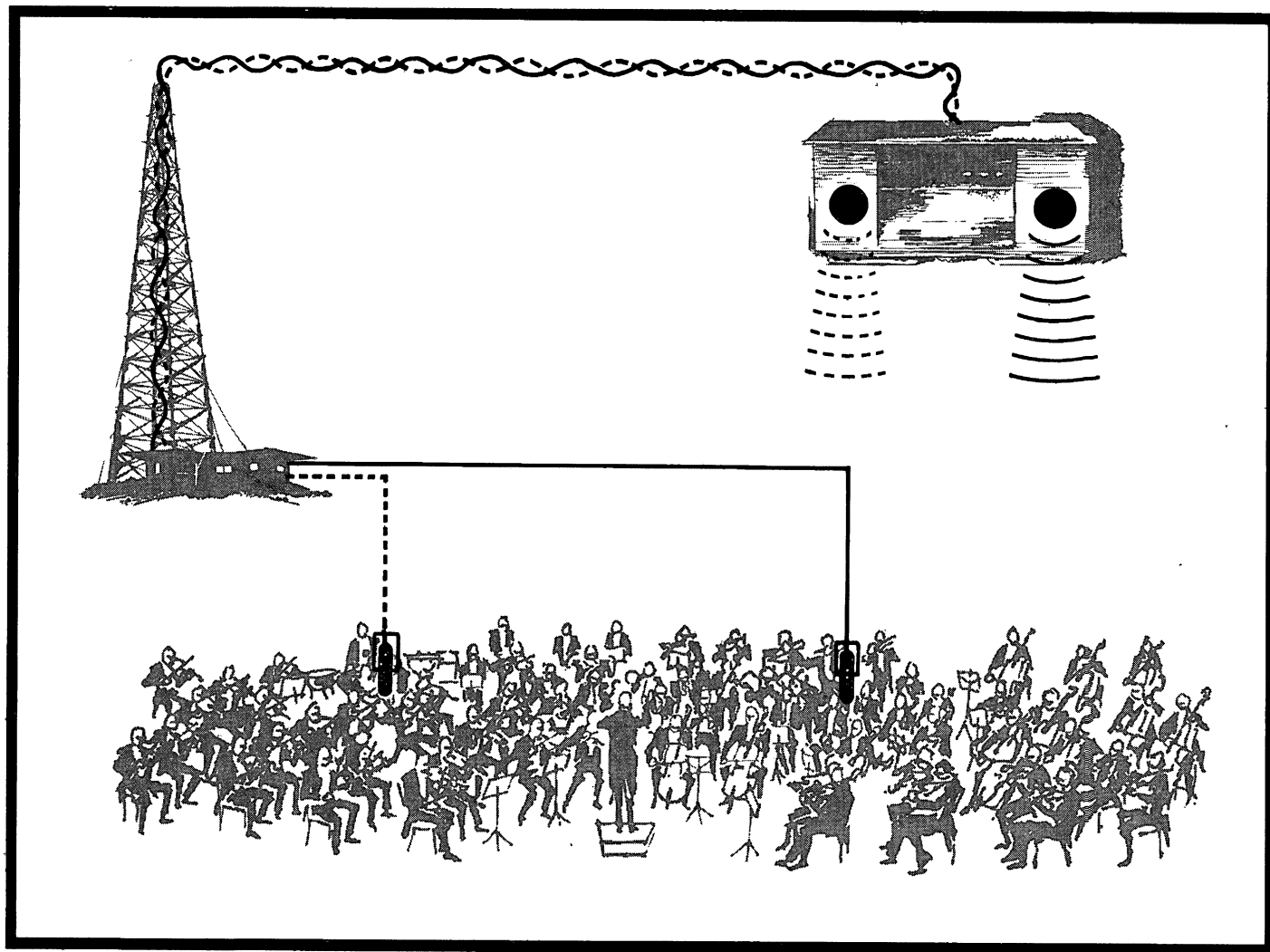


HF 23

HF 23



SERVICE MANUAL



HIGH FIDELITY AND STEREO FM MODELS

ZENITH RADIO CORPORATION

1900 N. AUSTIN AVENUE

CHICAGO, ILLINOIS 60639

PRICE \$1.50

HF 23

PART NO. 923-646

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HF17 is Zenith No. 923-521
 HF18 is Zenith No. 923-558
 HF19 is Zenith No. 923-606

HF17-1 is Zenith No. 923-529
 HF18-1 is Zenith No. 923-576
 HF20 is Zenith No. 923-610
 HF22 is Zenith No. 923-642

HF17-2 is Zenith No. 923-555
 HF18-2 is Zenith No. 923-592
 HF21 is Zenith No. 923-626

FEATURES OF HIGH FIDELITY & STEREO FM MODELS

CABINET			CHASSIS			SPEAKERS		
MODEL	STYLE	COLOR	MODEL	TYPE	EIA POWER OUTPUT	PART NUMBER	VOICE COIL IMPED. (In Ohms)	SIZE (In Inches)
B505B Note 2 (RA7)	Portable (Removable Lid)	Blue & White	—	Phono Only	—	849-48B	8	1-3½
B505F Note 2 (RA7)	Portable (Removable Lid)	Green & White	—	Phono Only	—	849-48B	8	1-3½
A507F Note 2 (HF21)	Portable (With Handle, Lift Lid)	Green	3AT20	Phono Only	—	49-1184	32	1-2x6
A507L Note 2 (HF21)	Portable (With Handle, Lift Lid)	Beige	3AT20	Phono Only	—	49-1184	32	1-2x6
A507V Note 2 (HF21)	Portable (With Handle, Lift Lid)	Coral	3AT20	Phono Only	—	49-1184	32	1-2x6
B525J Note 2 (RA7)	Portable (Removable Lid)	Brown & Beige	—	AM/Phono	—	849-48B	8	1-3½
C526R Note 2 (*)	Portable (Removable Lid)	Rosewood	—	FM/AM/Phono	—	849-66B	8	1-3½
B535J Note 2 (HF21)	Portable (With Handle, Lift Lid, Detachable Speaker Enclosures)	Brown & Walnut	8BT20	Phono Only	2x1W	49-1189	32	2-4
B535J1 Note 2 (HF21)	Portable (With Handle, Lift Lid, Detachable Speaker Enclosures)	Brown & Walnut	8BT20	Phono Only	2x1W	49-1189	32	2-4
B535Y Note 2 (HF21)	Portable (With Handle, Lift Lid, Detachable Speaker Enclosures)	Black & Rosewood	8BT20	Phono Only	2x1W	49-1189	32	2-4
B535Y1 Note 2 (HF21)	Portable (With Handle, Lift Lid, Detachable Speaker Enclosures)	Black & Rosewood	8BT20	Phono Only	2x1W	49-1189	32	2-4

FEATURES OF HIGH FIDELITY & STEREO FM MODELS

RECORD CHANGER					OTHER FEATURES			
PART NUMBER	MOUNTING	CARTRIDGE	STYLUS NOTE 1	45 RPM ADAPTER	POWER INDICATOR LIGHT	TAPE PROVISION	RECORD STORAGE	REMOTE SPEAKER PROVISION
Manual Player	Integral	942-8B	S 856-15B	827-18B	—	—	—	—
Manual Player	Integral	942-8B	S 856-15B	827-18B	—	—	—	—
169-374 OR 169-413	Integral	142-170	D-S 56-567	S-84995 OR S-85021	—	—	—	—
169-373 OR 169-412	Integral	142-170	D-S 56-567	S-84995 OR S-85021	—	—	—	—
169-375 OR 169-414	Integral	142-170	D-S 56-567	S-84995 OR S-85021	—	—	—	—
Manual	Integral	942-8B	S 856-15B	827-17B	—	—	—	—
Manual	Integral	942-17B	856-22B	827-21B	—	—	—	—
169-389	Integral	142-171	S-S 56-598	S-72910	—	—	—	—
169-405	Integral	142-171	S-S 56-598	S-72910	—	—	—	—
169-388	Integral	142-171	S-S 56-598	S-72910	—	—	—	—
169-404	Integral	142-171	S-S 56-598	S-72910	—	—	—	—

FEATURES OF HIGH FIDELITY & STEREO FM MODELS

CABINET			CHASSIS			SPEAKERS		
MODEL	STYLE	COLOR	MODEL	TYPE	EIA POWER OUTPUT	PART NUMBER	VOICE COIL IMPED. (In Ohms)	SIZE (In Inches)
B545W	Portable (With Handle, Detachable Speaker Enclosures)	Walnut	—	Phono Only	2x1W	964-24020	16	2-5¼
B553W Note 2 (HF22)	Portable (With Handle, Detachable Speaker Enclosures)	Walnut	—	Phono Only	2x4W	964-25775	8	2-6x9
C556W Note 2 (*)	Modular Table (Lift Lid)	Walnut	—	Phono Only	2x10W	849-56B	8	2-6x9
C565W Note 2 (HF22)	Modular Table (Lift Lid) (Circle Of Sound Speakers)	Walnut	16CT21	Phono Only	2x25W	49-1168 49-1214	8 6.4	2-Horn 2-6
C585W Note 2 (*)	Modular Table (Lift Lid)	Walnut	—	FM/AM/Phono	2x10W	849-56B	8	2-6x9
C587W Note 2 (HF22)	Modular Table (Lift Lid)	Walnut	29CT20	FM/AM/Phono	2x25W	49-1168 49-1220	8 8	2-Horn 2-6
C590W Note 2 (HF22)	Modular Table (Lift Lid) (Circle Of Sound Speakers)	Walnut	29CT21	FM/AM/Phono	2x25W	49-1168 49-1214	8 6.4	2-Horn 2-6
C906W1	Console (Lift Lid)	Walnut	21BT34Z1	FM/AM/Phono	2x10W	49-1094 49-1153	45 16	2-3½ 2-6x9
C907M1	Console (Lift Lid)	Maple	21BT34Z1	FM/AM/Phono	2x10W	49-1094 49-1153	45 16	4-3½ 2-6x9
C908DE1	Console (Lift Lid)	Dark Oak	21BT34Z1	FM/AM/Phono	2x10W	49-1094 49-1153	45 16	4-3½ 2-6x9
C908P1	Console (Lift Lid)	Pecan	21BT34Z1	FM/AM/Phono	2x10W	49-1094 49-1153	45 16	4-3½ 2-6x9
C910W1	Console (Lift Lid)	Walnut	21BT34Z1	FM/AM/Phono	2x10W	49-1094 49-1153	45 16	4-3½ 2-6x5
C911W1	Console (Lift Lid)	Walnut	21BT34Z1	FM/AM/Phono	2x10W	49-1094 49-1153	45 16	4-3½ 2-6x9

FEATURES OF HIGH FIDELITY & STEREO FM MODELS

RECORD CHANGER					OTHER FEATURES			
PART NUMBER	MOUNTING	CARTRIDGE	STYLUS NOTE 1	45 RPM ADAPTER	POWER INDICATOR LIGHT	TAPE PROVISION	RECORD STORAGE	REMOTE SPEAKER PROVISION
169-407	Hinged Shelf	142-175	D-S 56-560	S-72648	—	—	—	—
169-408	Hinged Shelf	142-175	D-S 56-560	S-72648	—	—	—	—
169-409	Shelf	142-172	D-S 56-597	S-78980	—	Note 7	—	Note 6
169-403	Shelf	142-167	D-S S-82621	S-82964	—	Note 7	—	Note 6
169-409	Shelf	142-172	D-S 56-597	S-78980	—	Note 7	—	Note 6
169-381	Shelf	142-167	D-S S-82621	S-72648 OR S-72910	—	Note 7	—	Note 6
169-403	Shelf	142-167	D-S S-82621	S-82964	—	Note 7	—	Note 6
169-361	Shelf	142-164	D-S 56-560	S-82965	—	Note 7	Yes	Note 5
169-392	Shelf	142-167	D-S S-82621	S-82965	—	Note 7	Yes	Note 5
169-392	Shelf	142-167	D-S S-82621	S-82965	—	Note 7	Yes	Note 5
169-392	Shelf	142-167	D-S S-82621	S-82965	—	Note 7	Yes	Note 5
169-392	Shelf	142-167	D-S S-82621	S-82965	—	Note 7	Yes	Note 5
169-392	Shelf	142-167	D-S S-82621	S-82965	—	Note 8	Yes	Note 5

FEATURES OF HIGH FIDELITY & STEREO FM MODELS

CABINET			CHASSIS			SPEAKERS		
MODEL	STYLE	COLOR	MODEL	TYPE	EIA POWER OUTPUT	PART NUMBER	VOICE COIL IMPED. (In Ohms)	SIZE (In Inches)
C920W	Console (Lift Lid)	Walnut	21BT34Z1	FM/AM/Phono	2x10W	49-1094 49-1166 49-1218	45 8 16	2-3½ 2-Horn 2-10
C921DE	Console (Lift Lid)	Dark Oak	21BT34Z1	FM/AM/Phono	2x10W	49-1094 49-1166 49-1222	45 8 16	2-3½ 2-Horn 2-10
C922M	Console (Lift Lid)	Maple	21BT34Z1	FM/AM/Phono	2x10W	49-1094 49-1166 49-1218	45 8 16	2-3½ 2-Horn 2-10
C930W	Console (Lift Lid)	Walnut	29CT30	FM/AM/Phono	2x25W	49-1094 49-1166 49-1217	45 8 8	2-3½ 2-Horn 2-10
C937M	Console (Lift Lid)	Maple	29CT30	FM/AM/Phono	2x25W	49-1094 49-1166 49-1217	45 8 8	2-3½ 2-Horn 2-10
C939DE	Console (Lift Lid)	Dark Oak	29CT30	FM/AM/Phono	2x25W	49-1094 49-1166 49-1217	45 8 8	2-3½ 2-Horn 2-10
C947DE1	Console (Lift Lid)	Dark Oak	29CT30	FM/AM/Phono	2x25W	49-1094 49-1151 49-1203	45 6.4 8	2-3½ 2-Horn 2-8x12
C947DE2 Note 2 (HF22)	Console (Lift Lid)	Dark Oak	27BT30	FM/AM/Phono	2x25W	49-1094 49-1151 49-1203	45 6.4 8	2-3½ 2-Horn 2-8x12
CT947DE	Console (Lift Lid)	Dark Oak	29CT30	FM/AM/Phono	2x25W	49-1094 49-1151 49-1203	45 6.4 8	2-3½ 2-Horn 2-8x12
C950W1	Console (Lift Lid)	Walnut	25BT22	FM/AM/Phono	2x50W	49-1094 49-1162 49-1171	45 6.4 6.4	4-3½ 2-Horn 2-12
C950W2	Console (Lift Lid)	Walnut	25BT22	FM/AM/Phono	2x50W	49-1094 49-1162 49-1171	45 6.4 6.4	4-3½ 2-Horn 2-12
CT951M	Console (Lift Lid)	Maple	29CT30	FM/AM/Phono	2x25W	49-1094 49-1162 49-1171	45 6.4 6.4	4-3½ 2-Horn 2-12
CT951M1	Console (Lift Lid)	Maple	29CT30	FM/AM/Phono	2x25W	49-1094 49-1162 49-1171	45 6.4 6.4	4-3½ 2-Horn 2-12
CT953DE	Console (Lift Lid)	Dark Oak	29CT30	FM/AM/Phono	2x25W	49-1094 49-1162 49-1171	45 6.4 6.4	4-3½ 2-Horn 2-12

FEATURES OF HIGH FIDELITY & STEREO FM MODELS

PART NUMBER	RECORD CHANGER				OTHER FEATURES			
	MOUNTING	CARTRIDGE	STYLUS NOTE 1	45 RPM ADAPTER	POWER INDICATOR LIGHT	TAPE PROVISION	RECORD STORAGE	REMOTE SPEAKER PROVISION
169-411	Shelf	142-167	D-S S-82621	S-82965	Yes	Note 8	Yes	Note 5
169-411	Shelf	142-167	D-S S-82621	S-82965	Yes	Note 7	Yes	Note 5
169-411	Shelf	142-167	D-S S-82621	S-82965	Yes	Note 8	Yes	Note 5
169-395	Shelf	142-167	D-S S-82621	S-82965	Yes	Note 8	Yes	Note 5
169-395	Shelf	142-167	D-S S-82621	S-82965	Yes	Note 8	Yes	Note 5
169-395	Shelf	142-167	D-S S-82621	S-82965	Yes	Note 8	Yes	Note 5
169-395	Shelf	142-167	D-S S-82621	S-82965	Yes	Note 8	Yes	Note 4
169-399	Shelf	142-167	D-S S-82621	S-82965	Yes	Note 7	Yes	Note 4
169-395	Shelf	142-167	D-S S-82621	S-82965	Yes	Built-In C631	—	Note 4
169-366	Shelf	142-167	D-S S-82621	S-82965	Yes	Note 7	Yes	Note 4
169-366	Shelf	142-167	D-S S-82621	S-82965	Yes	Note 8	Yes	Note 4
169-395	Shelf	142-167	D-S S-82621	S-82965	Yes	Built-In C632	—	Note 4
169-395	Shelf	142-167	D-S S-82621	S-82965	Yes	Built-In C632	—	Note 4
169-395	Shelf	142-167	D-S S-82621	S-82965	Yes	Built-In C632	—	Note 4

FEATURES OF HIGH FIDELITY & STEREO FM MODELS

CABINET			CHASSIS			SPEAKERS		
MODEL	STYLE	COLOR	MODEL	TYPE	EIA POWER OUTPUT	PART NUMBER	VOICE COIL IMPED. (In Ohms)	SIZE (In Inches)
CT953DE1	Console (Lift Lid)	Dark Oak	29CT30	FM/AM/Phono	2x25W	49-1094 49-1162 49-1171	45 6.4 6.4	4-3½ 2-Horn 2-12
C966DE Note 2 (HF22)	Console (Lift Lid)	Dark Oak	29AT24 6AT24	FM/AM/Phono	2x80W	49-1073 49-1094 49-1190	6.4 45 6.4	2-15 4-3½ 2-Horn
C966DE1 Note 2 (HF22)	Console (Lift Lid)	Dark Oak	29AT24Z1 6AT24	FM/AM/Phono	2x80W	49-1073 49-1094 49-1190	6.4 45 6.4	2-15 4-3½ 2-Horn
C966P Note 2 (HF22)	Console (Lift Lid)	Pecan	29AT24 6AT24	FM/AM/Phono	2x80W	49-1073 49-1094 49-1190	6.4 45 6.4	2-15 4-3½ 2-Horn
C966P1 Note 2 (HF22)	Console (Lift Lid)	Pecan	29AT24Z1 6AT24	FM/AM/Phono	2x80W	49-1073 49-1094 49-1190	6.4 45 6.4	2-15 4-3½ 2-Horn
C8720W1 Note 2 (HF22)	Console Combination (Lift Lids)	Walnut	27BT30 Note 3	FM/AM/Phono Color TV	2x25W	49-1162 49-1204	6.4 8	2-Horn 2-12
C8720W11	Console Combination (Lift Lids)	Walnut	29CT30 Note 3	FM/AM/Phono Color TV	2x25W	49-1162 49-1204	6.4 8	2-Horn 2-12
C8775P	Console Combination (Lift Lids)	Pecan	29CT30 Note 3	FM/AM/Phono Color TV	2x25W	49-1094 49-1162 49-1177	45 6.4 6.4	2-3½ 2-Horn 2-9x15
C9015W Note 2 (*)	Table Extension Speaker	Walnut	—	—	—	— —	16 16	1-6x9 1-2½
S9017W1 Note 2 (HF22)	Table Extension Speaker	Walnut	—	—	—	49-1102 49-1166	6.4 8	1-12 1-Horn
B9022W Note 2 (RC2)	Component Record Changer	Walnut	—	—	—	—	—	—
C9024W Note 2 (*)	Component Record Changer	Walnut	—	—	—	—	—	—
C9026W Note 2 (*)	Component Record Changer	Walnut	—	—	—	—	—	—
C9029W	Decoder	Walnut	15WCA10	Amplifier	2x15	49-1168 49-1220	8 8	2-Horn 2-6

FEATURES OF HIGH FIDELITY & STEREO FM MODELS

RECORD CHANGER					OTHER FEATURES			
PART NUMBER	MOUNTING	CARTRIDGE	STYLUS NOTE 1	45 RPM ADAPTER	POWER INDICATOR LIGHT	TAPE PROVISION	RECORD STORAGE	REMOTE SPEAKER PROVISION
169-395	Shelf	142-167	D-S S-82621	S-82965	Yes	Built-In C632	—	Note 4
169-364	Shelf	142-167	D-S S-82621	S-82718	Yes	Note 8	Yes	Note 4
169-417	Shelf	142-167	D-S S-82621	S-82965	Yes	Note 8	Yes	Note 4
169-364	Shelf	142-167	D-S S-82621	S-82718	Yes	Note 8	Yes	Note 4
169-417	Shelf	142-167	D-S S-82621	S-82965	Yes	Note 8	Yes	Note 4
169-399	Shelf	142-167	D-S S-82621	S-82965	Yes	Note 7	—	Note 4
169-395	Shelf	142-167	D-S S-82621	S-82965	Yes	Note 7	—	Note 4
169-395	Shelf	142-167	D-S S-82621	S-82965	Yes	Note 7	—	Note 4
—	—	—	—	—	—	—	—	Note 9
—	—	—	—	—	—	—	—	Note 10
169-386	Shelf	142-172	D-S 56-597	S-78979	—	—	—	—
169-386	Shelf	142-172	D-S 56-597	S-78980	—	—	—	—
169-399	Shelf	142-167	S-82621	S-82965	—	—	—	—
—	—	—	—	—	Yes	Yes	—	—

NOTES

1. Stylus: S = Manufactured Sapphire, D = Diamond.
2. Model listed for reference only. For chassis information refer to Service Manual shown in parenthesis ().
(*) Denotes Service Manual number has not been assigned.
3. Refer to Color TV Service Manuals for Color chassis information.
4. Built-in Sound Control Center with external speaker terminals and headphone jack.
5. External speaker terminals.
6. Headphone Jack.
7. Tape Input and Output - May be used with the following:
Model C635 - Cartridge Tape Player,
Model A636 - Cassette Tape Player/Recorder.
8. Tape Input and Output - May be used with the following:
Model C631 - Cartridge Tape Player,
Model C632 - Cassette Tape Player/Recorder,
Model C635 - Cartridge Tape Player,
Model A636 - Cassette Tape Player/Recorder.
9. One pair of Model C9015W Extension Speakers may be used with any Zenith stereo model (not exceeding 15 watts-EIA-per channel) which have external speaker terminals (see notes 4 and 5 above).
10. One pair of Models S9017W or S9017W1 Extension Speakers may be used with any Zenith stereo model which has external speaker terminals (see notes 4 and 5 above).

RECORD CHANGER FEATURES

PART NO.	MFG.	BASE PLATE	TURNTABLE
169-361	(VM)	Tree Bark Brown	Light Beige
169-364	(G)	Bronze Gold	Dark Brown
169-366	(VM)	Tree Bark Brown	Light Beige
169-373	(BSR)	Off White	Yellow
169-374	(BSR)	Off White	Dark Green
169-375	(BSR)	Off White	Gray
169-381	(BSR)	Black	Light Gray and Metal
169-386	(BSR)	Black	Black
169-388	(BSR)	Light Gray	Black
169-389	(BSR)	Off White	Dark Brown
169-392	(VM)	Tree Bark Brown	Light Beige
169-395	(VM)	Dark Brown	Light Beige
169-399	(VM)	Tree Bark Brown	Light Beige
169-403	(VM)	Black	Light Gray and Metal
169-404	(BSR)	Light Gray	Black
169-405	(BSR)	Off White	Dark Brown
169-407	(BSR)	Black	Black
169-408	(BSR)	Silver	Black
169-409	(BSR)	Black	Light Gray and Metal
169-411	(VM)	Tree Bark Brown	Light Beige
169-412	(BSR)	Off White	Yellow
169-413	(BSR)	Off White	Dark Green
169-414	(BSR)	Off White	Gray
169-417	(VM)	Beige	Dark Brown and Nickel Gold

SECTION TWO

FM/MX/AM ALIGNMENT AND GENERAL INFORMATION

THEORY

For theory and operation, of circuits not covered in this manual, refer to Service Manuals HF 18 (Zenith Part No. 923-558), HF 19 (Zenith Part No. 923-606), and HF 22 (Zenith Part No. 923-642).

MULTIPLEX ALIGNMENT

These receivers have been properly aligned at the factory and will not require further adjustment. As a result, it is not recommended that any attempt be made to alter the multiplex stages. However, should any major components in these circuits require replacement or should anyone tamper with the multiplex adjustments then, of course, realignment will be necessary.

MUTING CONTROL

A muting control, which supplies a reverse bias voltage to the base of the 19KHz amplifier, is factory adjusted, and should not require readjustment. However, if the receiver is operated in an extremely noisy area, there is a possibility that there may be noise bursts of sufficient magnitude to overcome this mute voltage . . . when this occurs, the Stereophonic FM Indicator will light up. To further cut off the 19KHz amplifier, carefully rotate the muting control in a clockwise direction. This should only be done when a stereo signal is on the air since the mute control must only be advanced to a point where the Stereo Indicator does not light up on noise, but it should not be advanced to a point where the desired stereo signal is cut off.

ANTENNAS FOR STEREO FM

Due to the characteristics of the stereo FM system, it will require more signal for proper performance than does monaural FM. As a result, it may be necessary to operate the stereo FM receiver with an external antenna. The necessity for an external antenna will be determined by the signal conditions at each individual installation.

EXTERNAL FM ANTENNA

If the receiver is operated in an area of either low signal strength, high noise, or where multipath (FM ghosts) signals are present, a good external FM antenna will be required. The necessity of an external antenna as a result of weak signal or noise, will be quite evident since the set will not limit, and/or noise will be quite evident. It is extremely difficult to determine if multipath (FM ghosts) signals are present, however, should the program material be distorted, the best manner to decide if multipath signals are the cause of the problem, is to connect an external FM antenna to the receiver. Usually a TV antenna may be available for trial, but even then the results can be misleading, since many TV antennas are of low gain on FM frequencies. Reduction of multipath distortion under high signal conditions may be accomplished by relocation of the receiver's antenna system.

FM CABINET ANTENNA

Certain models contain an FM antenna built into the cabinet. This antenna is a folded dipole cut to the desired frequency, and is attached to the internal periphery of the cabinet. The following models use line cord antennas: C587, C590, C906 and C906-1.

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 21BT34 and 21BT34Z1, Test Point "C". Located between Transistors Q101 (A.M. Converter) and Q201 (1ST. I.F.).

Chassis 25BT22 - Test Point "C" RF amplifier AGC Feed Thru on FM Tuner.

Chassis 29CT30 - Test Point at Junction of R2, R229; either end of Purple wire at pulley end of gang.

Chassis 21BT34, 21BT34Z1

Micro Volts Input	Reverse AGC Voltage at Test Point "C"
0	1.34
25	1.23
100	0.91
200	0.82
500	0.73
1K	*0.70
5K	0.58
50K	0.10
100K	0.06

Chassis 29CT30

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

Chassis 25BT22

Micro Volts Input	AGC Voltage At 1st I.F. (See Note)
0	1.20
25	1.12
100	0.88
200	0.76
500	0.64
1K	*0.58
5K	0.49
50K	0.37
100K	0.25

Note: AGC voltage for chassis 25BT22 is read across the 820 ohm resistor connected from the 1st I.F. emitter to the "B-" (-12.4V). Refer to AGC Adjustments.

AGC ADJUSTMENTS

Chassis 25BT22 - Adjust AGC control so that under no signal conditions a voltage of 1.2 volts is measured across the 820 ohm resistor connected from 1st IF emitter to "B-" (-12.4V) when in A.M.

AUTOMATIC FREQUENCY CONTROL-AFC

These receivers feature an automatic frequency control which automatically keeps your receiver on the exact station frequency when you are tuned to an FM station. To utilize this feature tune the receiver as instructed and then turn the band switch to AFC position.

When the desired FM station is a weak station, adjacent in frequency to a strong station, the AFC may pull the tuning into the stronger station. Under these conditions, place the bandswitch in FM position and tune the receiver as instructed.

Tuning the receivers on the frequency modulation band will require more care than on the broadcast band. A hissing sound may be noted when tuning between Frequency Modulation stations. This is normal, and will disappear as the station is tuned in. After a station is located, the pointer should be moved back and forth over it until the point of quietest reception and best tone quality is found. Correct tuning is indicated by the disappearance of background noise.

SPEAKER PHASING

It is most important that coded speaker leads be connected to coded terminals on speakers for proper polarity within each speaker group. It is also then most important that the speaker groups be in phase with each other. One excellent method is to play a monaural record with the volume of each speaker group equal.

Under these conditions the sound should appear to come from a point midway between the two speaker groups. If the sound comes from any other point than midpoint, then one speaker group is out of phase with the other and you should check polarity. One of the easiest methods of checking polarity within the speaker group is to momentarily place a 4½ volt battery across the speaker feed terminals. All the speaker cones should simultaneously move in the same direction.

POWER AMPLIFIERS

Power transistors and their circuits are unique in operation, therefore, repair procedure differs from those steps followed when repairing tube type-circuits.

1. Each channel of the following amplifiers use a pair of matched power transistors in the final output stage. Therefore, should one transistor fail, both transistors must be replaced simultaneously, since they will not perform properly unless matched. (In chassis using complementary symmetry circuits a matched pair consists of one NPN and one PNP transistor.) (In chassis using quasi-complementary symmetry circuits, the outputs consist of two matched NPN's. The drivers, which are matched NPN and PNP, should also be replaced as matched pairs): 3AT20, 6AT24, 8BT20, 15WCA10, 16CT21, 21BT34, 21BT34Z1, 27BT30, 29CT20, 29CT21, 29CT30, B545 and B553.
2. When a power transistor is replaced the insulator (when used) between the transistor and the heat sink should also be replaced. On the following be certain to apply Dow Corning No. 340 heat conductive grease between the transistor and the insulator. Also between the insulator and the chassis. The Dow Corning grease can be obtained in 1 c.c. quantities by ordering part No. 205-51: 6AT24, 15WCA10, 16CT21, 21BT34, 21BT34Z1, 27BT30, 29CT20, 29CT21, and 29CT30.
3. On the following place the heat conductive grease in the clamp, or on the chassis, and all around the transistor: 8BT20, B545, and B553 (early production).
4. Do not operate these amplifiers without their proper speaker load.
5. Do not short out the audio output of either channel when the amplifier is operating.
6. Should a power transistor fail (short) be certain to replace the emitter resistors for the specific channel. Also be cer-

tain to check the condition of the silicon diode rectifiers, and driver transistors.

7. Remove plug-in transistors from their sockets before doing any soldering to the socket lugs.

CIRCUIT BOARD COMPONENT IDENTIFICATION

As a special feature to aid the Service Technician, Zenith has identified the location of components which are mounted on certain circuit boards. This information is printed on the circuit boards and also appears on the schematic. Zenith has also prepared a two-color 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, as follows.

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.

CIRCUIT BOARD SERVICING

Servicing circuit board sets is, in general, much the same as servicing ordinary receivers. However, certain tools and techniques are helpful for this type of work.

1. Good pair of long-nose pliers.
2. Sharp wire cutters.
3. Small stiff glue brush (for solder removal).
4. Metal pick (soldering aid).
5. Pencil type soldering iron with a small tip (25 watts or less).
6. Tin leads on component before soldering.
7. Use only solder with an extremely low melting point, (60% Tin, 40% Lead).

WARNING: Excessive heat may damage the circuit board foil during component replacement if a soldering pencil, iron or gun of higher wattage rating is used.

COMPONENT REPLACEMENT

Resistors and capacitors should be replaced by clipping out the defective part and neatly soldering in the new part. If a unit, such as the oscillator coil or I.F. transformer is to be removed, heat the mounting lugs with a pencil type soldering iron and move them away from the soldered connection with a long-nose pliers or metal pick. Continue heating the lugs and brush away the molten solder with a small stiff glue brush. Remove the defective unit before lifting it off the chassis. Before inserting the new unit, be certain that the lug holes are open and free from solder. Forcing a lug against a solder filled lug hole may break the bond between the chassis base and the wiring foil. It is, therefore, necessary to exercise care when replacing units.

An open or damaged section of circuit board wiring foil can be repaired by soldering a short jumper wire across the points to be connected. When soldering the low voltage electrolytics, transistors and diodes, the wire should be held with a pair of long nose pliers. The long nose pliers will act as a heat sink.

TROUBLE SHOOTING AND SIGNAL TRACING

The old technique of "screwdriver testing" is definitely not recommended while trouble shooting any solid state product. In that method various circuit points were touched or shorted to ground to cause a hum or click in the speaker. This must be avoided because a solid state component can be destroyed if excessive voltage or if wrong voltage polarity is applied. Only standard point to point signal tracing with the proper RF, IF, and Audio Signal Sources should be used.

RESISTANCE MEASUREMENTS

When making resistance measurements in the circuit, it is most important to remove any transistors in the circuit under test for accuracy in readings. Incorrect or inaccurate resistance measurements are the result of a transistor acting as a diode and conducting. When making measurements across an electrolytic capacitor, be certain the ohm meter leads are correctly polarized. Also, be certain the battery voltage of the meter does not exceed the working voltage of the capacitor; the capacitor may otherwise be damaged.

FM ALIGNMENT

Alignment of these chassis will, in most cases, not be necessary unless an RF or IF transformer is replaced or if someone has tampered with the adjustment.

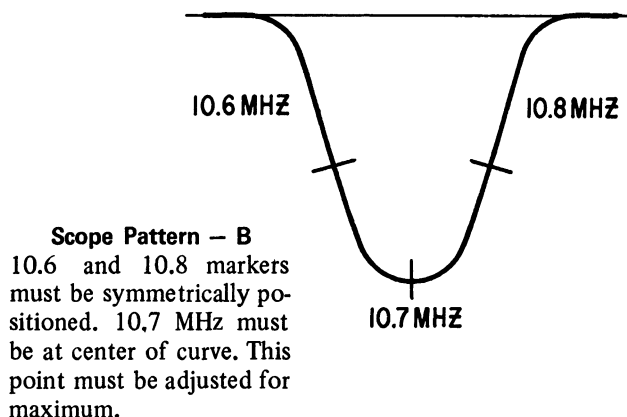
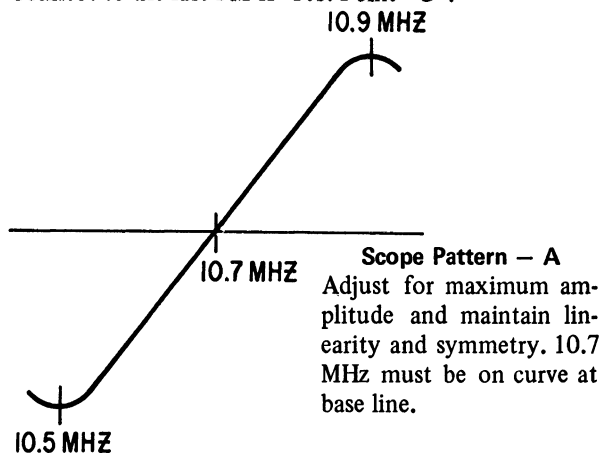
Because of the wide band pass required in the multiplex FM tuner, it is desirable to use an FM signal generator having a deviation of 400 KHz with a sweep rate of 60 Hertz as well as an oscilloscope when aligning both the IF and RF FM portions of this receiver. It is not only necessary to obtain maximum amplitude in the IF amplifier stages, but also necessary to maintain symmetry. To help achieve this symmetry, it is desirable to have 10.6, 10.7 and 10.8 megacycle markers in obtaining IF curve symmetry.

The condenser mentioned further on in the alignment procedure should be as small as possible and the ground lead of the generator must be connected to the chassis at the base of the socket, where the signal is being injected. Should the signal be injected at some point other than a socket, then the ground lead should be connected to ground as closely as possible to this point.

