

PHOTOFACT[®] with

CIRCUITRACE[®]

For Supplier Address See PHOTOFACT Index

NOTE

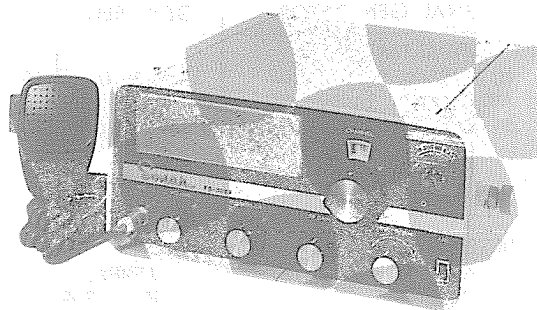
Repair or adjustment of transmitter circuits must be under supervision of a person with first-or second-class radiotelephone license.

(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 FS-3023

ALIGNMENT INSTRUCTIONS

Suggested Alignment Tools: GC ELECTRONICS
T2A, T2B, T3, T4 9295
ALL Other Tunable Coils
and Transformers 9150

SYNTHESIZER

INDICATOR	CHANNEL	ADJUST	FREQUENCY	REMARKS
FREQUENCY COUNTER				
Input of counter to Pin 2 of V8, common to ground.	13	C28	16.350MHz	
Input of counter to TP (Pin 7 of V8A), common to ground.	13	C38A	4.765MHz	
Input of counter to Pin 8 of V9, common to ground.	13	C47A	6MHz	

RECEIVER

Connect an AC VTVM or AF Wattmeter across speaker voice coil.
Adjustments made with 14-volt DC input or 120-volt AC input to power supply.
Adjust volume control to obtain suitable reading.

SIGNAL GENERATOR	GEN FREQ	CHANNEL	ADJUST	REMARKS
High side thru .01uF to Pin 2 of V3, low side to ground.	6.00MHz, 1000Hz @ 30% modulation.	10	T2A(Top & Bot.), T2B(Top & Bot.), T3(Top & Bot.), T4(Top & Bot.)	Set generator output low enough to prevent AGC limiting. Adjust for maximum.
High side thru .01uF to antenna jack, low side to ground.	27.075MHz, 1000Hz @ 30% modulation.	10	L1,L2, T1(Top & Bot.)	Set generator output low enough to prevent AGC limiting. Adjust for maximum.

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

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SONAR MODEL FS-3023

RECEIVER ADJUSTMENTS

Connect an AC VTVM or AF Wattmeter across speaker voice coil.
These adjustments made with 14-volt DC input or 120-volt AC input to power supply.
Adjust volume control to obtain a suitable reading.

SIGNAL GENERATOR	GEN FREQ	CHANNEL	ADJUST	REMARKS
V1 NEUTRALIZATION High side thru .01uF to antenna jack, low side to ground.	27.075MHz, 1000Hz @ 30% modulation.	10	C4	Disconnect R4 from B+. Increase signal input for indication on meter connected to output. Ad- just C4 for MINIMUM. Re-connect R4. Adjust L1 and L2 for maximum.
S METER	27.115MHz, 1000Hz @ 30% modulation, 00uV.	13	R56	Adjust for 0 (zero) on S meter.

TRANSMITTER

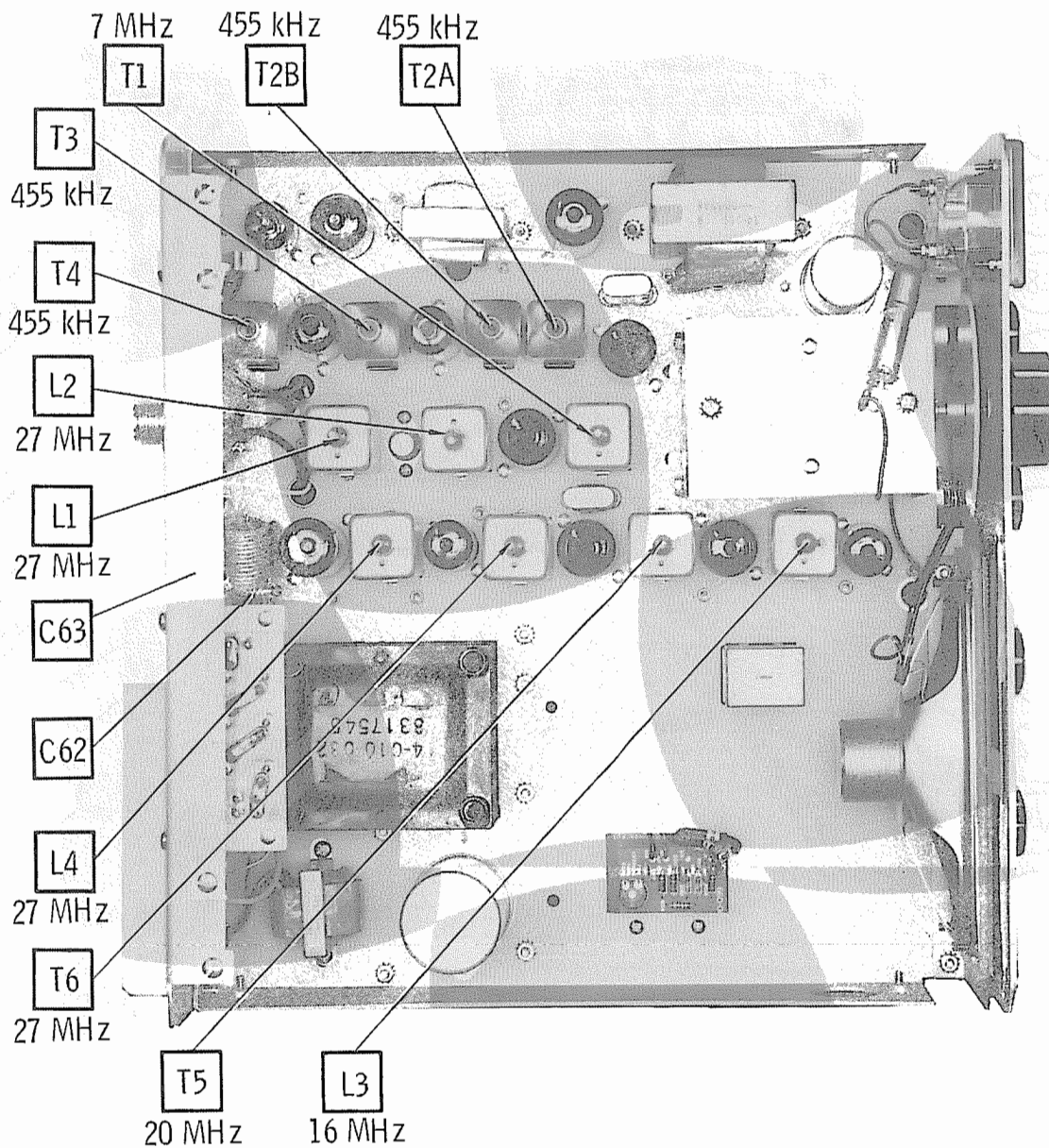
Connect an RF Wattmeter or 50-ohm, 25-watt dummy load to antenna connector.
Adjustments made with 14-volt DC input or 120-volt AC input to power supply.

INDICATOR	ADJUST	REMARKS
OSCILLATOR, MIXER, BUFFER, DRIVER, FINAL RF Wattmeter	L3,T5(Top & Bot.),T6(Top & Bot.),L4, C62,C63	Channel selector to Ch. 13. Key transmitter. Adjust for maximum.
OUTPUT POWER RF Wattmeter	C62,C63	Key transmitter. Adjust for 4 watts output.
FINAL NEUTRALIZATION Input of RF voltmeter to antenna jack, common to ground.	C55	Disconnect yellow lead of T8. Key transmitter. Adjust C55 for MINIMUM. Peak L4 and C62.

