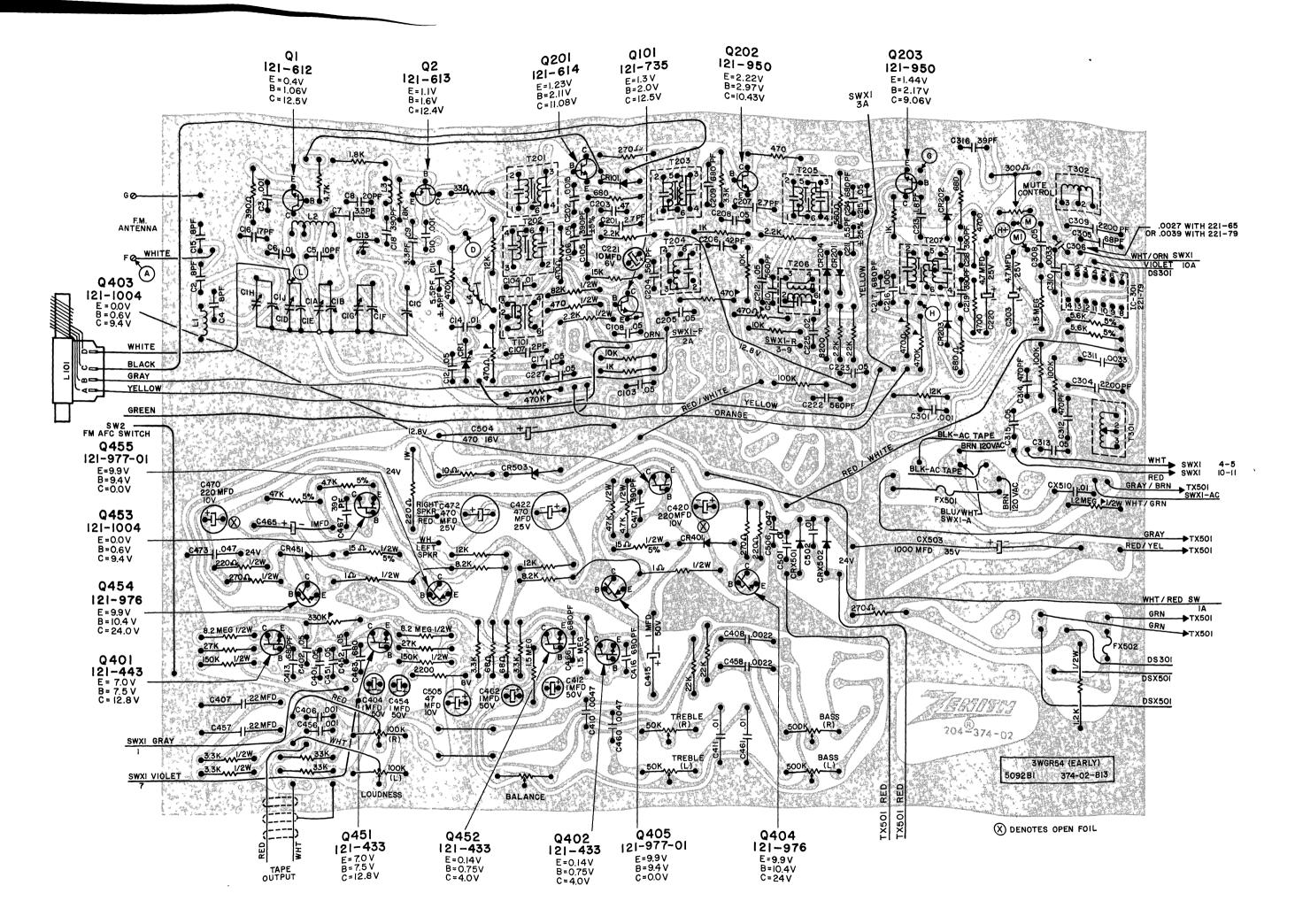


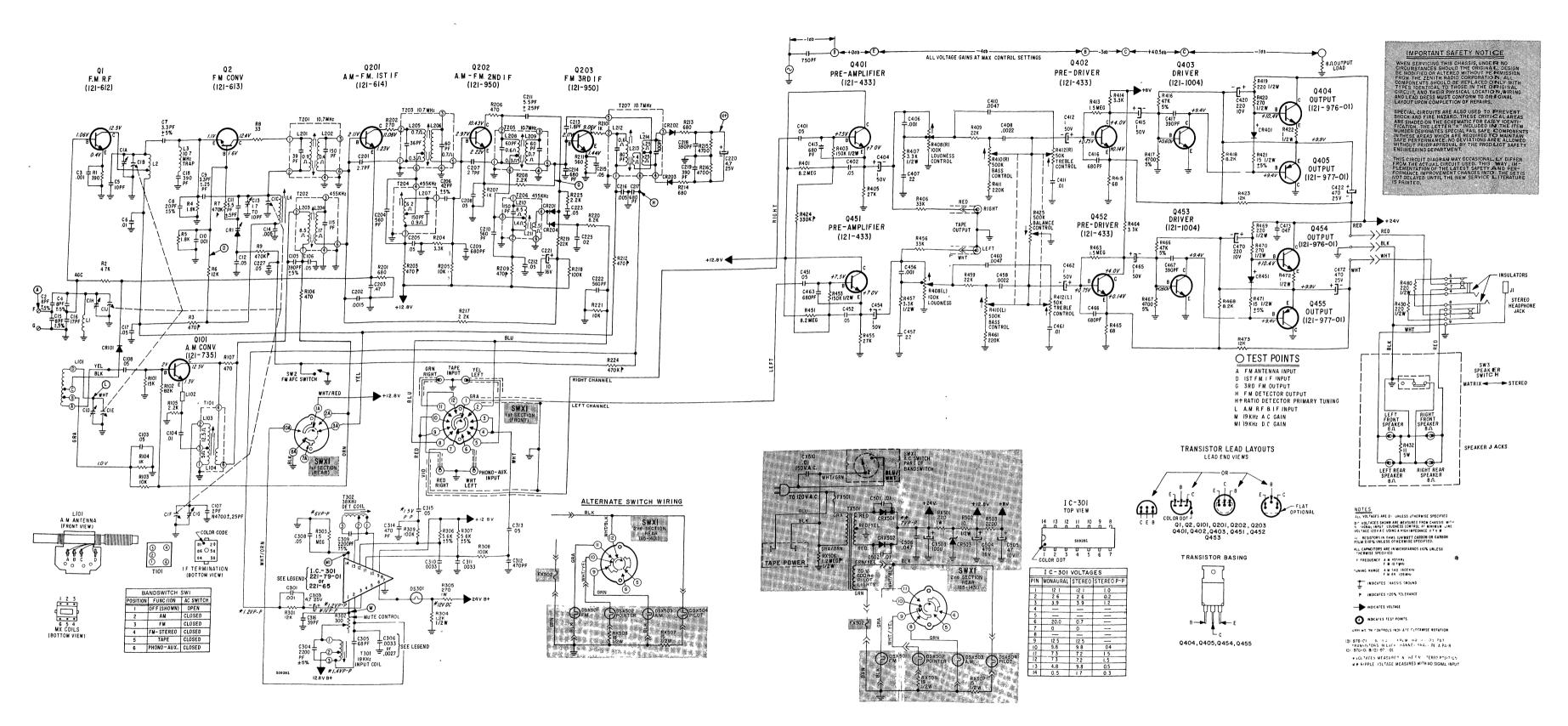
TRANSISTORS					
No-	PART No.				
QI	121-612	F.M R.F.			
Q2	121-613	F.M. CONVERTER			
Q101	121-735	A.M.CONVERTER			
Q20	121-614	A.M F.M. 1st 1 F.			
Q202	121-950	A.M. = F.M 2 nd 1.F.			
Q203	121 000	F.M. 3rd I.F.			
Q40 I	101-477	PRE-AMPLIFIER			
Q40 2	121-433	PRE-DRIVER			
Q403	121-1004	DRIVER			
Q404	121-976	OUTPUT			
Q40•5	121-977				
Q45 I	121-433	PRE-AMPLIFIER			
Q45-2		PRE-DRIVER			
Q45-3	121-1004	DRIVER			
Q45-4	121-976-01	OUTPUT			
Q455	121-977-01	001701			
IC3 OI	221-79-01 or 221-65	MULTIPLEX DEMODULATOR			

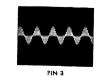


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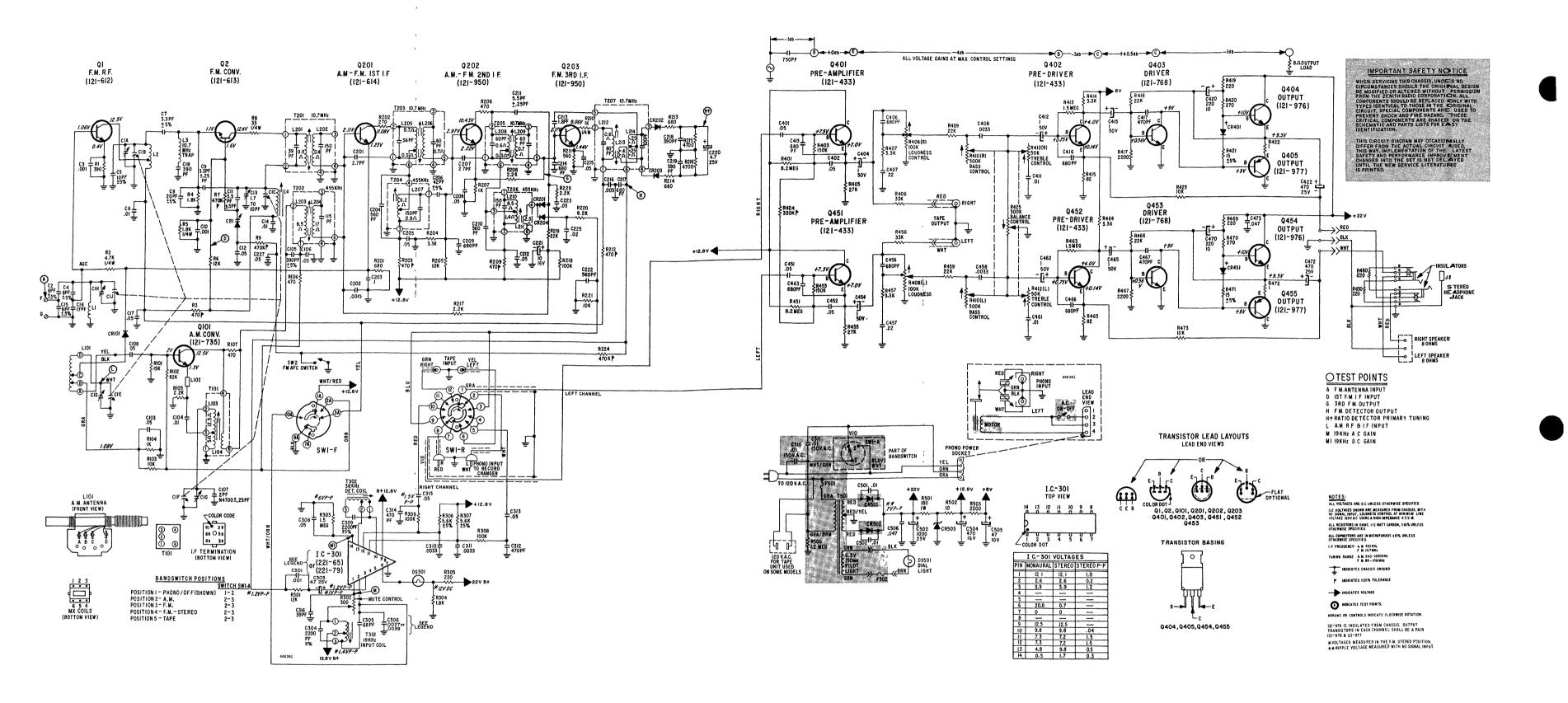




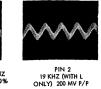
PIN 12 (UPPÈR) RIGHT OUTPUT PIN 11 (LOWER) LEFT OUTPUT (L INPUT ONLY) 1 V P/P

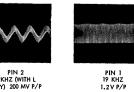
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LEGEND CHASSIS 3WGR54	QI Q2 Q201 Q101 Q202 Q203
TEM	121-612 121-613 121-614 121-735 121-950 121-950
CIA   FAL DETECTOR TRIMMER   5301 (3-9921-98) 12X (OMM ES	B=1.00V B=2.11V B=2.0V B=2.17V SWXI B=2.17V
CHG	C=12.4V
FM	
GIG CHI WAS STATEMENT ATTEMENT	1.8K T20I C 270.0 470
CU 22.3-02 F A AYTENHA TURNING CU 23V CU 22.3-02 F A AYTENHA TURNING CU 23V CU 22.3-02 F A AYTENHA TURNING CU 23V CU 22.3-02 F A CU 22.3-02 F	T203 π (300Ω) T302
C103 22-\$174 590-F USE 000V  C104 22-\$1394 79 MFD D18C 25V C104 22-\$1394 79 MFD D18C 25V C105 22-\$1394 79 MFD D18C 25V C107 22-\$1394 79 MFD D18C 25V C108 22-\$1394 79 MFD D18C 25V C109 22-\$1394 79 MFD D18C 25V C109 22-\$1394 79 MFD D18C 25V C109 23-\$1394 79 MFD D18C 25V C109 24-\$1394 79 MFD D18C 25V C109 24	
C103 22-30-34 JS MFD DISC 25V ROUNT PLAN TO THE COMPANY PROPERTY OF THE COMPANY PROPERTY PROP	50 C L2 67 133PF 10 C203 147 T T T T T T T T T T T T T T T T T T T
Cold 22-3310 2.7 FF (BMMCK ± 10% 590V COLD ± 1	ANTENNA 6 C305 C305 C305 C305 C305 C305 C305 C305
COM   22-5-64   Sep PF DISC 560V   Sep PF DISC 56	CGILOL CSLIDER OF (D) STAILET LOT ON SWXI
C211 22-3770 5.5 FF DISC 25 FF 500V ALT 83-7812 12 W 5Sh C212 22-3034 6 W FF DISC 25 C 25	A) \$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
C216 22-2369 JOS MFD DISC 25V R420 [83-9846-58] 270 HZ W 1078 C217 [22-6342] 60 PF DISC 500V R420 [83-9846-58] 270 HZ W 1078 C218 [22-3177] 300 PF DISC 500V R421 [83-9946-28] 15 OHM 11/2 W 5% (ALT 63-770 HZ W 55)	— 131-1004
C220 22 - 715-04 1 10 MFD ELECTROL-YTE NY R422 (63-4501 1 ) MFD ELECTROL-YTE NY R422 (83-921-24) 12K OHM 12 W C222 (22-3032 ) .09 MFD DISC 28V R422 (83-921-24) 12K OHM 51 12 W 1078 1 (22 W 1078) 12	E=0.0.V
C27) 22-3034 J0 MPD DISC 22V  C301 12-3729 J0 MPD DISC 25V  C302 12-3729 J0 MPD DISC 25V  C303 12-3724 J0 MPD DISC 25V  C304 12-3729 J0 MPD DISC 25V  C304 12-3729 J0 MPD DISC 25V  C305 12-3722 J0 MPD DISC 25V  C305 12-3722 J0 MPD DISC 25V  C305 12-3722 J0 MPD DISC 25V  C305 12-372 J0 MPD DISC 25V  C305 12-372 J0 MPD DISC 25V  C306 12-372 J0 MPD DISC 25V  C307 12-372 J0 MPD DISC 25V  C307 12-372 J0 MPD DISC 25V  C308 12	C=9.4V = 3 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
R432 63-10135 11 OHM 5 W	WHITE SWXI-F SWXI-F SWXI-F SWXI-F
USED WITH 221-65) 500V R453 63-1876 150K OHM 1/2 W	
C309   22 - 2034   C309   C32 - 2034   C309   C32 - 2034   C329	VI VELLOW
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
C400 2 2-3044 AF MED DEC 29V AFF DEC FOOLY TO 50V AFF DEC FOOLY AFF DEC	SW2   ORANGE   C301 .001   OI   OI   OI   OI   OI   OI   OI   O
C412 22-2/193 1MFD ELECTROLYTIC SBV R466 5-549922-121 47K CHM 5% CALT 22-2/193 5 CALT 22-2/193 5 CALT 23-2/193	Q455   Compared the second of
C407 2 2 3 3 3 4 5 MEO DISC 28V	E=9.9V SWXI 4-5
C452 2-2-034 J. 96 MPD DISC 2RV R771 6-26946-28 15 DMM 1/2W 95.  C454 2-2-7153 JMFD ELECTROLYTIC 50V R472 (5-450) (10M 1/2W 95.)  C454 2-2-2-588 J. 00 MPD DISC 50V R473 [5-3924-36] (12K OHM 1/2W S.)	C=0.0V C470 SOMED TYPE FOR GRAY / BRN - TX501
C457 22-2668 2 2 MFO NYLAR 50V R450 83-1757 22 00 MR 127 22 0 MFO NYLAR 50V R450 83-1757 22 0 0 MR 127 22 0 MFO NYLAR 50V R450 83-1757 22 0 MR 127 22 0 MFO NYLAR 50V R450 83-1757 23 0 MR 127 23 0 MR	Q453   C422   C4
C454 22.7153 1.MFD ELETROLYTIC 50V ARATE (3.450) 1. GMM 172 W 10% 35% GASON C457 22.2667 (3.2450) 2. WFD MSC 560V C450 22.4667 (3.2450) 2. WFD MSC 560V C450 22.467 (3.2450) 2. WFD MSC 560V C450 22.467 (3.2450) 2. WFD MSC 560V C450 22.475 (3.2450) 2. WFD MSC 560V C450 22.475 (3.2450) 2. WFD MSC 560V C450 22.275 (3.2450) 2. WFD MSC 560V C450 22	121-1004 BLU/WHT2 SWXI-A SWXI-A
C501 22-4617 01 MFD DISC 500V 12 20 1631 TRAP COLL 10 7 MHz	B=0.6V C=9.4V CR45I 1.047 24V CR45I 2K RED/YEL TX50I
C5092   22-4417   31 MED INSIG 500V   14   20-3897   FM OSCILLATOR COIL	2200 W/2W 6 100 MFD 35V 1000 MFD 35V 24V
CROSS SECTION 1.0 SERVICES 10 VAC	Q454  21-976-01   B   E   B
	S COLUMN TO THE SECOND TO THE SECOND THE SEC
R5   G3-921-78   JRC ONES 95   MISS 78 1/4 W 10%   L209   III 7256   JRD   F TRANS. TO AME FRI   L209   III 7256   JRD   F TRANS. TO AME FRI   L209   III 7256   JRD   F TRANS. TO AME FRI   L209   III 7256   JRD   F TRANS. TO AME FRI   L209   III 7256   JRD   F TRANS. TO AME FRI   L209   III 7256   JRD   F TRANS. TO AME FRI   L209   III 7256   JRD   F TRANS. TO AME FRI   L210   III 7256   JRD   F TRANS. TO AME FRI   L210   III 7256   JRD   F TRANS. TO AME FRI   L210   III 7256   JRD   F TRANS. TO AME FRI   L210   III 7256   JRD   F TRANS. TO AME FRI   L210   JRD   F TR	C = 24.0V 8.2 MEG 1/2W C E 8.2 MEG 1/2W C E 8.2 MEG 1/2W
R8 63-4122 33 OHM R9 63-9922-36 470K OHM 5% L213 IN T207 RATIO DETECTOR TRANS. (ALT 63-7698 1/2 W 20%) L214 IN T207 RATIO DETECTOR TRANS.	27K
R102 63-1866 82K OHM 1/2 W T101 96-3077 AM OSCILLATOR TRANSFORMER	121-443 To July 2200 2200 2200 To July 2200 C458 0022
R102   63-9621-96   DKC CHINE 95   TO 10   TO 10   SE-5546   FM ST FE TRANS. 10.7 JMck   TO 10   SE-5546   TM ST	
R107 63-1772 470-0148 1/2 W. A. W.	
R007   63-9921-65   270-0486 55.   R007	CHIVI CRAY TO SOK (R) O O O O O O O O O O O O O O O O O O O
R205 63-921-96 (ALT 63-3908 1/2 W 10%) SW3 95-1468 SPEARER SWITCH ISLIDE 27-217 (CM 10%) STERCO HEADPHONE JACK R205 63-921-94 (TO 10M 67%) CR1 1 103-27 AFC DIODE	SWXI GRAY  3.3K V/2W  3.3K V/2W  3.3K V/2W
R206 63-921-44 470 OHM 58, Page 100-1 103-47 AFC DIODE 0.3-921-42 1 N CHM 58 2 1 N 10%) CRI 1 103-47 AFC DIODE 0.3-921-42 1 N CHM 58 2 1 N 10%) CRI 1 103-139 1 103-13	SWXI VIOLET SOK (L) SOK (L) SOK (L) SOK (L)
R210 63-9921-72 (ALT 93-772-172 9296) CICR21 103-25-91 GERMANIUM DIODES (CR22 103-96) GERMANIUM DIODES (ALT 93-1018-32-14) VIOS) CR22 103-961 GERMANIUM DIODES (CR22 103-96) GERMANIUM DIO	TOURNESS BALANCE
R212 \$36921-64 \$41.7 \$537797.12 W 10%] CR401 10%222 DHODE \$43621-66 \$60 DHM 6% 72 W 10%3 CR451 10%3222 DHODE \$43621-66 \$60 DHM 6% 72 W 10%3 CR451 10%322 DHODE \$43621-66 \$60 DHM 6% 72 W 10%3 CR451 10%322 DHODE \$43621-66 SH, \$60 DHM 6% 72 W 10%3 CR451 10%322 DHODE \$43621-66 SH, \$60 DHM 6% 72 W 10%3 CR451 10%320 SH, \$60 DHM 6% 72 W 10%3 CR451 10%320 SH, \$60 DHM 6% 72 W 10%3 CR451 10%3	COUDNESS
R215 63-9921-88 4.7K OHM 5% CRX502 212-76 SILICON RECTIFIER CRS63 103-96 DIGDE	Q451 Q452 Q405 Q404 XX
(ALT 63-7799 1/2 W 10%)	빛 등 121−433 121−433 121−977−01 121−976
(ALT 63-7624 1/2 W 10%) DS301 100-611 STEREO INDICATOR LIGHT	TAPE B=7.5 V B=0.14V E=9.9 V E=9.9 V E=9.9 V TAPE B=7.5 V B=0.75 V B=0.75 V B=9.4 V B=10.4 V
R271 63-9021-96 10K COMM 5K 12-7027 12/W 10K1 F2724 12/W 10K1	OUTPUT C=12.8 V C=4.0 V C=4.0 V C=0.0 V C=24.0 V