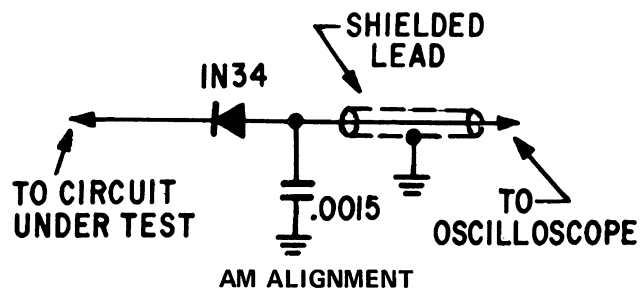
In all alignment procedures, the signal generator output should be kept just high enough to obtain an indication. This is most necessary, since on some chassis we have a zero time constant limiter which will clip the signals if their magnitude is too great, resulting in erroneous waveforms.

In the following alignment procedure charts there is a letter appearing in the operation column in addition to the number. This letter indicates the test point to which the hot lead of the scope is to be connected as follows:

- A. Connect to Ratio Detector Test Point "H".
- B. Connect to the last FM IF Test Point "G".



A detector probe is required. If your oscilloscope is not equipped with this probe, it can easily be constructed. For best results, this probe should be shielded.



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

Normally the Oscillator, RF and Mixer Coils and Transformers will not require adjustment unless they have been replaced or misaligned. If alignment becomes necessary the Oscillator Coil should be adjusted at 535 KHz with the tuning gang closed. Adjust the RF and Mixer Transformers at 600 KHz. These adjustments should be made after the corresponding trimmer adjustment shown in the alignment charts. Repeat the corresponding coil and trimmer adjustments for best results.

RF AND IF ALIGNMENT PROCEDURE FOR CHASSIS 21BT34 & 21BT34Z1

OPERATION *	CONNECT GENERATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL TO	ADJUST	PURPOSE
NOTE: For AM Alignment Use A Signal With 400 Hertz Modulation							
1 C	One turn loosely coupled to wavemagnet		455 KHz	BC	600 KHz	L203, L204, L207, L210	Align IF channel for maximum output
2 C			1600 KHz	BC	1600 KHz	C1G	Set oscillator to dial scale
3 C			600 KHz	BC	600 KHz	L103	
4 C			Repeat Operations No. 2 & 3				
5 C			1500 KHz	BC	1400 KHz	C1D	Align antenna stage
NOTE: For FM Alignment Use A Signal With 400 KHz Deviation							
6 A	Term. No. 5 of T205 3rd IF Trans. Test Point "G"	47 ohm in shunt with gen. output. Then from hot lead a 27 ohm in series with a .001 MFD capacitor.	10.7 MHz	FM	Gang Closed	L212	Adjust Primary and Secondary of ratio detector for maximum amplitude and symmetry, as shown in Scope Pattern "A"
7 A			10.7 MHz	FM	Gang Closed	L214	
8 B	Term. No. 3 of T203 2nd IF Trans. Test Point "F"		10.7 MHz	FM	Gang Closed	L208 & L209	
9 B	Term. No. 3 of T201 1st IF Trans. Test Point "E"		10.7 MHz	FM	Gang Closed	L205 & L206	Align I.F. transformer for maximum output and symmetry. This pattern is not necessarily identical to the overall Scope Pattern "B"
10 B	Connect to Test Point "D"		10.7 MHz	FM	Gang Closed	L201 & L202	
11 B			10.7 MHz	FM	Gang Closed	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 10B and 11B Generator ground Must be Connected On Braid As Close To Gang As Possible							
12 B	FM Antenna Post (Remove Antenna) Test Point "A"	300 ohm	106 MHz	FM	106 MHz	C13	Set oscillator to dial scale
13 B			90 MHz	FM	90 MHz	L4	
14 B			Repeat Operations 12 B and 13 B				
15 B			106 MHz	FM	106 MHz	C1A	Align FM Detector stage for maximum
16 B			90 MHz	FM	90 MHz	L2 if necessary	
17 B			106 MHz	FM	106 MHz	C1H	Align FM Antenna stage for maximum
18 B			90 MHz	FM	90 MHz	L1 if necessary	
19 B			Repeat Operations 15 B thru 18 B				

*For A, B, C See Page 12.

RF AND IF ALIGNMENT PROCEDURE FOR CHASSIS 25BT22

OPERATION *	CONNECT GENERATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	SET DIAL TO	ADJUST IRON CORES	PURPOSE
1 A	Term. #4 of T205 4th IF Trans.	47 ohm in shunt with gen. output. Then from hot lead a 27 ohm in series with a .001 MFD capacitor.	10.7 MHz 400 KHz Deviation	88 MHz	L213	Adjust Primary and Secondary of ratio detector for maximum amplitude and symmetry as shown in Scope Pattern "A"
2 A	Term. #4 of T205 4th IF Trans.		10.7 MHz 400 KHz Deviation	88 MHz	L214	
3 B	Term. #4 of T203 4th IF Trans. Test Point "F"		10.7 MHz 400 KHz Deviation	88 MHz	L211, L212	Align I.F. transformers for maximum output and symmetry. This pattern is not necessarily identical to the overall Scope Pattern "B"
4 B	Term. #4 of T201 2nd IF Trans. Test Point "E"		10.7 MHz 400 KHz Deviation	88 MHz	L207, L208	
5 B	Connect to emitter of Q2 Mixer Test Point #K		10.7 MHz 400 KHz Deviation	88 MHz	L9, L10	
6 B	Connect to emitter of Q2 Mixer Test Point #K		10.7 MHz 400 KHz Deviation	88 MHz	L5, L6	Align I.F. transformers for maximum output and symmetry as indicated in Scope Pattern "B"
7 B	Connect to emitter of Q2 Mixer Test Point #K		10.7 MHz 400 KHz Deviation	88 MHz	Readjust L5, L6, L203, L204, L207, L208, L211, L212	
8 B	FM Antenna Post (Remove Antenna)	300 ohm	98 MHz 400 KHz Deviation	98 MHz	L7	Set oscillator to Dial Scale.
9 B	FM Antenna Post (Remove Antenna)	300 ohm	98 MHz 400 KHz Deviation	98 MHz	L3, L2, L1	Align RF output, RF input and FM Antenna stages for maximum.
10 C	Base of Q101	.05 in series with hot lead of gen.	455 KHz 400 Hertz Modulated	600 KHz	L102, L103, L205, L206, L209, L210	Align AM IF for maximum.
11 C	Two turn loop loosely coupled to wave-magnet		1600 KHz 400 Hertz Modulated	1600 KHz	C101E	Set oscillator to dial scale.
12 C	Two turn loop loosely coupled to wave-magnet		1400 400 Hertz Modulated	1400 KHz	C101D, C101A	Align detector and antenna stages.

* For A, B, C See Page 12.

Refer to page 12 for AGC adjustment

RF AND IF ALIGNMENT PROCEDURE FOR CHASSIS 29CT30

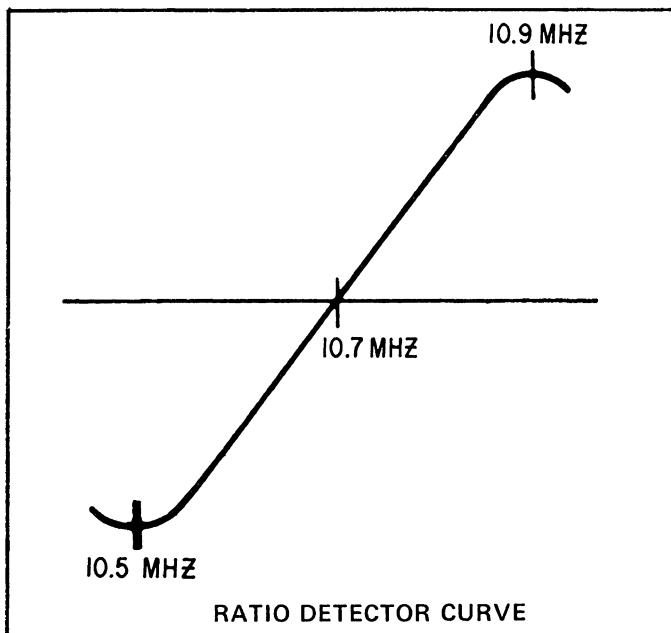
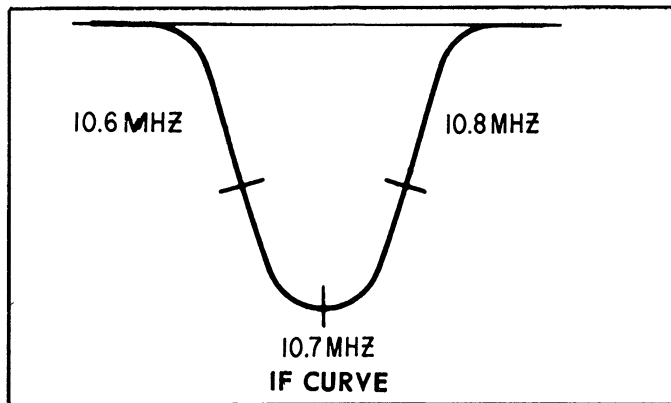
OPERATION *	CONNECT GENERATOR TO	DUMMY ANTENNA	INPUT SIGNAL FREQUENCY	BAND	SET DIAL TO	ADJUST	PURPOSE
NOTE: For AM Alignment Use A Signal With 400 Hertz Modulation							
1C	One turn loosely coupled to wavemagnet		455 KHz	AM	600 KHz	L203, L204, L207, L210, L215	Align IF channel for maximum output
2C			1600 KHz	AM	1600 KHz	C1K	Set oscillator to dial scale
3C			600 KHz	AM	600 KHz	L103	
4C			Repeat Operations No. 2 & 3				Align RF stage
5C			1400 KHz	AM	1400 KHz	C1H	
6C			600 KHz	AM	600 KHz	L106	
7C			Repeat Operations No. 5 & 6				
8C			1400 KHz	AM	1400 KHz	C1F	Align antenna stage.
NOTE: For FM Alignment Use A Signal With 400 KHz Deviation							
9A	Term.No. 5 of T205 3rd IF Trans. Test Point "G"	47 ohm in shunt with gen. output. Then from hot lead a 27 ohm in series with a .001 MFD capacitor.	10.7 MHz	FM	Gang Closed	L212	Adjust Primary and Secondary of ratio detector for maximum amplitude and symmetry, as shown in Scope Pattern "A"
10A			10.7 MHz	FM	Gang Closed	L214	
11B	Term. No. 3 of T203 2nd IF Trans. Test Point "F"		10.7 MHz	FM	Gang Closed	L208 & L209	Align I.F. transformer for maximum output and symmetry. This pattern is not necessarily identical to the overall Scope Pattern "B"
12B	Term. No. 4 of T201 1st IF Trans. Test Point "E"		10.7 MHz	FM	Gang Closed	L205 & L206	
13B	Connect to Test Point "D"		10.7 MHz	FM	Gang Closed	L201 & L202	
14B			10.7 MHz	FM	Gang Closed	Readjust L201, L202, L205, L206, L208 & L209	Align I.F. transformer for maximum output and symmetry as indicated in Scope Pattern "B"
NOTE: In Steps 13B and 14B Generator ground Must be Connected On Braid As Close To Gang As Possible							
15B	FM Antenna Post (Remove Antenna) Test Point "A"	300 ohm	106 MHz	FM	106 MHz	C13	Set oscillator to dial scale
16B			90 MHz	FM	90 MHz	L4	
17B			Repeat Operations 15B & 16B				Align FM Detector stage for maximum
18B			106 MHz	FM	106 MHz	C1C	
19B			90 MHz	FM	90 MHz	L2 if necessary	
20B			106 MHz	FM	106 MHz	C1A	
21B			90 MHz	FM	90 MHz	L1 if necessary	Align FM Antenna stage for maximum
22B			Repeat Operations 15B thru 21B				

*For A, B, C See Page 12.

SECTION THREE

MULTIPLEX ALIGNMENT PROCEDURE

Using the Zenith FM multiplex signal generator, the multiplex portion of Zenith or any FM multiplex receiver can be aligned, but first before any attempt is made to do this it is necessary that the technician be certain that the RF, IF, and ratio detector alignment is correct, and that the receiver operates normally on monaural signals.



Because of the wide band pass required in the multiplex FM receiver, it is desirable to use an FM signal generator having a deviation of at least 200 KHz with a sweep rate of 60 Hertz, as well as an oscilloscope. During the IF and ratio detector alignment it is not only necessary to obtain maximum gain, but also extremely important to maintain symmetry.

To help achieve this IF curve symmetry 10.6 and 10.8 megahertz markers must be symmetrically positioned and the 10.7 megahertz marker must be at the center of the curve. When aligning the ratio detector, 10.5 and 10.9 megahertz markers are desirable to achieve S curve symmetry. The pattern illustrating marker use to obtain S curve symmetry indicates it is most necessary to adjust for maximum gain and at the same time maintain linearity and symmetry. 10.7

megahertz must be on the curve at the reference line. 10.5 megahertz and 10.9 megahertz must be at the lower and upper turn of the S curve respectively. Only when the I.F. and ratio detector circuitry have been aligned in accordance with these specifications should the technician proceed to align the multiplex portion of the receiver.

Preliminary Procedures

Before using the Zenith FM multiplex signal generator, it is recommended that it be connected to the power source and turned on giving it a 10 to 20 minute warmup period. This will allow ample time for the RF, audio, and 19KHz oscillators to stabilize.

The following procedure is only necessary when the generator has been received from the factory, or has been subjected to a great deal of handling or transportation vibration. Although the 19KHz pilot generator oscillator is extremely stable, there is always the possibility that it could shift from its precisely assigned frequency. As a result, we have a very simple method to check the 19KHz pilot frequency using an FM multiplex receiver and FM multiplex station as a frequency standard. Proceed as follows:

1. Tune your FM multiplex receiver to an FM multiplex station and when the pilot indicator lights up, this indicates the 19KHz pilot amplifier is functioning. Since the 19KHz sine wave is from the transmitter it must be on frequency and can be used as a reference standard. With a cable connect the collector output of the 19KHz amplifier to the vertical input of a good oscilloscope.
2. On the multiplex generator set the pilot carrier amplitude control to 10%. Place L-R, L+R and 67KHz switches in OFF position and connect the composite output terminal directly to the horizontal input of the oscilloscope. On the oscilloscope you will see an oval Lissajous figure which should be motionless when the 19KHz output of the generator is synchronized with the 19KHz signal from the transmitter. Should the Lissajous figure rotate it will only be necessary to adjust the pilot carrier frequency trimmer on the multiplex generator with an IF alignment wrench until the Lissajous figure ceases to rotate. After the generator has been adjusted to zero beat, disconnect all cable.

This multiplex generator provides a composite multiplex signal as well as an RF signal, FM modulated by the composite multiplex signal. The composite signal is very useful since it is an excellent tool that can be used in signal tracing the multiplex portion of the receiver. We do not recommend that multiplex alignment be made using only the composite signal injected at the output terminal of the ratio detector tertiary winding, since there is always some phase shift occurring in the RF, IF or ratio detector circuits. As a result, multiplex alignment made by a signal injected at the ratio detector 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 and separation would be the maximum for this receiver.

The RF carrier in this generator is variable from 88 to 108MHz. The RF signal should be injected at a point in the FM band where no other 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 adjusting slug on the generator to this same frequency. The AGC voltage developed in the receiver should be maximum. AGC voltage substantially less than this will indicate the RF frequency adjusting slug is tuned to an image.

19KHz Sub Carrier Amplifier, Doubler and Mute Adjustments

1. Turn generator 19KHz pilot carrier amplitude control to 10% position.
2. Connect the V.T.V.M. (DC scale) and/or scope to the junction of the two frequency doubling diodes and chassis (test point "N").
3. Place the stereo-monaural switch in stereo position and short Test Point "T" to ground.
4. Adjust the 19KHz amplifier transformer and the doubler transformer for maximum output. Simultaneously adjust the mute control so the voltage at the junction of the two frequency doubling diodes never exceeds .2 volt during this operation. This voltage must be kept at a minimum for proper alignment. The three controls in this paragraph have an effect on each other. Should the stereo indicator light up, readjust the mute control to extinguish the lamp and continue adjustment of the transformers for maximum.
5. Remove ground from Test Point "T".
6. Turn generator pilot carrier amplitude control to 5% position.
7. Slowly rotate the mute control to a point where the stereo indicator lights up.

Separation Adjustments

1. Place stereo monaural switch in Stereo position.
2. Turn generator pilot carrier amplitude control to 10% position.
3. Move L-R and L+R generator switches from OFF position to L-R and L+R positions.
4. Connect a V.T.V.M. (AC scale) and/or scope to the L audio output, after the 38KHz filter.
5. Adjust the 38KHz detector transformer for maximum voltage at L output. The magnitude of this signal should be much greater than that at the R output. The voltage at the L output should be approximately 10 times or greater than at the R output.

TROUBLE-SHOOTING

Should a problem arise in aligning the FM multiplex portion of the receiver and the technician does not know whether the difficulty lies in the RF, IF, limiter and ratio detector portions of the receiver, or whether the difficulty lies in the multiplex

portion, the multiplex generator can be used as an excellent signal tracing device to determine if the multiplex section of the receiver is functioning properly. The composite output of the multiplex generator can be injected at the output of the ratio detector.

To reduce possible extraneous signals coming through the 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.

67KHz Signal Tracing

1. Turn generator pilot carrier amplitude control to zero.
2. Move L+R and L-R switches to OFF position.
3. Move 67 KHz generator switch from OFF position up to 67KHz. Sequentially connect an oscilloscope to the input and output of the 67KHz trap. The 67KHz signal at the output of the trap if it is properly nulled, will be much smaller than at the input. The voltage ratio should be approximately 20 to 1 input to output.

19KHz Signal Tracing

1. Move the 67KHz generator switch to OFF.
2. Rotate the generator 19KHz pilot carrier amplitude control to 10% position.
3. Sequentially connect your scope to the base of composite amplifier, base of 19KHz amplifier and collector of 19KHz amplifier. The amplitude of the 19KHz signal should greatly increase as you proceed along the 19KHz chain.

Doubler and Subcarrier Signal Tracing

To determine if the doubler is functioning, place your scope at the junction of the two diodes and you will see 38KHz DC pulses. Placing the scope at the collector of the subcarrier amplifier, you should see a 38KHz sine wave which will indicate that the subcarrier amplifier and associated ringing circuitry is functioning properly.

Multiplex Detector Signal Tracing

1. Leave the 19KHz amplitude control at 10%.
2. Move the L - R generator switch from OFF position to L - R position. You should see equal amplitude 1000 hertz sine waves at both L and R outputs.
3. Move the L+R switch from OFF up to L+R and look at the L audio output, and measure the magnitude of the 1000 Hertz sine wave. If the multiplex detect or and preceding circuitry are aligned properly, the magnitude of the wave form at L should be greater than at R.

If all the waves are similar in form and magnitude to those indicated, then 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 wave forms are missing at a latter point but are apparent at a previous point, then something is amiss in the circuitry between the two test points.

SECTION FOUR

FOUR CHANNEL SOUND

INTRODUCTION

As the state of the art advances, new devices and circuits are developed, resulting in rapid and wide spread changes in a given industry. An example of this would be the following changes which have occurred in the audio related fields:

1. Monophonic records, radio broadcasts, and tape.
2. Stereophonic records and tape.
3. Stereophonic FM radio broadcasts.

Monophonic records and broadcasts provided the listener with a basic medium of transmission. Figure 1 illustrates the studio (radio or recording) in which are found the orchestra, and one microphone. Below that we show the listening room containing one loudspeaker system and one listener. While a "direct connection" is shown between the microphone and the loudspeaker, it should be understood that, in place of the direct

connection, there will be storage devices (tape and records), and transmission systems (transmitters and receivers). While those four elements (tape, records, transmitters and receivers) will normally be used, they have been omitted from the illustrations to simplify explanations.

Introduction of stereophonic sound provided the means by which it was possible to present sound that would identify the left - right position of entertainers, or their instruments. This resulted in a more realistic sound image to the listener. In the early days of stereo we were limited to the use of records and tape, until a technique was developed by Zenith which would allow transmission of stereo records and tape via FM (referred to as multiplexing, or more commonly FM stereo).

In figure 2 we have illustrated the studio, but this time with two microphones, which in turn are "connected" to two loudspeakers in the listening room.

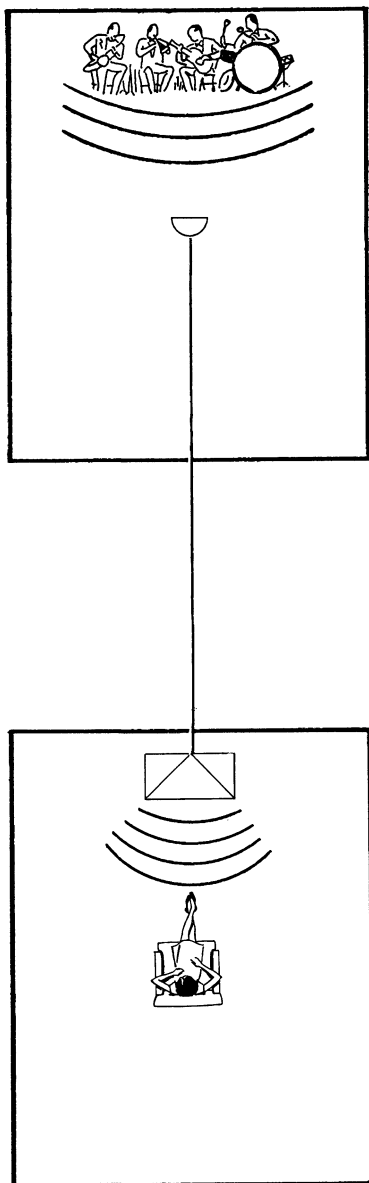


FIGURE 1

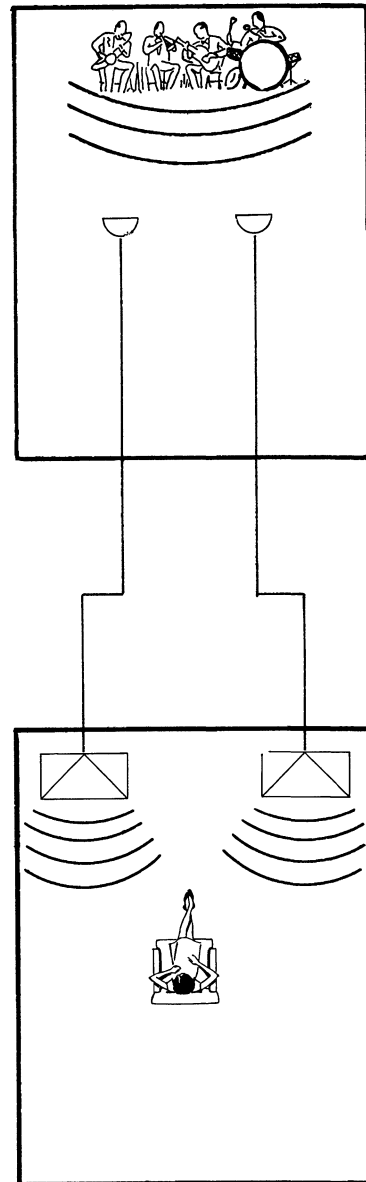


FIGURE 2

At this point we should make note of the fact that the human auditory system responds to sounds which approach not only from the left and right, but also from the front and rear. This is due, in part, to the reflected sounds in the listening room. If both the listener and the sound source were in an area that had no echos, such as an open field, the sound would arrive from only one direction, as illustrated in figure 3. However, most areas (such as the average room) do have echos (or indirect sound) as shown in figure 4.

It is known that the human auditory system will detect sounds from the front, back, left, right, and directions in between. A human, with normal hearing, can pinpoint most individual sounds from any point within a 360 degree circle. Human hearing can also detect the intermix of sounds (or lack of) caused by room acoustics (due to amplitude, phase, frequency, and time delay). This is referred to as "ambient sound" (meaning surrounding). Ambient sound, when part of, or added to stereo records or tape can result in a greatly enhanced sound.

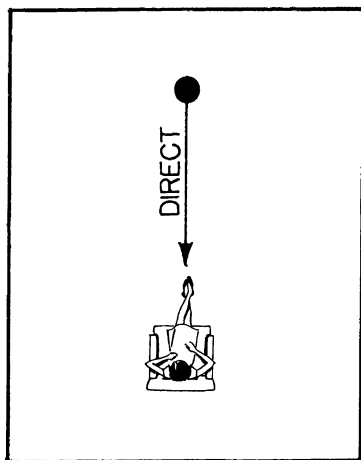


FIGURE 3

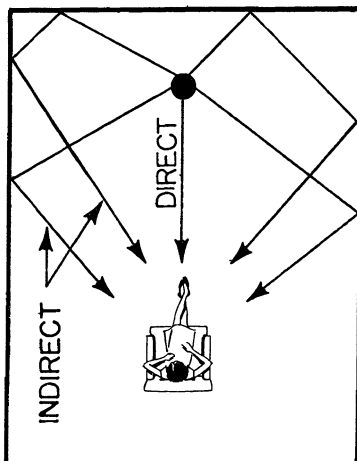


FIGURE 4

WHAT IS FOUR CHANNEL SOUND?

Now comes the introduction of Four Channel Sound (sometimes referred to as quadra-sonic or quadri-phonic sound, etc.).

Since we have sounds in the four quarters of the room, what can be done with them? How can they be re-produced? Figure 5 illustrates four microphones, one in each quarter of the room. They in turn are "connected" to four loudspeakers in the listening room (one in each corner).

So far this looks simple, but — how can we record four separate channels? The most practical method is on tape (at this moment). There would be no problem if one were to use only tape. However, how do we broadcast the tape? The Federal Communications Commission (FCC) has approved a system of broadcasting two channel stereo, but has not approved a system for four separate channels. How can a four channel system be processed, when most of the media (radio, disc, tape) is designed around a two channel system?

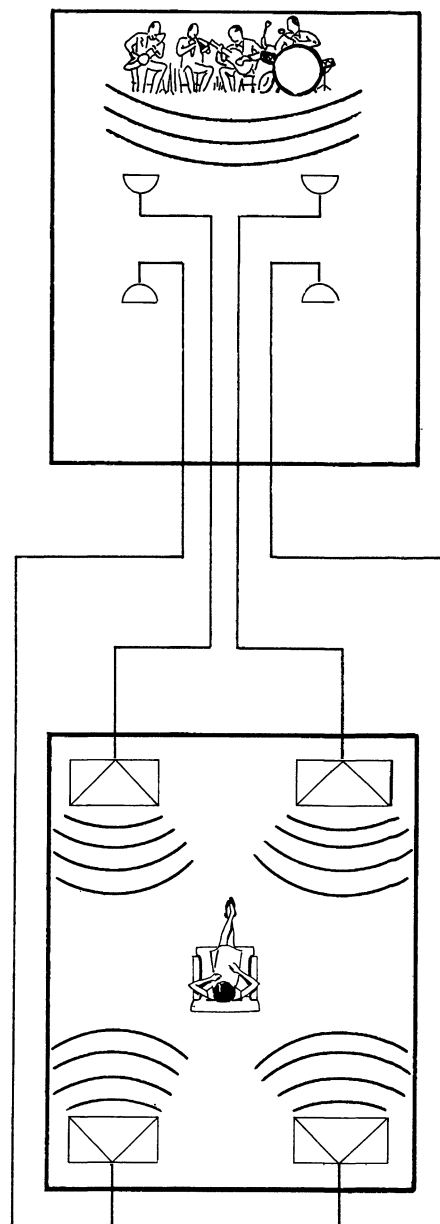


FIGURE 5

DISCRETE VS. MATRIX

Perhaps we should define two terms which we will be using.

1. **DISCRETE** – Separate or distinct.
2. **MATRIX** – In this discussion refers to a circuit for combining a group of incoming signals into another group of signals which will contain specific percentage levels of each of the incoming signals.

A discrete system would pick up 1, 2 or 4 separate sound sources and send them via 1, 2 or 4 separate channels to 1, 2 or 4 separate sound reproducers as illustrated in Figures 1, 2 and 5 respectively. As noted before this results in limitations as far as broadcasts and discs are concerned. In addition, if you were to put four separate channels on tape you would cut the available time in half, increasing tape cost (based on current tape cassette and cartridge design).

How do we broadcast a regular stereo disc or stereo tape on FM? We use a basic circuit which combines the L and R signals into sum (L+R) and difference (L-R) signals. Could this system be used for the broadcast of four channel sound?

ENCODING MATRIX

In figure 6 we show four separate sources of sound: Left-Front (LF), Right-Front (RF), Right-Back (RB), and Left-Back (LB). As you will note, a certain ratio of each source (LF, RF, RB, and LB) is fed to a matrix. The resultant mixtures, or "encoded" signals, are available at the "L" and "R" outputs. We now have "L" and "R" outputs which are compatible with current media, that is, we can record on discs, tape, or can broadcast encoded signals on FM stereo.

Since there are several similar methods for encoding, we have selected a typical matrix type encoder, that would be used in a radio station or recording studio, to provide reference data for our explanation of the decoding system operation.

Let us restate the data from figure 6 which represents the output of the encoder (L' denotes encoded L, R' denotes encoded R, and $\cong$ denotes an approximate value):

$$L' \cong +1.22LF + .38RF + 1.22LB - .62RB \quad (1)$$

$$R' \cong +.38LF + 1.22RF - .62LB + 1.22RB \quad (2)$$

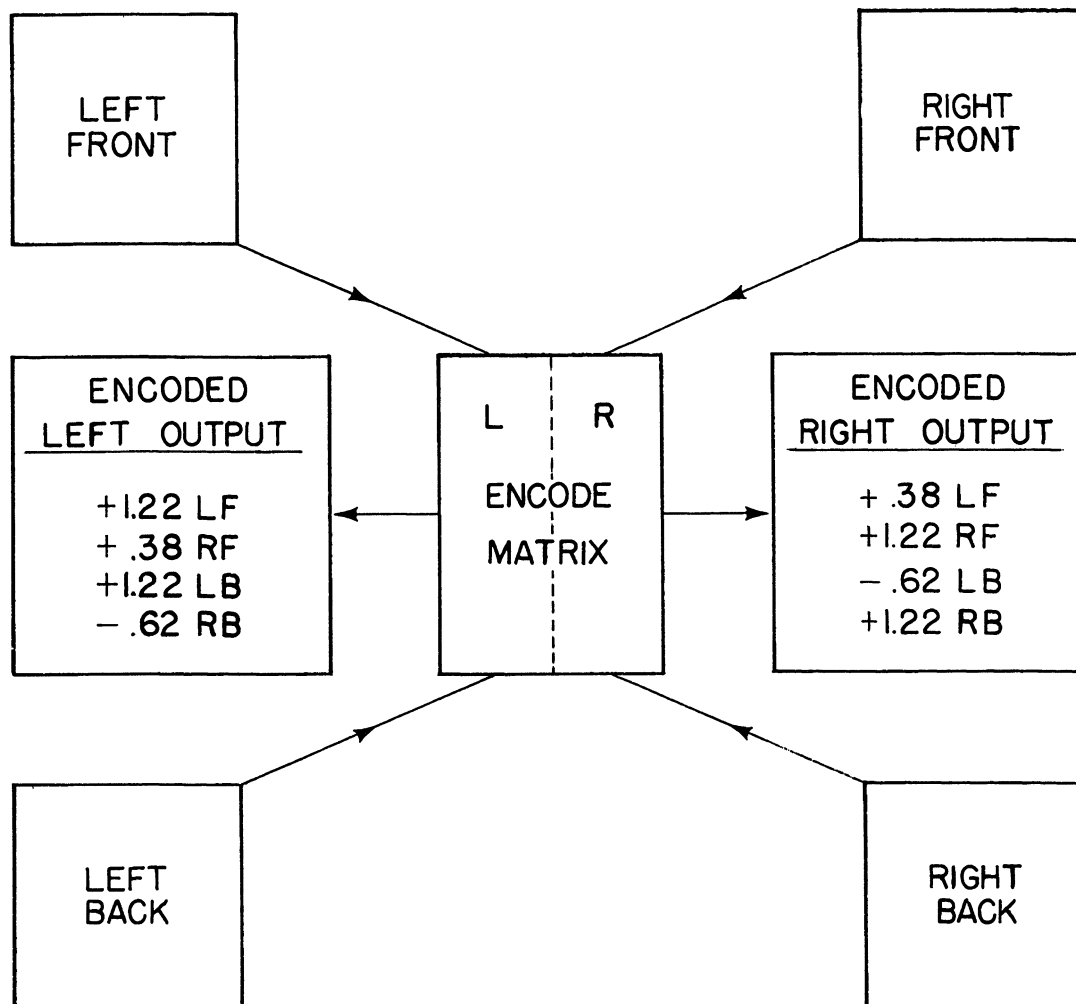


FIGURE 6

What we are saying in equation No. 1 is that the encoded L channel contains four basic signal components, representing the four basic corner sources, in a given ratio. The encoded L signal contains LF and LB signals that are equal to the LF and LB inputs and are in phase, an in-phase signal that is 38% of the RF input, and a signal which is 62% of the RB input (but out of phase with the input).

A similar interpretation also applies to the R encoded output.

Since we have reduced the four sources to two channels, we can process them as we would two channel material, that is broadcast via FM, or record on disc or tape.

DECODING MATRIX

If encoded material is applied to a conventional stereo system (no decoding) it will be reproduced, but without the enhancement due to the ambient sound or any of the front to rear depth of sound. There will only be the conventional left-right composition of the sound. Figure 7 illustrates the decoding action. The L' and R' signals will be applied to the decoding matrix so there will be specific ratios of L' and R' at the output of the matrix. While four decoded outputs can be derived, Zenith engineers have determined that decoding the Left-Front (LF) and Right-Front (RF) provides no significant

advantage, under most conditions. For this reason Zenith decodes only the Left-Back (LB) and the Right-Back (RB). Zenith engineers have also found that optimum reproduction is obtained when a given ratio of L' and R' signals are available at the output of the matrix.

Zenith uses the following ratio values:

$$LB \cong +.68L' - .53R' \quad (3)$$

$$RB \cong -.53L' + .68R' \quad (4)$$

When equations 1, 2 and 3 are combined we derive:

$$LB \cong +.63LF - .39RF + 1.16LB - 1.07RB \quad (5)$$

Likewise, combining equations 1, 2 and 4 yields:

$$RB \cong -.39LF + .63RF - 1.07LB + 1.16RB \quad (6)$$

From equation 5 for the LB output we see that the LB signal is predominant, while RB is of lower value and of a phase opposite to LB. The LF is of a lower value and in phase, while RF is lower yet and of a phase opposite to LF.

Equations 5 and 6 are represented in figure 7 as the derived LB and RB outputs. The LF and RF outputs are those of the inputs L' and R', the encoded signals as in equations 1 and 2 respectively.

