

PHOTOFACT[®] with

CIRCUITRACE[®]

For Supplier Address See PHOTOFACT Index

NOTE

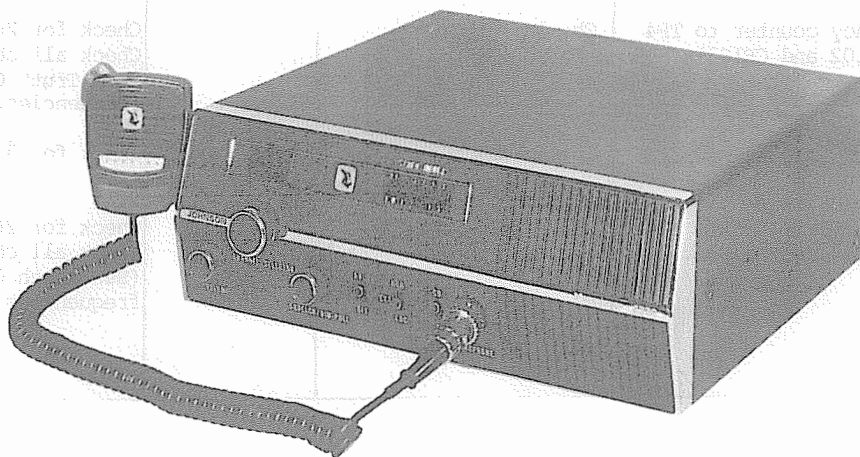
Repair or adjustment of transmitter circuits must be under supervision of a person with first-or second-class radiotelephone license.

(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.



JOHNSON MODEL MESSENGER 4230

MODEL MESSENGER 4230

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

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ALIGNMENT INSTRUCTIONS

CAUTION: Use isolation transformer or observe polarity when connecting test equipment. Maintain line voltage at 120V AC. Allow a 15-minute warm-up period. Adjustments made with 13.8-volt DC input. Connect low sides of test equipment to ground unless specified otherwise. Connect 50-ohm dummy load or antenna before keying transmitter. Connect microphone.

Suggested Alignment Tools:	GC ELECTRONICS:
T1, T2, T5, T6, T10, T101	9440
Z1A, Z1B, T3, T4	5009, 8728, 8728A
T7, T8, L3	8282, 8606, 9302, 9440
L4, L5, L7	9300, 9302, 9304

SYNTHESIZER ALIGNMENT

TEST EQUIPMENT	TRANSCIVER	ADJUST	REMARKS
Input of frequency counter to TP2 (Q102 Gate 2).	Ch. 19		Check for 5.120MHz.
Input of frequency counter to TP3 (Q105 Base).	Ch. 19		Check for 30.820MHz.
Input of DC meter to TP1.	Ch. 1	T101	Adjust for 3.00 volts.
Input of oscilloscope to TP4 (junction of CR102 and CR103).	Ch. 19	T10	Adjust for maximum RF output.
Input of frequency counter to TP4 (junction of CR102 and CR103).	Ch. 1		Check for 26.510MHz. Check all channels. (See Truth Chart for correct frequencies.)
Input of frequency counter to TP3 (Q105 Base).	Ch. 19 Xmt		Check for 31.275MHz.
Input of frequency counter to TP4 (junction of CR102 and CR103).	Ch. 1 Xmt		Check for 26.965MHz. Check all channels. (See Truth Chart for correct frequencies.)

RECEIVER ALIGNMENT

Connect an AC VTVM or AF wattmeter across speaker voice coil. Adjust volume control to obtain a suitable indication. Set generator output low enough to prevent AGC limiting. Squelch MINIMUM, ANL off, NOR/EXT/LOC Switch EXT.

TEST EQUIPMENT	TRANSCIVER	ADJUST	REMARKS
Output of signal generator thru .01uF to TP5 (Q2 Base). 455kHz, 1000Hz @ 30% modulation.	Ch. 19	T4, T3, Z1A, Z1B	Adjust for maximum output.
Output of signal generator thru .01uF to antenna jack. 27.185MHz, 1000Hz @ 30% modulation.	Ch. 19	T2, T1	Adjust for maximum output. If necessary, readjust Z1A, Z1B, T3 and T4.

RECEIVER ADJUSTMENTS

Connect an AC VTVM or AF wattmeter across speaker voice coil.
Adjust volume control to obtain a suitable indication.
Squelch MINIMUM, ANL off, NOR/EXT/LOC Switch EXT.

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Output of signal generator thru .01uF to antenna jack. 27.185MHz, 1000Hz @ 30% modulation. Output 1000uV.	Ch. 19	R202	S METER Adjust for 9 on S scale of meter.

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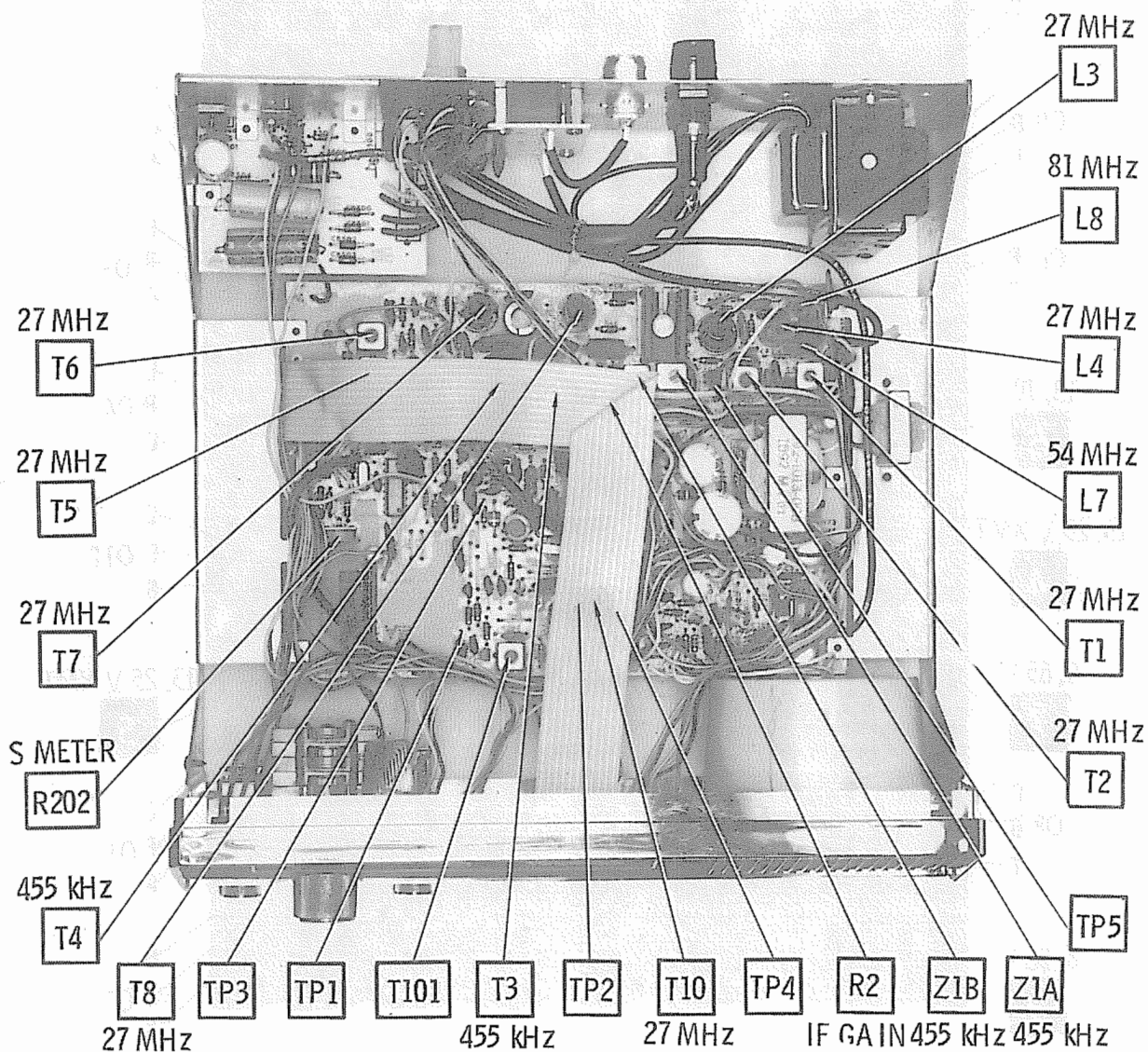
TRANSMITTER ALIGNMENT

Connect an RF wattmeter and 50-ohm, 25-watt dummy load to antenna connector.
NOTE: Be sure to check transmit frequency and power on all active channels after alignment of transmitter.
See page 4 for channel frequencies.

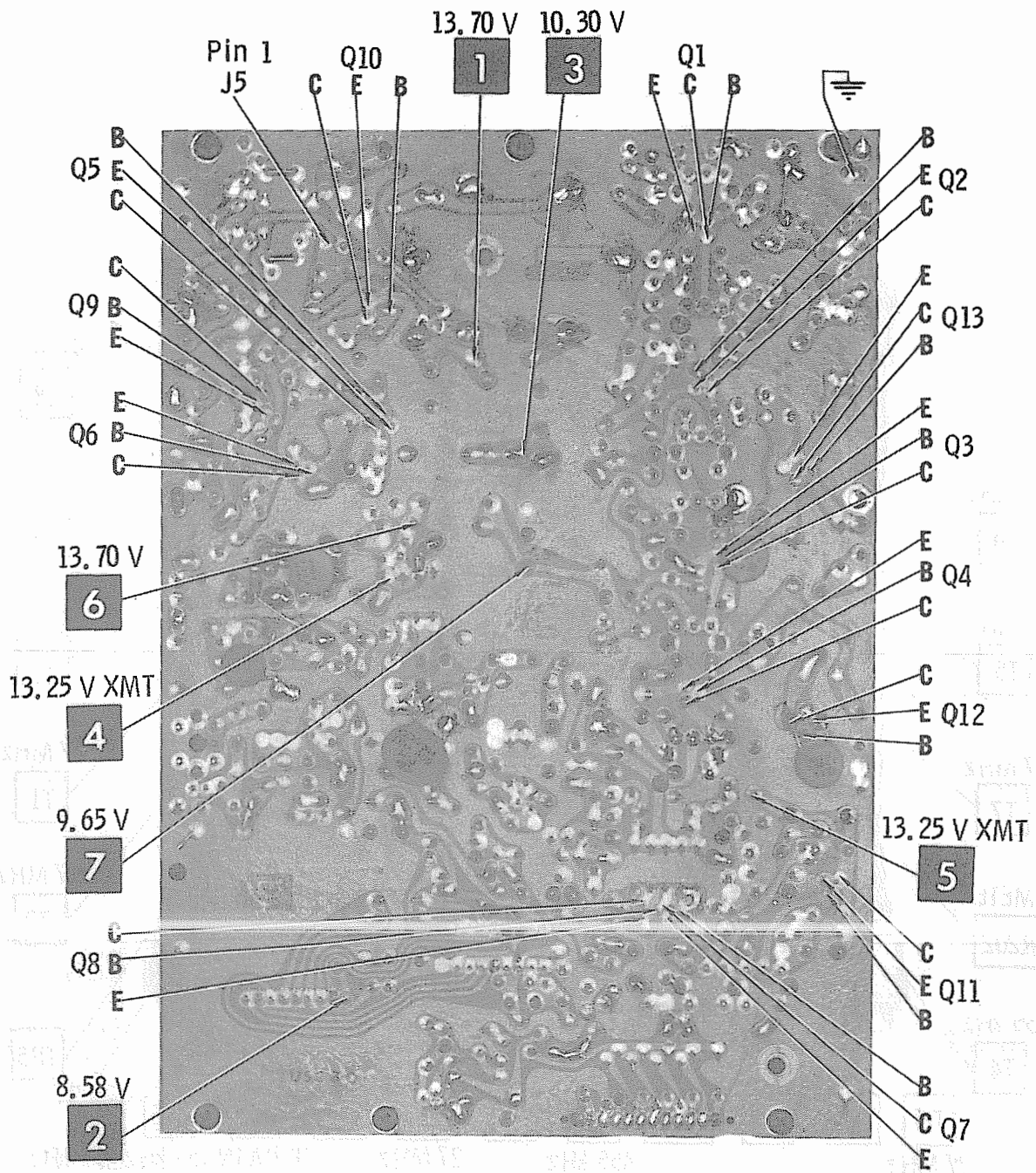
TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Input of spectrum analyzer or harmonic meter to antenna jack. Input of spectrum analyzer or harmonic meter to antenna jack.	Ch. 19	T5,T6,T7,T8, L3,L4	Adjust for maximum RF output.
	Ch. 19	L4	Adjust for 3.8 watts RF output maximum.
	Ch. 19	L7	Adjust for MINIMUM at 54MHz (second harmonic).
	Ch. 19	L5	Adjust for MINIMUM at 81MHz (third harmonic).

