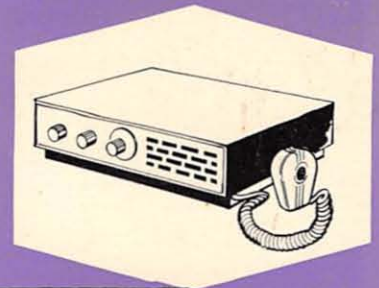


# SAMS PHOTOFACT<sup>®</sup>



## CB RADIO SERIES



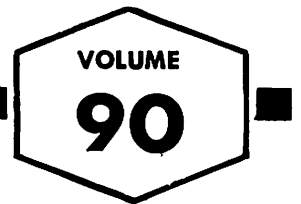
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\$3.95  
\$4.95 IN CANADA  
Cat. No. CB-90

# SAMS PHOTOFACT<sup>®</sup>

## CB RADIO SERIES



by the *Howard W. Sams* ENGINEERING STAFF



**HOWARD W. SAMS & CO., INC.**  
INDIANAPOLIS INDIANA

**FIRST EDITION**  
**FIRST PRINTING — JUNE 1976**  
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**THIRD PRINTING—MAY, 1977**

**C B RADIO SERIES**  
**VOLUME 90**

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Library of Congress Catalog Card Number: 61-18464



**NOTE**

Repair or adjustment of transmitter circuits must be under supervision of a person with first-or second-class radiotelephone license.  
(Refer to FCC Rules and Regulations Part 95, Subpart C & D.)

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**C B RADIO SERIES**

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# PHOTOFACT<sup>®</sup> with CIRCUITRACE<sup>®</sup>

For Supplier Address See PHOTOFACT Index

## NOTE

Repair or adjustment of transmitter circuits must be under supervision of a person with first-or second-class radiotelephone license. (Refer to FCC Rules and Regulations Part 95, Subpart C & D.)

The frequency of the transmitter should be checked periodically with a secondary frequency standard to insure proper and legal operation.

Best results will be obtained when adjusting the final RF output circuit if the antenna normally used is connected and the chassis is as nearly in the cabinet as possible.

Connect either 50-ohm dummy load or the normally used antenna system.



MODELS 2301, 2302



MODEL 2300

FULCOMM/STEREOSONIC MODELS 2300/01/02

**HOWARD W. SAMS & CO., INC.** Indianapolis, Indiana 46206

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Printed in U. S. of America 6CY340

## ALIGNMENT INSTRUCTIONS

**Suggested Alignment Tools:**

**GC ELECTRONICS:**

L131, L141, L151 ..... 5000, 8290  
 L441, L451, L463, L465 ..... 9300  
 L111, L112, L121, L122, L311, L431 thru L433..9440

### RECEIVER

Connect an AC VTVM or AF Wattmeter across speaker voice coil.  
 Adjustments made with 14-volt DC input.  
 Adjust volume control to obtain suitable reading.

SIGNAL GENERATOR	GEN FREQ	CHANNEL	ADJUST	REMARKS
High side thru .01uF to base of Q13, low side to ground.	455kHz, 1000Hz @ 30% modulation.	Any	L151, L141, L131	Set generator output low enough to prevent AGC limiting. Adjust for maximum.
High side thru .01uF to antenna jack, low side to ground.	27.115MHz, 1000Hz @ 30% modulation.	13	L121, L122, L311, L112, L111	Set generator output low enough to prevent AGC limiting. Adjust for maximum.

### RECEIVER ADJUSTMENTS

Connect an AC VTVM or AF Wattmeter across speaker voice coil.  
 These adjustments made with 14-volt DC input.  
 Adjust volume control to obtain a suitable reading.

SIGNAL GENERATOR	GEN FREQ	CHANNEL	ADJUST	REMARKS
<b>AGC</b> High side thru .01uF to antenna jack, low side to ground.	27.115MHz, 1000Hz @ 30% modulation, output 50,000uV.	13	VR152	Adjust volume control to obtain 0db. Decrease generator to 50uV. Adjust so that signal does not drop more than 10db.
<b>SQUELCH RANGE</b> High side thru .01uF to antenna jack, low side to ground.	27.115MHz, 1000Hz @ 30% modulation, output 100uV.	13	VR181	Set squelch control fully clockwise. Adjust so that audio output is decreased by 1/2.

## RECEIVER ADJUSTMENTS(cont)

SIGNAL GENERATOR	GEN FREQ	CHANNEL	ADJUST	REMARKS
S METER	27.115MHz 1000Hz @ 30% modulation, output 100uV.	13	VR151	Adjust for a 9 reading on S meter.

## TRANSMITTER

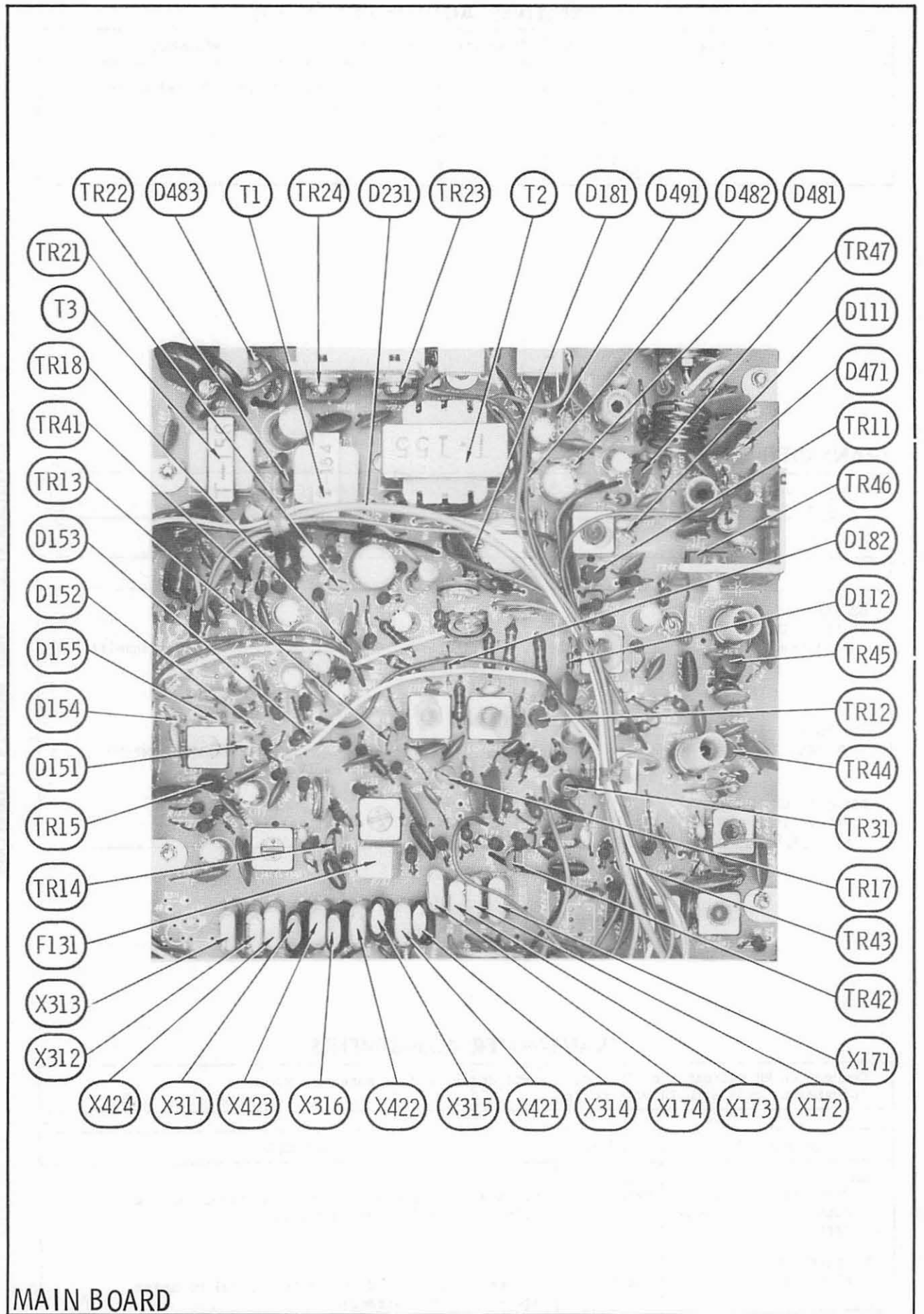
Connect an RF Wattmeter or 50-ohm, 25-watt dummy load to antenna connector.  
Adjustments made with 14-volt DC input.

INDICATOR	ADJUST	REMARKS
OSCILLATOR, MIXER, BUFFER, DRIVER, FINAL RF Wattmeter	L431, L432, L433, L441, L451, L463, L464	Channel Selector to Ch. 13. Key transmitter. Adjust for maximum.
TVI TRAP TV (Ch. 2)	L465	Key transmitter. Adjust for MINIMUM interference on TV.
FINAL INPUT POWER Remove jumper at TP47 and connect 0-100DC milliammeter	L463	Adjust for 5 watts. (Max)

## TRANSMITTER ADJUSTMENTS

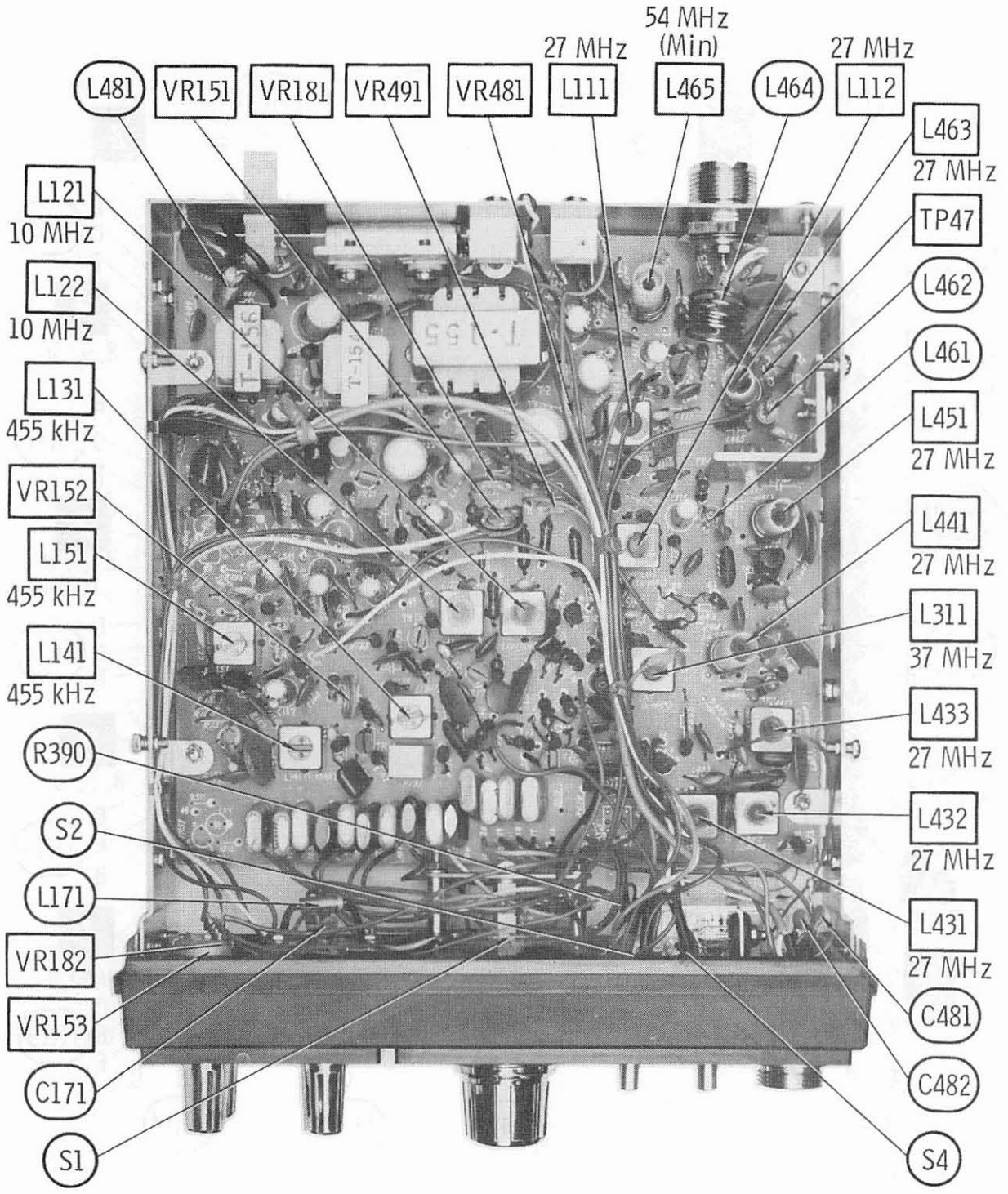
Connect an RF Wattmeter or 50-ohm, 25-watt dummy load to antenna connector.  
Adjustments made with 14-volt DC input.

INDICATOR	ADJUST	REMARKS
AMC Modulation Meter connected to antenna jack.	VR481	Set audio generator for 50% modulation. Increase 16db. Adjust for 100% modulation.
RF PANEL METER RF Wattmeter	VR491	Key transmitter. Adjust so that panel RF meter agrees with RF wattmeter.



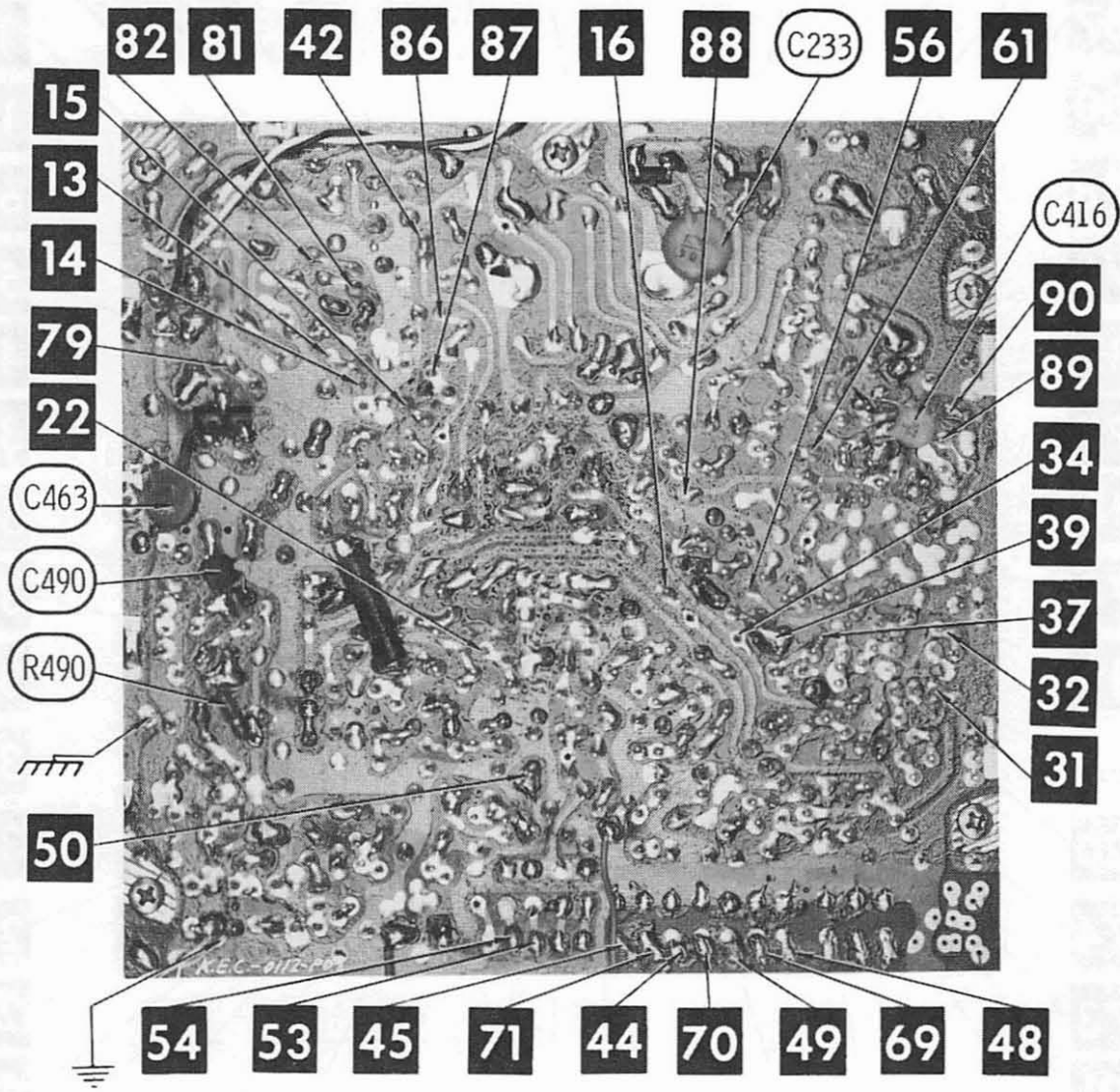
MAIN BOARD





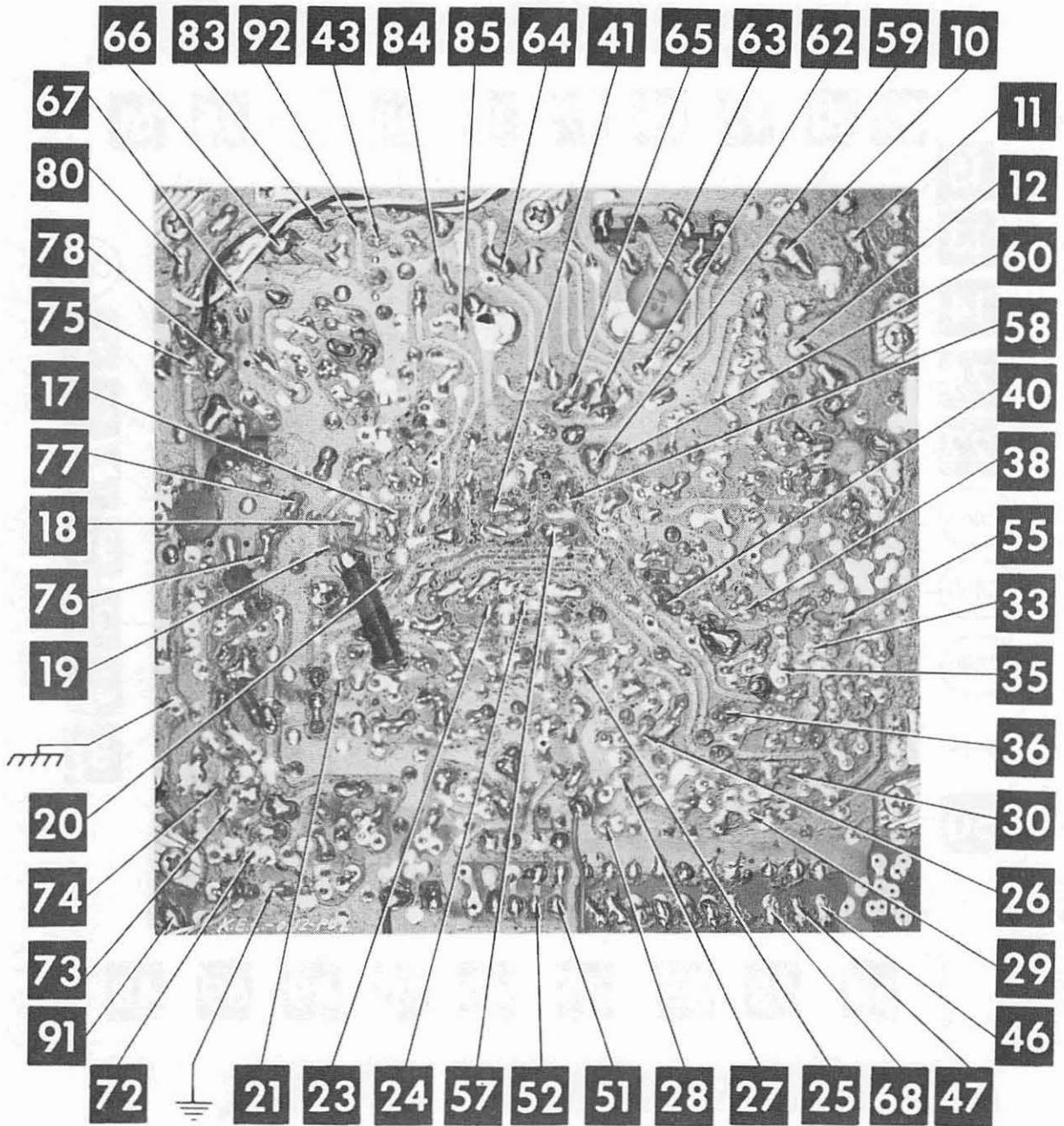
CHASSIS-BOTTOM



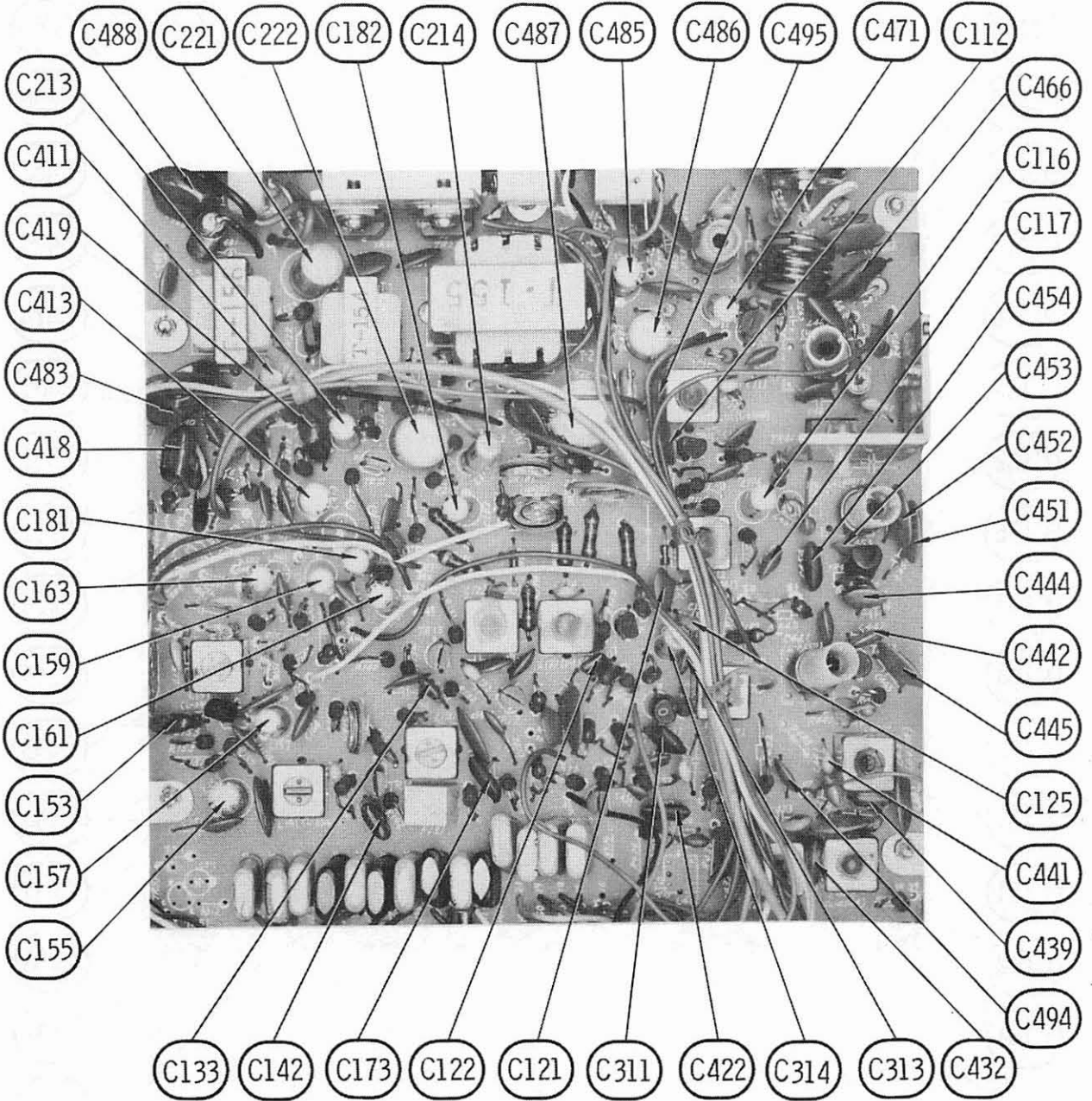


FULCOMM/STEREOSONIC MODELS 2300/01/02

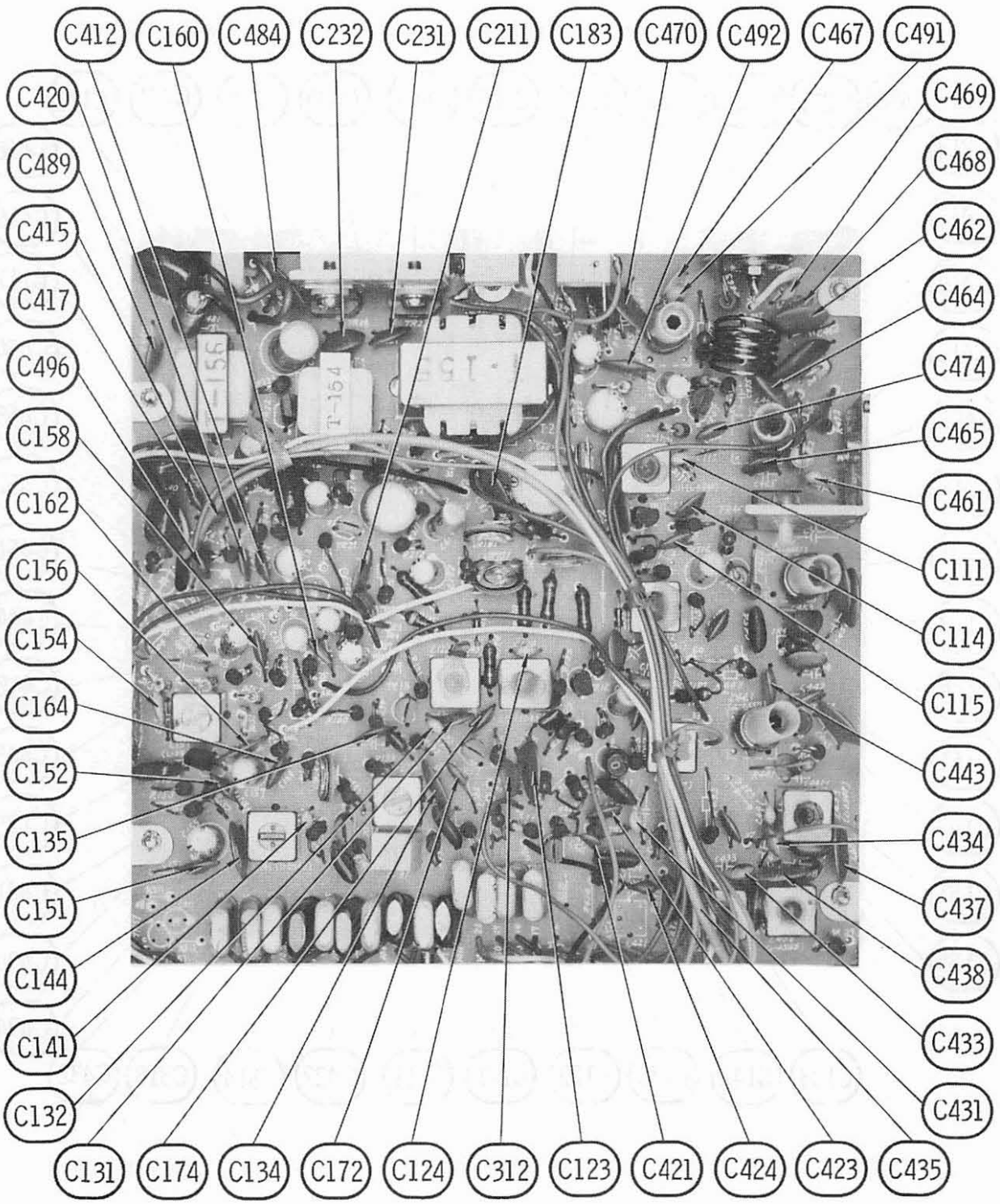
MAIN BOARD



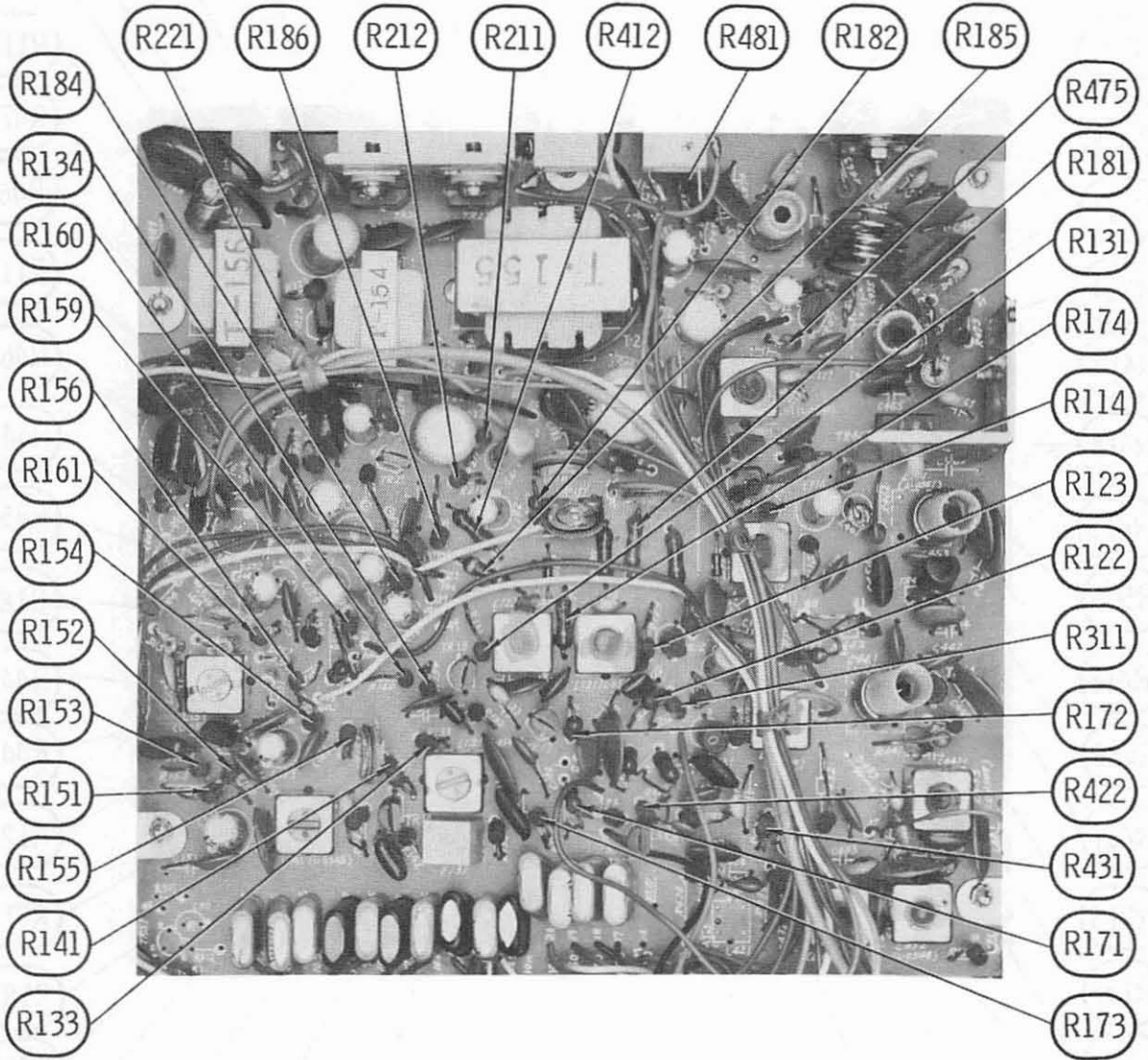
MAIN BOARD



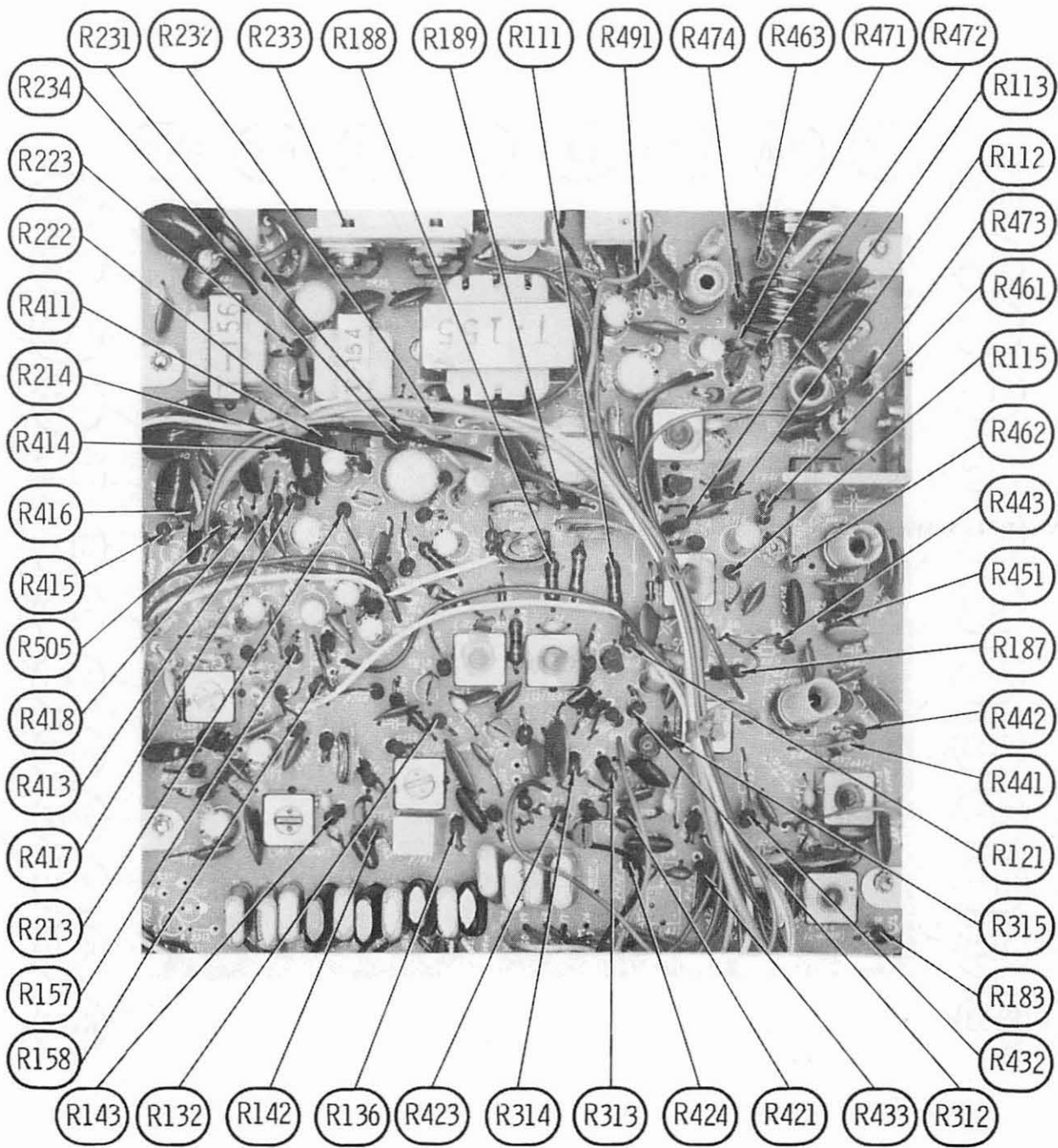
MAIN BOARD



MAIN BOARD



MAIN BOARD



MAIN BOARD



# PARTS LIST AND DESCRIPTION

(When ordering parts, state Model, Part Number, and Description.)

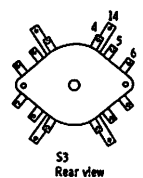
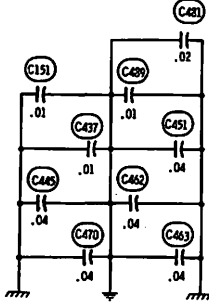
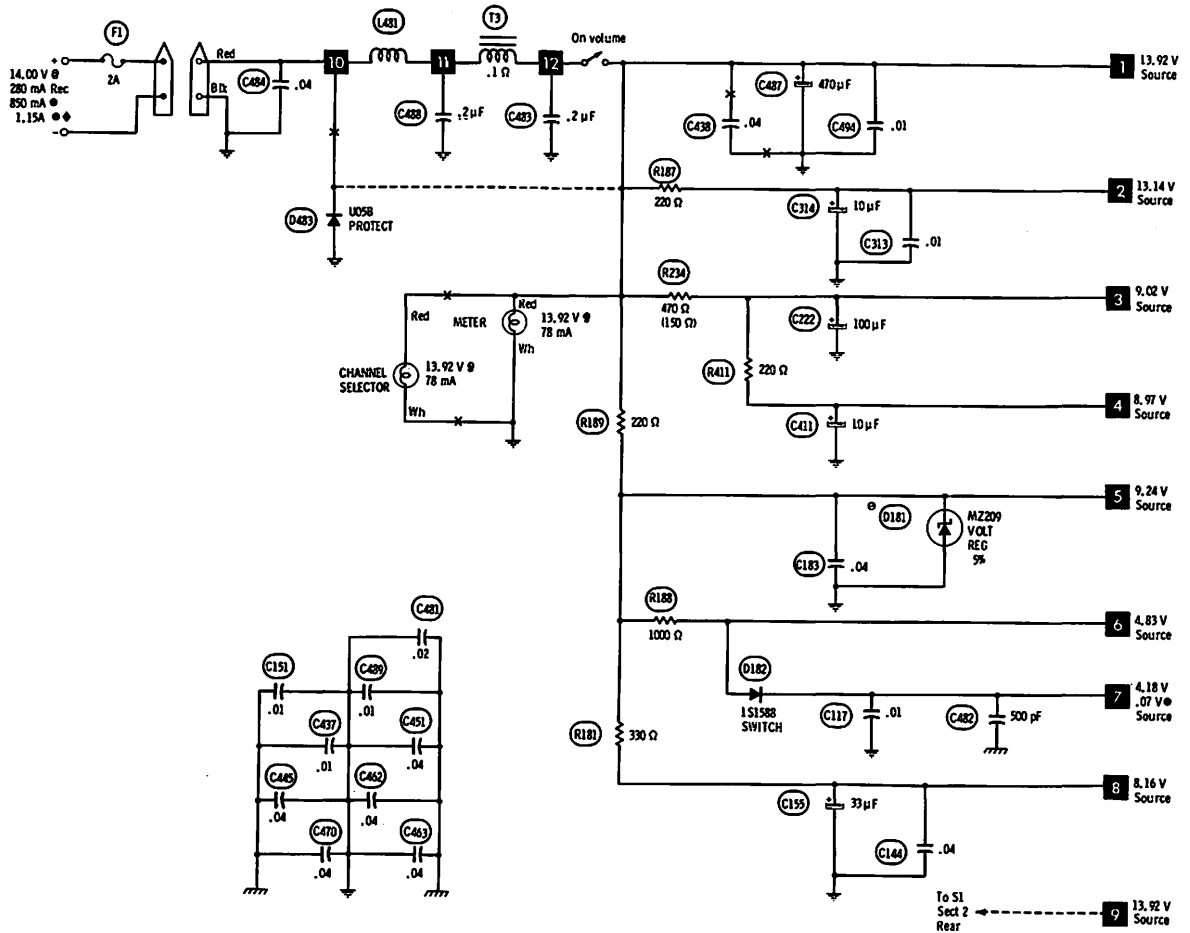
## SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFG. PART No.	REPLACEMENT DATA						
			GENERAL ELECTRIC PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.
D111	1S1588		GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177
D112	1S1588		GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177
D151	1N60		1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D152	1N60		1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D153	1S1588		GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177
D154	1N60		1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D155	1N60		1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D181	MZ209		GEZD-9.1	Z89.18		RE 114		RT-240	ECG139
D182	1S1588		GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177
D231	KB-162								
D471	SR1K-1		GE-504A	PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116
D472	TLR-105								
D481	1N60		1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D482	1N60		1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D483	U05B		GE-512	PTC204	HEPRO092	RE 92	SK3051	RT-201	ECG156
D491	1S1588		GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177
TR11	25C1359C		GE-212	PTC121	HEPS0014	RE 192	SK3038	RT-107A	ECG199
	25C381-0	(1)	GE-20	PTC121	HEPS0011	RE 192	SK3038	RT-108A	ECG199
TR12	25C1359C		GE-212	PTC121	HEPS0014	RE 192	SK3038	RT-107A	ECG199
	25C381-0	(1)	GE-20	PTC121	HEPS0011	RE 192	SK3038	RT-108A	ECG199
	25C1675L	(1)	GE-20	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG229
	25C839	(1)	GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
TR13	25C1675L		GE-20	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG229
	25C839	(1)	GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
TR14	25C1675L		GE-20	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG229
	25C839	(1)	GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
TR15	25C1675L		GE-20	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG229
	25C839	(1)	GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
TR17	25C1675L		GE-20	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG229
	25C839	(1)	GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
TR18	25C945R		GE-210	PTC121	HEPS0015	RE 192	SK3124	RT-107A	ECG199
TR21	25C945R		GE-210	PTC121	HEPS0015	RE 192	SK3124	RT-107A	ECG199
TR22	25C945R		GE-210	PTC121	HEPS0015	RE 192	SK3124	RT-107A	ECG199
TR23	25C1096L	(18)	GE-28	PTC110	HEPS5027	RE 42	SK3054	RT-197	ECG186A
	25C1226Q	(1)(15)	GE-28	PTC110	HEPS5027	RE 42	SK3054	RT-197	ECG186A
TR24	25C1096L	(18)	GE-28	PTC110	HEPS5027	RE 42	SK3054	RT-197	ECG186A
	25C1226Q	(1)(15)	GE-28	PTC110	HEPS5027	RE 42	SK3054	RT-197	ECG186A
TR31	25C381-0		GE-20	PTC121	HEPS0011	RE 192	SK3038	RT-108A	ECG199
TR41	25C945R		GE-210	PTC121	HEPS0015	RE 192	SK3124	RT-107A	ECG199
TR42	25C1675L		GE-20	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG229
	25C839	(1)	GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
TR43	25C1359B,C		GE-212	PTC121	HEPS0014	RE 192	SK3038	RT-107A	ECG199
	25C381-0	(1)	GE-20	PTC121	HEPS0011	RE 192	SK3038	RT-108A	ECG199
	25C839	(1)	GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
	25C1675L	(1)	GE-20	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG229
TR44	25C1359C		GE-212	PTC121	HEPS0014	RE 192	SK3038	RT-107A	ECG199
	25C381-0	(1)	GE-20	PTC121	HEPS0011	RE 192	SK3038	RT-108A	ECG199
	25C839	(1)	GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
	25C1675L	(1)	GE-20	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG229
TR45	25C1973	(10)							ECG315
	25C495T	(1)(11)							ECG295
	25C1449	(1)(12)							
	25C1018	(1)(13)							
	25C1957	(1)		PTC180					ECG299
TR46	25C1975	(14)	GE-215	PTC186		RE 203			ECG295
	25C1678	(1)(15)	GE-215	PTC186		RE 203			ECG235
	25C1306	(1)(16)	GE-215	PTC186		RE 203			ECG235
	25C1964	(1)(17)	GE-215	PTC186		RE 203			ECG235
TR47	25C945R		GE-210	PTC121	HEPS0015	RE 192	SK3124	RT-107A	ECG199

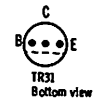
- (1) Used in some versions. (13) Rating, 4.0 watt @ 1.0 amp. (17) Rating, 12 watt @ 3.5 amp.  
 (10) Rating, 750 mw @ 500 ma. (14) Rating, 15 watt @ 2.0 amp. (18) Rating, 10 watt @ 2.0 amp.  
 (11) Rating, 5.0 watt @ 800 ma. (15) Rating, 10 watt @ 3.0 amp.  
 (12) Rating, 5.0 watt @ 3.0 amp. (16) Rating, 12 watt @ 3.0 amp.

(CONTINUED ON PAGE 22)

FULCOMM/STEREOSONIC MODELS 2300/01/02



Terminal Guides



- X— Circuitry not used in some versions
  - Circuitry used in some versions
  - ⊙ See parts list
  - ⊕ Nominal value
  - ⊕ Ground
- rtm* Chassis  
 Measurements with switching as shown unless noted:  
 ■ Squelch fully clockwise ⊕ 100% modulation  
 ● Transmit
- Supply voltage maintained as shown at input.  
 Voltages measured with digital meter, no signal.  
 Controls adjusted for normal operation.  
 Arrow at control indicates direction of advance.  
 Terminal identification may not be found on unit.  
 Resistors are 1/2W or less, 5% unless noted.  
 Value in ( ) used in some versions.

Chan	Crystal Complement	Chan	Crystal Complement	Chan	Crystal Complement	Chan	Crystal Complement
1	X311, X171, X421	7	X312, X173, X423	13	X314, X171, X421	19	X315, X173, X423
2	X311, X172, X422	8	X312, X174, X424	14	X314, X172, X422	20	X315, X174, X424
3	X311, X173, X423	9	X313, X171, X421	15	X314, X173, X423	21	X316, X171, X421
4	X311, X174, X424	10	X313, X172, X422	16	X314, X174, X424	22	X316, X172, X422
5	X312, X171, X421	11	X313, X173, X423	17	X315, X171, X421		
6	X312, X172, X422	12	X313, X174, X424	18	X315, X172, X422	23	X316, X174, X424

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 WITH **CIRCUITRACE**<sup>®</sup>  
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# PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

## CAPACITORS(cont)

ITEM No.	RATING	MFR. PART No.	REPLACEMENT DATA			
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C419	.1			DPMS2P1	EWFA010	1P8-P10
C420	.01		DC-103	GP10000	MAG5011	2SS-S10
C421	500		DD-501	GP500	GP350	10TS-T50
C422	150 10%			CD7FD151J03	SX315	424MC1500J501
C423	.01		DC-103	GP10000	MAG5011	2SS-S10
C424	23		DTZ-25	NP025	CN0425	10TCC-Q25
C431	15		DTZ-15	NP015	CN0415	10TCC-Q15
C432	150 10%			CD7FD151J03	SX315	424MC1500J501
C433	3		DTZ-3R3	NP03P3	CN0533	10TCC-V33
C434	3		DTZ-3R3	NP03P3	CN0533	10TCC-V33
C435	100 10%			CD10FD111J03	SX311	424MC1100J501
C437	.04				GP140	5GA-S40
C438	.04				GP140	5GA-S40
C439	100 10%			CD10FD111J03	SX311	424MC1100J501
C441	33		DTZ-33	NP033	CN0433	10TCC-Q33
C442	.01		DC-103	GP10000	MAG5011	2SS-S10
C443	130 10%			CD7FD131J03	SX313	424MC1300J501
C444	100			CD10FD111J03	SX311	424MC1100J501
C445	.04				GP140	5GA-S40
C451	.04				GP140	5GA-S40
C452	.04				GP140	5GA-S40
C453	100		DD-101	GP100	GP310	10TS-T10
C454	220 10%			CD10FD221J03	SX322	424ME2200J501
C461	22		DTZ-22	NP022	CN0422	10TCC-Q22
C462	.04				GP140	5GA-S40
C463	.04				GP140	5GA-S40
C464	.04				GP140	5GA-S40
C465	.01		DC-103	GP10000	MAG5011	2SS-S10
C466	270 10%			CD15FD271J03	SX327	424ME2700J501
C467	47		DTZ-47	NP047	CN0447	10TCC-Q47
C468	100		DD-101	GP100	GP310	10TS-T10
C469	33		DTZ-33	NP033	CN0433	10TCC-Q33
C470	.04				GP140	5GA-S40
C474	.005		DC-502	GP5000	TA250	2SS-D50
C481	.02				GP140	5GA-S40
C482	500					
C483	.2			DPMS6P2	PVC602	6PS-P20
C484	.04				GP140	5GA-S40
C488	.2			DPMS6P2	PVC602	6PS-P20
C489	.01		DC-103	GP10000	MAG5011	2SS-S10
C490	47			CD6ED47QJ03	SX447	424MC470J501
C491	5					10TCC-V50
C492	.001		DD-102	GP1000	GP210	2SS-D10
C494	.01		DC-103	GP10000	MAG5011	2SS-S10
C495	.01		DC-103	GP10000	MAG5011	2SS-S10
C496	.01		DC-103	GP10000	MAG5011	2SS-S10

(1) Not used in Model 2300.

## CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM No.	FUNCTION	RESISTANCE	REPLACEMENT DATA				
			MFR. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	MALLORY PART No.	TRW PART No.
VR151	S Meter	10K		T-10K (2)	C-103 (2)	MTC14L1 (2)	X201R103B (2)
VR152	AGC	30K		T-50K (2)	C-503 (2)	MTC54L1 (2)	X201R503B (2)
VR153	Volume/Switch	10K					
VR181	Squelch Range	50K		T-50K (2)	C-503 (2)	MTC54L1 (2)	X201R503B (2)
VR182	Squelch	50K					
VR491	RF Meter	10K		T-10K (2)	C-103 (2)	MTC14L1 (2)	X201R103B (2)

(2) Cut off one of the end terminals and bend to fit PC board.

# PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

## COILS (RF-IF)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
L111	Rec Ant (27MHz)	(1)	L540		
L112	Rec RF (27MHz)		L541		
L121	Rec Mixer (10MHz)		L542		
L122	Rec Mixer (10MHz)		L543		
L131	IF (455kHz)		L544		
L141	IF (455kHz)				
L151	IF (455kHz)		L546		
L171	RF Choke				
L311	Synth Osc (37MHz)		L547		
L431	Xmit Mixer (27MHz)				
L432	Harmonic Suppressor (27MHz)		L548		
L433	Harmonic Suppressor (27MHz)		L549		
L441	Xmit Buffer/27MHz)		L545		
L451	Xmit Driver (27MHz)				
L461	RF Choke				
L462	RF Choke				
L463	Final Tank (27MHz)				
L464	RF Choke				
L465	TVI Trap (54MHz)				
L481	RF Choke				

(1) Not used in Model 2300.

## FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000~)	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T3	1.15A	.1	.7mH	T-156 (1)			(1) Number on unit

## TRANSFORMER (Driver)

ITEM No.	TURNS RATIO			REPLACEMENT DATA			NOTES
	PRI.	SEC. 1	SEC. 2	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T1	1	1		T-154 (1)			(1) Number on unit

# PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

## TRANSFORMER (Audio Output)

ITEM No.	IMPEDANCE		REPLACEMENT DATA			NOTES
	PRI.	SEC.	MFR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T2	8	8	T-155 (1)			(1) Number on unit

## SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFR. PART No.	QUAM PART No.	
SP	3 5/8 PM 8 ohms		3A05Z8	

FULCOMM/STEREOSONIC MODELS 2300/01/02

## FUSE DEVICES

ITEM No.	DESCRIPTION	REPLACEMENT DATA						
		PART No.		BUSS PART No.		LITTELFUSE PART No.		WORKMAN PART No.
		DEVICE	HOLDER	DEVICE	HOLDER	DEVICE	HOLDER	DEVICE
F1	2 Amp Fast-acting			AGC2	HDJ	312002	150145	FG2-2

## PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

### CRYSTALS

ITEM No.	CRYSTAL FREQUENCY IN MHz	MFR. PART No.	CTS KNIGHTS PART No.	CHANNEL	ITEM No.	CRYSTAL FREQUENCY IN MHz	MFR. PART No.	CTS KNIGHTS PART No.	CHANNEL
X171	10.180		DCSSW10.180	1,5,9,13,17,21	X314	37.750		DA20W37.750	13,14,15,16
X172	10.170		DCSSW10.170	2,6,10,14,18,22	X315	37.800		DA20W37.800	17,18,19,20
X173	10.160		DCSSW10.160	3,7,11,15,19	X316	37.850		DA20W37.850	21,22,23
X174	10.140		DCSSW10.140	4,8,12,16,20,23	X421	10.635		DBSSW10.635	1,5,9,13,17,21
X311	37.600		DA20W37.600	1,2,3,4	X422	10.625		DBSSW10.625	2,6,10,14,18,22
X312	37.650		DA20W37.650	5,6,7,8	X423	10.615		DBSSW10.615	3,7,11,15,19
X313	37.700		DA20W37.700	9,10,11,12	X424	10.595		DBSSW10.595	4,8,12,16,20,23

### MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
FL131	Filter		455kHz (LF-B6)
M1	Meter		S/Rf
S1	Switch		Channel Selector
S2	Switch		PA-CB (Not used in Model 2300)
S3	Switch		Delta Tune (Not used in Model 2300)
S4	Switch		ANL (Not used in Model 2300)
	Printed Circuit Board		(KEC.0112-P02)

### WIRING DATA

General-use Hook-up Wire .....	Use BELDEN No. 8530 (Solid) Available in 12 Colors 8524 (Stranded) Available in 12 Colors
Power Cord, 2-Wire .....	Use BELDEN No. 17106 (Plastic) or 17126 (Rubber) -6 feet 17109 (Plastic) or 17129 (Rubber) -9 feet
Shielded Antenna Lead .....	Use BELDEN No. 8214 Lowest-loss (RG-8/U Type) 8237 Low-loss (RG-8/U) 8240 (Solid) Miniature (RG-58/U) 8259 (Stranded) Miniature (RG-58A/U)
Coiled Microphone Cable .....	Use BELDEN No. 8497 3-Conductor (1 shielded for Press-to-Talk) Neoprene 8491 4-Conductor (2 shielded, 2 unshielded) Neoprene



# PHOTOFACT<sup>®</sup> with CIRCUITRACE<sup>®</sup>

For Supplier Address See PHOTOFACT Index

## NOTE

Repair or adjustment of transmitter circuits must be under supervision of a person with first-or second-class radiotelephone license.