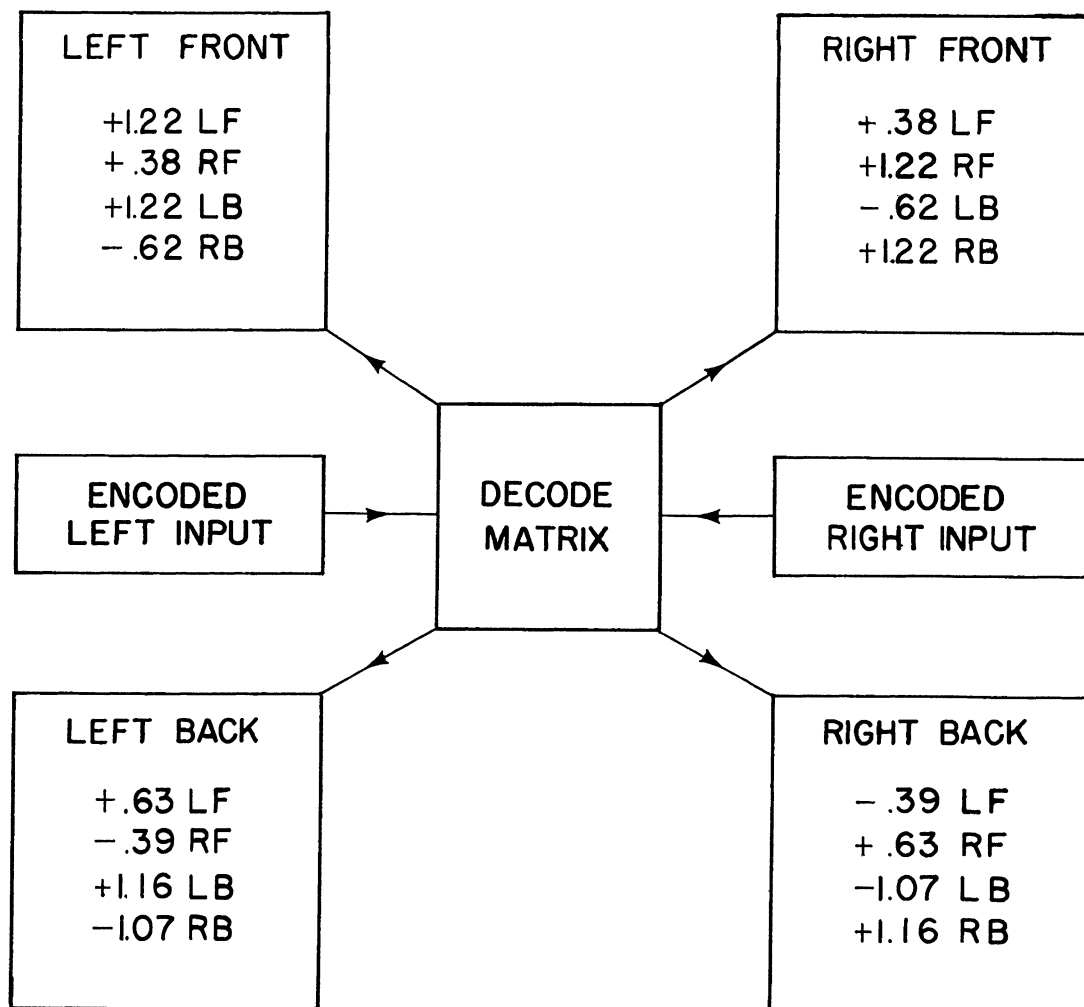


FIGURE 7

DECODER MATRIX CIRCUIT

Now that we have discussed operation of the encoding and decoding matrix circuits, we will move on to the circuit in use. Figure 8 shows the circuitry as used in Chassis 15WCA10 (Model C9029W). Starting at the input, the R' and L' signals (encoded) will be fed through the Input Selector Switch S401, capacitors C401 and C451, to the bases of Q401 and Q451. These transistors will have their outputs (collectors) out of phase with their respective inputs (bases). In addition, a signal at the emitter (in phase with the base) will be fed via capacitor C420 and resistor R431 to the opposite emitters. Capacitor C420 serves as DC isolation between the two emitter circuits. Resistors R403, R431 and R453 form divider networks controlling the ratio of R' and L' injected into the opposite emitters.

At the collector of each transistor (Q401 and Q451) there will be an element of L' in phase with the L' input and R' out of phase with the R' input (if we have looked at Q401 for the right channel). A similar observation will be noted at the collector of Q451. Values at either collector are determined by the divider network consisting of R403, R431 and R453, and will reflect the ratios shown previously in equations (3) and (4).

Switch S402, connected in series with C420 and R431, activates the decoding circuit when closed. When this switch is open, the decoding circuit is not in operation and the chassis will function as two separate amplifier channels. Following the above circuits are conventional dual Loudness, Bass, and Treble controls and their respective pre amplifiers and also power amplifiers using complementary symmetry circuitry. In the output of each stage is an autoformer for matching the output transistors to external loads of 8 ohms. Between the autoformer and the speaker jacks is located a phase reversal switch with which to achieve proper speaker phasing when the Decoder is used with different units.

DECODER CONNECTIONS

Next comes the question — Since Chassis 15WCA10 only contains the decoder and two audio output channels, where do we connect to obtain the encoded material? Many Zenith stereo sets introduced in June, 1971 are equipped with Decoder jacks located on the cabinet rear, along with the tape input/output connectors, etc. (see figure 9). Figure 10 shows a partial circuit of Chassis 29CT30 (which is typical and is used in many of the console stereo models). Four connectors for the Decoder are connected in the circuit at a point after the Loudness Controls, but before the Bass and Treble controls. When any model with Decoder provisions is shipped from the factory, jumpers are connected between the right decoder input/output and also between the left decoder input/output, so normal stereo operation is obtained.

4 CHANNEL AUDIO CONNECTOR JACKS

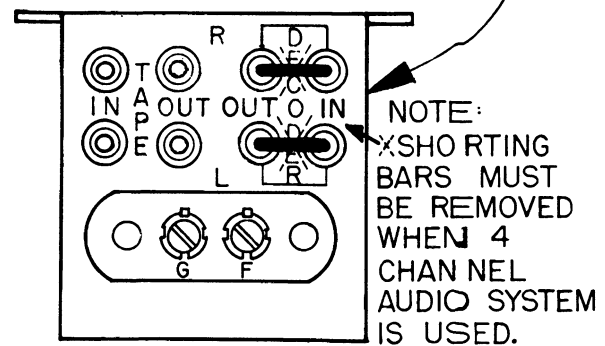


FIGURE 9

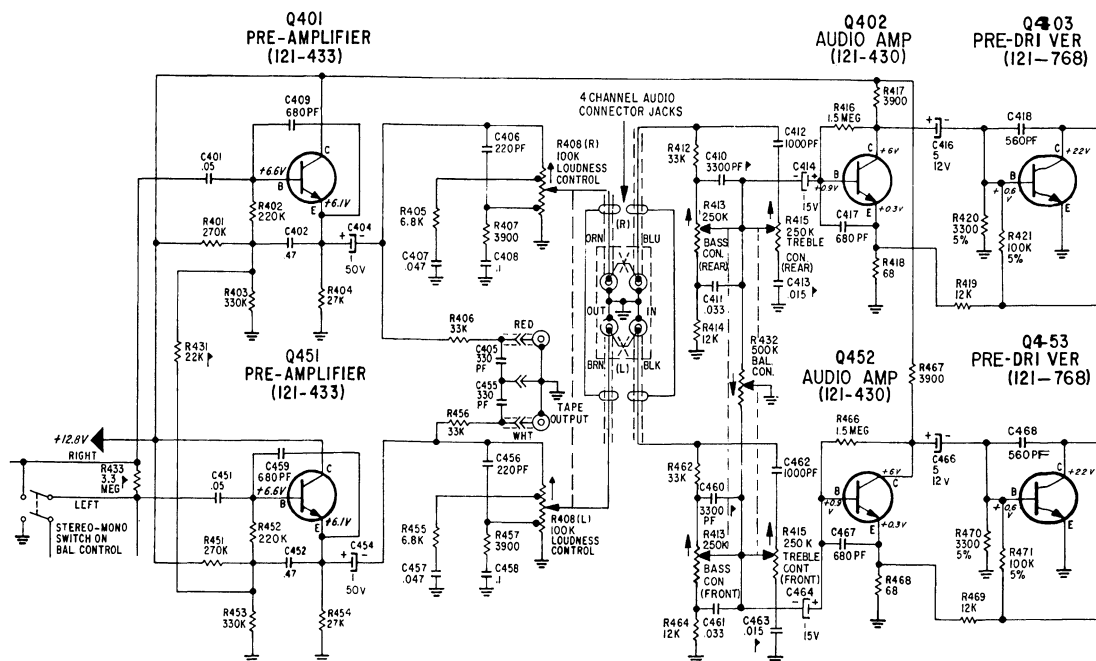


FIGURE 10

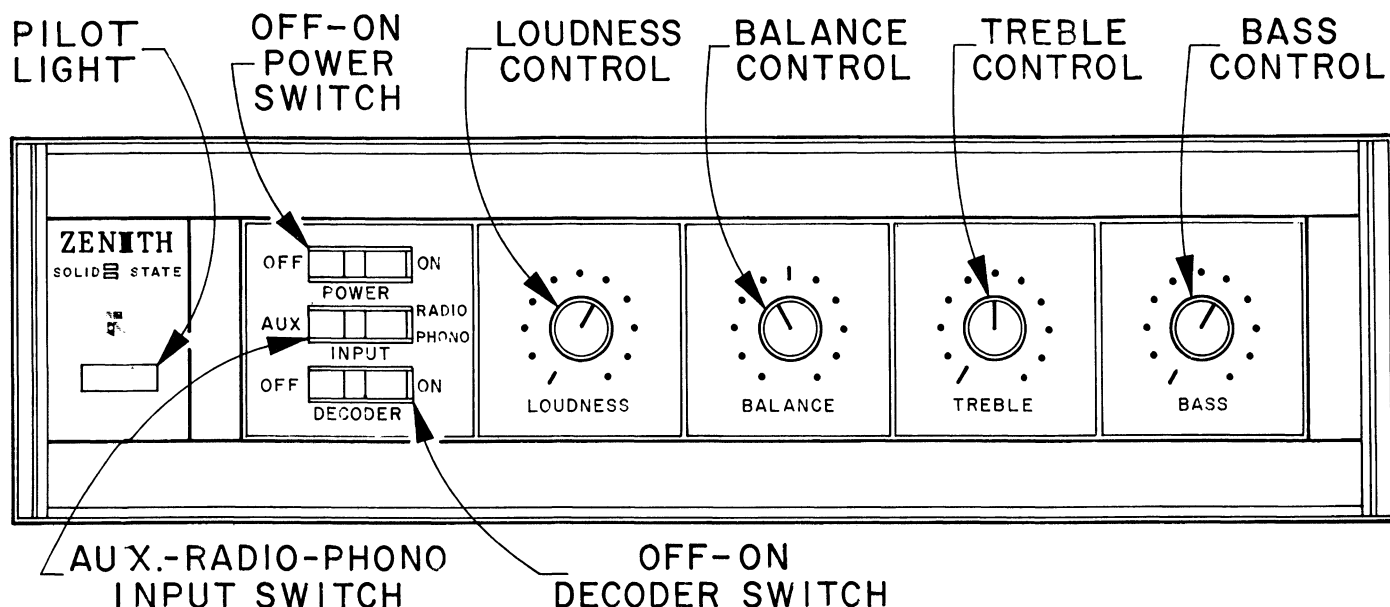


FIGURE 11

INSTALLATION

To install the Decoder, proceed as follows, (referring to figures 9, 11 and 12, also see Decoder Operating Guide):

1. Turn Main Stereo unit OFF. (Main Stereo unit refers to your existing two channel stereo unit).
2. Determine if your unit has Decoder Jacks (then follow step 3), or only Tape Output Jacks (skip steps 3 and 4, and go to step 5).
3. Remove two jumpers from decoder jacks on rear of main stereo unit (if equipped with decoder jacks).
4. Two adapters are supplied which have two plugs and one jack each. Install one of the adapters in the Right channel by inserting the orange coded plug into the orange jack (R DECODER OUT), and the blue coded plug into the blue jack (R DECODER IN). For the Left channel insert the brown coded adapter plug into the brown jack (L DECODER OUT), and the black coded plug into the black jack (L DECODER IN). The red and white coded plugs on the cable which is part of the Decoder are connected to the corresponding red and white coded jacks on the adapters (skip step 5).
5. NOTE: This Decoder has been designed to allow use with the tape output jacks on those models which are not equipped with decoder jacks. Install the above adapters by inserting the orange coded plug into the Right Tape Output Jack and the brown coded plug into the Left Tape Output Jack. Decoder cable plugs are connected to the red and white adapter jacks. Two in-line adapters are then connected to the blue and black adapter plugs. These in-line adapters then allow connection to tape recorder input jacks.
6. Place Decoder Speaker Assemblies in the rear corners of the room, pointing them to the front as shown in figure 5. (Note step 8 under "Decoder Operation").
7. Insert plugs on Speaker Assembly Cables into the R and L Speaker Jacks on rear of Decoder.

8. Plug Decoder AC cable into a convenient 110 volt, 60 Hertz (cycles) AC outlet.
9. CAUTION: Be certain that all cables are placed away from normal room traffic paths.

DECODER OPERATION

1. Turn the Main Stereo unit ON, following the operating instructions for that unit.
2. Select a source of stereo sound (such as FM, Tape, or Phono) with the Stereo/Mono Switch in the STEREO position. An "encoded" four channel tape or disc is recommended, if available.
3. Set the Main Stereo unit level and tone as desired.
4. Place Decoder Power Switch in ON position, Input Selector Switch to RADIO/PHONO, and Decoder Switch to the ON position.
5. Adjust the Decoder Loudness, Bass, and Treble controls to provide the desired level and tone similar to the main stereo unit.
6. Rotate the Balance controls on both the Main Stereo unit and on the Decoder unit fully to the clockwise direction. This will permit adjusting balance between two speaker systems on one side of the room.
7. Adjust Decoder Loudness control for the desired balance of sound level between the front and rear speaker systems. Loudness control on the main unit will control the Decoders over all level. NOTE: If the Decoder has been connected to the tape output jacks of a unit, which does not have Decoder jacks, it will be necessary to readjust the Decoder Loudness Control if the Loudness Control is adjusted on the Main unit.
8. In order to obtain maximum tonal response the speaker systems must be correctly phased. A phase switch is located on the rear of the Decoder and is placed in either the plus (+) or minus (-) position. The proper position is that in which a stereo sound appears to come from a point approximately midway between the Front and Rear

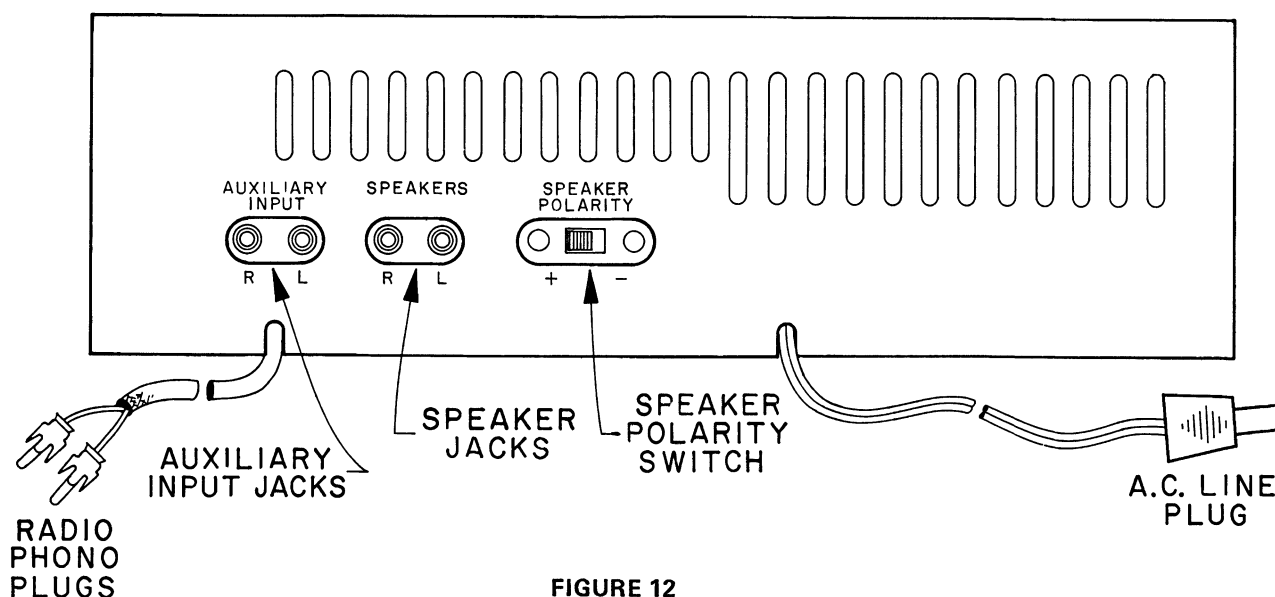


FIGURE 12

speaker systems. NOTE: It may be easier to set the Phase Switch if the rear speaker system (on the one side) were moved forward near the front speaker system and then adjust the switch. (It should not be necessary to adjust this switch again unless it has been accidentally moved, or if the Decoder is to be used with a different unit.)

9. Adjust Main unit Balance control for the desired Left-Right balance of the Front Speaker Systems.
10. Adjust the Decoder Balance control for the desired Left-Right balance of the Rear Speaker Systems.
11. Adjust the controls on the Main unit to provide the desired program material, being certain to place the stereo/mono Switch in the STEREO position.
12. With the Decode Switch in the OFF position you will be provided with a pair of rear channels containing the same program material as the respective front channels.
13. Placing the Decode Switch in the ON position will activate the decode circuits, and if encoded "Four Channel" material is being received it will be reproduced, as such, in the four speaker systems.
14. Place the Decoder Power Switch in the OFF position when not in use.

DISCRETE FOUR CHANNEL OPERATION

In the event that you have, or may obtain a "Discrete Four Channel" source, such as a Four Channel Tape Player/Recorder, you should connect the Left-Front and Right-Front channels to the Left and Right tape inputs on your Main unit. Connect the Left-Back and Right-Back channels to the Aux inputs on the Decoder and place the Radio/Phono-Aux switch in the AUX position. This will provide four discrete reproduction channels, similar to figure 5, when the Decoder Switch is in the OFF position. Decoder Power Switch must be in the ON position.

SPEAKER POSITIONS

While it is recommended that the speakers be positioned as shown in Figure 5 (Front speakers facing the rear of the room and the rear speakers facing the front of the room) it is possible that alternate speaker positions (see figure 13) may provide a more desirable sound for some FM broadcasts, tape, or records.

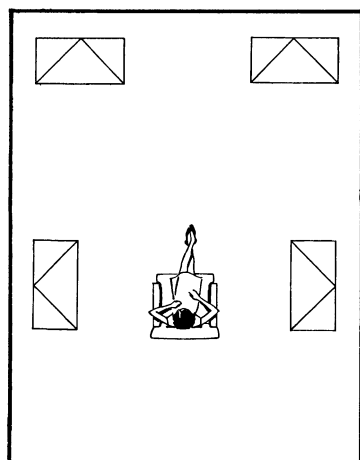


FIGURE 13A

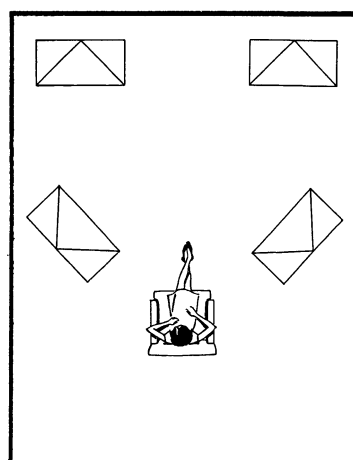


FIGURE 13B

PART NUMBER	DESCRIPTION	PRICE	PART NUMBER	DESCRIPTION	PRICE
CHASSIS 15WCA10					
11-259	Line Cord	2.30	*121-889	Transistor - Driver (2 Required)	
*12-5880	Chassis Support Bracket (2 Required)		125-140	Line Cord Retaining Bushing (2 Required)	.10
19-492	Wire Retaining Clip (3 Required)	.05	*136-25	Fused With Leads (.750 Amp.)	
22-2939	680 PF Ceramic Disc Cap. - 500V. (6 Required)	.25	205-51	Silicone Grease	.16
22-3034	.05 MF Ceramic Disc Cap. - 25V. (2 Required)	.45	212-71	Silicon Rectifier (2 Required)	1.25
22-3599	.015 MF Mylar Cap. - 50V. (2 Required)	.30	*800-364	Output Transistors - Matched Pair (Consists of One Each 83-8298, 121-926, 121-927, and 205-51).	
22-3661	.05 MF Ceramic Disc Cap. - 100V.	.25	*S-91190	Phase Switch, Jack & Plate Assembly	
22-3657	1 MF Electrolytic Cap. - 50V. (2 Required)	1.50	CHASSIS 21BT34		
22-3721	200 MF Electrolytic Cap. - 35V. (2 Required)	2.25	12-5420	Background Bracket	1.55
22-3891	.0068 MF Cap. - 100V. (4 Required)	.30	*12-5425	Pulley Mtg. Bracket (Part Of S-85563 & S-86475) (2 Required)	.03
22-3973	100 MF Electrolytic Cap. - 25V. (2 Required)	1.30	*12-5524	Control Mtg. Bracket	
22-4572	500 MF Cap. - 15V.	1.60	17-130	Cable Clamp	.25
22-5091	2 MF Electrolytic Cap. - 15V. (2 Required)	.80	17-156	Cable Clamp	
22-5860	.82 MF Mylar Cap. - 100V (2 Required)		19-480	Retaining Clip	.03
22-5862	.1 MF Cap. - 100V. (2 Required)	.35	19-485	Speed Clip	.10
22-6005	.01 MF Ceramic Disc Cap.	.40	19-614	Clip (Part Of S-85104)	
22-6112	1000 MF Electrolytic Cap. - 65V.	3.15	20-1256	Trap Coil - 10.7 MHz	1.05
*22-6707	7 MF Electrolytic Cap. - 10V. 03%		20-1648	FM R.F. Coil	.35
*33-397	Printed Circuit Board Frame		20-1649	FM Oscillator Coil	.50
52-1287	3 Conductor Cable (Used on S-91190)	.15	20-2033	Peaking Coil	.40
52-1642	2 Conductor Cable (Used on S-91190)	1.05	*20-3080	Trap Coil - 67 KHz (2 Required)	
*52-1991	Shielded Cable & Plug (Used on 85-1212		20-3291	FM Antenna Coil	.20
54-139	3/8 - 32 x 9/16 Palnut (1 Used on Ea. 63-7681, 63-7682, 63-7683 & 63-9000)	.03	22-13	.0033 MF Disc Capacitor - 500V.	.25
54-334	Tinnerman Speed Nut (1 Used on Ea. 114-1144)	.03	22-14	.0047 MF Disc Capacitor - 500V. (2 Required)	.25
63-1708	15 Ohm Resistor - 1/2W. 10% (2 Required)	.17	22-18	.0022 MF Disc Capacitor - 500V. (2 Required)	.25
63-1740	82 Ohm Resistor - 1/2W. 10% (2 Required)	.17	22-2428	1.8 PF Gimmick Capacitor - 500V.	.25
63-1768	390 Ohm Resistor - 1/2W. 10% (2 Used on 63-7683)	.17	22-2481	8 PF Disc Capacitor ± .25 PF - 500V. (3 Required)	.25
63-1774	560 Ohm Resistor - 1/2W. 5% (2 Required)	.17	22-2729	.001 MF Disc Capacitor - 25V. (3 Required)	.25
*63-1777	680 Ohm Resistor - 1/2W. 5% (2 Required)		22-2884	5 MF Electrolytic Capacitor - 12V. (4 Required)	1.50
63-1792	1500 Ohm Resistor - 1/2W. 10%	.17	22-2939	680 PF Disc Capacitor - 500V. (2 Required)	.25
63-1798	2200 Ohm Resistor - 1/2W. 5% (2 Required)	.34	22-3033	.02 MF Disc Capacitor - 25V.	.35
63-1810	3900 Ohm Resistor - 1/2W. 10% (2 Required)	.17	22-3034	.05 MF Disc Capacitor - 25V. (12 Required)	.45
63-1817	5600 Ohm Resistor - 1/2W. 10% (2 Required)	.17	22-3080	.005 MF Disc Capacitor - 25V.	.25
*63-1827	10K Ohm Resistor - 1/2W. 10% (4 Required)		22-3177	390 PF Disc Capacitor - 500V. (2 Required)	.25
63-1831	12K Ohm Resistor - 1/2W. 10% (2 Required)	.17	22-3255	330 PF Disc Capacitor - 500V. (2 Required)	.25
63-1838	18K Ohm Resistor - 1/2W. 10% (2 Required)	.17	22-3310	2.7 PF Gimmick Capacitor - 500V. (2 Required)	.25
*63-1860	62K Ohm Resistor - 1/2W. 5% (2 Required)		22-3393	.01 MF Disc Capacitor - 25V. (5 Required)	.25
*63-1918	1.5 Megohm Resistor - 1/2W. 10% (2 Required)		22-3415	.0068 MF Disc Capacitor - 25V.	.25
63-1925	2.2 Megohm Resistor - 1/2W. 10% (2 Required)		22-3541	3.3 PF Gimmick Capacitor ± 5% - 500V.	.25
63-1933	3.3 Megohm Resistor - 1/2W. 20%	.17	22-3558	16 PF Disc Capacitor ± 5% - 500V.	.25
*63-5930	.47 Ohm Resistor - 1W. 10% (4 Required)		22-3652	.1 MF Disc Capacitor - 10V. (3 Required)	.30
63-6105	6800 Ohm Resistor - 1W. 10%	.15	22-3661	.05 MF Disc Capacitor - 100V.	.25
63-7681	Dual Treble Control	2.60	22-3675	10 PF Disc Capacitor ± 5% - 500V.	.25
63-7682	Dual Bass Control	2.50	22-3687	1 MF Electrolytic Capacitor - 50V. (2 Required)	1.50
63-7683	Dual Loudness Control	2.95	22-3721	200 MF Electrolytic Capacitor - 35V. (2 Required)	2.25
*63-9000	Balance Control		22-3770	5.5 PF Disc Capacitor ± .25 PF - 500V.	.30
64-1033	Grip Eyelet (40 Used on P.C. Board)	.03	22-3791	42 PF Disc Capacitor ± 5% - 500V.	.25
64-1046	Grip Eyelet (60 Used on P.C. Board)	.03	22-3792	17 PF Disc Capacitor ± 5% - 500V.	.25
*78-2066	Pilot Light Bulb (With Mtg. Clip)		22-3896	5 MF Electrolytic Capacitor - 25V.	1.00
79-174-12	No. 18 Sleeve - Yellow (5 Required)	.03	22-4568	100 MF Electrolytic Capacitor - 15V. (2 Required)	.95
83-6192	5 Lug Terminal Strip	.15	22-4572	500 MF Electrolytic Capacitor - 15V. (2 Required)	1.60
*83-8298	Insulating Strip (2 Required)		22-4617	.01 MF Disc Capacitor - 500V. (2 Required)	.10
*85-1212	Rocker Switch (Main-Aux.)		22-4855	Trimmer Capacitor - 1.7 To 10 PF Ceramic	.45
*85-1274	Rocker Switch (Decoder)		22-5362	1000 MF Electrolytic Capacitor - 50V.	4.05
*85-1275	Rocker Switch (On-Off)		22-5480	390 PF Mica Capacitor - 100V.	.50
*85-1296	Slide Switch (Part of S-91190)		22-5481	560 PF Disc Capacitor - 500V. (2 Required)	.25
86-543	Miniature Spring Terminal (18 Used on P.C. Board)	.03	22-5482	680 PF Disc Capacitor - 500V. (6 Required)	.25
94-1545	Nylon Shoulder-Bushing (4 Required)	.10	22-5483	1500 PF Disc Capacitor - 500V.	.25
*95-2981	Auto Transformer (2 Required)		22-5486	10 MF Electrolytic Capacitor - 6V.	.95
*95-3003	Power Transformer		22-5487	.47 MF Disc Capacitor - 3V. (2 Required)	.45
100-249	Pilot Light Bulb	.18	22-5730	270 PF Polystyrene Capacitor ± 5% - 500V.	.15
*103-222	Zener Diode (2 Required)		-OR-		
112-793	6 - 20 x 1/4 Phillips Rd. Hd. Self-Tap. Screw (4 Required)	.03	22-3424	270 PF Mica Capacitor ± 5% - 100V.	.35
*114-159	6 - 18 x .250 Hex Hd. Screw (6 Required)		22-5781	1000 PF Polystyrene Capacitor ± 5% - 500V. (2 Required)	.15
114-802	8 - 18 x 5/16 x 1/4 Hex Washer Hd. Self-Tap. Screw (2 Required)	.03	-OR-		
114-806	8 - 18 x 1/4 x 1/4 Hex Washer Hd. Self-Tap. Screw Stat. Bronze (2 Required)	.03	22-3613	1000 PF Mica Capacitor ± 5% - 100V. (2 Required)	.50
*114-1144	4 - 24 x .500 Hex Washer Hd. Tap. Screw (1 Used on Ea. 121-886 & 121-887)		22-5782	2200 PF Polystyrene Capacitor ± 5% - 500V.	.15
121-430	Transistor - Pre-Amplifier (2 Required)		-OR-		
121-433	Transistor - Pre-Driver (2 Required)	1.30	22-3635	2200 PF Mica Capacitor ± 5% - 100V.	1.05
			22-5814	.022 MF Mylar Capacitor ± 10% - 100V. (4 Required)	.30
			22-5815	.056 MF Mylar Capacitor ± 10% - 100V. (2 Required)	.30

*Denotes parts not previously used in Zenith receivers.

PART NUMBER	DESCRIPTION	PRICE	PART NUMBER	DESCRIPTION	PRICE
CHASSIS 21BT34 (Continued)			63-1883	220K Ohm Resistor - ½W. 10% (2 Required)	.17
22-5878	5.5 PF Disc Capacitor ± .5 PF - 50V.	.10	63-1898	470K Ohm Resistor - ½W. 20% (3 Required)	.17
22-5879	3.3 PF Disc Capacitor ± .25 PF - 50V.	.10	63-1904	680K Ohm Resistor - ½W. 10%	.17
22-6048	.22 MF Disc Capacitor ± 10% - 50V. (2 Required)	.50	63-1918	1.5 Megohm Resistor - ½W. 10% (2 Required)	.17
*22-6136	2000 PF Polystyrene Capacitor ± 5% - 100V.	.85	63-4122	33 Ohm Resistor - ¼W. 10%	.17
*22-6137	5 Section Variable Capacitor - FM Detector Trimmer, FM Detector Tuning - FM Oscillator Tuning - AM Antenna Trimmer - AM Antenna Tuning - AM Oscillator Tuning - AM Oscillator Trimmer - FM Antenna Trimmer FM Antenna Tuning	12.25	63-4185	1000 Ohm Resistor - ¼W. 10%	.17
*22-6246	3.3 MF Electrolytic Capacitor - 15V.	1.05	63-4196	1800 Ohm Resistor - ¼W. 10%	.17
*33-327	PC Board Support Frame		63-4213	4700 Ohm Resistor - ¼W. 10%	.17
43-571	9 Contact Housing (Used On 86-390)	.30	63-4501	1 Ohm Resistor - ½W. 10% (2 Required)	.15
44-48	Connector Jack (4 Part Of S-79667)	.20	63-5659	560 Ohm Resistor - 2W. 10%	.34
52-1062	2 Conductor Cable (Used On 86-449 Or 86-357, 86-450 Or 86-344)	.10	63-6495	Mute Control - 100K Ohm	1.00
52-1425	2 Conductor Shielded Cable (Used On 58-214)	1.15	63-7681	Dual Treble Control - 50K Ohm	2.60
52-1443	4 Conductor Cable - Approx. 6" (Used On S-82104)	.15	63-7682	Dual Bass Control - 100K Ohm	2.50
52-1530	3 Conductor Cable - Approx. 28" (Used On 83-3404)		63-7683	Dual Loudness Control	2.95
52-1588	2 Conductor Shielded Lead (Part Of S-79667)	1.00	63-7684	Balance Control & Switch	3.30
52-1589	2 Conductor Shielded Lead (Part Of S-82528)	.85	64-6	1/8 Dia. x 3/16 Lg. Tubular Rivet (2 Part Of S-79667)	
52-1590	2 Conductor Shielded Lead (Used On 85-1170)	.70	64-288	Shoulder Rivet (Part Of S-85563, S-85564 & 2 Part Of S-85565) (4 Required)	.03
*52-1884	2 Conductor Shielded Cable	.85	76-1987	Tuning Shaft	.80
54-139	3/8-32 x 9/16 Palnut (1 Used On 63-7681, 63-7682, 63-7683, 63-7684 & 114-802) (5 Required)	.03	79-174-12	No. 18 Sleeving - Yellow - 1 1/2"	.03
54-334	Tinnerman Speed Nut (1 Used On Ea. 114-591) (4 Required)	.03	80-2143	Tension Spring	.05
54-828	1/2-20 Palnut (Used On 114-802)	.03	82-153	2nd. I.F. Grounding Strap	.35
57-7850	Side Plate		82-165	Grounding Strap (Part Of S-85104)	.20
57-8147	Side Plate (Gang)		82-182	Oscillator Coil Ground Strap	
58-214	Single Prong Plug (2 Used On 52-1425)	.10	83-1961	Antenna Terminal Strip (Part Of S-79667)	.35
59-1081	Pointer (Dial)	.95	83-3404	3 Lug Terminal Strip (Used On 52-1530)	.05
61-222	Idler Pulley (1 Used On S-85564, 2 Used On S-85565, S-86475 & 1 Used On Ea. S-85563) (6 Required)	.20	83-6173	Plastic Tie Strip (2 Required)	.03
63-1701	10 Ohm Resistor - ½W. 10%	.17	83-7417	Antenna Protective Strip	.20
63-1708	15 Ohm Resistor - ½W. 10% (2 Required)	.17	83-7803	3 Lug Terminal Strip	.10
63-1740	82 Ohm Resistor - ½W. 10% (2 Required)	.17	*83-8163	Antenna Mtg. Strip (Part Of S-82104)	
63-1761	270 Ohm Resistor - ½W. 10%	.17	85-1170	Bandswitch	8.95
63-1764	330 Ohm Resistor - ½W. 10% (2 Required)	.17	86-390	Connector Terminal (Used On 43-571 & Part Of S-86608)	.03
63-1768	390 Ohm Resistor - ½W. 10%	.17	86-449	Connector Terminal (Used On 52-1062)	.10
63-1769	430 Ohm Resistor - ½W. 5% (4 Required)		-OR-		
63-1771	470 Ohm Resistor - ½W. 10% (2 Required)	.17	86-357	Connector Terminal (Used On 52-1062)	.03
63-1772	470 Ohm Resistor - ½W. 20% (4 Required)	.17	86-450	Connector Terminal (Used On 52-1062)	.10
63-1775	560 Ohm Resistor - ½W. 10% (3 Required)	.17	-OR-		
63-1778	680 Ohm Resistor - ½W. 10% (6 Required)	.17	86-344	Connector Terminal (Used On 52-1062)	.03
63-1781	820 Ohm Resistor - ½W. 5%	.34	93-1833	Transistor Insulating Washer (2 Required)	.03
63-1782	820 Ohm Resistor - ½W. 10%	.17	*93-1906	No. 4 Washer (1 Used On Ea. 114-591) (4 Required)	
63-1785	1000 Ohm Resistor - ½W. 10% (3 Required)		94-1532	Nylon Shaft Bushing	.20
63-1796	1800 Ohm Resistor - ½W. 10%		94-1545	Nylon Insulating Bushing (Use Only When 800-312 Is Used) (4 Required)	.10
63-1798	2200 Ohm Resistor - ½W. 5%	.34	95-2541	Transformer - AM 1st. I.F. 455 KHz	1.75
63-1799	2200 Ohm Resistor - ½W. 10% (5 Required)	.17	95-2542	Transformer - AM 2nd. I.F. 455 KHz	1.75
63-1803	2700 Ohm Resistor - ½W. 10% (2 Required)		95-2543	Transformer - 3rd. I.F. 455 KHz	1.95
63-1806	3300 Ohm Resistor - ½W. 10% (2 Required)	.17	95-2544	Transformer - AM Oscillator	1.45
63-1810	3900 Ohm Resistor - ½W. 10% (2 Required)	.17	95-2545	Transformer - FM Ratio Detector 10.7 MHz	2.65
63-1813	4700 Ohm Resistor - ½W. 10% (2 Required)	.17	95-2546	Transformer - FM 1st. I.F. 10.7 MHz	1.95
63-1817	5600 Ohm Resistor - ½W. 10%	.17	95-2547	Transformer - FM 2nd. I.F. 10.7 MHz	2.00
63-1820	6800 Ohm Resistor - ½W. 10% (2 Required)	.17	95-2548	Transformer - FM 3rd. I.F. 10.7 MHz	2.10
63-1824	8200 Ohm Resistor - ½W. 10% (3 Required)	.17	95-2856	Doubler Coil 19 KHz	1.30
63-1825	9100 Ohm Resistor - ½W. 5%	.34	95-2857	Detector Coil 38 KHz	1.30
63-1826	10K Ohm Resistor - ½W. 5%		95-2858	Input Coil 19 KHz	1.30
63-1827	10K Ohm Resistor - ½W. 10% (6 Required)		100-249	Indicator Lamp	.18
63-1831	12K Ohm Resistor - ½W. 10% (3 Required)		103-23	Germanium Diode (4 Required)	.75
63-1835	15K Ohm Resistor - ½W. 20%		103-47	Silicon Diode - AFC	3.75
63-1841	22K Ohm Resistor - ½W. 10%		-OR-		
63-1845	27K Ohm Resistor - ½W. 10% (2 Required)	.17	103-189	Silicon Diode	3.75
63-1848	33K Ohm Resistor - ½W. 10% (2 Required)	.17	103-74	Germanium Diode	.50
63-1853	43K Ohm Resistor - ½W. 5% (2 Required)	.34	103-90	Germanium Diode - Matched	1.00
63-1855	47K Ohm Resistor - ½W. 10% (2 Required)		103-96	Diode	1.90
63-1869	100K Ohm Resistor - ½W. 10%	.17	103-145	Diode (2 Required)	.50
63-1876	150K Ohm Resistor - ½W. 10% (2 Required)	.17	105-107	Integnet (2 Required)	1.00
63-1880	180K Ohm Resistor - ½W. 10% (2 Required)		114-342	6-20 x 3/16 x 1/4 Hex Hd. Self-Tap. Screw-Stat. Bronze (Used On 83-7803)	.03
			114-591	4-24 x 3/8 x 3/16 Slotted Hex Hd. Self-Tap. Screw - Cadmium (2 Used On Ea. 800-312)	.03
			114-689	8-18 x 1/2 Hex Hd. Special Washer - Spinlock - Self-Tap. Screw-Stat. Bronze (2 Used On S-82104)	.03
			114-801	8-18 x 5/16 x 1/4 Hex Hd. Self-Tap. Screw-Stat. Bronze (1 Used On S-85564 & S-85569, 2 Used On 12-5420, 57-7850, 57-8147,	

