

# 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.



PACE MODEL 8046

MODEL 8046

**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:  
 L1,L3,L6,L7,L8,L10,L17,L18,L27.....5009  
 L13,L14,L19 thru L23.....9440  
 C201,C202.....5000

## SYNTHESIZER ALIGNMENT

| TEST EQUIPMENT                              | TRANSCEIVER                   | ADJUST | REMARKS                                                                                                     |
|---------------------------------------------|-------------------------------|--------|-------------------------------------------------------------------------------------------------------------|
| Input of frequency counter to TP4.          | Ch. 19                        | C201   | Adjust for 10.240MHz.                                                                                       |
| Input of DC meter to TP1.                   | Ch. 1                         | L1     | Adjust for 2.00 volts.                                                                                      |
| Input of RF VTVM to TP2.                    | Ch. 19                        | L3     | Adjust for maximum RF voltage.                                                                              |
| Input of frequency counter to TP3.          | Ch. 1,<br>Delta Tune midrange |        | Check for 16.270MHz.<br>Check all channels<br>(Channel frequency -<br>10.695MHz = frequency on<br>counter). |
| Input of frequency counter to antenna jack. | Ch. 1, XMT                    | C202   | Adjust for 26.965MHz.                                                                                       |

## 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.

| TEST EQUIPMENT                                                                               | TRANSCEIVER                                                                               | ADJUST                      | REMARKS                                                                           |
|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------------------------|
| Output of signal generator thru .01uF to TP4.<br>455kHz,1000Hz @ 30% modulation.             | Ch. 19,<br>Delta Tune midrange<br>RF Gain Maximum<br>Squelch MINIMUM<br>NB Off<br>ANL Off | L23,L22,L21                 | Adjust for maximum output.                                                        |
| Output of signal generator thru .01uF to antenna jack.<br>27.185MHz,1000Hz @ 30% modulation. | Ch. 19,<br>Delta Tune midrange<br>RF Gain Maximum<br>Squelch MINIMUM<br>NB Off<br>ANL Off | L20,L27,<br>L19,L18,<br>L17 | Adjust for maximum output.<br>It may be necessary to<br>readjust L21,L22 and L23. |

## 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.<br>27.185MHz, 1000Hz @ 30% modulation.<br>Output 1000uV. | Ch. 19,<br>Delta Tune midrange<br>RF Gain Maximum<br>NB Off<br>ANL Off | R303   | SQUELCH RANGE<br>Set Squelch Control R202 fully clockwise.<br>Adjust R303 so that squelch just breaks. |
| Output of signal generator thru .01uF to antenna jack.<br>27.185MHz, 1000Hz @ 30% modulation.<br>Output 100uV.  | Ch. 19,<br>Delta Tune midrange<br>RF Gain Maximum<br>NB Off<br>ANL Off | R304   | S METER<br>Adjust R304 for 9 on S scale of meter.                                                      |

## TRANSMITTER ALIGNMENT

Connect an RF wattmeter and 50-ohm, 25-watt dummy load to antenna connector.

NOTE: Be sure to check transmit frequency and power on all active channels after alignment of transmitter.

See page 4 for channel frequencies.

| TEST EQUIPMENT | TRANSCEIVER | ADJUST                          | REMARKS                     |
|----------------|-------------|---------------------------------|-----------------------------|
|                | Ch. 19      | L6, L7, L8,<br>L10, L13,<br>L14 | Adjust for maximum.         |
|                | Ch. 19      | L14, L13                        | Adjust for 4 watts maximum. |

## TRANSMITTER ADJUSTMENTS

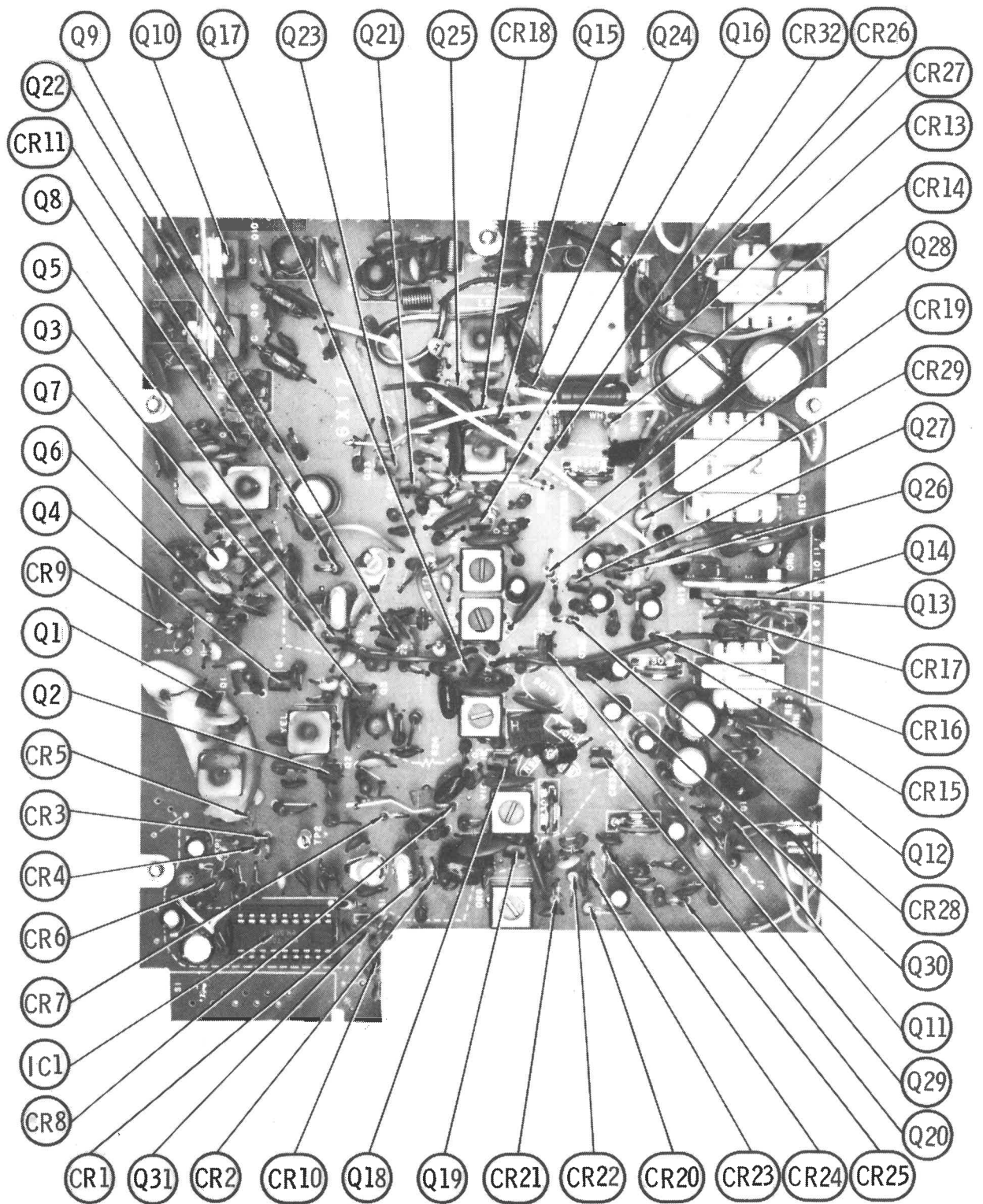
Connect an RF wattmeter and 50-ohm, 25-watt dummy load to antenna connector.

NOTE: Be sure to check transmit frequency and power on all active channels after adjustment of transmitter.

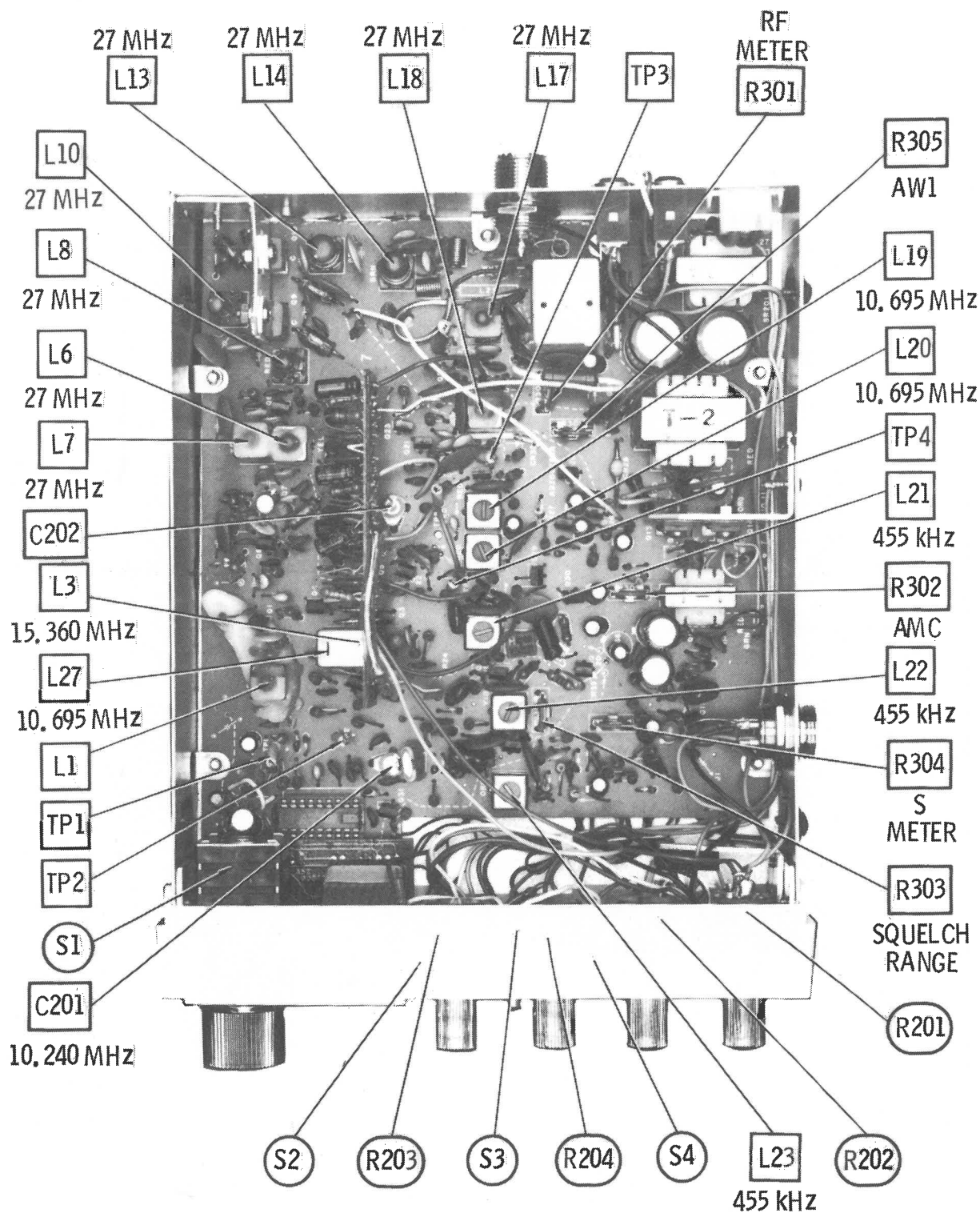
See page 4 for channel frequencies.

| TEST EQUIPMENT                                                                   | TRANSCEIVER | ADJUST | REMARKS                                                                   |
|----------------------------------------------------------------------------------|-------------|--------|---------------------------------------------------------------------------|
| Modulation meter to antenna jack.<br>Inject a 1000Hz, 20mV signal at MIC signal. | Ch. 19      | R302   | AMC<br>Adjust R302 for 100% modulation maximum.                           |
| Connect a RF wattmeter and 50 Ohm, 25 watt dummy load to antenna connector.      | Ch. 19      | R301   | RF PANEL METER<br>Adjust R301 so RF panel meter agrees with RF wattmeter. |
| Connect a 150 Ohm non-inductive resistor to antenna jack.                        | Ch. 19      | R305   | AWI<br>Adjust R305 so TX/AWI light flashes.                               |