TRUTH CHART

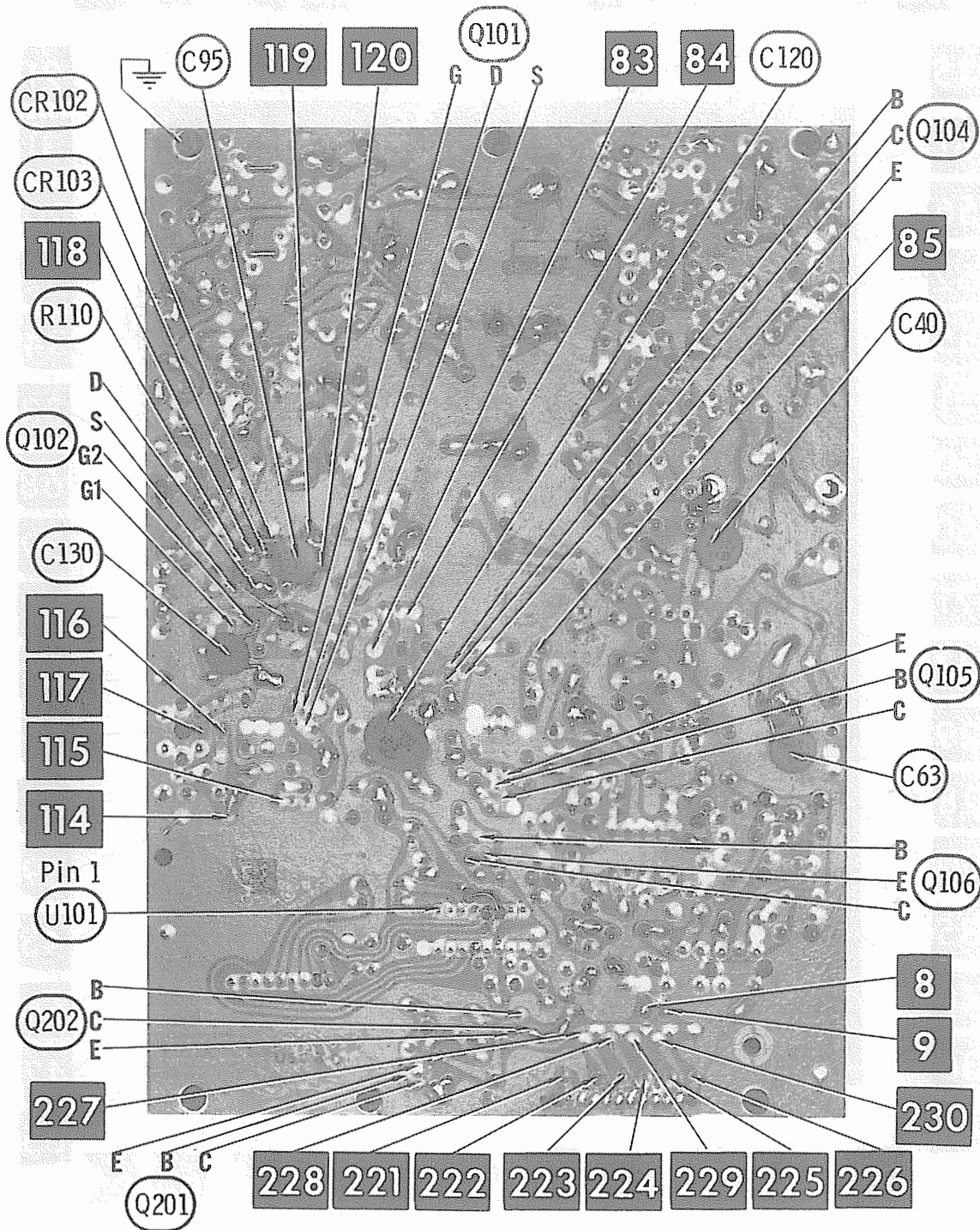
C H A N N E L	1 = 10.30 Volts 0 = 0 Volts								REC VCO OUTPUT IN MHz AT TP4	XMT VCO OUTPUT IN MHz AT TP4	VCO OUTPUT IN MHz AT
	U101 PROGRAM DIVIDER										
	PINS										
	13	14	15	2	3	4	5				
1	0	0	0	0	0	0	1		26.510	26.965	
2	0	0	0	0	0	1	0		26.520	26.975	
3	0	0	0	0	0	1	1		26.530	26.985	
4	0	0	0	0	1	0	1		26.550	27.005	
5	0	0	0	0	1	1	0		26.560	27.015	
6	0	0	0	0	1	1	1		26.570	27.025	
7	0	0	0	1	0	0	0		26.580	27.035	
8	0	0	1	0	0	0	0		26.590	27.055	
9	0	0	1	0	0	0	1		26.610	27.065	
10	0	0	1	0	0	1	0		26.620	27.075	
11	0	0	1	0	0	1	1		26.630	27.085	
12	0	0	1	0	1	0	1		26.650	27.105	
13	0	0	1	0	1	1	0		26.660	27.115	
14	0	0	1	0	1	1	1		26.670	27.125	
15	0	0	1	1	0	0	0		26.680	27.135	
16	0	1	0	0	0	0	0		26.700	27.155	
17	0	1	0	0	0	0	1		26.710	27.165	
18	0	1	0	0	0	1	0		26.720	27.175	
19	0	1	0	0	0	1	1		26.730	27.185	
20	0	1	0	0	1	0	1		26.750	27.205	
21	0	1	0	0	1	1	0		26.760	27.215	
22	0	1	0	0	1	1	1		26.770	27.225	
23	0	1	1	0	0	0	0		26.800	27.255	
24	0	1	0	1	0	0	0		26.780	27.235	
25	0	1	0	1	0	0	1		26.790	27.245	
26	0	1	1	0	0	0	1		26.810	27.265	
27	0	1	1	0	0	1	0		26.820	27.275	
28	0	1	1	0	0	1	1		26.830	27.285	
29	0	1	1	0	1	0	0		26.840	27.295	
30	0	1	1	0	1	0	1		26.850	27.305	
31	0	1	1	0	1	1	0		26.860	27.315	
32	0	1	1	0	1	1	1		26.870	27.325	
33	0	1	1	1	0	0	0		26.880	27.335	
34	0	1	1	1	0	0	1		26.890	27.345	
35	1	0	0	0	0	0	0		26.900	27.355	
36	1	0	0	0	0	0	1		26.910	27.365	
37	1	0	0	0	0	1	0		26.920	27.375	
38	1	0	0	0	0	1	1		26.930	27.385	
39	1	0	0	0	1	0	0		26.940	27.395	
40	1	0	0	0	1	0	1		26.950	27.405	