(Refer to FCC Rules and Regulations Part 95, Subpart C & D.)

The frequency of the transmitter should be checked periodically with a secondary frequency standard to insure proper and legal operation.

Best results will be obtained when adjusting the final RF output circuit if the antenna normally used is connected and the chassis is as nearly in the cabinet as possible.

Connect either 50-ohm dummy load or the normally used antenna system.



MODEL GTX-23

## ALIGNMENT INSTRUCTIONS

Suggested Alignment Tools:

L131, L141, L151.....	5000, 8290
L441, L451, L463, L465.....	9300
L111, L112, L121, L122, L311, L431 thru L433.....	9440

GC ELECTRONICS:

## RECEIVER

Connect an AC VTVM or AF Wattmeter across speaker voice coil.  
Adjustments made with 14-volt DC input.  
Adjust volume control to obtain suitable reading.

SIGNAL GENERATOR	GEN FREQ	CHANNEL	ADJUST	REMARKS
High side thru .01uF to base of Q13, low side to ground.	455kHz, 1000Hz @ 30% modulation.	Any	L151, L141, L131	Set generator output low enough to prevent AGC limiting. Adjust for maximum.
High side thru .01uF to antenna jack, low side to ground.	27.115MHz, 1000Hz @ 30% modulation.	13	L121, L122, L311, L112, L111	Set generator output low enough to prevent AGC limiting. Adjust for maximum.

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GEMTRONICS MODEL GTX-23

## RECEIVER ADJUSTMENTS

Connect an AC VTVM or AF Wattmeter across speaker voice coil.  
 These adjustments made with 14-volt DC input.  
 Adjust volume control to obtain a suitable reading.

SIGNAL GENERATOR	GEN FREQ	CHANNEL	ADJUST	REMARKS
AGC High side thru .01uF to antenna jack, low side to ground.	27.115MHz, 1000Hz @ 30% modulation, output 50,000uV.	13	VR152	Adjust volume control to obtain 0 db. Decrease generator to 50uV. Adjust so that signal does not drop more than 10 db.
SQUELCH RANGE High side thru .01uF to antenna jack, low side to ground.	27.115MHz, 1000Hz @ 30% modulation, output 100uV.	13	VR181	Set squelch control fully clockwise. Adjust so that audio output is reduced by one-half.
S METER	27.115MHz 1000Hz @ 30% modulation, output 100uV.	13	VR151	Adjust for a 9 reading on S Meter.

## TRANSMITTER

Connect an RF Wattmeter or 50-ohm, 25-watt dummy load to antenna connector.  
 Adjustments made with 14-volt DC input.

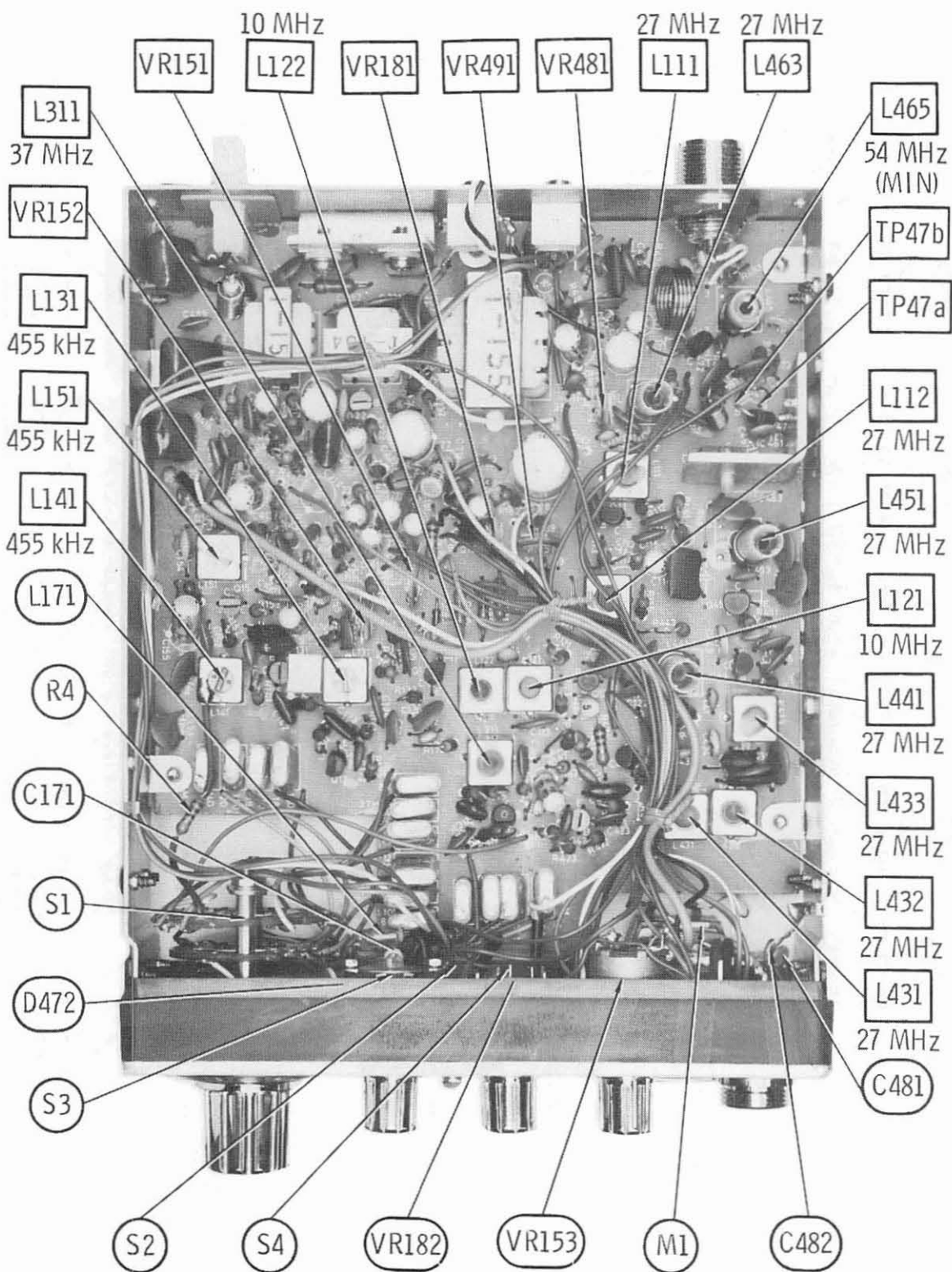
INDICATOR	ADJUST	REMARKS
OSCILLATOR, MIXER, BUFFER, DRIVER, FINAL RF Wattmeter	L431,L432, L433,L441, L451,L463	Channel selector to Ch. 13. Key transmitter. Adjust for maximum.
TVI TRAP TV (Ch.2)	L465	Key transmitter. Adjust for MINIMUM interference on TV.
FINAL INPUT POWER Remove jumper at TP47 and connect 0-1000 DC milliammeter.	L463	Adjust for 5 watts. (Max)

## TRANSMITTER ADJUSTMENTS

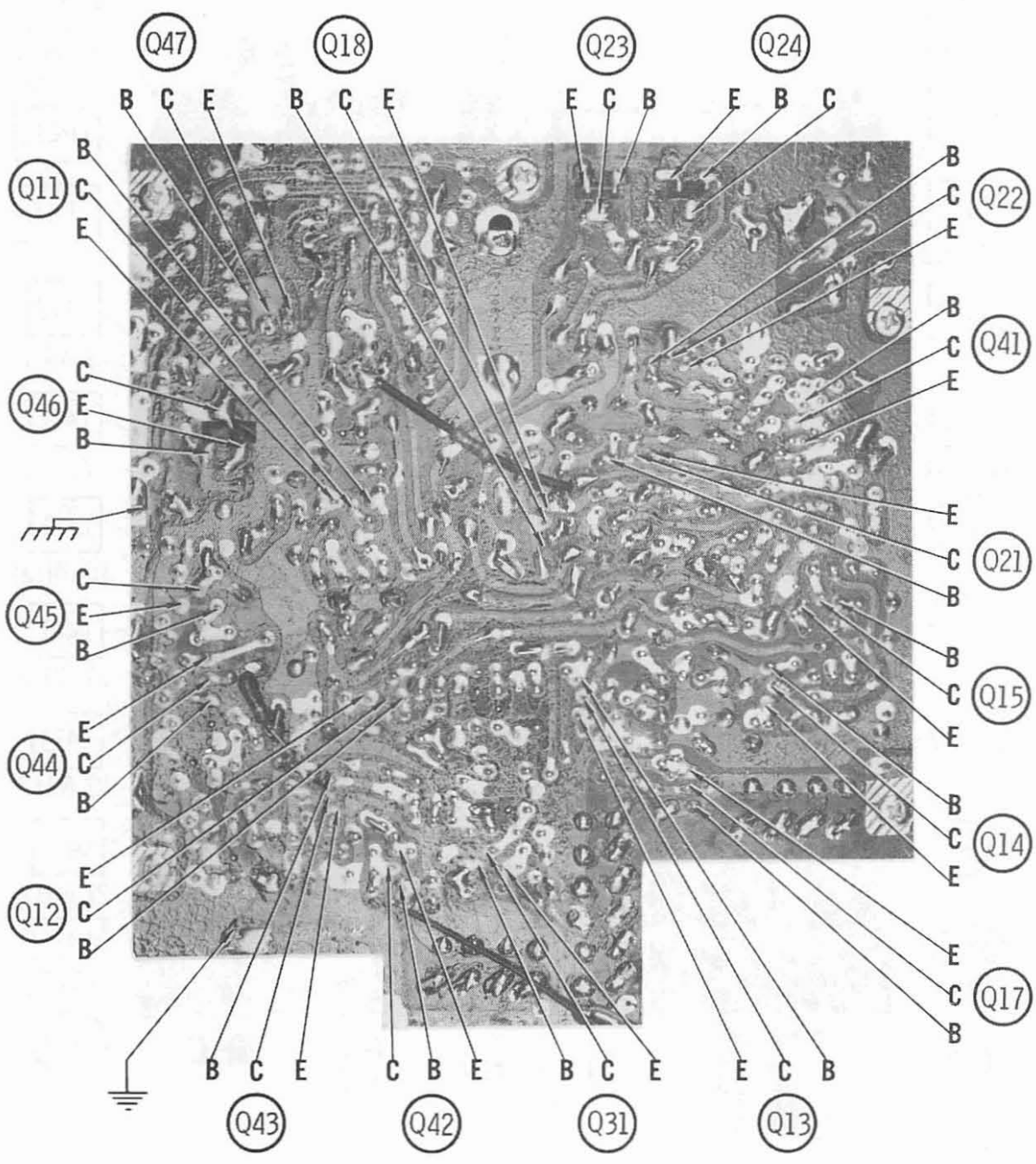
Connect an RF Wattmeter or 50-ohm, 25-watt dummy load to antenna connector.  
 Adjustments made with 14-volt DC input.

INDICATOR	ADJUST	REMARKS
AMC Modulation Meter connected to antenna jack.	VR481	Set audio generator for 50% modulation. Increase 16 db. Adjust for 100% modulation.
RF PANEL METER RF Wattmeter	VR491	Key transmitter. Adjust so that panel RF meter agrees with RF wattmeter.

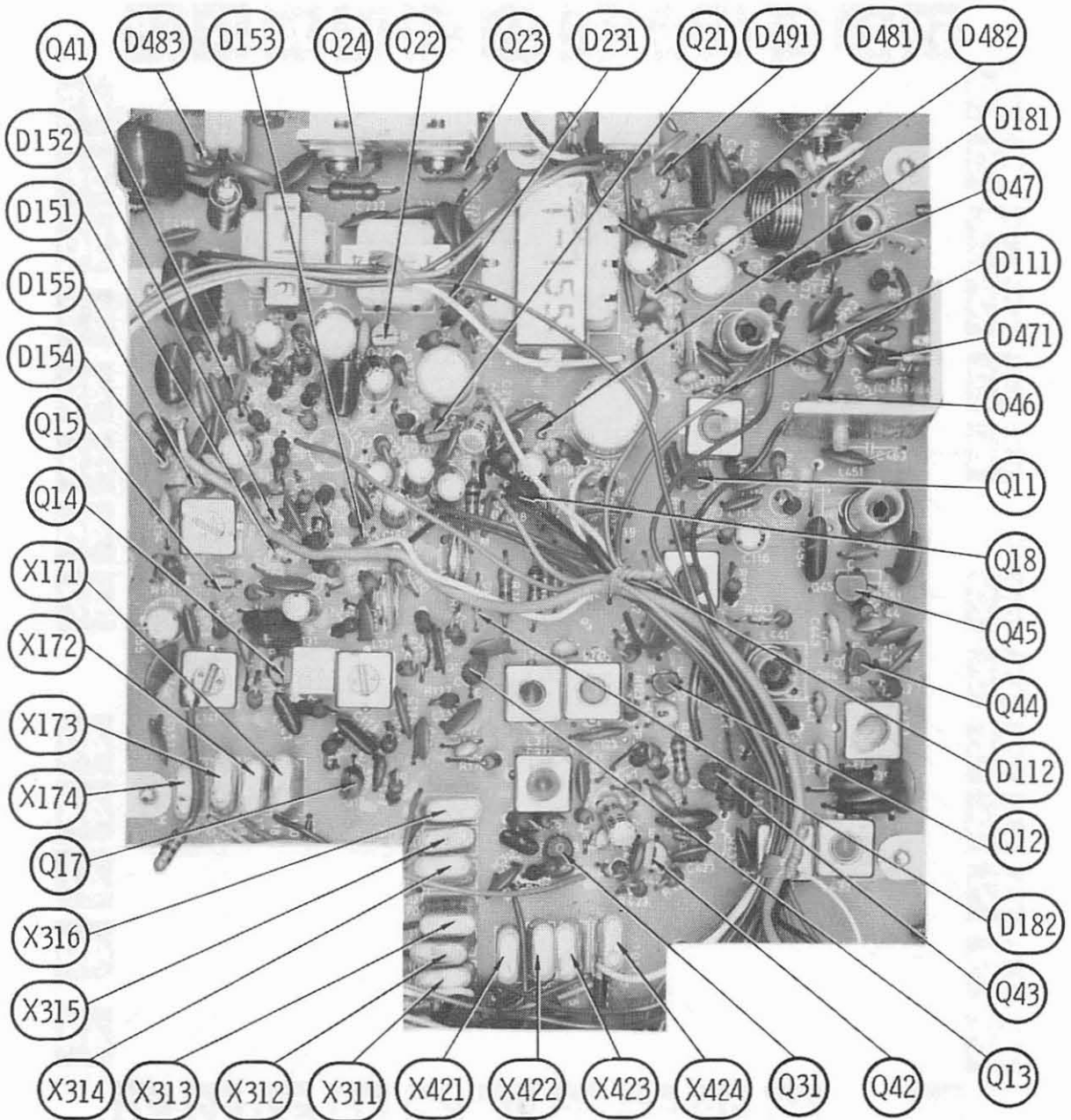




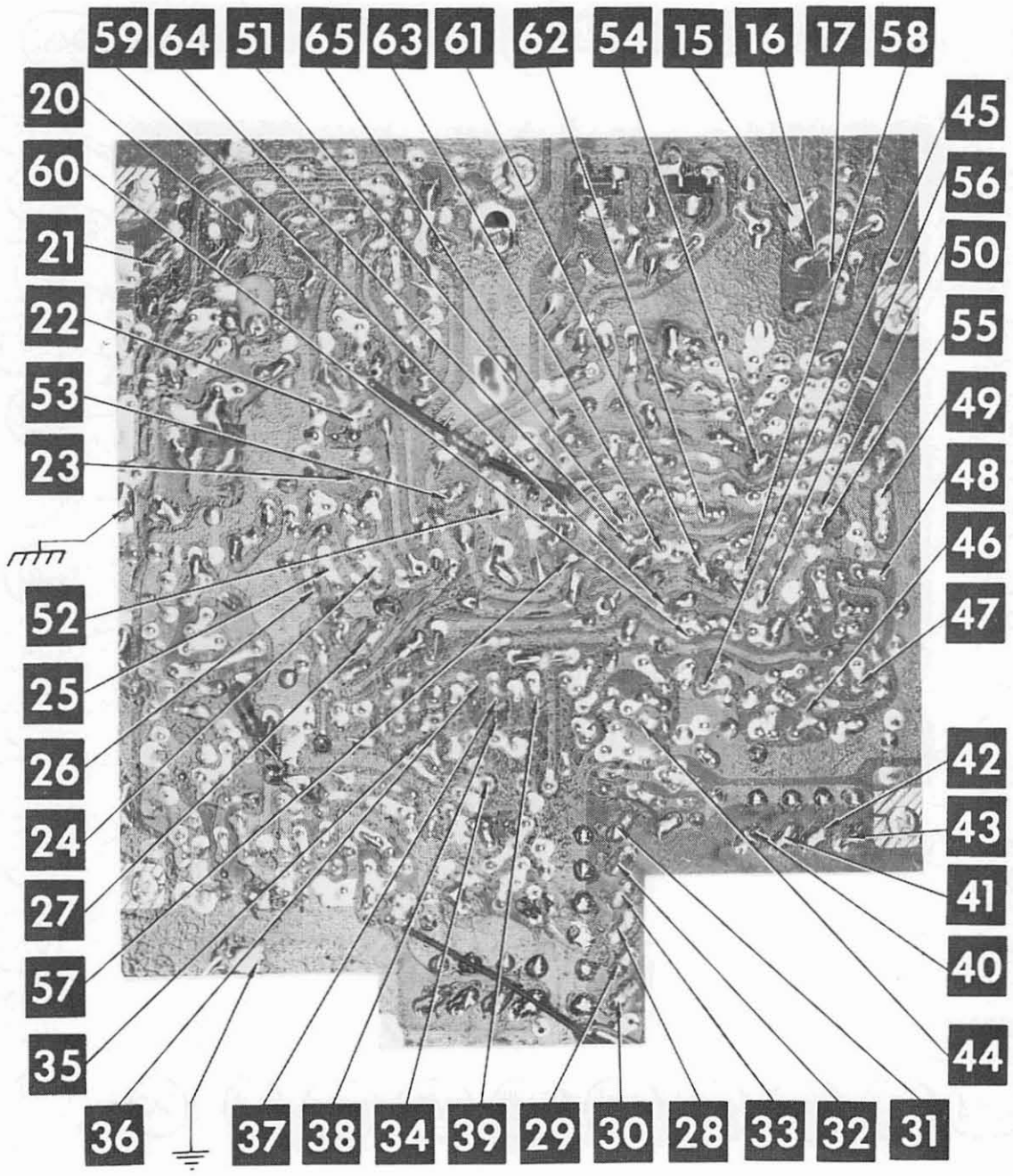
CHASSIS-BOTTOM



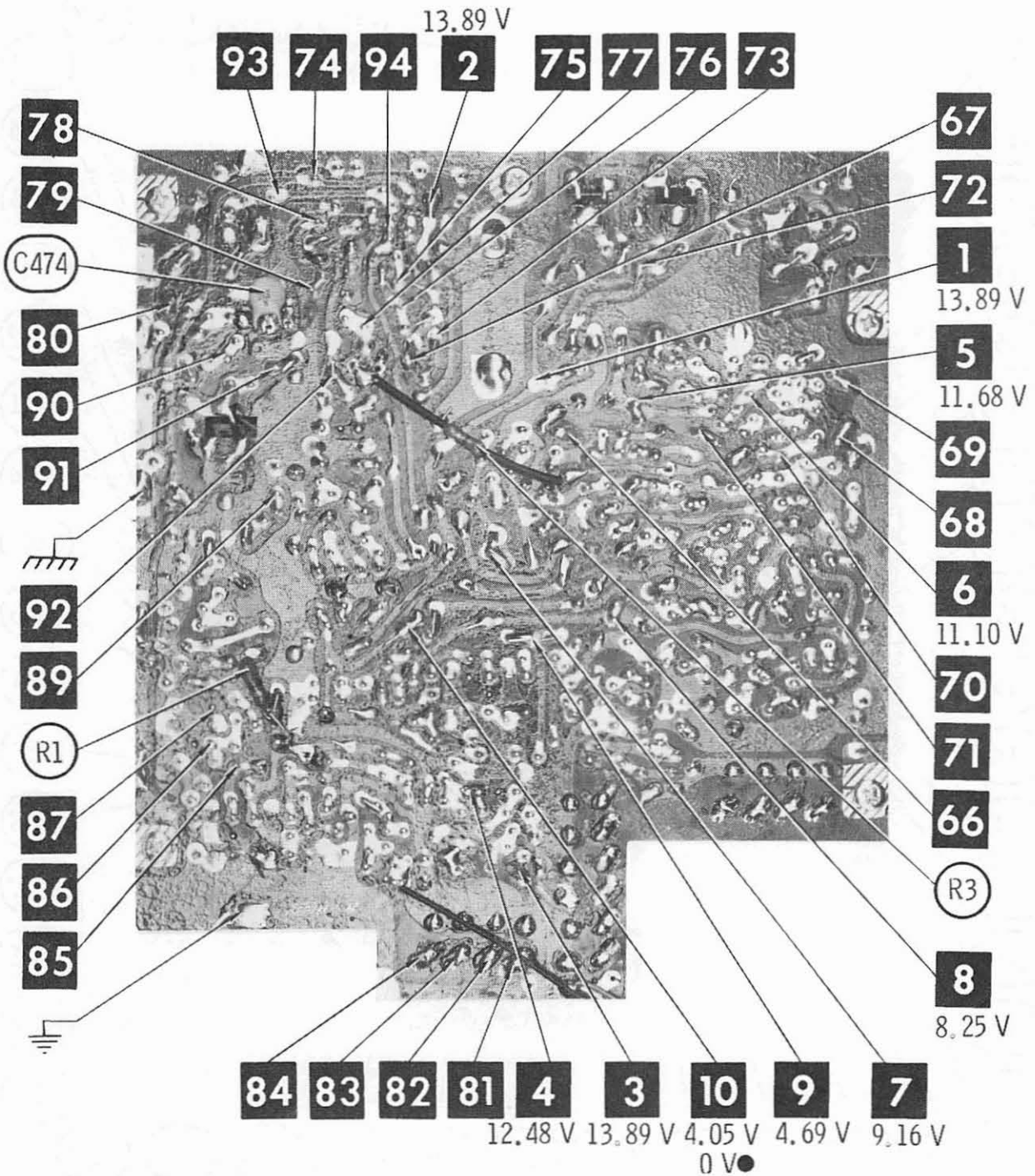
MAIN BOARD



MAIN BOARD



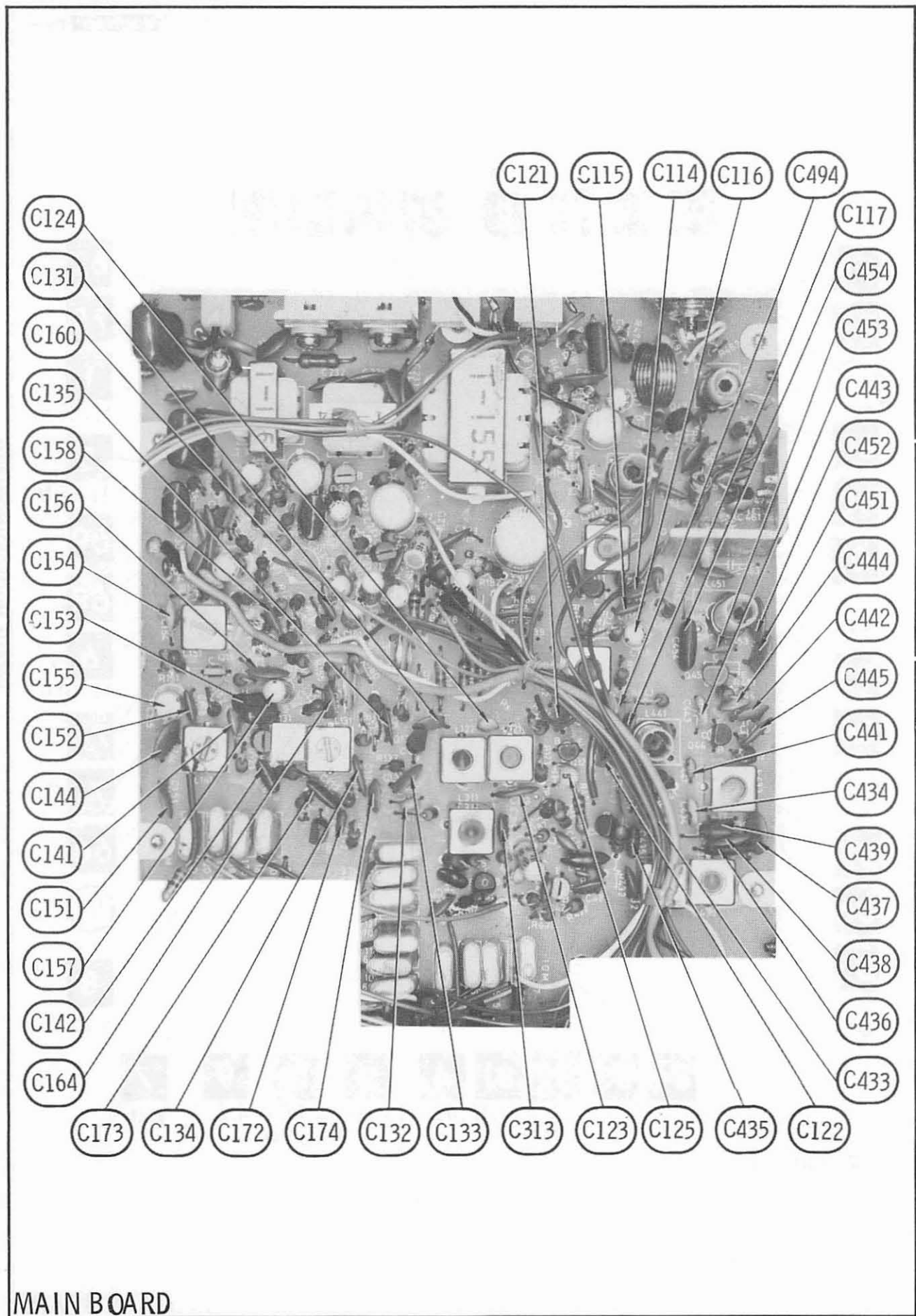
MAIN BOARD



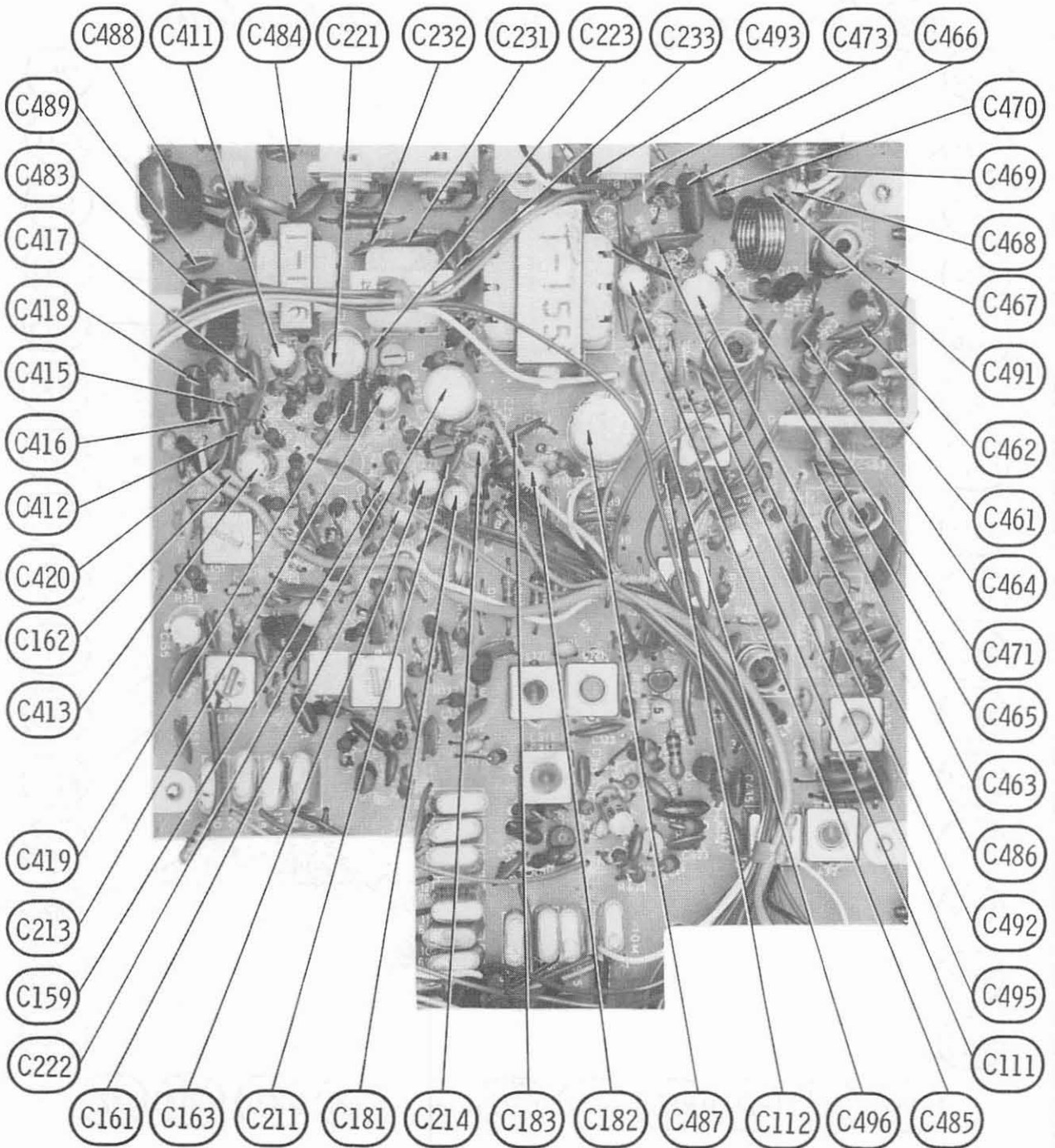
GEMTRONICS MODEL GTX-23

● Transmit

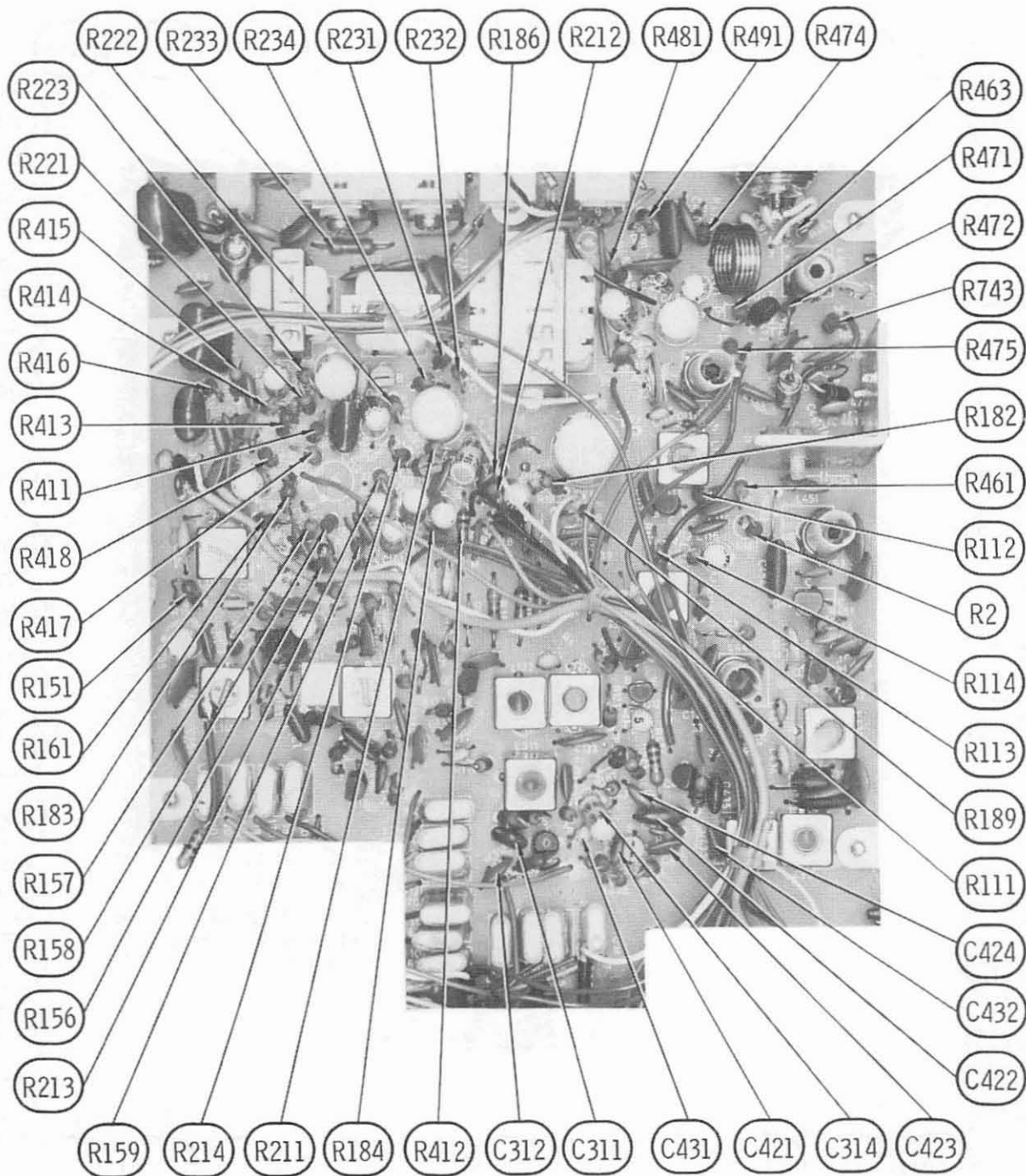
MAIN BOARD



MAIN BOARD

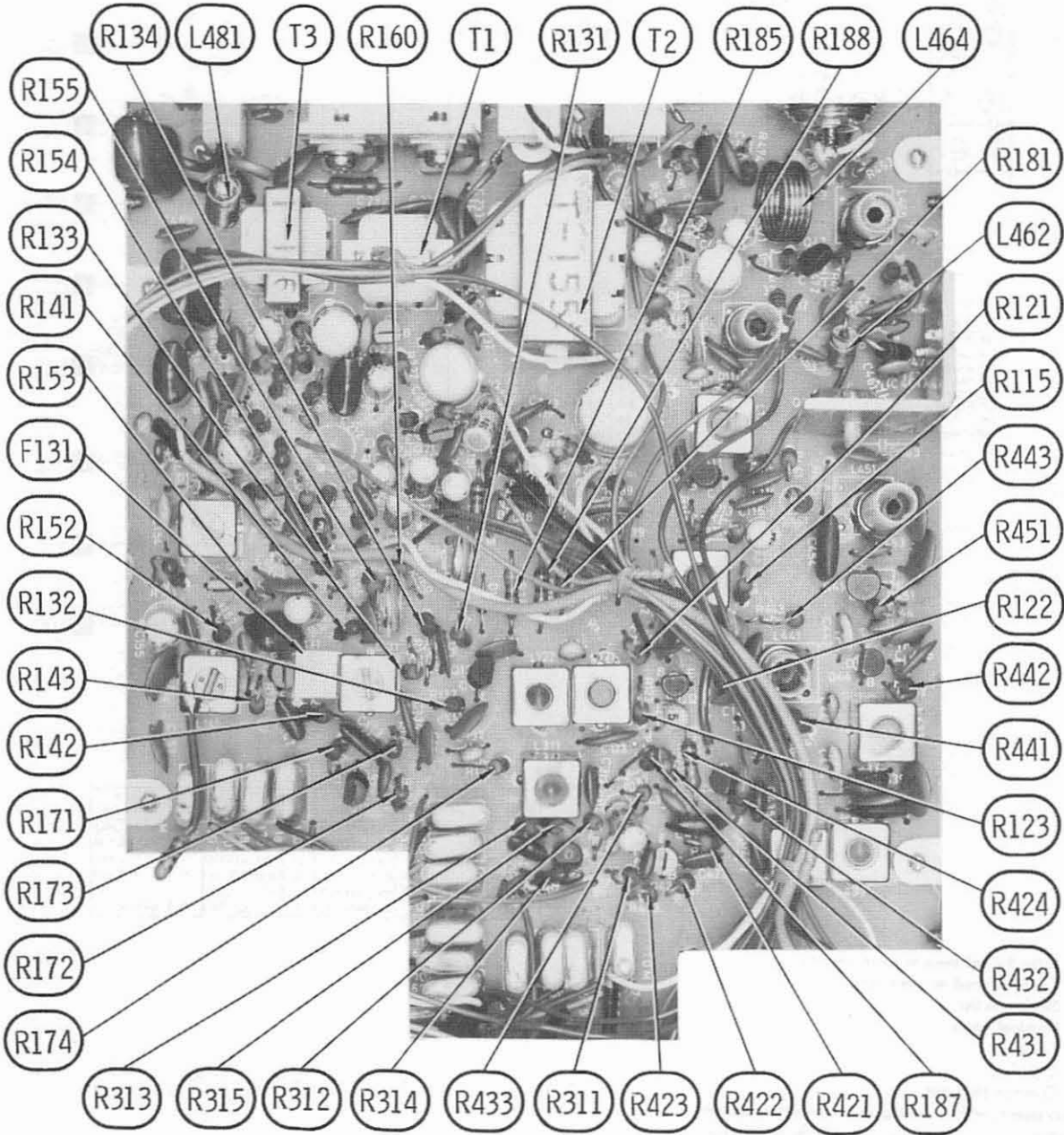


MAIN BOARD

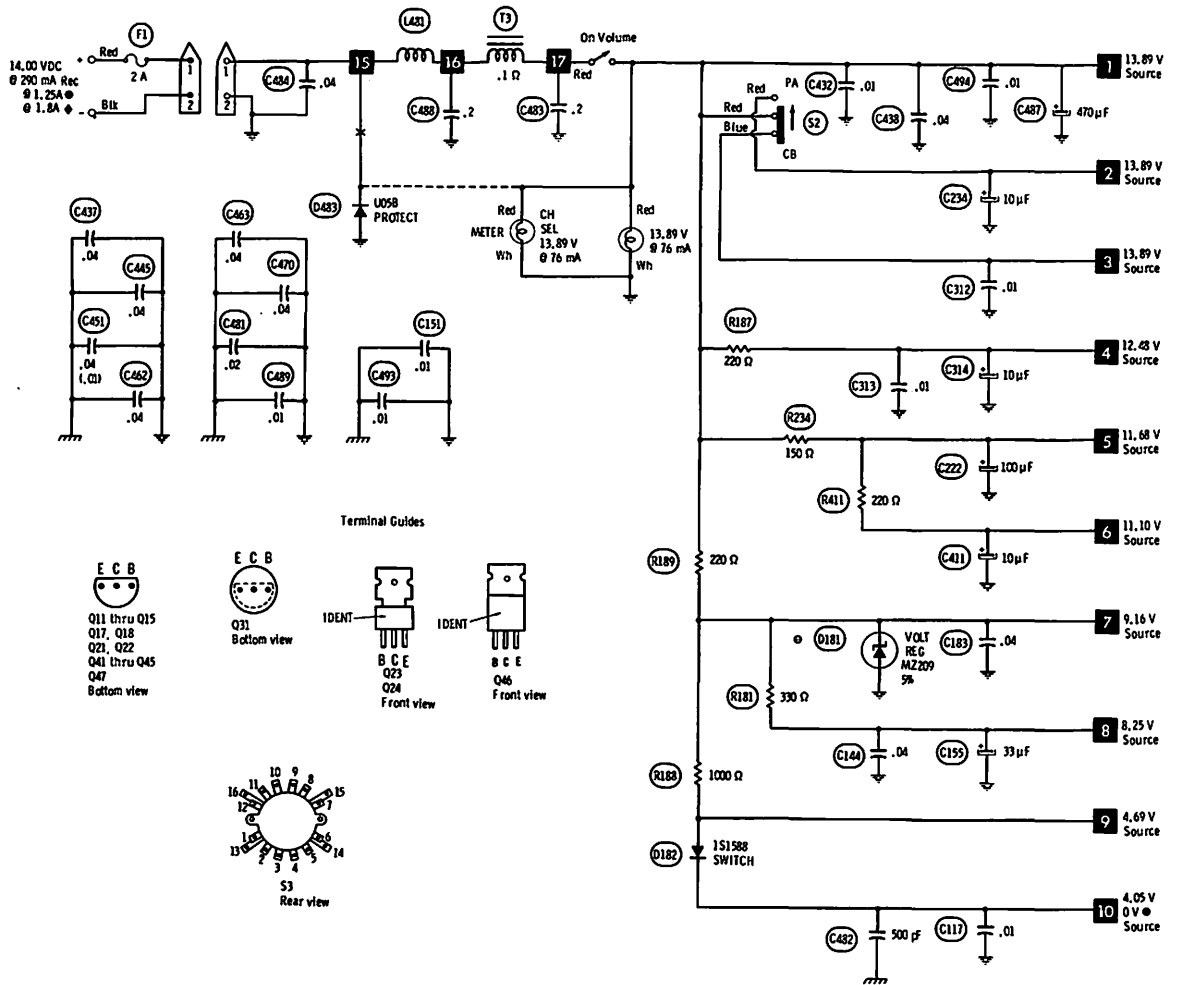


MAIN BOARD

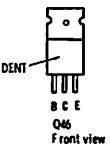
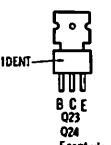




MAIN BOARD



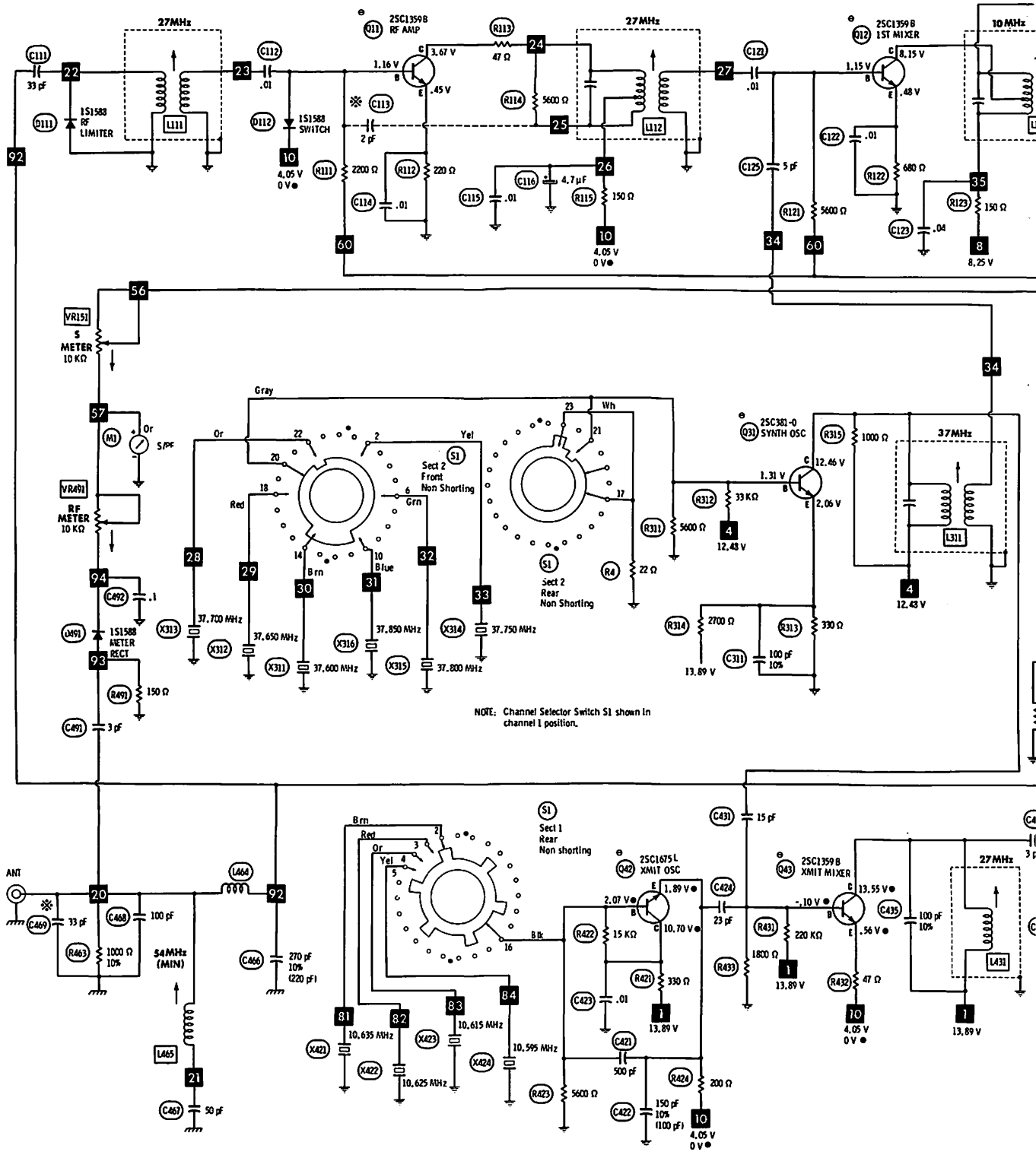
Terminal Guides



Chan	Crystal Complement	Chan	Crystal Complement	Chan	Crystal Complement	Chan	Crystal Complement
1	X311, X171, X421	7	X312, X173, X423	13	X314, X171, X421	19	X315, X173, X423
2	X311, X172, X422	8	X312, X174, X424	14	X314, X172, X422	20	X315, X174, X424
3	X311, X173, X423	9	X313, X171, X421	15	X314, X173, X423	21	X316, X171, X421
4	X311, X174, X424	10	X313, X172, X422	16	X314, X174, X424	22	X316, X172, X422
5	X312, X171, X421	11	X313, X173, X423	17	X315, X171, X421		
6	X312, X172, X422	12	X313, X174, X424	18	X315, X172, X422	23	X316, X174, X424

- X— Circuitry not used in some versions
  - Circuitry used in some versions
  - ⊙ See parts list
  - ⊛ Nominal value
  - ⊕ Ground
  - ⊞ Chassis
  - ▽ Common tie point
- Measurements with switching as shown unless noted:  
 ■ Squelch fully clockwise    ◆ 100% modulation  
 ● Transmit
- Supply voltage maintained as shown at input.  
 Voltages measured with digital meter, no signal.  
 Controls adjusted for normal operation.  
 Arrow at control indicates direction of advance.  
 Terminal identification may not be found on unit.  
 Resistors are 1/2W or less, 5% unless noted.  
 Value in ( ) used in some versions.

A PHOTOFAC STANDARD NOTATION SCHEMATIC  
 WITH **CIRCUITRACE**



# PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

## CAPACITORS(cont)

ITEM No.	RATING	MFR. PART No.	REPLACEMENT DATA			
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C233	.1		DC-104	MGP1	MAG5001	TG-P10
C311	100 10%			CD10FD101J03	SX310	424MC1000J501
C312	.01		DC-103	GP10000	MAG5011	2SS-S10
C313	.01		DC-103	GP10000	MAG5011	2SS-S10
C412	.04				GP140	5GA-S40
C415	.003		DD-302		GP230	10TS-D30
C416	.005					10TS-D50
C417	.01		DC-103	GP10000	MAG5011	2SS-S10
C418	.1 10%			DPMS2P1	ENF1A010	1PB-P10
C419	.1 10%			DPMS2P1	ENF1A010	1PB-P10
C420	.01		DC-103	GP10000	MAG5011	2SS-S10
C421	500		DD-501	GP500	GP350	10TS-T50
C422	150 10%			CD7FD151J03	SX315	424MC1500J501
C423	.01		DD-682	GP6800	GP268	10TS-D68
C424	23		DTZ-22	NP022	CN0422	10TCC-Q22
C431	15		DTZ-15	NP015	CN0415	10TCC-Q15
C432	.01		DC-103	GP10000	MAG5011	2SS-S10
C433	3		DTZ-3R3	NP03P3	CN0533	10TCC-V33
C434	3		DTZ-3R3	NP03P3	CN0533	10TCC-V33
C435	100 10%			CD10FD101J03	SX310	424MC1000J501
C436	150 10%			CD7FD151J03	SX315	424MC1500J501
C437	.04				GP140	5GA-S40
C438	.04				GP140	5GA-S40
C439	100 10%			CD10FD101J03	SX310	424MC1000J501
C441	33		DTZ-33	NP033	CN0433	10TCC-Q33
C442	.01		DC-103	GP10000	MAG5011	2SS-S10
C443	150		DD-151		CN0315	10TCC-T15
C444	50		DTZ-50	NP050	CN0450	10TCC-Q50
C445	.04				GP140	5GA-S40
C451	.04				GP140	5GA-S40
C452	.04				GP140	5GA-S40
C453	100		DD-101	GP100	GP310	10TS-T10
C454	270 10%			CD15FD271J03	SX327	424ME2700J501
C461	33		DTZ-33	NP033	CN0433	10TCC-Q33
C462	.04				GP140	5GA-S40
C463	.04				GP140	5GA-S40
C464	.04				GP140	5GA-S40
C465	.01		DC-103	GP10000	MAG5011	2SS-S10
C466	270 10%			CD15FD271J03	SX327	424ME2700J501
C467	50		DTZ-50	NP050	CN0450	10TCC-Q50
C468	100		DD-101	GP100	GP310	10TS-T10
C469	33		DTZ-33	NP033	CN0433	10TCC-Q33
C470	.04				GP140	5GA-S40
C473	.01		DC-103	GP10000	MAG5011	2SS-S10
C474	.005					10TS-D50
C481	.02				GP120	5GA-S20
C482	500		DD-501	GP500	GP350	10TS-T50
C483	.2			DPMS2P2	PVC602	2PS-P20
C484	.04				GP140	5GA-S40
C488	.2			DPMS2P2	PVC602	2PS-P20
C489	.01		DC-103	GP10000	MAG5011	2SS-S10
C491	3		DTZ-3R3	NP03P3	CN0533	10TCC-V33
C492	.1		DC-104	MGP1	MAG5001	TG-P10
C493	.01		DC-103	GP10000	MAG5011	2SS-S10
C494	.01		DC-103	GP10000	MAG5011	2SS-S10
C495	.01		DC-103	GP10000	MAG5011	2SS-S10
C496	.001		DD-102		GP210	10TS-D10

## CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM No.	FUNCTION	RESIST-ANCE	REPLACEMENT DATA				
			MFR. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	MALLORY PART No.	TRW PART No.
VR151	S Meter	10K	106-066	T-10K (2)	C-103 (2)	MTC14L1 (2)	X201R103B (2)
VR152	AGC	30K	106-067	T-50K (2)	C-503 (2)	MTC54L1 (2)	X201R503B (2)
VR153	Volume/Power Switch	10K	106-069				
VR181	Squelch Range	50K	106-068	T-50K (2)	C-503 (2)	MTC54L1 (2)	X201R503B (2)
VR182	Squelch	50K	106-070				
VR481	AMC	50K	106-068	T-50K (2)	C-503 (2)	MTC54L1 (2)	X201R503B (2)
VR491	RF Meter	10K	106-066	T-10K (2)	C-103 (2)	MTC14L1 (2)	X201R103B (2)

(2) Cut off one of the end terminals and bend to fit PC board.