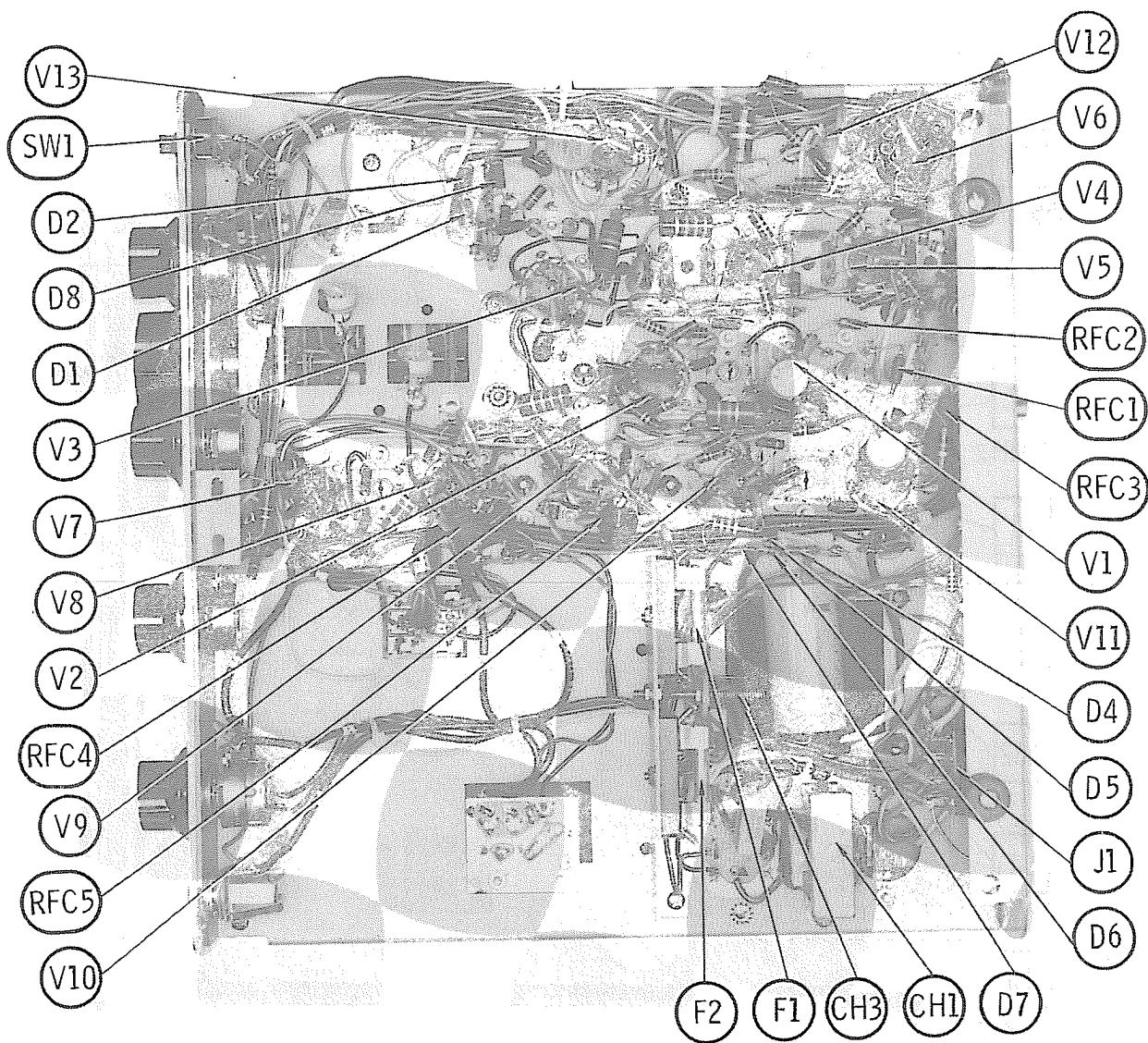
TRANSMITTER ADJUSTMENTS

Connect an RF Wattmeter or 50-ohm, 25-watt dummy load to antenna connector.
Adjustments made with 14-volt DC input or 120-volt AC input to power supply.

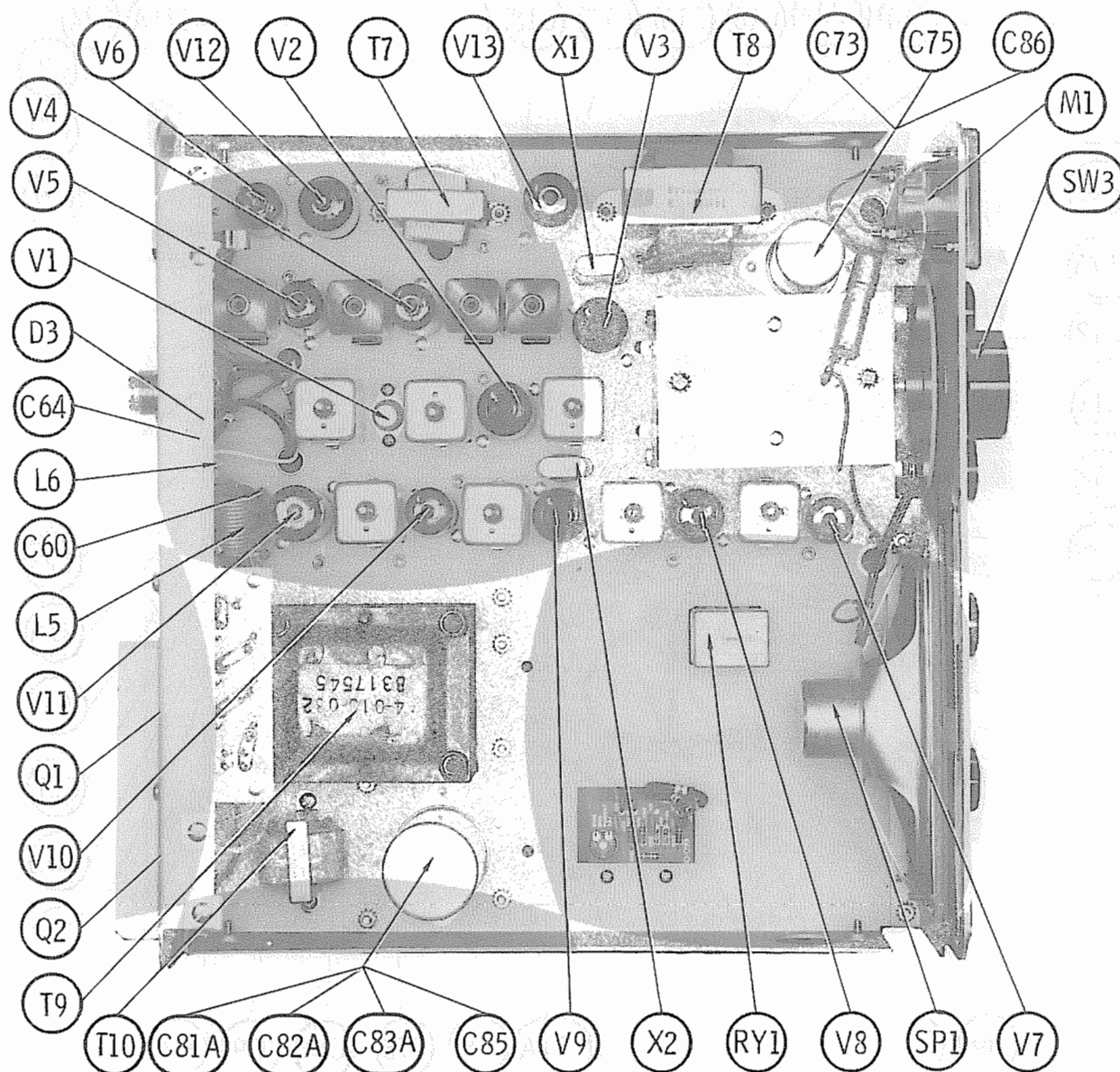
INDICATOR	ADJUST	REMARKS
AMC Modulation meter connected to antenna jack.	R105	Adjust so strong audio signal will not cause over- modulation.