CHASSIS - BOTTOM

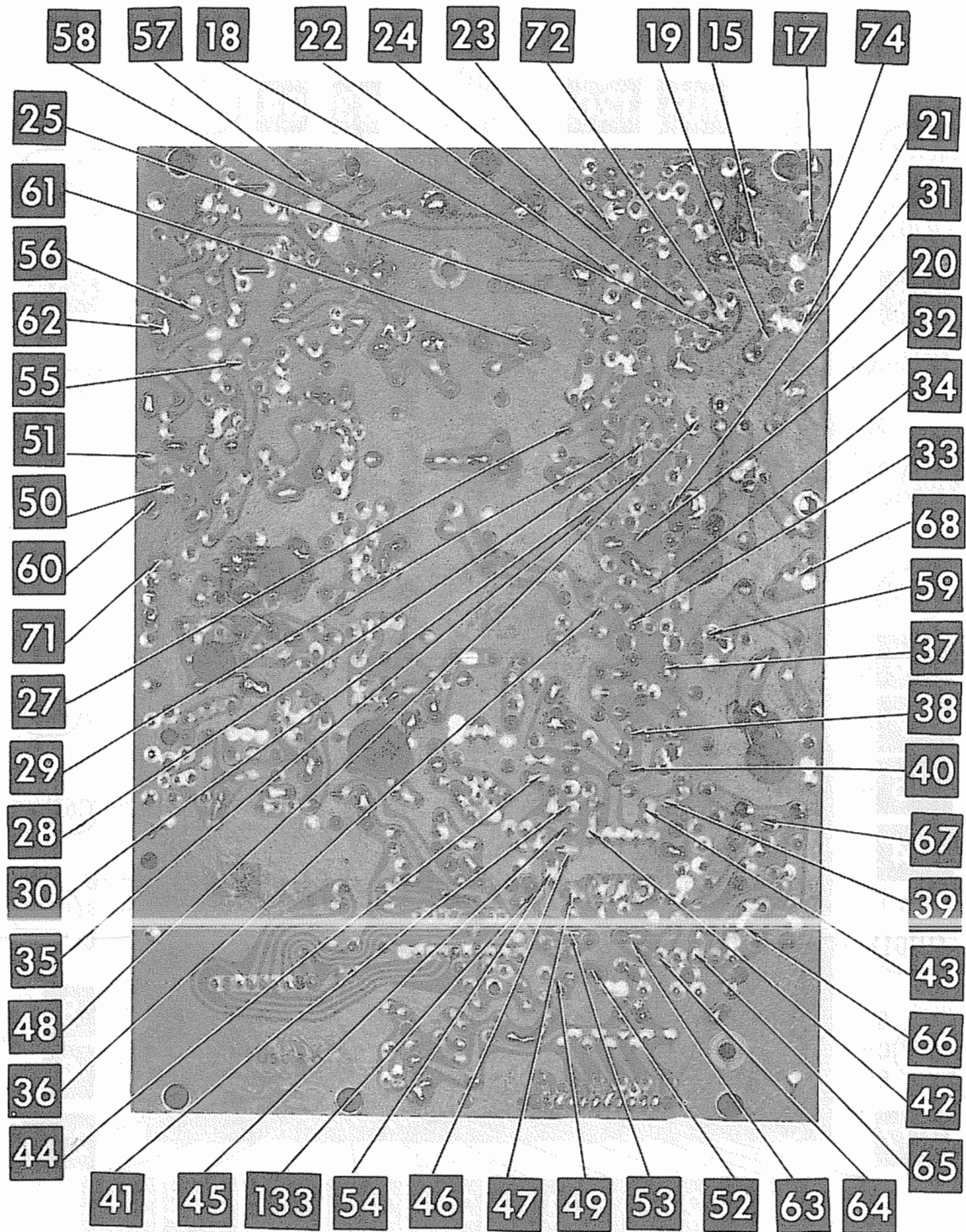


MAIN BOARD

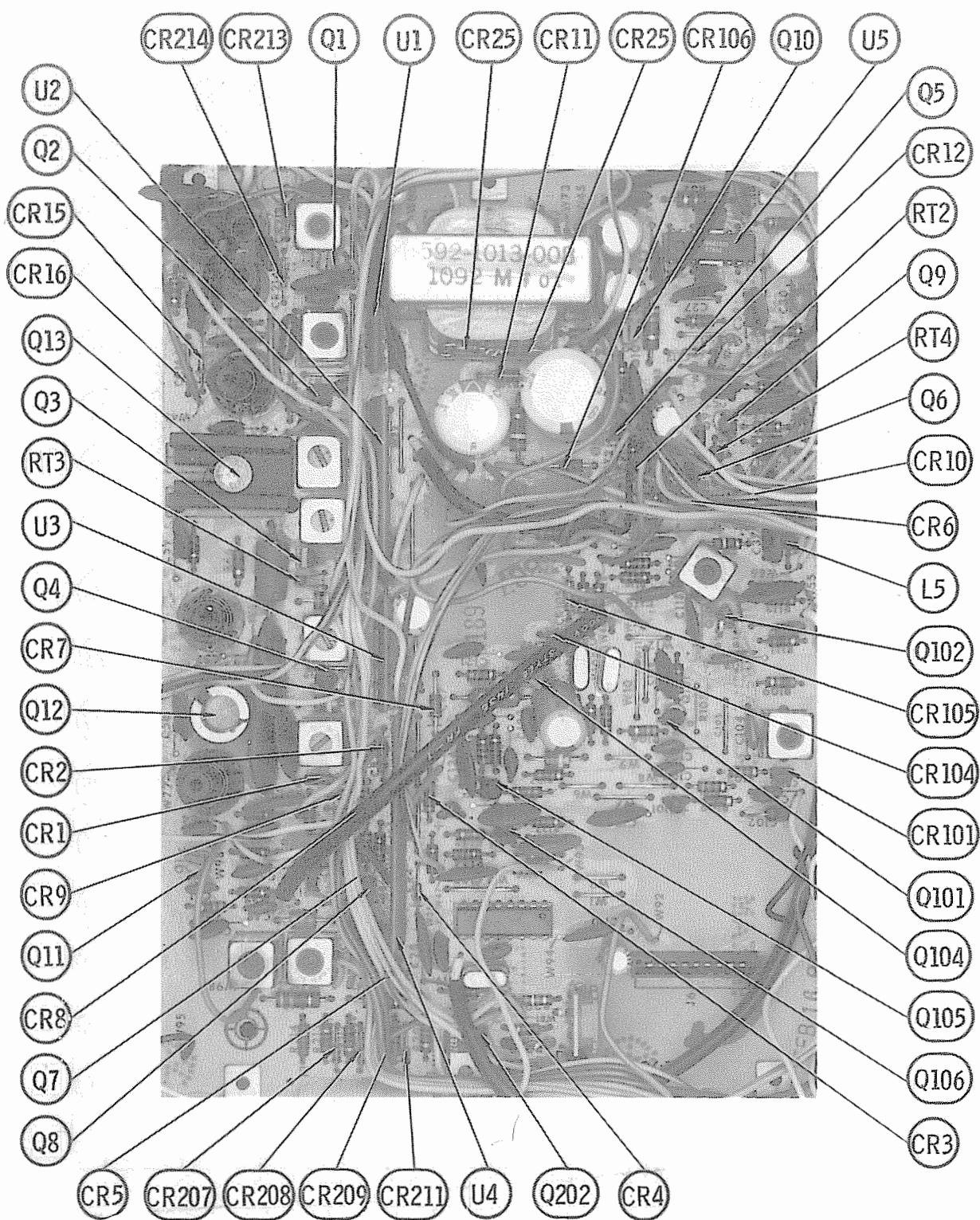


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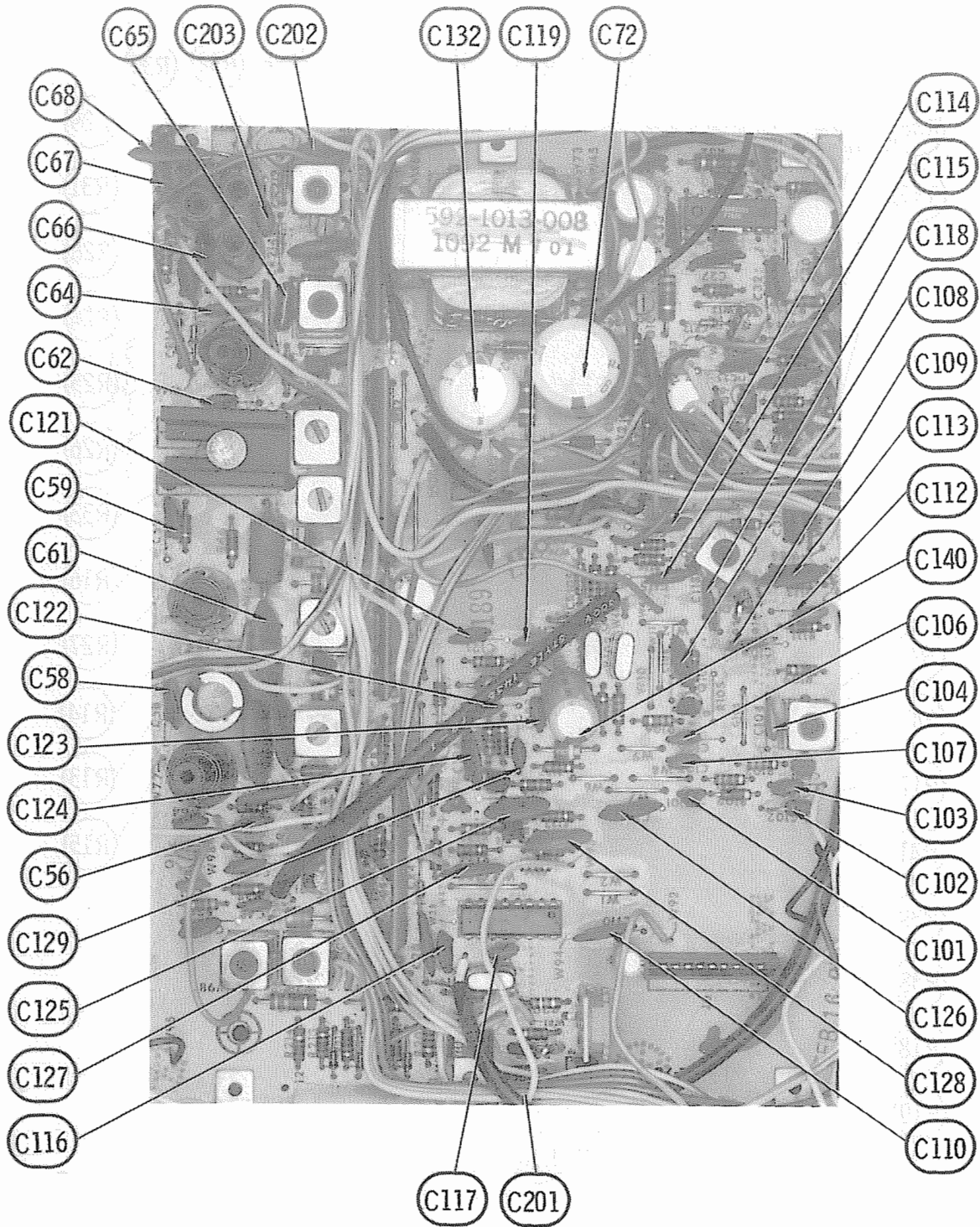
MAIN BOARD



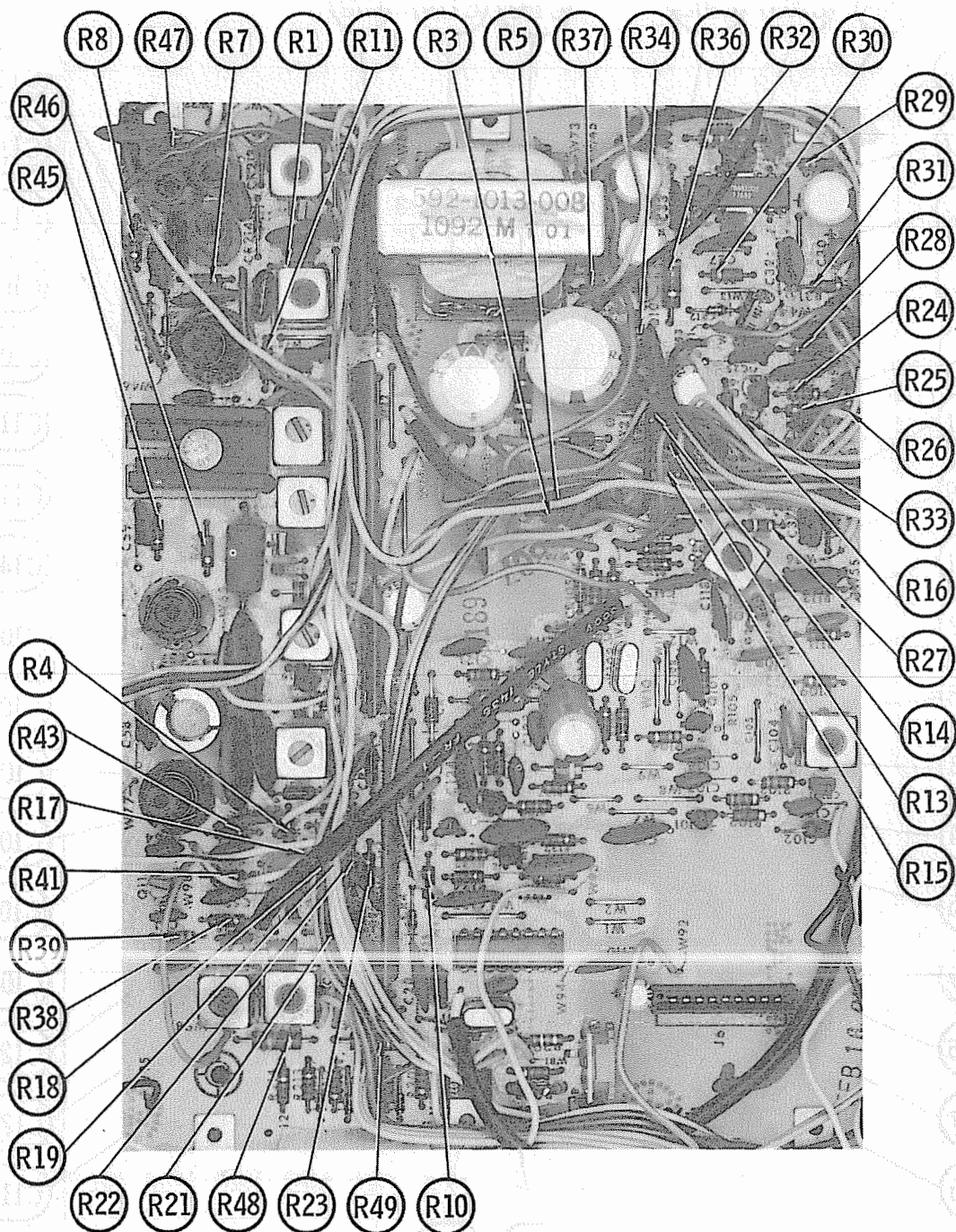
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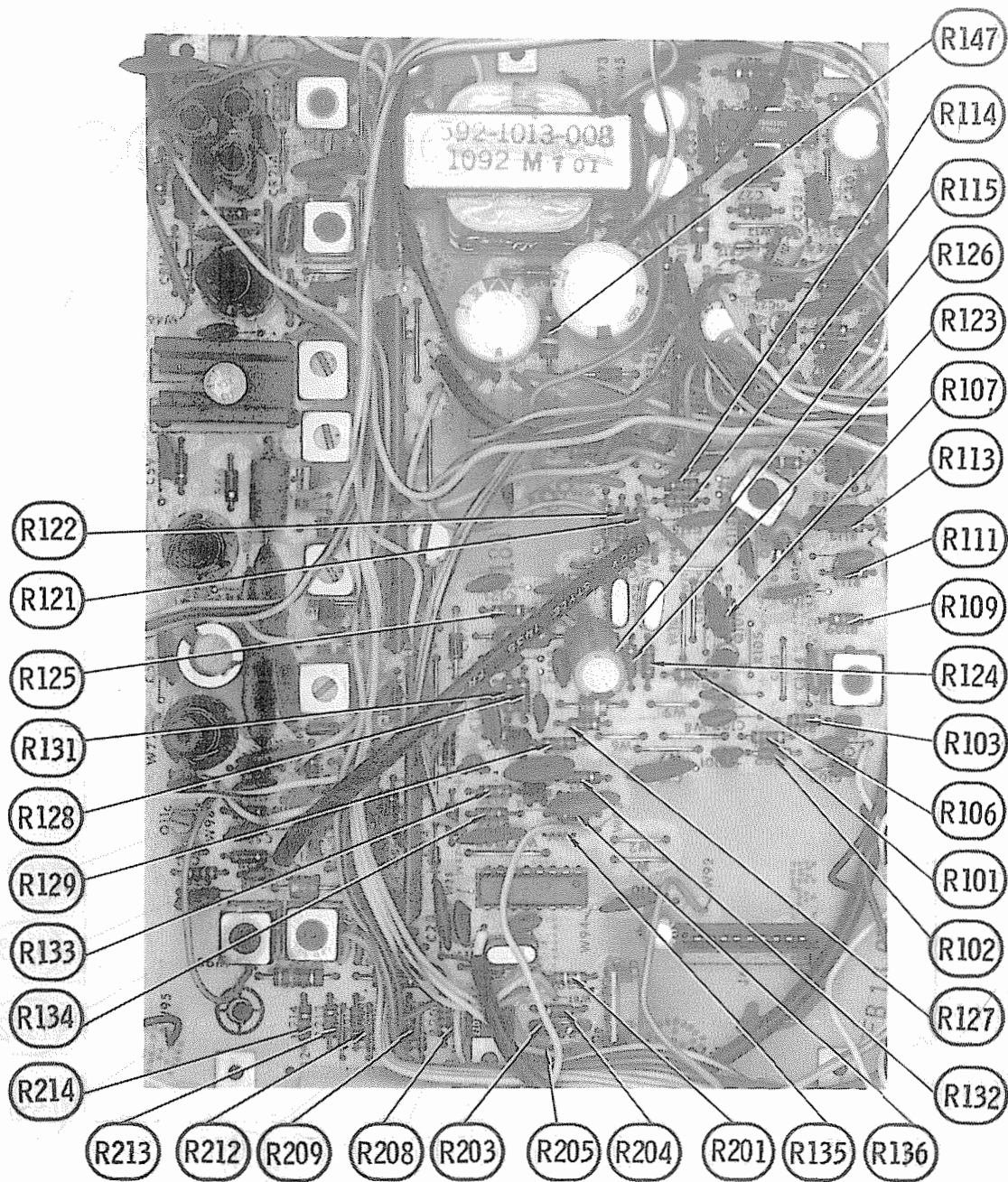
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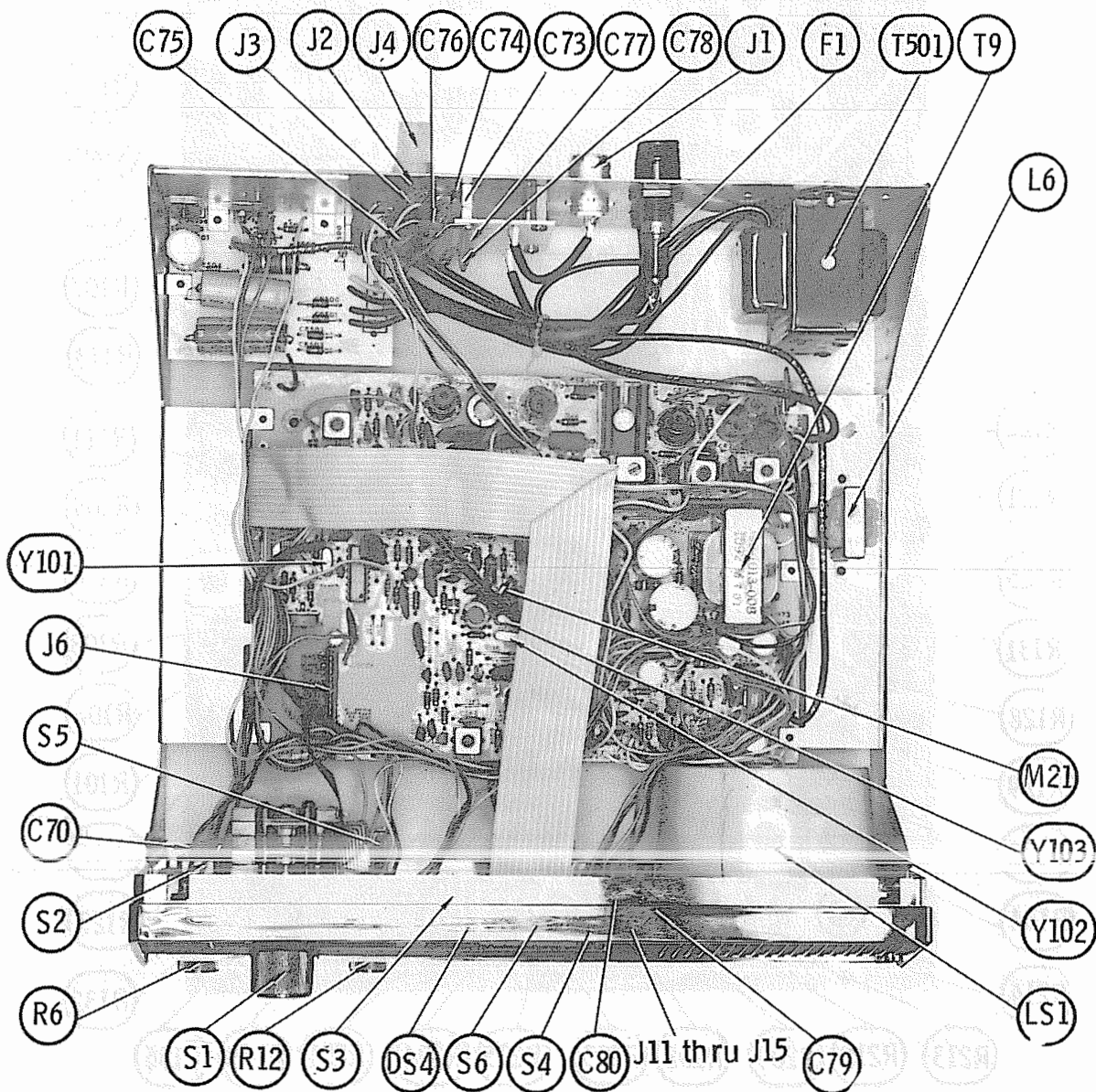
MAIN BOARD