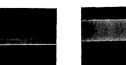


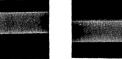




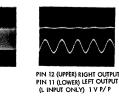






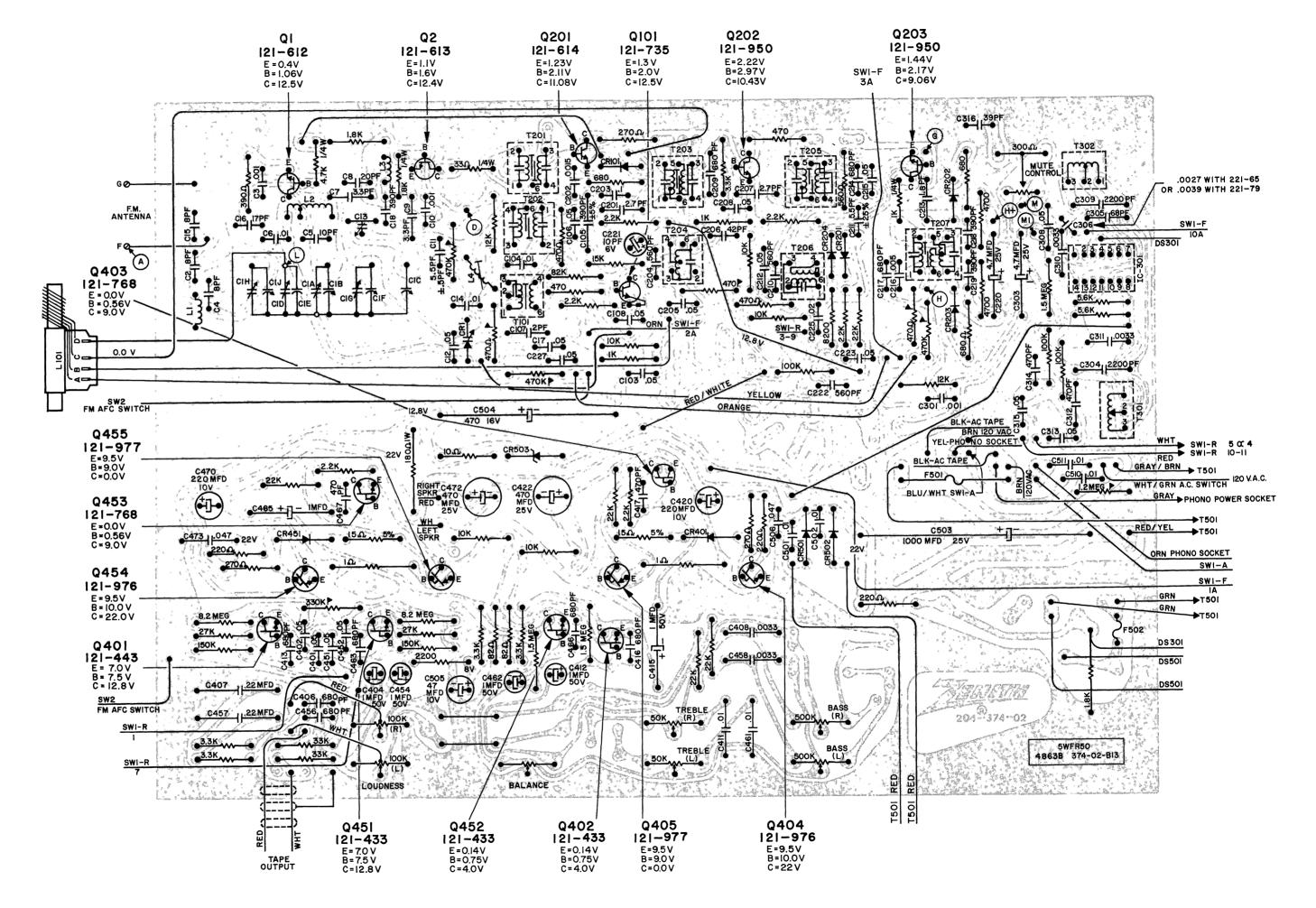


38 KHZ TANK END 38 KHZ 13 V P/P

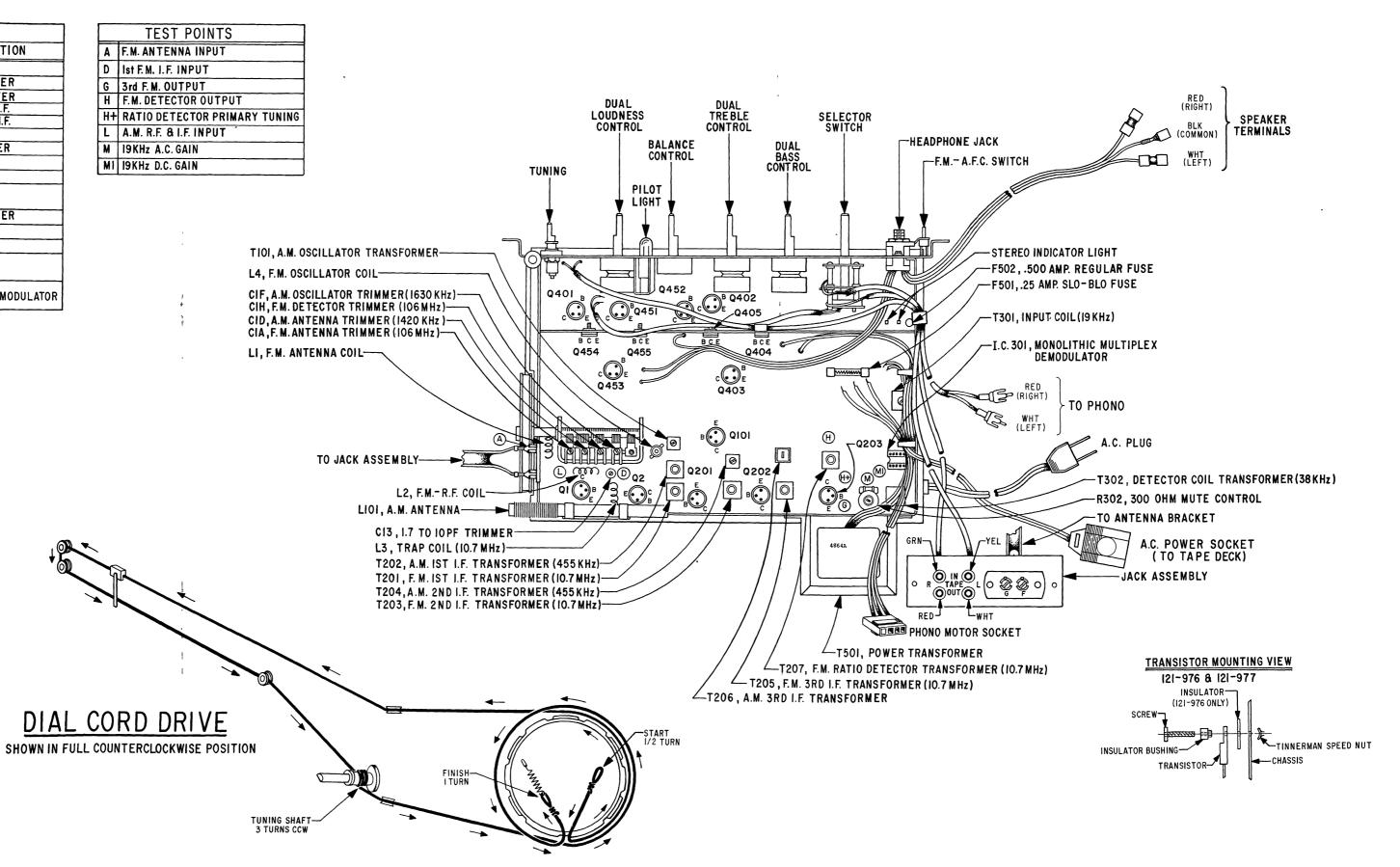


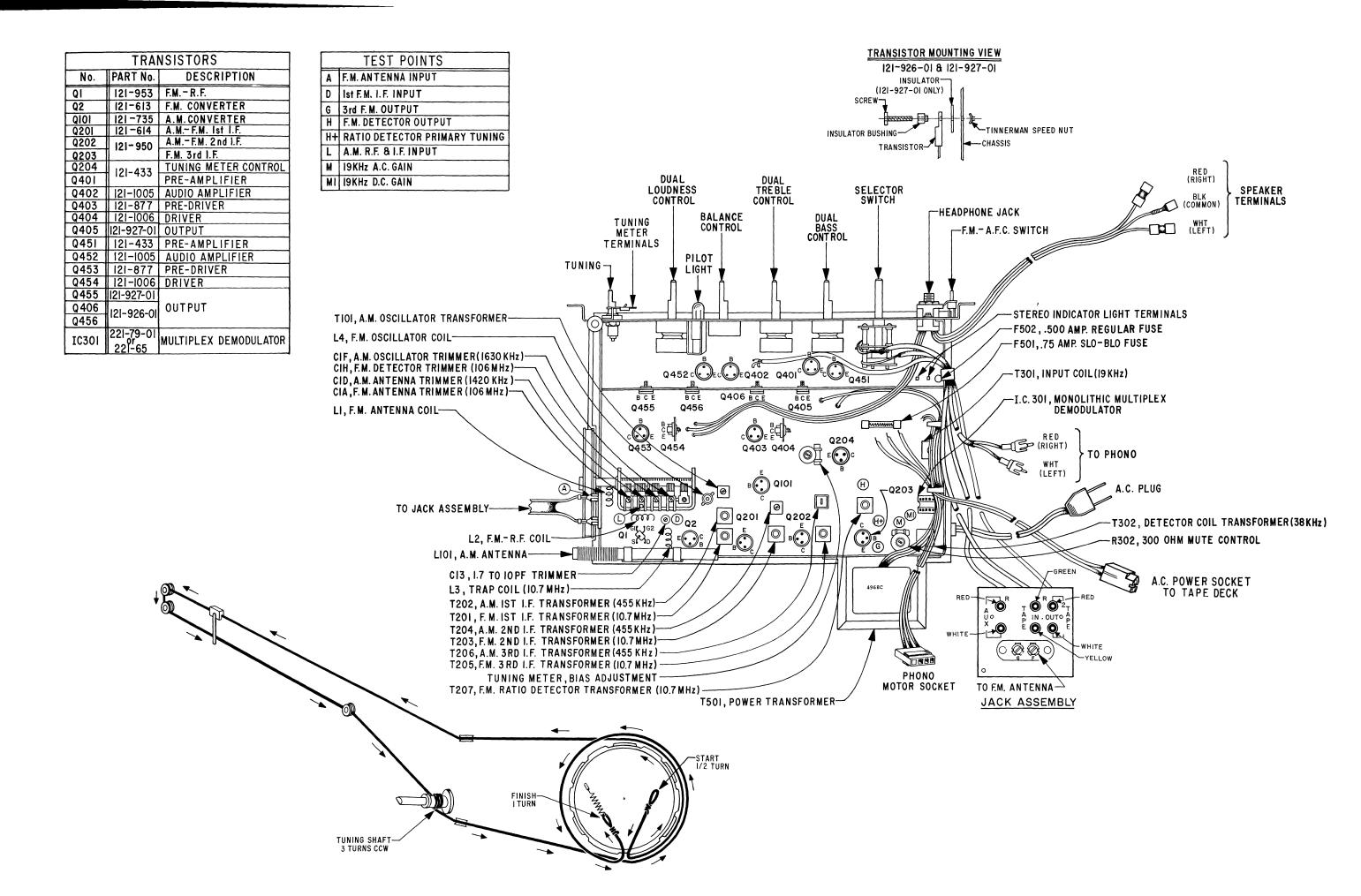
CHASSIS 5WFR50 - SCHEMATIC

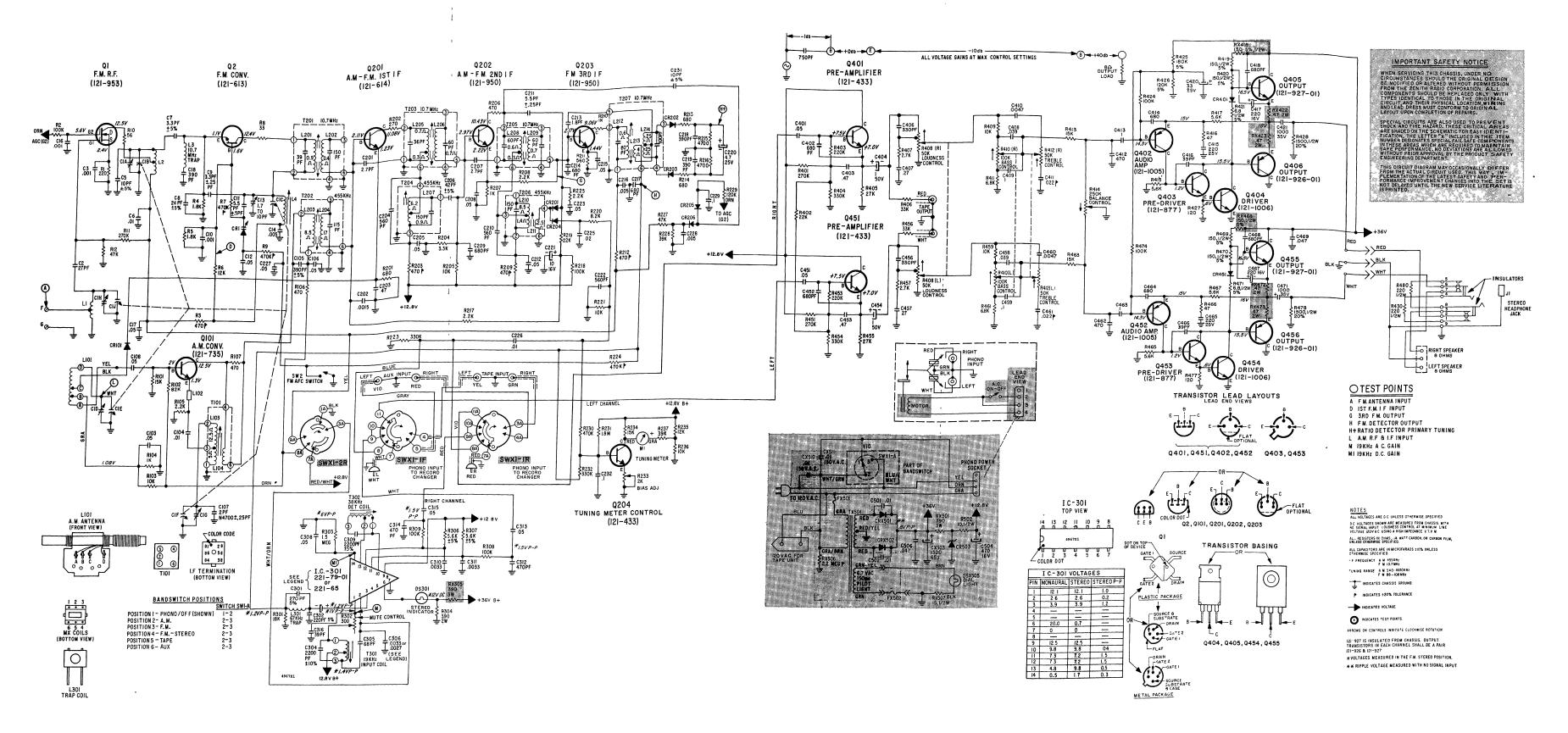
ITEM NO.	PART ENUMBER	LEGEND CHA	ITEM NO.	PART NUMBER	DESCRIPTION
NO.	- TOWNER	\ FM DETECTOR TRIMMER	R213 R214	63-T778 63-1778	680 ÓHM 680 0HM
C1D /		FM DETECTOR TUNING FM OSCILLATOR TUNING AM ANTENNA TRIMMER AM ANTENNA TUNING	R215 R216	63-1813 63-1813	4700 OHM 4700 OHM 2.2K OHM
C1E	<b>2</b> 2-7134	AM ANTENNA TUNING AM OSCILLATOR TUNING AM OSCILLATOR TRIMMER	R217 R218 R219	63-1799 63-1869 63-1841	2.2K OHM 100K OHM 22K OHM
C1G C1H C1J		FM ANTENNA TRIMMER	R220 R221	63-1824 63-1827	8200 OHM 10K OHM
C2	22-2481 22-2729 22-2481	8 PF DISC ± 0.5% 500V .001 MFD DISC 25V	R224	63-1898 63-1799	470K OHM 20% 2.2K OHM
C4 C5 C6	22-2481 22-3675 22-3393	8 PF DISC ± 0.5% 500V 10 PF DISC ± 5% 500V .01 MFD DISC 25V	R225 R301	63-1831	12K OHM
C7   C8	⊒22-3541 ⊒22-3751	3,3 PF GIMMICK ± 5% 500V 20 PF DISC ± 5% 500V	R302 R303	63-8328 63-1918	300 OHM MUTE CONTROL 1.5 MEG OHM
C9 C10	22-5879 22-2729 22-5878	3.3 PF DISC ± .25 PF 25V .001 MFD DISC 25V	R304 R305 R306	63-1796 63-1757 63-1816	1.8K OHM 220 OHM 5.6K OHM 5%
C11 C12 C13	22-3034 22-4855	5.5 PF DISC ± 0.5 PF 25V .05 MFD DISC 25V 1.7 TO 10 PF CERAMIC TRIMMER	R307 R308	63-1816 63-1869	5.6K OHM 5% 100K OHM
C14 C15	22-3393 22-2481	.01 MFD DISC 25V 8 PF DISC ± 0.5% 500V	R309 R401	63-1869 63-1950	100K OHM 8.2 MEG OHM
C16 C17 C18	22-3792 22-3034 22-3177	17 PF DISC ± 5% 500V .05 MFD DISC 25V 390 PF DISC 500V	R403	63-1950	150K OHM
C103	22-3034	.05 MFD DISC 25V	R405	63-1845	27K OHM
C104 C105 C106	22-3393 22-5972 22-3034	.01 MFD DISC 25V 390 PF ± 5% POLYSTYRENE 125V 05 MFD DISC 25V	R406 R407 R408R	63-1848 63-1806	33K OHM 3.3K OHM 100K DUAL LOUDNESS CONTROL
C107 C108	22-4819 22-3034	.06 MFD DISC 25V 2 PF N4700 ± .25 PF 500V .05 MFD DISC 25V	R408L) R409	63-9255 63-1841	(ALTERNATE 63-10160) 22K OHM
C201 C202	22-3310 22-5483	2.7 PF GIMMICK ± 10% 500V .0015 MFD DISC 500V	R410R R410L		500K DUAL BASS CONTROL (ALTERNATE 63-10162) 50K DUAL TREBLE CONTROL
C202 C203 C204	22-5487 22-5481	.47 MFD DISC 3V 560 PF DISC 500V	R412L	63-1918	(ALTERNATE 63-10161) 1.5 MEG OHM
C205 C206	22-3034 22-3791	.05 MFD DISC 25V 42 PF DISC ± 5% 500V	R414 R415 R416	63-1806 63-1740 63-1841	3.3K OHM 82 OHM
C207 C208 C209	22-3310 22-3034 22-5482	2.7 PF GIMMICK ± 10% 500V .05 MFD DISC 25V 680 PF DISC 500V	R417	63-1799	22K OHM 2200 OHM
C210 C211	22-5481 22-3770	560 PF DISC 500V 5,5 PF DISC ± .25 PF 500V .05 MFD DISC 25V	R419 R420	63-1757 63-1761	220 OHM 270 OHM
C212 C213	22-3034 22-2428 22-5482	.05 MFD DISC 25V 1.8 PF GIMMICK ± 10% 500V 680 PF DISC 500V	R421 R422 R423	63-1707 63-4501 63-1827	15 OHM 5% 1 OHM 10K OHM
C214 C215 C216	22-3034 22-3080	.05 MFD DISC 25V .005 MFD DISC 25V	R424 R425	63-1891 63-9254	330K OHM 20% 500K BALANCE CONTROL
C217 C218 C219	22-2939 22-3177	680 PF DISC 500V 390 PF DISC 500V 390 PF DISC 500V	R430	63-1757	(ALTERNATE 63-10159) 220 OHM
C220 C221 .	22-3177 22-7142-03 22-7151-04	4.7 MFD ELECTROLYTIC 25V 10 MFD ELECTROLYTIC 16V	R451	63-1950	8.2 MEG OHM
C222 C223	22-3362 22-3034	560 PF DISC 500V .05 MFD DISC 25V	R453	63-1876	150K OHM
C225 C227	22-3033 22-3034	.02 MFD 25V .05 MFD DISC 25V	R455 R456	63-1845 63-1848	27K OHM 33K OHM
G301	22-2729	.001 MFD DISC 25V	R457	63-1806	3.3K OHM
C303 C304	22-7142-03 22-5782	4.7 MFD ELECTROLYTIC 25V 2200 PF POLYSTYRENE ± 5% 500V 68 PF DISC 500V	R459 R463	63-1841	22K OHM 1.5 MEG OHM
C305 C306	22-3608 22-7191 OR	.0027 MFD DISC 500V (USED WITH 221-65)	R464 R465	63-1806 63-1740 63-1841	3.3K OHM 82 OHM
C308	22-5581 22-3034	.0039 MFD DISC 500V (USED WITH 221-79) .05 MFD DISC 25V	R466 R467	63-1841 63-1799	22K OHM 2200 OHM
C310 C311	22-5782 22-13 22-13	2200 PF POLYSTYRENE ± 5% 500V .0033 MFD DISC 500V .0033 MFD DISC 500V	R469 R470	63-1757 63-1761	220 OHM 270 OHM
C312 C313	22-16 22-3034	470 PF DISC 500V .05 MFD DISC 25V	R471 R472	63-1707 63-4501	15 OHM 5% 1 OHM
C314 C315 C316	22-16 22-3034 22-3381	470 PF DISC 500V .05 MFD DISC 25V 39 PF ± 5% DISC 500V	R473 R480	63-1827 63-1757	10K OHM 220 OHM
C401	22-3034	.05 MFD DISC 25V	R501	63-6038	180 1W
C402 C404	22-3034	.05 MFD DISC 25V 1 MFD ELECTROLYTIC 50V	R502 R503	63-1701 63-1799	10 OHM 2.2K OHM
C406	22-2939	680 PF DISC 500V	R506	63-1916	
C407 C408	22-6048 22-13	.22 MFD MYLAR 50V .0033 MFD DISC 500V	L1 L2	20-3291 20-1648 20-1631	FM ANTENNA COIL FM RF COIL TRAF COIL 10.7 MHz
C411 C412	22-3513 22-7153	.01 MFD DISC 500V 1 MFD ELECTROLYTIC 50V	L3 L4	20-3597	FM OSCILLATOR COIL
C413 C415	22-2939	1 MFD ELECTROLYTIC 50V	L101 L102 L103	\$-93292 149-311 IN T101	AM ANTENNA ASSEMBLY FERRITE CORE SLEEVE AM OSCILLATOR TRANS. PRI. AM OSCILLATOR TRANS. SEC.
C416 C417	22-7143 22-2939 22-16	680 PF DISC 500V .00047 MFD DISC 500V	L104	IN T101	
C420	22-7150-09	220 MFD ELECTROLYTIC 10V	L201 L202	IN T201 IN T201	1ST IF 10.7 MHz PR!. 1ST IF 10.7 MHz SEC. 1ST IF 455 KHz PRI.
C422	22-7152-11	470 MFD ELECTROLYTIC 25V	L203 L204 L205	IN T202 IN T202 IN T203	1ST IF 455 KHz SEC. 2ND IF 10.7 MHz PRI.
C451 C452	22-3034 22-3034	.05 MFD DISC 25V .05 MFD DISC 25V	L206 L207	IN T203 IN T204	2ND IF 10.7 MHz SEC. 2ND IF 455 KHz
C454	22-7153	1 MFD ELECTROLYTIC 50V	L208 L209 L210	IN T205 IN T205 IN T206	3RD IF 10.7 MHz PRI. 3RD IF 10.7 MHz SEC. 3RD IF 455 KHz PRI.
C456 C457	22-2939 22-6048	680 PF DISC 500V .22 MFD MYLAR 50V	L211 L212	IN T206 IN T207	3RD IF 455 KHz SEC. RATIO DETECTOR 10.7 MHz PRI.
C458	22-13	.0033 MFD DISC 500V	L213 L214	IN T207	RATIO DETECTOR 10.7 MHz TERTIARY RATIO DETECTOR 10.7 MHz SEC.
C461 C462 C463	22-3513 22-7153 22-2939	.01 MFD DISC 500V 1 MFD ELECTROLYTIC 50V 680 PF DISC 500V	T101	96-3077	AM OSCILLATOR
C465	22-7143	1 MFD ELECTROLYTIC 50V	T201 T202	95-2546 95-2541	FM 1ST IF 10.7 MHz AM 1ST IF 455 KHz
C466 C467	22-2939 22-16	680 PF DISC 500V .00047 MFD DISC 500V	T203	95-2547 95-2542	FM 2ND IF 10.7 MHz
C470 C472	22-7150-09 22-7152-11	220 MFD ELECTROLYTIC 10V 470 MFD ELECTROLYTIC 25V	T205 T206 T207	95-2548 95-2689 95-2545	FM 3RD IF 10.7 MHz AM 3RD IF 455 KHz FM RATIO DETECTOR 10.7 MHz
C473 C501	22-6447-01	.047 MFD MYLAR 20% 100V	T301	95-3021	INPUT COIL 19 KHz
C502 C503	22-4617 22-4617 22-7142-12	.01 MFD DISC 500V	T302	95-3023 95-2651	DETECTOR COIL 38KHz POWER TRANSFORMER
C504 C505	22-7141-11 22-7150-07	470 MFD ELECTROLYTIC 16V 47 MFD ELECTROLYTIC 10V	SW1	85-1370	BAND SWITCH
C506 C510 ∑	22-6447-01 22-6005	.047 MFD MYLAR 20% 100V	SW2	85-1372 78-2137-01	AFC SWITCH (SLIDE SP-DT)
C511 (	22-6006 63-1768	.01 MFD DISC 150VAC .01 MFD DISC 150VAC 390 OHM	CR1	(103-47	STEREO HEADPHONE JACK
R2 R3	83-4213 63-1772	4.7K OHM 1/4W 470 OHM 20%		OR 103-189	1
R4 R5	63-1796 63-4196	1.8K OHM 1.8K OHM 1/4W	CR101	103-142	SILICON DIODE
R6 R7 R8	63-1831 63-1898 63-4122	12K OHM 470K OHM 20% 33 OHM 1/4W	CR201 CR202	103-23 103-90}	GERMANIUM DIODE GERMANIUM DIODES (MATCHED
R9	63-1898	470K OHM 20%	CR203 CR204	103-90 103-23	PAIR) GERMANIUM DIODE
R101 R102 R103	63-1834 63-1866 63-1827	15K OHM 82K OHM 10K OHM	CR401	103-222	DIODE
R104 R105	63-1785 63-1799	1K OHM 2.2K OHM	CR451	103-222	DIODE
R106 R107	63-1771 63-1771	470 OHM 470 OHM	CR503 CR502 CR503	212-76 212-76 103-96	SILICON RECTIFIER SILICON RECTIFIER DIODE
R201 R202	63-1778 63-1761	680 OHM 270 OHM	IC301	221.65	MONOLITHIC MULTIPLEX
R203 R204	63-1772 63-1806	470 OHM 20% 3.3K OHM		OR 221-79	DEMODULATOR
R205 R206	63-1827 63-1771	10K OHM 470 OHM	DS301 DS501	100-611	STEREO INDICATOR LIGHT
R207	63-1785 63-1799	1K OHM 2.2K OHM	PC	204-374-02	A CONTRACTOR OF THE PROPERTY O
R208 R209	63-1772 63-4185	470 OHM 20%	L.C.	CU4-374-UZ	PRINTED CIRCUIT BOARD

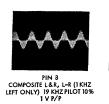


	TRA	NSISTORS				
No.	PART No.	DESCRIPTION				
QI	121-612	F.M R.F.				
Q2	121-613	F.M. CONVERTER				
Q101	121-735	A.M. CONVERTER				
Q201	121-614	A.M F.M. 1st 1.F.				
Q202	121-950	A.M F.M. 2 nd I.F.				
Q203	12. 000	F.M. 3rd I.F.				
Q40I	101-477	PRE-AMPLIFIER				
Q402	121-433	PRE-DRIVER				
Q403	121-768	DRIVER				
Q404	121-976	OUTPUT				
Q405	121-977					
Q451	121-433	PRE-AMPLIFIER				
Q452		PRE-DRIVER				
Q453	121-768	DRIVER				
Q454	121-976	OUTDUT				
Q455	121-977	OUTPUT				
10701	221-65	MULTIPLEX DEMODULATOR				
IC301	221-79	MULTIPLEX DEMODULATOR				