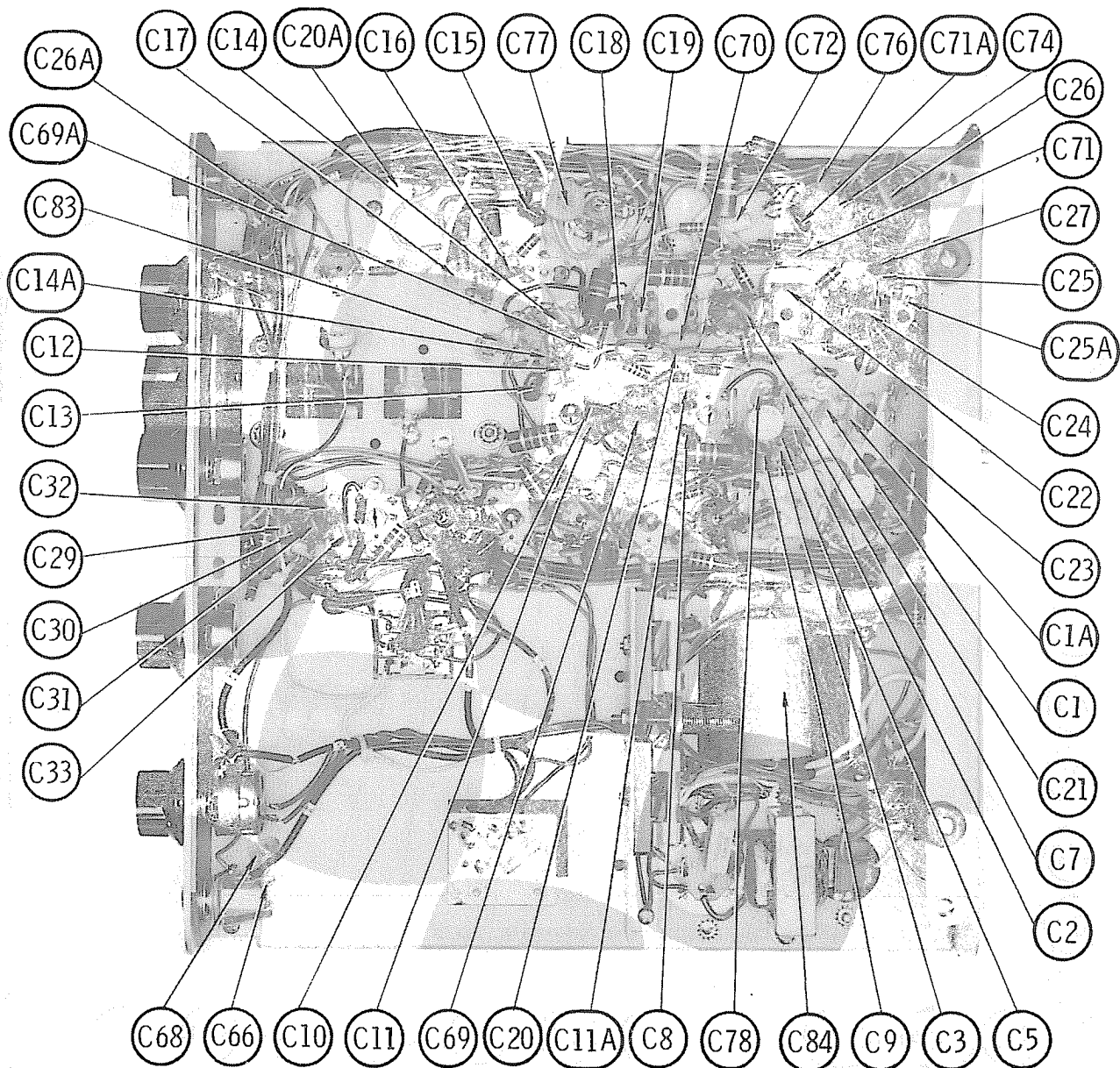
CHASSIS-TOP



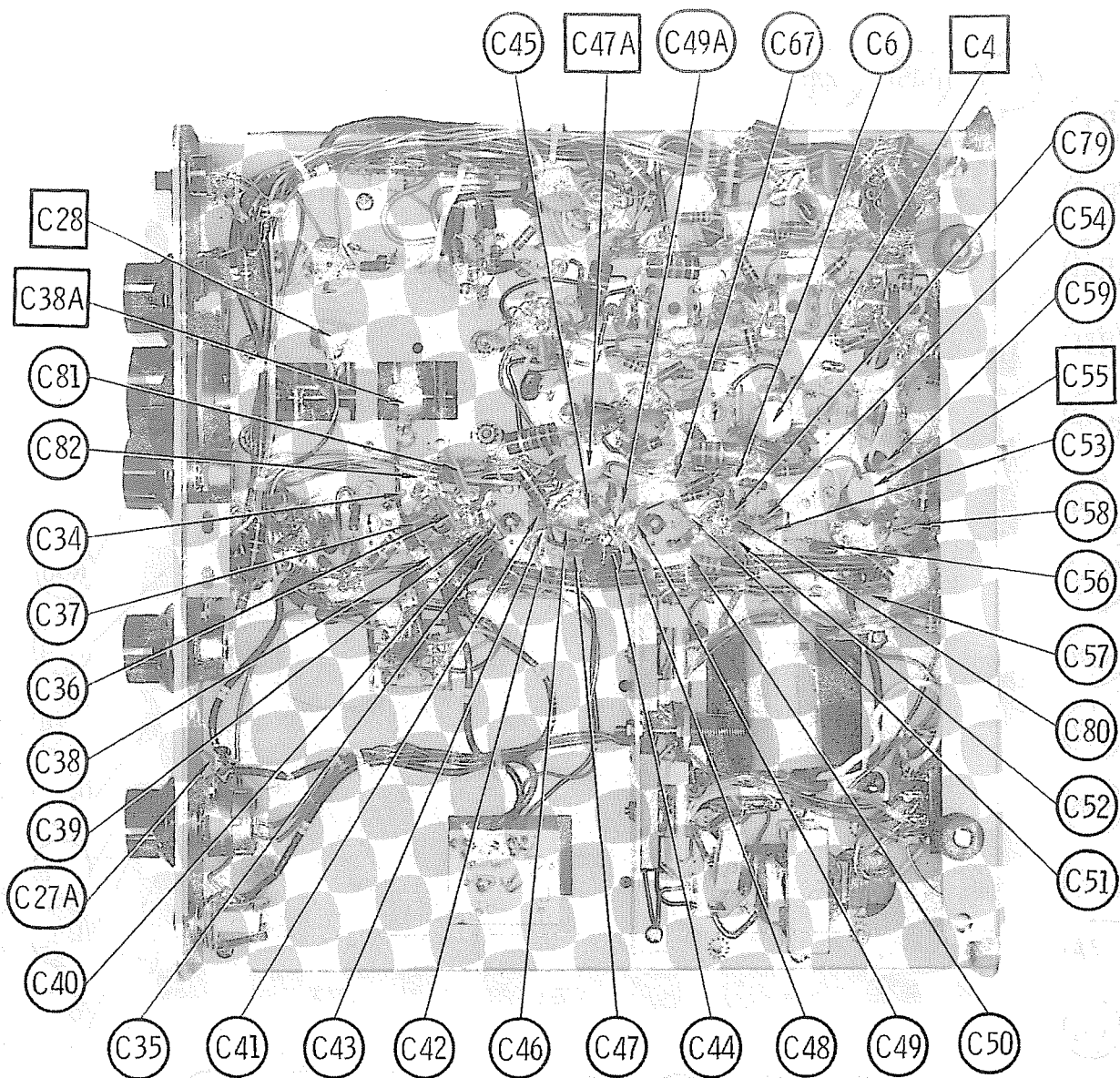
CHASSIS-BOTTOM



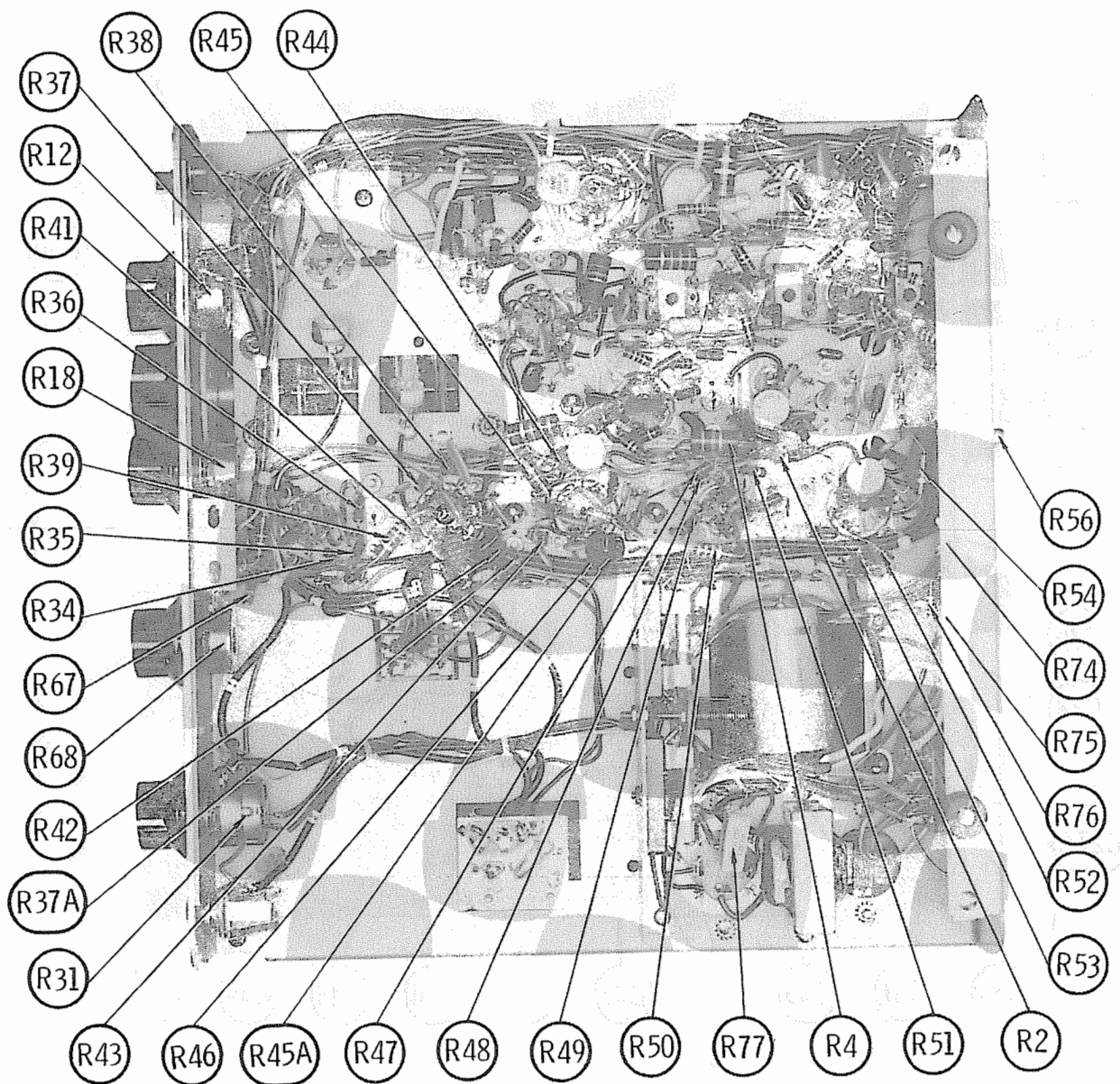
CHASSIS-TOP



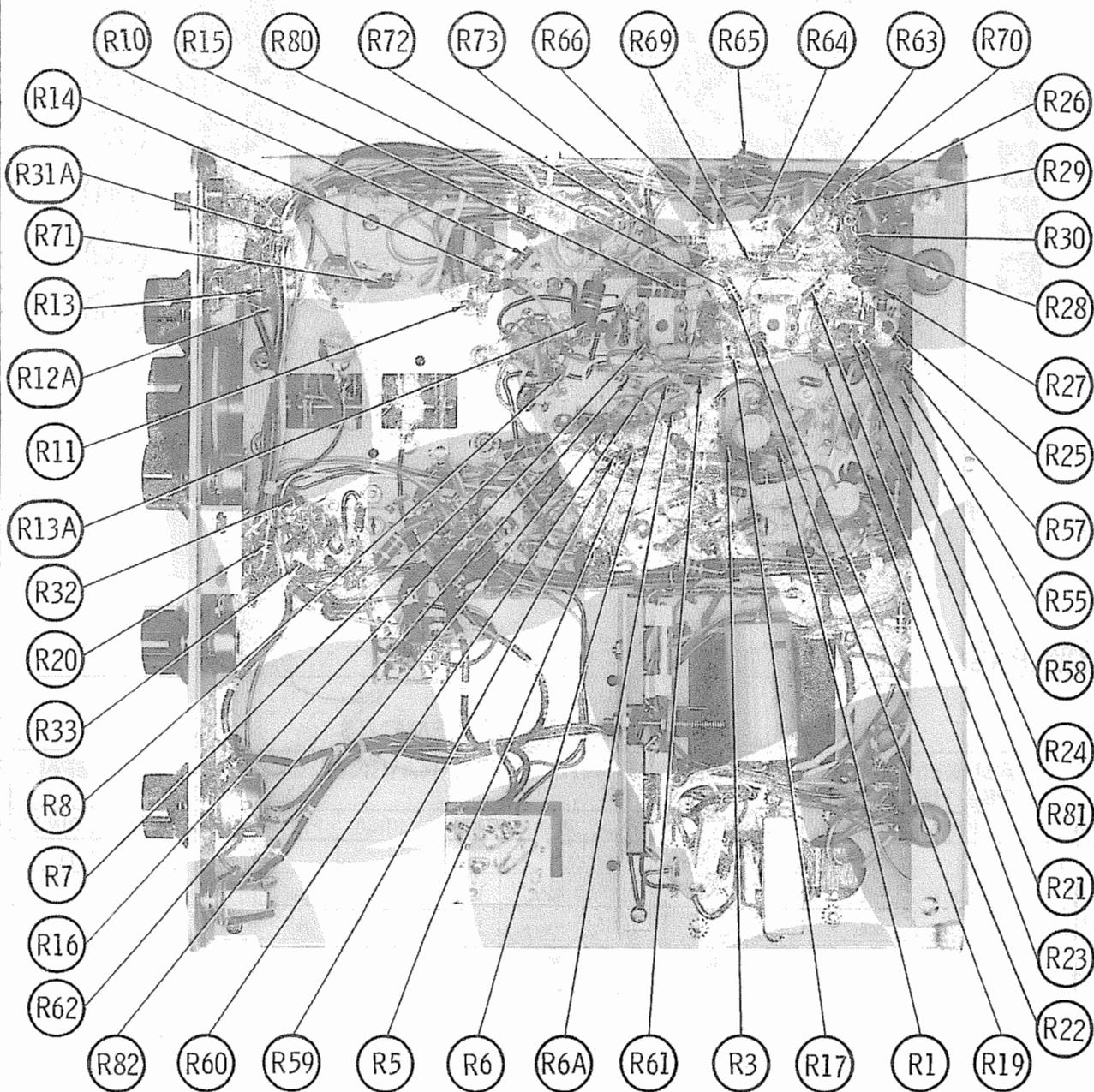
CHASSIS-BOTTOM



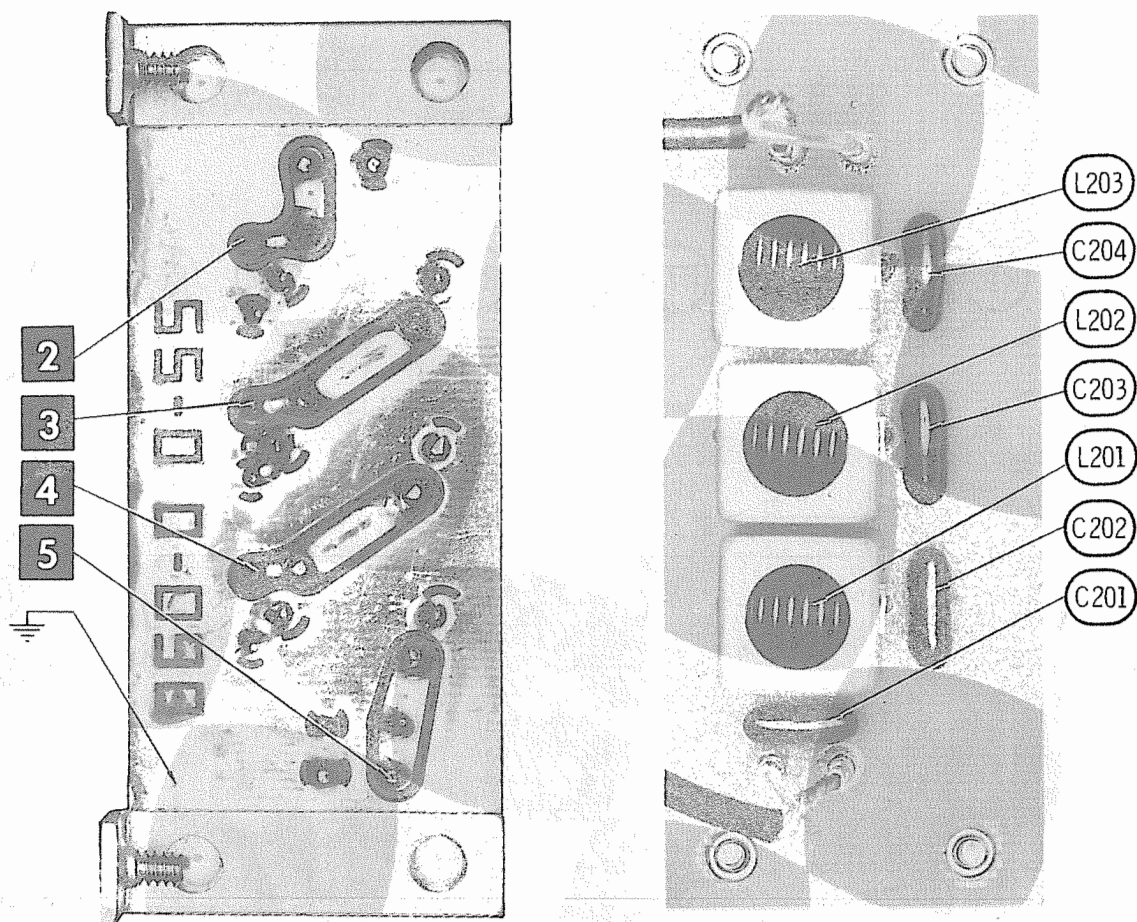
CHASSIS-BOTTOM



CHASSIS-BOTTOM



CHASSIS-BOTTOM

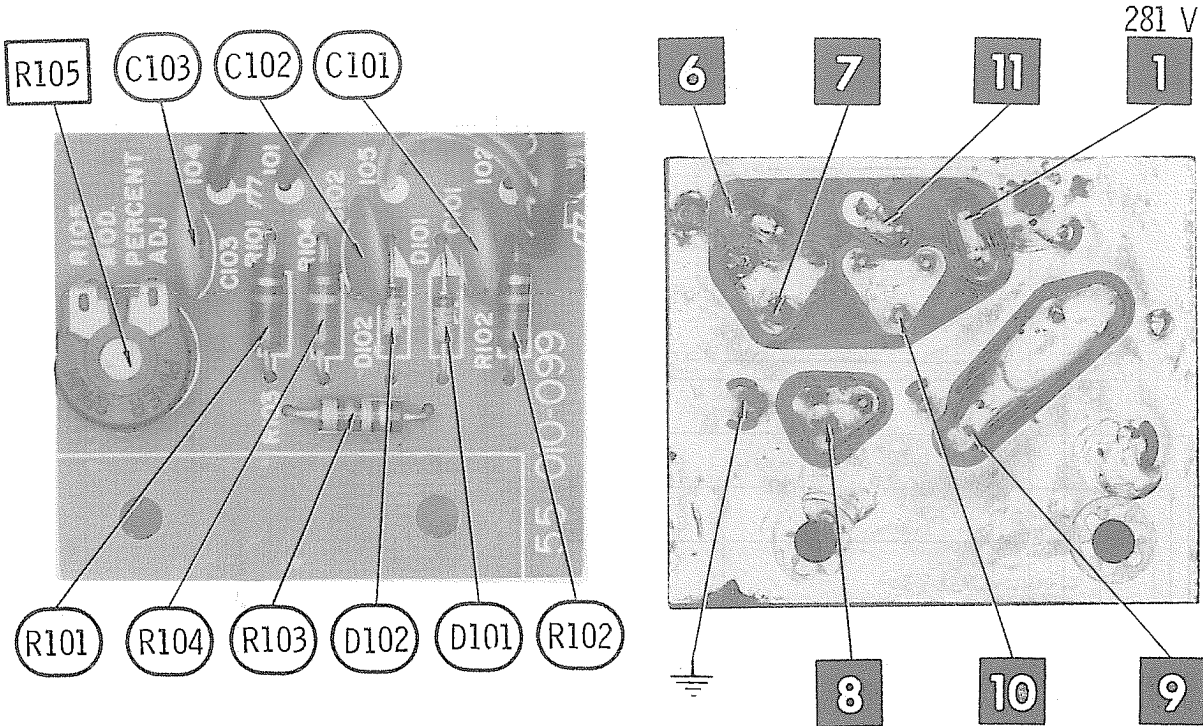


LOW PASS FILTER BOARD

RESISTANCE MEASUREMENTS

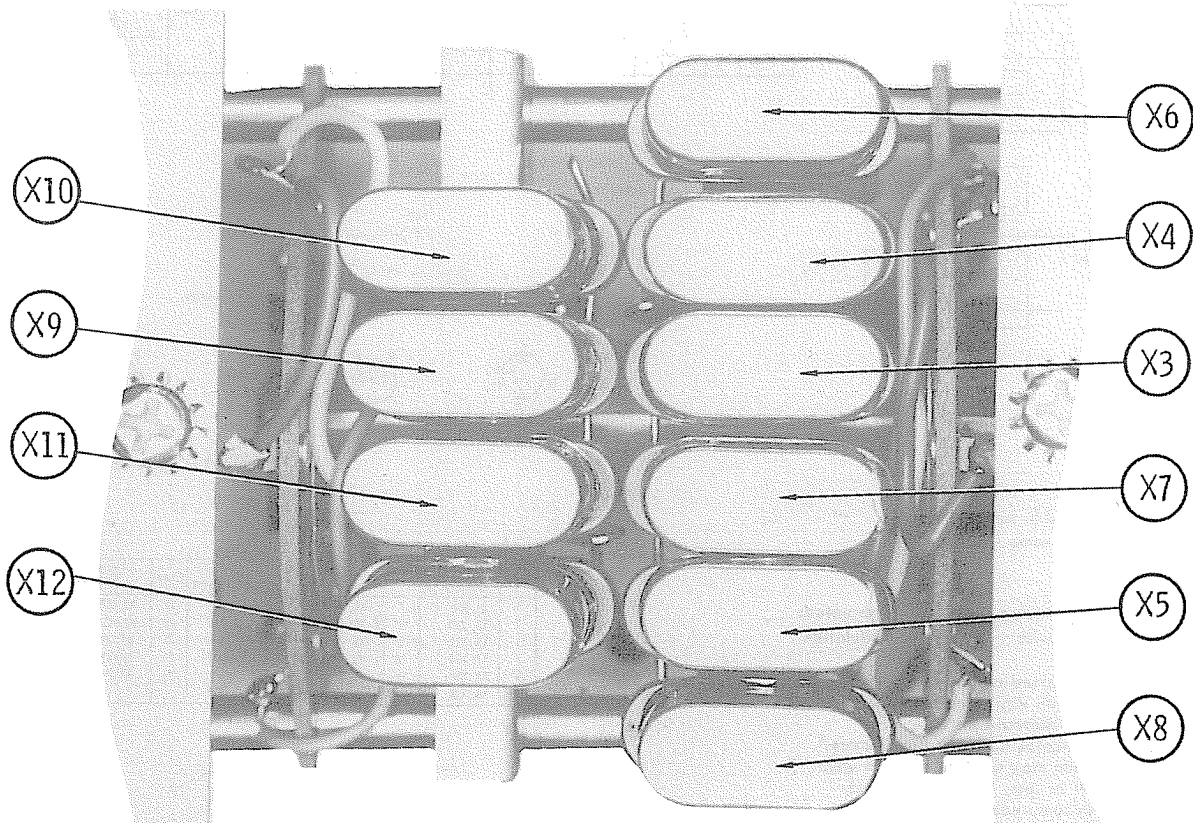