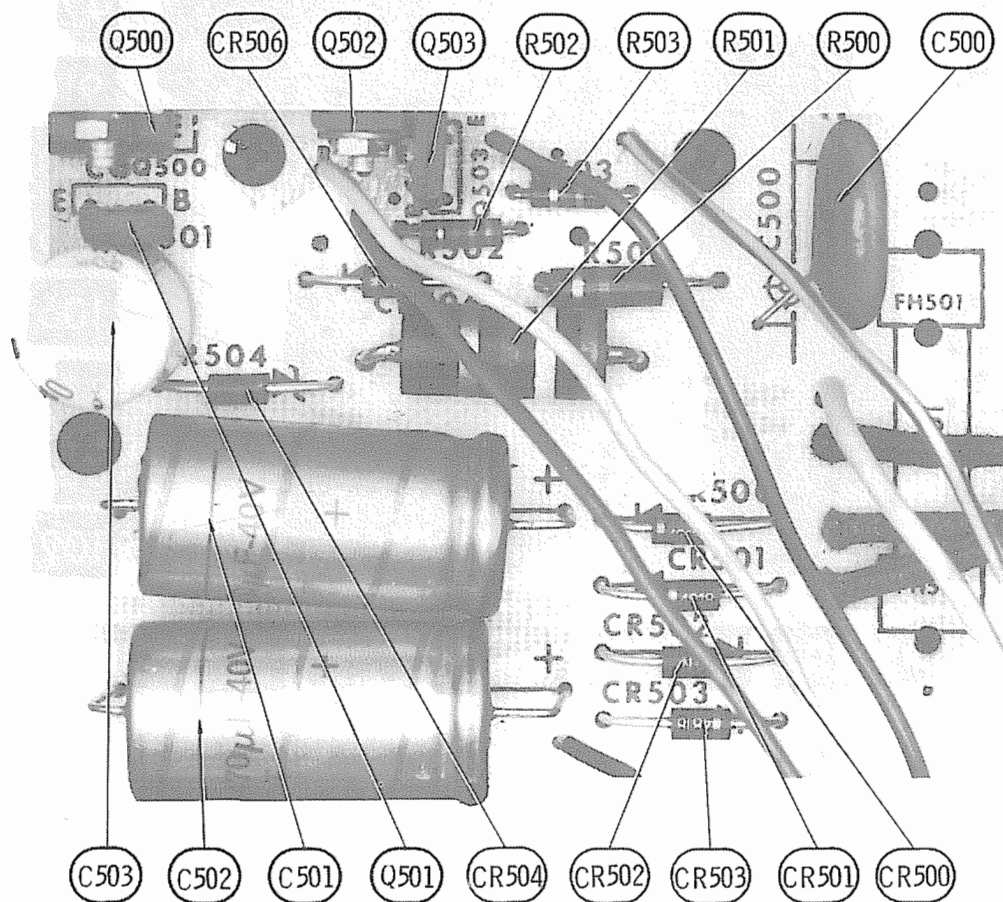
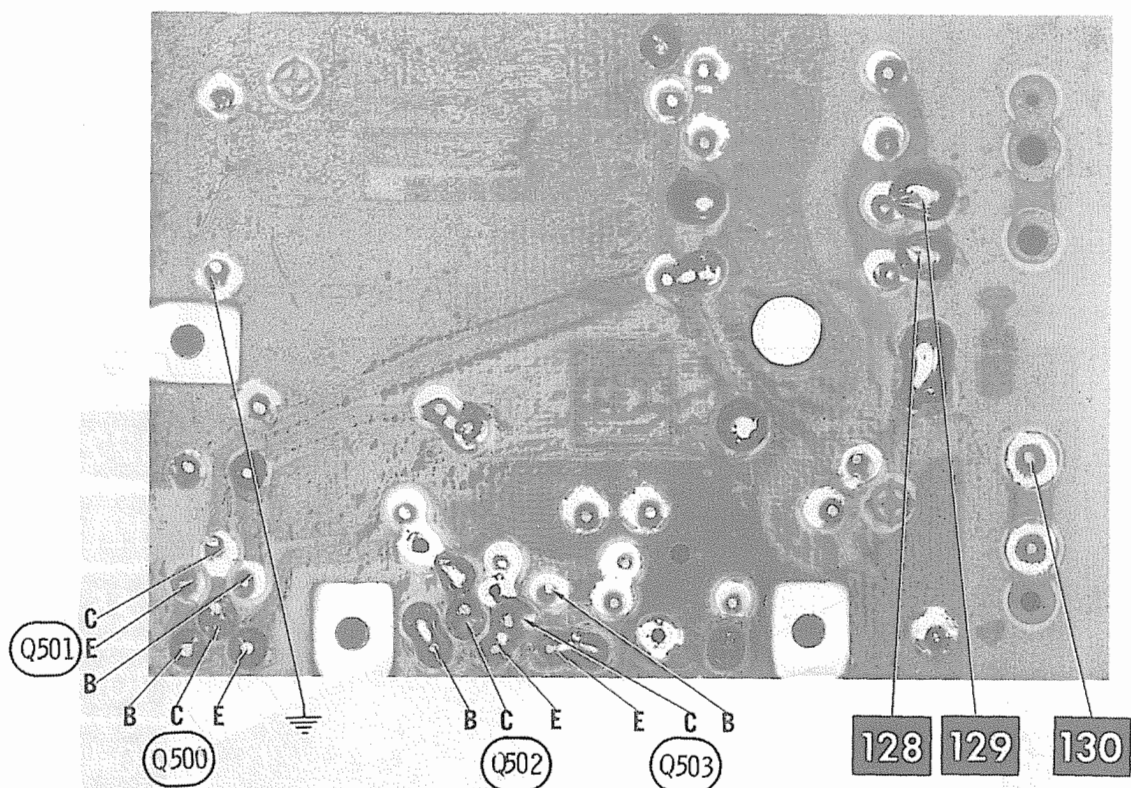
MAIN BOARD