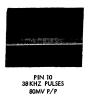






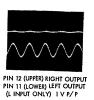




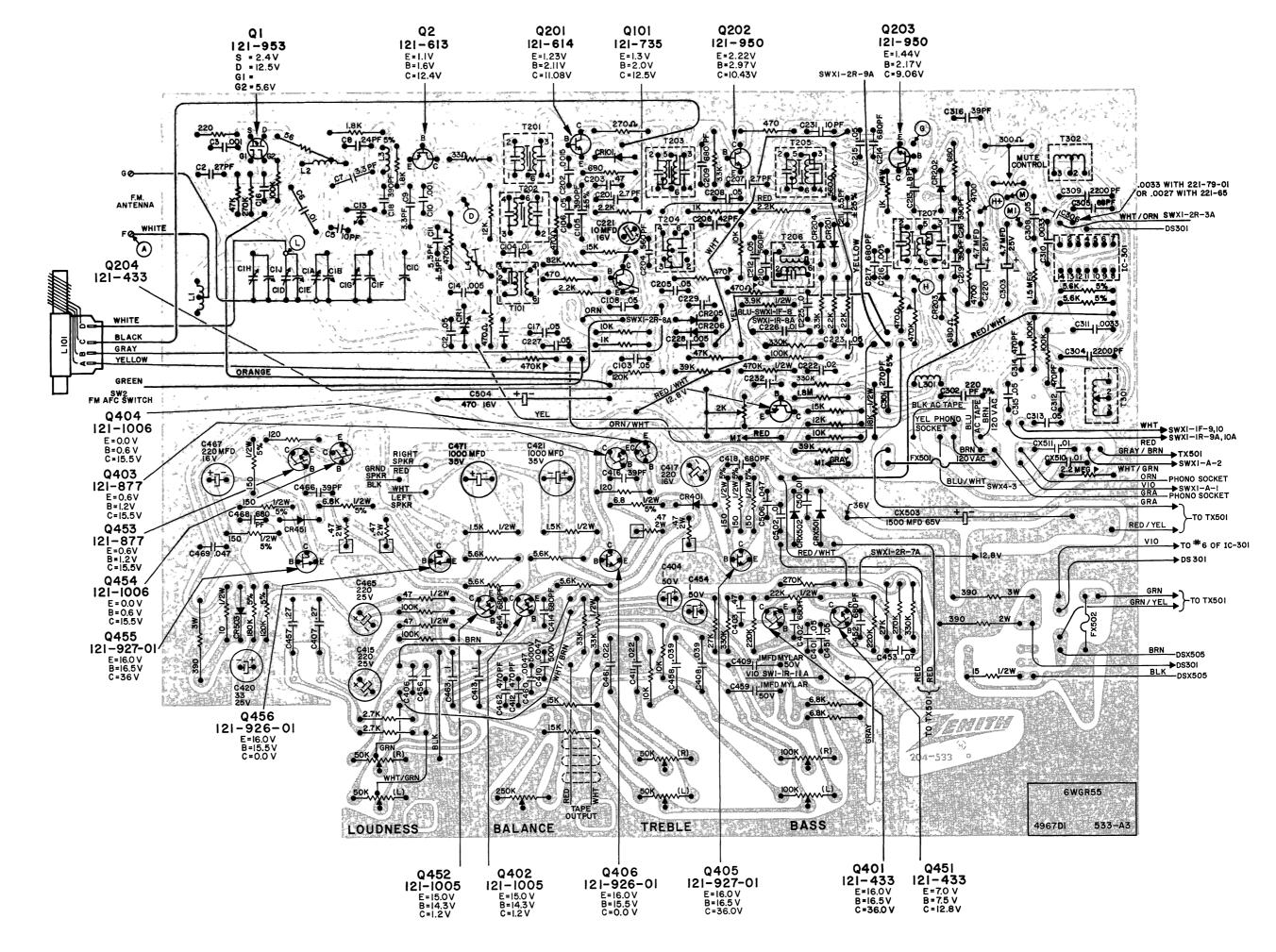






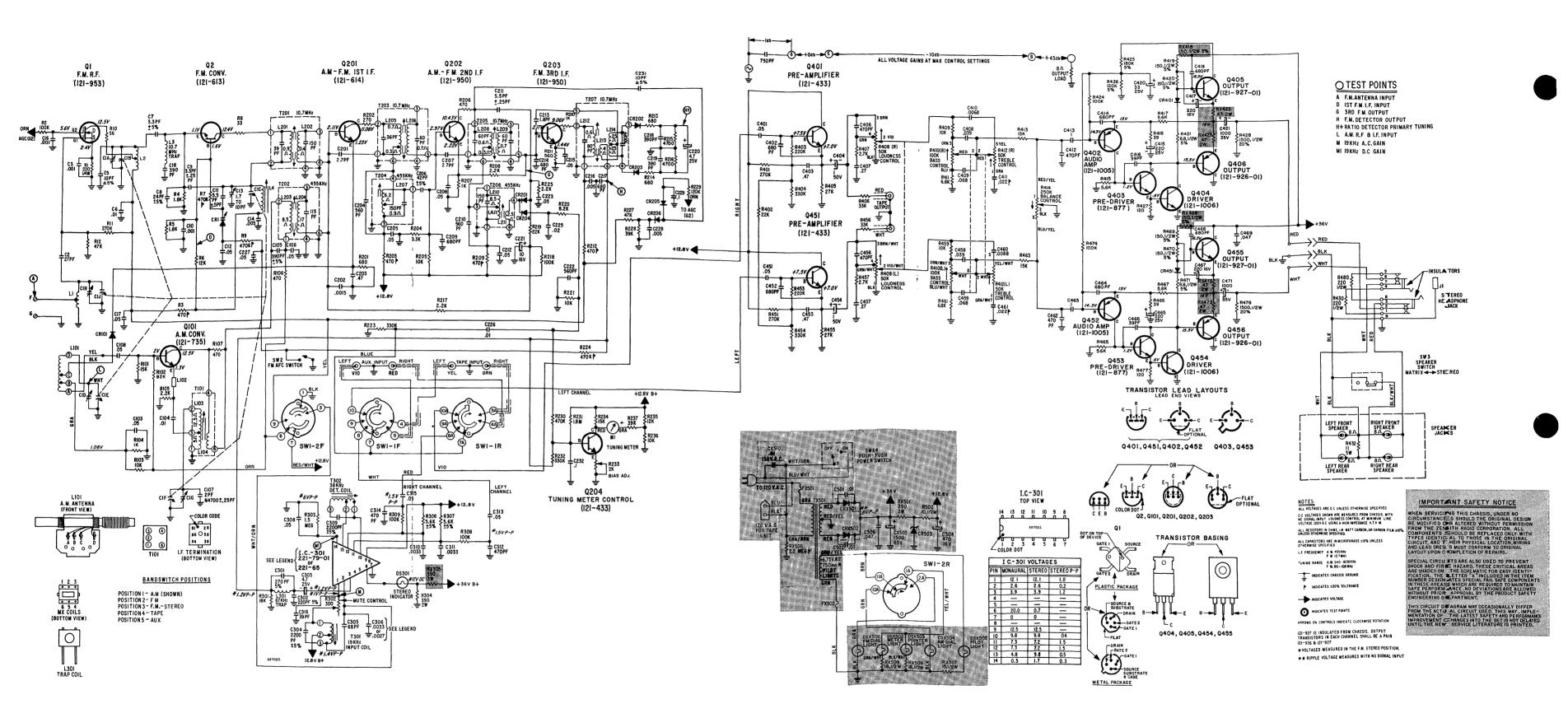


		CHASSIS LEGI			GR55
ITEM NO.	PART NEJMBER	DESCRIPTION	ITEM NO.	PART NUMBER	DESCRIPTION
C1A C1B		FM DETECTOR TRIMMER FM DETECTOR TUNING FM OSCILLATOR TUNING AM ANTENNA TRIMMER AM ANTENNA TUNING AM OSCILLATOR TUNING AM OSCILLATOR TUNING AM OSCILLATOR TRIMMER	R229 R230	63-9922-22 83-1897 63-9924-50	120K DHM 5% (ALT 63-7873 1/2W 10%) 470K OHM 1/2W
C1C C1D	)	FM OSCILLATOR TUNING AM ANTENNA TRIMMER AM ANTENNA TUNING	R231	63-9922-32	1.8 MEG OHM 10% (ALT 63-7922 1/2W 10%) 330K OHM 5%
C1D C1E C1F C1G	222-7134	AM OSCILLATOR TUNING AM OSCILLATOR TRIMMER		63-6250	(ALT 63-7890 1/2W 10%) 2K OHM METER CONTROL
C1H C1J C2 C3 C5	227-2396	FM ANTENNA TRIMMER FM ANTENNA TUNING 27 PF DISC 500V	H236	63-9922-00 63-9922-98 63-9921-96	330K OHM 5% (ALT 63-7890 1/2W 10%) 2K OHM METER CONTROL 15K OHM 5% (ALT 63-7831 1/2W 10%) 12K OHM 5% (ALT 63-7831 1/2W 10%) 10K OHM 5% (ALT 63-7831 1/2W 10%) 39K OHM 5% (ALT 63-7852 1/2W 10%)
C3 C5	22-2396 22-2729 22-3675	.001 MFD DISC 25V 10 PF DISC ± 5% 500V	R237 R301	63-9922-10 63-1838	39K OHM 5% (ALT 63-7852 1/2W 10%) 18K OHM
C6 C7 C8	2Z-3393 2Z-3541 2Z-2515	.01 MFD DISG 25V 3.3 PF GIMMICK ± 5% 500V 24 PF DISC ± 5% 500V	R302 R303	63-8328 63-9924-48	300 OHM MUTE CONTROL 15 MEG OHM 5% (ALT 62-79)
C9 C10 C11	22-2515 22-5879 22-2729 22-5878	AM OSCILLATOR TRIMMER FM ANTENNA TRIMMER FM ANTENNA TRIMMER FM ANTENNA TRIMMER OUT MED DISC 25V 10 FF DISC 25V 10 FF DISC 25V 3.3 FF DISC 25V 3.3 FF DISC 25V 3.3 FF DISC 25V 5.5 FF DISC 25 FF SDOV 5.5 FF DISC 25 FF SDOV	R304	63-1458 63-16430-88	8 1/2W 10%) 390 OHM 2W 390 OHM 3W
C12 C13	2Z-3034 2Z-4855 2Z-3080	.05 MFD DISC 25V	R306 R307	63-9921-90	5.6K OHM ± 5% (ALT 63-7816 1/2W 5%) 5.6K OHM ± 5% (ALT 63-7816 1/2W 5%) 100K OHM 5% (ALT 63-7869 1/2W 10%) 100K OHM 5% (ALT 63-7869 1/2W 10%)
C16	22-3080 22-2729 22-3034 22-3177	.005 MFD DISC 25V .001 MFD DISC 25V .05 MFD DISC 25V	R308 R309	63-9922-20 63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%) 100K OHM 5% (ALT 63-7869 1/2W 10%)
C17 C18		390 PF DISC 600V	R401 R402 R403	63-9922-30 63-1841 63-9922-28	270K OHM 5% (ALT 63-7887 1/2W 10%) 22K OHM 22OK OHM 5% (ALT 63-7883 1/2W 10%)
C103 C104 C105 C106	2Z-3034 2Z-3393 2Z-5072	.05 MFD DISC 25V .01 MFD DISC 25V	R404	63-9922-32	220K OHM 5% (ALT 63-7883 1/2W 10%) 330K OHM 5% (ALT 63-7890 1/2W 10%) 27K OHM 5% (ALT 63-7845 1/2W 10%)
C107	22-5972 22-3034 22-4819	390 PF ± 5% POL YSTYRENE 125V .05 MFD DISC 25V 2 PF N4700 ± 25 PF 500V .05 MFD DISC 25V	R406 R407	63-1848	33K OHM 2.7K OHM 5% (ALT 63-7803 1/2W 10%)
C108	22=-3034		R408R   R408L   R409	63-9955 63-9921-96	50K DUAL LOUDNESS CONTROL 10K OHM (ALT 83-7827 1/2W 10%)
C202 C203 C204 C205 C206	22-3310 22-5483 22-5487	2.7 PF GIMMICK ± 10% 500V .0015 MFD DISC 500V .47 MFD DISC 3V 560 PF DISC 500V	R410R	63-9956	100K DUAL BASS CONTROL
C204 C205 C206	2Z-5487 2Z-5481 2Z-3034 2Z-3791	.05 MFD DISC 25V	R411 R412R R412L R413	63-9921-92	6.8K OHM 5% (ALT 63-7820 1/2W 10%) 50K DUAL TREBLE CONTROL
C207 C208	22-3310 22-3034 22-5482	2.7 PF GIMMICK + 10% 500V .05 MFD DISC 25V	R413 R414	63-9922-00 63-9953 63-9921-90	
C206 C207 C208 C209 C210 C211 G212	22-5482 22-5481 22-3770	42 PF DISC ± 5% 500V 2.7 PE GIMMICK + 10% 500V 0.6 MFD DISC 25V 880 PF DISC 500V 580 PF DISC 500V 580 PF DISC 500V 5.8 PF DISC 500V 0.6 MFD DISC 25V 0.6 MFD DISC 50V 10% 500 PF DISC 50V 10% 500 PF DISC 50V 0.5 MFD DISC 50V	R414 R415 R416 R417	63-9921-90 63-1729 63-9921-90	
G212 G213	22-3034 22-2428	.05 MFD DISC 25V 1.8 PF GIMMICK ± 10% 500V	RX418	63-9946-52 63-1749	7-0HM 5-6K OHM 5% IALT 63-7817 1/2W 10%) 150 OHM 2 5% 1/2W IALT 63-7748 1/2W 5%1 150 OHM 2 5% 1/2W
C213 C214 C215 C216	22-5482 22-3034 22-3080	.05 MFD DISC 26V .005 MFD DISC 25V	R420	. 63-9946-52	(ALT 63-7749 1/2W 5%) 160 OHM ±5% 1/2W 1/2W (ALT 63-7749 1/2W 5%)
C216 C217 C218 C219	22-5482 22-3177	680 PF DISC 500V 390 PF DISC 500V	R421	63-9946-20	1/2W (ALT 63-7749 1/2W 5%) 6.8 OHM ± 5% 1/2W
C219 C220 C221	22-3177 22-3177 22-7142-03 22-7151-04 22-3362	.05 MPD DISC 25V .005 MPD DISC 25V .005 MPD DISC 25V .050 MPD DISC 500V	RX422 RX423 R424	63-9784 53-9784	6.8 OHM ± 5% 1/2W (ALT 63-7968 1/2W 5%) 47 OHM 2W 47 OHM 2W
C220 C221 C222 C223 C225	22-3362 22-3034 22-3033	560 PF DISC 500V .05 MFD DISC 25V .02 MFD DISC 25V	R424 R425	63-9922-20 63-9922-26	100K OHM 5% (ALT 63-7869 1/2W 10%) 180K OHM ± 5% (ALT 63-7879 1/2W 5%) 120K OHM ± 5% (ALT 63-7872 1/2W 5%)
C226	22-3033 22-3393 22-3034 22-3080	.01 MFD DISC 25V 05 MFD DISC 25V	R426	63-9922-22	(ALT 63-7879 1/2W 5%) 120K OHM ± 5% (ALT 63-7872 1/2W 5%)
C228 C229 C231	22-3080 22-3652 22-3875	.005 MFD DISC 25V	R427 R428	63-9921-50 63-9946-76	120 OHM 5% (ALT 63-7747 1/2W 10%) 1500 OHM 5% 1/2W (ALT 63-7763 1/2W 20%)
C232	22-3652	10 PF DISC ± 5% 500V 1 MFD DISC 10V	R430	63-1757	220 OHM
C301 C302 C303	22-5780 22-2976 22-7142-03	270 PF POLYSTYRENE ± 5% 500V 220 PF DISC N750 ± 5% 500V 4.7 MFD ELECTROLYTIC 25V 2200 PF POLYSTYRENE ± 5% 500V	R451 R453	63-9922-30 63-9922-28 63-9922-32	
C304 C305 C306	22-7142-03 22-5782 22-3608 22-13	2200 PF POLYSTYRENE ± 5% 500V 68 PF DISC 500V .0033 MFD DISC 500V	R454 R455 R456 R457	63-9922-06 63-9922-08	27K OHM 5% (ALT 63-7845 1/2W 10%) 33K OHM 5% (ALT 63-7848 1/2W 10%)
C306	22-13 OR 22-7191	.0033 MFD DISC 500V (USED WITH 221-79-01) .0027 MFD DISC 500V (USED WITH 221-66)	R457 R459 R461	63-9921-82 63-9921-96 63-9921-92	2,7K OHM 5% (ALT 63-7803 1/2W 10%) 10K OHM 5% (ALT 63-7827 1/2W 10%) 6.8K OHM 5% (ALT 63-7820 1/2W 10%)
			R463 R465	63-9922-00 63-9921-90	330K OHM 5% (ALT 83-7890 1/2W 10%) 27K OHM 5% (ALT 83-7846 1/2W 10%) 33K OHM 5% (ALT 63-7848 1/2W 10%) 2.7K OHM 5% (ALT 63-7848 1/2W 10%) 10K OHM 5% (ALT 63-7827 1/2W 10%) 6.8K OHM 5% (ALT 63-7827 1/2W 10%) 15K OHM 5% (ALT 63-7827 1/2W 10%) 5.6K OHM 5% (ALT 63-7817 1/2W 10%) 5.6K OHM 5% (ALT 63-7817 1/2W 10%) 4.7 OHM
C308 C309 C310	22-3034 22-5782 22-13 22-13	.05 MFD DISC 25V 2200 PF POLYSTYRENE ± 5% 500V 0033 MFD DISC 500V 0033 MFD DISC 500V	R466 R467 RX468	63-1729 63-9921-90 63-9948-52	5.6K OHM 5% (ALT 63-7817 1/2W 10%)
C311	22-13 22-16 22-3034	0033 MFD DISC 500V 470 PF DISC 500V .05 MFD DISC 25V	R469	63-9946-52	150 OHM + 5% 1/2W
C313 C314 C315	22-16 22-3034	470 PF DISC 500V .05 MFD DISC 25V	R470	63-9946-52	(ALT 63-7749 1/2W 5%) 150 OHM ± 5% 1/2W IALT 63-7749 1/2W 5%)
C316 C401	22-3381	39 PF ± 5% DISC 500V	R471 RX472 RX473	63-4535 63-9784 63-9784 63-9922-20	(ALT 63-7749 1/2W 5%) 6.8 OHM ± 5% 1/2W 37 OHM 2W
C402 C403 C404	22-2939 22-5487 22-7153 22-3255	.05 MPD DISC 25V 680 PF DISC 500V 47 MPD DISC 3V 1 MFD ELECTROLITIC 50V 330 PF DISC 500V	R477	63-9921-50	47 OHM 2W 47 OHM 5W (ALT 63-7869 1/2W 10%) 120 OHM 5% (ALT 63-7747 1/2W 10%) 1500 OHM 5% 1/2W
C404 C406 C407	22-7153 22-3255 22-5964	1 MFD ELECTROLITIC 50V 330 PF DISC 500V 27 MFD MYLAR 50V	R478 R480	63-9946-76	1500 OHM 5% 1/2W (ALT 63-7793 1/2W 20%) 220 OHM 1/2W
	22-5964 22-7202 22-6905 22-14	27 MFD MYLAR 50V .039 MFD MYLAR 50V 1 MFD MYLAR 50V .0047 MFD DISC 500V	A		Andrews and the state of a second
C408 C409 C410 C411 C412 C413 C414	22-5814	.022 MFD MYLAR 20% 100V	R502 RX506 RX507	53-9946-24 63-10526-01 63-9945-28	390 OHM 3W 10 OHM 5 1/2W (ALT, 63-7701 1/2W 10% 2.2 MEG OHM ± 20% 15 OHM 5 1/2W (ALT, 63-7708 1/2W 10%)
C413 C414	22-6905 22-2939 22-7152-9	1 MFD MYLAR 10% 50V	112	20.2664	EM ANTENNA COU
C415 C416 C417	22-3381	220 MFD ELECTROLYTIC 25V 39 PF DISC + 5% 500V 220 MFD ELECTROLYTIC 16V 680 PF DISC 500V 33 MFD ELECTROLYTIC 25V	L3 L4	20-3665 20-1631 20-3597	FM RF COIL TRAP COIL 10.7 MHZ FM OSCILLATOR COIL
C417 C418 C420 C421	22-2939 22-7152-6 22-7154-12	680 PF DISC 500V 33 MFD ELECTROLYTIC 25V 1000 MFD ELECTROLYTIC 35V	L101	\$-93292-01	AND ANTENNA ACCEMENT
C451	222-3034	.05 MFD DISC 25V	L102 L103	149-311 IN-T101 1N-T101	AM AN I ENNA ASSEMBLE FERRITE CORE SLEEVE AM OSCILLATOR TRANS. PRI AM OSCILLATOR TRANS. SEC.
C452 C453 C454 C456	22-2939 22-5487 22-7153 22-3255	.47 MFD DISC 500V	L201	1N-T201	1ST IF TRANSFORMER 10.7 MHzPRI.
C456 C457 C458	22-3255 22-5964 22-7202	1 MFD ELECTROLYTIC 50V 330 PF DISC 500V 27 MFD MYLAR 50V .039 MFD MYLAR 50V	L202 L203 L204	1N-T202 1N-T202	1ST IF TRANSFORMER 10.7 MHzPRI. 1ST IF TRANSFORMER 10.7 MHz SEC. 1ST IF AM 455 KHz PRI. 1ST IF 455 KHz SEC.
C459	2=2-6905	1 MFD MYLAR 50V	L205 L206 L207	1N-T203 1N-T203 1N-T204	2ND IF TRANSPORMER 10.7 MHz PRI.
C461	222-5814	.022 MFD MYLAR 20% 100V	L208 L209 L210	1N-T205	2ND IF AM 455 KHz 3RD IF TRANSFORMER 10.7 MHz PRI. 3RD IF TRANSFORMER 10.7 MHz SEC.
C463 C464 C465	22-6905 22-2939 22-7152-9 22-3381	1 MFD MYLAR 10% 50V 680 PF DISC 500V 220 MFD ELECTROLYTIC 25V	L210 L211 L212	1N-T206 1N-T206 1N-T207	3RD IF AM 455 KHz PRI. 3RD IF AM 455 KHz SEC. RATIO DETECTOR TRANS.
C465 C466 C467 C468	22-3381 22-7151-9 22-2939	220 MFD ELECTROLYTIC 25V 39 PF DISC ± 5% 500V 220 MFD ELECTROLYTIC 16V 680 PF DISC 500V .047 MYLAR ± 20% 100V	L213	1N-T207	10.7 MHz PRI. RATIO DETECTOR TRANS.
C468 C469 C471	2=2-2939 2=2-7326 2=2-7154-12		L214	1N-T207	10.7 MHz TERTIARY RATIO DETECTOR TRANS. 10.7 MHz SEC.
C501			L301	20-3080	67 KHz TRAP
CX503 C504	2 2 4617 2 2 4617 2 2 27113 2 2 7161-11 2 2 7326 2 2 6005 2 2 6005	1500 MFD DISC 500V 1500 MFD ELECTROLYTIC 65V 470 MFD ELECTROLYTIC 16V	T101	95-3077	AM OSCILLATOR TRANSFORMER
CX510	2 32-7326 2 32-6005	.047 MFD MYLAR +205, 160V .01 MFD DISC 150VAC	T201 T202 T203	95-2548 95-2541 95-2547	FM 1ST TRANSFORMER 10.7 MHz AM 1ST IF AM 455 KHz
CX511 R1	6=3.9921.56	220 OHM 5% IALT 63-10183-56	T203 T204 T205	95-2547 95-2542 95-2548	AM 1ST IF AM 455 KHz FM 2ND IF TRANSFORMER 10.7 MHz AM 2ND IF TRANSFORMER 10.7 MHz FM 3RD IF TRANSFORMER 10.7 MHz AM 3RD IF AM 455 KHz
R2	6=3-9922-20	1/4W 10%) 100K OHM 5% (ALT 63-10184-20	T206 T207	95-2689 95-2545	AM 3RD IF AM 455 KHz FM RATIO DETECTOR 10.7 MHz
R3 R4 R5	6 =3-9921-64 6 =3-9921-78 6 =3-4196	1/4W 10%) 470 OHM 5% (ALT 63-7772 1/2W 20%) 1.8K OHM 5% (ALT 63-7796 1/2W 10%)	T301 T302	95-3021 95-3023	INPUT COIL 19 KHz DETECTOR COIL 38KHz
R6 R7	6 -3-4196 6 -3-9921-98 6 -3-9922-36	470K OHM 5% (ALT 63-7898 1/2W 20%)	TX501	adress on assess	
R8 R9	6 3-4122 6 3-9922-36	470K OHM 5% (ALT 63-7898 1/2W 20%)	SWX1 SW2	85-1438 85-1372-01	POWER TRANSPORMER  BAND SWITCH  AFC SWITCH (SLIDE SP.DT)  STEREO HEADPHONE JACK
R10 R11	6- 3-4133 6- 3-9922-30	56 OHM 1/4W 270K OHM 5% (ALT 63-10184-30 1/4W 10%)	J1	78-2137-01	STEREO HEADPHONE JACK
R12	653-9922-12		CR1	103-47 OR	AFC DIODE
R101 R102	6= 3-9922-00 6= 3-9922-18 6= 3-9921-96	15K OHM 5% (ALT 63-7834 1/ZW 10%) 82K OHM 5% (ALT 63-7866 1/ZW 10%)	CR101	103-169 )	SILICON DIODE
R102 R103 R104	€ 3-9921-96 € 3-9921-72	15K OHM 5% (ALT 63-7834 1/2W 10%) 82K OHM 5% (ALT 63-7886 1/2W 10%) 10K OHM 5% (ALT 63-7827 1/2W 10%) 1K OHM 5% (ALT 63-7785 1/2W 10%) 2.2K OHM 5% (ALT 63-7785 1/2W 10%) 470 OHM 1/2W	CR201	103-23-01	GERANIUM DIODE  GERANIUM DIODES (MATCHED PAIR)
R 105 R 106 R 107	6=3-9921-72 6=3-9921-80 6=3-1771 6=3-9921-64	2.2K OHM 5% (ALT 63-7799 1/2W 10%) 470 OHM 1/2W 470 OHM 5% (ALT 63-7771 1/2W 10%)	CR203 CR204 CR205	103-901	GERANIUM DIODE GERANIUM DIODE
R201 R202	6=3-1778 6=3-1761	680 OHM 5% (ALT 63-7778 1/2W 10%) 270 OHM 5% (ALT 63-7781 1/2W 10%) 470 OHM 5% (ALT 63-7772 1/2W 20%)	CR206	103-23-01	GERANIUM DIODE
R203	6=3-1772 6=3-1806	470 OHM 5% (ALT 63-7772 1/2W 20%) 3.3K OHM 5% (ALT 63-7806 1/2W 10%)	CR401	L	L
R205 R206	6=3-1827 (=3-1771	3.3K OHM 5% (ALT 63-7826 1/2W 10%) 10K OHM 5% (ALT 63-7827 1/2W 10%) 470 OHM 5% (ALT 63-7771 1/2W 10%) 1K OHM 5% (ALT 63-7771 1/2W 10%) 2K OHM 5% (ALT 63-7785 1/2W 10%)		1 212-75 2 212-76	
R207	GS 3-9921-72				



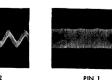
ODGOS 100-248 PILOT LIGHT
PC 204-533 PRINTED CIRCUIT BOARD
PX801 136-117-17 -75 AMP SLO BLO FUSE
PX802 136-114-12 BAMP REGULAR FUSE

