



# 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.

PRESIDENT MODEL MADISON



MODEL MADISON

**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. Suggested Alignment Tools: GC ELECTRONICS:  
 L27, L30, L32 ..... 5009, 5000, 8276, 8728, 8728A  
 L1 thru L8, L16, L17, L24, L37, L39 ..... 9440  
 CT1 thru CT7 ..... 5000, 8276

## SYNTHESIZER ALIGNMENT

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Input of RF VTVM to TP6.	Ch. 1 Clarifier-Midrange AM	L24	Adjust for maximum.
Input of DC meter to TP7.	Ch. 1	L17	Adjust for 2.0 volts.
Input of RF VTVM to TP8.	Ch. 19	L16	Adjust for maximum.
Input of frequency counter to TP8.	Ch. 19	CT6	Adjust for 34.9850MHz $\pm$ 20Hz.
Input of frequency counter to TP8.	Ch. 19, USB	CT4	Adjust for 34.9875MHz $\pm$ 20Hz.
Input of frequency counter to TP8.	Ch. 19, LSB	CT5	Adjust for 34.9825MHz $\pm$ 20Hz.
Input of frequency counter to TP8.	Ch. 19, LSB, Xmit	VR9	Adjust for 34.9825MHz $\pm$ 20Hz.
Input of frequency counter to TP9.	Ch. 19, USB, Xmit	CT2	Adjust for 7.8025MHz $\pm$ 5Hz -0Hz.
Input of frequency counter to TP9.	Ch. 19, LSB, Xmit	CT3	Adjust for 7.7975MHz $\pm$ 0Hz -5Hz.

## RECEIVER ALIGNMENT

Connect an AC VTVM or AF wattmeter across speaker voice coil.  
 Adjust volume control to obtain a suitable indication.

### AM

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Output of signal generator thru .01uF to antenna jack. 23.5MHz, no modulation. Output 200uV. Input of RF VTVM to TP5.	Ch. 19, AM RF Gain-Maximum NB-On	L1, L2	Adjust for maximum.

## RECEIVER ALIGNMENT

Connect an AC VTVM or AF wattmeter across speaker voice coil.  
 Adjust volume control to obtain a suitable indication.

### SSB

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Output of signal generator thru .01uF to antenna jack. 27.186MHz, no modulation. Output .25uV.	Ch. 19, USB RF Gain-Maximum Clarifier-Midrange Volume-Maximum	L8, L7, L5, L6, L4, L3	Adjust for maximum output.
Output of signal generator thru .01uF to antenna jack. 27.186MHz, no modulation. Output .25uV.	Ch. 19	CT1	Adjust for .5 watts audio.

## RECEIVER ADJUSTMENTS

Connect an AC VTVM or AF wattmeter across speaker voice coil.  
 Adjust volume control to obtain a suitable indication.

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Output of signal generator thru .01uF to antenna jack. 27.185MHz, no modulation. Output 1000uV.	Ch. 19, USB RF Gain-MINIMUM Volume-Maximum	VR2	SSB AGC Adjust VR2 for .5 watts audio.
Output of signal generator thru .01uF to antenna jack. 27.186MHz, no modulation. Output 100uV.	Ch. 19	VR1	S METER Adjust for 9 on S scale of meter.

## RECEIVER ADJUSTMENTS (cont)

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Output of signal generator thru .01uF to antenna jack. 27.186MHz, no modulation. Output 1000uV.	Ch. 19	VR3	SQUELCH RANGE Set squelch control VR404 fully clockwise. Adjust VR3 so that squelch just breaks.
Output of signal generator thru .01uF to antenna jack. 27.185MHz, 1000Hz @ 30% modulation. Output .5uV.	Ch. 19, AM	VR5	AM AGC Adjust VR5 for .5 watts audio.

### 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.

#### AM

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Input of spectrum analyzer to antenna jack.	Ch. 19	L27	Adjust for MINIMUM at 54MHz.

### 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.

#### SSB

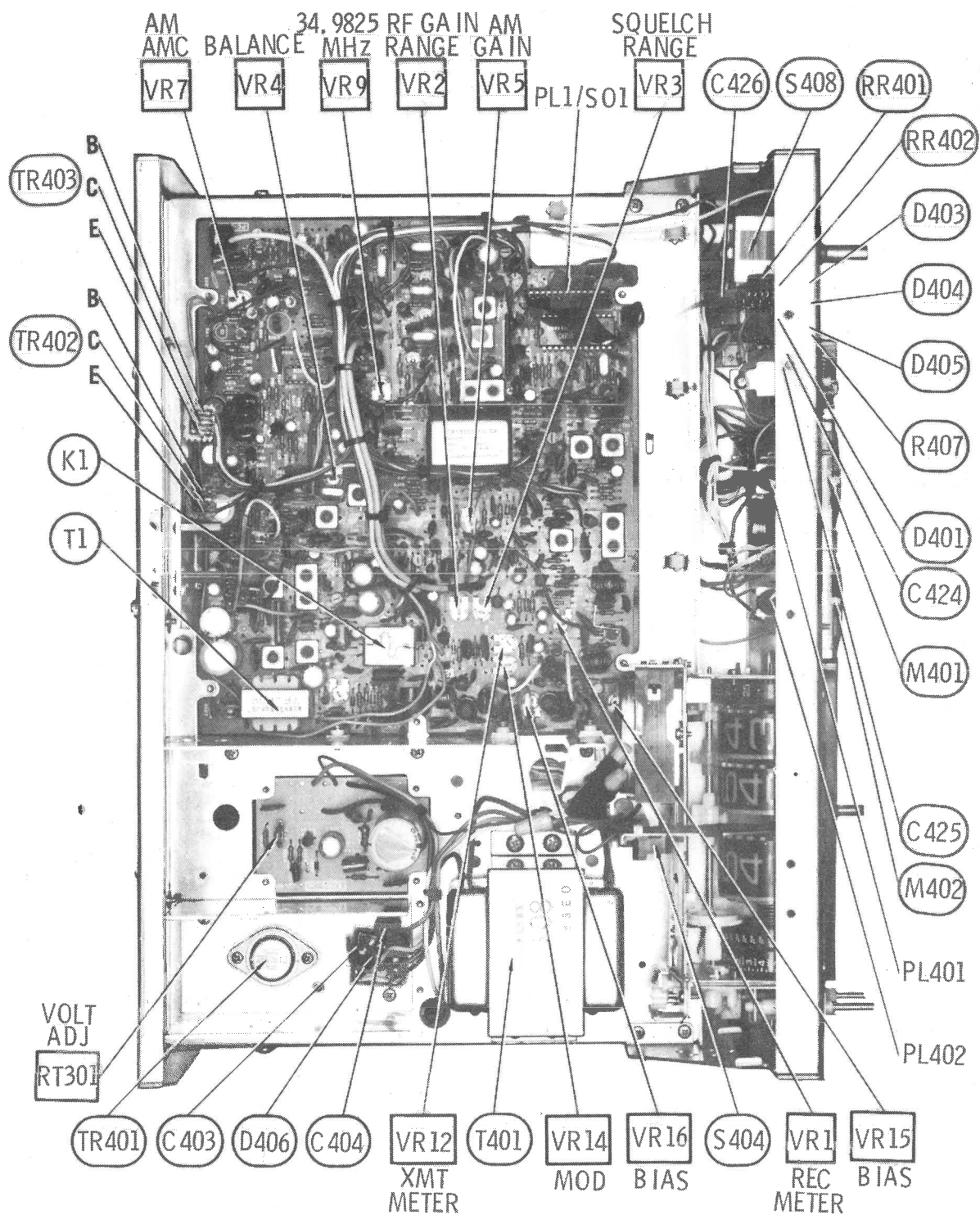
TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Output of 2 tone generator to mike input. 500Hz and 2400Hz at .5 volts.	Ch. 19, USB Mike Gain-Maximum	L39,L37, L32,L30	Adjust for maximum.
Output of 2 tone generator to mike input. 500Hz and 2400Hz at .5 volts.	Ch. 19, USB	CT7	Adjust CT7 for 11.0 watts.

### TRANSMITTER ADJUSTMENTS

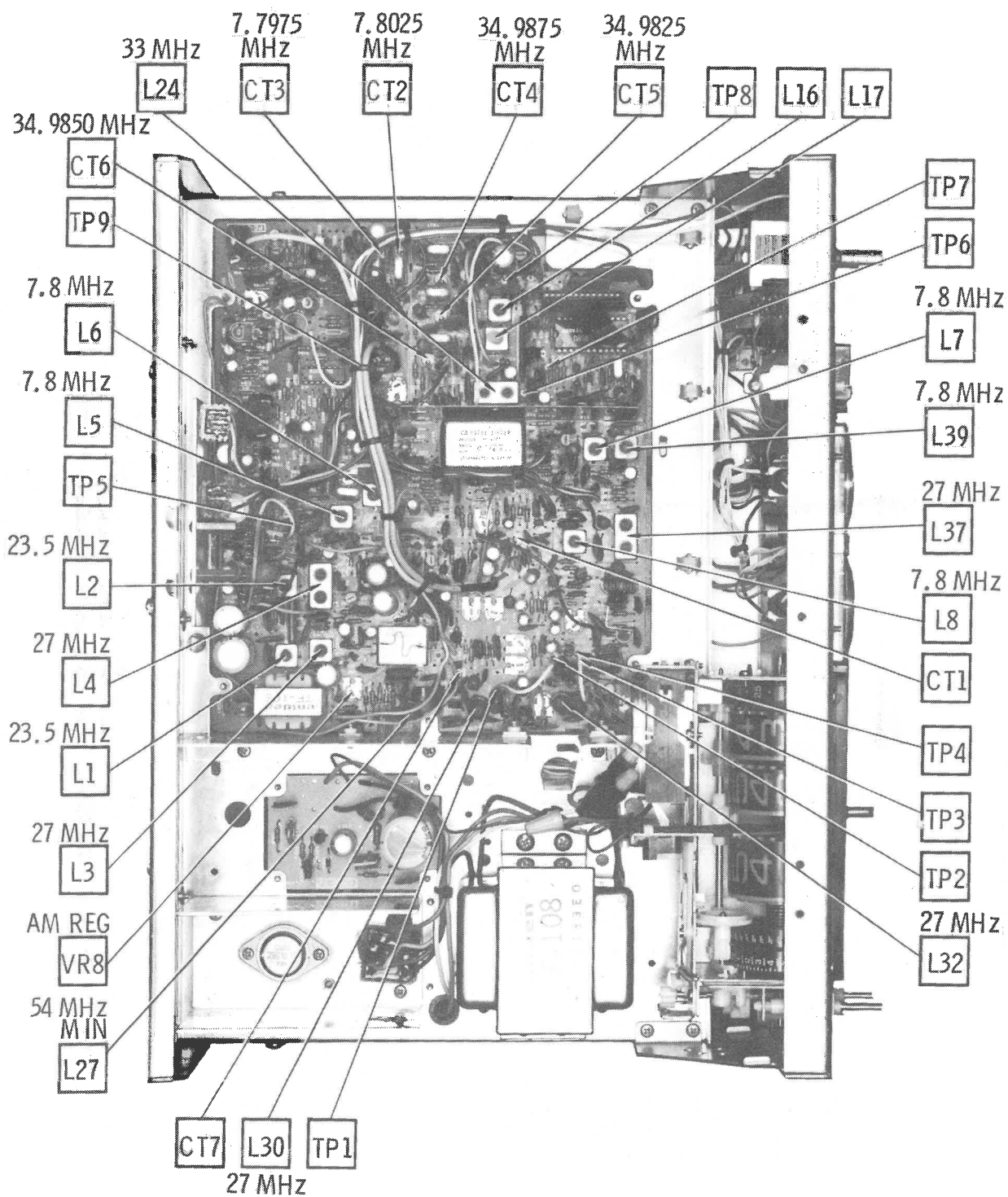
Connect an RF wattmeter and 50-ohm, 25-watt dummy load to antenna connector.  
NOTE: Be sure to check transmit frequency and power on all active channels after adjustments of transmitter.  
See page 4 for channel frequencies.

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
DC current meter to TP3 and TP4. No modulation.	Ch. 19, USB	VR15	BIAS Adjust VR15 for 40mA +10mA.
DC current meter to TP1 and TP2. No modulation.	Ch. 19, USB	VR16	BIAS Adjust VR16 for 15mA. +10mA.
No modulation.	Ch. 19, USB	VR4	BALANCE Adjust for MINIMUM RF.
No modulation.	Ch. 19, AM	VR8	AM REG Adjust VR8 for 3.8 watts.
No modulation.	Ch. 19, AM	VR12	RF PANEL METER Adjust VR12 for 3.8 watts on RF scale of meter.
Inject a 1000Hz signal at mic input. Modulation meter to antenna jack.	Ch. 19, AM AMC-Maximum	VR7	AM AMC Adjust signal for 50% modulation. Increase signal 630 times. Adjust VR7 for 95% modulation.
Modulation meter to antenna jack. Inject a 1000Hz signal at mic input.	Ch. 13, AM	VR14	MOD Adjust VR14 so that MOD panel meter agrees with external modulation meter.