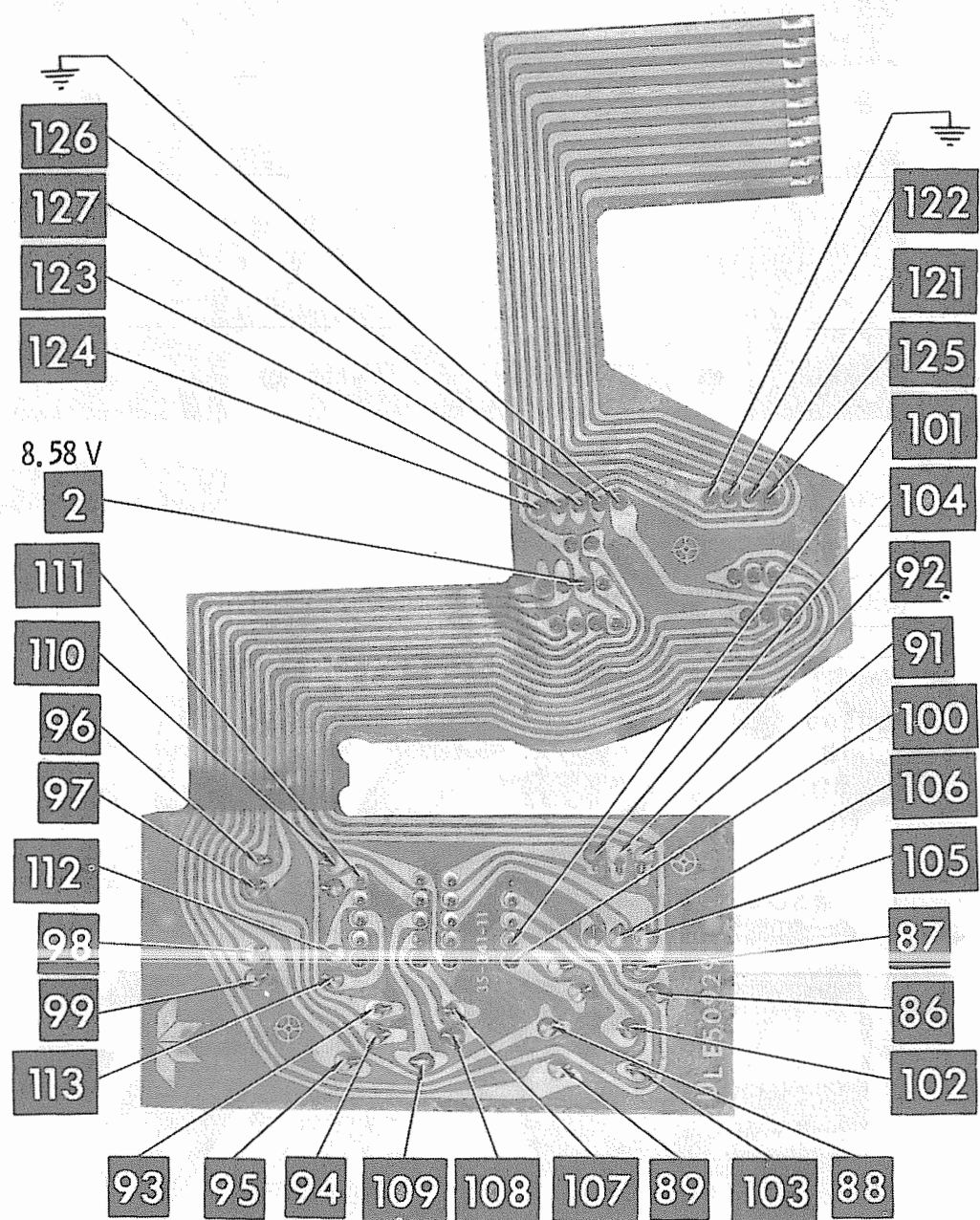
MAIN BOARD



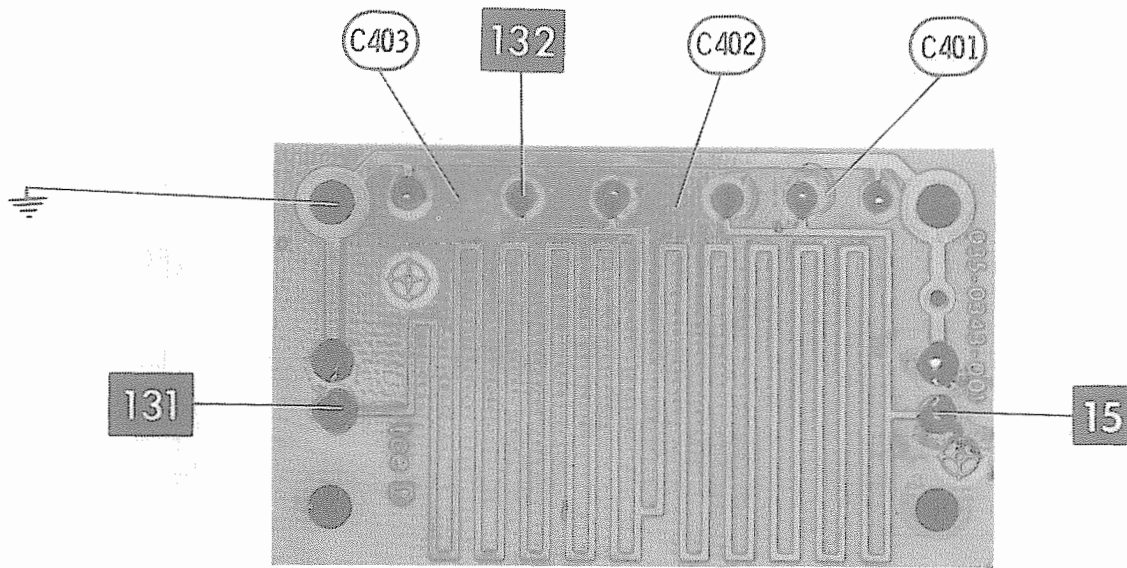
CHASSIS - BOTTOM



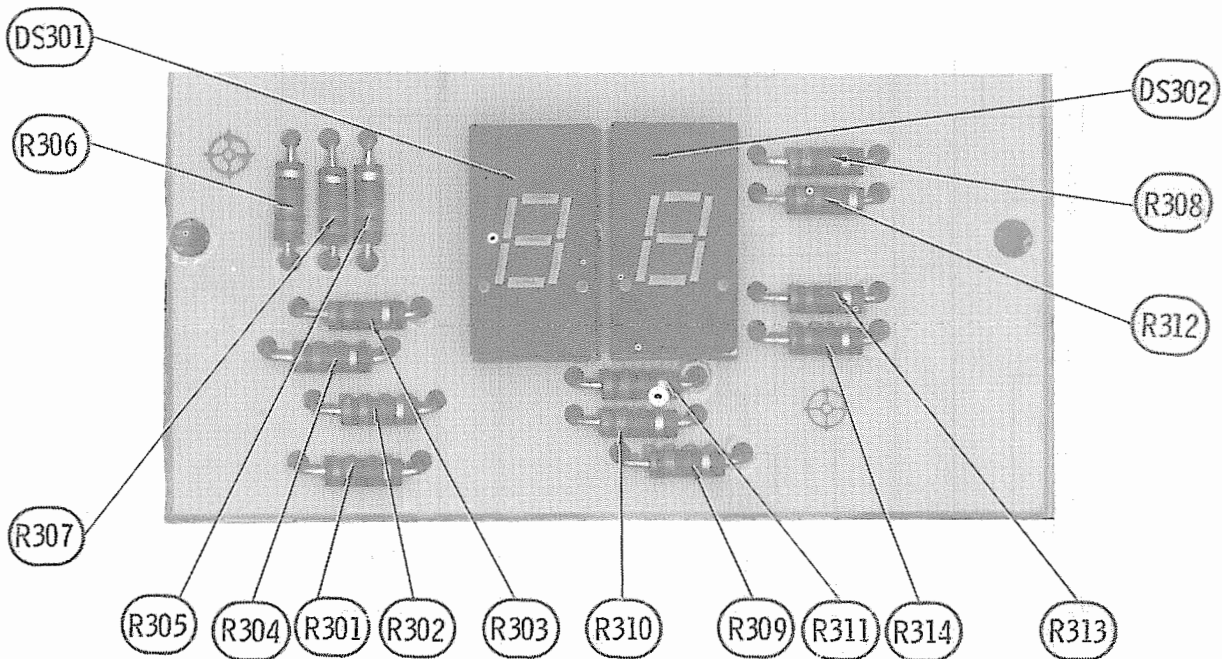
AC POWER SUPPLY BOARD



CH. SELECTOR & LED READOUT BOARD

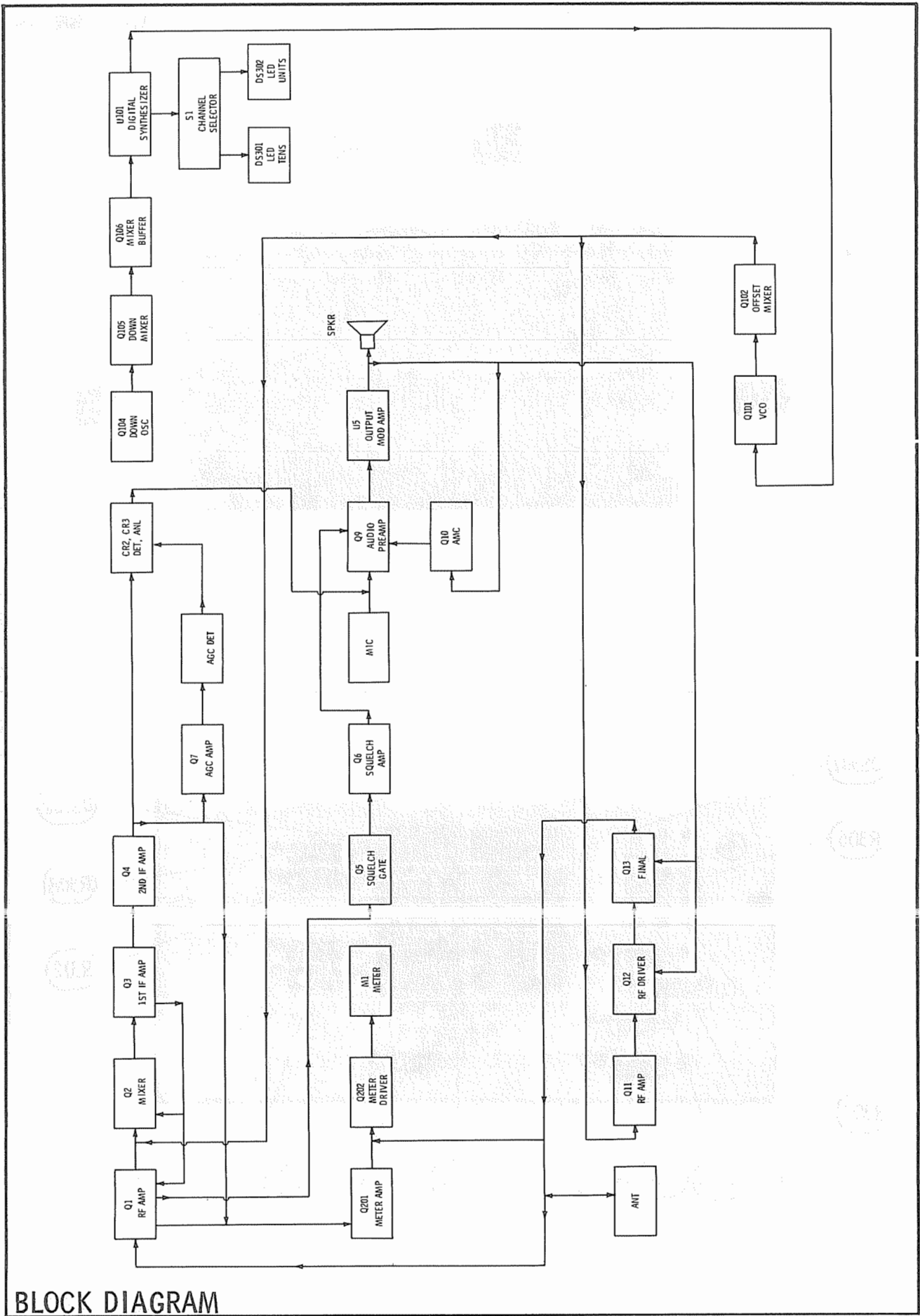


BANDPASS BOARD



LED READOUT BOARD

JOHNSON MODEL MESSENGER 4230



PARTS LIST AND DESCRIPTION

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

SEMICONDUCTORS (Select replacement transistor for best results)