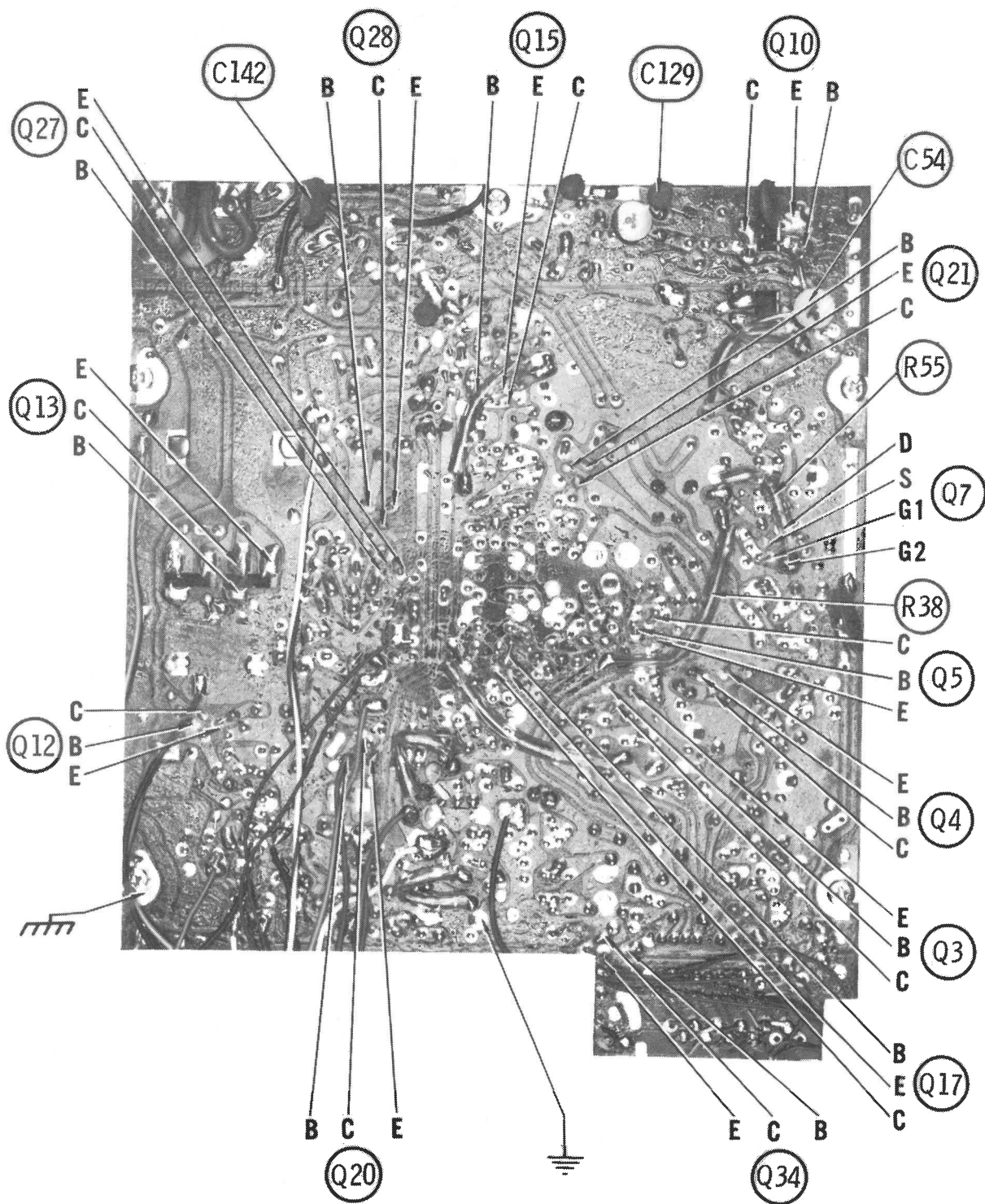
PAGE MODEL 8046



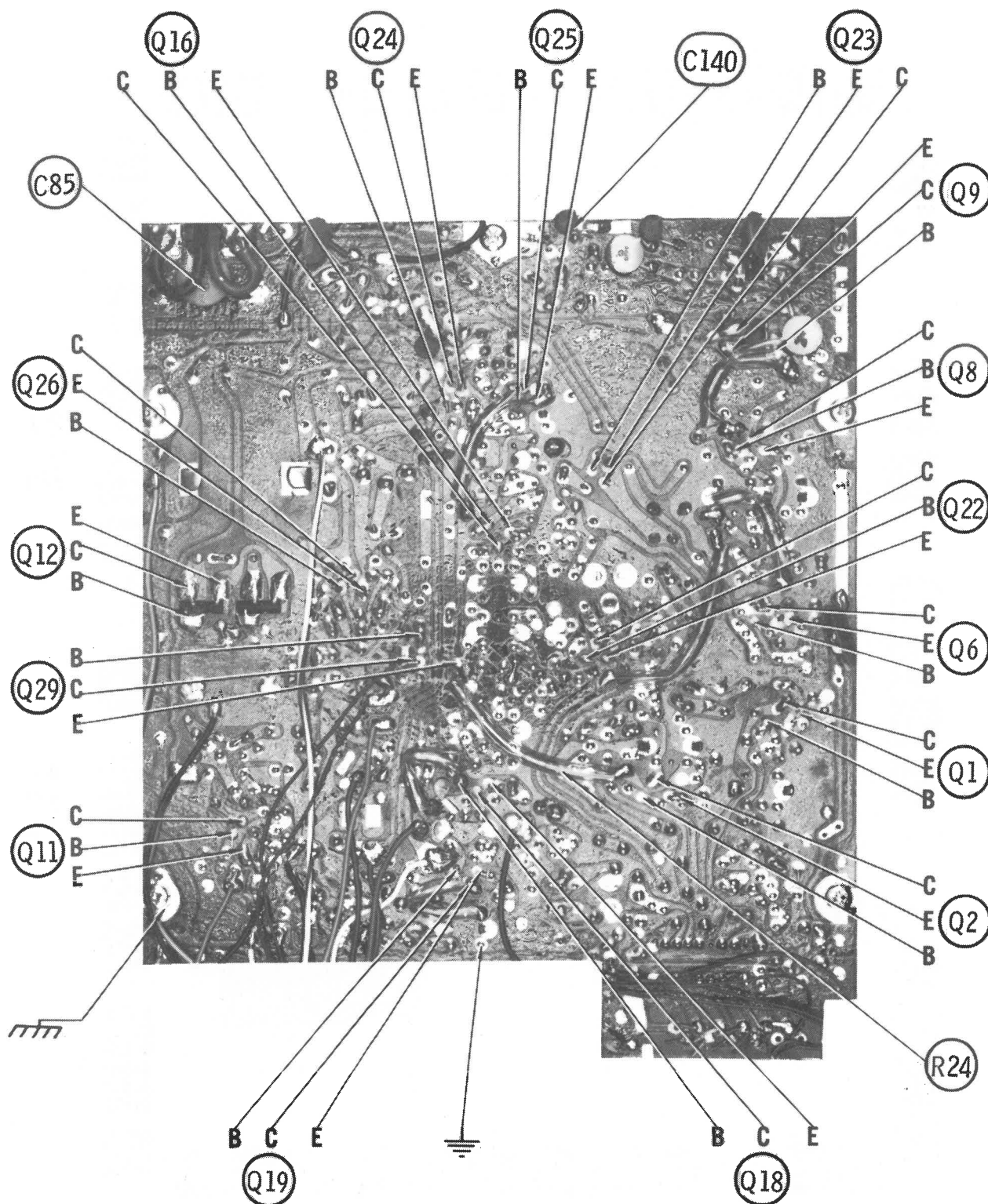
MAIN BOARD



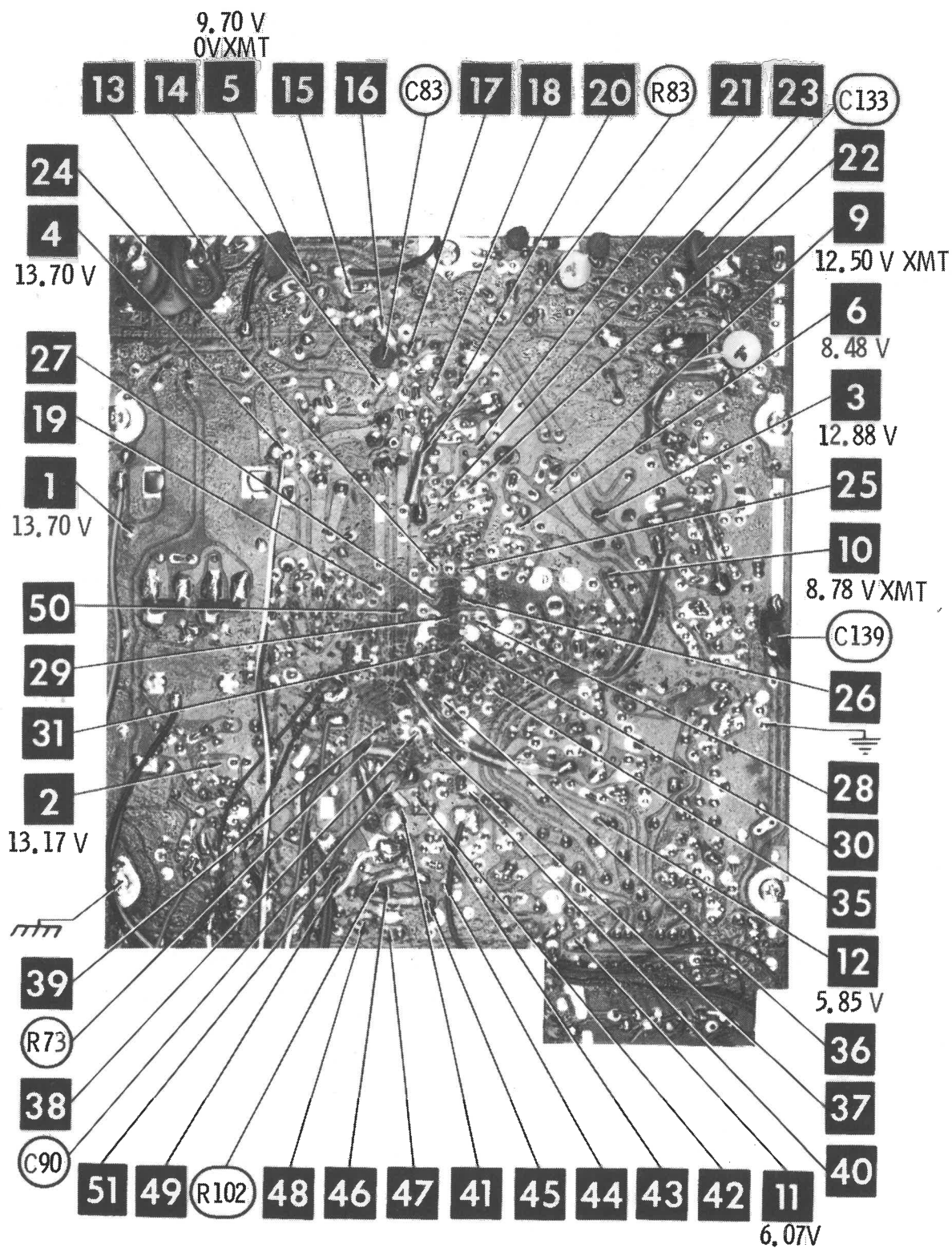
CHASSIS - BOTTOM



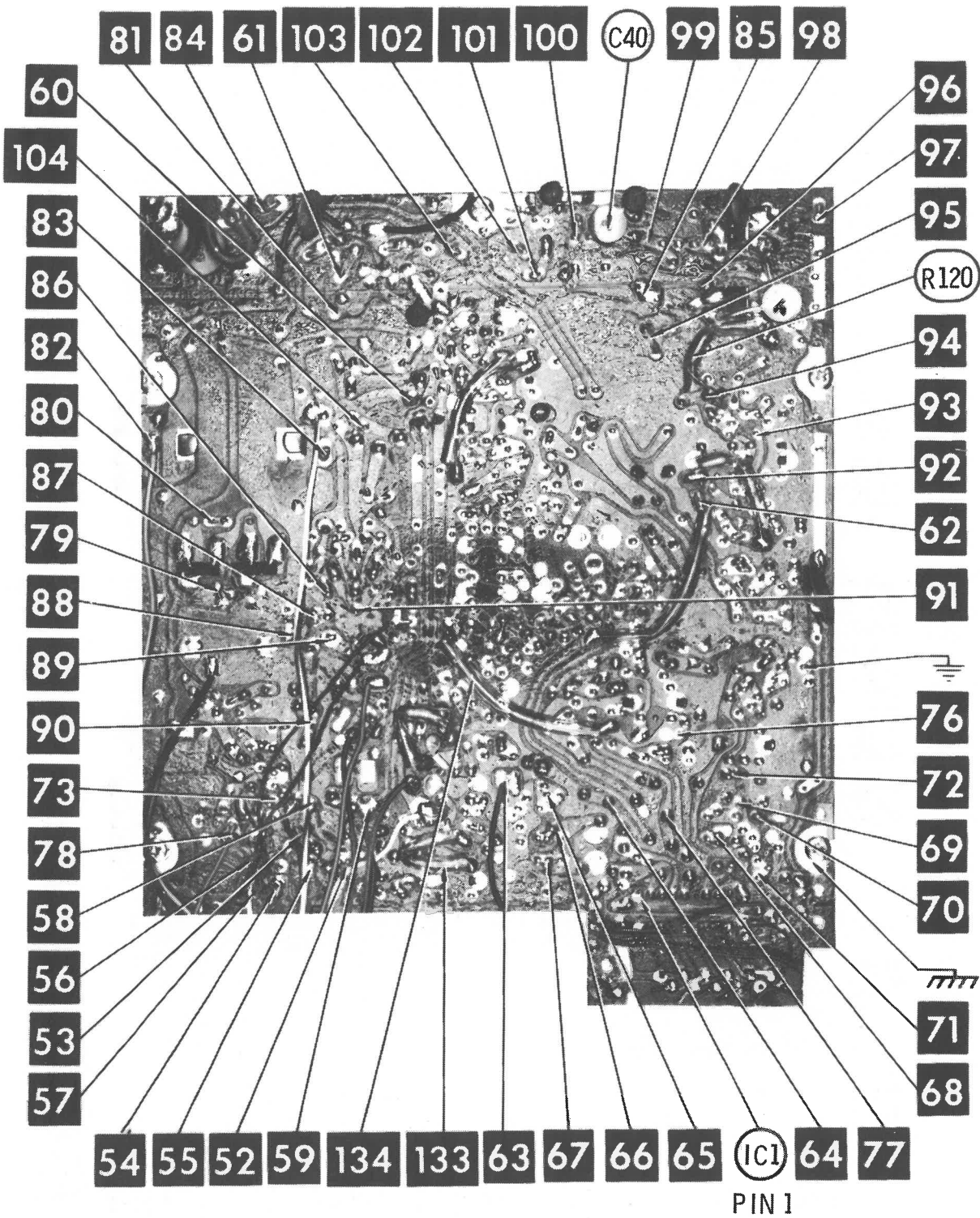
MAIN BOARD



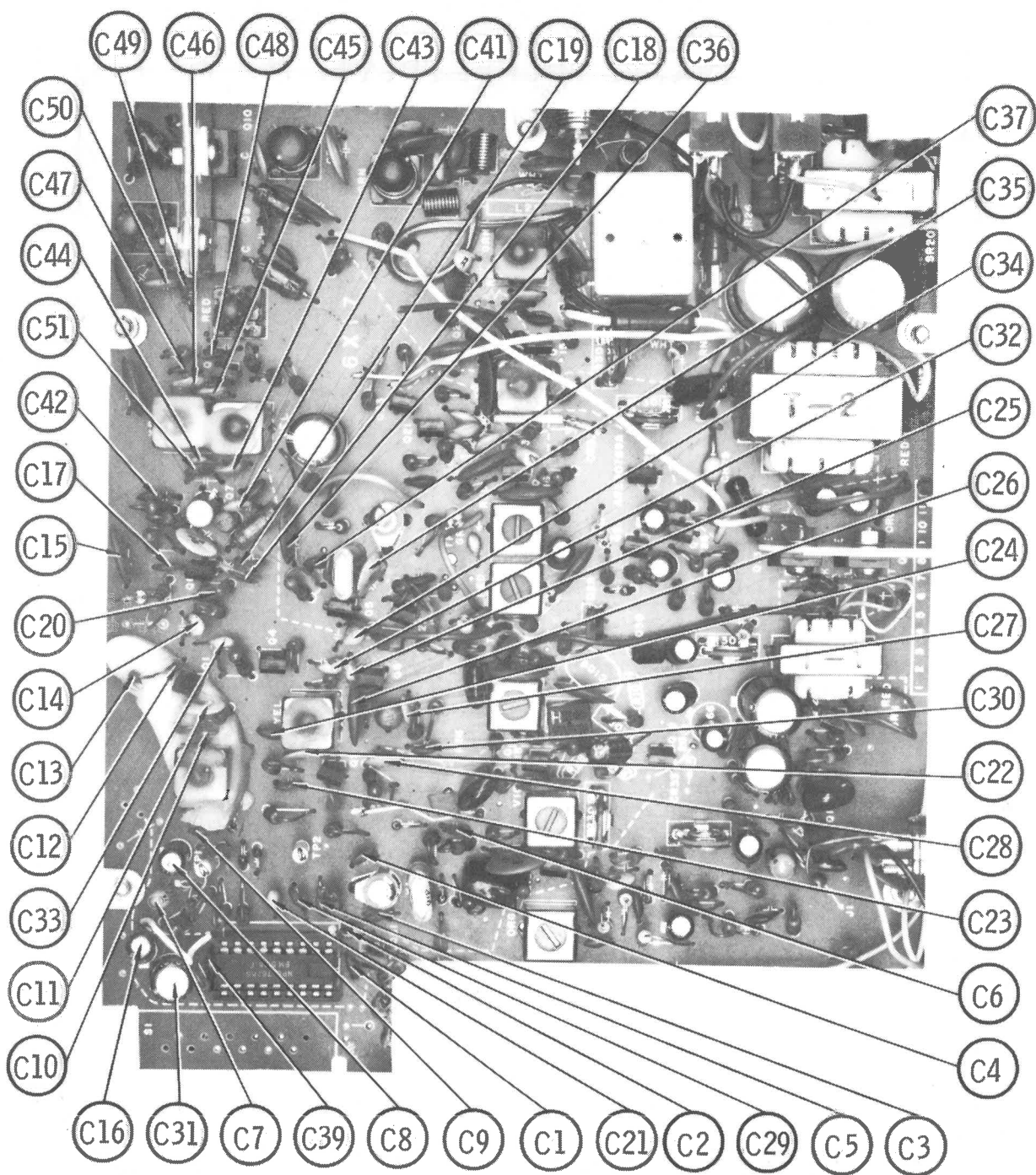
MAIN BOARD



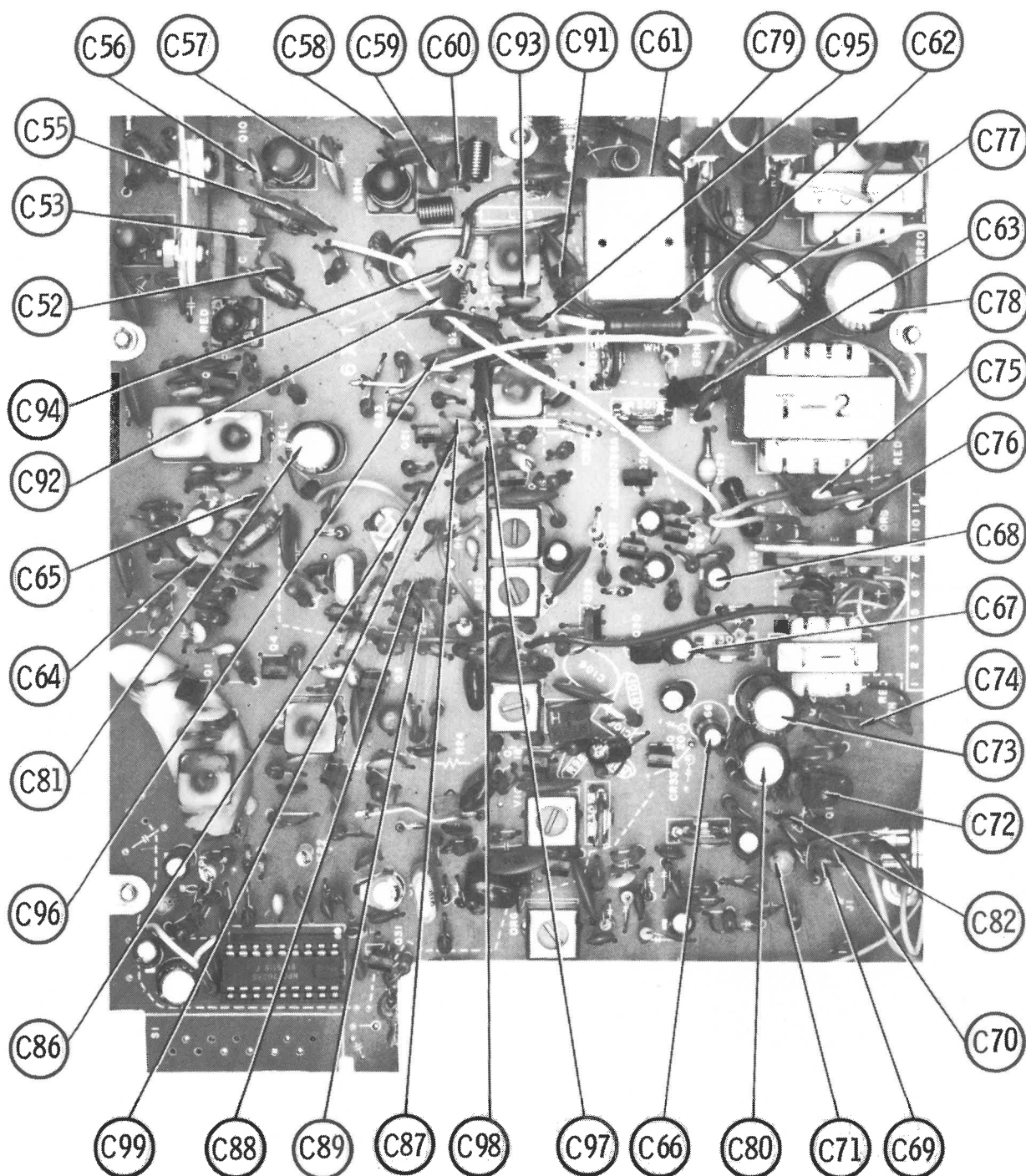