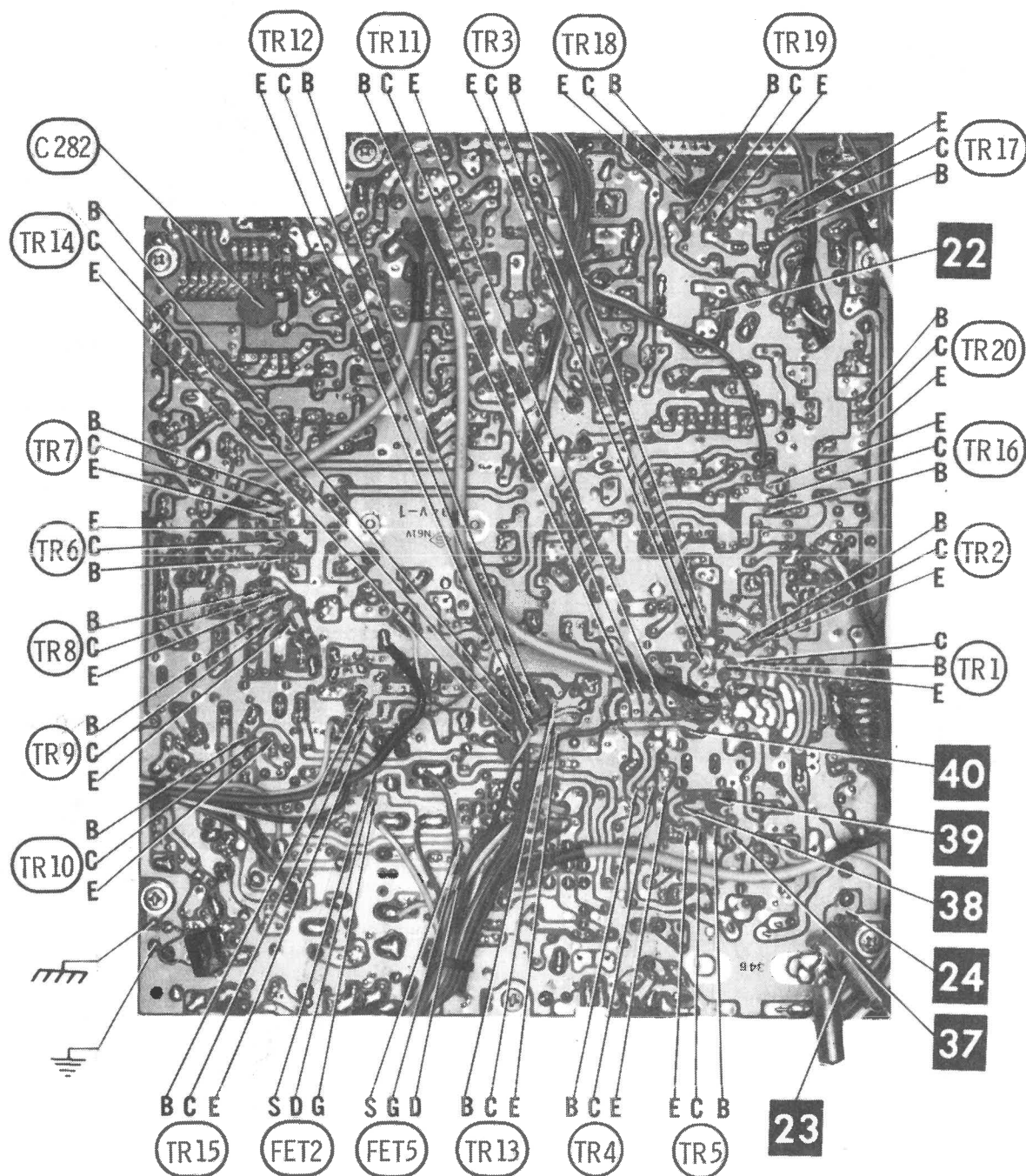
PRESIDENT MODEL MADISON



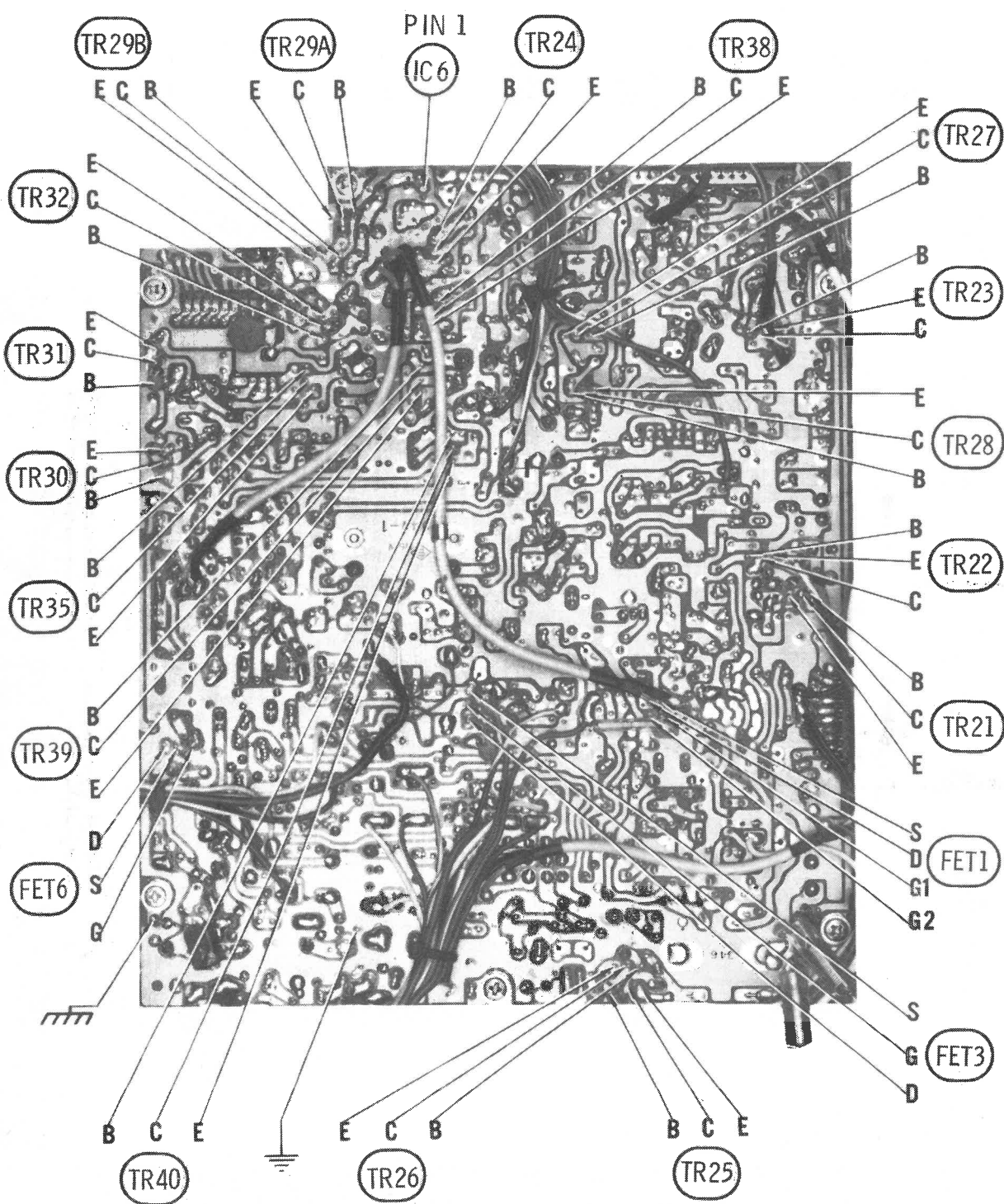
CHASSIS - TOP



CHASSIS - TOP

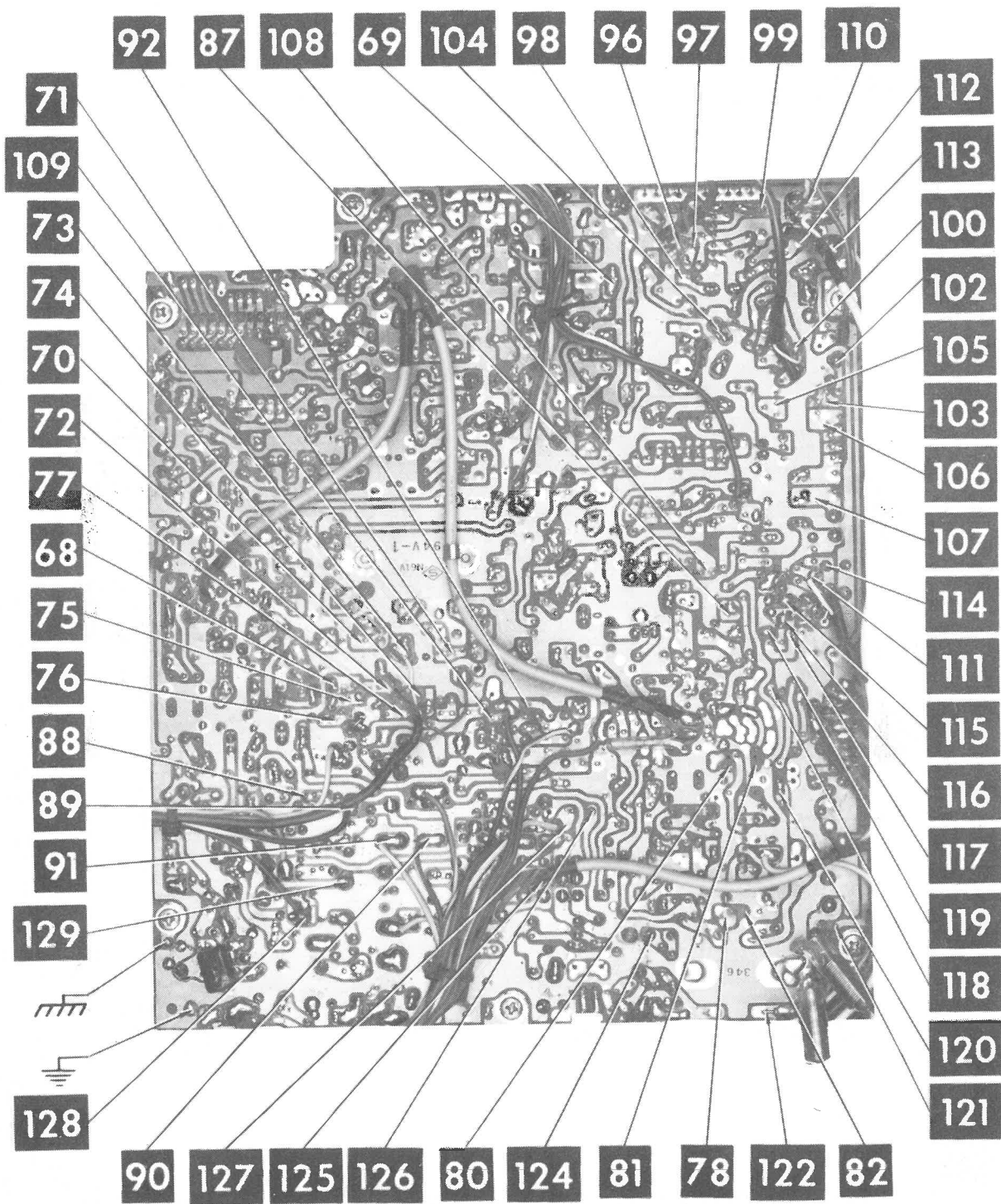


MAIN BOARD



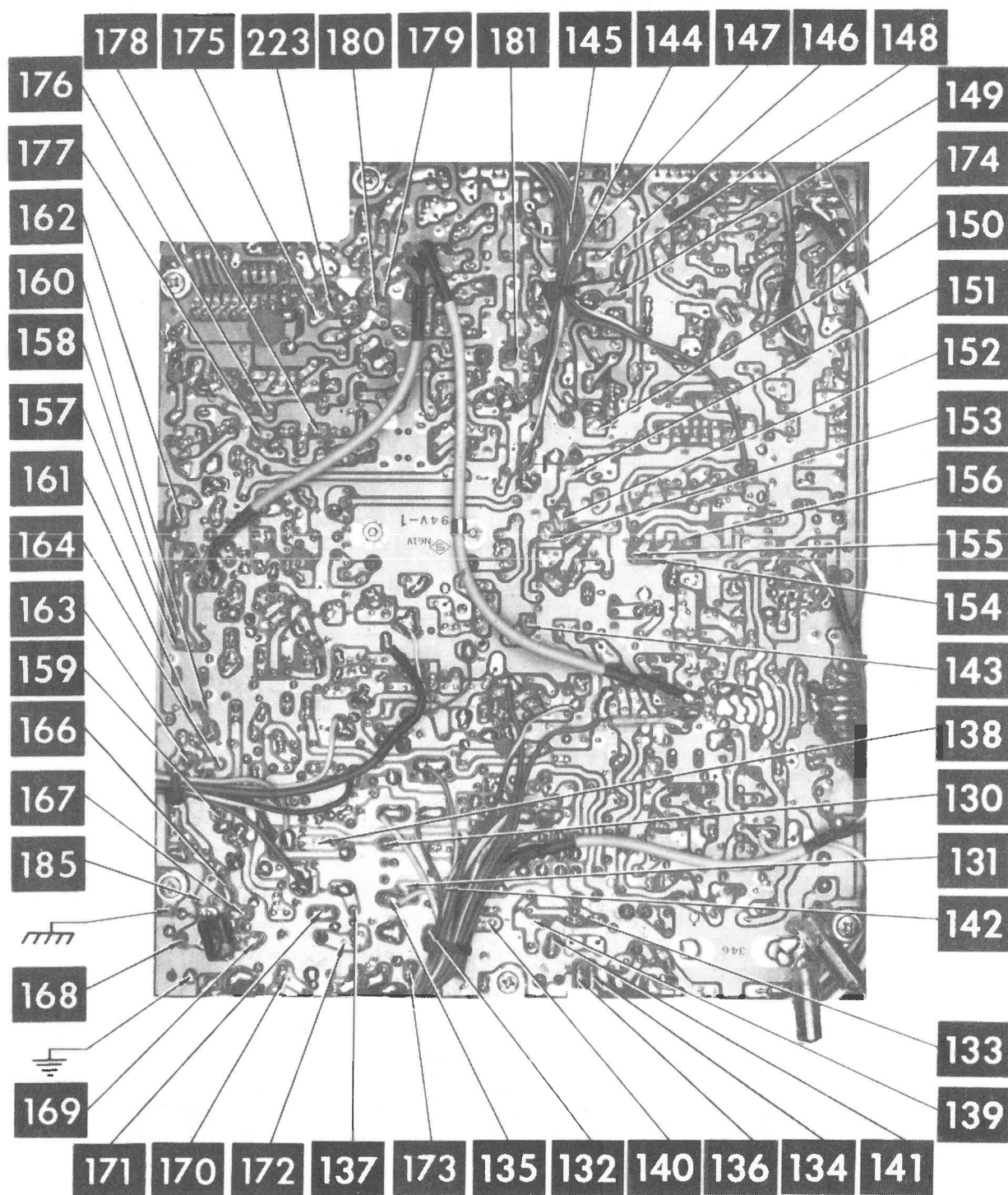
MAIN BOARD



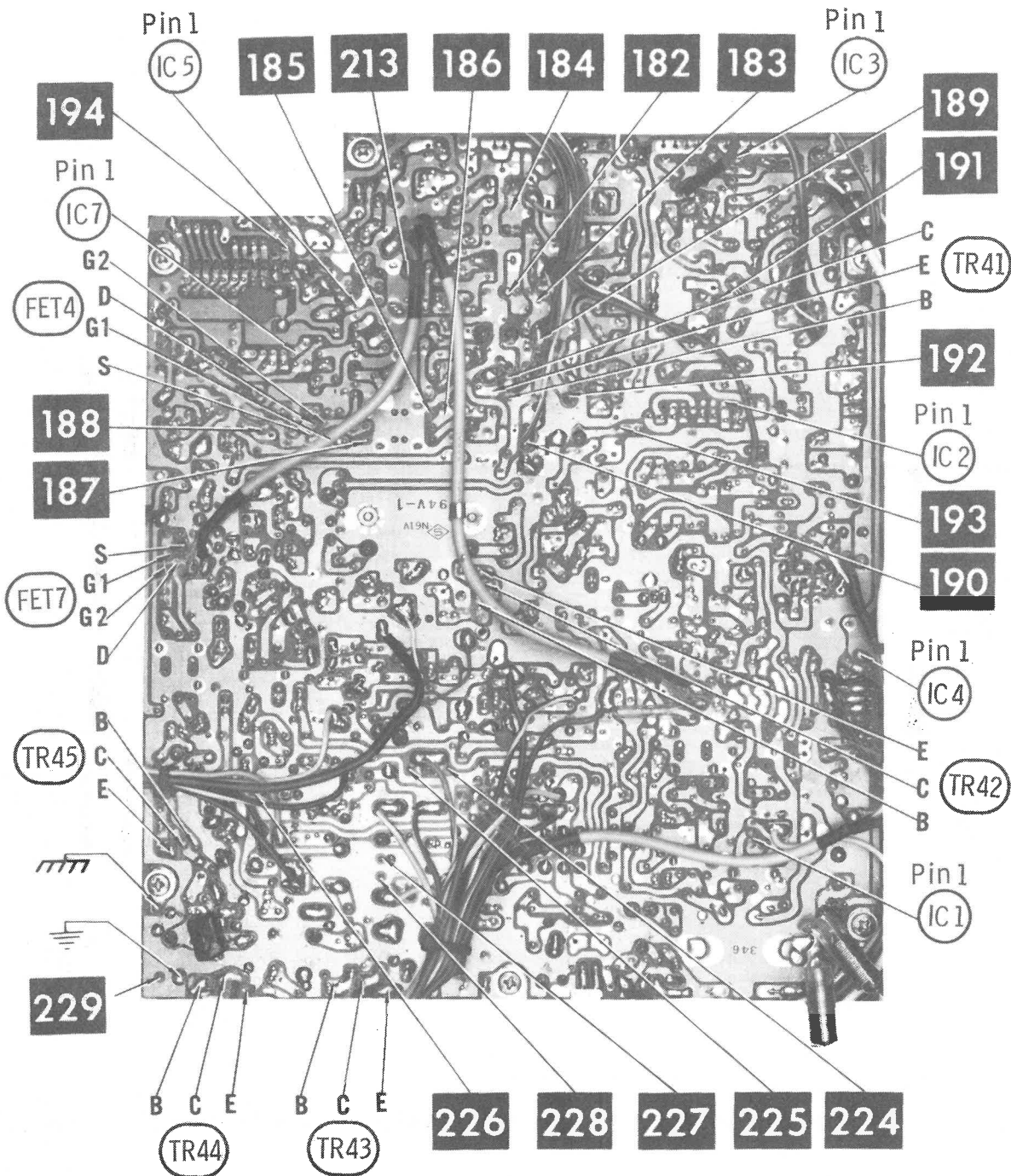


PRESIDENT MODEL MADISON

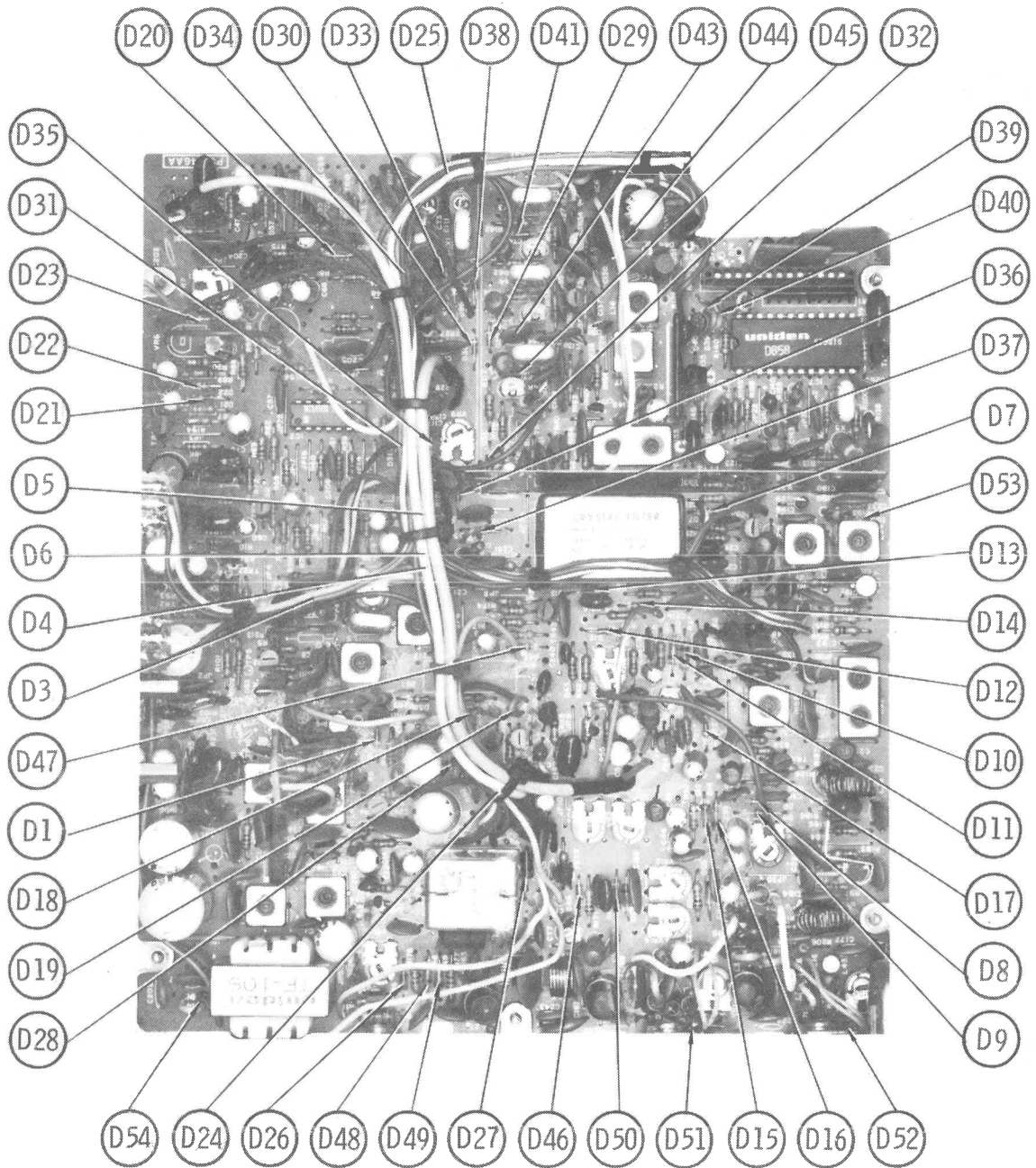
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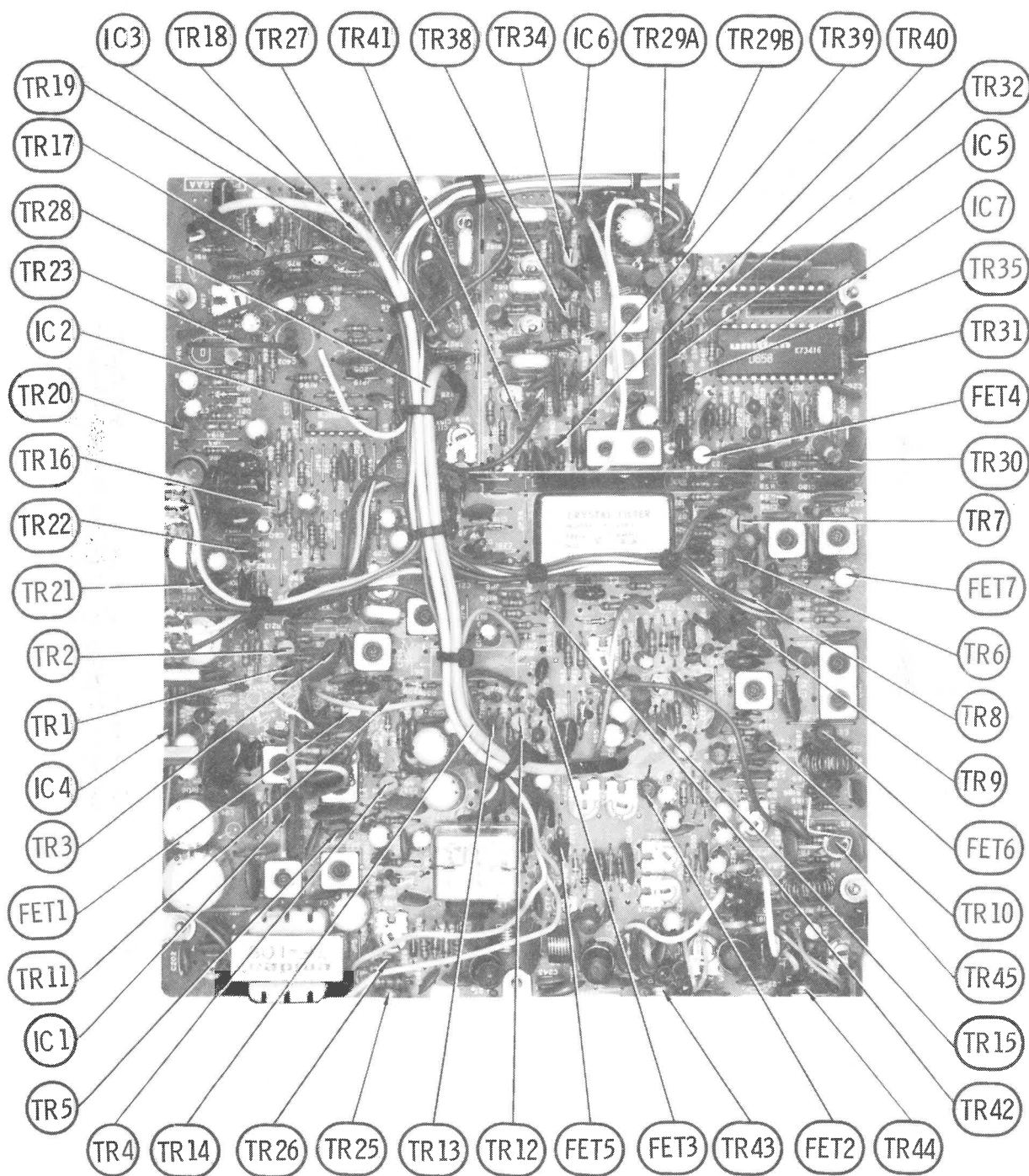
**MAIN BOARD**