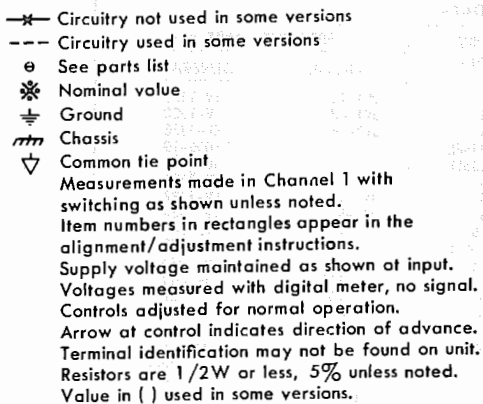
ITEM No.	TYPE No.	MFG. PART No.	REPLACEMENT DATA									
			GENERAL ELECTRIC PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.	THORDARSON PART No.	WORKMAN PART No.	ZENITH PART No.
CR1	1N67A	523-1500-067	1N34AS	PTC207	HEPR9134A	REN 109	SK3087	RT-200	ECG109	1N34A	WEP134	ZEN-430
CR2			1N34AS	PTC207	HEPR9134A	REN 109	SK3087	RT-200	ECG109	1N34A	WEP134	ZEN-430
CR3			GE-504A	PTC201	HEPR0052	REN 116	SK3030	RT-213	ECG116	1N4004	WEP156	212-76-02
CR4			GE-300	PTC214	HEPR0602	REN 177	SK3100	RT-218	ECG177		WEP1062	
CR5			GE-300	PTC214	HEPR0602	REN 177	SK3100	RT-218	ECG177		WEP1062	
CR6	1N67A	523-1500-067	1N34AS	PTC207	HEPR9134A	REN 109	SK3087	RT-200	ECG109	1N34A	WEP134	ZEN-430
CR7		523-2503-100	GE20-10	ZB108		REN 140	SK3061	RT-241	ECG140A	1N4740A	WEP1110	
CR8			1N34AS	PTC207	HEPR9134A	REN 109	SK3087	RT-200	ECG109	1N34A	WEP134	ZEN-430
CR9			1N34AS	PTC207	HEPR9134A	REN 109	SK3087	RT-200	ECG109	1N34A	WEP134	ZEN-430
CR10			GE-300	PTC214	HEPR0602	REN 177	SK3100	RT-218	ECG177		WEP1062	
CR11	1N4003	523-0501-002	GE-504A	1N4003	HEPR0052	REN 116	SK3312	RT-210	ECG116	1N4004	WEP156	212-76-02
CR12			GE-300	PTC214	HEPR0602	REN 177	SK3100	RT-218	ECG177		WEP1062	
CR15			GE-300	PTC214	HEPR0602	REN 177	SK3100	RT-218	ECG177		WEP1062	
CR16			GE-300	PTC214	HEPR0602	REN 177	SK3100	RT-218	ECG177		WEP1062	
CR25		523-2003-150	GE20-15	ZB158		REN 145	SK3063	RT-245	ECG145A	1N4744A	WEP1114	ZEN-508
CR26		523-2003-150	GE20-15	ZB158		REN 145	SK3063	RT-245	ECG145A	1N4744A	WEP1114	ZEN-508
CR101	WV2209		GE-90		HEPR2503	REN 614		RT-262	ECG614		WEP200	ZEN-453
CR102			GE-504A	PTC201	HEPR0052	REN 116	SK3030	RT-213	ECG116	1N4004	WEP156	212-76-02
CR103			GE-504A	PTC201	HEPR0052	REN 116	SK3030	RT-213	ECG116	1N4004	WEP156	212-76-02
CR104			1N34AS	PTC207	HEPR9134A	REN 109	SK3087	RT-200	ECG109	1N34A	WEP134	ZEN-430
CR105			1N34AS	PTC207	HEPR9134A	REN 109	SK3087	RT-200	ECG109	1N34A	WEP134	ZEN-430
CR106			GE-514	PTC214	HEPR0602	REN 177	SK3100	RT-218	ECG519	1N4148	WEP925	
CR207			GE-514	PTC214	HEPR0602	REN 177	SK3100	RT-218	ECG519	1N4148	WEP925	
CR208			GE-514	PTC214	HEPR0602	REN 177	SK3100	RT-218	ECG519	1N4148	WEP925	
CR209			GE-514	PTC214	HEPR0602	REN 177	SK3100	RT-218	ECG519	1N4148	WEP925	
CR211			GE-514	PTC214	HEPR0602	REN 177	SK3100	RT-218	ECG519	1N4148	WEP925	
CR213			GE-514	PTC214	HEPR0602	REN 177	SK3100	RT-218	ECG519	1N4148	WEP925	
CR214			GE-514	PTC214	HEPR0602	REN 177	SK3100	RT-218	ECG519	1N4148	WEP925	
CR215			GE-514	PTC214	HEPR0602	REN 177	SK3100	RT-218	ECG519	1N4148	WEP925	
CR500	1N4818	523-0013-201	GE-510	PTC205	HEPR0170	REN 125	SK3081	RT-201	ECG125		WEP170	
CR501	1N4818	523-0013-201	GE-510	PTC205	HEPR0170	REN 125	SK3081	RT-201	ECG125		WEP170	
CR502	1N4818	523-0013-201	GE-510	PTC205	HEPR0170	REN 125	SK3081	RT-201	ECG125		WEP170	
CR503	1N4818	523-0013-201	GE-510	PTC205	HEPR0170	REN 125	SK3081	RT-201	ECG125		WEP170	
CR504		523-2003-150	GE20-15	ZB158		REN 145	SK3063	RT-245	ECG145A	1N4744A	WEP1114	ZEN-508
CR506	1N4818	523-0013-201	GE-510	PTC205	HEPR0170	REN 125	SK3081	RT-201	ECG125		WEP170	
Q1	3011	576-0003-018	GE20-15	ZB158		REN 145	SK3063	RT-245	ECG145A	1N4744A	WEP1114	ZEN-508
Q2	3011	576-0003-011	GE-220*	PTC123*	HEPS0015*	REN 123A*	SK3124	RT-102	ECG123A*	25C711*	WEP634	121-29000*
Q3	3011	576-0003-011	GE-220*	PTC123*	HEPS0015*	REN 123A*	SK3124	RT-102	ECG123A*	25C711*	WEP634	121-29000*
Q4	3011	576-0003-011	GE-220*	PTC123*	HEPS0015*	REN 123A*	SK3124	RT-102	ECG123A*	25C711*	WEP634	121-29000*
Q5	3011	576-0003-011	GE-220*	PTC123*	HEPS0015*	REN 123A*	SK3124	RT-102	ECG123A*	25C711*	WEP634	121-29000*
Q6	3011	576-0003-011	GE-220*	PTC123*	HEPS0015*	REN 123A*	SK3124	RT-102	ECG123A*	25C711*	WEP634	121-29000*
Q7	3011	576-0003-011	GE-220*	PTC123*	HEPS0015*	REN 123A*	SK3124	RT-102	ECG123A*	25C711*	WEP634	121-29000*
Q8	3011	576-0003-011	GE-220*	PTC123*	HEPS0015*	REN 123A*	SK3124	RT-102	ECG123A*	25C711*	WEP634	121-29000*
Q9	3011	576-0003-011	GE-220*	PTC123*	HEPS0015*	REN 123A*	SK3124	RT-102	ECG123A*	25C711*	WEP634	121-29000*
Q10	3011	576-0003-011	GE-220*	PTC123*	HEPS0015*	REN 123A*	SK3124	RT-102	ECG123A*	25C711*	WEP634	121-29000*
Q11	3011	576-0003-011	GE-220*	PTC123*	HEPS0015*	REN 123A*	SK3124	RT-102	ECG123A*	25C711*	WEP634	121-29000*
Q12	4004	576-0004-004	GE-219	PTC158	HEPS3004	REN 79A	SK3048	RT-182	ECG329		WEP755	
Q13	4013	576-0004-013	GE-46	PTC176		REN 224	SK3049	RT-307	ECG224		WEP224	
Q101	6013	576-0006-013	GE-FET-2	PTC161	HEPF0021	REN 132	SK3448	RT-175	ECG312			ZEN-123
Q102		576-0006-223	GE-FET-4	PTC182	HEPF2007	REN 222	SK3065	RT-181	ECG222		WEP905	121-826
Q104	3011	576-0003-011	GE-220*	PTC123*	HEPS0015*	REN 123A*	SK3124	RT-102	ECG123A*	25C711*	WEP634	121-29000*
Q105	3011	576-0003-011	GE-220*	PTC123*	HEPS0015*	REN 123A*	SK3124	RT-102	ECG123A*	25C711*	WEP634	121-29000*
Q106	3011	576-0003-011	GE-220*	PTC123*	HEPS0015*	REN 123A*	SK3124	RT-102	ECG123A*	25C711*	WEP634	121-29000*
Q201	3011	576-0003-011	GE-220*	PTC123*	HEPS0015*	REN 123A*	SK3124	RT-102	ECG123A*	25C711*	WEP634	121-29000*
Q202	2027	576-0002-027	GE-220*	PTC123*	HEPS0015*	REN 123A*	SK3124	RT-102	ECG123A*	25C711*	WEP634	121-29000*
	MPS-U01		GE-220*	PTC123*	HEPS0015*	REN 123A*	SK3124	RT-102	ECG123A*	25C711*	WEP634	121-29000*
Q500	2029	576-0002-029	GE-333	PTC186		REN 235	SK3197	RT-146	ECG235		WEP785	
	MJF2480		GE-333	PTC186		REN 235	SK3197	RT-146	ECG235		WEP785	
Q501	20294		GE-66	PTC169		RE 21	SK3041	RT-154	ECG241		WEP880	ZEN-209
Q502	20295		GE-66	PTC169		RE 21	SK3041	RT-154	ECG241		WEP880	ZEN-209
Q503	20294		GE-66	PTC169		RE 21	SK3041	RT-154	ECG241		WEP745	
U5	TB810DS	544-2006-001	GE1C-278									
U101	SC42502P	544-3001-201										

* Lead configuration may vary from original.

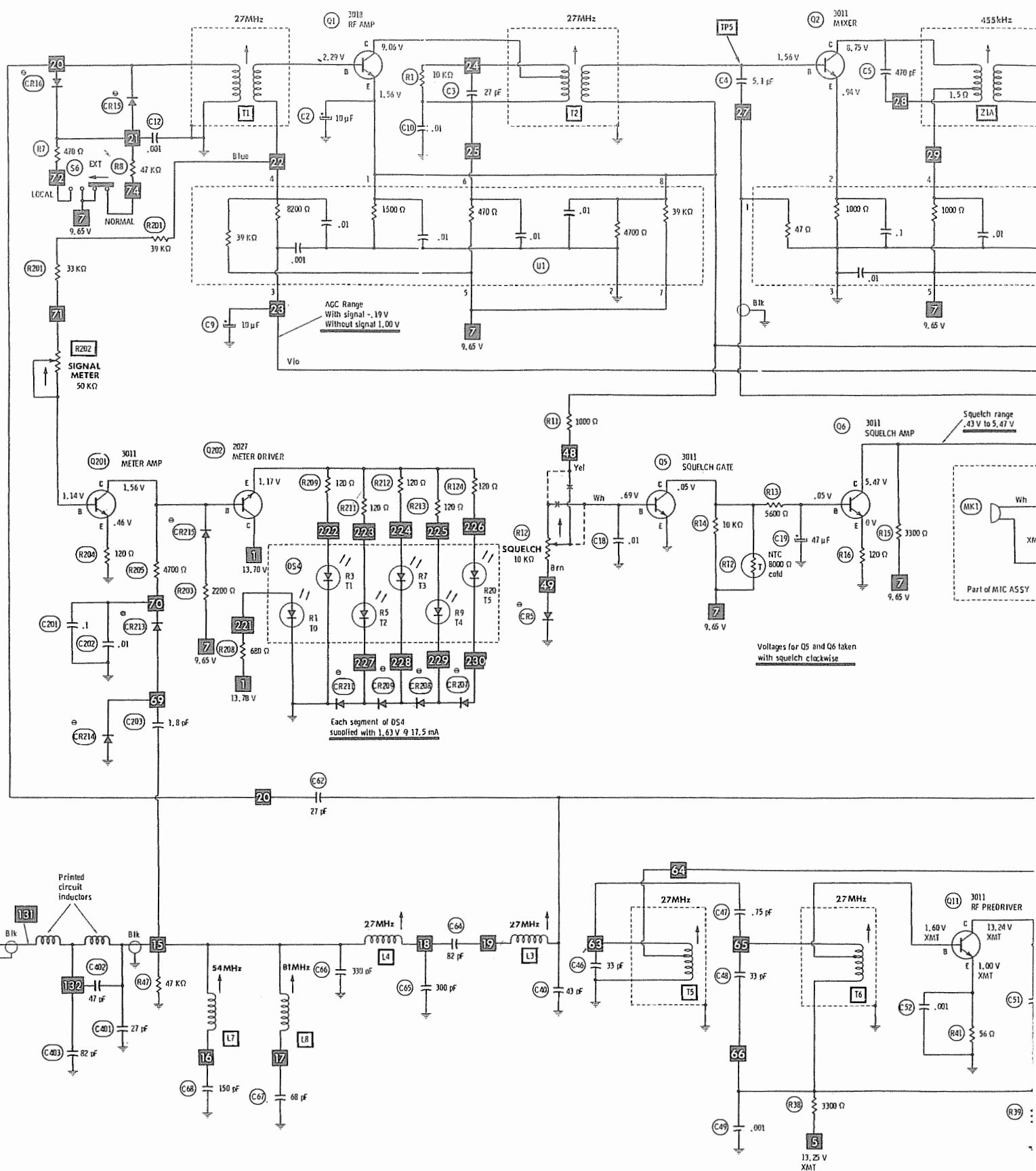
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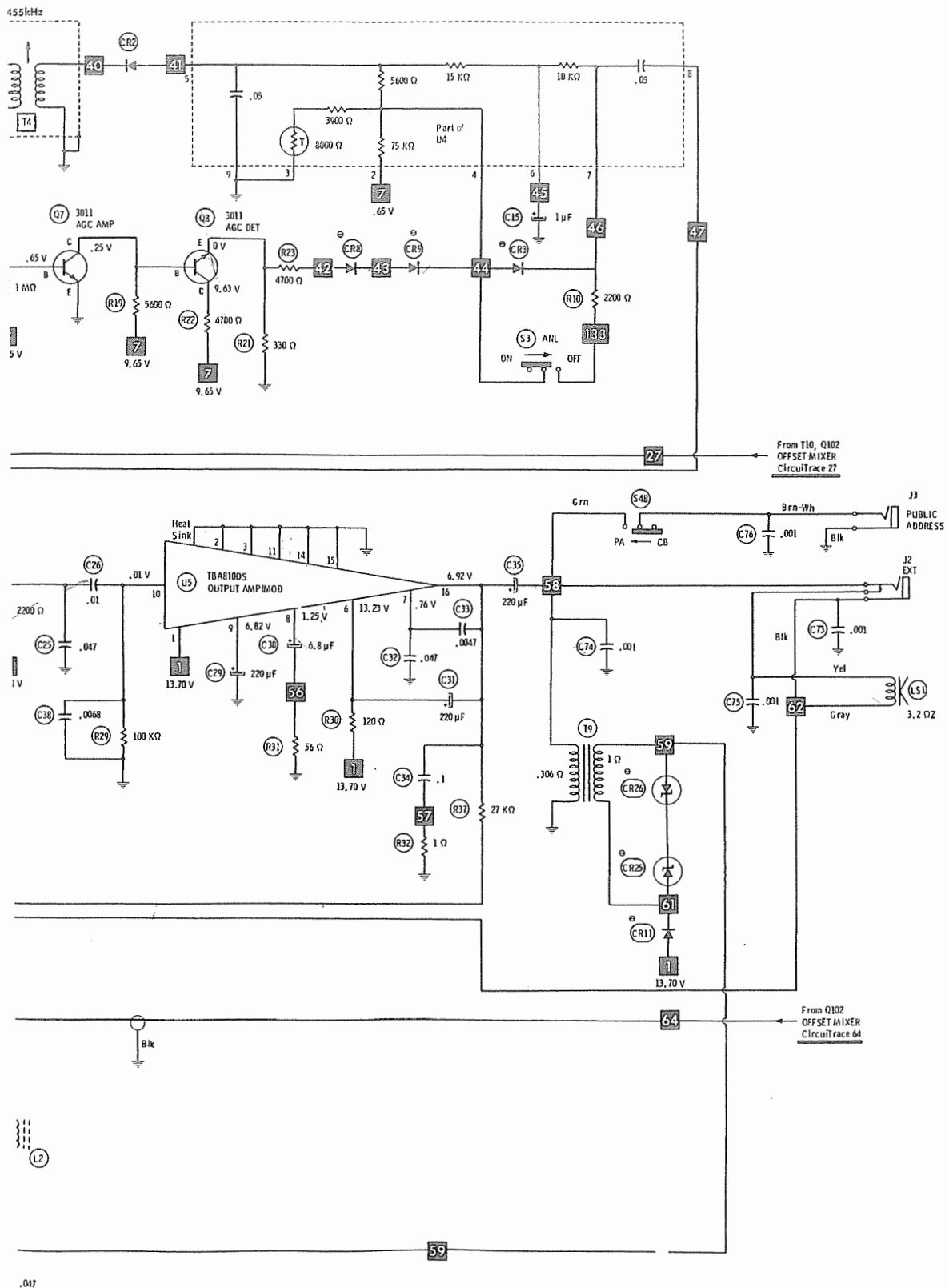
ELECTROLYTIC CAPACITORS