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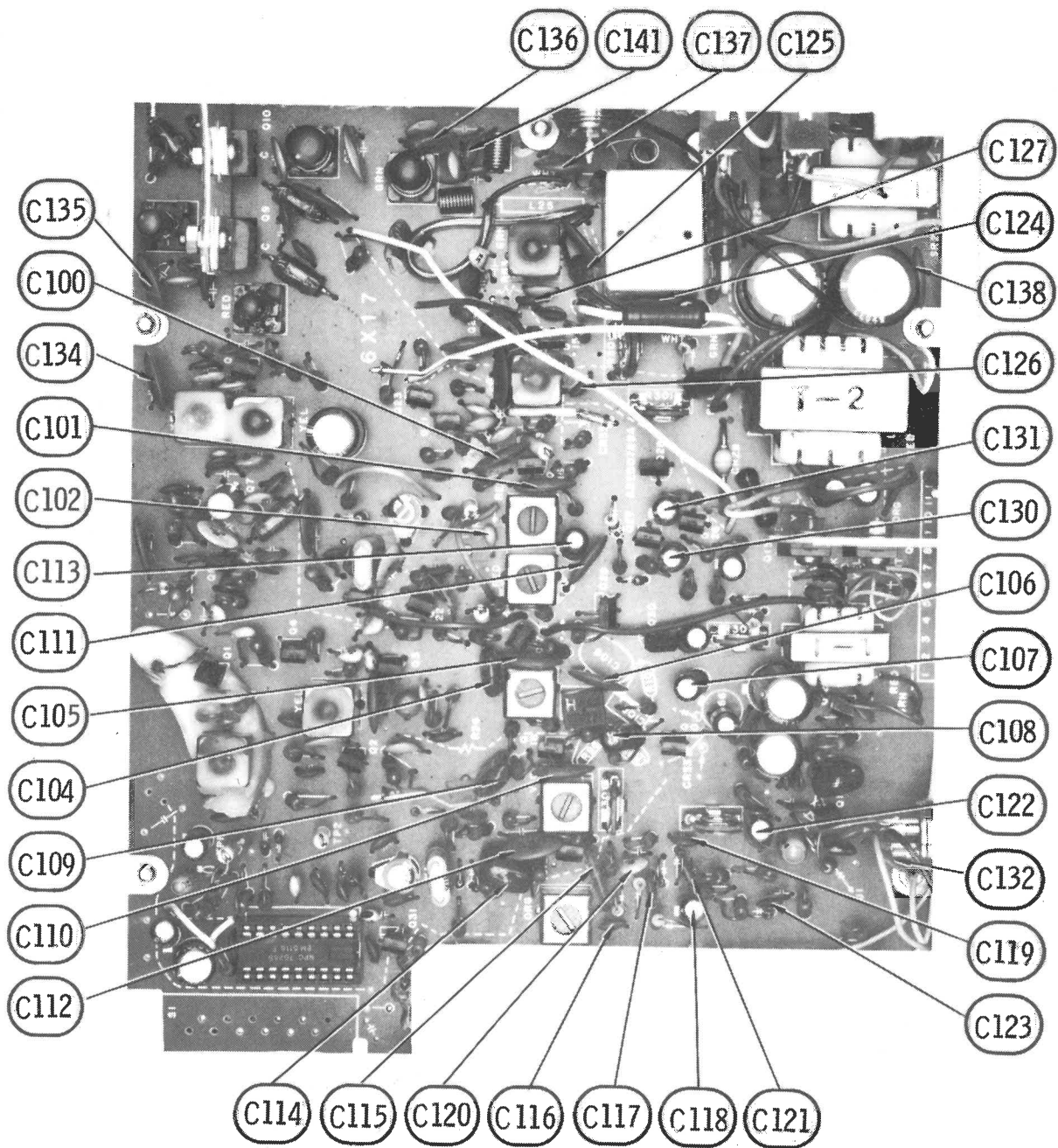
MAIN BOARD



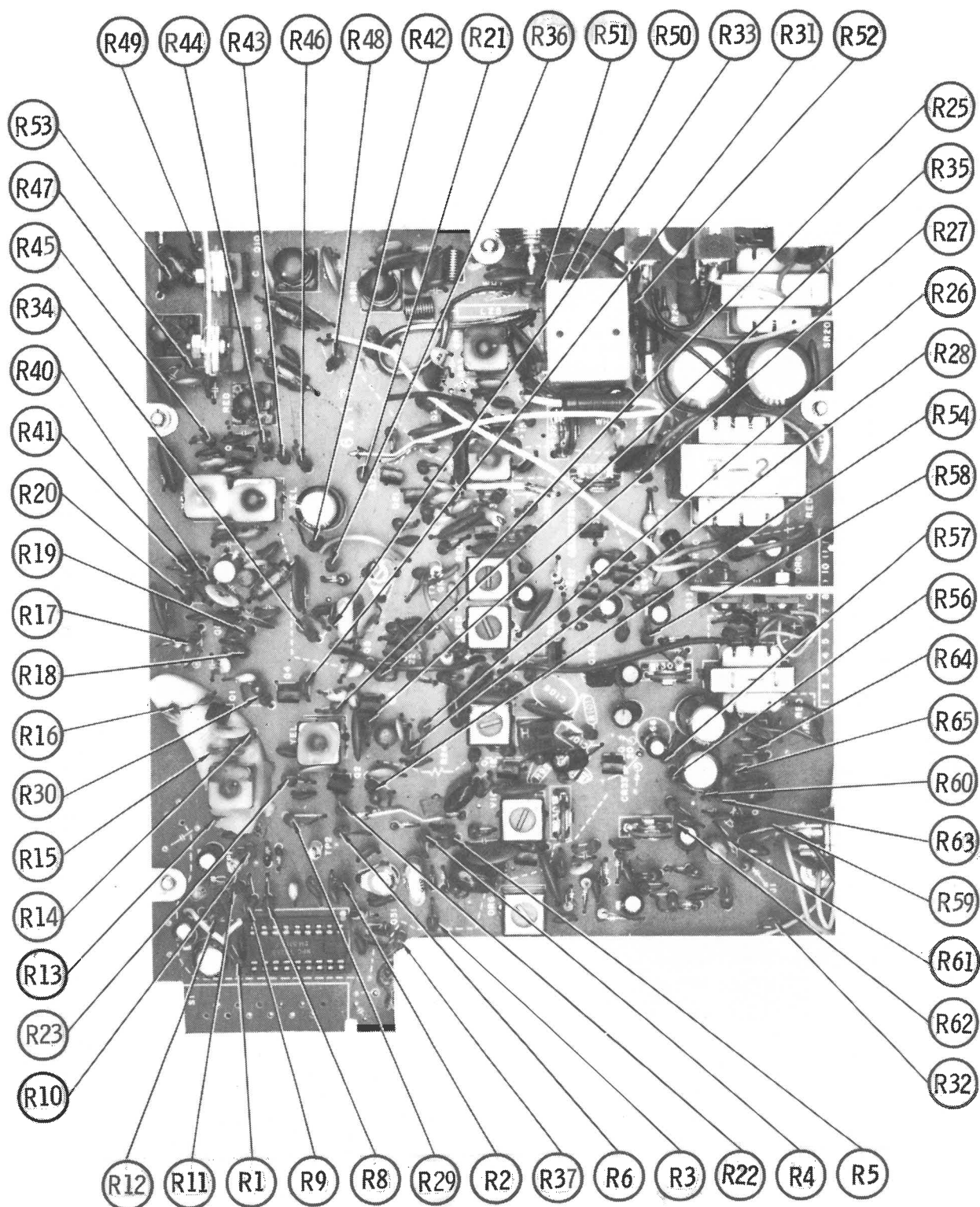
MAIN BOARD



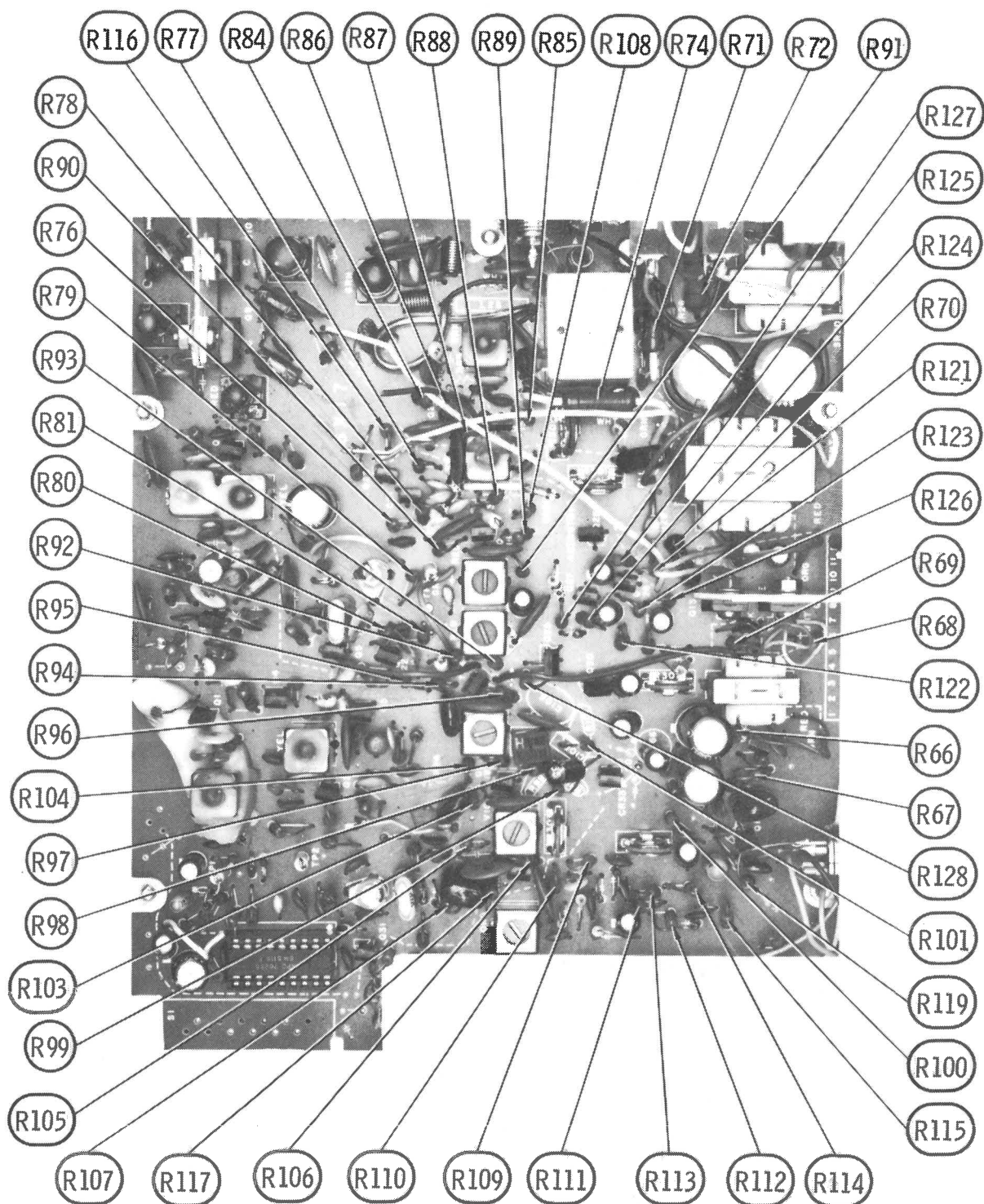
MAIN BOARD



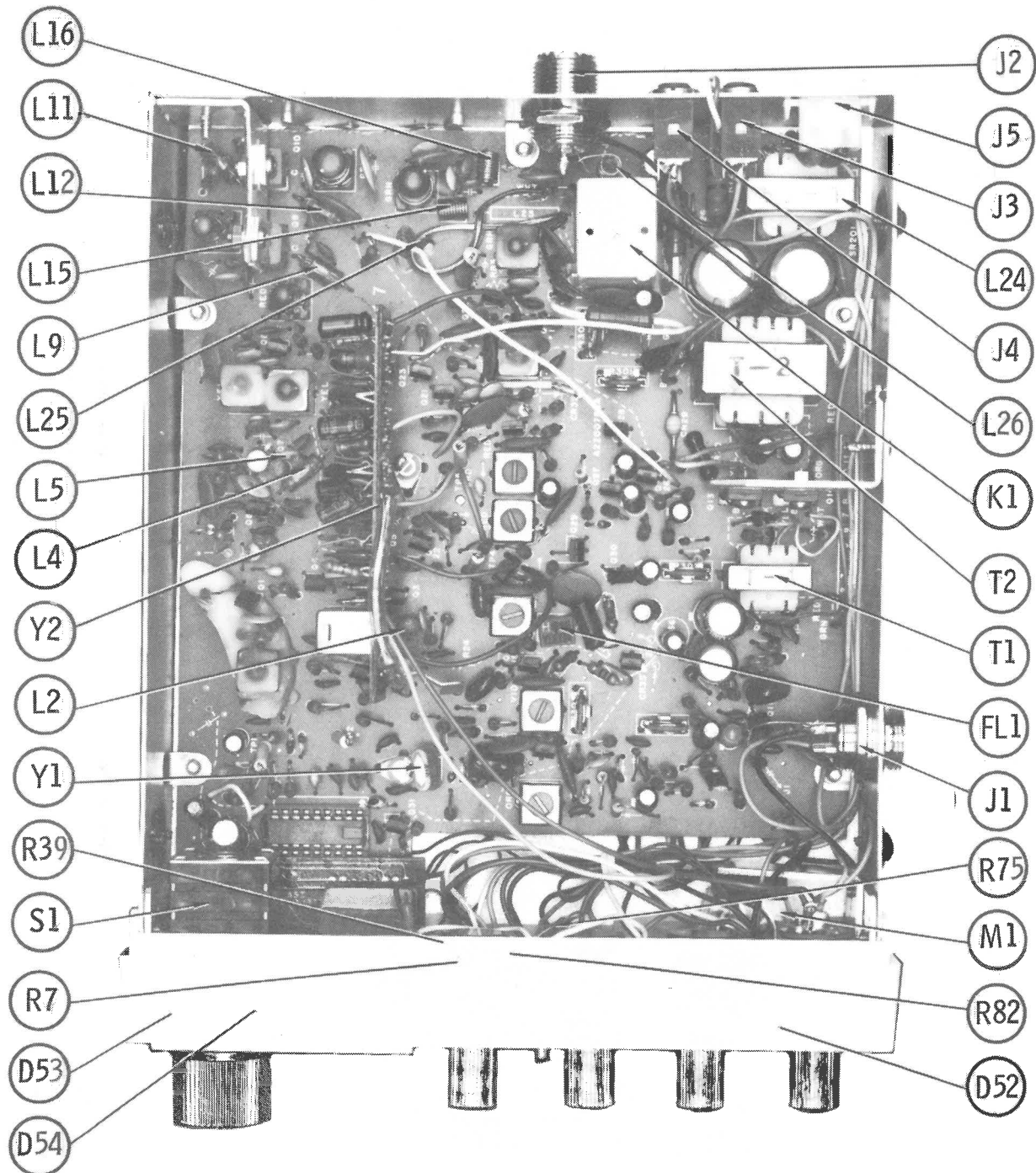
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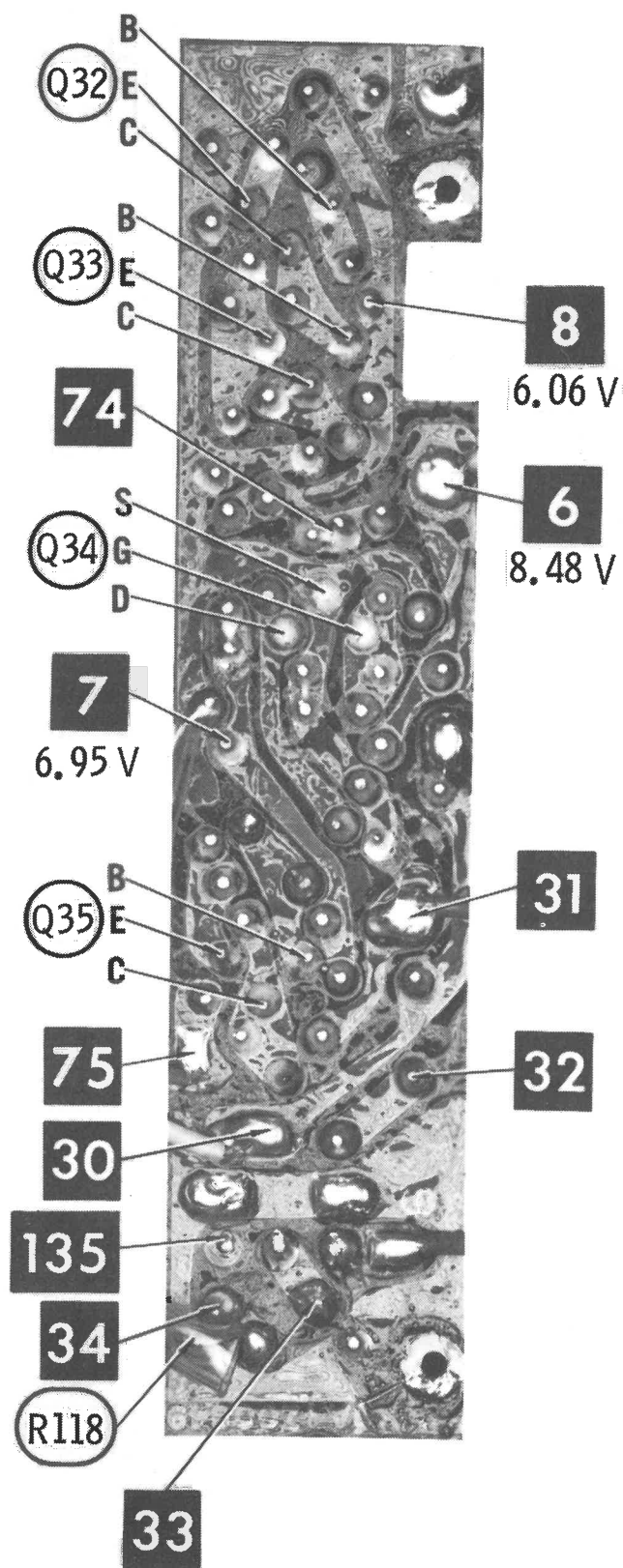
MAIN BOARD