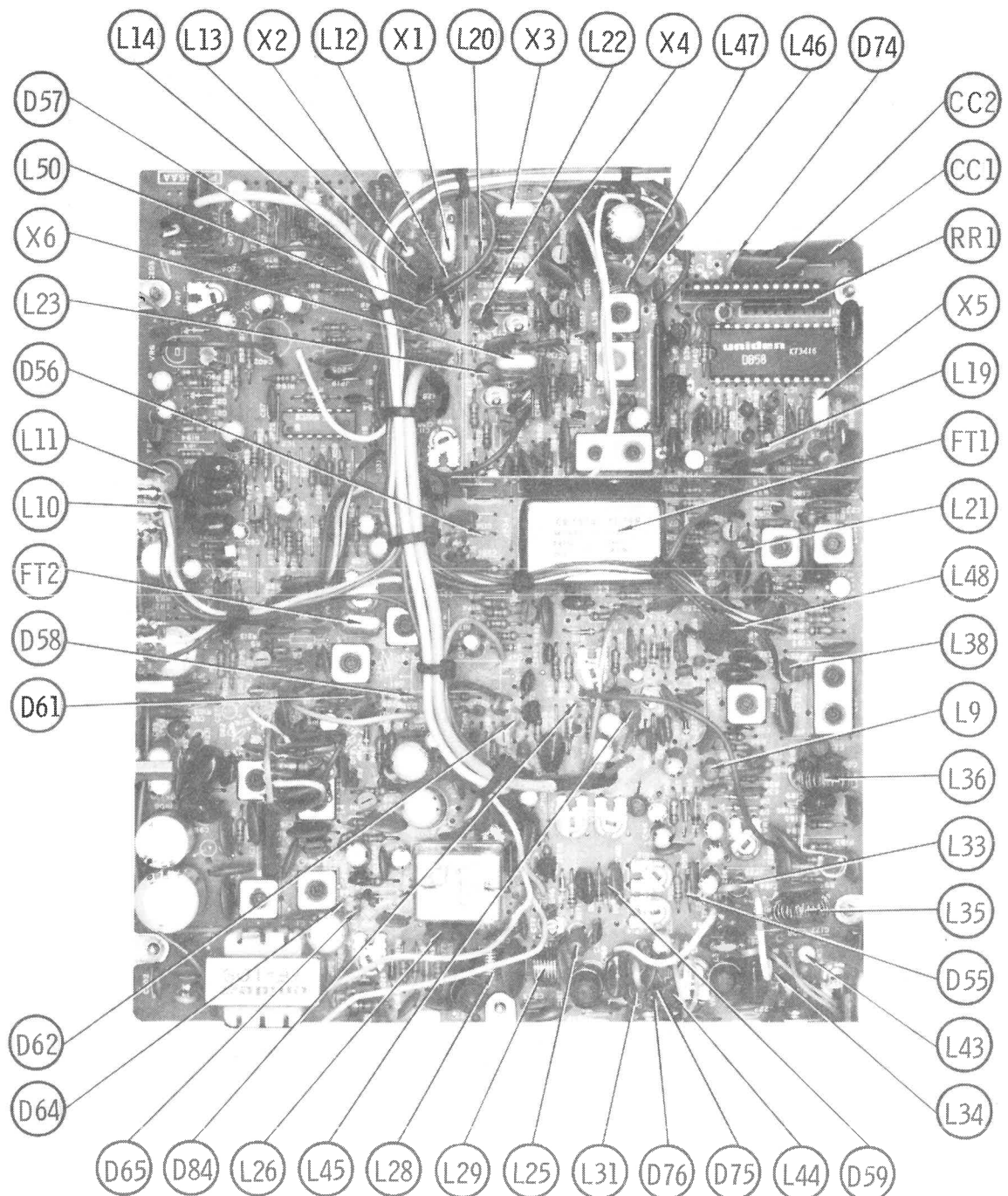
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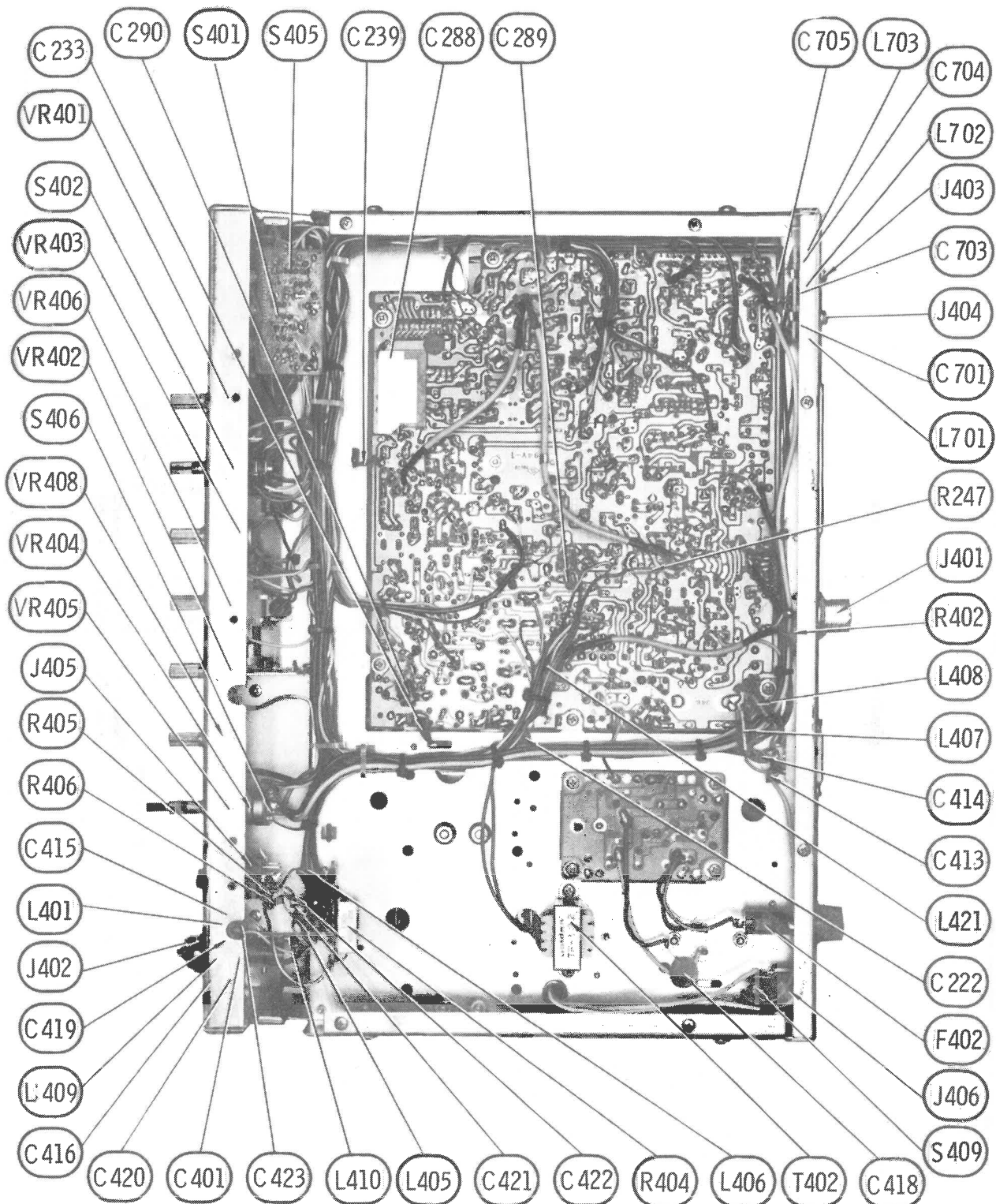
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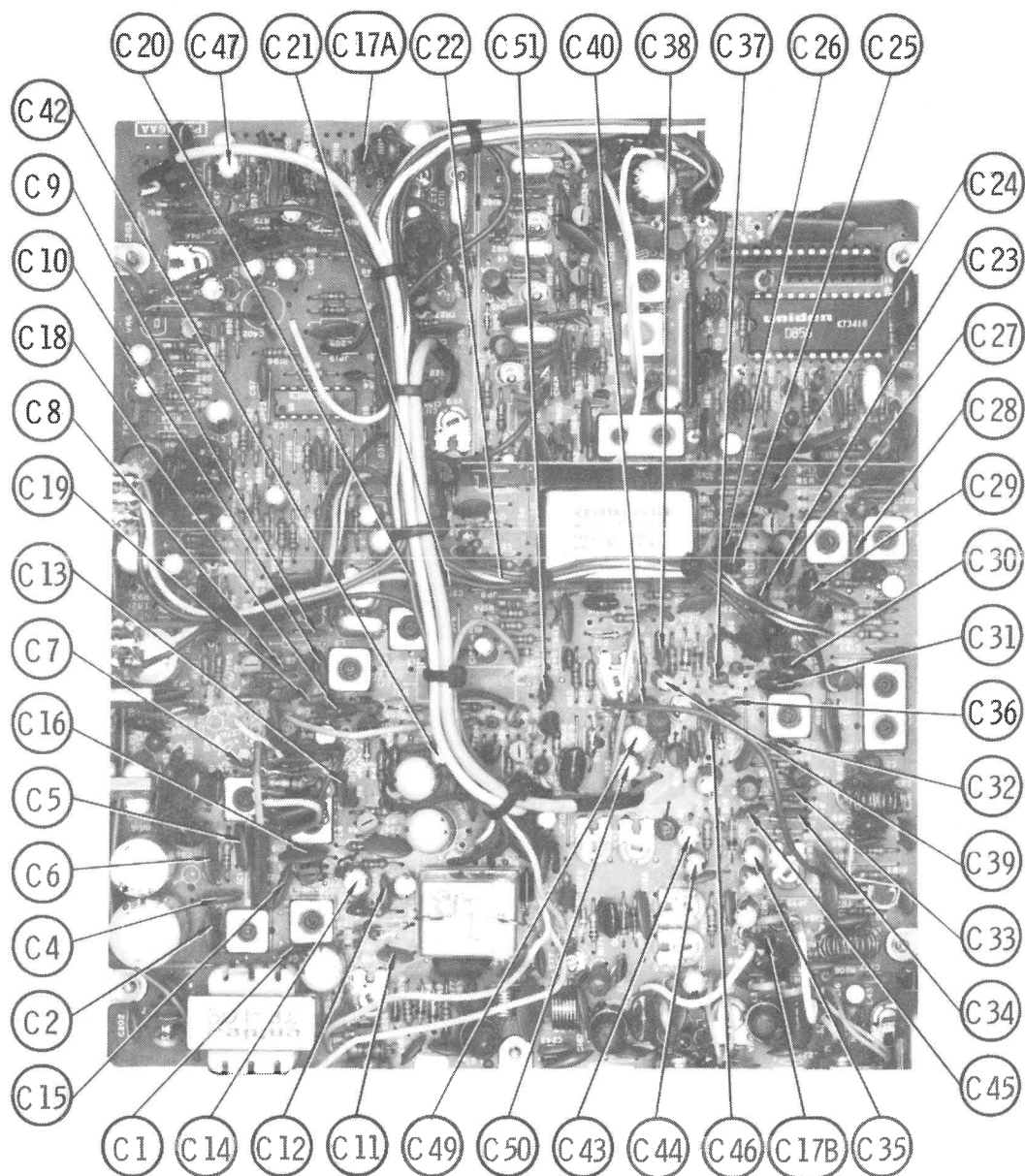
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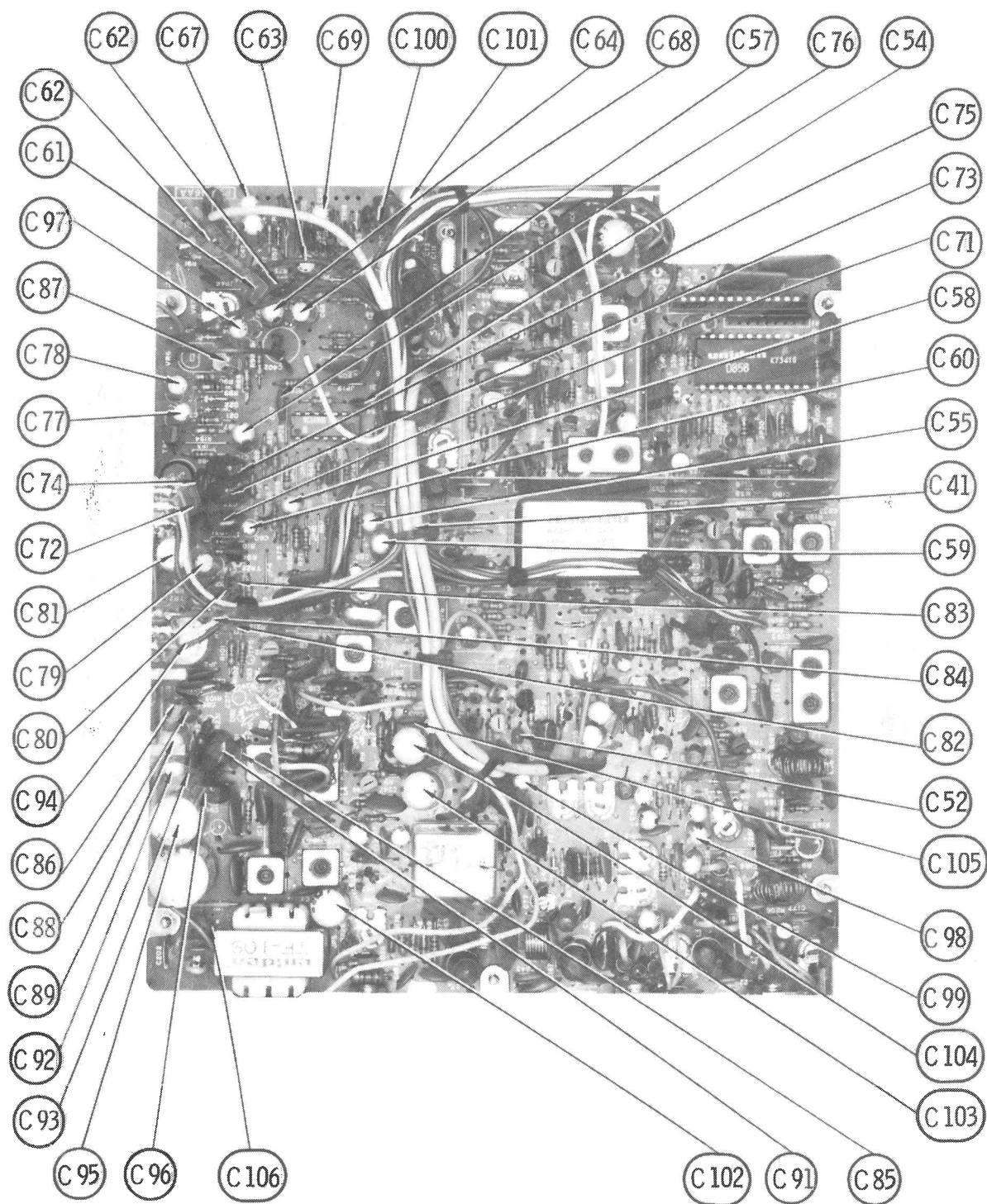
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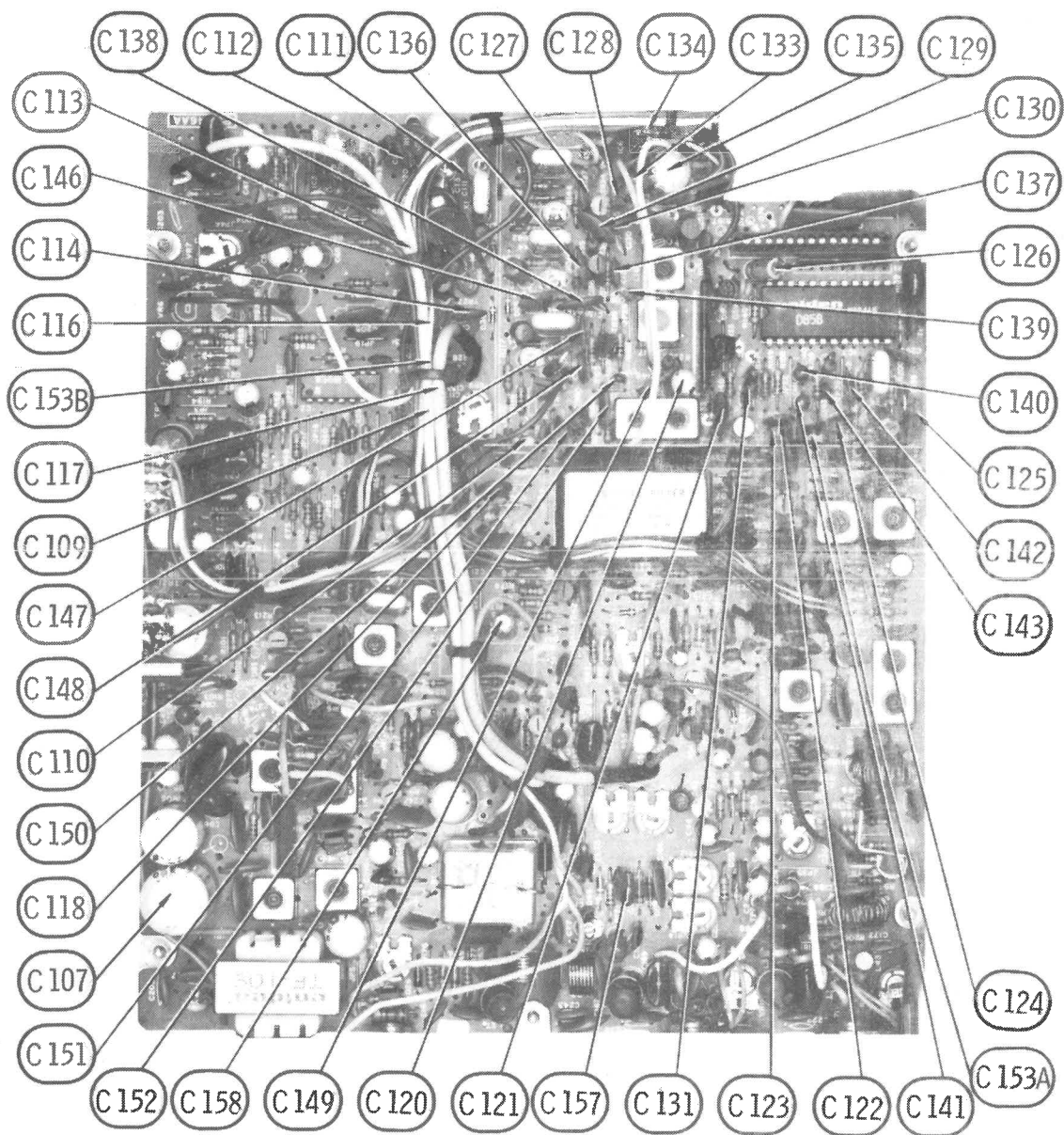
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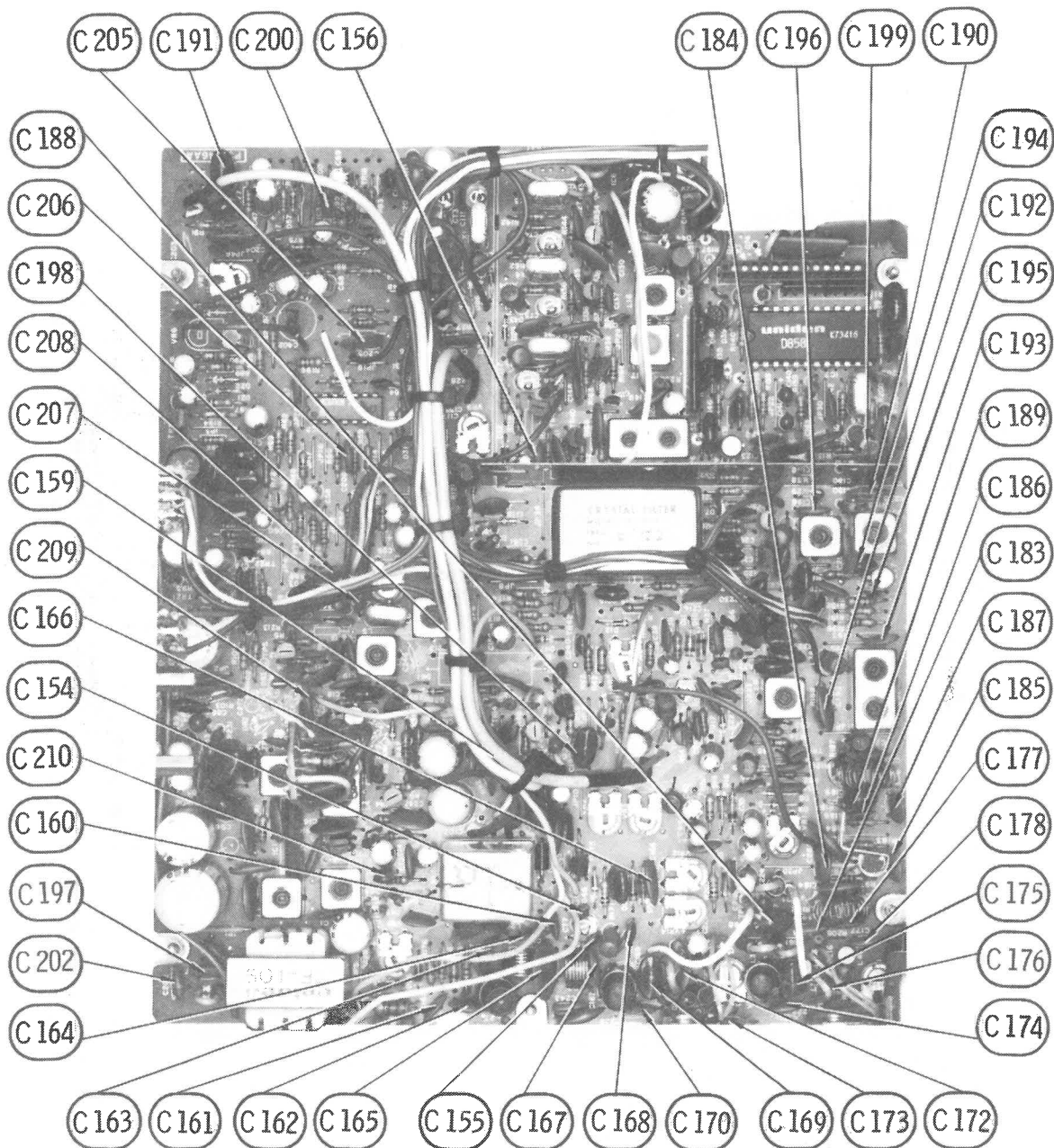
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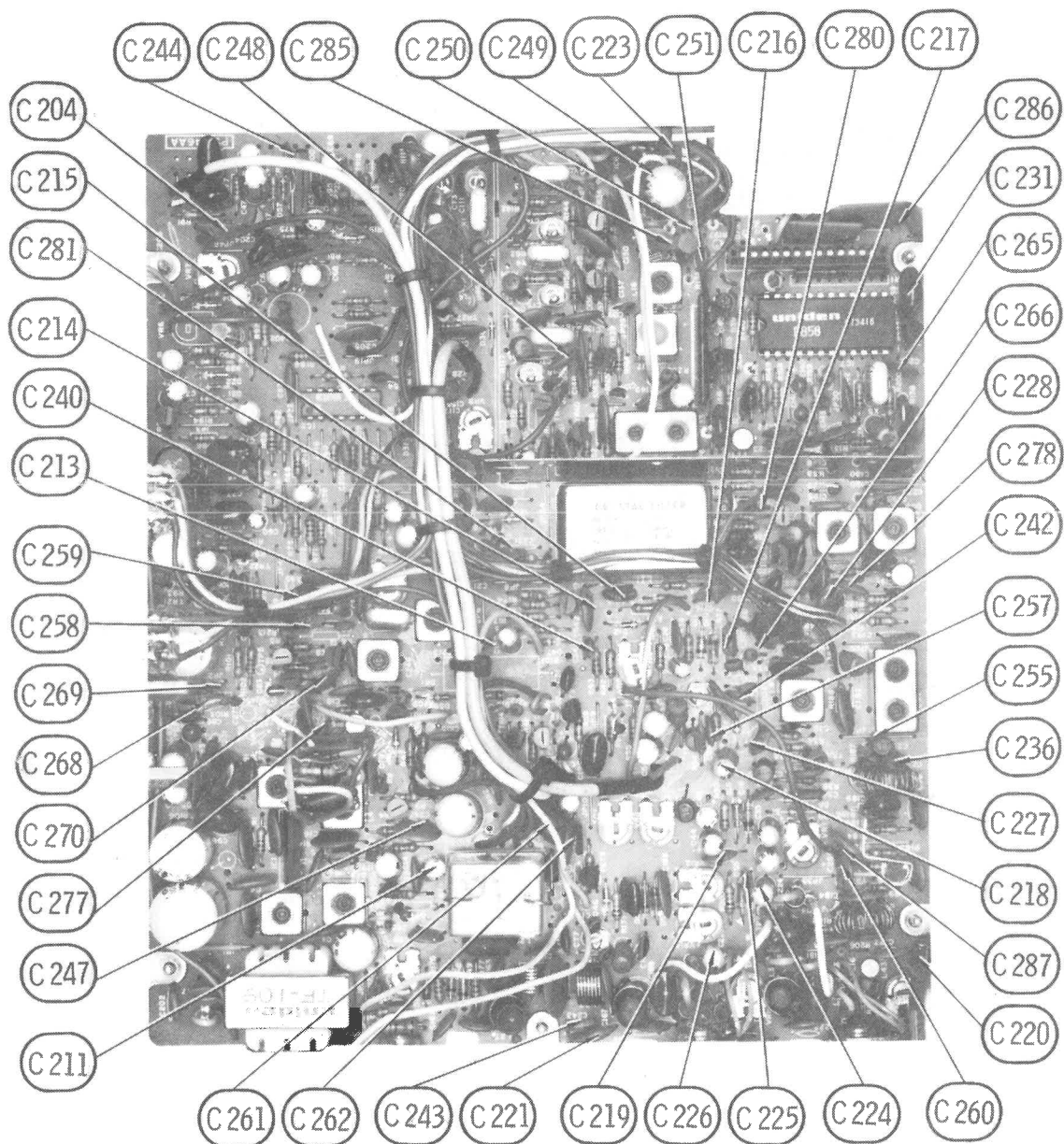
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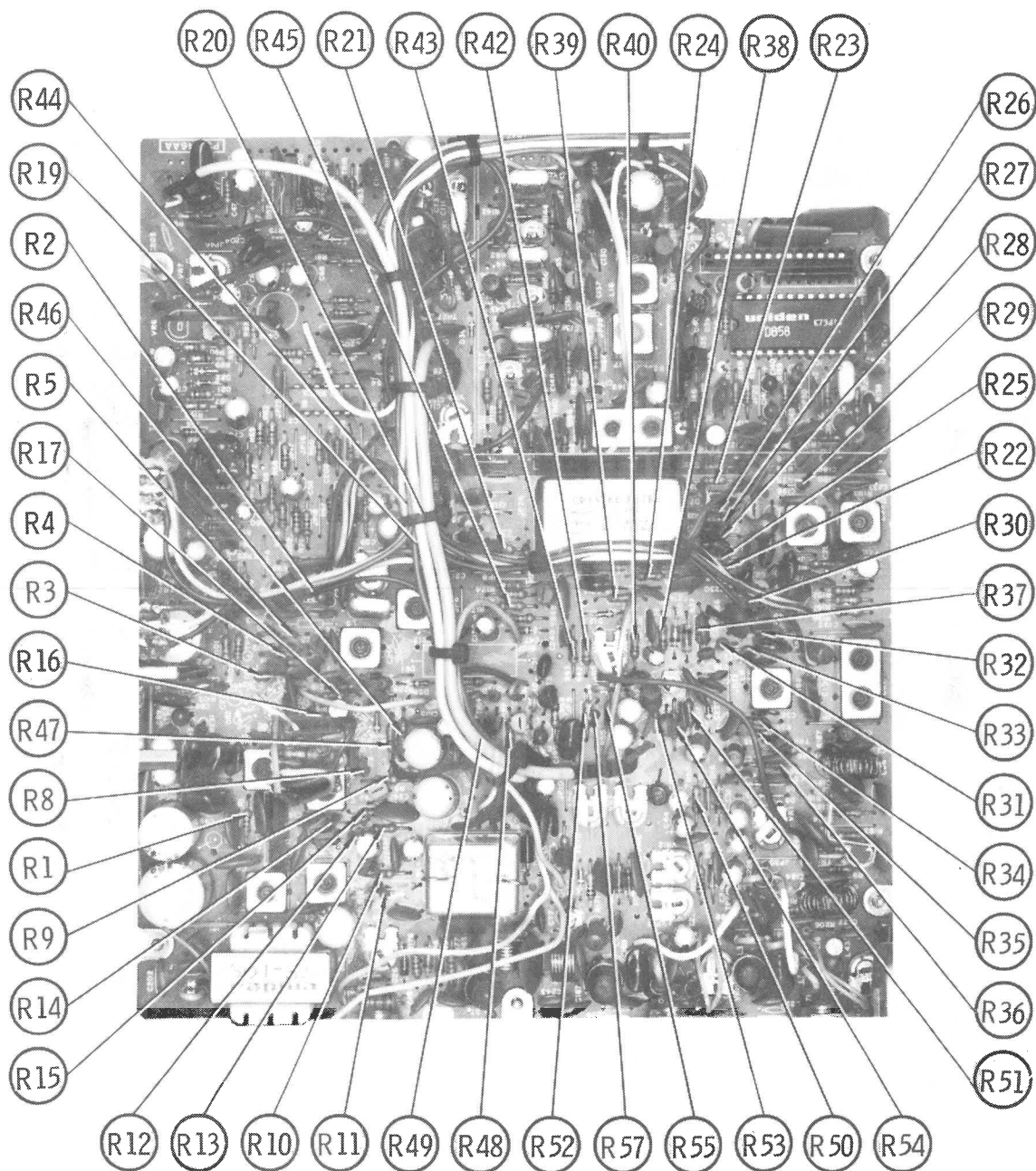
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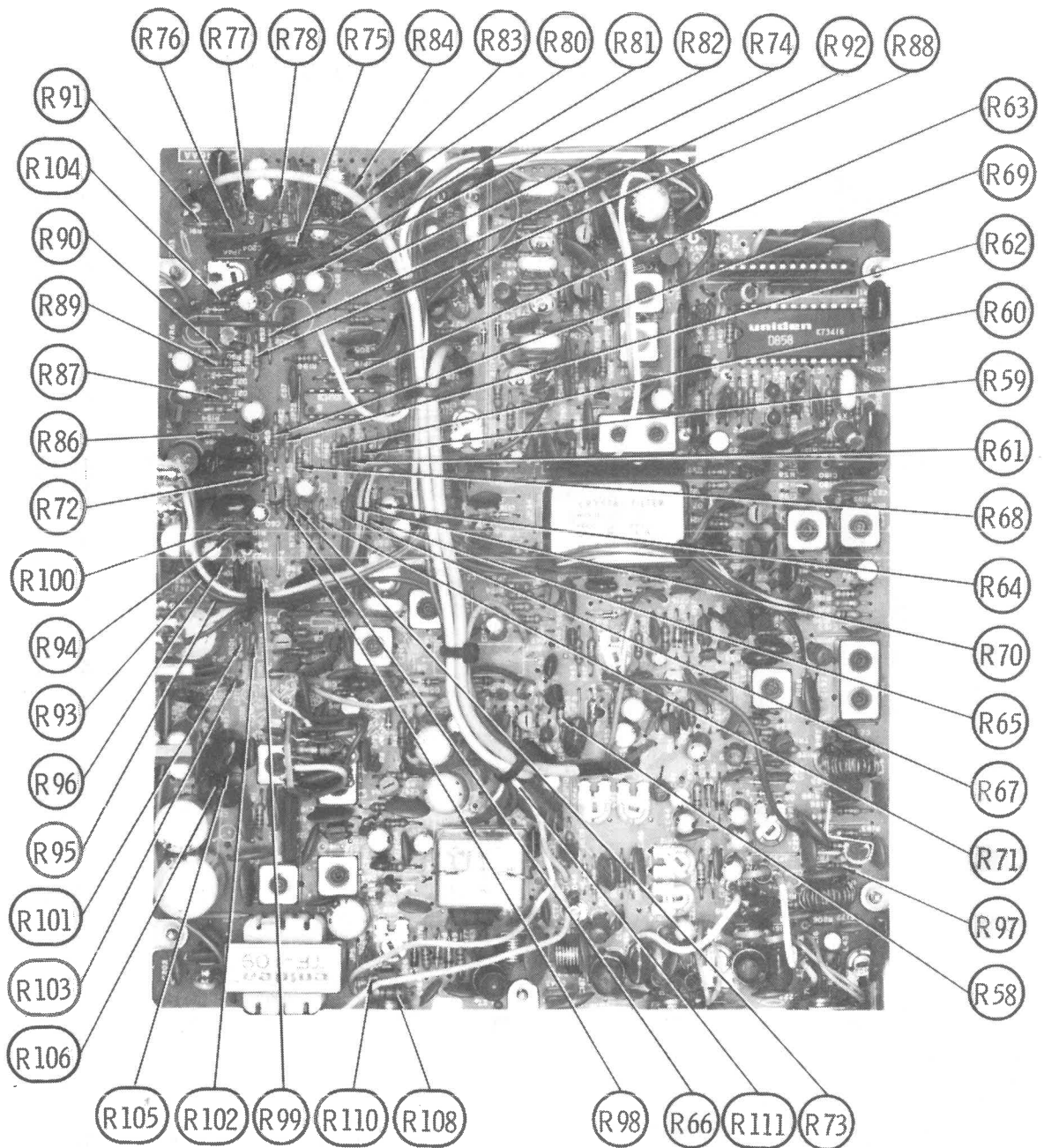
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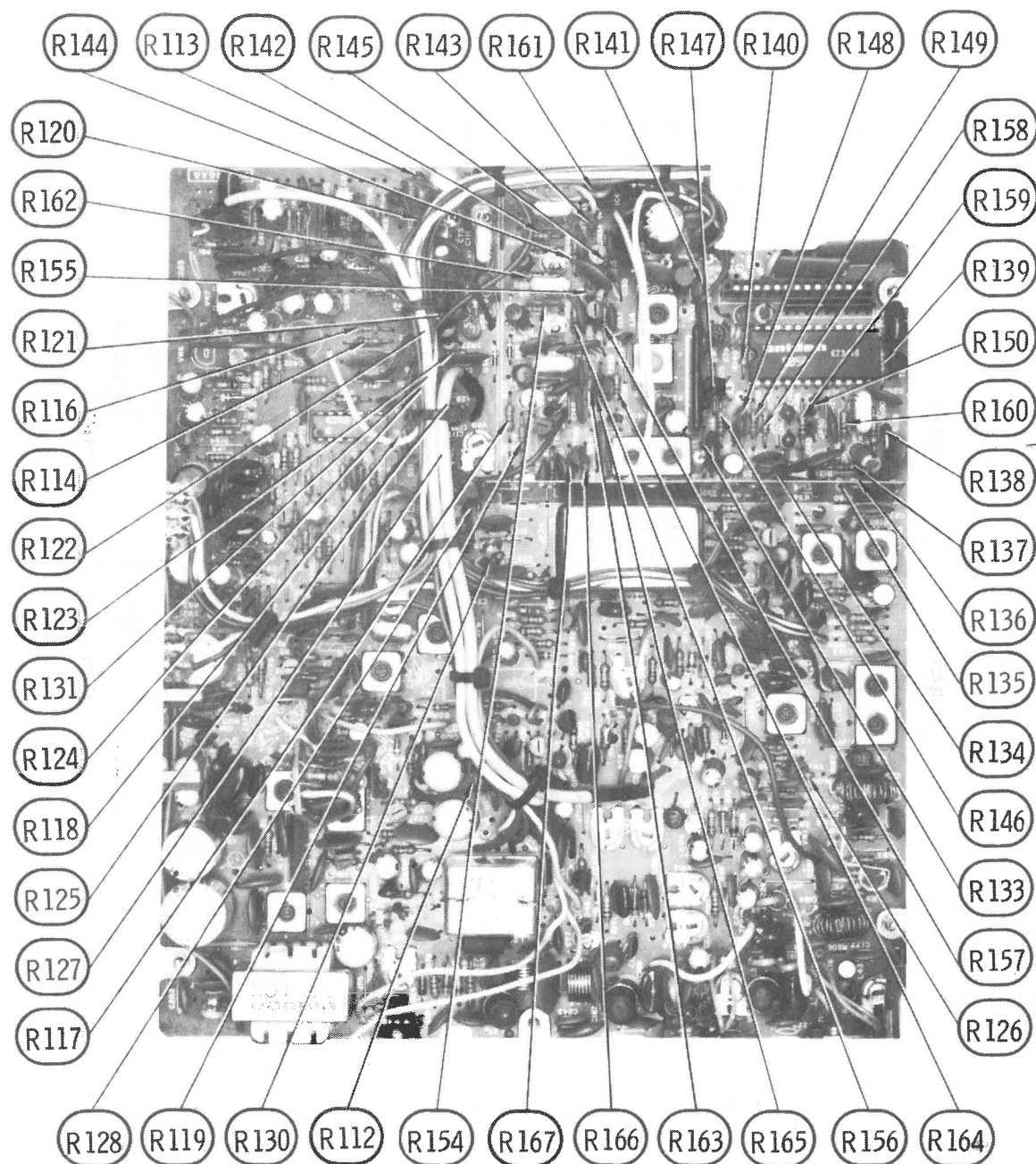
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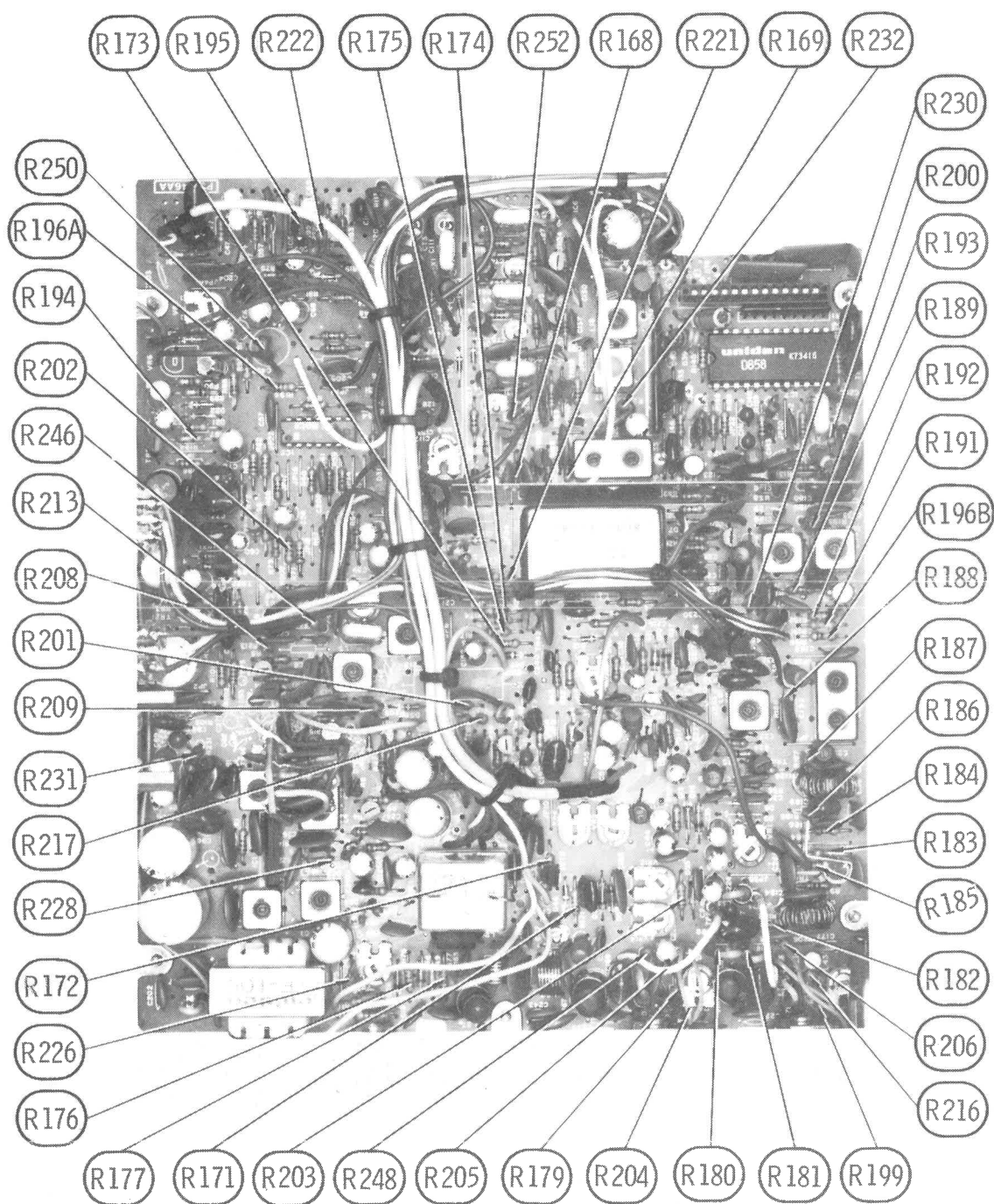
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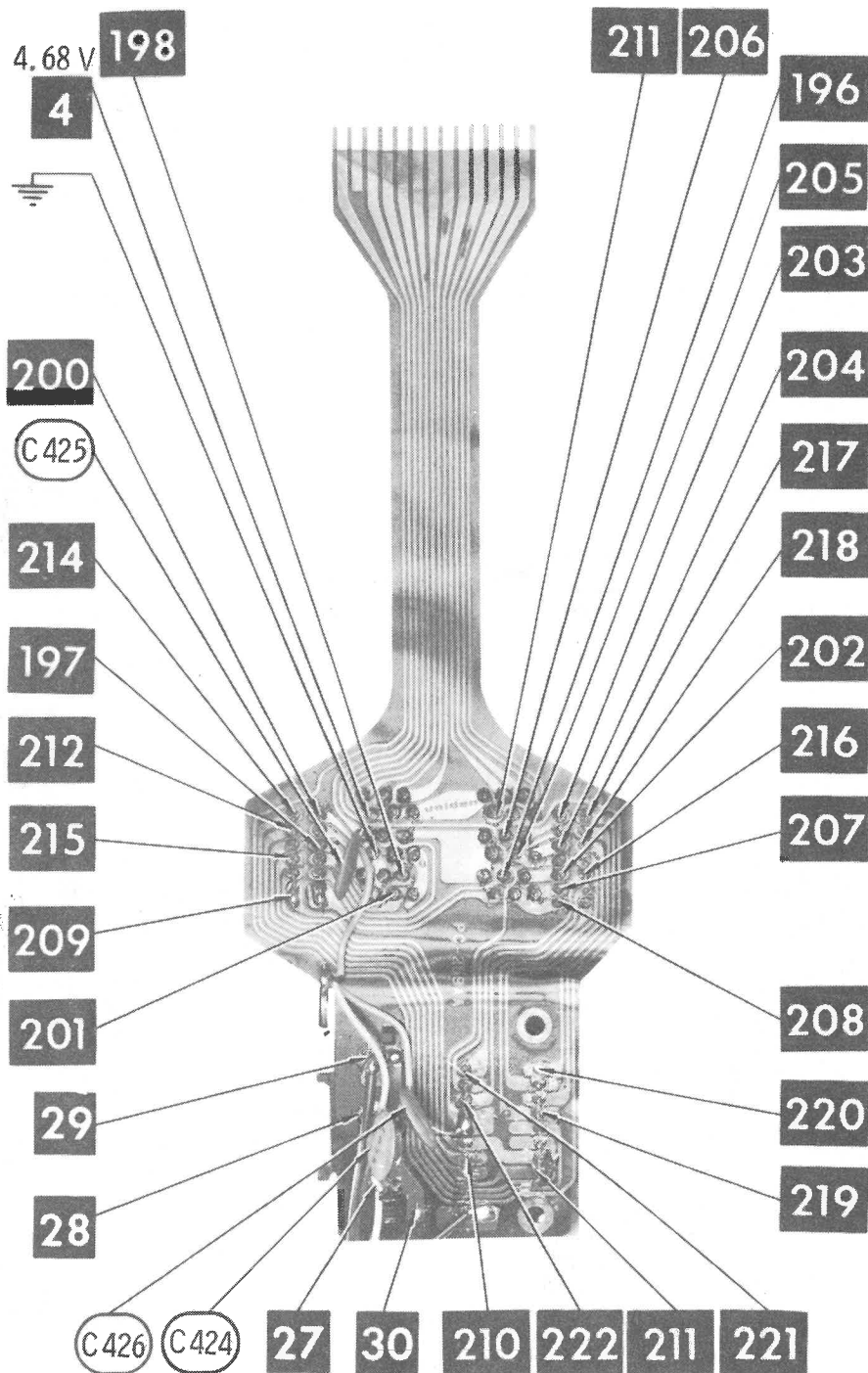
MAIN BOARD