# PARTS LIST AND DESCRIPTION (CONTINUED)

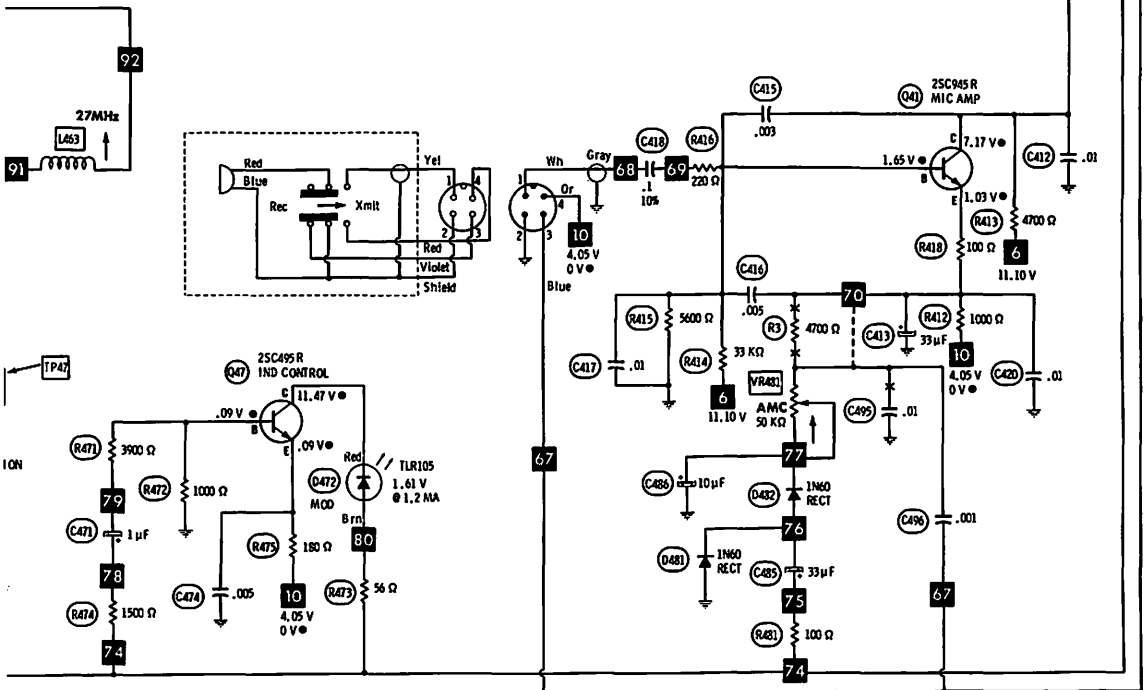
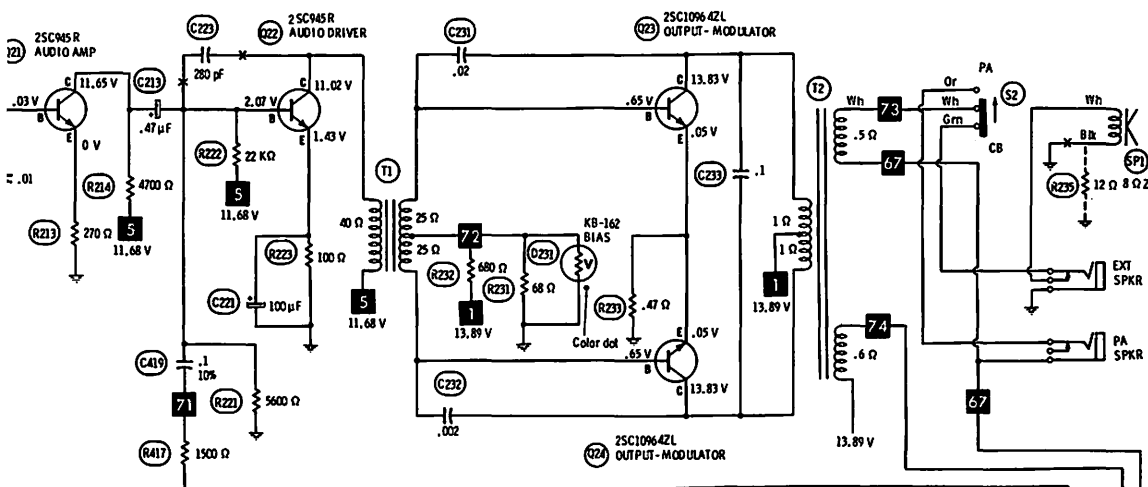
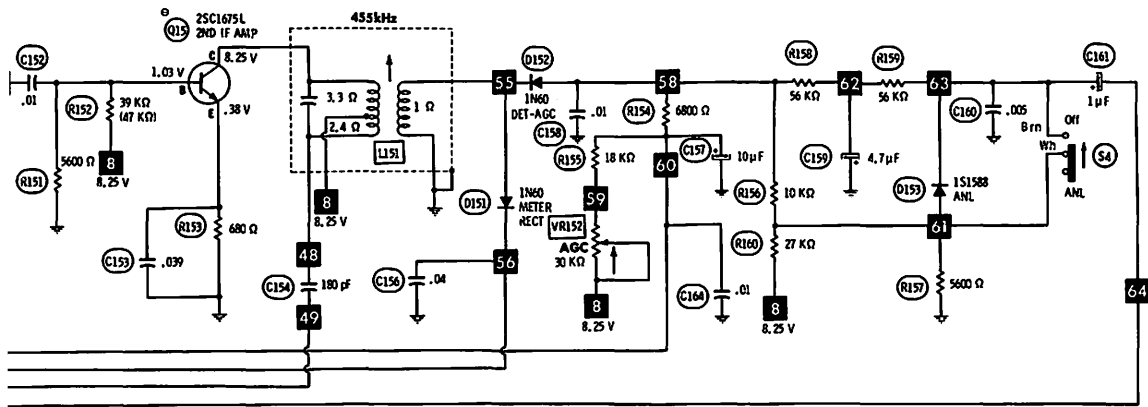
(When ordering parts, state Model, Part Number, and Description.)

## ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA			
		MFGR. PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C116	4.7 25V	106-089	PC5-50	VTT4R7A50	EV-1319
C155	33 16V	106-091	PC30-25	VTT33D25	EV-1325
C157	10 16V	106-090	PC10-25	VTT10A25	EV-1222
C159	4.7 16V	106-089	PC5-50	VTT4R7A50	EV-1519
C161	1 50V	106-324	PC1-50	MTV1CB50	EV-1615
C163	10 16V	106-090	PC10-25	VTT10A25	EV-1222
C181	1 16V	106-088	PC1-50	MTV1CB50	EV-1615
C182	4.7 16V	106-089	PC5-50	VTT4R7A50	EV-1319
C213	47 50V	106-324	PC50-50	VTT47G63	EV-1626
C214	1 16V	106-088	PC1-50	MTV1CB50	EV-1615
C221	100 10V	106-087	PC100-16	VTT100F16	EV-1230
C222	100 16V	106-092	PC100-16	VTT100F16	EV-1230
C314	10 16V	106-090	PC10-25	VTT10A25	EV-1222
C411	10 16V	106-090	PC10-25	VTT10A25	EV-1222
C413	33 10V	106-326	PC30-25	VTT33A10	EV-1125
C471	1 16V	106-088	PC1-50	MTV1CB50	EV-1615
C485	33 16V	106-091	PC30-25	VTT33D25	EV-1325
C486	10 50V	106-325	PC10-25	VTT10A25	EV-1222
C487	470 16V	106-093	PC500-16	VTT470J16	EV-1250

## CAPACITORS

ITEM No.	RATING	MFGR. PART No.	REPLACEMENT DATA			
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C111	33		DTZ-33	NP033	CN0433	10TCC-Q33
C112	.01		DC-103	GP10000	MAG5011	2SS-S10
C114	.01		DC-103	GP10000	MAG5011	2SS-S10
C115	.01		DC-103	GP10000	MAG5011	2SS-S10
C117	.01		DC-103	GP10000	MAG5011	2SS-S10
C121	.01		DC-103	GP10000	MAG5011	2SS-S10
C122	.01		DC-103	GP10000	MAG5011	2SS-S10
C123	.04				GP140	5GA-S40
C124	2		DTZ-2R2	NP02P2	CN0522	10TCC-V22
C125	5					10TCC-V50
C131	.01		DC-103	GP10000	MAG5011	2SS-S10
C132	7		DTZ-6R8	NP06P8		10TCC-V68
C133	.01		DC-103	GP10000	MAG5011	2SS-S10
C134	.04				GP140	5GA-S40
C135	500		DD-501	GP500	GP350	10TS-T50
C141	2.2		DTZ-2R2	NP02P2	CN0522	10TCC-V22
C142	.039			DPMS6S39	PVC6139	6PS-S39
C144	.04				GP140	5GA-S40
C151	.01		DC-103	GP10000	MAG5011	2SS-S10
C152	.01		DC-103	GP10000	MAG5011	2SS-S10
C153	.039			DPMS6S39	PVC6139	6PS-S39
C154	180		DD-181		GP318	10TS-T18
C156	.04				GP140	5GA-S40
C158	.01		DC-103	GP10000	MAG5011	2SS-S10
C160	.005					10TS-D50
C162	220		DD-221		GP322	10TS-T22
C164	.04				GP140	5GA-S40
C171	33		DTZ-33	NP033	CN0433	10TCC-Q33
C172	500		DD-501	GP500	GP350	10TS-T50
C173	150 10%			CD7FD151J03	SX315	424MC1500J501
C174	.01		DC-103	GP10000	MAG5011	2SS-S10
C183	.04				GP140	5GA-S40
C211	.01		DC-103	GP10000	MAG5011	2SS-S10
C223	280		DTZ-270			10TCC-T27
C231	.02				GP120	5GA-S20
C232	.002		DD-202	GP2000	GP220	2SS-D20



GEMTRONICS MODEL GTX-23

# PARTS LIST AND DESCRIPTION

(When ordering parts, state Model, Part Number, and Description.)

## WIRING DATA

General-use Hook-up Wire .....	Use BELDEN No. 8530 (Solid) Available in 12 Colors 8524 (Stranded) Available in 12 Colors
Power Cord, 2-Wire .....	Use BELDEN No. 17105 (Plastic) or 17126 (Rubber) -6 feet 17109 (Plastic) or 17129 (Rubber) -9 feet
Shielded Antenna Lead .....	Use BELDEN No. 8214 Lowest-loss (RG-8/U Type) 8237 Low-loss (RG-8/U) 8240 (Solid) Miniature (RG-58/U) 8259 (Stranded) Miniature (RG-58A/U)
Coiled Microphone Cable .....	Use BELDEN No. 8491 4-Conductor (2 shielded, 2 unshielded). Neoprene

## SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA						
			GENERAL ELECTRIC PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.
D111	1S1588	106-007	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177
D112	1S1588	106-007	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177
D151	1N60	106-008	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D152	1N60	106-008	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D153	1S1588	106-007	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177
D154	1N60	106-008	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D155	1N60	106-008	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D181	MZ209	106-010	GEZD-9.1	ZB9.1B		RE 114		RT-240	ECG139
D182	1S1588	106-007	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177
D231	KB-162	106-009							
	(Varistor)								
D471	SR1K-1	106-011	GE-504A	PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116
D472	TLR105	106-012							
D481	1N60	106-008	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D482	1N60	106-008	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D483	U05B	106-013	GE-512	PTC204	HEPRO092	RE 92	SK3051	RT-201	ECG156
D491	1S1588	106-007	GE-300	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177
Q11	2SC1359B		GE-212	PTC121	HEPS0014	RE 192	SK3038	RT-107A	ECG199
	2SC381-0	106-001	GE-20	PTC121	HEPS0011	RE 192	SK3038	RT-108A	ECG199
	2SC1674L	106-351	GE-20	PTC132	HEPS0015	RE 13	SK3038	RT-107A	ECG123A
Q12	2SC1359B		GE-212	PTC121	HEPS0014	RE 192	SK3038	RT-107A	ECG199
	2SC381-0	106-001	GE-20	PTC121	HEPS0011	RE 192	SK3038	RT-108A	ECG199
	2SC1674L	106-351	GE-20	PTC132	HEPS0015	RE 13	SK3038	RT-107A	ECG123A
Q13	2SC1675L	106-002	GE-20	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG229
	2SC839		GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q14	2SC1675L	106-002	GE-20	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG229
	2SC839		GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q15	2SC1675L	106-002	GE-20	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG229
	2SC839		GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q17	2SC1675L	106-002	GE-20	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG229
	2SC839		GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q18	2SC945R	106-003	GE-210	PTC121	HEPS0015	RE 192	SK3124	RT-107A	ECG199
Q21	2SC945R	106-003	GE-210	PTC121	HEPS0015	RE 192	SK3124	RT-107A	ECG199
Q22	2SC945R	106-003	GE-210	PTC121	HEPS0015	RE 192	SK3124	RT-107A	ECG199
Q23	2SC10964ZL	106-004	GE-28	PTC110	HEPS5027	RE 42	SK3054	RT-197	ECG186A
Q24	2SC10964ZL	106-004	GE-28	PTC110	HEPS5027	RE 42	SK3054	RT-197	ECG186A
Q31	2SC381-0	106-001	GE-20	PTC121	HEPS0011	RE 192	SK3038	RT-108A	ECG199
	2SC1674L	106-351	GE-20	PTC132	HEPS0015	RE 13	SK3038	RT-107A	ECG123A
Q41	2SC945R	106-003	GE-210	PTC121	HEPS0015	RE 192	SK3124	RT-107A	ECG199
Q42	2SC1675L	106-002	GE-20	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG229
	2SC839		GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q43	2SC1359B		GE-212	PTC121	HEPS0014	RE 192	SK3038	RT-107A	ECG199
	2SC381-0	106-001	GE-20	PTC121	HEPS0011	RE 192	SK3038	RT-108A	ECG199
	2SC1674L	106-351	GE-20	PTC132	HEPS0015	RE 13	SK3038	RT-107A	ECG123A
Q44	2SC1359B		GE-212	PTC121	HEPS0014	RE 192	SK3038	RT-107A	ECG199
	2SC381-0	106-001	GE-20	PTC121	HEPS0011	RE 192	SK3038	RT-108A	ECG199
	2SC1674L	106-351	GE-20	PTC132	HEPS0015	RE 13	SK3038	RT-107A	ECG123A
Q45	2SC1973		GE-20	PTC132	HEPS0015	RE 13	SK3038	RT-107A	ECG315
	2SC495T	106-005 (10)							ECG295
Q46	2SC1975	106-005 (11)	GE-215	PTC186		RE 203			ECG235
	2SC1678	106-006 (12)	GE-215	PTC186		RE 203			ECG235
Q47	2SC945R	106-003	GE-210	PTC121	HEPS0015	RE 192	SK3124	RT-107A	ECG199

(10) Rating, 5.0 watts @ 800 ma.  
 (11) Rating, 15 watts @ 2.0 amps.  
 (12) Rating, 10 watts @ 3.0 amps.



# PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

## COILS (RF-IF)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
L111	Rec Ant (27MHz)	106-104	L540		
L112	Rec RF (27MHz)	106-105	L541		
L121	Rec Mixer (10MHz)	106-106	L542		
L122	Rec Mixer (10MHz)	106-107	L543		
L131	IF (455kHz)	106-108	HEL-0544		
L141	IF (455kHz)	106-109	L545		
L151	IF (455kHz)	106-110	L546		
L171	RF Choke	106-121	0539-1		
L311	Synth Osc (37MHz)	106-111	L547		
L431	Xmit Mixer (27MHz)	106-112	HEL-0548		
L432	Harmonic Suppressor (27MHz)	106-112	L548		
L433	Harmonic Suppressor (27MHz)	106-113	L549		
L441	Xmit Buffer (27MHz)	106-114	HEL-0550		
L451	Xmit Driver (27MHz)	106-115	HEL-0551		
L462	RF Choke	106-117	HEL-0552		
L463	Final Tank (27MHz)	106-331	HEL-0557		
L464	RF Choke	106-119	HEL-0554		
L465	TVI Trap (54MHz)	106-118	HEL-0553		
L481	RF Choke	106-120	HEL-0555		

## FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000~)	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T3	1.8A	.1	.7mH	HET-0156 T-156 (1)			(1) Number on unit

## TRANSFORMER (Driver)

ITEM No.	TURNS RATIO			REPLACEMENT DATA			NOTES
	PRI.	SEC. 1	SEC. 2	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T1	1	1		HET-0154 T-154 (1)			(1) Number on unit

## TRANSFORMER (Audio Output)

ITEM No.	IMPEDANCE		REPLACEMENT DATA			NOTES
	PRI.	SEC.	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T2	8	8	HET-0155 T-155 (1)			(1) Number on unit

## SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
SP1	3 5/8" PM 8 ohms	106-128	3A0528	

## PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

### FUSE DEVICES

ITEM No.	DESCRIPTION	REPLACEMENT DATA						
		PART No.		BUSS PART No.		LITTELFUSE PART No.		WORKMAN PART No.
		DEVICE	HOLDER	DEVICE	HOLDER	DEVICE	HOLDER	DEVICE
F1	2A Fast Acting	106-139	106-138	AGC2	HDJ	312002	150145	FG2-2

### CRYSTALS

ITEM No.	CRYSTAL FREQUENCY IN MHz	MFGR. PART No.	CTS KNIGHTS PART No.	CHANNEL	ITEM No.	CRYSTAL FREQUENCY IN MHz	MFGR. PART No.	CTS KNIGHTS PART No.	CHANNEL
X171	10.180	106-352	DB125W10.180	1,5,9,13,17,21	X314	37.750	106-359	DA20M37.750	13,14,15,16
X172	10.170	106-353	DB125M10.170	2,6,10,14,18,22	X315	37.800	106-360	DA20M37.800	17,18,19,20
X173	10.160	106-354	DB125W10.160	3,7,11,15,19	X316	37.850	106-361	DA20M37.850	21,22,23
X174	10.140	106-355	DB125M10.140	4,8,12,16,20,23	X421	10.635	106-362	DC125M10.635	1,5,9,13,17,21
X311	37.600	106-356	DA20M37.600	1,2,3,4	X422	10.625	106-363	DC125M10.625	2,6,10,14,18,22
X312	37.650	106-357	DA20M37.650	5,6,7,8	X423	10.615	106-364	DC125M10.615	3,7,11,15,19
X313	37.700	106-358	DA20M37.700	9,10,11,12	X424	10.595	106-365	DC125M10.595	4,8,12,16,20,23

### CRYSTALS (USED IN SOME VERSIONS)

ITEM No.	CRYSTAL FREQUENCY IN MHz	MFGR. PART No.	CTS KNIGHTS PART No.	CHANNEL	ITEM No.	CRYSTAL FREQUENCY IN MHz	MFGR. PART No.	CTS KNIGHTS PART No.	CHANNEL
X171	10.180	106-015	DB125M10.180	1,5,9,13,17,21	X314	37.750	106-022	DA20M37.750	13,14,15,16
X172	10.170	106-016	DB125M10.170	2,6,10,14,18,22	X315	37.800	106-023	DA20M37.800	17,18,19,20
X173	10.160	106-017	DB125M10.160	3,7,11,15,19	X316	37.850	106-024	DA20M37.850	21,22,23
X174	10.140	106-018	DB125M10.140	4,8,12,16,20,23	X421	10.635	106-025	DC125M10.635	1,5,9,13,17,21
X311	37.600	106-019	DA20M37.600	1,2,3,4	X422	10.625	106-026	DC125M10.625	2,6,10,14,18,22
X312	37.650	106-020	DA20M37.650	5,6,7,8	X423	10.615	106-027	DC125M10.615	3,7,11,15,19
X313	37.700	106-021	DA20M37.700	9,10,11,12	X424	10.595	106-028	DC125M10.595	4,8,12,16,20,23

### MISCELLANEOUS

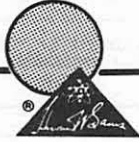
ITEM No.	PART NAME	PART No.	NOTES
F131	Filter	106-014	455kHz
M1	Meter		S-RF
S1	Switch	106-125	Channel Selector
S2	Switch	106-126	PA-CB
S3	Switch	106-127	Delta Tune
S4	Switch	106-126	ANL
	Printed Circuit Board	106-142	
	Crystal Socket	106-131	

### CABINETS & CABINET PARTS (When ordering specify model, chassis & color)

ITEM	PART No.	ITEM	PART No.
Cabinet, Top	106-154	Bracket, Mounting	106-156
Cabinet, Bottom	106-155	Knob, Channel Selector	106-145
Panel, Front	106-144	Knob, Control	106-148
Panel, Over Lay	106-143	Channel Selector Plate	106-146

### ACCESSORIES

ITEM	MFGR. PART No.	REMARKS
Microphone	106-134	
DC Power Cord w/Plug	106-135	



# PHOTOFACT<sup>®</sup> with CIRCUITRACE<sup>®</sup>

For Supplier Address See PHOTOFACT Index

## NOTE

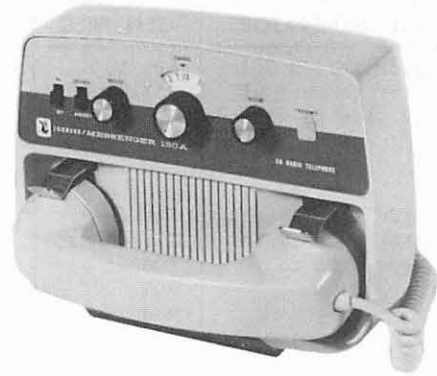
Repair or adjustment of transmitter circuits must be under supervision of a person with first-or second-class radiotelephone license.

(Refer to FCC Rules and Regulations Part 95, Subpart C & D.)

The frequency of the transmitter should be checked periodically with a secondary frequency standard to insure proper and legal operation.

Best results will be obtained when adjusting the final RF output circuit if the antenna normally used is connected and the chassis is as nearly in the cabinet as possible.

Connect either 50-ohm dummy load or the normally used antenna system.



MODEL 130A (242-130A)

## ALIGNMENT INSTRUCTIONS

Suggested Alignment Tools:	GC ELECTRONICS
T3, T4, Z1A, Z1B.....	5000, 8290
L6, L7, T12, T13.....	9300
T1, T2, T7, T8, T9, T10, T11.....	9440

JOHNSON MODEL MESSENGER 130A

## SYNTHESIZER

INDICATOR	CHANNEL	ADJUST	FREQUENCY	REMARKS
HF OSC				
RF Voltmeter	23	T7		Connect meter between CR14 and CR15. Adjust 1/8 turn beyond peak RF voltage point.
MIXER	12	T8, T9, T10, T11		Connect meter to case of Q15. Adjust for maximum.

**HOWARD W. SAMS & CO., INC.** Indianapolis, Indiana 46206

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## RECEIVER

Connect an AC VTVM or AF Wattmeter across speaker voice coil. NOTE: L6 and L7 should be adjusted before receiver is aligned. (See Transmitter Alignment). Adjustments are made with 14-volt DC input. Adjust volume control to obtain suitable reading.

SIGNAL GENERATOR	GEN FREQ	CHANNEL	ADJUST	REMARKS
High side thru a .01uF capacitor to Base of Q2, low side to ground.	Set to 455kHz, 1000Hz @ 30% Modulation.	Any	Z1A, Z1B, T3, T4	Set generator output low enough to prevent AGC limiting. Adjust for maximum.
High side thru a .01uF capacitor to antenna jack, low side to ground.	Set to 27.105MHz, 1000Hz @ 30% Modulation, output 0.5uV.	12	T1, T2	Set generator output low enough to prevent AGC limiting. Adjust for maximum.

## RECEIVER ADJUSTMENTS

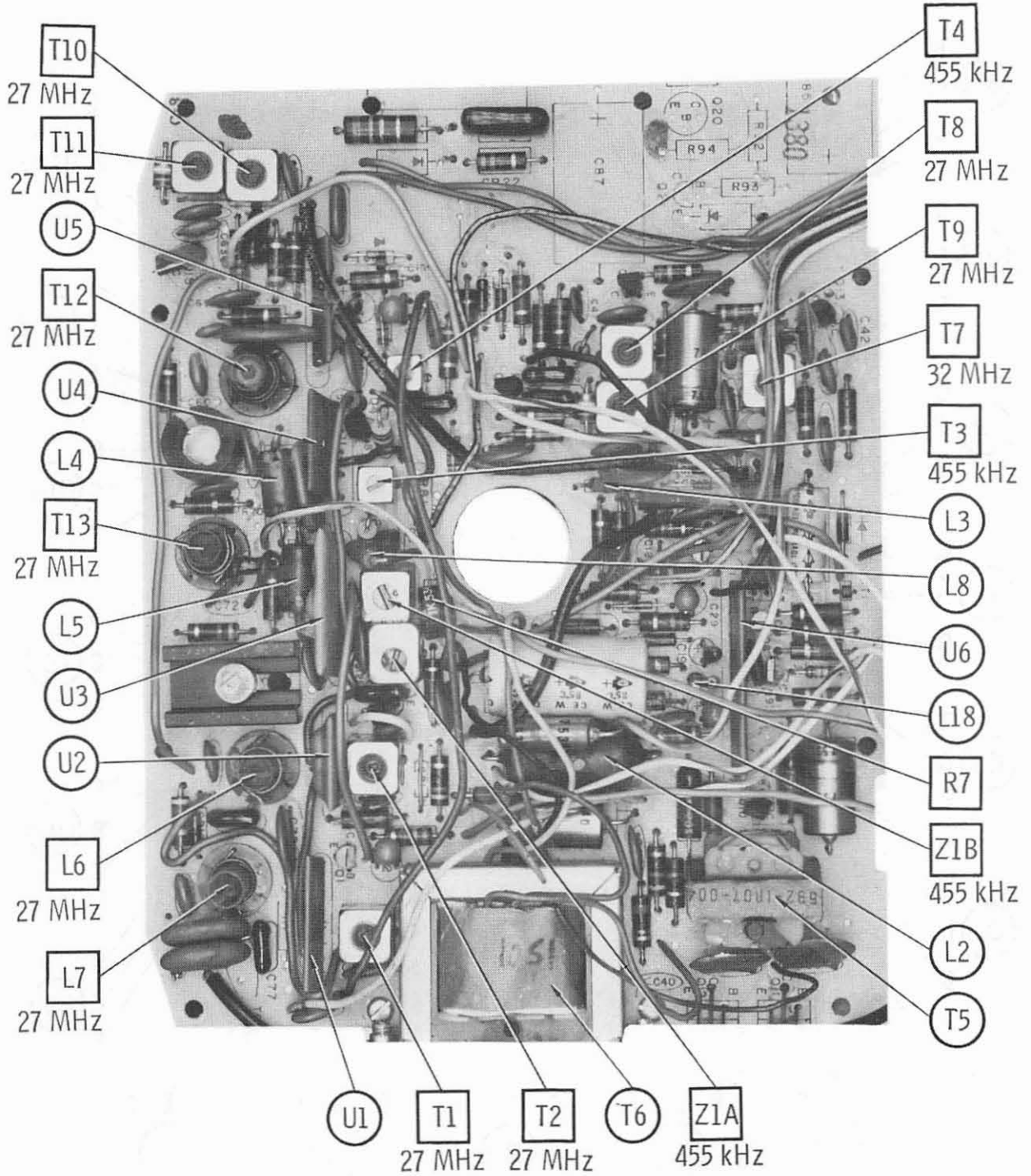
Connect an AC VTVM or AF Wattmeter across speaker voice coil. NOTE: L6 and L7 should be adjusted before receiver is aligned. (See Transmitter Alignment). Adjustments are made with 14-volt DC input. Adjust volume control to obtain suitable reading.

SIGNAL GENERATOR	GEN FREQ	CHANNEL	ADJUST	REMARKS
AGC High side thru a .01uF capacitor to antenna jack, low side to ground.	Set to 27.085MHz, 1000Hz @ 30% Modulation. output 500uV.	11	R7	Adjust volume control to obtain 0 db. Decrease generator to 0.5uV. Adjust so that signal does not drop more than 17 db.

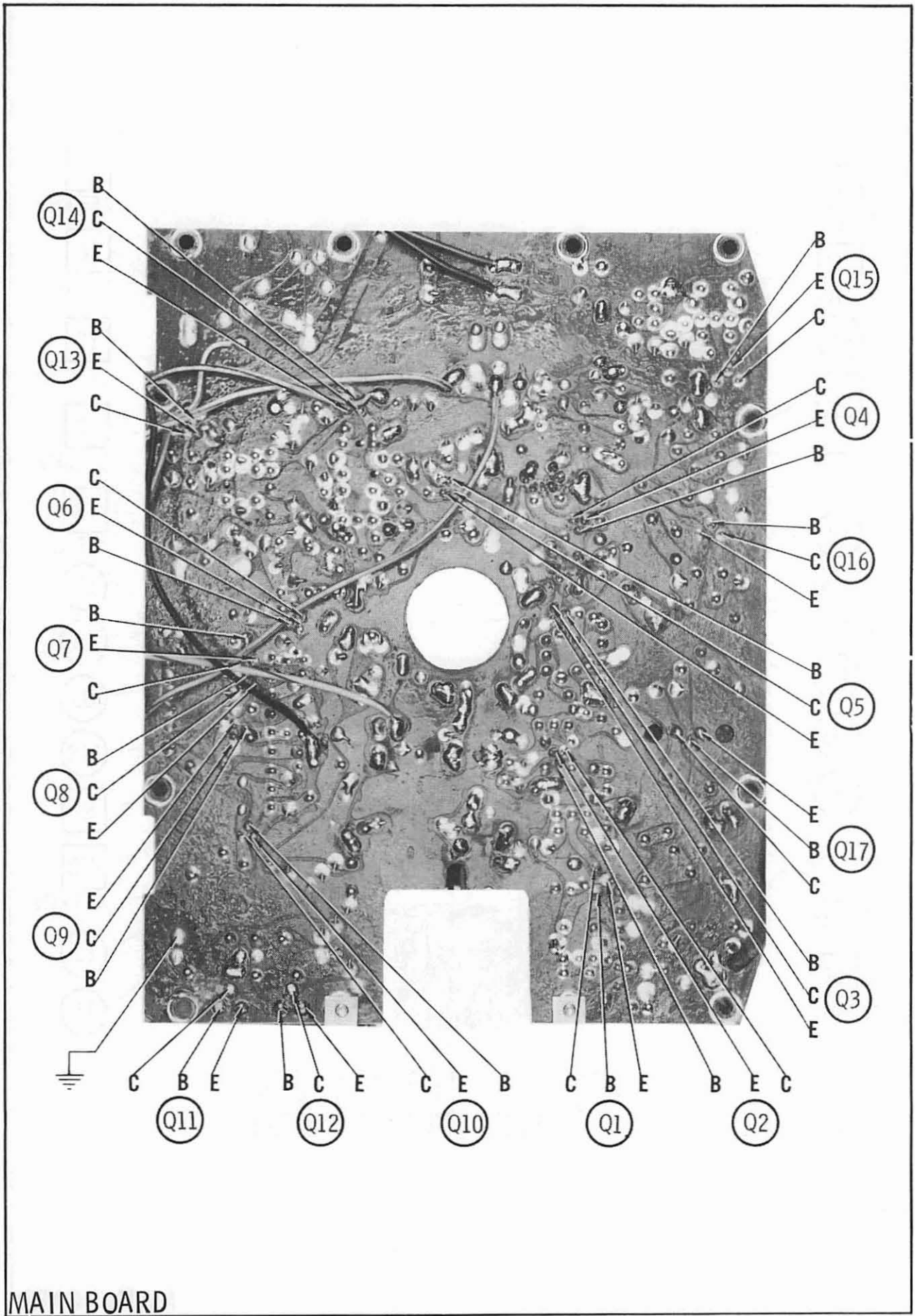
## TRANSMITTER

Connect an RF Wattmeter or 50-ohm 25-watt dummy load to antenna connector. Adjustments are made with 14-volt DC input.

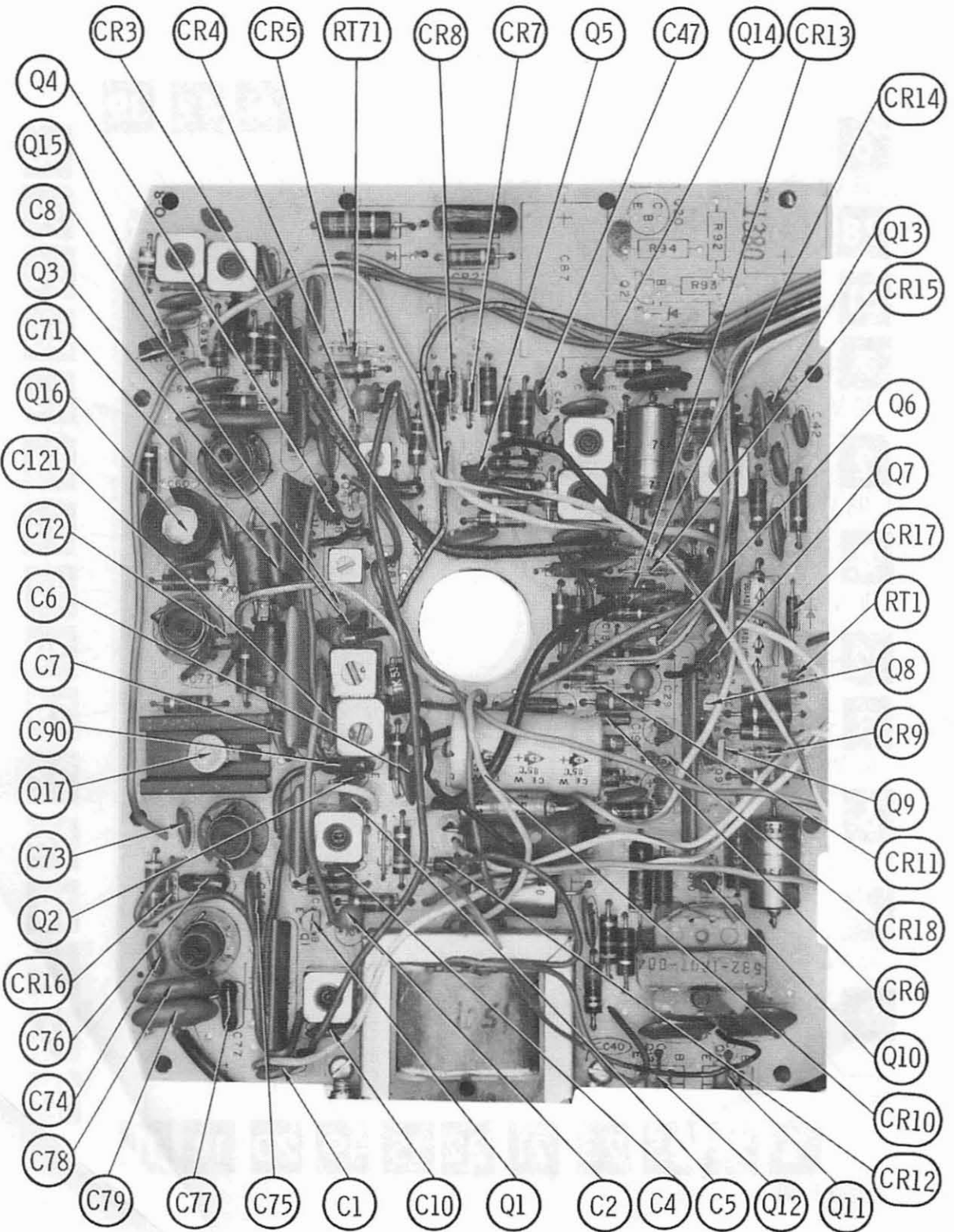
INDICATOR	ADJUST	REMARKS
BUFFER, DRIVER, FINAL RF Wattmeter or dummy load and RF VTVM.	T10, T11, T12, T13	Connect wattmeter to antenna connector. Channel Selector to Ch. 12. Key transmitter. Adjust for maximum.
FINAL INPUT POWER 0-1 A DC Milliammeter	L6, L7	Insert meter between emitter of Q17 and ground. Key transmitter. Adjust for no more than 5 watts DC input. Adjust L6 for MINIMUM current.



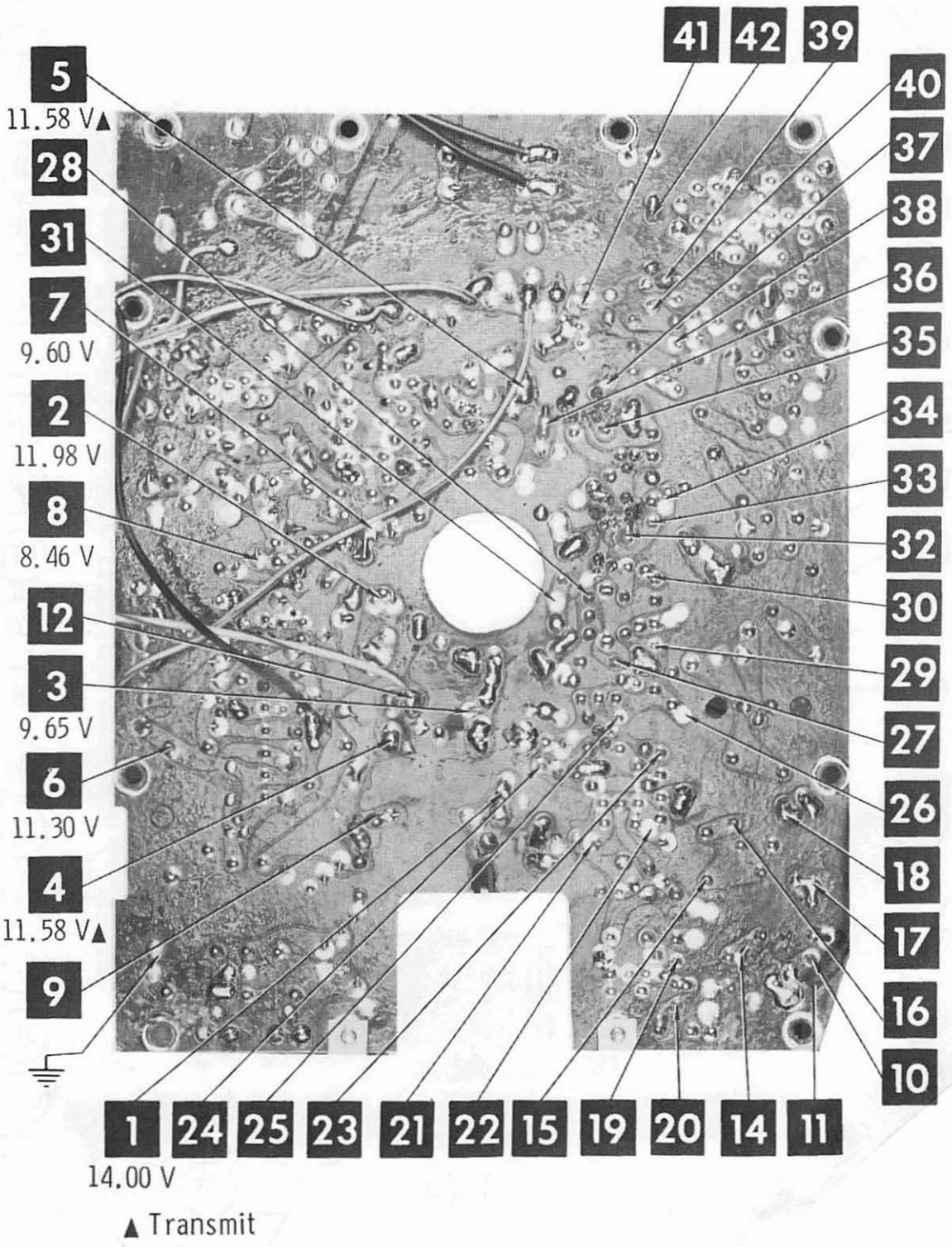
MAIN BOARD



MAIN BOARD

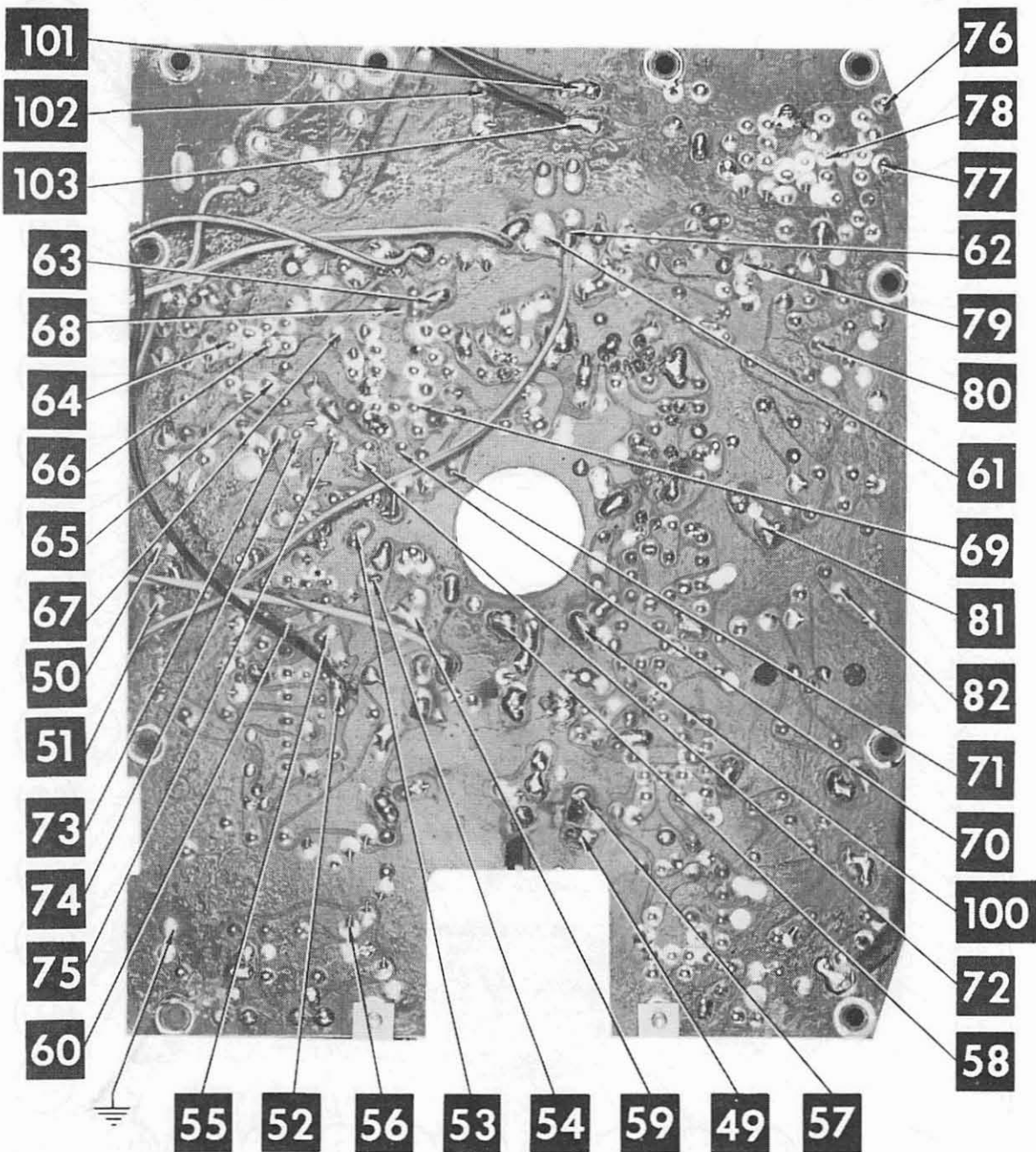


MAIN BOARD



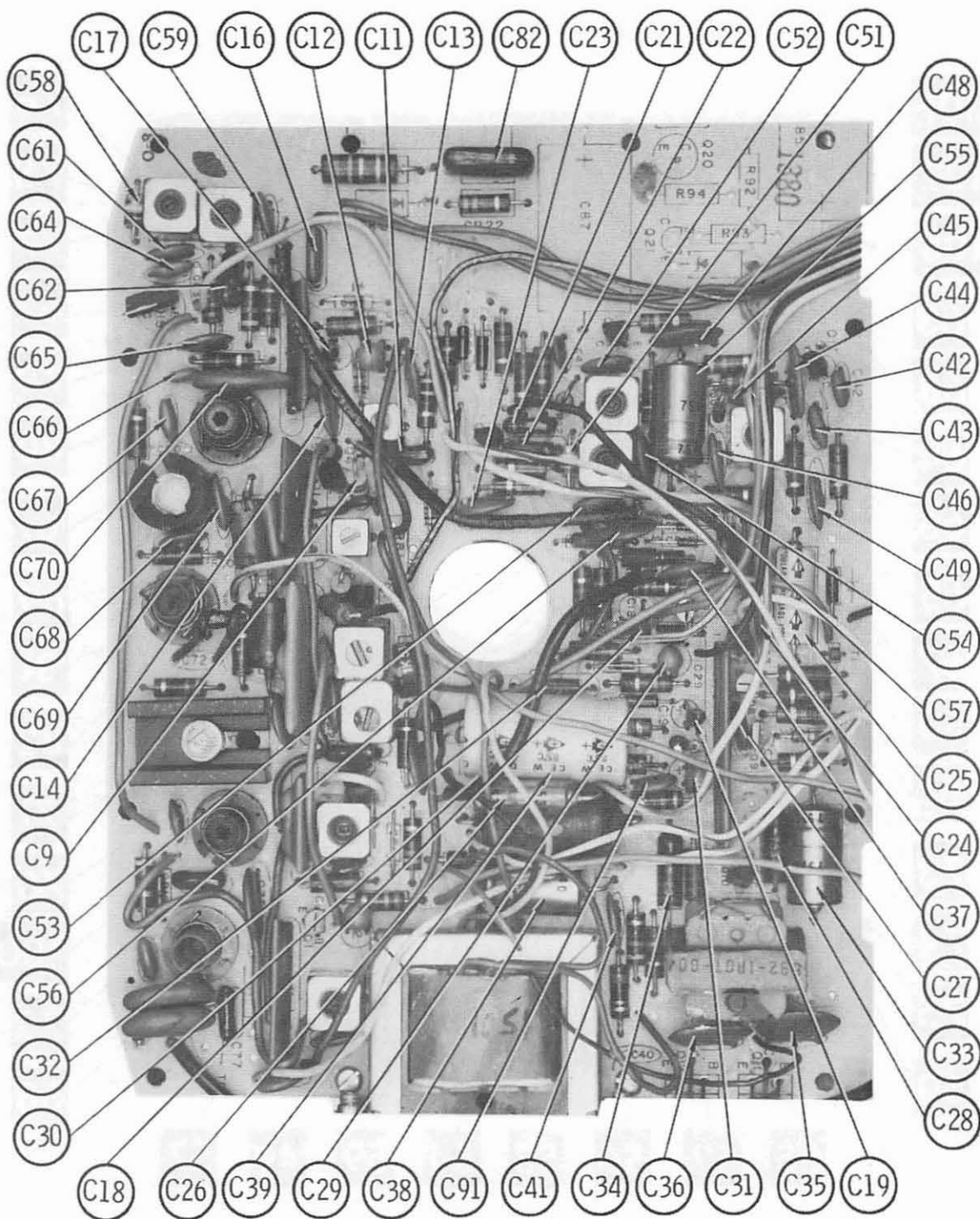
**MAIN BOARD**



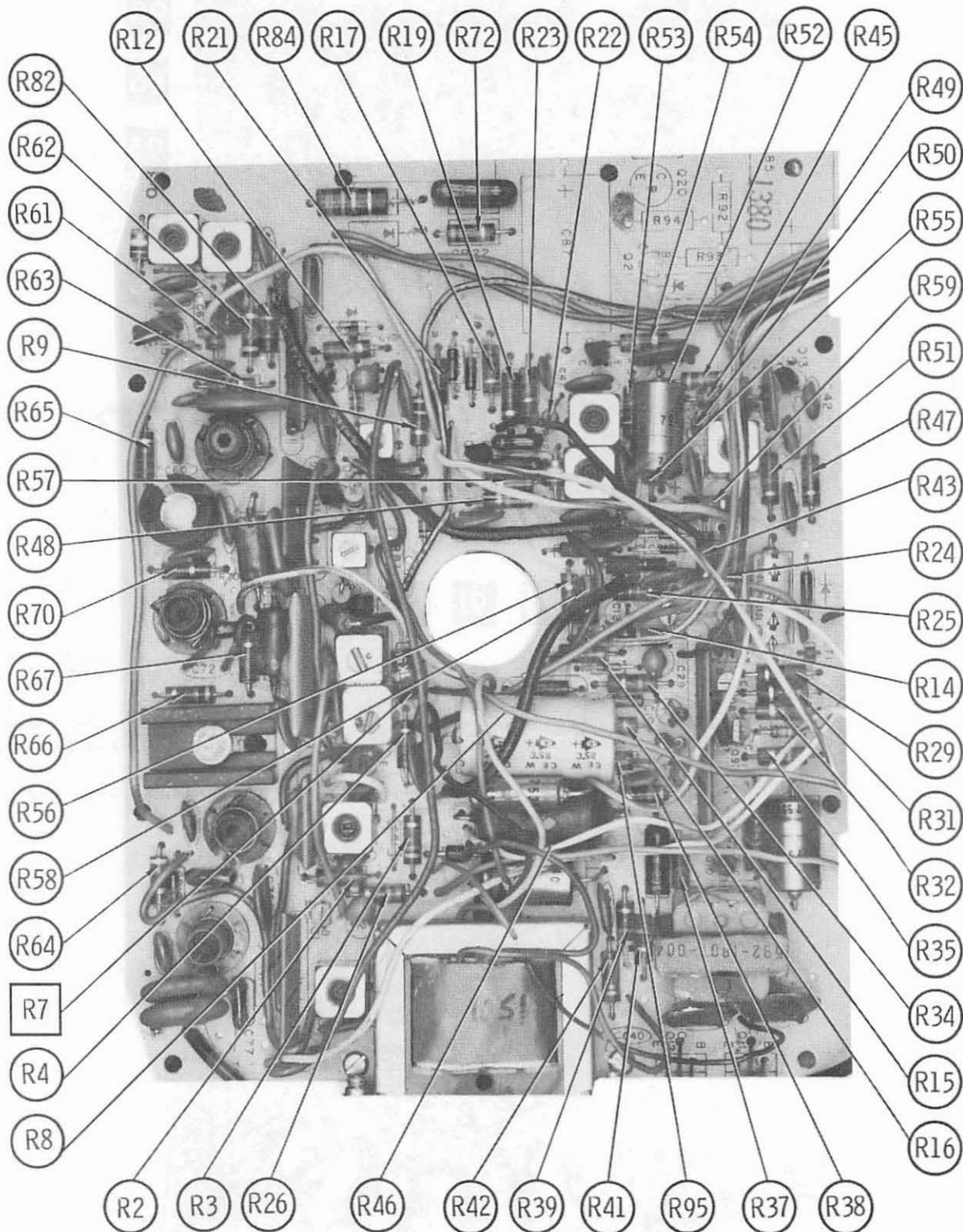


JOHNSON MODEL MESSENGER 130A

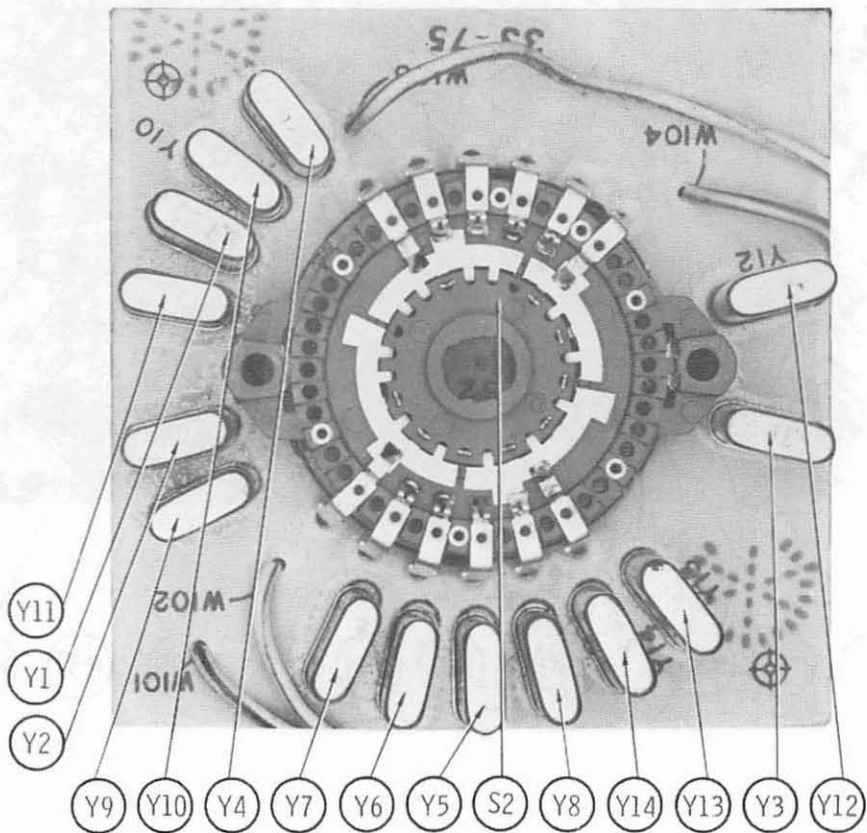
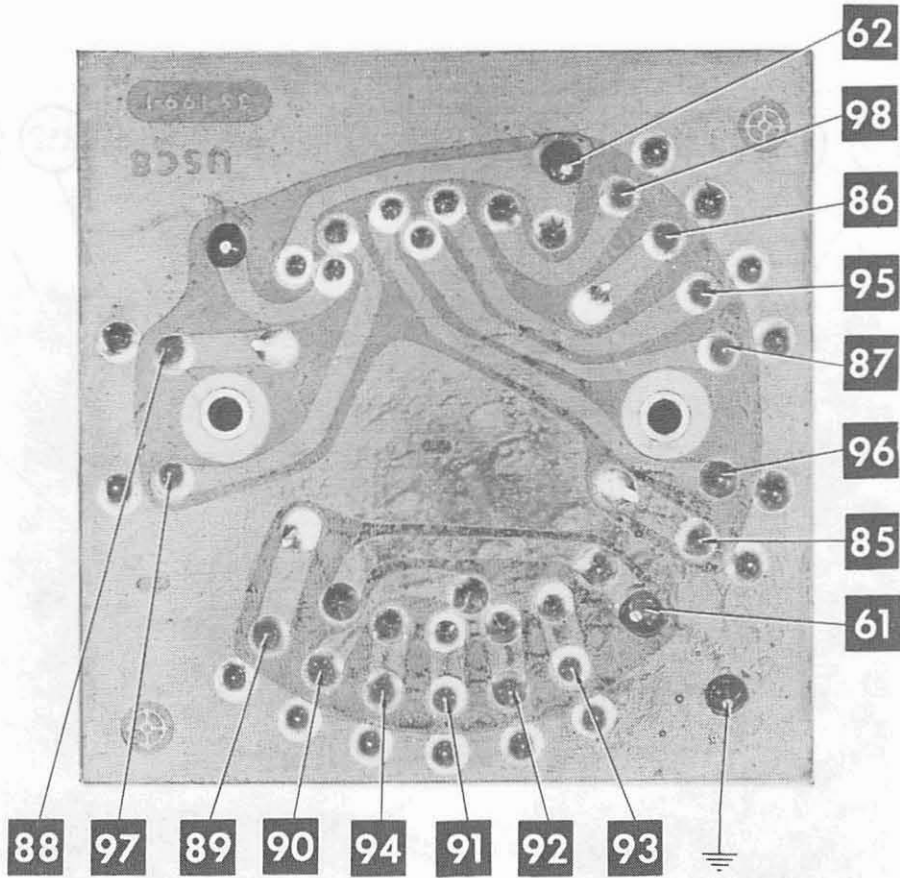
MAIN BOARD