MEASUREMENTS BELOW TAKEN WITH METER HAVING .08V MAX BETWEEN PROBE TIPS												
ITEM	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9	PIN 10	PIN 11	PIN 12
V1		28K+		2.4M				0		FIL		FIL
V2	33K +	2.6M	220K+	FIL	FIL	490K	0	2200	100K			
V3	56K +	100K	33K+	FIL	FIL	33K +	0	0	12K			
V4	2.6M	0	FIL	FIL	1K+	90K+	64					
V5	2.6M	0	FIL	FIL	1K +	90K+	62					
V6	1.2M	1.3M	FIL	FIL	1.1M	0	47K					
V7	100K	0	FIL	FIL	1K +	47K +	470					
V8	4.7K +	100K	100K +	FIL	FIL	1K +	14	14	100K			
V9	10K +	100K	220K +	FIL	FIL	1K +	14	14	100K			
V10	103K	0	FIL	FIL	1K +	33K +	0					
V11		30K	0	FIL	FIL		100 +			15K +		
V12	500K+	220K	1200	FIL	FIL	510K +	2.7M	17K	FIL			
V13	100K+	100	330	FIL	FIL	100+	120	330	FIL			

+ Measured from cathode of D5.

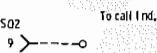
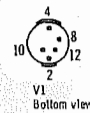
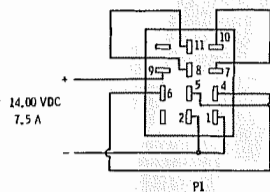
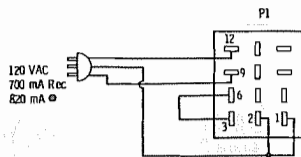
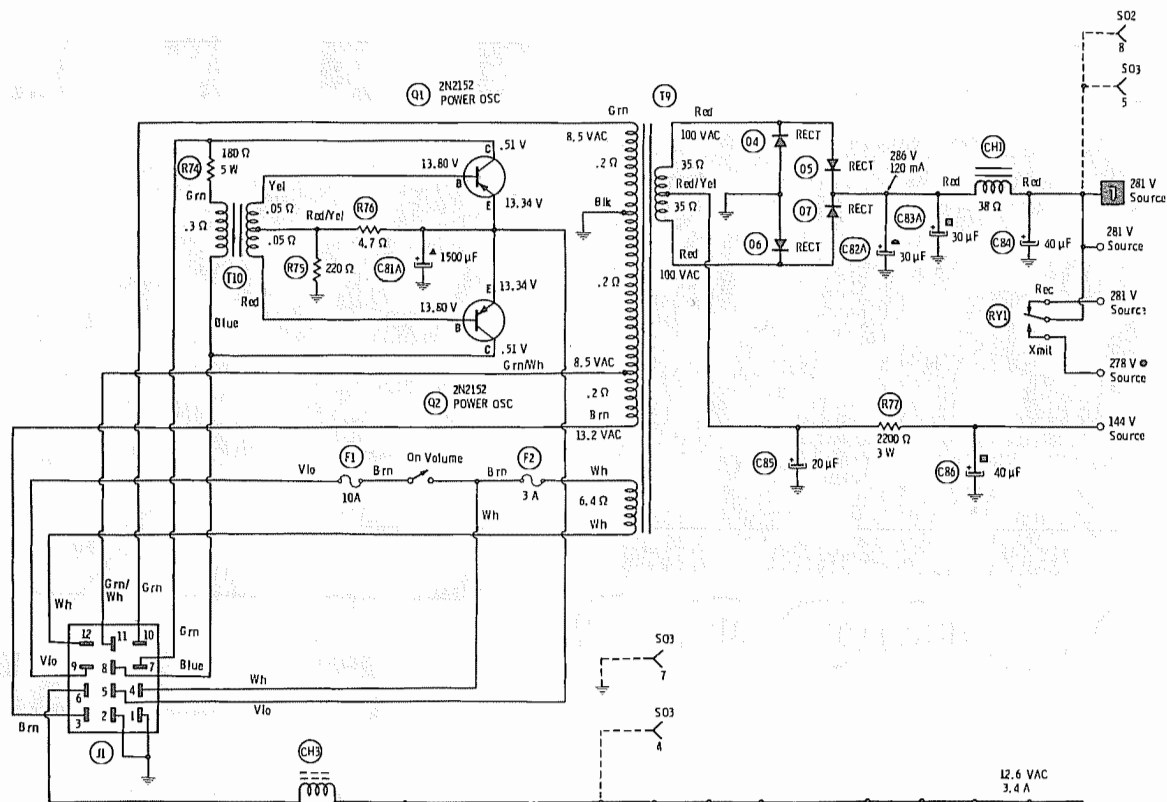