MAIN BOARD

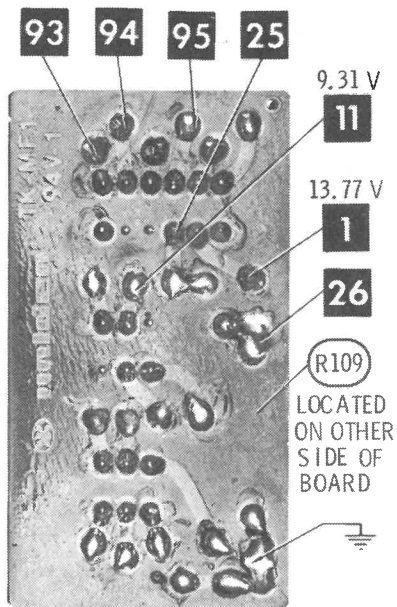


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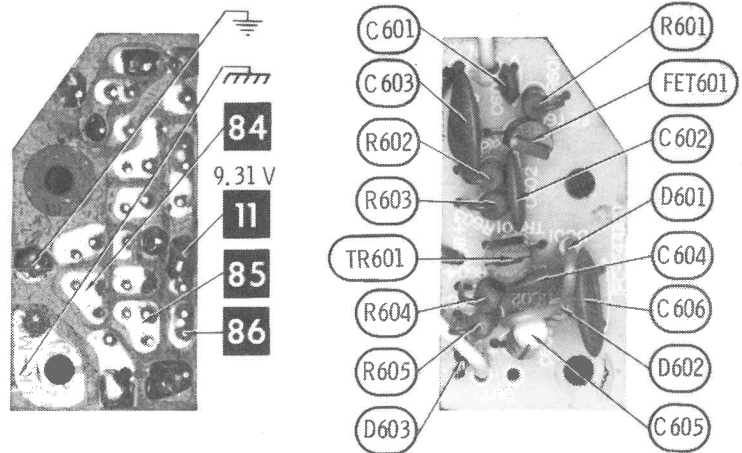


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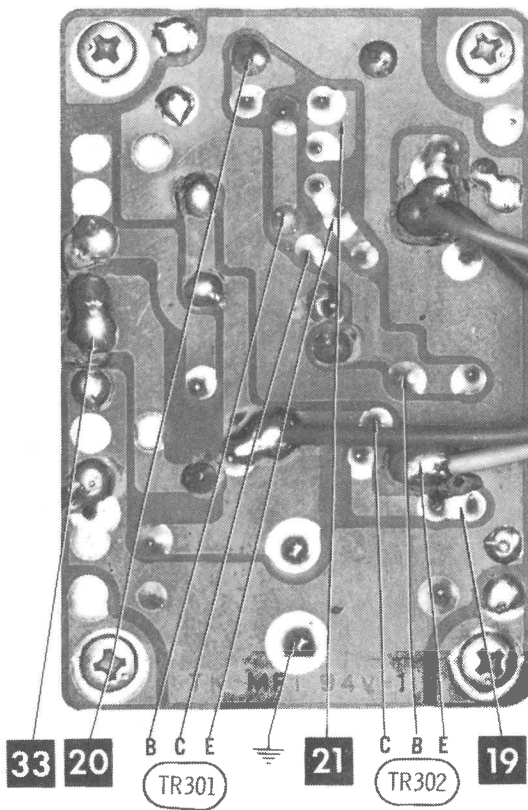
CH. SELECTOR BOARD



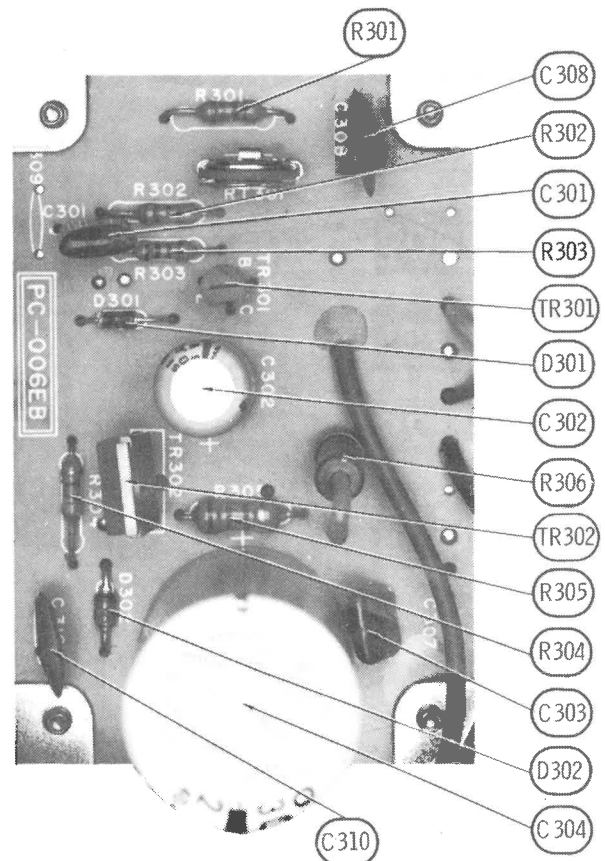
SWITCH BOARD



NOISE BLANKER BOARD



POWER SUPPLY BOARD



# TRUTH CHART

1 = 4.68 Volts 0 = 0 Volts

1 = 4.68 Volts      0 = 0 Volts													
CHANNEL	IC7 PROGRAM DIVIDER										AM REC/TX VCO OUTPUT IN MHz AT TP8	LSB REC/TX VCO OUTPUT IN MHz AT TP8	USB REC/TX VCO OUTPUT IN MHz AT TP8
	PINS												
	13	14	15	16	17	18	19	20	21				
1	1	0	0	0	1	0	0	1	0	34.765	34.7625	34.7675	
2	0	1	0	0	1	0	0	1	0	34.775	34.7725	34.7775	
3	1	1	0	0	1	0	0	1	0	34.785	34.7825	34.7875	
4	1	0	1	0	1	0	0	1	0	34.705	34.8025	34.8075	
5	0	1	1	0	1	0	0	1	0	34.815	34.8125	34.8175	
6	1	1	1	0	1	0	0	1	0	34.825	34.8225	34.8275	
7	0	0	0	1	1	0	0	1	0	34.835	34.8325	34.8375	
8	0	0	0	0	0	0	0	0	1	34.855	34.8525	34.8575	
9	1	0	0	0	0	0	0	0	1	34.865	34.8625	34.8675	
10	0	1	0	0	0	0	0	0	1	34.875	34.8725	34.8775	
11	1	1	0	0	0	0	0	0	1	34.885	34.8825	34.8875	
12	1	0	1	0	0	0	0	0	1	34.905	34.9125	34.9075	
13	0	1	1	0	0	0	0	0	1	34.915	34.9125	34.9175	
14	1	1	1	0	0	0	0	0	1	34.925	34.9225	34.9275	
15	0	0	0	1	0	0	0	0	1	34.935	34.9325	34.9375	
16	0	0	0	0	1	0	0	0	1	34.955	34.9525	34.9575	
17	1	0	0	0	1	0	0	0	1	34.965	34.9625	34.9675	
18	0	1	0	0	1	0	0	0	1	34.975	34.9725	34.9775	
19	1	1	0	0	1	0	0	0	1	34.985	34.9825	34.9875	
20	1	0	1	0	1	0	0	0	1	34.005	35.0025	35.0075	
21	0	1	1	0	1	0	0	0	1	34.015	35.0125	35.0175	
22	1	1	1	0	1	0	0	0	1	34.025	35.0225	35.0275	
23	0	0	0	0	0	1	0	0	1	34.055	35.0525	35.0575	
24	0	0	0	1	1	0	0	0	1	34.035	35.0325	35.0375	
25	1	0	0	1	1	0	0	0	1	34.045	35.0425	35.0475	
26	1	0	0	0	0	1	0	0	1	34.065	35.0625	35.0675	
27	0	1	0	0	0	1	0	0	1	34.075	35.0725	35.0775	
28	1	1	0	0	0	1	0	0	1	34.085	35.0825	35.0875	
29	0	0	1	0	0	1	0	0	1	34.095	35.0925	35.0975	
30	1	0	1	0	0	1	0	0	1	34.105	35.1025	35.1075	
31	0	1	1	0	0	1	0	0	1	34.115	35.1125	35.1175	
32	1	1	1	0	0	1	0	0	1	34.125	35.1225	35.1275	
33	0	0	0	1	0	1	0	0	1	34.135	35.1325	35.1375	
34	1	0	0	1	0	1	0	0	1	34.145	35.1425	35.1475	
35	0	0	0	0	1	1	0	0	1	34.155	35.1525	35.1575	
36	1	0	0	0	1	1	0	0	1	34.165	35.1625	35.1675	
37	0	1	0	0	1	1	0	0	1	34.175	35.1725	35.1775	
38	1	1	0	0	1	1	0	0	1	34.185	35.1825	35.1875	
39	0	0	1	0	1	1	0	0	1	34.195	35.1926	35.1975	
40	1	0	1	0	1	1	0	0	1	34.205	35.2025	35.2075	