122-68 OR





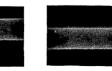








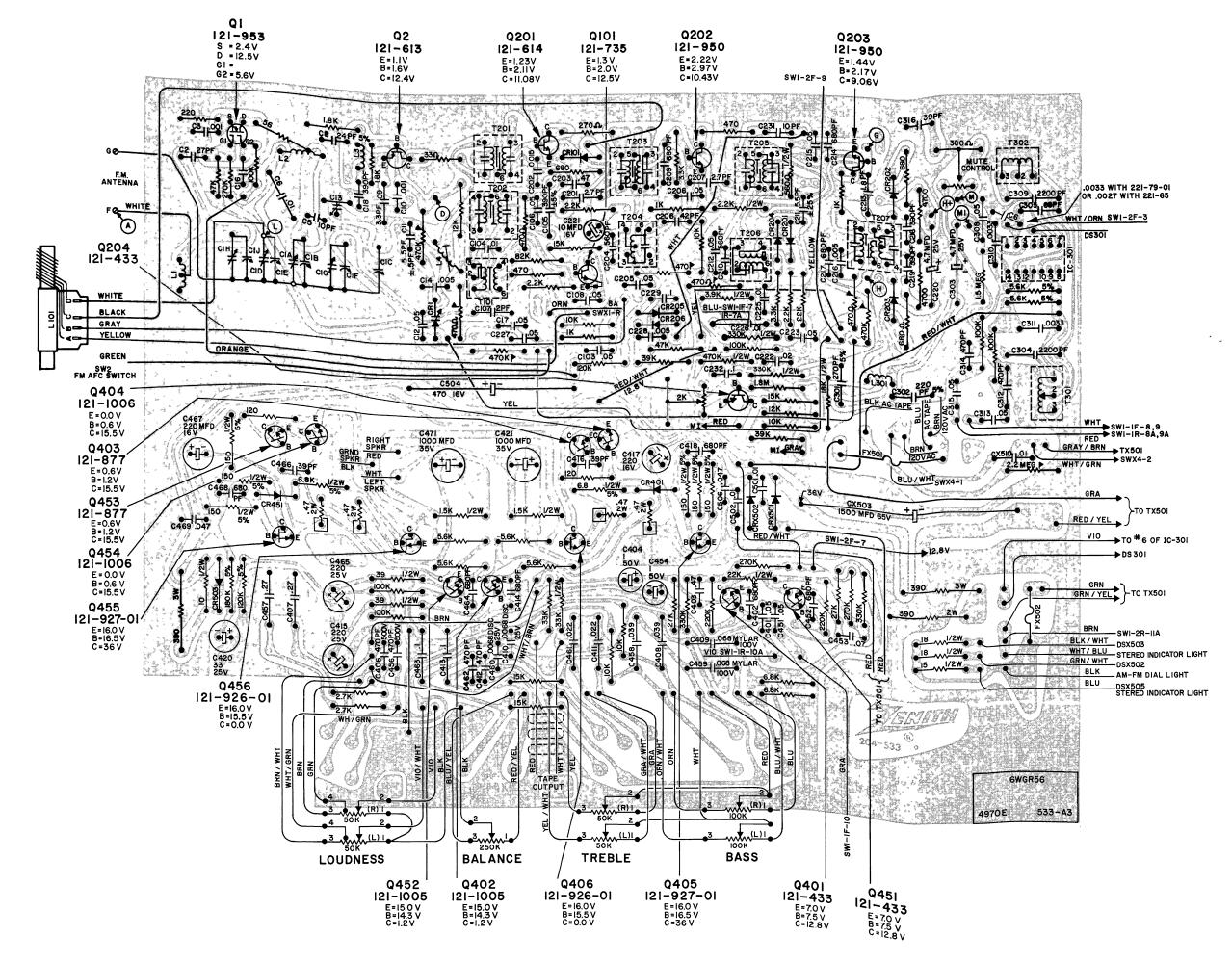


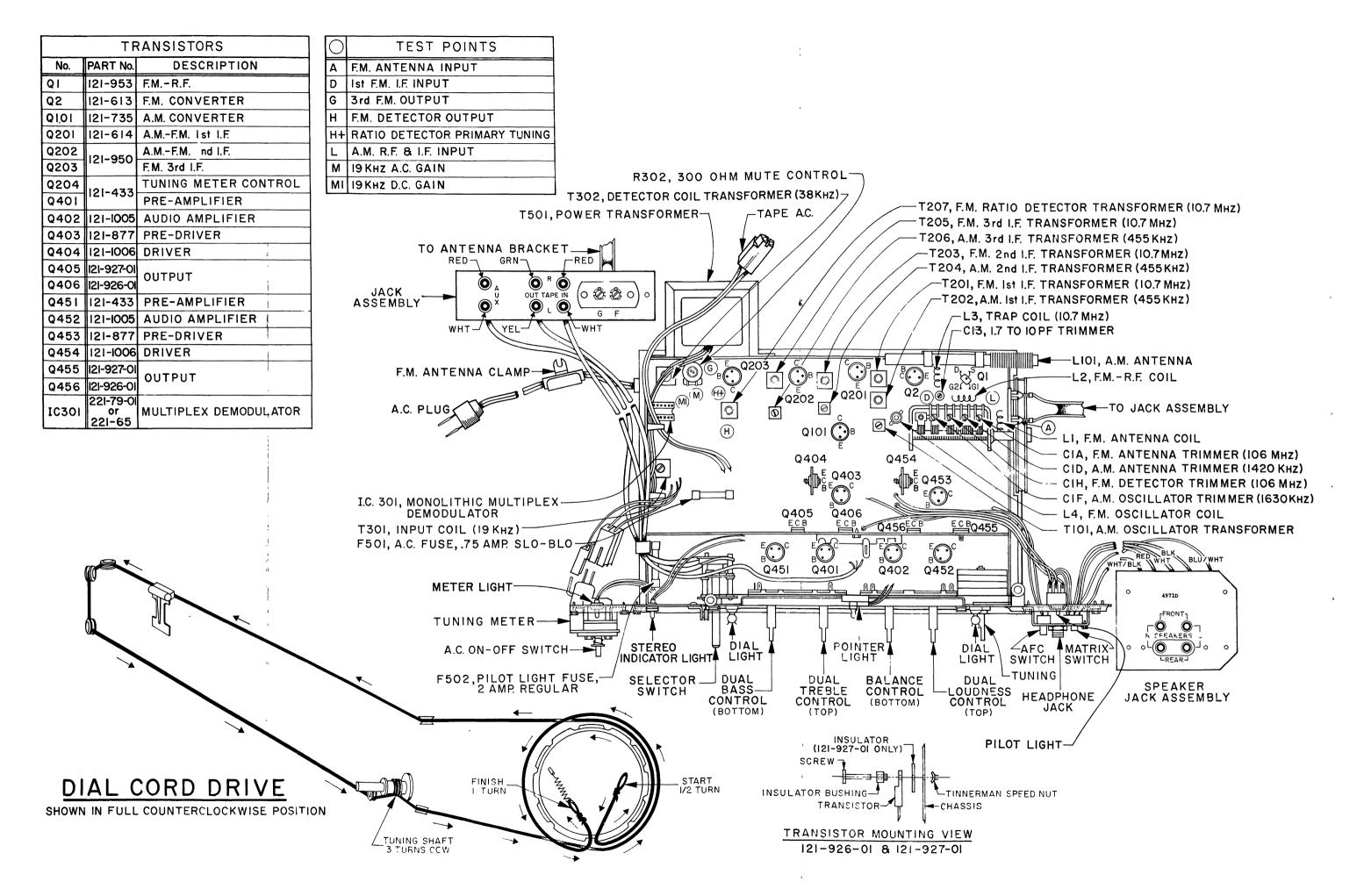


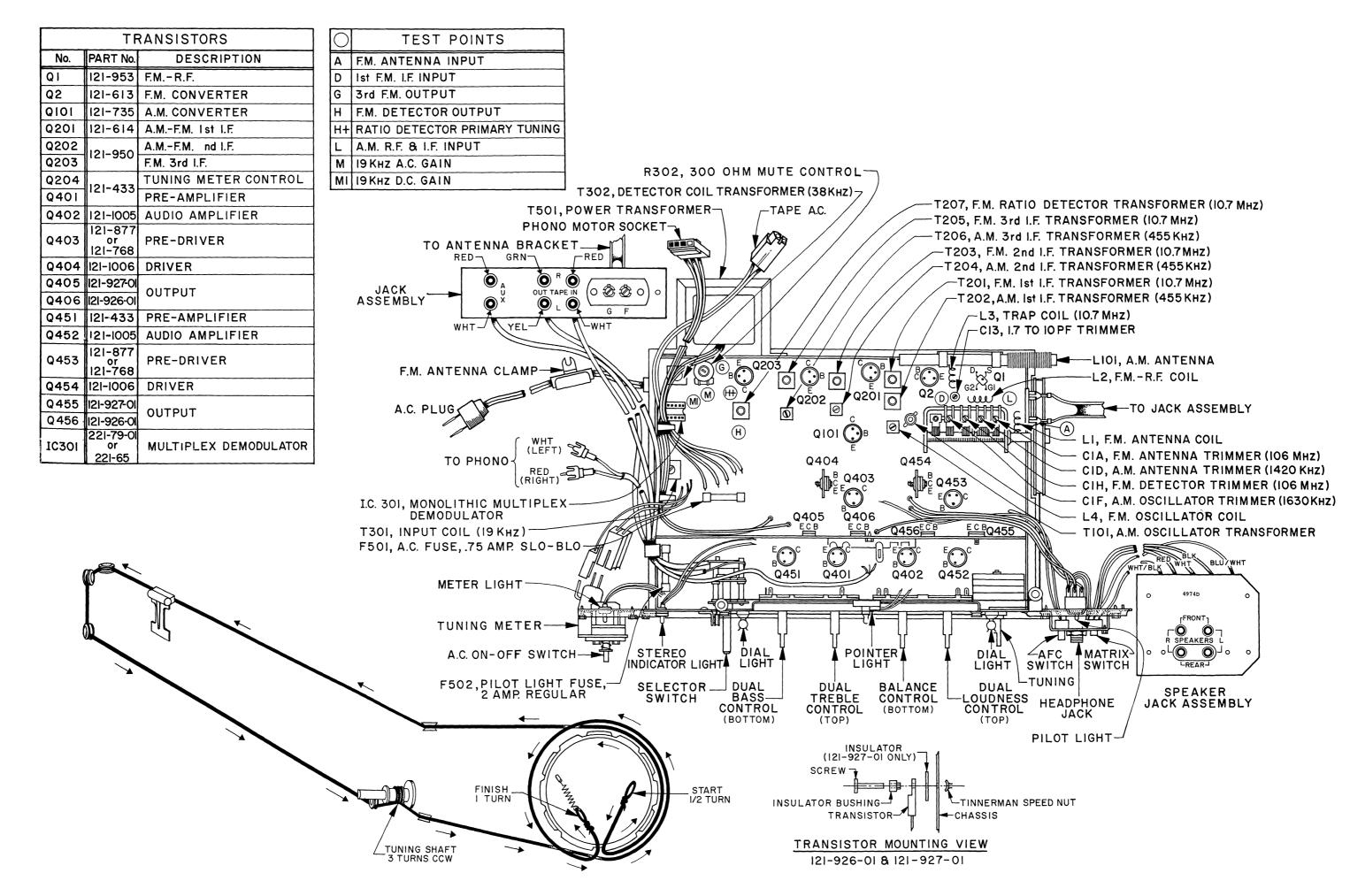


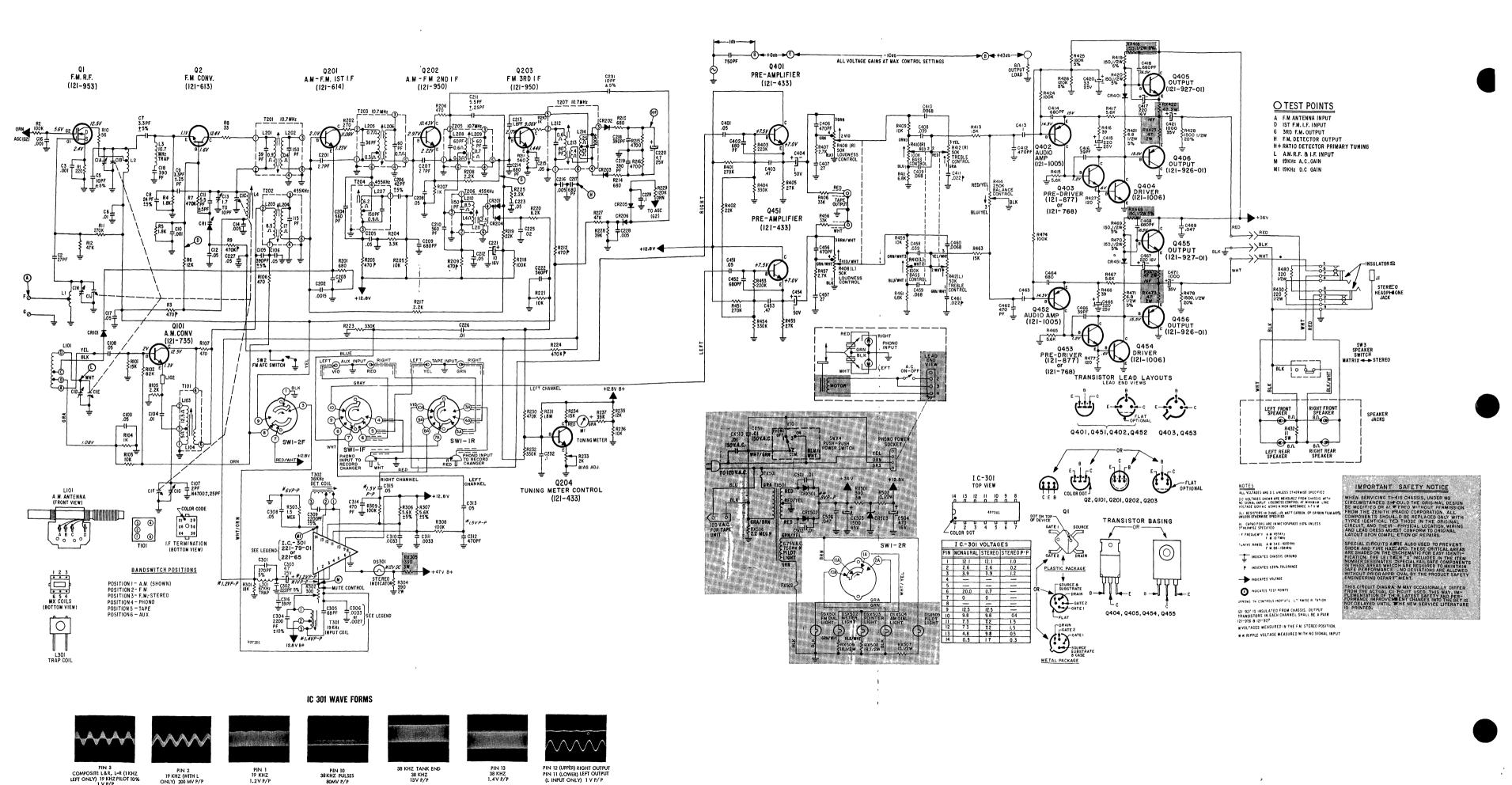
PIN 12 (UPPER) RIGHT OUTPUT PIN 11 (LOWER) LEFT OUTPUT (L INPUT ONLY) 1 V P/P

		CHASSIS LEGI			R56
NO.	PART NUMBER	DESCRIPTION FM DETECTOR TRIMMER	NO.	PART NUMBER	DESCRIPTION
CIA CIB CIC	(	FM DETECTOR TUNING FM OSCILLATOR TUNING AM ANTERNA TRIMMER AM ANTERNA TUNING AM OSCILLATOR TUNING	R236 R237	63-9921-96 63-9922-10	10K OHM 5% (ALT 63-7827 1/2W 10%) 39K OHM 5% (ALT 63-7852 1/2W 10%)
CID CIE CIF CIG CIH	2 2.7134	AM ANTENNA TRIMMER AM ANTENNA TUNING AM OSCILLATOR TUNING	R301 R302 R303	63-1838 63-8328 63-9924-48	18K OHM 1/2W 300 OHM MUTE CONTROL 1.5 MEG OHM 5% (ALT 63-7918
CIG	(	FM ANTENNA TRIMMER  FM ANTENNA TRIMMER  FM ANTENNA TRIMMER	R304 RX305	63-1458 63-10430-86 63-9921-90	18K OHM 1/ZW 300 OHM MUTE CONTROL 1.5 MEG OHM 5% (ALT 63-7918 1/ZW 10%) 390 OHM ZW 380 OHM ZW
C1J / C2 C3	2:2-2396 2:2-2729 2:2-3675	27 PF DISC 500V	R306	63-9921-90	380 0198.389 5.6K OHM ±5% (ALT 63-7816 1/2W 5%) 5.6K OHM ±5% (ALT 63-7816 1/2W 5%) 100K OHM 5% (ALT 63-7869 1/2W 10%) 100K OHM 5% (ALT 63-7869 1/2W 10%)
C6 C6	2:2-3675 2:2-3393 2:2-3541	10 PF DISC ±5% 500V .01 MFD DISC 25V 3.3 PF GIMMICK ±5% 500V	R307 R308 R309	63-9922-20 63-9922-20	100K OHM 5% (ALT 63-7869 1/2W 10%) 100K OHM 5% (ALT 63-7869 1/2W 10%)
C7 C8 C9	2 2 2515 2 2 5879	24 PF DISC ±5% 500V 3 3 PF DISC + 25PF 25V	R401 R402	63-9922-30 63-1841	270K OHM 5% (ALT 63-7887 1/2W 10%) 22K OHM
C10 C11 C12	2:2-5879 2:2-2729 2:2-5878 2:2-3034	.001 MFD DISC 25V 6.5 PF DISC ±0.5 PF 500V .05 MFD DISC 25V	R402 R403 R404 R406	63-1841 63-9922-28 63-9922-32 63-9922-06 63-1848	22K OHM 220K OHM 5% (ALT 63-7883 1/ZW 10%) 330K OHM 5% (ALT 63-7880 1/ZW 10%) 27K OHM 5% (ALT 63-7845 1/ZW 10%)
C12 C13 C14 C16 C17	22-3034 22-4865 22-3080 22-2729 22-3034	1.7 TO 10 PF CERAMIC TRIMMER .005 MFD DISC 25V	R406 R406 R407 R408R	63-9921-82	33K OHM 2.7K OHM 5% (ALT 63-7803 1/2W 10%)
C17 C18	22-3034 2-2-3177	.001 MFD DISC 25V .05 MFD DISC 25V 390 PF DISC 500V	R408L	63-10189-01 63-9921-96	50K DUAL LOUDNESS CONTROL 10K OHM 5% (ALT 63-7827 1/2W 10%)
C103 C104	Z-2-3034 Z-2-3393	.05 MFD DISC 25V .01 MFD DISC 25V	R410R R410L R411 R412R	63-8982-01 63-9921-92	100K DUAL BASS CONTROL 6.8K OHM 5% (ALT 63-7820 1/2W 10%)
C104 C105 C106 C107 C108	2 2-3034 2 2-3393 2 2-5972 2 2-3034 2 2-4819 2 2-3034	.01 MFD DISC 25V 390 PF ±5% POL VSTYRENE 125V .05 MFD DISC 25V 2 PF N4700 ± 25PF 50QV .05 MFD DISC 25V	R412R R412L R413	63-8983-01 63-9922-00	50K DUAL TREBLE CONTROL 15K OHM 5% (ALT 63-7834 1/2W 10%)
C108 C201	2-2-3034 2-2-3310		R414 R415 R416	63-8981-01 63-9921-90 63-1726	250 BALANCE CONTROL 5.6K OHM 5% (ALT 63-7817 1/2W 10%) 39 OHM
C202	2:2-5483 2:2-5487	2.7 PF GIMMICK ±10% 500V .0015 MFD DISC 500V .47 MFD DISC 3V	R417 RX418	63-9921-90 63-9948-52	5.6K OHM 5% (ALT. 83-7817 1/2W 10%) 150 OHM 55% 1/2W (ALT. 53-7749 1/2W 5%)
C204 C205 C206	2:2-5481 2:2-3034 2:2-3791	560PF DISC 500V .05 MFD DISC 25V 42 PF DISC ±5% 500V	R419 R420	63-9946-52	150 OHM ±5% 1/2W (ALT 63-7749
C206 C207 C208 C209	2-2-3310 2-2-3034	2.7 PF GIMMICK ±10% 500V	R420	63-9946-52	150 OHM ±5% 1/2W (ALT 63-7749 1/2W 5%) 6.8 OHM ±5% 1/2W (ALT 63-7968
C210	22-5482 22-5481 22-3770	680 PF DISC 500V 560 PF DISC 500V 5.5 PF DISC ±.25 PF 500V .05 MFD DISC 25V	R421 RX422	63-9946-20	9 6.8 OHM +5% 1/2W (ALT 63-7968 1/2W 5%)
C212	22-3770 22-3034 22-2428 22-5482	.05 MFD DISC 25V 1.8 PF GIMMICK ±10% 500V 680 PF DISC 500V	RX423 R424 R425	63-9784	1/2W 5%) 17/W 5%) 27 OHM 2W 47 OHM 2W 100K OHM 5% (ALT 63-7869 1/2W 10%)
C214 C215 C216	22-3034 22-3080 22-5482 22-3177	.05 MFD DISC 25V	R425 R426 R427	63-9922-26 63-9922-22 63-9921-50	180K OHM ±5% (ALT 63-7879 1/2W 5%) 120K OHM ±5% (ALT 63-7872 1/2W 5%) 120 OHM 5% (ALT 63-7747 1/2W 10%)
C215 C216 C217 C218 C219 C220 C221 C222	2:2-5482 2:2-3177	390 PF DISC 500V 390 PF DISC 500V 390 PF DISC 500V 390 PF DISC 500V 10 MFD ELECTROLYTIC 25V 10 MFD ELECTROLYTIC 16V	R428 R430 R431	63-9946-76 63-1757	1500 OHM ±5% (ALT 63-7793 1/2W 20%) 220 OHM
C219 C220 C221	22-3177 2-2-7142-03 2-2-7151-04 2-2-3362	4.7 MFD ELECTROLYTIC 25V 10 MFD ELECTROLYTIC 16V	R431 R432	63-10135	11 OHM SW
	22-3034		R451 R453 R454	63-9922-30 63-9922-28 63-9922-32	270K OHM 9% (ALT 63.782 1/2W 10%) 220K OHM 5% (ALT 63.782 1/2W 10%) 220K OHM 5% (ALT 63.782 1/2W 10%) 237K OHM 5% (ALT 63.784 1/2W 10%) 237K OHM 5% (ALT 63.784 1/2W 10%) 237K OHM 5% (ALT 63.784 1/2W 10%) 237K OHM 5% (ALT 63.782 1/2W 10%) 10K OHM 5% (ALT 63.782 1/2W 10%)
C225 C226 C227	2:2-3393	.06 MFD DISC 25V .02 MFD DISC 25V .01 MFD DISC 25V .05 MFD DISC 25V	R455	63-9922-32 63-9922-06 63-9922-08	27K OHM 5% (ALT 63-7890 1/2W 10%) 27K OHM 5% (ALT 63-7845 1/2W 10%) 33K OHM 5% (ALT 63-7848 1/2W 10%)
C228	2 2-3080 2 2-3652 2 2-3675	.005 MFD DISC 25V 1 MFD DISC 10V 10 PF DISC 15% 500V 1 MFD DISC 10V	R457	63-9921-82 63-9921-96 63-9921-92	2.7K OHM 5% (ALT 63-7803 1/2W 10%) 10K OHM 5% (ALT 63-7827 1/2W 10%)
C231 C232	22-3652		R461 R463 R465	63-9922-00 63-9921-90	15K OHM 5% (ALT 63-7834 1/2W 10%) 5,6K OHM 5% (ALT 63-7834 1/2W 10%)
C301 C302 C303 C304	2:2-5780 2:2-2976 2:2-7142-03	270 PF POLYSTYRENE ±5% 500V 220 PF DISC N750 ±5% 500V 4.7 MFD ELECTROLYTIC 25V 2200 PF POLYSTYRENE ±5% 500V	R466 R467	63-1726 63-9921-90 63-9946-52	39 OHM 5.6K OHM 5% (ALT 63-7617 1/2W 10%) 151 OHM 5% 1/2W (ALT, 63-7749 1/2W 5%)
C304 C305 C306	22.5782 22.3608 2.2.13		R469	63-9946-52	150 OHM 55% 1/2W (ALT 63-7749 1/2W 5%). 150 OHM 55% 1/2W (ALT 63-7749 1/2W 5%)
C306	or	.0033 MFD DISC 500V (TO BE USED WITH 221-79-01)	R470	63-9946-52	150 OHM +5% 1/2W (ALT 63-7749
	2-7191	.0027 MFD DISC 500V (TO BE USED WITH 221-65)	R471 RX472	63-4535 83-9784	17,2W 5-3) 68, OHM 5-5% 1/2W 47 OHM 2W 100K OHM 5% (ALT 63-7869 1/2W 10%) 120 OHM 5% (ALT 63-7874 1/2W 10%) 1500 OHM 6% (ALT 63-7793 1/2W 20%)
C308 C309	2.2-3034 2.2-5782	.05 MFD DISC 25V 2200 PF POLYSTYRENE ±5% 500V .0033 MFD DISC 500V .0033 MFD DISC 500V 470 PF DISC 500V	RX473	63-9784 63-9922-20	A7 OHM 2W 100K OHM 5% (ALT 63-7869 1/2W 10%)
C310 C311 C312	2 2 5782 2 2 13 2 2 13 2 2 16	.0033 MFD DISC 500V 470 PF DISC 500V	R477 R478 R480	63-9921-50 63-9946-76 63-1757	1500 OHM 5% (ALT 63-7793 1/2W 20%) 220 OHM 1/2W
G313 G314 G315	2 2-3034 2 2-16 2 2-3034	.05 MFD DISC 25V 470 PF DISC 500V .05 MFD DISC 25V	R481	63.10430.86	300 0040 30
C316	2:2-3381	39 PF ±5% DISC 500V .05 MFD DISC 25V	R502	63-10430-86 63-9946-24	
C401 C402 C403 C404	2 2-2939 2 2-5487 2 2-7153	680 PF DISC 500V	RX507	63-10526-01 63-8946-28	15 OHM 5% 1/2 W (ALT. 63-7708 1/2W 1864
C404 C406 6407	2-2-7153 2-2-16 2-2-5964	1 MFD ELECTROLYTIC 50V 470 PF DISC 500V .27 MFD MYLAR 50V	RX508 RX509	63-1712 63-1712	18 OHM 18 OHM
C408 C409	2-7202	.039 MFD MYLAR 50V .068 MFD MYLAR 100V	L1 L2 L3	20-3664 20-3665 20-1631	FM ANTENNA COIL FM RF COIL TRAP COIL 10,7 MHZ
C410 C411	2:2-3416 2:2-5814 2:2-16	,0068 MFD DISC 25V ,022 MFD MYLAR 20% 100V 470 PE DISC 500V	L3 L4	20-1631 20-3597	FM OSCILLATOR COIL
C413 C414	2=2-6905	.002 MFD MYLAR 20% 100V 470 PF DISC 500V 1 MFD MYLAR 10% 50V 680 PF DISC 500V	L101 L102 L103	\$-93292-01 149-311	AM ANTENNA ASSEMBLY FERRITE CORE SLEEVE
C410 C411 C412 C413 C414 C415 C416 C417 C418	2:2-7152-9 2:2-3381 2:2-7151-9 2:2-2939	220 MFD ELECTROLYTIC 25V 39 PF DISC ±5% 500V 220 MFD ELECTROLYTIC 16V	L104	IN T101 IN T101	AM OSCILLATOR TRANS, PRI AM OSCILLATOR TRANS, SEC,
C418 C420 C421	22-2939 22-7152-6 22-7154-12	680 PF DISC 500V 220 MPD ELECTROLYTIC 25V 39 PF DISC 55% 500V 220 MPD ELECTROLYTIC 16V 680 PF DISC 500V 33 MFD ELECTROLYTIC 26V 1000 MFD ELECTROLYTIC 35V	L201 L202	IN T201	1ST IF TRANSFORMER 10.7 MHz PRI. 1ST IF TRANSFORMER 10.7
C451 C452	252,3034	.05 MFD DISC 25V 680 PF DISC 500V	1.203	IN T202	MHz SEC. 1ST IF AM 455 KHz PRI. 1ST IF 456 KHz SEC.
C452 C453 C454	22-2939 22-5487 22-7153	.47 MFD DISC 500V 1 MFD ELECTROLYTIC 50V	L204 L205	IN T202 IN T203	2ND IF TRANSFORMER 10.7
C452 C453 C454 C456 C457 C458	2=2-16 2=2-5964	A7 MED DISC 3V 1 MED ELECTROLYTIC 50V 470 PF DISC 500V 27 MED MYLAR 50V .039 MED MYLAR 50V	L206 L207	IN T203	2ND IF TRANSFORMER 10.7 MHz SEC. 2ND IF AM 455 KHz
C459 C460 C461	2:2-5722 2:2-3415	.0068 MFD DISC 25V	L208	IN T204 IN T205	3RD IF TRANSFORMER 10,7
C462	222-5814 22-16	.022 MFD MYLAR 20% 100V 470 PF DISC 25V	L209 L210	IN T205 IN T206	3RD IF TRANSFORMER 10.7
C464 C465 C466	22-3939	680 PF DISC 500V	L211 L212	IN T206 IN T207	3RD 1F AM 455 KHz PRI. 3RD 1F AM 455 KHz SEC RATIO DETECTOR TRANS.
C466 'C468	22-3381 22-7151-9 22-2939 22-7326	39PF DISC 15% 500V 220 MFD ELECTROLYTIC 16V 680 PF DISC 500V	L213	IN T207	10.7 MHz PRI. RATIO DETECTOR TRANS. 10.7 MHz TERTIARY
C469	22-7326	.047 MYLAR ±20% 100V 1000 MFD ELECTROLYTIC 35V	L214	IN T207	10.7 MHz TERTIARY RATIO DETECTOR TRANS. 10.7 MHz SEC.
C501	22:4617		L301	20.000	67 KHz TRAP
C502 CX503 C504	22-4617 22-7113	OT MED DISC BOOV OF MED DISC BOOV 1500 MED ELECTROLYTIC 65V 470 MED ELECTROLYTIC 16V	T101 T201	95-3077 95-2546	AM OSCILLATOR TRANSFORMER FM 1ST TRANSFORMER 10.7 MHz
C508 CX510	22:4617 12:4617 22:4617 22:7113 22:7141.11 22:7326 22:6006 12:0005	AL MEDIAL TAN 4504 1004	T202 T203	95-2546 95-2541 95-2547	AM 1ST IF AM 455 KHz
CX511	222-6006 633-9921-56	61 MFD DISC 160VAC 220 OHM 5% (ALT 63-10183-56	T204 T205	95-2542 95-2648	10.7 MHz AM 2ND IF AM 455 KHz FM 3RD IF TRANSFORMER
R2	633-9922-20	1/4W 10%)	T206 T207	95,7699	10.7 MHz AM 3RD IF AM 455 KHz FM RATIO DETECTOR 10.7 MHz
R3 R4	631-9921-64 631-9921-78	1/4W 10%) 470 OHM 5% (ALT 63-7772 1/2W 20%) 1.8K OHM 5% (ALT 63-7796 1/2W 10%) 1.8K OHM 1/2W	T301 T302	95-2545 95-3021 95-3023	INPUT COIL 19 KHz DETECTOR COIL 38 KHz
R5 R6 R7	63-9921-78 63-9921-78 63-4196 63-9922-36 63-4122	1.8K OHM 1/2W 12K OHM 5% (ALT 63-7831 1/2W 10%) 470K OHM 5% (ALT 63-7898 1/2W 20%)	YX501	95-3174	POWER TRANSPORMER
R8 R9 R10	638-4122 638-9922-36 638-4133	33 OHM 1/2W 470K OHM 5% (ALT 63-7898 1/2W 20%) 56 OHM 1/4W 270K OHM 5% (ALT 63-10184-30	SW1 SW2	85-1442 85-1372-01	BAND SWITCH
R11	.63 <b>s</b> -9922-30	56 OHM 1/4W 270K OHM 5% (ALT 63-10184-30 1/4W 10%) 47K OHM 5% (ALT 63-10184-12	SW3 SWX4	85-1372-01 85-1448	AFC SWITCH (SLIDE SP-DT) MATRIX SWITCH (SLIDE SPDT) PUSH: PUSH FOWER SWITCH
R12	638-9922-12 638-9922-00	1/AW 10%)	J1 CR1	78-2137-01	STEREO HEADPHONE JACK
R102	632-9922-18 632-9921-96	15K OHM 5% (ALT 63-7834 1/2W 10%) 82K OHM 5% (ALT 63-7866 1/2W 10%) 10K OHM 5% (ALT 63-7827 1/2W 10%)	٠.,	103-47 or 103-189	AFC DIODE
R104 R105 R106	638-9921-72 638-9921-80 638-1771	1K OHM 5% (ALT 63-7785 1/2W 10%)	CR101	103-142-01	SILICON DIODE
R106 R107 R201	628-9921-64	470 OHM 1/2W 470 OHM 5% (ALT 63-7771 1/2W 10%) 680 OHM 5% (ALT 63-7778 1/2W 10%)	CR201 CR202 CR203	103-23-01 103-90 103-90	GERMANIUM DIODE GERMANIUM DIODES (MATCHED PAIR)
R202 R203	638-9921-68 638-9921-68 638-9921-64	680 OHM 5% (ALT 83-7778 1/2W 10%) 270 OHM 5% (ALT 83-7781 1/2W 10%) 470 OHM 5% (ALT 83-7781 1/2W 10%) 3.3K OHM 5% (ALT 83-7805 1/2W 10%) 3.0K OHM 5% (ALT 83-7807 1/2W 10%) 470 OHM 5% (ALT 83-7871 1/2W 10%) 1K OHM 5% (ALT 83-7771 1/2W 10%) 1K OHM 5% (ALT 83-7771 1/2W 10%) 2.2K OHM 1/2W 470 OHM 5% (ALT 83-7771 1/2W 10%)	CR204 CR205	103-23-01	GERMANIUM DIODE GERMANIUM DIODE
R204 R205 R206 R207	63=-9921-96 63=-9921-64	3.3K OHM 5% (ALT 63-7806 1/2W 10%) 10K OHM 5% (ALT 63-7827 1/2W 10%) 470 OHM 5% (ALT 63-7771 1/2W 10%)	CR206 CR401	103-23-01	GERMANIUM DIODE SILICON DIODE
R207 R208 R209	638-9921-72 638-1799 638-9921-64	1K OHM 5% (ALT 63-7785 1/2W 10%) 2.2K OHM 1/2W	CR451	103-222-01	SILICON DIODE
R210	638-9921-72 638-1775	1K OHM 5% (ALT 63-10183-72 1/4W 10%)	CRXS01 CRXS02 CRXS03	212.76 212.78 103.96	SILICON RECTIFIER SILICON RECTIFIER DIDDE (ZENER)
R212 R213 R214	638-9921-64	470 OHM 5% (ALT 63-7772 1/2W 20%)	1		Oldoe (Zenes)
R214 R215 R216	638-9921-68 638-9921-88 638-9921-88	880 OHM 5% (ALT 63-7778 1/2 W 10%) 4700 OHM 5% (ALT 63-7813 1/2W 10%) 4700 OHM 5% (ALT 63-7813 1/2W 10%) 2.2K OHM 5% (ALT 63-7899 1/2W 10%) 100K OHM 5% (ALT 63-7898 1/2W 10%)	IC-301	221-79-01 or 221-65	MONOLITHIC MULTIPLEX DEMODULATOR (SEE C306)
R217 R218 R219	638-9921-88 638-9921-80 638-9922-20	2.2K OHM 5% (ALT 63-7799 1/2W 10%) 100K OHM 5% (ALT 63-7869 1/2W 10%)	D\$301	100-611	STEREO INDCATOR LIGHT
R219 R220 R221 R223	63=-9922-04 63=-9921-94 63=-1827 63=-1890	22K UMM D% (ALT 93-7041 1/211 10%)	D60600 D60600 D60600	100 604 100-633	FM DIAL LIGHT METER LIGHT
R223 R224 R225	63=-1890 63=-9921-64 63=-9921-80	8.2K OHM 5% (ALT 63-7824 1/2W 10%) IOK OHM 1/2W 330K OHM 1/2W 330K OHM 1/2W 330K OHM 1/2W 32K OHM 5% (ALT 63-7772 1/2W 10%) 2.2K OHM 5% (ALT 63-7758 1/2W 10%) 47K OHM 5% (ALT 63-7585 1/2W 10%) 50K OHM 5% (ALT 63-7583 1/2W 10%) 50K OHM 5% (ALT 63-7583 1/2W 10%) 50K OHM 10% (ALT 63-7822 1/2W 10%) 1.8 MEG OHM 10% (ALT 63-7822 1/2W 10%)	0600903 060604 060608	100-604 100-633 100-633 100-604 100-633	FM DIAL LIGHT METER LIGHT POINTER LIGHT AND DIAL LIGHT PILOT LIGHT
R227 R228 R229	63=-9922-12 63=-9922-10 63=-9922-22	47K OHM 5% (ALT 63-7855 1/2W 10%) 39K OHM 5% (ALT 63-7852 1/2W 10%)	PC	204-533	PRINTED CIRCUIT SCARD
R229 R230 R231	63=-9922-22 63=-1897 63=-9924-50	120K OHM 5% (ALT 63-7873 1/2W 10%) 470K OHM 1/2W 1.8 MEG OHM 10% (ALT 63-7822	FX501 FX502	136-117-17 139-114-20	75 AMP SLO-BLO-FUSE
R232 R233	63=-9922-32 63=-9250	330K OHM 5% (ALT 63-7890 1/2W 10%)	MI	122-72	TUNING METER
R234 R235	63-9922-00 63-9921-98	2K OHM METER CONTROL 15K OHM 5% (ALT 63-7834 1/2W 10%) 12K OHM 5% (ALT 63-7831 1/2W 10%)	İ		(4970D2)