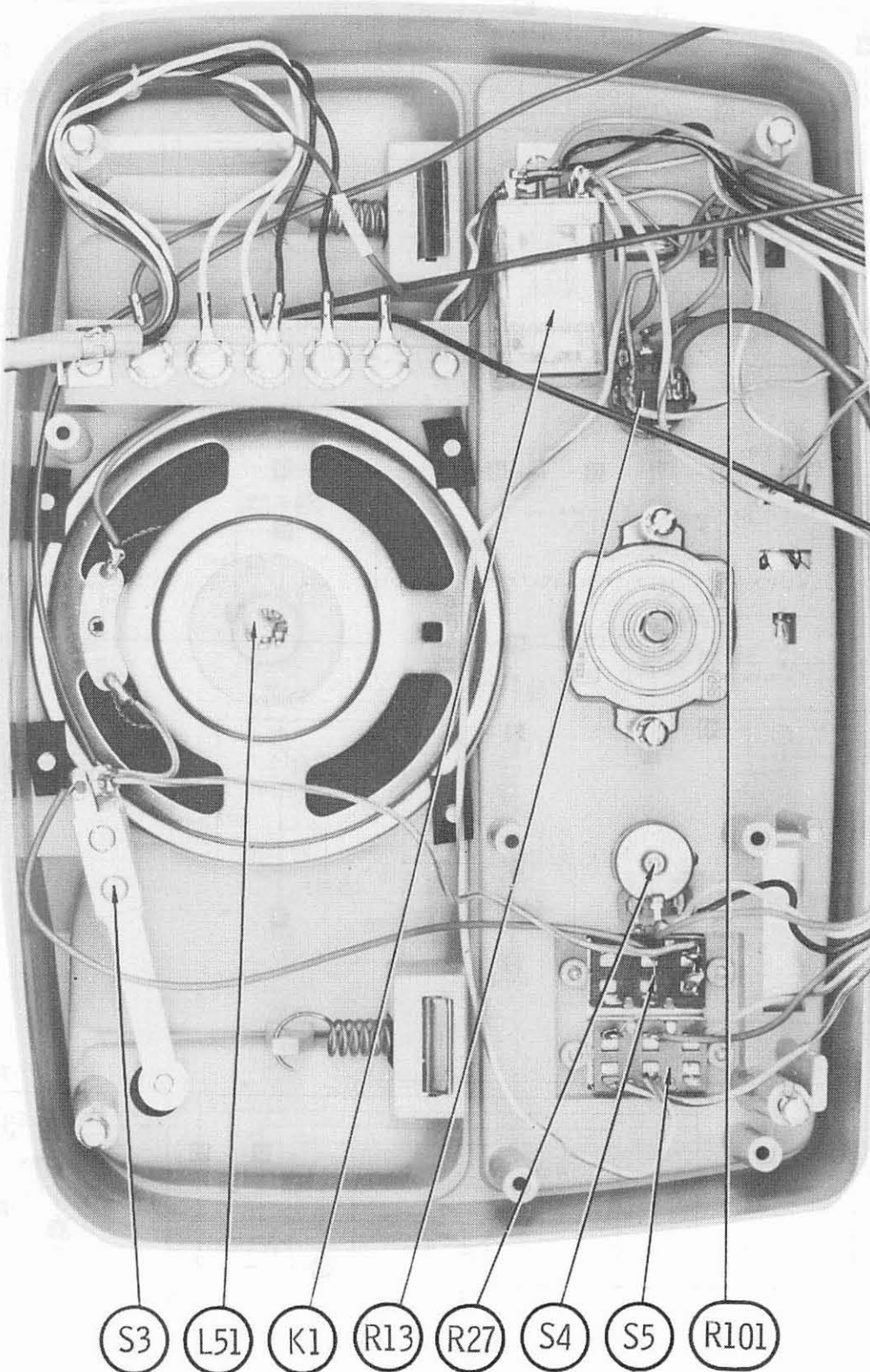
MAIN BOARD



MAIN BOARD

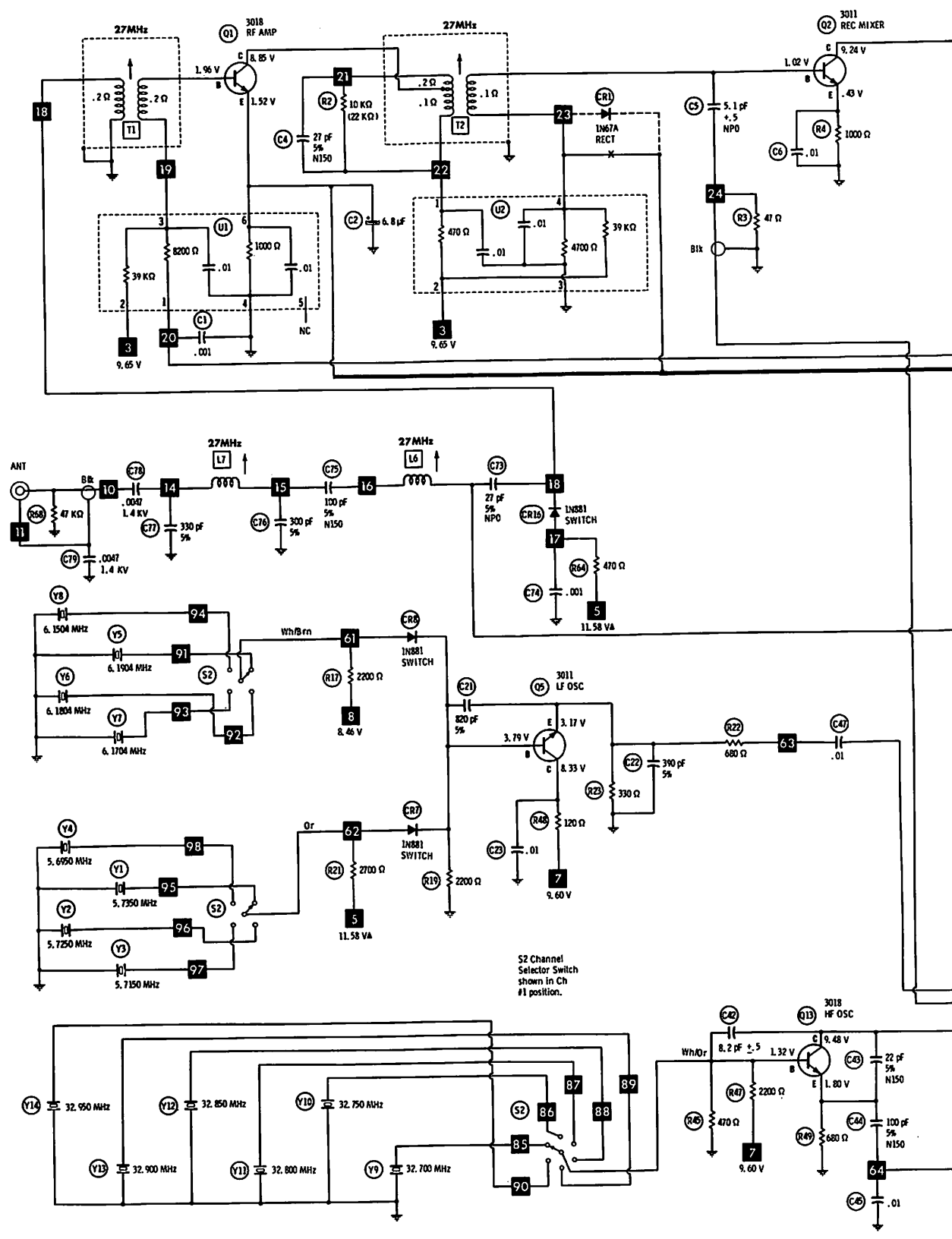


**CRYSTAL BOARD**

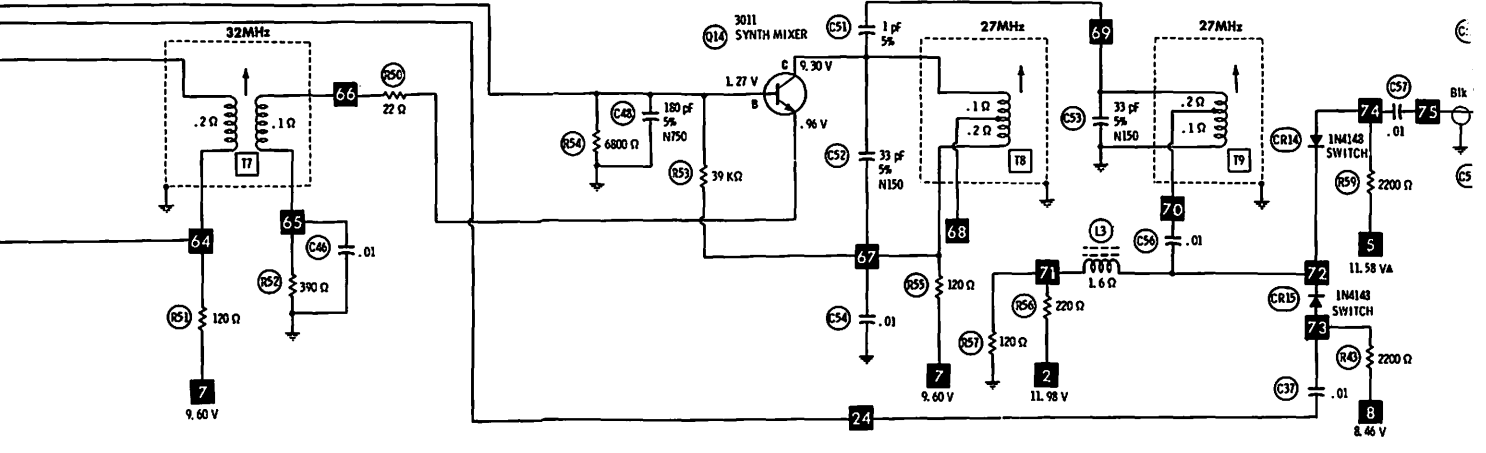
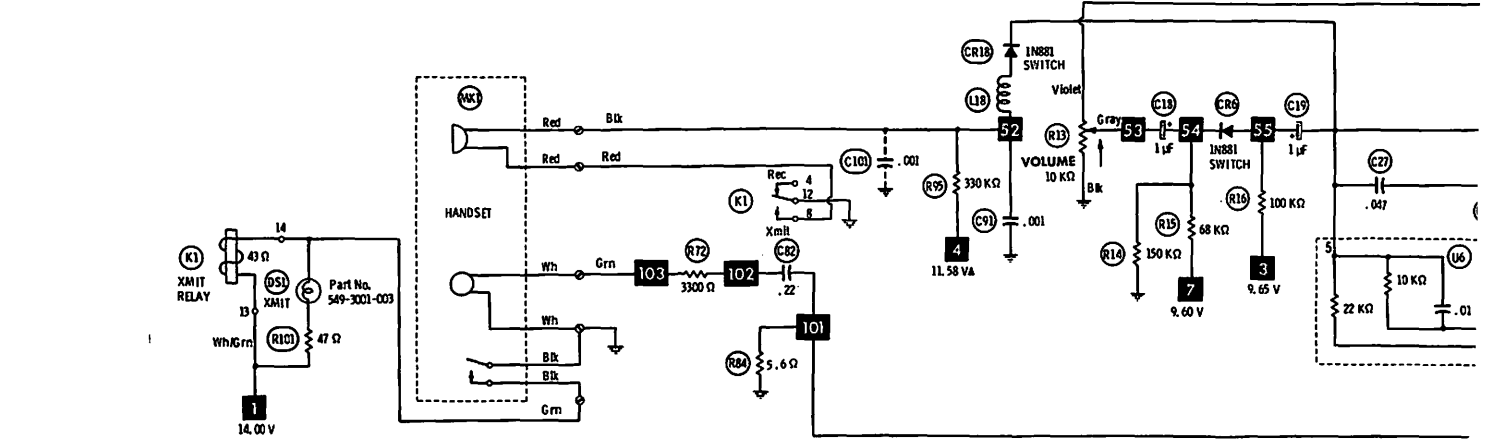
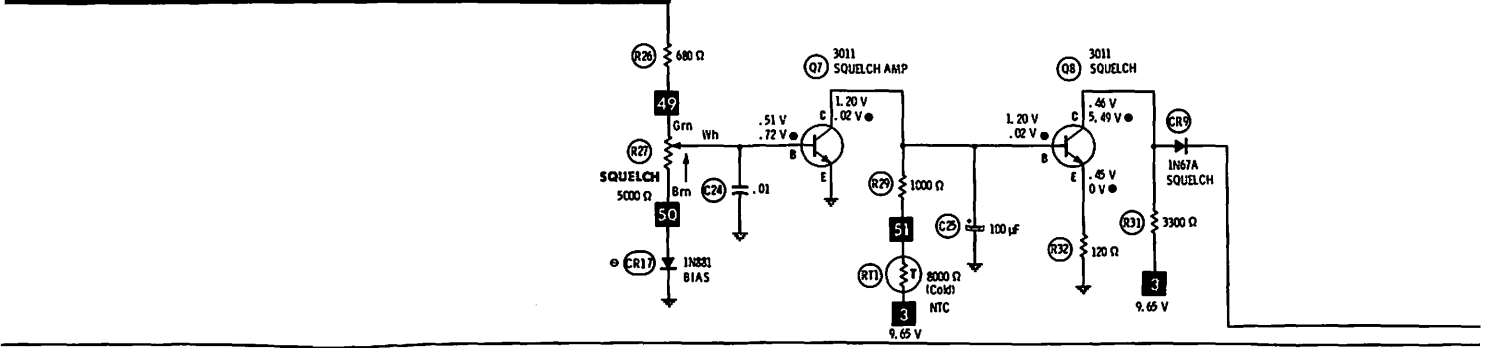
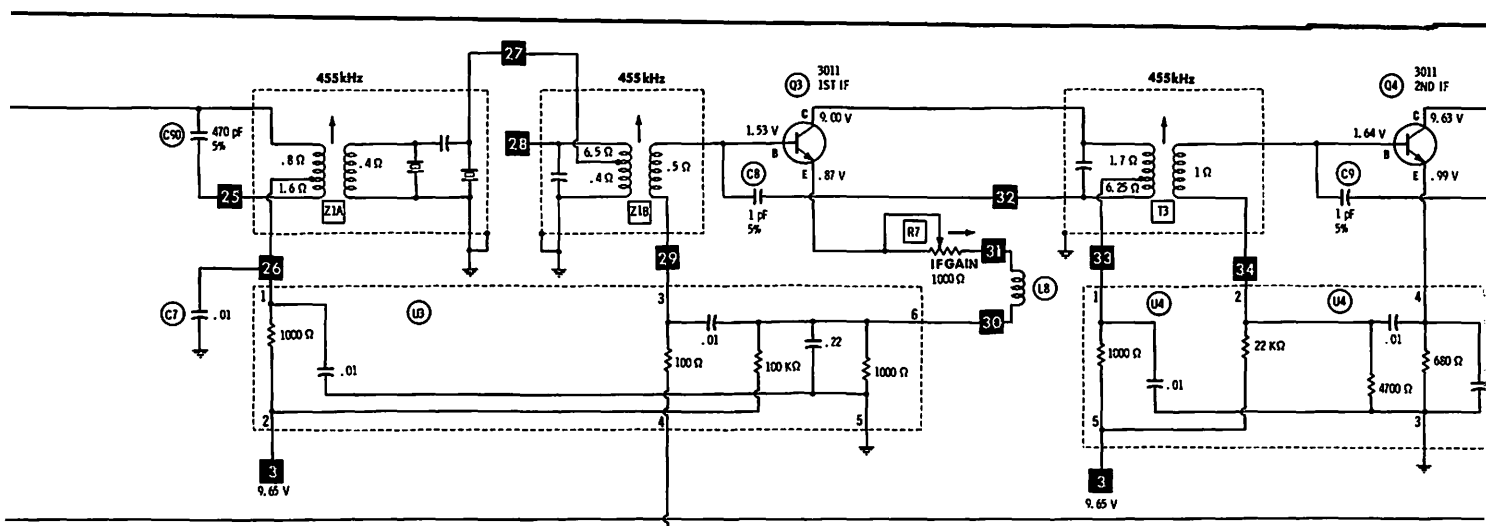


- S3
- L51
- K1
- R13
- R27
- S4
- S5
- R101

CABINET FRONT-REAR VIEW



A PHOTOFAC STANDARD NOTATION SCHEMATIC  
 WITH CIRCUITRACE<sup>®</sup>  
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## PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

### CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM No.	FUNCTION	RESIST-ANCE	REPLACEMENT DATA				
			MFGR. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	MALLORY PART No.	TRW PART No.
R7	IF Gain Volume/Power Switch Squelch	1000	562-0019-102	T-1000	C-102	MTC13L1	X201R102B
R13		10K	562-0016-004				
R27		5000	562-0002-011				

### RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		ITEM No.	RATING	REPLACEMENT DATA	
		WORKMAN PART No.	MFGR. PART No.			WORKMAN PART No.	MFGR. PART No.
RT1	8000 Cold NTC		569-3001-001	RT71	8000 Cold NTC		569-3001-001

### COILS (RF-IF)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
L2	RF Choke (20mH)	542-8001-011			
L3	RF Choke (20uH)	542-3002-002			
L4	RF Choke (13uH)	542-3003-001		6152	
L5	RF Choke (13uH)	542-3003-001		72F125AP	
L6	Final Tank (27MHz)	542-1005-010		72F125AP	
L7	Pi Filter (27MHz)	542-1005-004			
L18	RF Choke (20uH)	542-3002-002		6152	
T1	Rec Ant (27MHz)	592-5015-001			
T2	Rec RF (27MHz)	592-5015-002			
T3	IF (455kHz)	592-5020-004		8811	
T4	IF (455kHz)	592-5020-004		8811	
T7	Synth Osc (32MHz)	592-5015-006			
T8	Synth Mixer (27MHz)	592-5015-005			
T9	Harmonic Suppressor (27MHz)	592-5015-005			
T10	Harmonic Suppressor (27MHz)	592-5015-005			
T11	Harmonic Suppressor (27MHz)	592-5015-005			
T12	Xmit Amp (27MHz)	592-5014-001			
T13	Xmit Driver (27MHz)	592-5014-002			
Z1A	IF (455kHz)	532-1004-001			
Z1B	IF (455kHz)				





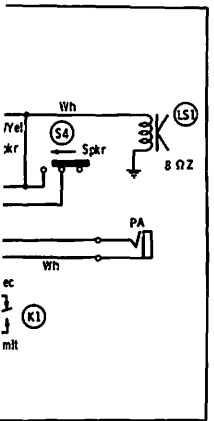
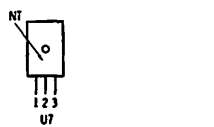
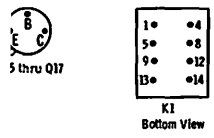
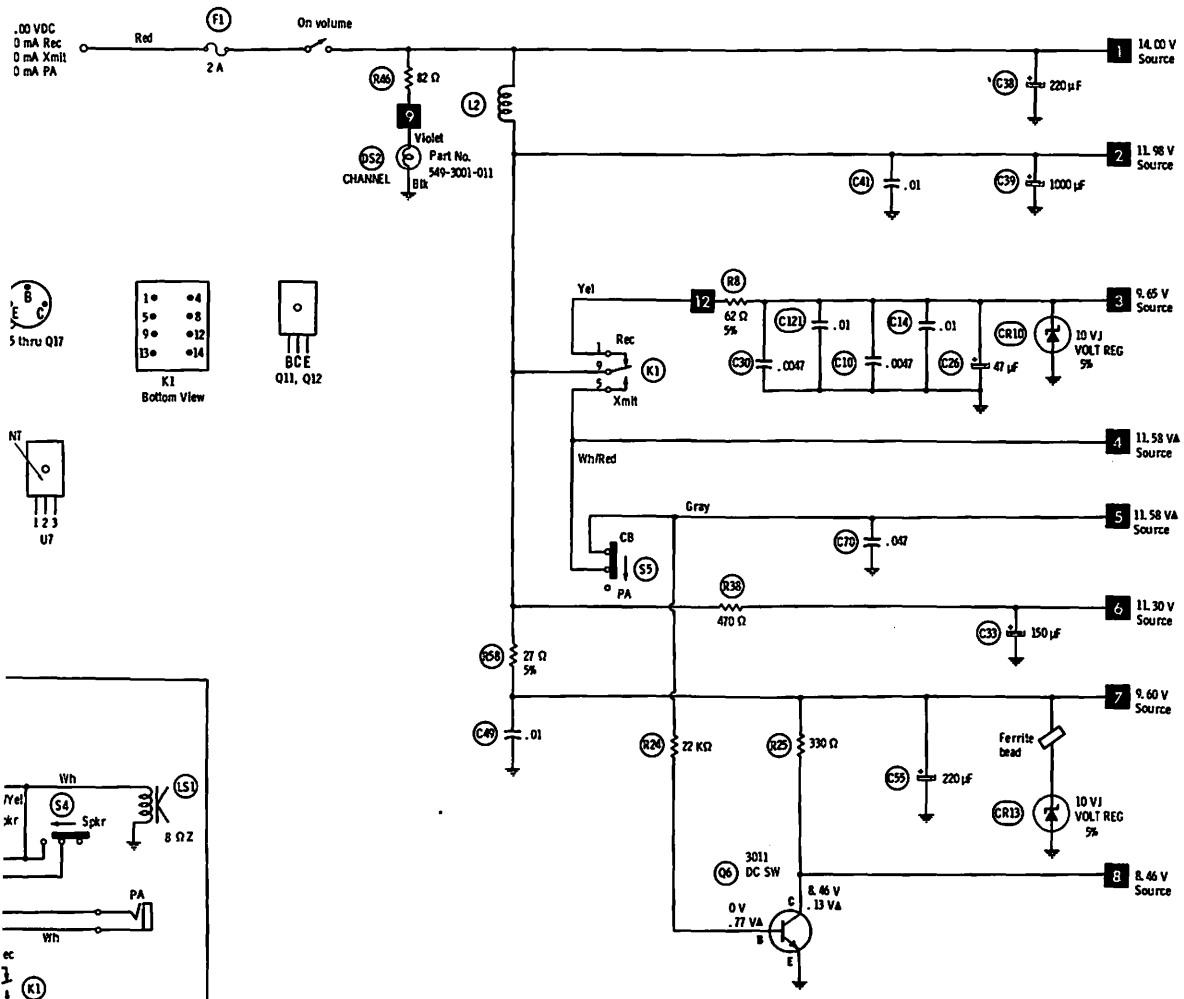
# PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

## CAPACITORS

ITEM No.	RATING	MFR. PART No.	REPLACEMENT DATA					
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.		
C1	.001	510-3216-270	DD-102		GP210	10TS-D10		
C4	27 5% N150				*	10TCP-Q27		
C5	5.1 ±.5 NPO					10TCC-V50		
C6	.01			DC-103	GP10000	MAG5011	2SS-S10	
C7	.01			DC-103	GP10000	MAG5011	2SS-S10	
C8	1 5%					CN0510	10TCC-V10	
C9	1 5%					CN0510	10TCC-V10	
C10	.0047						10TS-D47	
C11	150 5%			DTN-150	N150	CN7315	10TCU-T15	
C13	.01			DC-103	GP10000	MAG5011	2SS-S10	
C14	.01			DC-103	GP10000	MAG5011	2SS-S10	
C16	.01 5%			DC-103	GP10000	MAG5011	2SS-S10	
C21	820 5%				CD19FD821J03	SX382	424ME200J501	
C22	390 5%				CD15FD391J03	SX339	424ME390J501	
C23	.01			DC-103	GP10000	MAG5011	2SS-S10	
C24	.01			DC-103	GP10000	MAG5011	2SS-S10	
C27	.047			DC-503	MGP05	MAG5015	TGL-S50	
C30	.001			DD-102		GP210	10TS-D10	
C35	.022					GP120	56A-S20	
C36	.022					GP120	56A-S20	
C37	.01			DC-103	GP10000	MAG5011	2SS-S10	
C41	.01			DC-103	GP10000	MAG5011	2SS-S10	
C42	8.2 N750		510-3216-220			*	10TCP-Q22	
C43	22 5% N150			510-3216-101			*	10TCP-T10
C44	100 5% N150							2SS-S10
C45	.01				DC-103	GP10000	MAG5011	2SS-S10
C46	.01				DC-103	GP10000	MAG5011	2SS-S10
C47	.01 16V				DC-103	GP10000	MAG5011	2SS-S10
C48	180 5% N750				DTN-180			10TCU-T18
C49	.01				DC-103	GP10000	MAG5011	2SS-S10
C51	1 5%						CN0510	10TCC-V10
C52	33 5% N150			510-3216-330			*	10TCP-Q33
C53	33 5% N150		510-3216-330			*	10TCP-Q33	
C54	.01			DC-103	GP10000	MAG5011	2SS-S10	
C56	.01			DC-103	GP10000	MAG5011	2SS-S10	
C57	.01			DC-103	GP10000	MAG5011	2SS-S10	
C58	1 5%					CN0510	10TCC-V10	
C59	33 5% N150	510-3216-330			*	10TCP-Q33		
C61	33 5% N750		DTN-33	N33	CN7433	10TCU-Q33		
C62	.001 5%			CD19FD102J03	SX210	424ME1001J501		
C64	22 5% NPO		DTZ-22	NPO22	CN0422	10TCC-Q22		
C65	.01		DC-103	GP10000	MAG5011	2SS-S10		
C66	12 5% N750				CN7412	10TCU-Q12		
C67	.001		DD-102		GP210	10TS-D10		
C68	43 5% N150	510-3216-430			*			
C69	.0047					10TS-D50		
C70	.047		DC-503	MGP05	MAG5015	TGL-S50		
C71	.047 50V			DPMS2S47	ENF1A147	1PB-S47		
C72	.001 5%			CD19FD102J03	SX210	424ME1001J501		
C73	27 5% NPO		DTZ-68	NPO68	CN0468	10TCC-Q68		
C74	.001		DD-102		GP210	10TS-D10		
C75	100 5% N150	510-3216-101			*	10TCP-T10		
C76	300 5%			CD15FD301J03	SX330	424ME300J501		
C77	330 5%			CD15FD331J03	SX333	424ME330J501		
C78	.0047 1.4KV	510-3001-472				1PB-P22		
C79	.0047 1.4KV	510-3001-472				424ME4700J501		
C82	.22			DPMS2P22	ENF1A022	10TS-D10		
C90	470			CD15FD471J03	SX347	424ME4700J501		
C91	.001		DD-102		GP210	10TS-D10		
C96	56			CD6ED560J03	SX456	424MC56R0J501		
C121	.01		DC-103	GP10000	MAG5011	2SS-S10		

\* Not normally in distributor's stock. Available thru distributor on order to manufacturer.



CRYSTAL CHART

CH	HF OSC	LF REC	LF XMIT
1	Y9	Y5	Y1
2	Y9	Y6	Y2
3	Y9	Y7	Y3
4	Y9	Y8	Y4
5	Y10	Y5	Y1
6	Y10	Y6	Y2
7	Y10	Y7	Y3
8	Y10	Y8	Y4
9	Y11	Y5	Y1
10	Y11	Y6	Y2
11	Y11	Y7	Y3
12	Y11	Y8	Y4
13	Y12	Y5	Y1
14	Y12	Y6	Y2
15	Y12	Y7	Y3
16	Y12	Y8	Y4
17	Y13	Y5	Y1
18	Y13	Y6	Y2
19	Y13	Y7	Y3
20	Y13	Y8	Y4
21	Y14	Y5	Y1
22	Y14	Y6	Y2
23	Y14	Y8	Y4

-X- Circuitry not used in some versions  
 --- Circuitry used in some versions  
 ⊙ See parts list  
 ⊕ Ground  
 rfm Chassis  
 Measurements with switching as shown unless noted:  
 ● Squelch fully clockwise  
 ▲ Transmit  
 Supply voltage maintained as shown at input.  
 Voltages measured with digital meter, no signal.  
 Controls adjusted for normal operation.  
 Arrow at control indicates direction of advance.  
 Terminal identification may not be found on unit.  
 Resistors are 1/2W or less, 10% unless noted.  
 Value in ( ) used in some versions.

**JOHNSON MODEL MESSENGER 130A**

# PARTS LIST AND DESCRIPTION

(When ordering parts, state Model, Part Number, and Description.)

## SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA							
			GENERAL ELECTRIC PART No.	INTERNATIONAL RECTIFIER PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.
CR1	1N67A	523-1500-067	1N34AS	1N34A	PTC207	HEPR9134	RE 47	SK3087	RT-200	ECG109
CR3	1N67A	523-1500-067	1N34AS	1N34A	PTC207	HEPR9134	RE 47	SK3087	RT-200	ECG109
CR4	1N67A	523-1500-067	1N34AS	1N34A	PTC207	HEPR9134	RE 47	SK3087	RT-200	ECG109
CR5	1N4148	523-1500-883	GE-300	D200	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177
CR6	1N881	523-1500-881	GE-504A	8D4	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116
CR7	1N881	523-1500-881	GE-504A	8D4	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116
CR8	1N881	523-1500-881	GE-504A	8D4	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116
CR9	1N67A	523-1500-067	1N34AS	1N34A	PTC207	HEPR9134	RE 47	SK3087	RT-200	ECG109
CR10	10VJ (10 Volts	523-2503-100 +5% Zener)	GEZD-10		ZB10B				RT-241	ECG140
CR11	1N4148	523-1500-883	GE-300	D200	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177
CR12	1N4003	523-0501-002	GE-504A	8D4	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116
CR13	10VJ (10 Volts	523-2503-100 +5% Zener)	GEZD-10		ZB10B				RT-241	ECG140
CR14	1N4148	523-1500-883	GE-300	D200	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177
CR15	1N4148	523-1500-883	GE-300	D200	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177
CR16	1N881	523-1500-881	GE-504A	8D4	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116
CR17	1N881	523-1500-881	GE-504A	8D4	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116
CR18	1N4148	523-1500-883	GE-300	D200	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177
Q1	3018	576-0003-018	GE-11	TR-24	PTC115	HEPS0016	RE 9	SK3018	RT-108A	ECG107
Q2	3011	576-0003-011	GE-20	TR-24	PTC139	HEPS0015	RE 13	SK3038	RT-172	ECG123A
Q3	3011	576-0003-011	GE-20	TR-24	PTC139	HEPS0015	RE 13	SK3038	RT-172	ECG123A
Q4	3011	576-0003-011	GE-20	TR-24	PTC139	HEPS0015	RE 13	SK3038	RT-172	ECG123A
Q5	3011	576-0003-011	GE-20	TR-24	PTC139	HEPS0015	RE 13	SK3038	RT-172	ECG123A
Q6	3011	576-0003-011	GE-20	TR-24	PTC139	HEPS0015	RE 13	SK3038	RT-172	ECG123A
Q7	3011	576-0003-011	GE-20	TR-24	PTC139	HEPS0015	RE 13	SK3038	RT-172	ECG123A
Q8	3011	576-0003-011	GE-20	TR-24	PTC139	HEPS0015	RE 13	SK3038	RT-172	ECG123A
Q9	3011	576-0003-011	GE-20	TR-24	PTC139	HEPS0015	RE 13	SK3038	RT-172	ECG123A
Q10	3011	576-0003-011	GE-20	TR-24	PTC139	HEPS0015	RE 13	SK3038	RT-172	ECG123A
Q11	20294 MJE2480	576-0002-029 (10)	GE-66	TR-76 TR-92	PTC167 PTC167		RE 21	SK3054 SK3534	RT-197 RT-197	ECG241 ECG241
Q12	20294 MJE2480	576-0002-029 (10)	GE-66	TR-76 TR-92	PTC167 PTC167		RE 21	SK3054 SK3534	RT-197 RT-197	ECG241 ECG241
Q13	3018	576-0003-018	GE-11	TR-24	PTC115	HEPS0016	RE 9	SK3018	RT-108A	ECG107
Q14	3011	576-0003-011	GE-20	TR-24	PTC139	HEPS0015	RE 13	SK3038	RT-172	ECG123A
Q15	4035	576-0004-035	GE-219	TR-64	PTC179	HEPS3013	RE 79	SK3047	RT-186	ECG195A
Q16	4004	576-0004-004	GE-219	TR-65	PTC179	HEPS3001	RE 79	SK3048	RT-182	ECG195A
Q17	4005	576-0004-005	GE-219	TR-65	PTC158	HEPS3001	RE 79	SK3048	RT-182	ECG195A

(1) Used in some versions.  
(10) Rating, 60 watts @ 4.0 amps.

## ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA			
		MFR. PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	6.8 35V	510-2045-689		TDC685M035FL	SD35-6R89
C12	6.8 35V	510-2045-689		TDC685M035FL	SD35-6R89
C17	1 35V	510-2045-109		TDC105M035EL	SD35-19
C18	1 35V	510-2045-109		TDC105M035EL	SD35-19
C19	1 35V	510-2045-109		TDC105M035EL	SD35-19
C25	100 10V	510-4003-005	WBR100-16	MTA100E15	TVA-1160
C26	47 25V	510-4006-012	PC50-25	VTT47E25	EV-1326
C28	22 15V	510-2003-220	PC25-25	VTT22A16	EV-1224
C29	6.8 35V	510-2045-689		TDC685M035FL	SD35-6R89
C31	6.8 35V	510-2045-689		TDC685M035FL	SD35-6R89
C32	1 35V	510-2005-109		TDC105M035EL	SD35-19
C33	150 25V	510-4006-006	PC150-25	TT25X150	EV-1235
C34	56 6V	510-2002-560		TDC566	SD6-569
C38	220 16V	510-4006-004	WBR250-16	MTA250F15	TVA-1161
C39	1000 16V	510-4006-005	PC1000-16	VTT1000L16	EV-1260
C55	220 16V	510-4006-004	WBR250-16	MTA250F15	TVA-1161

# PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

## TRANSFORMER (Driver)

ITEM No.	TURNS RATIO			REPLACEMENT DATA			NOTES
	PRI.	SEC. 1	SEC. 2	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T5	2	1		592-1007-004			

## TRANSFORMER (Audio Output)

ITEM No.	IMPEDANCE		REPLACEMENT DATA			NOTES
	PRI.	SEC.	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T6	50	8	592-1013-006			

## SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
LS1	3 5/8" PM 8 ohms	589-1003-002	3A05Z8R	

## FUSE DEVICES

ITEM No.	DESCRIPTION	REPLACEMENT DATA						
		PART No.		BUSS PART No.		LITTELFUSE PART No.		WORKMAN PART No.
		DEVICE	HOLDER	DEVICE	HOLDER	DEVICE	HOLDER	DEVICE
F1	2 Amp Fast Acting	534-0003-024		AGC3	HDJ	312002	150143	FG2-2

JOHNSON MODEL MESSENGER 130A

## PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

### CRYSTALS

ITEM No.	CRYSTAL FREQUENCY IN MHz	MFR. PART No.	CTS KNIGHTS PART No.	CHANNEL	ITEM No.	CRYSTAL FREQUENCY IN MHz	MFR. PART No.	CTS KNIGHTS PART No.	CHANNEL
Y1	5.7350	519-0023-104	JB20W5.7350	1,5,9,13,17,21	Y8	6.1504	519-0023-105	JC20W6.1504	4,8,12,16,20,23
Y2	5.7250	519-0023-103	JB20W5.7250	2,6,10,14,18,22	Y9	32.700	519-0024-001	JA15W32.700	1,2,3,4
Y3	5.7150	519-0023-102	JB20W5.7150	3,7,11,15,19	Y10	32.750	519-0024-002	JA15W32.750	5,6,7,8
Y4	5.6950	519-0023-101	JB20W5.6950	4,8,12,16,20,23	Y11	32.800	519-0024-003	JA15W32.800	9,10,11,12
Y5	6.1904	519-0023-108	JC20W6.1904	1,5,9,13,17,21	Y12	32.850	519-0024-004	JA15W32.850	13,14,15,16
Y6	6.1804	519-0023-107	JC20W6.1804	2,6,10,14,18,22	Y13	32.900	519-0024-005	JA15W32.900	17,18,19,20
Y7	6.1704	519-0023-106	JC20W6.1704	3,7,11,15,19,23	Y14	32.950	519-0024-006	JA15W32.950	21,22,23

### MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
K1	Relay	567-0020-001	(12V) 43 ohms
S2	Switch	583-9004-012	Channel Selector
		583-2009-211	(Switch Wafer)
S4	Switch	583-3001-003	Handset/Speaker
S5	Switch	583-3001-003	PA-CB
U1	Printed Circuit Unit	544-0003-011	RF Amp
U2	Printed Circuit Unit	544-0002-011	1st Mixer
U3	Printed Circuit Unit	544-0003-043	1st IF
U4	Printed Circuit Unit	544-0002-014	2nd IF
U5	Printed Circuit Unit	544-0002-015	Noise Limit
U6	Printed Circuit Unit	544-0002-026	Audio
	Printed Circuit Board	035-0199-001	Channel Selector Board
U7	Printed Circuit Board	035-0181-015	Main
	Hand Set Board	586-1007-005	Terminal Board
	Hand Set Assembly	023-3267-001	

### CABINETS & CABINET PARTS (When ordering specify model, chassis & color)

ITEM	PART No.	ITEM	PART No.
Case, Rear	032-0395-001	Handset Clamp	017-1865-001
Case, Front	032-0394-001	Handset Resonator	023-2858-001
Upper Overlay	559-2079-002	Transmitter Cup	589-9002-012
Knob, Control	547-0008-001	Mouth Piece	589-9002-013
Knob, Channel Selector	547-0008-005		

### ACCESSORIES

ITEM	MFR. PART No.	REMARKS
DC Power Cord	023-2780-003	

### WIRING DATA

General-use Hook-up Wire .....	Use BELDEN No. 8530 (Solid) Available in 12 Colors 8524 (Stranded) Available in 12 Colors
Power Cord, 2-Wire .....	Use BELDEN No. 17106 (Plastic) or 17126 (Rubber) -6 feet 17109 (Plastic) or 17129 (Rubber) -9 feet
Shielded Antenna Lead .....	Use BELDEN No. 8214 Lowest-loss (RG-8/U Type) 8237 Low-loss (RG-8/U) 8240 (Solid) Miniature (RG-58/U) 8259 (Stranded) Miniature (RG-58A/U)
Coiled Microphone Cable .....	Use BELDEN No. 8497 3-Conductor (1 shielded for Press-to-Talk) Neoprene 8491 4-Conductor (2 shielded, 2 unshielded) Neoprene



# PHOTOFACT<sup>®</sup> with

# CIRCUITRACE<sup>®</sup>

For Supplier Address See PHOTOFACT Index

### NOTE

Repair or adjustment of transmitter circuits must be under supervision of a person with first-or second-class radiotelephone license.

(Refer to FCC Rules and Regulations Part 95, Subpart C & D.)

The frequency of the transmitter should be checked periodically with a secondary frequency standard to insure proper and legal operation.

Best results will be obtained when adjusting the final RF output circuit if the antenna normally used is connected and the chassis is as nearly in the cabinet as possible.

Connect either 50-ohm dummy load or the normally used antenna system.



MODEL 13-857

### ALIGNMENT INSTRUCTIONS

Suggested Alignment Tools:	GC ELECTRONICS
L12 thru L16 .....	5000, 8290
L7 thru L9 .....	9300
L1 thru L6, L10, L11 .....	9440

MIDLAND MODEL 13-857

### RECEIVER

Connect an AC VTVM or AF Wattmeter across speaker voice coil. Adjustments made with 14-volt DC input. Adjust volume control to obtain suitable reading.

SIGNAL GENERATOR	GEN FREQ	CHANNEL	ADJUST	REMARKS
High side thru .01uF to base Q21, low side to ground.	455kHz, 1-00Hz @ 30% modulation.	Any	L14,L15, L16	Set generator output low enough to prevent AGC limiting. Adjust for maximum.
High side thru .01uF to antenna jack, low side to ground.	27.115MHz, 1000Hz @ 30% modulation.	CH13	L10,L11, L12,L13	Set generator output low enough to prevent AGC limiting. Adjust for maximum.

**HOWARD W. SAMS & CO., INC.** Indianapolis, Indiana 46206

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## RECEIVER ADJUSTMENTS

Connect an AC VTVM or AF Wattmeter across speaker voice coil.  
 These adjustments made with 14-volt DC input.  
 Adjust volume control to obtain a suitable reading.

SIGNAL GENERATOR	GEN FREQ	CHANNEL	ADJUST	REMARKS
SQUELCH RANGE High side thru .01 $\mu$ F to antenna jack, low side to ground.	27.115MHz, 1000Hz @ 30% modulation, output 200uV.	13	RV1	Set squelch control fully clockwise. Adjust so that squelch just breaks.
S METER	27.115MHz 1000Hz @ 30% modulation output 100uV.	13	RV3	Set S meter for a 9 reading.

## TRANSMITTER

Connect an RF Wattmeter or 50-ohm, 25-watt dummy load to antenna connector.  
 Adjustments made with 14-volt DC input.

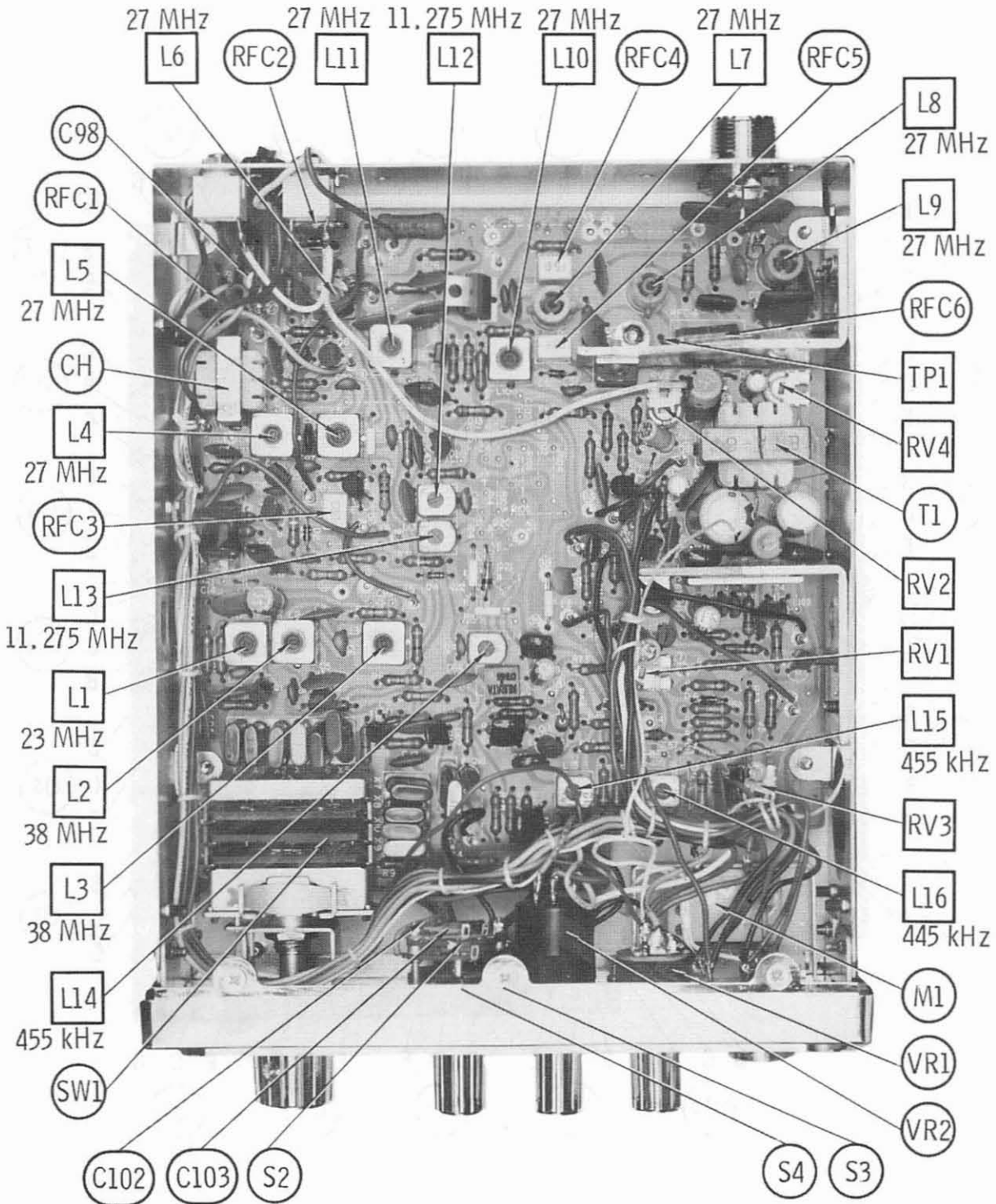
INDICATOR	ADJUST	REMARKS
OSCILLATOR, MIXER, BUFFER, DRIVER, FINAL RF Wattmeter	L1, L2, L3, L4, L5, L6, L7, L8, L9	Channel selector to Ch. 13. Key transmitter. Adjust for maximum.
FINAL INPUT POWER Remove jumper at TP1 and connect 0-1500DC milliammeter.	L9	Adjust for 5 watts. Current in final should not exceed 950mA.

## TRANSMITTER ADJUSTMENTS

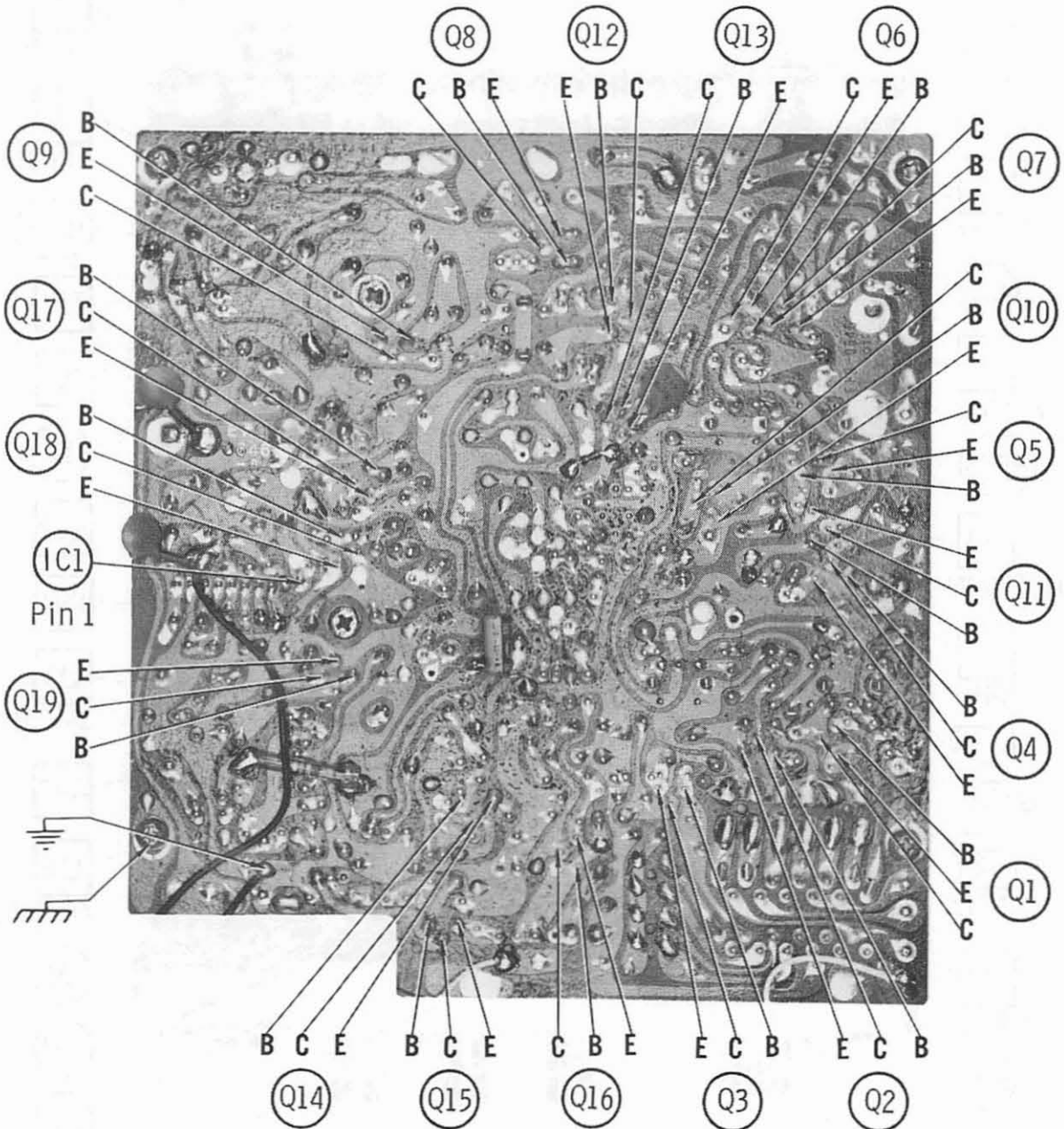
Connect an RF Wattmeter or 50-ohm, 25-watt dummy load to antenna connector.  
 Adjustments made with 14-volt DC input.