AND  
AM TX

PRESIDENT MODEL MADISON

all should be 35.-----



From CircuitTrace 1  
at S406 on PLL  
Schematic

# NOTE

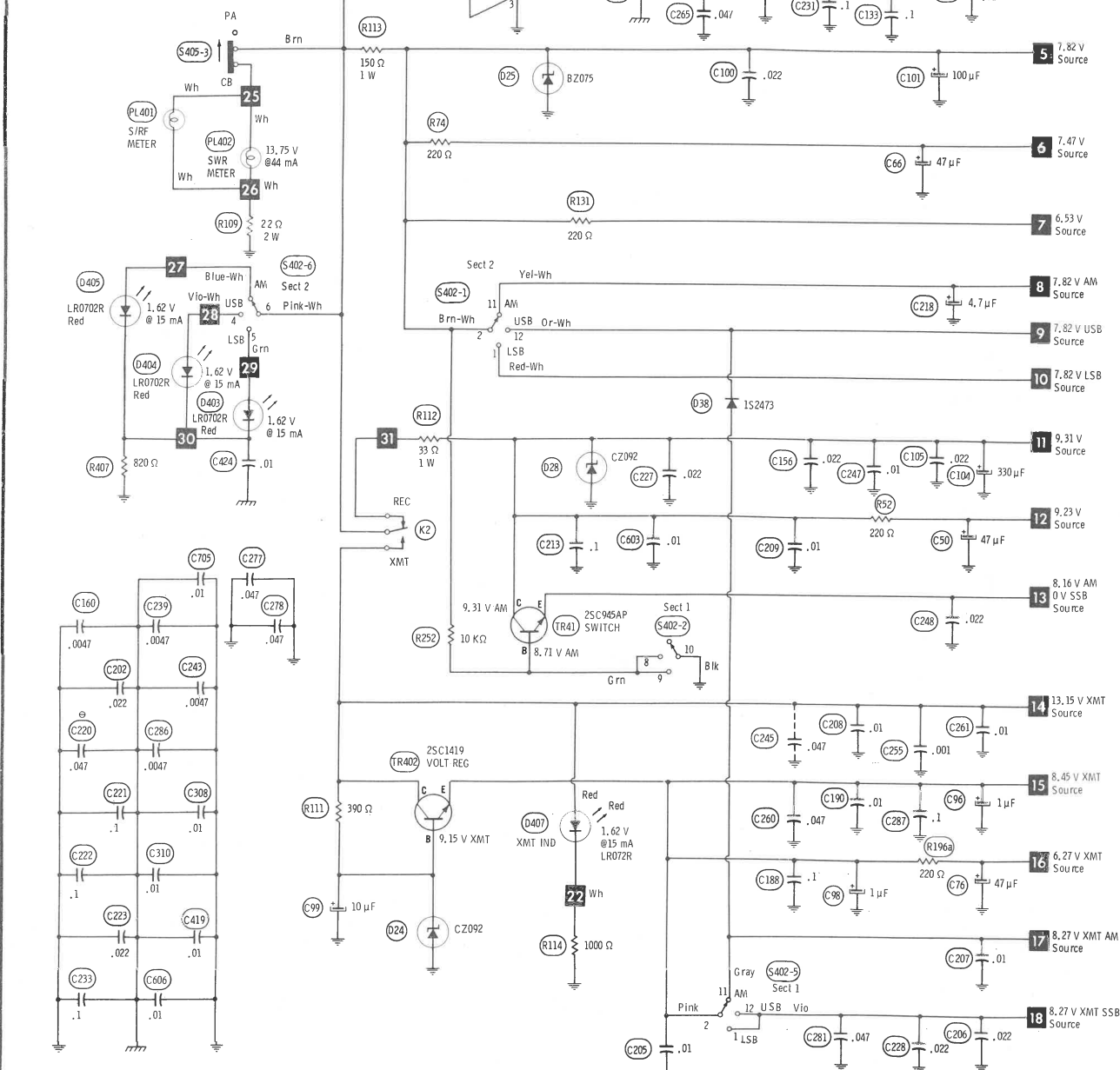
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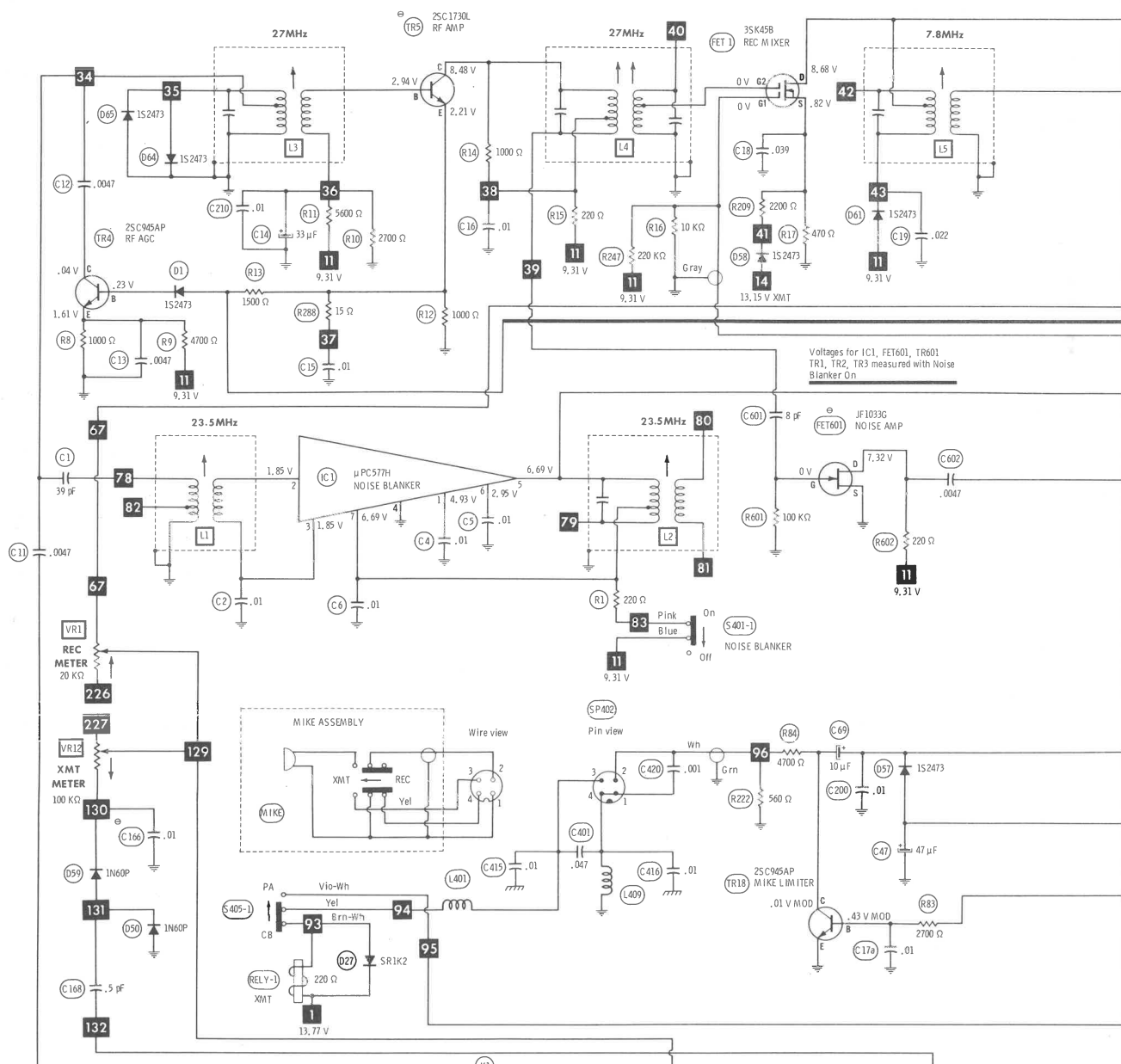
The frequency of the transmitter should be checked periodically with a secondary frequency standard to insure proper and legal operation.

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.

## PRESIDENT MODEL MADISON





✖ Circuitry not used in some versions

--- Circuitry used in some versions

⊕ See parts list

✱ Nominal value

⊥ Ground

Chassis

▽ Common tie point

Measurements made in Channel 1 with

switching as shown unless noted.

Item numbers in rectangles appear in the

alignment/adjustment instructions.

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.

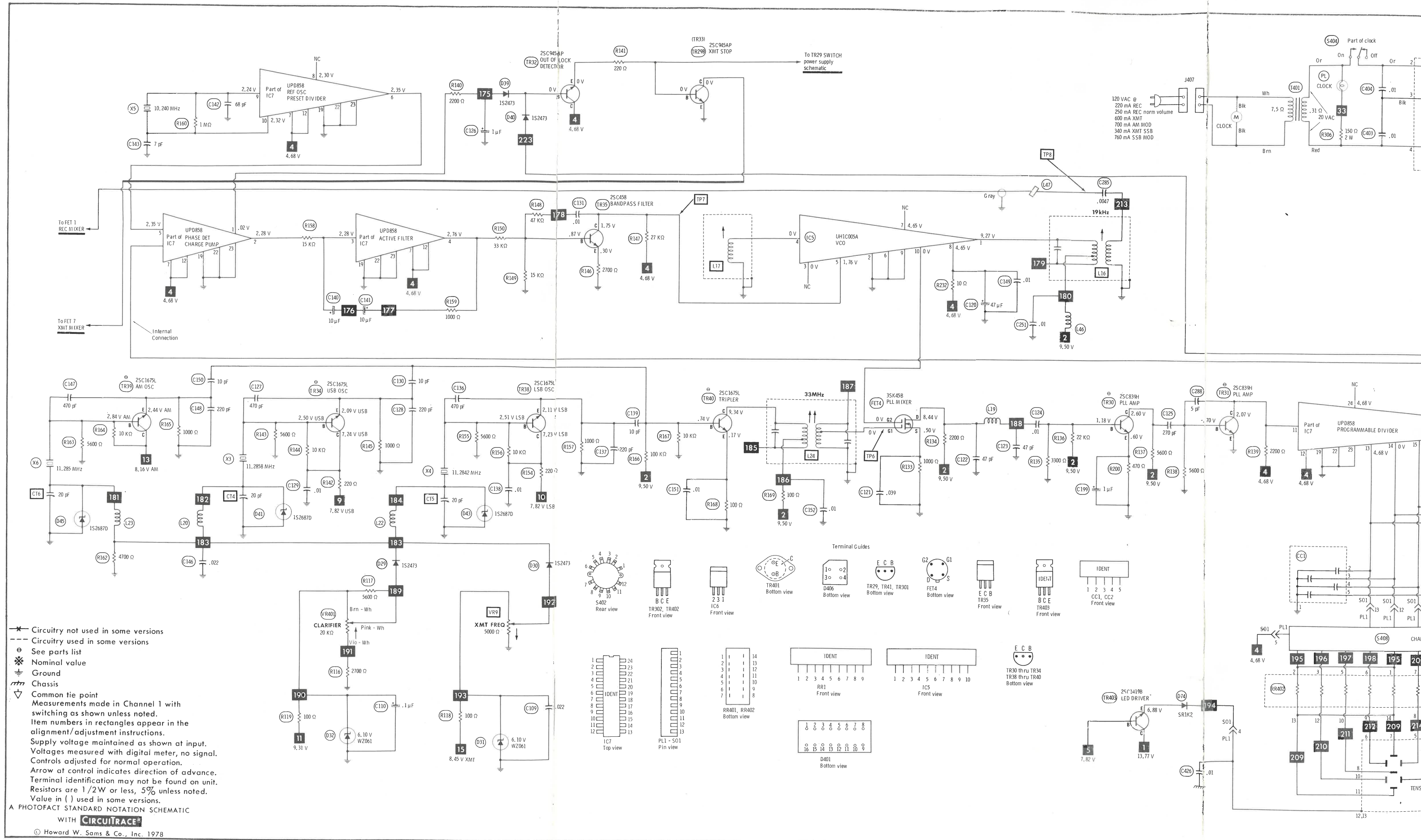
A PHOTOFACIT STANDARD NOTATION SCHEMATIC

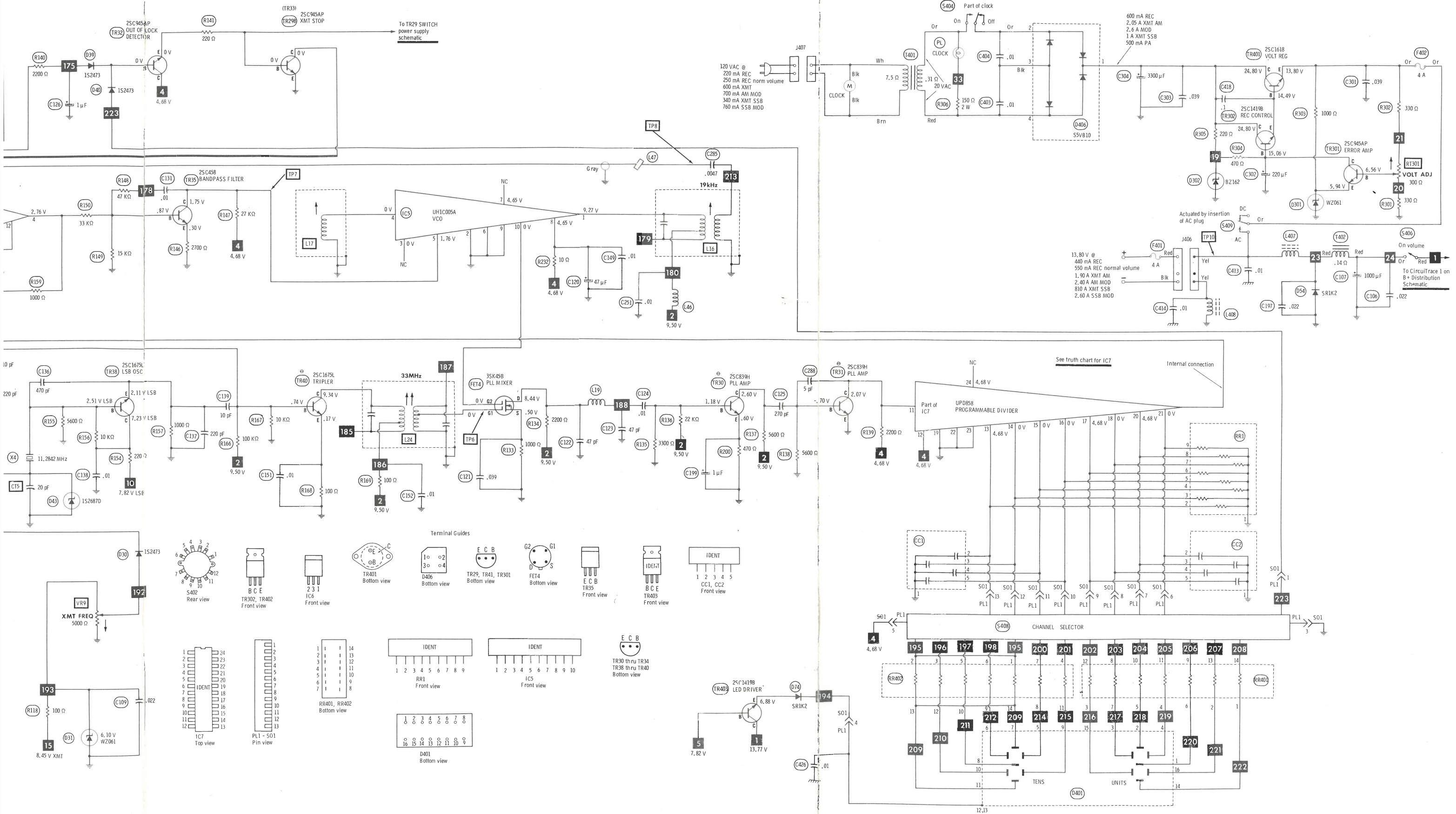
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(When ordering parts, state Model, Part Number, and Description.)

ITEM No.	TYPE No.	MFRG. PART No.	REPLACEMENT DATA										ZENITH PART No.
			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.		
D1	1S2473 1S1588 1S2472	2000-317	GE-300 GE-300 GE-300	PTC214 PTC214 PTC214	HEPR0602 HEPR0602 HEPR0602	RE 52 RE 52 RE 52	SK3100 SK3100 SK3100	RT-218 RT-218 RT-218	ECG177 ECG177 ECG177		WEP1062 WEP1062 WEP1062		
D3	1S2473 1S1588 1S2472	2000-317	GE-300 GE-300 GE-300	PTC214 PTC214 PTC214	HEPR0602 HEPR0602 HEPR0602	RE 52 RE 52 RE 52	SK3100 SK3100 SK3100	RT-218 RT-218 RT-218	ECG177 ECG177 ECG177		WEP1062 WEP1062 WEP1062		
D4	1S2473 1S1588 1S2472	2000-317	GE-300 GE-300 GE-300	PTC214 PTC214 PTC214	HEPR0602 HEPR0602 HEPR0602	RE 52 RE 52 RE 52	SK3100 SK3100 SK3100	RT-218 RT-218 RT-218	ECG177 ECG177 ECG177		WEP1062 WEP1062 WEP1062		
D5	1S2473 1S1588 1S2472	2000-317	GE-300 GE-300 GE-300	PTC214 PTC214 PTC214	HEPR0602 HEPR0602 HEPR0602	RE 52 RE 52 RE 52	SK3100 SK3100 SK3100	RT-218 RT-218 RT-218	ECG177 ECG177 ECG177		WEP1062 WEP1062 WEP1062		
D6	1S2473 1S1588 1S2472	2000-317	GE-300 GE-300 GE-300	PTC214 PTC214 PTC214	HEPR0602 HEPR0602 HEPR0602	RE 52 RE 52 RE 52	SK3100 SK3100 SK3100	RT-218 RT-218 RT-218	ECG177 ECG177 ECG177		WEP1062 WEP1062 WEP1062		
D7	1S2473 1S1588 1S2472	2000-317	GE-300 GE-300 GE-300	PTC214 PTC214 PTC214	HEPR0602 HEPR0602 HEPR0602	RE 52 RE 52 RE 52	SK3100 SK3100 SK3100	RT-218 RT-218 RT-218	ECG177 ECG177 ECG177		WEP1062 WEP1062 WEP1062		
D8	1S2473 1S1588 1S2472	2000-317	GE-300 GE-300 GE-300	PTC214 PTC214 PTC214	HEPR0602 HEPR0602 HEPR0602	RE 52 RE 52 RE 52	SK3100 SK3100 SK3100	RT-218 RT-218 RT-218	ECG177 ECG177 ECG177		WEP1062 WEP1062 WEP1062		
D9	1S2473 1S1588 1S2472	2000-317	GE-300 GE-300 GE-300	PTC214 PTC214 PTC214	HEPR0602 HEPR0602 HEPR0602	RE 52 RE 52 RE 52	SK3100 SK3100 SK3100	RT-218 RT-218 RT-218	ECG177 ECG177 ECG177		WEP1062 WEP1062 WEP1062		
D10	1N60P 1N60 1N60	2000-318	1N60 1N60 1N60	PTC206 PTC206 PTC206	HEPR9135 HEPR9135 HEPR9135	RE 47 RE 47 RE 47	SK3088 SK3088 SK3088	RT-263 RT-263 RT-263	ECG109 ECG109 ECG109	1N60 1N60 1N60	WEP134 WEP134 WEP134	ZEN-430 ZEN-430 ZEN-430	
D11	1S2473 1S1588 1S2472	2000-318	GE-300 GE-300 GE-300	PTC214 PTC214 PTC214	HEPR0602 HEPR0602 HEPR0602	RE 52 RE 52 RE 52	SK3100 SK3100 SK3100	RT-218 RT-218 RT-218	ECG177 ECG177 ECG177		WEP1062 WEP1062 WEP1062		
D12	1S2473 1S1588 1S2472	2000-317	GE-300 GE-300 GE-300	PTC214 PTC214 PTC214	HEPR0602 HEPR0602 HEPR0602	RE 52 RE 52 RE 52	SK3100 SK3100 SK3100	RT-218 RT-218 RT-218	ECG177 ECG177 ECG177		WEP1062 WEP1062 WEP1062		
D13	1S2473 1S1588 1S2472	2000-317	GE-300 GE-300 GE-300	PTC214 PTC214 PTC214	HEPR0602 HEPR0602 HEPR0602	RE 52 RE 52 RE 52	SK3100 SK3100 SK3100	RT-218 RT-218 RT-218	ECG177 ECG177 ECG177		WEP1062 WEP1062 WEP1062		
D14	1S2473 1S1588 1S2472	2000-317	GE-300 GE-300 GE-300	PTC214 PTC214 PTC214	HEPR0602 HEPR0602 HEPR0602	RE 52 RE 52 RE 52	SK3100 SK3100 SK3100	RT-218 RT-218 RT-218	ECG177 ECG177 ECG177		WEP1062 WEP1062 WEP1062		
D15	1N60P 1N60 1N60	2000-318	1N60 1N60 1N60	PTC206 PTC206 PTC206	HEPR9135 HEPR9135 HEPR9135	RE 47 RE 47 RE 47	SK3088 SK3088 SK3088	RT-263 RT-263 RT-263	ECG109 ECG109 ECG109	1N60 1N60 1N60	WEP134 WEP134 WEP134	ZEN-430 ZEN-430 ZEN-430	
D16	1N60P 1N60 1N60	2000-318	1N60 1N60 1N60	PTC206 PTC2									