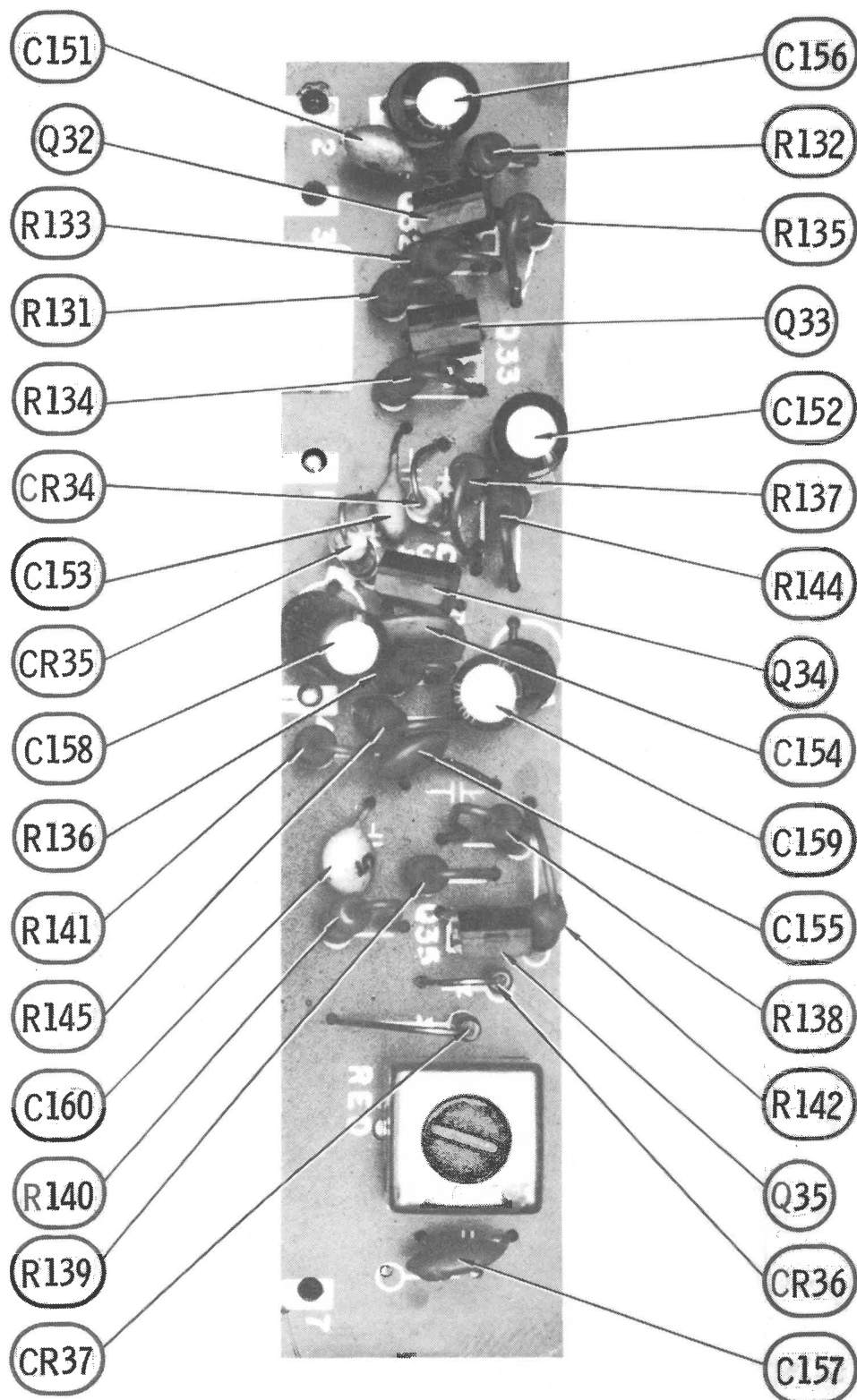
MAIN BOARD



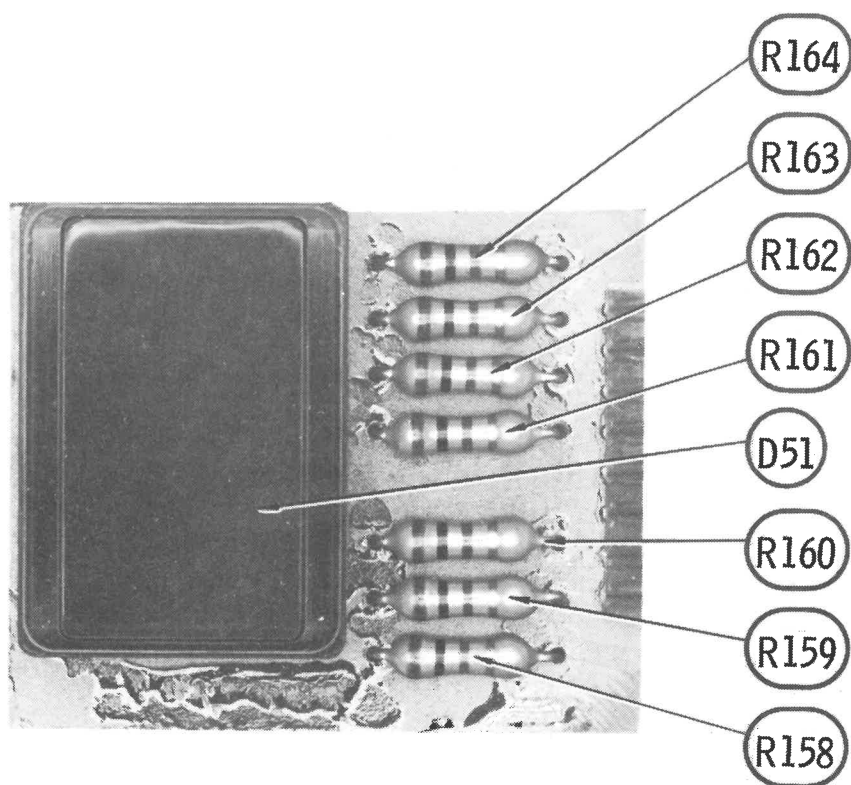
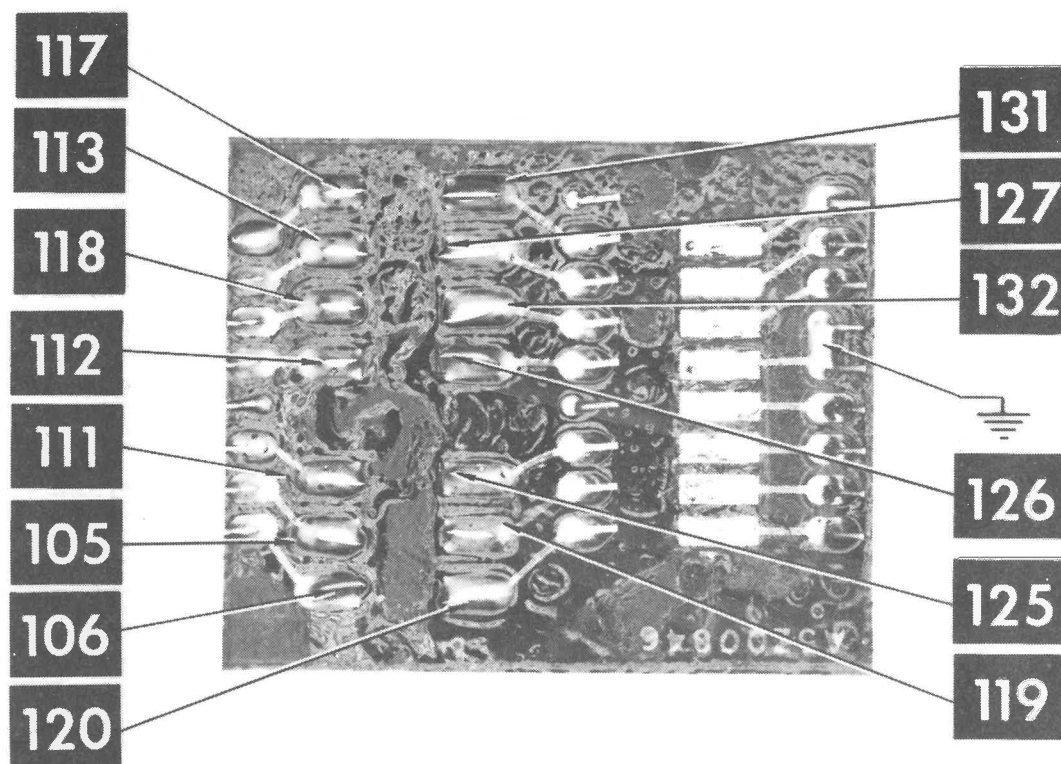
CHASSIS - BOTTOM



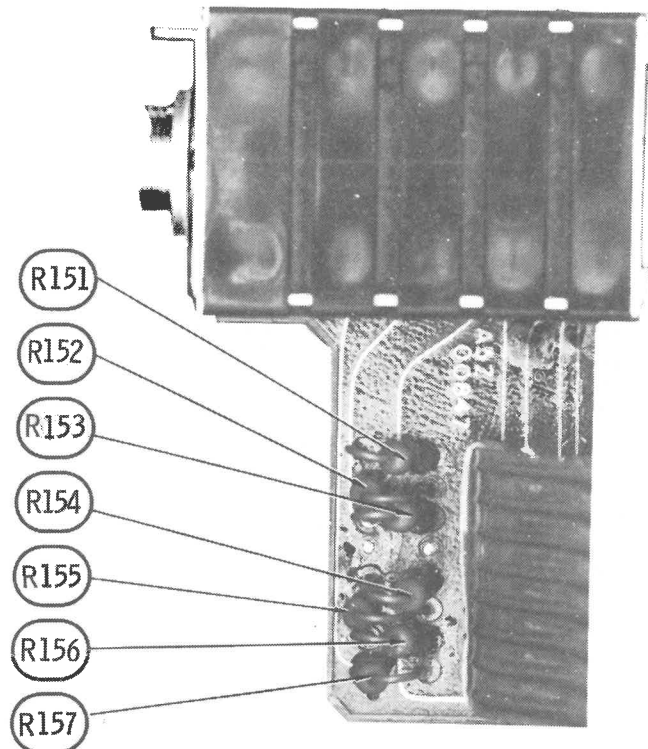
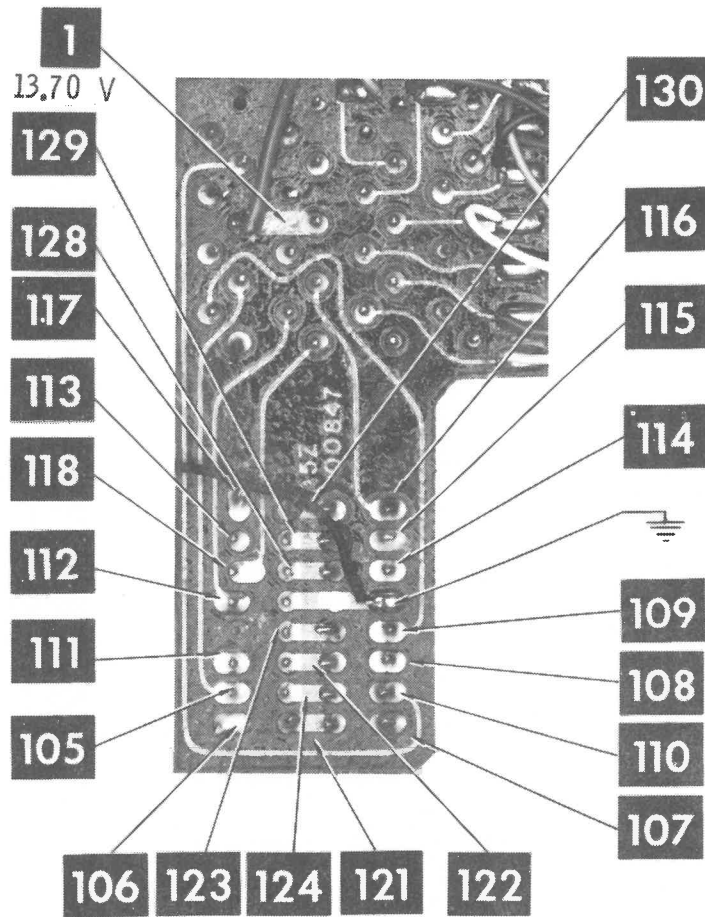
NOISE BLANKER BOARD