INDICATOR	ADJUST	REMARKS
AMC Modulation Meter connected to antenna jack.	RV2	Inject a 1000Hz 20mV audio signal at mic input. Key transmitter. Adjust for 90% modulation maximum.
RF PANEL METER RF Wattmeter	RV4	Key transmitter. Adjust so that panel RF meter agrees with RF wattmeter.

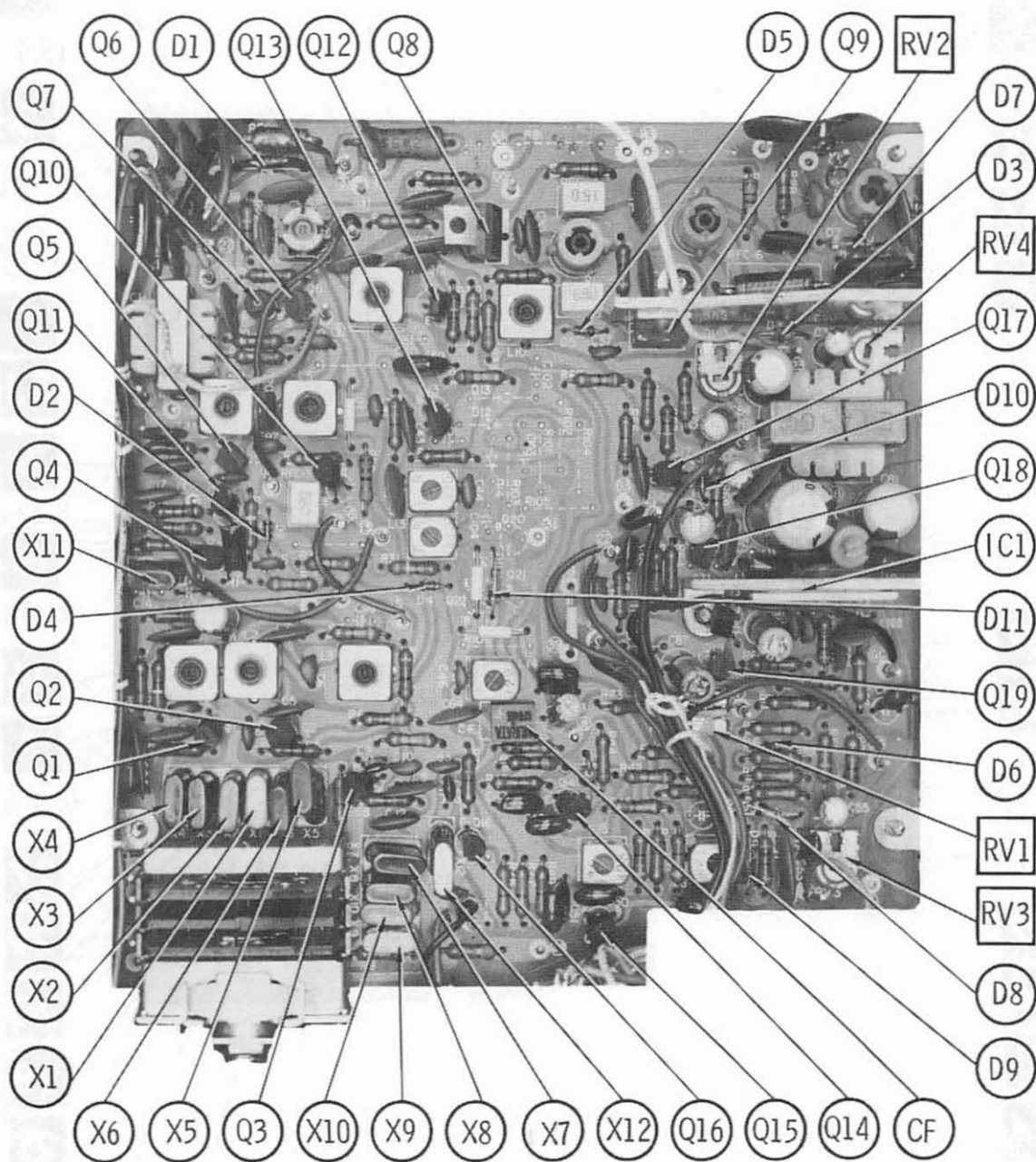




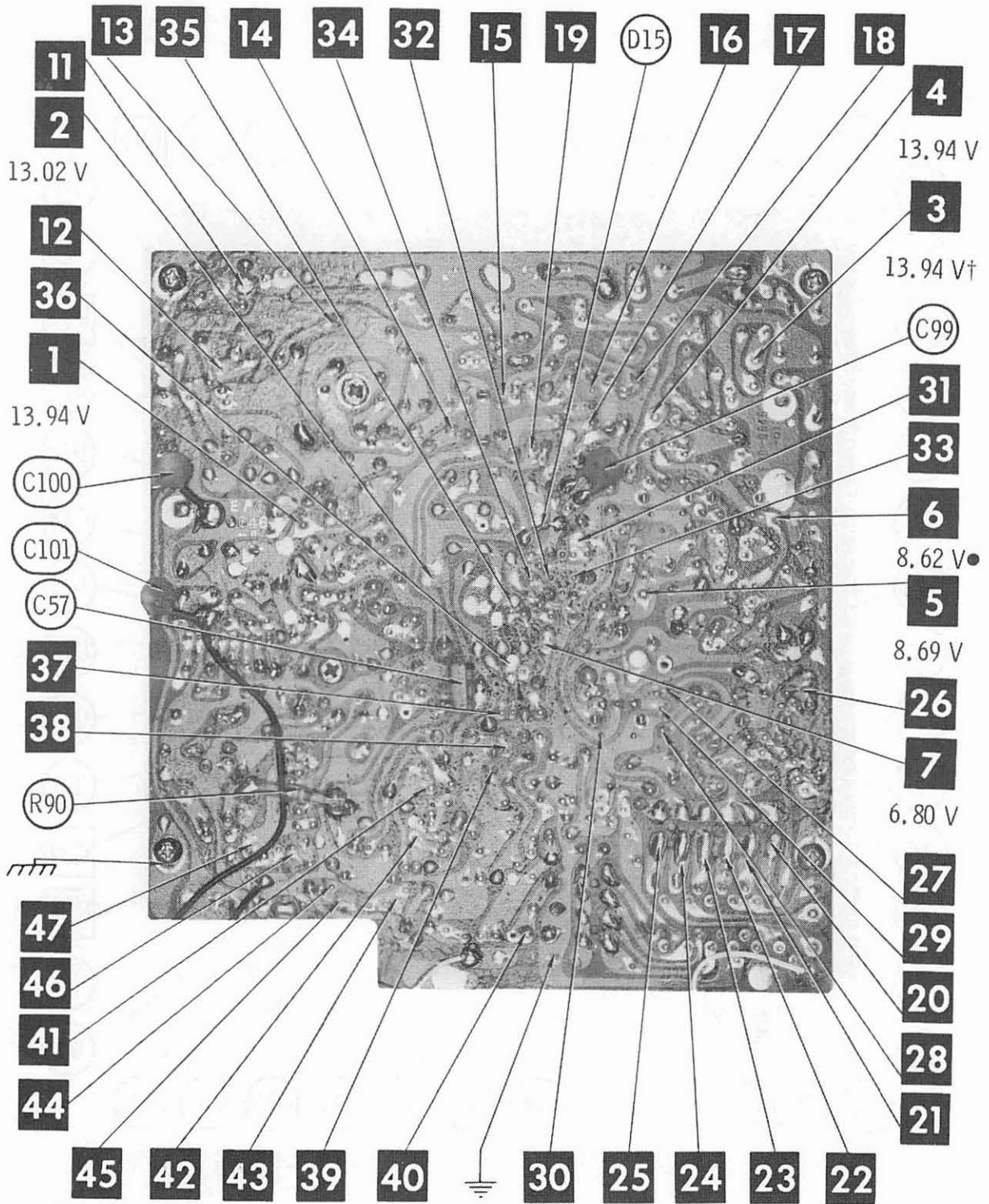
CHASSIS - BOTTOM



MAIN BOARD

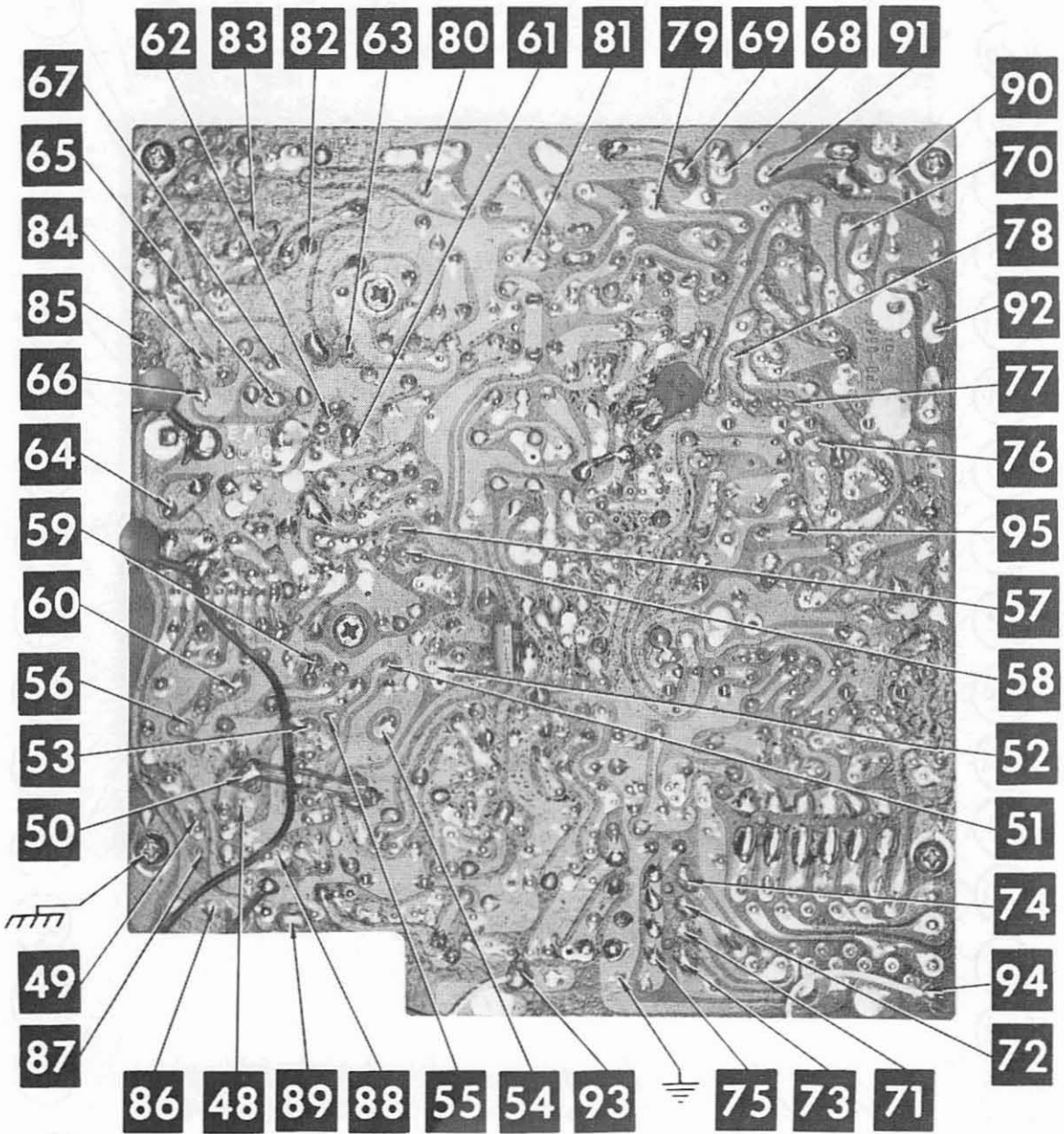


MAIN BOARD

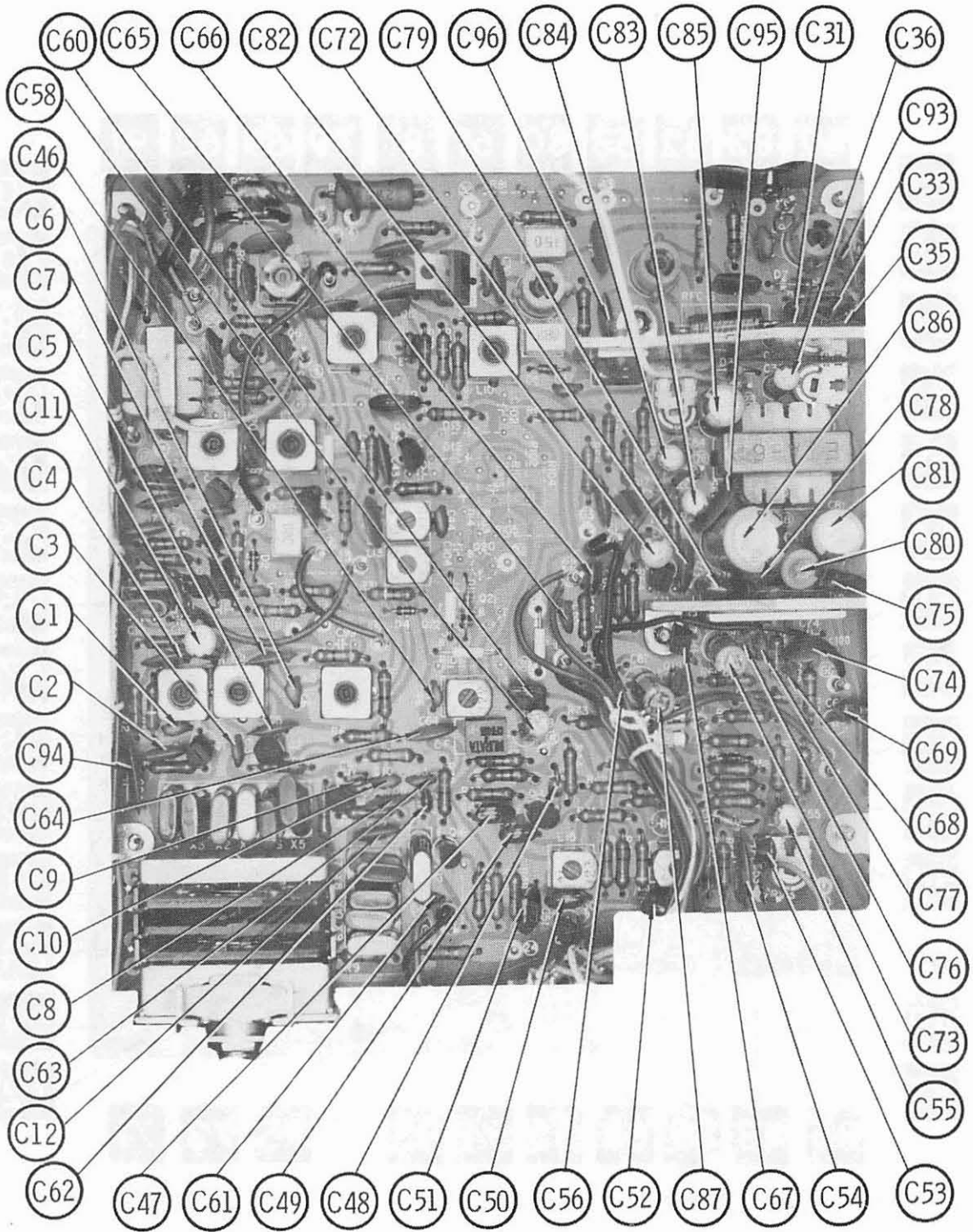


† Measured with S5 in PA position. • Transmit.

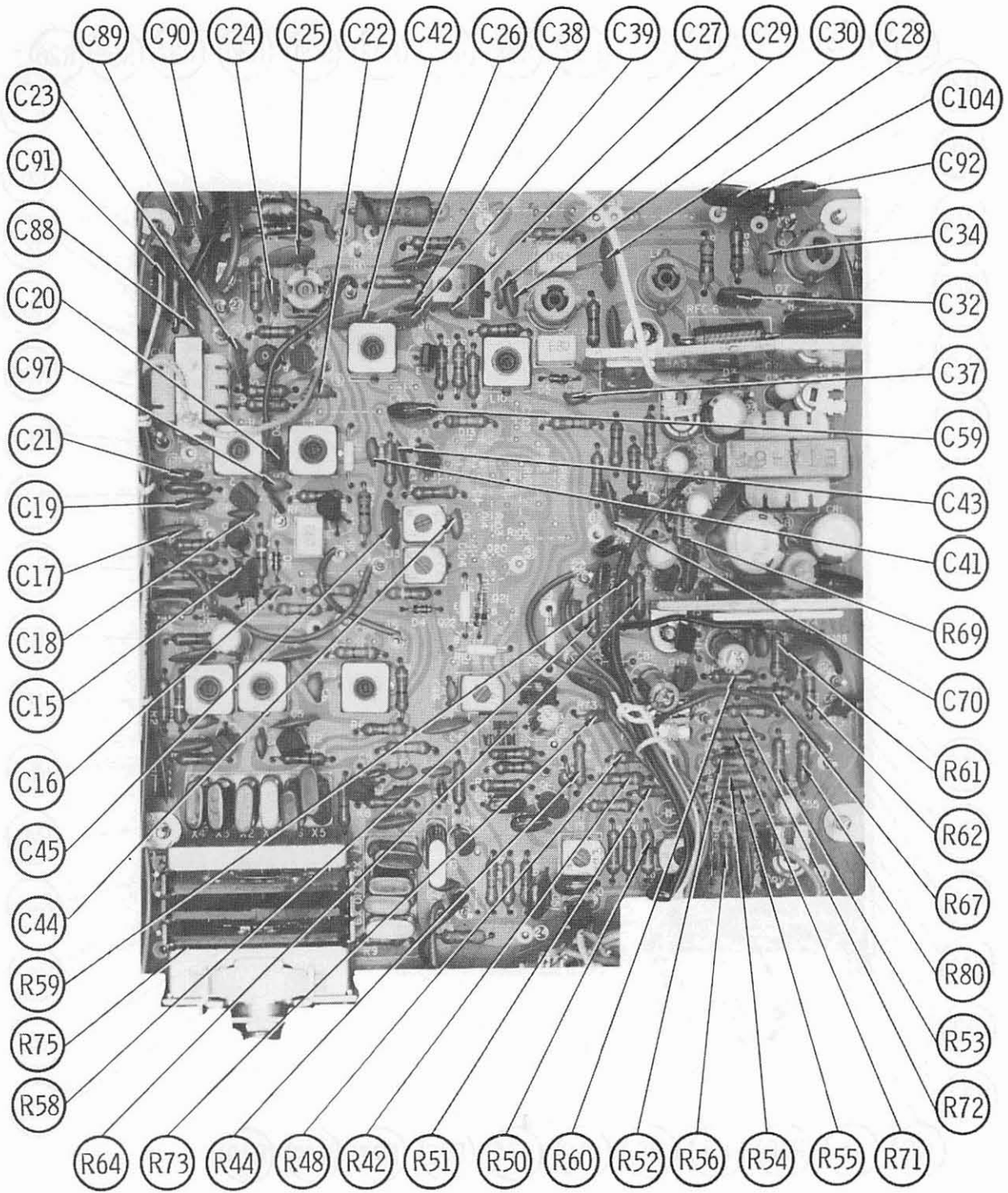
MAIN BOARD



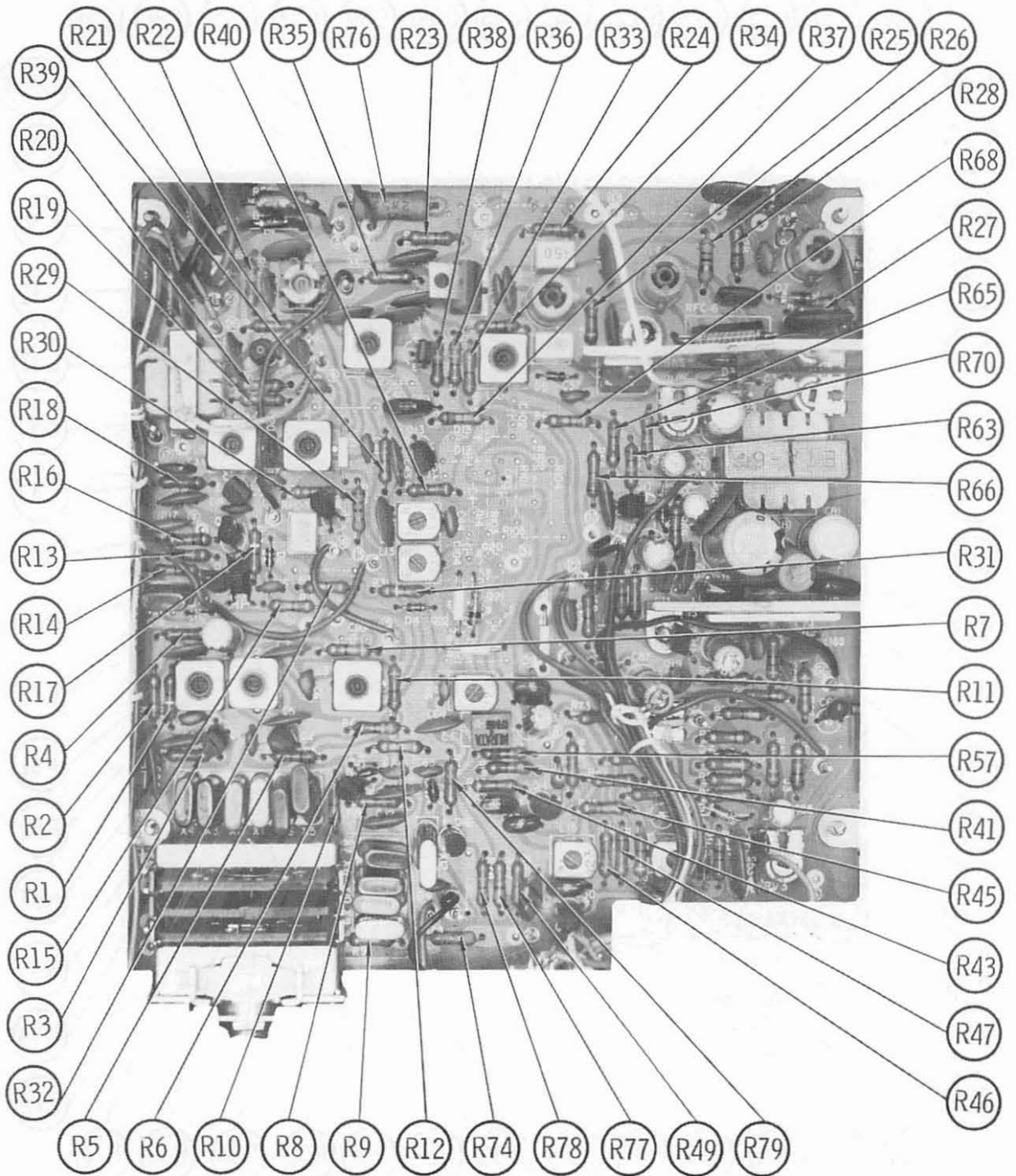
MAIN BOARD



MAIN BOARD



MAIN BOARD



MAIN BOARD



# PARTS LIST AND DESCRIPTION

(When ordering parts, state Model, Part Number, and Description.)

## SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA							
			GENERAL ELECTRIC PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.	
D1	10D1	Zener)	GE-504A	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116	
D2	SR1K-4 RD9.1E (9.1 Volt)		GE-504A	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116	
	V06C		GEZD-9.1	ZB9.18	HEPZ0412	RE 114	SK3060	RT-240	ECG139	
D3	1S1555		GE-504A	PTC201	HEPR0052	RE 49	SK3030	RT-210	ECG116	
D4	1S1555		GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177	
D5	1S1555		GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177	
D6	1S1555		GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177	
D7	1N60		1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109	
D8	1N60		1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109	
D9	1N60		1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109	
D10	1N60		1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109	
D11	1N60		1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109	
D15	1S1555		GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177	
IC1	TA7205P								ECG1155	
Q1	2SC839F			GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q2	2SC710C			GE-20	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A
	2SC829(1)			GE-20	PTC132	HEPS0011	RE 9	SK3018	RT-105	ECG229
	2SC839(1)			GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q3	2SC839F			GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q4	2SC839F		GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A	
Q5	2SC710C		GE-20	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A	
	2SC829(1)		GE-20	PTC132	HEPS0011	RE 9	SK3018	RT-105	ECG229	
	2SC839(1)		GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A	
Q6	2SC710C		GE-20	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A	
	2SC839(1)		GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A	
Q7	2SC735-0		GE-20	PTC121	HEPS0016	RE 13	SK3018	RT-107A	ECG123A	
Q8	2SC1760		GE-210	PTC123	HEPS0015	RE 13	SK3122	RT-107A	ECG289	
	2SC1760			PTC180					ECG306	
Q9	2SC1306I(10)		GE-215	PTC186		RE 203			ECG235	
	2SC1816(1)(11)		GE-215	PTC186		RE 203			ECG235	
Q10	2SC1318Q		GE-210	PTC123	HEPS0015	RE 17	SK3122	RT-114	ECG297	
Q11	2SA719Q		GE-21	PTC103	HEPS0019	RE 26	SK3114	RT-126A	ECG159	
Q12	2SC460B		GE-210	PTC136	HEPS0014	RE 9	SK3018	RT-187	ECG233	
	2SC710(1)		GE-20	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A	
Q13	2SC710C		GE-20	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A	
	2SC839(1)		GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A	
Q14	2SC710C		GE-20	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A	
	2SC829(1)		GE-20	PTC132	HEPS0011	RE 9	SK3018	RT-105	ECG229	
	2SC839(1)		GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A	
Q15	2SC710C		GE-20	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A	
	2SC829(1)		GE-20	PTC132	HEPS0011	RE 9	SK3018	RT-105	ECG229	
	2SC839(1)		GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A	
Q16	2SC839F		GE-61	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A	
Q17	2SC945R		GE-210	PTC121	HEPS0015	RE 192	SK3124	RT-107A	ECG199	
	2SC828(1)		GE-61	PTC132	HEPS0015	RE 192	SK3122	RT-172	ECG199	
Q18	2SC945AQ		GE-210	PTC121	HEPS0015	RE 192	SK3124	RT-107A	ECG199	
	2SC828(1)		GE-61	PTC132	HEPS0015	RE 192	SK3122	RT-172	ECG199	
Q19	2SC945AQ		GE-210	PTC121	HEPS0015	RE 192	SK3124	RT-107A	ECG199	
	2SC828(1)		GE-61	PTC132	HEPS0015	RE 192	SK3122	RT-172	ECG199	

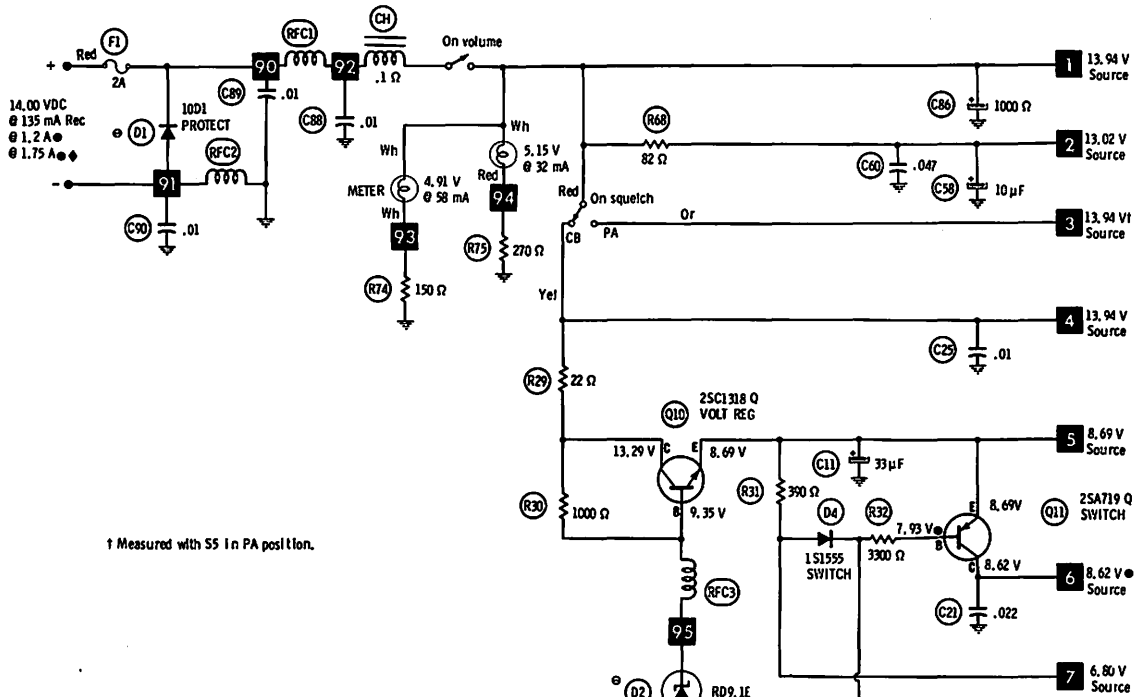
- (1) Used in some versions.
- (10) Rating, 12 watts @ 3.0 amps.
- (11) Rating, 16 watts @ 4.0 amps.

MIDLAND MODEL 13-857

## ELECTROLYTIC CAPACITORS

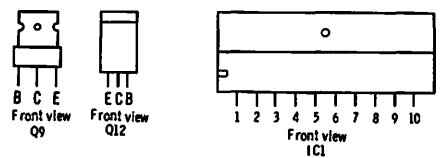
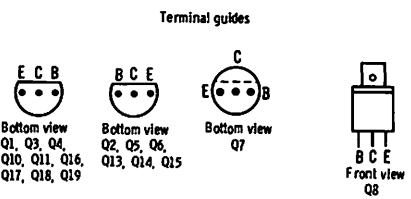
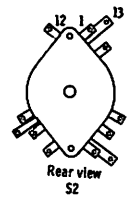
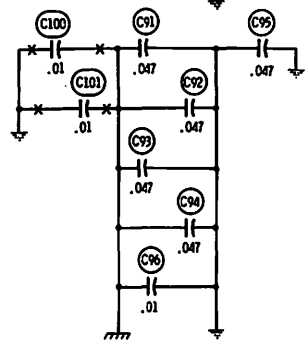
ITEM No.	RATING	REPLACEMENT DATA			
		MFGR. PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C11	33 16V		PC30-25	VTT33D25	EV-1325
C36	1 50V		PC1-50	MTV1CB50	EV-1615
C55	1 50V		PC1-50	MTV1CB50	EV-1615
C57	3.3 25V		PC5-50	VTT3R3A50	EV-1318
C58	10 16V		PC10-25	VTT10A25	EV-1222
C69	3.9 25V			TDC335M035FL	S035-3R99
C73	33 6.3V		PC30-25	VTT33A10	EV-1125
C80	47 16V		PC50-16	VTT47D16	EV-1226
C81	220 10V		PC250-10	VTT220F10	EV-1140
C82	33 6.3V		PC30-25	VTT33A10	EV-1125
C83	10 16V		PC10-25	VTT10A25	EV-1222
C84	1 50V		PC1-50	MTV1CB50	EV-1615
C85	47 16V		PC50-16	VTT47D16	EV-1226
C86	1000 16V		PC1000-16	VTT1000L16	EV-1260
C87	33 6.3V		PC30-25	VTT33A10	EV-1125
C98	33 16V		PC30-25	VTT33D25	EV-1325

(CONTINUED ON PAGE 82)



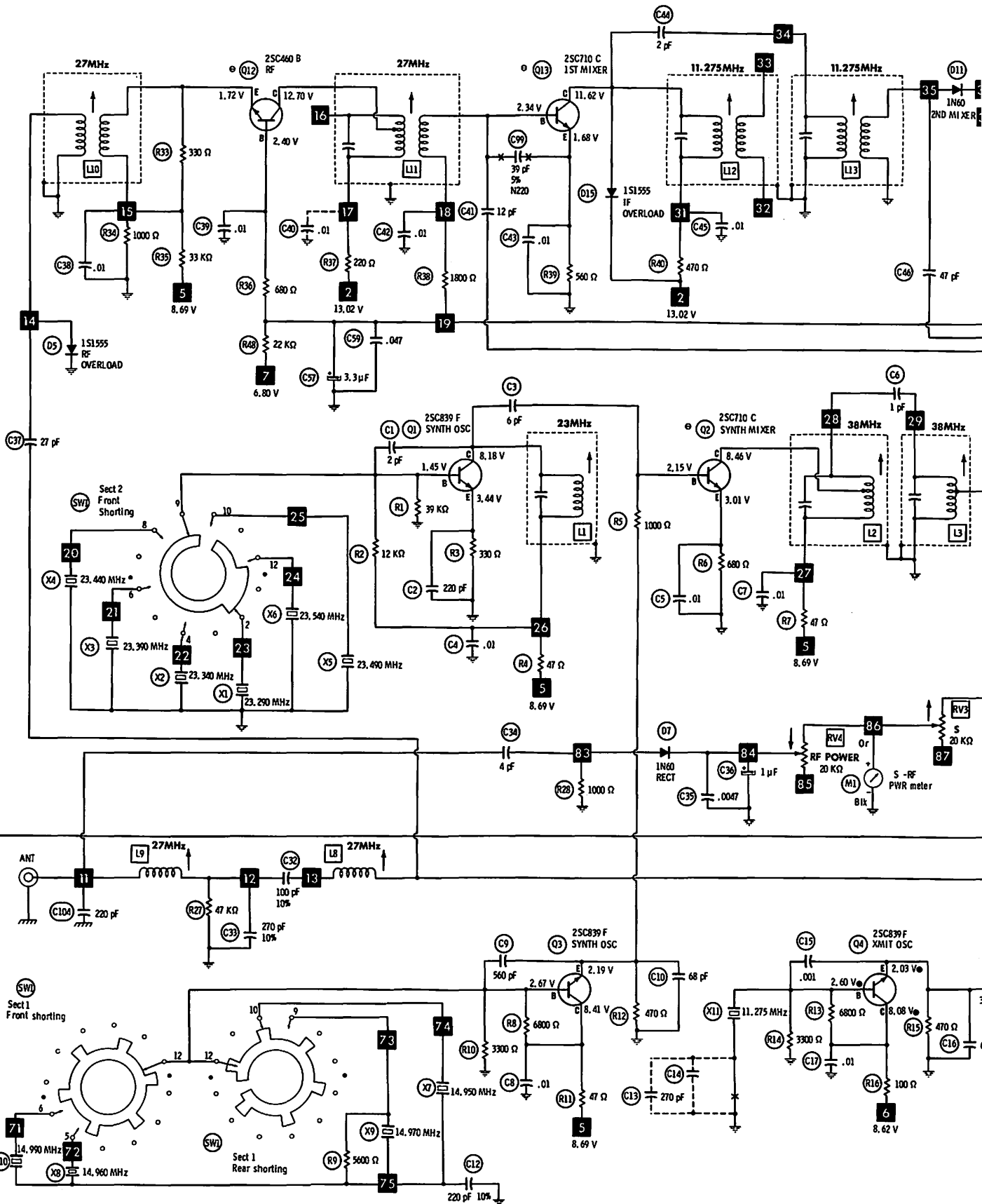
† Measured with S5 in PA position.

Chan	Crystal Complement
1	X1, X7
2	X1, X8
3	X1, X9
4	X1, X10
5	X2, X7
6	X2, X8
7	X2, X9
8	X2, X10
9	X3, X7
10	X3, X8
11	X3, X9
12	X3, X10
13	X4, X7
14	X4, X8
15	X4, X9
16	X4, X10
17	X5, X7
18	X5, X8
19	X5, X9
20	X5, X10
21	X6, X7
22	X6, X8
23	X6, X10



-x- Circuitry not used in some versions  
 --- Circuitry used in some versions  
 ⊕ See parts list  
 ⊕ Ground  
 Chassis  
 Measurements with switching as shown unless noted:  
 ■ Squelch fully clockwise    ♦ 100% modulation  
 ● Transmit  
 Supply voltage maintained as shown at input.  
 Voltages measured with digital meter, no signal.  
 Controls adjusted for normal operation.  
 Arrow at control indicates direction of advance.  
 Terminal identification may not be found on unit.  
 Resistors are 1/2W or less, 5% unless noted.  
 Value in ( ) used in some versions.

A PHOTOFACIT STANDARD NOTATION SCHEMATIC  
 WITH CIRCUITRACE<sup>®</sup>  
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## PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

### CRYSTALS

ITEM No.	CRYSTAL FREQUENCY IN MHz	MFGR. PART No.	CTS KNIGHTS PART No.	CHANNEL	ITEM No.	CRYSTAL FREQUENCY IN MHz	MFGR. PART No.	CTS KNIGHTS PART No.	CHANNEL
X1	23.290	13-128114	MA20W23.290	1,2,3,4	X7	14.950	13-128120	MB90W14.950	1,5,9,13,17,21
X2	23.340	13-128115	MA20W23.340	5,6,7,8	X8	14.960	13-128121	MB90W14.960	2,6,10,14,18,22
X3	23.390	13-128116	MA20W23.390	9,10,11,12	X9	14.970	13-128122	MB90W14.970	3,7,11,15,19
X4	23.440	13-128117	MA20W23.440	13,14,15,16	X10	14.990	13-128123	MB90W14.990	4,8,12,16,20,23
X5	23.490	13-128118	MA20W23.490	17,18,19,20	X11	11.275	13-128124	MC90W11.275	Xmit Osc
X6	23.540	13-128119	MA20W23.540	21,22,23	X12	11.730	13-128125	MC140W11.730	Rec Osc

### MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
CF	Filter, Ceramic	13-179057	455kHz
M1	Meter	13-200066	S/RF
SW1	Switch	13-180101	Channel Selector
SW2	Switch	13-183211	DELTA Tune
SW3	Switch	13-183205	ANL
SW4	Switch	13-183205	EXT/CB
	Printed Circuit Board	EPO-0646-01	Main

### CABINETS & CABINET PARTS (When ordering specify model, chassis & color)

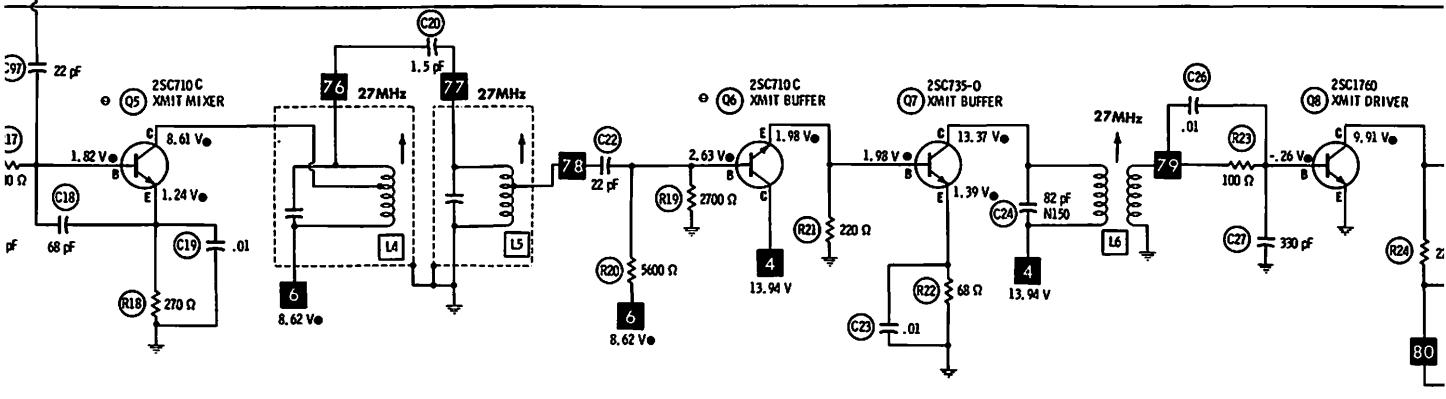
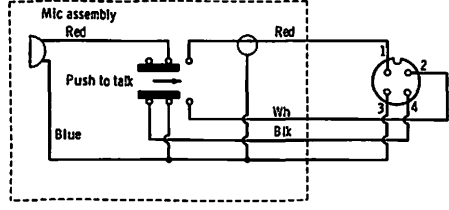
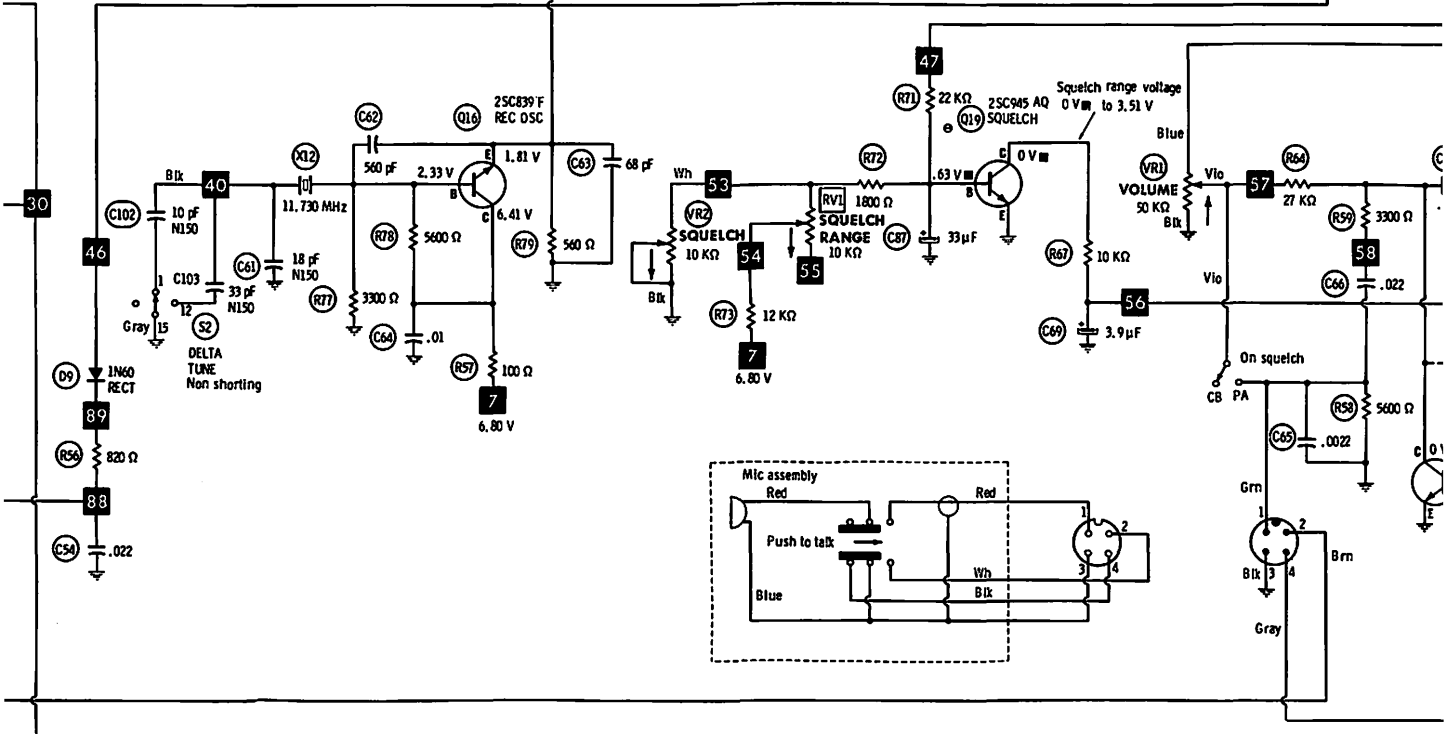
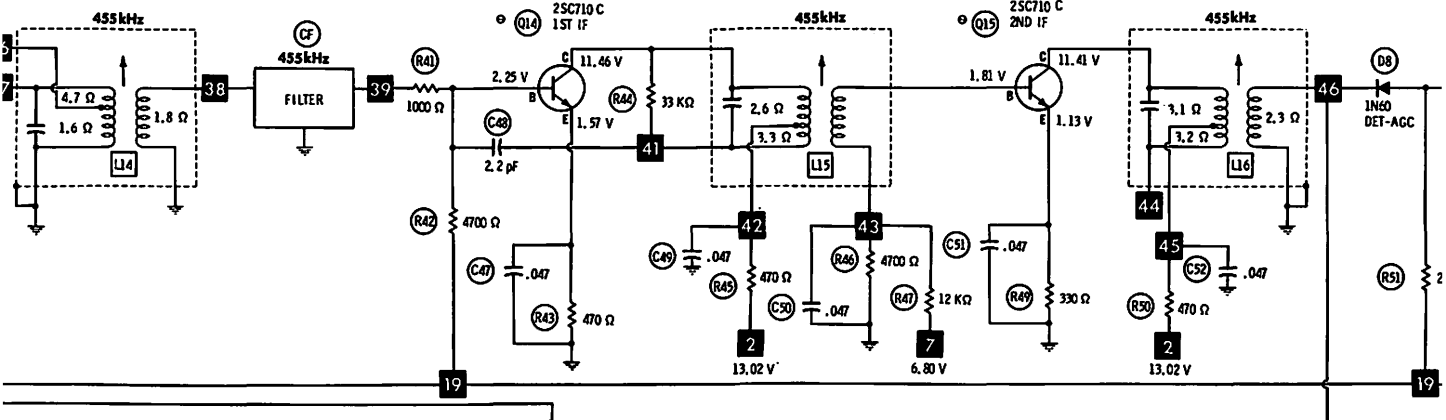
ITEM	PART No.	ITEM	PART No.
Cabinet, Upper	13-011022	Plate, Channel	13-115126
Cabinet, Lower	13-013130	Knob, Channel Assembly	13-115121
Cabinet, Front	13-010289	Knob (Control)	13-110188
Panel, Front	13-020657		

### ACCESSORIES

ITEM	MFGR. PART No.	REMARKS
Microphone	13-038075	
DC Power Cord w/Fuse	13-034083	

### WIRING DATA

General-use Hook-up Wire .....	Use BELDEN No. 8530 (Solid) Available in 12 Colors 8524 (Stranded) Available in 12 Colors
Power Cord, 2-Wire .....	Use BELDEN No. 17106 (Plastic) or 17126 (Rubber) -6 feet 17109 (Plastic) or 17129 (Rubber) -9 feet
Shielded Antenna Lead .....	Use BELDEN No. 8214 Lowest-loss (RG-8/U Type) 8237 Low-loss (RG-8/U) 8240 (Solid) Miniature (RG-58/U) 8259 (Stranded) Miniature (RG-58A/U)
Coiled Microphone Cable .....	Use BELDEN No. 8491 4-Conductor (2 shielded, 2 unshielded) Neoprene



## PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

### CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM No.	FUNCTION	RESIST-ANCE	REPLACEMENT DATA				
			MFR. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	MALLORY PART No.	TRW PART No.
RV1	Squelch Range	10K	13-164120				
RV2	ANC	2000	13-164124				
RV3	S Meter	20K	13-164119				
RV4	RF Meter	20K	13-164119				
VR1	Volume/Power Switch	50K	13-160124				
VR2	Squelch/PA Switch	10K	13-166068				

### COILS (RF-IF)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
L1	Synth Osc (23MHz)	13-170211	ETR-336		
L2	Synth Mixer (38MHz)	13-176483			
L3	Synth Mixer (38MHz)	13-176484	ETR-340		
L4	Xmit Mixer (27MHz)	13-176485	ETR339		
L5	Xmit Mixer (27MHz)	13-176486	ETR-340		
L6	Xmit Buffer (27MHz)	13-176487	0341		
L7	Xmit Driver (27MHz)	13-176488			
L8	Final Tank (27MHz)	13-176489			
L9	Antenna Load (27MHz)	13-176490			
L10	Rec Antenna (27MHz)	13-176491	ETR-333		
L11	Rec RF (27MHz)	13-176492	ETR-334		
L12	Rec Mixer (11MHz)	13-176493	335		
L13	Rec Mixer (11MHz)		335		
L14	IF (455kHz)	13-090362	122		
L15	IF (455kHz)	13-090363	123		
L16	IF (455kHz)	13-090364	129		
RFC1	RF Choke	13-178203			
RFC2	RF Choke	13-178203			
RFC3	RF Choke (68uH)	13-178204			
RFC4	RF Choke (15uH)	13-178205			
RFC5	RF Choke (68uH)	13-178204			
RFC6	RF Choke	13-178206			

### FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000~)	MFR. PART No.	THORDARSON PART No.	TRIAD PART No.	
CH	1.775A	.1	.37mH	13-178202 ELA-16(1)			(1) Number on unit

### TRANSFORMER (Audio Output)

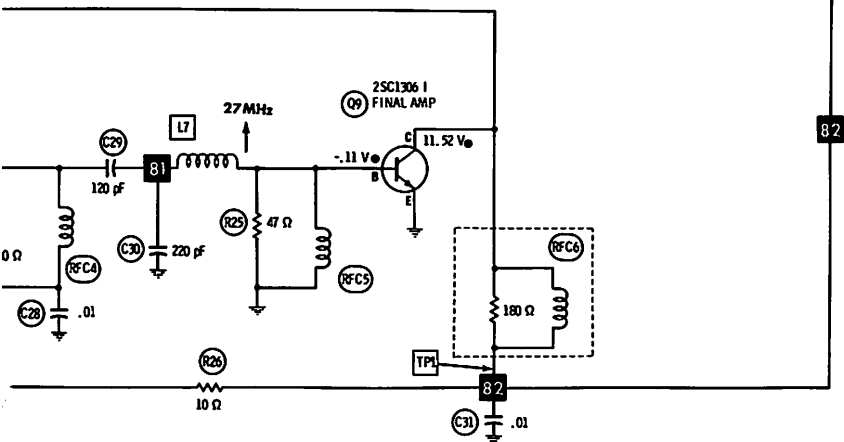
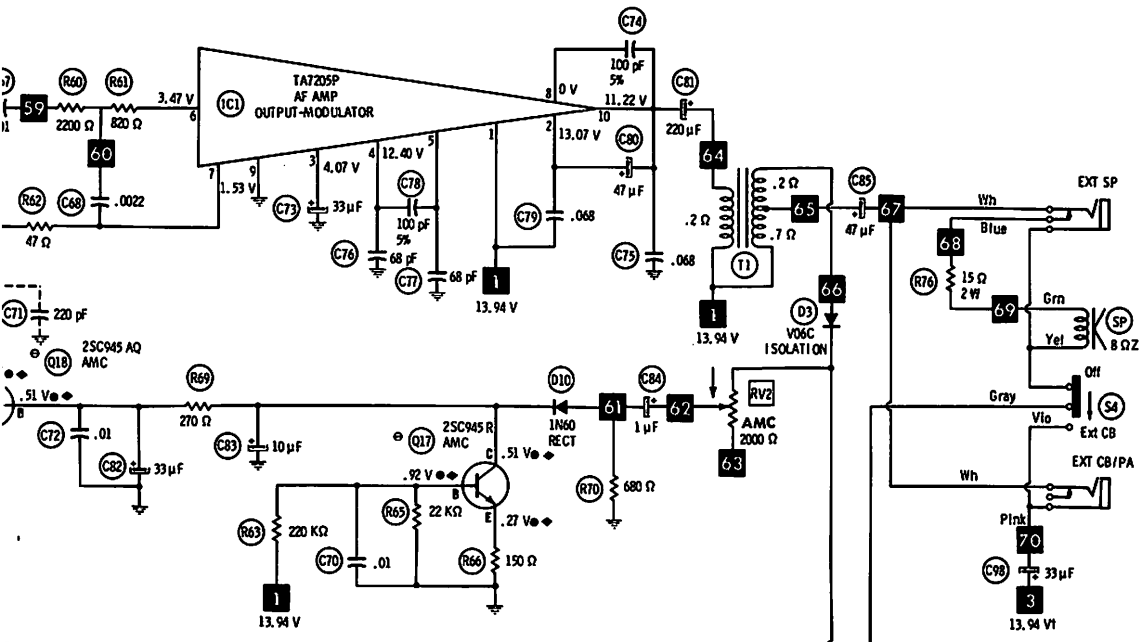
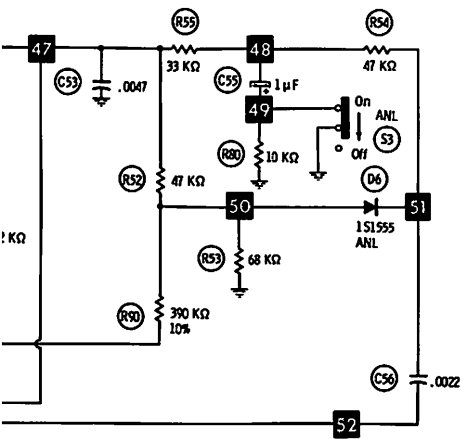
ITEM No.	IMPEDANCE		REPLACEMENT DATA			NOTES
	PRI.	SEC.	MFR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T1	32	8	13-096193 ETA-66 (1)			(1) Number on unit

### SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFR. PART No.	QUAM PART No.	
SP1	3" PM 8 ohms	13-060105	30A0528R	

### FUSE DEVICES

ITEM No.	DESCRIPTION	REPLACEMENT DATA							
		PART No.		BUSS PART No.		LITTELFUSE PART No.		WORKMAN PART No.	
		DEVICE	HOLDER	DEVICE	HOLDER	DEVICE	HOLDER	DEVICE	
F1	2 Amp Fast Acting			AGC2	HDJ	312002	150145	FG2-2	



# PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

## CAPACITORS

ITEM No.	RATING	MFR. PART No.	REPLACEMENT DATA			
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C1	2		DTZ-2R2	NP02P2	CN0522	10TCC-V22
C2	220 10%		DD-221		GP322	10TS-T22
C3	6		DTZ-6R8	NP06P8	CN0568	10TCC-V68
C4	.01		DC-103	GP10000	MAG5011	2SS-S10
C5	.01		DC-103	GP10000	MAG5011	2SS-S10
C6	1				CN0510	10TCC-V10
C7	.01		DC-103	GP10000	MAG5011	2SS-S10
C8	.01		DC-103	GP10000	MAG5011	2SS-S10
C9	560 10% 50V			CD19FD561J03	SX356	424ME5600J501
C10	68		DTZ-68	NP068	CN0468	10TCC-Q68
C12	220 10%		DD-221		GP322	10TS-T22
C15	.001 10% 50V			DPMS6D1	ENF1A210	1PB-D10
C16	68		DTZ-68	NP068	CN0468	10TCC-Q68
C17	.01		DC-103	GP10000	MAG5011	2SS-S10
C18	68		DTZ-68	NP068	CN0468	10TCC-Q68
C19	.01		DC-103	GP10000	MAG5011	2SS-S10
C20	1.5		DTZ-1R5	NP01P5	CN0515	10TCC-V15
C21	.022 10% 50V			DPMS2S22	ENF1A122	1PB-S22
C22	22 10%		DTZ-22	NP022	CN0422	10TCC-Q22
C23	.01		DC-103	GP10000	MAG5011	2SS-S10
C24	82 N150 10%				*	10TCP-Q82
C25	.01		DC-103	GP10000	MAG5011	2SS-S10
C26	.01		DC-103	GP10000	MAG5011	2SS-S10
C27	330 10%		DD-331	GP330	GP330	10TS-T33
C28	.01		DC-103	GP10000	MAG5011	2SS-S10
C29	120 10%		DTZ-120		CN0312	10TCC-T12
C30	220 10%		DD-221		GP322	10TS-T22
C31	.01		DC-103	GP10000	MAG5011	2SS-S10
C32	100 10%			CD10FD101J03	SX310	424MC1000J501
C33	270 10%			CD15FD271J03	SX327	424ME2700J501
C34	4		DTZ-4R7	NP04P7	CN0537	10TCC-V47
C35	.0047		DD-472	GP4700	GP247	2SS-D47
C37	27				CN0427	10TCC-Q27
C38	.01		DC-103	GP10000	MAG5011	2SS-S10
C39	.01		DC-103	GP10000	MAG5011	2SS-S10
C41	12				CN0412	10TCC-Q12
C42	.01		DC-103	GP10000	MAG5011	2SS-S10
C43	.01		DC-103	GP10000	MAG5011	2SS-S10
C44	2		DTZ-2R2	NP02P2	CN0522	10TCC-V22
C45	.01		DC-103	GP10000	MAG5011	2SS-S10
C46	47		DTZ-47	NP047	CN0447	10TCC-Q47
C47	.047 10% 50V			DPMS2S47	ENF1A147	1PB-S47
C48	2.2 10% 50V		DTZ-2R2	NP02P2	CN0522	10TCC-V22
C49	.047 10% 50V			DPMS2S47	ENF1A147	1PB-S47
C50	.047 10% 50V			DPMS2S47	ENF1A147	1PB-S47
C51	.047 10% 50V			DPMS2S47	ENF1A147	1PB-S47
C52	.047 10% 50V			DPMS2S47	ENF1A147	1PB-S47
C53	.0047 10% 50V			DPMS6D47	ENF1A247	1PB-D47
C54	.022		DC-203		MAG5012	2SS-S20
C55	.0022 10% 50V			DPMS6D22	ENF6222	6PS-D22
C59	.047 50V 10%			DPMS2S47	ENF1A147	1PB-S47
C60	.047 10% 50V			DPMS2S47	ENF1A147	1PB-S47
C61	18 N150				*	10TCP-Q18
C62	560 10% 50V			CD19FD561J03	SX356	424ME5600J501
C63	68		DTZ-68	NP068	CN0468	10TCC-Q68
C64	.04				GP140	56A-S40
C65	.0022 10%		DD-222		GP222	2SS-D22
C66	.022 10% 50V			DPMS2S22	ENF1A122	1PB-S22
C67	.02 10% 50V			DPMS2S2	PVC212	2PS-S20
C68	.0022		DD-222		GP222	2SS-D22
C70	.01		DC-103	GP10000	MAG5011	2SS-S10
C72	.02		DC-203		MAG5012	2SS-S20
C74	100 5%		DTZ-100		CN0310	10TCC-T10
C75	.068 10% 50V			NP0100	ENF1A168	1PB-S68
C76	68		DTZ-68	NP068	CN0468	10TCC-Q68
C77	68		DTZ-68	NP068	CN0468	10TCC-Q68
C78	100 5%		DTZ-100	NP0100	CN0310	10TCC-T10
C79	.068 10% 50V			DPMS4S68	ENF1A168	1PB-S68
C88	.01		DC-103	GP10000	MAG5011	2SS-S10
C89	.01		DC-103	GP10000	MAG5011	2SS-S10
C90	.01		DC-103	GP10000	MAG5011	2SS-S10
C91	.047		DC-503	MGPO5	MAG5015	TGL-S50
C92	.047		DC-503	MGPO5	MAG5015	TGL-S50
C93	.047		DC-503	MGPO5	MAG5015	TGL-S50
C94	.047		DC-503	MGPO5	MAG5015	TGL-S50
C95	.047		DC-503	MGPO5	MAG5015	TGL-S50
C96	.01		DC-103	GP10000	MAG5011	2SS-S10
C97	22		DTZ-22	NP022	CN0422	10TCC-Q22
C99	39 5% N220				*	10TCR-Q39
C100	.01		DC-103	GP10000	MAG5011	2SS-S10
C101	.01		DC-103	GP10000	MAG5011	2SS-S10
C102	10 N150				*	10TCP-Q10
C103	33 N150				*	10TCP-Q33
C104	220 10%			CD10FD221J03	SX322	424ME2200J501

\*Not normally in distributor's stock. Available thru distributor on order to manufacturer.