# PARTS LIST AND DESCRIPTION (CONTINUED)

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

## SEMICONDUCTORS (Select replacement transistor for best results) (cont)

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.	THORDARSON PART No.	WORKMAN PART No.	ZENITH PART No.
D41	1S2687D	2000-323	GEZD-9.1	ZB9.1A	HEPR2502	RE 114	SK3060	RT-240	ECG612	1N4739A	WEP200	ZEN-452
	1S2687				HEPR2502				ECG612		WEP200	ZEN-452
	1S2686				HEPR2502				ECG612		WEP200	ZEN-452
D43	1S2687D	2000-327	GEZD-9.1	ZB9.1A	HEPR2502	RE 114	SK3060	RT-240	ECG612	1N4739A	WEP200	ZEN-452
	1S2687				HEPR2502				ECG612		WEP200	ZEN-452
	1S2686				HEPR2502				ECG612		WEP200	ZEN-452
D44	C2092	2000-323	GEZD-9.1	ZB9.1A	HEPR2502	RE 114	SK3060	RT-240	ECG612	1N4739A	WEP1109	103-272
D45	1S2687D				HEPR2502				ECG612		WEP200	ZEN-452
	1S2687				HEPR2502				ECG612		WEP200	ZEN-452
D46	1S2686	2000-317	GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177	1N60	WEP1062	ZEN-430
	1S2473				HEPR0602				ECG177		WEP1062	ZEN-430
	1S1588				HEPR0602				ECG177		WEP1062	ZEN-430
D47	1S2472	2000-317	GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177	1N60	WEP1062	ZEN-430
	1S2472				HEPR0602				ECG177		WEP1062	ZEN-430
	1S1588				HEPR0602				ECG177		WEP1062	ZEN-430
D48	1N60P	2000-337	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109	1N60	WEP134	ZEN-430
	1N60				HEPR9135				ECG109		WEP134	ZEN-430
	1N60P				HEPR9135				ECG109		WEP134	ZEN-430
D49	1N60P	2000-337	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109	1N60	WEP134	ZEN-430
	1N60				HEPR9135				ECG109		WEP134	ZEN-430
	1N60				HEPR9135				ECG109		WEP134	ZEN-430
D50	1N60P	2000-318	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109	1N60	WEP134	ZEN-430
	1N60				HEPR9135				ECG109		WEP134	ZEN-430
	1N60				HEPR9135				ECG109		WEP134	ZEN-430
D51	MV1Y	2000-339	GE-300	PTC301	HEPR0602	RE 250	SK3100	RT-218	ECG601	1N4004	WEP1062	ZEN-430
D52	MV1Y				HEPR0602				ECG601		WEP1062	ZEN-430
D53	1S2473				HEPR0602				ECG601		WEP1062	ZEN-430
	1S1588	2000-317	GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177	1N4004	WEP1062	ZEN-430
	1S2472				HEPR0602				ECG177		WEP1062	ZEN-430
	SR1K2				HEPR0602				ECG177		WEP1062	ZEN-430
	G2B3	2000-320	GE-504A	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116	1N4004	WEP156	212-61
	S3V				HEPR0052				ECG116		WEP156	212-61
	1N60P				HEPR0052				ECG116		WEP156	212-61
D55	1N60P	2000-318	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109	1N60	WEP134	ZEN-430
	1N60				HEPR9135				ECG109		WEP134	ZEN-430
	1N60				HEPR9135				ECG109		WEP134	ZEN-430
D56	1S2473	2000-302	GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177	1N60	WEP1062	ZEN-430
	1S1588				HEPR0602				ECG177		WEP1062	ZEN-430
	1S2472				HEPR0602				ECG177		WEP1062	ZEN-430
D57	1S2473	2000-302	GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177	1N60	WEP1062	ZEN-430
	1S1588				HEPR0602				ECG177		WEP1062	ZEN-430
	1S2472				HEPR0602				ECG177		WEP1062	ZEN-430
D58	1S2473	2000-302	GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177	1N60	WEP1062	ZEN-430
	1S1588				HEPR0602				ECG177		WEP1062	ZEN-430
	1S2472				HEPR0602				ECG177		WEP1062	ZEN-430
D59	1N60P	2000-318	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109	1N60	WEP134	ZEN-430
	1N60				HEPR9135				ECG109		WEP134	ZEN-430
	1N60				HEPR9135				ECG109		WEP134	ZEN-430
D61	1S2473	2000-319	GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177	1N4004	WEP1062	ZEN-430
	1S1588				HEPR0602				ECG177		WEP1062	ZEN-430
	1S2472				HEPR0602				ECG177		WEP1062	ZEN-430
D62	1S2473	2000-319	GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177	1N4004	WEP1062	ZEN-430
	1S1588				HEPR0602				ECG177		WEP1062	ZEN-430
	1S2472				HEPR0602				ECG177		WEP1062	ZEN-430
D64	1S2473	2000-319	GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177	1N4004	WEP1062	ZEN-430
	1S1588				HEPR0602				ECG177		WEP1062	ZEN-430
	1S2472				HEPR0602				ECG177		WEP1062	ZEN-430
D65	1S2473	2000-319	GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177	1N4004	WEP1062	ZEN-430
	1S1588				HEPR0602				ECG177		WEP1062	ZEN-430
	1S2472				HEPR0602				ECG177		WEP1062	ZEN-430
D74	SR1K2	2000-320	GE-504A	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116	1N4004	WEP156	212-61
D75	1S2473				HEPR0052				ECG116		WEP156	212-61
	1S1588				HEPR0052				ECG116		WEP156	212-61
	1S2472	2000-319	GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177	1N4004	WEP1062	ZEN-430
D76	1S2473				HEPR0602				ECG177		WEP1062	ZEN-430
	1S1588				HEPR0602				ECG177		WEP1062	ZEN-430
	1S2472	2000-319	GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177	1N4004	WEP1062	ZEN-430
	1S1588				HEPR0602				ECG177		WEP1062	ZEN-430
	1S2473				HEPR0602				ECG177		WEP1062	ZEN-430
D84	1S2473	2000-319	GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177	1N4004	WEP1062	ZEN-430
	1S1588				HEPR0602				ECG177		WEP1062	ZEN-430
	1S2472				HEPR0602				ECG177		WEP1062	ZEN-430
D301	WZ061	2000-328	GEZD-6.2	ZM6.2B	HEPR0602	RE 109	SK3100	RT-237	ECG5013	1N4735A	WEP1414	ZEN-430
D302	BZ162				HEPR0602				ECG5013		WEP1414	ZEN-430
D406	S5VB10				HEPR0602				ECG5013		WEP1414	ZEN-430
D601	1N60P	2000-337	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109	1N60	WEP134	ZEN-430
	1N60				HEPR9135				ECG109		WEP134	ZEN-430
	1N60P				HEPR9135				ECG109		WEP134	ZEN-430
D602	1N60P	2000-337	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109	1N60	WEP134	ZEN-430
	1N60				HEPR9135				ECG109		WEP134	ZEN-430
	1N60				HEPR9135				ECG109		WEP134	ZEN-430
D603	1S2473	2000-319	GE-300	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177	1N60	WEP1062	ZEN-430
	1S1588				HEPR0602				ECG177		WEP1062	ZEN-430
	1S2472				HEPR0602				ECG177		WEP1062	ZEN-430
FET1	3SK45B	2000-102	GE-FET-4	PTC182	HEPF2004	RE 199	SK3050	RT-181	ECG222	1N60	WEP905	121-826
	3N201				HEPF2004				ECG222		WEP905	121-826
	3SK45				HEPF2004				ECG222		WEP905	121-826
FET2	3SK41	2000-102	GE-FET-4	PTC182	HEPF2004	RE 199	SK3050	RT-181	ECG222	1N60	WEP905	121-826
	2SK19BL				HEPF2004				ECG222		WEP905	121-826
	2N2338				HEPF2004				ECG222		WEP905	121-826
	JF1033	2000-105	GE-FET-2	PTC161	HEPF0021	RE 45	SK3116	RT-175	ECG312	1N60	WEP920	ZEN-123
	2SK19				HEPF0021				ECG312		WEP920	ZEN-123
	2SK33				HEPF0021				ECG312		WEP920	ZEN-123
FET3	2SK68A	2000-104	GE-FET-1	PTC151	HEPF0010	RE 46	SK3112	RT-176	ECG133	1N60	WEP801	ZEN-123
	2SK68				HEPF0010				ECG133		WEP801	ZEN-123
	2SK30A				HEPF0010				ECG133		WEP801	ZEN-123
FET4	2SK68AM	2000-104	GE-FET-1	PTC151	HEPF0010	RE 46	SK3112	RT-176	ECG133	1N60	WEP801	ZEN-123
	3SK45B				HEPF0010				ECG133		WEP801	ZEN-123
	3SK45				HEPF0010				ECG133		WEP801	ZEN-123
	3N201	2000-103	GE-FET-4	PTC182	HEPF2004	RE 199	SK3050	RT-181	ECG222	1N60	WEP905	121-826
	3SK40				HEPF2004				ECG222		WEP905	121-826
	3SK41				HEPF2004				ECG222		WEP905	121-826
FET5	3SK45-B-09	2000-103	GE-FET-4	PTC182	HEPF2004	RE 199	SK3050	RT-181	ECG222	1N60	WEP905	121-826
	2SK68A				HEPF2004				ECG222		WEP905	121-826
	2SK68				HEPF2004				ECG222		WEP905	121-826
	2SK30A	2000-104	GE-FET-1	PTC151	HEPF0010	RE 46	SK3112	RT-176	ECG133	1N60	WEP801	ZEN-123
	2SK68AM				HEPF0010				ECG133		WEP801	ZEN-123
	2SK68				HEPF0010				ECG133		WEP801	ZEN-123

# PARTS LIST AND DESCRIPTION (CONTINUED)

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

## SEMICONDUCTORS (Select replacement transistor for best results) (cont)

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.	THORDARSON PART No.	WORKMAN PART No.	ZENITH PART No.
FET6	2SK198L JF1033 2SK19	2000-105	GE-FET-2 PTC161	PTC161	HEPF0021	RE 45	SK3116	RT-175	ECG312		WEP920	ZEN-123
FET7	2SK19	2000-102	GE-FET-2	PTC161	HEPF0021	RE 45	SK3116	RT-175	ECG312		WEP920	ZEN-123
	2NJ33B		GE-FET-2	PTC161	HEPF0021	RE 45	SK3116	RT-175	ECG312		WEP920	ZEN-123
	3SK458		GE-FET-4	PTC182	HEPF2004	RE 199	SK3050	RT-181	ECG222		WEP905	121-826
	3N201		GE-FET-4	PTC182	HEPF2004	RE 199	SK3050	RT-181	ECG222		WEP905	121-826
	3SK45		GE-FET-4	PTC182	HEPF2004	RE 199	SK3050	RT-181	ECG222		WEP905	121-826
FET601	3SK40	2000-106	GE-FET-2	PTC161	HEPF0021	RE 45	SK3116	RT-175	ECG312		WEP905	121-826
	3SK41		GE-FET-2	PTC161	HEPF0021	RE 45	SK3116	RT-175	ECG312		WEP905	121-826
	JF1033G		GE-FET-2	PTC161	HEPF0021	RE 45	SK3116	RT-175	ECG312		WEP905	121-826
	JF1033		GE-FET-2	PTC161	HEPF0021	RE 45	SK3116	RT-175	ECG312		WEP905	121-826
	2SK19		GE-FET-2	PTC161	HEPF0021	RE 45	SK3116	RT-175	ECG312		WEP905	121-826
IC1	2NJ233B UPC577H NJM2201	2000-007	GE-FET-2 GEIC-140	PTC161 PTC161	HEPF0021 HEPF0021	RE 45-M RE 341-M	SK3116	RT-175	ECG312	UPC577H	WEP939	ZEN-123
IC2	MB3202 MC1496N MC1496A	2000-009	GEIC-140		HEPC6050G HEPC6050G	RE 341-M RE 341-M			ECG1082	UPC577H	WEP939	ZEN-123
IC3	LM1496N UPC592H2	2000-006							ECG1082			
IC4	TA7120P UPC1156H NJM2016	2000-005	GEIC-103			RE 340-M	SK3285		ECG1195			
IC5	MB3710 UHC005A	2000-011							ECG1087			
IC6	78L05A NJM78L05A	2000-004				RE 387-IC RE 387-IC			ECG1194			
IC7	78L05 UPD858 UPD858C	2000-001				RE 387-IC RE 387-IC			ECG1194			
TR1	25C945A 25C945	2000-235	GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG1198	25C945	WEP1945	121-Z9000
TR2	25C828		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG1198	25C945	WEP1945	121-Z9000
	25C1740		GE-61*	PTC121*	25C828	RE 192	SK3122	RT-302	ECG1198	25C828	WEP828	ZEN-119
	25C945AP		GE-62	PTC121*	HEPS0015*	RE 13*	SK3122	RT-109*	ECG123A*		WEP736*	121-972
	25A733P		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG1198	25C945	WEP1945	121-Z9000
TR3	25A495 25A564	2000-236	GE-48	PTC103*	25A733	RE 219	SK3138	RT-303	ECG294	25A733	WEP916	ZEN-106
TR4	25A495	2000-214	GE-48	PTC103*	25A733	RE 219	SK3138	RT-303	ECG294	25A733	WEP916	121-879
	25A564		GE-221*	PTC103*	25A495	RE 26*	SK3114	RT-303	ECG159*	25A495	WEP495	121-881
	25C1730L		GE-65	PTC103*	25A564	RE 193	SK3114	RT-303	ECG234	25A564	WEP564	121-881
	25C1730		GE-17*	PTC136*	HEPS0025*	RE 9	SK3018*	RT-107A	ECG107		WEP535	121-881
	25C945		GE-17*	PTC136*	HEPS0025*	RE 9	SK3018*	RT-107A	ECG107		WEP535	121-881
TR5	25C828	2000-235	GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG1198	25C945	WEP1945	121-Z9000
	25C1740		GE-61*	PTC121*	25C828	RE 192	SK3122	RT-302	ECG1198	25C828	WEP828	ZEN-119
	25C945AP		GE-62	PTC121*	HEPS0015*	RE 13*	SK3122	RT-109*	ECG123A*		WEP736*	121-972
	25C945A		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG1198	25C945	WEP1945	121-Z9000
	25C945		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG1198	25C945	WEP1945	121-Z9000
TR6	25C828	2000-214	GE-61*	PTC121*	25C828	RE 192	SK3122	RT-302	ECG1198	25C828	WEP828	ZEN-119
	25C1740		GE-62	PTC121*	HEPS0015*	RE 13*	SK3122	RT-109*	ECG123A*		WEP736*	121-972
	25C1730L		GE-17*	PTC136*	HEPS0025*	RE 9	SK3018*	RT-107A	ECG107		WEP535	121-881
	25C1730		GE-17*	PTC136*	HEPS0025*	RE 9	SK3018*	RT-107A	ECG107		WEP535	121-881
	25C460		GE-61*	PTC136*	25C460	RE 9	SK3018*	RT-134	ECG107	25C460	WEP460	121-722
TR7	25C930	2000-213	GE-60*	PTC136*	25C930	RE 9	SK3039*	RT-308	ECG229*	25C930	WEP956*	ZEN-127
	25C1675		GE-213	PTC139*	25C1675	RE 13*	SK3124	RT-308	ECG229*		WEP956*	ZEN-127
	25C1675L		GE-213	PTC139*	25C1675	RE 13*	SK3124	RT-308	ECG229*		WEP956*	ZEN-127
	25C1675		GE-213	PTC139*	25C1675	RE 13*	SK3124	RT-308	ECG229*		WEP956*	ZEN-127
	25C460		GE-61*	PTC136*	25C460	RE 9	SK3018*	RT-134	ECG107	25C460	WEP460	121-722
TR8	25C829	2000-213	GE-20*	PTC132*	25C829	RE 13*	SK3018*	RT-308	ECG123A*	25C829	WEP736*	ZEN-120
	25C829		GE-20*	PTC132*	25C829	RE 9*	SK3122	RT-308	ECG229*	25C829	WEP829	ZEN-127
	25C1675L		GE-213	PTC139*	25C1675	RE 13*	SK3124	RT-308	ECG229*		WEP956*	ZEN-127
	25C1675		GE-213	PTC139*	25C1675	RE 13*	SK3124	RT-308	ECG229*		WEP956*	ZEN-127
	25C460		GE-61*	PTC136*	25C460	RE 9	SK3018*	RT-134	ECG107	25C460	WEP460	121-722
TR9	25C839	2000-234	GE-61*	PTC132*	25C839	RE 13*	SK3018*	RT-308	ECG123A*	25C839	WEP736*	ZEN-120
	25C829		GE-20*	PTC121*	25C829	RE 9*	SK3122	RT-308	ECG229*	25C829	WEP829	ZEN-127
	25C839H		GE-61*	PTC132*	25C839	RE 13*	SK3018*	RT-308	ECG123A*	25C839	WEP736*	ZEN-120
	25C839		GE-61*	PTC132*	25C839	RE 13*	SK3018*	RT-308	ECG123A*	25C839	WEP736*	ZEN-120
	25C1675		GE-213	PTC139*	25C1675	RE 13*	SK3124	RT-308	ECG229*	25C839	WEP956*	ZEN-127
TR10	25C829	2000-234	GE-20*	PTC121*	25C829	RE 9*	SK3122	RT-308	ECG229*	25C829	WEP829	ZEN-127
	25C460		GE-61*	PTC136*	25C460	RE 9	SK3018*	RT-134	ECG107	25C460	WEP460	121-722
	25C839H		GE-61*	PTC132*	25C839	RE 13*	SK3018*	RT-308	ECG123A*	25C839	WEP736*	ZEN-120
	25C839		GE-61*	PTC132*	25C839	RE 13*	SK3018*	RT-308	ECG123A*	25C839	WEP736*	ZEN-120
	25C1675		GE-213	PTC139*	25C1675	RE 13*	SK3124	RT-308	ECG229*	25C839	WEP956*	ZEN-127
TR11	25C829	2000-234	GE-20*	PTC121*	25C829	RE 9*	SK3122	RT-308	ECG229*	25C829	WEP829	ZEN-127
	25C460		GE-61*	PTC136*	25C460	RE 9	SK3018*	RT-134	ECG107	25C460	WEP460	121-722
	25C839H		GE-61*	PTC132*	25C839	RE 13*	SK3018*	RT-308	ECG123A*	25C839	WEP736*	ZEN-120
	25C839		GE-61*	PTC132*	25C839	RE 13*	SK3018*	RT-308	ECG123A*	25C839	WEP736*	ZEN-120
	25C1675		GE-213	PTC139*	25C1675	RE 13*	SK3124	RT-308	ECG229*	25C839	WEP956*	ZEN-127
TR12	25C829	2000-235	GE-20*	PTC121*	25C829	RE 9*	SK3122	RT-308	ECG229*	25C829	WEP829	ZEN-127
	25C460		GE-61*	PTC136*	25C460	RE 9	SK3018*	RT-134	ECG107	25C460	WEP460	121-722
	25C945AP		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG1198	25C945	WEP1945	121-Z9000
	25C945A		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG1198	25C945	WEP1945	121-Z9000
	25C945		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG1198	25C945	WEP1945	121-Z9000
TR13	25C828	2000-235	GE-61*	PTC121*	25C828	RE 192	SK3122	RT-302	ECG1198	25C828	WEP828	ZEN-119
	25C1740		GE-62	PTC121*	HEPS0015*	RE 13*	SK3122	RT-109*	ECG123A*		WEP736*	121-972
	25C945AP		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG1198	25C945	WEP1945	121-Z9000
	25C945A		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG1198	25C945	WEP1945	121-Z9000
	25C945		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG1198	25C945	WEP1945	121-Z9000

PRESIDENT MODEL MADISON

# PARTS LIST AND DESCRIPTION (CONTINUED)

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

## SEMICONDUCTORS (Select replacement transistor for best results) (cont)

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.	THORDARSON PART No.	WORKMAN PART No.	ZENITH PART No.
TR13	25C945AP	2000-235	GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C945A		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C945		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C828		GE-61*	PTC121*	25C828	RE 192	SK3122	RT-302	ECG199	25C828	WEP828	ZEN-119
	25C1740		GE-62	PTC121*	HEPS0015*	RE 13*	SK3122	RT-109*	ECG123A*		WEP736*	121-972
TR14	25C945AP	2000-235	GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C945A		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C945		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C828		GE-61*	PTC121*	25C828	RE 192	SK3122	RT-302	ECG199	25C828	WEP828	ZEN-119
	25C1740		GE-62	PTC121*	HEPS0015*	RE 13*	SK3122	RT-109*	ECG123A*		WEP736*	121-972
TR15	25C458	2000-235	GE-210*	PTC121*	25C458	RE 13*	SK3124	RT-187	ECG123A*	25C458	WEP458	ZEN-114
	25C900		GE-62	PTC139*	25C900	RE 192	SK3124	RT-302	ECG199	25C900	WEP66	ZEN-119
	25C372		GE-61*	PTC121*	25C372	RE 13*	SK3122	RT-308	ECG123A*	25C372	WEP372	ZEN-114
	25C945AP		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C945A		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
TR16	25C945	2000-235	GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C828		GE-61*	PTC121*	25C828	RE 192	SK3122	RT-302	ECG199	25C828	WEP828	ZEN-119
	25C1740		GE-62	PTC121*	HEPS0015*	RE 13*	SK3122	RT-109*	ECG123A*		WEP736*	121-972
	25C458		GE-210*	PTC121*	25C458	RE 13*	SK3124	RT-187	ECG123A*	25C458	WEP458	ZEN-114
	25C900		GE-62	PTC139*	25C900	RE 192	SK3124	RT-302	ECG199	25C900	WEP66	ZEN-119
TR17	25C372	2000-236	GE-61*	PTC121*	25C372	RE 13*	SK3122	RT-308	ECG123A*	25C372	WEP372	ZEN-114
	25A733P		GE-48	PTC103*	25A733	RE 219	SK3138	RT-303	ECG294	25A733	WEP916	
	25A733		GE-48	PTC103*	25A733	RE 219	SK3138	RT-303	ECG294	25A733	WEP916	
	25A495		GE-221*	PTC103*	25A495	RE 26*	SK3114	RT-303	ECG159*	25A495	WEP495	ZEN-106
	25A564		GE-65	PTC103*	25A564	RE 193	SK3114	RT-303	ECG234	25A564	WEP564	121-879
TR18	25C945AP	2000-235	GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C945A		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C945		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C828		GE-61*	PTC121*	25C828	RE 192	SK3122	RT-302	ECG199	25C828	WEP828	ZEN-119
	25C1740		GE-62	PTC121*	HEPS0015*	RE 13*	SK3122	RT-109*	ECG123A*		WEP736*	121-972
TR19	25C458	2000-236	GE-210*	PTC121*	25C458	RE 13*	SK3124	RT-187	ECG123A*	25C458	WEP458	ZEN-114
	25C900		GE-62	PTC139*	25C900	RE 192	SK3124	RT-302	ECG199	25C900	WEP66	ZEN-119
	25C372		GE-61*	PTC121*	25C372	RE 13*	SK3122	RT-308	ECG123A*	25C372	WEP372	ZEN-114
	25A733P		GE-48	PTC103*	25A733	RE 219	SK3138	RT-303	ECG294	25A733	WEP916	
	25A733		GE-48	PTC103*	25A733	RE 219	SK3138	RT-303	ECG294	25A733	WEP916	
TR20	25A495	2000-235	GE-221*	PTC103*	25A495	RE 26*	SK3114	RT-303	ECG159*	25A495	WEP495	ZEN-106
	25A564		GE-65	PTC103*	25A564	RE 193	SK3114	RT-303	ECG234	25A564	WEP564	121-879
	25C945AP		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C945A		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C945		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
TR21	25C828	2000-235	GE-61*	PTC121*	25C828	RE 192	SK3122	RT-302	ECG199	25C828	WEP828	ZEN-119
	25C1740		GE-62	PTC121*	HEPS0015*	RE 13*	SK3122	RT-109*	ECG123A*		WEP736*	121-972
	25C458		GE-210*	PTC121*	25C458	RE 13*	SK3124	RT-187	ECG123A*	25C458	WEP458	ZEN-114
	25C900		GE-62	PTC139*	25C900	RE 192	SK3124	RT-302	ECG199	25C900	WEP66	ZEN-119
	25C372		GE-61*	PTC121*	25C372	RE 13*	SK3122	RT-308	ECG123A*	25C372	WEP372	ZEN-114
TR22	25C945AP	2000-235	GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C945A		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C945		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C828		GE-61*	PTC121*	25C828	RE 192	SK3122	RT-302	ECG199	25C828	WEP828	ZEN-119
	25C1740		GE-62	PTC121*	HEPS0015*	RE 13*	SK3122	RT-109*	ECG123A*		WEP736*	121-972
TR23	25C458	2000-235	GE-210*	PTC121*	25C458	RE 13*	SK3124	RT-187	ECG123A*	25C458	WEP458	ZEN-114
	25C900		GE-62	PTC139*	25C900	RE 192	SK3124	RT-302	ECG199	25C900	WEP66	ZEN-119
	25C372		GE-61*	PTC121*	25C372	RE 13*	SK3122	RT-308	ECG123A*	25C372	WEP372	ZEN-114
	25C945AP		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C945A		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
TR24	25C945	2000-235	GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C828		GE-61*	PTC121*	25C828	RE 192	SK3122	RT-302	ECG199	25C828	WEP828	ZEN-119
	25C1740		GE-62	PTC121*	HEPS0015*	RE 13*	SK3122	RT-109*	ECG123A*		WEP736*	121-972
	25C458		GE-210*	PTC121*	25C458	RE 13*	SK3124	RT-187	ECG123A*	25C458	WEP458	ZEN-114
	25C900		GE-62	PTC139*	25C900	RE 192	SK3124	RT-302	ECG199	25C900	WEP66	ZEN-119
TR25	25C372	2000-216	GE-61*	PTC121*	25C372	RE 13*	SK3122	RT-308	ECG123A*	25C372	WEP372	ZEN-114
	25C1419B		GE-66	PTC167	HEPS5027	RE 21	SK3054	RT-197	ECG152		WEP745	
	25D325		GE-28	PTC110	25D325	RE 42	SK3197	RT-197	ECG186	25D325	WEP751	
	25C1096		GE-28	PTC110	25C1096	RE 42	SK3197	RT-166	ECG186A	25C1096	WEP1096	
	25D235		GE-66		25D235	RE 21	SK3054	RT-197	ECG152	25D235	WEP745	
TR26	25C1419	2000-235	GE-66	PTC167	HEPS5027	RE 21	SK3054	RT-197	ECG152		WEP745	
	25C945AP		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C945A		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C945		GE-212	PTC121*	25C945	RE 192	SK3124	RT-107A	ECG199	25C945	WEP1945	121-Z9000
	25C828		GE-61*	PTC121*	25C828	RE 192	SK3122	RT-302	ECG199	25C828	WEP828	ZEN-119
TR27	25C1740	2000-213	GE-62	PTC121*	HEPS0015*	RE 13*	SK3122	RT-109*	ECG123A*		WEP736*	121-972
	25C458		GE-210*	PTC121*	25C458	RE 13*	SK3124	RT-187	ECG123A*	25C458	WEP458	ZEN-114
	25C900		GE-62	PTC139*	25C900	RE 192	SK3124	RT-302	ECG199	25C900	WEP66	ZEN-119
	25C372		GE-61*	PTC121*	25C372	RE 13*	SK3122	RT-308	ECG123A*	25C372	WEP372	ZEN-114
	25C1675L		GE-213	PTC139*	25C1675	RE 13*	SK3124	RT-308	ECG229*		WEP956*	ZEN-127
TR28	25C1675L	2000-213	GE-213	PTC139*	25C1675	RE 13*	SK3124	RT-308	ECG229*		WEP956*	ZEN-127
	25C1675		GE-213	PTC139*	25C1675	RE 13*	SK3124	RT-308	ECG229*		WEP956*	ZEN-127
	25C460		GE-61*	PTC136*	25C460	RE 9	SK3018*	RT-134	ECG107	25C460	WEP460	121-722
	25C839		GE-61*	PTC132*	25C839	RE 13*	SK3018*	RT-308	ECG123A*	25C839	WEP736*	ZEN-120
	25C829		GE-20*	PTC121*	25C829	RE 9*	SK3122	RT-308	ECG229*	25C829	WEP829	ZEN-127