PART NUMBER	DESCRIPTION	PRICE	PART NUMBER	DESCRIPTION	PRICE
CHASSIS 21BT34 (Continued)					
	S-85565 & 85-1170, 3 Used On 33-327 & 1 Used On S-85563 (16 Required)	.03	22-3675	10 PF Disc Capacitor $\pm 5\%$ - 500V.	.25
114-802	8-18 x 5/16 x 1/4 Hex Washer Hd. Self-Tap. Screw-Stat. Bronze (1 Mts. 17-130 & 17-156) (2 Required)	.03	22-3687	1 MF Electrolytic Capacitor - 50V. (2 Required)	1.50
121-430	Transistor - Driver (2 Required)	1.10	22-3721	200 MF Electrolytic Capacitor - 35V. (2 Required)	2.25
121-433	Transistor - Pre-Amp. (2 Required)	1.30	22-3770	5.5 PF Disc Capacitor $\pm .25$ PF - 500V.	.30
121-546	Transistor - 2nd. & 3rd. I.F. (2 Required)	.80	22-3791	42 PF Disc Capacitor $\pm 5\%$ - 500V.	.25
121-612	Transistor - R.F. (FM)	.90	22-3792	17 PF Disc Capacitor $\pm 5\%$ - 500V.	.25
121-613	Transistor - Audodyne Converter (FM)	.80	22-3896	5 MF Electrolytic Capacitor - 25V.	1.00
121-614	Transistor - 1st. I.F. Amplifier AM, FM	.80	22-4568	100 MF Electrolytic Capacitor - 15V. (2 Required)	.95
121-639	Transistor - Composite Amplifier (3 Required)	.70	22-4572	500 MF Electrolytic Capacitor - 15V. (2 Required)	1.60
121-706	Transistor - Audio Driver (2 Required)	.85	22-4617	.01 MF Disc Capacitor - 500V. (2 Required)	.10
121-714	Transistor - AM - FM - I.F.	.80	22-4855	Trimmer Capacitor - 1.7 To 10 PF Ceramic	.45
121-737	Transistor - Stereo Indicator Switch	.95	22-5362	1000 MF Electrolytic Capacitor - 50V.	4.05
121-762	Transistor - Detector	1.30	22-5480	390 PF Mica Capacitor - 100V.	.50
*126-1534	Radiation Shield		22-5481	560 PF Disc Capacitor - 500V. (2 Required)	.25
*126-1535	Radiation Shield		22-5482	680 PF Disc Capacitor - 500V. (6 Required)	.25
149-311	Ferrite Core	.05	22-5483	1500 PF Disc Capacitor - 500V.	.25
188-140	Retaining Ring	.03	22-5486	10 MF Electrolytic Capacitor - 6V.	.95
188-155	Clamping Ring (Part Of S-85569)	.05	22-5487	.47 MF Disc Capacitor - 3V. (2 Required)	.45
212-71	Silicon Rectifier (2 Required)	1.25	22-5780	270 PF Polystyrene Capacitor $\pm 5\%$ - 500V.	.15
-OR-			-OR-		
212-94B	*Silicon Rectifier (2 Required)	.75	22-3424	270 PF Mica Capacitor $\pm 5\%$ - 100V.	.35
800-289	Output Transistor - Matched Pair (2 Required)	5.00	22-5781	1000 PF Polystyrene Capacitor $\pm 5\%$ - 500V. (2 Required)	.15
-OR-			-OR-		
800-312	Output Transistor - Matched Pair (2 Required)	4.20	22-3613	1000 PF Mica Capacitor $\pm 5\%$ - 100V. (2 Required)	.50
S-79667	Antenna & Tape Input Bracket Assem.	2.10	22-5782	2200 PF Polystyrene Capacitor $\pm 5\%$ - 500V.	.15
S-82104	Wave Magnet Antenna Assem.	2.20	-OR-		
S-82528	Antenna Cable & Terminal Assem.	.20	22-3635	2200 PF Mica Capacitor $\pm 5\%$ - 100V.	1.05
S-85104	I.F. Grounding Strap, Braid & Clip Assem.		22-5814	.022 MF Mylar Capacitor $\pm 10\%$ - 100V. (4 Required)	.30
S-85562	Drive Cord & Eyelet Assem.	.25	22-5815	.056 MF Mylar Capacitor $\pm 10\%$ - 100V. (2 Required)	.30
S-85563	Pulley Mtg. Bracket Assem.		22-5878	5.5 PF Disc Capacitor $\pm .5$ PF - 50V.	.10
S-85564	Pulley Mtg. Bracket Assem.		22-5879	3.3 PF Disc Capacitor $\pm .25$ PF - 50V.	.10
S-85565	Pointer Guide Bracket Assem.	1.60	22-6048	.22 MF Disc Capacitor $\pm 10\%$ - 50V. (2 Required)	.50
S-85569	Drive Pulley Assem.	.50	*22-6136	2000 PF Polystyrene Capacitor $\pm 5\%$ - 100V.	.85
S-86475	Pulley Mtg. Bracket Assem.		*22-6137	5 Section Variable Capacitor - FM Detector Trimmer, FM Detector Tuning - FM Oscillator Tuning - AM Antenna Trimmer - AM Antenna Tuning - AM Oscillator Tuning - AM Oscillator Trimmer - FM Antenna Trimmer FM Antenna Tuning	12.25
*S-86608	Socket & Terminal Assem.	.65		3.3 MF Electrolytic Capacitor - 15V.	1.05
CHASSIS 21BT34Z1			*22-6246	PC Board Support Frame	
12-5420	Background Bracket	1.55	43-571	9 Contact Housing (Used On 86-390)	.30
*12-5425	Pulley Mtg. Bracket (Part Of S-85563 & S-86475) (2 Required)	.03	44-48	Connector Jack (4 Part Of S-79667)	.20
*12-5524	Control Mtg. Bracket		52-1062	2 Conductor Cable (Used On 86-449 Or 86,357, 86-450 Or 85-344)	.10
17-130	Cable Clamp	.25	52-1425	2 Conductor Shielded Cable (Used On 58-214)	1.15
17-156	Cable Clamp	.10	52-1443	4 Conductor Cable - Approx. 6" (Used On S-82104)	.15
19-480	Retaining Clip	.03	52-1501	3 Conductor Cable (Used On 86-344)	
19-485	Cable Retaining Clip	.10	52-1588	2 Conductor Shielded Lead (Part Of S-79667)	1.00
19-614	Clip (Part Of S-85104)		52-1589	2 Conductor Shielded Lead (Part Of S-82528)	.85
20-1256	Trap Coil - 10.7 MHz	1.05	52-1590	2 Conductor Shielded Lead (Used On 85-1170)	.70
20-1648	FM R.F. Coil	.35	*52-1884	2 Conductor Shielded Cable	.85
20-1649	FM Oscillator Coil	.50	54-139	3/8-32 x 9/16 Palnut (1 Used On 63-7681, 63-7682, 63-7683, 63-7684 & 114-802) (5 Required)	.03
20-2033	Peaking Coil	.40	54-334	Tinnerman Speed Nut (1 Used On Ea. 114-591) (4 Required)	.03
*20-3080	Trap Coil - 67 KHz	.50	54-828	1/2-20 Palnut (Used On 114-802)	.03
20-3291	FM Antenna Coil	.20	57-7850	Side Plate	
22-13	.0033 MF Disc Capacitor - 500V.	.25	57-8147	Side Plate (Gang)	
22-14	.0047 MF Disc Capacitor - 25V. (3 Required)	.25	58-214	Single Prong Plug (2 Used On 52-1425)	.10
22-18	.0022 MF Disc Capacitor - 500V. (2 Required)	.25	59-1081	Pointer (Dial)	.95
22-2428	1.8 PF Gimmick Capacitor - 500V.	.25	61-222	Idler Pulley (1 Used On S-85564, 2 Used On S-85565, S-86475 & 1 Used On Ea. S-85563) (6 Required)	.20
22-2481	8 PF Disc Capacitor $\pm .25$ PF - 500V. (3 Required)	.25	63-1701	10 Ohm Resistor - $\frac{1}{2}W$. 10%	.17
22-2729	.001 MF Disc Capacitor - 25V. (3 Required)	.25	63-1708	15 Ohm Resistor - $\frac{1}{2}W$. 10% (2 Required)	.17
22-2884	5 MF Electrolytic Capacitor - 12V. (4 Required)	1.50	63-1740	82 Ohm Resistor - $\frac{1}{2}W$. 10% (2 Required)	.17
22-2939	680 PF Disc Capacitor - 500V. (2 Required)	.25	63-1761	270 Ohm Resistor - $\frac{1}{2}W$. 10%	.17
22-3033	.02 MF Disc Capacitor - 25V.	.35	63-1764	330 Ohm Resistor - $\frac{1}{2}W$. 10% (2 Required)	.17
22-3034	.05 MF Disc Capacitor - 25V. (12 Required)	.45	63-1768	390 Ohm Resistor - $\frac{1}{2}W$. 10%	.17
22-3080	.005 MF Disc Capacitor - 25V.	.25	63-1769	430 Ohm Resistor - $\frac{1}{2}W$. 5% (4 Required)	
22-3177	390 PF Disc Capacitor - 500V. (2 Required)	.25			
22-3255	330 PF Disc Capacitor - 500V. (2 Required)	.25			
22-3310	2.7 PF Gimmick Capacitor - 500V. (2 Required)	.25			
22-3393	.01 MF Disc Capacitor - 25V. (5 Required)	.25			
22-3415	.0068 MF Disc Capacitor - 25V.	.25			
22-3541	3.3 PF Gimmick Capacitor $\pm 5\%$ - 500V.	.25			
22-3558	16 PF Disc Capacitor $\pm 5\%$ - 500V.	.25			
22-3652	.1 MF Disc Capacitor - 10V. (3 Required)	.30			
22-3661	.05 MF Disc Capacitor - 100V.	.25			

*Denotes parts not previously used in Zenith receivers.

PART NUMBER	DESCRIPTION	PRICE	PART NUMBER	DESCRIPTION	PRICE
CHASSIS 21BT34Z1 (Continued)			95-2541	Transformer - AM 1st. I.F. 455 KHz	1.75
63-1771	470 Ohm Resistor - 1/2W. 10% (2 Required)	.17	95-2542	Transformer - AM 2nd. I.F. 455 KHz	1.75
63-1772	470 Ohm Resistor - 1/2W. 20% (4 Required)	.17	95-2543	Transformer - 3rd. I.F. 455 KHz	1.95
63-1775	560 Ohm Resistor - 1/2W. 10% (3 Required)	.17	95-2544	Transformer - AM Oscillator	1.45
63-1778	680 Ohm Resistor - 1/2W. 10% (6 Required)	.17	95-2545	Transformer - FM Ratio Detector 10.7 MHz	2.65
63-1781	820 Ohm Resistor - 1/2W. 5%	.34	95-2546	Transformer - FM 1st. I.F. 10.7 MHz	1.95
63-1782	820 Ohm Resistor - 1/2W. 10%	.17	95-2547	Transformer - FM 2nd. I.F. 10.7 MHz	2.00
63-1785	1000 Ohm Resistor - 1/2W. 10% (3 Required)		95-2548	Transformer - FM 3rd. I.F. 10.7 MHz	2.10
63-1796	1800 Ohm Resistor - 1/2W. 10%		95-2856	Doubler Coil 19 KHz	1.30
63-1798	2200 Ohm Resistor - 1/2W. 5%	.34	95-2857	Detector Coil 38 KHz	1.30
63-1799	2200 Ohm Resistor - 1/2W. 10% (5 Required)	.17	95-2858	Input Coil 19 KHz	1.30
63-1803	2700 Ohm Resistor - 1/2W. 10% (2 Required)		100-249	Indicator Lamp	.18
63-1806	3300 Ohm Resistor - 1/2W. 10% (2 Required)	.17	103-23	Germanium Diode (4 Required)	.75
63-1810	3900 Ohm Resistor - 1/2W. 10% (2 Required)	.17	103-47	Silicon Diode - AFC	3.75
63-1813	4700 Ohm Resistor - 1/2W. 10% (2 Required)	.17	-OR-		
63-1817	5600 Ohm Resistor - 1/2W. 10%	.17	103-189	Silicon Diode	3.75
63-1820	6800 Ohm Resistor - 1/2W. 10% (2 Required)	.17	103-74	Germanium Diode	.50
63-1824	8200 Ohm Resistor - 1/2W. 10% (3 Required)	.17	103-90	Germanium Diode - Matched	1.00
63-1825	9100 Ohm Resistor - 1/2W. 5%	.34	103-96	Diode	1.90
63-1826	10K Ohm Resistor - 1/2W. 5%		103-145	Diode (2 Required)	.50
63-1827	10K Ohm Resistor - 1/2W. 10% (6 Required)		105-107	Integnet 38 KHz Filter (2 Required)	1.00
63-1831	12K Ohm Resistor - 1/2W. 10% (3 Required)		114-342	6-20 x 3/16 x 1/4 Hex Hd. Self-Tap. Screw-Stat. Bronze (Used On 83-7803)	.03
63-1835	15K Ohm Resistor - 1/2W. 20%		114-591	4-24 x 3/8 x 3/16 Slotted Hex Hd. Self-Tap. Screw - Cadmium (2 Used On Ea. 800-312)	.03
63-1841	22K Ohm Resistor - 1/2W. 10%		114-689	8-18 x 1/2 Hex Hd. Special Washer - Spinlock - Self-Tap. Screw-Stat. Bronze (2 Used On S-82104)	.03
63-1845	27K Ohm Resistor - 1/2W. 10% (2 Required)	.17	114-801	8-18 x 5/16 x 1/4 Hex Hd. Self-Tap. Screw-Stat. Bronze (1 Used On S-85564 & S-85569, 2 Used On 12-5420, 57-7850, 57-8147, S-85565 & 85-1170, 3 Used On 33-327 & 1 Used On S-85563) (16 Required)	.03
63-1848	33K Ohm Resistor - 1/2W. 10% (2 Required)	.17	114-802	8-18 x 5/16 x 1/4 Hex Washer Hd. Self-Tap. Screw-Stat. Bronze (1 Mts. 17-130 & 17-156) (2 Required)	.03
63-1853	43K Ohm Resistor - 1/2W. 5% (2 Required)	.34	121-430	Transistor - Driver (2 Required)	1.10
63-1855	47K Ohm Resistor - 1/2W. 10% (2 Required)		121-433	Transistor - Pre-Amp. (2 Required)	1.30
63-1869	100K Ohm Resistor - 1/2W. 10%	.17	121-546	Transistor - 2nd. & 3rd. I.F. (2 Required)	.80
63-1876	150K Ohm Resistor - 1/2W. 10% (2 Required)	.17	121-612	Transistor - R.F. (FM)	.90
63-1880	180K Ohm Resistor - 1/2W. 10% (2 Required)		121-613	Transistor - Audodyne Converter (FM)	.80
63-1883	220K Ohm Resistor - 1/2W. 10% (2 Required)	.17	121-614	Transistor - 1st. I.F. Amplifier AM, FM	.80
63-1898	470K Ohm Resistor - 1/2W. 20% (3 Required)	.17	121-639	Transistor - Composite Amplifier (3 Required)	.70
63-1904	680K Ohm Resistor - 1/2W. 10%	.17	121-706	Transistor - Audio Driver (2 Required)	.85
63-1918	1.5 Megohm Resistor - 1/2W. 10% (2 Required)		121-714	Transistor - AM - FM - I.F.	.80
63-4122	33 Ohm Resistor - 1/4W. 10%	.17	121-737	Transistor - Stereo Indicator Switch	.95
63-4185	1000 Ohm Resistor - 1/4W. 10%	.17	121-762	Transistor - Detector	1.30
63-4196	1800 Ohm Resistor - 1/4W. 10%	.17	*126-1534	Radiation Shield	
63-4213	4700 Ohm Resistor - 1/4W. 10%	.17	*126-1535	Radiation Shield	
63-4501	1 Ohm Resistor - 1/2W. 10% (2 Required)	.15	149-311	Ferrite Core	.05
63-5659	560 Ohm Resistor - 2W. 10%	.34	188-140	Retaining Ring	.03
63-6495	Mute Control - 100K Ohm	1.00	188-155	Clamping Ring (Part Of S-85569)	.05
63-7681	Dual Treble Control - 50K Ohm	2.60	212-71	Silicon Rectifier (2 Required)	1.25
63-7682	Dual Bass Control - 100K Ohm	2.50	-OR-		
63-7683	Dual Loudness Control	2.95	212-94B	Silicon Rectifier (2 Required)	.75
63-7684	Balance Control & Switch	3.30	800-289	Output Transistor - Matched Pair (2 Required)	5.00
64-6	1/8 Dia. x 3/16 Lg. Tubular Rivet (2 Part Of S-79667)		-OR-		
64-288	Shoulder Rivet (Part Of S-85563, S-85564 & 2 Part Of S-85565) (4 Required)	.03	800-312	Output Transistor - Matched Pair (2 Required)	4.20
76-1987	Tuning Shaft	.80	S-79667	Antenna & Tape Input Bracket Assem.	2.10
79-174-12	No. 18 Sleeve - Yellow - 1 1/2"	.03	S-82104	Wave Magnet Antenna Assem.	2.20
80-2143	Tension Spring	.05	S-82528	Antenna Cable & Terminal Assem.	.20
82-153	2nd. I.F. Grounding Strap	.35	S-85104	I.F. Grounding Strap, Braid & Clip Assem.	
82-165	Grounding Strap (Part Of S-85104)	.20	S-85562	Drive Cord & Eyelet Assem.	.25
82-182	Oscillator Coil Ground Strap		S-85563	Pulley Mtg. Bracket Assem.	
83-1961	Antenna Terminal Strip (Part Of S-79667)	.35	S-85564	Pulley Mtg. Bracket Assem.	
83-6173	Plastic Tie Strip (2 Required)	.03	S-85565	Pointer Guide Bracket Assem.	1.60
83-7417	Antenna Protective Strip	.20	S-85569	Drive Pulley Assem.	.50
83-7803	3 Lug Terminal Strip	.10	S-86475	Pulley Mtg. Bracket Assem.	
*83-8163	Antenna Mtg. Strip (Part Of S-82104)		*S-86608	Socket & Terminal Assem.	.65
85-1170	Bandswitch	8.95	*S-87113	Speaker Cable, Terminal & Sleeve Assem.	
86-344	Connector Terminal (3 Used On 52-1501)				
86-390	Connector Terminal (Used On 43-571 & Part Of S-86608)	.03			
86-449	Connector Terminal (Used On 52-1062)	.10			
-OR-					
86-357	Connector Terminal (Used On 52-1062)	.03			
86-450	Connector Terminal (Used On 52-1062)	.10			
-OR-					
86-344	Connector Terminal (Used On 52-1062)	.03			
93-1833	Transistor Insulating Washer (2 Required)	.03			
*93-1906	No. 4 Washer (1 Used On Ea. 114-591) (4 Required)				
94-1532	Nylon Shaft Bushing	.20			
94-1545	Nylon Insulating Bushing (Use Only When 800-312 Is Used) (4 Required)	.10			
				CHASSIS 25BT22	
			*12-5216	Light Shield Strip	1.15
			*19-616	Retaining Clip (1 Used On Ea. 54-867) (6 Req.)	.05
			19-633	Tinnerman Speed Clip	
			*26-1811	Dial Scale	8.10

PART NUMBER	DESCRIPTION	PRICE	PART NUMBER	DESCRIPTION	PRICE
CHASSIS 25BT22 (Continued)			22-3177	390 PF Disc Capacitor - 500V (2 Req.)	.25
*43-1109	6 Contact Housing (Used on 86-538) (4 Req.)	.45	22-3254	.1 MF Disc Capacitor - 25V (4 Req.)	.75
*46-7249	Control Knob - Loudness - Treble - Balance & Bass (4 Req.)	.60	22-3362	560 PF Disc Capacitor - 500V (2 Req.)	.25
*46-7355	Stereo - Monaural & On-Off Knob (2 Req.)	.75	22-3393	.01 MF Disc Capacitor - 25V	.25
54-541	Thread - Forming Palnut (3 Used on 12-5216 & 2 Used on Ea. 57-7421 & 57-7422) (11 Req.)	.03	22-3415	.0068 MF Disc Capacitor - 25V	.25
54-812	Tinnerman Speed Nut (3 Used on 126-1429)	.03	22-3448	10 MF Electrolytic Capacitor - 15V	1.00
*54-834	Thread - Forming Palnut (1 Joins RF Chassis & Escutcheon)	.03	22-3675	10 PF Disc Capacitor - 500V	.25
*54-867	Tinnerman Speed Nut (1 Used on 63-8237, 63-8238, 63-8239, 63-8240, 83-7206 & 6 Used on 912-467)		22-4147	1 MF Capacitor - 400V (3 Req.)	.35
*57-7257	Die-Cast Excuteon	10.05	22-4564	10 MF Electrolytic Capacitor - 25V	.90
*57-7421	Slide Switch Mounting Plate	1.65	22-4568	100 MF Electrolytic Capacitor - 15V	.95
*57-7422	Slide Switch Mounting Plate	1.80	22-4808	3 Section Variable Capacitor (AM Antenna Trimmer, AM Antenna Tuner, AM Detector Tuner, AM Oscillator Trimmer & AM Oscillator Tuner)	4.30
*57-7499	Retainer Plate (1 Used on 83-7210, 83-7211, 83-7212 & 83-7213) (4 Req.)	.45	22-5018	.47 MF Capacitor - 50V	.60
57-8123	Retainer Plate (Used on 83-7206) (8 Req.)		22-5459	.0015 MF Disc Capacitor - 500V	.10
*63-8237	Loudness Control	6.75	22-5639	.22 MF Capacitor - 100V	.45
*63-8238	Treble Control	5.20	22-5761	470 PF Disc Capacitor (2 Req.)	.15
*63-8239	Bass Control	5.15	22-5780	270 PF Capacitor - 500V	.15
*63-8240	Balance Control	2.85	-OR-		
83-3801	Felt Strip (Used on 57-7257)	.03	22-3424	270 PF Capacitor	.35
*83-7206	Slider Guide (4 Used on Ea. 126-1416) (8 Req.)	.30	22-5781	1000 PF Polystyrene Capacitor (2 Req.)	.15
*83-7210	Indicator Strip - Volume (2 Req.)	.05	-OR-		
*83-7211	Indicator Strip - Treble (2 Req.)	.05	22-3613	1000 PF Mica Capacitor (2 Req.)	.50
*83-7212	Indicator Strip - Balance (2 Req.)	.05	22-5782	2200 PF Polystyrene Capacitor (2 Req.)	.15
*83-7213	Indicator Strip - Bass (2 Req.)	.05	-OR-		
83-7663	Insulating Strip		22-3635	2200 PF Mica Capacitor (2 Req.)	1.05
*83-7872	Channel Strip (2 Req.)		*22-6046	5 PF Disc Capacitor - 500V	
*83-7873	Channel Strip (2 Req.)		43-571	Nine Contact Housing - Male (Used on 86-390)	.30
*86-538	Connector Terminal (Used on 43-1109) (21 Req.)	.05	43-877	Three Contact Housing - Male (Used on 86-483)	.25
100-249	Pilot Light Bulb (2 Req.)	.18	*43-1103	Function Plate Housing (Used on 57-7452)	.95
112-1376	4-24 x 3/8 Phillips Pan Hd. Self-Tap. Screw-Stat. Bronze (4 Used on Ea. 63-8237, 63-8238, 63-8239 & 63-8240) (16 Req.)	.03	52-1496	Two Conductor Shielded Cable (Used on 86-388)	1.00
114-806	8-18 x 1/4 x 1/4 Hex Hd. Self-Tap. Screw-Stat. Bronze (4 Joins Audio Chassis & RF Chassis)	.03	*52-1622	Two Conductor Cable - Approx. 7 1/2" (Used on 58-315)	.05
114-900	8-18 x 7/16 x 1/4 Hex Hd. Self-Tap. Screw-Stat. Bronze (4 Join Escutcheon & RF Chassis)	.03	*52-1624	Two Conductor Shilded Cable (Used on 85-1072)	.60
*126-1410	Light Shield (2 Req.)	.50	*52-1625	Two Conductor Shielded Cable (Used on 86-565)	.70
*126-1416	Slider Guide Shield (8 Used on 83-7206)	.15	*52-1626	Two Conductor Shielded Cable (Used on 58-315)	1.20
126-1429	Bandswitch Shield	.25	*52-1629	Single Conductor Shielded Cable (I.F.)	.35
*192-467	Dial Crystal	2.65	54-139	3/8-32 x 9/16 Palnut - Cadmium (Used on 85-1070)	.03
CHASSIS 25BT22 R.F. CHASSIS COMPONENTS			54-812	Tinnerman Speed Nut (12 Used on Chassis)	.03
12-4211	Variable Capacitor Mounting Bracket	.20	*54 832	Tinnerman Speed Nut (2 Used on 12-5192)	.03
*12-5192	Meter Mounting Bracket	.20	*57-7256	Back Ground Plate (Used on 126-1420)	1.40
*12-5193	Chassis Mounting Bracket	1.15	57-7452	Function Plate & Socket	1.80
12-5214	Rear Chassis Support Bracket	.20	58-315	Connector Plug (2 Used on 52-1626 & 1 Used on 52-1622) (3 Req.)	.20
*12-5232	Switch Bracket (Used on 85-1071)	.45	*59-1036	Dial Pointer	.70
19-448	Grounding Clip (1 Part of S-83449) (2 Req.)	.10	61-222	Pulley (2 Part of S-83474 & 2 Part of S-83475)	.20
19-464	Coil Mounting Clip (Part of S-74470)	.05	63-1701	10 Ohm Resistor - 1/2W 10%	.17
19-480	Wire Retaining Clip	.03	63-1740	82 Ohm Resistor - 1/2W 10%	.17
19-485	Cable Clamp	.10	63-1743	100 Ohm Resistor - 1/2W 10%	.17
19-492	Wire Retaining Clip (4 Req.)	.05	63-1761	270 Ohm Resistor - 1/2W 10%	.17
19-536	Wire Retaining Clip	.05	63-1764	330 Ohm Resistor - 1/2W 10% (5 Req.)	.17
20-1422	Peaking Coil	.75	63-1768	390 Ohm Resistor - 1/2W 10%	.17
20-2008	Peaking Coil - 10.7 MHz Choke	.50	63-1771	470 Ohm Resistor - 1/2W 10% (4 Req.)	.17
20-2033	Peaking Coil (2 Req.)	.40	63-1775	560 Ohm Resistor - 1/2W 10%	.17
22-5	100 PF Disc Capacitor - 500V	.25	63-1778	680 Ohm Resistor - 1/2W 10% (7 Req.)	.17
22-14	.0047 MF Disc Capacitor - 500V	.25	63-1782	820 Ohm Resistor - 1/2W 10% (2 Req.)	.17
22-18	.0022 MF Disc Capacitor - 500V (3 Req.)	.25	63-1785	1000 Ohm Resistor - 1/2W 10% (5 Req.)	.17
22-2333	2.2 PF Gimmick Capacitor - 500V	.20	63-1792	1500 Ohm Resistor - 1/2W 10% (3 Req.)	.17
22-2374	6 PF Disc Capacitor - 500V	.25	63-1796	1800 Ohm Resistor - 1/2W 10%	.17
22-2424	1.5 PF Gimmick Capacitor	.20	63-1799	2200 Ohm Resistor - 1/2W 10%	.17
22-2481	8 PF Disc Capacitor - 500V	.25	63-1803	2700 Ohm Resistor - 1/2W 10%	.17
22-2715	1.2 PF Gimmick Capacitor - 500V	.20	63-1806	3300 Ohm Resistor - 1/2W 10% (2 Req.)	.17
22-2720	1 PF Gimmick Capacitor - 500V	.20	63-1810	3900 Ohm Resistor - 1/2W 10%	.17
22-2729	.001 MF Disc Capacitor - 25V (2 Req.)	.25	63-1813	4700 Ohm Resistor - 1/2W 10% (3 Req.)	.17
22-2884	5 MF Electrolytic Capacitor - 12V (3 Req.)	1.50	63-1817	5600 Ohm Resistor - 1/2W 10% (3 Req.)	.17
22-2903	22 PF Disc Capacitor - 500V	.25	63-1824	8200 Ohm Resistor - 1/2W 10%	.17
22-3034	.05 MF Disc Capacitor - 25V (15 Req.)	.45	63-1825	9100 Ohm Resistor - 1/2W 5%	.34
22-3080	.005 MF Disc Capacitor - 25V	.25	63-1826	10K Ohm Resistor - 1/2W 5%	
			63-1831	12K Ohm Resistor - 1/2W 10% (2 Req.)	
			63-1834	15K Ohm Resistor - 1/2W 10% (3 Req.)	.17
			63-1838	18K Ohm Resistor - 1/2W 10%	.17
			63-1848	33K Ohm Resistor - 1/2W 10% (2 Req.)	.17
			63-1855	47K Ohm Resistor - 1/2W 10%	
			63-1869	100K Ohm Resistor - 1/2W 10% (2 Req.)	.17
			63-1883	220K Ohm Resistor - 1/2W 10%	.17
			63-1890	330K Ohm Resistor - 1/2W 10%	

*Denotes parts not previously used in Zenith Receivers.