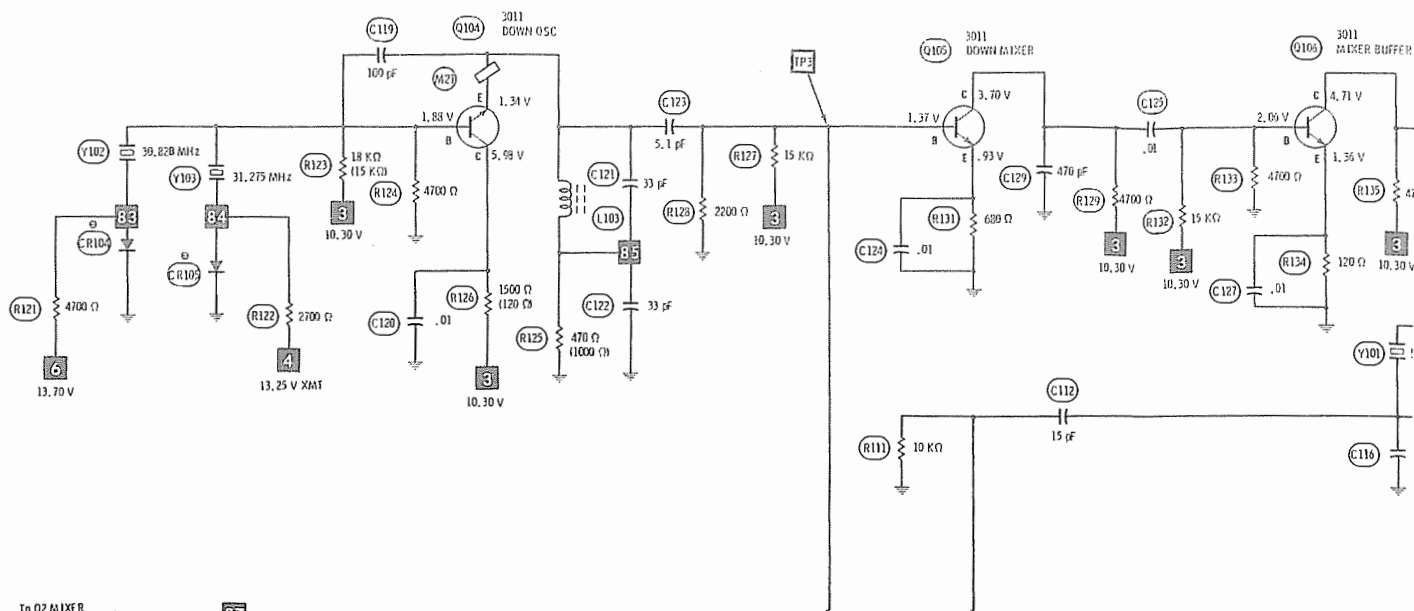
ITEM No.	RATING	MFG. PART No.	REPLACEMENT DATA			
			CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
					Q-LINE	GENERAL LINE
C2	10 25V		PC10-25	VTT10825	QV1-43	EV-1322
C9	10 25V		PC10-25	VTT10825	QV1-43	EV-1322
C13	47 25V		PC50-25	VTT47E25	QV1-75	EV-1326
C15	1 35V	510-2245-109		TDC105M035EL		SD35-19
C17	1 35V	510-2245-109		TDC105M035EL		SD35-19
C19	47 25V		PC50-25	VTT47E25	QV1-75	EV-1326
C21	10 25V		PC10-25	VTT10825	QV1-43	EV-1322
C24	22 25V		PC25-25	VTT22025	QV1-57	EV-1324
C29	220 16V	510-4116-221	PC250-25	VTT220H16	QV1-117	EV-1240
C30	6.8 35V	510-2245-689		TDC685M035FL		SD35-6R89
C31	220 16V	510-4116-221	PC250-25	VTT220H16	QV1-117	EV-1240
C35	220 16V	510-4116-221	PC250-25	VTT220H16	QV1-117	EV-1240
C36	10 25V		PC10-25	VTT10825	QV1-43	EV-1322
C39	10 16V		PC10-25	VTT10825	QV1-41	EV-1222
C72	2200 16V	510-9008-001	WBR2000-16	TC1520C	QET-643	TVA-1175.3
C101	1 35V	510-2245-109		TDC105M035EL		SD35-19
C102	.56 35V	510-2005-568				SD35-R569
C132	1000 16V	510-4116-102	PC1000-16	VTT1000L16	QV1-183	EV-1260
C140	220 16V	510-4116-221	PC250-25	VTT220H16	QV1-117	EV-1240
C501	470 40V	510-4009-001	WBR500-50*	VTT470N50	QV1-159	EV-1550
C502	470 40V	510-4009-001	WBR500-50*	VTT470N50	QV1-159	EV-1550
C503	220 25V		PC250-25	VTT220K25	QV1-119	EV-1340



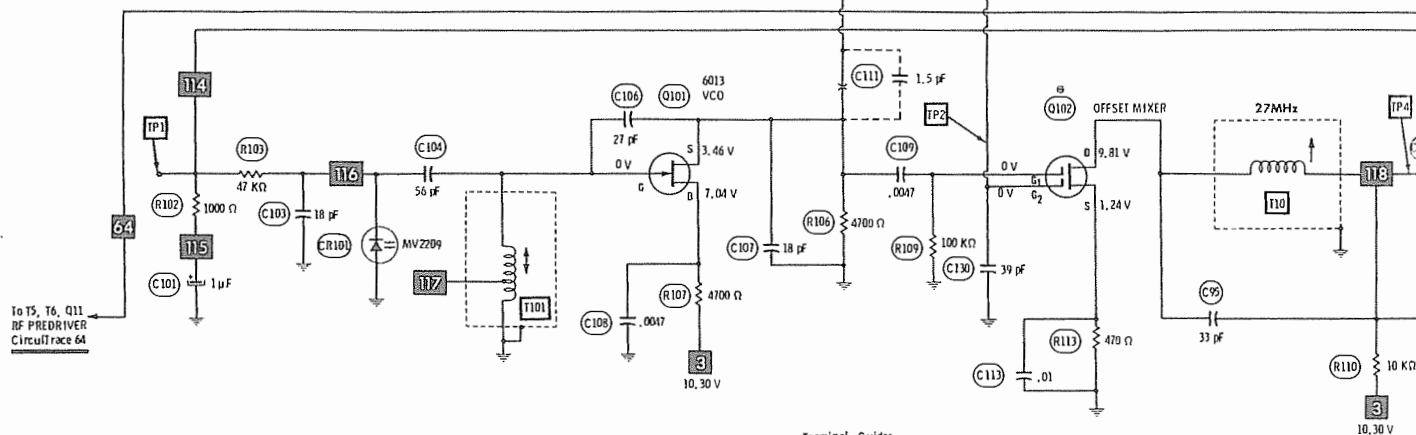
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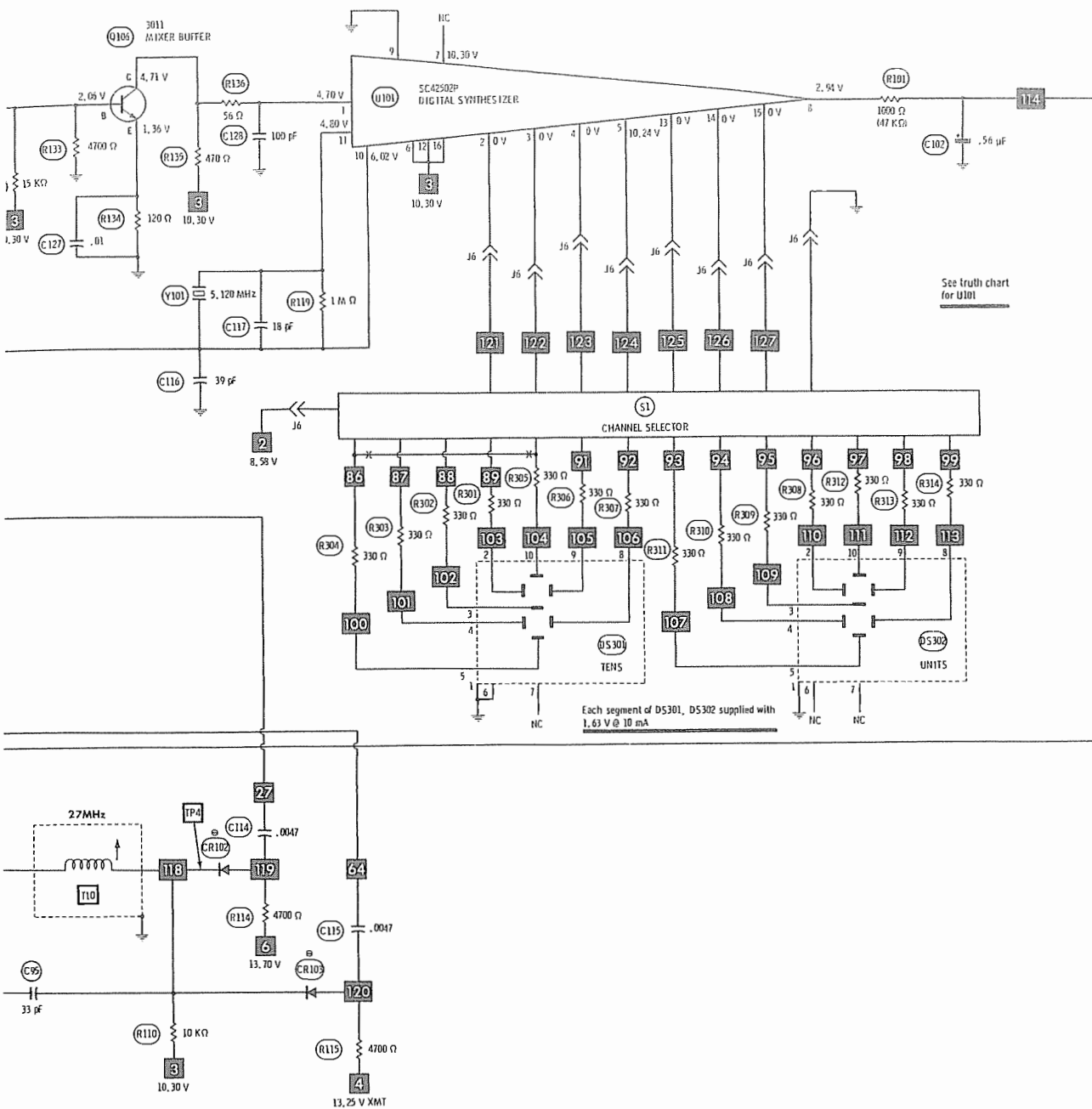