**PHOTOFACT<sup>®</sup> with**

**CIRCUITRACE<sup>®</sup>**

For Supplier Address See PHOTOFACT Index

**NOTE**

Repair or adjustment of transmitter circuits must be under supervision of a person with first-or second-class radiotelephone license. (Refer to FCC Rules and Regulations Part 95, Subpart C & D.)

The frequency of the transmitter should be checked periodically with a secondary frequency standard to insure proper and legal operation.

Best results will be obtained when adjusting the final RF output circuit if the antenna normally used is connected and the chassis is as nearly in the cabinet as possible.

Connect either 50-ohm dummy load or the normally used antenna system.



MODEL LB-23A

**ALIGNMENT INSTRUCTIONS**

Suggested Alignment Tools: GC ELECTRONICS  
 L1, L2, L7, L13 thru L17 ..... 9440  
 ALL other tuneable coils and  
 Transformers .....5000, 8290

ROBYN MODEL LB-23A

**RECEIVER**

Connect an AC VTVM or AF Wattmeter across speaker voice coil. These adjustments made with 14-volt DC input. Adjust volume control to obtain a suitable reading.

SIGNAL GENERATOR	GEN FREQ	CHANNEL	ADJUST	REMARKS
High side thru .01uF to base of TR3, low side to ground.	455kHz, 1000Hz @ 30% modulation.	Any	L5, L6	Set generator output low enough to prevent AGC limiting. Adjust for maximum.
High side thru .01uF to antenna jack, low side to ground.	27.115MHz, 1000Hz @ 30% modulation.	13	L1, L2, L7, L3, L4	Set generator output low enough to prevent AGC limiting. Adjust for maximum.

**HOWARD W. SAMS & CO., INC.** Indianapolis, Indiana 46206

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## RECEIVER ADJUSTMENTS

Connect an AC VTVM or AF Wattmeter across speaker voice coil.  
 These adjustments made with 14-volt DC input.  
 Adjust volume control to obtain a suitable reading.

SIGNAL GENERATOR	GEN FREQ	CHANNEL	ADJUST	REMARKS
SQUELCH RANGE High side thru .01uF to antenna jack, low side to ground.	27.115MHz, 1000Hz @ 30% modulation, output 5000uV.	13	VR3	Set squelch control fully clockwise. Back off 90 degrees. Adjust so that squelch just breaks.
ANL S Meter	27.115MHz, 1000Hz @ 30% modulation, output 10,000uV	13	VR6	Adjust for 9 on S Meter.

## TRANSMITTER

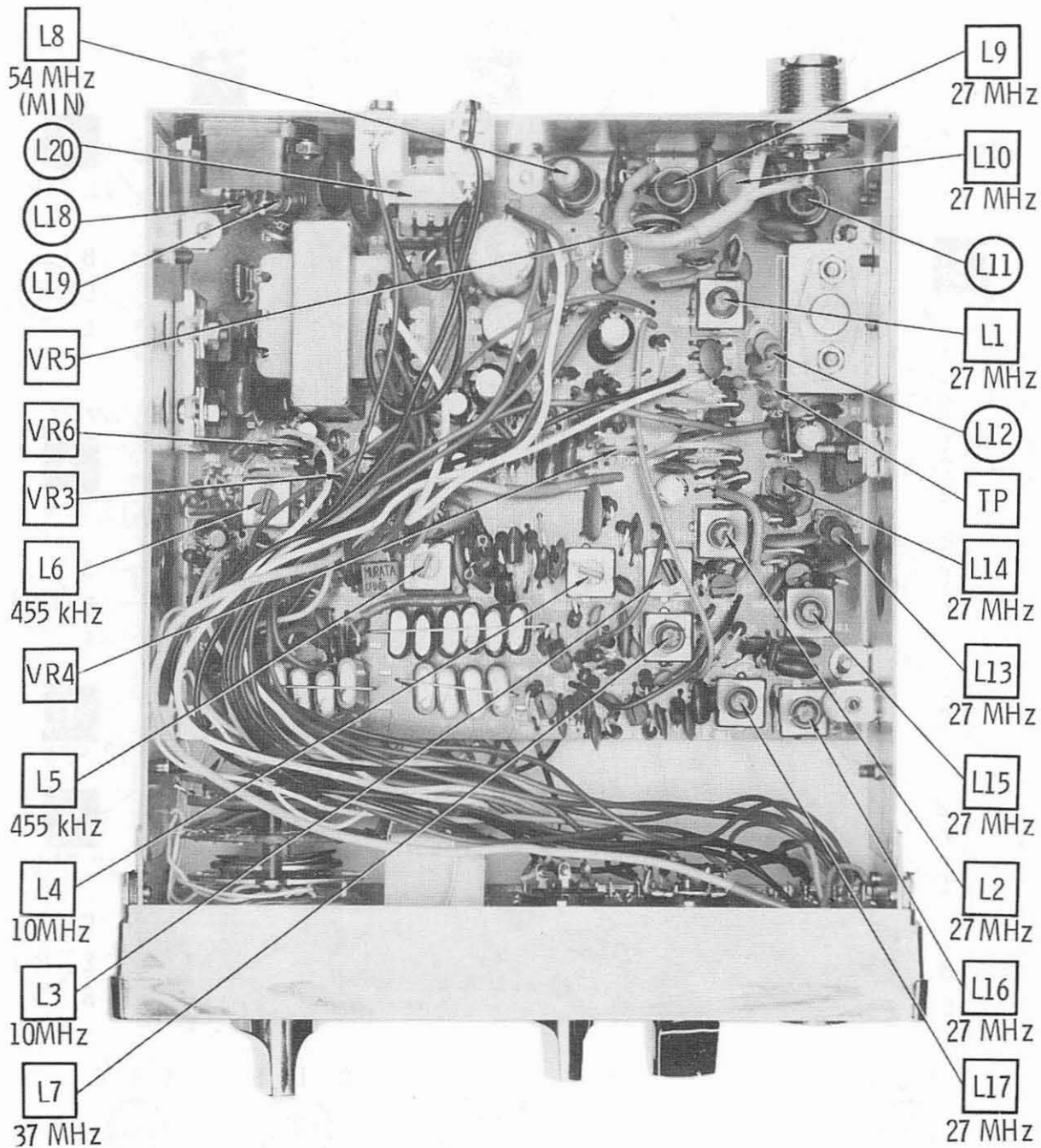
Connect an RF Wattmeter or 50-ohm, 25-watt dummy load to antenna connector.  
 Adjustments made with 14-volt DC input.

INDICATOR	ADJUST	REMARKS
OSCILLATOR, MIXER, BUFFER, DRIVER, FINAL RF Wattmeter	L17, L16, L15, L14, L13, L10	Channel selector to Ch. 13. Key transmitter. Adjust for maximum.
TVI TRAP TV (Ch. 2)	L8	Key transmitter. Adjust for MINIMUM interference on TV.
FINAL INPUT POWER Remove jumper at TP1 and connect 0-500 DC milliammeter.	L9	Adjust for 5 watts. (MAX). Current should not exceed 410mA.

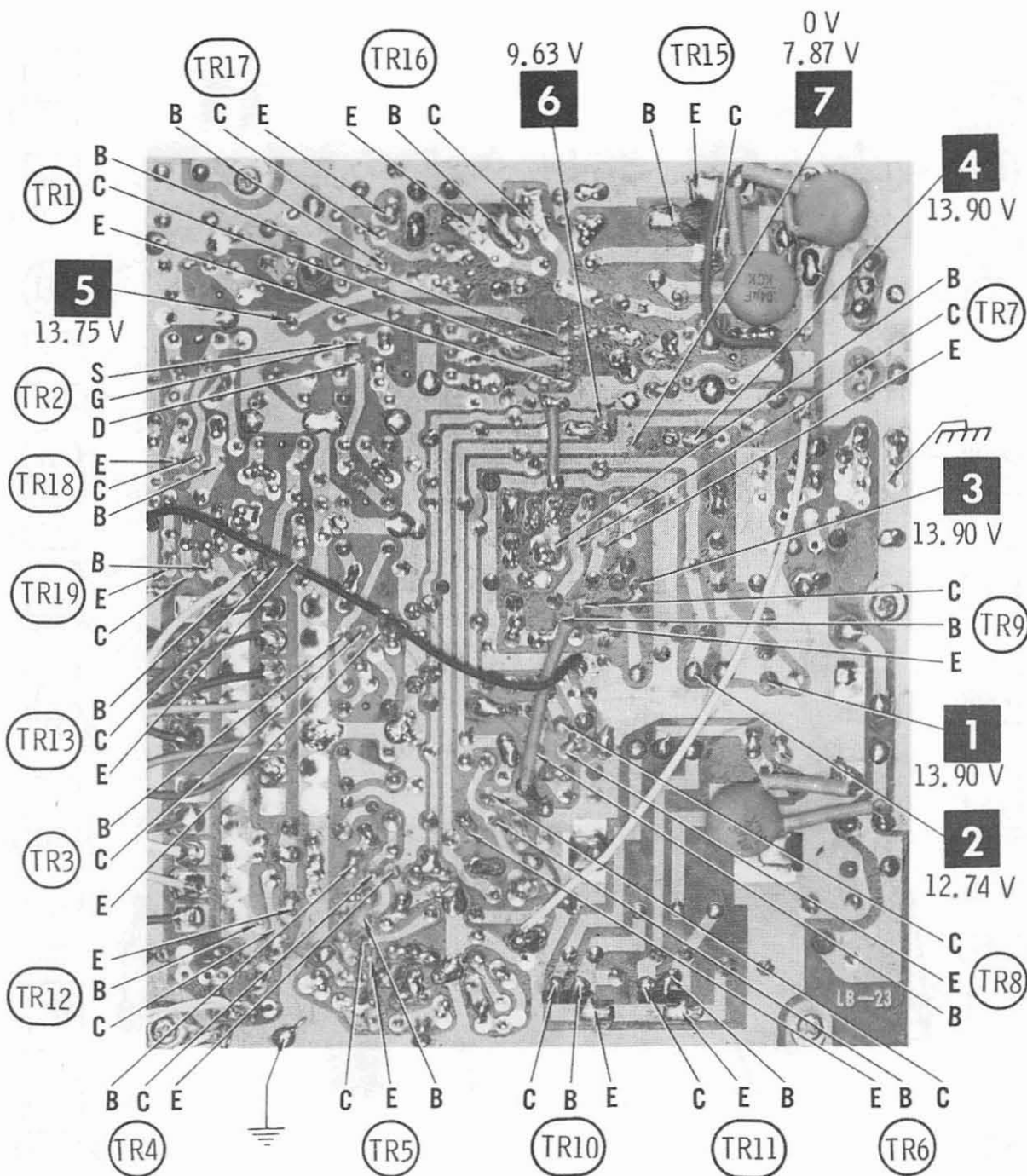
## TRANSMITTER ADJUSTMENTS

Connect an RF Wattmeter or 50-ohm, 25-watt dummy load to antenna connector.  
 Adjustments made with 14-volt DC input.

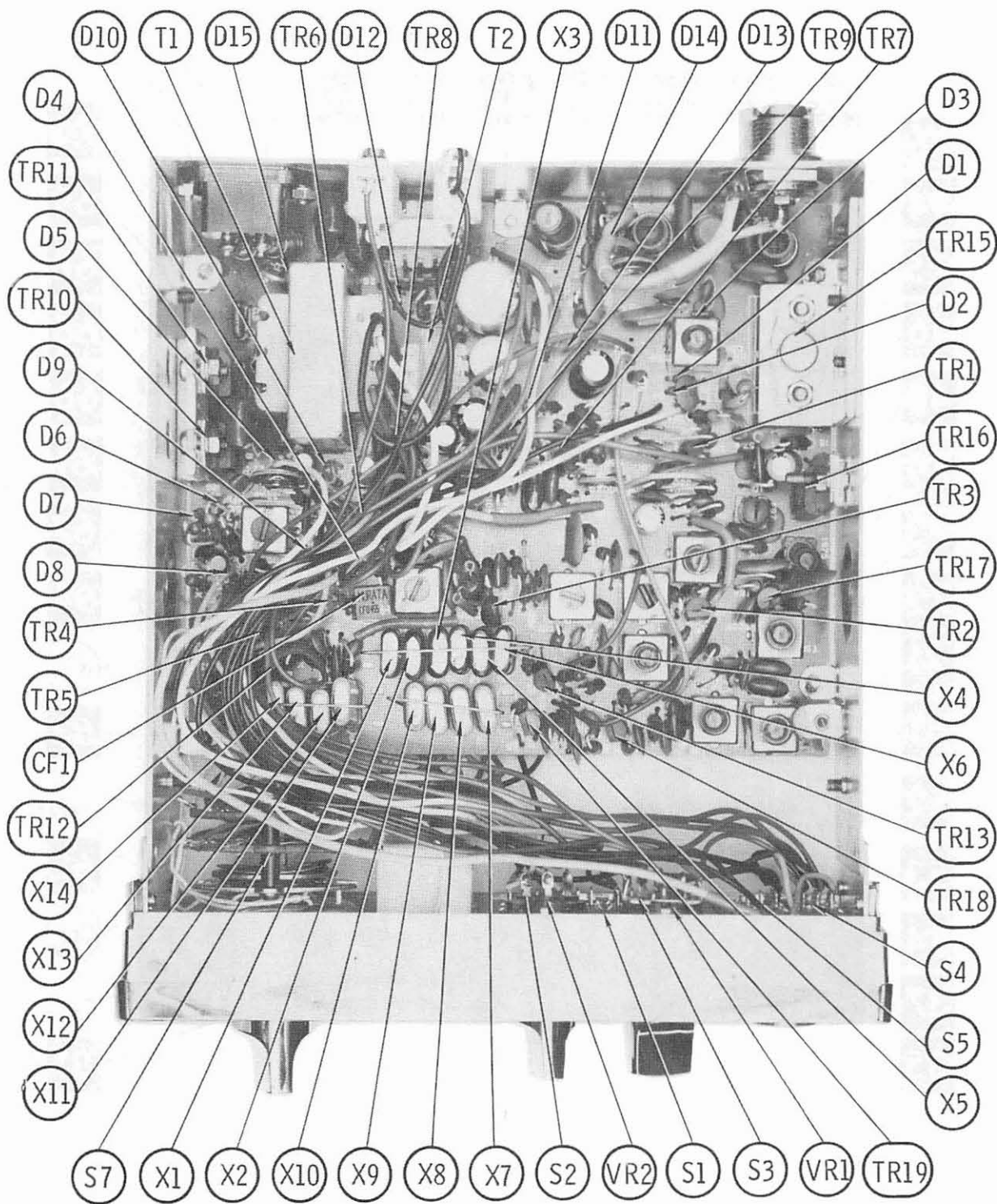
INDICATOR	ADJUST	REMARKS
MODULATION Modulation Meter connected to antenna jack	VR4	Inject a 1000Hz 5mV audio signal at mic input. Key transmitter. Adjust for 100% modulation maximum.
RF PANEL METER RF Wattmeter	VR5	Key transmitter. Adjust so that panel RF meter agrees with RF wattmeter



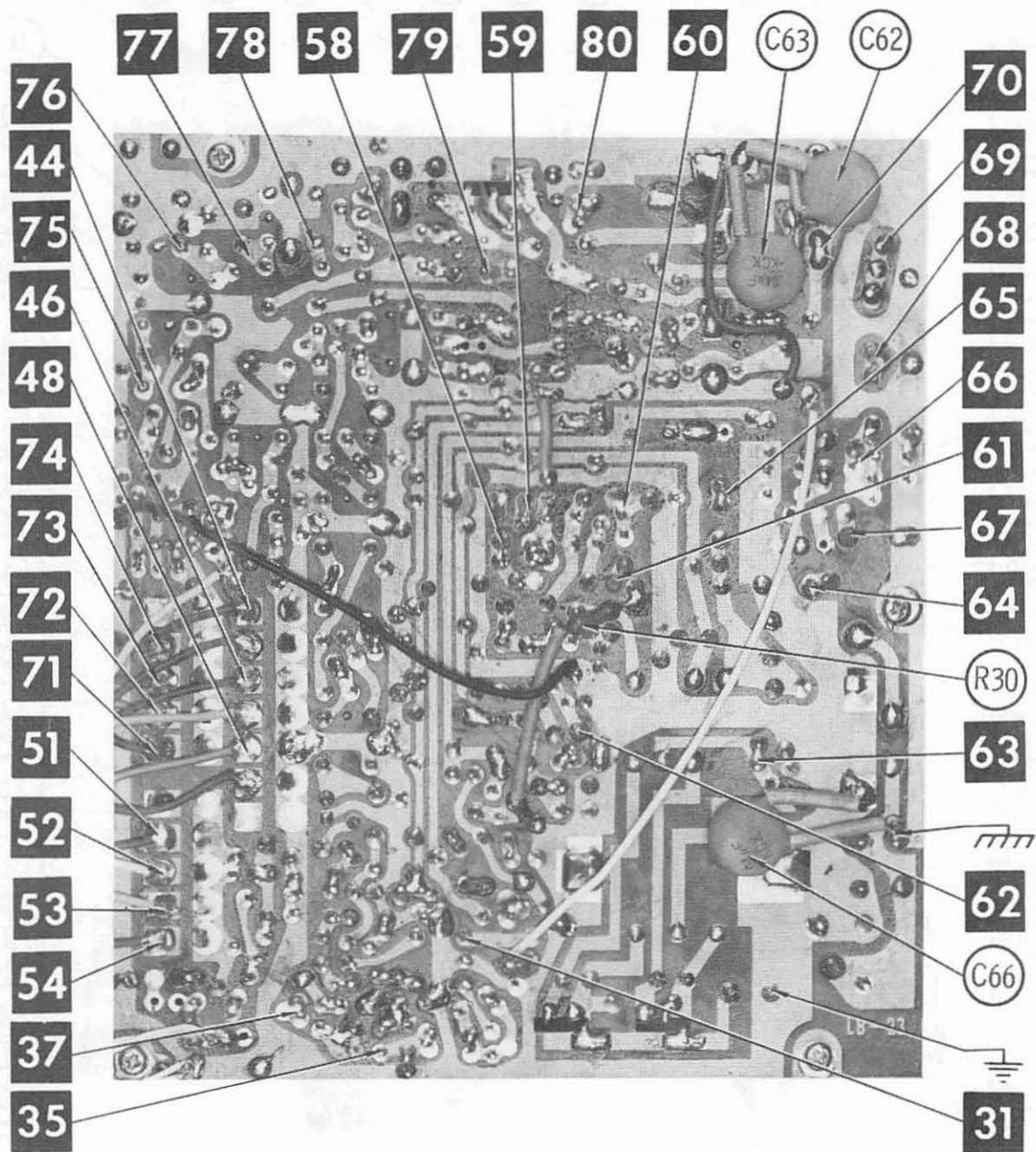
CHASSIS - BOTTOM



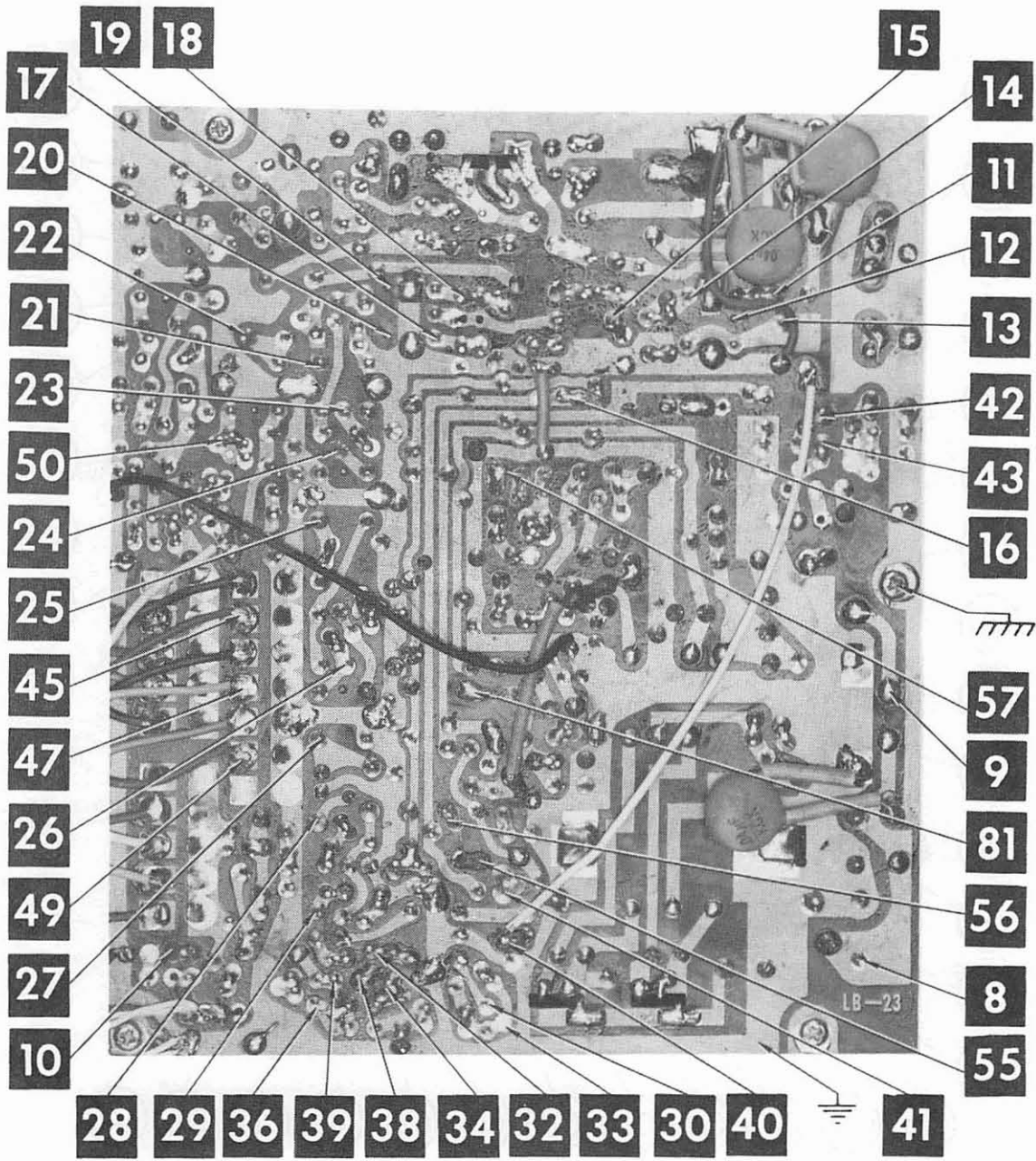
MAIN BOARD



CHASSIS - BOTTOM

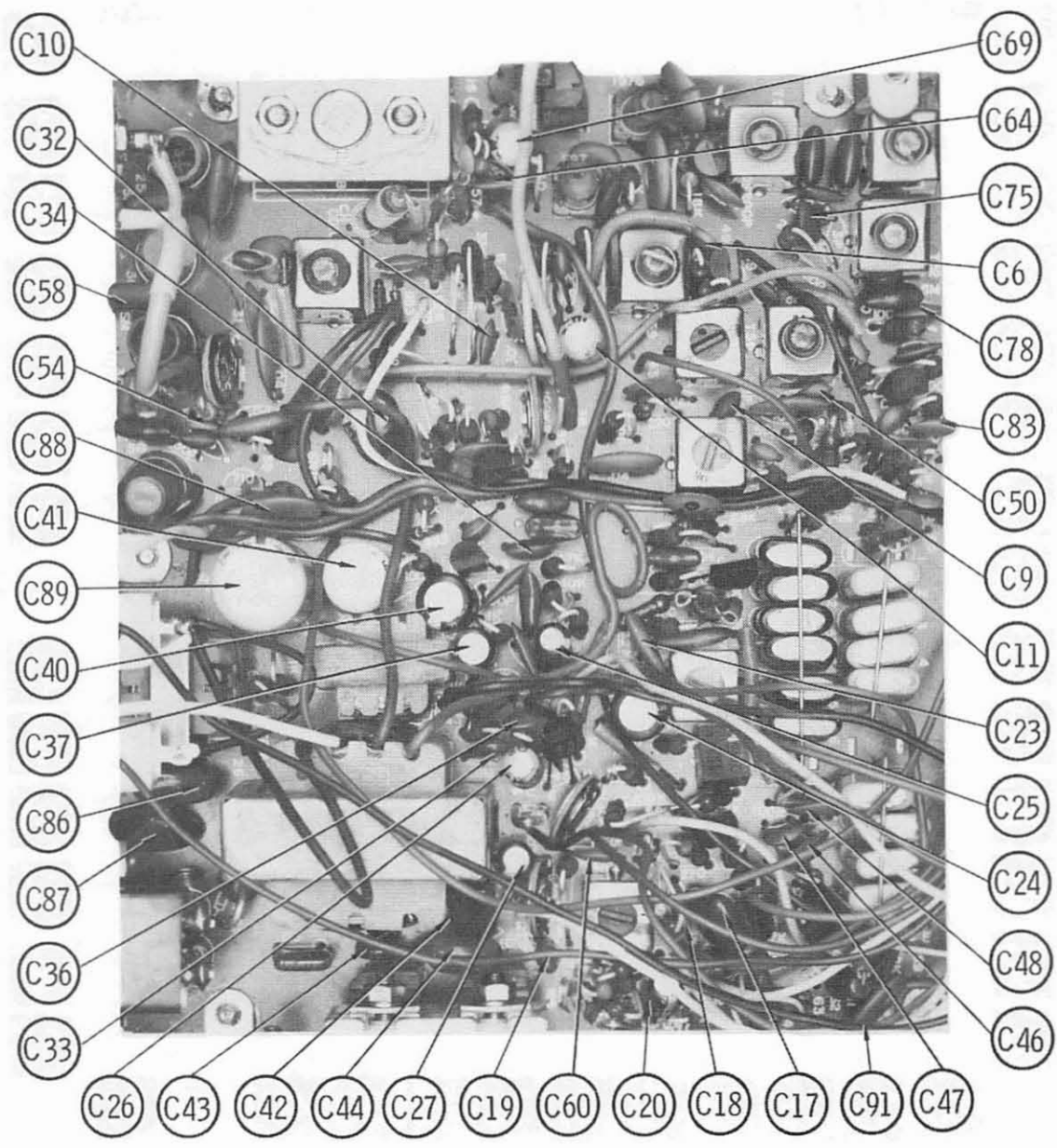


MAIN BOARD



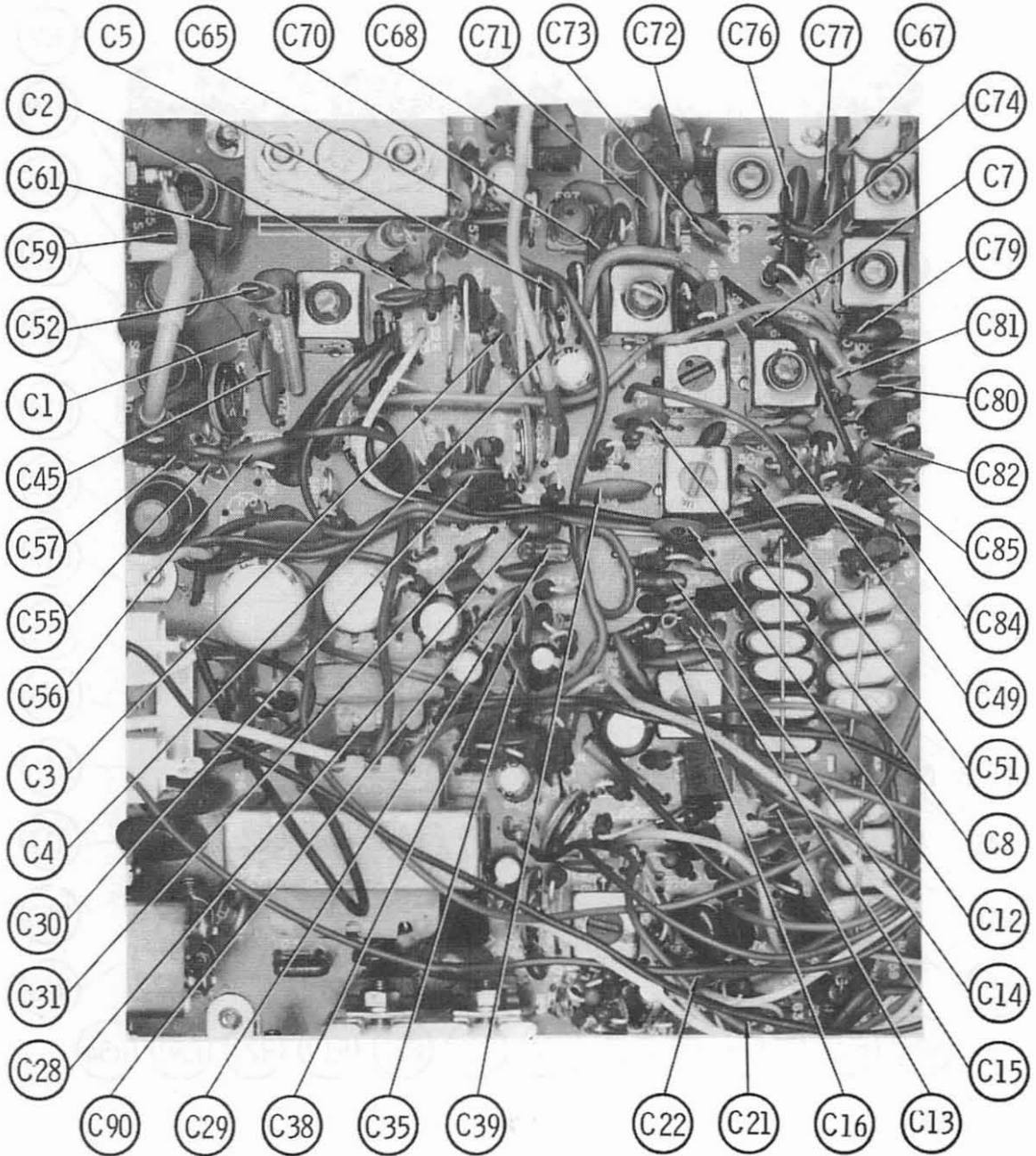
ROBYN MODEL LB-23A

MAIN BOARD

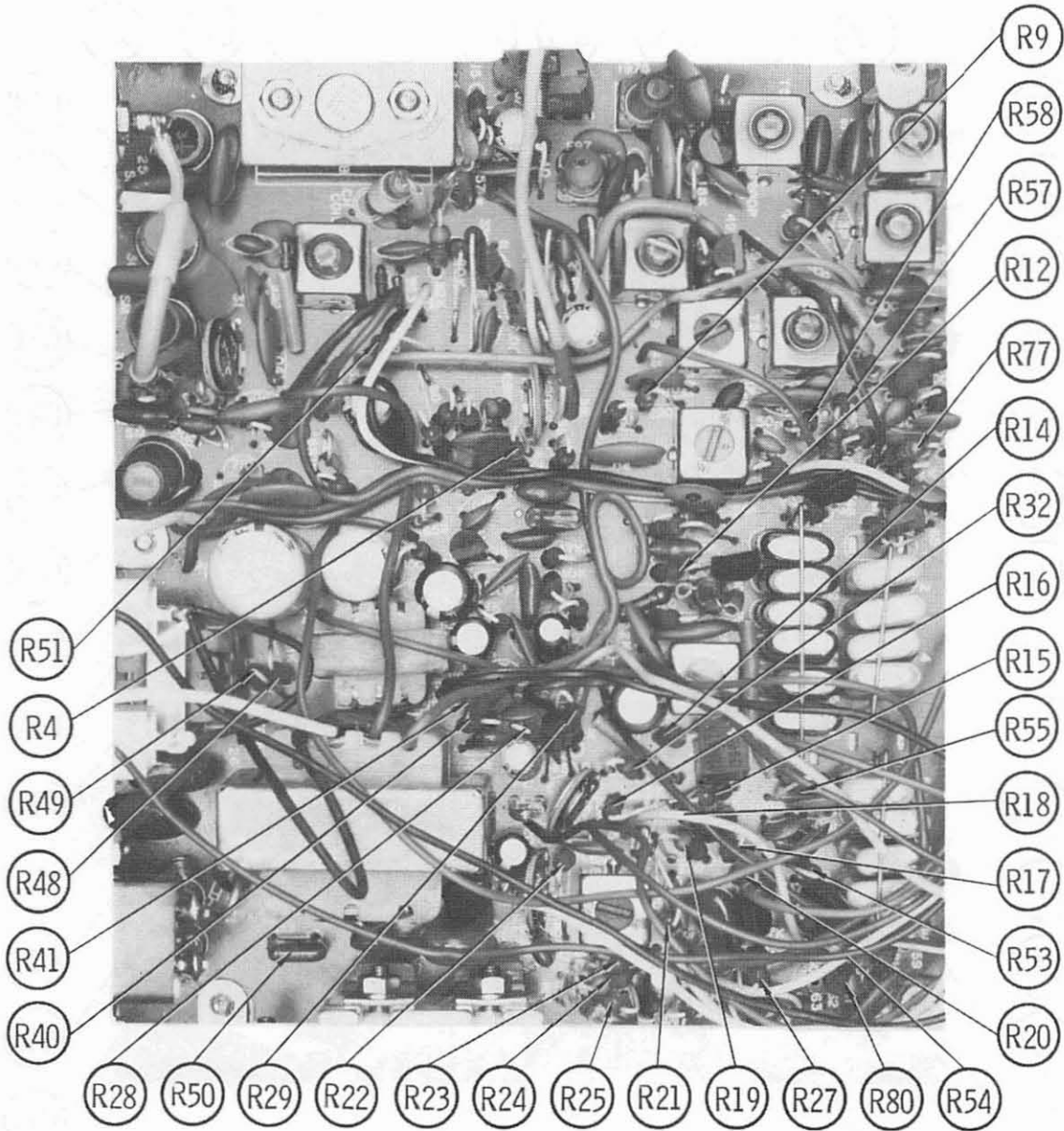


MAIN BOARD

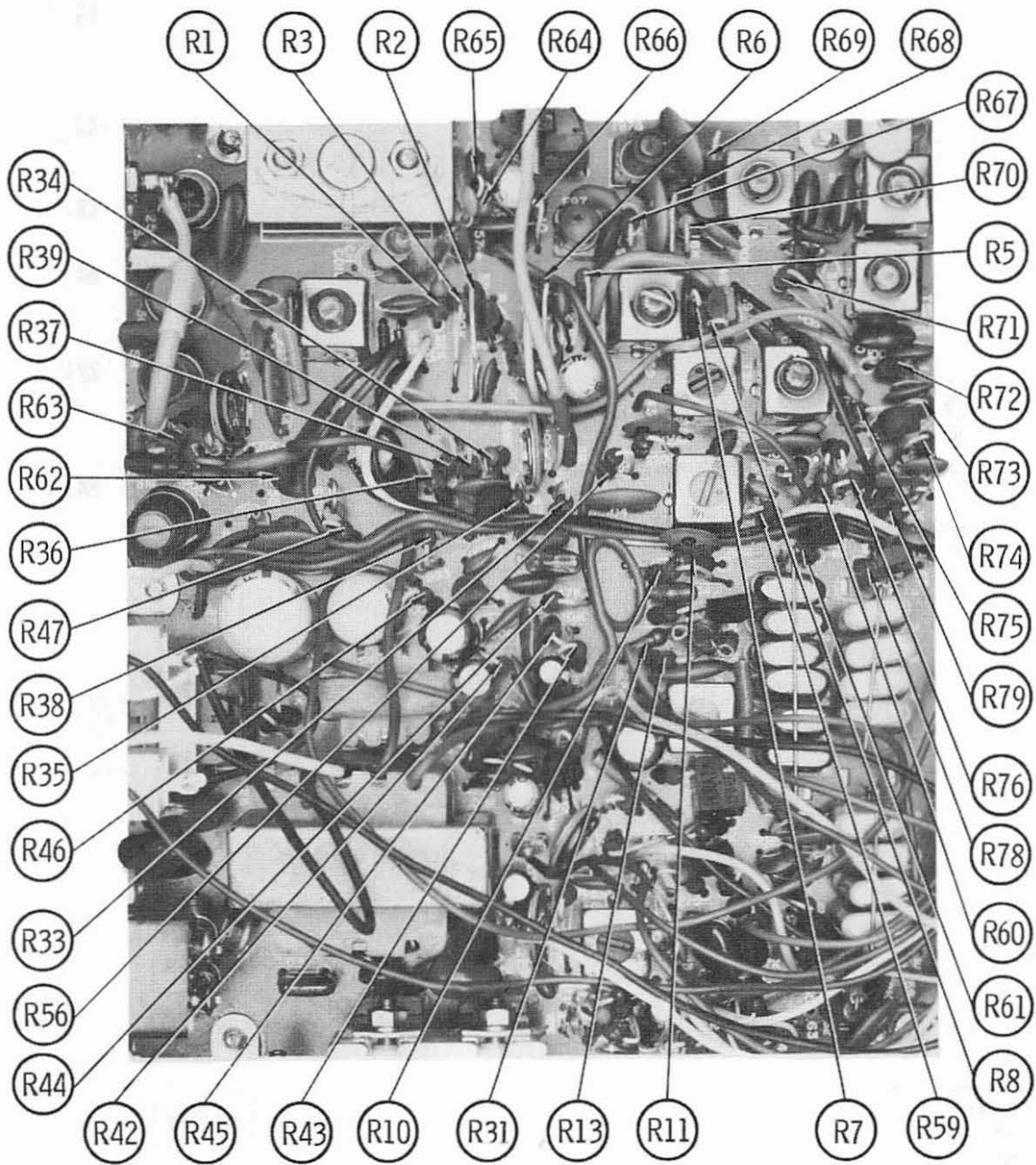




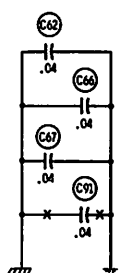
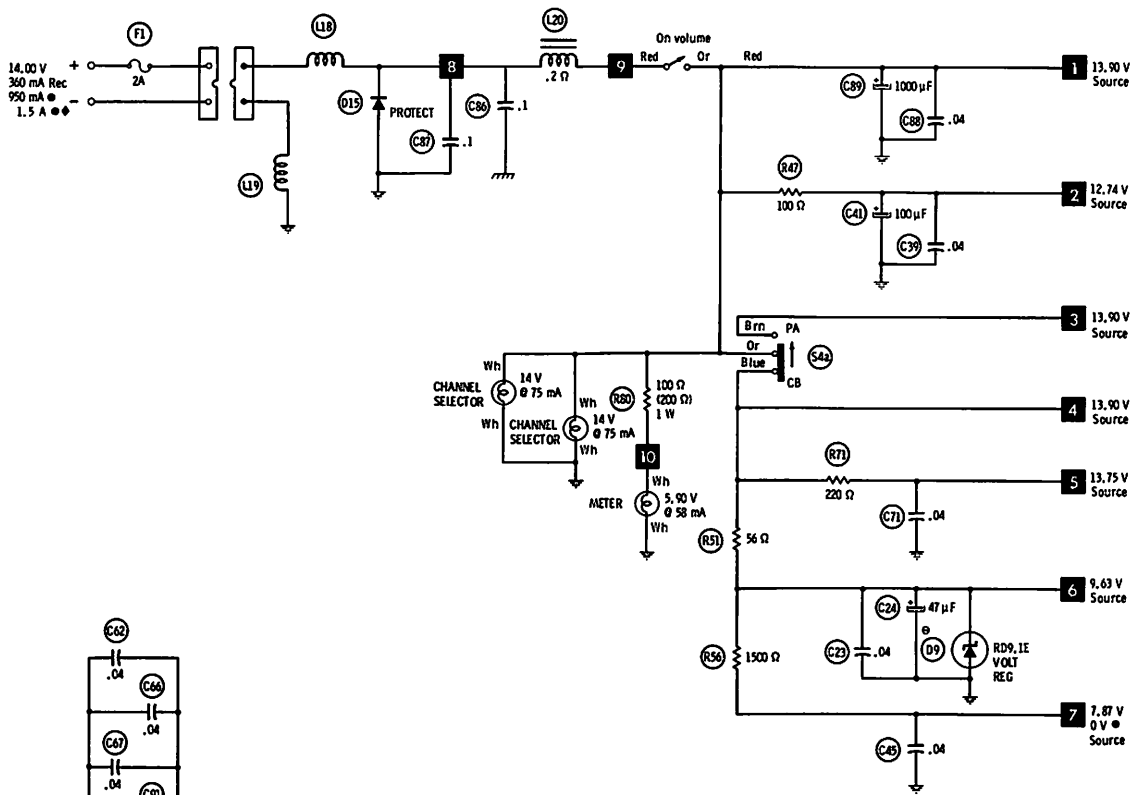
MAIN BOARD



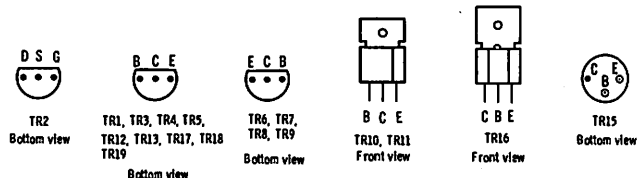
MAIN BOARD



MAIN BOARD



Transistor Terminal Guides



-x- Circuitry not used in some versions  
 --- Circuitry used in some versions  
 ○ See parts list  
 ⊕ Ground  
 r/n Chassis  
 Measurements with switching as shown unless noted:  
 ■ Squelch fully clockwise    ♦ 100% modulation  
 ● Transmit  
 Supply voltage maintained as shown at input.  
 Voltages measured with digital meter, no signal.  
 Controls adjusted for normal operation.  
 Arrow at control indicates direction of advance.  
 Terminal identification may not be found on unit.  
 Resistors are 1/2W or less, 5% unless noted.  
 Value in ( ) used in some versions.

Chan	Crystal Complement
1	X1, X7, X11
2	X1, X8, X12
3	X1, X9, X13
4	X1, X10, X14
5	X2, X7, X11
6	X2, X8, X12
7	X2, X9, X13
8	X2, X10, X14
9	X3, X7, X11
10	X3, X8, X12
11	X3, X9, X13
12	X3, X10, X14
13	X4, X7, X11
14	X4, X8, X12
15	X4, X9, X13
16	X4, X10, X14
17	X5, X7, X11
18	X5, X8, X12
19	X5, X9, X13
20	X5, X10, X14
21	X6, X7, X11
22	X6, X8, X12
23	X6, X10, X14

# PARTS LIST AND DESCRIPTION

(When ordering parts, state Model, Part Number, and Description.)