NOISE BLANKER BOARD



LED BOARD



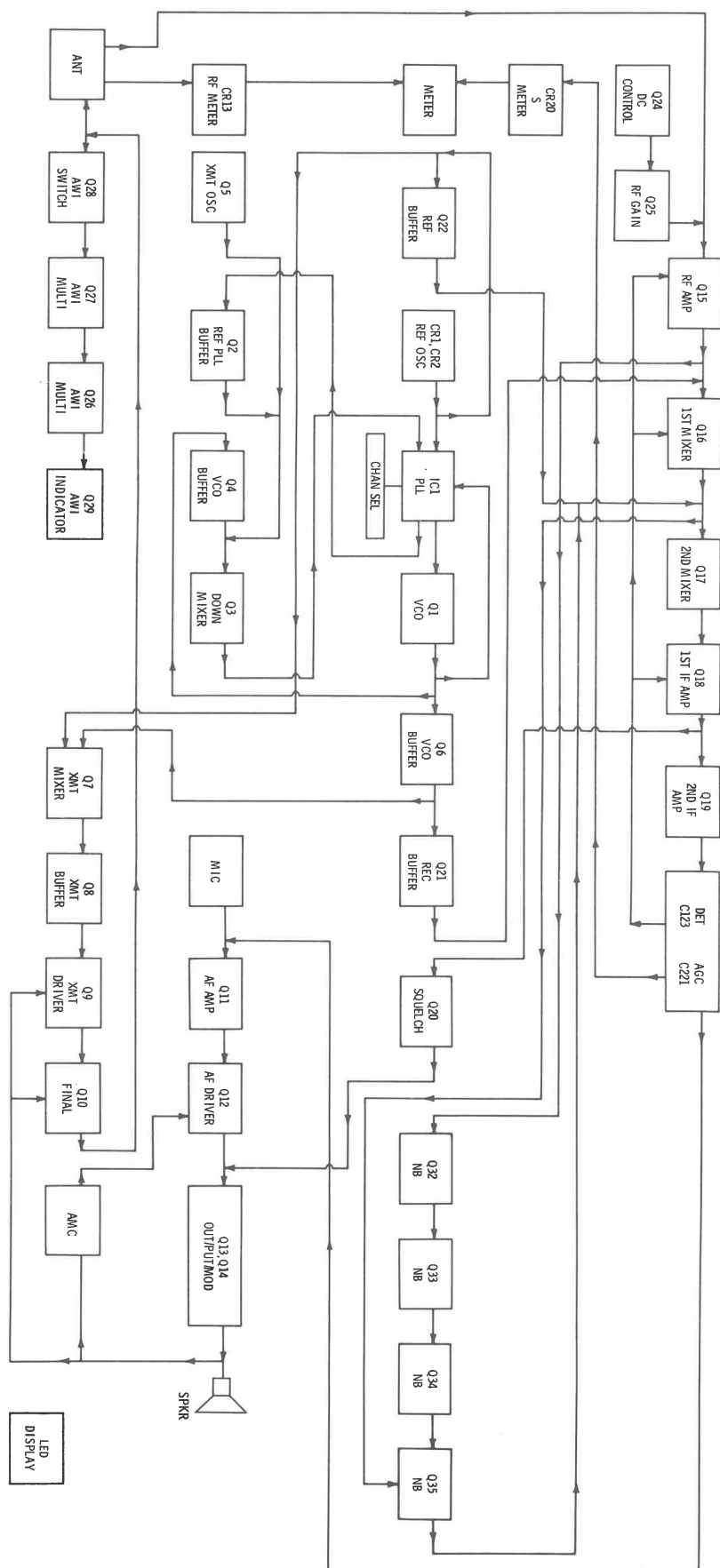
SWITCH BOARD

PAGE MODEL 8046

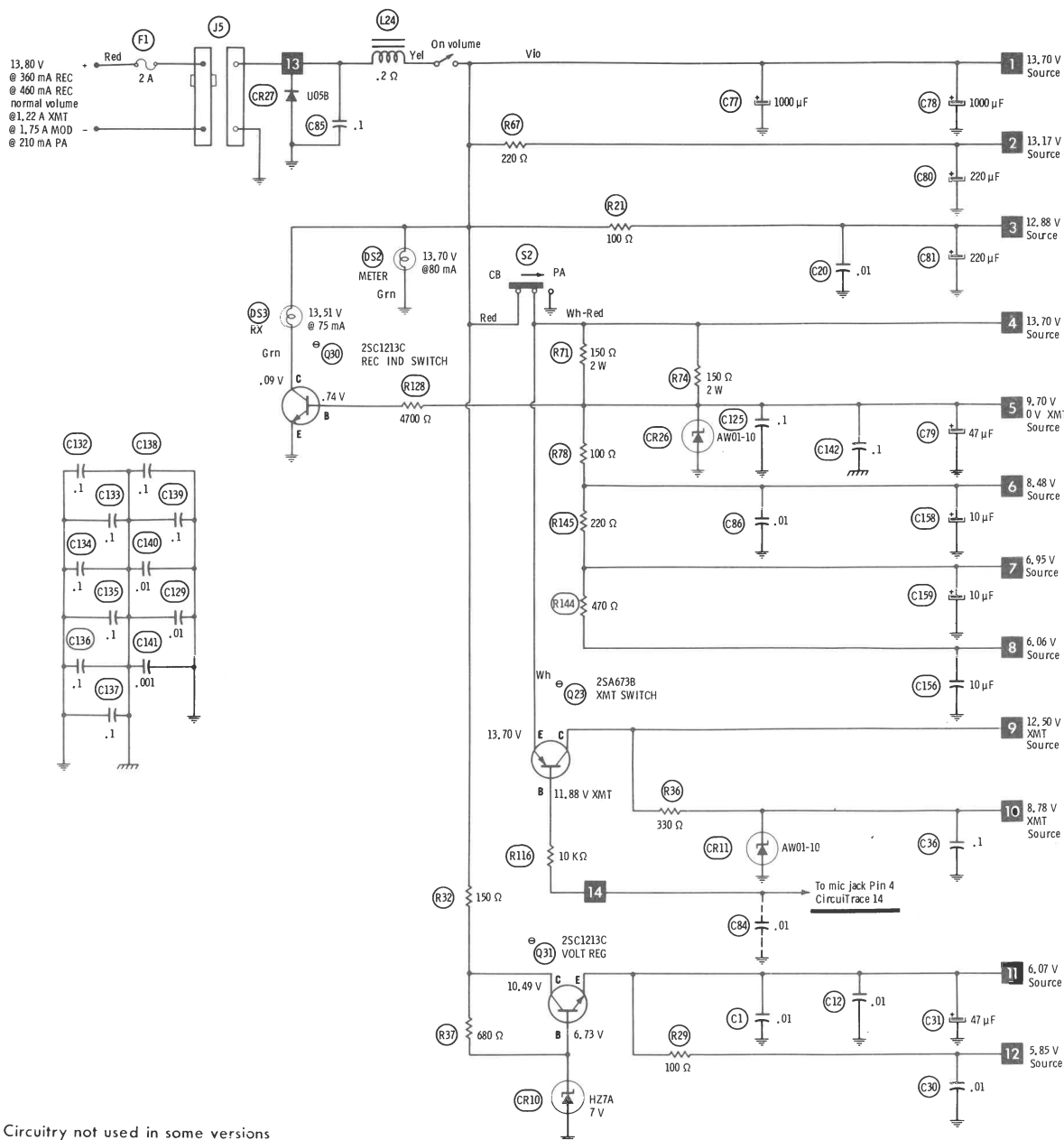
# TRUTH CHART

| 1 = <u>6.05</u> Volts      0 = <u>0</u> Volts |                                                  |    |    |    |    |    |    |    |                                                   |
|-----------------------------------------------|--------------------------------------------------|----|----|----|----|----|----|----|---------------------------------------------------|
| C<br>H<br>A<br>N<br>N<br>E<br>L               | IC1<br>PROGRAM DIVIDER<br>5.120MHz at IC1, Pin 5 |    |    |    |    |    |    |    | REC &<br>XMT<br>VCO<br>OUTPUT<br>IN MHz<br>AT TP3 |
|                                               | PINS                                             |    |    |    |    |    |    |    |                                                   |
|                                               | 10                                               | 11 | 12 | 13 | 14 | 15 | 16 | 17 |                                                   |
| 1                                             | 0                                                | 1  | 0  | 1  | 1  | 0  | 1  | 1  | 16.270                                            |
| 2                                             | 0                                                | 1  | 0  | 1  | 1  | 1  | 0  | 0  | 16.280                                            |
| 3                                             | 0                                                | 1  | 0  | 1  | 1  | 1  | 0  | 1  | 16.290                                            |
| 4                                             | 0                                                | 1  | 0  | 1  | 1  | 1  | 1  | 1  | 16.310                                            |
| 5                                             | 0                                                | 1  | 1  | 0  | 0  | 0  | 0  | 0  | 16.320                                            |
| 6                                             | 0                                                | 1  | 1  | 0  | 0  | 0  | 0  | 1  | 16.330                                            |
| 7                                             | 0                                                | 1  | 1  | 0  | 0  | 0  | 1  | 0  | 16.340                                            |
| 8                                             | 0                                                | 1  | 1  | 0  | 0  | 1  | 0  | 0  | 16.360                                            |
| 9                                             | 0                                                | 1  | 1  | 0  | 0  | 1  | 0  | 1  | 16.370                                            |
| 10                                            | 0                                                | 1  | 1  | 0  | 0  | 1  | 1  | 0  | 16.380                                            |
| 11                                            | 0                                                | 1  | 1  | 0  | 0  | 1  | 1  | 1  | 16.390                                            |
| 12                                            | 0                                                | 1  | 1  | 0  | 1  | 0  | 0  | 1  | 16.410                                            |
| 13                                            | 0                                                | 1  | 1  | 0  | 1  | 0  | 1  | 0  | 16.420                                            |
| 14                                            | 0                                                | 1  | 1  | 0  | 1  | 0  | 1  | 1  | 16.430                                            |
| 15                                            | 0                                                | 1  | 1  | 0  | 1  | 1  | 0  | 0  | 16.440                                            |
| 16                                            | 0                                                | 1  | 1  | 0  | 1  | 1  | 1  | 0  | 16.460                                            |
| 17                                            | 0                                                | 1  | 1  | 0  | 1  | 1  | 1  | 1  | 16.470                                            |
| 18                                            | 0                                                | 1  | 1  | 1  | 0  | 0  | 0  | 0  | 16.480                                            |
| 19                                            | 0                                                | 1  | 1  | 1  | 0  | 0  | 0  | 1  | 16.490                                            |
| 20                                            | 0                                                | 1  | 1  | 1  | 0  | 0  | 1  | 1  | 16.510                                            |

| 1 = <u>6.05</u> Volts      0 = <u>0</u> Volts |                                                  |    |    |    |    |    |    |    |                                                   |
|-----------------------------------------------|--------------------------------------------------|----|----|----|----|----|----|----|---------------------------------------------------|
| C<br>H<br>A<br>N<br>N<br>E<br>L               | IC1<br>PROGRAM DIVIDER<br>5.120MHZ at IC1, Pin 5 |    |    |    |    |    |    |    | REC &<br>XMT<br>VCO<br>OUTPUT<br>IN MHZ<br>AT TP3 |
|                                               | PINS                                             |    |    |    |    |    |    |    |                                                   |
|                                               | 10                                               | 11 | 12 | 13 | 14 | 15 | 16 | 17 |                                                   |
| 21                                            | 0                                                | 1  | 1  | 1  | 0  | 1  | 0  | 0  | 16.520                                            |
| 22                                            | 0                                                | 1  | 1  | 1  | 0  | 1  | 0  | 1  | 16.530                                            |
| 23                                            | 0                                                | 1  | 1  | 1  | 1  | 0  | 0  | 0  | 16.560                                            |
| 24                                            | 0                                                | 1  | 1  | 1  | 0  | 1  | 1  | 0  | 16.540                                            |
| 25                                            | 0                                                | 1  | 1  | 1  | 0  | 1  | 1  | 1  | 16.550                                            |
| 26                                            | 0                                                | 1  | 1  | 1  | 1  | 0  | 0  | 1  | 16.570                                            |
| 27                                            | 0                                                | 1  | 1  | 1  | 1  | 0  | 1  | 0  | 16.580                                            |
| 28                                            | 0                                                | 1  | 1  | 1  | 1  | 0  | 1  | 1  | 16.590                                            |
| 29                                            | 0                                                | 1  | 1  | 1  | 1  | 1  | 0  | 0  | 16.600                                            |
| 30                                            | 0                                                | 1  | 1  | 1  | 1  | 1  | 0  | 1  | 16.610                                            |
| 31                                            | 0                                                | 1  | 1  | 1  | 1  | 1  | 1  | 0  | 16.620                                            |
| 32                                            | 0                                                | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 16.630                                            |
| 33                                            | 1                                                | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 16.640                                            |
| 34                                            | 1                                                | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 16.650                                            |
| 35                                            | 1                                                | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 16.660                                            |
| 36                                            | 1                                                | 0  | 0  | 0  | 0  | 0  | 1  | 1  | 16.670                                            |
| 37                                            | 1                                                | 0  | 0  | 0  | 0  | 1  | 0  | 0  | 16.680                                            |
| 38                                            | 1                                                | 0  | 0  | 0  | 0  | 1  | 0  | 1  | 16.690                                            |
| 39                                            | 1                                                | 0  | 0  | 0  | 0  | 1  | 1  | 0  | 16.700                                            |
| 40                                            | 1                                                | 0  | 0  | 0  | 0  | 1  | 1  | 1  | 16.710                                            |



BLOCK DIAGRAM



—\*— 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 1/2 W or less, 5% unless noted.

Value in ( ) used in some versions.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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# PARTS LIST AND DESCRIPTION

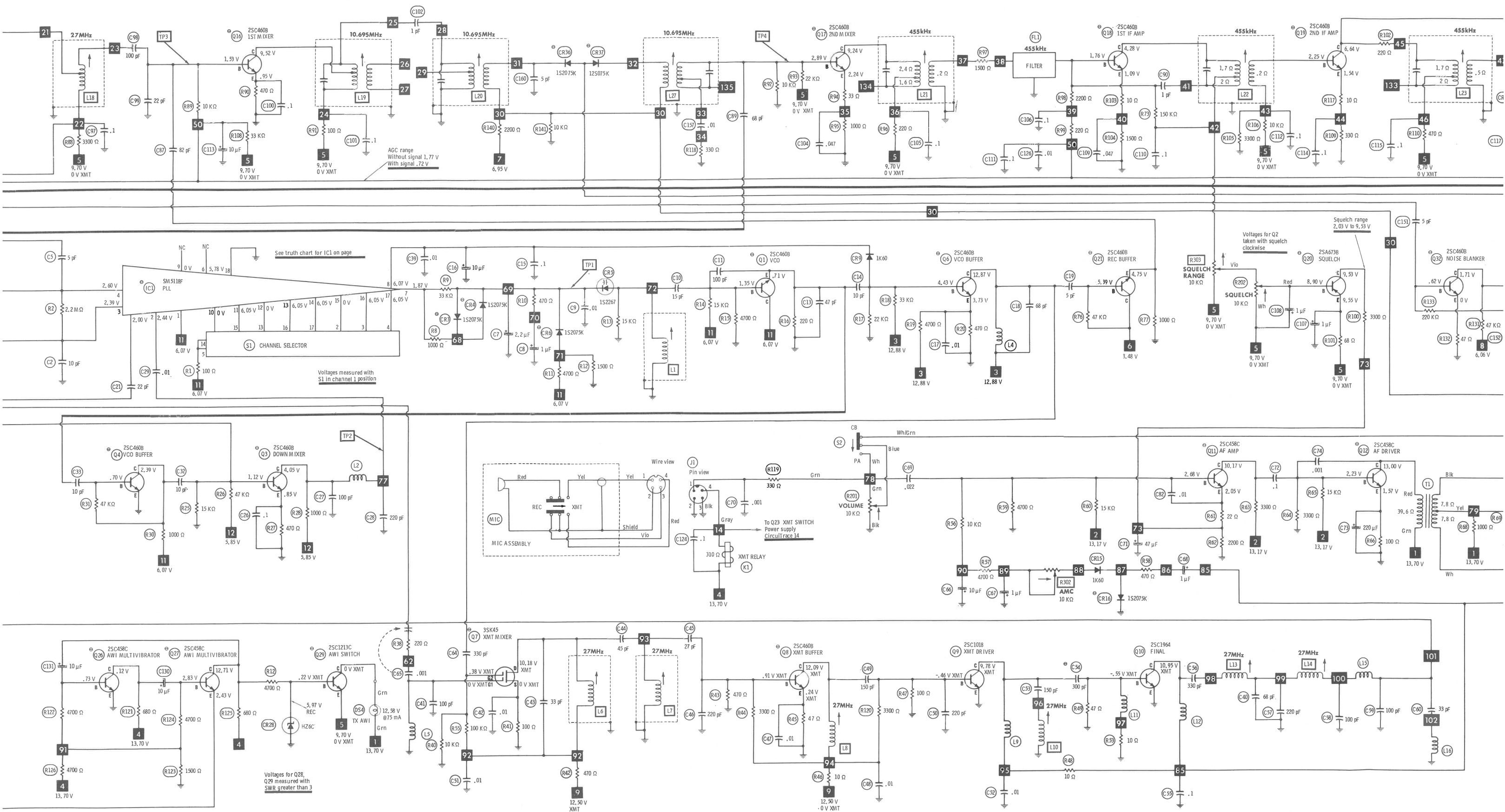
(When ordering parts, state Model, Part Number, and Description.)