AUDIO CLIPPER BOARD

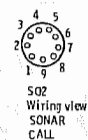
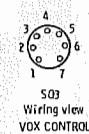
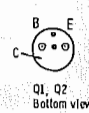
SONAR MODEL FS-3023



CRYSTAL-SWITCH BOARD



Terminal Guides



- *— Circuitry not used in some versions
- Circuitry used in some versions
- ⊛ Nominal value
- ⊕ Ground

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.

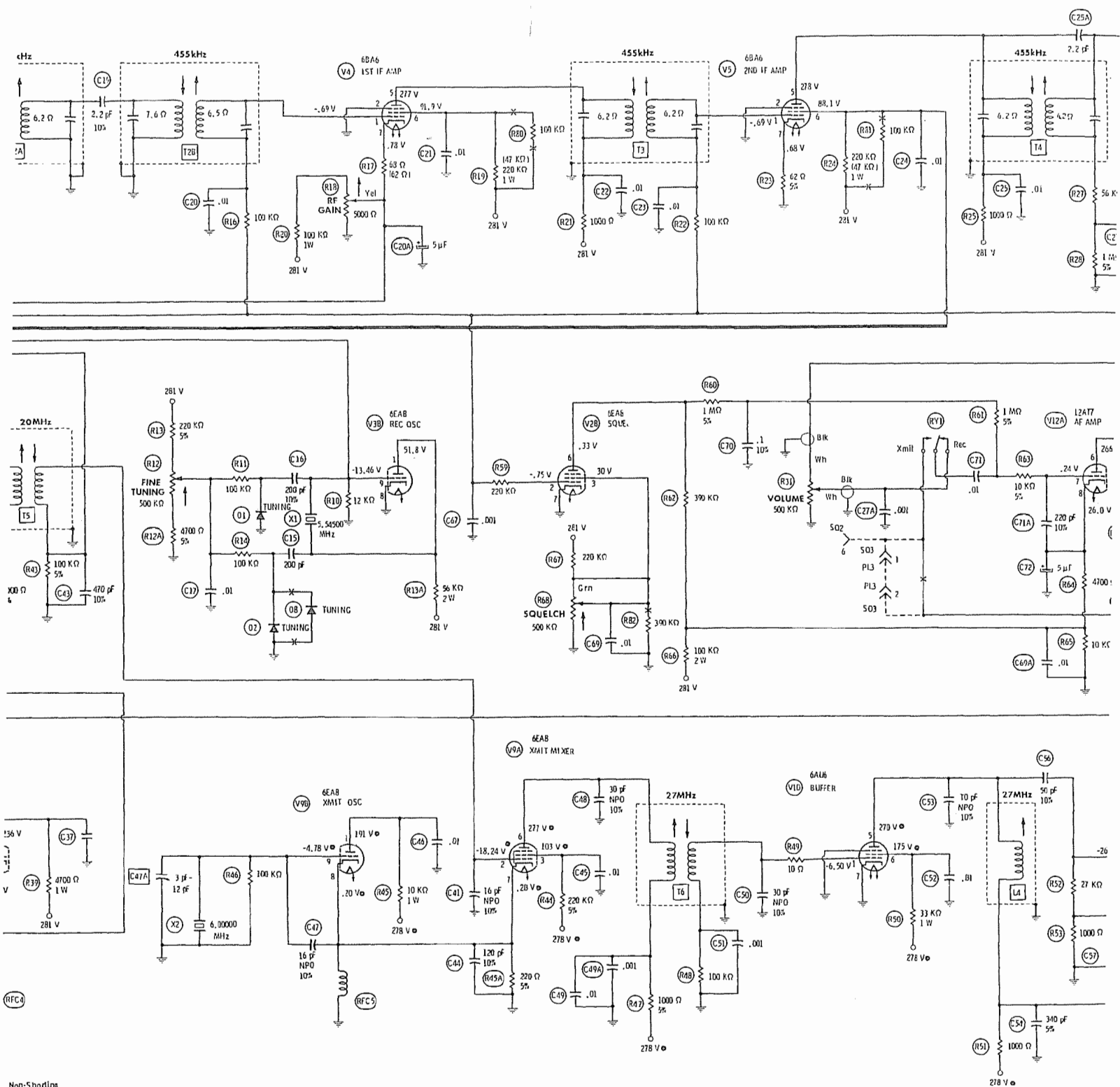
A PHOTOFAC STANDARD NOTATION SCHEMATIC

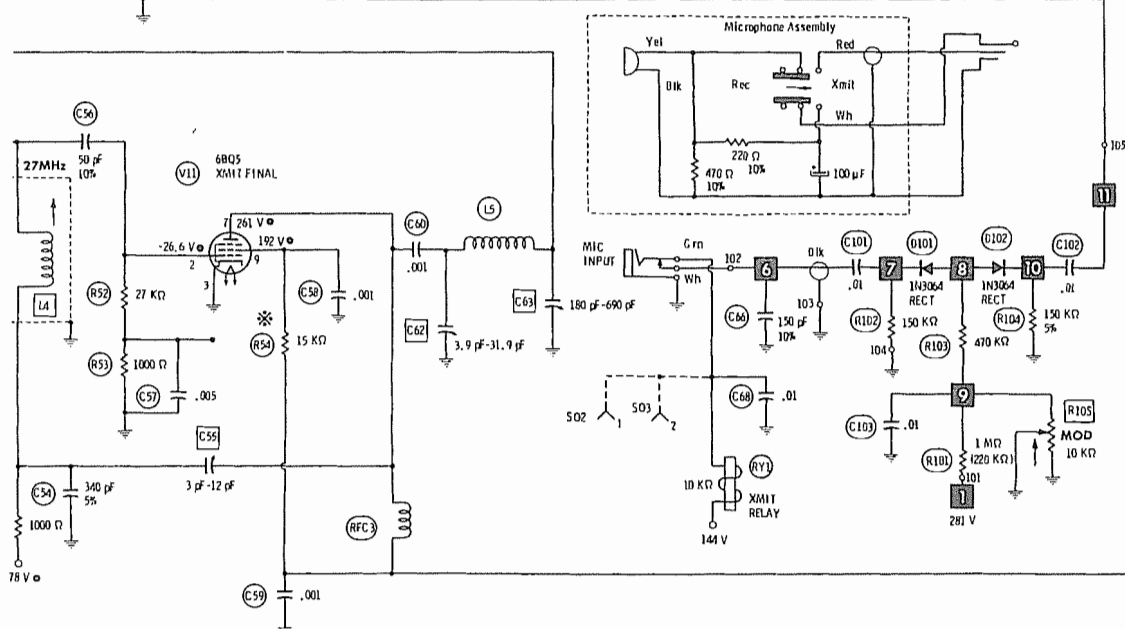
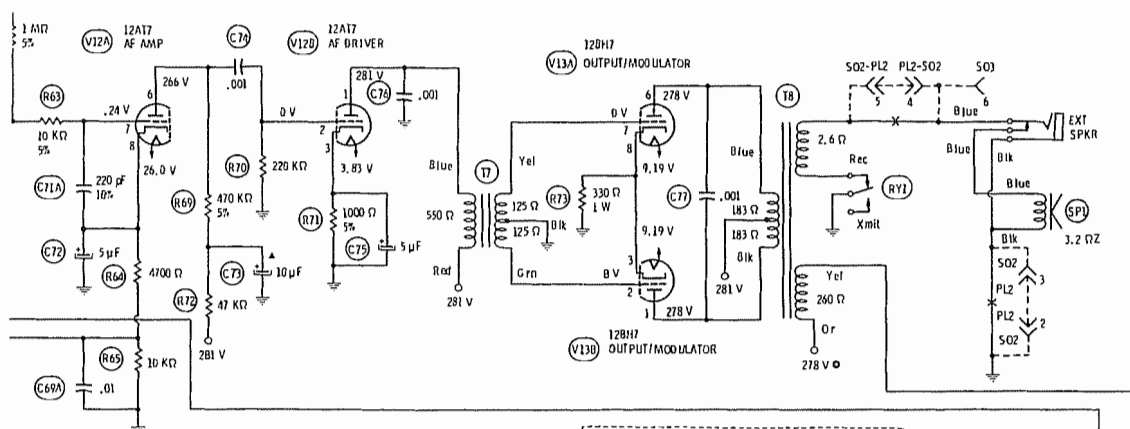
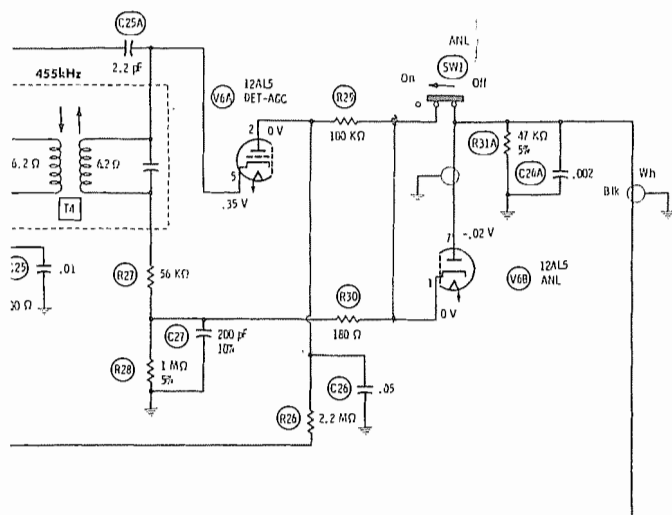
WITH **CIRCUITACE**