## SEMICONDUCTORS (Select replacement transistor for best results)

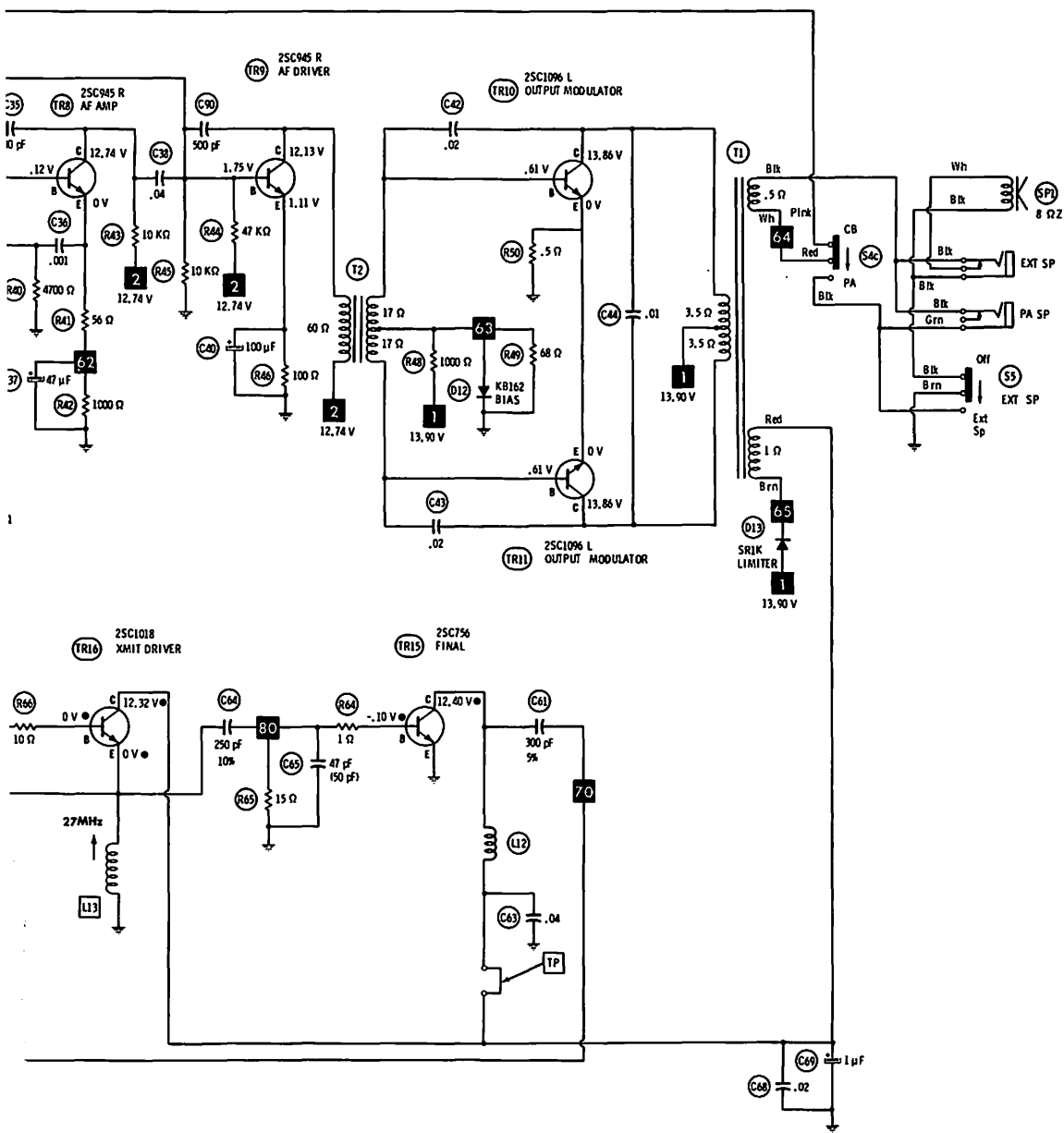
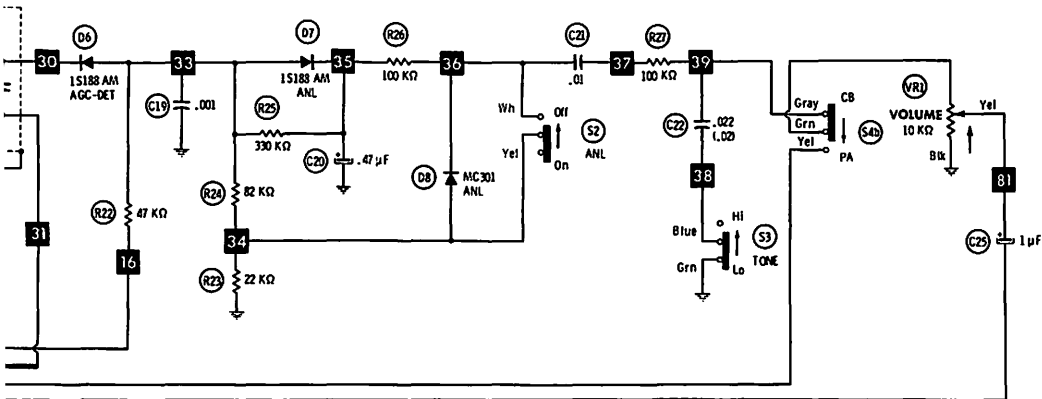
ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA						
			GENERAL ELECTRIC PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.
D1	1S953		GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177
D2	1S953		GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177
D3	1S953		GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177
D4	1S953		GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177
D5	1S188AM		1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D6	1S188AM		1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D7	1S188AM		1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D8	MC301		GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177
D9	RD-9.1E (9.1 Volt Zener)		GEZD-9.1	PTC505	HEPZ0412	RE 114	SK3060	RT-240	ECG139
D10	1S188AM		1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D11	1S953		GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177
D12	KB-162 (Varistor)								
D13	SR-1K		GE-504A	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116
D14	1S188AM		1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D15			GE-504A	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116
TR1	25C1908E		GE-20	PTC136	HEPS0015	RE 9	SK3124	RT-107A	ECG107
TR2	25K33GR		GE-FET-2	PTC152	HEPF0021	RE 45	SK3116	RT-175	ECG132
TR3	25C710C		GE-211	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A
TR4	25C710C		GE-211	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A
TR5	25C710C		GE-211	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A
TR6	25C945R		GE-210	PTC121	HEPS0015	RE 192	SK3124	RT-107A	ECG199
TR7	25C945R		GE-210	PTC121	HEPS0015	RE 192	SK3124	RT-107A	ECG199
TR8	25C945R		GE-210	PTC121	HEPS0015	RE 192	SK3124	RT-107A	ECG199
TR9	25C945R		GE-210	PTC121	HEPS0015	RE 192	SK3124	RT-107A	ECG199
TR10	25C1096L		GE-28	PTC110	HEPS5027	RE 42	SK3054	RT-197	ECG186A
TR11	25C1096L		GE-28	PTC110	HEPS5027	RE 42	SK3054	RT-197	ECG186A
TR12	25C710C		GE-211	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A
TR13	25C710C		GE-211	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A
TR15	25C756(10)		GE-46	PTC158				RT-182	ECG282
TR16	25C1018(11)		GE-215						ECG299
TR17	25C620E		GE-20	PTC136	HEPS0014	RE 13	SK3122	RT-172	ECG123A
TR18	25C710C		GE-211	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A
TR19	25C710C		GE-211	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A

(10) Rating, 10 watts @ 4.0 amps.

(11) Rating, 4 watts @ 1.0 amps.

## ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA			
		MFR. PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C11	1 100V		PC1-100	MTV1CB100	TVA-1330
C20	.47 50V		PC1-50	VTTR47B63	EV-1610
C24	47 25V		PC50-25	VTT47E25	EV-1326
C25	1 50V		PC1-50	MTV1CB50	EV-1615
C26	4.7 25V		PC5-50	VTT4R7A50	EV-1319
C27	1 50V		PC1-50	MTV1CB50	EV-1615
C32	47 25V		PC50-25	VTT47E25	EV-1326
C37	47 10V		PC50-16	VTT47D16	EV-1226
C40	100 10V		PC100-16	VTT100F16	EV-1230
C41	100 16V		PC100-16	VTT100F16	EV-1230
C69	1 100V		PC1-100	MTV1CB100	TVA-1330
C89	1000 16V		PC1000-16	VTT1000L16	EV-1260



ROBYN MODEL LB-23A

# PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

## CAPACITORS

ITEM No.	RATING	MFRG. PART No.	REPLACEMENT DATA			
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C1	.02		DC-203		MAG5012	2SS-S20
C2	.01		DC-103	GP10000	MAG5011	2SS-S10
C3	.02		DC-203		MAG5012	2SS-S20
C4	.04				GP140	5GA-S40
C5	25			CD6ED240J03	SX424	MS-424
C6	10		DTZ-10	NP010	CN0410	10TCC-Q10
C7	.001		DD-102	GP1000	GP210	2SS-D10
C8	.02		DC-203		MAG5012	2SS-S20
C9	1				CN0510	10TCC-V10
C10	.01		DC-103	GP10000	MAG5011	2SS-S10
C12	.02		DC-203		MAG5012	2SS-S20
C13	5					10TCC-V50
C14	.04				GP140	5GA-S40
C15	.001 5%			CD19FD102J03	SX210	424ME1001J501
C16	.04				GP140	5GA-S40
C17	.04 50V			DPMS6S39	PVC6139	6PS-S39
C18	1				CN0510	10TCC-V10
C19	.001			DPMS6D1	EWFTA210	1PB-D10
C21	.01			DPMS4S1	EWFTA110	1PB-S10
C22	.022			DPMS2S22	EWFTA122	1PB-S22
C23	.04				GP140	5GA-S40
C28	.04			DPMS6S39	PVC6139	6PS-S39
C29	.04			DPMS6S39	PVC6139	6PS-S39
C30	500		DD-501	GP500	GP350	10TS-T50
C31	.001		DD-102	GP1000	GP210	2SS-D10
C33	.01			DPMS4S1	EWFTA110	1PB-S10
C34	.1 12V		DC-104	MGP1	MAG5001	TG-P10
C35	500		DD-501	GP500	GP350	10TS-T50
C36	.001		DD-102	GP1000	GP210	2SS-D10
C38	.04			DPMS6S39	PVC6139	6PS-S39
C39	.01		DC-103	GP10000	MAG5011	2SS-S10
C42	.02			DPMS2S2	PVC212	2PS-S20
C43	.02			DPMS2S2	PVC212	2PS-S20
C44	.01			DPMS4S1	EWFTA110	1PB-S10
C45	.04				GP140	5GA-S40
C46	.02		DC-203		MAG5012	2SS-S20
C47	100 10%		DTZ-100	NP0100	CN0310	10TCC-T10
C48	500		DD-501	GP500	GP350	10TS-T50
C49	.04				GP140	5GA-S40
C50	47		DTZ-47	NP047	CN0447	10TCC-Q47
C51	47		DTZ-47	NP047	CN0447	10TCC-Q47
C52	25		DTZ-25	NP025	CN0425	10TCC-Q25
C54	1				CN0510	10TCC-V10
C55	30			CD6ED300J03	SX430	
C56	.04				GP140	5GA-S40
C57	100 10%			CD10FD101J03	SX310	424MC1000J501
C58	300 5%			CD15FD301J03	SX330	424ME3000J501
C59	250 5%			CD10FD251J03		
C60	.01		DC-103	GP10000	MAG5011	2SS-S10
C61	300 5%			CD15FD301J03	SX330	424ME3000J501
C62	.04				GP140	5GA-S40
C63	.04				GP140	5GA-S40
C64	250 10%			CD10FD251J03		
C65	47		DTZ-47	NP047	CN0447	10TCC-Q47
C66	.04				GP140	5GA-S40
C67	.04				GP140	5GA-S40
C68	.02		DC-203		MAG5012	2SS-S20
C70	150 5%			CD7FD151J03	SX315	424MC1500J501
C71	.04				GP140	5GA-S40
C72	.04				GP140	5GA-S40
C73	200		DD-201	GP200	GP320	10TS-T20
C74	3		DTZ-3R3	NP03P3	CN0533	10TCC-V33
C75	3		DTZ-3R3	NP03P3	CN0533	10TCC-V33
C76	100 10%			CD10FD101J03	SX310	424MC1000J501
C77	100 10%			CD10FD101J03	SX310	424MC1000J501
C78	.01		DC-103	GP10000	MAG5011	2SS-S10
C79	100 10%			CD10FD101J03	SX310	424MC1000J501
C80	.01		DC-103	GP10000	MAG5011	2SS-S10
C81	47		DTZ-47	NP047	CN0447	10TCC-Q47
C82	40				CN0439	10TCC-Q39
C83	.02		DC-203		MAG5012	2SS-S20





## PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

### CAPACITORS(cont)

ITEM No.	RATING	MFR. PART No.	REPLACEMENT DATA			
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C84	.001		DD-102	GP1000	GP210	2SS-D10
C85	200		DD-201	GP200	GP320	10TS-T20
C86	.1			DPMS2P1	EWFA010	1PB-P10
C87	.1			DPMS2P1	EWFA010	1PB-P10
C88	.04		DC-104	MGPI	MAG5001	TG-P10
C90	500		DD-501	GP500	GP350	10TS-T50
C91	.04				GP140	5GA-S40

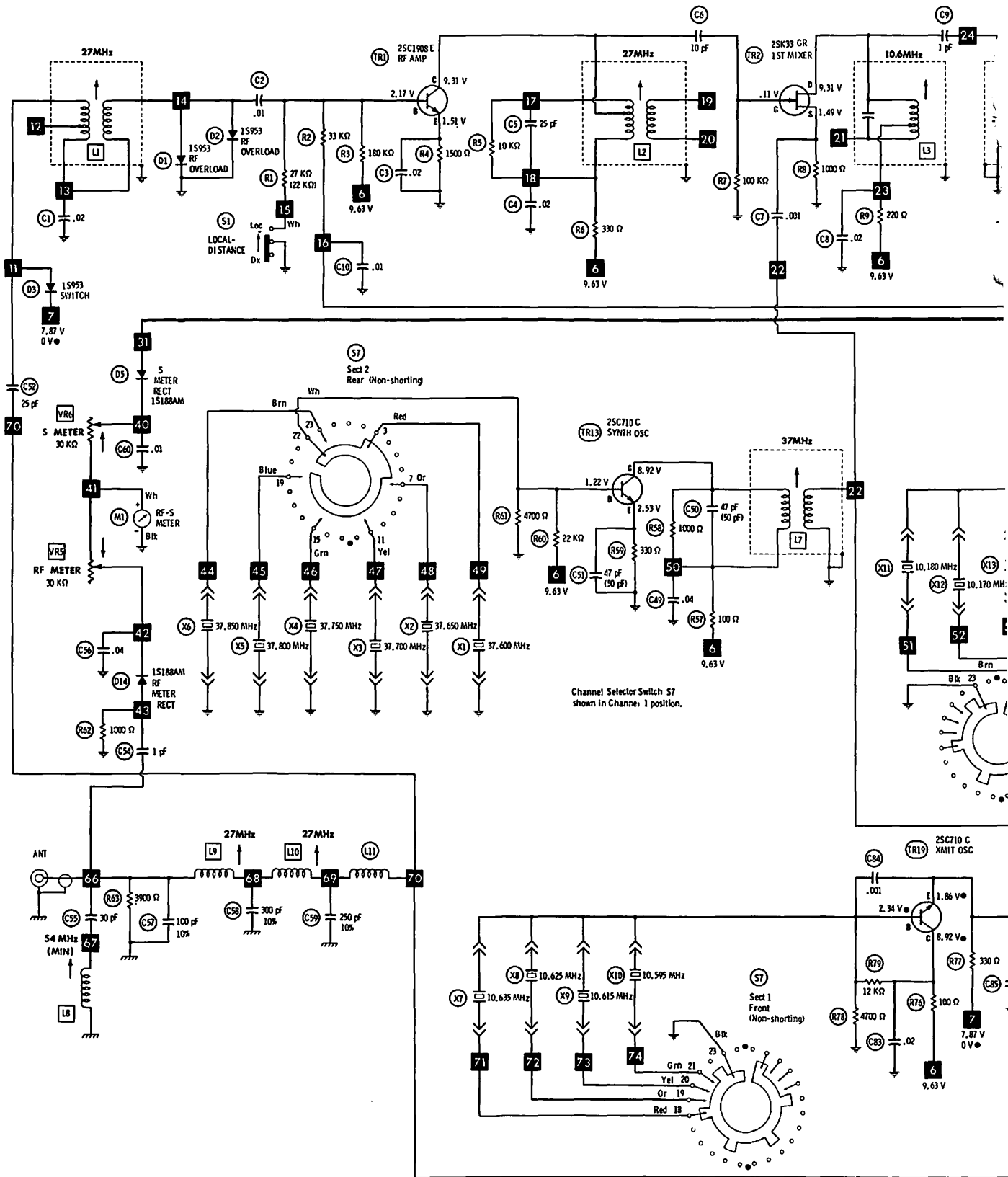
### CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM No.	FUNCTION	RESISTANCE	REPLACEMENT DATA				
			MFR. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	MALLORY PART No.	TRW PART No.
VR1	Volume/Power Switch	10K					
VR2	Squelch	10K					
VR3	Squelch Range	30K		T-50K (2)	C-503 (2)	MTC54L1 (2)	X201R503B (2)
VR4	Mic Gain	100K		T-100K (2)	C-104 (2)	MTC15L1 (2)	X201R104B (2)
VR5	RF Meter	30K		T-50K (2)	C-503 (2)	MTC54L1 (2)	X201R503B (2)
VR6	S Meter	30K		T-50K (2)	C-503 (2)	MTC54L1 (2)	X201R503B (2)

(2) Cut off one of the end terminals and bend to fit PC board.

### COILS (RF-IF)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
L1	Rec Ant (27MHz)	T60			
L2	Rec RF (27MHz)	T59			
L3	Rec Mixer (10.6MHz)	T56			
L4	Rec Mixer (10.6MHz)	T57			
L5	IF (455kHz)	N-52A			
L6	IF (455kHz)	N-51C			
L7	Synth Osc (37MHz)	T-61			
L8	TVI Trap (54MHz)	NS-1753			
L9	Pi Filter (27MHz)	NS-1752			
L10	Pi Filter (27MHz)	NS-1752			
L11	Final Tank	NS-1752			
L12	RF Choke	NS-1726			
L13	Xmit Driver (27MHz)	F-99			
L14	Xmit Amp (27MHz)	F-97			
L15	Harmonic Suppressor (27MHz)	T-58			
L16	Harmonic Suppressor (27MHz)	T-52			
L17	Xmit Mixer (27MHz)	T-52			
L18	RF Choke	NS-1724			
L19	RF Choke	NS-1724			



## PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

### FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000~)	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
L20	1.5A	.2	1.5mH				

### TRANSFORMER (Driver)

ITEM No.	TURNS RATIO			REPLACEMENT DATA			NOTES
	PRI.	SEC. 1	SEC. 2	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	

### TRANSFORMER (Audio Output)

ITEM No.	IMPEDANCE		REPLACEMENT DATA			NOTES
	PRI.	SEC.	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T2	128	8				

### SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
SP	3 5/8 PM 8 ohms		3A05Z8	

ROBYN MODEL LB-23A

# PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

## FUSE DEVICES

ITEM No.	DESCRIPTION	REPLACEMENT DATA						
		PART No.		BUSS PART No.		LITTELFUSE PART No.		WORKMAN PART No.
		DEVICE	HOLDER	DEVICE	HOLDER	DEVICE	HOLDER	DEVICE
F1	2 Amp Fast Acting			AGC2	HDJ	312002	150145	F62-2

## CRYSTALS

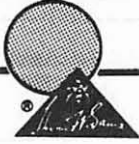
ITEM No.	CRYSTAL FREQUENCY IN MHz	MFGR. PART No.	CTS KNIGHTS PART No.	CHANNEL	ITEM No.	CRYSTAL FREQUENCY IN MHz	MFGR. PART No.	CTS KNIGHTS PART No.	CHANNEL
X1	37.600		DA32M37.600	1,2,3,4	X8	10.625		DB90M10.625	2,6,10,14,18,22
X2	37.650		DA32M37.650	5,6,7,8	X9	10.615		DB90M10.615	3,7,11,15,19
X3	37.700		DA32M37.700	9,10,11,12	X10	10.595		DB90M10.595	4,8,12,16,20,23
X4	37.750		DA32M37.750	13,14,15,16	X11	10.180		DC90M10.180	1,5,9,13,17,21
X5	37.800		DA32M37.800	17,18,19,20	X12	10.170		DC90M10.170	2,6,10,14,18,22
X6	37.850		DA32M37.850	21,22,23	X13	10.160		DC90M10.160	3,7,11,15,19
X7	10.635		DB90M10.635	1,5,9,13,17,21	X14	10.140		DC90M10.140	4,8,12,16,20,23

## MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
CF1	Filter		455kHz
M1	Meter		S/RF
S1	Switch		Local - Distance
S2	Switch		ANL
S3	Switch		Tone (Hi-Lo)
S4	Switch		PA-CB
S5	Switch		Ext Speaker
S7	Switch		Channel Selector

## WIRING DATA

General-use Hook-up Wire .....	Use BELDEN No. 8530 (Solid) Available in 12 Colors 8524 (Stranded) Available in 12 Colors
Power Cord, 2-Wire .....	Use BELDEN No. 17106 (Plastic) or 17126 (Rubber) -6 feet 17109 (Plastic) or 17129 (Rubber) -9 feet
Shielded Antenna Lead .....	Use BELDEN No. 8214 Lowest-loss (RG-8/U Type) 8237 Low-loss (RG-8/U) 8240 (Solid) Miniature (RG-58/U) 8259 (Stranded) Miniature (RG-58A/U)
Coiled Microphone Cable .....	Use BELDEN No. 8491 4-Conductor (2 shielded, 2 unshielded) Neoprene



# PHOTOFACT<sup>®</sup> with

# CIRCUITRACE<sup>®</sup>

For Supplier Address See PHOTOFACT Index

## NOTE

Repair or adjustment of transmitter circuits must be under supervision of a person with first-or second-class radiotelephone license.

(Refer to FCC Rules and Regulations Part 95, Subpart C & D.)

The frequency of the transmitter should be checked periodically with a secondary frequency standard to insure proper and legal operation.

Best results will be obtained when adjusting the final RF output circuit if the antenna normally used is connected and the chassis is as nearly in the cabinet as possible.

Connect either 50-ohm dummy load or the normally used antenna system.



ROSS/ELECTROPHONIC MODEL CB-1000

MODEL CB-1000

**HOWARD W. SAMS & CO., INC.** Indianapolis, Indiana 46206

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6CY366

## ALIGNMENT INSTRUCTIONS

<b>Suggested Alignment Tools:</b> L1, L22 ..... L6, L7, L8 ..... ALL other tunable coils and transformers..	<b>GC ELECTRONICS:</b> 9300 5000, 8290 9440
--	--

### RECEIVER

Connect an AC VTVM or AF Wattmeter across speaker voice coil. Adjustments made with 14-volt DC input. Adjust volume control to obtain suitable reading.				
SIGNAL GENERATOR	GEN FREQ	CHANNEL	ADJUST	REMARKS
High side thru .01uF to Q3 Base, low side to ground.	455kHz, 1000Hz @ 30% modulation.	Any	L8, L9	Set generator output low enough to prevent AGC limiting. Adjust for maximum.
High side thru .01uF to antenna jack, low side to ground.	27.115MHz, 1000Hz @ 30% modulation.	13	L4, L5, L6, L7, L10	Set generator output low enough to prevent AGC limiting. Adjust for maximum.

### RECEIVER ADJUSTMENTS

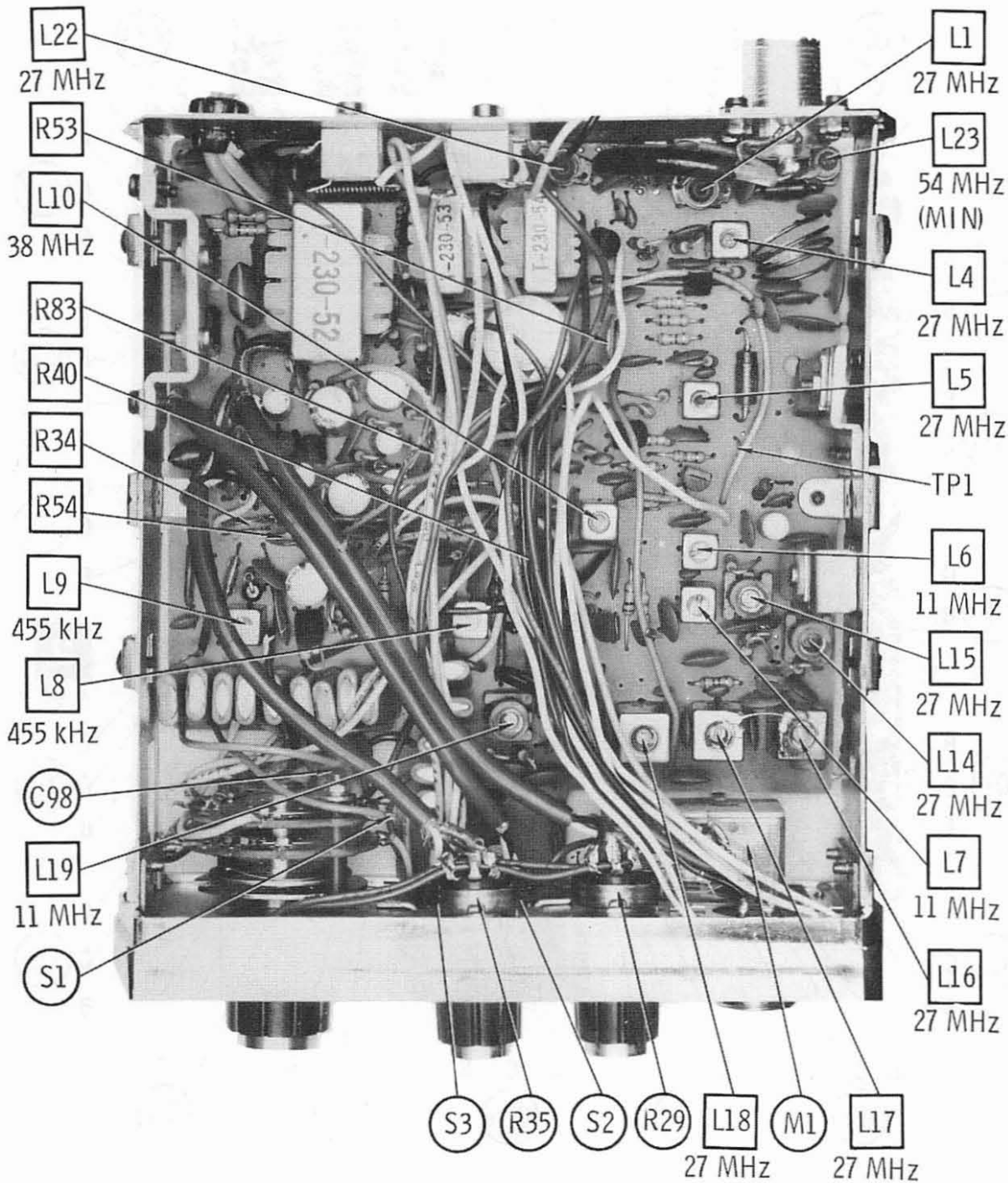
Connect an AC VTVM or AF Wattmeter across speaker voice coil. Adjustments made with 14-volt DC input. Adjust volume control to obtain suitable reading.				
SIGNAL GENERATOR	GEN FREQ	CHANNEL	ADJUST	REMARKS
<b>BIAS, RECEIVER OSCILLATOR</b> High side thru .01uF to antenna jack, low side to ground.	27.115MHz, 1000Hz @ 30% modulation, output 1uV.	13	R40	Set squelch fully counter-clockwise. Adjust for maximum.
<b>SQUELCH RANGE</b> High side thru .01uF to antenna jack, low side to ground.	27.115MHz, 1000Hz @ 30% modulation, output 1000uV.	13	R34	Set squelch control fully clockwise. Adjust so that squelch just breaks.
<b>S METER</b> High side thru .01uF to antenna jack, low side to ground.	27.115MHz, 1000Hz @ 30% modulation, output 20uV.	13	R54	Adjust for 30 on S scale.

### TRANSMITTER

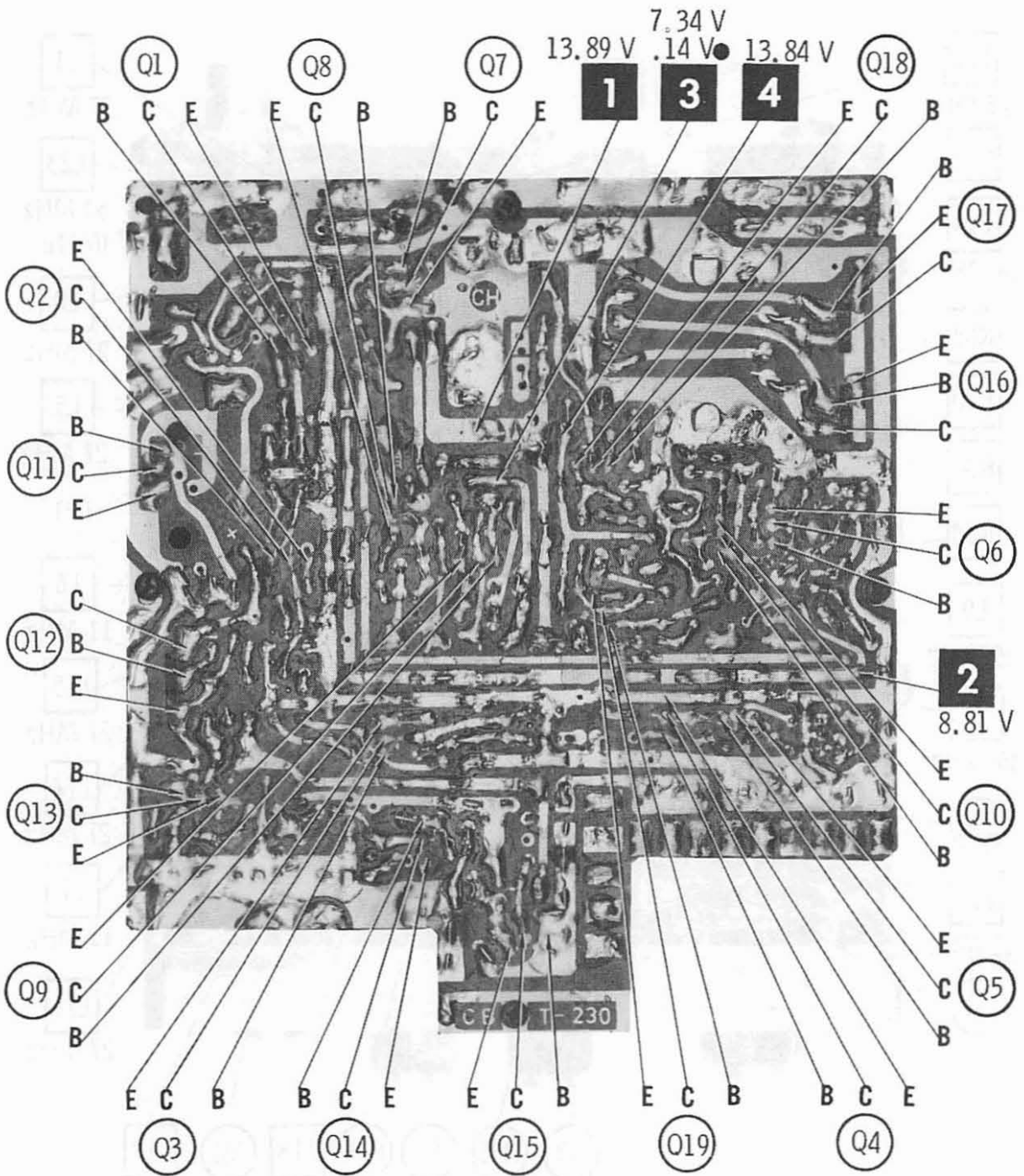
Connect an RF Wattmeter or 50-ohm, 25-watt dummy load to antenna connector. Adjustments made with 14-volt DC input.		
INDICATOR	ADJUST	REMARKS
<b>OSCILLATOR, MIXER, BUFFER, DRIVER, FINAL</b> RF Wattmeter	L19, L18, L17, L16, L15, L14	Channel selector to Ch. 13. Key transmitter. Adjust for maximum.
<b>OUTPUT POWER</b> RF Wattmeter	L1, L22	Key transmitter. Adjust for 4 watts output.
<b>TVI TRAP</b> TV (Ch. 2)	L23	Key transmitter. Adjust for MINIMUM interference on TV.

### TRANSMITTER ADJUSTMENTS

Connect an RF Wattmeter or 50-ohm, 25-watt dummy load to antenna connector. Adjustments made with 14-volt DC input.		
INDICATOR	ADJUST	REMARKS
<b>AMC</b> Modulation Meter connected to antenna jack.	R83	Disable AMC. Inject a 1000Hz 110% modulated signal at mic input. Key transmitter. Adjust for 100% modulation maximum. Restore AMC to operation.
<b>RF PANEL METER</b> RF Wattmeter	R53	Adjust so that panel RF meter reads 9 on RFO scale.

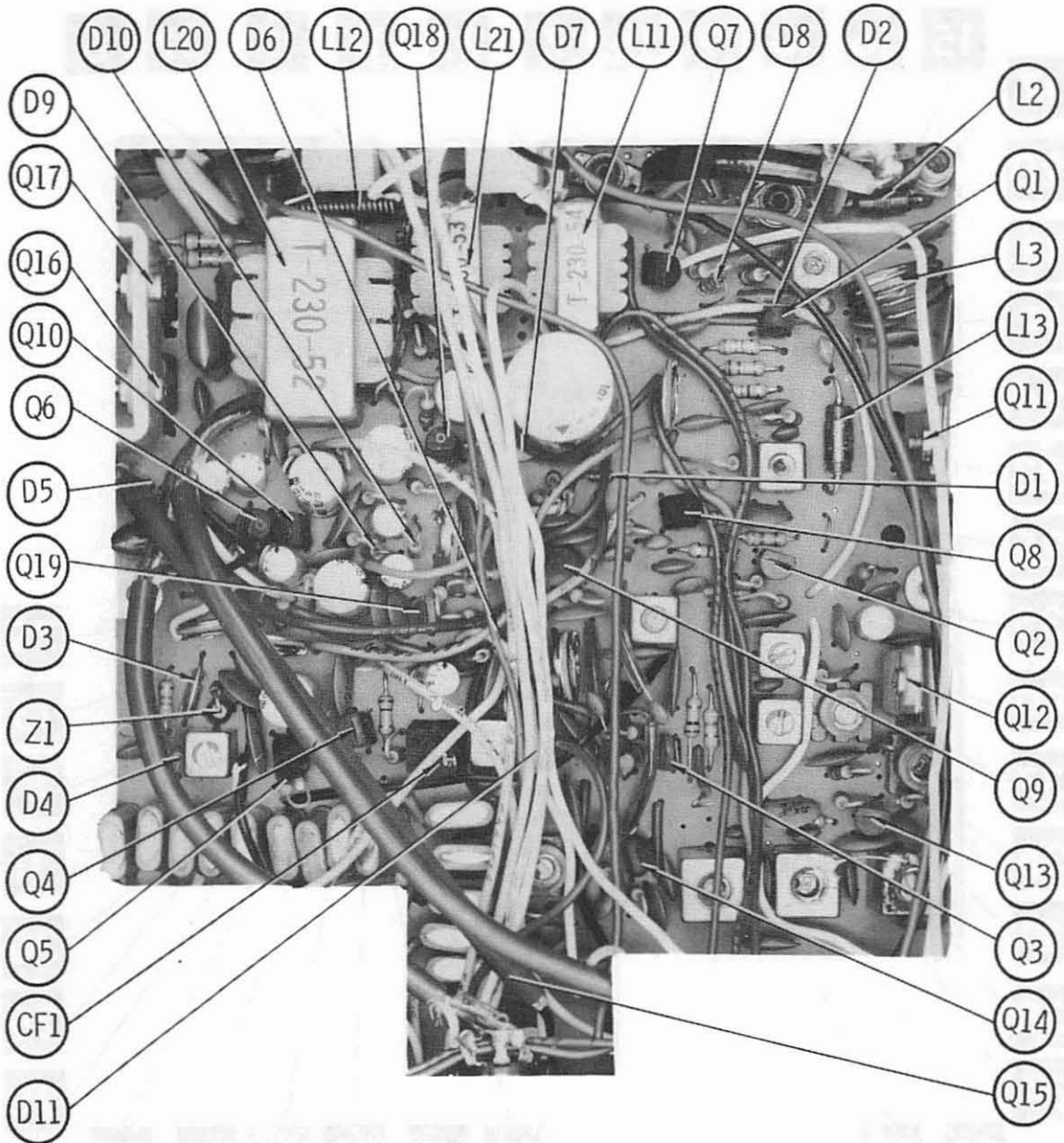


CHASSIS - BOTTOM

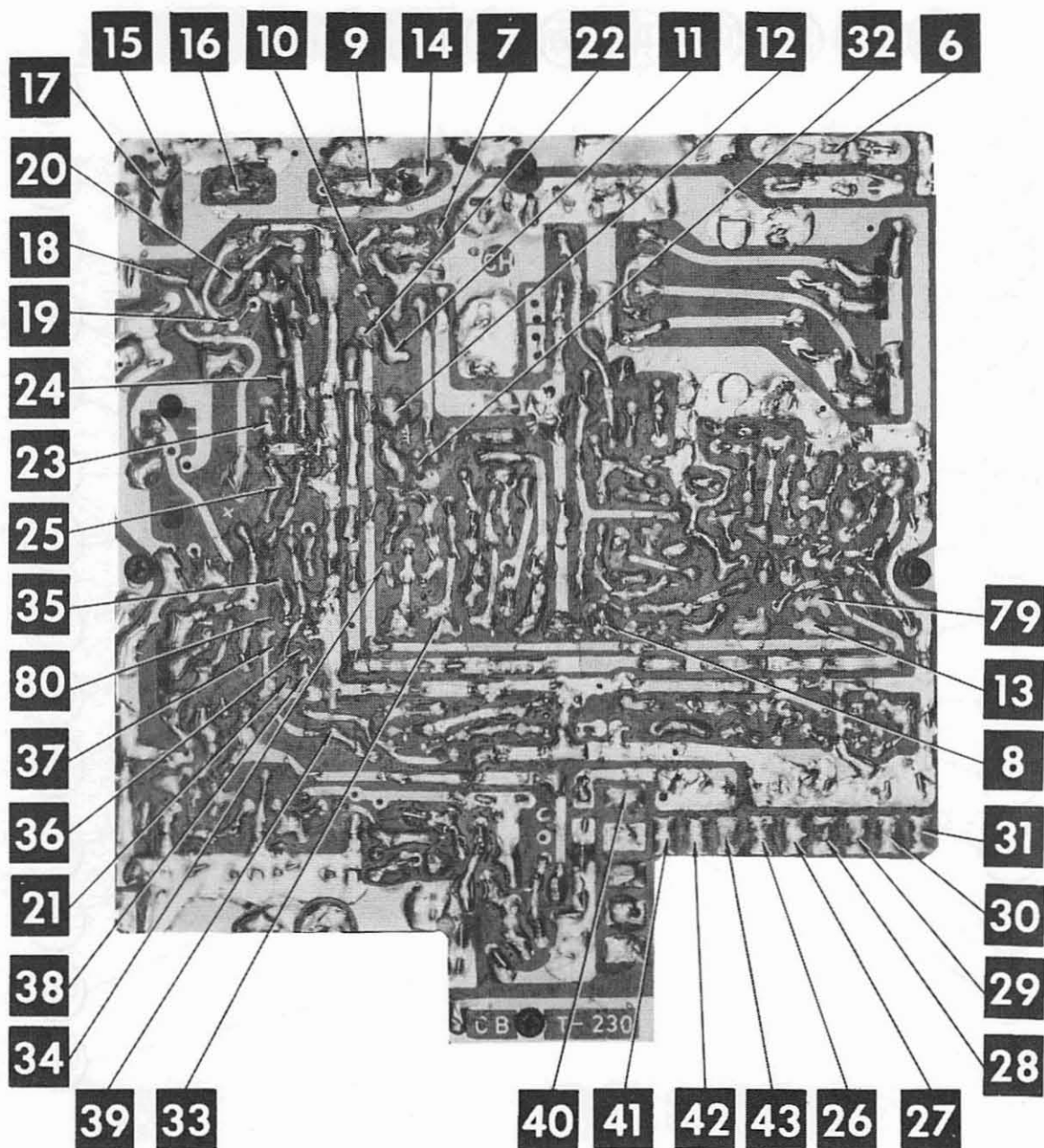


MAIN BOARD

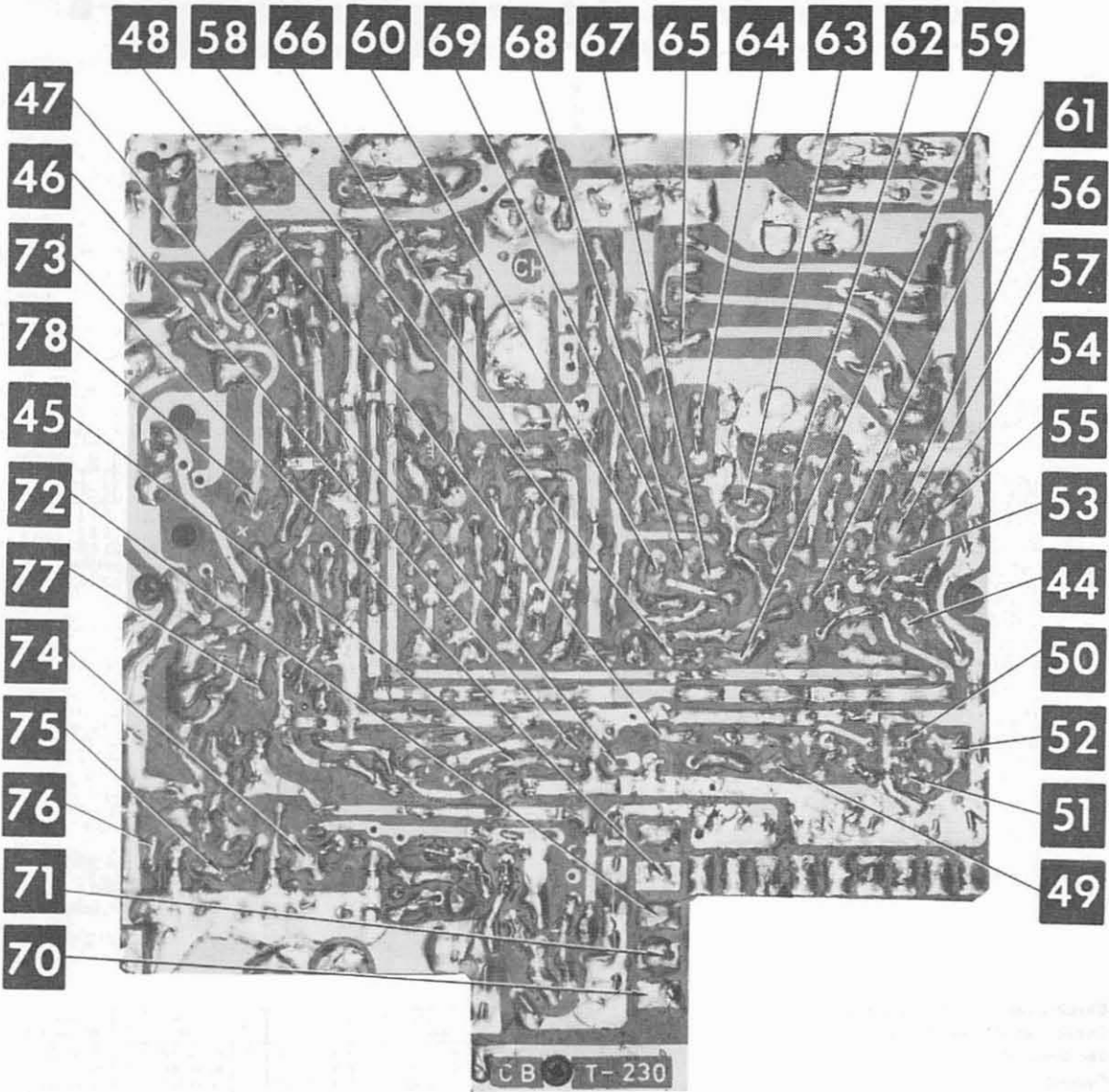




MAIN BOARD

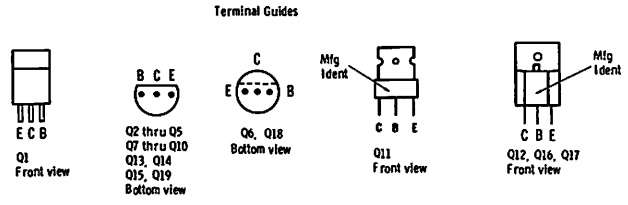
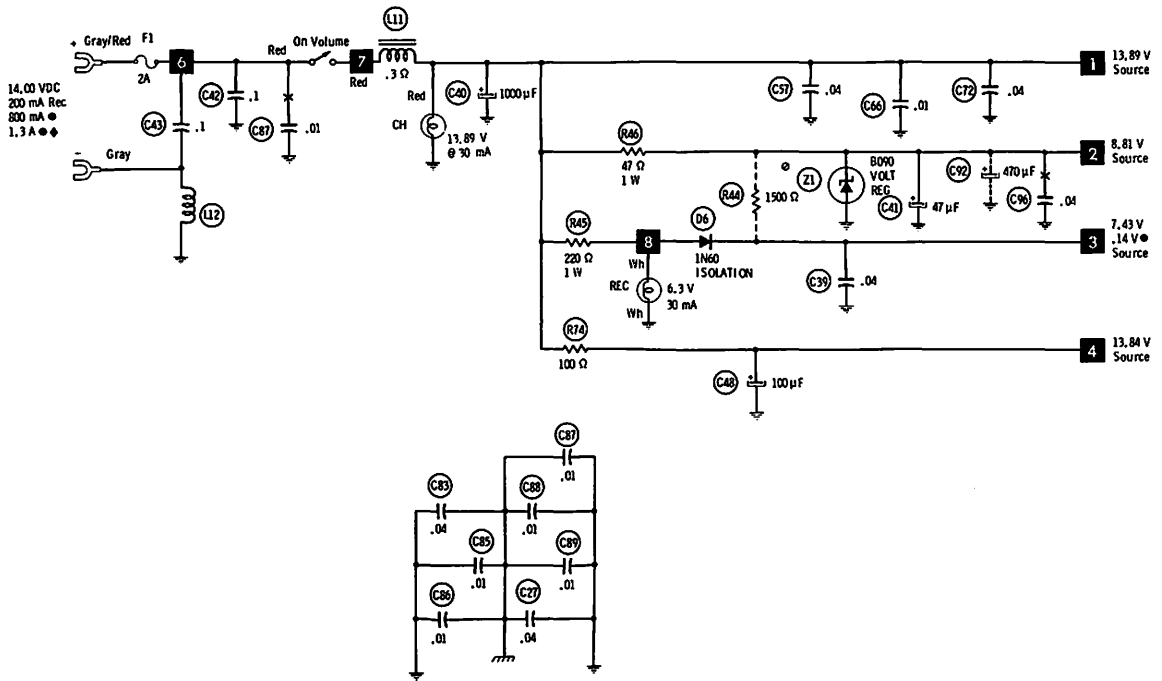


MAIN BOARD



ROSS/ELECTROPHONIC MODEL CB-1000

MAIN BOARD



—\*— Circuitry not used in some versions

--- Circuitry used in some versions

⊕ See parts list

⊕ Ground

Chassis

Measurements with switching as shown unless noted:

■ Squelch fully clockwise    ♦ 100% modulation

● Transmit    ▲ AM

Supply voltage maintained as shown at input.

Voltages measured with digital meter, no signal.

Controls adjusted for normal operation.

Arrow at control indicates direction of advance.

Terminal identification may not be found on unit.

Resistors are 1/2W or less, 5% unless noted.

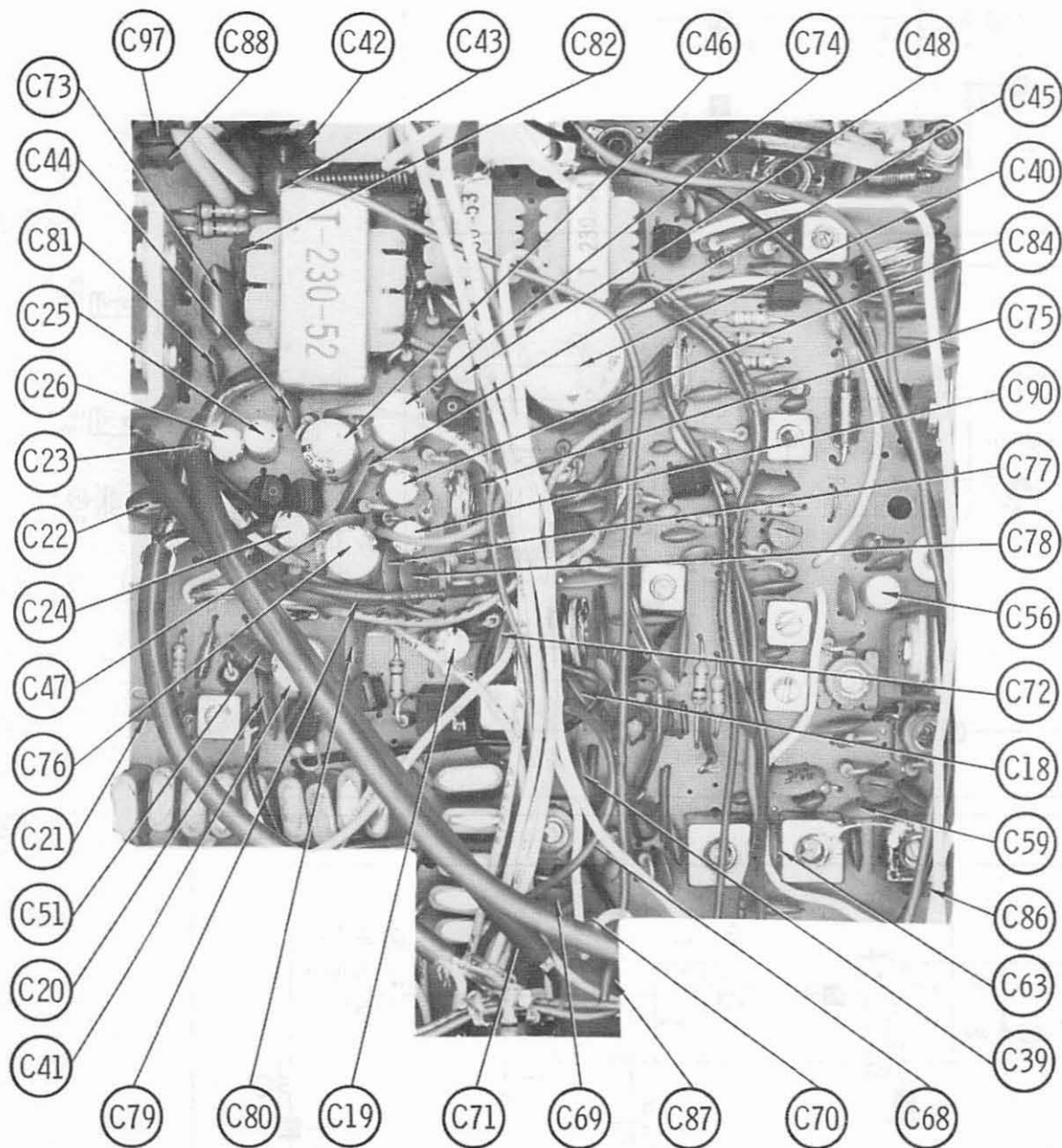
Value in ( ) used in some versions.