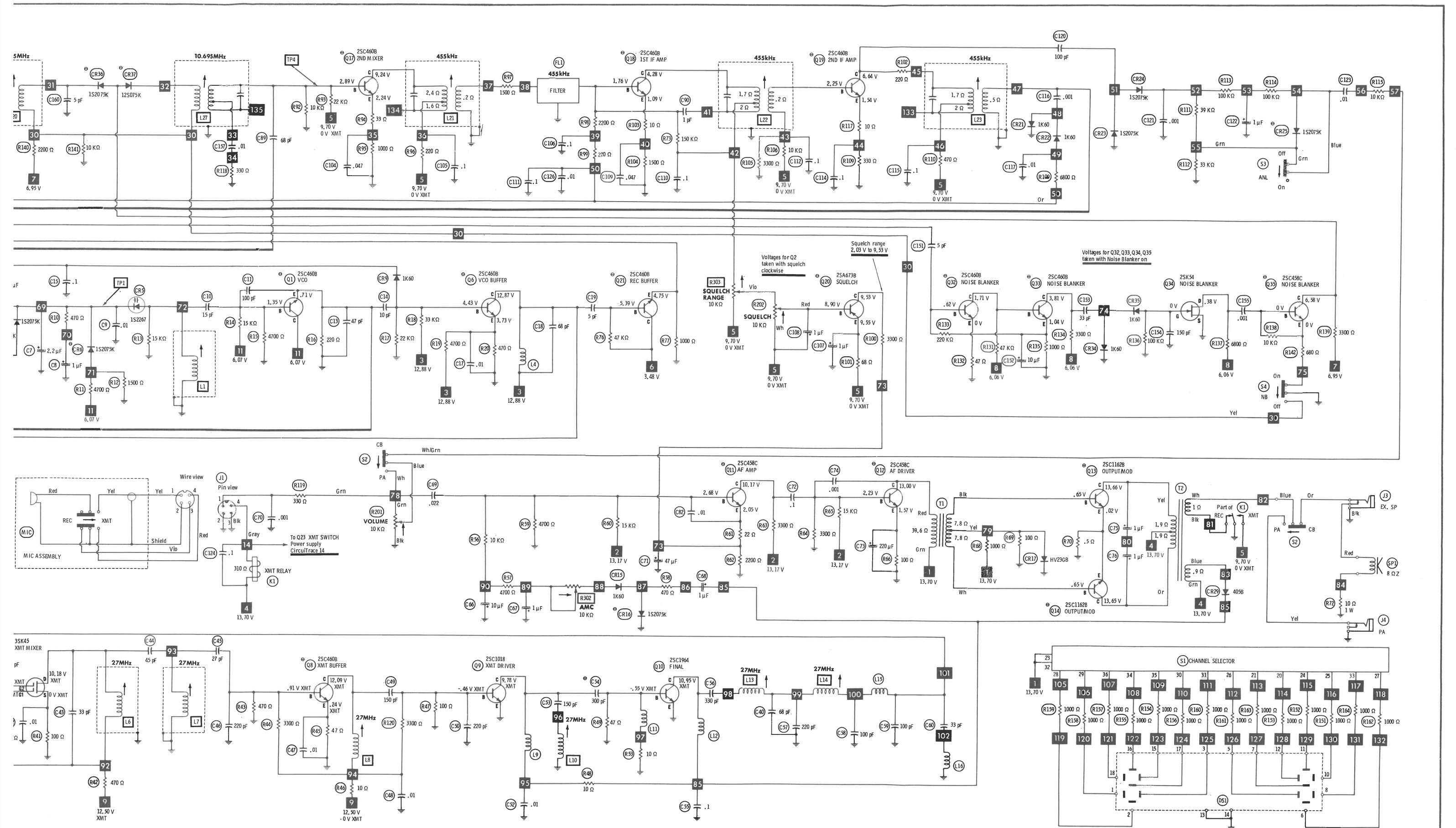
## SEMICONDUCTORS (Select replacement transistor for best results)

| ITEM No. | TYPE No.   | MFG. PART No. | REPLACEMENT DATA          |                     |                  |                   |                   |              |                  |                   |
|----------|------------|---------------|---------------------------|---------------------|------------------|-------------------|-------------------|--------------|------------------|-------------------|
|          |            |               | GENERAL ELECTRIC PART No. | IR WORKMAN PART No. | MALLORY PART No. | MOTOROLA PART No. | RAYTHEON PART No. | RCA PART No. | SPRAGUE PART No. | SYLVANIA PART No. |
| CR1      | 1S2267     | IP20-0185     | GE-90                     | D201                | PTC311           | HEPR2503          | RE 195            | SK3126       | RT-262           | ECG610            |
| CR2      | 1S2267     | IP20-0185     | GE-90                     | D201                | PTC311           | HEPR2503          | RE 195            | SK3126       | RT-262           | ECG610            |
| CR3      | 1S2075K    | IP20-0282     | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
|          | 1S2075(1)  |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| CR4      | 1S2075K    | IP20-0282     | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| CR5      | 1S2267     | IP20-0185     | GE-90                     | D201                | PTC311           | HEPR2503          | RE 195            | SK3126       | RT-262           | ECG610            |
| CR6      | 1S2075K    | IP20-0282     | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
|          | 1S2075(1)  |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| CR7      | 1S2075K    | IP20-0282     | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
|          | 1S2075(1)  |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| CR8      | 1S2075K    | IP20-0282     | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
|          | 1S2075(1)  |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| CR9      | 1K60       | IP20-0283     | 1N60                      | 1N60                | PTC206           | HEPR9135          | RE 47             | SK3088       | RT-263           | ECG109            |
| CR10     | HZ7A       | IP20-0186     | GEZD-6.8                  | Z1206               | ZB10A            | HEPZ0409          | RE 110            | SK3334       | RT-238           | ECG5071           |
| CR11     | AW01-10    | IP20-0233     | GEZD-10                   | Z1210               | ZB10A            | HEPZ0413          | RE 115            | SK3061       | RT-241           | ECG140            |
| CR13     | 1K60       | IP20-0283     | 1N60                      | 1N60                | PTC206           | HEPR9135          | RE 47             | SK3088       | RT-263           | ECG109            |
| CR14     | 1K60       | IP20-0283     | 1N60                      | 1N60                | PTC206           | HEPR9135          | RE 47             | SK3088       | RT-263           | ECG109            |
| CR15     | 1K60       | IP20-0283     | 1N60                      | 1N60                | PTC206           | HEPR9135          | RE 47             | SK3088       | RT-263           | ECG109            |
| CR16     | 1S2075K    | IP20-0282     | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
|          | 1S2075(1)  |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| CR17     | HV-23GB    | IP20-0244     |                           |                     | PTC301           |                   |                   |              |                  | ECG601            |
| CR18     | 1S2075K    | IP20-0282     | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
|          | 1S2075(1)  |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| CR19     | 1K60       | IP20-0283     | 1N60                      | 1N60                | PTC206           | HEPR9135          | RE 47             | SK3088       | RT-263           | ECG109            |
| CR20     | 1K60       | IP20-0283     | 1N60                      | 1N60                | PTC206           | HEPR9135          | RE 47             | SK3088       | RT-263           | ECG109            |
| CR21     | 1K60       | IP20-0283     | 1N60                      | 1N60                | PTC206           | HEPR9135          | RE 47             | SK3088       | RT-263           | ECG109            |
| CR22     | 1K60       | IP20-0283     | 1N60                      | 1N60                | PTC206           | HEPR9135          | RE 47             | SK3088       | RT-263           | ECG109            |
| CR23     | 1S2075K    | IP20-0282     | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| CR24     | 1S2075K    | IP20-0282     | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| CR25     | 1S2075K    | IP20-0282     | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
|          | 1S2075(1)  |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| CR26     | AW01-10    | IP20-0233     | GEZD-10                   | Z1210               | ZB10A            | HEPZ0413          | RE 115            | SK3061       | RT-241           | ECG140            |
| CR27     | U05B       | IP20-0164     | GE-512                    | R350                | PTC204           | HEPR0092          | RE 92             | SK3051       | RT-201           | ECG156            |
| CR28     | HZ-6C      | IP20-0284     | GEZD-6.2                  | WEP103              | ZB6.2A           | HEPZ0408          | RE 109            | SK3058       | RT-237           | ECG137            |
| CR29     | U05B       | IP20-0164     | GE-512                    | R350                | PTC204           | HEPR0092          | RE 92             | SK3051       | RT-201           | ECG156            |
| CR31     | 1K60       | IP20-0283     | 1N60                      | 1N60                | PTC206           | HEPR9135          | RE 47             | SK3088       | RT-263           | ECG109            |
| CR32     | 1K60       | IP20-0283     | 1N60                      | 1N60                | PTC206           | HEPR9135          | RE 47             | SK3088       | RT-263           | ECG109            |
| CR34     | 1K60       | IP20-0283     | 1N60                      | 1N60                | PTC206           | HEPR9135          | RE 47             | SK3088       | RT-263           | ECG109            |
| CR35     | 1K60       | IP20-0283     | 1N60                      | 1N60                | PTC206           | HEPR9135          | RE 47             | SK3088       | RT-263           | ECG109            |
| CR36     | 1S2075K    | IP20-0282     | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| CR37     | 1S2075K    | IP20-0282     | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| IC1      | SM5118F    |               |                           |                     |                  |                   |                   |              |                  |                   |
|          | SM5118     | IP20-0234(1)  |                           |                     |                  |                   |                   |              |                  |                   |
| Q1       | 2SC460B    | IP20-0179     | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
|          | 2SC460(1)  |               | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
| Q2       | 2SC460B    | IP20-0179     | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
|          | 2SC460(1)  |               | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
| Q3       | 2SC460B    | IP20-0179     | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
|          | 2SC460(1)  |               | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
| Q4       | 2SC460B    | IP20-0179     | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
|          | 2SC460(1)  |               | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
| Q5       | 2SC460B    | IP20-0179     | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
|          | 2SC460(1)  |               | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
| Q6       | 2SC460B    | IP20-0179     | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
|          | 2SC460(1)  |               | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
| Q7       | 3SK45      |               | GE-FET-4                  | WEP905              | PTC181           | HEPF2004          | RE 199            | SK3050       | RT-181           | ECG222            |
|          | 3SK45B     | IP20-0157(1)  | GE-FET-4                  | WEP905              | PTC181           | HEPF2004          | RE 199            | SK3050       | RT-181           | ECG222            |
| Q8       | 2SC460B    | IP20-0179     | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
|          | 2SC460(1)  |               | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
| Q9       | 2SC1018    | IP20-0123     | GE-236                    | WEP1018             | PTC192           |                   | RE 212            | SK3197       | RT-146           | ECG235            |
| Q10      | 2SC1964    | IP20-0135     | GE-215                    | WEP1306             | PTC186           |                   | RE 203            | SK3124       | RT-187           | ECG123A *         |
| Q11      | 2SC458C    | IP20-0191     | GE-210 *                  | (IR)2SC458B         | PTC121 *         | HEPS0009 *        | RE 13 *           | SK3124       | RT-187           | ECG123A *         |
|          | 2SC458(1)  |               | GE-210 *                  | (IR)2SC458B         | PTC121 *         | HEPS0009 *        | RE 13 *           | SK3124       | RT-187           | ECG123A *         |
| Q12      | 2SC458C    | IP20-0191     | GE-210 *                  | (IR)2SC458B         | PTC121 *         | HEPS0009 *        | RE 13 *           | SK3124       | RT-187           | ECG123A *         |
|          | 2SC458(1)  |               | GE-210 *                  | (IR)2SC458B         | PTC121 *         | HEPS0009 *        | RE 13 *           | SK3124       | RT-187           | ECG123A *         |
| Q13      | 2SC1162B   |               | GE-247                    | WEP900              | PTC163           |                   | RE 9              | SK3018 *     | RT-134           | ECG107            |
|          | 2SC1162NT  | IP20-0230(1)  | GE-247                    | WEP900              | PTC163           |                   | RE 9              | SK3018 *     | RT-134           | ECG107            |
|          | 2SC1162(1) |               | GE-247                    | WEP900              | PTC163           |                   | RE 9              | SK3018 *     | RT-134           | ECG107            |
| Q14      | 2SC1162B   |               | GE-247                    | WEP900              | PTC163           |                   | RE 9              | SK3018 *     | RT-134           | ECG107            |
|          | 2SC1162WT  | IP20-0230(1)  | GE-247                    | WEP900              | PTC163           |                   | RE 9              | SK3018 *     | RT-134           | ECG107            |
|          | 2SC1162(1) |               | GE-247                    | WEP900              | PTC163           |                   | RE 9              | SK3018 *     | RT-134           | ECG107            |
| Q15      | 2SC460B    | IP20-0179     | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
|          | 2SC460(1)  |               | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
| Q16      | 2SC460B    | IP20-0179     | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
|          | 2SC460(1)  |               | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
| Q17      | 2SC460B    | IP20-0179     | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
|          | 2SC460(1)  |               | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
| Q18      | 2SC460B    | IP20-0179     | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
|          | 2SC460(1)  |               | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
| Q19      | 2SC460B    | IP20-0179     | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
|          | 2SC460(1)  |               | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
| Q20      | 2SA673B    |               | GE-269                    | TR-28 *             | PTC103 *         | HEPS0026 *        | RE 197 *          | SK3114       | RT-115 *         | ECG290            |
|          | 2SA673A    | IP20-0192(1)  | GE-269                    | TR-28 *             | PTC103 *         | HEPS0026 *        | RE 197 *          | SK3114       | RT-115 *         | ECG290            |
|          | 2SA673(1)  |               | GE-269                    | TR-28 *             | PTC103 *         | HEPS0026 *        | RE 197 *          | SK3114       | RT-115 *         | ECG290            |
| Q21      | 2SC460B    | IP20-0179     | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |

PAGE MODEL 8046







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.   | MFRG. PART No. | REPLACEMENT DATA          |                     |                  |                   |                   |              |                  |                   |
|----------|------------|----------------|---------------------------|---------------------|------------------|-------------------|-------------------|--------------|------------------|-------------------|
|          |            |                | GENERAL ELECTRIC PART No. | IR WORKMAN PART No. | MALLORY PART No. | MOTOROLA PART No. | RAYTHEON PART No. | RCA PART No. | SPRAGUE PART No. | SYLVANIA PART No. |
| Q22      | 2SC460(1)  | IP20-0179      | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
|          | 2SC460B    |                | (IR)2SC460B               | PTC136 *            | HEPS0014 *       | RE 9              | SK3018 *          | RT-134       | ECG107           |                   |
| Q23      | 2SC460(1)  | IP20-0192(1)   | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
|          | 2SA673B    |                | GE-269                    | TR-28 *             | PTC103 *         | HEPS0026 *        | RE 197 *          | SK3114       | RT-115 *         | ECG290            |
| Q24      | 2SA673A    | IP20-0191      | GE-269                    | TR-28 *             | PTC103 *         | HEPS0026 *        | RE 197 *          | SK3114       | RT-115 *         | ECG290            |
|          | 2SA673(1)  |                | GE-269                    | TR-28 *             | PTC103 *         | HEPS0026 *        | RE 197 *          | SK3114       | RT-115 *         | ECG290            |
| Q25      | 2SC458C    | IP20-0191      | GE-210 *                  | (IR)2SC458B         | PTC121 *         | HEPS0009 *        | RE 13 *           | SK3124       | RT-187           | ECG123A *         |
|          | 2SC458(1)  |                | GE-210 *                  | (IR)2SC458B         | PTC121 *         | HEPS0009 *        | RE 13 *           | SK3124       | RT-187           | ECG123A *         |
| Q26      | 2SC458C    | IP20-0191      | GE-210 *                  | (IR)2SC458B         | PTC121 *         | HEPS0009 *        | RE 13 *           | SK3124       | RT-187           | ECG123A *         |
|          | 2SC458     |                | GE-210 *                  | (IR)2SC458B         | PTC121 *         | HEPS0009 *        | RE 13 *           | SK3124       | RT-187           | ECG123A *         |
| Q27      | 2SC458C    | IP20-0191      | GE-210 *                  | (IR)2SC458B         | PTC121 *         | HEPS0009 *        | RE 13 *           | SK3124       | RT-187           | ECG123A *         |
|          | 2SC458(1)  |                | GE-210 *                  | (IR)2SC458B         | PTC121 *         | HEPS0009 *        | RE 13 *           | SK3124       | RT-187           | ECG123A *         |
| Q28      | 2SC458C    | IP20-0191      | GE-210 *                  | (IR)2SC458B         | PTC121 *         | HEPS0009 *        | RE 13 *           | SK3124       | RT-187           | ECG123A *         |
|          | 2SC458(1)  |                | GE-210 *                  | (IR)2SC458B         | PTC121 *         | HEPS0009 *        | RE 13 *           | SK3124       | RT-187           | ECG123A *         |
| Q29      | 2SC1213C   | IP20-0231      | GE-210 *                  | (IR)2SC458B         | PTC121 *         | HEPS0009 *        | RE 13 *           | SK3124       | RT-187           | ECG123A *         |
|          | 2SC1213(1) |                | GE-268                    | TR-25 *             | PTC123 *         | HEPS5014 *        | RE 17 *           | SK3024 *     | RT-134           | ECG289            |
| Q30      | 2SC1213C   | IP20-0231      | GE-268                    | TR-25 *             | PTC123 *         | HEPS5014 *        | RE 17 *           | SK3024 *     | RT-134           | ECG289            |
|          | 2SC1213(1) |                | GE-268                    | TR-25 *             | PTC123 *         | HEPS5014 *        | RE 17 *           | SK3024 *     | RT-134           | ECG289            |
| Q31      | 2SC1213C   | IP20-0231      | GE-268                    | TR-25 *             | PTC123 *         | HEPS5014 *        | RE 17 *           | SK3024 *     | RT-134           | ECG289            |
|          | 2SC1213(1) |                | GE-268                    | TR-25 *             | PTC123 *         | HEPS5014 *        | RE 17 *           | SK3024 *     | RT-134           | ECG289            |
| Q32      | 2SC460B    | IP20-0179      | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
|          | 2SC460(1)  |                | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
| Q33      | 2SC460B    | IP20-0179      | GE-61 *                   | (IR)2SC460B         | PTC136 *         | HEPS0014 *        | RE 9              | SK3018 *     | RT-134           | ECG107            |
|          | 2SC460(1)  |                | GE-20                     | TR-25               | PTC144           | HEPS5014          | RE 13             | SK3122 *     | RT-114           | ECG123A           |
| Q34      | 2SK54      | IP20-0191      | GE-FET-2                  | FE-100              | PTC161           | HEPF0021          | RE 45             | SK3116       | RT-175           | ECG312            |
|          | 2SC458C    |                | GE-210 *                  | (IR)2SC458B         | PTC121 *         | HEPS0009 *        | RE 13 *           | SK3124       | RT-187           | ECG123A *         |
| Q35      | 2SC458(1)  |                | GE-210 *                  | (IR)2SC458B         | PTC121 *         | HEPS0009 *        | RE 13 *           | SK3124       | RT-187           | ECG123A *         |

\* Lead configuration may vary from original.  
(1) Used in some versions.