To Q2 MIXER
Circuit trace 27





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.	
						Q-LINE	GENERAL LINE
C1	.0047		DO-472	GP4700	GP247		5GA-047
C3	27 N150 5%	510-3216-270					10TCP-Q27
C4	5.1 NPO ±.5	510-3213-519					
C5	470 5%			CD15F0471J03	SX347	QW1-42	MWA-471
C6	1 5%				CH0510		10TCC-V10
C7	1 5%				CH0510		10TCC-V10
C8	130 NPO 5%	510-3213-131					
C10	.01 50V		UK50-103		MAG5011		
C11	.01 50V		UK50-103		MAG5011		
C12	.001		DO-102		GP210		10TS-D10
C14	.01 50V		UK50-103		MAG5011		
C16	.01 50V		UK50-103		MAG5011		
C18	.01 50V		UK50-103		MAG5011		
C20	.01 50V		UK50-103		MAG5011		
C22	.01 50V		UK50-103		MAG5011		
C23	.01 50V		UK50-103		MAG5011		
C25	.047 16V		UK16-503		MAG1615		HY-635
C26	.01 50V		UK50-103		MAG5011		
C27	.1 16V		UK16-104		MAG1601		HY-650
C28	.0047		DO-472	GP4700	GP247		5GA-047
C32	.047 16V		UK16-503		MAG1615		HY-635
C33	.0047		DO-472	GP4700	GP247		5GA-047
C34	.1 16V		UK16-104		MAG1601		HY-650
C37	.001		DO-102		GP210		10TS-D10
C38	.0068 50V		DO-682	GP6800	GP268		5GA-D68
C40	43 N150 5%	510-3216-430					
C46	33 N150 5%	510-3216-330					10TCP-Q33
C47	.75 5%						
C48	33 N750 5%		DTN-33	N33	CN7433		10TCU-Q33
C49	.001		DO-102		GP210		10TS-D10
C51	18 N150 5%	510-3216-180					10TCP-Q18
C52	.001		DO-102		GP210		10TS-D10
C54	.047 50V		UK50-503		MAG5015		
C55	12 N150 5%	510-3216-120					10TCP-Q12
C56	.001		DO-102		GP210		10TS-D10
C58	.0047		DO-472	GP4700	GP247		5GA-047
C59	.001		DO-102		GP210		10TS-D10
C61	.047 50V		UK50-503		MAG5015		10TCP-Q27
C62	27 N150 5%	510-3220-270					
C63	43 N150 5%	510-3216-430					10TCP-Q82
C64	82 N150 5%	510-3216-820					MWA-301
C65	300 5%			CD15F0301J03	SX330	QW1-38	MWA-331
C66	330 5%			CD15F0331J03	SX333	QW1-39	10TCU-Q68
C67	68 N750 5%		DTN-68	N68	CN7468		10TCP-T15
C68	150 N150 5%	510-3216-151					
C70	.01 50V		UK50-103		MAG5011		
C73	.001		DO-102		GP210		10TS-D10
C74	.001		DO-102		GP210		10TS-D10
C75	.001		DO-102		GP210		10TS-D10
C76	.001		DO-102		GP210		10TS-D10
C77	.01		UK50-103		MAG5011		
C78	.001		DO-102		GP210		10TS-D10
C79	.001		DO-102		GP210		10TS-D10
C80	.001		DO-102		GP210		10TS-D10
C95	33 N150 5%	510-3216-330					10TCP-Q33
C103	18 N750 5%		DTN-20	N20	CN7420		10TCU-Q20
C104	56 N750 5%	510-3220-560					
C106	27 N750 5%		DTN-20	N20	CN7427		10TCU-Q27
C107	18 N750 5%		DO-472	GP4700	CN7420		10TCU-Q20
C108	.0047		DO-472	GP4700	GP247		5GA-047
C109	.0047		DO-472	GP4700	GP247		5GA-047
C110	.01 50V		UK50-103		MAG5011		
C111	1.5						
C112	15 NPO 5%		DTZ-15	NP015	CN0415		10TCC-Q15
C113	.01 50V		UK50-103		MAG5011		
C114	.0047		DO-472	GP4700	GP247		5GA-047
C115	.0047		DO-472	GP4700	GP247		5GA-047
C116	39 NPO 5%				CN0439		10TCC-Q39
C117	18 N750 5%		DTN-20	N20	CN7420		10TCU-Q20
C118	.0047		DO-472	GP4700	GP247		5GA-047
C119	100 N150 5%						10TCP-T10
C120	.01 50V		UK50-103		MAG5011		
C121	33 N150 5%	510-3216-330					10TCP-Q33
C122	33 N150 5%	510-3216-330					10TCP-Q33
C123	5.1 NPO ±.5	510-3213-519					
C124	.01 50V		UK50-103		MAG5011		
C125	.01 50V		UK50-103		MAG5011		
C126	.01 50V		UK50-103		MAG5011		
C127	.01 50V		UK50-103		MAG5011		
C128	100 N150 5%	510-3216-101					10TCP-T10
C129	470		DO-471	GP470	GP347		10TS-T47
C130	39 NPO 5%				CN0439		10TCC-Q39
C141	.001						
C142	.001						
C201	.1 16V		UK16-104		MAG1601		HY-650
C202	.01 50V		UK50-103		MAG5011		
C203	1.8 NPO ±.25						
C401	27 NPO 5%			NP047	CN0427		10TCC-Q27
C402	47 NPO 5%		DTZ-47	NP082	CN0447		10TCC-Q47
C403	82 NPO 5%		DTZ-82	NP082	CN0482		10TCC-Q82
C500	.0047		DO-472	GP4700	GP247		5GA-047
C504	.001		DO-102		GP210		10TS-D10

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.	MALLORY PART No.	TRW PART No.
R2	IF Gain	1000	562-0019-102			X260R102B
R6	Volume/Switch	10K	562-0002-021			
R12	Squelch/Switch	10K	562-0002-041			
R202	Signal Meter	50K	562-0004-503(5)	T-50K	MTC54L1	X201R503B

(5) Number on unit.

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.
RT2	8000 Cold NTC			RT4	4000 Cold NTC		
RT3	4000 Cold NTC						

COILS (RF-IF)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
L2	RF Choke				
L3	Final Loading (27MHz)				
L4	Pi Filter (27MHz)				
L5	RF Choke				
L7	TVI Trap (54MHz)				
L8	TVI Trap (81MHz)				
L103	RF Choke				
T1	Rec RF (27MHz)	592-5015-001			
T2	RF Amp (27MHz)	592-5015-002			
T3	IF (455kHz)	592-5015-024			
T4	IF (455kHz)	592-5015-024			
T5	RF Predriver (455kHz)	592-5015-005			
T6	RF Predriver (455kHz)	592-5015-005			
T7	RF Driver (455kHz)				
T8	Final (455kHz)				
T10	Offset Mixer (27MHz)	592-5015-005		CBS107-T	
T101	VCO	592-5015-005			
Z1A	IF (455kHz)		MHF71T		
Z1B	IF (455kHz)		YXE0857A1A524		

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.	
L6	1.4A	.299	1.85mH	542-5007-021			

JOHNSON MODEL MESSENGER 4230

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.	
T9	4	1		592-1013-008	MCB31		

TRANSFORMER (Power)

ITEM No.	RATING		REPLACEMENT DATA			NOTES
	PRI.	SEC. 1	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T501	120V AC @ 430mA AC	24.0V AC @ 2.16A AC	592-3001-001		PCB-8	

SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
LS1	3 1/2" PM, 3.2 Ohms	589-1013-001	3A05	

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	.5A Quick Acting	534-0003-017	534-1002-001	AGC1/2	HKD	312.500	342038	FG1/2-2
F2	2A Quick Acting	534-0003-024	534-1004-031	AGC2	HQJ	312002	150145	FG2-2

PARTS LIST AND DESCRIPTION (CONTINUED)

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

MICROPHONE

ITEM No.	REPLACEMENT DATA				CONNECTION DATA						
	MFGR. PART No.	GC PART No.	GC NOISE CANCEL	GC POWER	GC CONNECTOR	GC Red	GC Shield	GC Yellow	GC Blue	GC White	GC Black
MIC	023-2708-111	18-032	18-034	18-010	18-099	1	10 Connector Case	5	3	4	2

MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
DS1	Lamp		Xmt (10.90V @ 64mA)
DS2	Lamp		Rec (10.46V @ 60mA)
DS4	Lamp	549-4002-052	Signal Meter (1.63V @ 17.5mA)
OS301	LED	549-4002-001	Channel Display (1.63V @ 10mA)
OS302	LED	549-4002-001	Channel Display (1.63V @ 10mA)
J4	Plug	515-9030-001	DC Power
J11-15	Jack	515-1003-001	Microphone
P1	Cable	597-1001-002	AC Power
S1	Switch	583-2009-221	Channel Selector
S3	Switch	583-3003-011	ANL
S4	Switch	583-3003-011	CB/PA
S6	Switch	583-3003-021	LOC/HOR
U1	Component Combination		
U2	Component Combination		
U3	Component Combination		
U4	Component Combination		
Y101	Crystal	519-0008-002	5.120MHz
Y102	Crystal	519-0005-202	30.820MHz
Y103	Crystal	519-0005-203	31.275MHz
	Cable	023-3690-001	DC Power
	Printed Circuit Board	035-0341-011	Channel Selector
	Printed Circuit Board	035-0343-001	Harmonic Filter
	Printed Circuit Board	035-0341-001	Main
	Printed Circuit Board	035-0341-031	Power

JOHNSON MODEL MESSENGER 4230

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

ITEM	PART No.	ITEM	PART No.
Case, Back Assembly	023-2701-001	Knob, Channel Selector	032-0470-014
Knob, Control	032-0470-012		

WIRING DATA

General-use Hook-up Wire (available in 5 colors)	BELDEN No. 8523	Coiled Microphone Cable	
Shielded Hook-up Wire (spiral wrapped)	BELDEN No. 8421	3-conductor (1 shielded)	23AWG BELDEN No. 9471 (5')
(braided)	BELDEN No. 8401		BELDEN No. 8497 (6')
Speaker Cable (available in 4 colors)	BELDEN No. 8782		BELDEN No. 9472 (7-1/2')
Bonding Strap	BELDEN No. 8672		28AWG BELDEN No. 9466 (6')
AC Power Cord	(6') BELDEN No. 17106		31AWG BELDEN No. 9468 (10')
	(9') BELDEN No. 17109	4-conductor (unshielded)	23AWG BELDEN No. 8415 (6')
		5-conductor (1 shielded)	28AWG BELDEN No. 9467 (6')
			BELDEN No. 9465 (7-1/2')