# PARTS LIST AND DESCRIPTION (CONTINUED)

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

## SEMICONDUCTORS (Select replacement transistor for best results) (cont)

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.	THORDARSON PART No.	WORKMAN PART No.	ZENITH PART No.
TR29A	2SC945AP	2000-235	GE-212	PTC121*	2SC945	RE 192	SK3124	RT-107A	ECG199	2SC945	WEP1945	121-Z9000
	2SC945A		GE-212	PTC121*	2SC945	RE 192	SK3124	RT-107A	ECG199	2SC945	WEP1945	121-Z9000
	2SC945		GE-212	PTC121*	2SC945	RE 192	SK3124	RT-107A	ECG199	2SC945	WEP1945	121-Z9000
	2SC828		GE-61*	PTC121*	2SC828	RE 192	SK3122	RT-302	ECG199	2SC828	WEP828	ZEN-119
	2SC1740		GE-62	PTC121*	HEPS0015*	RE 13*	SK3122	RT-109*	ECG123A*		WEP736*	121-972
	2SC458		GE-210*	PTC121*	2SC458	RE 13*	SK3124	RT-187	ECG123A*	2SC458	WEP458	ZEN-114
	2SC900		GE-62	PTC139*	2SC900	RE 192	SK3124	RT-302	ECG199	2SC900	WEP66	ZEN-119
	2SC372		GE-61*	PTC121*	2SC372	RE 13*	SK3122	RT-308	ECG123A*	2SC372	WEP372	ZEN-114
	2SC945AP		GE-212	PTC121*	2SC945	RE 192	SK3124	RT-107A	ECG199	2SC945	WEP1945	121-Z9000
	2SC945A		GE-212	PTC121*	2SC945	RE 192	SK3124	RT-107A	ECG199	2SC945	WEP1945	121-Z9000
TR29B	2SC945A	2000-235	GE-212	PTC121*	2SC945	RE 192	SK3124	RT-107A	ECG199	2SC945	WEP1945	121-Z9000
	2SC945		GE-212	PTC121*	2SC945	RE 192	SK3124	RT-107A	ECG199	2SC945	WEP1945	121-Z9000
	2SC828		GE-61*	PTC121*	2SC828	RE 192	SK3122	RT-302	ECG199	2SC828	WEP828	ZEN-119
	2SC1740		GE-62	PTC121*	HEPS0015*	RE 13*	SK3122	RT-109*	ECG123A*		WEP736*	121-972
	2SC458		GE-210*	PTC121*	2SC458	RE 13*	SK3124	RT-187	ECG123A*	2SC458	WEP458	ZEN-114
	2SC900		GE-62	PTC139*	2SC900	RE 192	SK3124	RT-302	ECG199	2SC900	WEP66	ZEN-119
	2SC372		GE-61*	PTC121*	2SC372	RE 13*	SK3122	RT-308	ECG123A*	2SC372	WEP372	ZEN-114
	2SC839H		GE-61*	PTC132*	2SC839	RE 13*	SK3018*	RT-308	ECG123A*	2SC839	WEP736*	121-Z9000
	2SC1675L		GE-213	PTC139*	2SC1675	RE 13*	SK3124	RT-308	ECG229*	2SC839	WEP956*	ZEN-127
	2SC1675		GE-213	PTC139*	2SC1675	RE 13*	SK3124	RT-308	ECG229*	2SC839	WEP956*	ZEN-127
TR30	2SC460	2000-234	GE-61*	PTC136*	2SC460	RE 9	SK3018*	RT-134	ECG107	2SC460	WEP460	121-722
	2SC839		GE-61*	PTC132*	2SC839	RE 13*	SK3018*	RT-308	ECG123A*	2SC839	WEP736*	ZEN-120
	2SC829		GE-20*	PTC121*	2SC829	RE 9*	SK3122	RT-308	ECG229*	2SC829	WEP829	ZEN-127
	2SC839H		GE-61*	PTC132*	2SC839	RE 13*	SK3018*	RT-308	ECG123A*	2SC839	WEP736*	ZEN-120
	2SC1675L		GE-213	PTC139*	2SC1675	RE 13*	SK3124	RT-308	ECG229*	2SC1675	WEP956*	ZEN-127
	2SC1675		GE-213	PTC139*	2SC1675	RE 13*	SK3124	RT-308	ECG229*	2SC1675	WEP956*	ZEN-127
	2SC460		GE-61*	PTC136*	2SC460	RE 9	SK3018*	RT-134	ECG107	2SC460	WEP460	121-722
	2SC839		GE-61*	PTC132*	2SC839	RE 13*	SK3018*	RT-308	ECG123A*	2SC839	WEP736*	ZEN-120
	2SC829		GE-20*	PTC121*	2SC829	RE 9*	SK3122	RT-308	ECG229*	2SC829	WEP829	ZEN-127
	2SC839H		GE-61*	PTC132*	2SC839	RE 13*	SK3018*	RT-308	ECG123A*	2SC839	WEP736*	ZEN-120
TR31	2SC1675L	2000-234	GE-213	PTC139*	2SC1675	RE 13*	SK3124	RT-308	ECG229*	2SC1675	WEP956*	ZEN-127
	2SC1675		GE-213	PTC139*	2SC1675	RE 13*	SK3124	RT-308	ECG229*	2SC1675	WEP956*	ZEN-127
	2SC460		GE-61*	PTC136*	2SC460	RE 9	SK3018*	RT-134	ECG107	2SC460	WEP460	121-722
	2SC839		GE-61*	PTC132*	2SC839	RE 13*	SK3018*	RT-308	ECG123A*	2SC839	WEP736*	ZEN-120
	2SC829		GE-20*	PTC121*	2SC829	RE 9*	SK3122	RT-308	ECG229*	2SC829	WEP829	ZEN-127
	2SC945AP		GE-212	PTC121*	2SC945	RE 192	SK3124	RT-107A	ECG199	2SC945	WEP1945	121-Z9000
	2SC945A		GE-212	PTC121*	2SC945	RE 192	SK3124	RT-107A	ECG199	2SC945	WEP1945	121-Z9000
	2SC945		GE-212	PTC121*	2SC945	RE 192	SK3124	RT-107A	ECG199	2SC945	WEP1945	121-Z9000
	2SC828		GE-61*	PTC121*	2SC828	RE 192	SK3122	RT-302	ECG199	2SC828	WEP828	ZEN-119
	2SC1740		GE-62	PTC121*	HEPS0015*	RE 13*	SK3122	RT-109*	ECG123A*		WEP736*	121-972
TR32	2SC458	2000-235	GE-210*	PTC121*	2SC458	RE 13*	SK3124	RT-187	ECG123A*	2SC458	WEP458	ZEN-114
	2SC900		GE-62	PTC139*	2SC900	RE 192	SK3124	RT-302	ECG199	2SC900	WEP66	ZEN-119
	2SC372		GE-61*	PTC121*	2SC372	RE 13*	SK3122	RT-308	ECG123A*	2SC372	WEP372	ZEN-114
	2SC1675L		GE-213	PTC139*	2SC1675	RE 13*	SK3124	RT-308	ECG229*	2SC1675	WEP956*	ZEN-127
	2SC1675		GE-213	PTC139*	2SC1675	RE 13*	SK3124	RT-308	ECG229*	2SC1675	WEP956*	ZEN-127
	2SC839		GE-61*	PTC132*	2SC839	RE 13*	SK3018*	RT-308	ECG123A*	2SC839	WEP736*	ZEN-120
	2SC829		GE-20*	PTC121*	2SC829	RE 9*	SK3122	RT-308	ECG229*	2SC829	WEP829	ZEN-127
	2SC460		GE-61*	PTC136*	2SC460	RE 9	SK3018*	RT-134	ECG107	2SC460	WEP460	121-722
	2SC458C		GE-210*	PTC121*	2SC458	RE 13*	SK3124	RT-187	ECG123A*	2SC458	WEP458	ZEN-114
	2SC458		GE-210*	PTC121*	2SC458	RE 13*	SK3124	RT-187	ECG123A*	2SC458	WEP458	ZEN-114
TR34	2SC945AP	2000-213	GE-212	PTC121*	2SC945	RE 192	SK3124	RT-107A	ECG199	2SC945	WEP1945	121-Z9000
	2SC945A		GE-212	PTC121*	2SC945	RE 192	SK3124	RT-107A	ECG199	2SC945	WEP1945	121-Z9000
	2SC945		GE-212	PTC121*	2SC945	RE 192	SK3124	RT-107A	ECG199	2SC945	WEP1945	121-Z9000
	2SC828		GE-61*	PTC121*	2SC828	RE 192	SK3122	RT-302	ECG199	2SC828	WEP828	ZEN-119
	2SC1740		GE-62	PTC121*	HEPS0015*	RE 13*	SK3122	RT-109*	ECG123A*		WEP736*	121-972
	2SC458		GE-210*	PTC121*	2SC458	RE 13*	SK3124	RT-187	ECG123A*	2SC458	WEP458	ZEN-114
	2SC900		GE-62	PTC139*	2SC900	RE 192	SK3124	RT-302	ECG199	2SC900	WEP66	ZEN-119
	2SC372		GE-61*	PTC121*	2SC372	RE 13*	SK3122	RT-308	ECG123A*	2SC372	WEP372	ZEN-114
	2SC1675L		GE-213	PTC139*	2SC1675	RE 13*	SK3124	RT-308	ECG229*	2SC1675	WEP956*	ZEN-127
	2SC1675		GE-213	PTC139*	2SC1675	RE 13*	SK3124	RT-308	ECG229*	2SC1675	WEP956*	ZEN-127
TR35	2SC839	2000-213	GE-61*	PTC132*	2SC839	RE 13*	SK3018*	RT-308	ECG123A*	2SC839	WEP736*	ZEN-120
	2SC829		GE-20*	PTC121*	2SC829	RE 9*	SK3122	RT-308	ECG229*	2SC829	WEP829	ZEN-127
	2SC460		GE-61*	PTC136*	2SC460	RE 9	SK3018*	RT-134	ECG107	2SC460	WEP460	121-722
	2SC945AP		GE-212	PTC121*	2SC945	RE 192	SK3124	RT-107A	ECG199	2SC945	WEP1945	121-Z9000
	2SC945A		GE-212	PTC121*	2SC945	RE 192	SK3124	RT-107A	ECG199	2SC945	WEP1945	121-Z9000
	2SC945		GE-212	PTC121*	2SC945	RE 192	SK3124	RT-107A	ECG199	2SC945	WEP1945	121-Z9000
	2SC828		GE-61*	PTC121*	2SC828	RE 192	SK3122	RT-302	ECG199	2SC828	WEP828	ZEN-119
	2SC1740		GE-62	PTC121*	HEPS0015*	RE 13*	SK3122	RT-109*	ECG123A*		WEP736*	121-972
	2SC900		GE-62	PTC139*	2SC900	RE 192	SK3124	RT-302	ECG199	2SC900	WEP66	ZEN-119
	2SC372		GE-61*	PTC121*	2SC372	RE 13*	SK3122	RT-308	ECG123A*	2SC372	WEP372	ZEN-114
TR38	2SC1675L	2000-213	GE-213	PTC139*	2SC1675	RE 13*	SK3124	RT-308	ECG229*	2SC1675	WEP956*	ZEN-127
	2SC1675		GE-213	PTC139*	2SC1675	RE 13*	SK3124	RT-308	ECG229*	2SC1675	WEP956*	ZEN-127
	2SC839		GE-61*	PTC132*	2SC839	RE 13*	SK3018*	RT-308	ECG123A*	2SC839	WEP736*	ZEN-120
	2SC829		GE-20*	PTC121*	2SC829	RE 9*	SK3122	RT-308	ECG229*	2SC829	WEP829	ZEN-127
	2SC460		GE-61*	PTC136*	2SC460	RE 9	SK3018*	RT-134	ECG107	2SC460	WEP460	121-722
	2SC945AP		GE-212	PTC121*	2SC945	RE 192	SK3124	RT-107A	ECG199	2SC945	WEP1945	121-Z9000
	2SC945A		GE-212	PTC121*	2SC945	RE 192	SK3124	RT-107A	ECG199	2SC945	WEP1945	121-Z9000
	2SC945		GE-212	PTC121*	2SC945	RE 192	SK3124	RT-107A	ECG199	2SC945	WEP1945	121-Z9000
	2SC828		GE-61*	PTC121*	2SC828	RE 192	SK3122	RT-302	ECG199	2SC828	WEP828	ZEN-119
	2SC1740		GE-62	PTC121*	HEPS0015*	RE 13*	SK3122	RT-109*	ECG123A*		WEP736*	121-972
TR39	2SC900	2000-213	GE-62	PTC139*	2SC900	RE 192	SK3124	RT-302	ECG199	2SC900	WEP66	ZEN-119
	2SC372		GE-61*	PTC121*	2SC372	RE 13*	SK3122	RT-308	ECG123A*	2SC372	WEP372	ZEN-114
	2SC1675L		GE-213	PTC139*	2SC1675	RE 13*	SK3124	RT-308	ECG229*	2SC1675	WEP956*	ZEN-127
	2SC1675		GE-213	PTC139*	2SC1675	RE 13*	SK3124	RT-308	ECG229*	2SC1675	WEP956*	ZEN-127
	2SC839		GE-61*	PTC132*	2SC839	RE 13*	SK3018*	RT-308	ECG123A*	2SC839	WEP736*	ZEN-120
	2SC829		GE-20*	PTC121*	2SC829	RE 9*	SK3122	RT-308	ECG229*	2SC829	WEP829	ZEN-127
	2SC460		GE-61*	PTC136*	2SC460	RE 9	SK3018*	RT-134	ECG107	2SC460	WEP460	121-722
	2SC945AP		GE-212	PTC121*	2SC945	RE 192	SK3124	RT-107A	ECG199	2SC945	WEP1945	121-Z900

## PARTS LIST AND DESCRIPTION (CONTINUED)

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

### SEMICONDUCTORS (Select replacement transistor for best results)(cont)

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.	THORDARSON PART No.	WORKMAN PART No.	ZENITH PART No.
TR302	2SC1419B (16)	2000-216	GE-66	PTC167	HEPS5027	RE 21	SK3054	RT-197	ECG152		WEP745	
TR401	2SC1419	2000-221	GE-66	PTC167	HEPS5027	RE 21	SK3054	RT-197	ECG152		WEP745	
	2SC1618		GE-14	PTC140	HEPS7004	RE 19	SK3027	RT-131	ECG130		WEP704	
	2SC1777		GE-14	PTC140	HEPS7004	RE 19	SK3027	RT-131	ECG130		WEP704	
	2SD188		GE-75	PTC118	HEPS7004	RE 29	SK3029	RT-131	ECG130		WEP704	
TR402	2SC1618B	2000-216	GE-14	PTC140	HEPS7004	RE 19	SK3027	RT-131	ECG130		WEP704	
	2SC1419		GE-66	PTC167	HEPS5027	RE 21	SK3054	RT-197	ECG152		WEP745	
	2SD325		GE-28	PTC110	2SD325	RE 42	SK3197	RT-197	ECG186	2SD325	WEP751	
	2SC1096		GE-28	PTC110	2SC1096	RE 42	SK3197	RT-166	ECG186A	2SC1096	WEP1096	
TR403	2SD235	2000-216	GE-66	PTC167	HEPS5027	RE 21	SK3054	RT-197	ECG152	2SD235	WEP745	
	2SC1419B		GE-66	PTC167	HEPS5027	RE 21	SK3054	RT-197	ECG152		WEP745	
	2SC1419		GE-66	PTC167	HEPS5027	RE 21	SK3054	RT-197	ECG152		WEP745	
	2SD325		GE-28	PTC110	2SD325	RE 42	SK3197	RT-197	ECG186	2SD325	WEP751	
TR601	2SC1096	2000-213	GE-28	PTC110	2SC1096	RE 42	SK3197	RT-166	ECG186A	2SC1096	WEP1096	
	2SD235		GE-66	PTC139*	2SD235	RE 21	SK3054	RT-197	ECG152	2SD235	WEP745	
	2SC1675L		GE-213	PTC139*	2SC1675	RE 13*	SK3124	RT-308	ECG229*		WEP956*	ZEN-127
	2SC1675		GE-213	PTC139*	2SC1675	RE 13*	SK3124	RT-308	ECG229*		WEP956*	ZEN-127
	2SC839		GE-61*	PTC132*	2SC839	RE 13*	SK3018*	RT-308	ECG123A*	2SC839	WEP736*	ZEN-120
	2SC829		GE-20*	PTC121*	2SC829	RE 9*	SK3122	RT-308	ECG229*	2SC829	WEP829	ZEN-127
	2SC460		GE-61*	PTC136*	2SC460	RE 9	SK3018*	RT-134	ECG107	2SC460	WEP460	121-722

(14) 25 Watt @ 8.0 Amp.

(15) 12 Watt @ 3.0 Amp.

(16) 20 Watt @ 2.0 Amp.

### ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA				
		MFR. PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
					Q-LINE	GENERAL LINE
C14	33 10V	1800-323	PC30-25	VTT33B10	QV1-61	EV-1125
C17B	2.2 25V	1800-603		TDC225M035FL		SD35-2R29
C35	1 50V	1800-302	PC1-50	VTT1A50	QV1-11	EV-1615
C39	.1 16V	1800-501		TDC104M050EL	QDT1-2	SD50-R109
C42	10 16V	1800-306	PC10-25	VTT10B25	QV1-41	EV-1222
C43	10 16V	1800-306	PC10-25	VTT10B25	QV1-41	EV-1222
C44	4.7 25V	1800-304	PC5-50	VTT4R7B50	QV1-27	EV-1319
C47	47 10V	1800-316	PC50-16	VTT47D16	QV1-73	EV-1226
C49	47 10V	1800-316	PC50-16	VTT47D16	QV1-73	EV-1226
C50	47 10V	1800-316	PC50-16	VTT47D16	QV1-73	EV-1226
C52	1 25V	1800-606		TDC105M035EL		SD35-19
C55	2.2 25V	1800-303	PC2-100	VTT2R2A50	QV1-19	EV-1517
C58	1 50V	1800-302	PC1-50	VTT1A50	QV1-11	EV-1615
C59	47 10V	1800-316	PC50-16	VTT47D16	QV1-73	EV-1226
C60	.1 16V	1800-501		TDC104M050EL	QDT1-2	SD50-R109
C63	10 16V	1800-306	PC10-25	VTT10B25	QV1-41	EV-1222
C66	47 10V	1800-316	PC50-16	VTT47D16	QV1-73	EV-1226
C67	4.7 25V	1800-304	PC5-50	VTT4R7B50	QV1-27	EV-1319
C68	4.7 25V	1800-304	PC5-50	VTT4R7B50	QV1-27	EV-1319
C69	10 16V	1800-306	PC10-25	VTT10B25	QV1-41	EV-1222
C76	47 10V	1800-316	PC50-16	VTT47D16	QV1-73	EV-1226
C77	.47 50V	1800-301	PC1-50	VTT4R7A63	QV1-3	EV-1610
C78	.47 50V	1800-301	PC1-50	VTT4R7A63	QV1-3	EV-1610
C79	.47 50V	1800-301	PC1-50	VTT4R7A63	QV1-3	EV-1610
C81	220 16V	1800-314	PC250-25	VTT220H16	QV1-117	EV-1240
C84	1 50V	1800-302	PC1-50	VTT1A50	QV1-11	EV-1615
C87	10 16V	1800-306	PC10-25	VTT10B25	QV1-41	EV-1222
C88	4.7 25V	1800-607		TDC475M010EL	QDT1-48	SD10-4R79
C89	33 16V	1800-307	PC30-25	VTT33D25	QV1-63	EV-1325
C92	33 16V	1800-307	PC30-25	VTT33D25	QV1-63	EV-1325
C94	470 16V	1800-309	PC500-16	VTT470K16	QV1-151	EV-1250
C95	470 16V	1800-309	PC500-16	VTT470K16	QV1-151	EV-1250
C97	4.7 25V	1800-304	PC5-50	VTT4R7B50	QV1-27	EV-1319
C98	1 50V	1800-302	PC1-50	VTT1A50	QV1-11	EV-1615
C99	10 16V	1800-306	PC10-25	VTT10B25	QV1-41	EV-1222
C101	100 10V	1800-310	PC100-10	VTT100E10	QV1-93	EV-1130
C102	220 10V	1800-325	PC250-10	VTT220F10	QV1-115	EV-1140
C103	470 10V	1800-327	PC500-16	VTT470K16	QV1-149	EV-1150
C104	330 10V	1800-326	WBR300-35	VTT330G10	QV1-131	EV-1145
C107	1000 16V	1800-328	PC1000-16	VTT1000L16	QV1-183	EV-1260
C110	.1 16V	1800-501		TDC104M050EL	QDT1-2	SD50-R109
C120	47 10V	1800-316	PC50-16	VTT47D16	QV1-73	EV-1226
C126	1 50V	1800-302	PC1-50	VTT1A50	QV1-11	EV-1615
C135	220 10V	1800-325	PC250-10	VTT220F10	QV1-115	EV-1140
C140	10 6.3V	1800-602		TDC106M025FL	QDT1-64	SD25-109
C141	10 6.3V	1800-602		TDC106M025FL	QDT1-64	SD25-109
C158	1 50V	1800-302	PC1-50	VTT1A50	QV1-11	EV-1615
C199	1 50V	1800-302	PC1-50	VTT1A50	QV1-11	EV-1615
C211	2.2 25V	1800-303	PC2-100	VTT2R2A50	QV1-19	EV-1517
C218	4.7 25V	1800-304	PC5-50	VTT4R7B50	QV1-27	EV-1319
C224	1 50V	1800-302	PC1-50	VTT1A50	QV1-11	EV-1615
C226	1 50V	1800-302	PC1-50	VTT1A50	QV1-11	EV-1615
C302	220 16V	1800-314	PC250-25	VTT220H16	QV1-117	EV-1240
C304	3300 25V	1800-329	WBR3000-35	TC2530		TVA-1214
C605	.1 16V	1800-501		TDC104M050EL	QDT1-2	SD50-R109

# PARTS LIST AND DESCRIPTION (CONTINUED)

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

## CAPACITORS (cont)

ITEM No.	RATING	MFG. PART No.	REPLACEMENT DATA				
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
						Q-LINE	GENERAL LINE
C1	39 NPO 50V				CN0439		10TCC-Q39
C2	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C4	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C5	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C6	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C7	47 NPO 50V		DTZ-47	NP047	CN0447		10TCC-Q47
C8	100 50V		DD-101	GP100	GP310		10TS-T10
C9	.001 50V		DD-102G	GP1000	GP210	QC2-81	5GA-D10
C10	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C11	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C12	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C13	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C15	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C16	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C17A	.01 50V			WMF1S1	EWFA110	QF1-91	1PB-S10
C18	.039 50V			DPMS6S39	PVC6139		6PS-S39
C19	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C20	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C21	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C22	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C23	.022 50V			DPMS2S22	EWFA122	QF1-127	1PB-S22
C24	56 NPO 50V				CN0456		10TCC-Q56
C25	.039 50V			DPMS6S39	PVC6139		6PS-S39
C26	.039 50V			DPMS6S39	PVC6139		6PS-S39
C27	.039 50V			DPMS6S39	PVC6139		6PS-S39
C28	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C29	.039 50V			DPMS6S39	PVC6139		6PS-S39
C30	.039 50V			DPMS6S39	PVC6139		6PS-S39
C31	.039 50V			DPMS6S39	PVC6139		6PS-S39
C32	5 NPO 50V		DTZ-4R7	NP04P7	CN0547		10TCC-V47
C33	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C34	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C36	5 NPO 50V		DTZ-4R7	NP04P7	CN0547		10TCC-V47
	3 50V	(1)	DTZ-3R3	NP03P3	CN0533		10TCC-V33
C37	7 NPO 50V	(1)	DTZ-6R8	NP06P8	CN0568		10TCC-V68
	2 50V		DTZ-2R2	NP02P2	CN0522		10TCC-V22
C38	330 N750 50V		DTN-330	N330	CN7333		10TCU-T33
C40	.039 50V			DPMS6S39	PVC6139		6PS-S39
C41	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C45	47 NPO 50V		DTZ-47	NP047	CN0447		10TCC-Q47
C46	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C51	.022 50V			DPMS2S22	EWFA122	QF1-127	1PB-S22
C54	22 NPO 50V		DTZ-22	NP022	CN0422		10TCC-Q22
C57	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C61	.047 50V			DPMS2S47	EWFA147	QF1-171	1PB-S47
C62	.047 50V			DPMS2S47	EWFA147	QF1-171	1PB-S47
C64	.039 50V			DPMS6S39	PVC6139		6PS-S39
C71	.068 50V			WMF1S68	EWFA168	QF1-195	1PB-S68
C72	.022 50V			DPMS2S22	EWFA122	QF1-127	1PB-S22
C73	.1 50V			DPMS2P1	EWFA010	QF1-215	1PB-P10
C74	.022 50V			DPMS2S22	EWFA122	QF1-127	1PB-S22
C75	.1 50V			DPMS2P1	EWFA010	QF1-215	1PB-P10
C80	.0068 50V			DPMS6S12	PVC6112		6PS-S12
	.01 50V	(1)	DC-103	MGP01	TA110	QC2-141	TG-S10
C82	.047 50V	(1)		DPMS2S47	EWFA147	QF1-171	1PB-S47
	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C83	.01 50V			WMF1S1	EWFA110	QF1-91	1PB-S10
C85	.039 50V			DPMS6S39	PVC6139		6PS-S39
C86	.022 50V			DPMS2S22	EWFA122	QF1-127	1PB-S22
C91	.1 50V			DPMS2P1	EWFA010	QF1-215	1PB-P10
C93	68 NPO 50V		DTZ-68	NP068	CN0468		10TCC-Q68
C96	.1 50V			DPMS2P1	EWFA010	QF1-215	1PB-P10
C100	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C105	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C106	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C109	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C111	18 NPO 50V				CN0418		10TCC-Q18
C112	18 NPO 50V				CN0418		10TCC-Q18
C113	.001 50V		DD-102G	GP1000	GP210	QC2-81	5GA-D10
C114	.001 50V		DD-102G	GP1000	GP210	QC2-81	5GA-D10
C115	100 NPO 50V		DTZ-100	NP0100	CN0310		10TCC-T10
C116	10 NPO 50V		DTZ-10	NP010	CN0410		10TCC-Q10
C117	1 NPO 50V				CN0510		10TCC-V10
C118	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C121	.039 50V			DPMS6S39	PVC6139		6PS-S39
C122	47 NPO 50V		DTZ-47	NP047	CN0447		10TCC-Q47
C123	47 NPO 50V		DTZ-47	NP047	CN0447		10TCC-Q47
C124	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C125	270 50V			GP270	GP327		10TS-T27
C127	470 50V			GP470	GP347		10TS-T47
C128	220 50V				GP322		10TS-T22
C129	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C130	10 NPO 50V		DTZ-10	NP010	CN0410		10TCC-Q10
C131	.01 50V			DPMS2S2	PVC212		2PS-S20
C133	.1 50V			DPMS2P1	EWFA010	QF1-215	1PB-P10
C134	.1 50V			DPMS2P1	EWFA010	QF1-215	1PB-P10
C136	470 50V		DD-471	GP470	GP347		10TS-T47
C137	220 50V		DD-221		GP322		10TS-T22
C138	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C139	10 NPO 50V		DTZ-10	NP010	CN0410		10TCC-Q10
C142	68 NPO 50V		DTZ-68	NP068	CN0468		10TCC-Q68
C143	7 NPO 50V		DTZ-6R8	NP06P8	CN0568		10TCC-V68
C146	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C147	470 50V		DD-471	GP470	GP347		10TS-T47
C148	220 50V		DD-221		GP322		10TS-T22
C149	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C150	10 NPO 50V		DTZ-10	NP010	CN0410		10TCC-Q10
C151	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C152	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C153A	.1 50V			DPMS2P1	EWFA010	QF1-215	1PB-P10

PRESIDENT MODEL MADISON

# 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.	
						Q-LINE	GENERAL LINE
C153B	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C154	10 NPO 50V		DTZ-10	NP010	CN0410		10TCC-Q10
C155	1 NPO 50V				CN0510		10TCC-V10
C156	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C157	.039 50V			DPMS6S39	PVC6139		6PS-S39
C159	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C160	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C161	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C162	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C163	47 NPO 50V		DTZ-47	NP047	CN0447		10TCC-Q47
C164	68 NPO 50V		DTZ-68	NP068	CN0468		10TCC-Q68
C165	220 NPO 50V		DTZ-220				10TCC-T22
C166	.01 50V	(1)	DC-103	MGP01	TA110	QC2-141	TG-S10
	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C167	390 50V		DD-391	GP390	GP339		10TS-T39
C168	.5 NPO 50V	1800-002					
C169	.1 50V			DPMS2P1	EWFA1A010	QF1-215	1PB-P10
C170	470 50V		DD-471	GP470	GP347		10TS-T47
C172	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C173	220 N220 50V	1800-098			*		10TCR-T22
C174	56 NPO 50V				CN0456		10TCC-Q56
C175	.1 50V			DPMS2P1	EWFA1A010	QF1-215	1PB-P10
C176	56 NPO 50V				CN0456		10TCC-Q56
C177	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C178	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C183	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C184	120 NPO 50V	(1)	DTZ-120		CN0312		10TCC-T12
	82 50V		DTZ-82	NP082	CN0482		10TCC-Q82
C185	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C186	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C187	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C188	.1 50V	(1)		DPMS2P1	EWFA1A010	QF1-215	1PB-P10
C189	.047 50V			DPMS2S47	EWFA1A147	QF1-171	1PB-S47
	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C190	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C191	.1 50V			DPMS2P1	EWFA1A010	QF1-215	1PB-P10
C192	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C193	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C194	.039 50V			DPMS6S39	PVC6139		6PS-S39
C195	10 NPO 50V	(1)	DTZ-10	NP010	CN0410		10TCC-Q10
	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C196	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C197	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C198	.1 50V	(1)		DPMS2P1	EWFA1A010	QF1-215	1PB-P10
	.039 50V			DPMS6S39	PVC6139		6PS-S39
C200	.01 50V			WMF1S1	EWFA1A110	QF1-91	1PB-S10
C202	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C204	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C205	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C206	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C207	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C208	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C209	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C210	.01 50V			WMF1S1	EWFA1A110	QF1-91	1PB-S10
C213	.1 50V		DC-104	MGP1	TA010	QC2-233	TG-P10
C214	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C215	.047 50V	(1)		DPMS2S47	EWFA1A147	QF1-171	1PB-S47
	.022 50V			DPMS2S22	EWFA1A122	QF1-127	1PB-S22
C216	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C217	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C219	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C220	.047 50V	(1)		DPMS2S47	EWFA1A147	QF1-171	1PB-S47
	.022 50V			DPMS2S22	EWFA1A122	QF1-127	1PB-S22
C221	.1 50V		DC-104	MGP1	TA010	QC2-233	TG-P10
C222	.1 50V		DC-104	MGP1	TA010	QC2-233	TG-P10
C223	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C225	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C227	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C228	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C231	.1 50V			DPMS2P1	EWFA1A010	QF1-215	1PB-P10
C233	.1 50V		DC-104	MGP1	TA010	QC2-233	TG-P10
C236	33 NPO 50V		DTZ-33	NP033	CN0433		10TCC-Q33
C239	.1 50V		DC-104	MGP1	TA010	QC2-233	TG-P10
C240	.01 50V			WMF1S1	EWFA1A110	QF1-91	1PB-S10
C242	47 NPO 50V		DTZ-47	NP047	CN0447		10TCC-Q47
C243	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C244	33 NPO 50V	(1)	DTZ-33	NP033	CN0433		10TCC-Q33
C245	.047 50V		DC-503	MGP05	TA150	QC2-207	TG-S50
C247	.047 50V		DC-503	MGP05	TA150	QC2-207	TG-S50
C248	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C249	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C250	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C251	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C255	.001 50V		DD-102G	GP1000	GP210	QC2-81	5GA-D10
C257	27 NPO 50V	(1)			CN0427		10TCC-Q27
	68 NPO 50V		DTZ-68	NP068	CN0468		10TCC-Q68
C258	330 50V		DD-331	GP330	GP333		10TS-T33
C259	.039 50V			DPMS6S39	PVC6139		6PS-S39
C260	.047 50V		DC-503	MGP05	TA150	QC2-207	TG-S50
C261	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C262	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C265	.047 50V		DC-503	MGP05	TA150	QC2-207	TG-S50
C266	.047 50V		DC-503	MGP05	TA150	QC2-207	TG-S50
C268	100 NPO 50V		DTZ-100	NP0100	CN0310		10TCC-T10
C269	270 50V		DD-271	GP270	GP327		10TS-T27
C270	470 50V		DD-471	GP470	GP347		10TS-T47
C277	.047 50V		DC-503	MGP05	TA150	QC2-207	TG-S50
C278	.047 50V		DC-503	MGP05	TA150	QC2-207	TG-S50
C280	27 NPO 50V				CN0427		10TCC-Q27
C281	.047 50V		DC-503	MGP05	TA150	QC2-207	TG-S50
C282	.047 50V		DC-503	MGP05	TA150	QC2-207	TG-S50
C285	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C286	.0047 50V		DD-472	GP4700	GP247		5GA-D47
C287	.1 50V		DC-104	MGP1	TA010	QC2-233	TG-P10
C288	5 NPO 50V		DTZ-4R7	NP04P7	CN0547		10TCC-V47

## 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.	
						Q-LINE	GENERAL LINE
C289	.001 50V		DD-102G	GP1000	GP210	QC2-81	5GA-D10
C290	.047 50V			DPMS2S47	EWFA1A147	QF1-171	1PB-S47
C301	.039 50V			DPMS6S39	PVC6139		6PS-S39
C303	.039 50V			DPMS6S39	PVC6139		6PS-S39
C308	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C310	.01 50V		UC-103	MGP01	TA110	QC2-141	TG-S10
C401	.047 50V			DPMS2S47	EWFA1A147	QF1-171	1PB-S47
C403	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C404	.01 50V		UC-103	MGP01	TA110	QC2-141	TG-S10
C413	.01 50V		UC-103	MGP01	TA110	QC2-141	TG-S10
C414	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C415	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C416	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C418	.1 50V		DC-104	MGP1	TA010	QC2-233	TG-P10
C419	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C420	.001 50V		DD-102G	GP1000	GP210	QC2-81	5GA-D10
C421	.001 50V		DD-102G	GP1000	GP210	QC2-81	5GA-D10
C422	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C423	.022 50V		DC-203	MGP02	TA120	QC2-157	TG-S20
C424	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C425	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C426	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C601	8 NPO 50V		DTZ-6R8	NP06P8	CN0568		10TCC-V68
C602	.0047 50V		UD-472	GP4700	GP247		5GA-D47
C603	.01 50V		DC-103	MGP01	TA110	QC2-141	TG-S10
C604	39 NPO 50V				CN0439		10TCC-Q39
C606	.01 50V	1800-103	DC-103	MGP01	TA110	QC2-141	TG-S10
C701	.01 50V	1800-103	DC-103	MGP01	TA110	QC2-141	TG-S10
C703	.01 50V	1900-203	DC-103	MGP01	TA110	QC2-141	TG-S10
C704	.01 50V	1900-203	DC-103	MGP01	TA110	QC2-141	TG-S10
C705	.01 50V	1900-203	DC-103	MGP01	TA110	QC2-141	TG-S10
CC1	50V	1800-103					
CC2	50V	1800-103					
CT1	20 50V	1900-203					
CT2	20 50V	1900-203					
CT3	20 50V	1900-203					
CT4	20 50V	1900-203					
CT5	20 50V	1900-203					
CT6	20 50V	1900-203					
CT7	20 50V	1900-203					

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

(1) Used in some versions.

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### 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.
RT301	Volt Adj	300	1900-221	T-300		MTC32L1	X201R351B
VR1	Reg Meter	20K	1900-223				U260R253B
VR2	RF Gain Range	200K	1900-224				U260R254B
VR3	Squelch Range	100K	1900-219				U260R104B
VR4	Balance	50K	1900-218				U260R503B
VR5	AM Gain Range	500K	1900-225				U260R504B
VR7	AM AMC	5000	1900-216				U260R502B
VR8	AM Reg	10K	1900-217				U260R103B
VR9	34.9825MHz	5000	1900-216				U260R502B
VR12	Xmit Meter	100K	1900-219				U260R104B
VR14	Mod	100K	1900-219				U260R104B
VR15	Bias	300	1900-222				
VR16	Bias	300	1900-222				
VR401	Clarifier	20K	3000-105				
VR402	RF Meter	100K	3000-114				
VR403-1	SWR/CAL	5000	3000-116(18)				
VR403-2	SWR/CAL	5000					
VR404	Squelch	100K	3000-120(19)				
VR405	Volume/Power Switch	10K					
VR406	Tone	10K	3000-105				
VR408	Mic Gain	10K	3000-105				

(18) Includes VR403-1 and VR403-2.

(19) Includes VR404, VR405 and S406.

## PARTS LIST AND DESCRIPTION (CONTINUED)

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

### 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.
R404 RR1	10 5W Resistor Network	5W-SQ-10	1900-601 1800-104	RR401 RR402	Resistor Network Resistor Network		1900-402 1900-402

### COILS (RF-IF)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS	
		PART No.	OTHER IDENTIFICATION	MILLER PART No.		
L1	Noise Blanker (23.5MHz)	2200-001	LA-029	CBS740-T		
L2	Noise Blanker (23.5MHz)	2200-054	LA-060			
L3	Rec Antenna (27MHz)	2200-024	LA-152			
L4	Rec RF (27MHz)	2200-026	LA-156			
L5	IF (7.8MHz)	2200-033	LA-178			
L6	IF (7.8MHz)	2200-029	LA-179			
L7	IF (7.8MHz)	2200-022	LA-038			
L8	IF (7.8MHz)	2200-023	LA-096			
L9	RF Choke (470uH)	2200-040	LZ-012			
L10	Filter (56mH)	2200-041	LZ-015			
L11	Filter (68mH)	2200-042	LZ-015	CBS512-7TC CBS511-7TC		
L12	RF Choke (470uH)	2200-040	LZ-012			
L13	RF Choke (470uH)	2200-040	LZ-012			
L14	RF Choke (470uH)	2200-040	LZ-012			
L16	VCO	2200-055	LA-195			
L17	VCO	2200-031	LA-191			
L19	RF Choke (100uH)	2200-202	LZ-012			
L20	RF Choke (470uH)	2200-040	LZ-012			
L21	RF Choke (470uH)	2200-040	LZ-012			
L22	RF Choke (470uH)	2200-040	LZ-012			
L23	RF Choke (470uH)	2200-040	LZ-012	CB304		
L24	Tripler (33MHz)	2200-030	LA-190			
L25	RF Choke (470uH)	2200-040	LZ-012			
L27	TVI Trap (54MHz)	2200-020	LC-018			
L28	Antenna Match	2200-060	LE-068			
L29	Pi Filter	2200-060	LE-068			
L30	Final (27MHz)	2200-056	LC-019			
L31	RF Choke	2200-036	LD-018			
L32	Xmit Driver (27MHz)	2200-020	LC-018			
L33	RF Choke	2200-036	LD-018	CB304		
L34	RF Choke	2200-036	LD-018			
L35	Xmit Predriver (27MHz)	2200-037	LD-057			
L36	Xmit Amp (27MHz)	2200-037	LD-057	CBS512-7TC		
L37	Xmit Mixer (27MHz)	2200-027	LA-196			
L38	RF Choke (470uH)	2200-040	LZ-012			
L39	Carrier Inj (7.8MHz)	2200-022	LA-038			
L43	RF Choke (1uH)	2200-206	LZ-002			
L44	RF Choke (1uH)	2200-206	LZ-002			
L45	RF Choke (100uH)	2200-202	LZ-012			
L46	RF Choke (10uH)	2200-205	LZ-001			
L48	IF (7.8MHz)	2200-061	LD-096			
L50	RF Choke (470uH)	2200-040	LZ-012			
L401	RF Choke	2200-059	LD-089			
L405	RF Choke	2200-059	LD-089			
L406	RF Choke	2200-059	LD-089			
L407	RF Choke	2200-035	LD-013			
L408	RF Choke	2200-035	LD-013			
L409	RF Choke	2200-059	LD-089			
L410	RF Choke	2200-059	LD-089			
L421	RF Choke	2200-062	LD-094			
L701	RF Choke	2200-059	LD-089			
L702	RF Choke	2200-059	LD-089			
L703	RF Choke	2200-059	LD-089			

### 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.	
T402	2.4A	.238	2.85mH	2300-003			

## PARTS LIST AND DESCRIPTION (CONTINUED)

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

### TRANSFORMER (Audio Output)

ITEM No.	IMPEDANCE		REPLACEMENT DATA			NOTES
			MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T1	5.12	8	2600-006 TF-109(1)		MCB-20	(1) Number on unit.

### TRANSFORMER (Power)

ITEM No.	RATING		REPLACEMENT DATA			NOTES
			MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T401	120V AC @ .460A	20.0V @ 4.68A	2600-007 TF-108(1)			(1) Number on unit.

### SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
SP401	4" PM, 8 Ohms	3100-001		

### 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
F401	4 Amp	2800-003	2700-004	AGC4	HDJ	311004	150145	
F402	4 Amp	2800-003	2800-004	AGC4	HKP	311004	342001L	

### 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	3200-003	18-032	18-034	18-010	18-092	2	1	3	NC	NC	1

PRESIDENT MODEL MADISON

## PARTS LIST AND DESCRIPTION (CONTINUED)

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

### MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
D401	LED	2000-306	Channel Display (13.5mA @ 1.85V)
D403	LED	2000-307	LSB Indicator (15mA @ 1.62V)
D404	LED	2000-307	USB Indicator (15mA @ 1.62V)
D405	LED	2000-307	AM Indicator (15mA @ 1.62V)
D407	LED	2000-307	TX (12mA @ 1.68V)
FT1	Crystal Filter	2100-001	7.8MHz
FT2	Crystal Filter	2100-002	7.8MHz
J401	Jack	1100-002	Antenna
J402	Jack	1100-004	Microphone
J403	Jack	1100-001	PA
J404	Jack	1100-001	External Speaker
J405	Jack	1100-014	Phone
J406	Jack	1100-003	DC Power
J407	Jack	1100-016	AC Power
L26	Ferrite Bead	2200-057	
L47	Ferrite Bead	2200-058	
M401	Meter	2900-005	S/R
M402	Meter	2900-007	SWR/MOD
M	Clock	3600-001	Digital
PL401	Lamp	2500-001	S/R Meter (44mA @ 11.64V)
PL402	Lamp	2500-001	SWR/MOD (44mA @ 11.64V)
REL1	Relay	2400-002	Xmit/Rec
S401	Switch	3000-003	NB
S402	Switch	3000-103	AM/USB/LSB
S403	Switch	3000-003	SWR/RF-MOD
S404	Switch		AC Power (Part of Clock)
S405	Switch	3000-003	CB/PA
S406	Switch		Power (Part of Volume Control)
S408	Switch	3000-105	Channel Selector
S409	Switch		Power Conversion (Part of AC Power Jack)
X1	Crystal	2100-004	7.8025MHz
X2	Crystal	2100-005	7.7975MHz
X3	Crystal	2100-008	11.285MHz
X4	Crystal	2100-006	11.2842MHz
X5	Crystal	2100-009	10.240MHz
X6	Crystal	2100-007	11.865MHz
	Printed Circuit Board	3500-014	Main (PC-346AA)
	Printed Circuit Board	3500-022	Channel Selector Switch (PC-259AA)
	Printed Circuit Board	3500-009	Power Supply (PC-006EB)
	Printed Circuit Board	3500-023	Push Switch (PC-277AA)
	Printed Circuit Board	3500-024	Noise Blanking (PC-244AA)
	Printed Circuit Board	3500-025	PA-External Speaker Jack (PC-246AA)
	Printed Circuit Board	3500-026	Microphone Jack (PC-275AA)
	Printed Circuit Board	3500-028	TR401-TR402 (PC-298AA)
	Socket	1400-002	Crystal (SK-001)
	Socket	1400-001	Relay (SK-018)
	Power Cord	2700-004	AC
	Power Cord	2700-001	DC

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

ITEM	PART No.	ITEM	PART No.
Knob, Channel	1300-004	Knob, Clock (Sleep)	1300-013
Knob, Volume	1300-012	Cabinet (Transceiver)	3300-815
Knob, Squelch	1300-011	Plate (Transceiver, Bottom)	3300-810
Knob, Mike Gain/RF Gain/SWR-CAL/Clarifier/Tone	1300-002	Cabinet (Speaker)	3300-811
Knob, Mode Switch	1300-005	Plate (Speaker Bottom)	3400-512
Knob, SWR-RF MOD/NB/PA-CB	1300-003	Microphone Hanger	3300-401
Knob, Clock (Alarm-Time Set)	1300-015	Escutcheon (Transceiver)	3400-511
Knob, Clock (Select)	1300-014	Escutcheon (Speaker)	3400-513

### 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')