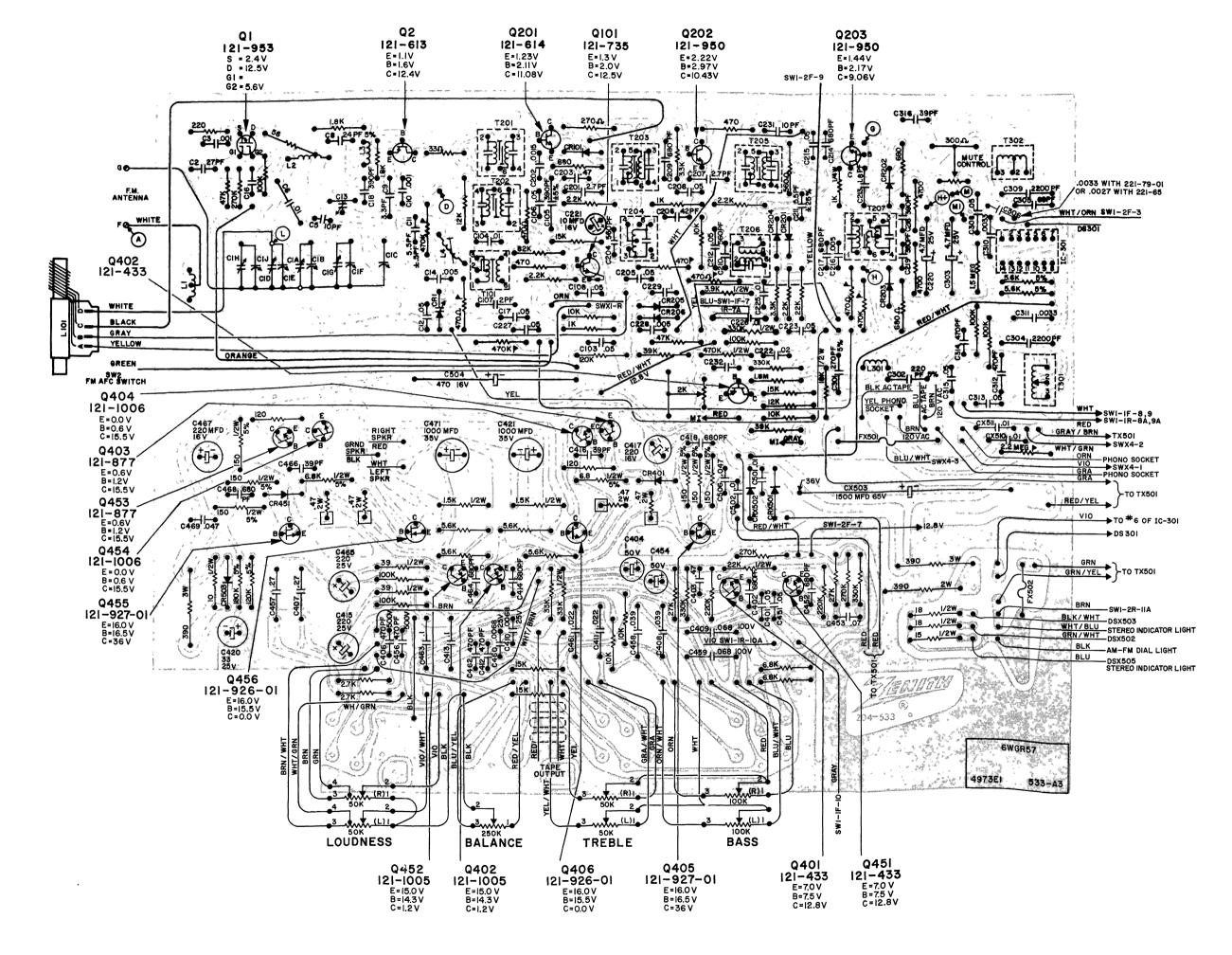
38 KHZ TANK END 38 KHZ 13V P/P

PIN 1 19 KHZ 1.2V P/P

PIN 10 38 KHZ PULSES 80MV P/P

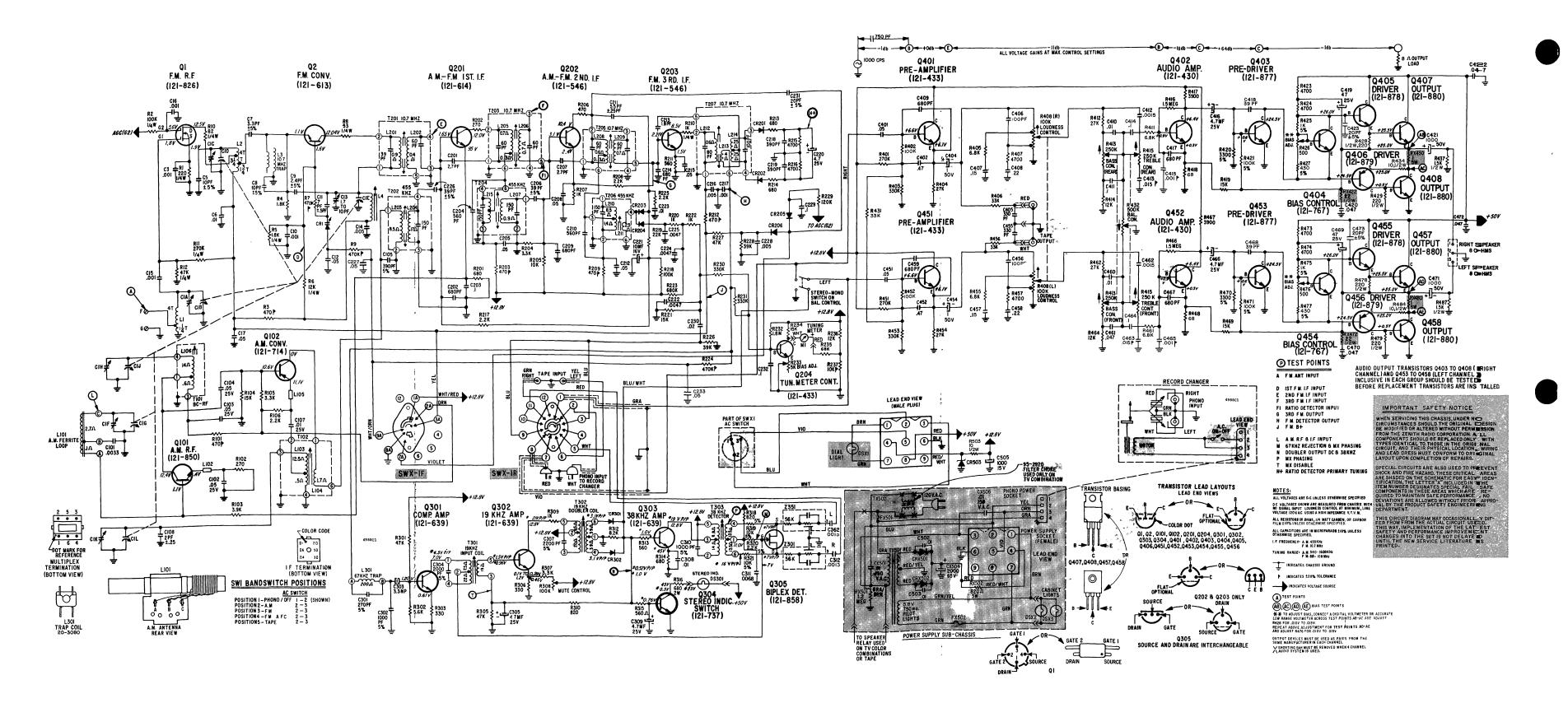
PIN 13 38 KHZ 1.4 V P/P

ITEM NO.	PART NUMBER	CHASSIS LEG	ITEM NO.	PART NUMBER	DESCRIPTION
11A 11B 11C	I I I	FM DETECTOR TRIMMER FM DETECTOR TUNING	.R230 R231	63-1897 63-9924-50	470K OHM 1/2W 1.8 MEG OHM 10% (ALT 63-7922 1/2W 10%)
CIE	\ \ <u>\</u>	FM DETECTOR TUNING FM SCILLATOR TUNING AM ANTENNA TRIMMER AM ANTENNA TRIMMER AM COSCILLATOR TUNING AM SCILLATOR TUNING FM ANTENNA TRIMMER FM ANTENNA TRIMMER FM ANTENNA TRIMMER FM ANTENNA TRIMMER TM SCILLATOR TUNING 27 P	R232 R233	63-9922-32 63-9250	330K OHM 5% (ALT 63-7890 (1/2W 10
1F (	22-7134	AM COSCILLATOR TUNING AM COSCILLATOR TRIMMER	R234 R235 R236	63-9922-00 63-9921-98	15K OHM 5% (ALT 63-7834 1/2W 10%) 12K OHM 5% (ALT 63-7831 1/2W 10%) 10K OHM 5% (ALT 63-7827 1/2W 10%) 39K OHM 5% (ALT 63-7852 1/2W 10%)
ij)	22-2396	FM ANTENNA TUNING 27 PF DISC 500V	R237	63-9921-96 63-9922-10	
	22-2729 22-3675 22-3393	10 P DISC ±5% 500V	R301 R302 R303	63-1838 63-8328 63-9924-48	18K OHM 1/2W 300 OHM MUTE CONTROL 1.5 MEG OHM 5% (ALT 63.7918 1/2W
	22-3541 22-2515 22-5879	3.3 P F GIMANICK ±5% 500V 24 PF DISC ±5% 500V 3.3 P F DISC ± 25 PF 25V .001 MSWFD DISC 25V	R304 RX305 R306	63-1458 63-10430-86 63-9921-90	
	22-2729 22-5878	.001 MSWIFD DISC 25V	R307 R308 R309	63-9921-90 63-9922-20 63-9922-20	390 QHM 1W 5.6K OHM ±5% (ALT 63-7818 1/2W 5% 5.6K OHM ±5% (ALT 63-7816 1/2W 5% 100K OHM 5% (ALT 63-7869 1/2W 10% 100K OHM 5% (ALT 63-7869 1/2W 10%
	22-3034 22-4855 22-3080	.05 NOTE FO DISC 25V  1.7 TO 10 PF CERAMIC TRIMMER  .005 ■MFD DISC 25V  .001 MFD DISC 25V  .05 NoTFD DISC 25V	R401	63-9922-30	270K OHM 5% IALT 63-7887 1/2W 109
	22-3060 22-2729 22-3034 22-3177	.001 MFD DISC 25V .05 MMFD DISC 25V 390 PMF DISC 500V	R402 R403 R404	63-1841 63-9922-28 63-9922-32	22K OHM 220K OHM 5% (ALT 63-7883 1/2W 109 330K OHM 5% (ALT 63-7890 1/2W 109 27K OHM 5% (ALT 63-7845 1/2W 10% 33K OHM
	22-3034 22-3393	.05 N-1FD DISC 25V .01 N-1FD DISC 25V 390 FP £ ±5% POLYSTYRENE 125V	R405 R406	63-9922-06 63-1848 63-9921-82	27K OHM 5% (ALT 63-7845 1/2W 10% 33K OHM 2.7K OHM 5% (ALT 63-7803 1/2W 10%
	22-5972	390 PF ±5% POLYSTYRENE 125V .05 M FD DISC 25V 2 PF N4700 ± .25PF 600V	R407 R408R R408L	63-10189-01	50K DUAL LOUDNESS CONTROL
	22-4819 22-3034	.05 NTFD DISC 25V	R409 R410R R410L R411	63-9921-96 63-9982-01	10K OHM 5% (ALT 63-7627 1/2W 10% 100K DUAL BASS CONTROL
	22-3310 22-5483 22-5487	2.7 P ■ GIMMICK ±10% 500V .001 ➡ MFD DISC 500V .47 M⊒ FD DISC 3V 560 ➡ F DISC 500V	R411 R412R R412L	63-9921-92 63-8983-01	6.8K OHM 5% (ALT 63-7820 1/2W 10% 50K DUAL TREBLE CONTROL
	22-5481	.05 M20 FD DISC 25V	R413 R414	63-9922-00 63-8961-01 63-9921-90	15K OHM 5% (ALT 63-7834 1/2W 10% 250K BALANCE CONTROL 5.6K OHM 5% (ALT 63-7817 1/2W 10% 39 OHM
	22-3791 22-3310 22-3034	42 PF DISC ±5% 500V 2.7 P #F GIMMICK ±10% 500V .05 M ## FD DISC 25V	R415 R416 R417	63-1726 63-9921-90	5.6K OHM 5% (ALT 63-7817 1/2W 10%   39 OHM   5.6K OHM 5% (ALT 63-7817 1/2W 10%
	22-5482 22-5481 22-3770	680 F=F DISC 500V 560 F=F DISC 500V 5.5 P = DISC +.25 PF 500V	RX418 R419	63-9946-52 63-1749	39 OHM 5% (ALT 63-7817 1/2W 10% 150.0HM 5% (ALT 63-7817 1/2W 10% 150.0HM 5% 7/2W (ALT 63-749 1/2W 150.0HM 5% 1/2W (ALT 63-749 1/2W 6.8 OHM 5% 1/2W (ALT 63-7968 1/2W 47 OHM 2W 47 OHM 2W 47 OHM 2W 47 OHM 2W 47 OHM 5% (ALT 63-7868 1/2W 47 OHM 2W 47 OHM 5% (ALT 63-7868 1/2W 47 OHM 2W 47 OHM 5% (ALT 63-7868 1/2W 47 OHM 2W 47 OHM 5% (ALT 63-7868 1/2W 47 OHM 5% (ALT 63-788) (ALT 63-788) (ALT 63-788
	22-3034 22-2428 22-5482	2.7 P J= GIMMICK ±10% 500V  05 N=29 FD 105C ±5V  600 F= F D18C ±50V  600 F= F D18C ±50V  05 N=20 FD 19C ±5V F500V  05 N=20 FD 19C ±5V  880 F= F D18C ±50V  680 F= F D18C ±50V	R421 RX422 RX423	63-9946-20 63-9784 63-9784 63-9922-20 63-9922-26	6.8 OHM 5% 1/ZW (ALT 63-7968 1/2W 347 OHM ZW
	22-3034	.05 Nam FD DISC 25V .005 SMFD DISC 25V	R424 R425	63-9922-26 63-9922-26	100K OHM 5% (ALT 63-7869 1/2W 103 180K OHM 5% (ALT 63-7869 1/2W 57 120K OHM 5% (ALT 63-7872 1/2W 57 120 OHM 5% (ALT 63-7747 1/2W 10%)
	22-5482 22-3177 22-3177 22-7142-03	.005 #WFD DISC 25V .005 #WFD DISC 25V .005 #WFD DISC 50DV .005 #WFD DISC 50DV .005 #WFD DISC 50DV .005 #WFD DISC 50DV	R426 R427 R428	63-9922-22 63-9921-50 63-9946-76	
	22-7142-03 22-7151-04 22-3362		R430 R432	63-1757 63-10135	220 OHM 11 OHM 5W
	22-3034 22-3033	10 M = D ELECTROLYTIC 16V 560 = F DISC 500V .05 N/# FD DISC 25V	R451 R453 R454	63-9922-30 63-9922-28 63-9922-32	220K OHM 5% (ALT 63-7883 1/2W 103
	22-3393 22-3034 22-3080	.01 MB FD DISC 25V .05 MB FD DISC 25V .005 BMFD DISC 25V	R455	63-9922-06	330K OHM 5% (ALT 63-7890 1/2W 10%) 27K OHM 5% (ALT 63-7845 1/2W 10%) 33K OHM 5% (ALT 63-7848 1/2W 10%)
	22-3652 22-3675 22-3652	0.05 #WFD DISC 25V  1 MF= D DISC .10V  10 PF= DISC ±5% 500V  1 MF= D DISC 10V	R457 R459 R461	63-9921-96 63-9921-96 63-9921-92	2.7K OHM 5% (ALT 63-7803 1/2W 10% 10K OHM 5% (ALT 63-7827 1/2W 10% 6.8K OHM 5% (ALT 63-7820 1/2W 10%
	22-5780 22-2976		R463 R465	63-9922-00	330K OHM 5% (ALT 63-7890 1/2W 103 27K OHM 5% (ALT 63-7846 1/2W 10%, 33K OHM 5% (ALT 63-7846 1/2W 10%, 27K OHM 5% (ALT 63-7820 1/2W 10% 10K OHM 5% (ALT 63-7827 1/2W 10%, 6.8K OHM 5% (ALT 63-7820 1/2W 10%, 15K OHM 5% (ALT 63-7834 1/2W 10%, 5.6K OHM 5% (ALT 63-7834 1/2W 10%, 5.6K OHM 5% (ALT 63-7817 1/2W 10%, 39 OHM
	22-7142-03	270 P→ F POLYSTYRENE ±5% 500V 220 P→ F DISC N750 ±5% 500V 4.7 M ■ FO ELECTROLYTIC 25V 2200 PF POLYSTYRENE ±5% 500V 63 P F→ DISC 500V .003. MFD DISC 500V (USED WITH	R466 R467 RX468 R469	63-1726 63-9921-90 63-9946-52 63-9946-52	39 OHM 5% (ALT 63-7817 1/2W 10% 156 OHM 5% (ALT 63-7817 1/2W 10% 159 OHM 5% 1/2W (ALT 63-7749 1/2W 150 OHM 5% 1/2W (ALT 63-7749 1/2W 6.8 OHM 5% 1/2W (ALT 63-7749 1/2W 6.8 OHM 5% 1/2W 4.7 OHM 2W 4.7 OHM 2W 4.7 OHM 2W
	22-3608 22-13	63 P ☐ DISC 500V .0033⊆ MFD DISC 500V (USED WITH 22 1-79-01)	R470	63-9946-52 63-9946-52 63-4535	150 OHM ±5% 1/2W (ALT 63-7749 1/2W 150 OHM ±5% 1/2W (ALT 63-7749 1/2W 6.8 OHM +5% 1/2W
	or 22-7191	.0027 MFD DISC 500V (USED WITH 22 1-65)	RX472 BX473	63-9784 63-9784	47 OHM ZW 47 OHM ZW
	22-3034 22-5782	22 1-93) 05 MB FD DISC 25V 2200 PF POLYSTYRENE ±5% 500V 0033= MFD DISC 500V 0033= MFD DISC 500V	R474 R477 R478	63-9922-20 63-9921-50 63-9946-76	100K OHM 5% (ALT 63-7869 1/2W 109 120 OHM 5% (ALT 63-7747 1/2W 10%) 1500 OHM ±5% (ALT 63-7793 1/2W 20 220 OHM 1/2W
	22-5782 22-13 22-13 22-16	.0033= MFD DISC 500V 470 P F DISC 500V	R480 RX501	63-1757 63-10430-86 63-9946-24	CALL THOMAS AND AND AND AND AND AND AND AND AND AND
	22-3034 22-16 22-3034	.003 NP F DISC 500V .95 NM FD DISC 25V 470 PF F DISC 500V 05 NM FD DISC 25V 39 PF +5% DISC 500V	R502 RX506	63-9946-24 63-10525-01	10 OHM 5% 1/2W (ALT: 63-7701 1/2W 10%)
	22-3381	39 PF= +5% DISC 500V	RX507	63-9946-28	15 OHM 5% 1/2W (ALT. 63-7708 1/2W 10%)
	22-2939	39 PT - 59, UISC 500V  50 M* FD DISC 500V  600 PF FD ISC 500V  47 M* FD DISC 500V  47 M* FD DISC 500V  47 M* FD DISC 500V  47 M* FD MYLAR 50V  039 INAFD MYLAR 50V  030 INAFD MYLAR 50V  030 INAFD MYLAR 50V  030 INAFD MYLAR 50V  000 INAFD INAFD MYLAR 50V  000 INAFD INAFD MYLAR 50V  000 INAFD INAFD MYLAR 50V  000 INAFD INAFD MYLAR 50V  000 INAFD INAFD MYLAR 50V  000 INAFD INAFD MYLAR 50V  000 INAFD INAFD MYLAR 50V  000 INAFD INAFD MYLAR 50V  000 INAFD INAFD MYLAR 50V  000 INAFD INAFD MYLAR 50V  000 INAFD INAFD MYLAR 50V  000 INAFD	BX509	63-1712 63-1712 20-3664	18 OHM
	22-7153 22-16 22-5964	470 P F DISC 500V 27 M FD MYLAR 50V	L1 L2 L3	20-3665	FM RF COIL TRAP COIL 10.7 MHz FM OSCILLATOR COIL
	22-7202 22-5722 22-3415 22-5814	.068 MFD DISC 25V	L4 L101	20-3597 S-93292-01	AM ANTENNA ASSEMBLY
	22-16	.022   NFD MYLAR 20% 100V   470   P   F DISC 500V   1 M   D MYLAR 10% 50V	L102 L103 L104	149-311 IN T101 IN T101	FERRITE CORE SLEEVE AM OSCILLATOR TRANS, PRI, AM OSCILLATOR TRANS, SEC
	22-2939	680 P ≠ OISC 500V 220 M→ FD ELECTROLYTIC 25V 39 PF DISC +5% 500V	L201	IN T201	
	72-3381 22-7151-9 22-2939 22-7152-6 22-7154-12	220 MW FD ELECTROLYTIC 16V 680 PWF DISC 500V	L202 L203 L204	IN T202 IN T202	1ST IF TRANSFORMER 10.7 MHz PRI 1ST IF TRANSFORMER 10.7 MHz SEC 1ST IF AM 455 KHz PRI 1ST IF 455 KHz SEC
	22-7154-12	1000 PMFD ELECTROLYTIC 35V	L205 L206 L207	IN T203 IN T203 IN T204	2ND IF TRANSFORMER 10.7 MHz PRI 2ND IF TRANSFORMER 10.7 MHz SEC 2ND IF AM 455 KHz
	22-3034 22-2939 22-5487	.00 NI - D DIOC 25V	L208 L209 L210	IN T205 IN T205 IN T206	3RD IF TRANSFORMER 10.7 MHz PRI 3RD IF TRANSFORMER 10.7 MHz SEC 3RD IF AM 455 KHz PRI. 3RD IF AM 455 KHz SEC.
	22-7153	580 P = DISC 500V  47 M = D DISC 3V  1 M F : D ELECTROLYTIC 50V  470 P = DISC 50V  27 M = D MYLAR 50V  .039 M = TO MYLAR 50V  .058 M = TO MYLAR 100V  .058 M = TO MYLAR 100V	L211 L212	IN T206 IN T207	3RD IF AM 455 KHz SEC. RATIO DETECTOR TRANS. 10,7 MHz PRI.
	22-5964 22-7202 22-5722 22-3415	.039 M FD MYLAR 50V .068 M FD MYLAR 100V	L213	IN T207	RATIO DETECTOR TRANS. 10,7 MHz TERTIARY
	22-5814 22-16	.0058 MFD DISC 25V .022 N-7FD MYLAR 20% 100V 470 PF DISC 25V	L214	IN T207	RATIO DETECTOR TRANS. 10.7 MHz SEC.
	22-6905 22-2939 22-7152-9	1 MF MYLAR 10% 50V 680 PF DISC 500V 220 M FD ELECTROLYTIC 25V 39 PF DISC ±5% 500V	L301 T101	20-3080 95-3077	67 KHz TRAP AM OSCILLATOR TRANSFORMER
	22-3381 22-7151-9 22-2939	39 PF DISC ±5% 500V 220 M FD ELECTROLYTIC 16V 680 PF DISC 500V .047 M21YLAR ±20% 100V	T201 T202	95-2548 95-2541	FM 1ST TRANSFORMER 10.7 MHz AM 1ST IF AM 455 KHz FM 2ND IF TRANSFORMER 10.7 MHz
	22-7326 22-7154-12	1000 PENTED ELECTROLYTIC 35V	T203 T204	95-2547	FM 2ND IF TRANSFORMER 10.7 MHz AM 2ND IF AM 455 KHz
	22-4617 22-4617	01 M D DISC 500V 01 M D DISC 500V	T205 T206 T207	95-2548 95-2689 95-2545	AM 2ND IF AM 455 KHz FM 3RD IF TRANSFORMER 10.7 MHz AM 3RD IF AM 455 KHz FM RATIO DETECTOR 10.7 MHz
ا	22-7113 22-7141-11 22-7326 22-6005	470 M SFO ELECTROLYTIC 18V 470 M SFO ELECTROLYTIC 18V 047 M FFO MYLAR +20% 100V	T301 T302	95-3021 95-3023	INPUT COIL 19 KHz DETECTOR COIL 38 KHz
ni.	63-9921-56	DI MEED DISC 500V 91 MEED DISC 500V 91 MEED DISC 500V 101 MEED DISC 500V 470 MEED ELECTROLYTIC 55V 470 MEED ELECTROLYTIC 16V 091 MEED DISC 500 VAC 01 MEED DISC 500 VAC 220 OPEM 5% (ALT 63-10183 1/2V 10%)	TX501 SW1	95-3174 85-1441	POWER TRANSFORMER
	63-9922-20 63-9921-64 63-9921-78	100K C→HM 5% (ALT 63-10168-/20 1/4W 10%) 470 O H→HM 5% (ALT 63-7772 1/2 W 20%) 1.8K C→HM 5% (ALT 63-7798 1/2W 10%) 1.8K C→HM 1/2W	SW2 SW3	85-1372-01 85-1372-01	AFC SWITCH (SLIDE SP-DT)
	63-4196 63-9921-98	1.8K C3 HM 1/2W 12K O =HM 5% (ALT 63-7831 1/2W 10%) 470K C3 HM 5% (ALT 63-7898 1/2W 20%)	SWX4	78-2137-01	MATRIX SWITCH (SLIDE SPOTI PUSH PUSH FOWER SWITCH STEREO HEADPHONE JACK
	63-4122 63-9922-36 63-4133 63-9922-30	33 OH (M) 1/2W 470K (D) HM 5% (ALT 63.7808 1/2W 20%)	CR1	103-47 OR	AFC DIODE
	63-4133 63-9922-30 63-9922-12	56 OH MM 1/4W 270K CHM 5% (ALT 63-10184-30 1/4W 10%) 47K O MHM 5% (ALT 63-10184-12 1/4W 10%)	CR101	103-189	SILICON DIODE
	63-9922-00 63-9922-18	15K O #HM 5% (ALT 63-7834 1/2W 10%) 82K O #HM 5% (ALT 63-7866 1/2W 10%) 10K O #HM 5% (ALT 63-7856 1/2W 10%) 1K O HF M 5% (ALT 63-7785 1/2W 10%)	CB201	103-23-01	GERMANIUM DIODE
	63-9921-96 63-9921-72 63-9921-80	10K O = 1M 5% (ALT 63-7827 1/2W 10%) 1K O = M 5% (ALT 63-785 1/2W 10%) 2.2K O = HM 5% (ALT 63-7785 1/2W 10%)	CR202 CR203 CR204	103-90 103-90 103-23-01	GERMANIUM DIODES (MATCHED PAI GERMANIUM DIODE
	63-9921-80 63-1771 63-9921-64	2.2K Cas HM 5% (ALT 63-7799 1/2W 10%) 470 OH-IN 1/2W 470 OH-IM 5% (ALT 83-7771 1/2W 10%)	CR205 CR206	103-23-01	GERMANIUM DIODE GERMANIUM DIODE
	63-9921-68 63-9921-58		CR401	103-222-01	SILICON DIODE SILICON DIODE
	63-9921-64 63-9921-84 63-9921-96	680 O → M 5% IALT 83-7778 1/2W 10%) 270 O → M 5% IALT 83-7761 1/2W 10%) 470 O → M 5% IALT 83-7761 1/2W 20%) 3.3K O → HM 5% IALT 83-7806 1/2W 10%) 10K O → HM 5% IALT 83-7806 1/2W 10%) 470 O → M 5% IALT 83-7827 1/2W 10%) 470 O → M 5% IALT 83-7781 1/2W 10%)	CRUSE) CRUSE2	212 70	
	63-9921-64	470 OH M 5% (ALT 63-7771 1/2W 10%) 1K OH M 5% (ALT 63-7785 1/2W 10%) 2.2K OHM 1/2W	CR503	212-76 103-96	SILICON RECTIFIER SILICON RECTIFIER DIODE (ZENER)
	63-1799 63-9921-64 63-9921-72	470 OI-1M 5% (ALT 63-7772 1/2W 20%)	I.C301	221-79-01 OR 221-65	MONOLITHIC MULTIPLEX DEMODULATOR (SEE C306)
	63-9921-64 63-9921-68	18. OH - M 5% (ALT 63-10183-72 1/2W 10%) 550 OH-MN 1/4W 470 OH-HN +5% (ALT 63-7772 1/2W 20%) 680 OH-M 5% (ALT 63-7778 1/2W 10%) 680 OH-M 5% (ALT 63-7778 1/2W 10%) 4700 OB-HN 5% (ALT 63-7813 1/2W 10%) 4700 OB-HN 5% (ALT 63-7813 1/2W 10%) 4700 OB-HN 5% (ALT 63-7813 1/2W 10%) 4700 OB-HN 5% (ALT 63-7813 1/2W 10%)	DS301	100-611	STEREO INDICATOR LIGHT
	63-9921-88	4700 CD-HM 5% (ALT 63-7813 1/2W 10%)	DSX501 DSX502	100-604 100-633	FM DIAL LIGHT METER LIGHT
	03-3321-00	4700 C-71W 0 / (ALT 03-7613 1/2W 10/6)	D6X503	100-633	POINTER LIGHT



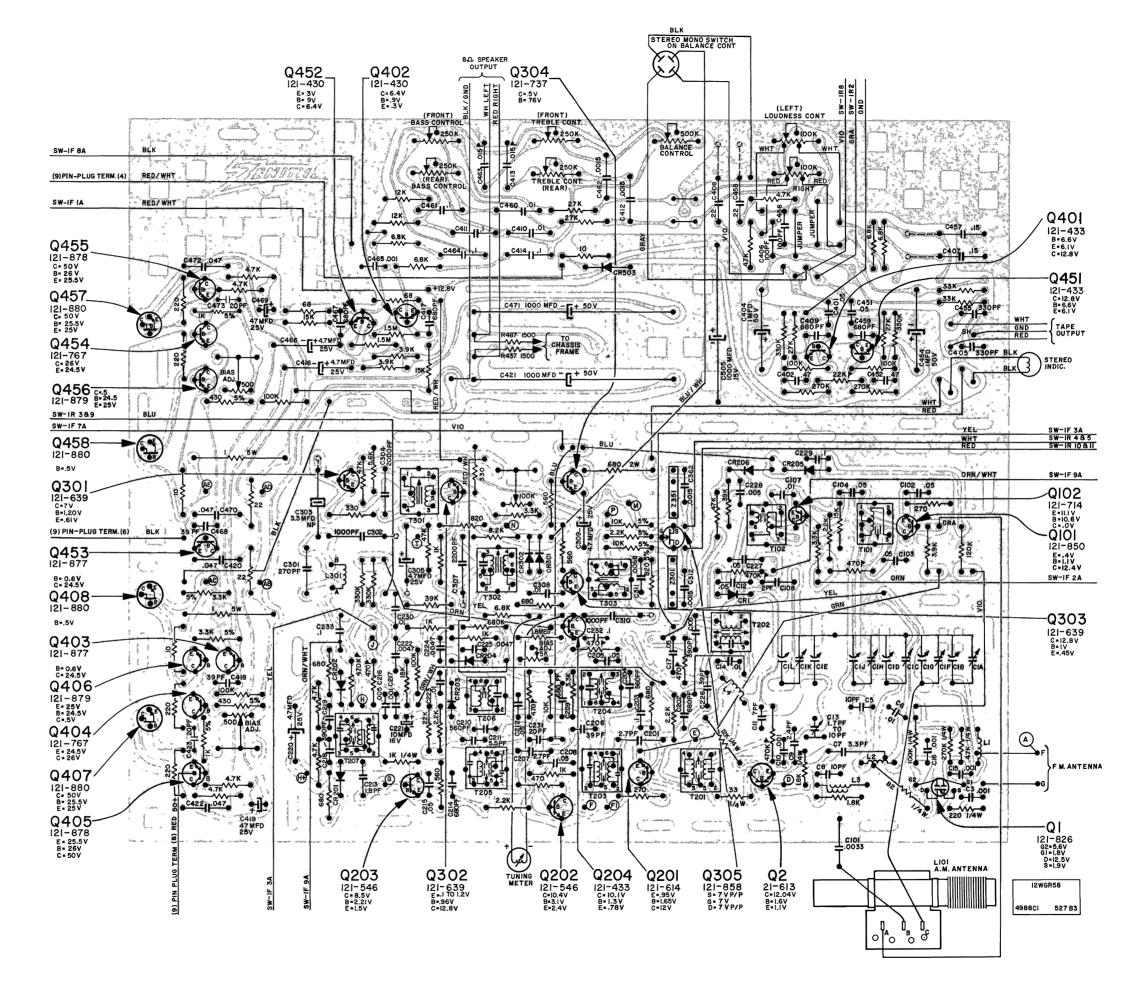
PC 204-633 PRINTED CITICUTT BOARI
PX501 138-114-20 2 AMP REGULAR FUSE
M1 122-72 TUNING METER