ELECTROLYTIC CAPACITORS

| ITEM No. | RATING   | REPLACEMENT DATA |                           |                  |                  |              |
|----------|----------|------------------|---------------------------|------------------|------------------|--------------|
|          |          | MFRG. PART No.   | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. |              |
|          |          |                  |                           |                  | Q-LINE           | GENERAL LINE |
| C7       | 2.2 16V  | IP22-0090        |                           | TDC225M035FL     |                  | SD35-2R29    |
| C8       | 1 50V    | IP22-0064        |                           | VTT1A50          | QV1-11           | EV-1615      |
| C16      | 10 16V   | IP22-0004        |                           | PC10-25          | QV1-41           | EV-1222      |
| C31      | 47 16V   | IP22-0006        |                           | PC50-16          | QV1-73           | EV-1226      |
| C62      | 1 50V    | IP22-0064        |                           | PC1-50           | QV1-11           | EV-1615      |
| C63      | 1 50V    | IP22-0064        |                           | PC1-50           | QV1-11           | EV-1615      |
| C66      | 10 16V   | IP22-0004        |                           | PC10-25          | QV1-41           | EV-1222      |
| C67      | 1 50V    | IP22-0064        |                           | PC1-50           | QV1-11           | EV-1615      |
| C68      | 1 50V    | IP22-0064        |                           | PC1-50           | QV1-11           | EV-1615      |
| C71      | 47 10V   | IP22-0137        |                           | TDC476M020GL     | QDT1-98          | SD20-479     |
| C73      | 220 16V  | IP22-0009        |                           | VTT220H16        | QE1-479          | TVA-1160.6   |
| C75      | 1 50V    | IP22-0064        |                           | PC1-50           | QV1-11           | EV-1615      |
| C76      | 1 50V    | IP22-0064        |                           | PC1-50           | QV1-11           | EV-1615      |
| C77      | 1000 16V | IP22-0011        |                           | PC1000-16        | QV1-183          | EV-1260      |
| C78      | 1000 16V | IP22-0011        |                           | PC1000-16        | QV1-183          | EV-1260      |
| C79      | 47 16V   | IP22-0006        |                           | PC50-16          | QV1-73           | EV-1226      |
| C80      | 220 16V  | IP22-0009        |                           | PC200-16         | QE1-479          | TVA-1160.6   |
| C81      | 220 16V  | IP22-0009        |                           | PC200-16         | QE1-479          | TVA-1160.6   |
| C107     | 1 50V    | IP22-0064        |                           | PC1-50           | QV1-11           | EV-1615      |
| C108     | 1 50V    | IP22-0064        |                           | PC1-50           | QV1-11           | EV-1615      |
| C113     | 10 16V   | IP22-0004        |                           | PC10-25          | QV1-41           | EV-1222      |
| C118     | 1 50V    | IP22-0064        |                           | PC1-50           | QV1-11           | EV-1615      |
| C122     | 1 50V    | IP22-0064        |                           | PC1-50           | QV1-11           | EV-1615      |
| C130     | 10 16V   | IP22-0004        |                           | PC10-25          | QV1-41           | EV-1222      |
| C131     | 10 16V   | IP22-0004        |                           | PC10-25          | QV1-41           | EV-1222      |
| C152     | 10 16V   | IP22-0004        |                           | PC10-25          | QV1-41           | EV-1222      |
| C156     | 10 16V   | IP22-0004        |                           | PC10-25          | QV1-41           | EV-1222      |
| C158     | 10 16V   | IP22-0004        |                           | PC10-25          | QV1-41           | EV-1222      |
| C159     | 10 16V   | IP22-0004        |                           | PC10-25          | QV1-41           | EV-1222      |

PARTS LIST AND DESCRIPTION (CONTINUED)

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

CAPACITORS

| ITEM No. | RATING   | MFRG. PART No. | REPLACEMENT DATA   |                           |                  |           |              |
|----------|----------|----------------|--------------------|---------------------------|------------------|-----------|--------------|
|          |          |                | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE   | PART No.     |
|          |          |                |                    |                           |                  | Q-LINE    | GENERAL LINE |
| C1       | .01      | (1)            | DC-103             | MGP01                     | TA110            | QC2-141   | TG-S10       |
| C2       | 10       |                | DTZ-10             | NP010                     | CN0410           |           | 10TCC-Q10    |
| C3       | .01      |                | DC-103             | MGP01                     | TA110            | QC2-141   | TG-S10       |
| C4       | .01      |                | DC-103             | MGP01                     | TA110            | QC2-141   | TG-S10       |
| C5       | 5        |                | DTZ-4R7            | NP04P7                    | CN0547           |           | 10TCC-V47    |
| C6       | .01      |                | DC-103             | MGP01                     | TA110            | QC2-141   | TG-S10       |
| C9       | .01      |                | DC-103             | MGP01                     | TA110            | QC2-141   | TG-S10       |
| C10      | 15 N750  |                | DTN-15             | N15                       | CN7415           |           | 10TCU-Q15    |
| C11      | 100      |                | DD-101             | GP100                     | GP310            |           | 10TS-T10     |
| C12      | .01      |                | DC-103             | MGP01                     | TA110            | QC2-141   | TG-S10       |
| C13      | 47 N750  |                | DTN-47             | N47                       | CN7447           |           | 10TCU-Q47    |
| C14      | 10       |                | DTZ-10             | NP010                     | CN0410           |           | 10TCC-Q10    |
| C15      | .1 50V   |                | DC-104             | MGP1                      | TA010            | QC2-233   | TG-P10       |
| C17      | .01      |                | DC-103             | MGP01                     | TA110            | QC2-141   | TG-S10       |
| C18      | 68       |                | DD-680             | GP68                      | GP468            |           | 10TS-Q68     |
| C19      | 5        |                | DTZ-4R7            | NP04P7                    | CN0547           |           | 10TCC-V47    |
| C20      | .01      |                | DC-103             | MGP01                     | TA110            | QC2-141   | TG-S10       |
| C21      | 22       |                | DTZ-22             | NP022                     | CN0422           |           | 10TCC-Q22    |
| C22      | 100      |                | DD-101             | GP100                     | GP310            |           | 10TS-T10     |
| C23      | .01      |                | DC-103             | MGP01                     | TA110            | QC2-141   | TG-S10       |
| C24      | .01      |                | DC-103             | MGP01                     | TA110            | QC2-141   | TG-S10       |
| C25      | 10       |                | DTZ-10             | NP010                     | CN0410           |           | 10TCC-Q10    |
| C26      | .1 50V   |                | DC-104             | MGP1                      | TA010            | QC2-233   | TG-P10       |
| C27      | 100      |                | DD-101             | GP100                     | GP310            |           | 10TS-T10     |
| C28      | 220      |                | DD-221             |                           | GP322            |           | 10TS-T22     |
| C29      | .01      |                | DC-103             | MGP01                     | TA110            | QC2-141   | TG-S10       |
| C30      | .01      |                | DC-103             | MGP01                     | TA110            | QC2-141   | TG-S10       |
| C32      | 10       |                | DTZ-10             | NP010                     | CN0410           |           | 10TCC-Q10    |
| C33      | 10       |                | DTZ-10             | NP010                     | CN0410           |           | 10TCC-Q10    |
| C34      | 10       |                | DTZ-10             | NP010                     | CN0410           |           | 10TCC-Q10    |
| C35      | 330      |                | DD-331             | GP330                     | GP333            |           | 10TS-T33     |
| C36      | .1 50V   |                | DC-104             | MGP1                      | TA010            | QC2-233   | TG-P10       |
| C37      | .01      |                | DC-103             | MGP01                     | TA110            | QC2-141   | TG-S10       |
| C39      | .01      |                | DC-103             | MGP01                     | TA110            | QC2-141   | TG-S10       |
| C40      | 68       |                | DD-680             | GP68                      | GP468            |           | 10TS-Q68     |
| C41      | 100      |                | DD-101             | GP100                     | GP310            |           | 10TS-T10     |
| C42      | .01      |                | DC-103             | MGP01                     | TA110            | QC2-141   | TG-S10       |
| C43      | 33       |                | DTZ-33             | NP033                     | CN0433           |           | 10TCC-Q33    |
| C44      | 45       |                | DTZ-47             | NP047                     | CN0447           |           | 10TCC-Q47    |
| C46      | 220      |                | DD-221             |                           | GP322            |           | 10TS-T22     |
| C47      | .01      |                | DC-103             | MGP01                     | TA110            | QC2-141   | TG-S10       |
| C48      | .01      |                | DC-103             | MGP01                     | TA110            | QC2-141   | TG-S10       |
| C49      | 150      |                | DD-151             |                           | GP315            |           | 10TS-T15     |
| C50      | 220      |                | DD-221             |                           | GP322            |           | 10TS-T22     |
| C51      | .01      |                | DC-103             | MGP01                     | TA110            | QC2-141   | TG-S10       |
| C52      | .01      |                | DC-103             | MGP01                     | TA110            | QC2-141   | TG-S10       |
| C53      | 150 10%  |                | DD-151             |                           | GP315            |           | 10TS-T15     |
| C54      | 300      |                | DD-301             | GP300                     | GP330            |           | 10TS-T30     |
|          | 330      |                | DD-331             | GP330                     | GP333            |           | 10TS-T33     |
| C55      | .1 50V   |                | DC-104             | MGP1                      | TA010            | QC2-233   | TG-P10       |
| C56      | 330      |                | DD-331             | GP330                     | GP333            |           | 10TS-T33     |
| C57      | 220      |                | DD-221             |                           | GP322            |           | 10TS-T22     |
| C58      | 100      |                | DD-101             | GP100                     | GP310            |           | 10TS-T10     |
| C59      | 100      |                | DD-101             | GP100                     | GP310            |           | 10TS-T10     |
| C60      | 39       |                |                    | CN0439                    |                  | 10TCC-Q39 |              |
| C61      | 1        |                |                    | CN0510                    |                  | 10TCC-V10 |              |
| C64      | 330      | DD-331         | GP330              | GP333                     |                  | 10TS-T33  |              |
| C65      | .001     | DD-102G        | GP1000             | GP210                     | QC2-81           | 56A-D10   |              |
| C69      | .022 10% |                |                    | M192P2239R8               | QFT2-127         | 1FT-S22   |              |
| C70      | .001     | DD-102G        | GP1000             | GP210                     | QC2-81           | 56A-D10   |              |
| C72      | .1       |                | WMF05P1            | EWF05010                  | QFT2-215         | 1FT-P10   |              |
| C74      | .001     | DD-102G        | GP1000             | GP210                     | QC2-81           | 56A-D10   |              |
| C82      | .01      | DC-103         | MGP01              | TA110                     | QC2-141          | TG-S10    |              |
| C83      | .01      | DC-103         | MGP01              | TA110                     | QC2-141          | TG-S10    |              |
| C84      | .01      | DC-103         | MGP01              | TA110                     | QC2-141          | TG-S10    |              |
| C85      | .1 50V   | DC-104         | MGP1               | TA010                     | QC2-233          | TG-P10    |              |
| C86      | .01      | DC-103         | MGP01              | TA110                     | QC2-141          | TG-S10    |              |
| C87      | 82       | DD-820         |                    | GP482                     |                  | 10TS-Q82  |              |
| C88      | .01      | DC-103         | MGP01              | TA110                     | QC2-141          | TG-S10    |              |
| C89      | 68       | DD-680         | GP68               | GP468                     |                  | 10TS-Q68  |              |
| C90      | 1        |                |                    | CN0510                    |                  | 10TCC-V10 |              |
| C91      | .01      | DC-103         | MGP01              | TA110                     | QC2-141          | TG-S10    |              |
| C92      | .01      | DC-103         | MGP01              | TA110                     | QC2-141          | TG-S10    |              |
| C93      | 47       | DTZ-47         | NP047              | CN0447                    |                  | 10TCC-Q47 |              |
| C94      | 33       | DTZ-33         | NP033              | CN0433                    |                  | 10TCC-Q33 |              |
| C95      | .01      | DC-103         | MGP01              | TA110                     | QC2-141          | TG-S10    |              |
| C96      | .1 50V   | DC-104         | MGP1               | TA010                     | QC2-233          | TG-P10    |              |
| C97      | .1 50V   | DC-104         | MGP1               | TA010                     | QC2-233          | TG-P10    |              |
| C98      | 100      | DD-101         | GP100              | GP310                     |                  | 10TS-T10  |              |
| C99      | 220      | DD-221         |                    | GP322                     |                  | 10TS-T22  |              |
| C100     | .1 50V   | DC-104         | MGP1               | TA010                     | QC2-233          | TG-P10    |              |
| C101     | .1 50V   | DC-104         | MGP1               | TA010                     | QC2-233          | TG-P10    |              |
| C102     | 1        |                |                    | CN0510                    |                  | 10TCC-V10 |              |
| C104     | .047 10% |                |                    | EWF1A147                  | QFT2-171         | 1FT-S39   |              |
| C105     | .1 50V   | DC-104         | MGP1               | TA010                     | QC2-233          | TG-P10    |              |
| C106     | .1 50V   | DC-104         | MGP1               | TA010                     | QC2-233          | TG-P10    |              |
| C109     | .047 10% |                |                    | EWF1A147                  | QFT2-171         | 1FT-S39   |              |
| C110     | .1 50V   | DC-104         | MGP1               | TA010                     | QC2-233          | TG-P10    |              |
| C111     | .1 50V   | DC-104         | MGP1               | TA010                     | QC2-233          | TG-P10    |              |

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

| 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       | .01      | (1)           | DC-103             | MGP01                     | TA110            | QC2-141  | TG-S10       |
| C2       | 10       |               | DTZ-10             | NP010                     | CN0410           |          | 10TCC-Q10    |
| C3       | .01      |               | DC-103             | MGP01                     | TA110            | QC2-141  | TG-S10       |
| C4       | .01      |               | DC-103             | MGP01                     | TA110            | QC2-141  | TG-S10       |
| C5       | 5        |               | DTZ-4R7            | NP04P7                    | CN0547           |          | 10TCC-V47    |
| C6       | .01      |               | DC-103             | MGP01                     | TA110            | QC2-141  | TG-S10       |
| C9       | .01      |               | DC-103             | MGP01                     | TA110            | QC2-141  | TG-S10       |
| C10      | 15 N750  |               | DTN-15             | N15                       | CN7415           |          | 10TCU-Q15    |
| C11      | 100      |               | DD-101             | GP100                     | GP310            |          | 10TS-T10     |
| C12      | .01      |               | DC-103             | MGP01                     | TA110            | QC2-141  | TG-S10       |
| C13      | 47 N750  |               | DTN-47             | N47                       | CN7447           |          | 10TCU-Q47    |
| C14      | 10       |               | DTZ-10             | NP010                     | CN0410           |          | 10TCC-Q10    |
| C15      | .1 50V   |               | DC-104             | MGP1                      | TA010            | QC2-233  | TG-P10       |
| C17      | .01      |               | DC-103             | MGP01                     | TA110            | QC2-141  | TG-S10       |
| C18      | 68       |               | DD-680             | GP68                      | GP468            |          | 10TS-Q68     |
| C19      | 5        |               | DTZ-4R7            | NP04P7                    | CN0547           |          | 10TCC-V47    |
| C20      | .01      |               | DC-103             | MGP01                     | TA110            | QC2-141  | TG-S10       |
| C21      | .01      |               | DTZ-22             | NP022                     | CN0422           |          | 10TCC-Q22    |
| C22      | 100      |               | DD-101             | GP100                     | GP310            |          | 10TS-T10     |
| C23      | .01      |               | DC-103             | MGP01                     | TA110            | QC2-141  | TG-S10       |
| C24      | .01      |               | DC-103             | MGP01                     | TA110            | QC2-141  | TG-S10       |
| C25      | 10       |               | DTZ-10             | NP010                     | CN0410           |          | 10TCC-Q10    |
| C26      | .1 50V   |               | DC-104             | MGP1                      | TA010            | QC2-233  | TG-P10       |
| C27      | 100      |               | DD-101             | GP100                     | GP310            |          | 10TS-T10     |
| C28      | 220      |               | DD-221             |                           | GP322            |          | 10TS-T22     |
| C29      | .01      |               | DC-103             | MGP01                     | TA110            | QC2-141  | TG-S10       |
| C30      | .01      |               | DC-103             | MGP01                     | TA110            | QC2-141  | TG-S10       |
| C32      | 10       |               | DTZ-10             | NP010                     | CN0410           |          | 10TCC-Q10    |
| C33      | 10       |               | DTZ-10             | NP010                     | CN0410           |          | 10TCC-Q10    |
| C34      | 10       |               | DTZ-10             | NP010                     | CN0410           |          | 10TCC-Q10    |
| C35      | 330      |               | DD-331             | GP330                     | GP333            |          | 10TS-T33     |
| C36      | .1 50V   |               | DC-104             | MGP1                      | TA010            | QC2-233  | TG-P10       |
| C37      | .01      |               | DC-103             | MGP01                     | TA110            | QC2-141  | TG-S10       |
| C39      | .01      |               | DC-103             | MGP01                     | TA110            | QC2-141  | TG-S10       |
| C40      | 68       |               | DD-680             | GP68                      | GP468            |          | 10TS-Q68     |
| C41      | 100      |               | DD-101             | GP100                     | GP310            |          | 10TS-T10     |
| C42      | .01      |               | DC-103             | MGP01                     | TA110            | QC2-141  | TG-S10       |
| C43      | 33       |               | DTZ-33             | NP033                     | CN0433           |          | 10TCC-Q33    |
| C44      | 45       |               | DTZ-47             | NP047                     | CN0447           |          | 10TCC-Q47    |
| C46      | 220      |               | DD-221             |                           | GP322            |          | 10TS-T22     |
| C47      | .01      |               | DC-103             | MGP01                     | TA110            | QC2-141  | TG-S10       |
| C48      | .01      |               | DC-103             | MGP01                     | TA110            | QC2-141  | TG-S10       |
| C49      | 150      |               | DD-151             |                           | GP315            |          | 10TS-T15     |
| C50      | 220      |               | DD-221             |                           | GP322            |          | 10TS-T22     |
| C51      | .01      |               | DC-103             | MGP01                     | TA110            | QC2-141  | TG-S10       |
| C52      | .01      |               | DC-103             | MGP01                     | TA110            | QC2-141  | TG-S10       |
| C53      | 150 10%  |               | DD-151             |                           | GP315            |          | 10TS-T15     |
| C54      | 300      |               | DD-301             | GP300                     | GP330            |          | 10TS-T30     |
|          | 330      |               | DD-331             | GP330                     | GP333            |          | 10TS-T33     |
| C55      | .1 50V   |               | DC-104             | MGP1                      | TA010            | QC2-233  | TG-P10       |
| C56      | 330      |               | DD-331             | GP330                     | GP333            |          | 10TS-T33     |
| C57      | 220      |               | DD-221             |                           | GP322            |          | 10TS-T22     |
| C58      | 100      |               | DD-101             | GP100                     | GP310            |          | 10TS-T10     |
| C59      | 100      |               | DD-101             | GP100                     | GP310            |          | 10TS-T10     |
| C60      | 39       |               |                    |                           | CN0439           |          | 10TCC-Q39    |
| C61      | 1        |               |                    |                           | CN0510           |          | 10TCC-V10    |
| C64      | 330      |               | DD-331             | GP330                     | GP333            |          | 10TS-T33     |
| C65      | .001     |               | DD-102G            | GP1000                    | GP210            | QC2-81   | 56A-D10      |
| C69      | .022 10% |               |                    |                           | M192P2239R8      | QFT2-127 | 1FT-S22      |
| C70      | .001     |               | DD-102G            | GP1000                    | GP210            | QC2-81   | 56A-D10      |
| C72      | .1       |               |                    | WMF05P1                   | EWF05010         | QFT2-215 | 1FT-P10      |
| C74      | .001     |               | DD-102G            | GP1000                    | GP210            | QC2-81   | 56A-D10      |
| C82      | .01      |               | DC-103             | MGP01                     | TA110</          |          |              |

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

| ITEM<br>No. | RATING  | MFG.<br>PART No.       | REPLACEMENT DATA      |                                  |                     |                  |              |
|-------------|---------|------------------------|-----------------------|----------------------------------|---------------------|------------------|--------------|
|             |         |                        | CENTRALAB<br>PART No. | CORNELL-<br>DUBILIER<br>PART No. | MALLORY<br>PART No. | SPRAGUE PART No. |              |
|             |         |                        |                       |                                  |                     | Q-LINE           | GENERAL LINE |
| C112        | .1 50V  | IP22-0093<br>IP22-0092 | DC-104                | MGP1                             | TA010               | QC2-233          | TG-P10       |
| C114        | .1      |                        |                       | WMF05P1                          | EWFO5010            | QFT2-215         | 1FT-P10      |
| C115        | .1 50V  |                        | DC-104                | MGP1                             | TA010               | QC2-233          | TG-P10       |
| C116        | .001    |                        | DD-102G               | GP1000                           | GP210               | QC2-81           | 5GA-D10      |
| C117        | .01     |                        | DC-103                | MGP01                            | TA110               | QC2-141          | TG-S10       |
| C119        | .01     |                        | DC-103                | MGP01                            | TA110               | QC2-141          | TG-S10       |
| C120        | 100     |                        | DD-101                | GP100                            | GP310               |                  | 10TS-T10     |
| C121        | .001    |                        | DD-102G               | GP1000                           | GP210               | QC2-81           | 5GA-D10      |
| C123        | .01 10% |                        |                       | WMF1S1                           | EWFTA110            | QFT2-91          | 1FT-S10      |
| C214        | .1 50V  |                        | DC-104                | MGP1                             | TA010               | QC2-233          | TG-P10       |
| C125        | .1 50V  |                        | DC-104                | MGP1                             | TA010               | QC2-233          | TG-P10       |
| C126        | .01     |                        | DC-103                | MGP01                            | TA110               | QC2-141          | TG-S10       |
| C127        | .01     |                        | DC-103                | MGP01                            | TA110               | QC2-141          | TG-S10       |
| C129        | .01     |                        | DC-103                | MGP01                            | TA110               | QC2-141          | TG-S10       |
| C132        | .1 50V  |                        | DC-104                | MGP1                             | TA010               | QC2-233          | TG-P10       |
| C133        | .1 50V  |                        | DC-104                | MGP1                             | TA010               | QC2-233          | TG-P10       |
| C134        | .1 50V  |                        | DC-104                | MGP1                             | TA010               | QC2-233          | TG-P10       |
| C135        | .1 50V  |                        | DC-104                | MGP1                             | TA010               | QC2-233          | TG-P10       |
| C136        | .1 50V  |                        | DC-104                | MGP1                             | TA010               | QC2-233          | TG-P10       |
| C137        | .1 50V  |                        | DC-104                | MGP1                             | TA010               | QC2-233          | TG-P10       |
| C138        | .1 50V  |                        | DC-104                | MGP1                             | TA010               | QC2-233          | TG-P10       |
| C139        | .1 50V  |                        | DC-104                | MGP1                             | TA010               | QC2-233          | TG-P10       |
| C140        | .01     |                        | DC-103                | MGP01                            | TA110               | QC2-141          | TG-S10       |
| C141        | .001    |                        | DD-102G               | GP1000                           | GP210               | QC2-81           | 5GA-D10      |
| C142        | .1 50V  |                        | DC-104                | MGP1                             | TA010               | QC2-233          | TG-P10       |
| C151        | 5       |                        | DTZ-4R7               | NP04P7                           | CN0547              |                  | 10TCC-V47    |
| C153        | 33      |                        | DTZ-33                | NP033                            | CN0433              |                  | 10TCC-Q33    |
| C154        | 150     |                        | DD-151                |                                  | GP315               |                  | 10TS-T15     |
| C155        | .001    |                        | DD-102G               | GP1000                           | GP210               | QC2-81           | 5GA-D10      |
| C157        | .01     |                        | DC-103                | MGP01                            | TA110               | QC2-141          | TG-S10       |
| C160        | 5       |                        | DTZ-4R7               | NP04P7                           | CN0547              |                  | 10TCC-V47    |
| C201        | 10      |                        |                       |                                  |                     |                  | GKB10000     |
| C202        | 50      |                        |                       |                                  |                     | GKB50000         |              |

(1) Used in some versions.

| ITEM No. | FUNCTION      | RESIST-ANCE | REPLACEMENT DATA |                    |                    |                  |              |
|----------|---------------|-------------|------------------|--------------------|--------------------|------------------|--------------|
|          |               |             | MFGR. PART No.   | CENTRALAB PART No. | CLAROSTAT PART No. | MALLORY PART No. | TRW PART No. |
| R201     | Volume/Switch | 10K         | IP24-0032        |                    |                    |                  |              |
| R202     | Squelch       | 10K         | IP24-0043        |                    |                    |                  |              |
| R203     | Delta Tune    | 10K         | IP24-0042        |                    |                    |                  |              |
| R204     | RF Gain       | 10K         | IP24-0043        |                    |                    |                  |              |
| R301     | RF Meter      | 10K         | IP24-0003        |                    |                    |                  |              |
| R302     | AMC           | 10K         | IP24-0003        | T-10K              | C-103              | MTC14L1          | X201R103B    |
| R303     | Squelch Range | 10K         | IP24-0003        | T-10K              | C-103              | MTC14L1          | X201R103B    |
| S304     | S Meter       | 10K         | IP24-0003        | T-10K              | C-103              | MTC14L1          | X201R103B    |
| R305     | AWI           | 10K         | IP24-0003        | T-10K              | C-103              | MTC14L1          | X201R103B    |

| ITEM No. | FUNCTION                    | REPLACEMENT DATA |                      |                 | REMARKS |
|----------|-----------------------------|------------------|----------------------|-----------------|---------|
|          |                             | PART No.         | OTHER IDENTIFICATION | MILLER PART No. |         |
| L1       | VCO                         | IP21-0294        | A4ZS63557            |                 |         |
| L2       | Pi Filter (47uH)            | IP21-0295        |                      |                 |         |
| L3       | Ref PLL Buffer (15.360MHz)  | IP21-0296        | A4ZS63559            |                 |         |
| L4       | RF Choke (.1uH)             | IP21-0297        | A4ZS63553            |                 |         |
| L5       | RF Choke (3.3uH)            | IP21-0298        |                      |                 |         |
| L6       | Harmonic Suppressor (27MHz) | IP21-0296        | A4ZS63559            |                 |         |
| L7       | XMT Mixer (27MHz)           | IP21-0296        | A4ZS63559            |                 |         |
| L8       | XMT Buffer (27MHz)          | IP21-0301        | A4ZS63560            |                 |         |
| L9       | RF Choke (.1uH)             | IP21-0297        | A4ZS63553            |                 |         |
| L10      | XMT Driver (27MHz)          | IP21-0301        | A4ZS63560            |                 |         |
| L11      | RF Choke (.1uH)             | IP21-0297        | A4ZS63553            |                 |         |
| L12      | RF Choke (.1uH)             | IP21-0297        | A4ZS63553            |                 |         |
| L13      | Final Amp (27MHz)           | IP21-0306        | A4ZS63561            |                 |         |
| L14      | Pi Filter (27MHz)           | IP21-0306        | A4ZS63561            |                 |         |
| L15      | Pi Filter (.22uH)           | IP21-0308        | A4ZS63564            |                 |         |
| L16      | TVI Trap (.22uH)            | IP21-0308        | A4ZS63564            |                 |         |
| L17      | Rec Antenna (27MHz)         | IP21-0310        | A4ZS63562            |                 |         |
| L18      | Rec RF (27MHz)              | IP21-0311        | A4ZS63563            |                 |         |
| L19      | Rec Mixer (10.695MHz)       | IP21-0312        | A4ZS63552            |                 |         |
| L20      | Rec Mixer (10.695MHz)       | IP21-0312        | A4ZS63552            |                 |         |
| L21      | IF (455kHz)                 | IP21-0314        | A4ZS63565            |                 |         |
| L22      | IF (455kHz)                 | IP21-0315        | A4ZS63566            |                 |         |
| L23      | IF (455kHz)                 | IP21-0316        | A4ZS63567            |                 |         |
| L25      | Directional Coupler         | IP21-0382        | A4ZS63603            |                 |         |
| L26      | RF Choke                    | IP21-0312        | A4ZS63552            |                 |         |
| L27      | Rec Mixer (10.695MHz)       |                  |                      |                 |         |

## PARTS LIST AND DESCRIPTION (CONTINUED)

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

### FILTER CHOKE

| ITEM No. | RATINGS               |         |                                    | REPLACEMENT DATA      |                        |                   | NOTES               |
|----------|-----------------------|---------|------------------------------------|-----------------------|------------------------|-------------------|---------------------|
|          | CURRENT<br>(Measured) | DC RES. | INDUCTANCE<br>(0 CURRENT<br>1000~) | MFGR.<br>PART No.     | THORDARSON<br>PART No. | TRIAD<br>PART No. |                     |
| L24      | 1.75A                 | .2      | 3.23mH                             | IP21-0317<br>L-24 (1) |                        |                   | (1) Number on unit. |

### TRANSFORMER (Driver)

| ITEM No. | TURNS RATIO |        |        | REPLACEMENT DATA     |                        |                   | NOTES               |
|----------|-------------|--------|--------|----------------------|------------------------|-------------------|---------------------|
|          | PRI.        | SEC. 1 | SEC. 2 | MFGR.<br>PART No.    | THORDARSON<br>PART No. | TRIAD<br>PART No. |                     |
| T1       | 1.8         | 1      |        | IP21-0318<br>T-1 (1) |                        |                   | (1) Number on unit. |

PAGE MODEL 8046

### TRANSFORMER (Audio Output)

| ITEM No. | IMPEDANCE |          | REPLACEMENT DATA     |                        |                   | NOTES               |
|----------|-----------|----------|----------------------|------------------------|-------------------|---------------------|
|          | PRI.      | SEC.     | MFGR.<br>PART No.    | THORDARSON<br>PART No. | TRIAD<br>PART No. |                     |
| T2       | 32        | 1 8 25.9 | IP21-0319<br>T-2 (1) |                        | MCB-68            | (1) Number on unit. |

### SPEAKER

| ITEM No. | TYPE             | REPLACEMENT DATA  |                  | NOTES |
|----------|------------------|-------------------|------------------|-------|
|          |                  | MFGR.<br>PART No. | QUAM<br>PART No. |       |
| SP1      | 3 1/2" PM 8 Ohms | IP29-0022         | 3A05Z8R          |       |

### FUSE DEVICES

| ITEM No. | DESCRIPTION    | REPLACEMENT DATA |        |                  |        |                        |        |                     |
|----------|----------------|------------------|--------|------------------|--------|------------------------|--------|---------------------|
|          |                | PART No.         |        | BUSS<br>PART No. |        | LITTELFUSE<br>PART No. |        | WORKMAN<br>PART No. |
|          |                | DEVICE           | HOLDER | DEVICE           | HOLDER | DEVICE                 | HOLDER | DEVICE              |
| F1       | 2A Fast Acting | IP36-0002        |        | AGC2             | HDJ    | 312002                 | 150145 | FG2-2               |

## PARTS LIST AND DESCRIPTION (CONTINUED)

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

### MICROPHONE

| ITEM No. | REPLACEMENT DATA |             |                 |          | CONNECTION DATA |        |           |           |         |          |          |
|----------|------------------|-------------|-----------------|----------|-----------------|--------|-----------|-----------|---------|----------|----------|
|          | MFGR. PART No.   | GC PART No. | GC NOISE CANCEL | GC POWER | GC CONNECTOR    | GC Red | GC Shield | GC Yellow | GC Blue | GC White | GC Black |
| MIC      | IP29-0021        | 18-032      | 18-034          | 18-010   | 18-092          | 1      | 2         | 4         | NC      | NC       | 2        |

### MISCELLANEOUS

| ITEM No. | PART NAME             | PART No.  | NOTES                              |
|----------|-----------------------|-----------|------------------------------------|
| DS1      | LED                   | IP28-0029 | Channel Readout                    |
| DS2      | Lamp                  | IP28-0009 | Meter Illumination (13.70V @ 80mA) |
| DS3      | Lamp                  | IP28-0009 | RX Indicator (13.51V @ 75mA)       |
| DS4      | Lamp                  | IP28-0009 | TX/AWI (12.58V @ 75mA)             |
| FL1      | Filter                | IP31-0091 | 455kHz                             |
| J1       | Jack                  | IP26-0014 | Microphone                         |
| J2       | Jack                  | IP26-0028 | Antenna                            |
| J3       | Jack                  | IP26-0034 | External Speaker                   |
| J4       | Jack                  | IP26-0034 | PA                                 |
| J5       | Jack                  | IP35-0007 | DC Power                           |
| K1       | Relay                 | IP32-0010 | XMT/Rec (305 Ohm)                  |
| M1       | Meter                 | IP27-0015 | S/Rf                               |
| S1       | Switch                | IP25-0063 | Channel Selector                   |
| S2       | Switch                | IP25-0051 | PA/CB                              |
| S3       | Switch                | IP25-0052 | ANL                                |
| S4       | Switch                | IP25-0052 | NB                                 |
| Y1       | Crystal               | IP31-0095 | 10.240MHz (PLL)                    |
| Y2       | Crystal               | IP31-0096 | 15.815MHz (XMT Oscillator)         |
|          | Printed Circuit Board | IP37-0012 | Switching                          |
|          | Printed Circuit Board | IP37-0013 | Noise Blanker                      |
|          | Printed Circuit Board | IP37-0014 | Channel Indicator                  |

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

| ITEM              | PART No.  | ITEM                   | PART No.  |
|-------------------|-----------|------------------------|-----------|
| Case, Top         | IP30-0293 | Lens Led               | IP30-0299 |
| Case, Bottom      | IP30-0294 | Knob, Channel Selector | IP30-0296 |
| Bracket, Mounting | IP30-0295 | Knob, Small            | IP30-0297 |
| Bezel Assembly    | IP30-0302 |                        |           |

### 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')    |