PART NUMBER	DESCRIPTION	PRICE	PART NUMBER	DESCRIPTION	PRICE
CHASSIS 25BT22 (Continued)					
63-1894	390K Ohm Resistor - 1/2W 10% (2 Req.)	.17	*126-1419	Stereo Light Shield	.15
63-1897	470K Ohm Resistor - 1/2W 10%	.17	126-1420	Dial Scale Light Shield	1.80
63-1911	1 Megohm Resistor - 1/2W 10%	.17	149-370	Iron Core	.15
63-1915	1.2 Megohm Resistor - 1/2W 10%	.17	171-66	Stereo Light Reflector	.03
63-1925	2.2 Megohm Resistor - 1/2W 10%		199-246	Insulating Sleeve (2 Part of S-83449)	.05
63-4548	22 Megohm Resistor - 1/2W 20% (2 Req.)	.17	885-12	S.P.S.T. Switch No. 1 - 2 Contact (Part of 85-1070)	1.50
63-6495	Potentiometer - 100K Ohm	1.00	885-13	S.P.D.T. Switch No. 2 - 3 Contact (Part of 83-1070)	2.25
*63-8258	Potentiometer - 150K Ohm	.55	S-74470	Antenna Coil Assem.	1.45
64-862	Steel Eyelet (4 Used on FM Tuner)	.03	S-79435	Multiplex Trap Coil Assem.	1.00
69-217	4-40 x 3/16 Rd. Hd. Machine Screw - N.P. (2 Used on Ea. 85-1071 & 85-1072) (4 Req.)	.05	S-79436	Multiplex Doubler Coil Assem.	2.50
*78-1891	Socket & Wire (3 Req.)	.95	S-79438	Multiplex Input Coil Assem.	2.30
*78-1892	Socket & Wire (2 Req.)	.75	S-82931	F.M. Tuner Assem.	34.00
*78-1901	Socket & Wire (3 Req.)	.60	*S-83447	Phono Cable & Connector Plug Assem.	1.75
80-209	Tension Spring	.10	*S-83449	Shielded Cable & Terminal Assem. (Tape In)	1.70
80-1140	Tension Spring	.05	*S 83450	FM Cable & Plug Assem.	.45
*83-7308	Terminal Strip (Used on 126-1420)	.30	*S 83454	Stereo Indicator, Wire & Terminal Assem.	1.55
*83-7309	Antenna Terminal Strip	.30	*S-83474	Chassis Mtg. Bracket & Pulley Assem.	1.50
*85-1070	Bandswitch	12.00	*S-83475	Pointer Guide Rail & Pulley Assem.	1.70
*85-1071	Switch (On-Off)	4.55	*S-83476	Drive Cord & Eyelet Assem.	.70
*85-1072	Switch (Stereo - Monaural)	3.95	*S-83477	Drive Cord & Eyelet Assem.	.40
86-388	Connector Terminal (2 Used on 52-1496)	.05	*S-83478	Drive Cord & Eyelet Assem.	.35
86-390	Connector Terminal (8 Used on 43-571)	.03	*S-84181	Multiplex Detector Coil Assem.	1.70
86-483	Connector Terminal - Male (1 Used on Red Wire & 2 Used on Black Wire) (3 Req.)	.03	CHASSIS 25BT22 AUDIO CHASSIS COMPONENTS		
86-500	Terminal (Test Point) (19 Req.)	.03	17-141	Cable Clamp	.20
86-565	Connector Terminal (3 Used on 52-1625, 2 Used on 100-482 & 1 Used on Red Wire)		19-448	Ground Clip	.10
*95-2716	Transformer - Detector (AM)	1.35	19-546	Capacitor Retaining Clip (3 Req.)	.10
*95-2717	Transformer - Oscillator (AM)	1.25	19-561	Capacitor Retaining Clip (2 Req.)	.10
*95-2718	Transformer - 1st. I.F. (AM)	2.30	22-13	.0003 MF Disc Capacitor - 500V (2 Req.)	.25
*95-2719	Transformer - 2nd. I.F. (AM)	2.80	22-2884	5 MF Electrolytic Capacitor - 15V (2 Req.)	1.50
*95-2720	Transformer - 3rd. I.F. (AM)	3.45	22-3034	.05 MF Disc Capacitor - 25V (4 Req.)	.45
*95-2726	Transformer - 3rd. & 4th. I.F. (FM) (2 Req.)	2.35	22-3255	330 PF Disc Capacitor - 500V (2 Req.)	.25
*95-2727	Transformer - Ratio Detector	5.15	22-3892	.01 MF Capacitor - 100V (2 Req.)	.30
*95-2728	Transformer - 2nd. I.F. (FM)	2.35	22-4576	25 MF Electrolytic Capacitor - 15 V (2 Req.)	1.10
100-249	Pilot Light Bulb (3 Req.)	.18	22 4905	.01 MF Disc Capacitor - 100V (2 Req.)	.10
100-422	Pilot Light Bulb (6 Req.)	.30	22-5012	.15 MF Mylar Capacitor - 50V (2 Req.)	.75
*100 482	Stereo Indicator & Wire (Part of S-83454)		22-5018	.01 MF Disc Capacitor - 50V	.60
103-23	Diode (8 Req.)	.75	22-5159	.047 MF Capacitor - 50V (2 Req.)	.35
*105-107	38 KHz Filter (2 Req.)	1.00	22-5167	1000 MF Electrolytic Capacitor - 30V	3.20
113-8	6-32 x 1/4 x 1/4 Hex Hd. Mach. Screw - N.P. - Internal Shakeproof Lockwasher (2 Join 12-4211 & 22-4808)	.03	22 5188	.1 MF Capacitor - 50V (2 Req.)	.35
114-344	6-20 x 1/4 x 1/4 Hex Hd. Self-Tap. Screw-Stat. Bronze (3 Used on 57-7256, 2 Join 126-1420 & 57-7256, 1 Used on 85-1070 & 2 Mt. 43-1103)	.03	22-5192	300 MF Electrolytic Capacitor - 1 5V	2.45
114-624	6-20 x 5/16 Hex Hd. Self-Tap. Screw-Stat. Bronze - Flat Washer Att. (2 Used on S-83475)	.10	22-5316	500 MF Electrolytic Capacitor - 5 0V	2.55
114-638	6-20 x 3/8 Hex Hd. Self-Tap. Screw-Stat. Bronze - Flat Washer Att. (2 Mt. 43-1103)	.03	22-5362	1000 MF Electrolytic Capacitor - 50V (2 Req.)	4.05
114-801	8-18 x 5/16 x 1/4 Hex Hd. Self-Tap. Screw-Stat. Bronze (2 Used on 12-4211)	.03	22-5474	2000 MF Electrolytic Capacitor - 30V	3.90
114-804	8-18 x 1/2 Hex Hd. Self-Tap. Screw-Stat. Bronze - Flat Washer Att. (4 Used on FM Tuner)	.03	22-5542	2200 PF Disc Capacitor - 1KV (2 Req.)	.20
114-806	8-18 x 1/4 x 1/4 Hex Hd. Self-Tap. Screw-Stat. Bronze (2 Used on 83-7309, & 3 Used on Ea. S-83474 & 12-5193 & 2 Mt. 12-5232) (10 Req.)	.03	*22-5639	.22 MF Mylar Capacitor - 100V (2 Req.)	.45
121-496	Transistor - Comp. Amp. - 19KHz Amp. - 38KHz Amp. - Stereo Ind. SW. (4 Req.)	.85	*22-5867	.12 MF Capacitor - 100V (2 Req.)	.40
121-546	Transistor - FM & AM 2nd. I.F., FM 3rd. I.F. & 4th. FM I.F. (3 Req.)	.80	*22-5900	.56 MF Capacitor - 100V (2 Req.)	.75
121-638	Transistor - AM Mixer	.75	*22-5911	.27 MF Mylar Capacitor - 100V (2 Req.)	.60
*121-734	Transistor - Bplex Detector	1.00	*22-6239	100 PF Disc Capacitor - 25V (4 Req.)	
*121-753	Transistor - AM Oscillator	.72	43-841	Three Contact Housing (Used on .86-390)	.10
*121-775	Transistor - 1st. I.F. FM & AM	.80	43-876	Three Contact Housing (Used on .86-484)	.25
-OR-			54-812	Tinnerman Speed Nut (4 Used on: 64-1033 & 5 Used on 86-500) (9 Req.)	.03
121-614	Transistor - 1st. I.F. FM & AM	.80	63-1740	82 Ohm Resistor - 1/2W 10% (2 Req.)	.17
*122-41	Tuning Meter	7.30	63-1757	220 Ohm Resistor - 1/2W 10%	.17
125-117	Rubber Grommet (4 Used on FM Tuner)	.03	63-1771	470 Ohm Resistor (2 Req.)	.17
126 1336	Coil Shield	.20	63-1775	560 Ohm Resistor - 1/2W 10% (2 Req.)	.17
			63-1782	820 Ohm Resistor - 1/2W 10% (2 Req.)	.17
			63-1820	6800 Ohm Resistor - 1/2W 10% (2 Req.)	.17
			63-1827	10K Ohm Resistor - 1/2W 10% (2 Req.)	
			63-1838	18K Ohm Resistor - 1/2W 10% (2 Req.)	.17
			63-1841	22K Ohm Resistor - 1/2W 10% (2 Req.)	
			63-1845	27K Ohm Resistor - 1/2W 10%	.17
			63-1848	33K Ohm Resistor - 1/2W 10% (4 Req.)	.17
			63-1852	39K Ohm Resistor - 1/2W 10% (2 Req.)	
			63-1869	100K Ohm Resistor - 1/2W 10% (2 Req.)	.17
			63-1876	150K Ohm Resistor - 1/2W 10% (4 Req.)	.17
			63-1890	330K Ohm Resistor - 1/2W 10% (2 Req.)	
			63 1939	4.7 Megohm Resistor - 1/2W 10% (4 Req.)	
			63-4519	2.7 Ohm Resistor - 1/2W 10% (4 Req.)	.17
			63-5305	.51 Ohm Resistor - 5W 5% (4 Req.)	.75
			63-5659	560 Ohm Resistor - 2W 10% (2 Req.)	.34

PART NUMBER	DESCRIPTION	PRICE	PART NUMBER	DESCRIPTION	PRICE
CHASSIS 25BT22 (Continued)					
63-6052	390 Ohm Resistor - 1W 10% (2 Req.)	.25	22-3652	.1 MF Disc Capacitor - 10V. (2 Required)	.30
63-7576	50 Ohm Resistor - 4W 10%		22-3675	10 PF Disc Capacitor - 500V. (2 Required)	.25
*63-8618	150 Ohm Resistor - 4W 10%		22-3687	1 MF Electrolytic Capacitor - 50V. (4 Required)	1.50
*63-8619	100 Ohm Resistor - 3W (2 Req.)		22-3751	20 PF Capacitor - + 5% 500V.	.30
64-1033	Grip Eyelet (4 Req.)	.03	*22-3770	5.5 PF Disc Capacitor - 500V.	.30
78-1812	Two Contact Transistor Socket (2 Part of Ea. S-73214)	.30	22-3896	5 MF Electrolytic Capacitor - 25V.	1.00
79-174-12	No. 18 Sleeve - Yellow - 1½"	.03	22-4573	1000 MF Electrolytic Capacitor - 15V.	2.10
83-5277	Transistor Insulating Strip (2 Part of Ea. 800-329)	.03	22-4819	2 PF Capacitor - + .25% 500V.	.50
83-5288	13 Lug Terminal Strip	.35	22-4855	Trimmer Capacitor - 1.7 To 10 PF Ceramic	.45
83-5794	18 Lug Terminal Strip	.80	22-5233	.015 MF Mylar Capacitor - + 20% 50V. (2 Required)	.45
86-344	Connector Terminal (3 Part of S-83439)	.03	22-5316	500 MF Electrolytic Capacitor - 50V. (2 Required)	2.55
86-388	Connector Terminal (2 Part of S-83440)	.05	22-5481	560 PF Disc Capacitor - 500V. (2 Required)	.25
86-390	Connector Terminal (2 Req.)	.03	22-5482	680 PF Disc Capacitor - 500V. (7 Required)	.25
86-484	Connector Terminal (3 Req.)	.03	22-5486	10 MF Electrolytic Capacitor - 6V.	.95
86-500	Connector Pin (5 Req.)	.03	22-5487	47 MF Disc Capacitor - 3V. (2 Required)	.45
*95-2699	Driver Transformer (2 Req.)	5.30	*22-5780	270 PF Polystyrene Capacitor - 500V.	.15
103-96	Diode - Zener	1.90	*22-5781	1000 PF Polystyrene Capacitor - 500V. (2 Required)	.15
114-26	8- 18 x ¼ x ¼ Hex Hd. Self-Tap. Screw-Stat. Bronze (1 Used on 17-141)	.03	-OR-		
114-271	6- 20 x ½ x ¼ Hex Hd. Self-Tap. Screw-Stat. Bronze (4 Used on Ea. 800-329)	.03	22-3613	1000 PF Mica Capacitor (2 Required)	.50
114-344	6- 20 x ¼ x ¼ Hex Hd. Self-Tap. Screw-Stat. Bronze (4 Used on Ea. S-73214 & 2 Used on Ea. 95-2699) (12 Req.)	.03	22-5782	2200 PF Capacitor - ± 5% 500V.	.15
121-433	Transistor - Pre-Amp. (2 Req.)	1.30	22-5862	.1 MF Mylar Capacitor - 100V. (2 Required)	.35
-OR-			22-5866	.047 MF Mylar Capacitor - 100V. (6 Required)	.30
*121-752	Transistor - Pre-Amp. (2 Req.)	1.52	22-5883	.033 MF Mylar Capacitor - 100V. (2 Required)	.35
121-706	Transistor - Driver (2 Req.)	.85	22-5971	.0033 MF Mylar Capacitor (2 Required)	.30
121-751	Transistor - Driver (2 Req.)	.72	*22-5972	390 PF Polystyrene Capacitor - 125V.	.15
199-246	Insulating Sleeve (2 Part of S-83440)	.05	*22-5986	50 MF Electrolytic Capacitor - 25V. (2 Required)	1.10
199-319	Insulating Sleeve (2 Part of S-83439)	.05	*22-6111	.001 MF Mylar Capacitor - 50V. (2 Required)	.40
205-51	Low Corning Heat Conductive Grease (Part of 800-329)	.16	*22-6245	Gang Capacitor, Six Section (FM Antenna Trimmer, FM Antenna Tuning, FM Detector Trimmer, FM Detector Tuning, FM Oscillator Tuning, AM Antenna Trimmer, AM Antenna Tuning, AM Detector Trimmer, AM Detector Tuning, AM Oscillator Trimmer, AM Oscillator Tuning)	
*800-329	Output Transistor Assem. - Matched Pr. (2 Req.)			3.3 MF Electrolytic Capacitor - 15V.	1.05
S-73214	Heat Sink & Socket Assem. (2 Req.)	2.10	22-6344	7 PF Ceramic Disc Capacitor - ± .5 PF 500V.	
*S-83439	Speaker Cable, Terminal & Sleeve Assem.	.50	22-6347	2000 PF Capacitor - ± 5% 50V.	
*S-83440	Two Conductor Shielded Cable, Terminal & Sleeve Assem.	.85	-OR-		
CHASSIS 29CT30					
12-5425	Pulley Mtg. Bracket (Part Of S-85563)	.03	52-1425	2000 PF Capacitor - ± 5% 100V.	.85
*12-5508	Heat Sink Bracket		52-1501	P.C. BD. Frame	
12-5765	Bracket		*33-375	9 Contact Housing (Used On 86-390)	.30
17-143	Nylon Clamp (2 Required)	.20	43-571	Connector Jack (4 Part Of S-79667)	.20
19-480	Wire Retaining Clip	.03	44-48	2 Conductor Cable (Used On 86-449 Or 86-357 & 86-450 Or 86-344)	.10
19-485	Cable Retaining Clip (1 Used On Ea. 52-1588 & 52-1589)	.10	52-1062	2 Conductor Shielded Lead (Used On 58-214)	1.15
*20-1256	Trap Coil (10.7 MHz)	.50	*52-1588	3 Conductor Cable - Approx. 20" (Used On 86-344)	.60
*20-1649	FM Oscillator Coil	.50	*52-1589	2 Conductor Shielded Lead (Used On 86-388)	1.00
*20-3076	FM Antenna Coil		*52-1590	2 Conductor Shielded Lead (Used On 86-388)	.85
*20-3077	FM Detector Coil		*52-2022	2 Conductor Shielded Lead (Used On 85-1207)	.70
20-3080	Trap Coil - 67 KHz	.50	*52-2023	2 Conductor Shielded Cable (Used On 58-338)	
22-13	.0033 MF Disc Capacitor - +10-10% 500V. (2 Required)	.25	54-139	2 Conductor Shielded Cable (Used On 58-338)	
22-14	.0047 MF Disc Capacitor - 500V. (3 Required)	.25	54-808	3/8-32 x 9/16 Nut (5 Required)	.03
22-2428	1 .8 PF Gimmick Capacitor - 500V.	.25	54-828	Tinnerman Speed Nut (1 Used On Ea. 114-1129)	.03
22-2592	3.4 MF Ceramic Disc Capacitor - 500V.	.25	58-214	1/2-20 Nut	.03
22-2703	220 PF Disc Capacitor - 500V. (2 Required)	.25	58-338	Single Prong Plug (2 Used On 52-1425)	.10
22-2729	.001 MF Disc Capacitor - 25V. (5 Required)	.25	*59-1099	Plug (2 Required)	.20
22-2884	5 MF Electrolytic Capacitor - 12V. (4 Required)	1.50	61-222	Dial Pointer, Blade W/Carriage	
22-3034	.005 MF Disc Capacitor - 25V. (14 Required)	.45		Idle Pulley (Part Of S-77501, S-85563, S-75501, S-85564 & 2 Part Of S-89890)	.20
22-3080	.005 MF Disc Capacitor - 25V. (2 Required)	.25	61-324	Pulley, Flanged (Part Of S-89195)	
22-3177	390 PF Disc Capacitor - 500V. (2 Required)	.25	61-325	Pulley, Flanged	
22-3255	330 PF Disc Capacitor - 500V. (2 Required)	.25	63-1701	10 Ohm Resistor - ½W. 10% (3 Required)	.17
22-3310	2.7 PF Gimmick Capacitor - 500V. (2 Required)	.25	63-1715	22 Ohm Resistor - ½W. 10% (2 Required)	.17
22-3362	560 PF Disc Capacitor - 500V. (2 Required)	.25	63-1736	68 Ohm Resistor - ½W. 10% (2 Required)	.17
22-3381	39 PF Ceramic Disc Capacitor - + 5% 500V. (2 Required)	.45	63-1757	220 Ohm Resistor - ½W. 10% (4 Required)	.17
22-3393	.01 MF Disc Capacitor - 25V. (6 Required)	.25	63-1761	270 Ohm Resistor - ½W. 10% (2 Required)	.17
22-3415	.0068 MF Disc Capacitor - 25V.	.25	63-1764	330 Ohm Resistor - ½W. 10% (2 Required)	.17
22-3541	3.3 PF Gimmick Capacitor - 500V.	.25	63-1771	470 Ohm Resistor - ½W. 10%	.17
			63-1772	470 Ohm Resistor - ½W. 20% (5 Required)	.17
			63-1775	560 Ohm Resistor - ½W. 10% (3 Required)	.17
			63-1777	680 Ohm Resistor - ½W. 5% (2 Required)	.17
			63-1778	680 Ohm Resistor - ½W. 10% (5 Required)	.17
			63-1781	820 Ohm Resistor - ½W. 5%	.34
			63-1782	820 Ohm Resistor - ½W. 10%	.17
			63-1785	1000 Ohm Resistor - ½W. 10% (4 Required)	

PART NUMBER	DESCRIPTION	PRICE	PART NUMBER	DESCRIPTION	PRICE
CHASSIS 29CT30 (Continued)			86-450	Connector Terminal (Used On 52-1062)	.10
63-1794	1600 Ohm Resistor - ½W. 5% (2 Required)	.10	-OR-		
63-1796	1800 Ohm Resistor - ½W. 10%		86-344	Connector Terminal (Used On 52-1062)	.03
63-1798	2200 Ohm Resistor - ½W. 5%	.34	86-500	Terminal (23 Required)	.03
63-1799	2200 Ohm Resistor - ½W. 10% (4 Required)	.17	86-543	Miniature Spring Terminal (88 Required)	.03
63-1805	3300 Ohm Resistor - ½W. 5% (2 Required)	.34	86-617	Terminal Ring	
63-1806	3300 Ohm Resistor - ½W. 10% (3 Required)	.17	93-1906	No. 4 Flat Washer (1 Used On Ea. 114-1129)	
63-1810	3900 Ohm Resistor - ½W. 10% (5 Required)	.17	94-1532	Nylon Shaft Bushing	.20
63-1813	4700 Ohm Resistor - ½W. 10% (6 Required)	.17	94-1586	Shoulder Bushing (4 Required)	
63-1817	5600 Ohm Resistor - ½W. 10%	.17	95-2543	Transformer - 3rd. I.F. AM 455 KHz	1.95
63-1820	6800 Ohm Resistor - ½W. 10% (3 Required)	.17	95-2544	Transformer - AM - Oscillator	1.45
63-1824	8200 Ohm Resistor - ½W. 10%	.17	*95-2750	Transformer - B.C. R.F.	
63-1826	10K Ohm Resistor - ½W. 5% (2 Required)		*95-2751	Transistor - AM 1st. I.F. AM 455 KHz	
63-1827	10K Ohm Resistor - ½W. 10%		*95-2752	Transformer - AM 2nd. I.F. AM 455 KHz	
63-1831	12K Ohm Resistor - ½W. 10% (4 Required)		*95-2753	Transformer - FM 1st. I.F. 10.7 MHz	
63-1834	15K Ohm Resistor - ½W. 10% (2 Required)		*95-2754	Transformer - FM 2nd. I.F. 10.7 MHz	
63-1841	22K Ohm Resistor - ½W. 10%		*95-2755	Transformer - FM 3rd. I.F. 10.7 MHz	
63-1842	22K Ohm Resistor - ½W. 20%	.17	*95-2756	Transformer - FM Ratio Detector 10.7 MHz	
63-1845	27K Ohm Resistor - ½W. 10% (2 Required)	.17	*95-2856	Multiplex Doubler Coil - 19 KHz	1.30
63-1848	33K Ohm Resistor - ½W. 10% (5 Required)	.17	*95-2857	Multiplex Detector Coil - 38 KHz	1.30
63-1852	39K Ohm Resistor - ½W. 10% (2 Required)		*95-2858	Multiplex Input Coil - 19 KHz	1.30
63-1855	47K Ohm Resistor - ½W. 10% (4 Required)		100-249	Indicator Lamp (3 Required)	.18
63-1859	56K Ohm Resistor - ½W. 10%		103-23	Germanium Diode (6 Required)	.75
63-1868	100K Ohm Resistor - ½W. 5% (2 Required)	.34	103-47	Diode AFC	3.75
63-1869	100K Ohm Resistor - ½W. 10%	.17	103-90	Germanium Diode - Matched Pair	2.00
63-1873	120K Ohm Resistor - ½W. 10%	.17	103-96	Diode, Zener	1.90
63-1883	220K Ohm Resistor - ½W. 10% (2 Required)	.17	*105-107	Integnet - 38 KHz Filter	1.00
63-1887	270K Ohm Resistor - ½W. 10% (2 Required)	.17	114-689	8-18 x 1/2 Hex Hd. Spec. Washer (Spinlock) Self-Tap. Screw-Stat. Bronze (2 Join Wavemagnet Assem. & 83-3561)	.03
63-1890	330K Ohm Resistor - ½W. 10% (2 Required)		114-801	8-18 x 5/16 Hex Hd. Self-Tap. Screw-Stat. Bronze (3 Mt. Chassis, 12-5508, 1 Mts. 83-8122 & 2 Mts. 12-5420) (9 Required)	.03
63-1898	470K Ohm Resistor - ½W. 20% (3 Required)	.17	114-864	8-18 x 3/8 Hex Washer Hd. Self-Tap. Screw-Stat. Bronze (1 Mts. Ea. 17-143) (2 Required)	.03
63-1904	680K Ohm Resistor - ½W. 10%	.17	114-1053	6-20 x 5/16 x 1/4 Hex Hd. Self-Tap. Screw- Cadmium	.05
63-1918	1.5 Megohm Resistor - ½W. 10% (2 Required)		*114-1127	8-18 x .800 x 1/4 Hex Washer Hd. Self-Tap. Shoulder Screw (2 Mt. Pulley)	
63-1933	3.3 Megohm Resistor - ½W. 20%		*114-1129	4-24 x 1/2 x 3/16 Slotted Hex Hd. Self-Tap. Screw-Stat. Bronze (2 Used On Ea. 121-853X) (4 Required)	
63-4122	33 Ohm Resistor - ¼W. 10% (2 Required)	.17	121-430	Transistor - Audio - Amp. (2 Required)	1.10
63-4157	220 Ohm Resistor - ¼W. 10%	.17	121-433	Transistor - Pre-Amp. (2 Required)	1.30
63-4185	1000 Ohm Resistor - ¼W. 10%	.17	121-546	Transistor - AM-FM 2nd. I.F., FM 3rd. I.F. (2 Required)	.80
63-4196	1800 Ohm Resistor - ¼W. 10%	.17	121-613	Transistor - Autodyne Converter - FM	.80
63-4231	12K Ohm Resistor - ¼W. 10%	.17	121-614	Transistor - AM-FM 1st. I.F.	.80
63-4255	47K Ohm Resistor - ¼W. 10%	.17	121-639	Transistor - Comp. Amp., 19 KHz Amp. & 38 KHz Amp., Tuning Meter Control (4 Required)	.70
63-4269	100K Ohm Resistor - ¼W. 10%	.17	121-714	Transistor - AM Converter	.80
63-4287	270K Ohm Resistor - ¼W. 10%	.17	*121-737	Transistor - Stereo Indicator Switch	.95
63-5663	680 Ohm Resistor - 2W. 10%	.30	*121-767	Transistor - Bias Control (2 Required)	.68
63-6424	1 Ohm Resistor - 5W. 10% (2 Required)	.75	*121-768	Transistor - Pre-Driver (2 Required)	1.20
63-6495	Mute Control - 100K	1.00	*121-773	Transistor - Driver (2 Required)	.72
*63-8708	Rotary Control, Single - 5K Ohm 30% ¼W. Bias Adjust.		*121-774	Transistor - Driver (2 Required)	
*63-8964	Rotary Control, Dual Treble - 250K Ohm 30% 1/8W.		*121-853X	Transistor - Output - Matched Pair (2 Required)	
*63-8965	Rotary Control, Dual Bass - 250K Ohm 30% 1/8W.		*121-858	Transistor - Bplex Detector	
*63-8966	Rotary Control, Single Balance W/Switch 500K Ohm		149-311	Ferrite Core (Sleeve) (2 Required)	.05
*63-8967	Rotary Control, Dual Loudness - 100K Ohm		*149-426	Ferrite Core, Antenna Rod (Part Of S-88463)	
*63-8977	Rotary Control, Single 1000 Ohm 30% ¼W. Bias Adjust. (2 Required)		188-140	Retaining Ring	.03
64-6	1/8" Dia. x 3/16" Lg. Tubular Rivet (2 Part Of S-79667)		188-155	Clamping Ring (Part Of S-89195)	.05
64-288	Shoulder Rivet (1 Part Of Ea. S-85563, S-85564, 2 Part Of S-89890) (4 Required)	.03	199-319	Insulating Sleeve (Used On 52-1501) (2 Required)	
*76-2032	Tuning Shaft		*199-567	Sleeving (Part Of S-88463)	
80-1963	Idler Pulley Spring (Part Of S-77501)	.15	205-51	Dow Corning Heat Conductive Grease (Part Of 12-853X)	.16
80-2143	Cord Tension Spring		S-77501	Pulley & Spring Assem.	.30
*82-195	Ground Strap		S-79667	Antenna & Tape Input Bracket Assem.	
83-1961	Antenna Terminal Strip (Part Of S-79667)	.35	S-82528	Antenna Cable & Terminal Assem.	.20
83-3561	Cable Retaining Strip	.05	S-85563	Pulley Mtg. Bracket Assem.	
83-6173	Tie Strip	.03	S-85564	Pulley Mtg. Bracket Assem.	
*83-7417	Antenna Protective Strip	.20	S-85569	Drive Pulley Assem.	.50
*83-7552	Transistor Insulating Washer (2 Part Of Ea. 121-853X)		S-86608	Socket & Terminal Assem.	
*83-8122	Terminal Strip		S-87113	Speaker Cable, Terminal & Sleeve Assem.	
83-8163	Antenna Mtg. Terminal Strip (2 Part Of S-88463)		*S-88463	Wavemagnet Antenna Assem.	
*85-1207	Rotary Switch		S-88984	Dial Cord & Eyelet Assem.	
86-344	Terminal, Connector (Used On 52-1062 & 52-1501) (6 Required)	.03	S-88985	Dial Cord & Eyelet Assem.	
86-390	Connector Terminal (9 Used On 43-571)	.03			
86-449	Connector Terminal (Used On 52-1062)	.10			
-OR-					
86-357	Connector Terminal (Used On 52-1062)	.03			

PART NUMBER	DESCRIPTION	PRICE	PART NUMBER	DESCRIPTION	PRICE
CHASSIS 29CT30 (Continued)					
S-89195	Pulley & Ring Assem.		964-23139C	Nail, Chrome (Used on Drop Seat, Left & Right Sides for 'U' Channel)	.05
*S-89890	Pulley & Bracket Pointer Guide Assem.		*964-23140-H	Strike - Stat. Bronze (Mounted on Drop Seat, Right Side)	
MODEL B545W CHASSIS COMPONENTS			*964-23141-3	Catch (Inside Cabinet - Right Side)	
63-1771	470 Ohm Resistor - 1/2W 10% (4 Req.)	.17	*964-23279-A	Logo- Zenith	
63-1883	220K Ohm Resistor - 1/2W 10% (2 Req.)	.17	*964-24020	5 1/4" Speaker (2 Req.)	
63-1897	470K Ohm Resistor - 1/2W 10% (2 Req.)	.17	*964-24458	Knob Assem. (3 Req.)	
63-3992	68K Ohm Resistor - 1/2W 10% (3 Req.)	.17	*964-24783-H	Hinge, Male - Stat. Bronze (Used on Top Left Remote Speaker)	
800-294	Output Transistor - Assem. Matched Pair - PNP - NPN (2 Req.)	2.45	*964-24784-H	Hinge, Female - Stat. Bronze (Used on Main Cabinet - Left Side) (2 Req.)	
*964-8976	1 Megohm Resistor - 1/2W 10% (2 Req.)		*964-24785-H	Hinge, Male - Stat. Bronze (Used on Top Right Remote Speaker)	
964-16699	4.7 Ohm Resistor - 1/2W 10% (2 Req.)	.17	*964-24786-H	Hinge, Female - Stat. Bronze (Used on Main Cabinet - Right Side)	
964-19610	200 MF Electrolytic Capacitor - 115V (2 Req.)	1.10	*964-25134-H	Hinge, Male - Stat. Bronze (Used on Bottom Right Remote Speaker)	
964-19613	.0033 MF Capacitor - 500V (2 Req.)	.40	*964-25136-H	Hinge, Male - Stat. Bronze (Used on Bottom Left Remote Speaker)	
964-19638	.05 MF Capacitor - 100V (6 Req.)	.70	*964-25273	6-32 x 1 1/4 Wafer Hd. Screw (8 Req.)	
964-19755	100 PF Capacitor - 500V (2 Req.)	.15	*964-25523-F	Control Plate	
964-19758	1 MF Electrolytic Capacitor - 15V	.85	*964-25584	Case Assem. W/Hardware	
964-20622	Terminal - Male	.15	*964-25585-F	Packing Carton	
964-20623	Terminal - Female	.15	*964-25587	Transistor Layout & Patent Label	
964-21866	Rectifier	.80	*964-25746	Audio Cable	
964-22009	Transistor - Pre-Amp. (4 Req.)	1.36	*964-25778	Handle	
964-22099	4.7 Megohm Resistor - 1/2W 10% (2 Req.)	.17	*964-26335	Changer Cups (4 Req.)	
964-23096	1000 MF Electrolytic Capacitor - 25V	.45	S-72648	45 RPM Adapter	1.80
*964-23419	Heat Sink		MODEL C9029 USING CHASSIS 15WCA10		
964-24412	Tone Control - 3M	4.95	*2-3517	Main Cabinet Back (Speaker)	
*964-25046	Diode (2 Req.)		*2-3597	Cabinet Back (Amplifier)	
*964-25138	47 PF Capacitor - 500V (2 Req.)		*14-9969	Main Cabinet (Speaker)	
*964-25591	36 PF Capacitor - 500V (2 Req.)		*14-10465	Cabinet (Amplifier)	
*964-25592	Volume Control - 500K (2 Req.)		*15-265	Plastic End Cap. (Part of S-91213)	
*964-25771	Power Transformer		*16-4203	Packing Carton	
*964-25868	43 Ohm Resistor - 1/2W 5% (2 Req.)		19-414	Cable Clip - Speaker (2 Req.)	.10
*964-25922	33 Med. Capacitor - 16V (2 Req.)		22-2945	3 MF Electrolytic Cap. (Crossover)	1.50
*964-27674	4.7 Megohm Resistor - 1/2W 5% (2 Req.)		44-48	Connector Plug (Part of S-90710)	.20
*964-27675	820K Ohm Resistor - 1/2W 5% (2 Req.)		*46-8211	Control Knob	
CABINET COMPONENTS			49-1168	Horn Speaker	7.20
*56-560	Needle (Part of 142-175)	3.35	*49-1220	6" Rd. Speaker	
83-2790	Motorboard Protector	.05	52-1441	Speaker Cable & Plug	2.85
*142-175	Cartridge - .7 Mil. Diamond & 3 Mil. Mfg. Sapphire (Part of 169-407)		54-424	8 - 32 x 11/32 Hex Palnut-Washer-Type (4 Used on Ea. Speaker)	.03
*169-407	4 Speed Record Changer (See Changer Parts List for Components)		*58-340	2 Prong Plug	
*902-703	Instruction Book		*63-5965	3.3 Ohm Resistor - 1W 10% (Crossover)	
964-12916-A	Eyelet - Nickel Plate (Bottom of Ea. Remote Speaker)		83-4601	Terminal Bound (Crossover)	.35
964-13621	Terminal - Amp.	.05	*83-8140	Sound Deadening Pad	
964-14195	Bumper (Inside Changer Compartment)	.35	86-329	Connector Terminal (4 Used on 52-1441)	.03
964-14220	Plug Housing, Amp.	.30	86-452	Connector Terminal (2 Used on Brown Wire 1 ft.)	.10
*964-14605-H	6 x 12 Truss Screw-Stat. Bronze (8 Mts. Speaker Baffle)		*101-5214	Transistor Layout & Patent Label	
964-15821	Cable Retainer (Inside Changer Compartment)	.05	112-1946	6 - 18 x 7/16 Phillips Oval Hd. Self-Tap. Screw - Stat. Bronze (6 Mts. Speaker)	.03
964-16380	Machine Screw (2 Used On Pivot)	.10	114-159	6 - 18 x .250 Hex Hd. Screw (2 Req.)	
*964-16579	Lock Washer (2 Used on Pivot)		114-895	6 - 18 x 1/2 Slotted Hex Hd. Self-Tap. Screw (8 Req.)	.03
964-16580	Eyelet, Pivot (2 Req.)	.10	114-900	8 - 18 x 7/16 x 1/4 Hex Hd. Self-Tap. Screw (4 Req.)	.03
964-17170	Amp. Terminal - .205 Flat	.03	114-1055	8 - 18 x 1/2 Hex Hd. Self-Tap. Screw - Stat. Bronze (4 Req.)	.05
*964-17310	Bumpers (4 Req.)		157-22	Coil Fastener (2 Used on S-83400)	.05
964-17602-F	Bushing, Pivot (2 Req.)	.30	*192-509	Jewel Indicator Light (Part of S-91213)	
964-18243-3	Power Cord	2.00	*202-3465	Instruction Book	
*964-18315	Tee Nut, Pivot (2 Req.)		*220-287	Packing Cushioning Material (2 Req.)	
964-18586-9	4 5 RPM Adapter Clamp (Spindle Clip)	.30	*220-295	Packing Cushioning Material (2 Req.)	
*964-19996-F	Eyelet (Back of Unit Middle)		*883-279	Trim Strip (Part of 14-9969)	
*964-20113	6 - 32 x 1/4 Wafer Hd. Screw (4 Mts. Transformer & Chassis)		*910-810	Grille Cloth (Part of 14-9969)	
964-20641	Catch, Chrome (2 Req.)	1.75	*912-580	8 - 32 x 1 1/4 Speaker Mtg. Screw (8 Part of 14-9969)	
964-20746-3	Remote Cable Assem. (2 Req.)	.25	966-34	1/16 x 5/8 Dia. Float (4 Part of 14-9969)	
*964-23137	'U' Channel - Chrome (Front of Drop Seat)		996-2	Gasket (Part of 14-9969)	
964-23138	Strike, Chrome (2 Req.)	.35	*S-83400	Filter Coil Assem.	.70
			*S-90710	Premate Speaker Cable Assem.	
			*S-91213	Control Escutcheon Assem. (Amplifier)	

PART NUMBER	DESCRIPTION	PRICE	PART NUMBER	DESCRIPTION	PRICE
FM TUNER ASSEMBLY S-82931			64-88	.088 Dia. x 1/8 Lg. Tubular Rivet. - N. P. (Part of S-69085)	.03
12-4192	Tuner Guide Bracket	.30	64-318	Brass Eyelet - USMC No. SE37 (2 Used on Ea. 78-1227 & 2 Used on 78-1378) (6 Req.)	.03
12-4193	Coil Mtg. Bracket	.15	76-1541	Guide Shaft (2 Req.)	.20
19-322	Coil Mtg. Clip (4 Req.)	.05	78-1227	Transistor Socket (2 Req.)	.35
20-1256	Trap Coil	.50	78-1378	Transistor Socket	.40
22-2374	6 PF Disc Capacitor - 500V	.25	79-174-12	No. 18 Sleeving - Yellow - 1½"	.03
22-2424	1.5 Gimmick Capacitor - 500V	.20	80-1467	Shaft Retaining Spring	.05
22-2642	15 PF Disc Capacitor - 500V	.25	80-1853	Transformer Retaining Spring	.03
22-3393	.01 MF Disc Capacitor - 25V (4 Req.)	.25	83-3829	2 Lug Terminal Strip	.05
22-3479	2.2 PF Disc Capacitor - 500V	.20	86-441	Insulated Feed-Thru Terminal (2 Req.)	.05
22-3675	10 PF Disc Capacitor - 10V	.25	94-613	Iron Core Bushing (4 Req.)	.10
22-4515	1.8 PF Gimmick Capacitor - 500V	.25	94-1534	Tuning Shaft Bushing	.20
22-4613	Feed-Thru Capacitor - 500V (5 Req.)	.10	95-2322	1st. I.F. Transformer (FM)	2.15
22-4718	Feed-Thru Capacitor - 500V	.10	103-47	Diode	3.75
22-5164	1.2 PF Gimmick Capacitor - 500V	.20	113-26	6-32 x ¼ x ¼ Hex Hd. Mach. Screw - N.P. - Ext. Lockwasher Att. (2 Used on Ea. 12-4193 & 57-5333) (4 Req.)	.03
22-5281	23 PF Disc Capacitor - 500V	.25	121-432	Transistor - FM - Oscillator	1.35
22-5318	34 PF Disc Capacitor - 500V (3 Req.)	.20	121-731	Transistor - FM - RF	1.44
24-1372	Tuner Cover	.30	121-732	Transistor - FM - Mixer	.70
44-48	Antenna Jack	.20	126-1141	Coil Shield - Side (2 Req.)	.15
56-426	Roll Pin (6 Req.)	.05	126-1142	Coil Shield - Center	.15
57-5333	Bearing Plate	.03	149-368	Iron Core & Spring (3 Req.)	.30
63-1778	680 Ohm Resistor - ¼W 10%	.17	149-385	Iron Core & Spring	.30
63-4122	33 Ohm Resistor - ¼W 10%	.17	188-232	Retaining Ring (1 Used on Ea. 94-613) (4 Req.)	.03
63-4157	220 Ohm Resistor - ¼W 10%	.17	S-62887	FM Coil Winding Assem. - FM Antenna Coil, FM - RF Input Coil, FM Detector Coil & FM Oscillator Coil (4 Req.)	.60
63-4171	470 Ohm Resistor - ¼W 10%	.17	S-69085	Shield & Terminal Strip Assem.	.35
63-4175	560 Ohm Resistor - ¼W 10%	.17	S-83409	Detector Coil Assem.	1.55
63-4185	1000 Ohm Resistor - ¼W 10%	.17	S-83410	Oscillator Coil Assem.	1.75
63-4199	2200 Ohm Resistor - ¼W 10%	.17	S-83411	Antenna Coil Assem.	1.25
63-4210	3900 Ohm Resistor - ¼W 10%	.17	S-83412	R.F. Input Coil Assem.	1.60
63-4227	10K Ohm Resistor - ¼W 10%	.17	S-83414	Bracket Shaft & Pin Assem.	5.25
63-4241	22K Ohm Resistor - ¼W 10%	.17			
63-4269	100K Ohm Resistor - ¼W 10%	.17			
63-4283	220K Ohm Resistor - ¼W 10%	.17			
63-4297	470K Ohm Resistor - ¼W 10%	.17			

