NOTE

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

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

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

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

MODEL TELSAT 1240 (99-33391W)

MANUFACTURER'S SPECIFICATIONS

GENERAL	
CIRCUITRY	Digital Phase Lock Loop Synthesizer
CHANNELS	40 Channels in the 27 MHz CB Band
MODE OF OPERATION	AM
POWER SOURCE	117V, 50/60 Hz AC or 13.8V DC
RECEIVER SECTION	
CIRCUIT TYPE	Dual Conversion Superheterodyne with RF Stage and 455 KHz Ceramic Filter
SENSITIVITY	0.7μV for 10dB S/N
SELECTIVITY	60dB down at ± 10 KHz
IMAGE REJECTION	60dB
SPURIOUS REJECTION	50dB
AGC RANGE (for 10dB level change)	60dB
DELTA TUNE RANGE	Approximately ± 1.5 KHz
SQUELCH RANGE	0.7μV to 1000μV ± 6dB
IF FREQUENCY	1st IF: 10.695 MHz 2nd IF: 455 KHz
AUDIO OUTPUT POWER	3 watts into "EXT. SP" jack (8 ohms)
TRANSMITTER SECTION	
RF POWER OUTPUT	Up to 4 watts (FCC Maximum at 117V, 50/60 Hz AC or at 13.8V DC)
EMISSION	6A3
HARMONIC AND SPURIOUS SUPPRESSION	Exceeds FCC Requirements
MODULATION	AM, 80% Typical
PA	
AUDIO OUTPUT POWER	3 watts

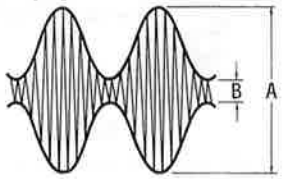
Courtesy of the Manufacturer

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

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
T101 thru T107, T201, T401	.9440
T203 thru T207	.5000,5009,8276,8728,8728A
L402, L405, L406, T401	.8282,9304,8728,8728A
CV201	.5000,8276



Modulation Ratio = $\frac{A - B}{A + B}$ x 100 (%)

FIGURE 1

SYNTHESIZER ALIGNMENT

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Input of frequency counter to TP1.	Ch. 19, XMT	T101	Adjust for 10.238MHz ±50Hz.
Input of frequency counter to TP1.	Ch. 19 Delta Tune Middle	VR102	Adjust for 10.240MHz ±50Hz.
Input of frequency counter to TP1.	Ch. 19 Delta Tune +	VR101	Adjust for 10.24060MHz.
Input of frequency counter to TP1.	Ch. 19 Delta Tune -	VR103	Adjust for 10.23940MHz.
Input of frequency counter to TP4 (IC101 pin 4).	Ch. 19 Delta Tune Middle		Check for 5.120MHz. Check for 5.119MHz in transmit.
Input of oscilloscope to TP3.	Ch. 19	T106	Adjust for maximum RF.
Input of DC meter to TP2.	Ch. 1	T102	Adjust for 2.00 volts ±.1 volt. Check for approx. 2.75 volts on Channel 40.
Input of DC meter to TP2.	Ch. 1, XMT		Check for 2.80 volts. Check for approx. 3.75 volts on Channel 40.
Input of frequency counter to TP3.	Ch. 1 Delta Tune Middle		Check for .910MHz. Check all channels. (See Truth Chart for correct frequencies.)
Input of frequency counter to TP3.	Ch. 1, XMT Delta Tune Middle		Check for 1.367MHz. Check all channels. (See Truth Chart for correct frequencies.)
Input of oscilloscope to TP5 (Junction of C116 and C117).	Ch. 19	T103	Adjust for maximum RF.
Input of frequency counter to TP5 (Junction of C116 and C117).	Ch. 1		Check for 16.270MHz. Check all channels. (See Truth Chart for correct frequencies.)
Input of frequency counter to TP5 (Junction of C116 and C117).	Ch. 1, XMT		Check for 16.727MHz. 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. Preset controls as follows, unless otherwise noted:
RF Gain Max, Delta Tune Middle, Squelch MINIMUM, ANL Off.

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Output of signal generator thru .01uF to TP6 (Q205 gate). 455kHz, 1000Hz @ 30% modulation.	Ch. 19	T207,T206, T205	Adjust for maximum output.
Output of signal generator thru .01uF to antenna input. 27.185MHz, 1000Hz @ 30% modulation.	Ch. 19	T204,T203, T202,T201	Adjust for maximum output.

RECEIVER ADJUSTMENTS

Connect an AC VTVM or AF wattmeter across speaker voice coil.
Adjust volume control to obtain a suitable indication.
Preset controls as follows, unless otherwise noted:
RF Gain Max, Delta Tune Middle, Squelch MINIMUM, ANL Off.

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Output of signal generator thru .01uF to antenna input. 27.185MHz, 1000Hz @ 30% modulation. Output 1uV.	Ch. 19	VR302	AGC Adjust for 2.00 volts RMS (.5 watts) audio output.
Output of signal generator thru .01uF to antenna input. 27.185MHz, 1000Hz @ 30% modulation. Output 100uV.	Ch. 19 Squelch Max	VR201	SQUELCH RANGE Adjust for maximum audio output. Increase generator output to 1000uV and re-adjust VR201 for a 6db drop in audio output.
Output of signal generator thru .01uF to antenna input. 27.185MHz, 1000Hz @ 30% modulation. Output 100uV.	Ch. 19	VR301	S METER Adjust for 9 on S scale of meter.

TRANSMITTER ALIGNMENT

Connect a 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 RF wattmeter to antenna input.	Ch. 19	T104,T107, T105,T401	Adjust for maximum RF RF output.
Input of RF wattmeter to antenna input.	Ch. 19	L402,L405, L406	Adjust for 4.0 watts RF output maximum.
Input of spectrum analyzer or harmonic meter to antenna input.	Ch. 19	CV201	Adjust for MINIMUM at 54MHz (2nd harmonic).

TRANSMITTER ADJUSTMENTS

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

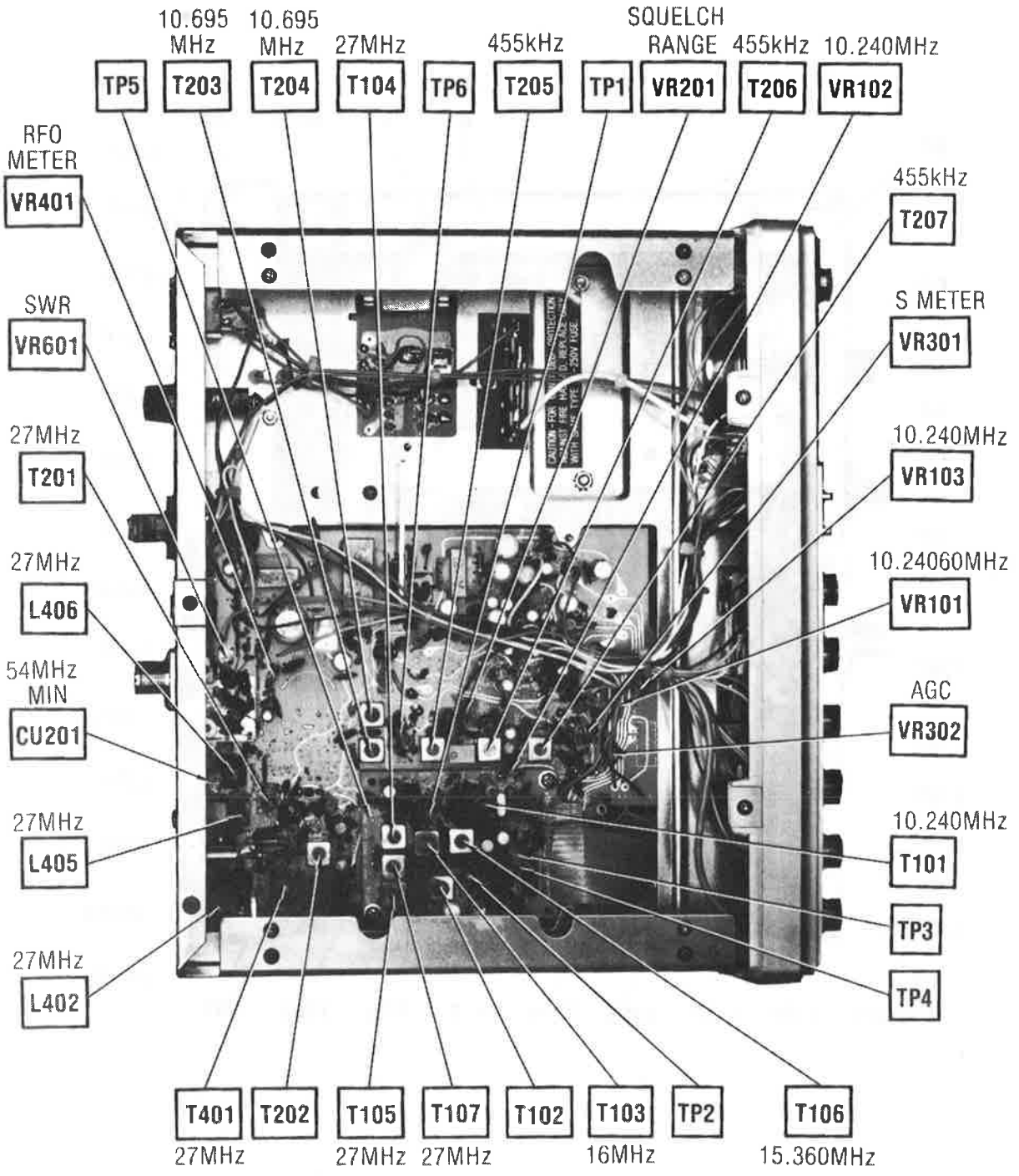
TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Input of oscilloscope or modulation meter to antenna input. Inject a 1000Hz, 6mV signal at mic input.	Ch. 19	VR305	AMC Adjust for 80% modulation maximum. (See Figure 1.)
Input of RF wattmeter to antenna input.	Ch. 19	VR401	RFO METER Adjust so RFO meter agrees with RF wattmeter.
Connect a 100 Ohm, non-inductive load to antenna input.	Ch.19 SWR/CAL Cal	VR601	SWR METER Set CAL ADJ control so that meter indicates full scale (CAL setting) switch SWR/CAL to SWR and adjust VR601 for 2 on SWR scale of meter.

TRUTH CHART

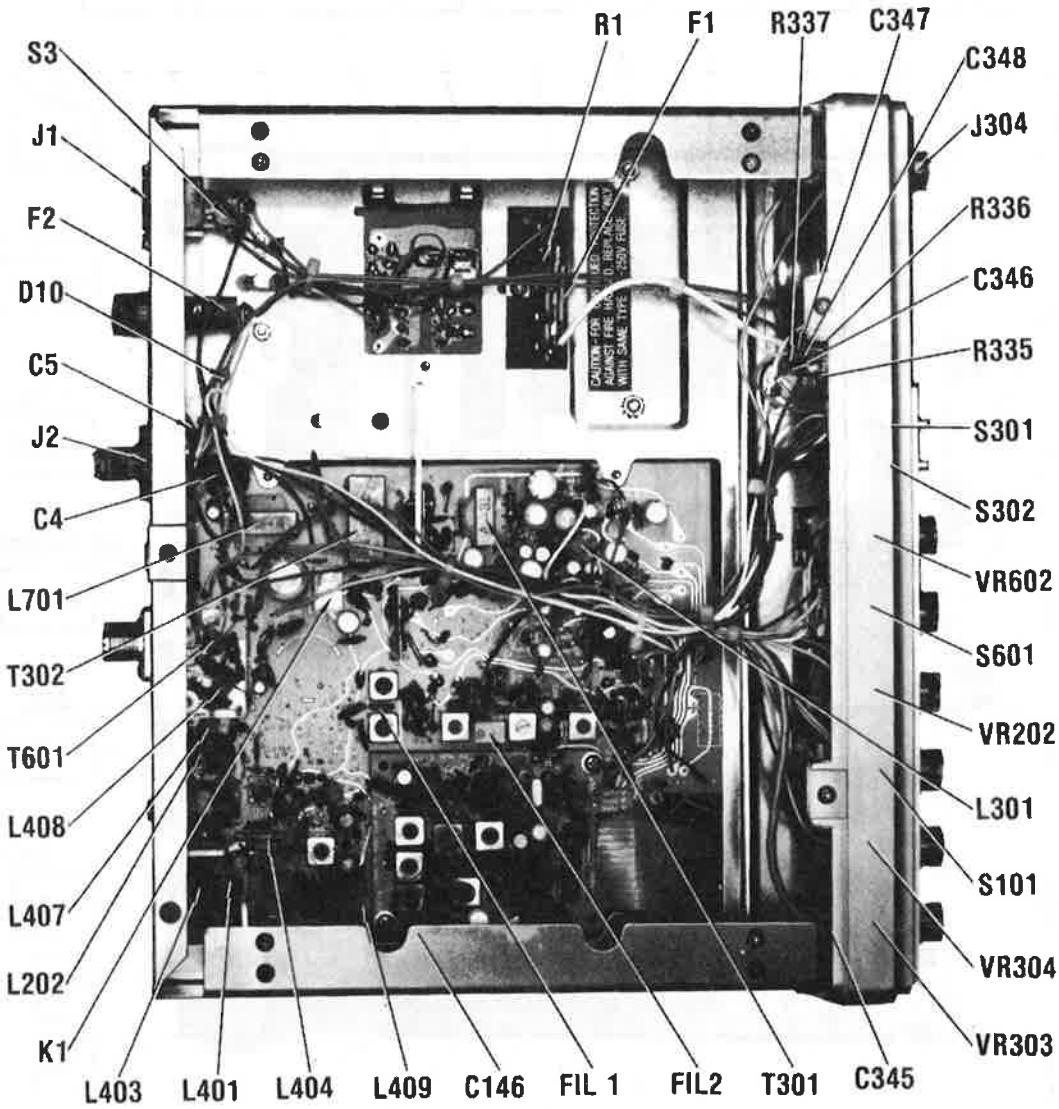
CHANNEL	1 = 3.80 Volts 0 = 0 Volts REC CHANNEL INPUT CODES PINS 9	10	11	12	13	14	15	REC DIVIDER INPUT IN MHz AT TP3	REC VCO OUTPUT IN MHz AT TP
1	1	0	1	1	0	1	1	.910	16.270
2	1	0	1	1	1	0	0	.920	16.280
3	1	0	1	1	1	0	1	.930	16.290
4	1	0	1	1	1	1	1	.950	16.310
5	1	1	0	0	0	0	0	.960	16.320
6	1	1	0	0	0	0	1	.970	16.330
7	1	1	0	0	0	1	0	.980	16.340
8	1	1	0	0	1	0	0	1.000	16.360
9	1	1	0	0	1	0	1	1.010	16.370
10	1	1	0	0	1	1	0	1.020	16.380
11	1	1	0	0	1	1	1	1.030	16.390
12	1	1	0	1	0	0	1	1.050	16.410
13	1	1	0	1	0	1	0	1.060	16.420
14	1	1	0	1	0	1	1	1.070	16.430
15	1	1	0	1	1	0	0	1.080	16.440
16	1	1	0	1	1	1	0	1.100	16.460
17	1	1	0	1	1	1	1	1.110	16.470
18	1	1	1	0	0	0	0	1.120	16.480
19	1	1	1	0	0	0	1	1.130	16.490
20	1	1	1	0	0	1	1	1.150	16.510
21	1	1	1	0	1	0	0	1.160	16.520
22	1	1	1	0	1	0	1	1.170	16.530
23	1	1	1	1	0	0	0	1.200	16.560
24	1	1	1	0	1	1	0	1.180	16.540
25	1	1	1	0	1	1	1	1.190	16.550
26	1	1	1	1	0	0	1	1.210	16.570
27	1	1	1	1	0	1	0	1.220	16.580
28	1	1	1	1	0	1	1	1.230	16.590
29	1	1	1	1	1	0	0	1.240	16.600
30	1	1	1	1	1	0	1	1.250	16.610
31	1	1	1	1	1	1	0	1.260	16.620
32	1	1	1	1	1	1	1	1.270	16.630
33	0	0	0	0	0	0	0	1.280	16.640
34	0	0	0	0	0	0	1	1.290	16.650
35	0	0	0	0	0	1	0	1.300	16.660
36	0	0	0	0	0	1	1	1.310	16.670
37	0	0	0	0	1	0	0	1.320	16.680
38	0	0	0	0	1	0	1	1.330	16.690
39	0	0	0	0	1	1	0	1.340	16.700
40	0	0	0	0	1	1	1	1.350	16.710