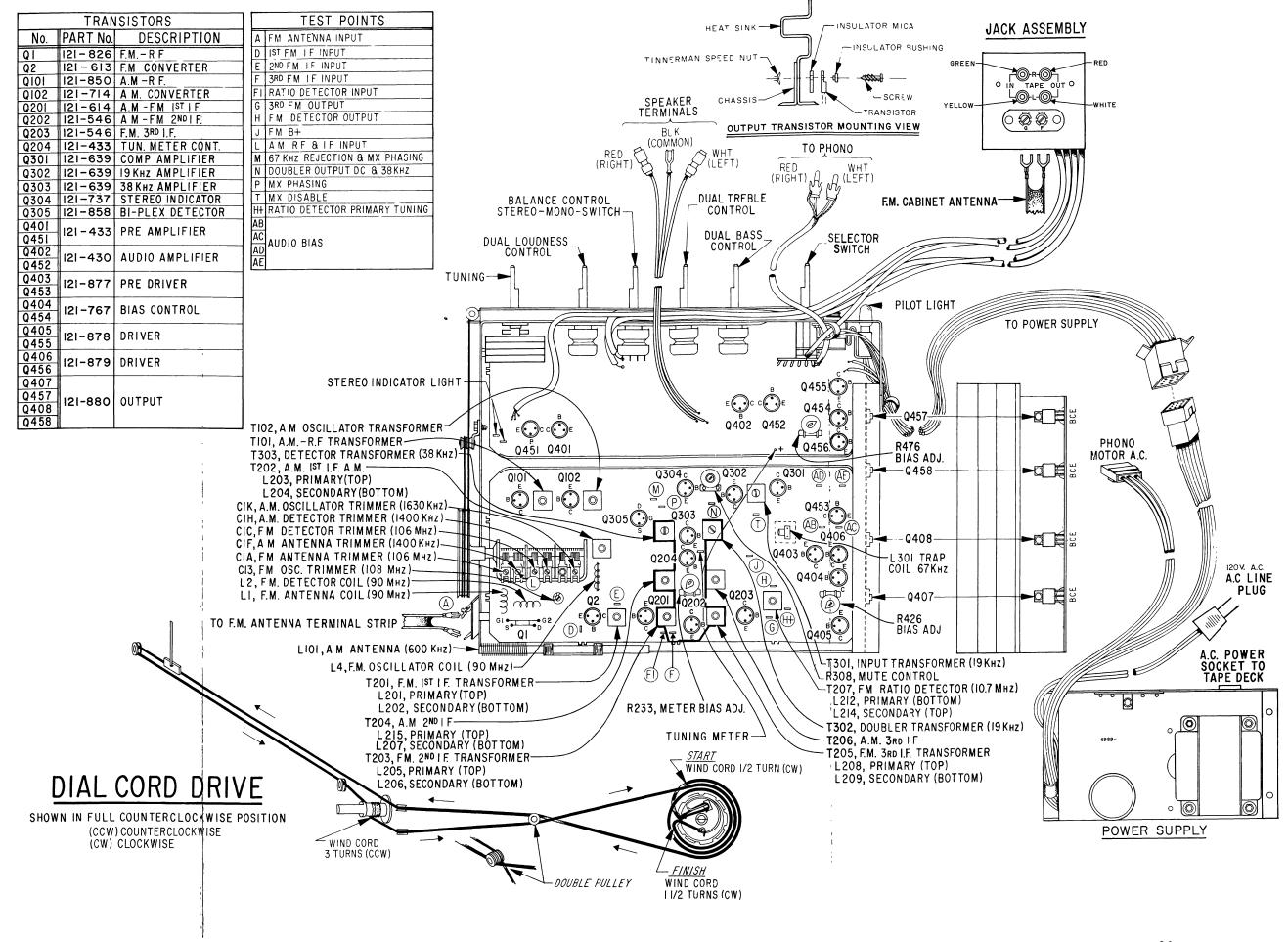
PRINTED CIRCUIT BOARD



#### **LEGEND CHASSIS 12WGR58**

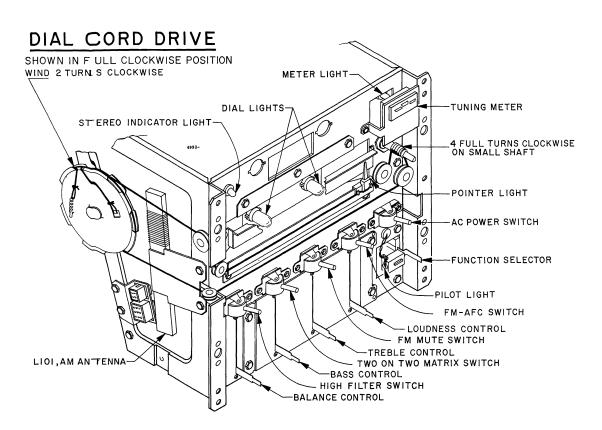
		LEGEND CHAS	515	12W	GR58
ITEM NO.	PART NUMBER	DESCRIPTION	ITEM NO.	PART NUMBER	DESCRIPTION
C1A \	HOMBEN	EM A. NT TRIMMER	R230		330K OHM 5% (ALT 63-7890 10% 1/2W)
C1B	1 (1	FM A_ NT TUNING	R231	63-9922-32	330K OHM 5% (ALT 63-7890 10% 1/2W) 330K OHM 5% (ALT 63-7890 10% 1/2W)
C1C C1D	I 11	FM A_ NT TRIMMER FM A_ NT TUNING FM D= ETECTOR TRIMMER FM D= ETECTOR TUNING	R232 R233	63-9924-50 63-8708	1,8M OHM 5% (ALT 63-7922 10% 1/2W) 5K BIAS ADJUST
CIE	22-6752	FM D— ETECTOR TUNING FM D—SCILLATOR TUNING AM A_NT TRIMMER AM A_NT TUNING AM DEFECTOR TRIMMER AM DEFECTOR TRIMMER AM DESCILLATOR TRIMMER AM OSCILLATOR TUNING .001 PMFD DISC 25% 10 PFF DISC 25% 5000	R234 R235	63-9922 63-9922-16	5K BIAS ADJUST 15K OHM 5% (ALT 63-7834 10% 1/2W) 68K OHM 5% (ALT 63-7862 10% 1/2W) 12K OHM 5% (ALT 63-7831 10% 1/2W) 10K OHM 5% (ALT 63-7828 20% 1/2W)
C1G (		AM A-NT TUNING	R236 R237	63-9921-98 63-9921-96	12K OHM 5% (ALT 63-7831 10% 1/2W)
C1J C1K	] []	AM DETECTOR TUNING	ì		
C1K /	\	AM CIPSCILLATOR TRIMMER AM CIPSCILLATOR TUNING	R301 R302	63-9922-12 63-9921-90	47K OHM 5% (ALT 63-7855 10% 1/2W) 5.6K OHM 5% (ALT 63-7817 10% 1/2W)
C3 C5	22-2729	.001 TMF0 DISC 25V	R303 R304	63-9921-60	330 OHM 5% (ALT 63-7764 10% 1/2W)
C6	22-3393	.01 Mm FD DISC 25V	R305	63-9922-12	47K OHM 5% (ALT 63-7855 10% 1/2W) 330 OHM 5% (ALT 63-7764 10% 1/2W) 3.3K OHM 5% (ALT 63-7806 10% 1/2W) 100K MUTE CONTROL
C7 C8	22-3675	10 PF DISC ±5% 500V	R306 R307	63-9921-60 63-9921-84	330 OHM 5% (ALT 63-7764 10% 1/2W) 3.3K OHM 5% (ALT 63-7806 10% 1/2W)
C9	22-6469 22-2729	.01 NW FD DISC 25V 10 PF GIMMICK ±5% 500V 10 PF DISC ±5% 500V .001 F AFD DISC 25V	R308 R309	63-6495 63-9921-72	100K MUTE CONTROL
C11 C12	22-6344 22-3034	AF AG. ED DIEC 3EV	R310	63-9921-70	1K OHM 5% (ALT 63-7785 10% 1/2W) 820 OHM 5% (ALT 63-7782 10% 1/2W)
C13	22.4966	1.7 TEC 10 PF CERAMIC TRIMMER	R311 R312	63-9921-94	8.2K OHM 5% (ALT 63-7824 10% 1/2W)
	22-3080 22-2729 22-2729	107 TeO 10 PF CERAMIC TRIMMER 005 PMFD DISC 25V 001 PMFD DISC 25V 001 PMFD DISC 25V	R313 R314	63-9921-66	660 OHM 5% (ALT 63-7775 10% 1/2W)
C15 C16 C17	22-2729 22-3034	.001 FMFD DISC 25V	R315 R316	63-9921-68 63-9921-66 63-5663	560 OHM 5% (ALT 63-7775 10% 1/2W) 680 OHM 5% (ALT 63-7778 10% 1/2W) 560 OHM 5% (ALT 63-7775 10% 1/2W)
1	l 1		R316 R317 R318	1	680 OHM 10% 2W
C101 C102	22-13 22-3034	.0033== MFD DISC ±10% 500V .05 M	R318 R319	63-9921-70 63-9921-96	820 OHM 5% (ALT 63-7781 5% 1/2W)
C102 C103 C104	22-3034 22-3034	.05 M FD DISC 25V .05 MP FD DISC 25V	R320 R321	63-9921-80 63-9921-96	820 OHM 5% (ALT 63-7781 5% 1/2W) 10K OHM 5% (ALT 63-7826 5% 1/2W) 2.2K OHM 5% (ALT 63-7798 5% 1/2W) 10K OHM 5% (ALT 63-7826 5% 1/2W)
C105	22-5972	.05 ML FD DISC 25V 390 PF FPOLYSTYRENE ±5% 125V .01 ML FD DISC 25V	I	l .	
C107 C108	22-3393	2 PF =±25 PF 500V	R401 R402	63-9922-30 63-9922-20	270K OHM 5% (ALT 63-7887 10% 1/2W) 100K OHM 5% (ALT 63-7869 10% 1/2W) 330K OHM 5% (ALT 63-7890 10% 1/2W)
C201	22-3310	2.7 PFF GIMMICK 500V	R402 R403 R404	63-9922-20 63-9922-32 63-9922-06	330K OHM 5% (ALT 63-7890 10% 1/2W)
C202 C203	22-5482 22-3652	680 P- F DISC 500V	R405	63,9921.92	33K OHM 5% (ALT 63-7845 10% 1/2W) 6.8K OHM 5% (ALT 63-7845 10% 1/2W) 33K OHM 5% (ALT 63-7848 10% 1/2W) 4700 OHM 5% (ALT 63-7848 10% 1/2W)
C204	22-5481	560 P- F DISC 500V .05 M FD DISC 25V	R406 R407	63-9922-08 63-9921-88	33K OHM 5% (ALT 63-7848 10% 1/2W) 4700 OHM 5% (ALT 63-7813 10% 1/2W)
C205 C206	22-3034 22-3381	.05 M FD DISC 25V 39 PF DISC ±5% 500V 2.7 PF GIMMICK 500V	R408R} R408L	63-8967-01	100K DUAL LOUDNESS CONTROL
C207 C208	22-3310 22-3034	2.7 PSF GIMMICK 500V	R411 R412	63-9921-92 63-9922-06	6.8K OHM 5% (ALT 63-7820 10% 1/2W)
C209	22-5482	680 P- F DISC 500V	R413R ( R413L	63-8965-01	27K OHM 5% (ALT 63-7845 10% 1/2W) 250K DUAL BASS CONTROL
C209 C210 C211	22-5481 22-3770	5.5 PE DOSC ±.25 PF 500V	R414	63-9921-98	12K OHM 5% (ALT 63-7831 10% 1/2W)
C212	22-3034 22-2428	2.7 PS— GUMMICK SUUV .05 MS—FD DISC 250V 680 PF FD DISC 500V 560 PF FD DISC 500V 5.5 PSSS 250 PS FD SUUV 1.8 PSSS 250 PS FD SUUV 1.8 PSSS 250 PSS 250 P	R415R ( R415L ) R416	** ***	
G214 G215 G216 G217	22-5482 22-3034	680 P F DISC 500V .05 M FD DISC 25V	R416	63-9924-48	290K DUAL THESEC CONTROL.  1.5 MEG 9K, IALT 53-7318 10% 1/2W) 3900 OHM 5% IALT 53-7310 10% 1/2W) 3900 OHM 5% IALT 53-7310 10% 1/2W) 3.3K OHM 5% IALT 53-735 10% 1/2W) 3.3K OHM 5% IALT 53-736 5% 1/2W) 3.3K OHM 5% IALT 53-786 5% 1/2W) 22*CHM 5% IALT 53-786 5% 1/2W) 22*CHM 5% IALT 53-786 5% 1/2W) 4700 OHM 5K IALT 53-781 5% 1/2W) 4700 OHM 5K IALT 53-781 5% 1/2W) 4700 OHM 5K IALT 53-781 30% 1/2W) 4700 OHM 5K IALT 53-781 30% 1/2W)
C216	22-3080	.005 MFD DISC 25V .001 MFD DISC 25V	R417 R418	63-9921-86 63-9921-44	68 OHM 5% (ALT 63-7810 10% 1/2W)
	22-3177	390 P F DISC 500V 390 P F DISC 500V	R419	63-9922 63-9921-84	15K OHM 5% (ALT 63-7834 10% 1/2W)
C219 C220	22-3177	390 P F DISC 500V 4.7 M FD ELECTROLYTIC 25V	R421	63-9922-20	100K OHM 5% (ALT. 63-7868 5% 1/2W)
C221 C222	22-7142-03 22-7151-04	10 ME D ELECTROLYTIC 16V	RX422 R423	63-9946-32 63-9921-88 63-9921-88	4700 OHM 5% (ALT 63-7813 10% 1/2W)
C222 C223 C224	22-14 22-3393	.0047 MFD 500V .01 M	R424 R425	63-9921-88 63-9921-72 63-9261	4700 OHM 5% (ALT 63-7813 10% 1/2W)
C224	22-14 22-14	.0047 MFD 500V .0047 MFD 500V 39 PF DISC ±5% 500V	R426 R427	63-9261	500 OHM BIAS ADJUST 430 OHM 5% (ALT 63-7769 5% 1/2W)
C225 C226	22-3381	39 PF DISC ±5% 500∨	R428	63-9921-63 63-1757	430 OHM 5% (ALT 63-7769 5% 1/2W)   220 OHM 10% 1/2W
C227 C228	22-3034 22-3080	.05 M FD DISC 25V	R429	63-1757 63-8424	220 OHM 10% 1/2W 220 OHM 10% 1/2W
C229	22-3652 22-5056	1 MF D DISC 10V .02 Mt FO DISC 25V	RX430 R431	63-9922-08	7 OHM 10% SIX 33K OHM 5% (ALT 63-7848 10% 1/2W)
C230 C231	22-3751	102 M PO DISC 25V 20 PF ±5% 500V 1 MF D DISC 10V	R432 R434	63-8966-01 63-9946-24	500K BALANCE CONTROL AND SW 10 OHM 5% 1/2W (ALT 63-7701 10% 1/2W
C232 C233	22-3652 22-3034	1 MF D DISC 10V .05 M FD DISC 25V	R437	63-9946-76	1500 OHM 5% 1/2W (ALT. 63-7792 10% 1/2V
- 1	1 1		R451	63-9922-30 63-9922-20	270K OHM 5% (ALT 63-7887 10% 1/2W)
C301 C302	22-5780 22-5781	270 P F POLYSTYRENE ±5% 500V 1000 PF POLYSTYRENE ±5% 500V	R452 R453	63-9922-20 63-9922-82 63-9922-06	270K OHM 5% (ALT 63-7887 10% 1/2W) 100K OHM 5% (ALT 63-7869 10% 1/2W) 330K OHM 5% (ALT 63-7890 10% 1/2W)
C303 C304	22-6246	1000 PF POLYSTYRENE ±5% 500V 3.3 M FD N.P 15V 2000 PF ±5% POLYSTYRENE 50V	R454 R455	63-9922-06	27K OHM 5% (ALT 63-7845 10% 1/2W)
C305	22-7142-03	4.7 Mt FD ELECTROLYTIC 25V	R456	63-9921-92 63-9922-08	33K OHM 5% (ALT 63-7820 10% 1/2W)
C307 C308	22-5782 22-3393	2200 PF POLYSTYRENE ±5% 500V .01 M FD DISC 25V	R457	63-9921-88	4700 OHM 5% (ALT 63-7813 10% 1/2W)
C309 C310		4.7 M FD ELECTROLYTIC 25V 1000 PF POLYSTYRENE ±5% 500V	R461 R462	63-9921-92 63-9922-06	53K OHM 5% (ALT 63-7848 10% 1/2W) 4700 OHM 5% (ALT 63-7848 10% 1/2W) 6.8K OHM 5% (ALT 63-7813 10% 1/2W) 27K OHM 5% (ALT 63-7845 10% 1/2W) 12K OHM 5% (ALT 63-7845 10% 1/2W)
C311	22-5781 22-3415	.0068= MFD DISC 25V	R464 R465	63-9921-98	12K OHM 5% (ALT 83-7831 10% 1/2W)
C312	22-5483	.0013= WFD D13C 100V	R466 R467	63-9924-48	1.5 MEG SK (ALT 63-7918 10% 1/2W) 390 OHM 5% (ALT 63-7918 10% 1/2W) 18K OHM 5% (ALT 63-793 10% 1/2W) 3.3K OHM 5% (ALT 63-793 10% 1/2W) 3.3K OHM 5% (ALT 63-793 5% 1/2W) 3.3K OHM 5% (ALT 63-793 5% 1/2W) 3.2K OHM 5% (ALT 63-793 5% 1/2W) 3.2K OHM 5% (ALT 63-793 10% 1/2W) 4790 OHM 5% (ALT 63-793 10% 1/2W) 4790 OHM 5% (ALT 63-793 10% 1/2W) 4790 OHM 5% ALT 63-793 10% 1/2W) 500 OHM 518 ALT 63-793 10% 1/2W)
C362 C401	22-5483 22-3034	.0015- MFD DISC 100V .05 M FD DISC 25V .47 M FD DISC 3V 1 MFED ELECTROLYTIC 50V	1 R468	63-9921-86 63-9921-44	68 OHM 5% (ALT 63-7736 10% 1/2W)
C402	22-5487	.47 M FD DISC 3V	R469 R470	63-9922 63-9921-84	15K OHM 5% (ALT 63-7834 10% 1/2W)   3.3K OHM 5% (ALT 63-7806 5% 1/2W)
C404 C405	22-7143 22-3255	1 MFED ELECTROLYTIC 50V	R471	63-9922-20 63-9946-32	100K OHM 5% (ALT 63-7868 5% 1/2W)
C406	22-3383	330 P F DISC 500V 100 P F DISC 100V	RX472 R473	63-9921-88	4700 OHM 5% (ALT 63-7813 10% 1/2W)
C406 C407 C408	22-6134 22-6048	15 M FD MYLAR 100V 22 M FD MYLAR 50V	R474 R475	63-9921-88 63-9921-72	4700 OHM 5% (ALT 63-7813 10% 1/2W)
C409	22-5482 22-5863	22M FUNTAR 30V 680 P F DISC 500V .01 M FD MYLAR 100V 1 MF D MYLAR 100V .0015 MFD DISC 100V	R476	63-9261	500 OHM BIAS ADJUST 430 OHM 5% (ALT 63-7769 5% 1/2W)
C411 C412	22-5862	1 MF ID MYLAR 100V	R477 R478	63-9921-63 63-1757 63-1757	430 OMM 5% (ALT 63-7769 5% 1/2W) 220 OMM 10% 220 OMM 10%
C412 C413 C414	22-5483 22-5233	.0015 MFD DISC 100V .015 MAFD MYLAR ±20% 50V 1 MF ID MYLAR 100V	R479	63-1757	220 OHM 10%
C414	22-5862 22-5688	1 MF ID MYLAR 100V	RX480 R484	63-6424 63-9946-24	TOHM 105, 50 10 OHM 5% 1/2W (ALT 63-7*01 10% 1/2W 1500 OHM 5% 1/2W (ALT, 63-7792 10% 1/2W
C415 C416	22-7142-03	.001 MAIFO DISC ±20% 500V 4.7 M FD ELECTROLYTIC 25V 680 P F DISC 500V	R487	63-9946-76	
C417 C418	22-5482 22-3381	39 PF DISC ±5% 500V 47 MF=D ELECTROLYTIC 25V	RX501 RX502	63-10526-03 63-4684	1.2 MEG 20%
C419 C420	22-7152-07	47 MED ELECTROLYTIC 25V 047 M-4FD MYLAR 100V	R503	63-9946-24	320 OHN 3W 10 OHM 5% 1/2W (ALT 63-7701 10% 1/2W
C421 C422	22-7143-12	.047 M/FD MYLAR 100V 1000 MMFD ELECTROLYTIC 50V .047 M/FD MYLAR 100V	Li I	20-3076	
C422	22-5866	20 PF DISC ±5% 500V	L2 L3	20-3077	FM ANTENNA COIL FM DETECTOR COIL
C451	22-3034	.05 M JED DISC 26V	L4	20-3545	TRAP COIL 10.7 MHz FM OSCILLATOR COIL
C452 C454	22-5487 22-7143	.05 M FD DISC 25V .47 M FD DISC 3V	L101	S-88463	AM ANTENNA COIL ASSEMBLY
C455 C456	22-3265	1 MFC ELECTROLYTIC 50V 330 P MF DISC 500V 100 P MF DISC 100V	L102 L103	149-311 IN T102 IN T102 149-311	FERRITE CORE SLEEVE AM OSCILLATOR TRANS. PRI. AM OSCILLATOR TRANS. SEC. FERRITE CORE SLEEVE
C456 C457	22-3383 22-6134	100 P SEF DISC 100V 15 M SEFD MYLAR 100V	L104	IN T102	AM OSCILLATOR TRANS. SEC.
C457 C458	22-6048	15 M INFO MY LAR 100V 22 M INFO MY LAR 50V 680 P INF DISC 500V .01 M INFO MY LAR 100V 1 MF ID MY LAR 100V	L105 L106	149-311 IN T101	FERRITE CORE SLEEVE BC RF TRANS.
C459 C460	22-5482 22-5863	.01 M 1FD MYLAR 100V	I		
C461 C462	22-5862	1 MF D MYLAR 100V .0015 MFD DISC 100V	1 202	IN T201 IN T201	1ST IF TRANSFORMER 10.7 MHz PRI. 1ST IF TRANSFORMER 10.7 MHz SEC.
C463 C464	22-5233	.015 N=/IFD MYLAR ±20% 50V	L203 L204	IN T202	1ST IF AM 455 KHz PRI. 1ST IF AM 455 KHz SEC.
C485	22-5862 22-5688	1 MF €D MYLAR 100V .001 N-JFD DISC ±20% 500V	L205 L206	IN T202 IN T202 IN T203 IN T203	2ND IF TRANSFORMER 10.7 MHz PRI.
C465 C466 C467 C468	22-7142-03 22-5482	4.7 M SEFD ELECTROLYTIC 25V 680 P SEF DISC 500V	L207	IN T204 IN T205	2ND 1F TRANSPORMER 10.7 MHz SEC, 3RD 1F TRANSPORMER 10.7 MHz PRI. 3RD 1F TRANSFORMER 10.7 MHz SEC. 3RD 1F AM 455 KHz PRI.
C468	22-3381 22-7152-07	39 PF DISC ±5% 500V 47 MF D ELECTROLYTIC 25V	L207 L208 L209	IN T205	3RD IF TRANSFORMER 10.7 MHz PRI. 3RD IF TRANSFORMER 10.7 MHz SEC.
C469 C470 C471 C472	22-5866	.047 MAFD MYLAR 100V			3RD IF AM 455 KHz PRI.
C471 C472	22-7143-12 22-5866	.047 MTFD MYLAR 100V 1000 MMFD ELECTROLYTIC 50V .047 MTFD MYLAR 100V	L211 L212 L213	IN T206 IN T207	3RD IF AM 455 KHz SEC. RATIO DETECTOR TRANS, 10,7 MHz PR
C473	22-3751	20 PF DISC ±5% 500V	II L214	IN T207 IN T207	RATIO DET TRANS. 10.7 MHz TERITIAI RATIO DETECTOR TRANS. 10.7 MHz SE
CX501	22 8005	.01 M #7D DISC 150VAC	L215	IN T204	2ND AM 455 KHz PRI.
C503	22-8005 22-4617 22-4617	.01 Marie D DISC 600V	L301	20-3080	67 KHz TRAP COIL (PREFERRED)
C502 C503 CX504 C505	22.6417	OT NIETO DISC 160VAC OT MIETO DISC 500V 2000 EVIFO ELECTROLYTIC 75V 1000 EMPO ELECTROLYTIC 75V	T101	95-2750	B. C. R. F. TRANSFORMER
CX506	22-6006	OT MATO DISC 150VAC	T102	95-2544	AM OSCILLATOR TRANSFORMER
R1	63-9921-56		T201	95-2753 95-2751	FM 1ST IF TRANSFORMER 10.7 MHz
R2 R3	63-4269 63-9921-64	220 O- PM 5% (ALT 63-10183-66 1/4W 10%) 100K OHM 10% 1/4W 470 O- HM 5% (ALT 63-7772 1/2W 20%)	T202 T203	95-2751 95-2764 95-2752	I AM 1ST IF AM 455 KHz FM 2ND IF TRANSFORMER 10.7 MHz AM 2ND IF AM 455 KHz
R3 R4 R5	63-1796		T204		AM 2ND IF AM 455 KHz FM 3RD IF TRANSFORMER 10.7 MHz
R6	63-9921-78 63-4231	1.8K COHM 5% (ALT 63-10183-78 1/4W 10%) 12K COHM 10% 1/4W	T206 T207	95-2543 95-2756	FM 3RD IF TRANSFORMER 10.7 MHz AM 3RD IF AM 455 KHz FM RATIO DETECTOR 10.7 MHz
R7 R8	63-1898 63-4122	470K OHM 20% 1/2W	1207	!	
R9	63-9922-36	33 OHM M 10% 1/4W 470K OHM 5% (ALT 63-7898 1/2W 20%) 82 OHM M 10% 1/4W	T301 T302	95-2858 95-2856	INPUT TRANSFORMER 19 KHz DOUBLER TRANSFORMER 19 KHz
R10 R11	63-4287	270K OHM 10% 1/4W	T303	95-2856 95-2757	DETECTOR TRANSFORMER 38 KHz
R12	63-4255	47K C⇒ HM 10% 1/4W	TX501 TX502	95-2965 95-2920	POWER THANSFORMER
R101 R102	63-9921-64 63-9921-58	470 O= HM 5% (ALT 63-7772 1/2W 20%) 270 O= HM 5% (ALT 63-7761 1/2W 10%)	17005	24.446	FILTER CHOKE ON TV COMBINATION POWER SUPPLY ONLY
R103	63-9921-86	470 O→ HM 5% (ALT 63-7772 1/2W 20%) 270 O→ HM 5% (ALT 63-7761 1/2W 10%) 3.9K ○→HM 5% (ALT 63-7861 1/2W 10%) 15K ○→HM 5% (ALT 63-7804 1/2W 10%) 3.3K ○→HM 5% (ALT 63-7806 1/2W 10%) 2.2K ○→HM 5% (ALT 63-7799 1/2W 10%)	FX501	136-117-21	
R104 R105	63-9922 63-9921-84	3.3K CHM 5% (ALT 63-7834 1/2W 10%)	FX502	136-114-15	1.25 AMP SLOW-BLOW FUSE 1.0 AMP FUSE (PILOT LIGHT)
R106	63-9921-80	2.2K CHM 5% (ALT 63-7799 1/2W 10%)	SWX-1	85,1423	BAND SWITCH
R201	63-9921-68		CR1	103-47	AFC DIODE
R202 R203	63-9921-58 63-9921-64	680 O → HM 5% (ALT 63-7778 10% 1/2W) 270 O→ HM 5% (ALT 63-7761 10% 1/2W) 470 O→ HM 5% (ALT 63-7761 10% 1/2W) 3.3K C⇒HM 5% (ALT 63-7820 10% 1/2W) 10K C⇒HM 5% (ALT 63-7827 10% 1/2W)	CR201	103-90	
I R204	63-9921-84	3.3K CHM 5% (ALT 63-7806 10% 1/2W)	CR202	103-90	GERMANIUM DIODE   MATCHED PAIR
R205 R206	63-9921-96 63-9921-64	470 O HM 5% (ALT 63-7827 10% 1/2W)	CR203 CR204	103-23	GERMANIUM DIODE
R207 R208	63-9921-64 63-9921-72 63-9921-90	470 O HM 5% (ALT 63-7771 10% 1/2W) 1K OI-1M 5% (ALT 63-7785 10% 1/2W) 2 2K CHM 5% (ALT 63-7785 10% 1/2W)	CR205	103-23-01 103-23-01	GERMANIUM DIODE
R209	63-9921-80 63-9921-84	470 O HM 5% (ALT 63-7772 20% 1/2W)	CR206	1	GERMANIUM DIODE
R210 R211	63-4185	1K UHM 10% 1/4W 660 O HM 5% (ALT 63-7775 10% 1/2W)	CR301 CR302	103-23-01 103-23-01	GERMANIUM DIODE GERMANIUM DIODE
R212 R213	63-1772 63-1778	IK UP-IM 95 (ALT 63-778) 10% 1/2W) 22K CHM 55 (ALT 63-778) 10% 1/2W) 470 O HM 55 (ALT 63-7772 20% 1/2W) 1K OI-IM 10% 1/4W 660 O HM 55 (ALT 63-7775 10% 1/2W) 470 O HM 20% 1/2W 680 O HM 10% 1/2W	1	1	
R214	63-1778 63-9921-68 63-1813	680 O HM 5% (ALT 63-7778 10% 1/2W)	CRX501 CRX502	212-76 212-76	SILICON RECTIFIER
R215 R216	63-1813 63-1813	4700 COHM 10% 1/2W 4700 COHM 10% 1/2W	CR503	212-76 103-96	DIODE (ZENER)
1 R217	63,9921,80	2.2K OHM 5% (ALT 63-7799 10% 1/2W)	2301	105-107	INTEGNET
R218 R219	63-9922-20 63-9922-04	22K C>HM 5% (ALT 63-7869 10% 1/2W).	Z351	105-107	INTEGNET
R220 R221	63-9921-72	1K OH-IM 5% (ALT 63-7785 10% 1/2W)		100-249	The Sections are asset
R222	63-9921-72	680 O + HM 10% 1/2W) 680 O + HM 10% 1/2W) 680 O + HM 58 (ALT 63-7778 10% 1/2W) 4700 € CHM 10% 1/2W) 2.2K ← CHM 0% (ALT 63-7798 10% 1/2W) 1.0K ← CHM 0% (ALT 63-7898 10% 1/2W) 2.2K ← CHM 6% (ALT 63-7888 10% 1/2W) 1.1K ← CHM 6% (ALT 63-788 10% 1/2W) 1.1K ← CHM 6% (ALT 63-785 10% 1/2W) 1.1K ← CHM 6% (ALT 63-7785 10% 1/2W) 6.680K ← CHM 8% (ALT 63-7785 10% 1/2W)	DSX1 DSX2 DSX3		PILOT LIGHT # 1847 PILOT LIGHT # 1847 PILOT LIGHT # 1847
R223 R224	63-9922-40 63-9922-36	470V CUM EV (A) T 62 7000 200 1/200		100-249	
R225	63-9921-80	2.2K CHM 5% (ALT 63-7799 10% 1/2W) 39K CHM 5% (ALT 63-7852 10% 1/2W)	DS301	100-507	STEREO INDICATOR LIGHT
R227 R228	63-9922-12 63-9922-10	47K C= HM 5% (ALT 63-7855 10% 1/2W)	M1	122-68	METER (TUNING)
R228	63-9922-10 63-9922-22	39K O⇒HM 5% (ALT 63-7852 10% 1/2W) 120K OHM 5% (ALT 63-7873 10% 1/2W)		OR 122-68-03	METER (TUNING)
	1	1	1	1	4988C2

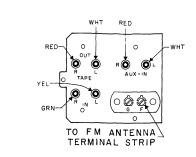




	•	TRANSISTORS
No.	PART No.	DESCRIPTION
QI	121 - 953	FM-RF
Q2	121 - 613	FM CONVERTER
Q101	121 - 850	AM-RF
Q102	121 - 735	AM CONVERTER
Q 201		AGC AMPLIFIER
Q202	121 - 950	AM 1st 1F
Q203		AM 2nd IF
Q301	121 - 603	MUTE BUFFER
Q302	121 - 950	MUTE AMPLIFIER
Q303	121 - 930	MUTE SWITCH
Q401	121 - 433	PRE-AMPLIFIER
Q402	121 - 433	AUDIO AMPLIFIER
Q 403	121 -1005	PRE-DRIVER
Q 404	121 - 877	DRIVER
Q407	121 - 1013	OUTPUT
Q408	121 -1012	001701
Q451	121 - 433	PRE-AMPLIFIER
Q452	121 - 433	AUDIO AMPLIFIER
Q 453	121 -1005	PRE-DRIVER
Q454	121 - 877	DRIVER
Q 457	121 -1013	OUTPUT
Q 458	121 - 1012	001701
Q 501	121 - 774	FM POWER SWITCH
Q 502	121 - 768	I W TOWER SWITCH
IC201	221 -89	FM IF GAIN BLOCK
IC202	221 - 90	FM IF LIMITER/QUAD. DETECTOR
IC301	16-122	MULTIPLEX PLL DEMODULATOR

0	TEST POINTS
Α	FM ANTENNA INPUT
D	FM IF INPUT
G	FM IF OUTPUT
Н	FM DETECTOR OUTPUT
L	AM RF INPUT
М	19 kHz OSCILLATOR OUTPUT
AB AC AD AE	AUDIO BIAS