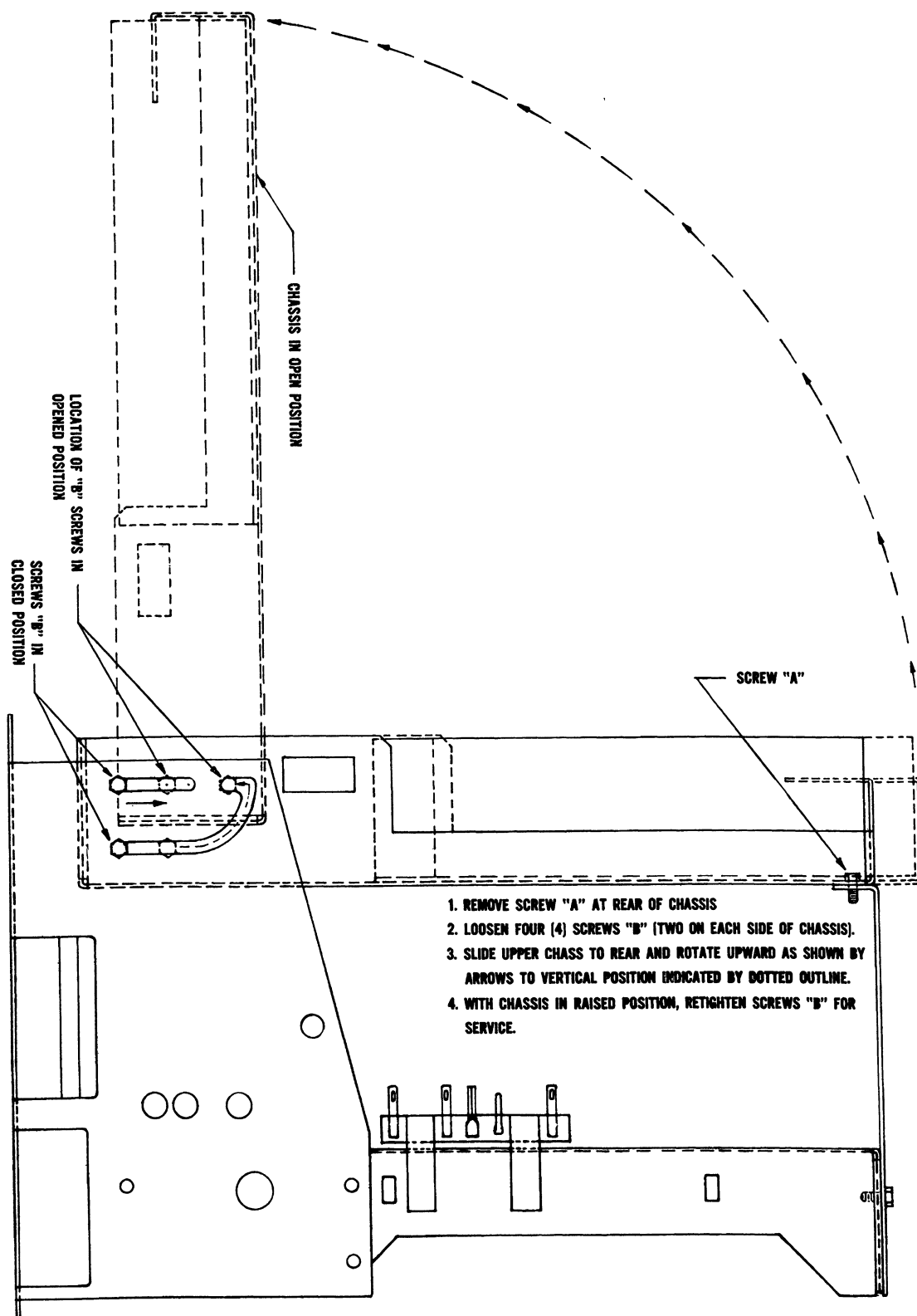
NOTES

NOTES

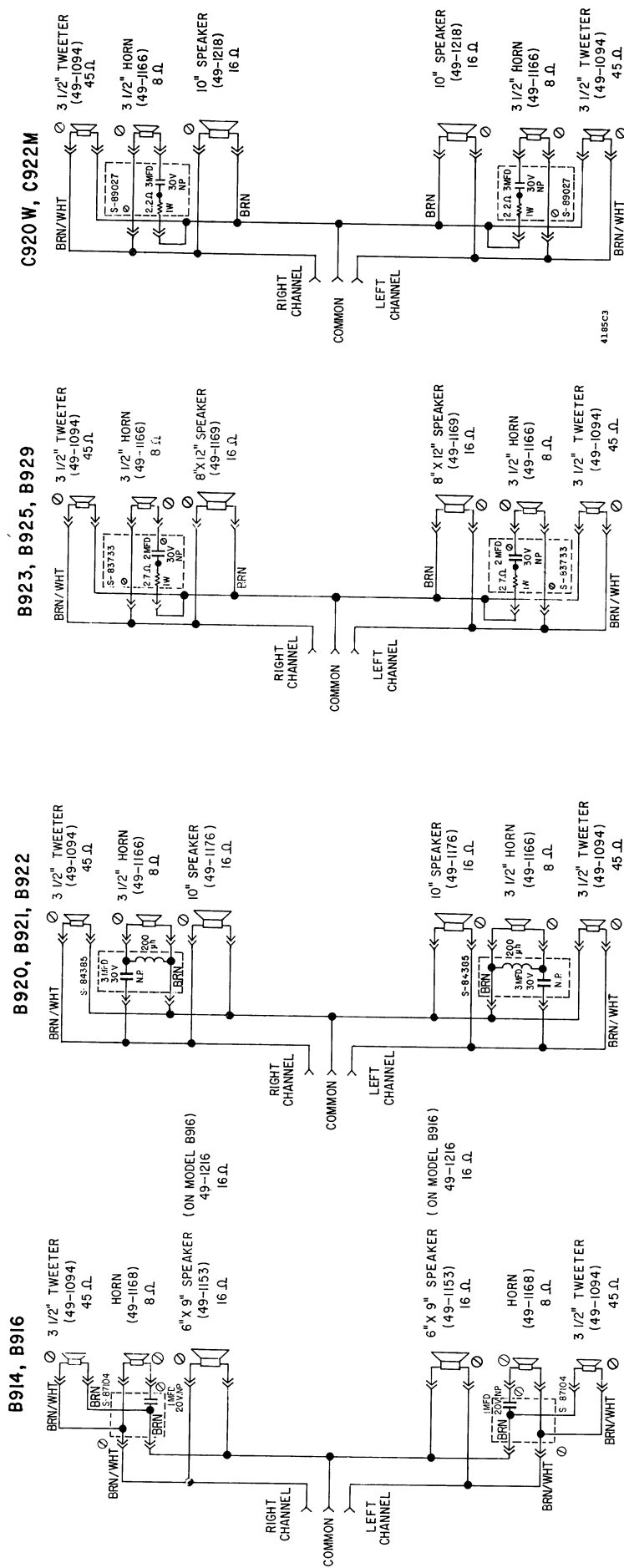
NOTES

MECHANICAL ASSEMBLIES

Zenith engineers have devised chassis constructions which, while maintaining a compact package size, will provide maximum access to the chassis should service be required. Illustrated here are two chassis configurations with instructions for tilting sub chassis into working position.



CHASSIS 25BT22



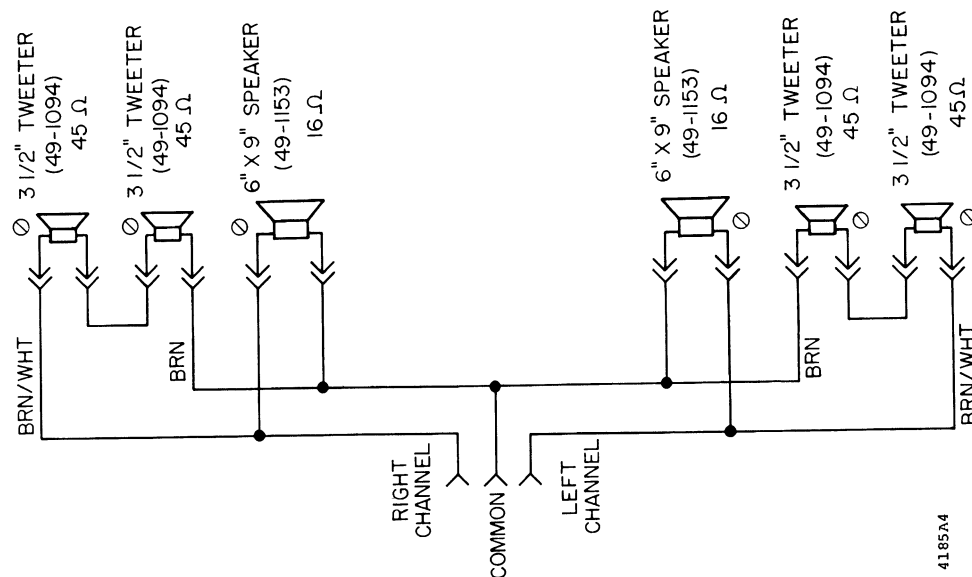
USED ON MODELS:

B914, B923,
B916, B925,
B920, B929,
B921, C920,
B922, C922

NOTE
 ⊕ INDICATES WHITE OR YELLOW VOICE COIL
 ⊖ POLARITY IDENTIFICATION DOT ON SPEAKER

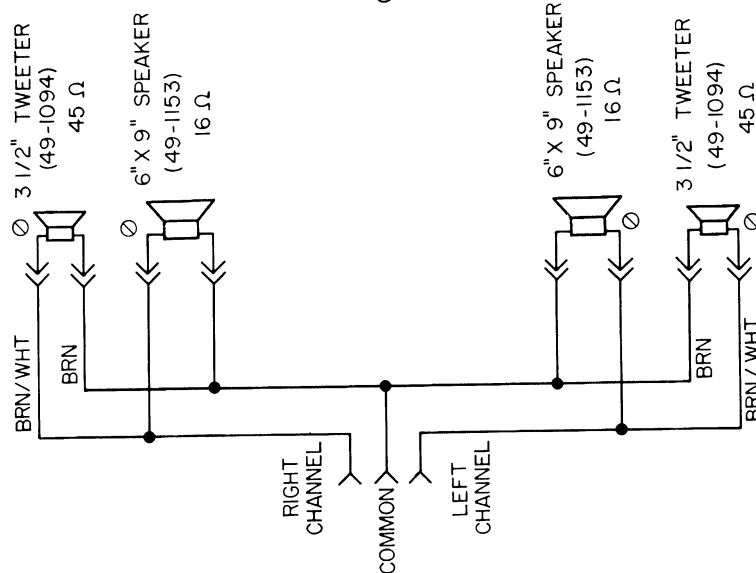
SPEAKER WIRING SCHEMATICS

C907M, C908DE, C908P,
C910W, C911W, C907MI, C911WI,
C908DEI, C908PI, C910WI

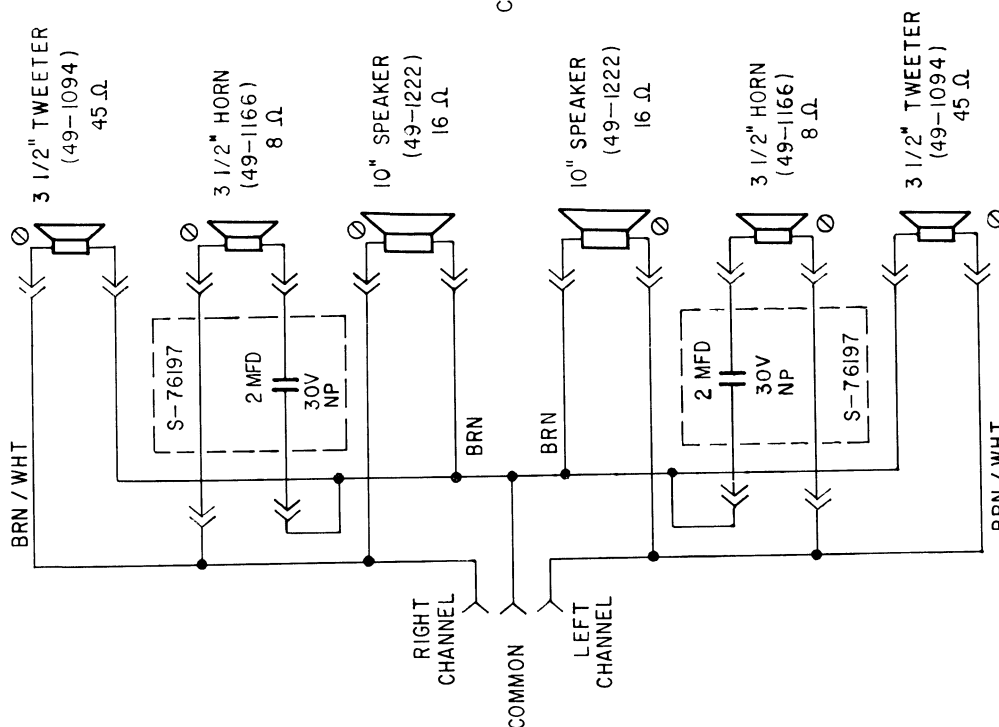


4185A4

C906W & C906WI

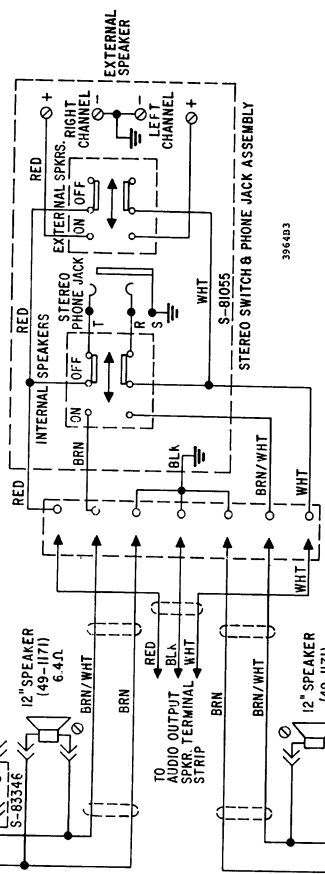
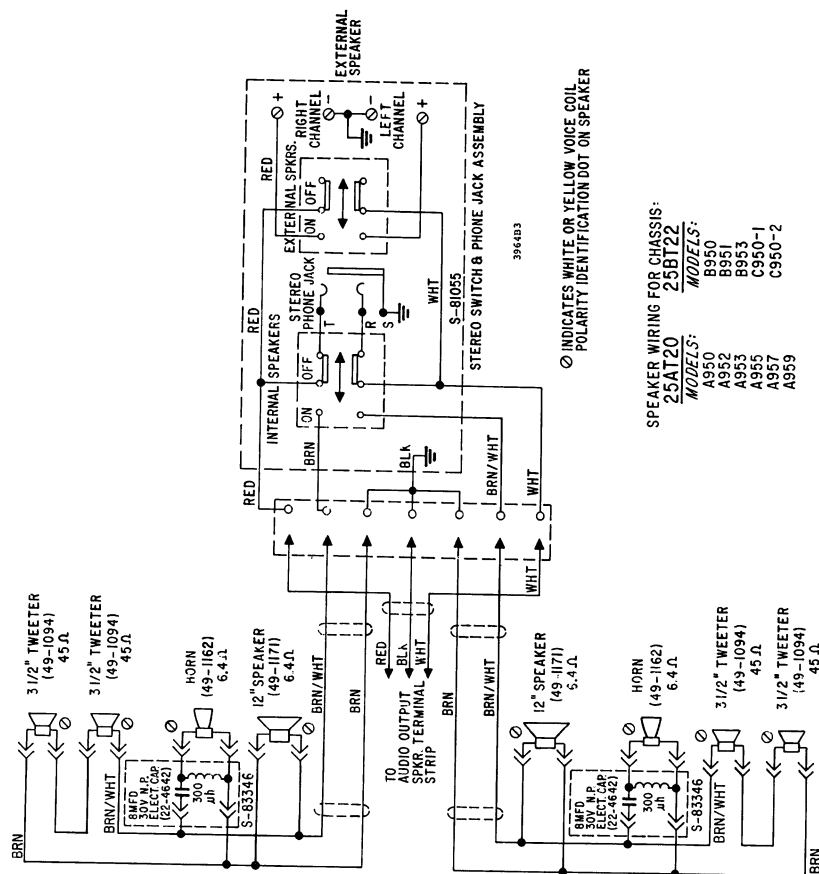
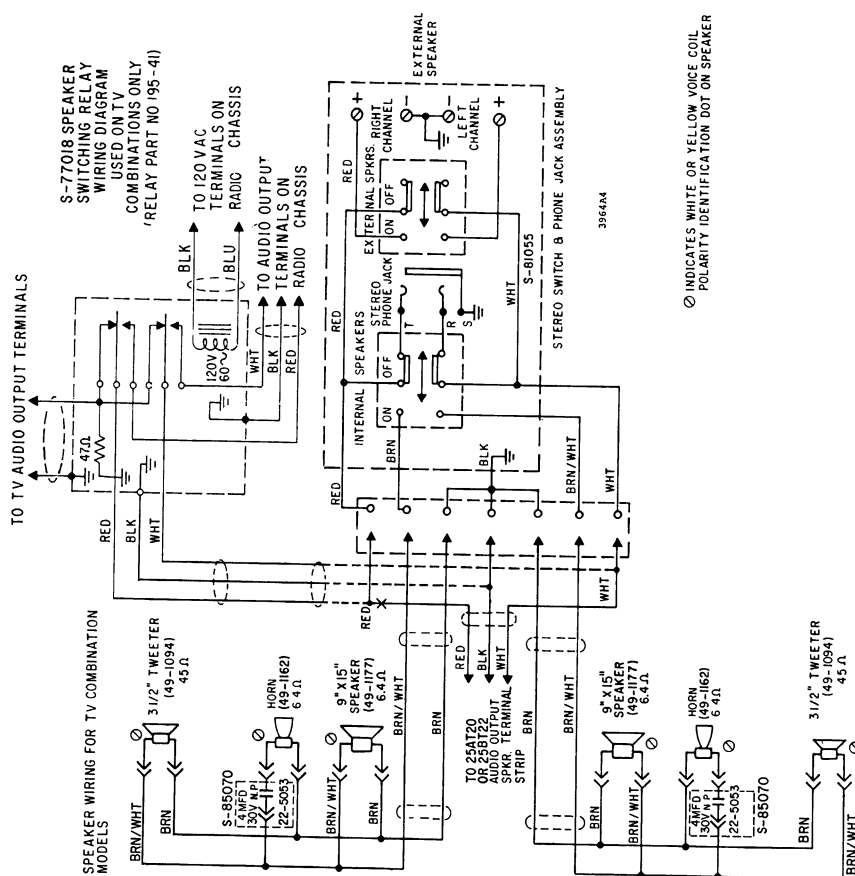


C921DE, P



NOTE:
⊗ INDICATES WHITE OR YELLOW VOICE COIL
⊙ POLARITY IDENTIFICATION DOT ON SPEAKER

SPEAKER WIRING SCHEMATICS



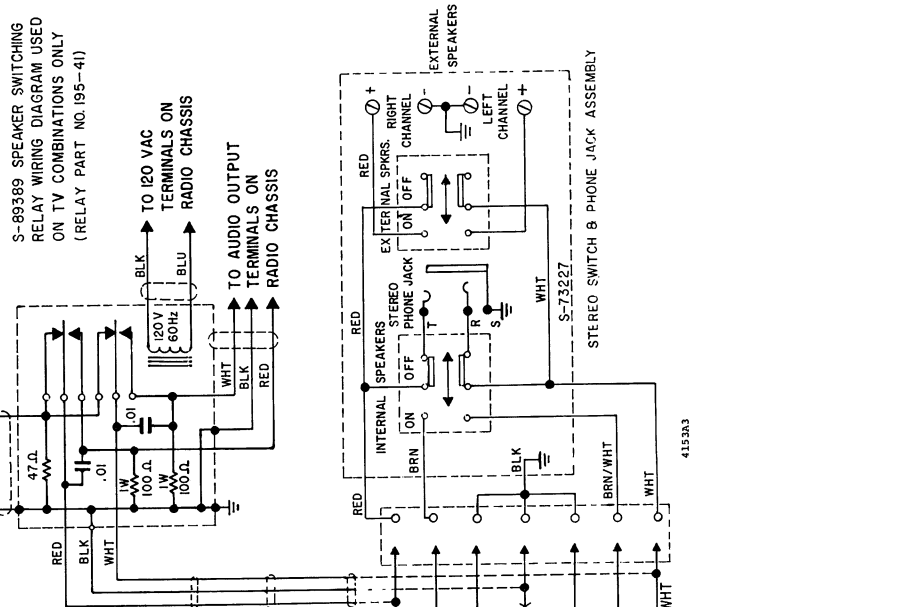
44

SPEAKER WIRING SCHEMATICS

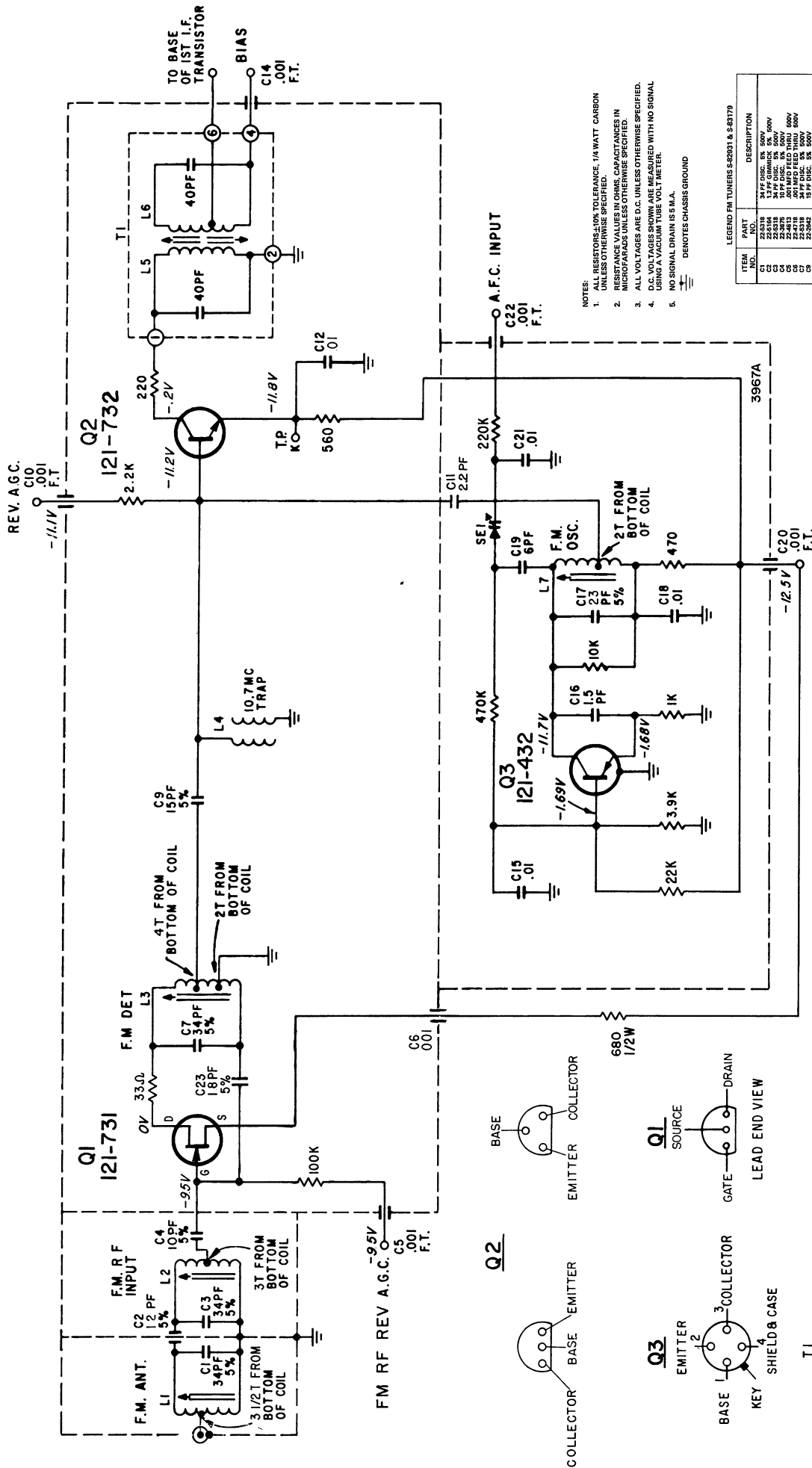
[illegible]

TO TV AUDIO
OUTPUT TERMINALS

S-89389 SPEAKER SWITCHING
RELAY WIRING DIAGRAM USED
ON TV COMBINATIONS ONLY
(RELAY PART NO. 195-41)

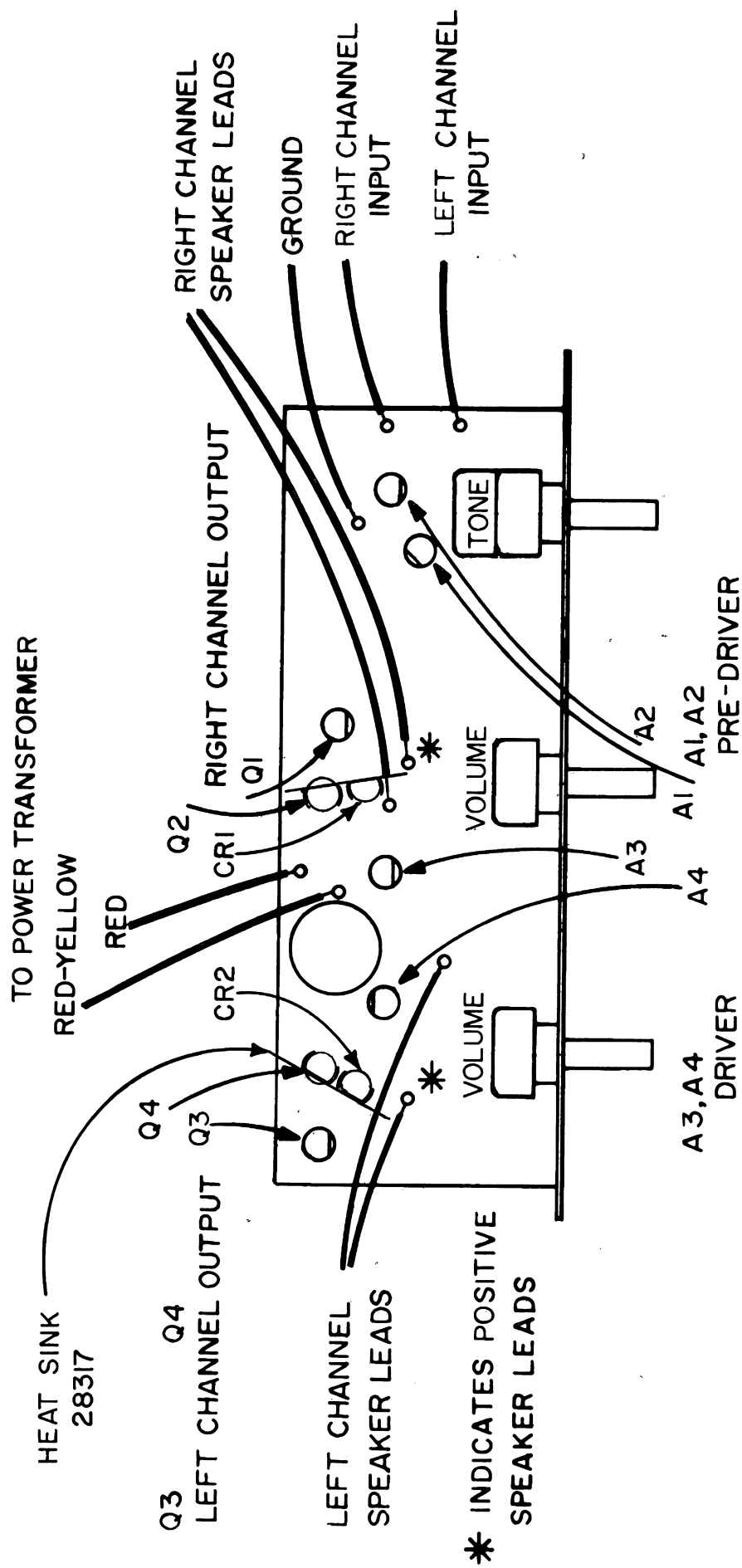


⊙ INDICATES WHITE OR YELLOW VOICE COIL
POLARITY IDENTIFICATION DOT ON SPEAKER

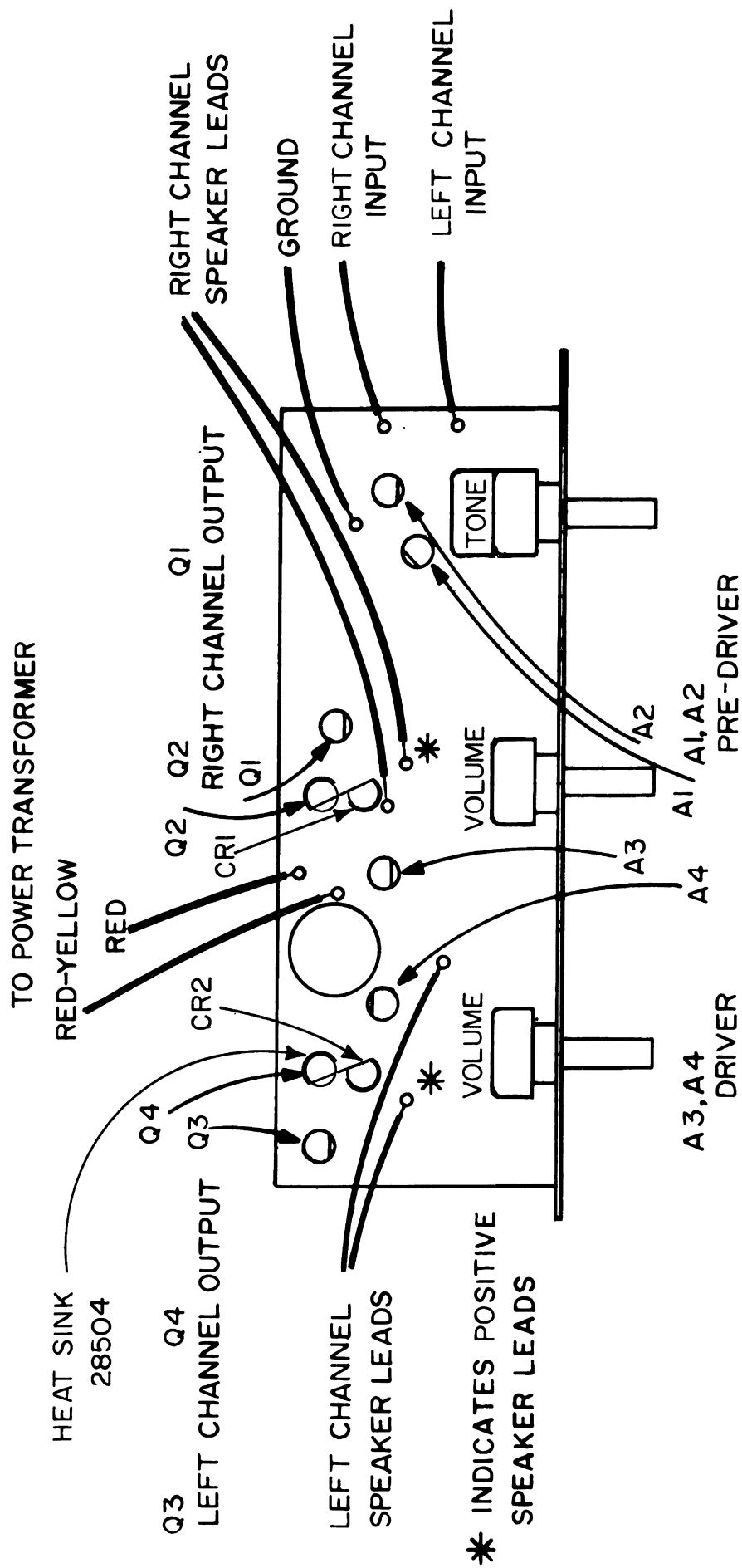


ITEM NO.	PART NO.	DESCRIPTION
C1	22-3318	34 PF DISC. 5% 500V
C2	22-3318	34 PF DISC. 5% 500V
C3	22-3318	34 PF DISC. 5% 500V
C4	22-4813	10 PF DISC. 5% 500V
C5	22-4813	10 PF DISC. 5% 500V
C6	22-4813	10 PF DISC. 5% 500V
C7	22-4813	10 PF DISC. 5% 500V
C8	22-4813	10 PF DISC. 5% 500V
C9	22-3842	15 PF DISC. 5% 500V
C10	22-3842	15 PF DISC. 5% 500V
C11	22-3819	2.2 PF DISC. 5% 500V
C12	22-3819	2.2 PF DISC. 5% 500V
C13	22-4813	10 PF DISC. 5% 500V
C14	22-3819	2.2 PF DISC. 5% 500V
C15	22-3303	22 PF DISC. 5% 500V
C16	22-3303	22 PF DISC. 5% 500V
C17	22-3303	22 PF DISC. 5% 500V
C18	22-3303	22 PF DISC. 5% 500V
C19	22-3303	22 PF DISC. 5% 500V
C20	22-3303	22 PF DISC. 5% 500V
C21	22-3303	22 PF DISC. 5% 500V
C22	22-3303	22 PF DISC. 5% 500V
C23	22-4813	10 PF DISC. 5% 500V
L1	22-4813	10 PF DISC. 5% 500V
L2	22-4813	10 PF DISC. 5% 500V
L3	22-4813	10 PF DISC. 5% 500V
L4	22-4813	10 PF DISC. 5% 500V
L5	22-4813	10 PF DISC. 5% 500V
L6	22-4813	10 PF DISC. 5% 500V
L7	22-4813	10 PF DISC. 5% 500V
L8	22-4813	10 PF DISC. 5% 500V
L9	22-4813	10 PF DISC. 5% 500V
L10	22-4813	10 PF DISC. 5% 500V
L11	22-4813	10 PF DISC. 5% 500V
L12	22-4813	10 PF DISC. 5% 500V
L13	22-4813	10 PF DISC. 5% 500V
L14	22-4813	10 PF DISC. 5% 500V
L15	22-4813	10 PF DISC. 5% 500V
L16	22-4813	10 PF DISC. 5% 500V
L17	22-4813	10 PF DISC. 5% 500V
L18	22-4813	10 PF DISC. 5% 500V
L19	22-4813	10 PF DISC. 5% 500V
L20	22-4813	10 PF DISC. 5% 500V
L21	22-4813	10 PF DISC. 5% 500V
L22	22-4813	10 PF DISC. 5% 500V
L23	22-4813	10 PF DISC. 5% 500V
L24	22-4813	10 PF DISC. 5% 500V
L25	22-4813	10 PF DISC. 5% 500V
L26	22-4813	10 PF DISC. 5% 500V
L27	22-4813	10 PF DISC. 5% 500V
L28	22-4813	10 PF DISC. 5% 500V
L29	22-4813	10 PF DISC. 5% 500V
L30	22-4813	10 PF DISC. 5% 500V
L31	22-4813	10 PF DISC. 5% 500V
L32	22-4813	10 PF DISC. 5% 500V
L33	22-4813	10 PF DISC. 5% 500V
L34	22-4813	10 PF DISC. 5% 500V
L35	22-4813	10 PF DISC. 5% 500V
L36	22-4813	10 PF DISC. 5% 500V
L37	22-4813	10 PF DISC. 5% 500V
L38	22-4813	10 PF DISC. 5% 500V
L39	22-4813	10 PF DISC. 5% 500V
L40	22-4813	10 PF DISC. 5% 500V
L41	22-4813	10 PF DISC. 5% 500V
L42	22-4813	10 PF DISC. 5% 500V
L43	22-4813	10 PF DISC. 5% 500V
L44	22-4813	10 PF DISC. 5% 500V
L45	22-4813	10 PF DISC. 5% 500V
L46	22-4813	10 PF DISC. 5% 500V
L47	22-4813	10 PF DISC. 5% 500V
L48	22-4813	10 PF DISC. 5% 500V
L49	22-4813	10 PF DISC. 5% 500V
L50	22-4813	10 PF DISC. 5% 500V
L51	22-4813	10 PF DISC. 5% 500V
L52	22-4813	10 PF DISC. 5% 500V
L53	22-4813	10 PF DISC. 5% 500V
L54	22-4813	10 PF DISC. 5% 500V
L55	22-4813	10 PF DISC. 5% 500V
L56	22-4813	10 PF DISC. 5% 500V
L57	22-4813	10 PF DISC. 5% 500V
L58	22-4813	10 PF DISC. 5% 500V
L59	22-4813	10 PF DISC. 5% 500V
L60	22-4813	10 PF DISC. 5% 500V
L61	22-4813	10 PF DISC. 5% 500V
L62	22-4813	10 PF DISC. 5% 500V
L63	22-4813	10 PF DISC. 5% 500V
L64	22-4813	10 PF DISC. 5% 500V
L65	22-4813	10 PF DISC. 5% 500V
L66	22-4813	10 PF DISC. 5% 500V
L67	22-4813	10 PF DISC. 5% 500V
L68	22-4813	10 PF DISC. 5% 500V
L69	22-4813	10 PF DISC. 5% 500V
L70	22-4813	10 PF DISC. 5% 500V
L71	22-4813	10 PF DISC. 5% 500V
L72	22-4813	10 PF DISC. 5% 500V
L73	22-4813	10 PF DISC. 5% 500V
L74	22-4813	10 PF DISC. 5% 500V
L75	22-4813	10 PF DISC. 5% 500V
L76	22-4813	10 PF DISC. 5% 500V
L77	22-4813	10 PF DISC. 5% 500V
L78	22-4813	10 PF DISC. 5% 500V
L79	22-4813	10 PF DISC. 5% 500V
L80	22-4813	10 PF DISC. 5% 500V
L81	22-4813	10 PF DISC. 5% 500V
L82	22-4813	10 PF DISC. 5% 500V
L83	22-4813	10 PF DISC. 5% 500V
L84	22-4813	10 PF DISC. 5% 500V
L85	22-4813	10 PF DISC. 5% 500V
L86	22-4813	10 PF DISC. 5% 500V
L87	22-4813	10 PF DISC. 5% 500V
L88	22-4813	10 PF DISC. 5% 500V
L89	22-4813	10 PF DISC. 5% 500V
L90	22-4813	10 PF DISC. 5% 500V
L91	22-4813	10 PF DISC. 5% 500V
L92	22-4813	10 PF DISC. 5% 500V
L93	22-4813	10 PF DISC. 5% 500V
L94	22-4813	10 PF DISC. 5% 500V
L95	22-4813	10 PF DISC. 5% 500V
L96	22-4813	10 PF DISC. 5% 500V
L97	22-4813	10 PF DISC. 5% 500V
L98	22-4813	10 PF DISC. 5% 500V
L99	22-4813	10 PF DISC. 5% 500V
L100	22-4813	10 PF DISC. 5% 500V