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







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. 8497 3-Conductor (1 shielded for Press-to-Talk) Neoprene 8491 4-Conductor (2 shielded, 2 unshielded) Neoprene

TUBES

AMPEREX			GENERAL ELECTRIC			RCA			SYLVANIA		
ITEM No.	USE	TYPE				ITEM No.	USE	TYPE			
V1	RF Amp	6DS4				V7	16MHz Synth. Osc	6AU6			
V2	1st Rec. Mixer/Squelch	6EA8				V8	Synth. Mixer/4MHz Synth. Osc	6EA8			
V3	2nd Rec. Mixer/Rec Osc	6EA8				V9	Xmit Osc/Xmit Mixer	6EA8			
V4	1st IF Amp	6BA6				V10	Buffer	6AU6			
V5	2nd IF Amp	6BA6				V11	Xmit Final	6BQ5			
V6	Detector/ANL	12AL5									

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.	WORKMAN PART No.
D1	(Varactor)	19-040-003								
D2	(Varactor)	19-040-003								
O3	1N295	19-050-004	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109	1N60
O4	S-60	19-040-002	GE-504A	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116	5A40
O5	S-60	19-040-002	GE-504A	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116	5A40
O6	S-60	19-040-002	GE-504A	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116	5A40
O7	S-60	19-040-002	GE-504A	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116	5A40
D8	(Varactor)	19-040-003								
D101	1N3064		GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177	D200
D102	1N3064		GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177	D200
Q1	2N2156	(10)		PTC106	HEPG6010				ECG213	
	2N2152	19-020-019(1)		PTC106	HEPG6010				ECG213	
		(10)								
Q2	MSP1161	(1)		PTC106	HEPG6010				ECG213	
	2N2156	(10)		PTC106	HEPG6010				ECG213	
	2N2152	19-020-019(1)		PTC106	HEPG6010				ECG213	
		(10)								
	MSP1161			PTC106	HEPG6010				ECG213	

(1) Used in some versions.

(10) Rating, 170 watt @ 30 amp.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA			
		MFR. PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C20A	5 50V	06-530-043	WBR5-50	MTA5D50	TVA-1303
C72	5 50V	06-530-043	WBR5-50	MTA5D50	TVA-1303
C73	10 350V	06-950-038	CC0225A		TVL-2724
C75	5 50V				TL-1303
C86	40 250V				
C81A	1500 15V	06-450-037	WBR2000-16	TT15X1500A	TVA-1175.2
C82A	30 350V		CC0390A	FP396A	TVL-3639.14
C83A	30 350V				
C85	20 200V	06-130-027	WBR50-450	TC798	TVA-1713
C84	40 450V				

PARTS LIST AND DESCRIPTION (CONTINUED)

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

CAPACITORS

ITEM No.	RATING	MFG. PART No.	REPLACEMENT DATA			
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C1	25 NPO 10%	09-610-017	DTZ-25	NP025	CN0425	10TCC-Q25
C1A	25 NPO 10%		DTZ-25	NP025	CN0425	10TCC-Q25
C2	25 NPO 10%		DTZ-25	NP025	CN0425	10TCC-Q25
C3	.001		DD-102	GP1000	GP210	2SS-D10
C4	3-12					
C5	.01		DD-1032	GP10000	GP110	10TS-S10
C6	.01		DD-1032	GP10000	GP110	10TS-S10
C7	16 NPO 10%		DTZ-15	NP015	CN0415	10TCC-Q15
C8	50 10%		DTZ-50	NP050	CN0450	10TCC-Q50
C9	200 10%		DTZ-200			10TCC-T20
C10	250 5%			CD10FD251J03		
	260			CD10FD251J03		
C11	.01					10TS-S10
C11A	.005		DC-502	GP5000	TA250	2SS-D50
C12	25 NPO 10%		DTZ-25	NP025	CN0425	10TCC-Q25
C13	200 10%		DTZ-200			10TCC-T20
C14	39 NPO 10%					10TCC-V39
C14A	.01	09-610-017	DD-1032	GP10000	GP110	10TS-S10
C15	200 5%		DTZ-200			10TCC-T20
C16	200 5%		DTZ-200			10TCC-T20
C17	.01		DD-1032	GP10000	GP110	10TS-S10
C18	.01		DD-1032	GP10000	GP110	10TS-S10
C19	2.2 10%		DTZ-2R2	NP02P2	CN0522	10TCC-V22
C20	.01		DD-1032	GP10000	GP110	10TS-S10
C21	.01		DD-1032	GP10000	GP110	10TS-S10
C22	.01		DD-1032	GP10000	GP110	10TS-S10
C23	.01		DD-1032	GP10000	GP110	10TS-S10
C24	.01		DD-1032	GP10000	GP110	10TS-S10
C25	.01		DD-1032	GP10000	GP110	10TS-S10
C25A	2.2		DTZ-2R2	NP02P2	CN0522	10TCC-V22
C26	.05		DC-503	MGP05	MAG5015	TGL-S50
C26A	.002		DD-202	GP2000	GP220	2SS-D20
C27	200 10%		DTZ-200			10TCC-T20
C27A	.001	09-610-017	DD-102	GP1000	GP210	2SS-D10
C28	3-12					
C29	16 NPO 10%		DTZ-15	NP015	CN0415	10TCC-Q15
C30	85 5%			CD10ED820J03	SX482	424MC820J501
C31	.001		DD-102	GP1000	GP210	2SS-D10
C32	10 NPO 10%		DTZ-10	NP010	CN0410	10TCC-Q10
C33	.01		DD-1032	GP10000	GP110	10TS-S10
C34	2 NPO +.25		DTZ-2R2	NP02P2	CN0522	10TCC-V22
C35	120 10%			CD10FD121J03	SX312	424MC1200J501
C36	.01		DD-1032	GP10000	GP110	10TS-S10
C37	.01		DD-1032	GP10000	GP110	10TS-S10
C38	16 NPO 10%		DTZ-15	NP015	CN0415	10TCC-Q15
C38A	3-12	09-610-017				
C39	16 NPO 10%		DTZ-15	NP015	CN0415	10TCC-Q15
C40	.01		DD-1032	GP10000	GP110	10TS-S10
C41	16 NPO 10%		DTZ-15	NP015	CN0415	10TCC-Q15
C42	.01		DD-1032	GP10000	GP110	10TS-S10
C43	470 10%		DD-471	GP470	GP347	10TS-T47
C44	120 10%			CD10FD121J03	SX312	424MC1200J501
C45	.01		DD-1032	GP10000	GP110	10TS-S10
C46	.01		DD-1032	GP10000	GP110	10TS-S10
C47	16 NPO 10%		DTZ-15	NP015	CN0415	10TCC-Q15
C47A	3-12	09-610-017				
C48	30 NPO 10%					10TCC-Q30
C49	.001		DD-102	GP1000	GP210	2SS-D10
C49A	.001		DD-102	GP1000	GP210	2SS-D10
C50	30 NPO 10%					10TCC-Q30
C51	.001		DD-102	GP1000	GP210	2SS-D10
C52	.01		DD-1032	GP10000	GP110	10TS-S10
C53	10 NPO 10%		DTZ-10	NP010	CN0410	10TCC-Q10
C54	340 5%			CD15FD331J03	SX333	424ME330J501
C55	3-12	09-610-017				
C56	50 10%			C06E0500J03		
C57	.005		DC-502	GP5000	TA250	2SS-D50
C58	.001		DD-102	GP1000	GP210	2SS-D10
C59	.001		DD-102	GP1000	GP210	2SS-D10
C60	.001 1400V		DD30-102	HV3-1000	2HV210	30GA-D10
C62	3.9-31.9	08-150-D12 09-210-022				
C63	180-690					
C64	.001		DD-102	GP1000	GP210	2SS-D10
C66	150 10%		DTZ-150		CN0315	10TCC-T15
C67	.001		DD-102	GP1000	GP210	2SS-D10
C68	.01		DD-1032	GP10000	GP110	10TS-S10
C69	.01		DD-1032	GP10000	GP110	10TS-S10
C69A	.01		DD-1032	GP10000	GP110	10TS-S10
C70	.1 250V 10%			DPMS4P1	EFW4010	4PB-P10
C71	.01		DD-1032	GP10000	GP110	10TS-S10
C71A	220 10%		DTZ-220			10TCC-T22
C74	.001		DD-102	GP1000	GP210	2SS-D10
C76	.001		DD-102	GP1000	GP210	2SS-D10
C77	.001		DD-102	GP1000	GP210	2SS-D10
C78	.01		DD-1032	GP10000	GP110	10TS-S10