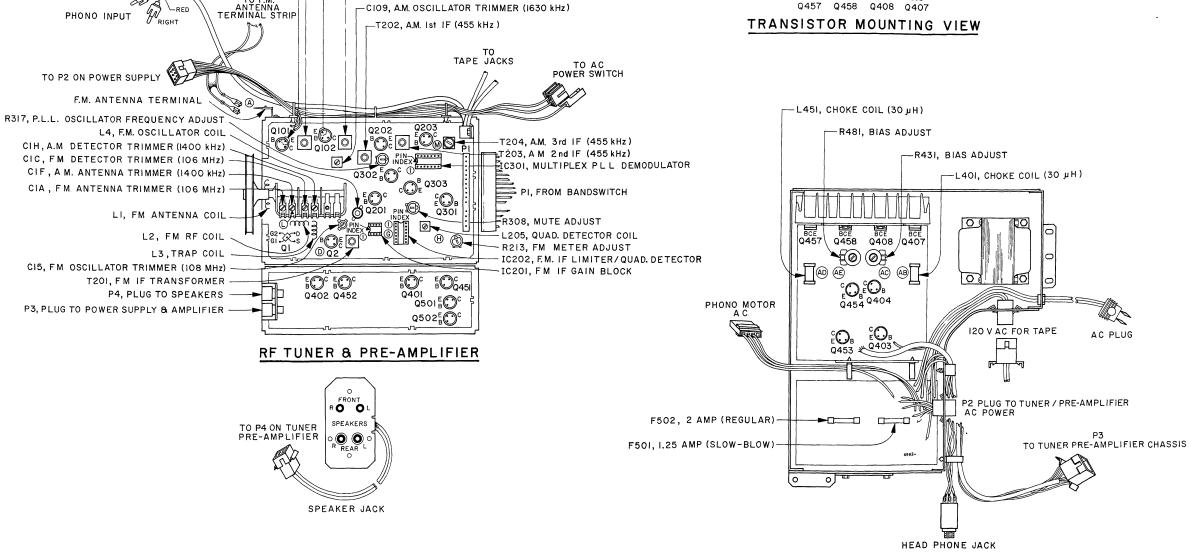




LIO2, FERRITE CORE SLEEVE

LIO4, FERRITE CORE SLEEVE

TIO2, AM OSCILLATOR TRANSFORMER



HEAT SINK-

CHASSIS -

AUDIO AMPLIFIER & POWER SUPPLY

TRANSISTOR INSULATOR BUSHING TINNERMAN SPEEDNUT -

## **CHASSIS LEGEND 12WGR59**

ITT.	DART T		ITEM	PART		ITEM	PART	Decomparer.
NO.	PART NUMBER	DESCRIPTION	NO.	NUMBER	DESCRIPTION	NO.	PART NUMBER	DESCRIPTION
CIA \	l li	FM ANTENNA TRIMMER FM ANTENNA TUNING		63-9921-82	2.7K OHM ±5% 1/4W (ALT 63-10183 82 ±10% 1/4W)		63-9922-30	270K OHM ±5% 1/4W (ALT 63-7887 ±10% 1/2W) 220K OHM ±5% 1/4W (ALT 63-7883
ctc I	1	FM RF TRIMMER FM RF TUNING	R103	63-9921-80	2.2K OHM ±5% 1/4W (ALT 63-10183 80 ±10% 1/4W)		63-9922-28	220K OHM ±5% 1/4W (ALT 63-7883 ±10% 1/2W) 330K OHM ±5% 1/4W (ALT 63-7890
CIE	22-6245-01	FM OSCILLATOR TUNING	R104	63-9921-64	470 OHM ±5% 1/4W (ALT 63-10183 64 ±10% 1/4W)		63-9922-32	330K OHM ±5% 1/4W (ALT 63-7890 ±10% 1/2W)
CTF CTG CTH		AM ANTENNA TUNING AM RF TRIMMER	R105	63-9921-58			63-9922-06	±10% 1/2W) 27K OHM ±5% 1/4W (ALT 63-7845 ±10% 1/2W)
CIH )	i 1	AM RF TUNING AM OSCILLATOR TUNING	R106	63-9921-86	58 ±10% 1/4W (ALT 63-10183	R457	63-9921-78	±10% 1/2W) 1800 OHM ±5% 1/4W (ALT 63-7796
C1L /	22-2729 22-2729	AM OSCILLATOR TUNING .001 MFD DISC 25V .001 MFD DISC 25V	R107	63-9921-64	86 ±19% 1/4W) 470 OHM ±5% 1/4W (ALT 63-10183	R458	63-9922-08	±10% 1/2W) 33K OHM ±5% 1/4W (ALT 63-7848 +10% 1/2W)
C3 C4	22-2729 22-2729 22-3675	.001 MFD DISC 25V .001 MFD DISC 25V 10 PF DISC 15% 500V	R108	63-9921-28	64 ±10% 1/4W) 15 OHM ±5% 1/4W (ALT 63-10183	R461	63-9922-44	±10% 1/2W) 1 MEG OHM ±5% 1/4W (ALT 63-7911
C1L / C2 C3 C3 C4 C5 C6 C7 C8 C9	22-3080	.005 MFD DISC 25V			28 ±10% 1/4W)	R462	63-9921-88	±10% 1/2W) 4.7K OHM ±5% 1/4W (ALT 63-7813
C7	22-3035 22-2468	12 PF DISC ±5% 500V 2.2 PF GIMMICK ±5%	1 1	- 1	39K OHM ±5% 1/4W (ALT 63-10184 10 ±10% 1/4W)	R463	63-9921-70	±10% 1/2W) 820 OHM ±5% 1/4W (ALT 63-7782
C9 C10	22-3177	2.2 PF GIMMICK 15% 390 PF DISC 500V 2.2 PF GIMMICK 15% 500V 7 PF DISC 1.5 PF N 1500 500V 20 PF DISC 15% 500V	R202	63-9922-08	33K OHM ±5% 1/4W (ALT 63-10184 08 ±10% 1/4W)	R464	63-9921-96	±10% 1/2W) 1DK OHM +5% 1/4W (ALT 63-7827
C10 C11	22-6344 22-2593	7 PF DISC ± .5 PF N 1500 500V	R203	63-9922-20			63-9921-92	±10% 1/2W) 6.8K OHM ±5% 1/4W (ALT 63-7820
C12 C13	22-2593 22-3080 22-3034	,005 MFD DISC 25V	R204	63-9921-72	±10% 1/4W) 1K CHM ±5% 1/4W (ALT 63-10183 72 ±10% 1/4W)		63-9922-04	
C14 C15	22-3034 22-4855 22-3080	.05 MFD DISC 25V 1.7 TO 10 PF CERAMIC TRIMMER .005 MFD DISC 25V	R205	63-9922-20	100K OHM ±5% 1/4W (ALT 63-10184 20 ±10% 1/4W)		63-9922-20	22K OHM 15% 1/4W (ALT 63-7841 110% 1/2W) 100K OHM 15% 1/4W (ALT 63-7869
C14 C15 C16 C17	22-3080	.005 MFD DISC 25V .005 MFD DISC 25V	R206	63-9921-48	100 OHM #5% 1/4W (ALT 63-10183-48			+10% 1/2W)
C18 C19	22-3080 22-3080	.005 MFD DISC 25V .005 MFD DISC 25V	R207	63-9921-60	±10% 1/4W) 330 OHM ±5% 1/4W (ALT 63-10183-60 ±10% 1/4W)		63-9921-50	120 OHM ±5% 1/4W (ALT 63-7747 ±10% 1/2W)
C101	22.13	.0033 MFD DISC 500V	R208	63-9921-96	±10% 1/4W) 10K OHM ±5% 1/4W (ALT 53-10181-96		63-9921-92	6800 OHM ±5% 1/4W (ALT 63-7820 ±10% 1/2W)
C102 C103	22-3034	.05 MFD DISC 25V .05 MFD DISC 25V	R209	63-9921-78	±5% 1/4W) 1.8K OHM ±5% 1/4W (ALT 63-10183-78		62-9921-82	2700 OHM ±6% 1/4W (ALT 63-7803 ±10% 1/2W)
C104 C105	22-3034	.05 MFD DISC 25V	R210	63-9921-96	+10% 1/4W)	RX477	63-9921-88	3900 CHM 16X 1/4N (ALT, 63-7809 15X 1/2W)
C106 C107	22-4819 22-5972	2 PF ±0.25 PF N4700 TUB 500V 390 PF ±6% POLYSTYRENE TUB. 125V	R211	63-9922-02	10K OHM ±5% 1/4W (ALT 63-10183-96 ±10% 1/4W)	R479	63-9921-88	4700 OHM ±5% 1/4W (ALT 63-7812 ±5% 1/2W)
C108	22-3372 22-3034 22-7460	.06 MFD DISC 25V 1 PF TO 7 PF AM OSCILLATOR		63-9922-36	18K DHM ±5% 1/4W (ALT 63-10184-02 ±10% 1/4W)	R480	63-9921-70	820 OHM ±5% 1/4W (ALT 63-7782 ±10% 1/2W)
C109	22:7151-05	TRIMMER 22 MFD ELECTROLYTIC 16V	R212		470K OHM ±5% 1/4W (ALT 63-10184-36 ±10% 1/4W)	R481 RX487	63-8328	300 OHM BIAS ADJUST
C110	22-7151-05	22 MPD ELECTROLYTIC 16V	R213 R214	63-10524-03 63-9921-80	2.5K OHM FM METER ADJUST 2.2K OHM £5% 1/4W (ALT 63-10183-80	RX488 RX489	63-10444-22 63-4511	BZ OHM ±10% 5W 1.B OHM ±6% 1/2W
C201 C202 C203	22-5482	680 PF DISC 500V	R215	63-9921-60	±10% 1/4W) 330 OHM +5% 1/4W (ALT 63-10183-60	CLASON SERVICE		10 Otto 100 Office State
C204	22-3080 22-3080	.005 MFD DISC 25V .005 MFD DISC 25V	R216	63-9921-68	±10% 1/4W) 680 OHM ±5% 1/4W (ALT 63-10183-68	1	63-9948-76	1500 OHM ±5% 1/2W (ALT 63-7792 ±10% 1/2W)
C205 C206	22-2642 22-6447-01	15 PF DISC ±5% 500V .047 MFD MYLAR 100V	R217	63-9922-32	±10% 1/4W) 330K OHM ±5% 1/4W (ALT 63-10184-32		63-1767	220 OHM ±10% 1/2W
C207	22-3034 22-3080	.05 MFD DISC 25V .005 MFD DISC 25V	R218	63-9921-64	±10% 1/4W) 470 OHM ±5% 1/4W (ALT 63-10183-64	RX501 RX502	63-1701 63-4536	30 OHM ±10% 1/20 8.8 OHM ±10% 1/2W
C208 C209 C210	22-2642 22-3034	15 PF DISC ±5% 500V	R219	63-9922-22	±10% 1/4W) 120K OHM ±5% 1/4W (ALT 63-10182-22	RX503 RX504	63-1701 63-10528-01	10 14th ±105 1/2W 58 OHis ±105 1/2W 10 OHIS ±105 1/2W 22 MEGOUND ±206 1/2W 390 OHIS ±55 7W 130 OHIS ±55 7W 130 OHIS ±55 3W 33 OHIS ±56 1/4W (ALT 63-7722
C210 C211 C212	22-2703	220 PF ±10% DISC 500V		63-9922-22	±6% 1/4W)	RX505 RX506 RX507	63-10449-86	390 OHM +6% 7W
C213	22-3770	.001 MFD DISC 25V 6.5 PF ±.25PF DISC 600V 6 PF ±5% DISC 500V	R220		27K OHM ±5% 1/4W (ALT 63-10182-06 ±5% 1/4W)	R507	63-10428-75	130 OHM +5% 3W
C214 C215	22-2381 22-3080 22-3415	005 MED DISC 25V	R221	63-9921-88	4.7K OHM ±5% 1/4W (ALT 63-10183-88 ±10% 1/4W)		1	
C218 C217 C218	22-3381	.0068 DISC 25V 39 PF DISC ±5% 500V 680 PF DISC 500V	R222	63-9922	15K OHM ±5% 1/4W (ALT 63-10184 ±10% 1/4W)	R509	63-9921-36	33 OHM ±5% 1/4W (ALT 63-7722 +10% 1/2W)
C218 C219	22-2939	10 MFD ELECTROLYTIC 16V	R223	63-9921-72	1K OHM ±5% 1/4W (ALT 63-10183-72 ±10% 1/4W)	R510	63- <del>9946</del> -28	15 OHM ±5% 1/2W (ALT 63-7708 ±10% 1/2W)
C220 C221	22,3652	1 MFD DISC 10V	R224	63-9921-60	330 OHM ±5% 1/4W (ALT 63-10183-60 ±10% 1/4W)	R512	63-9921-78	1800 OHM ±5% 1/4W (ALT 63-7796 ±10% 1/2W)
C222 C223	22-3034 22-3381 22-2939	39 PF ±5% DISC 500V	R225 R226	63-4171 63-9922-32	470 OHM +10% 1/4W)	R513	63-9922-18	
C223 C224 C225	22-3034 22-3034	.05 MFD DISC 25V .05 MFD DISC 25V	1	1	330K OHM ±5% 1/4W (ALT 63-10184-32 ±10% 1/4W) 3.3K OHM ±5% 1/4W (ALT 63-10183-84	R514	63-9922-04	±10% 1/2W) 22K OHM ±5% 1/4W (ALT 63-7841 ±10% 1/2W)
C225 C226 C227	22-3034 22-2642 22-3393	.05 MFD DISC 25V 15 PF DISC ±5% 500V .01 MFD	R227	63-9921-84		I	l	
C228	22-3393	.01 MFD DISC 25V	R228	63-9921-78	1.8K OHM ±5% 1/4W (ALT 63-10183-78 ±10% 1/4W) 12K OHM ±5% 1/4W (ALT 63-10183-98	CR1	103-47-01	A1-C DIODE
C229	22-3393	.01 MFD DISC 25V	R229	63-9921-98	12K OHM ±5% 1/4W (ALT 63-10183-98 +10% 1/4W)	CR201	103-23-01	GERMANIUM DIODE
C301 C302 C303	22-7406 22-7406	.47 MFD NP ELECTROLYTIC 35V .47 MFD NP ELECTROLYTIC 35V 4.7 MFD ELECTROLYTIC 25V	R230	63-9921-96	±10% 1/4W) 10K OHM ±5% 1/4W (ALT 63-10183-96 +10% 1/4W)	CR203	103-23-01	GERMANIUM DIODE
C303 C304	22-7152-03 22-3652	1 MFD DISC 10V	R231	63-9921-46	±10% 1/4W) 82 OHM ±5% 1/4W (ALT 63-10183-46 ±10% 1/4W)	CR205	103-23-01	GERMANIUM DIODE
C305 C306	22-7153-25 22-7493	A7 MFD ELECTROLYTIC 50V 560 PF 45% N470 DISC 500V	R301	63-9924-56	3.3 MEG OHM ±10% 1/4W (ALT	CR301 CR302	103-142 103-23-01	SILICON DIODE GERMANIUM DIODE
	22-5907 22-3527	560 PF ±5% N470 DISC 500V 1 MFD MYLAR 50V		63-9922-32	63-10184-56 ±10% 1/4W (ALT 330K OHM ±5% 1/4W (ALT 63-10182-32	CR302	103-142-01	SILICON DIODE
C309 C310	22-3527	.22 MFD DISC 12V .22 MFD DISC 12V .47 MFD NP ELECTROLYTIC 35V	R302	1	330K OHM 15% 1/4W (ALT 63-10182-32 16% 1/4W) 390K OHM 15% 1/4W (ALT 63-10184-34	CR401	103-145-01	SILICON DIODE
C311 C312	22-5901	.0033 MFD DISC 1000V	R303	63-9922-34	390K OHM ±5% 1/4W (ALT 63-10184-34 ±10% 1/4W) 150K OHM ±5% 1/4W (ALT 63-10184-24	CR402 CR403	103-145-01 103-145-01	SILICON DIODE SILICON DIODE
C313 C314 C315	22-2729 22-6285	.001 MFD DISC 25V .0068 MFD DISC ±20% 25V .0033 MFD DISC 1000V	R304	63-9922-24	+10% 1/4W)	CH404	21275	SH ICON DIOGE
[ C316	22-5901 22-2729	.0033 MFD DISC 1000V .001 MFD DISC 25V .0068 MFD DISC ±20% 25V	R305	63-9922-34	390K OHM ±5% 1/4W (ALT 63-10184-34 +10% 1/4W)	CR451 CR452	103-145-01	SILICON DIODE SILICON DIODE
C317 C318	22-6285 22-3080	.005 MFD DISC 25V	R306	63-9922-36	470K OHM ±5% 1/4W (ALT 63-10182-36	CR453	103-145-01 103-145-01 212-76	SILICON DIODE SILICON DIODE SILICON DIODE
C319	22-2729	.001 MFD DISC 25V	R307	63-9922-10	39K OHM +5% 1/4W (ALT 63-10184-10	CROSSIT	212.76	
C401 C402	22-3034 22-2939	.05 MFD DISC 25V 680 PF DISC 500V	R308 R309	63-10624-0 63-9922-20	±10% 1/4W) 10K OHM MUTE ADJUST 100K OHM ±5% 1/4W (ALT 63-10184-20	CRXG02	21276	SILICON RECTIFIER SILICON RECTIFIER ZENER DIODE
C402 C403 C404	22-5487 22-7163	680 PF DISC 500V A7 MFD DISC 3V 1 MFD ELECTROLYTIC 50V		63-9922-20	100K OHM ±5% 1/4W (ALT 63-10184-20 ±10% 1/4W) 100K OHM ±5% 1/4W (ALT 63-10184-20	CR505 CR506	103-142-01	SILICON DIODE
C405	22.3362	1 MFD ELECTROLYTIC 50V 560 PF DISC 500V .47 MFD MYLAR 100V	R310	1	±10% 1/4W)	CR507	103-142-01	SILICON DIODE
C407 C408	22-7496 22-3034 22-2939	.05 MFD DISC 25V 680 PF DISC 500V	R311	63-9922-16	68K OHM ±5% 1/4W (ALT 63-10182-16 ±5% 1/4W) 4.7K OHM ±5% 1/4W (ALT 63-10183-88	L1 L2	20-3595 20-3594 20-1631	FM ANTENNA COIL FM RF COIL 10.7 MHz TRAP COIL
C410 C411	22-2939 22-7153 22-14	1 MFD ELECTROLYTIC 50V	-R312	63-9921-88	+10% 1/4W)	L3 L4	20-3545	10.7 MHz TRAP COIL FM OSCILLATOR COIL 10 MICROHENRY COIL
C412 C413	22-5883	.033 MFD MYLAR 100V	R313	63-9921-88	4.7K OHM ±5% 1/4W (ALT 63-10183-88	L5	20-2033	
C414	22-5884 22-6814	.082 MFD MYLAR 100V .022 MFD 20% MYLAR 100V	R314	63-9921-46	±10% 1/4W) 82 OHM ±5% 1/4W (ALT 63-10182-46	L101 L102	A-84 149-311	AM ANTENNA COIL ASSEMBLY FERRITE CORE SLEEVE
C416 C418	22-7191 22-5862	.0027 MFD DISC 500V 1 MFD MYLAR 100V 470 PF DISC 500V	R315	63-9921-72	±5% 1/4W) 1K OHM ±5% 1/4W (ALT 63-10183-72	L103	149-311 IN-T101 149-311	FERRITE CORE SLEEVE BC-RF TRANSFORMER FERRITE CORE SLEEVE
C419 C420	22-16 22-7154-07	47 MED ELECTROLYTIC 35V	R316	63-9921-99	±10% 1/4W) 13K OHM ±5% 1/4W (ALT 63-10181-99	L 105	IN-T102	AM OSCILLATOR TRANSFORMER PR.I. AM OSCILLATOR TRANSFORMER SEC.
C421 C422	22-2939	680 PF DISC 500V	R317	63-10524 63-9922-12	±5% 1/4W) 5K PHASE LOCKED LOOP ADJUST	L106	IN-T201	1ST IF TRANSFORMER 10.7 MHz PRI.
C423 C424		100 MFD ELECTROLYTIC 35V 20 PF DISC 15% 500V	R318		47K OHM ±5% 1/4W (ALT 63-10184-12 ±10% 1/4W)	L201 L202	IN.T201	1ST IF TRANSFORMER 10.7 MHz SEC. 1ST IF AM 455 KHz PRI.
	22-3751 22-7496	47 MFD MYLAR 100V 330 PF DISC 500V	R319	63-9921-94	8.2K OHM ±5% 1/4W (ALT 63-10181-94 ±5% 1/4W)	L203 L204	IN-T202 IN-T202	1ST IF AM 455 KHZ PRI. 1ST IF AM 455 KHZ SEC. 10.7 MHZ QUAD DETECTOR COIL
C426 C427	22-3255 22-5639	.22 MFD MYLAR 100V	R320	63-9922-16	68K OHM ±5% 1/4W (ALT 63-10184-16 ±10% 1/4W)	L205 L206	20-3702 20-2033	10.7 MHz QUAD DETECTOR COIL 10 MICROHENRY COIL
C428	22-7143-12		R321	63-9922-10	39K OHM ±5% 1/4W (ALT 63-10184-10	L207 L208	IN-T203 IN-T203 IN-T204	10 MICROHENRY COIL 2ND IF AM 455 KHz PRI. 2ND IF AM 455 KHz PRI. 3RD IF AM 455 KHz PRI.
C451 C452	22-3034 22-2939	.05 MFD DISC 25V 680 PF DISC 500V	R322	63-9921-94	8.2K OHM ±5% 1/4W (ALT 63-10181-94 +5% 1/4W)	L209 L210	IN-T204 IN-T204	3RD IF AM 455 KHz PRI. 3RD IF AM 455 KHz SEC.
C453 C454	22-5487 22-7153	A7 MFD CERAMIC DISC 3V 1 MFD ELECTROLYTIC 50V 560 PF DISC 500V	R323	63-9922-10	82K OHM 55% 1/4W (ALT 63-10184-10 ±5% 1/4W) 39K OHM ±5% 1/4W (ALT 63-10184-10 ±10% 1/4W) 820K OHM ±10% 1/4W	L401	20-3716	CHOKE COIL 30 MICROHENRY
C455 C457	22-3362	560 PF DISC 500V .47 MFD MYLAR 100V .05 MFD DISC 25V	R324 R325	63-4308 63-4308	820K OHM ±10% 1/4W 820K OHM ±10% 1/4W		20-3716	CHOKE COIL 30 MICROHENRY
C458 C460	22-3034 22-2939	.05 MFD DISC 25V 680 PF DISC 500V	R401	63-9922-30	270K OHM ±10% 1/4W 270K OHM +5% 1/4W (ALT 63-7887	L451		10 MIDROHENRY COIL
C461 C462	22-2939 22-7153 22-14	680 PF DISC 500V 1 MFD ELECTROLYTIC 50V .0047 MFD DISC 500V	1	63-9922-04	270K OHM +5% 1/4W (ALT 63-7887 +10% 1/2W) 22K OHM +5% 1/4W (ALT 63-7841	L501	20-2033	
	22-5883 22-5884	.0047 MFD DISC 500V .033 MFD MYLAR 100V .082 MFD MYLAR 100V	R402	1	+10% 1/2W)	T101 T102	95-2750 95-2544	BC RF TRANSFORMER AM OSCILLATOR TRANSFORMER
C464 C465	22-5814	.022 MFD 20% MYLAR 100V .0027 MFD DISC 500V	R403	63-9922-28	220K OHM ±5% 1/4W (ALT 63-7883 ±10% 1/2W)	T201	95-2753	FM IF TRANSFORMER 10.7 MHz
C466 C468	22-7191 22-5862	1 MFD MYLAR 100V	R404	63-9922-32	330K OHM ±5% 1/4W (ALT 63-7890 ±10% 1/2W)	T202 T203	95-2751 96-2752	AM 1ST IF 455 KHz AM 2ND IF 455 KHz
C469	22-16		R405	63-9922-06	27K OHM ±5% 1/4W (ALT 63-7845 ±10% 1/2W)	T203 T204	95-2689	AM 3RD IF 465 KHz
C471	22-2939 22-7154-07 22-7154-08	680 PF DISC 500V 47 MFD ELECTROLYTIC 35V 100 MFD ELECTROLYTIC 35V	R407	63-9921-76		TX501	96-3198	POWER TRANSFORMER
C473 C474	22-3751	100 MFD ELECTROLYTIC 3SV 20 PF DISC ±5% 500V 47 MFD MYLAR 100V	R408	63-9922-08	±10% 1/2W) 33K OHM ±5% 1/4W (ALT 63-7848 ±10% 1/2W)	FX501 FX502	136-117-21 136-114-20	1.28 SLO - BLO FUSE. 2 AMP REGULAR BLOW FUSE.
C475 C476	22-7498	47 MFD MYLAR 100V 300 PF DISC 500V .22 MFD MYLAR 100V	R410R	63-10189	50K OHM DUAL LOUDNESS CONTROL	IC201	221-89	FM IF GAIN BLOCK
C477 C478	22-5639 22-7143-12	.22 MFD MYLAR 100V 1000 MFD ELECTROLYTIC 50V	R410L R411	63-9922-44	1 MEG OHM ±5% 1/4W (ALT 63-7911	IC201 IC202	221-89	FM IF LIMITER-QUAD DETECTOR
	22-4350	JOSÉ NIFO MYLAR 200V	R412	63-9921-88	±10% 1/2W) 4.7K OHM ±5% 1/4W (ALT 63-7813	IC301	221-91	MULTIPLEX P.L.L DEMODULATOR
C501 C502 C503		056 MFD MYLAR 200V	R413	63-9921-70	±10% 1/2W)	DS301	100-611	STEREO INDICATOR LIGHT
C503 CX504 CX506	22.4350		R414	63-9921-96	±10% 1/2W) 10K OHM ±5% 1/4W (ALT 63-7827	100000	**************************************	BANKER TYPOTO - CONTRACTOR CONTRACTOR
CX506	22-4350	1500 MFD ELECTROLYTIC 65V		1	±10% 1/2W)	06X502 05X503 06X504	100-610	METER LIGHT DIAL LIGHT NO. 1847
CX506	22,4350 22,7113 22,6005 22,6005	OT MED DISC 150VAC	R415R	11		0 2 2 2 2 2		
C507 C508	22-4350 22-7113 22-6005 22-6005 22-7151-11 22-7152-09	01 MED DISC 150VAC 470 MED ELECTROLYTIC 16V 220 MED ELECTROLYTIC 25V	R415L	1 63-8982		052504	100-249	DIAL LIGHT NO. 1847
C507 C508 C509 C510	22,4356 22,7113 22,6005 22,6005 22,7151-11 22,7152-09 22,7152-09 22,7152-04	01 MED DISC 150VAC  470 MED ELECTROLYTIC 16V 220 MED ELECTROLYTIC 25V 10 MED ELECTROLYTIC 25V	R415L R416	63-8982	6.8K OHM ±5% 1/4W (ALT 63-7820 ±10% 1/2W)	DSX504 DSX505	100-610 100-249 100-633 100-633	METER LIGHT DIAL LIGHT NO. 1847 DIAL LIGHT NO. 1847 PLOT LIGHT TUNING METER
C507 C508 C509	22,4350 22,7113 22,6005 22,6005	01 MED DISC 150VAC  470 MED ELECTROLYTIC 16V 220 MED ELECTROLYTIC 25V 10 MED ELECTROLYTIC 25V	R415L R416 R417R R417L	63-8982 63-9921-92 63-8983	6.8K OHM ±5% 1/4W (ALT 83-7820 ±10% 1/2W) 50K OHM DUAL TREBLE CONTROL	DECORDER	100-249 100-633 122-72 78-2137	DIAL LIGHT NO. 1847 PLOT LIGHT TUNING METER HEADPHONE JACK
C507 C508 C509 C510 C512	22,4350 22,7113 22,6005 22,6005 22,7151-11 22,7152-09 22,7152-09 22,7152-04 22,7149-07	OT MED DISC 150VAS OT MED DISC 150VAS 470 MED ELECTROLYTIC 15V 220 MED ELECTROLYTIC 25V 10 MED ELECTROLYTIC 25V 47 MED ELECTROLYTIC 25V 47 MED ELECTROLYTIC 33V	R415L R416 R417R R417L R418	63-8982 63-8983 63-9922-04	6.8K OHM ±5% 1/4W (ALT 63-7820 ±10% 1/2W) 50K OHM DUAL TREBLE CONTROL 22K OHM ±5% 1/4W (ALT 63-7841 +10% 1/2W)	M1 J1 PC	122-72 78-2137 204-537	TUNING METER HEADPHONE JACK PRINTED CIRCUIT ROARD RE
C507 C508 C509 C510 C512 R1 R2	22,41350 22,7113 22,6005 22,6005 22,7151-11 22,7152-09 22,7152-09 22,7152-04 22,7149-07 63-9922-20	10 MED DISS SEMARA  10 MED DISS SEMARA  20 MED ELECTROLYTIC TSV  20 MED ELECTROLYTIC ZSV  10 MED ELECTROLYTIC ZSV  20 MED ELECTROLYTIC ZSV  100K OHM SK 1/4 W (ALT 63-10184  20 ±10K 1/4W)  (ALT 63-10184	R415L R416 R417R R417L	63-8982 63-9921-92 63-8983	6.8K OHM ±5% 1/4W (ALT 63-7820 ±10% 1/2W) 50K OHM DUAL TREBLE CONTROL 22K OHM ±5% 1/4W (ALT 63-7841 ±10% 1/5% 1/4W (ALT 63-7841 10K OHM BALANCE CONTROL 10K OHM BALANCE CONTROL	M1 J1 PC	122-72 78-2137	TUNING METER  HEADPHONE JACK  PRINTED CIRCUIT BOARD RF PRINTED CIRCUIT BOARD AUDIO PRINTED CIRCUIT BOARD AUDIO PRINTED CIRCUIT BOARD POWER
C507 C808 C509 C510 C512 R1 R2	22.4350 22.7113 22.6005 22.6005 22.7152.01 22.7152.09 22.7152.09 22.7152.04 22.7149.07 63.9922.20	10 MED DISS SEMARA  10 MED DISS SEMARA  20 MED ELECTROLYTIC TSV  20 MED ELECTROLYTIC ZSV  10 MED ELECTROLYTIC ZSV  20 MED ELECTROLYTIC ZSV  100K OHM SK 1/4 W (ALT 63-10184  20 ±10K 1/4W)  (ALT 63-10184	R415L R416 R417R R417L R418	63-8982 63-9921-92 63-8983 63-9922-04 63-8981 63-9922-20	6.8K OHM ±5% 1/4W (ALT 63-7820 ±10% 1/2W) 50K OHM DUAL TREBLE CONTROL 22K OHM ±5% 1/4W (ALT 63-7841 ±10% 1/2W) 250K OHM BALANCE CONTROL 100K OHM \$5% 1/4W (ALT 63-7869 ±10% 1/2W)	M1 J1 PC PC PC	122-72 78-2137 204-537 204-538 204-545	TUNING METER  HEADPHONE JACK  PRINTED CIRCUIT BOARD RF PRINTED CIRCUIT BOARD AUDIO PRINTED CIRCUIT BOARD POWER AMULTISED
C507 C808 C509 C510 C512 R1 R2 R3	22.4350 22.7113 22.6005 22.6005 22.7151-11 22.7152-09 22.7152-09 22.7152-04 22.7149-07 63.9922-20 63.9922-12 63.9922-15	OTHER DISC ISSUADA THE DISC ISSUADA THE DISC ISSUADA THE DISC ISSUADA 20 MPD ELECTROLYTIC 25V 10 MPD ELECTROLYTIC 25V 10 MPD ELECTROLYTIC 25V 100K OHM 5% 1/4W (ALT 63-10184 20 1/10% 1/4W) 100K OHM 5% 1/4W (ALT 63-10183 56 310% 1/4W (ALT 63-10183	R415L R416 R417R R417L R418 R420 R421	63-8982 63-9921-92 63-8983 63-9622-04 63-8981 63-9922-20	6.8K COMM 45% 1/6W (ALT 63-7820 ±10% 1/78W)  SOK OHM DUAL TREBLE CONTROL 22K OHM 45% 1/6W (ALT 63-7841 ±10% 1/6W (ALT 63-7841 ±10% 1/6W (ALT 63-7868) ±10% 1/2W (ALT 63-7868) ±10% 1/2W (ALT 63-7868) ±50% 1/20% 1/6W (ALT 63-7878)	M1 J1 PC	122-72 78-2137 204-537 204-538	TUNING METER  HEADPHONE JACK  PRINTED CIRCUIT BOARD RF PRINTED CIRCUIT BOARD AUDIO PRINTED CIRCUIT BOARD AUDIO PRINTED CIRCUIT BOARD POWER
C507 C808 C509 C510 C512 R1 R2	22.4350 22.7113 22.6005 22.6005 22.7152.01 22.7152.09 22.7152.09 22.7152.04 22.7149.07 63.9922.20	OF MED DISS. INVIVIOUS CONTROL OF THE CONTROL OF TH	R415L R416 R417R R417L R418 R420 R421 R422	63-8982 63-9921-92 63-8983 63-9922-04 63-8981 63-9922-20 63-9922-20	6.8K OHM 15% 1/4W IALT 63-7820 150 OHM DUAL TREBLE CONTROL 22K OHM 55% 1/4W IALT 63-7841 150% 1/2W) 250K OHM 55% 1/4W IALT 63-7869 150% 1/2W) 100K OHM 55% 1/4W IALT 63-7869 15% 1/2W 150K 1/2W IALT 63-7869 15% 1/2W	M1 J1 PC PC PC PC	122-72 78-2137 204-537 204-538 204-545 204-546	TUNING METER HEADPHONE JACK PRINTEC CIRCUIT SOARD RF PRINTED CIRCUIT SOARD AUDIO PRINTED CIRCUIT SOARD POWER AMPLIFIER PRINTED CIRCUIT SOARD POWER SUPPLY
C507 C508 C509 C510 C512 R1 R2 R3 R4	22,4350 22,7113 22,6005 22,7151-11 22,7152-09 22,7152-09 22,7152-04 22,7149-07 63-0922-20 63-0922-12 63-9921-56 63-4129 63-9922-30	OF HEAD DISSUITATION OF THE PROPERTY OF THE PR	R415L R416 R417R R417L R418 R420 R421 R422 R423	63-8982 63-9921-92 63-8983 63-9922-04 63-8981 63-9922-20 63-9922-20 63-9922-20	6.8K OHM 15% 1/4W IALT 63-7820 150 OHM DUAL TREBLE CONTROL 22K OHM 55% 1/4W IALT 63-7841 150% 1/2W) 250K OHM 55% 1/4W IALT 63-7869 150% 1/2W) 100K OHM 55% 1/4W IALT 63-7869 15% 1/2W 150K 1/2W IALT 63-7869 15% 1/2W	M1 J1 PC PC PC PC	122-72 78-2137 204-537 204-538 204-545 204-546 85-1439 85-1446-0	TUNING METER HEADPHONE JACK PRINTED CIRCUIT BOARD ADDIO PRINTED CIRCUIT BOARD ADDIO PRINTED CIRCUIT BOARD POWER AMPLIFIER PRINTED CIRCUIT BOARD POWER SUPPLY SAND SWITCH FOWER BWITCH FOR THE TORK THE FOREIGN FOR THE FOREIG
C507 C508 C509 C510 C512 R1 R2 R3 R4 R5 R6	22.4356 22.7113 22.6305 22.6305 22.7161-11 22.7162-09 22.7152-04 22.7149-07 63.9922-12 63.9922-15 63.9921-56 63.4129 63.9921-60	AT BEED DISS. 1884/1884/1884  TO MATE LECTROLYTIC 15V  220 MFD ELECTROLYTIC 25V  220 MFD ELECTROLYTIC 25V  10 MFD ELECTROLYTIC 25V  47 MFD ELECTRO	R415L R416 R417R R417L R418 R420 R421 R422 R423 R424 R425	63-8982 63-9921-92 63-8983 63-9922-04 63-8981 63-9922-26 63-9922-26 63-9921-66	8.5C COM 45% 1/6W IALT 83-7820 210% 17207 SOK CHM DUAL TREBLE CONTROL 22K OHM 45% 1/6W IALT 83-7841 12K COM 45% 1/6W IALT 83-7869 100K COM 45% 1/6W IALT 83-7869 100K COM 45% 1/6W IALT 83-7875 15% 1/2W 1 120 OHM 45% 1/6W IALT 83-7875 15% 1/2W 1 120 OHM 45% 1/6W IALT 83-7875 15% 1/2W 1	M1 J1 PC PC PC PC	122-72 78-2137 204-538 204-545 204-546 85-1439 86-1446-0 85-1446-0 85-1446-0 85-1446-0	TUMING METER HEADPHONE JACK PRINTED CIRCUIT SOARD AFF PRINTED CIRCUIT SOARD AUDIO PRINTED CIRCUIT SOARD POWER AMPLIFIER SUPPLY BAND SWITCH FOWER SWITCH FA AFC SWITCH MATRIX SWITCH MATRIX SWITCH MATRIX SWITCH MATRIX SWITCH
C507 C508 C509 C510 C512 R1 R2 R3 R4 R5 R6	22-4386 22-113 22-605 22-605 22-715-11 22-715-20 22-715-20 22-715-20 22-715-20 63-9922-20 63-9922-30 63-9922-30 63-9922-30 63-9922-30 63-9922-30	10 180 180 180 180 180 180 180 180 180 1	R415L R416 R417R R417L R418 R420 R421 R422 R423 R424 R426	63-8982 63-9921-92 63-8983 63-9922-04 63-8981 63-9922-20 63-9922-20 63-9921-60 63-9921-60	6.8C CNM 45% 1/4W (ALT 83-7820 410% 1/70W) 500 CNM DUAL TREBLE CONTROL 420% 1/70W (ALT 83-7841 420% 1/70W) 500 CNM 45% 1/4W (ALT 63-7841 100% CNM 45% 1/4W (ALT 63-7868 45% 1/2W) 100% CNM 45% 1/4W (ALT 63-7868 45% 1/2W) 100% CNM 45% 1/4W (ALT 63-7878 45% 1/2W) 100% CNM 45% 1/4W (ALT 63-7747 410% 1/2W) 100% 1/2W 1/4W (ALT 63-7747 410% 1/2W) 100% 1/2W 1/4W (ALT 63-7747 410% 1/2W)	PC PC SW1 SWX2 SW3	78-2137 204-537 204-538 204-546 204-546 85-1439 85-1446-0 85-1446-0 85-1446-0 85-1446-0 85-1446-0 85-1446-0	TUMING METER HEADPHONE JACK PRINTED CIRCUIT SOARD APP PRINTED CIRCUIT SOARD AUDIO PRINTED CIRCUIT SOARD POWER SUPPLY BAND SWITCH POWER SWITCH AM JES SWITCH MATRIX SWITCH MATRIX SWITCH MATRIX SWITCH MATRIX SWITCH
C507 C508 C509 C510 C512 R1 R2 R3 R4 R6 R6 R7	22-4556 22-005 22-005 22-005 22-719-11 22-719-20 22-719-20 22-719-20 63-9922-20 63-9922-12 63-9922-20 63-9922-16 63-9922-16 63-9923-16 63-9923-16 63-9923-16 63-9923-16	AT BEED DISC. 1889-WAY.  AT BEED DISC. 1889-WAY.  20 MFD ELECTROLYTIC 16V  220 MFD ELECTROLYTIC 25V  20 MFD ELECTROLYTIC 25V  47 MFD ELECTROLYTIC 25V  47 MFD ELECTROLYTIC 25V  48 MFD ELECTROLYTIC	R415L R416 R417R R417L R418 R420 R421 R422 R423 R424 R425	63-8982 63-9921-92 63-8983 63-9922-04 63-8981 63-9922-20 63-9922-20 63-9921-60 63-9921-60	6.8C CHM 45% 1/4W IALT 63-7820 510% 17/2W) 500 CHM DUAL TREBLE CONTROL 22K CHM 55% 14W IALT 63-7841 250K CHM 65% 14W IALT 63-7841 150K CHM 150% 1/4W IALT 63-7869 150K 17/2W) 150K CHM 15% 1/4W IALT 63-7805 150K CHM 15% 14W IALT 63-7875 150K CHM 15% 14W IALT 63-7747 150K CHM 15% 14W IALT 63-7803	PC PC PC SW1 SWX2 SW3 SW4 SW5	78-2137 204-537 204-538 204-545 204-546 85-1439 85-1446-0 85-1446-0 85-1446-0 85-1446-0 85-1446-0 85-1446-0	TUMING METER HEADPHONE JACK PRINTED CIRCUIT SOARD AFF PRINTED CIRCUIT SOARD AUDIO PRINTED CIRCUIT SOARD POWER AMPLIFIER SUPPLY BAND SWITCH FOWER SWITCH FA AFC SWITCH MATRIX SWITCH MATRIX SWITCH MATRIX SWITCH MATRIX SWITCH
C507 C508 C509 C510 C512 R1 R2 R3 R4 R5 R6 R7 R8	22-4550 22-005 22-005 22-005 22-719-11 22-719-20 22-719-20 22-719-20 63-922-20 63-922-16 63-922-16 63-922-16 63-922-16 63-922-16 63-922-16 63-922-16 63-922-16 63-922-16 63-922-16 63-922-16	AT BEED DISC. 1889-WAY.  AT BEED DISC. 1889-WAY.  20 MFD ELECTROLYTIC 16V  220 MFD ELECTROLYTIC 25V  20 MFD ELECTROLYTIC 25V  47 MFD ELECTROLYTIC 25V  47 MFD ELECTROLYTIC 25V  48 MFD ELECTROLYTIC	R415L R416 R417R R417L R418 R420 R421 R422 R423 R424 R426	63-8982 63-9921-92 63-8983 63-9922-04 63-8981 63-9922-20 63-9922-20 63-9921-60 63-9921-60	6.8C CHM 45% 1/4W (ALT 83-7820 ±10% 1/79W) 500 CHM DUAL TREBLE CONTROL 510% 1/79W (ALT 83-7841 ±10% 1/79W) 500 CHM DUAL TREBLE CONTROL 100% COM 45% 1/4W (ALT 63-7841 ±10% 1/79W) 500 CHM 45% 1/4W (ALT 63-7868 ±5% 1/2W) 500 CHM 45% 1/4W (ALT 63-7878 ±5% 1/2W) 500 CHM 45% 1/4W (ALT 63-7747 ±10% 1/79W)	M1 J1 PC PC PC PC SW1 SWX2 SW3 SW5 SW6	78-2137 204-537 204-538 204-546 204-546 85-1439 86-1446-0 85-1446-0 85-1446-0 95-1446-0 70-1446-0 85-1446-0 85-1447-0 224-1-01	TUMING METER HEADPHONE JACK PRINTED CIRCUIT SOARD AUDIO PRINTED CIRCUIT SOARD AUDIO PRINTED CIRCUIT SOARD POWER SUPPLY BAND SWITCH POWER SWITCH AM JEE SWITCH MATRIX SWITCH MATRIX SWITCH MORE PRINTED WITCH MORE PRINTED WITCH MORE PRINTED WITCH MATRIX SWITCH MORE PRINTED WITCH
C507 C508 C509 C510 C512 R1 R2 R3 R4 R6 R6 R7	22-4556 22-005 22-005 22-005 22-719-11 22-719-20 22-719-20 22-719-20 63-9922-20 63-9922-12 63-9922-20 63-9922-16 63-9922-16 63-9923-16 63-9923-16 63-9923-16 63-9923-16	AT MED DISC 188V MAY TO MATE LECTROLYTIC 16V 220 MAD ELECTROLYTIC 16V 220 MAD ELECTROLYTIC 16V 220 MAD ELECTROLYTIC 16V 47 MATE LECTROLYTIC 25V 47 MATE ELECTROLYTIC 25V 48 MARCHAN MAY 47 CORM 55V 14V MALT 63-10184 47 CORM 55V 14V MALT 63-10184 47 CORM 55V 14V MAY MAT 63-10184 50 150V 14V MAY 50 150V 14V MAY 50 150V 14V MAY 50 150V 14V MAY 50 150V 14V MAY 50 150V 14V MAY 50 150V 14V MAY 50 150V 14V MAY 50 150V 14V MAY 50 150V 14V MAY 50 150V 14V MAY 50 150V 14V MAY 50 150V 150V 150V 150V 150V 150V 50 150V 150V 150V 150V 150V 150V 50 150V 150V 150V 150V 150V 150V 150V 50 150V 150V 150V 150V 150V 150V 150V 50 150V 150V 150V 150V 150V 150V 150V 50 150V 150V 150V 150V 150V 150V 150V 50 150V 150V 150V 150V 150V 150V 150V 50 150V 150V 150V 150V 150V 150V 150V 50 150V 150V 150V 150V 150V 150V 150V 50 150V 150V 150V 150V 150V 150V 50 150V 150V 150V 150V 150V 150V 150V 50 150V 150V 150V 150V 150V 150V 50 150V 150V 150V 150V 150V 150V 50 150V 150V 150V 150V 150V 150V 50 150V 150V 150V 150V 150V 50 150V 150V 150V 150V 50 150V 150V 150V 50 150V 150V 150V 50 150V 150V 50 150V 150V 50 150V 150V 50 15	R415L R416 R417R R417L R418 R420 R421 R422 R423 R424 R425 R426	63-9921-92 63-9921-92 63-9922-04 63-9922-06 63-9922-26 63-9921-92 63-9921-92 63-9921-92 63-9921-92 63-9921-92	8.8°C ONM 45% 1/6W (ALT 83-7820 5.10% 1/780*) 5.00′ ONM DUAL TREBLE CONTROL 5.00′ STAN 1/780 (ALT 63-7641 5.10% 1/780*) 5.00′ ONM 5.00′ STAN 1/780 (ALT 63-7609 1.00′ COM 5.00′ STAN 1/80° (ALT 63-7609 1.00′ COM 5.00′ STAN 1/80° (ALT 63-7609 1.00′ COM 5.00′ STAN 1/80° (ALT 63-7609 1.00′ ONM 5.00′ STAN 1/80° (ALT 63-760) 1.00′ ONM 5.00′ STAN 1/80° (ALT 63-760) 1.00′ COM 5.00′ STAN 1/80° (ALT 63-760) 1.00′ COM 5.00′ STAN 1/80° (ALT 63-760) 1.00′ COM 1/80° STAN 1/80° (ALT 63-760) 1.00′ COM 1/80° STAN 1/80° (ALT 63-760) 1.00′ COM 1/80° STAN 1/80° (ALT 63-760) 1.00′ COM 1/80° STAN 1/80° (ALT 63-760) 1.00′ STAN 1/80° (ALT 63-760) 1.00′ STAN 1/80° (ALT 63-760) 1.00′ STAN 1/80° (ALT 63-760) 1.00′ STAN 1/80° (ALT 63-760)	M1 J1 PC PC PC PC SW1 SW3 SW4 SW6 Y201	78-2137 204-537 204-538 204-548 204-548 85-1449 85-1449-0 85-1449-0 85-1449-0 85-1447-0 224-1-01 0R 224-1-01	TUMING METER HEADPHONE JACK PRINTED CIRCUIT SOAAD AF FRINTED CIRCUIT SOAAD AUDIO PRINTED CIRCUIT SOAAD AUDIO PRINTED CIRCUIT SOAAD POWER AMPLIFER PRINTED CIRCUIT SOAAD POWER AMPLIFER PRINTED CIRCUIT SOAAD POWER AND WITCH POWER SWYTCH FAM AFC SWYTCH FAM AFC SWYTCH CERAMIC FILTER SWITCH CERAMIC FILTER SWITCH CERAMIC FILTER SWITCH CERAMIC FILTER, 10.64 MM; (BLACK)
C507 C508 C509 C510 C512 R1 R2 R3 R4 R5 R6 R7 R8	22-4550 22-2005 22-2005 22-2015-11 22-1152-09 22-1152-09 22-1152-04 22-1149-07 63-9922-16 63-9922-06 63-9922-06 63-9922-06 63-9922-06 63-9922-06 63-9922-06 63-9922-06	AT BEED DISC. 1889/WAS 1.00 PM 18 PM	R415L R416 R417E R417L R418 R420 R421 R422 R423 R424 R426 R426 R429 R430 R431	\$ 3-9821-92 \$ 3-9822-04 \$ 3-9823-04 \$ 3-9822-04 \$ 3-9822-05 \$ 3-9822-25 \$ 3-9822-25 \$ 3-9821-95 \$ 3-9	6.8F. CHM 45% 1/4W IALT 63.7820 510% 17/4W 500 OHM DUAL TREBLE CONTROL 510% 17/4W 500 OHM DUAL TREBLE CONTROL 500 OHM 50% 1/4W IALT 63.7841 50% CHM 60% 1/4W IALT 63.7841 100% COM4 50% 1/4W IALT 63.7869 15% 17/2W 100% COM4 50% 1/4W IALT 63.7869 15% 17/2W 100% COM4 50% 1/4W IALT 63.7862 15% 17/2W 100% IALM 50% 1/4W IALT 63.7876 10% IALM 50% 1/4W IALT 63.7820 10% IALM 50% 1/4W IALT 63.7820 10% IALM 50% 1/4W IALT 63.7820 10% IALM 50% 1/4W IALT 63.7820 10% IALM 50% 1/4W IALT 63.7820 10% IALM 50% 1/4W IALT 63.7820 10% IALM 50% 1/4W IALT 63.7820 10% IALM 50% 1/4W IALT 63.7823 10% IALM 50%	M1 J1 PC PC PC PC SW1 SWX2 SW3 SW5 SW6	122-72 78-2137 204-537 204-538 204-545 204-546 85-14450 85-14450 85-14450 85-14450 05-14450 07-1040 07	TUMING METER HEADPHONE JACK PRINTED CRICCUIT BOARD AND AND AND AND AND AND AND AND AND AN
C507 C508 C509 C510 C512 R1 R2 R3 R4 R5 R6 R7 R8 R9 R10	22,4350 22,24350 22,2435 22,2435 22,7152,00 22,7152,00 22,7152,00 22,7152,00 22,7152,00 22,7152,00 22,7152,00 23,9922,15 63,4922,15 63,4922,16 63,4922,16 63,4922,16 63,4922,16 63,4922,16	07 1840 DISS. 1849 WALT. 53-10184 270 MIPD ELECTROLYTIC 15V 220 MPD ELECTROLYTIC 15V 220 MPD ELECTROLYTIC 25V 170 MPD 170 MPD (ALT 63-10184 171 MPD 170 MPD (ALT 63-10183 171 MPD 170 MPD (ALT 63-10183 172 MPD 170 MPD (ALT 63-10183 173 MPD 170 MPD (ALT 63-10183 173 MPD 170 MPD (ALT 63-10183 173 MPD 170 MPD (ALT 63-10183 173 MPD 170 MPD (ALT 63-10183 173 MPD 170 MPD (ALT 63-10183 174 MPD 170 MPD (ALT 63-10183 175 MPD 170 MPD (ALT 63-10183 175 MPD 170 MPD (ALT 63-10183 175 MPD 170 MPD (ALT 63-10183 175 MPD 170 MPD (ALT 63-10183 175 MPD 170 MPD (ALT 63-10183 175 MPD 170 MPD (ALT 63-10183 175 MPD 170 MPD (ALT 63-10183 175 MPD 170 MPD (ALT 63-10183 175 MPD 170 MPD (ALT 63-10183 175 MPD 170 MPD (ALT 63-10183 175 MPD 170 MPD (ALT 63-10183 175 MPD 170 MPD (ALT 63-10183) 175 MPD 170 MPD (ALT 63-10183) 175 MPD 170 MPD (ALT 63-10183) 175 MPD 170 MPD (ALT 63-10183) 175 MPD 170 MPD (ALT 63-10183)	R415L R416 R417R R417L R418 R420 R421 R422 R423 R424 R425 R426 R426 R429 R430 R431 RX431 RX431	\$ 03-9921-95 \$ 03-9922-95 \$ 03-9922-95 \$ 03-9922-95 \$ 03-9922-95 \$ 03-9921-95 \$	6.8C CHM 45% 1/4W (ALT 83-7820 ±10% 1/78/1) 500 CHM DUAL TREBLE CONTROL 510% 1/78/1 500 CHM DUAL TREBLE CONTROL 510% 1/78/1 51	M1 J1 PC PC PC PC SW1 SW3 SW4 SW6 Y201	122-72 78-2137 204-537 204-545 204-546 85-1449-0 85-1446-0 85-1446-0 85-1447-0 224-1 0R 224-1-02 0R	TUMING METER HEADPHONE JACK PRINTED CIRCUIT SOARD RF PRINTED CIRCUIT SOARD AUDIO PRINTED CIRCUIT SOARD AUDIO AMPLIFIER AMPLIFIER PRINTED CIRCUIT SOARD POWER SUPPLY BAND SWITCH POWER SWITCH FA AFC SWITCH HIGH FILTER SWITCH HIGH FILTER SWITCH CERAMIC FILTER, 10.64 MHz (BLACK) CERAMIC FILTER, 10.67 MHz (BLUE) CERAMIC FILTER, 10.70 MHz (RED)
C507 C508 C509 C5109 C512 R1 R2 R3 R4 R6 R6 R7 R8 R9 R10 R11 R12 R13	22,430 22,430 22,2006 22,7191-11 22,7162-00 22,7162-00 22,7162-00 22,7162-00 22,7162-00 22,7162-00 22,7162-00 22,7162-00 63-9922-16	AT MED DISC 1894/1994  AT MED ELECTROLYTIC 16V 220 MFD ELECTROLYTIC 26V 220 MFD ELECTROLYTIC 26V 220 MFD ELECTROLYTIC 26V 47 MFD ELECTROLYTIC 25V 47 MFD ELECTROLYTIC 25V 48 MFD ELECTROLYTIC 25V 48 MFD ELECTROLYTIC 25V 48 MFD ELECTROLYTIC 25V 48 MFD ELECTROLYTIC 25V 48 MFD ELECTROLYTIC 25V 48 MFD ELECTROLYTIC 25V 48 MFD ELECTROLYTIC 25V 48 MFD ELECTROLYTIC 25V 48 MFD ELECTROLYTIC 25V 48 MFD ELECTROLYTIC 25V 48 MFD ELECTROLYTIC 25V 220 MFD 25V MFM (ALT 63-10184 03 105 MFD ELECTROLYTIC 25V 330 CMM 25V MFM (ALT 63-10184 331 CMM 25V MFM (ALT 63-10184 331 CMM 25V MFM (ALT 63-10184 331 CMM 25V MFM (ALT 63-10184 331 CMM 25V MFM (ALT 63-10184 341 CMM 25V MFM (ALT 63-10183 341 CMM 25V MFM (ALT 63-10183 361 CMM 25V MFM (ALT 63-10183	R415L R416 R417R R417L R418 R420 R421 R422 R423 R424 R425 R426 R426 R429 R430 R431 RX433 RX433 RX433 RX433	\$ 5-9921 65-9921 65-9921 65-9921 65-9922 65-9922 65-9922 65-9922 65-9922 65-9922 65-9921-65-99	8.8°C ONM 45% 1/4W (ALT 83-7820 s.10% 1/2W) 50K ONM DUAL TREBLE CONTROL 50K COMM DUAL TREBLE CONTROL 50K COMM DUAL TREBLE CONTROL 50K COMM 50K 1/2W) 50K COMM 50K 1/2W) 50K COMM 50K 1/2W (ALT 63-7689 s.10% 1/2W) 10K COMM 55% 1/4W (ALT 63-7689 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7767 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7767 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7803 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7803 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7803 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7803 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7803 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7802 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7802 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7802 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7802 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7802 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7802 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7802 s.5W) 120 COMM 55% 1/5W	M1 J1 PC PC PC PC SW1 SW3 SW4 SW6 Y201	78-2137 204-537 204-545 204-546 85-1449-0 85-1449-0 85-1449-0 85-1449-0 85-1449-0 204-1-01 0R 224-1-02 0R 224-1-03 0R	TUMING METER HEADPHONE JACK PRINTED CIRCUIT SOARD RF PRINTED CIRCUIT SOARD AUDIO PRINTED CIRCUIT SOARD POWER PRINTED CIRCUIT SOARD POWER SUPPLY BAND SWITCH SOWER SWITCH HIGH FILTER SWITCH HIGH FILTER SWITCH CERAMIC FILTER, 10,64 MHz (BLACK) CERAMIC FILTER, 10,67 MHz (BLUE) CERAMIC FILTER, 10,70 MHz (RED) CERAMIC FILTER, 10,70 MHz (RED)
C507 C508 C509 C510 C512 R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12	22,4350 22,2113 22,6005 22,6005 22,005,11 22,005,11 22,7152,00 22,7152,00 22,7152,00 22,7152,00 22,7152,00 63,9022,10 63,9022,10 63,9022,00 63,9022,	AT MED DISC 1889/WAY  AT MATE DESCRIPTION 150  20 MATE DELECTROLYTIC 15V  20 MATE DELECTROLYTIC 25V  20 MATE DELECTROLYTIC 25V  47 MATE DELECTROLYTIC 25V  47 MATE DELECTROLYTIC 25V  48 MATE DELECTROLYTIC 25V  48 MATE DELECTROLYTIC 25V  49 MATE DELECTROLYTIC 25V  49 MATE DELECTROLYTIC 25V  40 MATE DELECTROLYTIC 25V  4	R415L R416 R417R R417L R418 R420 R421 R422 R423 R424 R426 R426 R430 R431 RX431 RX431 RX431 RX431 RX431	\$ 03-9921-95 \$ 03-9921-95 \$ 03-9922-05 \$ 03-9922-05 \$ 03-9922-25 \$ 03-9922-25 \$ 03-9921-95 \$	6.8F. CHM 45% 1/4W (ALT 83-7820 ±10% 1/78/1) 500. OHM DUAL TREBLE CONTROL 510% 1/78/1 5100 1/78/1 510% 1/78/1 5100 1/78/1 510% 1/78/1 5100 1/78/1 510% 1/78/1 5100 1/78/1 510% 1/78/1 5100 1/78/1 510% 1/78/1 5100 1/78/1 510% 1/78/1 5100 1/78/1 510% 1/78/1 5100 1/78/1 510% 1/78/1 510% 1/78/1 5100 1/78/1 510% 1/78/1 5100 1/78/1 510% 1/78/1 510% 1/78/1 5100 1/78/1 510% 1/78/1 510% 1/78/1 510% 1/78/1 5100 1/78/1 510% 1/78/1 510% 1/78/1 510% 1/78/1 5100 1/78/1 510%	M1 J1 PC PC PC PC SW1 SW3 SW4 SW6 Y201	78-2137 204-537 204-545 204-546 85-1449-0 85-1449-0 85-1449-0 85-1449-0 85-1449-0 204-1-01 OR 224-1-02 OR 224-1-03 OR	TUMING METER HEADPHONE JACK PRINTED CIRCUIT SOARD RF PRINTED CIRCUIT SOARD AUDIO PRINTED CIRCUIT SOARD AUDIO PRINTED CIRCUIT SOARD POWER SUPPLY BAND SWITCH SOWER SWITCH FM AIR'S SWITCH HIGH FILTER SWITCH CERAMIC FILTER, 10,64 MHz (BLACK) CERAMIC FILTER, 10,65 MHz (BLUE) CERAMIC FILTER, 10,70 MHz (RED) CERAMIC FILTER, 10,70 MHz (RED) CERAMIC FILTER, 10,73 MHz (RED)
C507 C508 C509 C510 C512 R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 R13	22,430 22,430 22,2006 22,7191-11 22,7162-00 22,7162-00 22,7162-00 22,7162-00 22,7162-00 22,7162-00 22,7162-00 22,7162-00 63-9922-16	AT BEED DISC. 1889/1897.  AT BEED DISC. 1889/1897.  AT DISC. 1899.  AT DISC. 1	R415L R416 R417R R417L R418 R420 R421 R422 R423 R424 R425 R426 R426 R429 R430 R431 RX433 RX433 RX433 RX433	\$ 5-9921 65-9921 65-9921 65-9921 65-9922 65-9922 65-9922 65-9922 65-9922 65-9922 65-9921-65-99	8.8°C ONM 45% 1/4W (ALT 83-7820 s.10% 1/2W) 50K ONM DUAL TREBLE CONTROL 50K COMM DUAL TREBLE CONTROL 50K COMM DUAL TREBLE CONTROL 50K COMM 50K 1/2W) 50K COMM 50K 1/2W) 50K COMM 50K 1/2W (ALT 63-7689 s.10% 1/2W) 10K COMM 55% 1/4W (ALT 63-7689 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7767 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7767 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7803 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7803 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7803 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7803 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7803 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7802 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7802 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7802 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7802 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7802 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7802 s.5% 1/2W) 120 COMM 55% 1/4W (ALT 63-7802 s.5W) 120 COMM 55% 1/5W	M1 J1 PC PC PC PC SW1 SW3 SW4 SW6 Y201	78-2137 204-537 204-545 204-546 85-1449-0 85-1449-0 85-1449-0 85-1449-0 85-1449-0 204-1-01 OR 224-1-02 OR 224-1-03 OR	TUMING METER HEADPHONE JACK PRINTED CIRCUIT BOARD RF PRINTED CIRCUIT BOARD ADDIO PRINTED CIRCUIT BOARD POWER AMPLIFIER SUPPLY BAND SWITCH POWER SWITCH POWER SWITCH HIGH FILTER SWITCH HIGH FILTER SWITCH CERAMIC FILTER, 10-67 MHz (BELUE) CERAMIC FILTER, 10-73 MHz (GRANGE CERAMIC FILTER, 10-73 MHz (GRANGE CERAMIC FILTER, 10-73 MHz (GRANGE CERAMIC FILTER, 10-73 MHz (GRANGE CERAMIC FILTER, 10-73 MHz (GRANGE CERAMIC FILTER, 10-73 MHz (GRANGE CERAMIC FILTER, 10-73 MHz (GRANGE CERAMIC FILTER, 10-73 MHz (GRANGE CERAMIC FILTER, 10-75 MHz (WHITE)