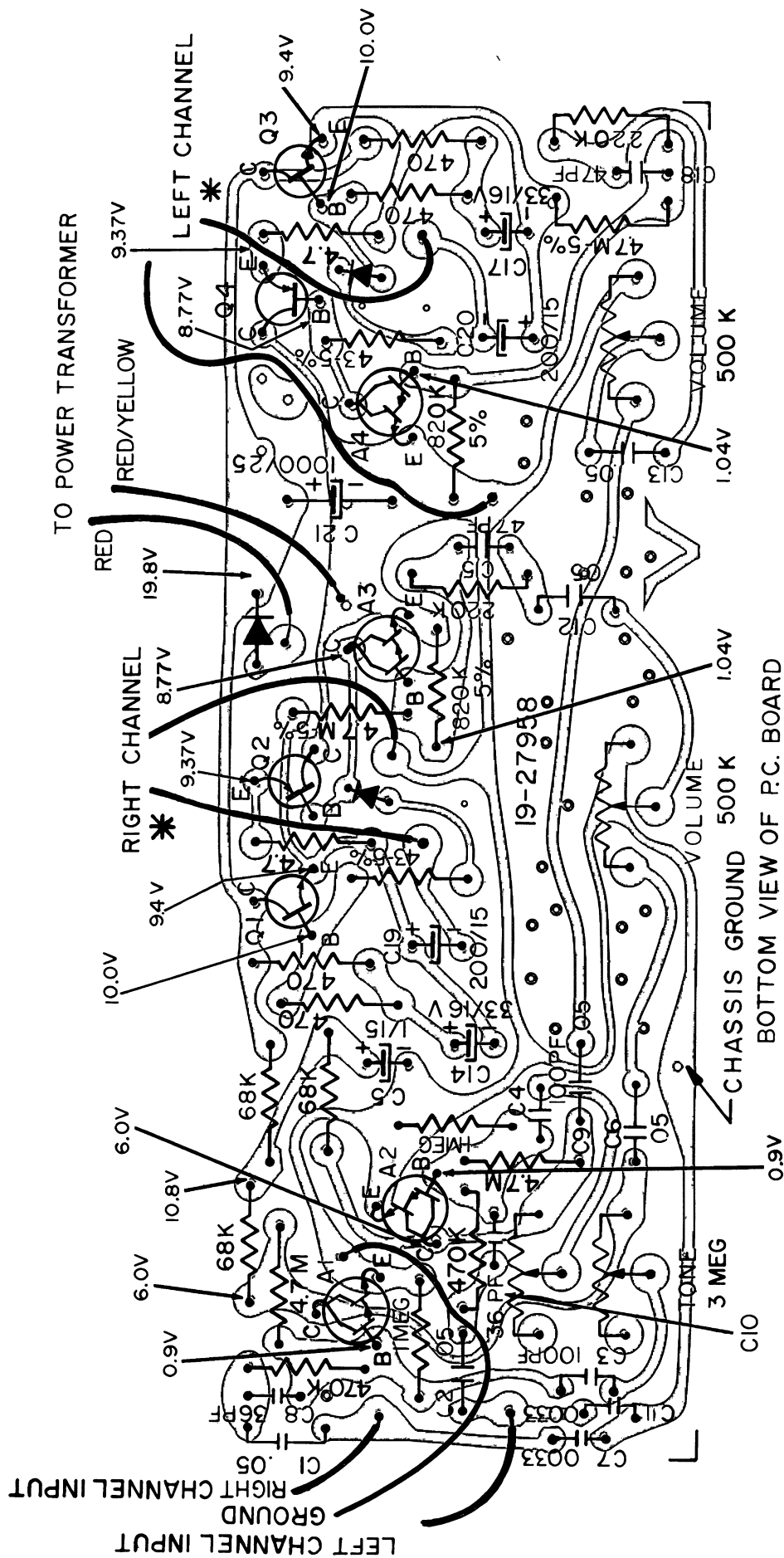
S82931 - FM TUNER - SCHEMATIC



B545 - CHASSIS LAYOUT - EARLY PRODUCTION

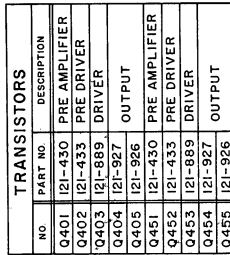


B545 - CHASSIS LAYOUT - LATER PRODUCTION



B545 - CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE -- LATER PRODUCTION

Item No.	Part No.	Description
C401	22-3034	.05 MFD DISC. 25V
C402	22-3035	.05 MFD DISC. 50V
C403	22-3036	1 MFD ELECTROLYTIC 50V
C404	22-3037	2 MFD CAPACITOR 100V
C405	22-3680	6800 PF DISC. 100V
C406	22-3681	1 MFD 100V
C407	22-3682	.015 MFD 50V
C408	22-3596	6800 PF DISC. 500V
C409	22-3597	1 MFD ELECTROLYTIC 10V
C410	22-3598	6800 PF DISC. 100V
C411	22-3599	1 MFD 100V
C412	22-3600	6800 PF DISC. 100V
C413	22-3573	1 MFD ELECTROLYTIC 25V
C414	22-3574	1 MFD ELECTROLYTIC 35V
C415	22-3575	2 MFD ELECTROLYTIC N.P. 30V
C416	22-3576	1 MFD ELECTROLYTIC N.P. 30V
C417	22-3577	1 MFD ELECTROLYTIC 50V
C418	22-3578	1 MFD ELECTROLYTIC 50V
C419	22-3579	1 MFD ELECTROLYTIC 50V
C420	22-3580	1 MFD ELECTROLYTIC 50V
C421	22-3581	1 MFD ELECTROLYTIC 50V
C422	22-3582	1 MFD ELECTROLYTIC 50V
C423	22-3583	1 MFD ELECTROLYTIC 50V
C424	22-3584	1 MFD ELECTROLYTIC 50V
C425	22-3585	1 MFD ELECTROLYTIC 50V
C426	22-3586	1 MFD ELECTROLYTIC 50V
C427	22-3587	1 MFD ELECTROLYTIC 50V
C428	22-3588	1 MFD ELECTROLYTIC 50V
C429	22-3589	1 MFD ELECTROLYTIC 50V
C430	22-3590	1 MFD ELECTROLYTIC 50V
C431	22-3591	1 MFD ELECTROLYTIC 50V
C432	22-3592	1 MFD ELECTROLYTIC 50V
C433	22-3593	1 MFD ELECTROLYTIC 50V
C434	22-3594	1 MFD ELECTROLYTIC 50V
C435	22-3595	1 MFD ELECTROLYTIC 50V
C436	22-3596	1 MFD ELECTROLYTIC 50V
C437	22-3597	1 MFD ELECTROLYTIC 50V
C438	22-3598	1 MFD ELECTROLYTIC 50V
C439	22-3599	1 MFD ELECTROLYTIC 50V
C440	22-3600	1 MFD ELECTROLYTIC 50V
C441	22-3601	1 MFD ELECTROLYTIC 50V
C442	22-3602	1 MFD ELECTROLYTIC 50V
C443	22-3603	1 MFD ELECTROLYTIC 50V
C444	22-3604	1 MFD ELECTROLYTIC 50V
C445	22-3605	1 MFD ELECTROLYTIC 50V
C446	22-3606	1 MFD ELECTROLYTIC 50V
C447	22-3607	1 MFD ELECTROLYTIC 50V
C448	22-3608	1 MFD ELECTROLYTIC 50V
C449	22-3609	1 MFD ELECTROLYTIC 50V
C450	22-3610	1 MFD ELECTROLYTIC 50V
C451	22-3611	1 MFD ELECTROLYTIC 50V
C452	22-3612	1 MFD ELECTROLYTIC 50V
C453	22-3613	1 MFD ELECTROLYTIC 50V
C454	22-3614	1 MFD ELECTROLYTIC 50V
C455	22-3615	1 MFD ELECTROLYTIC 50V
C456	22-3616	1 MFD ELECTROLYTIC 50V
C457	22-3617	1 MFD ELECTROLYTIC 50V
C458	22-3618	1 MFD ELECTROLYTIC 50V
C459	22-3619	1 MFD ELECTROLYTIC 50V
C460	22-3620	1 MFD ELECTROLYTIC 50V
C461	22-3621	1 MFD ELECTROLYTIC 50V
C462	22-3622	1 MFD ELECTROLYTIC 50V
C463	22-3623	1 MFD ELECTROLYTIC 50V
C464	22-3624	1 MFD ELECTROLYTIC 50V
C465	22-3625	1 MFD ELECTROLYTIC 50V
C466	22-3626	1 MFD ELECTROLYTIC 50V
C467	22-3627	1 MFD ELECTROLYTIC 50V
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C469	22-3629	1 MFD ELECTROLYTIC 50V
C470	22-3630	1 MFD ELECTROLYTIC 50V
C471	22-3631	1 MFD ELECTROLYTIC 50V
C472	22-3632	1 MFD ELECTROLYTIC 50V
C473	22-3633	1 MFD ELECTROLYTIC 50V
C474	22-3634	1 MFD ELECTROLYTIC 50V
C475	22-3635	1 MFD ELECTROLYTIC 50V
C476	22-3636	1 MFD ELECTROLYTIC 50V
C477	22-3637	1 MFD ELECTROLYTIC 50V
C478	22-3638	1 MFD ELECTROLYTIC 50V
C479	22-3639	1 MFD ELECTROLYTIC 50V
C480	22-3640	1 MFD ELECTROLYTIC 50V
C481	22-3641	1 MFD ELECTROLYTIC 50V
C482	22-3642	1 MFD ELECTROLYTIC 50V
C483	22-3643	1 MFD ELECTROLYTIC 50V
C484	22-3644	1 MFD ELECTROLYTIC 50V
C485	22-3645	1 MFD ELECTROLYTIC 50V
C486	22-3646	1 MFD ELECTROLYTIC 50V
C487	22-3647	1 MFD ELECTROLYTIC 50V
C488	22-3648	1 MFD ELECTROLYTIC 50V
C489	22-3649	1 MFD ELECTROLYTIC 50V
C490	22-3650	1 MFD ELECTROLYTIC 50V
C491	22-3651	1 MFD ELECTROLYTIC 50V
C492	22-3652	1 MFD ELECTROLYTIC 50V
C493	22-3653	1 MFD ELECTROLYTIC 50V
C494	22-3654	1 MFD ELECTROLYTIC 50V
C495	22-3	



0401, 0402, 0403, 0451, 0452, 0453

TRANSISTOR LEAD LAYOUTS

LEAD END VIEWS

Diagram 1 (Left): COLOR DOT. Shows a circular lead layout with terminals E, B, and C. A central dot is labeled 'COLOR DOT'.

Diagram 2 (Right): FLAT OPTIONAL. Shows a circular lead layout with terminals E, B, and C. A flat optional feature is indicated by a dashed line.

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

NOTES: * INDICATES 10% TOLERANCE IN OHMS. $\pm 0.0\%$, $\pm 1/2$ WATT, CARBON UNLESS OTHERWISE SPECIFIED. ALL CAPACITORS IN MICROFARADS $\pm 10\%$ UNLESS OTHERWISE SPECIFIED. $\pm$ INDICATES $\pm 20\%$.

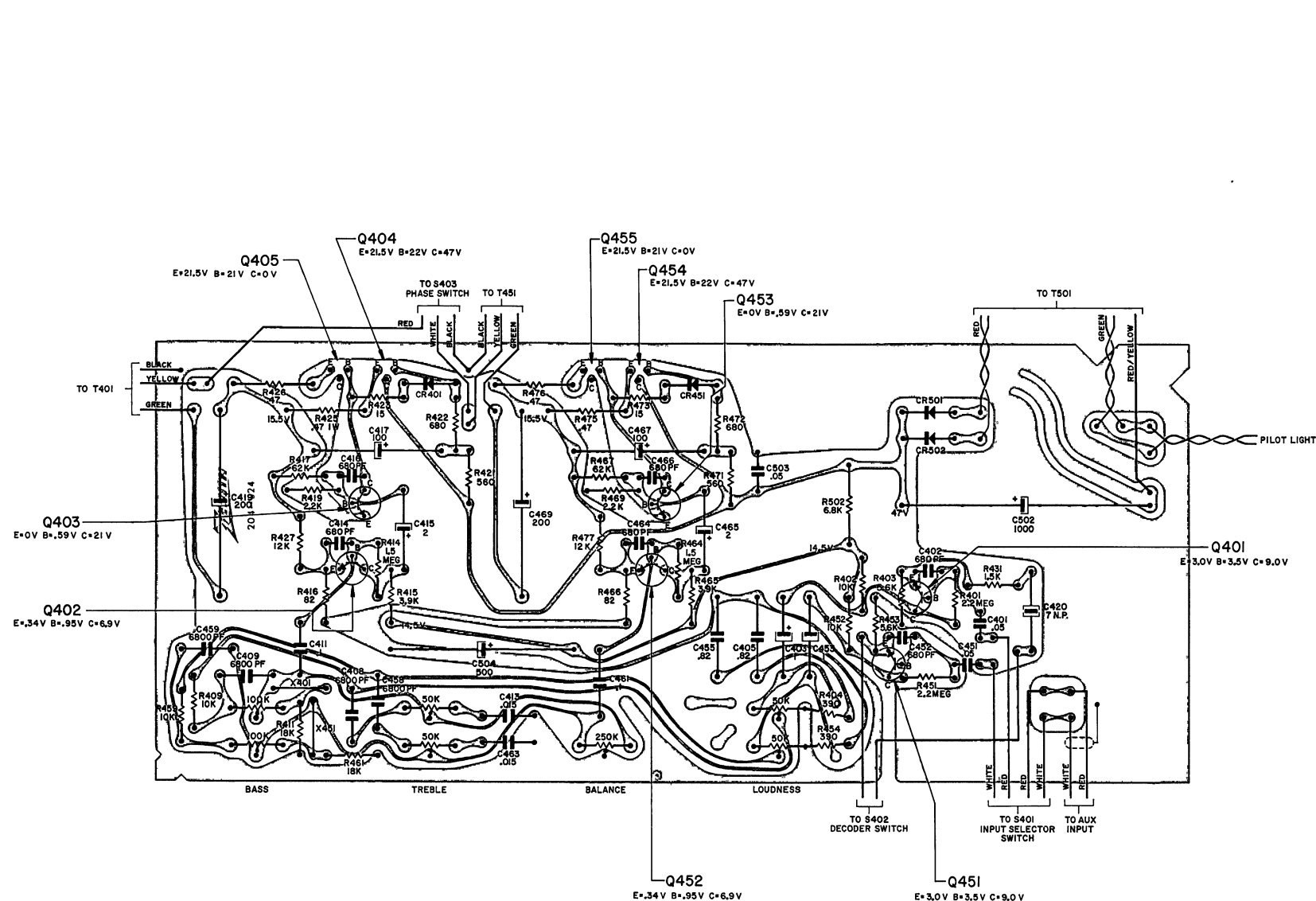
ALL VOLTAGES ARE DC UNLESS OTHERWISE SPECIFIED. ALL RESISTANCES ARE IN OHMS UNLESS OTHERWISE SPECIFIED. CHASSIS WITH NO SIGNAL AND LOUDNESS CONTROL AT MINIMUM USING A HIGH INPUT IMPEDANCE TEST TONE.

† DENOTES CHASSIS GROUND.

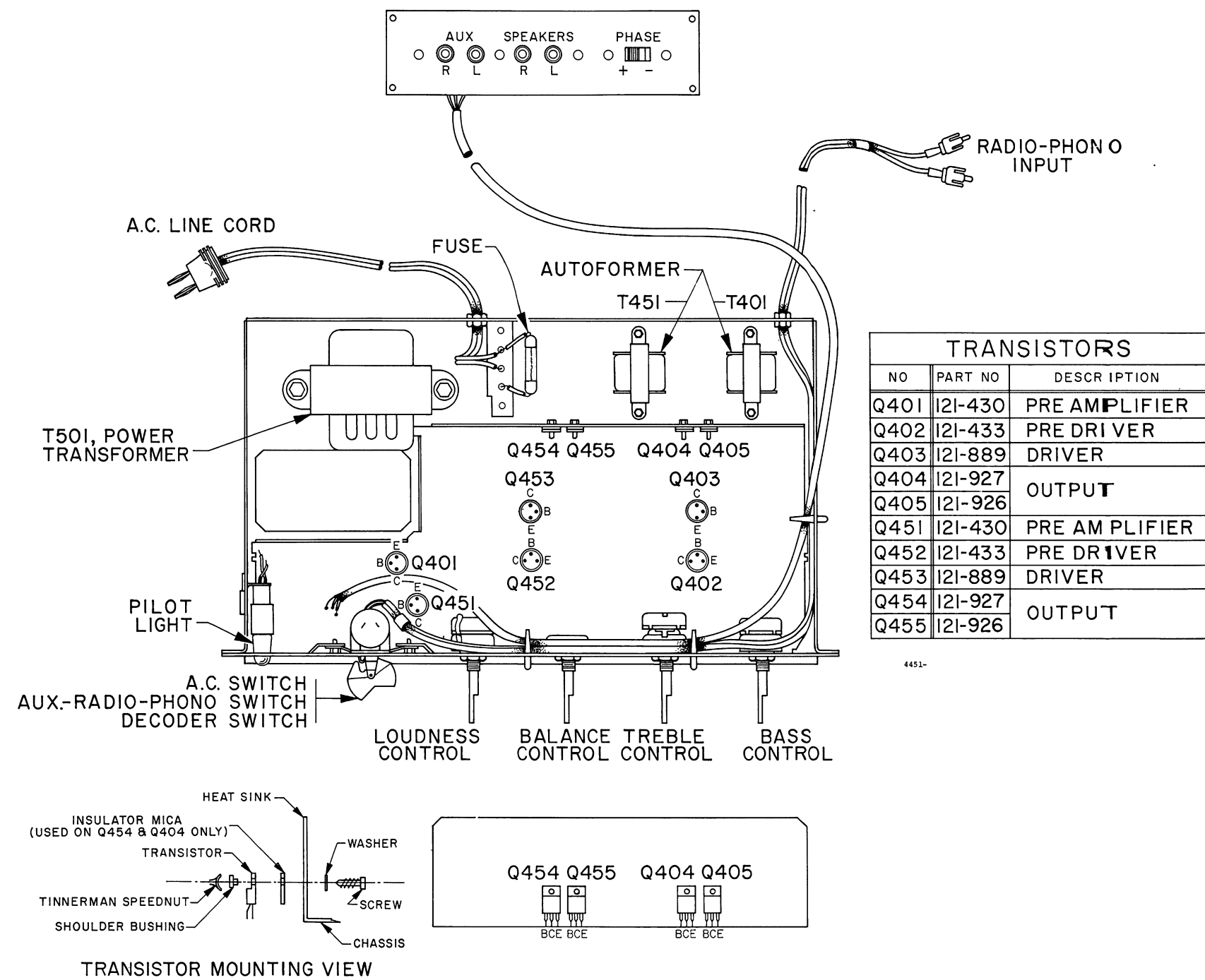
‡ INDICATES 10% TOLERANCE IN OHMS. $\pm 0.0\%$ TO 0.005 OHMS IN 100 OHM CHANNELS AND 0.004 TO 0.004 LEFT CHANNEL IN 100 OHM CHANNELS. ALL RESISTANCES IN OHMS UNLESS OTHERWISE SPECIFIED. INCLUSIVE IN EACH GROUP SHOULD BE TESTED BEFORE REPLACEMENT. THINSTRIPS ARE NOT INCLUDED.

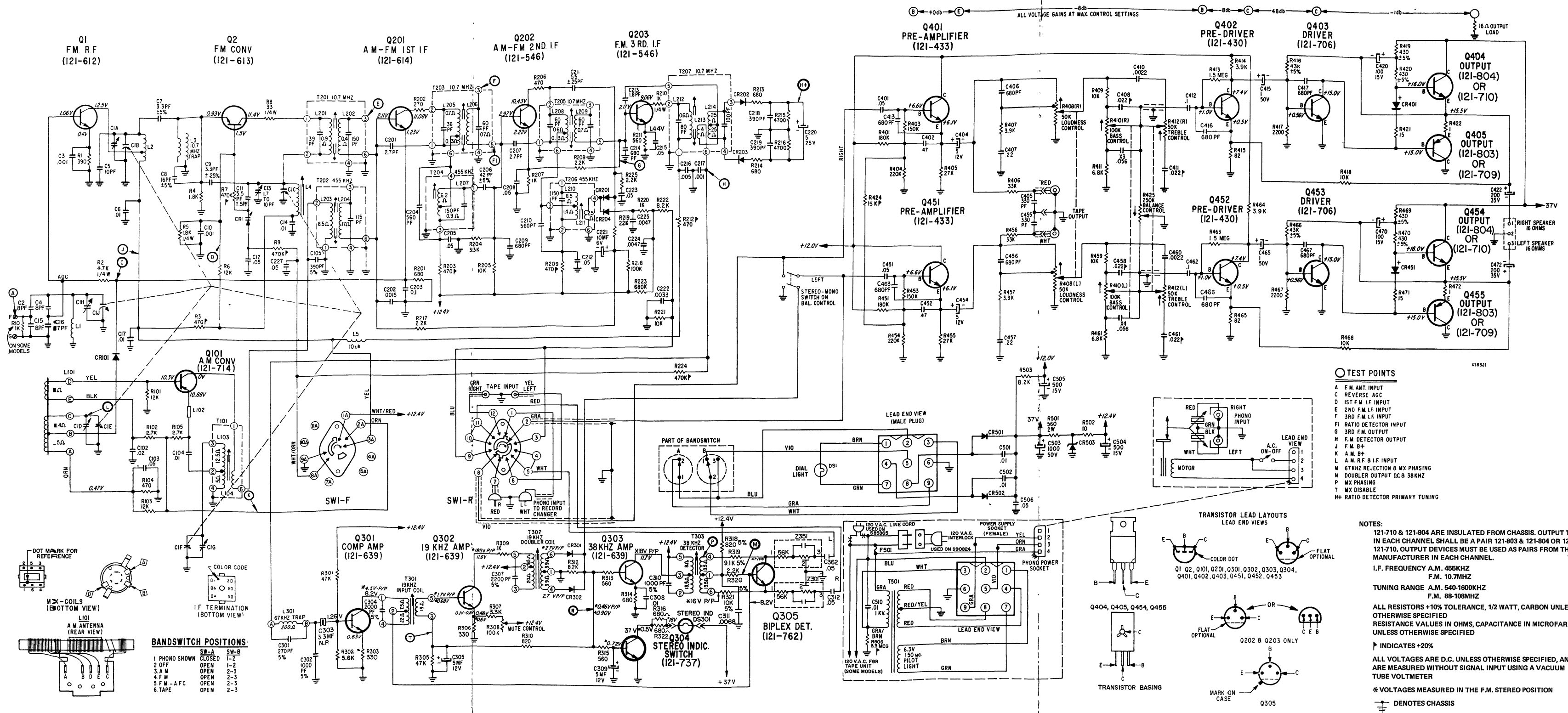
→ INDICATES VOLTAGE SOURCE

OUTPUT DEVICES MUST BE USED AS SPEAKERS FROM



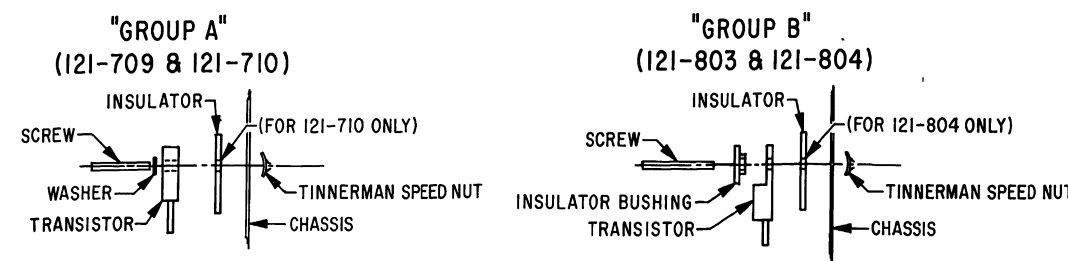
15WCA10 - CHASSIS WIRING AND COMPONENTS VIEWED FROM FOIL SIDE.





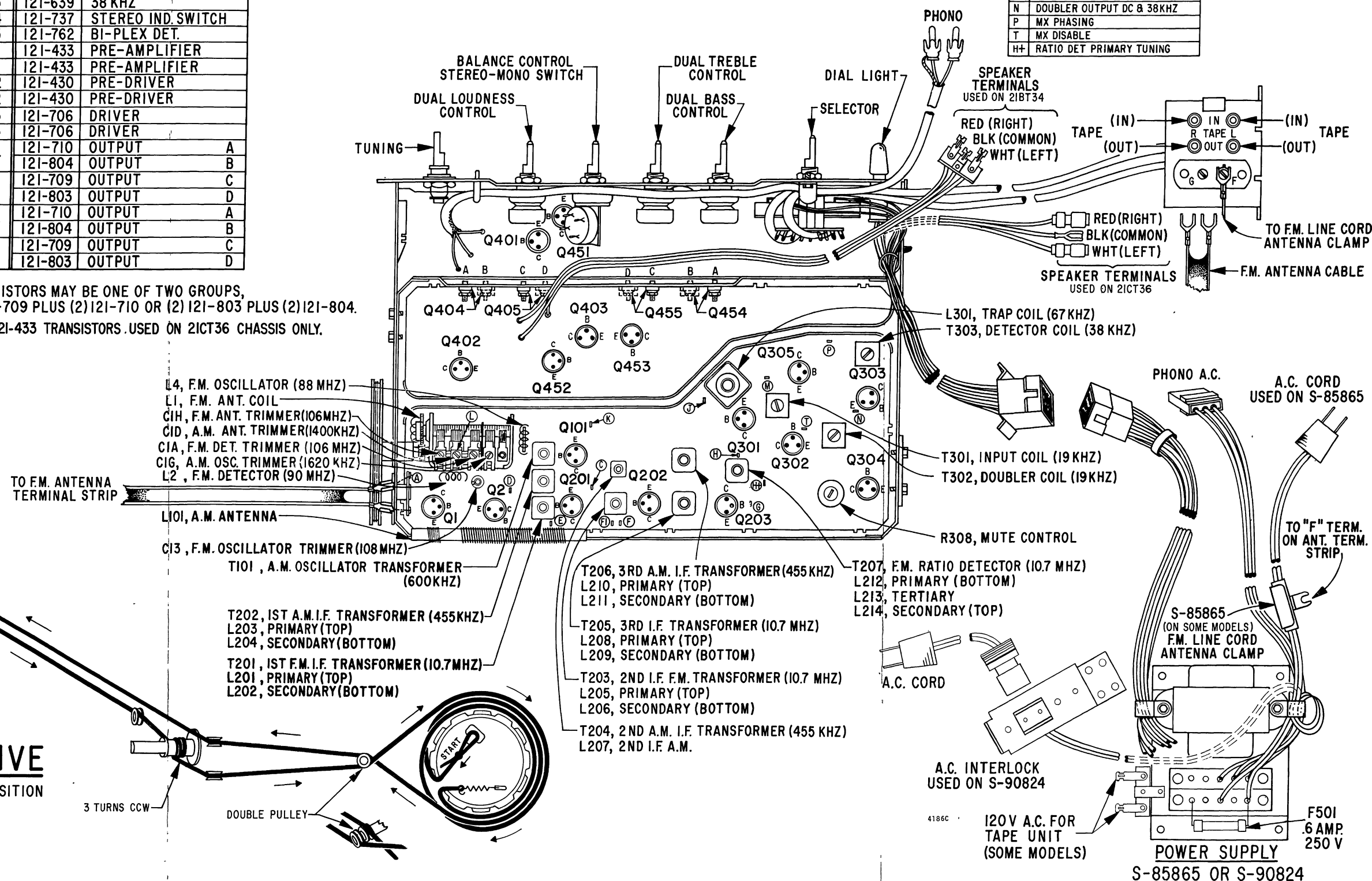
TRANSISTORS		
No.	PART No.	DESCRIPTION
Q1	121-612	F.M.-R.F.
Q2	121-613	F.M. CONVERTER
Q101	121-714	A.M. CONVERTER
Q201	121-614	A.M.-F.M. 1st I.F.
Q202	121-546	A.M.-F.M. 2nd I.F.
Q203	121-546	F.M. 3rd I.F.
Q301	121-639	COMP. AMPLIFIER
Q302	121-639	19 KHZ AMPLIFIER
Q303	121-639	38 KHZ
Q304	121-737	STEREO IND. SWITCH
Q305	121-762	BI- PLEX DET.
Q401	121-433	PRE-AMPLIFIER
Q451	121-433	PRE-AMPLIFIER
**Q402	121-433	PRE-DRIVER
**Q452	121-433	PRE-DRIVER
Q403	121-706	DRIVER
Q453	121-706	DRIVER
* Q404	121-710	OUTPUT A
	121-804	OUTPUT B
* Q405	121-709	OUTPUT C
	121-803	OUTPUT D
* Q454	121-710	OUTPUT A
	121-804	OUTPUT B
* Q455	121-709	OUTPUT C
	121-803	OUTPUT D

* OUTPUT TRANSISTORS MAY BE ONE OF TWO GROUPS, EITHER (2) 121-709 PLUS (2) 121-710 OR (2) 121-803 PLUS (2) 121-804.
 ** PRE-DRIVER 2-121-433 TRANSISTORS. USED ON 21CT36 CHASSIS ONLY.