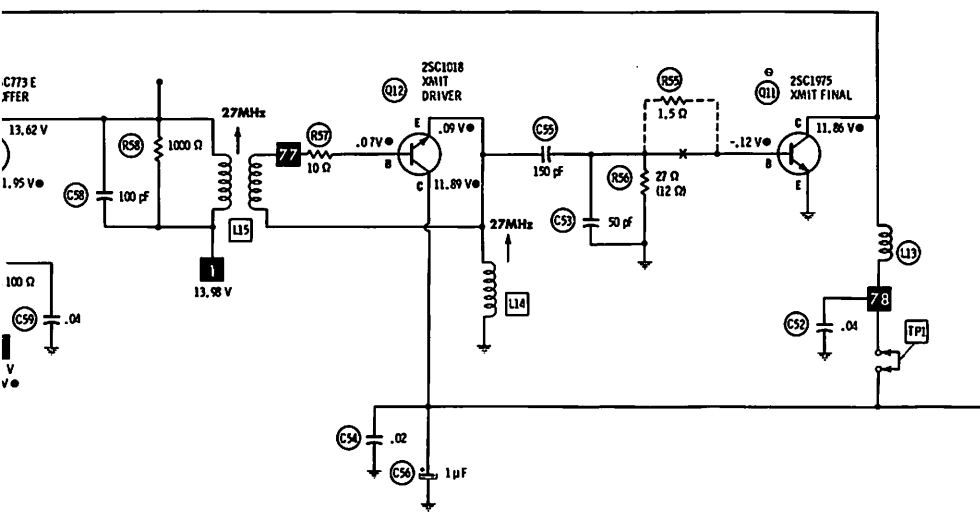
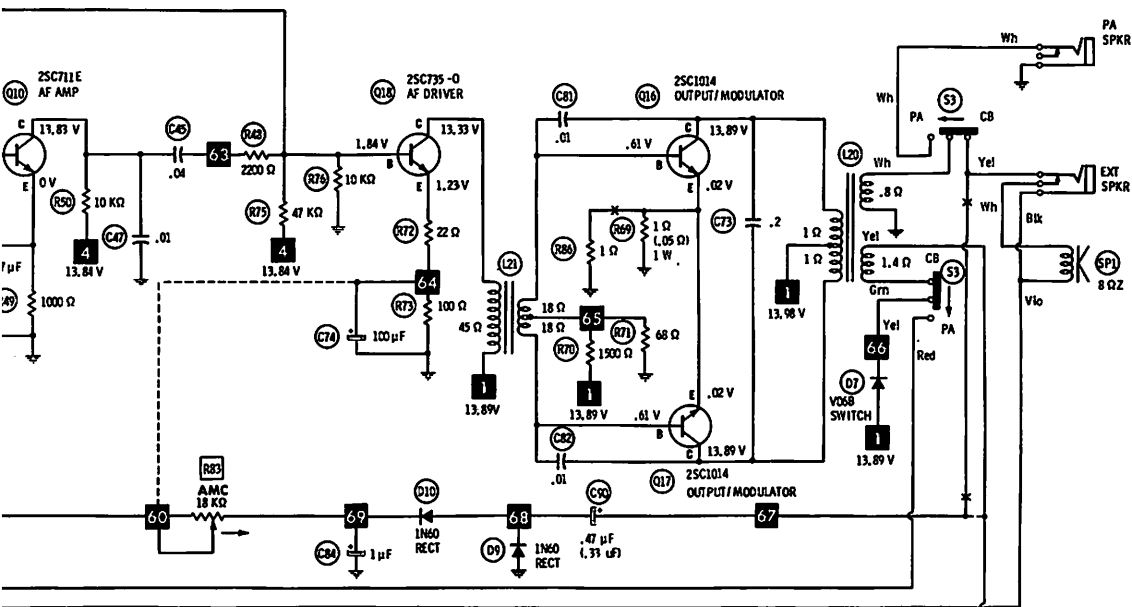
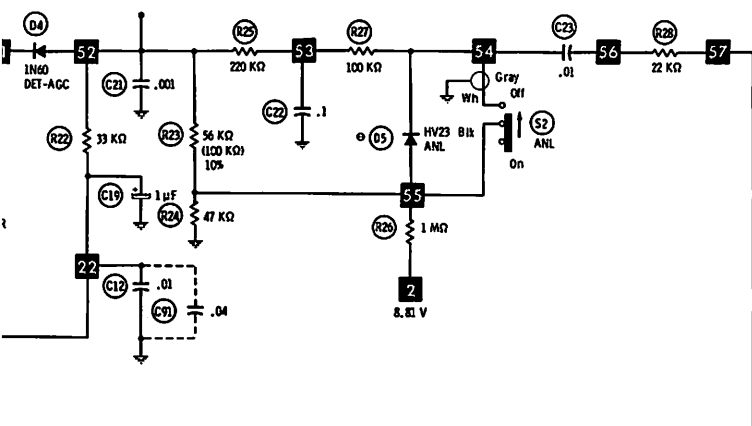
A PHOTOFAC STANDARD NOTATION SCHEMATIC

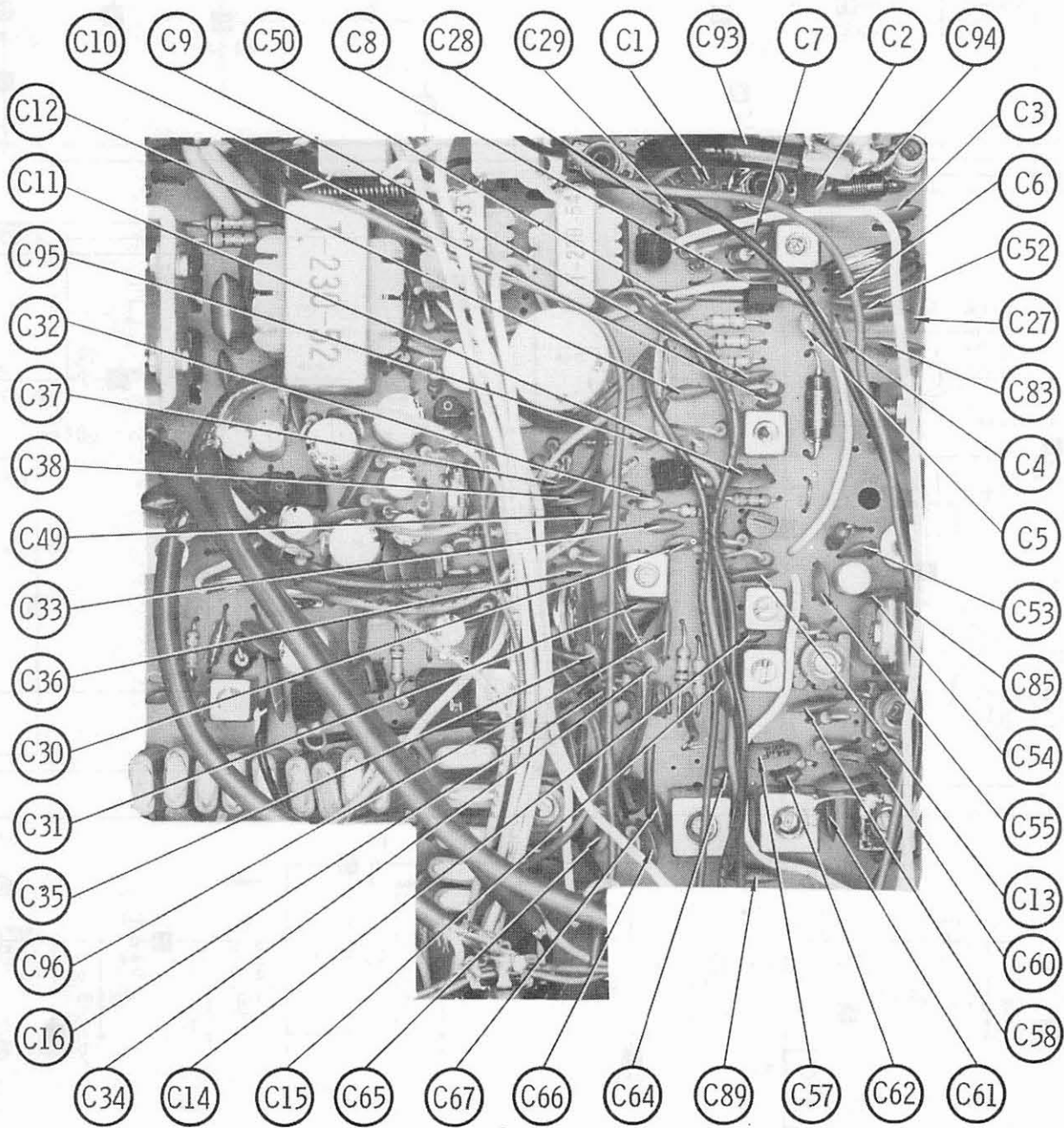
WITH CIRCUITRACE™

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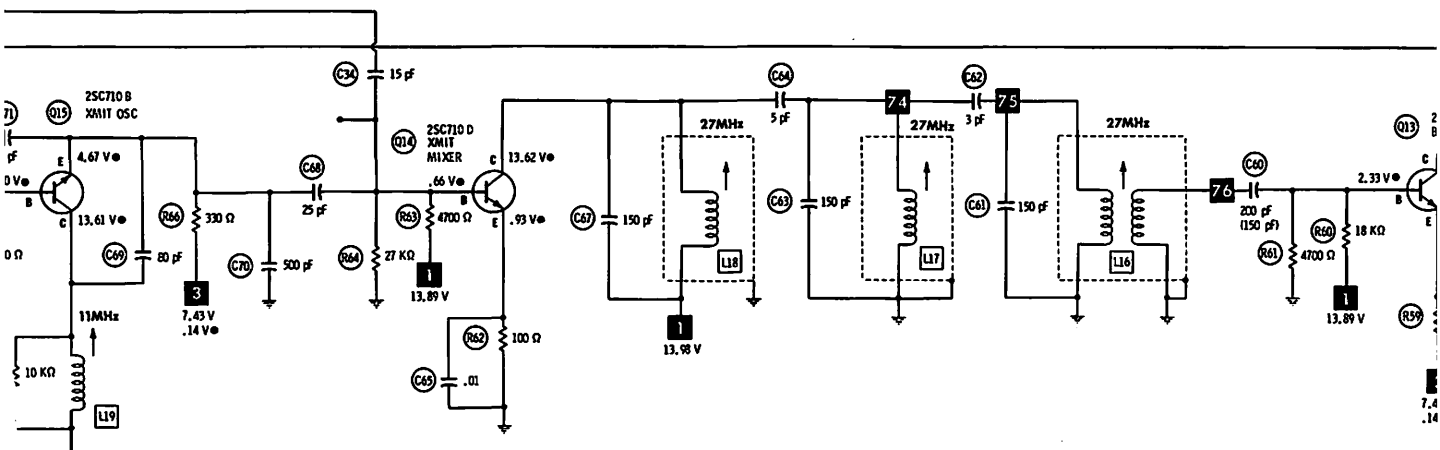
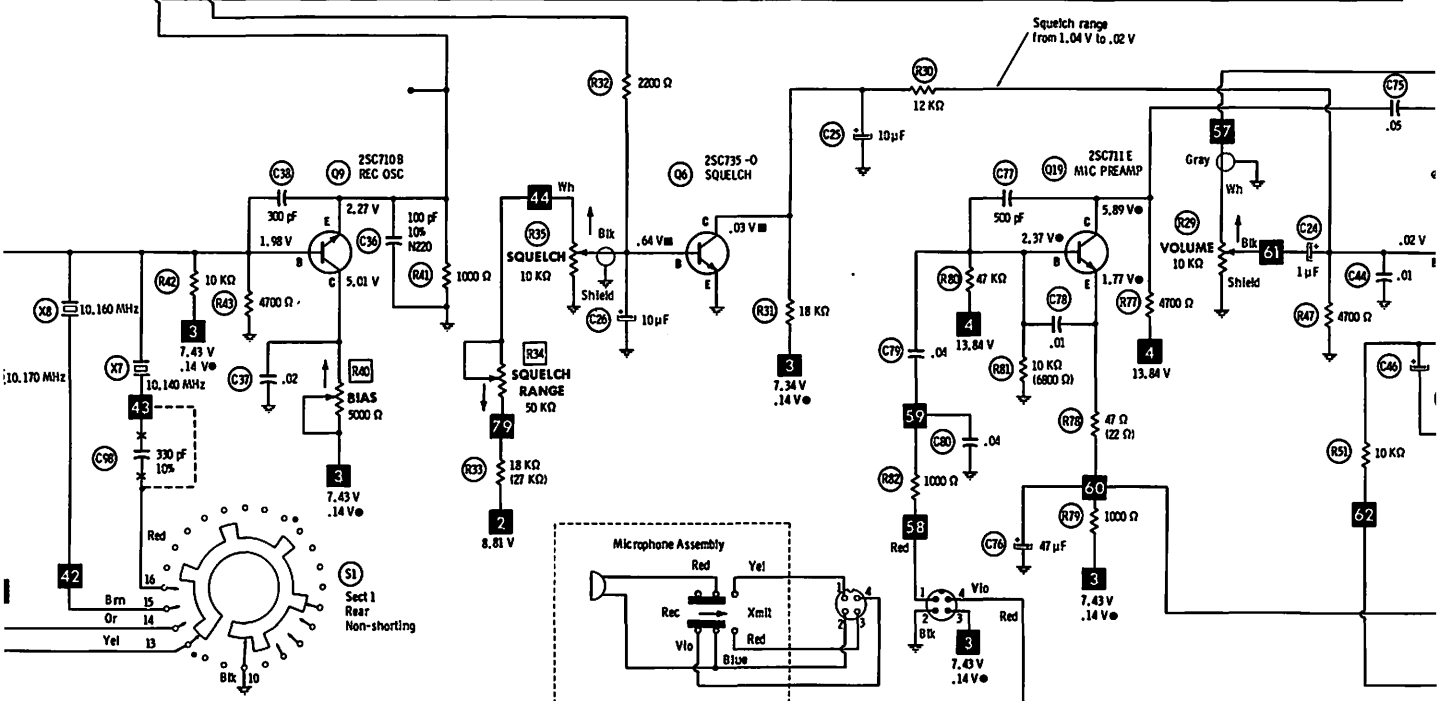
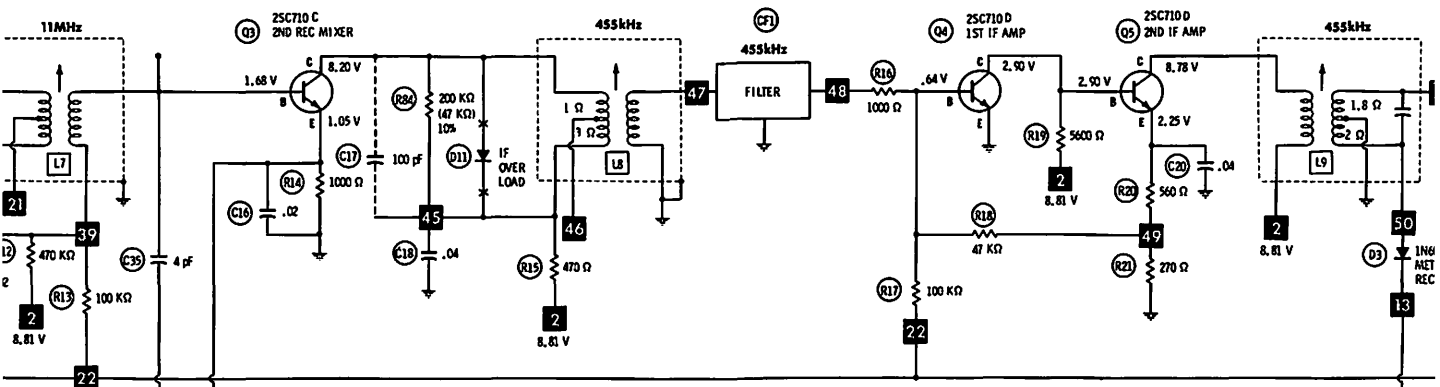
Chan	Crystal Complement	Chan	Crystal Complement	Chan	Crystal Complement	Chan	Crystal Complement
1	X1, X10, X14	7	X2, X8, X12	13	X4, X10, X14	19	X5, X8, X12
2	X1, X9, X13	8	X2, X7, X11	14	X4, X9, X13	20	X5, X7, X11
3	X1, X8, X12	9	X3, X10, X14	15	X4, X8, X12	21	X6, X10, X14
4	X1, X7, X11	10	X3, X9, X13	16	X4, X7, X11	22	X6, X9, X13
5	X2, X10, X14	11	X3, X8, X12	17	X5, X10, X14		
6	X2, X9, X13	12	X3, X7, X11	18	X5, X9, X13	23	X6, X7, X11



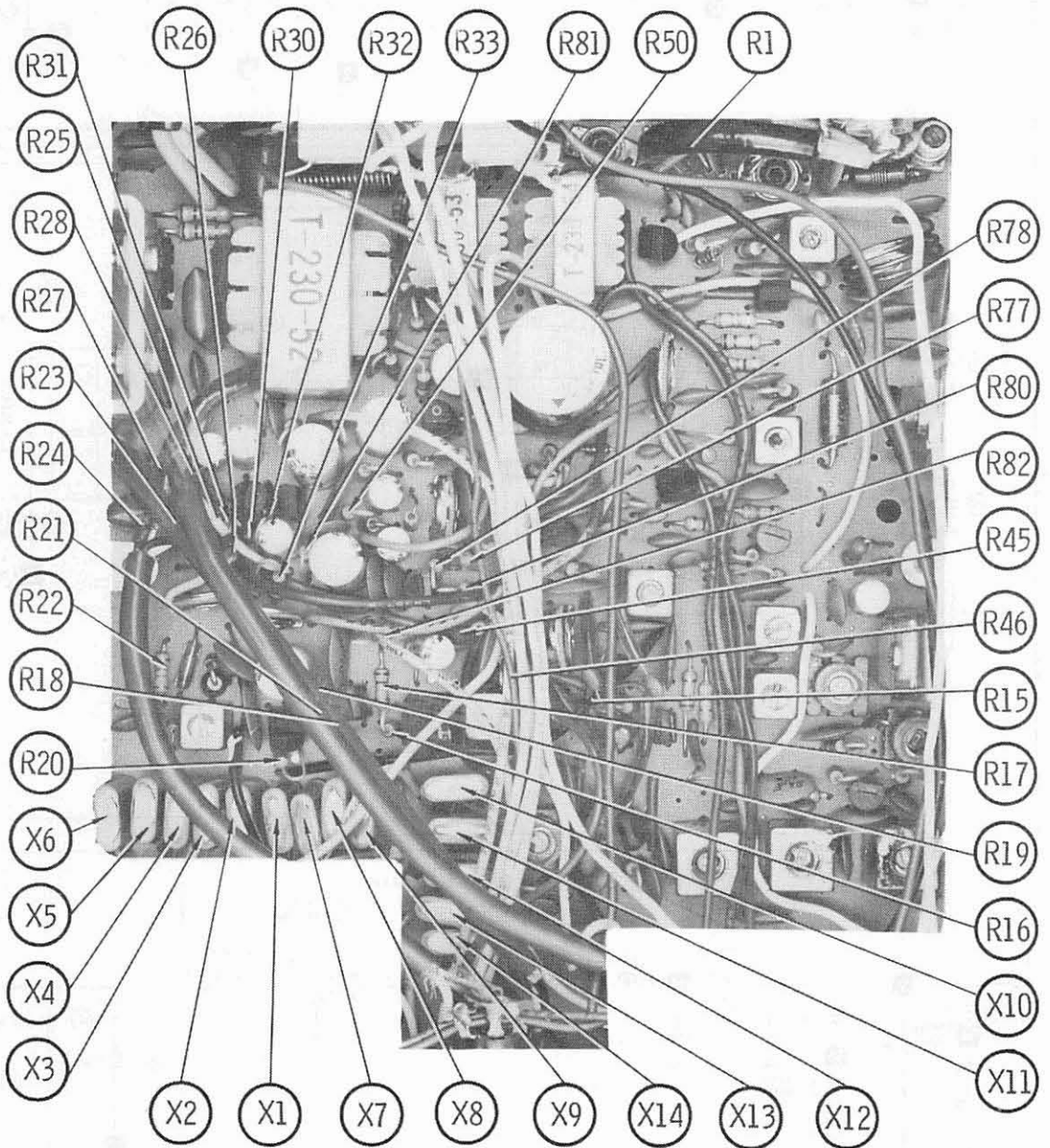




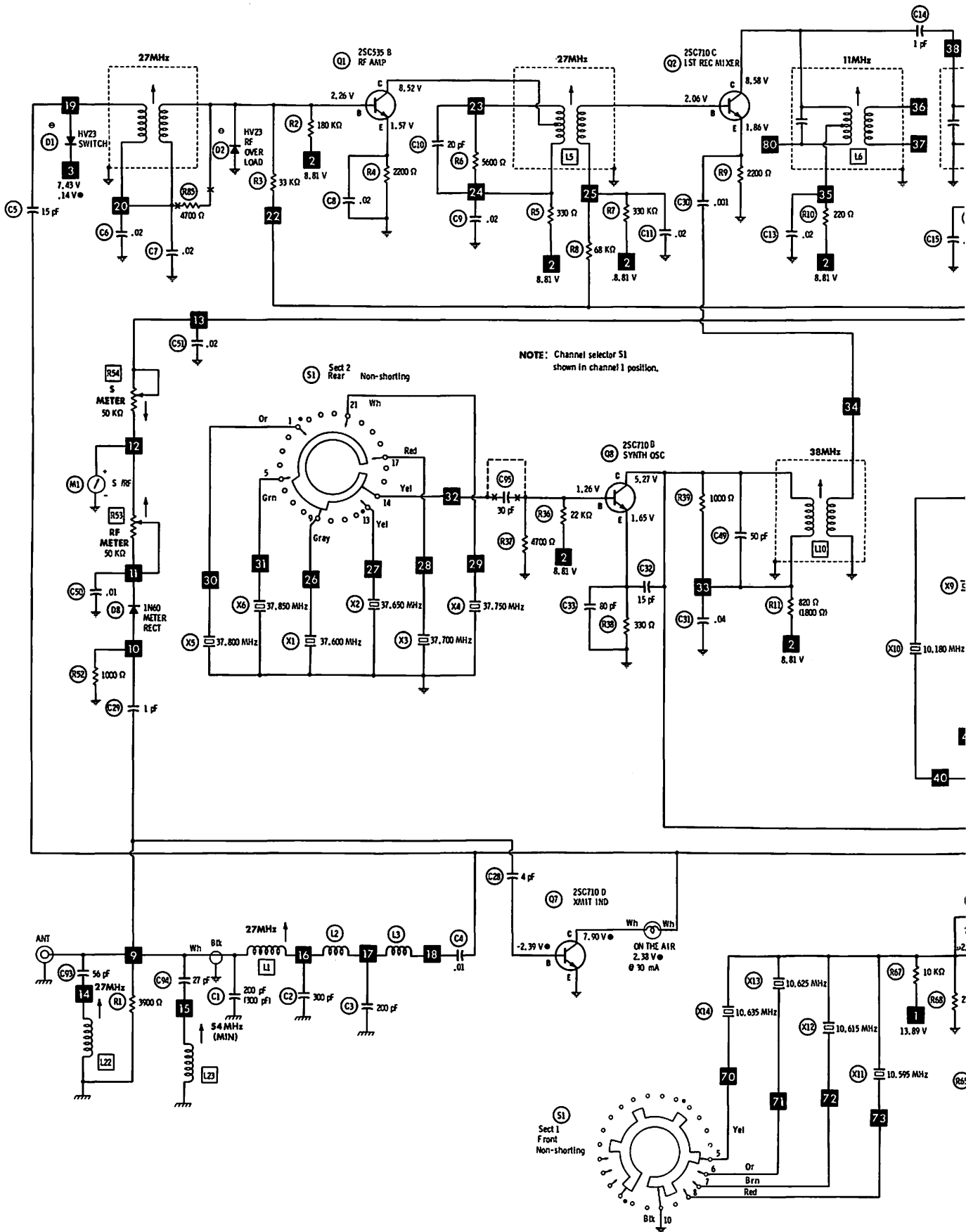
MAIN BOARD

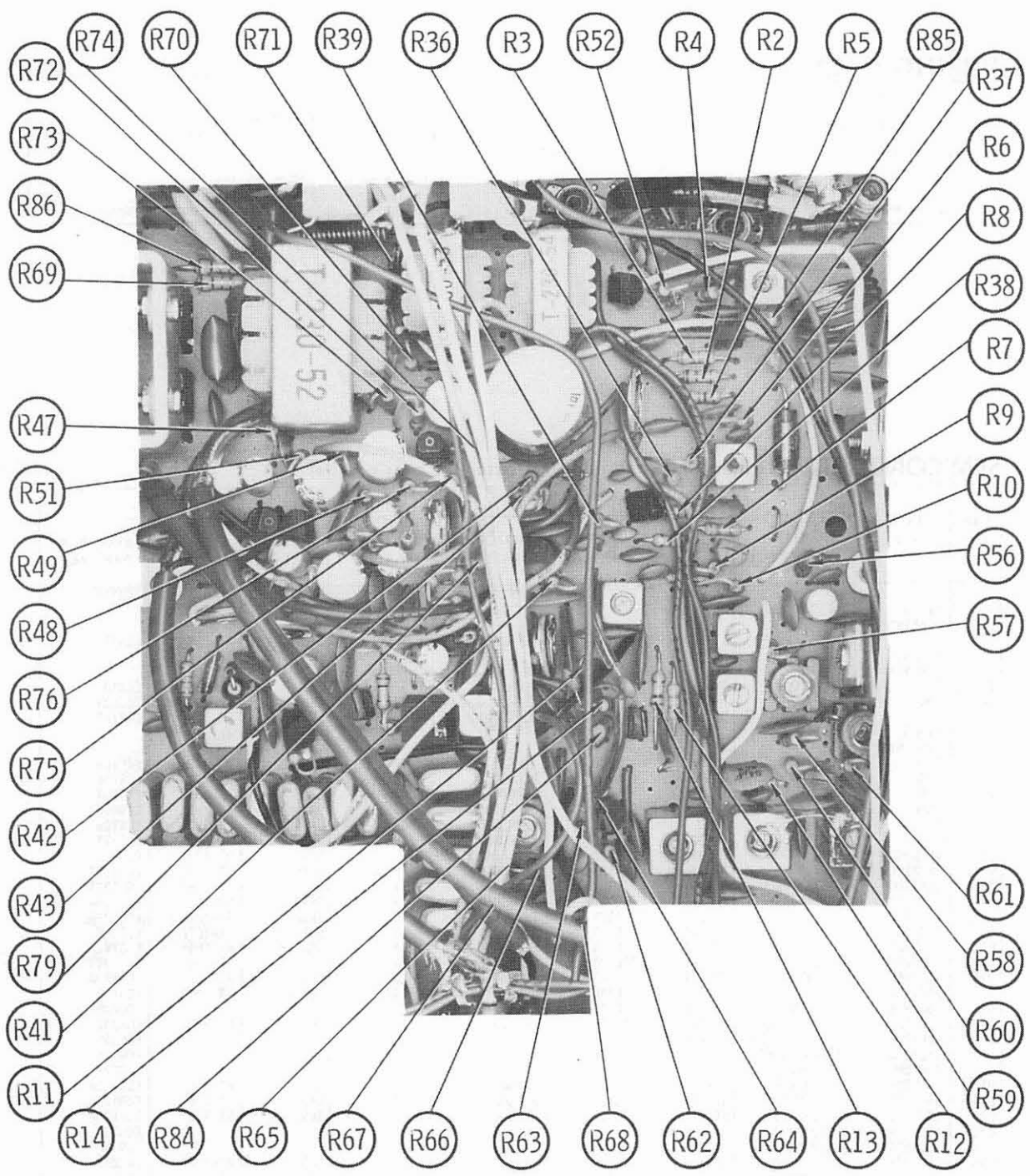






MAIN BOARD





MAIN BOARD

# PARTS LIST AND DESCRIPTION

(When ordering parts, state Model, Part Number, and Description.)

## WIRING DATA

General-use Hook-up Wire .....	Use BELDEN No. 8530 (Solid) Available in 12 Colors 8524 (Stranded) Available in 12 Colors
Power Cord, 2-Wire .....	Use BELDEN No. 17106 (Plastic) or 17126 (Rubber) -6 feet 17109 (Plastic) or 17129 (Rubber) -9 feet
Shielded Antenna Lead .....	Use BELDEN No. 8214 Lowest-Loss (RG-8/U Type) 8237 Low-Loss (RG-8/U) 8240 (Solid) Miniature (RG-58/U) 8259 (Stranded) Miniature (RG-58A/U)
Coiled Microphone Cable .....	Use BELDEN No. 8491 4-Conductor (2 shielded, 2 unshielded) Neoprene

## SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA						
			GENERAL ELECTRIC PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.
D1	HV-23 (Varistor)	(1) 21M625	GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177
D2	HV-23 (Varistor)	(1) 21M625	GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177
D3	1N60	21M288	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D4	1N60	21M288	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D5	HV-23 (Varistor)	(1) 21M625	GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177
D6	1N60	21M288	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D7	V06B	21M625	GE-504A	PTC201	HEPR0052	RE 49	SK3030	RT-210	ECG116
D8	1N60	21M288	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D9	1N60	21M288	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D10	1N60	21M288	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D11			GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177
Q1	25C535B	21M113	GE-86	PTC136	HEPS0016	RE 9	SK3018	RT-108A	ECG229
Q2	25C710C	21M132	GE-211	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A
Q3	25C710C	21M132	GE-211	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A
Q4	25C710D	21M627	GE-211	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A
Q5	25C710D	21M627	GE-211	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A
Q6	25C735-0	21M628	GE-210	PTC123	HEPS0015	RE 13	SK3122	RT-107A	ECG289
Q7	25C710D	21M627	GE-211	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A
Q8	25C710B	21M133	GE-211	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A
Q9	25C710B	21M133	GE-211	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A
Q10	25C711E	21M135	GE-62	PTC136	HEPS0024	RE 192	SK3124	RT-107A	ECG199
Q11	25C1975	(10)21M629	GE-215	PTC186		RE 203			ECG235
	25C778	(1)(11)21M630	GE-46	PTC176	HEPS3001	RE 198	SK3049	RT-182	ECG237
	25C1306	(1)(12)21M631	GE-215	PTC186		RE 203			ECG235
	25C1678	(1)(13)21M632	GE-215	PTC186		RE 203			ECG235
Q12	25C1018	(14)21M633							ECG299
Q13	25C773E	21M634	GE-210	PTC123	HEPS0015	RE 13	SK3124	RT-172	ECG123A
Q14	25C710D	21M627	GE-211	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A
Q15	25C710B	21M133	GE-211	PTC121	HEPS0016	RE 13	SK3018	RT-105	ECG123A
Q16	25C1014	(15)21M177							ECG300
Q17	25C1014	(15)21M177							ECG300
Q18	25C735-0	21M628	GE-210	PTC123	HEPS0015	RE 13	SK3122	RT-107A	ECG289
Q19	25C711E	21M135	GE-62	PTC136	HEPS0024	RE 192	SK3124	RT-107A	ECG199
Z1	B090	21M635	GEZD-9.1	PTC505	HEPZ0412	RE 114	SK3060	RT-240	ECG139
	(9.0 Volt Zener)								
	RD9.1FB	(1)	GEZD-9.1	ZB9.1B				RT-240	ECG139
	(9.1 Volt 5% Zener)								

- (1) Used in some versions.
- (10) Rating, 15 watts @ 2.0 amps.
- (11) Rating, 2.5 watts @ 2.0 amps.
- (12) Rating, 12 watts @ 3.0 amps.
- (13) Rating, 10 watts @ 3.0 amps.
- (14) Rating, 4.0 watts @ 1.0 amps.
- (15) Rating, 7.0 watts @ 1.5 amps.

# PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

## ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA			
		MFRG. PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C19	1 50V	25M018	PC1-50	MTV1C850	EV-1615
C24	1 50V	25M018	PC1-50	MTV1C850	EV-1615
C25	10 16V	25M016	PC10-25	VTT10A25	EV-1222
C26	10 16V	25M016	PC10-25	VTT10A25	EV-1222
C40	1000 16V	25M023	PC1000-16	VTT1000L16	EV-1260
C41	47 16V	25M029	PC50-16	VTT47D16	EV-1226
C46	47 16V	25M029	PC50-16	VTT47D16	EV-1226
C48	100 16V	25M010	PC100-16	VTT100F16	EV-1230
C56	1 50V	25M018	PC1-50	MTV1C850	EV-1615
C74	100 16V	25M010	PC100-16	VTT100F16	EV-1230
C76	47 16V	25M029	PC50-16	VTT47D16	EV-1226
C84	1 50V	25M018	WBR1-50	MTA1D50	TVA-1300
C90	.47 25V	25M101	PC1-50	VTR47B63	EV-1310

## CAPACITORS

ITEM No.	RATING	MFRG. PART No.	REPLACEMENT DATA			
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C1	200		DD-201	GP200	GP320	10TS-T20
C2	300		DD-301	GP300	GP330	10TS-T30
C3	200		DD-201	GP200	GP320	10TS-T20
C4	.01		DC-103	GP10000	MAG5011	2SS-S10
C5	15		DTZ-15	NP015	CN0415	10TCC-Q15
C6	.02		DC-203		MAG5012	2SS-S20
C7	.02		DC-203		MAG5012	2SS-S20
C8	.02		DC-203		MAG5012	2SS-S20
C9	.02		DC-203		MAG5012	2SS-S20
C10	20		DTZ-20	NP020	CN0420	10TCC-Q20
C11	.02		DC-203		MAG5012	2SS-S20
C12	.01		DC-103	GP10000	MAG5011	2SS-S10
C13	.02		DC-203		MAG5012	2SS-S20
C14	1				CN0510	10TCC-V10
C15	.02		DC-203		MAG5012	2SS-S20
C16	.02		DC-203		MAG5012	2SS-S20
C17	100		DD-101	GP100	GP310	10TS-T10
C18	.04				GP140	5GA-S40
C20	.04				GP140	5GA-S40
C21	.001		DD-102		GP210	10TS-D10
C22	.1			DPMS2P1	EWFTA010	1PB-P10
C23	.01		DC-103	GP10000	MAG5011	2SS-S10
C27	.04				GP140	5GA-S40
C28	4		DTZ-4R7	NP04P7	CN0537	10TCC-V47
C29	1				CN0510	10TCC-V10
C30	.001		DD-102		GP210	10TS-D10
C31	.04				GP140	5GA-S40
C32	15		DTZ-15	NP015	CN0415	10TCC-Q15
C33	80		DD-820		GP482	10TS-Q82
C34	15		DTZ-15	NP015	CN0415	10TCC-Q15
C35	4		DTZ-4R7	NP04P7	CN0537	10TCC-V47
C36	100 10% N220					10TCR-T10
C37	.02		DC-203		MAG5012	2SS-S20
C38	300		DD-301	GP300	GP330	10TS-T30
C39	.04				GP140	5GA-S40
C42	.1			DPMS2P1	EWFTA010	1PB-P10
C43	.1			DPMS2P1	EWFTA010	1PB-P10
C44	.01		DC-103	GP10000	MAG5011	2SS-S10
C45	.04				GP140	5GA-S40
C47	.01		DC-103	GP10000	MAG5011	2SS-S10

ROSS/ELECTROPHONIC MODEL CB-1000

# PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

## CAPACITORS(cont)

ITEM No.	RATING	MFR. PART No.	REPLACEMENT DATA			
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C49	50		DTZ-50	NP050	CN0450	10TCC-Q50
C50	.01		DC-103	GP10000	MAG5011	2SS-S10
C51	.02		DC-203		MAG5012	2SS-S20
C52	.04				GP140	5GA-S40
C53	50		DTZ-50	NP050	CN0450	10TCC-Q50
C54	.02		DC-203		MAG5012	2SS-S20
C55	150		DD-151		CN0315	10TCC-T15
C57	.04				GP140	5GA-S40
C58	100		DD-101	GP100	GP310	10TS-T10
C59	.04				GP140	5GA-S40
C60	200		DD-201	GP200	GP320	10TS-T20
C61	150		DD-151		CN0315	10TCC-T15
C62	3		DTZ-3R3	NP03P3	CN0533	10TCC-V33
C63	150		DD-151		CN0315	10TCC-T15
C64	5					10TCC-V50
C65	.01		DC-103	GP10000	MAG5011	2SS-S10
C66	.01		DC-103	GP10000	MAG5011	2SS-S10
C67	150		DD-151		CN0315	10TCC-T15
C68	25		DTZ-25	NP025	CN0425	10TCC-Q25
C69	80		DD-820		GP482	10TS-Q82
C70	500		DD-501	GP500	GP350	10TS-T50
C71	25		DTZ-25	NP025	CN0425	10TCC-Q25
C72	.04				GP140	5GA-S40
C73	2			DPMS2P2	PVC602	2PS-P20
C75	.05		DC-503	MGP05	MAG5015	TGL-S50
C77	500		DD-501	GP500	GP350	10TS-T50
C78	.01		DC-103	GP10000	MAG5011	2SS-S10
C79	.04				GP140	5GA-S40
C80	.04				GP140	5GA-S40
C81	.01		DC-103	GP10000	MAG5011	2SS-S10
C82	.01		DC-103	GP10000	MAG5011	2SS-S10
C83	.04				GP140	5GA-S40
C85	.01		DC-103	GP10000	MAG5011	2SS-S10
C86	.01		DC-103	GP10000	MAG5011	2SS-S10
C87	.01		DC-103	GP10000	MAG5011	2SS-S10
C88	.01		DC-103	GP10000	MAG5011	2SS-S10
C89	.04				GP140	5GA-S40
C91	.04				GP140	5GA-S40
C93	56		DD-560		GP456	10TS-Q56
C94	27				CN0427	10TCC-Q27
C95	30					10TCC-Q30
C96	.04				GP140	5GA-S40
C97	.04				GP140	5GA-S40
C98	330 10%		DD-331	GP330	GP333	10TS-T33

## CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM No.	FUNCTION	RESIST-ANCE	REPLACEMENT DATA				
			MFR. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	MALLORY PART No.	TRW PART No.
R29	Volume/Power Switch	10K	22M321				
R34	Squelch Range	50K	22M322	T-50K (2)	C-503 (2)	MTC54L1 (2)	X201R503B (2)
R35	Squelch	10K	22M323				
R40	Bias	5000	22M324	T-5000 (2)	C-502 (2)	MTC53L1 (2)	X201R502B (2)
R53	RF Bias	50K	22M322	T-50K (2)	C-503 (2)	MTC54L1 (2)	X201R503B (2)
R54	S Meter	50K	22M322	T-50K (2)	C-503 (2)	MTC54L1 (2)	X201R503B (2)

(2) Cut off one of the end terminals and bend to fit PC board.

## PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

### COILS (RF-IF)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
L1	Pi Filter (27MHz)	47M777			
L2	Pi Filter	47M778			
L3	RF Choke	47M779			
L4	Rec Ant (27MHz)	47M780	L4500T		
L5	Rec RF (27MHz)	47M781	L5500T		
L6	Rec Mixer (11MHz)	47M782	L6L758GT		
L7	Rec Mixer (11MHz)	47M783	L6L759CT		
L8	IF (455kHz)	47M784	LLC238AT		
L9	IF (455kHz)	47M785	L959AT		
L10	Synth Osc (38MHz)	47M786	L1059MT		
L12	RF Choke	47M787			
L13	RF Choke	47M788			
L14	Xmit Driver (27MHz)	47M789			
L15	Xmit Buffer (27MHz)	47M790			
L16	Harmonic Suppressor (27MHz)	47M791	L1650CT		
L17	Harmonic Suppressor (27MHz)	47M792			
L18	Xmit Mixer (27MHz)	47M793	L17L18500T		
L19	RF Choke	47M794			
L22	RF Choke	47M795			
L23	TVI Trap (54MHz)	47M796			

ROSS/ELECTROPHONIC MODEL CB-1000

### FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000~)	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
L11	1.3A	.3	5mH	47M797			

### TRANSFORMER (Driver)

ITEM No.	TURNS RATIO			REPLACEMENT DATA			NOTES
	PRI.	SEC. 1	SEC. 2	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
L21	1	1		47M798			

### TRANSFORMER (Audio Output)

ITEM No.	IMPEDANCE		REPLACEMENT DATA			NOTES
	PRI.	SEC.	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
L20	32	8	11M172			

## PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

### SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
SP	3" PM 8 ohms		30A05Z8R	

### FUSE DEVICES

ITEM No.	DESCRIPTION	REPLACEMENT DATA						
		PART No.		BUSS PART No.		LITTELFUSE PART No.		WORKMAN PART No.
		DEVICE	HOLDER	DEVICE	HOLDER	DEVICE	HOLDER	DEVICE
F1	2 Amp Fast Acting			AGC2	HDJ	312002	150145	F62-2

### CRYSTALS

ITEM No.	CRYSTAL FREQUENCY IN MHz	MFGR. PART No.	CTS KNIGHTS PART No.	CHANNEL	ITEM No.	CRYSTAL FREQUENCY IN MHz	MFGR. PART No.	CTS KNIGHTS PART No.	CHANNEL
X1	37.600	16M001	DA32W37.600	1,2,3,4	X8	10.160	16M013	DC90W10.160	3,7,11,15,19
X2	37.650	16M002	DA32W37.650	5,6,7,8	X9	10.170	16M012	DC90W10.170	2,6,10,14,18,22
X3	37.700	16M003	DA32W37.700	9,10,11,12	X10	10.180	16M011	DC90W10.180	1,5,9,13,17,21
X4	37.750	16M004	DA32W37.750	13,14,15,16	X11	10.595	16M010	DB25W10.595	4,8,12,16,20,23
X5	37.800	16M005	DA32W37.800	17,18,19,20	X12	10.615	16M009	DB25W10.615	3,7,11,15,19
X6	37.850	16M006	DA32W37.850	21,22,23	X13	10.625	16M008	DB25W10.625	2,6,10,14,18,22
X7	10.140	16M014	DC90W10.140	4,8,12,16,20,23	X14	10.635	16M007	DB25W10.635	1,5,9,13,17,21

### MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
FCL	Filter	47M799	(455kHz)
M1	Meter	13M022	S/RF
S1	Switch	12M329	Channel Selector
S2	Switch	12M330	ANL
S3	Switch	12M331	CB-PA
	Printed Circuit Board		(CB-T-230)



# INDEX

THIS INDEX LISTS ALL RADIOS APPEARING IN  
"CITIZENS BAND MANUALS" AND "PHOTOFACT CB RADIO SERIES"

KEY → (EP) EARLY PRODUCTION (LP) LATE PRODUCTION (REV) REVISED

AIRCRAFT		CADRE		COURIER (CONT.)		FANON (CONT.)		HEATHKIT (CONT.)		
	VOL.		VOL.		VOL.		VOL.		VOL.	
JE321 .....	15	C-75 .....	11	Courier Royale .....	14	T-909 .....	40	GW-12A/-12D, GWM-12A/		
23-02 .....	38	500/C .....	3	Courier TR-5 .....	16	T-1000 .....	45	-12D .....	5	
AIRLINE		510 .....	4	Courier TR-23S .....	13	FIELDMASTER				
GAS-587 .....	4	510A, 515 .....	6	Courier 1M, 23 .....	8	MF-1001 .....	60	GW-14, GNA-14-1, GWW-14 ..	11	
ALLIED		525 (500-1, 520) .....	7	Courier 23 Plus .....	18	Micro Mini 3 .....	55	GW-14A, GWM-14A/14AS ..	29	
A-2507 (17B6790X) .....	20	CAPITOL		Cruiser .....	79	Micro Mini 6 .....	58	GW-21, GWM-21 .....	4	
A-2530 (17B6825X) .....	19	ND-309 .....	3	CWT-30 .....	29	Micro Mini 23 .....	56	GW-22A/-22D, GWM-22A/		
A-2533 (17B6440X) .....	22	CHANNEL MASTER		CWT-40 .....	27	TR-18M .....	57	-22D .....	5	
A-2543 (17-9801S) .....	21	6423 .....	40	CWT-50 .....	30	GEMTRONICS				
A-2544 (17B9802S) .....	23	7553 .....	9	Fleet Courier, 30-B ..	9	GTX-23 .....	90	623 .....	71	
A-2545 (17B9803S) .....	18	6554 .....	13	Gladiator .....	49	GTX-2325 .....	82	623A (Pg. 5) .....	71	
A-2559 (21B5559U) .....	34	CITI-PHONE		Ranger 23 .....	33	GENERAL ELECTRIC				
A-2561 (21B5561) .....	35	CD-5/6/-5/12 .....	1	Rebel - 23+ .....	54	Y7050A .....	16	671 (Hy-Range II) .....	63	
A-2564 (17A6966U) .....	29	CD-5A/6, CD-5A/12 ..	9	Redball .....	72	GENERAL RADIO & TELEPHONE				
A-2567 (17B6435X) .....	22	CD-6/6, CD-6/12 .....	3	Spartan SSB .....	56	MC-6 .....	7	672 (Hy-Range III) .....	65	
A-2568 (17A6965U) .....	29	CD11/6, CD11/12 .....	12	Traveller (ML-100) ..	24	Super MC-8 .....	13	672A (Pg. 5) .....	65	
A-2569 (17C6469U) .....	24	II (1103-01) .....	15	Traveller II .....	31	Super MC-9 .....	16	673 (Hy-Range IV) .....	64	
ALLSTATE		SS .....	9	DEMCO		Super MC-11/A .....	22	673A (Pg. 5) .....	64	
832.62270 .....	7	19 .....	26	CH-300 .....	11	VS-6, VS-7 .....	11	674 (Hy-Range V) .....	70	
893.62910/11/21/31/41.	6	99/6, 99/12 .....	12	Chalet, DMT-110 .....	14	ITT				
AMPHENOL		CLARICON		Ravelle .....	11	320 .....				3
C-75 .....	12	14-523 .....	27	Ravelle 23 .....	15	JCPenney				
80 .....	22	15-200 .....	16	Satelite CB-1A .....	7	981-6051				
600, 625 .....	11	15-410 .....	14	Satelite Deluxe .....	19	(Golden Pinto) .....				28
650 .....	13	15-500 .....	23	R-101A, T-110A,		981-6075				
675 .....	14	15-600 .....	33	VW-12-120 .....	7	(Pinto SSB) .....				47
725 .....	15	30400 (Pirate) .....	79	Traveller (Series B) ..	8	981-6200 .....				51
750 .....	19	30600 (Privateer) .....	85	DEWALD		981-6213 (981-0649) .....				82
777 .....	18	COBRA		TR-6/-12/910 .....	2	981-6240				
APELCO		CAM-88 .....	9	DUO COM		(981-3445) .....				74
AR-9 .....	1	CAM-89 .....	58	100 .....	2	985-6050 (Pinto 23) ..				27
AR-10 .....	7	V .....	13	DYNASCAN		985-6055 (Pinto Jr.) ..				30
ARKAY		6 .....	34	(See Cobra)		985-6060 (Pinto-23B) ..				28
SQ-9/-9W .....	2	19 .....	75	ECHO		J. I. L.				
ARVIN		20 .....	49	99'er (Pg. 51) .....	49	852CB .....				86
20Y33-19 (1.45501) .....	27	21 .....	51	ELECTRONIC 2000		JOHNSON				
20Y55-19 (1.45601) .....	29	23, PAC-V .....	16	Contact CB-23CH .....	56	Messenger II (242-162/				
AUTOMATIC		24 .....	26	ELECTROPHONIC		-163, 250-180/-811) ..				5
MCE-6510 .....	25	25 .....	33	(See Ross/Electrophonic)		Messenger III .....				8
MCR-6450 .....	17	27 .....	23	FANON		Messenger III (242-143) (Rev.) ..				30
PCR-6452 .....	22	28, PAC-24 .....	43	CHB-3 .....	35	Messenger 100 .....				12
TRC-6448 .....	17	28A .....	72	CHB-4 .....	37	Messenger 102 .....				32
TRE-6500 .....	25	29 .....	56	Fanfare 100 .....	54	Messenger 108				
TRR-6454/A .....	17	85 .....	77	Fanfare 700 .....	53	(242-108) .....				50
BELTEK		98 .....	23	Fanfare 880 .....	73	Messenger 109				
Enduro 5 (N5396) .....	80	130 .....	44	FCB-9 .....	4	(242-109) .....				26
BENDIX		131 .....	45	IC-3000 .....	24	Messenger 110				
CB-6/-12 .....	2	132 (EP & LP) .....	54	IC-5000 .....	25	(242-0110) .....				19
BROWNING		135 (EP & LP) .....	54	L-1000 .....	18	Messenger 120				
Brownie .....	80	138/A .....	57	L-2000 .....	17	(242-0120) .....				41
Eaglette .....	20	139 .....	59	SFT-400 .....	35	Messenger 120A				
Eaglette 2 .....	29	880 .....	47	SFT-500 .....	35	(242-1120) .....				86
Golden Eagle Mark III	79	CONCORD		SFT-600 .....	31	Messenger 121				
LTD .....	66	TG-132B .....	12	SFT-800A .....	34	(242-0121) .....				40
Mark II Series B,		COURIER (E.C.I.)		SFT-900 .....	37	Messenger 121A				
SSB-115 .....	39	Cadet 23 .....	46	(Guardman) .....	37	(242-1121) .....				89
R-27, S-23 .....	10	Caravelle .....	38	T-606 .....	41	Messenger 122				
SST .....	37	Caravelle II .....	73	T-707 .....	43	(242-0122) .....				45
SST (LP)		CCT-2 W/CHB-3 .....	35	T-808 .....	38	Messenger 123				
(Ser. No. T-50000		CCT-3 .....	37	HALLMARK		(242-0123A & B) .....				24
& up) .....	81	CCT-4 .....	36	512 .....	5	Messenger 123				
69R, 69T (Golden		Centurion .....	52	1250B .....	10	(242-123) (Rev.) .....				
Eagle Mark II) .....	27	Chief 25 .....	35	HAMMARLUND		-C/-D/-E/-F/-G .....				42
		Citation .....	34	CB-SIX (CB-6) .....	7	Messenger 123A				
		Classic .....	25	HEATHKIT (HEATH)		(242-0123) .....				47
		Classic II .....	30	CB-1 .....	1	Messenger 123B .....				81
		Classic III .....	67	GRS-65A .....	14					
		Comet 23 .....	48	GW-10A/D, GWM-10A/D ..	3					
		Conqueror .....	38	GW-11A/-11D, GWM-11A/	4					
		Conqueror II .....	73	-11D .....	4					
		Courier Clipper 23 .....	26							



REALTONE	VOL.	ROYCE (CONT.)	VOL.	SEARS (CONT.)	VOL.	TEABERRY (CONT.)	VOL.	U.S.L.	VOL.
TR-6134	4	1-408	79	7535 (Ch. 789.10090)	27	Mighty "T"	84	TR-800	1
TR-6436	7	1-590A	82	934.36740500	89	Mini "T"	42	UTAC	
REGENCY		1-600A (Sim. to Pg.109)	71	SEARS SILVERTONE		Mini "T" II	44	Micro Mini 23	85
CB-27, CBM-27-6/-12	1	1-600B	71	(See SEARS)		Stalker One	86	TR-18M	84
CR-123	69	1-602A	77	SHARP		"T" Charlie One	54	UTICA	
CR-123B	75	1-605A	85	CBT-58	45	"T" Control	68	MC-27	2
CR-142	78	1-606	80	SILTRONIX		"T" Scout	88	T & CII	4
CR-185	76	1-620	84	SSB-23	57	Tele "T"	85	T & CIII	9
CR-186	71	1-630	87	SONAR		Twin "T"	87	VIKING	
Formula/23 (CB-292)	36	1-631	76	E	2	TELECON		242-126/-127/-128/ -129	1
GT-523 (CB-283)	22	1-635	83	E (Rev.)	4	TMC-206	10	VOCALINE	
Imperial (CB-253)	21	1-640	77	FS-23	7	TRAM		ED-27-6/-12/-27M-6/ -12	1
Imperial II (CB-254)	33	SAMPSON		G	6	Corsair 464	30	ED-276/-278	8
Range Gain	5	M10,R101A/102,T110A,		H	10	D201	88	JRC-400/-425	2
Range Gain II	13	VM12-120	5	J-23	15	Diamond 40	84	PT-27	3
Ranger CB270	16	SBE		T-2	12	Diamond 60	62	WEBCOR	
Romper (A-3)	8	SBE-1CB (Coronado)	29	T-6	30	Titan	13	ET-350	3
Sprint/23 (CB-291)	37	SBE-2CB (Capri)	30	SONARCOM		Titan II (S320)	24	WEBSTER	
Sprint/23 II (CB-293)	48	SBE-3CB (Cascade)	31	CBP	2	Titan IIA	40	Bandspanner 412	6
500 (CB-282)	20	SBE-5CB (Cascade II)	49	SONY		Titan III	34	Four-Eleven	2
ROBYN		SBE-6CB	33	CB-901	4	Titan IV	49	WT-2	11
BB-123	39	SBE-7CB (Sierra)	39	SPOKESMAN		TR-27D/E	10	440	5
DG-30	89	SBE-8CB (Console)	41	700	2	XL-100	11	550	8
GT-VIIB	83	SBE-9CB (Catalina)	41	SQUIRES-SANDERS		TRIUMPH		XTAL	
J-123	34	SBE-10CB (Coronado II)	48	Admiral	21	TC-900/A	4	XCB-5	85
K-123	35	SBE-11CB (Trinidad)	47	Skipper	22	TRUESTONE		XCB-7	89
LB-23	70	SBE-12CB (Sidebander I)	50	SSS	12	DC4530 (13-854) (LP)	62		
LB-23A	90	SBE-14CB (Super Console)	51	23'er	10	DX4370	59		
R-15	88	SBE-15CB (Cascade III)	60	STEREOSONIC		MCC4370A-57 (DC4370)	65		
R-25	88	SBE-16CB (Console II)	63	2300	90	MCC4434A-57 (DC4434)	58		
SS-747B	53	SBE-18CB (Sidebander III)	61	TEABERRY		MCC4532A-47 (DC4532)	82		
SX-101	77	SBE-21CB (Cortez)	58	Big "T"	41	MCC4532A-57 (DC4532)	55		
T-123	35	SBE-22CB (Catalina II)	67	Five by Five	35	MCC4620A-67 (DC4620)	80		
TR-123B	28	SBE-23CB (Capri II)	66	TELECON		MCC4630A-67 (DC4630)	81		
TR-123C	38	SEARS		TELECON		MCC4635A-67 (DC4635)	84		
WV-23	67	6469 (Ch. 787.10070)	17	TMC-206		MIC4322A-37 (DC4322)	45		
XL-ONE	42	6471 (Ch. 787.10080)	18	TRAM		MIC4350A-37 (DC4350)	63		
XL-TWO	74	6550 (Ch. 549.30500)	10	CORSAIR 464		MIC4812B-17 (DC4812B)	34		
605	57	6552 (Ch. 549.65520), 6553	9	CORSAIR 464		MIC4820A-86	19		
ROSS		6554 (Ch. 549.30001)	14	CORSAIR 464		MIC4821A-86 (DX4821)	20		
RE-025	31	6556 (Ch. 789.10010)	15	CORSAIR 464		MIC4920A-96 (DC4920)	28		
RE-050	31	6558 (Ch. 789.10010)	16	CORSAIR 464		MIC4920B-37 (DC4920)	44		
ROSS/ELECTROPHONIC		6562 (Ch. 789.10040/41), 6563 (Ch. 789.10050)	18	CORSAIR 464		MID4820A-86	19		
CB-1000	90	7203 (Ch. 562.30010)	25	CORSAIR 464		512 Series B (DX4101)	7		
ROYCE		7204 (Ch. 562.30020)	24	CORSAIR 464		1250A	10		
1-400	73	7531 (Ch. 789.10080)	26	CORSAIR 464		1250B	11		
1-402	80			CORSAIR 464		UNIMETRICS			
1-406	68			CORSAIR 464		Marlin - 1	78		
				CORSAIR 464		Porpoise - I	75		