TRUTH CHART

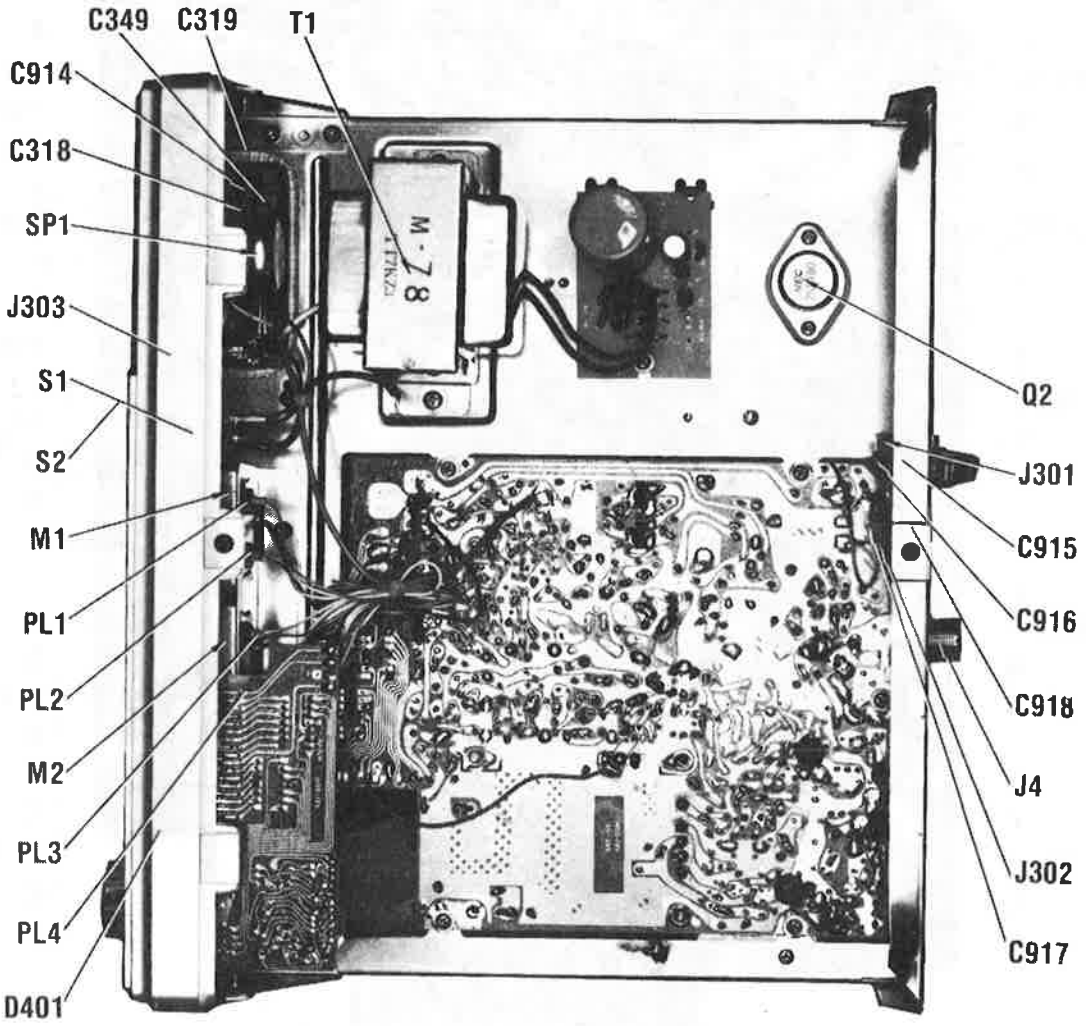
CHANNEL	1 = 3.80 Volts 0 = 0.30 Volts XMT CHANNEL INPUT CODES PINS 9	10	11	12	13	14	15	XMT DIVIDER INPUT IN MHz AT TP3	XMT VCO OUTPUT IN MHz AT TP
1	0	0	0	1	0	0	1	1.370	16.727
2	0	0	0	1	0	1	0	1.380	16.737
3	0	0	0	1	0	1	1	1.390	16.747
4	0	0	0	1	1	0	1	1.410	16.767
5	0	0	0	1	1	1	0	1.420	16.777
6	0	0	0	1	1	1	1	1.430	16.787
7	0	0	1	0	0	0	0	1.440	16.797
8	0	0	1	0	0	1	0	1.460	16.817
9	0	0	1	0	0	1	1	1.470	16.827
10	0	0	1	0	1	0	0	1.480	16.837
11	0	0	1	0	1	0	1	1.490	16.847
12	0	0	1	0	1	1	1	1.510	16.867
13	0	0	1	1	0	0	0	1.520	16.877
14	0	0	1	1	0	0	1	1.530	16.887
15	0	0	1	1	0	1	0	1.540	16.897
16	0	0	1	1	1	0	0	1.550	16.917
17	0	0	1	1	1	0	1	1.560	16.927
18	0	0	1	1	1	1	0	1.570	16.937
19	0	0	1	1	1	1	1	1.580	16.947
20	0	1	0	0	0	0	1	1.610	16.967
21	0	1	0	0	0	1	0	1.620	16.977
22	0	1	0	0	0	1	1	1.630	16.987
23	0	1	0	0	1	1	0	1.660	17.017
24	0	1	0	0	1	0	0	1.640	16.997
25	0	1	0	0	1	0	1	1.650	17.007
26	0	1	0	0	1	1	1	1.670	17.027
27	0	1	0	1	0	0	0	1.680	17.037
28	0	1	0	1	0	0	1	1.690	17.047
29	0	1	0	1	0	1	0	1.700	17.057
30	0	1	0	1	0	1	1	1.710	17.067
31	0	1	0	1	1	0	0	1.720	17.077
32	0	1	0	1	1	0	1	1.730	17.087
33	0	1	0	1	1	1	0	1.740	17.097
34	0	1	0	1	1	1	1	1.750	17.107
35	0	1	1	0	0	0	0	1.760	17.117
36	0	1	1	0	0	0	1	1.770	17.127
37	0	1	1	0	0	1	0	1.780	17.137
38	0	1	1	0	0	1	1	1.790	17.147
39	0	1	1	0	1	0	0	1.800	17.157
40	0	1	1	0	1	0	1	1.810	17.167



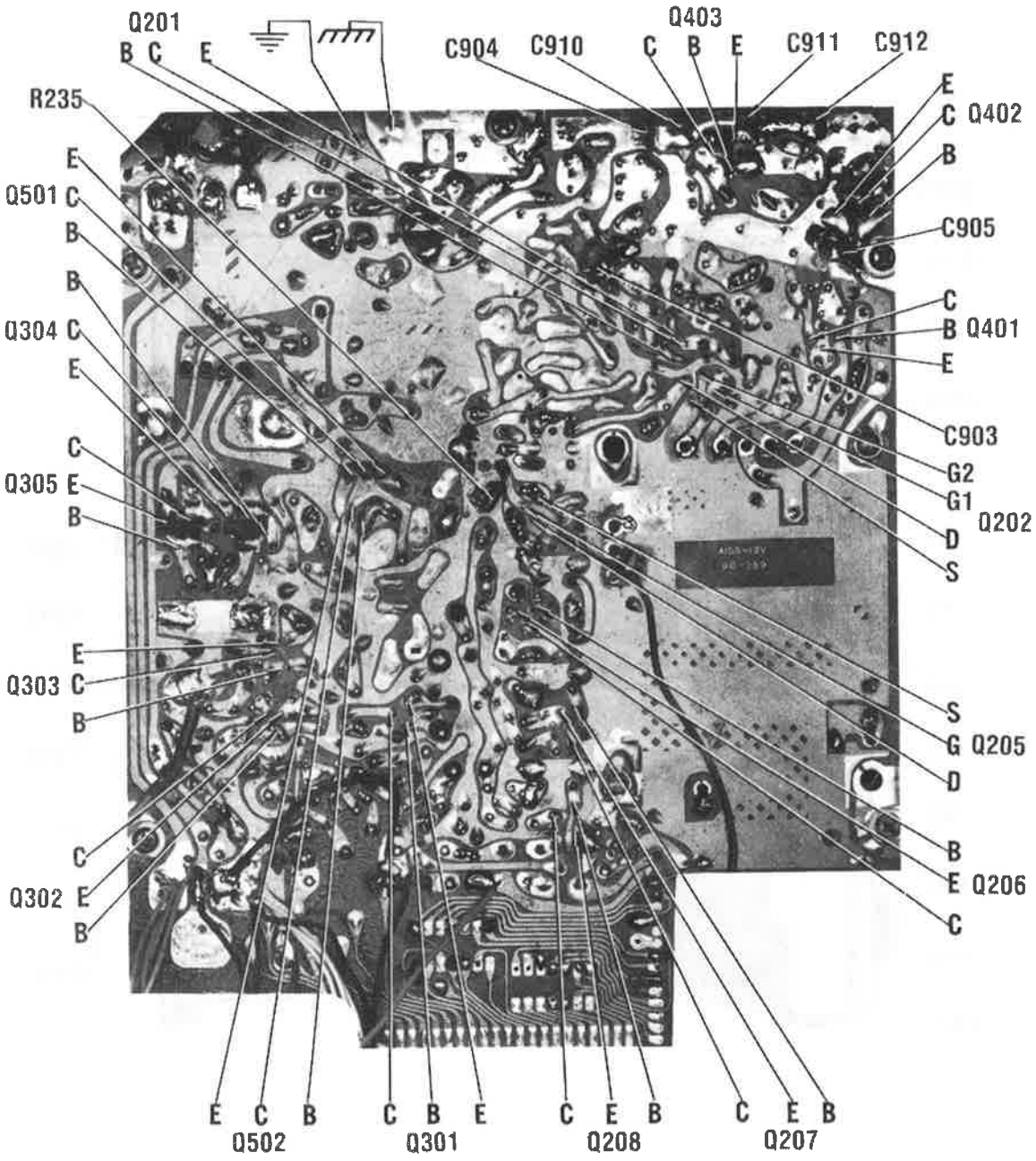
CHASSIS - BOTTOM



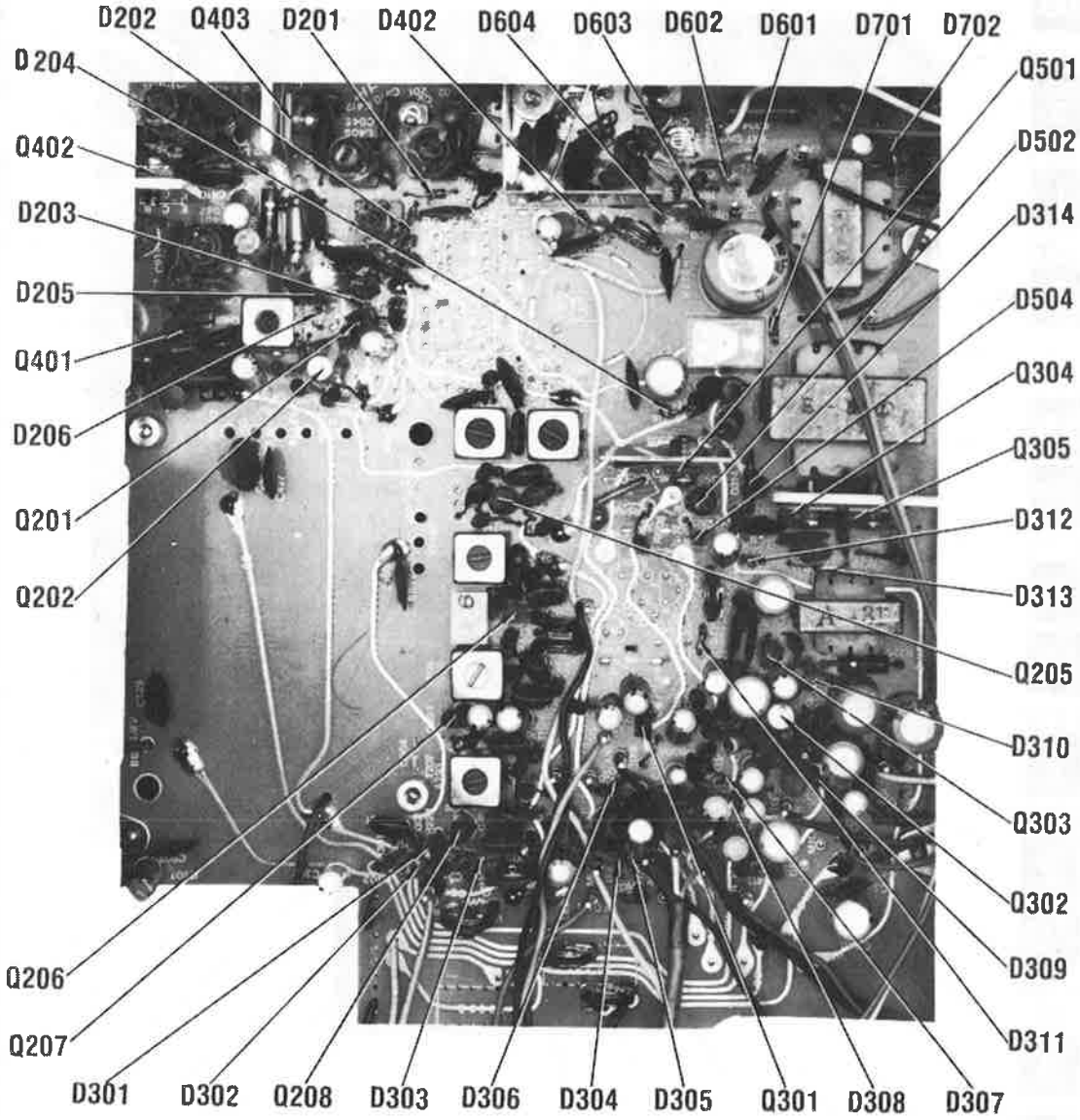
CHASSIS - BOTTOM


C349
C319
T1
C914
C318
SP1
J303
S1
S2
M1
PL1
PL2
M2
PL3
PL4
D401
Q2
J301
C915
C916
C918
J4
J302
C917

CHASSIS - TOP

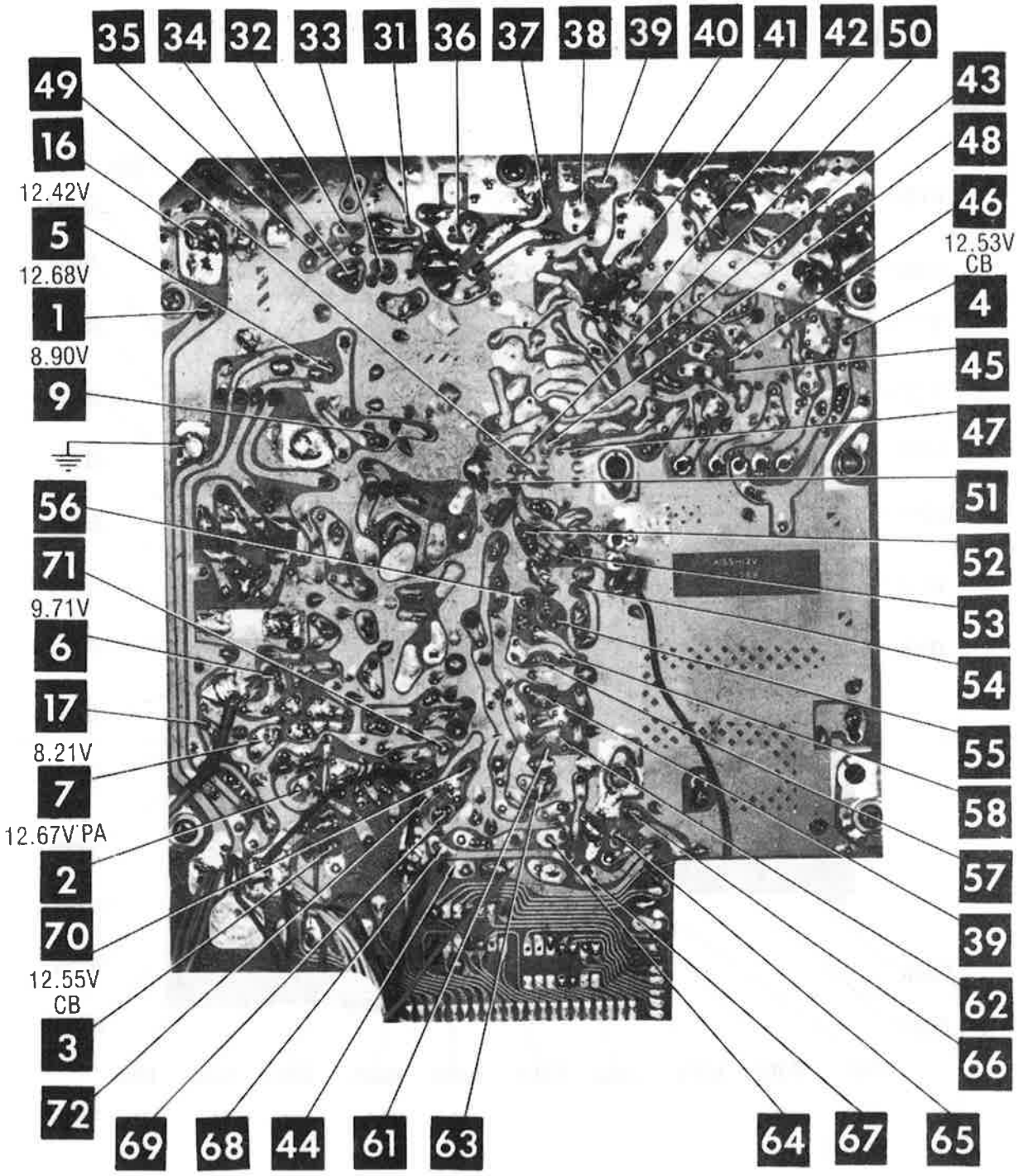

Q201
B C E
C904
C910
Q403
C B E
C911
C912
R235
E
C Q402
B
Q501 C
B
C905
B
C
Q304 C
B Q401
E
E
C903
C
G2
Q305 E
G1
B
Q202
D
S
E
Q303 C
S
B
G Q205
D
C
B
Q302 E
E Q206
B
C
E C B
C B E
C E B
C E B
Q502
Q301
Q208
Q207

MAIN BOARD

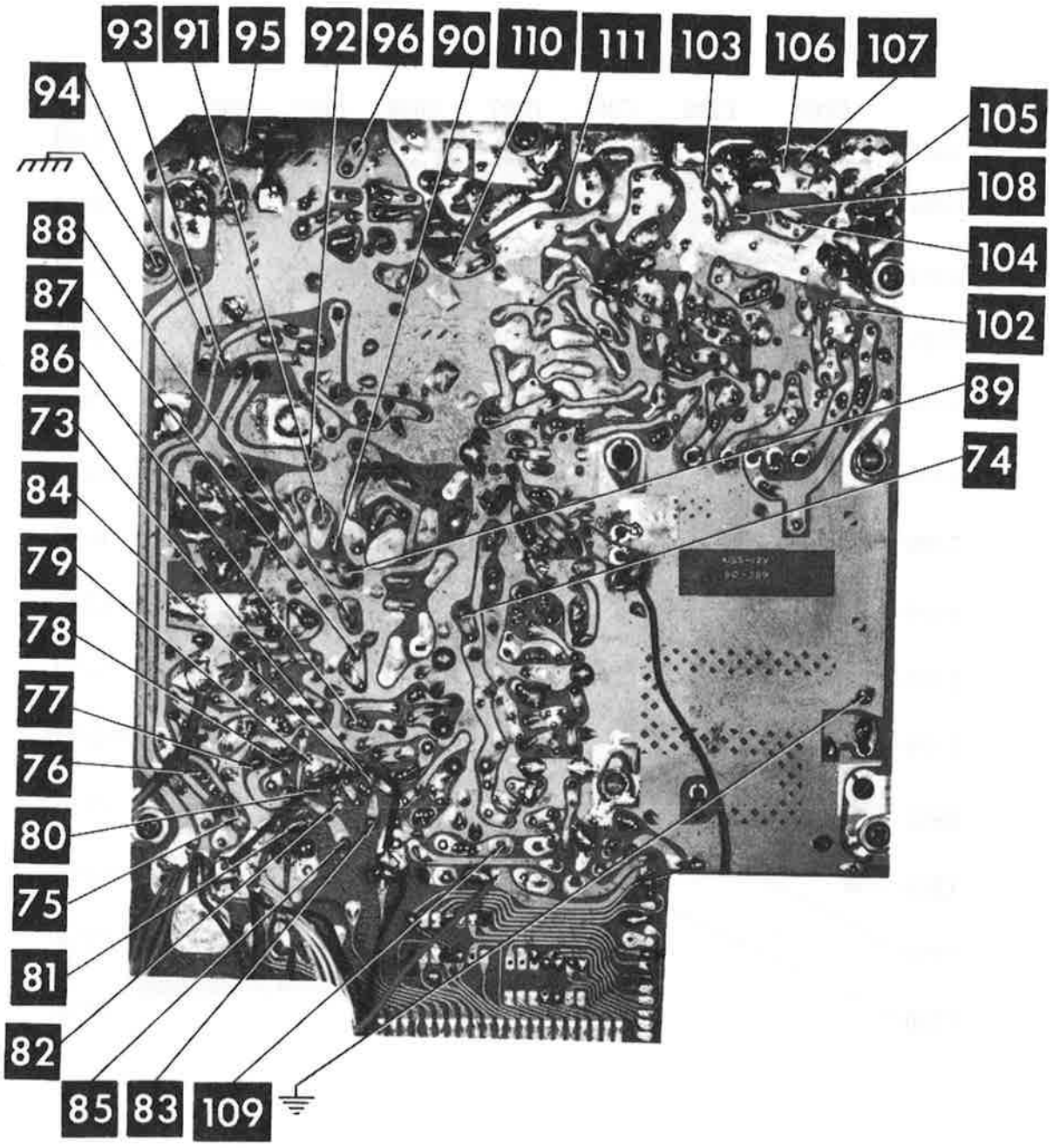

D202
Q403
D201
D402
D604
D603
D602
D601
D701
D702
D204
Q501
Q402
D502
D203
D314
D205
D504
Q401
Q304
D206
D305
Q201
D312
Q202
D313
Q205
D310
Q303
Q302
Q206
D309
Q207
D311
D301
D302
Q208
D303
D306
D304
D305
Q301
D308
D307

MAIN BOARD

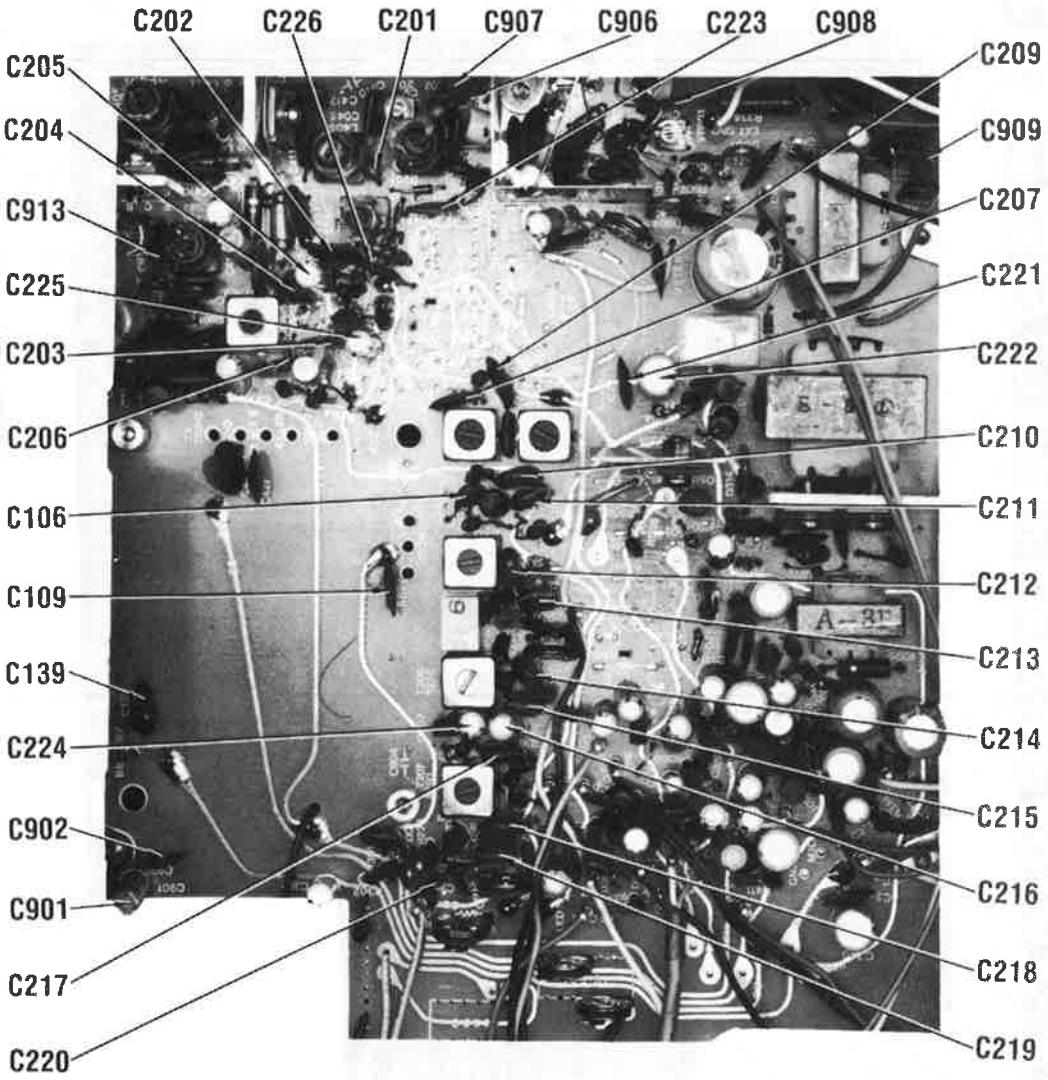
A Howard W. Sams CIRCUITRACE® Photo



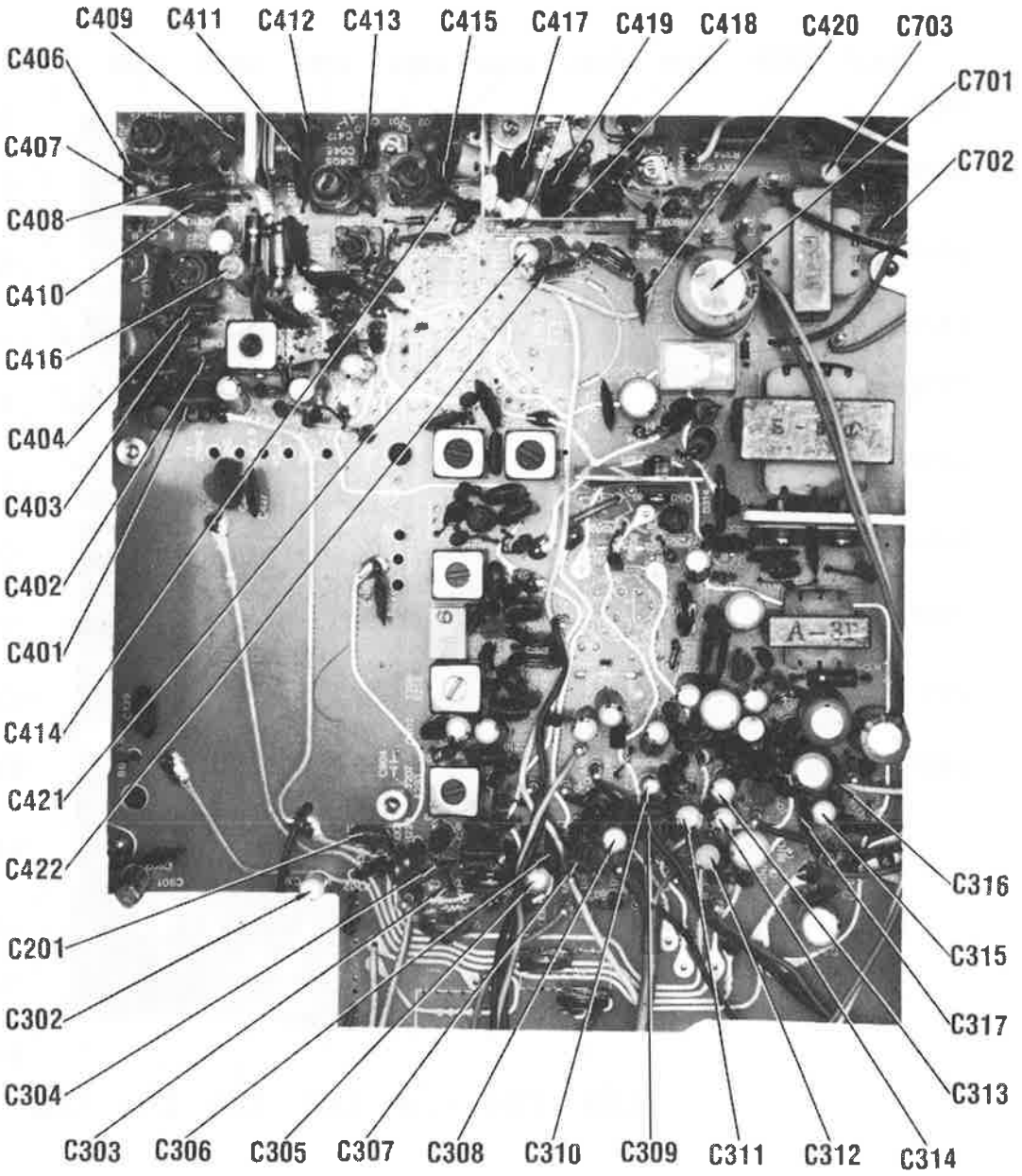
MAIN BOARD


93
91
95
92
96
90
110
111
103
106
107
94
105
108
88
104
87
102
86
89
73
74
84
79
78
77
76
80
75
81
82
85
83
109

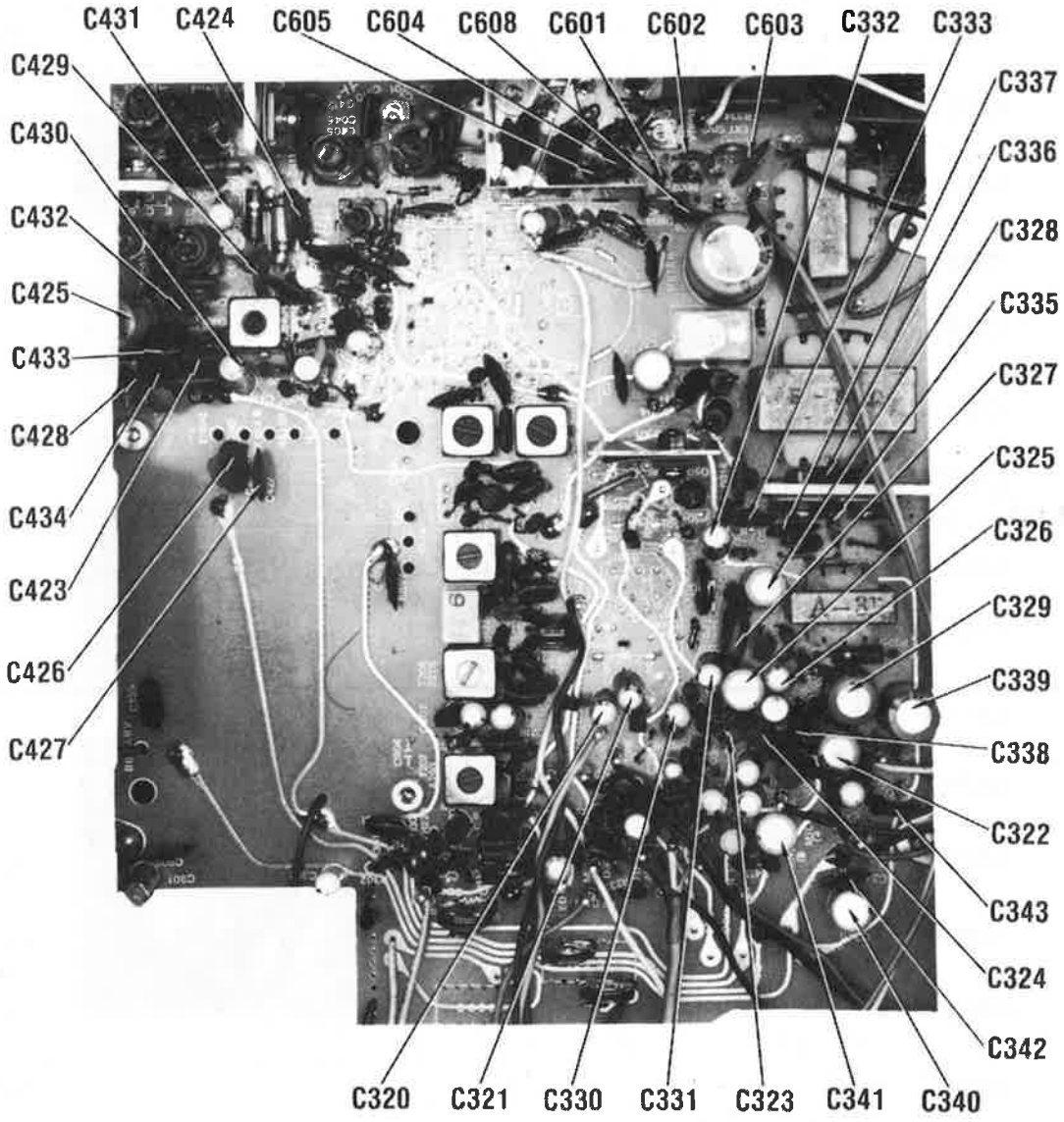
MAIN BOARD


C202
C226
C201
C907
C906
C223
C908
C205
C204
C913
C225
C203
C206
C106
C109
C139
C224
C902
C901
C217
C220
C209
C909
C207
C221
C222
C210
C211
C212
C213
C214
C215
C216
C218
C219

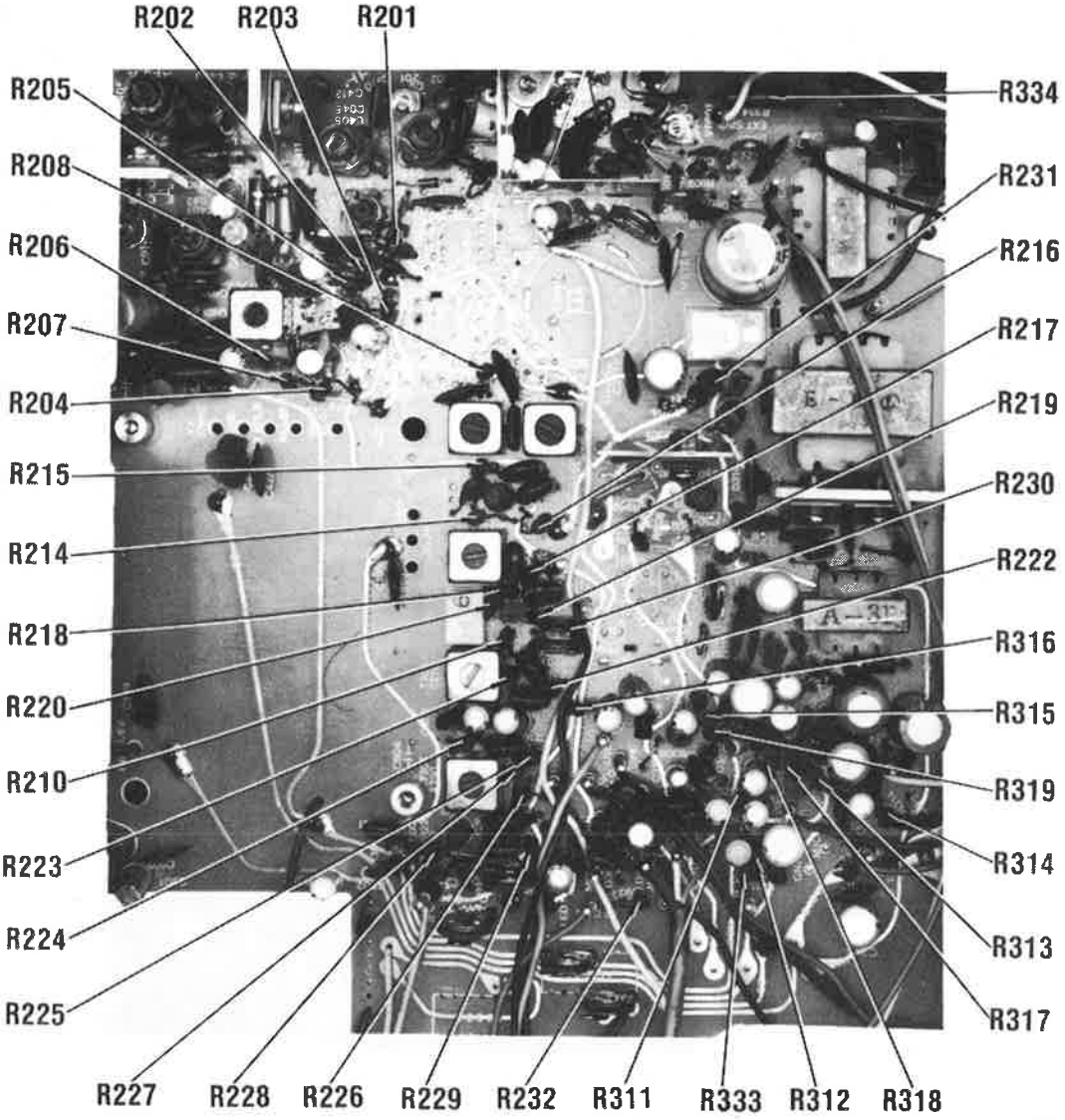
MA IN BOARD


C409
C411
C412
C413
C415
C417
C419
C418
C420
C703
C406
C701
C407
C702
C408
C410
C416
C404
C403
C402
C401
C414
C421
C422
C316
C201
C315
C302
C317
C304
C313
C303
C306
C305
C307
C308
C310
C309
C311
C312
C314

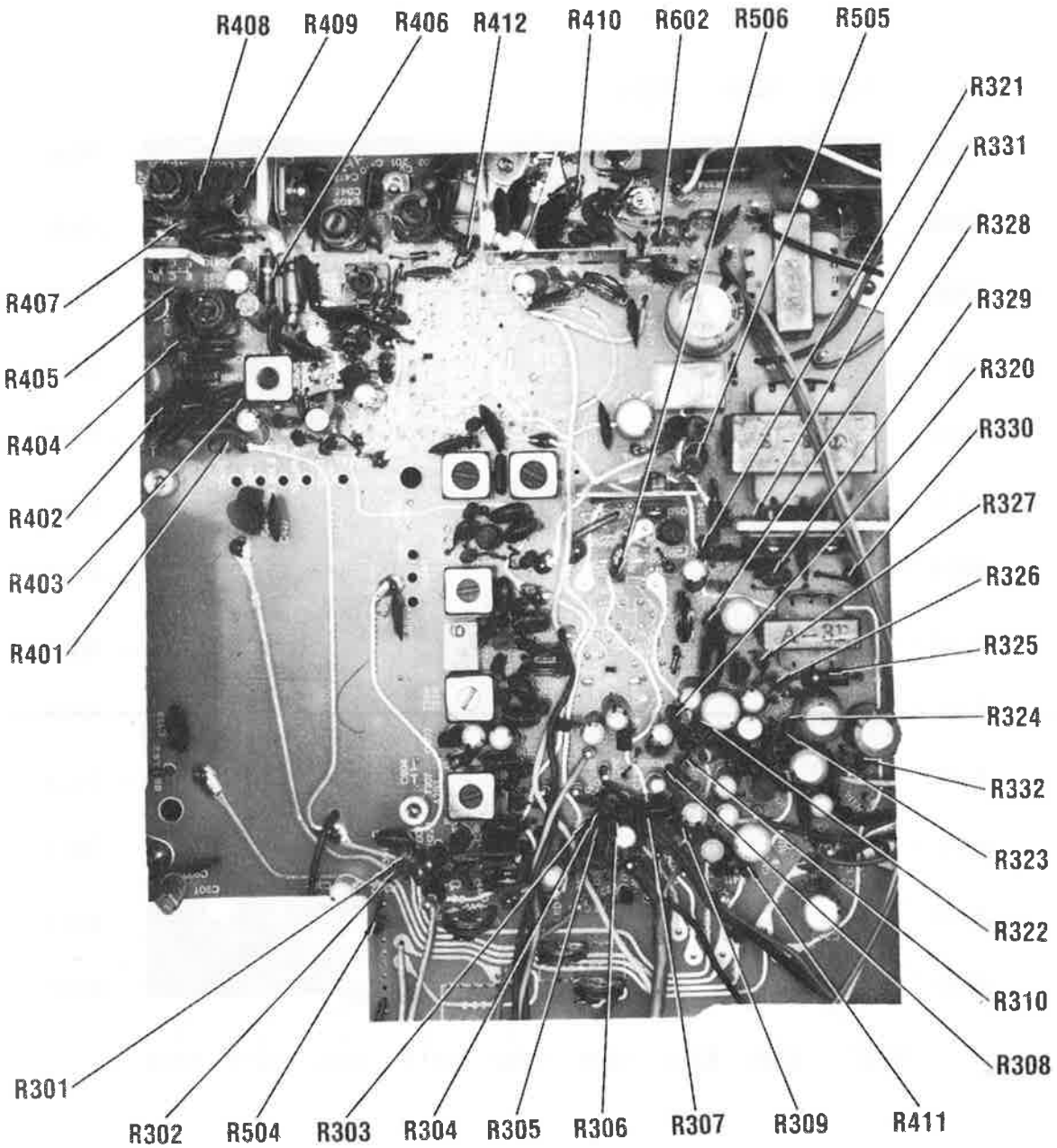
MAIN BOARD


C431
C424
C605
C604
C608
C601
C602
C603
C332
C333
C429
C337
C430
C336
C432
C328
C425
C335
C433
C327
C428
C325
C434
C326
C423
C329
C426
C339
C427
C338
C322
C343
C324
C342
C320
C321
C330
C331
C323
C341
C340

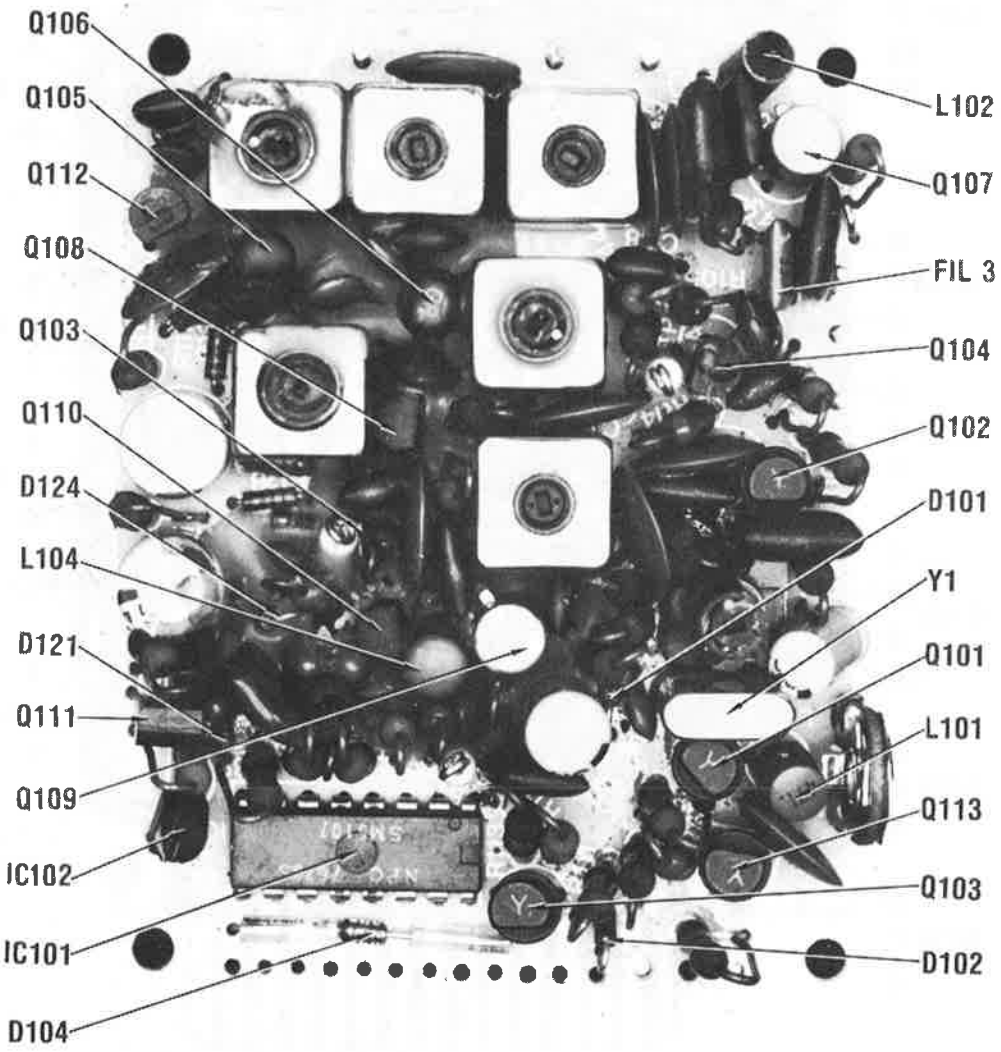
MAIN BOARD


R202
R203
R201
R205
R208
R206
R207
R204
R215
R214
R218
R220
R210
R223
R224
R225
R227
R228
R226
R229
R232
R311
R333
R312
R318
R317
R313
R314
R319
R315
R316
R222
R230
R219
R217
R216
R231
R334

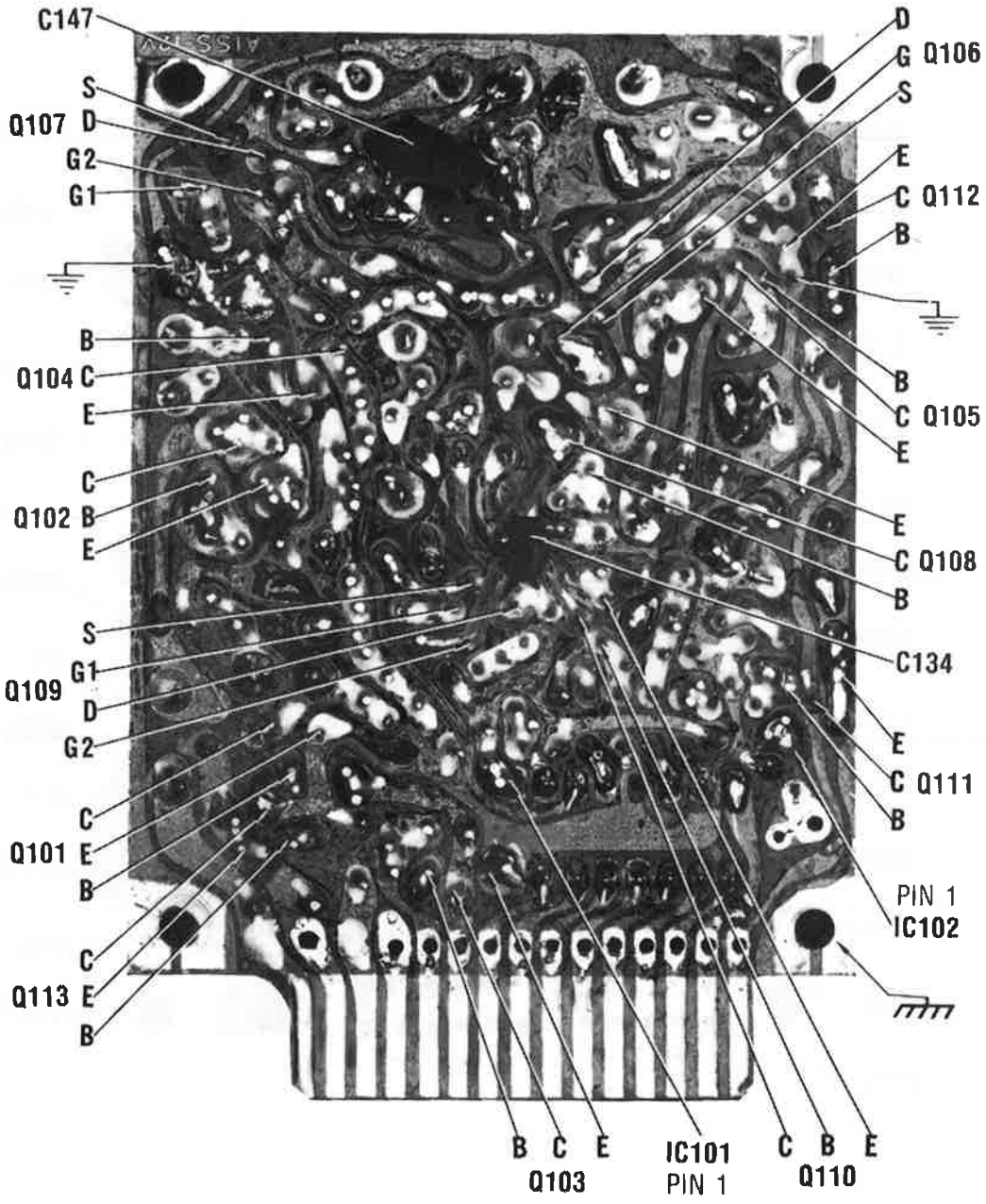
MAIN BOARD


R408
R409
R406
R412
R410
R602
R506
R505
R321
R331
R328
R329
R320
R330
R327
R326
R325
R324
R332
R323
R322
R310
R308
R407
R405
R404
R402
R403
R401
R301
R302
R504
R303
R304
R305
R306
R307
R309
R411

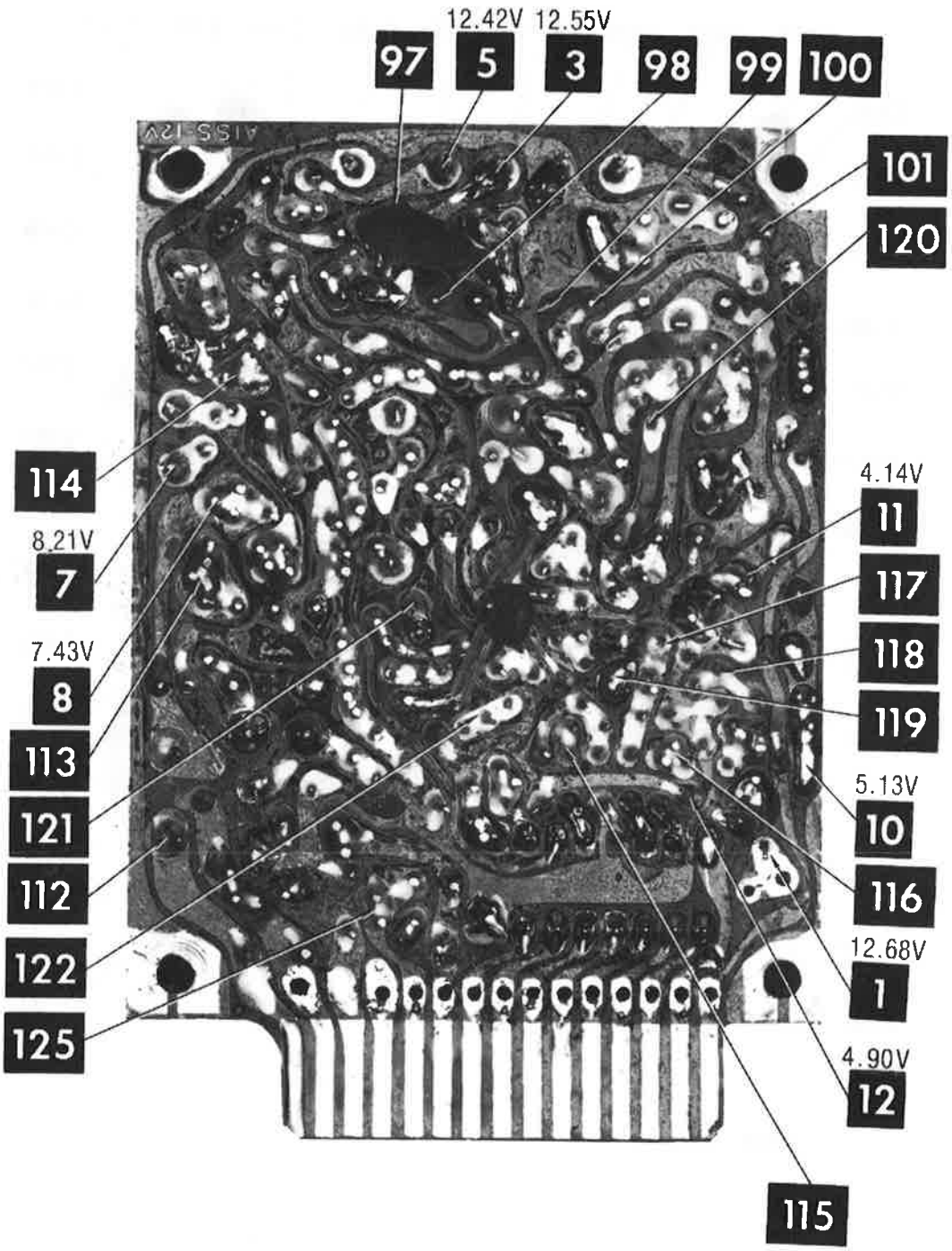
MA IN BOARD


Q106
Q105
Q112
Q108
Q103
Q110
D124
L104
D121
Q111
Q109
IC102
IC101
D104
L102
Q107
FIL 3
Q104
Q102
D101
Y1
Q101
L101
Q113
Q103
D102

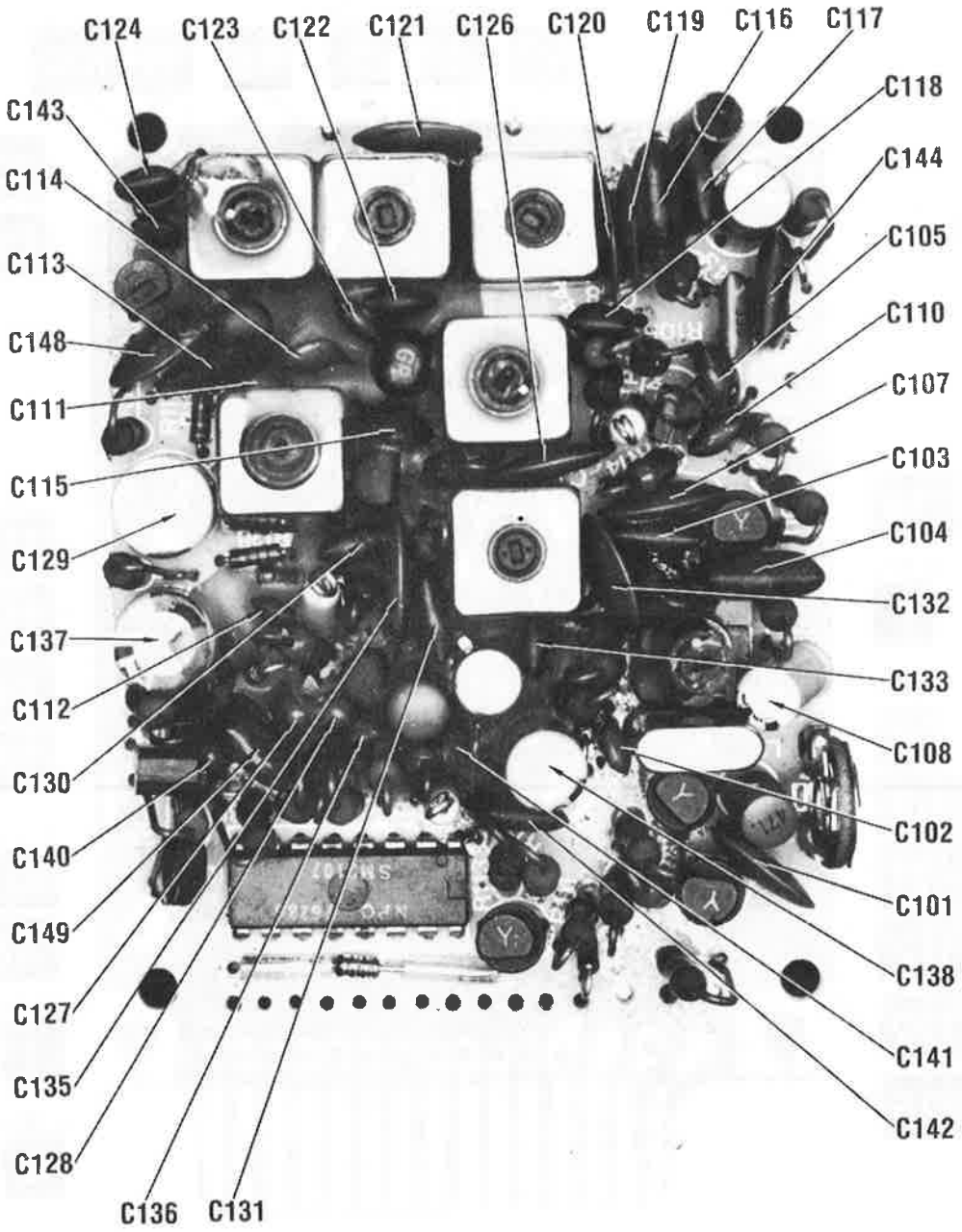
PLL BOARD


C147
S
Q107 D
G2
G1
B
Q104 C
E
C
Q102 B
E
S
G1
Q109
D
G2
C
Q101 E
B
C
Q113 E
B
D
G Q106
S
E
C Q112
B
B
C Q105
E
E
C Q108
B
C134
E
C Q111
B
PIN 1
IC102
B C E
Q103
IC101
PIN 1
C B E
Q110

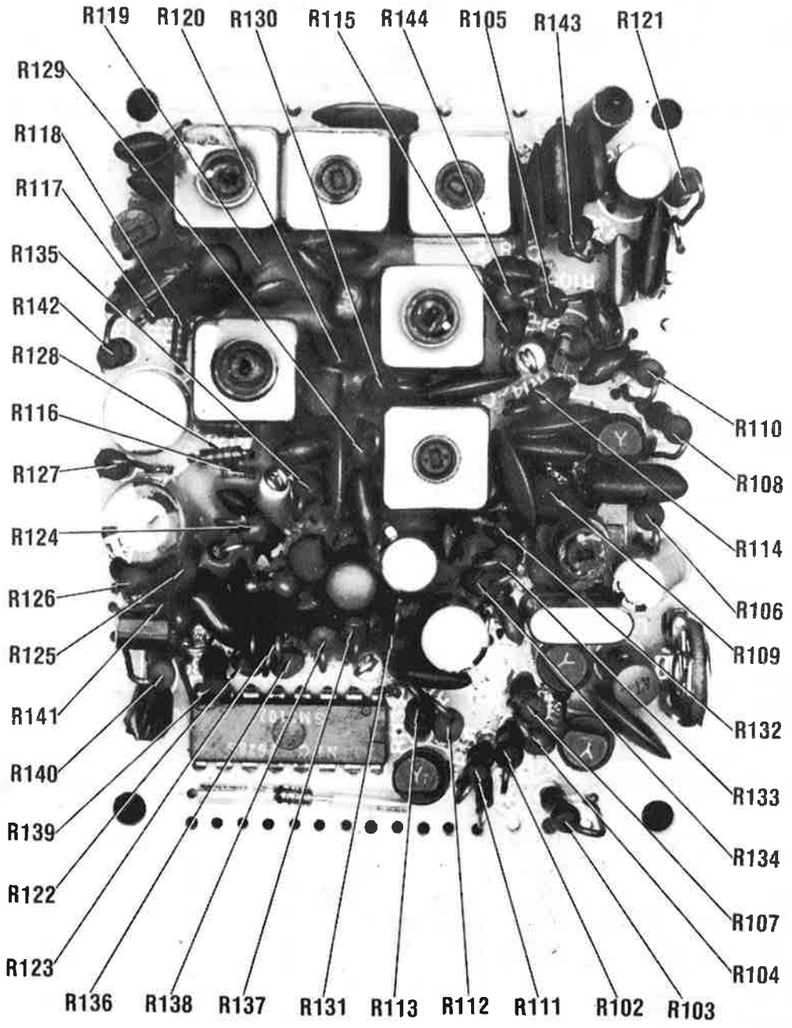
PLL BOARD


12.42V
12.55V
97
5
3
98
99
100
101
120
114
8.21V
7
7.43V
8
113
121
112
122
125
4.14V
11
117
118
119
5.13V
10
116
12.68V
1
4.90V
12
115

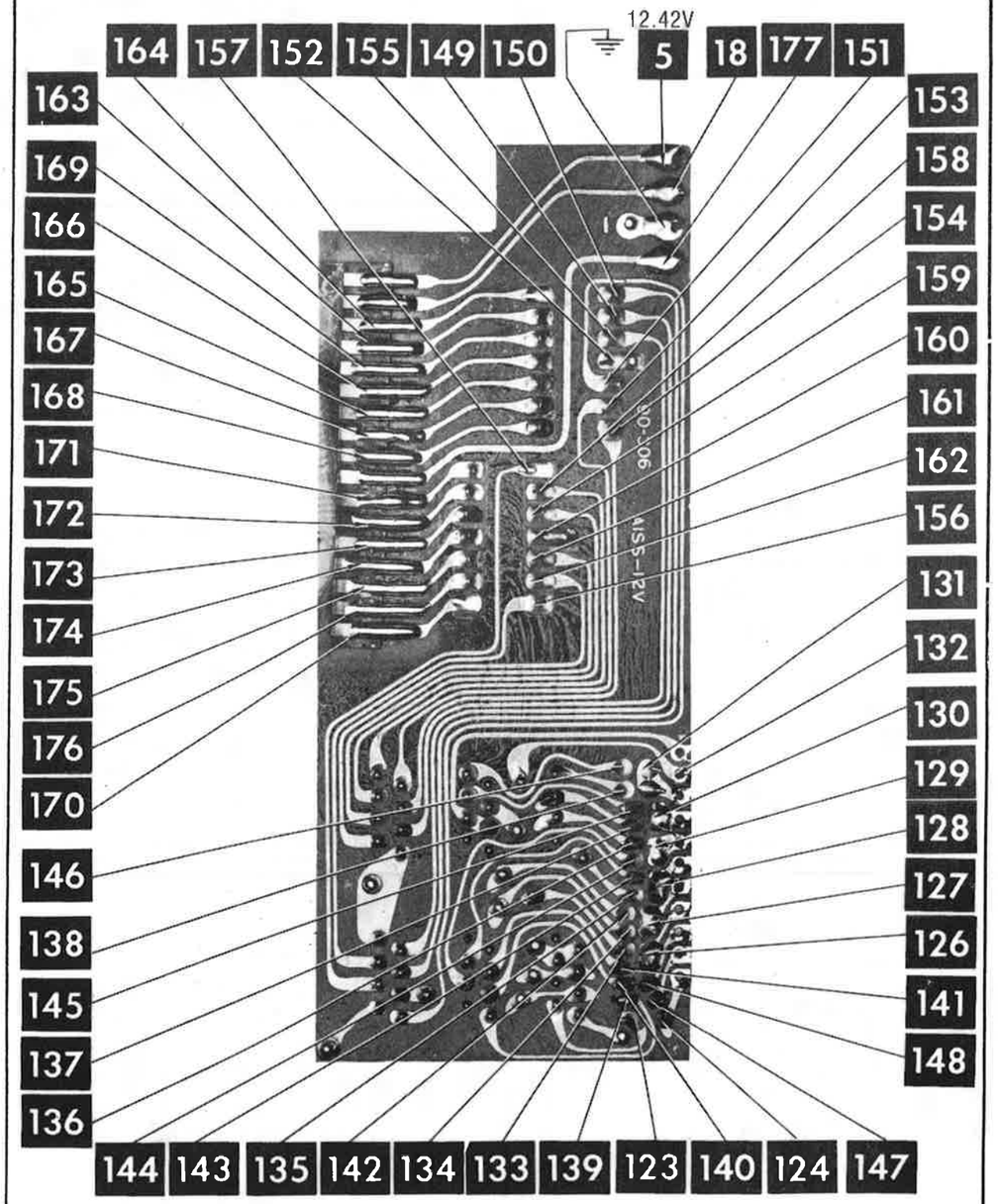
PLL BOARD


C124
C123
C122
C121
C126
C120
C119
C116
C117
C118
C143
C144
C114
C105
C113
C110
C148
C107
C111
C103
C115
C104
C129
C132
C137
C133
C112
C108
C130
C102
C140
C101
C149
C138
C127
C141
C135
C142
C128
C136
C131

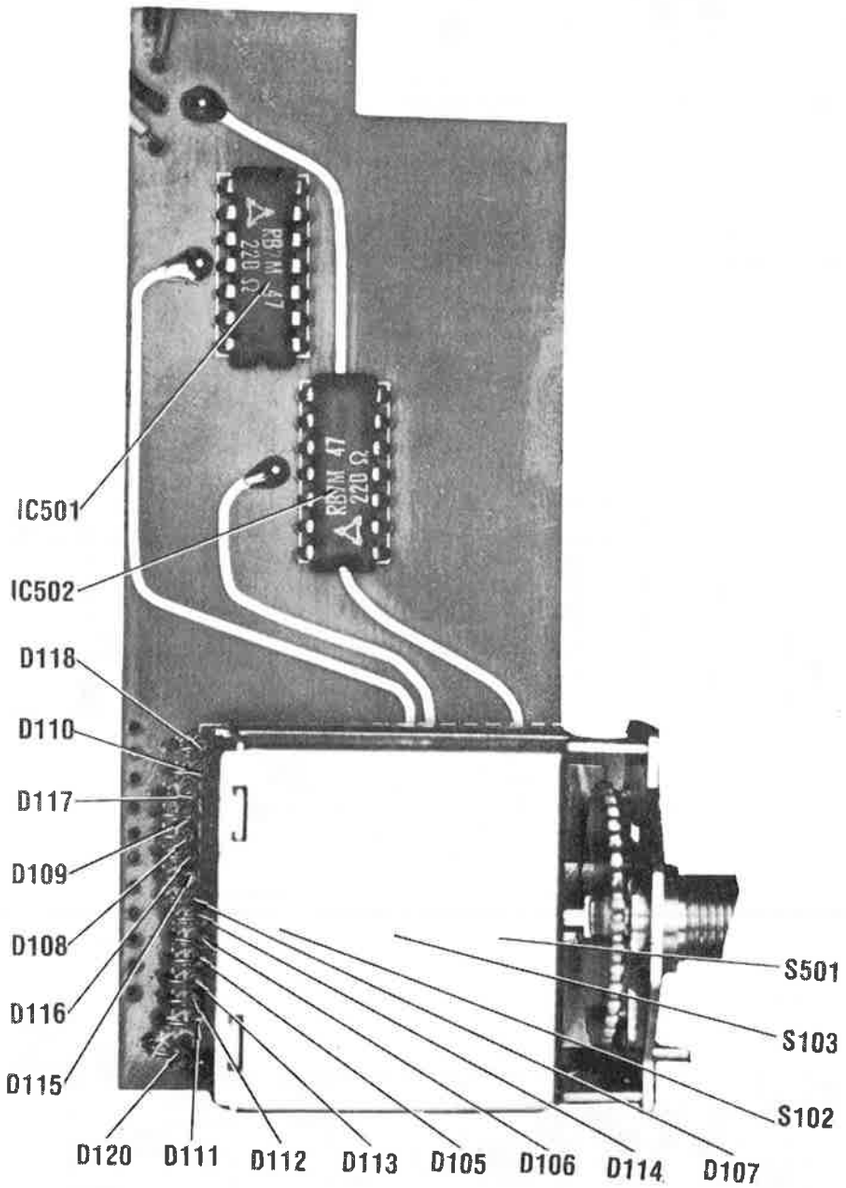
PLL BOARD



PLL BOARD

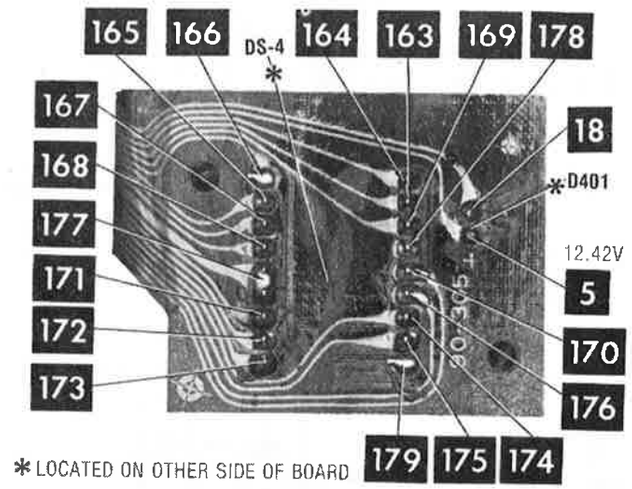


CH. SELECTOR BOARD



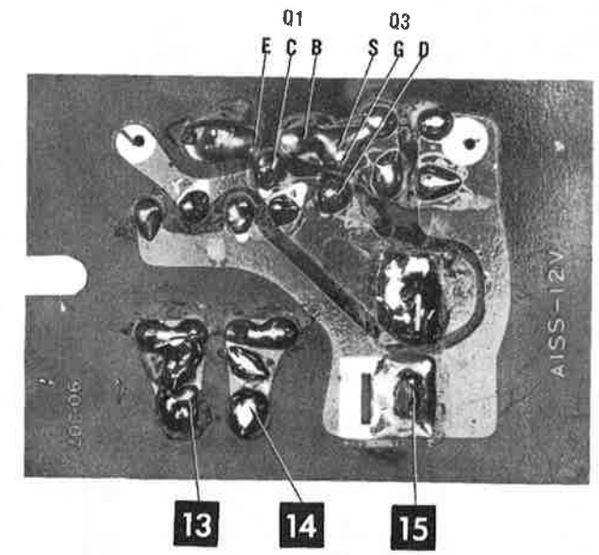
CH. SELECTOR BOARD

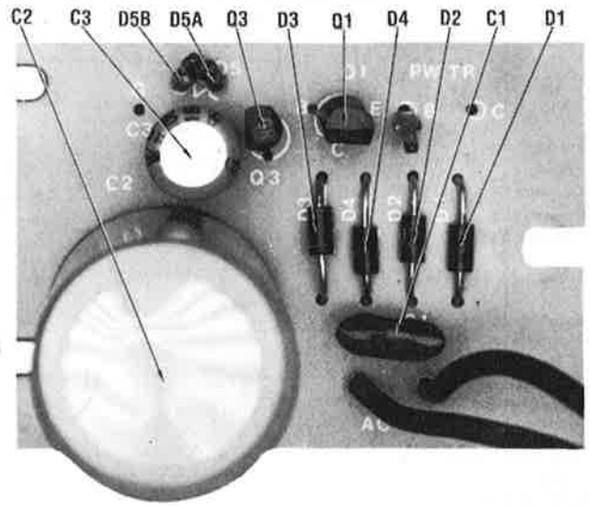
A Howard W. Sams CIRCUITRACE® Photo



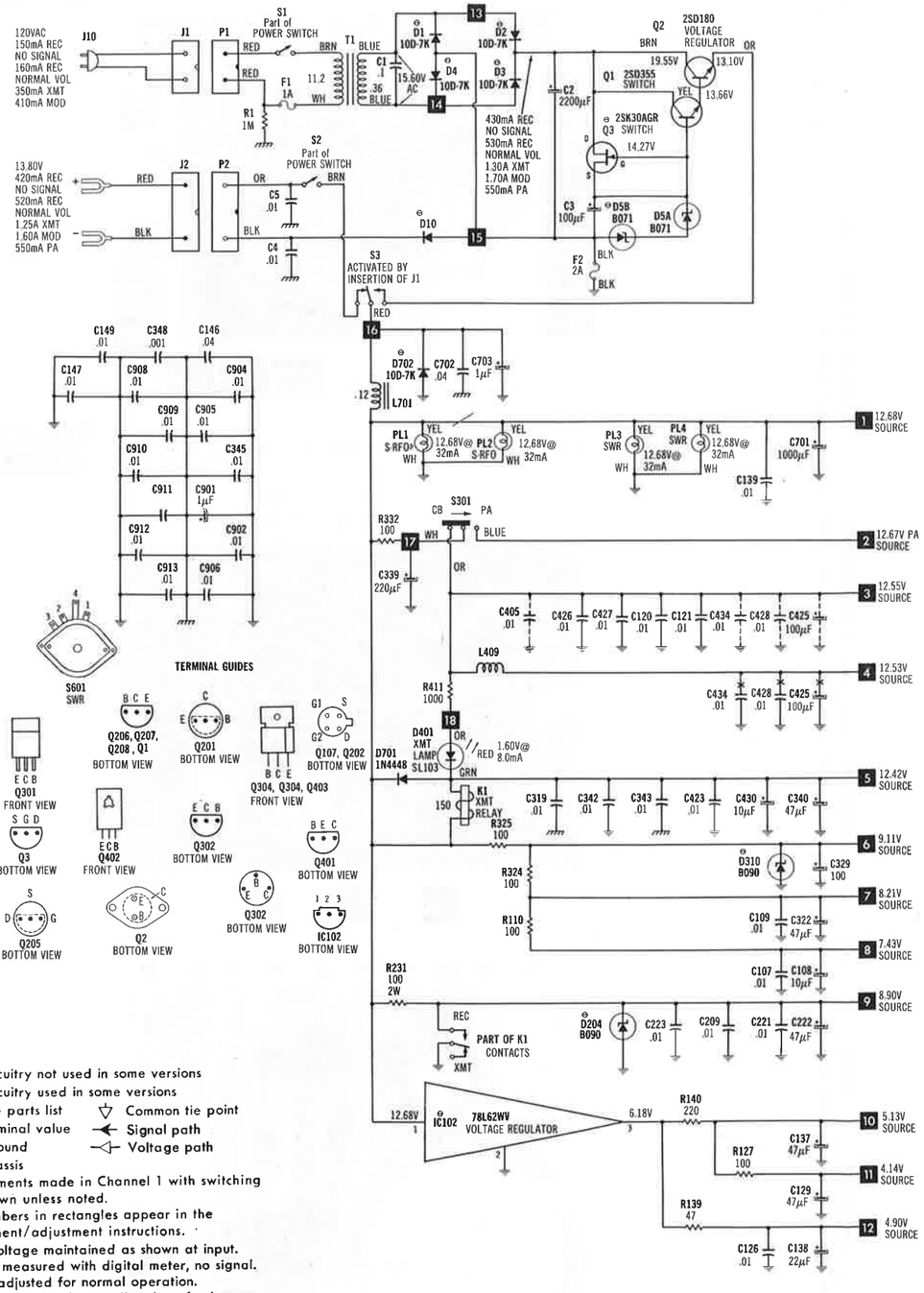
LED BOARD

A Howard W. Sams CIRCUITRACE® Photo





REGULATOR BOARD

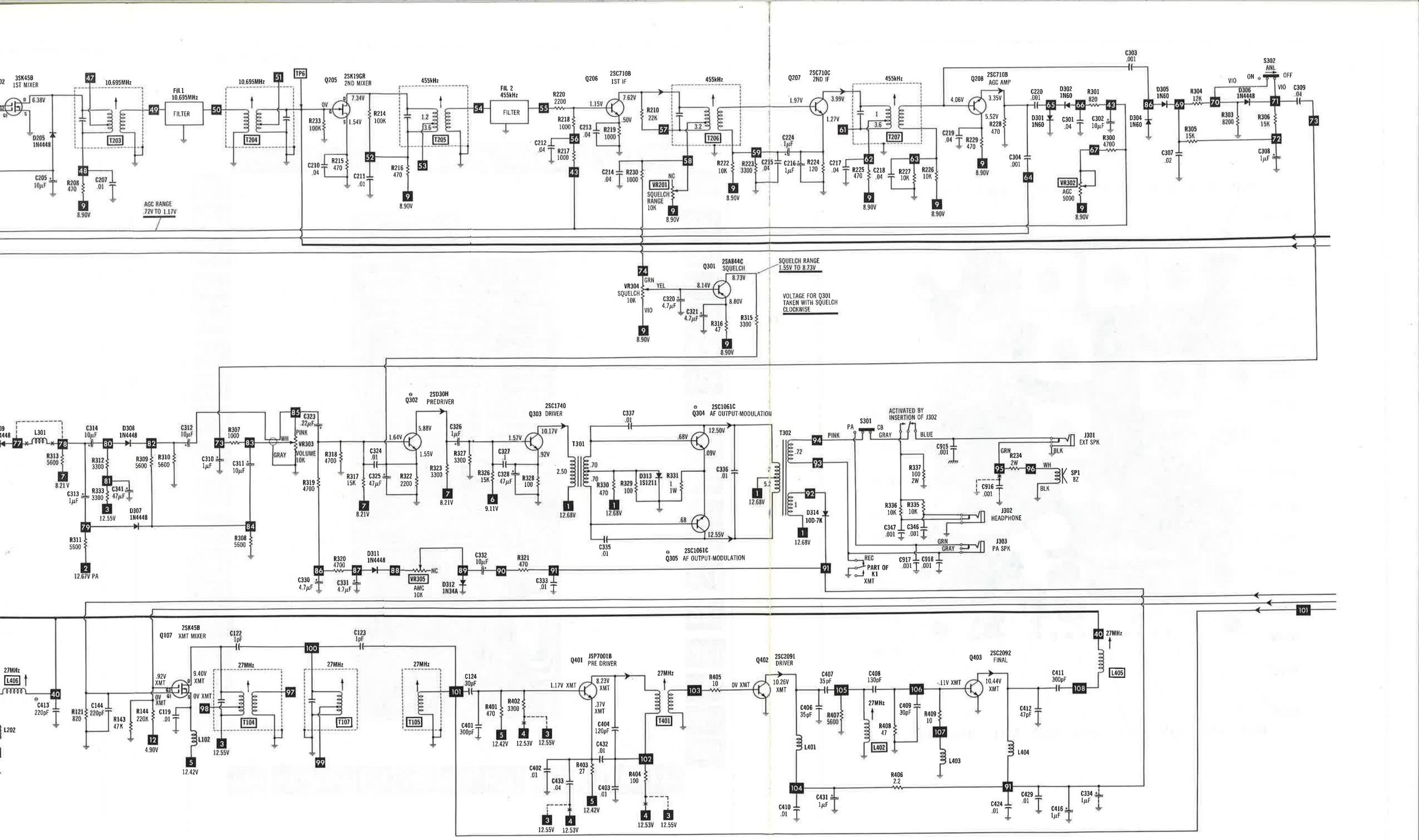


→ Circuitry not used in some versions
--- Circuitry used in some versions
⊖ See parts list
※ Nominal value
⏚ Ground
Chassis
▽ Common tie point
→ Signal path
◁ Voltage path

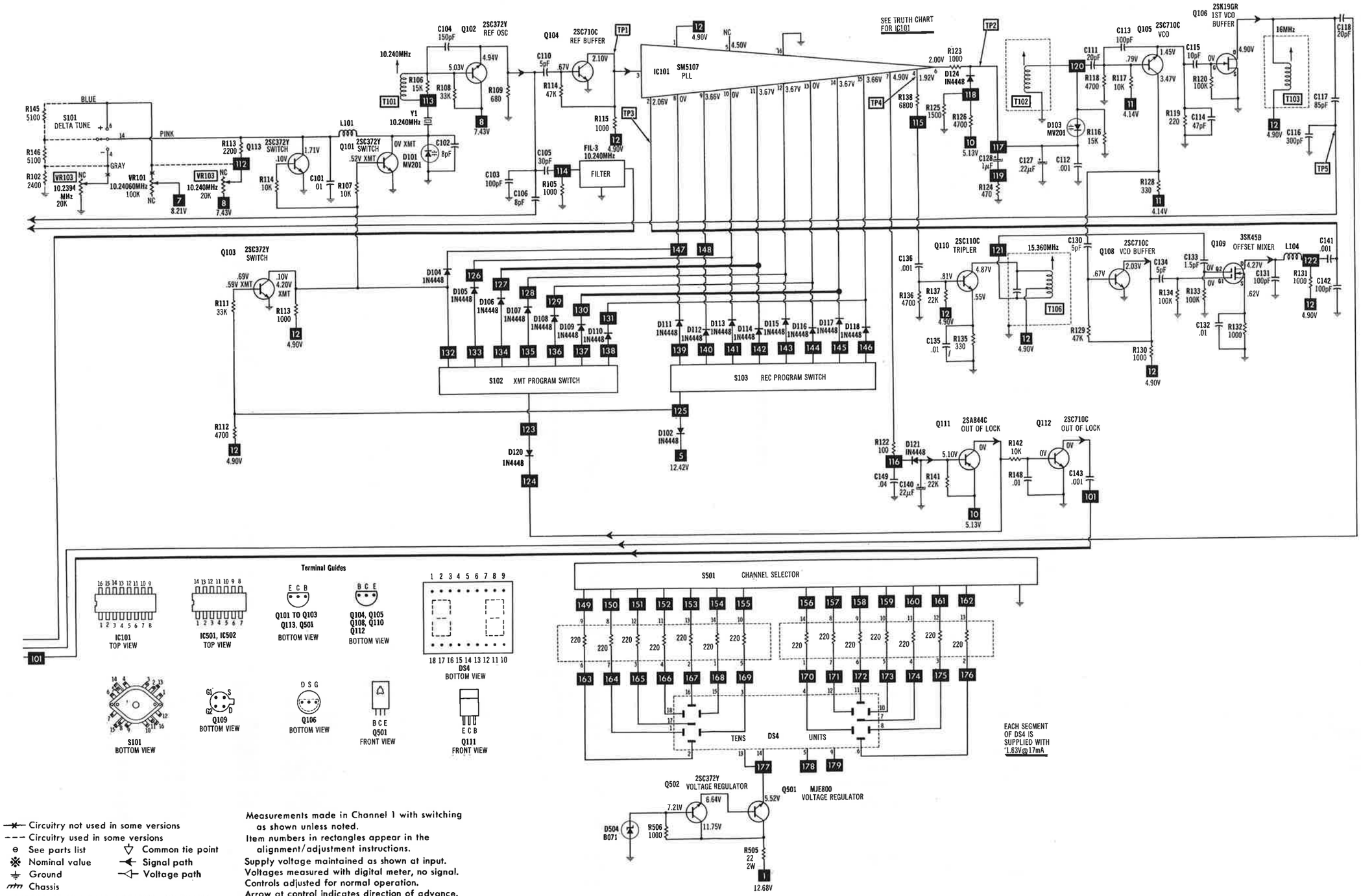
Measurements made in Channel 1 with switching as shown unless noted.
Item numbers in rectangles appear in the alignment/adjustment instructions.
Supply voltage maintained as shown at input.
Voltages measured with digital meter, no signal.
Controls adjusted for normal operation.
Arrow at control indicates 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 PHOTOFACT STANDARD NOTATION SCHEMATIC
WITH CIRCUITRACE®

POWER SUPPLY SCHEMATIC



MAIN SCHEMATIC

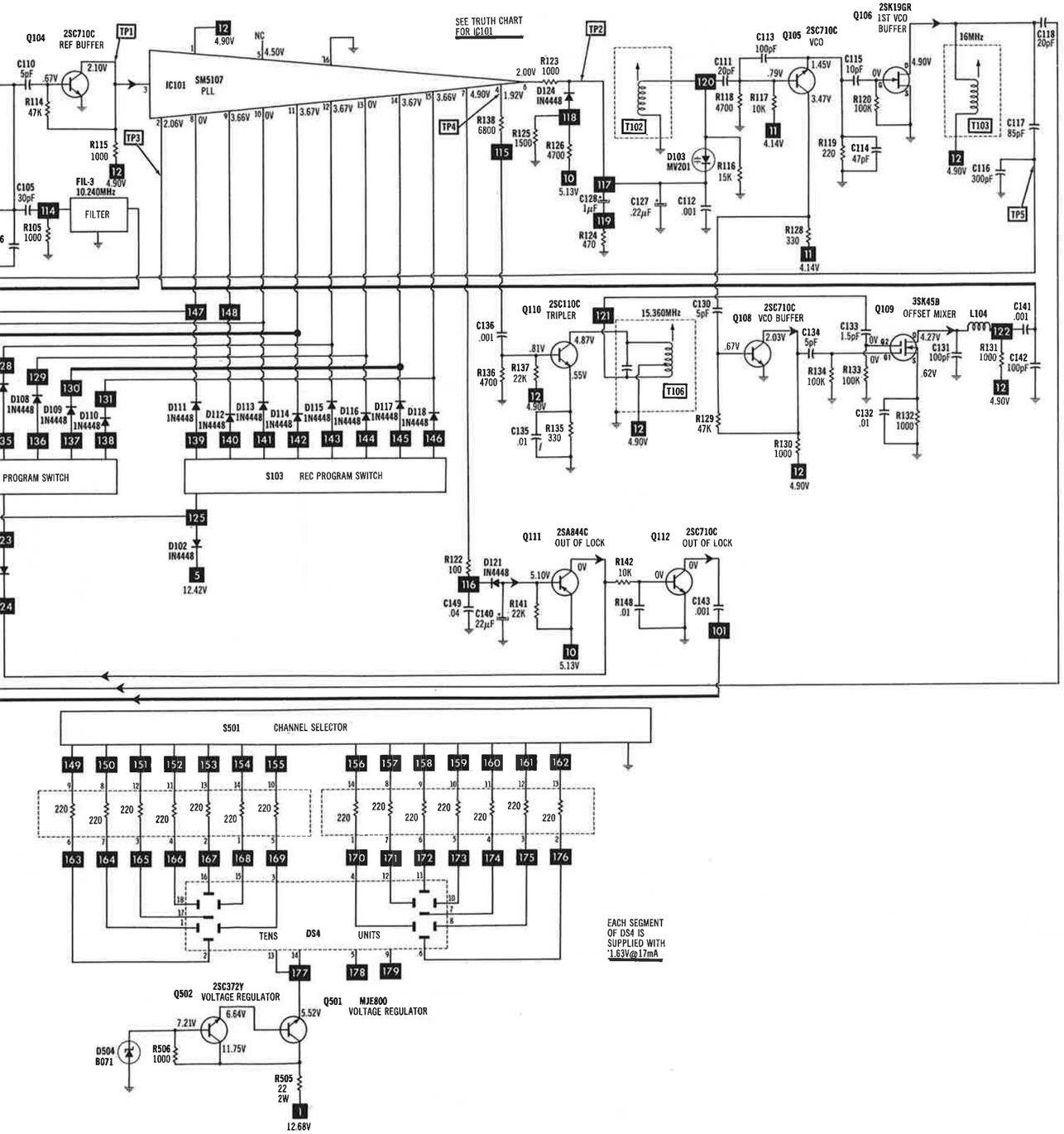


Circuitry not used in some versions
Circuitry used in some versions
See parts list
Nominal value
Ground
Chassis
Common tie point
Signal path
Voltage path

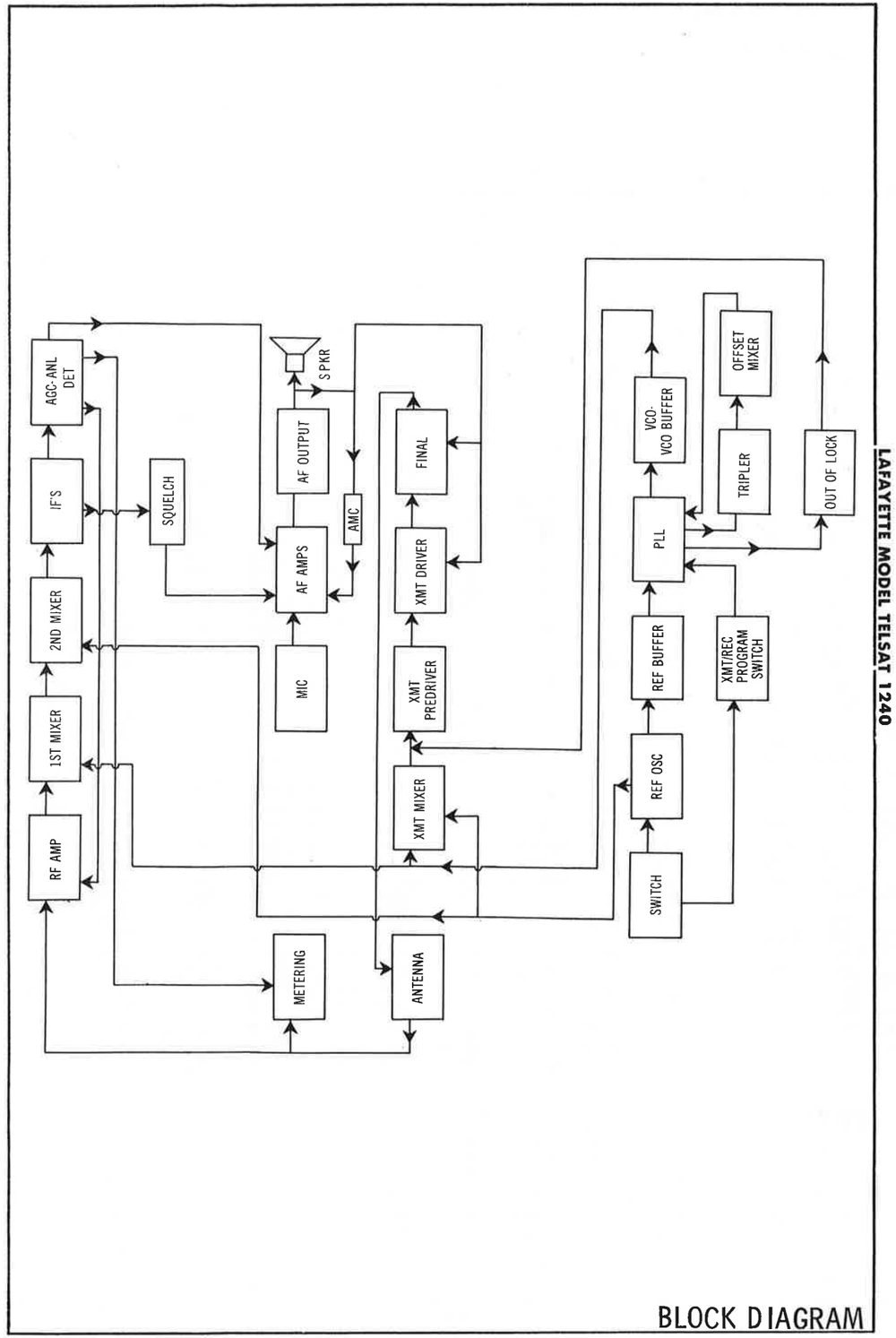
A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE®

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.

PLL SCHEMATIC



PLL SCHEMATIC



BLOCK DIAGRAM

PARTS LIST AND DESCRIPTION
(When ordering parts, state Model, Part Number, and Description.)

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')

SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA									
			GENERAL ELECTRIC PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.	THORDARSON PART No.	WORKMAN PART No.	ZENITH PART No.
D1	10D-7K		GE-509	PTC203	HEPR0055	REN 125	SK3032	RT-210	ECG125	TM125	WEP159	212-95
	10D-4	280217	GE-504A	PTC201	HEPR0053	REN 116	SK3312	RT-214	ECG116	TM116	WEP157	212-76-02
D2	10D-7K		GE-509	PTC203	HEPR0055	REN 125	SK3032	RT-210	ECG125	TM125	WEP159	212-95
	10D-4	280217	GE-504A	PTC201	HEPR0053	REN 116	SK3312	RT-214	ECG116	TM116	WEP157	212-76-02
D3	10D-7K		GE-509	PTC203	HEPR0055	REN 125	SK3032	RT-210	ECG125	TM125	WEP159	212-95
	10D-4	280217	GE-504A	PTC201	HEPR0053	REN 116	SK3312	RT-214	ECG116	TM116	WEP157	212-76-02
D4	10D-7K		GE-509	PTC203	HEPR0055	REN 125	SK3032	RT-210	ECG125	TM125	WEP159	212-95
	10D-4	280217	GE-504A	PTC201	HEPR0053	REN 116	SK3312	RT-214	ECG116	TM116	WEP157	212-76-02
D5A	B071		GEZD-7.5	ZB7.5B		REN 138	SK3059	RT-239	ECG138A	TM138/**	WEP1107	103-Z9002
	BZ071	281917	GEZD-7.5	ZB7.5B		REN 138	SK3059	RT-239	ECG138A	TM138/**	WEP1107	103-Z9002
	BZ150		GEZD-15	ZB15B		REN 145	SK3063	RT-245	ECG145A	TM145/**	WEP1114	103-Z9013
D5B	B071		GEZD-7.5	ZB7.5B		REN 138	SK3059	RT-239	ECG138A	TM138/**	WEP1107	103-Z9002
	BZ071	281917	GEZD-7.5	ZB7.5B		REN 138	SK3059	RT-239	ECG138A	TM138/**	WEP1107	103-Z9002
D10			GE-510	PTC205	HEPR0170	REN 125	SK3081	RT-201	ECG125	TM125	WEP170	212-Z9000
D101	MV201	280417		PTC301	HEPR2502	REN 612	SK3463		ECG612			103-176
D102	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D103	MV201	280417		PTC301	HEPR2502	REN 612	SK3463		ECG612			103-176
D104	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D105	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D106	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D107	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D108	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D109	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D110	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D111	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D112	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D113	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D114	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D115	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D116	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D117	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D118	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D120	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D121	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D124	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D201	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D202	1N34A	195617	1N34AS	PTC207	HEPR9134A	REN 109	SK3087	RT-200	ECG109	TM109/**	WEP134	103-Z9001
D203	1N60	100017	1N60	PTC206	HEPR9135	REN 109	SK3088	RT-263	ECG109	TM109/**	WEP134	103-Z9001
D204	B090		GEZD-9.1	ZB9.1B		REN 139	SK3060	RT-240	ECG139A	TM139/**	WEP1109	103-272
	BZ090	280317	GEZD-9.1	ZB9.1B		REN 139	SK3060	RT-240	ECG139A	TM139/**	WEP1109	103-272
D205	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D206	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D301	1N60	100017	1N60	PTC206	HEPR9135	REN 109	SK3088	RT-263	ECG109	TM109/**	WEP134	103-Z9001
D302	1N60	100017	1N60	PTC206	HEPR9135	REN 109	SK3088	RT-263	ECG109	TM109/**	WEP134	103-Z9001
D303	1N60	100017	1N60	PTC206	HEPR9135	REN 109	SK3088	RT-263	ECG109	TM109/**	WEP134	103-Z9001
D304	1N60	100017	1N60	PTC206	HEPR9135	REN 109	SK3088	RT-263	ECG109	TM109/**	WEP134	103-Z9001
D305	1N60	100017	1N60	PTC206	HEPR9135	REN 109	SK3088	RT-263	ECG109	TM109/**	WEP134	103-Z9001
D306	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D307	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D308	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D309	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D310	B090		GEZD-9.1	ZB9.1B		REN 139	SK3060	RT-240	ECG139A	TM139/**	WEP1109	103-272
	BZ090	280317	GEZD-9.1	ZB9.1B		REN 139	SK3060	RT-240	ECG139A	TM139/**	WEP1109	103-272
D311	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D312	1N34A	195617	1N34AS	PTC207	HEPR9134A	REN 109	SK3087	RT-200	ECG109	TM109/**	WEP134	103-Z9001
D313	1S1211	280117		PTC301		REN 601	SK3463		ECG601			
D314	10D-7K		GE-509	PTC203	HEPR0056	REN 125	SK3080	RT-210	ECG125	TM125	WEP160	103-247
	10D-4	280217	GE-504A	PTC201	HEPR0053	REN 116	SK3312	RT-214	ECG116	TM116	WEP157	212-76-02
D402	1N60	100017	1N60	PTC206	HEPR9135	REN 109	SK3088	RT-263	ECG109	TM109/**	WEP134	103-Z9001
D504	B071		GEZD-7.5	ZB7.5B		REN 138	SK3059	RT-239	ECG138A	TM138/**	WEP1107	103-Z9002
	BZ071	281917	GEZD-7.5	ZB7.5B		REN 138	SK3059	RT-239	ECG138A	TM138/**	WEP1107	103-Z9002
D601	1N60	100017	1N60	PTC206	HEPR9135	REN 109	SK3088	RT-263	ECG109	TM109/**	WEP134	103-Z9001
D602	1N60	100017	1N60	PTC206	HEPR9135	REN 109	SK3088	RT-263	ECG109	TM109/**	WEP134	103-Z9001
D603	1N60	100017	1N60	PTC206	HEPR9135	REN 109	SK3088	RT-263	ECG109	TM109/**	WEP134	103-Z9001
D604	1N60	100017	1N60	PTC206	HEPR9135	REN 109	SK3088	RT-263	ECG109	TM109/**	WEP134	103-Z9001
D701	1N4448	280017	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287
D702	10D-7K		GE-509	PTC203	HEPR0056	REN 125	SK3080	RT-210	ECG125	TM125	WEP160	103-247
IC101	SM5107	111725										
IC102	78L62WV											
	78L62AWC	111825										
	78L62											
Q1	2SD355	248017	GE-271	PTC143*	HEPS3011*	REN 297	SK3024*	RT-114*	ECG297	TM297	WEP914	121-Z9014
Q2	2SD180	282217		PTC140	HEPS7002	REN 223	SK3027	RT-131	ECG223	TM223/**	WEP704	121-Z9034
Q3	2SK30AGR		GE-FET-1	PTC151	HEPF0010	REN 133	SK3112	RT-176	ECG133	TM133	WEP801	121-756
	2SK30GR	226517	GE-FET-1	PTC151	HEPF0010	REN 133	SK3112	RT-176	ECG133	TM133	WEP801	121-756
Q101	2SC372Y	256917	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A*/**	WEP372	121-Z9000A*
Q102	2SC372Y	256917	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A*/**	WEP372	121-Z9000A*
Q103	2SC372Y	256917	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A*/**	WEP372	121-Z9000A*
Q104	2SC710C	229017	GE-211*	PTC132	HEPS0016*	REN 123A*	SK3444	RT-308*	ECG123A*	TM123A*/**	WEP710	121-Z9000A
Q105	2SC710C	229017	GE-211*	PTC132	HEPS0016*	REN 123A*	SK3444	RT-308*	ECG123A*	TM123A*/**	WEP710	121-Z9000A
Q106	2SK19GR	207417	GE-FET-2	PTC161	HEPF0021	REN 132	SK3448	RT-175	ECG312	TM312	WEP920	121-756
Q107	3SK45B	258017	GE-FET-4	PTC182	HEPF2007	REN 222	SK3065	RT-181	ECG222	TM222	WEP905	121-826
Q108	2SC710C	229017	GE-211*	PTC132	HEPS0016*	REN 123A*	SK3444	RT-308*	ECG123A*	TM123A*/**	WEP710	121-Z9000A
Q109	3SK45B	258017	GE-FET-4	PTC182	HEPF2007	REN 222	SK3065	RT-181	ECG222	TM222	WEP905	121-826
Q110	2SC710C	229017	GE-211*	PTC132	HEPS0016*	REN 123A*	SK3444	RT-308*	ECG123A*	TM123A*/**	WEP710	121-Z9000A
Q111	2SA844C	268717	GE-244*	PTC103*	HEPS0019*	REN 129*	SK3114	RT-126A*	ECG129*	TM129*	WEP564	121-Z9005
Q112	2SC710C	229017	GE-211*	PTC132	HEPS0016*	REN 123A*	SK3444	RT-308*	ECG123A*	TM123A*/**	WEP710	121-Z9000A

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.	MFGR. PART No.	REPLACEMENT DATA									
			GENERAL ELECTRIC PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.	THORDARSON PART No.	WORKMAN PART No.	ZENITH PART No.
Q113	2SC372Y	256917	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A*/**	WEP372	121-Z9000A*
Q201	2SC941-O	282317	GE-210	PTC132*	HEPS0016*	REN 123A*	SK3122	RT-107A	ECG123A*	TM123A*	WEP66	121-Z9000A*
Q202	3SK45B	258017	GE-FET-4	PTC182	HEPF2007	REN 222	SK3065	RT-181	ECG222	TM222	WEP905	121-826
Q205	2SK19GR	207417	GE-FET-2	PTC161	HEPF0021	REN 132	SK3448	RT-175	ECG312	TM312	WEP920	121-756
Q206	2SC710B	244817	GE-211*	PTC132	HEPS0016*	REN 123A*	SK3444	RT-308*	ECG123A*	TM123A*/**	WEP710	121-Z9000A
Q207	2SC710C	229017	GE-211*	PTC132	HEPS0016*	REN 123A*	SK3444	RT-308*	ECG123A*	TM123A*/**	WEP710	121-Z9000A
Q208	2SC710B	244817	GE-211*	PTC132	HEPS0016*	REN 123A*	SK3444	RT-308*	ECG123A*	TM123A*/**	WEP710	121-Z9000A
Q301	2SA844C	268717	GE-244*	PTC103*	HEPS0019*	REN 129*	SK3114	RT-126A*	ECG129*	TM129*	WEP564	121-Z9005
Q302	2SD30H		GE-59	PTC134	HEPG0011	REN 103A	SK3010	RT-123	ECG103A	TM103A	WEP641B	121-Z9015
	2SD30G	279317	GE-59	PTC134	HEPG0011	REN 103A	SK3010	RT-123	ECG103A	TM103A	WEP641B	121-Z9015
Q303	2SC1740	279917	GE-62	PTC121*	HEPS0015*	REN 123A*	SK3122	RT-109*	ECG123A*	TM123A*	WEP736*	121-Z9000A*
Q304	2SC1061C	279517	GE-66	PTC167	HEPS3061	REN 152	SK3054	RT-197	ECG152	TM152/**	WEP745	121-Z9002
	2SC1061		GE-66	PTC167	HEPS3061	REN 152	SK3054	RT-197	ECG152	TM152/**	WEP745	121-Z9002
Q305	2SC1061C	279517	GE-66	PTC167	HEPS3061	REN 152	SK3054	RT-197	ECG152	TM152/**	WEP745	121-Z9002
	2SC1061		GE-66	PTC167	HEPS3061	REN 152	SK3054	RT-197	ECG152	TM152/**	WEP745	121-Z9002
Q401	JSP7001B	279417	GE-20	PTC136	HEPS0015	REN 123A*	SK3444	RT-308	ECG123A*	TM123A*	WEP736	121-Z9000A
Q402	2SC2091	279617	GE-270	PTC180		REN 295	SK3253		ECG295	TM295	WEP913	121-880
Q403	2SC2092	279717	GE-337	PTC186		REN 235	SK3197	RT-146	ECG235	TM235	WEP840*	121-Z9039
Q501	MJE800	279817			HEPS9101		SK3180		ECG253			
Q502	2SC372Y	256917	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A*/**	WEP372	121-Z9000A*

* Lead configuration may vary from original.
/** Also available as exact type replacement.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	MFGR. PART No.	REPLACEMENT DATA				
			CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.		
					Q-LINE	GENERAL LINE
C2	2200 35V		WBR2000-50	TC50200A	QE1-648	TVA-1318.3
C3	100 16V		PC100-16	VTT100F16	QV1-95	EV-1230
C108	10 16V		PC10-25	VTT10B25	QV1-41	EV-1222
C127	.22 35V			TDC224M050EL	QDT1-10	SD50-R229
C128	1 25V			TDC105M035EL		SD35-19
C129	47 16V		PC50-16	VTT47D16	QV1-73	EV-1226
C137	47 16V		PC50-16	VTT47D16	QV1-73	EV-1226
C138	22 16V		PC25-25	VTT22B16	QV1-55	EV-1224
C140	.22 35V			TDC224M050EL	QDT1-10	SD50-R229
C205	10 16V		PC10-25	VTT10B25	QV1-41	EV-1222
C216	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C222	47 16V		PC50-16	VTT47D16	QV1-73	EV-1226
C224	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C225	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C302	10 16V		PC10-25	VTT10B25	QV1-41	EV-1222
C305	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C308	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C310	.1 16V			TDC104M050EL	QDT1-2	SD50-R109
C311	10 16V		PC10-25	VTT10B25	QV1-41	EV-1222
C312	10 16V		PC10-25	VTT10B25	QV1-41	EV-1222
C313	10 16V		PC10-25	VTT10B25	QV1-41	EV-1222
C314	10 16V		PC10-25	VTT10B25	QV1-41	EV-1222
C315	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C320	4.7 25V		PC5-50	VTT4R7B50	QV1-27	EV-1319
C321	4.7 25V		PC5-50	VTT4R7B50	QV1-27	EV-1319
C322	47 16V		PC50-16	VTT47D16	QV1-73	EV-1226
C323	.22 25V			TDC224M050EL	QDT1-10	SD50-R229
C325	47 16V		PC50-16	VTT47D16	QV1-73	EV-1226
C326	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C328	47 16V		PC50-16	VTT47D16	QV1-73	EV-1226
C329	100 16V		PC100-16	VTT100F16	QV1-95	EV-1230
C330	4.7 25V		PC5-50	VTT4R7B50	QV1-27	EV-1319
C331	4.7 25V		PC5-50	VTT4R7B50	QV1-27	EV-1319
C332	10 16V		PC10-25	VTT10B25	QV1-41	EV-1222
C334	1					
C339	220 16V		PC250-25	VTT220H16	QV1-117	EV-1240
C340	47 16V		PC50-16	VTT47D16	QV1-73	EV-1226
C341	47 16V		PC50-16	VTT47D16	QV1-73	EV-1226
C416	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C421	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C425	100 16V		PC100-16	VTT100F16	QV1-95	EV-1230
C430	10 16V		PC10-25	VTT10B25	QV1-41	EV-1222
C431	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C701	1000 16V		PC1000-16	VTT1000L16	QV1-183	EV-1260
C703	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C901	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615

CAPACITORS

ITEM No.	RATING	MFGR. PART No.	REPLACEMENT DATA				
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
						Q-LINE	GENERAL LINE
C1	.1 10%			WMF05P1	EWF05010	QFT2-215	1FT-P10
C4	.01 500V		DD6-103		SM110		5GAS-S10
C5	.01 500V		DD6-103		SM110		
C101	.01		UK50-103		MAG5011		
C102	8 N750		DTN-10	N10	CN7410		10TCU-Q10
C103	100 10%			CD15FD101J03	SX310	QW1-27	MWA-101
C104	150 10%			CD15FD151J03	SX315	QW1-31	MWA-151
C105	30			CD15ED300J03	SX430	QW1-14	MWA-300
C106	8			CD15CD080D03		QW1-5	MWA-080
C107	.01		UK50-103		MAG5011		
C109	.01		UK50-103		MAG5011		
C110	5			CD15CD050D03		QW1-2	MWA-050
C111	20 N750		DTN-20	N20	CN7420		10TCU-Q20
C112	.001		DD-102		GP210		10TS-D10

PARTS LIST A
(When ordering parts

CAPACITORS

ITEM No.	RATI
C113	100 10%
C114	47 N750
C115	10
C116	150 10%
C117	120 10%
C118	20
C119	.01
C120	.01
C121	.01
C122	1
C123	1
C124	30
C126	.01
C130	5
C131	100 10%
C132	.01
C133	1.5
C134	5
C135	.01
C136	.001
C139	.01
C141	.001
C142	100 10%
C143	.001
C144	220 10%
C146	.04 10%
C147	.01
C148	.01
C149	.04 10%
C201	30 N750
C202	.01
C203	.01
C204	.01
C206	.001
C207	.01
C209	.01
C210	.04 10%
C211	.04 10%
C212	.04 10%
C213	.04 10%
C214	.04 10%
C215	.04 10%
C217	.04 10%
C218	.04 10%
C219	.04 10%
C220	.001
C221	.01
C223	.01
C226	.01
C301	.04 10%
C303	.001
C304	.001
C306	.01
C307	.02 50V 10
C309	.04 10%
C316	.01
C317	.01
C318	.01
C319	.01
C324	.01
C327	.1 10%
C335	.01
C336	.01
C337	.01
C338	.01
C342	.01
C343	.01
C345	.01
C346	.001
C347	.001
C348	.001
C349	.01
C401	300 10%
C402	.01
C403	.01
C404	120 10%
C405	.01
C406	35
C407	35
C408	130 10%
C409	30
C410	.01
C411	300 10%
C412	47
C413	220 10%
C414	2
C415	220 10%
C417	220 10%
C418	12
C419	220 10%
C420	.01
C422	.01
C423	.01
C424	.01
C426	.01
C427	.01
C428	.01
C429	.01
C432	.01
C433	.04 10%
C434	.01
C601	.001

9471 (5')
8497 (6')
9472 (7-1/2')
9466 (6')
9468 (10')
8415 (6')
9467 (6')
9465 (7-1/2')

ARSON No.	WORKMAN PART No.	ZENITH PART No.
	WEP159	212-95
	WEP157	212-76-02
	WEP159	212-95
	WEP157	212-76-02
	WEP159	212-95
	WEP157	212-76-02
**	WEP1107	103-Z9002
**	WEP1107	103-Z9002
**	WEP1114	103-Z9013
**	WEP1107	103-Z9002
**	WEP1107	103-Z9002
	WEP170	212-Z9000
		103-176
	WEP925	103-287
		103-176
	WEP925	103-287
	WEP925	103-287
	WEP925	103-287
	WEP925	103-287
	WEP925	103-287
	WEP925	103-287
	WEP925	103-287
	WEP925	103-287
	WEP925	103-287
	WEP925	103-287
	WEP925	103-287
	WEP925	103-287
	WEP925	103-287
**	WEP134	103-Z9001
**	WEP134	103-Z9001
**	WEP1109	103-272
**	WEP1109	103-272
	WEP925	103-287
	WEP925	103-287
**	WEP134	103-Z9001
**	WEP134	103-Z9001
**	WEP134	103-Z9001
**	WEP134	103-Z9001
	WEP925	103-287
	WEP925	103-287
	WEP925	103-287
**	WEP1109	103-272
**	WEP1109	103-272
	WEP925	103-287
**	WEP134	103-Z9001
	WEP160	103-247
	WEP157	212-76-02
**	WEP134	103-Z9001
**	WEP1107	103-Z9002
**	WEP1107	103-Z9002
**	WEP134	103-Z9001
**	WEP134	103-Z9001
**	WEP134	103-Z9001
	WEP925	103-287
	WEP160	103-247
	WEP914	121-Z9014
**	WEP704	121-Z9034
	WEP801	121-756
	WEP801	121-756
*/**	WEP372	121-Z9000A¶
*/**	WEP372	121-Z9000A¶
*/**	WEP372	121-Z9000A¶
*/**	WEP710	121-Z9000A
*/**	WEP710	121-Z9000A
	WEP920	121-756
	WEP905	121-826
*/**	WEP710	121-Z9000A
	WEP905	121-826
*/**	WEP710	121-Z9000A
*/**	WEP564	121-Z9005
*/**	WEP710	121-Z9000A

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.	MFGR. PART No.	REPLACEMENT DATA									
			GENERAL ELECTRIC PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.	THORDARSON PART No.	WORKMAN PART No.	ZENITH PART No.
Q113	2SC372Y	256917	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A*/**	WEP372	121-Z9000A*
Q201	2SC941-0	282317	GE-210	PTC132*	HEPS0016*	REN 123A*	SK3122	RT-107A	ECG123A*	TM123A*	WEP66	121-Z9000A*
Q202	3SK45B	258017	GE-FET-4	PTC182	HEPF2007	REN 222	SK3065	RT-181	ECG222	TM222	WEP905	121-826
Q205	2SK19GR	207417	GE-FET-2	PTC161	HEPF0021	REN 132	SK3448	RT-175	ECG312	TM312	WEP920	121-756
Q206	2SC710B	244817	GE-211*	PTC132	HEPS0016*	REN 123A*	SK3444	RT-308*	ECG123A*	TM123A*/**	WEP710	121-Z9000A
Q207	2SC710C	229017	GE-211*	PTC132	HEPS0016*	REN 123A*	SK3444	RT-308*	ECG123A*	TM123A*/**	WEP710	121-Z9000A
Q208	2SC710B	244817	GE-211*	PTC132	HEPS0016*	REN 123A*	SK3444	RT-308*	ECG123A*	TM123A*/**	WEP710	121-Z9000A
Q301	2SA844C	268717	GE-244*	PTC103*	HEPS0019*	REN 129*	SK3114	RT-126A*	ECG129*	TM129*	WEP564	121-Z9005
Q302	2SD30H		GE-59	PTC134	HEPG0011	REN 103A	SK3010	RT-123	ECG103A	TM103A	WEP641B	121-Z9015
	2SD30G	279317	GE-59	PTC134	HEPG0011	REN 103A	SK3010	RT-123	ECG103A	TM103A	WEP641B	121-Z9015
Q303	2SC1740	279917	GE-62	PTC121*	HEPS0015*	REN 123A*	SK3122	RT-109*	ECG123A*	TM123A*	WEP736*	121-Z9000A*
Q304	2SC1061C	279517	GE-66	PTC167	HEPS3061	REN 152	SK3054	RT-197	ECG152	TM152/**	WEP745	121-Z9002
	2SC1061		GE-66	PTC167	HEPS3061	REN 152	SK3054	RT-197	ECG152	TM152/**	WEP745	121-Z9002
Q305	2SC1061C	279517	GE-66	PTC167	HEPS3061	REN 152	SK3054	RT-197	ECG152	TM152/**	WEP745	121-Z9002
	2SC1061		GE-66	PTC167	HEPS3061	REN 152	SK3054	RT-197	ECG152	TM152/**	WEP745	121-Z9002
Q401	JSP7001B	279417	GE-20	PTC136	HEPS0015	REN 123A*	SK3444	RT-308	ECG123A*	TM123A*	WEP736	121-Z9000A
Q402	2SC2091	279617	GE-270	PTC180		REN 295	SK3253		ECG295	TM295	WEP913	121-880
Q403	2SC2092	279717	GE-337	PTC186		REN 235	SK3197	RT-146	ECG235	TM235	WEP840*	121-Z9039
Q501	MJE800	279817			HEPS9101		SK3180		ECG253			
Q502	2SC372Y	256917	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A*/**	WEP372	121-Z9000A*

* Lead configuration may vary from original.
/** Also available as exact type replacement.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	MFGR. PART No.	REPLACEMENT DATA			
			CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No. Q-LINE	SPRAGUE PART No. GENERAL LINE
C2	2200 35V		WBR2000-50	TC50200A	QE1-648	TVA-1318.3
C3	100 16V		PC100-16	VTT100F16	QV1-95	EV-1230
C108	10 16V		PC10-25	VTT10B25	QV1-41	EV-1222
C127	.22 35V			TDC224M050EL	QDT1-10	SD50-R229
C128	1 25V			TDC105M035EL		SD35-19
C129	47 16V		PC50-16	VTT47D16	QV1-73	EV-1226
C137	47 16V		PC50-16	VTT47D16	QV1-73	EV-1226
C138	22 16V		PC25-25	VTT22B16	QV1-55	EV-1224
C140	.22 35V			TDC224M050EL	QDT1-10	SD50-R229
C205	10 16V		PC10-25	VTT10B25	QV1-41	EV-1222
C216	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C222	47 16V		PC50-16	VTT47D16	QV1-73	EV-1226
C224	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C225	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C302	10 16V		PC10-25	VTT10B25	QV1-41	EV-1222
C305	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C308	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C310	.1 16V			TDC104M050EL	QDT1-2	SD50-R109
C311	10 16V		PC10-25	VTT10B25	QV1-41	EV-1222
C312	10 16V		PC10-25	VTT10B25	QV1-41	EV-1222
C313	10 16V		PC10-25	VTT10B25	QV1-41	EV-1222
C314	10 16V		PC10-25	VTT10B25	QV1-41	EV-1222
C315	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C320	4.7 25V		PC5-50	VTT4R7B50	QV1-27	EV-1319
C321	4.7 25V		PC5-50	VTT4R7B50	QV1-27	EV-1319
C322	47 16V		PC50-16	VTT47D16	QV1-73	EV-1226
C323	.22 25V			TDC224M050EL	QDT1-10	SD50-R229
C325	47 16V		PC50-16	VTT47D16	QV1-73	EV-1226
C326	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C328	47 16V		PC50-16	VTT47D16	QV1-73	EV-1226
C329	100 16V		PC100-16	VTT100F16	QV1-95	EV-1230
C330	4.7 25V		PC5-50	VTT4R7B50	QV1-27	EV-1319
C331	4.7 25V		PC5-50	VTT4R7B50	QV1-27	EV-1319
C332	10 16V		PC10-25	VTT10B25	QV1-41	EV-1222
C334	1					
C339	220 16V		PC250-25	VTT220H16	QV1-117	EV-1240
C340	47 16V		PC50-16	VTT47D16	QV1-73	EV-1226
C341	47 16V		PC50-16	VTT47D16	QV1-73	EV-1226
C416	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C421	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C425	100 16V		PC100-16	VTT100F16	QV1-95	EV-1230
C430	10 16V		PC10-25	VTT10B25	QV1-41	EV-1222
C431	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C701	1000 16V		PC1000-16	VTT1000L16	QV1-183	EV-1260
C703	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C901	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615

CAPACITORS

ITEM No.	RATING	MFGR. PART No.	REPLACEMENT DATA				
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No. Q-LINE	SPRAGUE PART No. GENERAL LINE
C1	.1 10%			WMF05P1	EWF05010	QFT2-215	1FT-P10
C4	.01 500V		DD6-103		SM110		5GAS-S10
C5	.01 500V		DD6-103		SM110		
C101	.01		UK50-103		MAG5011		
C102	8 N750		DTN-10	N10	CN7410		10TCU-Q10
C103	100 10%			CD15FD101J03	SX310	QW1-27	MWA-101
C104	150 10%			CD15FD151J03	SX315	QW1-31	MWA-151
C105	30			CD15ED300J03	SX430	QW1-14	MWA-300
C106	8			CD15CD080D03		QW1-5	MWA-080
C107	.01		UK50-103		MAG5011		
C109	.01		UK50-103		MAG5011		
C110	5			CD15CD050D03		QW1-2	MWA-050
C111	20 N750		DTN-20	N20	CN7420		10TCU-Q20
C112	.001		DD-102		GP210		10TS-D10

PARTS LIST AND DESCRIPTION (CONTINUED)

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

CAPACITORS (cont)

ITEM No.	RATING	MFGR. PART No.	REPLACEMENT DATA				
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No. Q-LINE	SPRAGUE PART No. GENERAL LINE
C113	100 10%			CD15FD101J03	SX310	QW1-27	MWA-101
C114	47 N750		DTN-47	N47	CN7447		10TCU-Q47
C115	10			CD15CD100J03		QW1-6	MWA-100
C116	150 10%			CD15FD151J03	SX315	QW1-31	MWA-151
C117	120 10%			CD15FD121J03	SX312	QW1-29	MWA-121
C118	20			CD15ED200J03	SX420	QW1-10	MWA-200
C119	.01		UK50-103		MAG5011		
C120	.01		UK50-103		MAG5011		
C121	.01		UK50-103		MAG5011		
C122	1			CD15CD010D03		QW1-1	MWA-010
C123	1			CD15CD010D03		QW1-1	MWA-010
C124	30			CD15ED300J03	SX430	QW1-14	MWA-300
C126	.01		UK50-103		MAG5011		
C130	5			CD15CD050D03		QW1-2	MWA-050
C131	100 10%			CD15FD101J03	SX310	QW1-27	MWA-101
C132	.01		UK50-103		MAG5011		
C133	1.5	100251					
C134	5			CD15CD050D03		QW1-2	MWA-050
C135	.01		UK50-103		MAG5011		
C136	.001		DD-102		GP210		10TS-D10
C139	.01		UK50-103		MAG5011		
C141	.001		DD-102		GP210		10TS-D10
C142	100 10%			CD15FD101J03	SX310	QW1-27	MWA-101
C143	.001		DD-102		GP210		10TS-D10
C144	220 10%			CD15FD221J03	SX322	QW1-35	MWA-221
C146	.04 10%			DPMS6S39	M192P3939R8	QFT2-159	1FT-S39
C147	.01		UK50-103		MAG5011		
C148	.01		UK50-103		MAG5011		
C149	.04 10%			DPMS6S39	M192P3939R8	QFT2-159	1FT-S39
C201	30 N750		DTN-33	N33	CN7433		10TCU-Q33
C202	.01		UK50-103		MAG5011		
C203	.01		UK50-103		MAG5011		
C204	.01		UK50-103		MAG5011		
C206	.001		UK50-103		MAG5011		
C207	.01		UK50-103		MAG5011		
C209	.01		UK50-103		MAG5011		
C210	.04 10%				M192P3939R8		192P3939R8
C211	.04 10%				M192P3939R8		192P3939R8
C212	.04 10%				M192P3939R8		192P3939R8
C213	.04 10%				M192P3939R8		192P3939R8
C214	.04 10%				M192P3939R8		192P3939R8
C215	.04 10%				M192P3939R8		192P3939R8
C217	.04 10%				M192P3939R8		192P3939R8
C218	.04 10%				M192P3939R8		192P3939R8
C219	.04 10%				M192P3939R8		192P3939R8
C220	.001		DD-102		GP210		10TS-D10
C221	.01		UK50-103		MAG5011		
C223	.01		UK50-103		MAG5011		
C226	.01		UK50-103		MAG5011		
C301	.04 10%				M192P3939R8		192P3939R8
C303	.001		DD-102		GP210		10TS-D10
C304	.001		DD-102		GP210		10TS-D10
C306	.01		UK50-103		MAG5011		
C307	.02 50V 10%			DPMS2S2	PVC212		2PS-S20
C309	.04 10%			DPMS6S39	M192P3939R8	QFT2-159	1FT-S39
C316	.01		UK50-103		MAG5011		
C317	.01		UK50-103		MAG5011		
C318	.01		UK50-103		MAG5011		
C319	.01		UK50-103		MAG5011		
C324	.01		UK50-103		MAG5011		
C327	.1 10%			WMF05P1	EWF05010	QFT2-215	1FT-P10
C335	.01		UK50-103		MAG5011		
C336	.01		UK50-103		MAG5011		
C337	.01		UK50-103		MAG5011		
C338	.01		UK50-103		MAG5011		
C342	.01		UK50-103		MAG5011		
C343	.01		UK50-103		MAG5011		
C345	.01		UK50-103		MAG5011		
C346	.001		DD-102		GP210		10TS-D10
C347	.001		DD-102		GP210		10TS-D10
C348	.001		DD-102		GP210		10TS-D10
C349	.01		UK50-103		MAG5011		
C401	300 10%			CD15FD301J03	SX330	QW1-38	MWA-301
C402	.01		UK50-103		MAG5011		
C403	.01		UK50-d03		MAG5011		
C404	120 10%			CD15FD121J03	SX312	QW1-29	MWA-121
C405	.01						
C406	35			CD15ED360J03	SX436		MWA-360
C407	35			CD15ED360J03	SX436		MWA-360
C408	130 10%			CD15FD131J03	SX313	QW1-30	MWA-131
C409	30			CD15ED300J03	SX430	QW1-14	MWA-300
C410	.01		UK50-103		MAG5011		
C411	300 10%			CD15FD301J03	SX330	QW1-38	MWA-301
C412	47			CD15ED470J03	SX447	QW1-19	MWA-470
C413	220 10%			CD15FD221J03	SX322	QW1-35	MWA-221
C414	2	100351	C33A2R2D	CD020D03			
C415	220 10%			CD15FD221J03	SX322	QW1-35	MWA-221
C417	220 10%			CD15FD221J03	SX322	QW1-35	MWA-221
C418	12			CD12CD120J03		QW1-7	MWA-120
C419	220 10%			CD15FD221J03	SX322	QW1-35	MWA-221
C420	.01				CN15-422		10TCW-Q22
C422	.01		UK50-103		MAG5011		
C423	.01		UK50-103		MAG5011		
C424	.01		UK50-103		MAG5011		
C426	.01		UK50-103		MAG5011		
C427	.01		UK50-103		MAG5011		
C428	.01		UK50-103		MAG5011		
C429	.01		UK50-103		MAG5011		
C432	.01		UK50-103		MAG5011		
C433	.04 10%			DPMS6S39	M192P3939R8	QFT2-159	1FT-S39
C434	.01		UK50-103		MAG5011		
C601	.001		DD-102		GP210		10TS-D10

PARTS LIST AND DESCRIPTION (CONTINUED)

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

CAPACITORS (cont)

ITEM No.	RATING	MFGR. PART No.	REPLACEMENT DATA				
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
						Q-LINE	GENERAL LINE
C602	.001		DD-102		GP210		10TS-D10
C603	.01		UK50-103		MAG5011		
C604	1			CD15CD010D03		QW1-1	MWA-010
C605	1			CD15CD010D03		QW1-1	MWA-010
C608	.01		UK50-103		MAG5011		
C702	.04 10%			DPMS6S39	M192P3939R8	QFT2-159	1FT-S39
C902	.01		UK50-103		MAG5011		
C903	.01		UK50-103		MAG5011		
C904	.01		UK50-103		MAG5011		
C905	.01		UK50-103		MAG5011		
C906	.01		UK50-103		MAG5011		
C907	.01		UK50-103		MAG5011		
C908	.01		UK50-103		MAG5011		
C909	.01		UK50-103		MAG5011		
C910	.01		UK50-103		MAG5011		
C911	.01		UK50-103		MAG5011		
C912	.01		UK50-103		MAG5011		
C913	.01		UK50-103		MAG5011		
C914	.01		UK50-103		MAG5011		
C915	.001		DD-102		GP210		10TS-D10
C916	.001		DD-102		GP210		10TS-D10
C917	.001		DD-102		GP210		10TS-D10
C918	.001		DD-102		GP210		10TS-D10
CV201	20	116057					
CV202	20	116057					

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.
VR101	10.24060MHz	100K	3058-13	T-100K(2)	MTC15L1(2)	X201R104B(2)
VR102	10.2394MHz	20K	3055-13	T-20K(2)	MTC24L1(2)	X201R253B(2)
VR103	10.240MHz	10K	3054-13	T-10K(2)	MTC14L1(2)	X201R103B(2)
VR201	Squelch Range	10K	3054-13	T-10K(2)	MTC14L1(2)	X201R103B(2)
VR202	RF Gain	10K	1952-11			
VR301	S Meter	20K	3055-13	T-20K(2)	MTC24L1(2)	X201R253B(2)
VR302	AGC	5000	3057-13	T-5000(2)	MTC53L1(2)	X201R502B(2)
VR303	Volume	10K	1956-11			
VR304	Squelch	10K	1952-11			
VR305	AMC	10K	3054-13	T-10K(2)	MTC14L1(2)	X201R103B(2)
VR401	RFO Meter	100K	3058-13	T-100K(2)	MTC15L1(2)	X201R104B(2)
VR601	SWR	500	3065-13			
VR602	CAL Adjust	5000	1957-11			

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

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA	
		WORKMAN PART No.	MFGR. PART No.
IC501	Resistor Array	(1)	305113

ITEM No.	RATING	REPLACEMENT DATA	
		WORKMAN PART No.	MFGR. PART No.
IC502	Resistor Array	(1)	305113

(1) Consists of seven 220 Ohm Resistors.

COILS (RF-IF)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
L101	RF Choke (470uH)	316123			
L102	RF Choke (8.2uH)	316523			
L104	Offset Mixer (100uH)	316623			
L202	TVI Trap (4.7uH)(54MHz)	316323			
L301	RF Choke (22uH)				
L401	RF Choke (2.5uH)	316023			
L402	Driver (27MHz)	315723			
L403	RF Choke (10uH)	316223			
L404	RF Choke (.65uH)	315923			
L405	Final (27MHz)	240424			
L406	Loading Final (27MHz)	240424			
L407	Pi Filter (.22uH)	315823			
L408	Pi Filter (.22uH)	315823			
L409	RF Choke (10uH)	316223			
T101	Ref Oscillator (10.240MHz)	240624			
T102	VCO	240724	355		
T103	VCO Buffer	240824	354		
T104	XMT Mixer (27MHz)	240024	C193IT77485		
T105	XMT Mixer (27MHz)	240824	354		
T106	Trippler (15.360MHz)	240924	Z176IT77115		
T107	XMT Mixer (27MHz)	240024	C193IT77485		
T202	RF Amp (27MHz)	240024	C193IT77465		
T203	Mixer (10.695MHz)	239924	F001AM67C2		
T204	Mixer (10.695MHz)	239924	F001AM67C2		
T205	IF (455kHz)	240224	A293AD		
T206	IF (455kHz)	240324	227		
T207	IF (455kHz)	240224	A293AD		
T401	Predriver (27MHz)	240524			
T601	RF Choke	239824			

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.	
L701	1.7A	.118	3.45mH	193815	TR555		

PARTS LIST AND DESCRIPTION (CONTINUED)

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

TRANSFORMER (Power)

ITEM No.	RATING		REPLACEMENT DATA			NOTES
	PRI.	SEC. 1	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T1	120V AC @ .410A AC	15.60V AC @ 1.7A DC			(T) PCB-3	(T) Center tapped lead not used.

TRANSFORMER (Driver)

ITEM No.	TURNS RATIO			REPLACEMENT DATA			NOTES
	PRI.	SEC. 1	SEC. 2	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T301	1	.4	.4	193915	TR651		

TRANSFORMER (Audio Output)

ITEM No.	IMPEDANCE		REPLACEMENT DATA			NOTES
	PRI.	SEC.	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T302	32 CT	8 | 15.7	194015	TR822	MCB-37	

SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
SP1	2 3/4" PM 8 Ohms	138436		

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	1A Quick Acting	323620		GJV1		318001		
F2	2A Quick Acting	375520	260619	AGC-2	HRK	312002	342012AL	FG2-2

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	111234	18-032	18-034	18-010	18-092	1	2	4	NC	NC	2

MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
DS4	LED	282017	Channel Indicator Display (Each segment supplied with 1.63V @ 17mA)
D401	LED	236017	Transmit Indicator (1.60V @ 8mA) SL103
FIL-1	Filter	159835	10.695MHz
FIL-2	Filter	159735	455kHz
FIL-3	Filter	159635	10.240MHz
J2	Jack	260819	DC Power
J4	Jack	259719	Antenna
J301	Jack	260919	External Speaker
J302	Jack	260719	Headphone
J303	Jack	260919	PA Speaker
J304	Jack	259619	Microphone
K1	Relay	112237	Transmit (150 ohm)
M1	Meter	126727	S/RFO
M2	Meter	126827	SWR
PL1	Lamp	625220	S/RFO (12.68V @ 32mA)
PL2	Lamp	625220	S/RFO (12.68V @ 32mA)
PL3	Lamp	625220	SWR (12.68V @ 32mA)
PL4	Lamp	625220	SWR (12.68V @ 32mA)
P2	Plug	139638	DC Power (Cord included)
P304	Plug	259619	Microphone
S1,2	Switch	237314	Power On/Off (Rocker)
S3	Switch	261019	AC/DC (Actuated by insertion of AC Power Cord)
S101	Switch	237114	Delta Tune (Rotary)
S102	Switch		Transmit Program Switch
S103	Switch		Receive
S301	Switch	236314	CB/PA (Toggle)
S302	Switch	236314	ANL Off/On
S501	Switch	237014	Channel Selector (Rotary)
S601	Switch	237214	SWR/Cal (Rotary)
Y1	Crystal	163235	10.240MHz
	Connector	261119	Coaxial Antenna
	Printed Circuit Board	202816	Channel Switch
	Printed Circuit Board	202916	LED
	Printed Circuit Board	202216	Main
	Printed Circuit Board	202016	PLL
	Printed Circuit Board	203016	Regulator
	Printed Circuit Board	259919	Flexible Flat Cable

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

ITEM	PART No.
Cabinet Bottom	211980
Cabinet	211880
Escutcheon	211780

ITEM	PART No.
Knob, Channel Selector	221718
Knobs, Controls and Switches	221818