# OTEST 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

LF FREQUENCY: A.M. 455 KHz
F. FREQUENCY: A.M. 455 KHz
CERAMIC FILTERS MUST BE OF SAME CENTER FREQUENCY
GROUPING T201 AND 1205 MUST BE ADJUSTED TO THE SAME
FREQUENCY AS THE CERAMIC FILTERS.

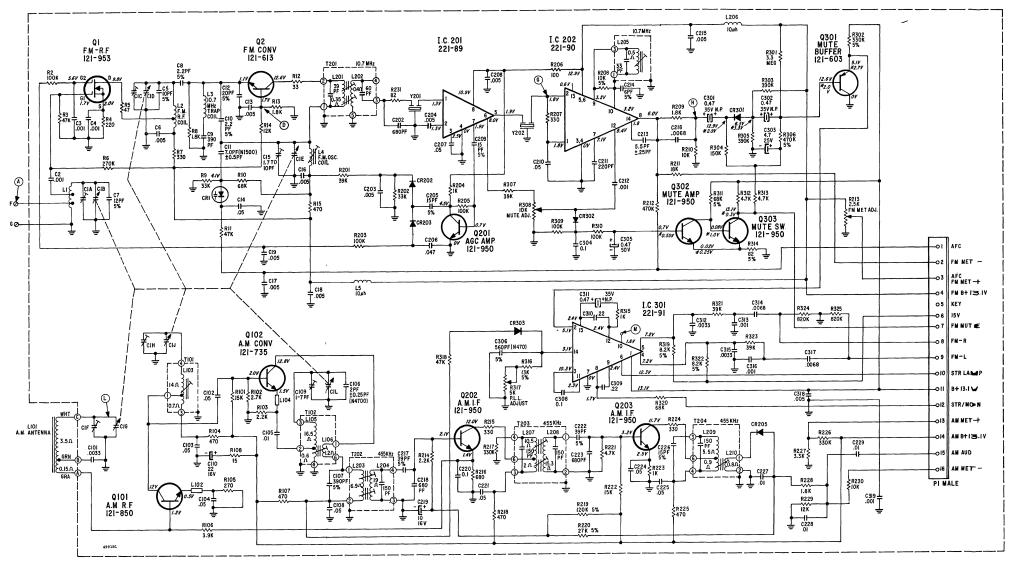
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION ON ROTARY CONTROLS AND UPWARD OR RIGHT HAND MOVEMENT ON SLIDE CONTROLS.

\* YOLTAGES MEASURED WITH ISOMY SIGNAL INPUT.

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

\*\* TO ADJUST BIAS, SET LINE AT 120 V.A.C., LET SET WARM UP FOR ONE MINUTE WITH NO SIGNAL. CONNECT LOW RANGE SOLIT METER ACROSS TEST POINTS AB -AC AND ADJUST RASJ FOR ACEV TO .025 VT. 0.35

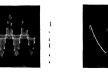
\*\*\* RIPPLE VOLTAGE MEASURED WITH NO SIGNAL INPUT

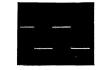


PC1 AM/FM, RF, IF & FM MPX



0.5V P/P (0.5 MILLISEC.)













PINS 8 AND 9-FILTER-

AMPLITUDE DETECTOR P1, #9-(UPPER) LEFT OUTPUT 0.47V P/P (0.5 MILLISEC.)

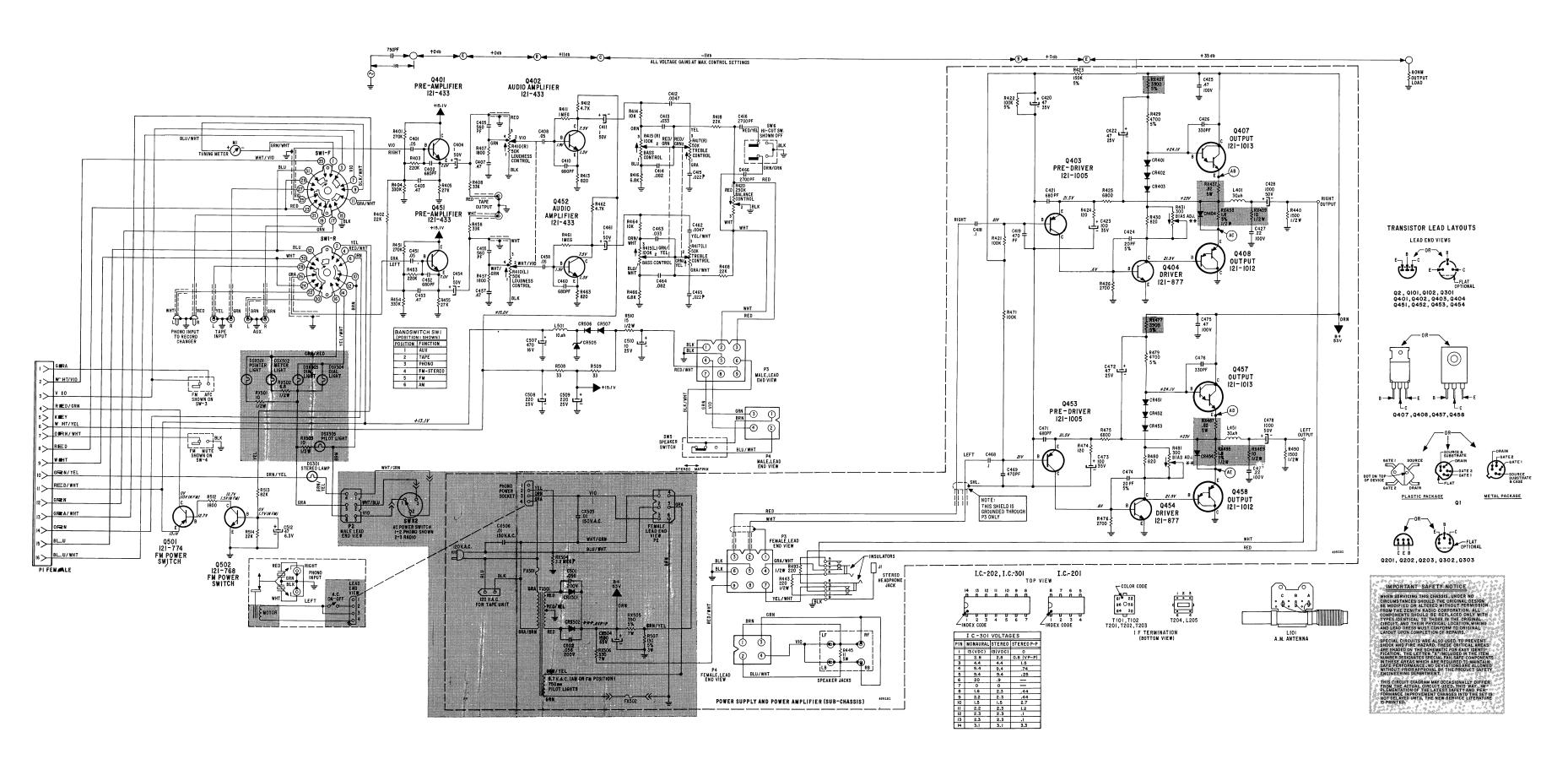
1.4V P/P (0.5 MILLISEC.)

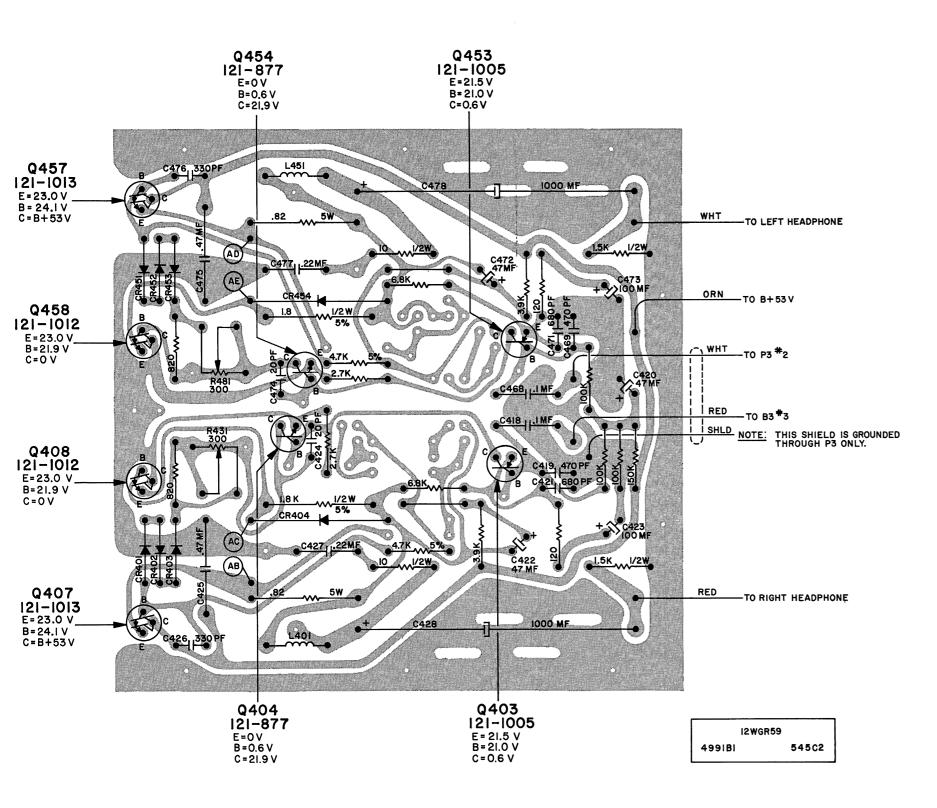
PIN 2-COMPOSITE INPUT PINS 3 AND 11-L+R, L-R (1 KHZ LEFT ONLY), COMPOSITE AMPLIFIED OSCILLATOR ADJUSTMENT 2.7V P/P (10.0 MICROSEC.)

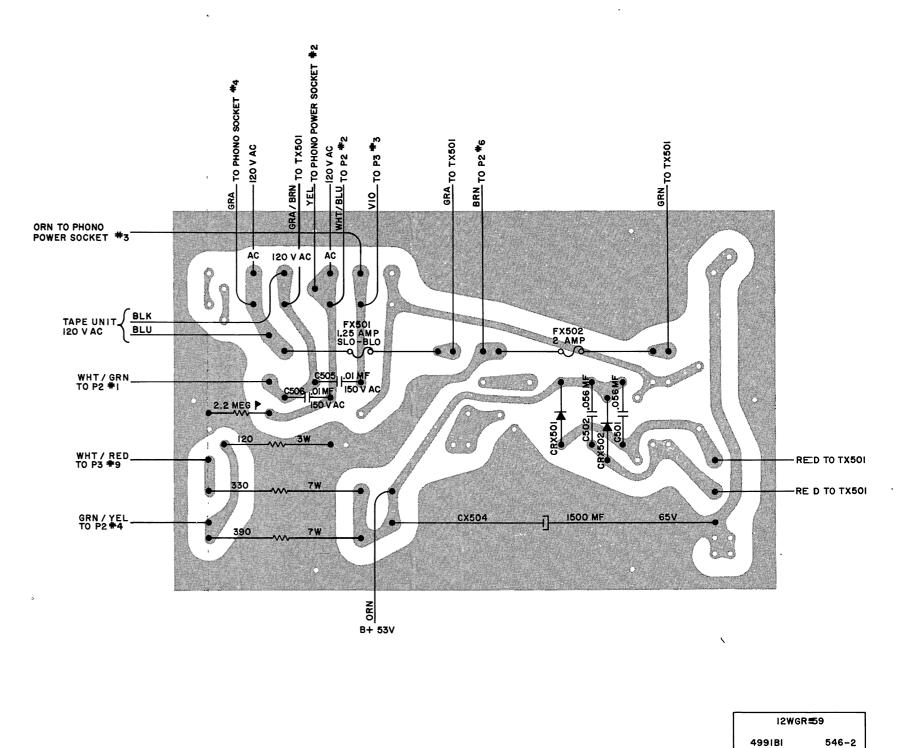
19 KHZ PILOT 10% L+R, L-R (1 KHZ LEFT ONLY), SIVE PINCE OF THE PIN

0.14V P/P (0.5 MILLISEC.)

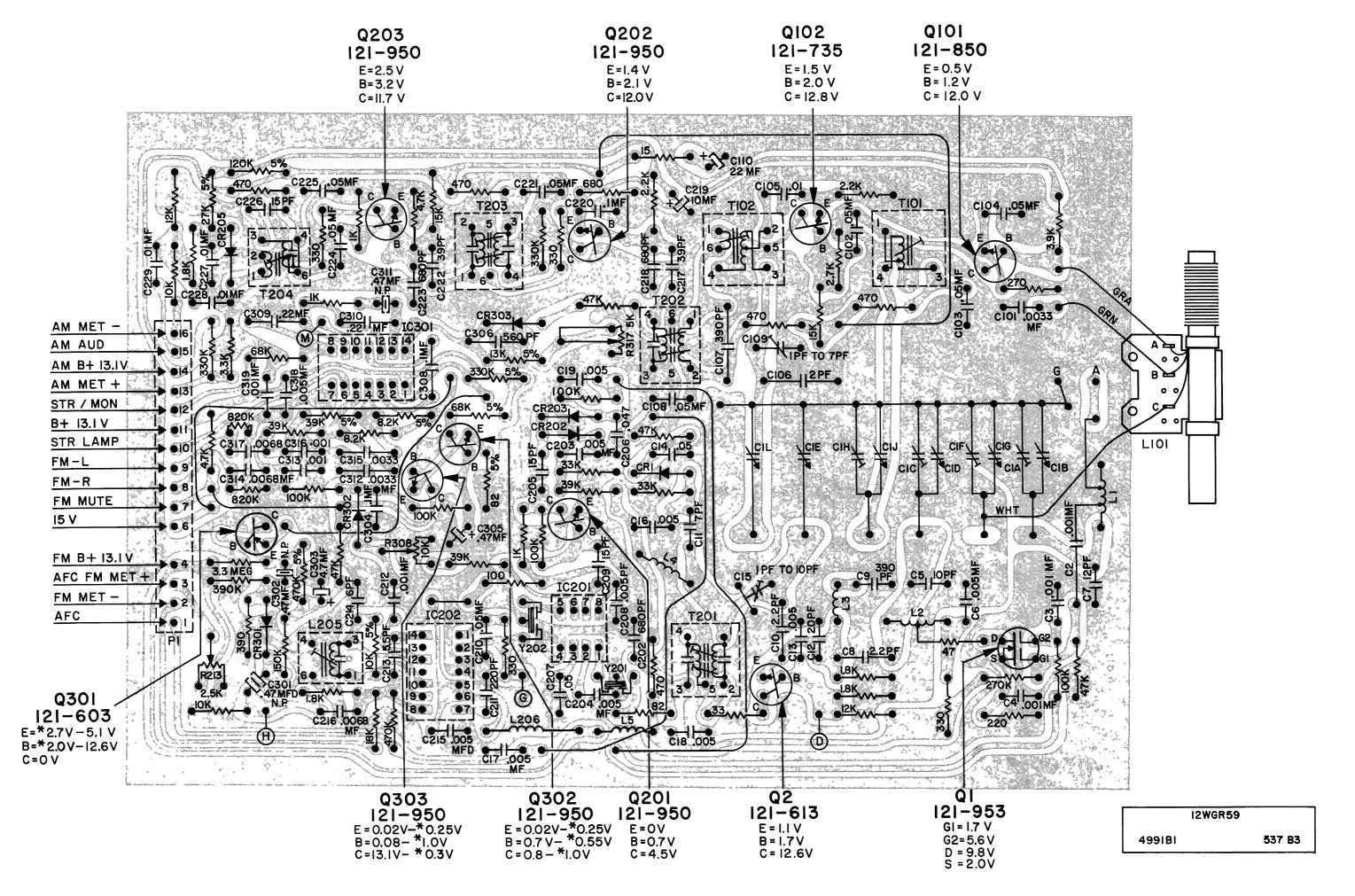
P1, #8-(LOWER) RIGHT OUTPUT 0.05V P/P (0.5 MILLISEC.)

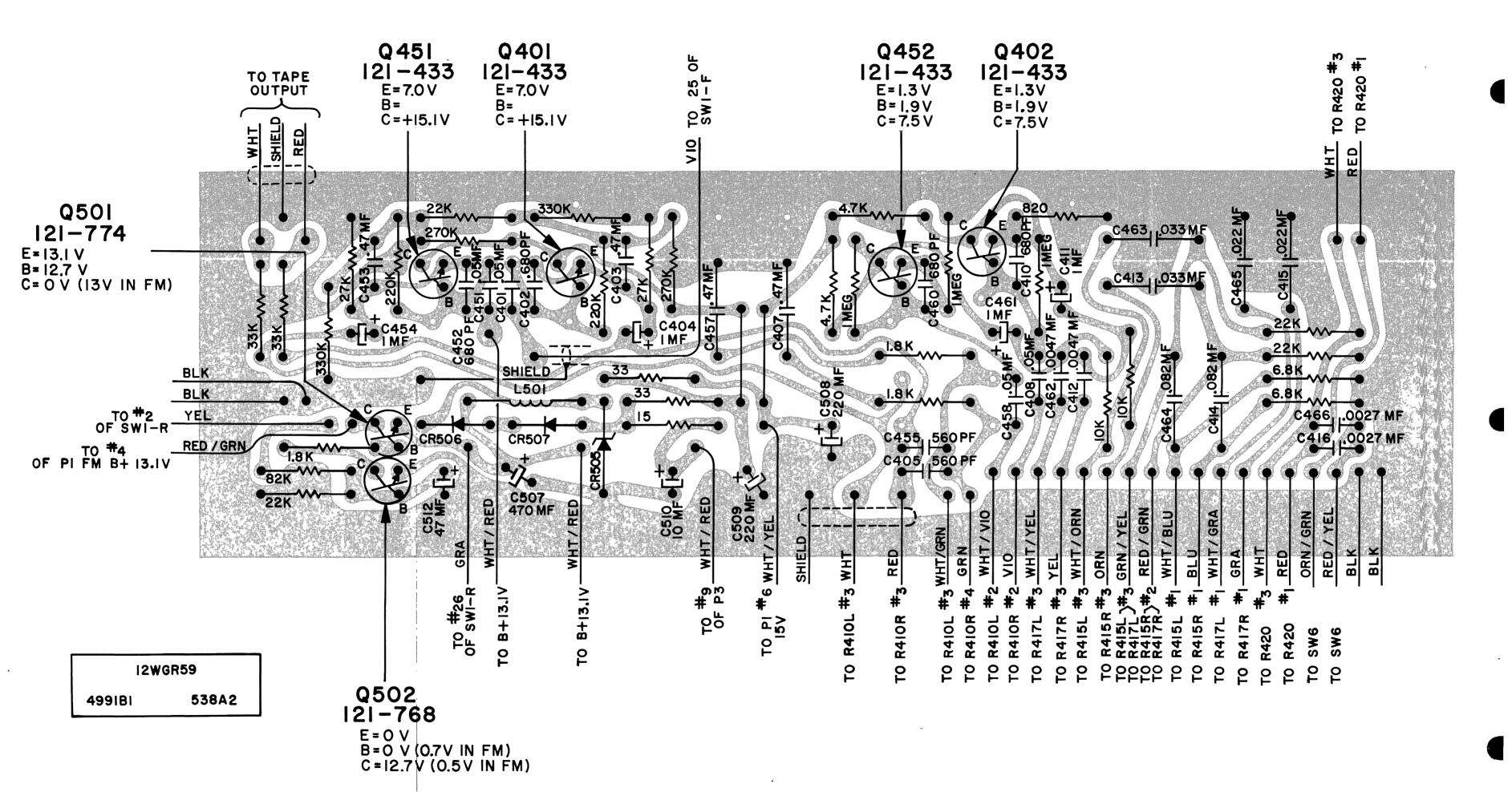


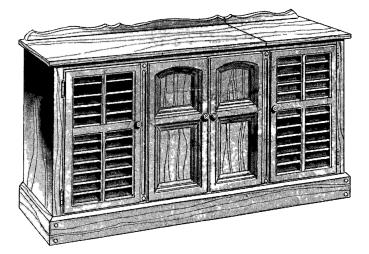




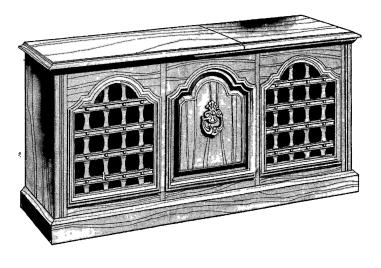
CHASSIS 12WGR59 - CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE - POWER SUPPLY



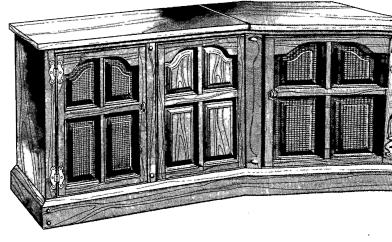




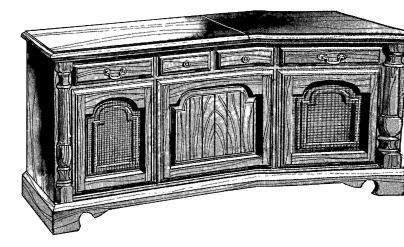
G916M



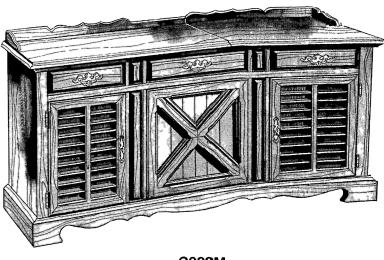
G921P



G914P



**G920AE** 



**G922M**