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.
C79	.001		DD-102	GP1000	GP210	25S-D10
C80	.001		DD-102	GP1000	GP210	25S-D10
C81	.1		DC-104	MGP1	MAG5001	TG-P10
C82	.1		DC-104	MGP1	MAG5001	TG-P10
C83	.001		DD-102	GP1000	GP210	25S-D10
C101	.01		DD-1032	GP10000	GP110	10TS-S10
C102	.01		DD-1032	GP10000	GP110	10TS-S10
C103	.01		DD-1032	GP10000	GP110	10TS-S10
C201	85			CD10ED020J03	SX482	424MC82RQJ501
C202	220			CD10FD221J03	SX322	424ME2200J501
C203	220			CD10FD221J03	SX322	424ME2200J501
C204	85			CD10ED020J03	SX482	424MC82RQJ501

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.
R12	Fine Tuning	500K	03-504-003	F2-500K,SF012	A47-500K-Z,RS-2 or [NP-500K-Z, UP-A-400]	UA55A,SL2500 or [RU55A,SL38, SL2500]	BU1,CF25,SS1, DC1
R18	RF Gain	5000	03-502-036	F1-5000, SR5012	A47-5000-S,RS-2 or [NP-5000-S, UP-A-400]	UA53L,SL2500 or [RU53L,SL38, SL2500]	BU1,CF8,SS3, DC1
R31	Volume/Switch	500K	03-504-037	F2-500K, SR5012,KR-1	A47-500K-Z,RS-2, SWE-12 or [NP-500K-Z, UP-A-400,NWE-12]	UA55A,SL2500,US41 or [RU55A,SL38, SL2500,US41]	BU1,CF25,SS3, GC
R56	S Meter	100K	03-104-026	F1-100K,SS008	A47-100K-S, FKS-1/2 or [NP-100K-S, UP-A-400]	UA15L,SK750 or [RU15L,SL38, SK750]	BU1,CF13,SS2, DC1
R68	Squelch	500K	03-504-003	F2-500K,SF012	A47-500K-Z,RS-2 or [NP-500K-Z, UP-A-400]	UA55A,SL2500 or [RU55A,SL38, SL2500]	BU1,CF25,SS1, DC1

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		ITEM No.	RATING	REPLACEMENT DATA	
		WORKMAN PART No.	MFR. PART No.			WORKMAN PART No.	MFR. PART No.
R74	180 5W WW	5W-SQ-175	02-181-422	R77	2200 3W WW	20-019	02-222-322

COILS (RF-IF)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
L1	Rec Ant (27MHz)	22-030-013			
L2	Rec RF (27MHz)	22-070-006			
L3	Synth Osc (16MHz)	22-070-007			
L4	Xmit Buffer (27MHz)	22-070-008			
L5	Pi Filter	22-070-001			
L6	Meter Coil	22-090-003			
L201	Pi Filter	55-030-024			
L202	Pi Filter	55-030-024			
L303	Pi Filter	55-030-024			
RFC1	RF Choke (1.8uH)	22-060-022			
RFC2	RF Choke (1uH)	22-060-023		74F106AP	
RFC3	RF Choke (21uH)	22-060-005		74F225A1	
RFC4	RF Choke (134uH)	22-060-004		74F225A1	
RFC5	RF Choke (134uH)	22-060-004		74F225A1	

PARTS LIST AND DESCRIPTION (CONTINUED)

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

COILS (RF-IF)(cont)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
T1	Rec Mixer (7MHz)	22-050-018			
T2A	IF (455kHz)	22-010-020		KHZ455	
T2B	IF (455kHz)	22-010-020		KHZ455	
T3	IF (455kHz)	22-010-020		KHZ455	
T4	IF (455kHz)	22-010-020		KHZ455	
T5	Synth Mixer (20MHz)	22-050-017			
T6	Xmit Mixer (27MHz)	22-050-016			

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.	
CH1	120mA	38	500mH	14-100-001			

TRANSFORMER (Driver)

ITEM No.	TURNS RATIO			REPLACEMENT DATA			NOTES
	PRI.	SEC. 1	SEC. 2	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T7	4	1		14-020-001			

TRANSFORMER (Audio Output)

ITEM No.	IMPEDANCE		REPLACEMENT DATA			NOTES
	PRI.	SEC.	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T8	3276	3.2	14-050-009			

TRANSFORMER (Power)

ITEM No.	RATING			REPLACEMENT DATA			NOTES
	PRI.	SEC. 1	SEC. 2	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T9	120V AC @ 820mA AC	204V AC CT @ 220mA AC	17V AC @ 3.6A AC	14-010-032			
	SEC. 3 13.2V AC @ 2.6A AC	SEC. 4	SEC. 5				

TRANSFORMER (POWER OSCILLATOR)

ITEM No.	TURNS RATIO			REPLACEMENT DATA			NOTES
	PRI.	SEC. 1	SEC. 2	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T10	2	1		14-110-002			

SONAR MODEL FS-3023

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.	
SP1	2 X 6 PM 3.2 Ohms	36-042-608	26A07Z	

FUSE DEVICES

ITEM No.		DESCRIPTION	REPLACEMENT DATA						WORKMAN PART No.
			PART No.		BUSS PART No.		LITTELFUSE PART No.		
			DEVICE	HOLDER	DEVICE	HOLDER	DEVICE	HOLDER	
F1	3AG 10 Amp	42-010-000	42-020-003	AGC10	3998	311010	357001	FG3-2	
F2	3AG 3 Amp	42-010-012	42-020-003	AGC3	3998	372003	357001		

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	5.54500	40-003-008	QC20S5.54500	Xmit Osc.	X7	16.40000	40-003-006*	QA32S16.40000	17,18,19,20
X2	6.00000	40-003-007	QC20S6.00000	Rec Osc.	X8	16.45000	40-003-006	QA32S16.45000	21,22,23
X3	16.20000	40-003-006*	QA32S16.20000	1,2,3,4	X9	4.76500	40-003-005*	QB20S4.76500	1,5,9,13,17,21
X4	16.25000	40-003-006*	QA32S16.25000	5,6,7,8	X10	4.77500	40-003-005*	QB20S4.77500	2,6,10,14,18,22
X5	16.30000	40-003-006*	QA32S16.30000	9,10,11,12	X11	4.78500	40-003-005*	QB20S4.78500	3,7,11,15,19
X6	16.35000	40-003-006*	QA32S16.35000	13,14,15,16	X12	4.80500	40-003-005*	QB20S4.80500	4,8,12,16,20,23

* Specify Part Number and frequency when ordering.

MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
M1	Meter	32-010-010	0-1mA
RY1	Relay	16-010-011	4PDT, 110V
SW1	Switch	10-020-005	ANL
SW3	Switch	51-010-004	Channel Selector Assembly

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

ITEM	PART No.	ITEM	PART No.
Escutcheon	11-020-043	Cover, Top or Bottom	11-080-006
Knob, Control	33-010-010	Cover, Right Side	11-080-027
Knob, Channel Selector	33-020-005	Cover, Left Side	11-080-028

ACCESSORIES

ITEM	MFGR. PART No.	REMARKS
Microphone Assembly	57-010-006	117V AC 12V DC
Power Cable Assembly	59-010-019	
Power Cable Assembly	59-010-018	