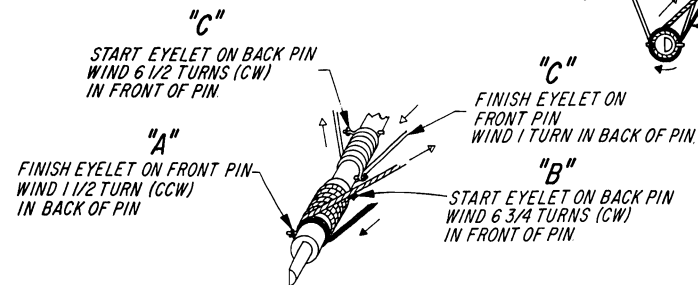


TEST POINTS	
A	F.M. ANT. INPUT
C	REVERSE AGC
D	1ST F.M. I.F. INPUT
E	2ND F.M. I.F. INPUT
F	3RD F.M. I.F. INPUT
FI	RATIO DETECTOR INPUT
G	3RD F.M. OUTPUT
H	F.M. DETECTOR OUTPUT
J	F.M. B+
K	A.M. B+
L	A.M. R.F. & I.F. INPUT
M	67KHZ REJECTION & MX PHASING
N	DOUBLER OUTPUT DC & 38KHZ
P	MX PHASING
T	MX DISABLE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

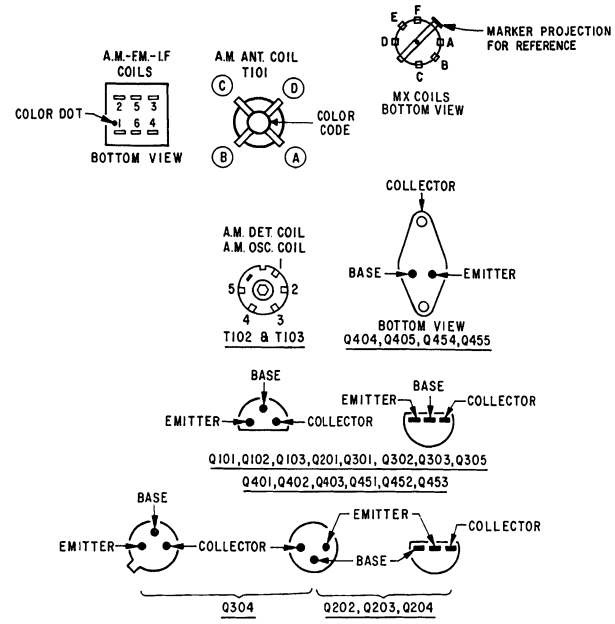
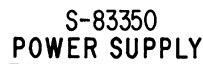
DIAL CORD DRIVE
 SHOWN IN FULL CLOCKWISE POSITION



SHOWN IN FULL COUNTERCLOCKWISE POSITION



SLIDE CONTROL
EDGE PC CONNECTORS

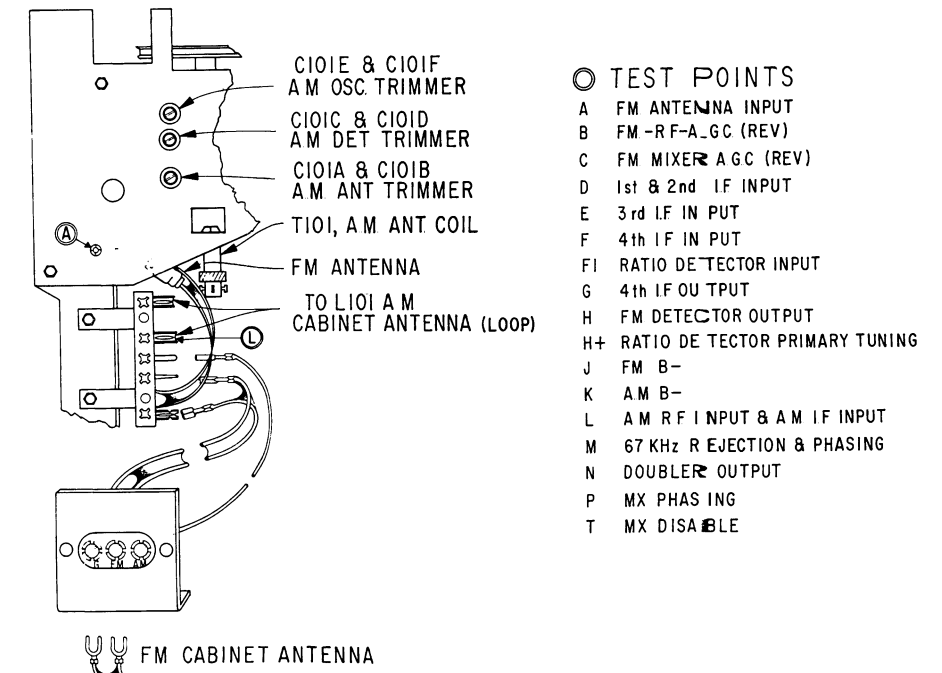


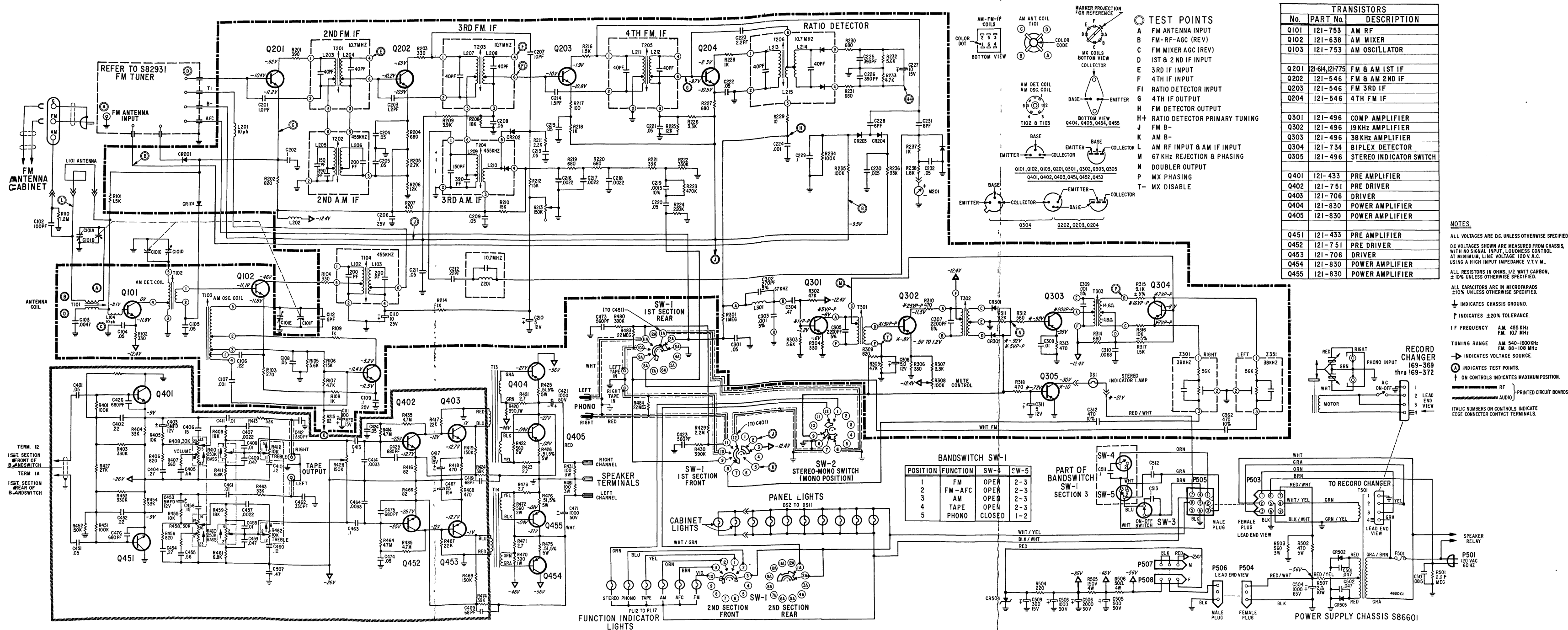
TI, 1st FM IF TRANS (10.7 MHz)
L5, PRI BOTTOM
L6, SEC TOP
L3, FM MIXER
L7, FM OSCILLATOR
L2, FM RF
L1, FM ANTENNA

NOTE COLOR CODE MUST
BE MATCHED ON THESE FOUR
TRANSISTORS ON ANY _____
ONE CHASSIS

TRANSISTORS		
No.	PART No.	DESCRIPTION
Q1	121-731	FM RF
Q2	121-732	FM MIXER
Q3	121-432	FM OSCILLATOR
Q101	121-753	AM RF
Q102	121-638	AM MIXER
Q103	121-753	AM OSCILLATOR
Q201	121-614	FM & AM 1st IF
Q202		FM & AM 2nd IF
Q203	121-546	FM 3rd IF
Q204		4th FM IF
Q301		COMP AMPLIFIER
Q302	121-496	19KHz AMPLIFIER
Q303		38KHz AMPLIFIER
Q304	121-734	BIPEX DETECTOR
Q305	121-496	STEREO INDICATOR SWITCH
Q401	121-433	PRE AMPLIFIER
Q402	121-751	PRE DRIVER
Q403	121-706	DRIVER
Q404		
Q405	121-830	POWER AMPLIFIER
Q451	121-433	PRE AMPLIFIER
Q452	121-751	PRE DRIVER
Q453	121-706	DRIVER
Q454		
Q455	121-830	POWER AMPLIFIER

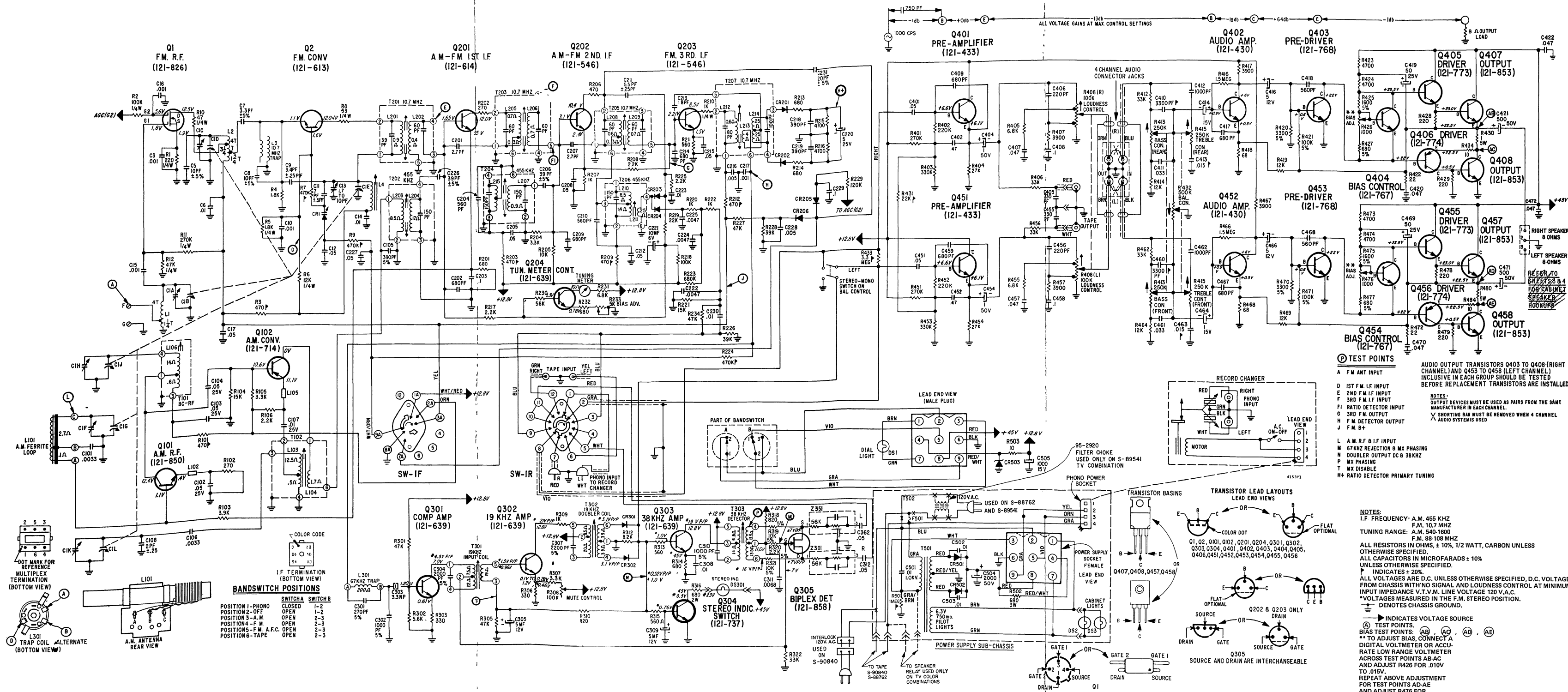
ITEM NO.	PART NO.	DESCRIPTION	ITEM NO.	PART NO.	DESCRIPTION	ITEM NO.	PART NO.	DESCRIPTION
C1190		AM ANTENNA TRANSFORMER	C260		500 MFD CAPACITOR .50V	R666		10K OHM RESISTOR
C1191		AM DETECTOR	C261	22-012	100 MFD ELECTROLYTIC .25V	R667	43-1182	800 OHM RESISTOR
C1192	24-008	500 MFD CAPACITOR .50V	C262	22-013	100 MFD ELECTROLYTIC .25V	R668	43-1183	800 OHM RESISTOR
C1193		VARIABLE CAPACITOR	C263	22-014	100 MFD ELECTROLYTIC .25V	R669	43-1184	800 OHM RESISTOR
C1194		500 MFD CAPACITOR .50V	C264	22-015	100 MFD ELECTROLYTIC .25V	R670	43-1185	800 OHM RESISTOR
C1195		100 PF DISC .100V	C265	22-087	100 MFD ELECTROLYTIC .25V	R671	43-1621	8.48K OHM RESISTOR
C1196	33-0034	25 MFD CAPACITOR .50V	C266	22-088	100 MFD ELECTROLYTIC .25V	R672	43-1622	8.48K OHM RESISTOR
C1197	33-0035	25 MFD CAPACITOR .50V	C267	22-089	100 MFD ELECTROLYTIC .25V	R673	43-1623	8.48K OHM RESISTOR
C1198	33-0036	25 MFD CAPACITOR .50V	C268	22-090	100 MFD ELECTROLYTIC .25V	R674	43-1624	8.48K OHM RESISTOR
C1199	33-0037	25 MFD CAPACITOR .50V	C269	22-091	100 MFD ELECTROLYTIC .25V	R675	43-1625	8.48K OHM RESISTOR
C1200	33-0038	25 MFD CAPACITOR .50V	C270	22-092	100 MFD ELECTROLYTIC .25V	R676	43-1626	8.48K OHM RESISTOR
C1201	33-0039	25 MFD CAPACITOR .50V	C271	22-093	100 MFD ELECTROLYTIC .25V	R677	43-1627	8.48K OHM RESISTOR
C1202	33-0040	25 MFD CAPACITOR .50V	C272	22-094	100 MFD ELECTROLYTIC .25V	R678	43-1628	8.48K OHM RESISTOR
C1203	33-0041	25 MFD CAPACITOR .50V	C273	22-095	100 MFD ELECTROLYTIC .25V	R679	43-1629	8.48K OHM RESISTOR
C1204	33-0042	25 MFD CAPACITOR .50V	C274	22-096	100 MFD ELECTROLYTIC .25V	R680	43-1630	8.48K OHM RESISTOR
C1205	33-0043	25 MFD CAPACITOR .50V	C275	22-097	100 MFD ELECTROLYTIC .25V	R681	43-1631	8.48K OHM RESISTOR
C1206	33-0044	25 MFD CAPACITOR .50V	C276	22-098	100 MFD ELECTROLYTIC .25V	R682	43-1632	8.48K OHM RESISTOR
C1207	33-0045	25 MFD CAPACITOR .50V	C277	22-099	100 MFD ELECTROLYTIC .25V	R683	43-1633	8.48K OHM RESISTOR
C1208	33-0046	25 MFD CAPACITOR .50V	C278	22-100	100 MFD ELECTROLYTIC .25V	R684	43-1634	8.48K OHM RESISTOR
C1209	33-0047	25 MFD CAPACITOR .50V	C279	22-101	100 MFD ELECTROLYTIC .25V	R685	43-1635	8.48K OHM RESISTOR
C1210	33-0048	25 MFD CAPACITOR .50V	C280	22-102	100 MFD ELECTROLYTIC .25V	R686	43-1636	8.48K OHM RESISTOR
C1211	33-0049	25 MFD CAPACITOR .50V	C281	22-103	100 MFD ELECTROLYTIC .25V	R687	43-1637	8.48K OHM RESISTOR
C1212	33-0050	25 MFD CAPACITOR .50V	C282	22-104	100 MFD ELECTROLYTIC .25V	R688	43-1638	8.48K OHM RESISTOR
C1213	33-0051	25 MFD CAPACITOR .50V	C283	22-105	100 MFD ELECTROLYTIC .25V	R689	43-1639	8.48K OHM RESISTOR
C1214	33-0052	25 MFD CAPACITOR .50V	C284	22-106	100 MFD ELECTROLYTIC .25V	R690	43-1640	8.48K OHM RESISTOR
C1215	33-0053	25 MFD CAPACITOR .50V	C285	22-107	100 MFD ELECTROLYTIC .25V	R691	43-1641	8.48K OHM RESISTOR
C1216	33-0054	25 MFD CAPACITOR .50V	C286	22-108	100 MFD ELECTROLYTIC .25V	R692	43-1642	8.48K OHM RESISTOR
C1217	33-0055	25 MFD CAPACITOR .50V	C287	22-109	100 MFD ELECTROLYTIC .25V	R693	43-1643	8.48K OHM RESISTOR
C1218	33-0056	25 MFD CAPACITOR .50V	C288	22-110	100 MFD ELECTROLYTIC .25V	R694	43-1644	8.48K OHM RESISTOR
C1219	33-0057	25 MFD CAPACITOR .50V	C289	22-111	100 MFD ELECTROLYTIC .25V	R695	43-1645	8.48K OHM RESISTOR
C1220	33-0058	25 MFD CAPACITOR .50V	C290	22-112	100 MFD ELECTROLYTIC .25V	R696	43-1646	8.48K OHM RESISTOR
C1221	33-0059	25 MFD CAPACITOR .50V	C291	22-113	100 MFD ELECTROLYTIC .25V	R697	43-1647	8.48K OHM RESISTOR
C1222	33-0060	25 MFD CAPACITOR .50V	C292	22-114	100 MFD ELECTROLYTIC .25V	R698	43-1648	8.48K OHM RESISTOR
C1223	33-0061	25 MFD CAPACITOR .50V	C293	22-115	100 MFD ELECTROLYTIC .25V	R699	43-1649	8.48K OHM RESISTOR
C1224	33-0062	25 MFD CAPACITOR .50V	C294	22-116	100 MFD ELECTROLYTIC .25V	R700	43-1650	8.48K OHM RESISTOR
C								
C1225	33-0063	25 MFD CAPACITOR .50V	C295	22-117	100 MFD ELECTROLYTIC .25V	R701	43-1651	8.48K OHM RESISTOR
C1226	33-0064	25 MFD CAPACITOR .50V	C296	22-118	100 MFD ELECTROLYTIC .25V	R702	43-1652	8.48K OHM RESISTOR
C1227	33-0065	25 MFD CAPACITOR .50V	C297	22-119	100 MFD ELECTROLYTIC .25V	R703	43-1653	8.48K OHM RESISTOR
C1228	33-0066	25 MFD CAPACITOR .50V	C298	22-120	100 MFD ELECTROLYTIC .25V	R704	43-1654	8.48K OHM RESISTOR
C1229	33-0067	25 MFD CAPACITOR .50V	C299	22-121	100 MFD ELECTROLYTIC .25V	R705	43-1655	8.48K OHM RESISTOR
C1230	33-0068	25 MFD CAPACITOR .50V	C300	22-122	100 MFD ELECTROLYTIC .25V	R706	43-1656	8.48K OHM RESISTOR
C1231	33-0069	25 MFD CAPACITOR .50V	C301	22-123	100 MFD ELECTROLYTIC .25V	R707	43-1657	8.48K OHM RESISTOR
C1232	33-0070	25 MFD CAPACITOR .50V	C302	22-124	100 MFD ELECTROLYTIC .25V	R708	43-1658	8.48K OHM RESISTOR
C1233	33-0071	25 MFD CAPACITOR .50V	C303	22-125	100 MFD ELECTROLYTIC .25V	R709	43-1659	8.48K OHM RESISTOR
C1234	33-0072	25 MFD CAPACITOR .50V	C304	22-126	100 MFD ELECTROLYTIC .25V	R710	43-1660	8.48K OHM RESISTOR
C1235	33-0073	25 MFD CAPACITOR .50V	C305	22-127	100 MFD ELECTROLYTIC .25V	R711	43-1661	8.48K OHM RESISTOR
C1236	33-0074	25 MFD CAPACITOR .50V	C306	22-128	100 MFD ELECTROLYTIC .25V	R712	43-1662	8.48K OHM RESISTOR
C1237	33-0075	25 MFD CAPACITOR .50V	C307	22-129	100 MFD ELECTROLYTIC .25V	R713	43-1663	8.48K OHM RESISTOR
C1238	33-0076	25 MFD CAPACITOR .50V	C308	22-130	100 MFD ELECTROLYTIC .25V	R714	43-1664	8.48K OHM RESISTOR
C1239	33-0077	25 MFD CAPACITOR .50V	C309	22-131	100 MFD ELECTROLYTIC .25V	R715	43-1665	8.48K OHM RESISTOR
C1240	33-0078	25 MFD CAPACITOR .50V	C310	22-132	100 MFD ELECTROLYTIC .25V	R716	43-1666	8.48K OHM RESISTOR
C1241	33-0079	25 MFD CAPACITOR .50V	C311	22-133	100 MFD ELECTROLYTIC .25V	R717	43-1667	8.48K OHM RESISTOR
C1242	33-0080	25 MFD CAPACITOR .50V	C312	22-134	100 MFD ELECTROLYTIC .25V	R718	43-1668	8.48K OHM RESISTOR
C1243	33-0081	25 MFD CAPACITOR .50V	C313	22-135	100 MFD ELECTROLYTIC .25V	R719	43-1669	8.48K OHM RESISTOR
C1244	33-0082	25 MFD CAPACITOR .50V	C314	22-136	100 MFD ELECTROLYTIC .25V	R720	43-1670	8.48K OHM RESISTOR
C1245	33-0083	25 MFD CAPACITOR .50V	C315	22-137	100 MFD ELECTROLYTIC .25V	R721	43-1671	8.48K OHM RESISTOR
C1246	33-0084	25 MFD CAPACITOR .50V	C316	22-138	100 MFD ELECTROLYTIC .25V	R722	43-1672	8.48K OHM RESISTOR
C1247	33-0085	25 MFD CAPACITOR .50V	C317	22-139	100 MFD ELECTROLYTIC .25V	R723	43-1673	8.48K OHM RESISTOR
C1248	33-0086	25 MFD CAPACITOR .50V	C318	22-140	100 MFD ELECTROLYTIC .25V	R724	43-1674	8.48K OHM RESISTOR
C1249	33-0087	25 MFD CAPACITOR .50V	C319	22-141	100 MFD ELECTROLYTIC .25V	R725	43-1675	8.48K OHM RESISTOR
C1250	33-0088	25 MFD CAPACITOR .50V	C320	22-142	100 MFD ELECTROLYTIC .25V	R726	43-1676	8.48K OHM RESISTOR
C1251	33-0089	25 MFD CAPACITOR .50V	C321	22-143	100 MFD ELECTROLYTIC .25V	R727	43-1677	8.48K OHM RESISTOR
C1252	33-0090	25 MFD CAPACITOR .50V	C322	22-144	100 MFD ELECTROLYTIC .25V	R728	43-1678	8.48K OHM RESISTOR
C1253	33-0091	25 MFD CAPACITOR .50V	C323	22-145	100 MFD ELECTROLYTIC .25V	R729	43-1679	8.48K OHM RESISTOR
C1254	33-0092	25 MFD CAPACITOR .50V	C324	22-146	100 MFD ELECTROLYTIC .25V	R730	43-1680	8.48K OHM RESISTOR
C1255	33-0093	25 MFD CAPACITOR .50V	C325	22-147	100 MFD ELECTROLYTIC .25V	R731	43-1681	8.48K OHM RESISTOR
C1256	33-0094	25 MFD CAPACITOR .50V	C326	22-148	100 MFD ELECTROLYTIC .25V	R732	43-1682	8.48K OHM RESISTOR
C1257	33-0095	25 MFD CAPACITOR .50V	C327	22-149	100 MFD ELECTROLYTIC .25V	R733	43-1683	8.48K OHM RESISTOR
C1258	33-0096	25 MFD CAPACITOR .50V	C328	22-150	100 MFD ELECTROLYTIC .25V	R734	43-1684	8.48K OHM RESISTOR
C1259	33-0097	25 MFD CAPACITOR .50V	C329	22-151	100 MFD ELECTROLYTIC .25V	R735	43-1685	8.48K OHM RESISTOR
C1260	33-0098	25 MFD CAPACITOR .50V	C330	22-152	100 MFD ELECTROLYTIC .25V	R736	43-1686	8.48K OHM RESISTOR
C1261	33-0099	25 MFD CAPACITOR .50V	C331	22-153	100 MFD ELECTROLYTIC .25V	R737	43-1687	8.48K OHM RESISTOR
C1262	33-0100	25 MFD CAPACITOR .50V	C332	22-154	100 MFD ELECTROLYTIC .25V	R738	43-1688	8.48K OHM RESISTOR
C1263	33-0101	25 MFD CAPACITOR .50V	C333	22-155	100 MFD ELECTROLYTIC .25V	R739	43-1689	8.48K OHM RESISTOR
C1264	33-0102	25 MFD CAPACITOR .50V	C334	22-156	100 MFD ELECTROLYTIC .25V	R740	43-1690	8.48K OHM RESISTOR
C1265	33-0103	25 MFD CAPACITOR .50V	C335	22-157	100 MFD ELECTROLYTIC .25V	R741	43-1691	8.48K OHM RESISTOR
C1266	33-0104	25 MFD CAPACITOR .50V	C336	22-158	100 MFD ELECTROLYTIC .25V	R742	43-1692	8.48K OHM RESISTOR
C1267	33-0105	25 MFD CAPACITOR .50V	C337	22-159	100 MFD ELECTROLYTIC .25V	R743	43-1693	8.48K OHM RESISTOR
C1268	33-0106	25 MFD CAPACITOR .50V	C338	22-160	100 MFD ELECTROLYTIC .25V	R744	43-1694	8.48K OHM RESISTOR
C1269	33-0107	25 MFD CAPACITOR .50V	C339	22-161	100 MFD ELECTROLYTIC .25V	R745	43-1695	8.48K OHM RESISTOR
C1270	33-0108	25 MFD CAPACITOR .50V	C340	22-162	100 MFD ELECTROLYTIC .25V	R746	43-1696	8.48K OHM RESISTOR
C1271	33-0109	25 MFD CAPACITOR .50V	C341	22-163	100 MFD ELECTROLYTIC .25V	R747	43-1697	8.48K OHM RESISTOR
C1272	33-0110	25 MFD CAPACITOR .50V	C342	22-164	100 MFD ELECTROLYTIC .25V	R748	43-1698	8.48K OHM RESISTOR
C1273	33-0111	25 MFD CAPACITOR .50V	C343	22-165	100 MFD ELECTROLYTIC .25V	R749	43-1699	8.48K OHM RESISTOR
C1274	33-0112	25 MFD CAPACITOR .50V	C344	22-166	100 MFD ELECTROLYTIC .25V	R750	43-1700	8.48K OHM RESISTOR
C1275	33-0113	25 MFD CAPACITOR .50V	C345	22-167	100 MFD ELECTROLYTIC .25V	R751	43-1701	8.48K OHM RESISTOR
C1276	33-0114	25 MFD CAPACITOR .50V	C346	22-168	100 MFD ELECTROLYTIC .25V	R752	43-1702	8.48K OHM RESISTOR
C1277	33-0115	25 MFD CAPACITOR .50V	C347	22-169	100 MFD ELECTROLYTIC .25V	R753	43-1703	8.48K OHM RESISTOR
C1278	33-0116	25 MFD CAPACITOR .50V	C348	22-170	100 MFD ELECTROLYTIC .25V	R754	43-1704	8.48K OHM RESISTOR
C1279	33-0117	25 MFD CAPACITOR .50V	C349	22-171	100 MFD ELECTROLYTIC .25V	R755	43-1705	8.48K OHM RESISTOR
C1280	33-0118	25 MFD CAPACITOR .50V	C350	22-172	100 MFD ELECTROLYTIC .25V	R756	43-1706	8.48K OHM RESISTOR
C1281	33-0119	25 MFD CAPACITOR .50V	C351	22-173	100 MFD ELECTROLYTIC .25V	R757	43-1707	8.48K OHM RESISTOR
C1282	33-0120	25 MFD CAPACITOR .50V	C352	22-174	100 MFD ELECTROLYTIC .25V	R758	43-1708	8.48K OHM RESISTOR
C1283	33-0121	25 MFD CAPACITOR .50V	C353	22-175	100 MFD ELECTROLYTIC .25V	R759	43-1709	8.48K OHM RESISTOR
C1284	33-0122	25 MFD CAPACITOR .50V	C354	22-176	100 MFD ELECTROLYTIC .25V	R760	43-1710	8.48K OHM RESISTOR
C1285	33-0123	25 MFD CAPACITOR .50V	C355	22-177	100 MFD ELECTROLYTIC .25V	R761	43-1711	8.48K OHM RESISTOR
C1286	33-0124	25 MFD CAPACITOR .50V	C356	22-178	100 MFD ELECTROLYTIC .25V	R762	43-1712	8.48K OHM RESISTOR
C1287	33-0125	25 MFD CAPACITOR .50V	C357	22-179	100 MFD ELECTROLYTIC .25V	R763	43-1713	8.48K OHM RESISTOR
C1288	33-0126	25 MFD CAPACITOR .50V	C358	22-180	100 MFD ELECTROLYTIC .25V	R764	43-1714	8.48K OHM RESISTOR
C1289	33-0127	25 MFD CAPACITOR .50V	C359	22-181	100 MFD ELECTROLYTIC .25V	R765	43-1715	8.48K OHM RESISTOR
C1290	33-0128	25 MFD CAPACITOR .50V	C360	22-182	100 MFD ELECTROLYTIC .25V	R766	43-1716	8.48K OHM RESISTOR
C1291	33-0129	25 MFD CAPACITOR .50V	C361	22-183	100 MFD ELECTROLYTIC .25V	R767	43-1717	8.48K OHM RESISTOR
C1292	33-0130	25 MFD CAPACITOR .50V	C362	22-184	100 MFD ELECTROLYTIC .25V	R768	43-1718	8.48K OHM RESISTOR
C1293	33-0131	25 MFD CAPACITOR .50V	C363	22-185	100 MFD ELECTROLYTIC .25V	R769	43-1719	8.48K OHM RESISTOR
C1294	33-0132	25 MFD CAPACITOR .50V	C364	22-186	100 MFD ELECTROLYTIC .25V	R770	43-1720	8.48K OHM RESISTOR
C1295	33-0133	25 MFD CAPACITOR .50V	C365	22-187	100 MFD ELECTROLYTIC .25V	R771	43-1721	8.48K OHM RESISTOR
C1296	33-0134	25 MFD CAPACITOR .50V	C366	22-188	100 MFD ELECTROLYTIC .25V	R772	43-1722	8.48K OHM RESISTOR
C1297	33-0135	25 MFD CAPACITOR .50V	C367	22-189	100 MFD ELECTROLYTIC .25V	R773	43-1723	8.48K OHM RESISTOR
C1298	33-0136	25 MFD CAPACITOR .50V	C368	2				





25BT22 - SCHEMATIC

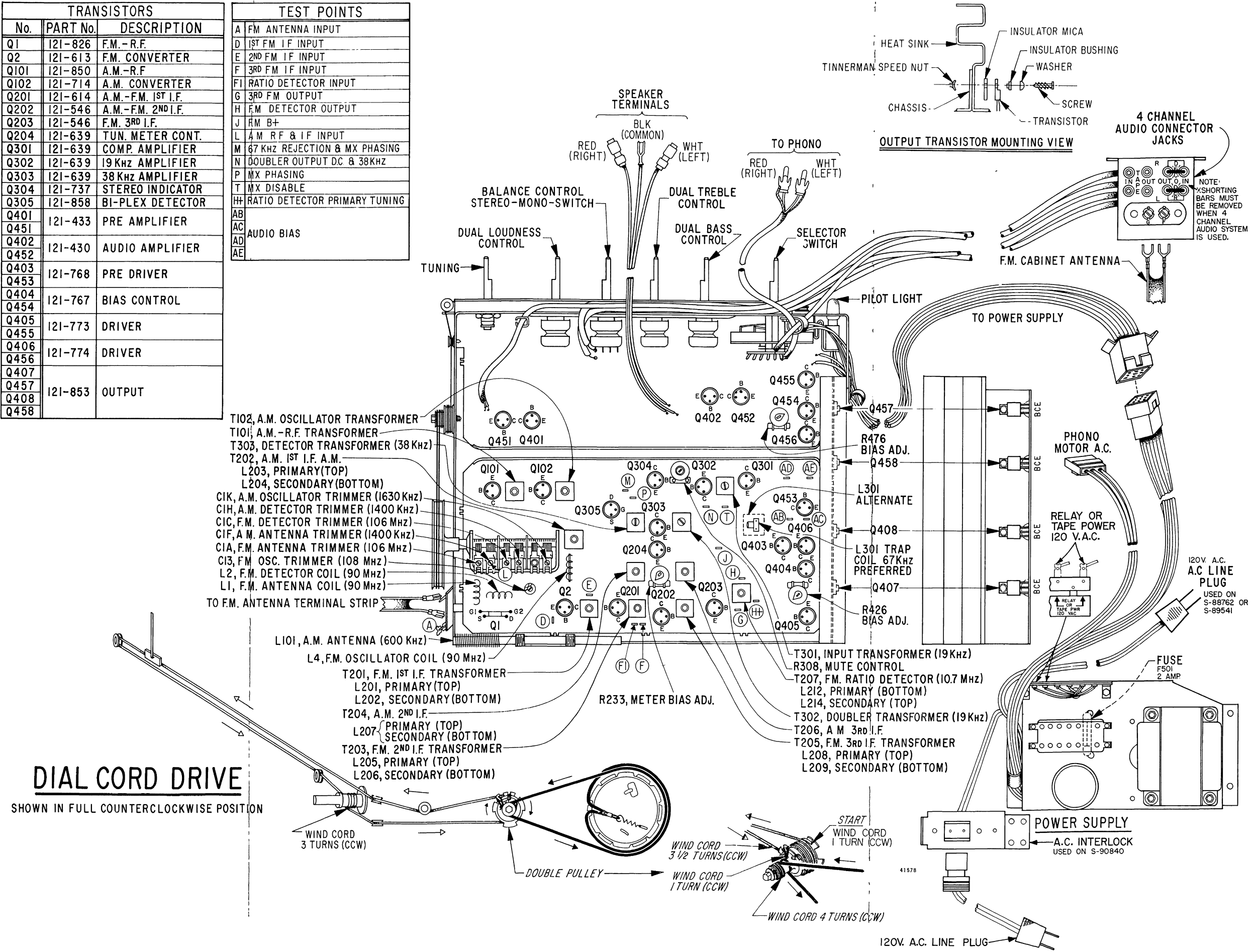


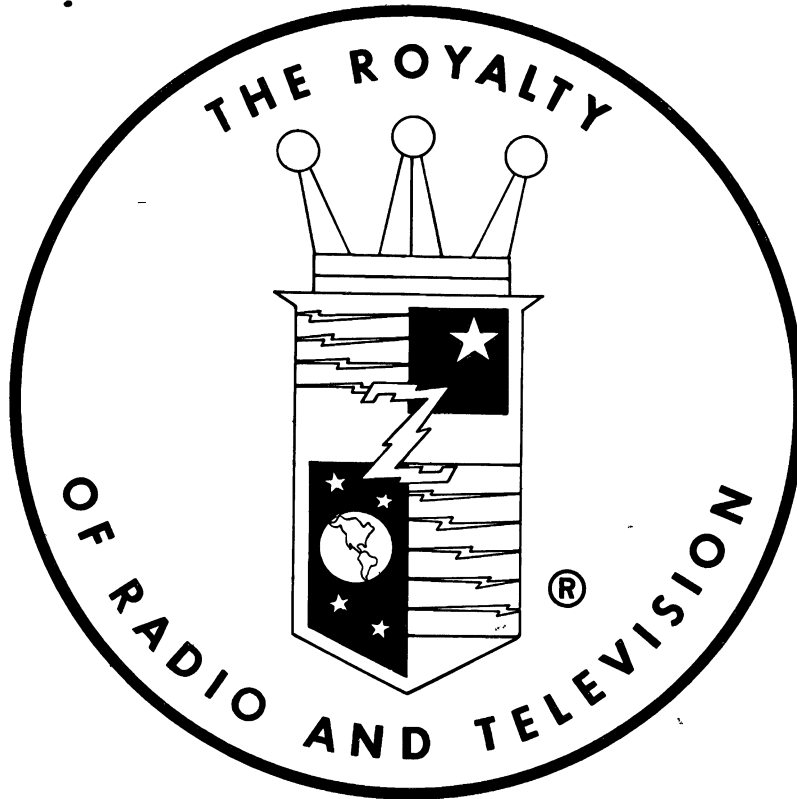


29CT30 - SCHEMATIC

TRANSISTORS		
No.	PART No.	DESCRIPTION
Q1	I21-826	F.M.-R.F.
Q2	I21-613	F.M. CONVERTER
Q101	I21-850	A.M.-R.F.
Q102	I21-714	A.M. CONVERTER
Q201	I21-614	A.M.-F.M. 1 ST I.F.
Q202	I21-546	A.M.-F.M. 2 ND I.F.
Q203	I21-546	F.M. 3 RD I.F.
Q204	I21-639	TUN. METER CONT.
Q301	I21-639	COMP. AMPLIFIER
Q302	I21-639	19 KHz AMPLIFIER
Q303	I21-639	38 KHz AMPLIFIER
Q304	I21-737	STEREO INDICATOR
Q305	I21-858	BI-PLEX DETECTOR
Q401	I21-433	PRE AMPLIFIER
Q451		
Q402	I21-430	AUDIO AMPLIFIER
Q452		
Q403	I21-768	PRE DRIVER
Q453		
Q404	I21-767	BIAS CONTROL
Q454		
Q405	I21-773	DRIVER
Q455		
Q406	I21-774	DRIVER
Q456		
Q407		
Q457	I21-853	OUTPUT
Q408		
Q458		

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





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SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE