



# 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.



MODEL 1-660

## MANUFACTURER'S SPECIFICATIONS

### GENERAL

- |                                        |                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Semiconductors                      | : 25 transistors, 2 FET's, 46 diodes, 4 integrated circuits (3 CMOS IC's), and 3 LED's.                                                                                                                                                                                                                                                                            |
| 2. Self Contained Speaker              | : 3", 8 ohm voice coil.                                                                                                                                                                                                                                                                                                                                            |
| 3. Microphone                          | : Dynamic microphone with push-to-talk switch, 500 ohms.                                                                                                                                                                                                                                                                                                           |
| 4. Controls, Indicators and Connectors | : Volume control with power on-off switch.<br>: Variable Squelch control.<br>: Channel Selector.<br>: Digital Channel Readout.<br>: Illuminated S/RF Power Meter.<br>: Transmit Light.<br>: Pushbutton A.N.L.<br>: Pushbutton PA-CB.<br>: Coaxial type antenna connector.<br>: External Speaker Jack.<br>: Microphone Connector.<br>: Public Address Speaker Jack. |
| 5. Power Supply                        | : 13.8 Volts DC (positive or negative ground).                                                                                                                                                                                                                                                                                                                     |
| 6. Cabinet Description                 | : Plastic front with chrome plating.                                                                                                                                                                                                                                                                                                                               |
| 7. Dimensions                          | : 7-7/8W x 2-3/8H x 8-13/16D.                                                                                                                                                                                                                                                                                                                                      |

### RECEIVER

- |                                                          |                                   |
|----------------------------------------------------------|-----------------------------------|
| 1. Frequency Range (MHz)                                 | : 26.965 — 27.255.                |
| 2. Sensitivity                                           | : 0.5 Microvolts for 10db S+N/N.  |
| 3. Selectivity                                           | : 5KHz minimum at 6db down.       |
| 4. Adj. Channel Rejection                                | : More than 60db.                 |
| 5. Audio Power output at 8 ohm                           | : More than 4W at 10% distortion. |
| 6. Audio fidelity (1KHz=0db, 6db down)                   | : 400Hz—2,000Hz.                  |
| 7. A.G.C. figure of merit<br>(input 94db for 10db range) | : More than 80db.                 |
| 8. Squelch sensitivity (Threshold)                       | : Less than 0.5uV.                |
| 9. Spurious Rejection                                    | : More than 45db.                 |

### TRANSMITTER

- |                          |                    |
|--------------------------|--------------------|
| 1. Frequency Range (MHz) | : 26.965 — 27.255. |
| 2. RF Output Power       | : 4W.              |
| 3. Modulation Capability | : 100%.            |
| 4. Spurious Suppression  | : More than 50db.  |
| 5. Frequency Tolerance   | : ± 0.005%.        |

Courtesy of the Manufacturer

ROYCE MODEL 1-660

**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:

T201, L403, L404, T401, T402 ..... 5009  
T101, T102 ..... 9440

## SYNTHESIZER ALIGNMENT

| TEST EQUIPMENT                                         | TRANSCEIVER | ADJUST | REMARKS                                                                                              |
|--------------------------------------------------------|-------------|--------|------------------------------------------------------------------------------------------------------|
| Input of frequency counter to TP1 (PLL Unit, Pin 2).   | Ch. 13      |        | Check for 10.240MHz.                                                                                 |
| Input of frequency counter to TP2 (PLL Unit, Pin 19).  | Ch. 1       |        | Check for 37.660MHz.<br>Check all channels<br>(Channel frequency +10.695 MHz = frequency on counter) |
| Input of frequency counter to TP4. (PLL Unit, Pin 23). | Ch. 1       |        | Check for 26.965MHz.<br>Check all channels<br>(Should indicate channel frequency).                   |

## 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 TP5 (Q201, Base). 455kHz, 1000Hz @ 30% modulation. | Ch. 13<br>Squelch Min<br>ANL Off | T201       | Adjust for maximum output.                                 |
| Output of signal generator thru .01uF to antenna jack. 27.115MHz, 1000Hz @ 30% modulation.  | Ch. 13<br>Squelch Min<br>ANL Off | T102, T101 | Adjust for maximum output.<br>IF necessary, readjust T201. |

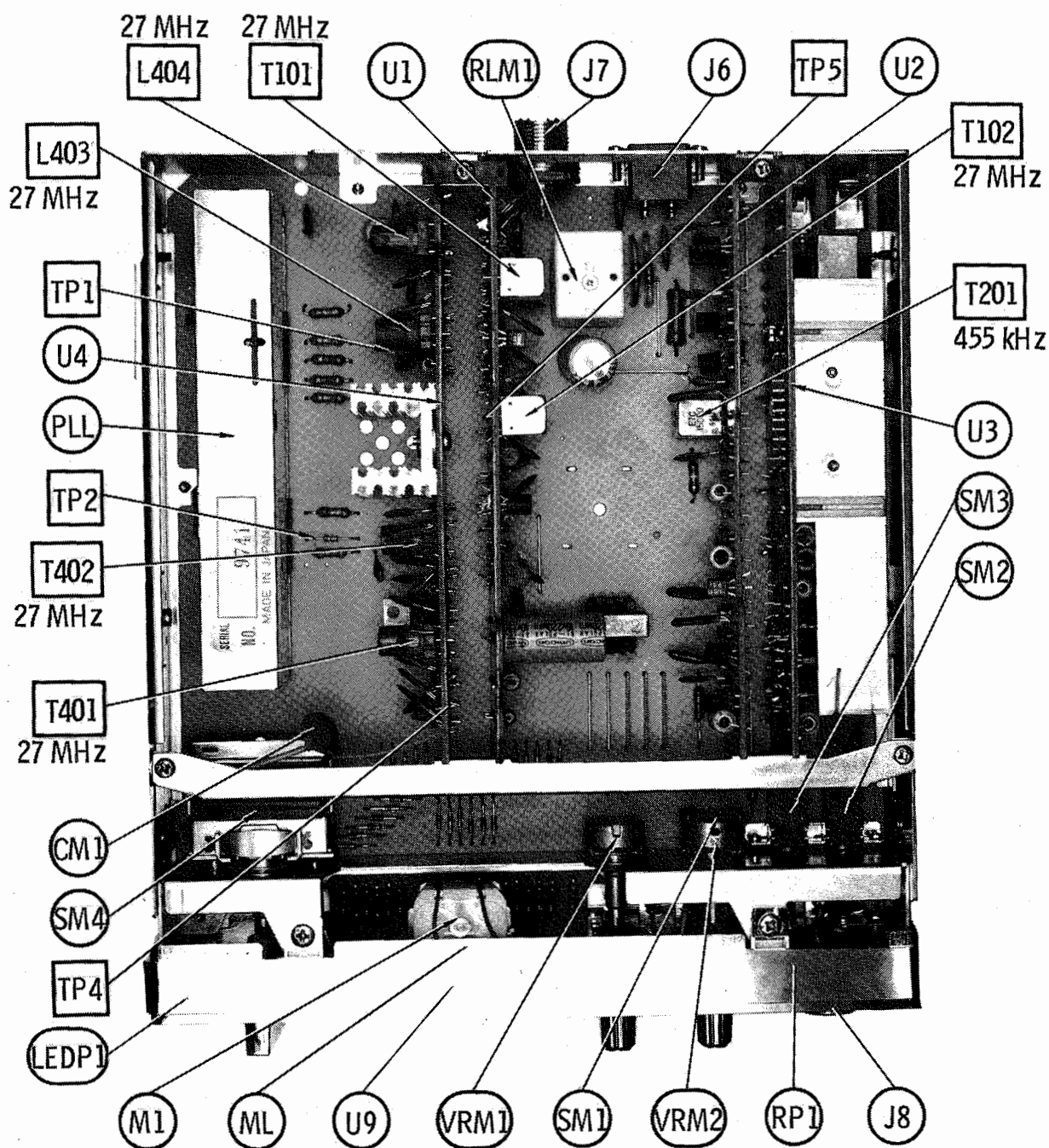
## TRANSMITTER ALIGNMENT

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.

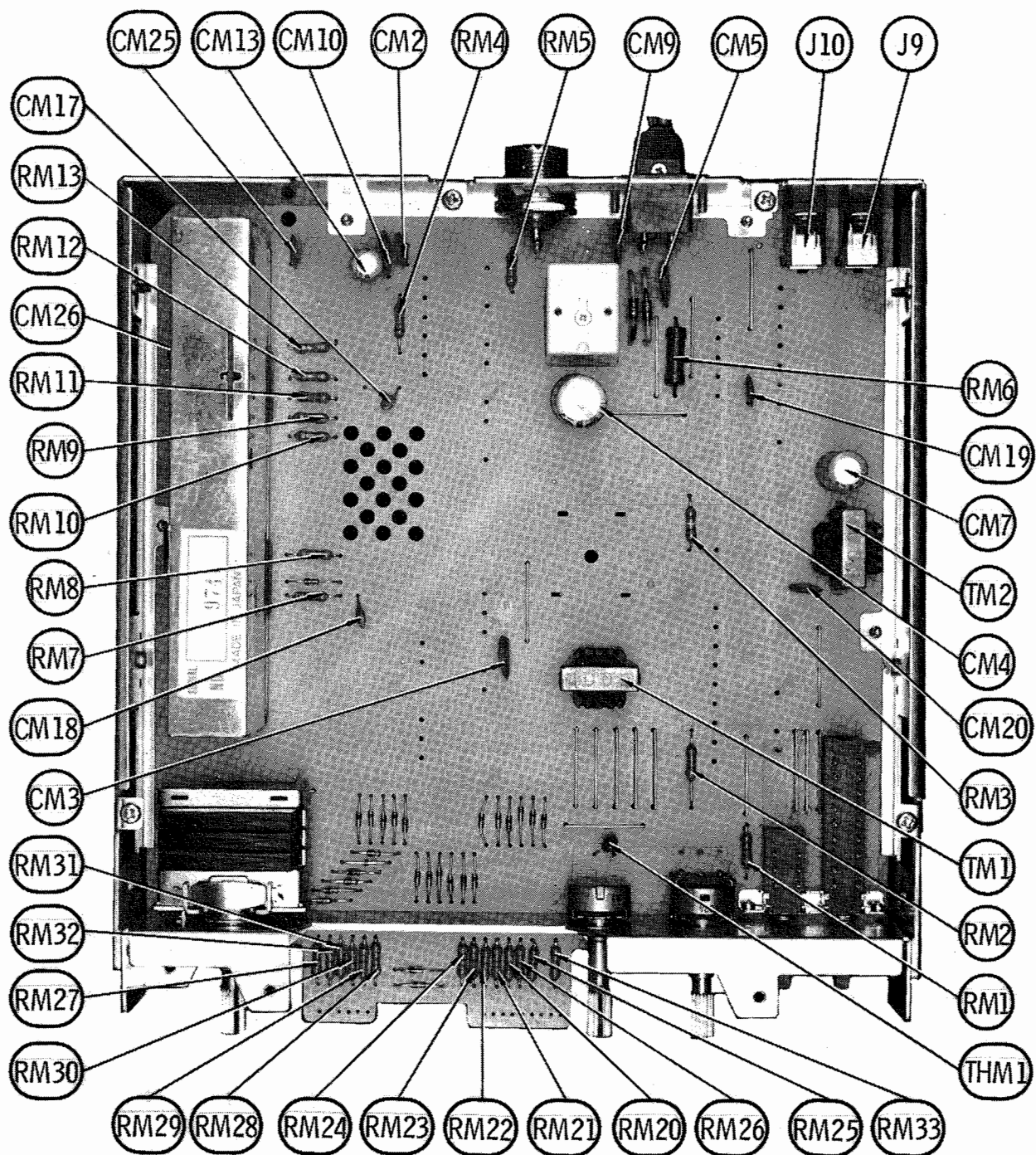
See page 4 for channel frequencies.

| TEST EQUIPMENT | TRANSCEIVER | ADJUST                          | REMARKS                     |
|----------------|-------------|---------------------------------|-----------------------------|
|                | Ch. 13      | T401,<br>T402,<br>L403,<br>L404 | Adjust for maximum.         |
|                | Ch. 13      | L404<br>L403                    | Adjust for 4 watts maximum. |

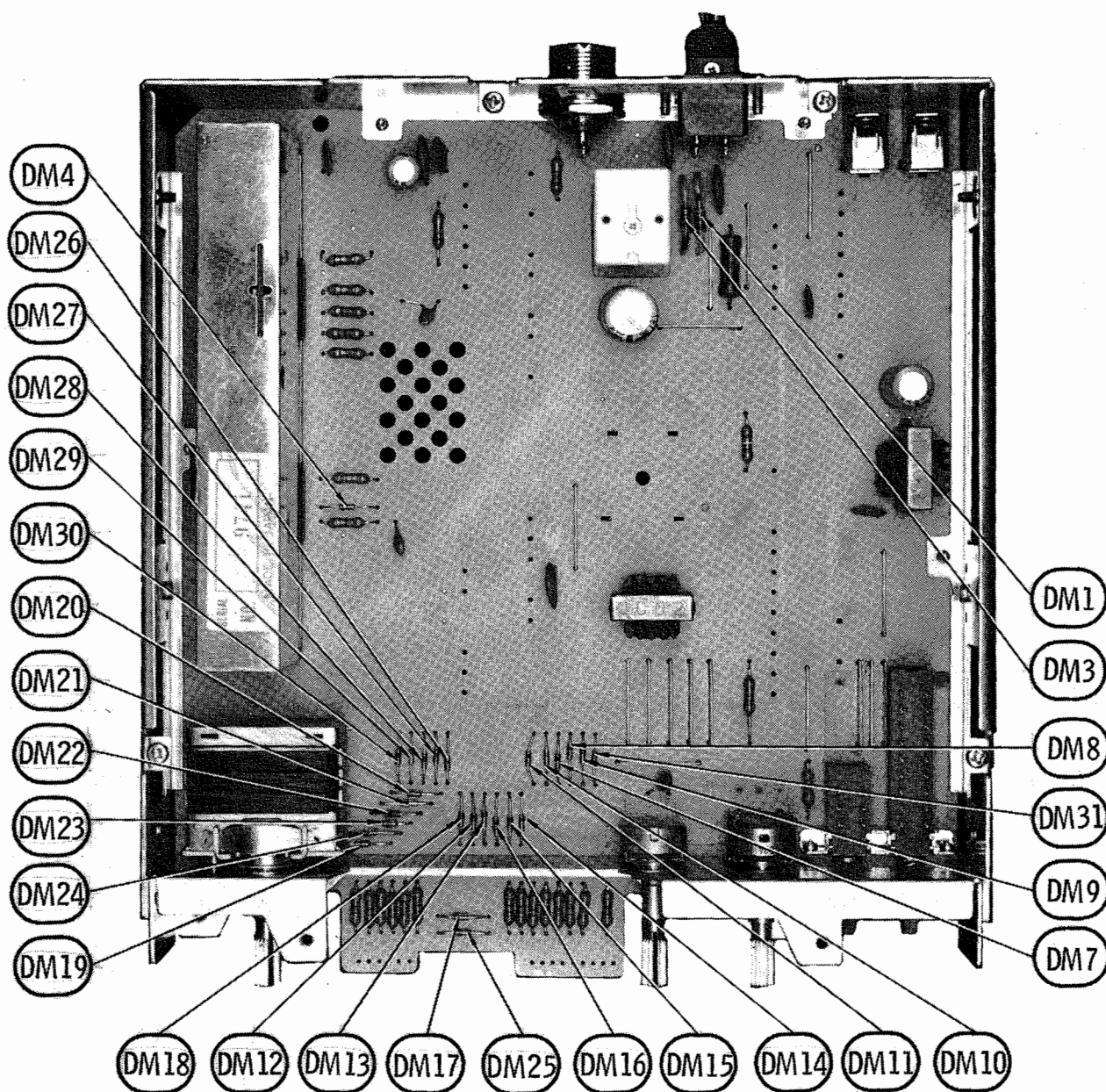


ROYCE MODEL 1-660

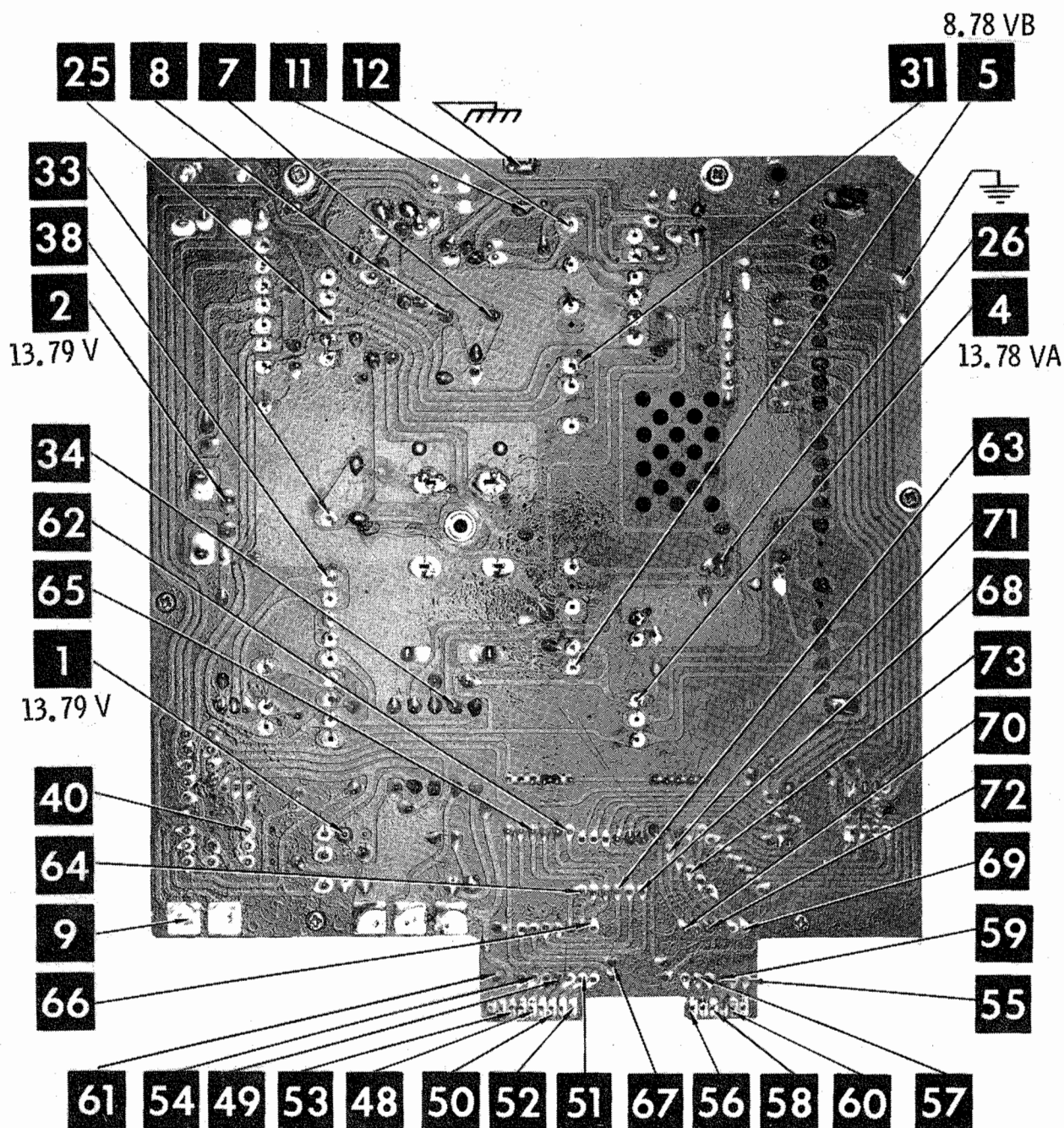
CHASSIS - BOTTOM



MOTHER BOARD

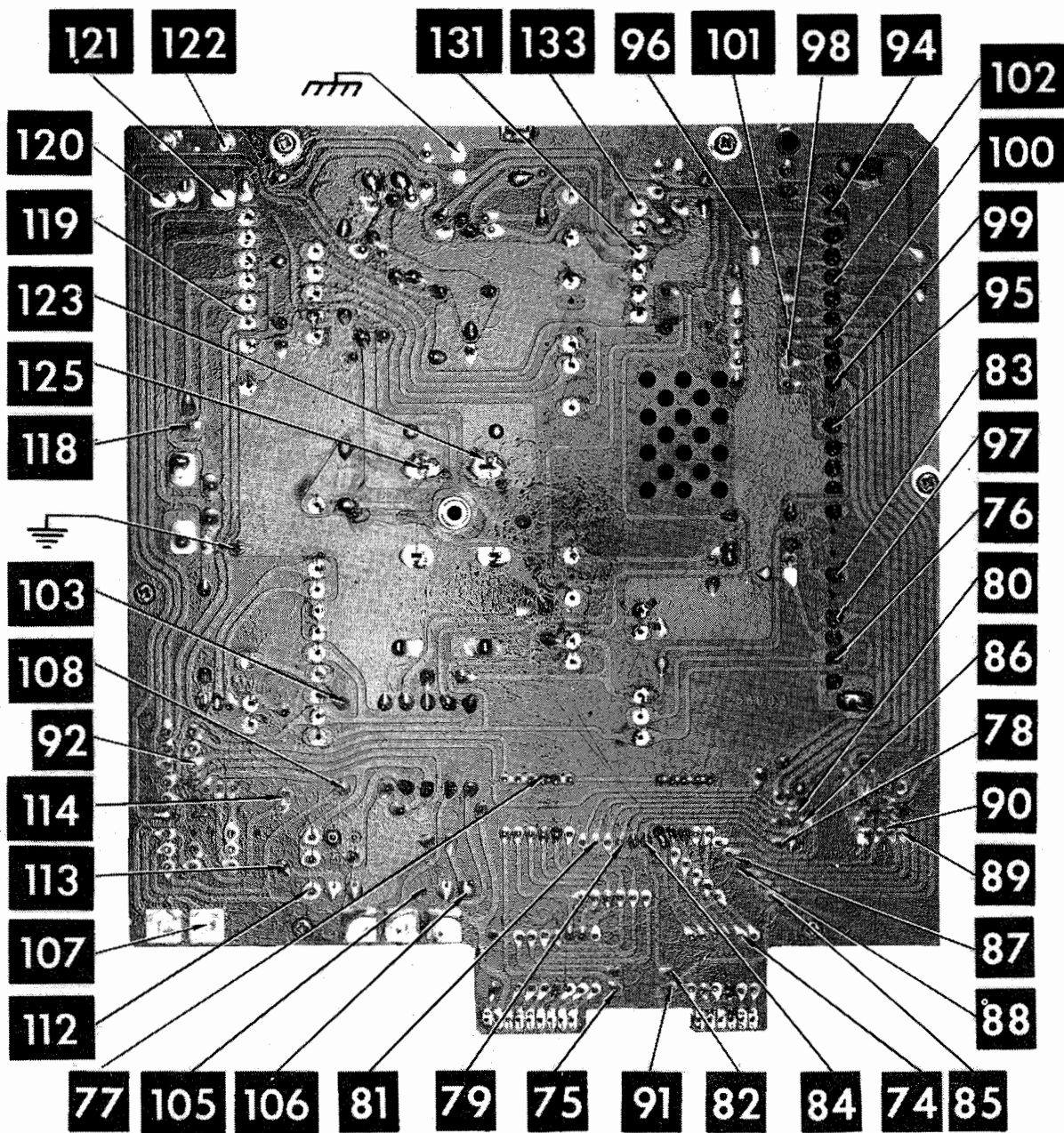


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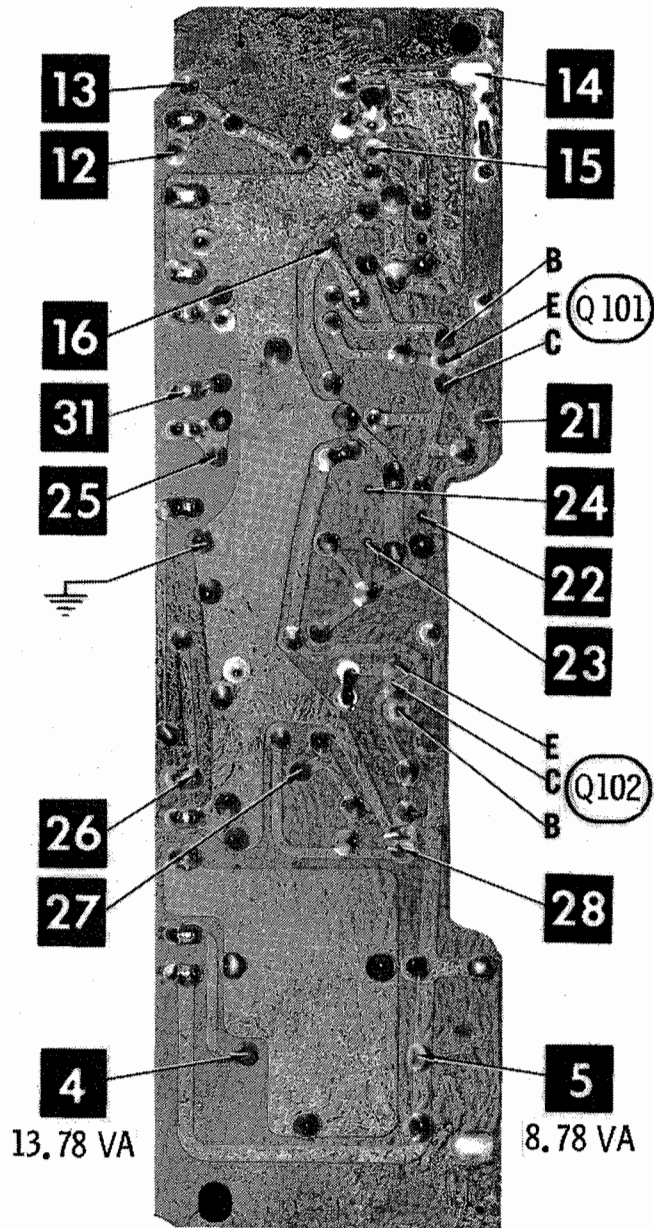


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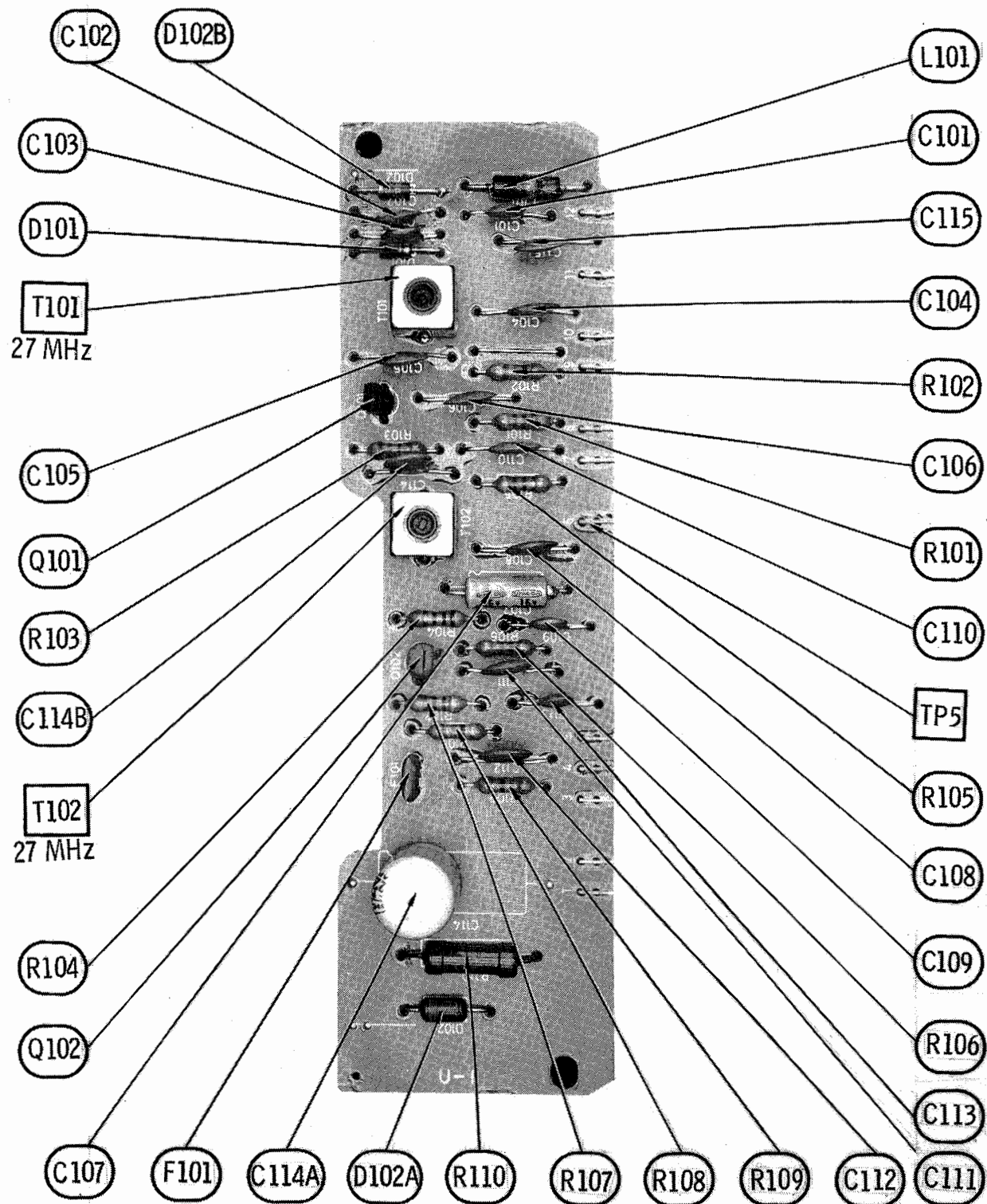
ROYCE MODEL 1-660



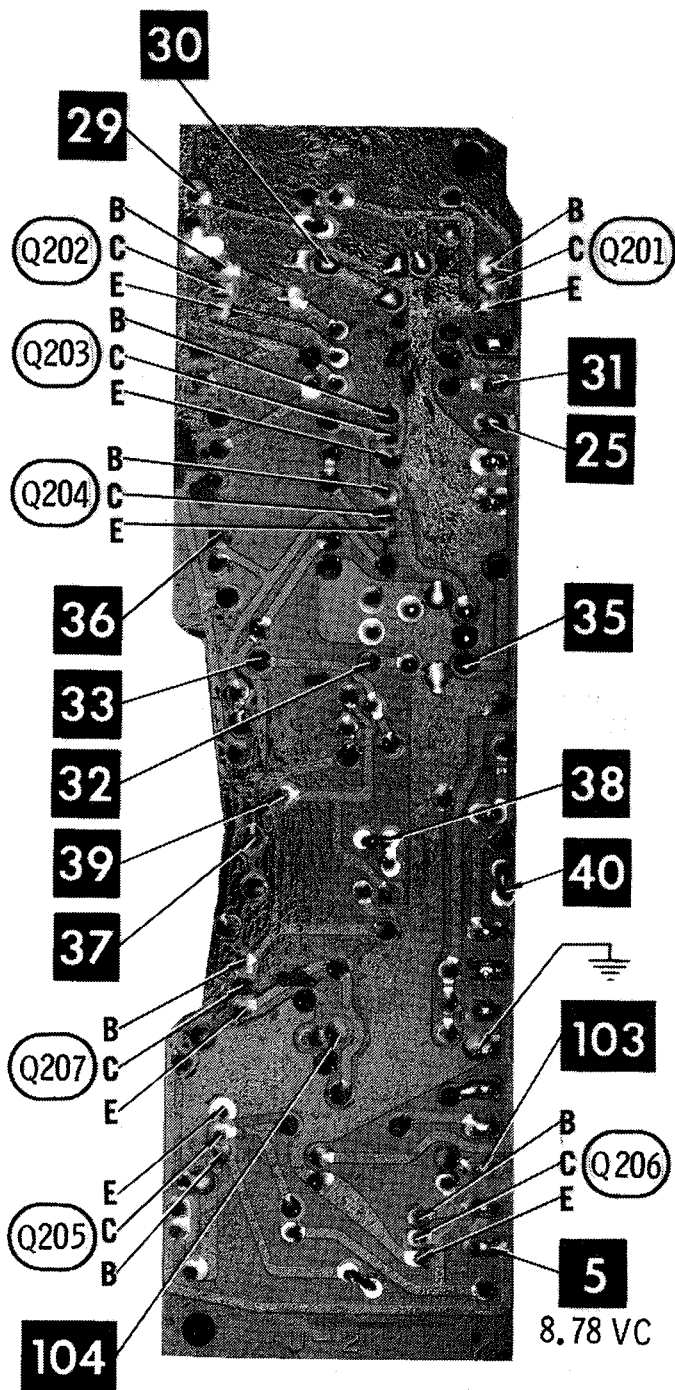
MOTHER BOARD



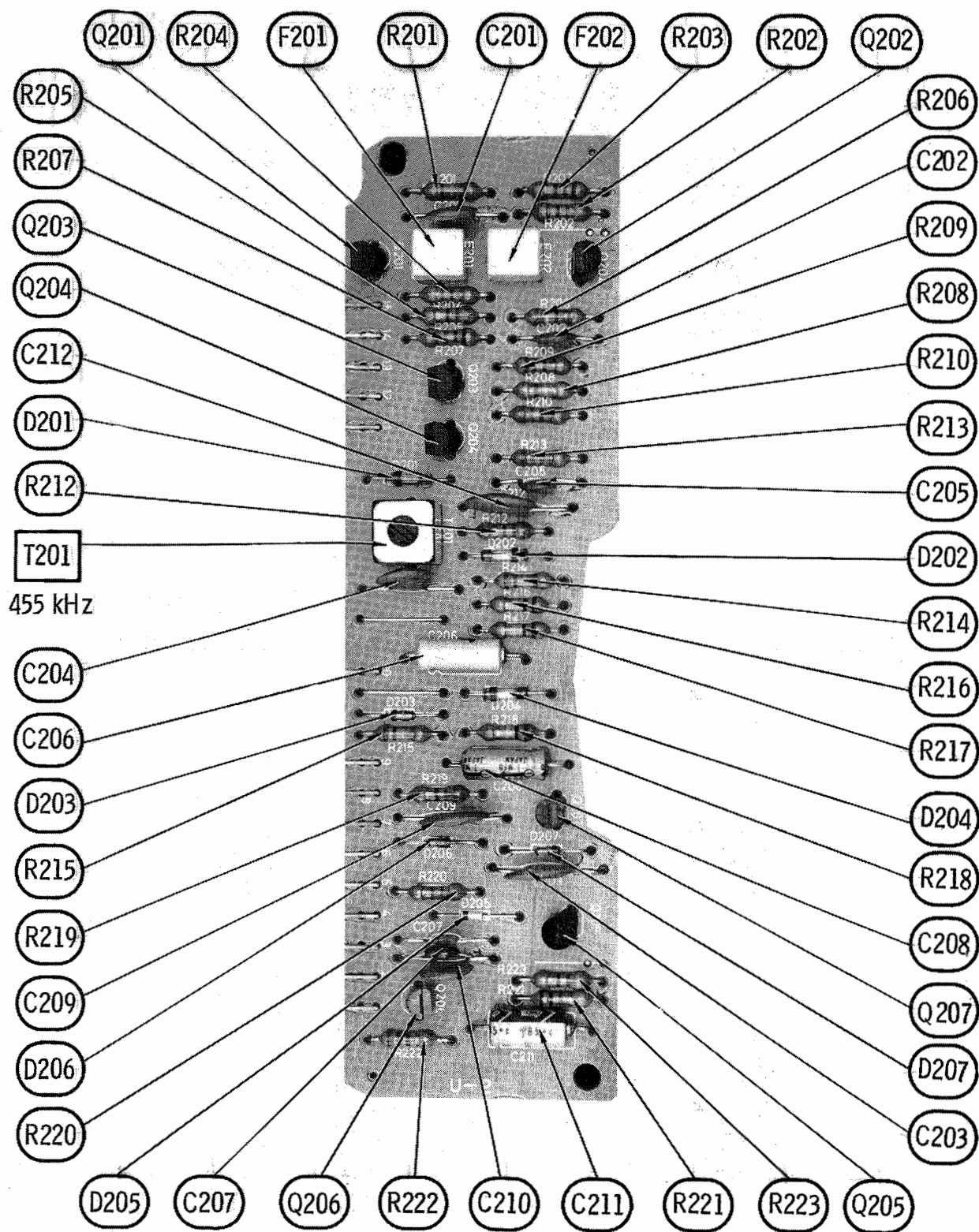
U-1 BOARD



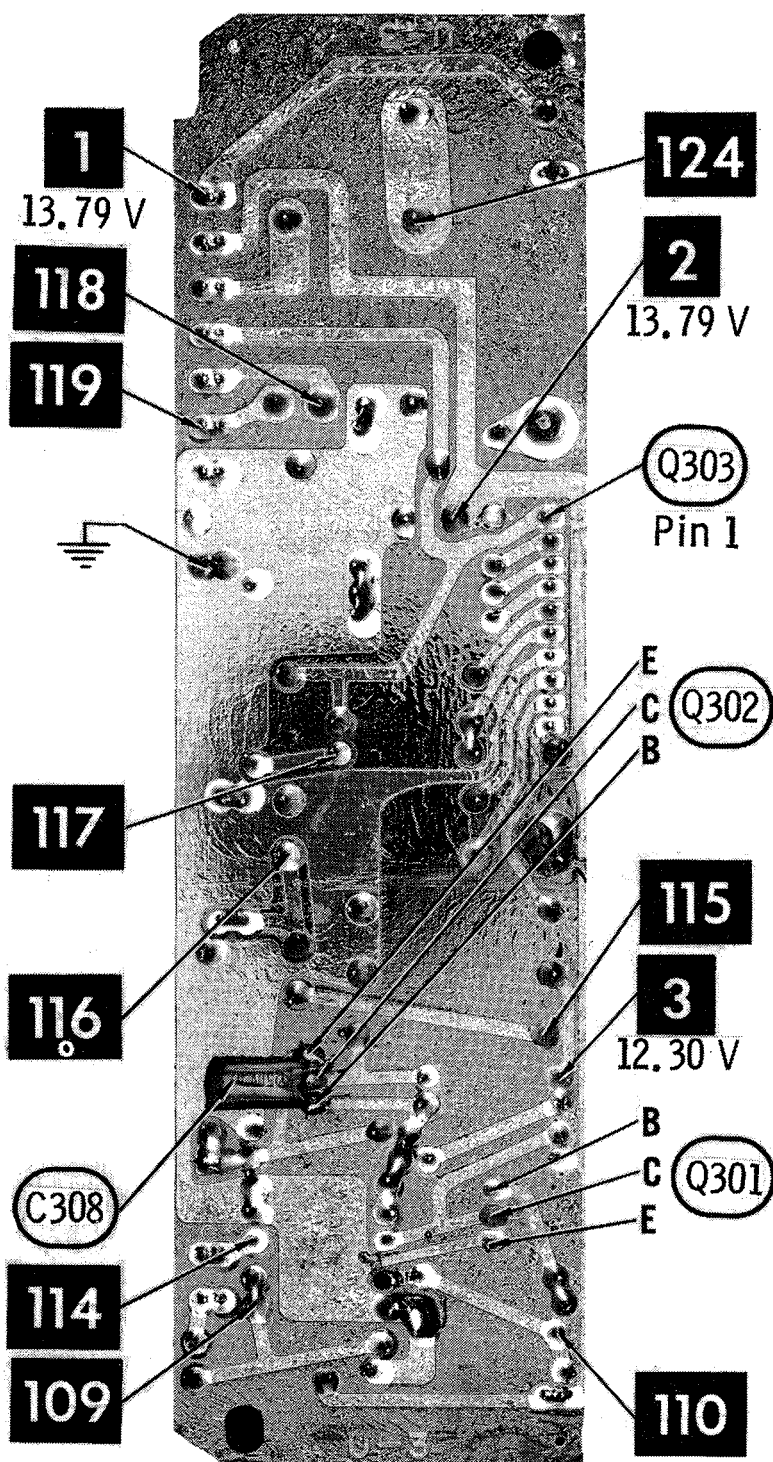
U-1 BOARD



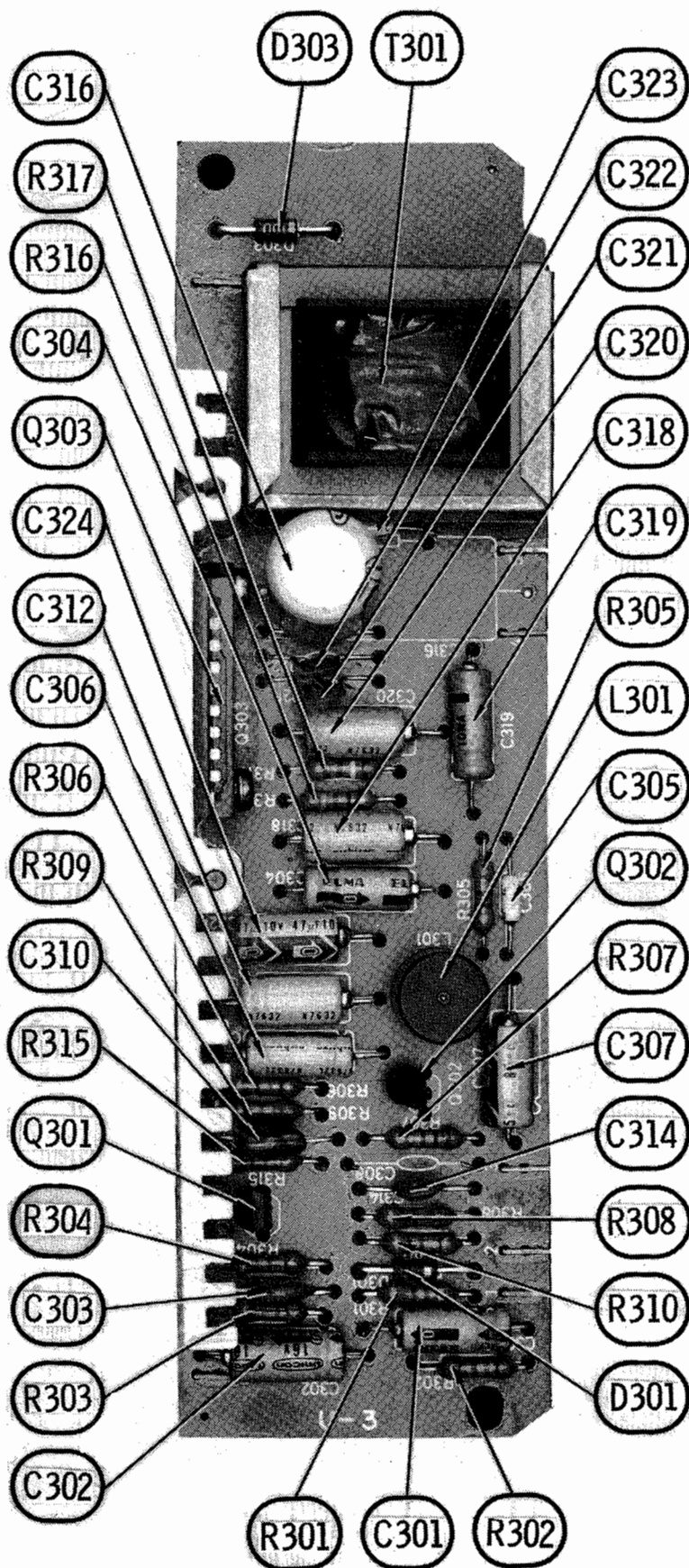
U-2 BOARD



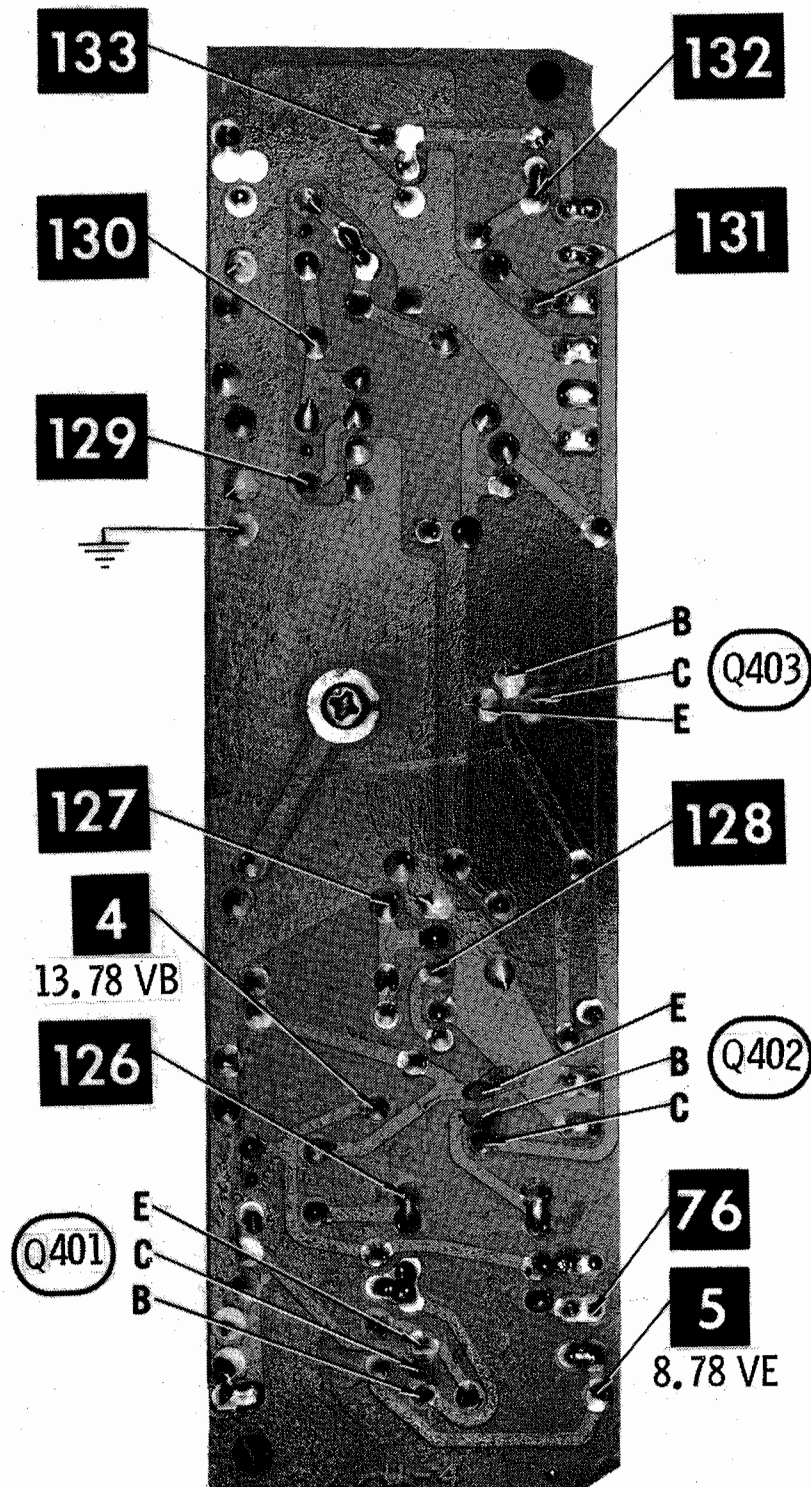
U-2 BOARD



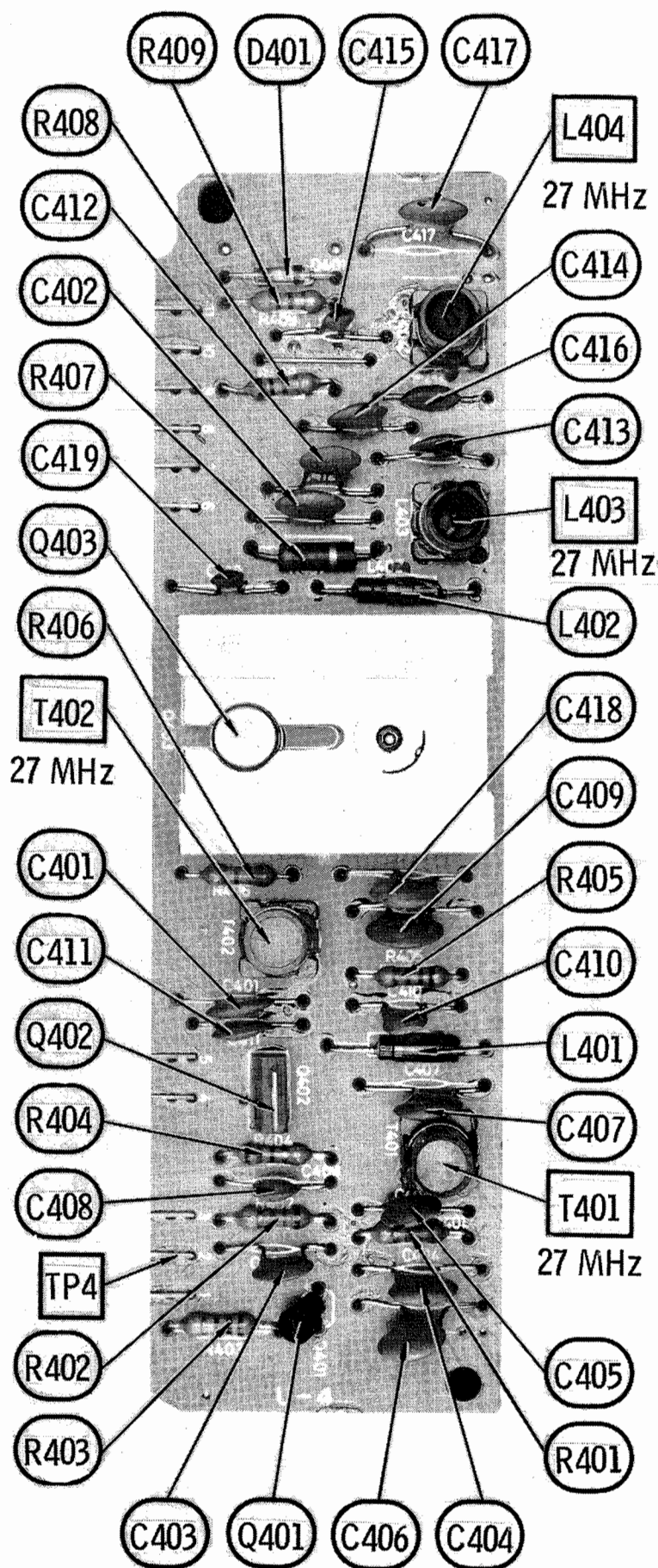
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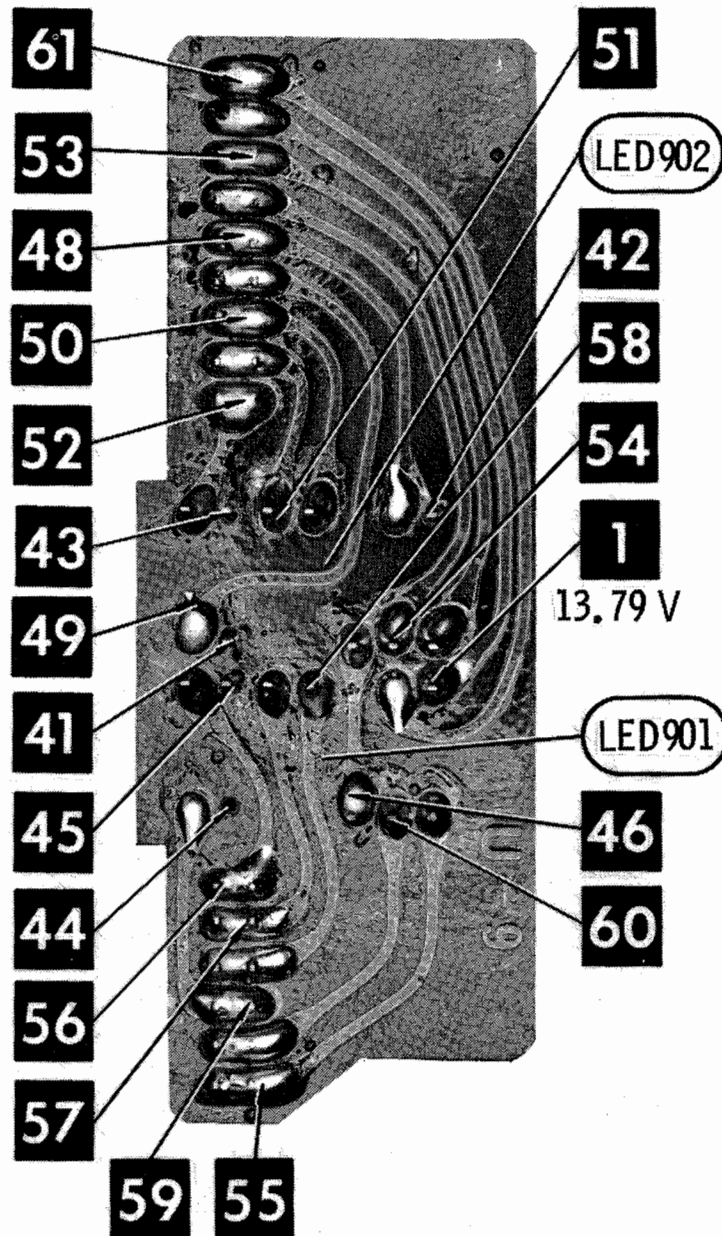
U-3 BOARD



U-4 BOARD



U-4 BOARD



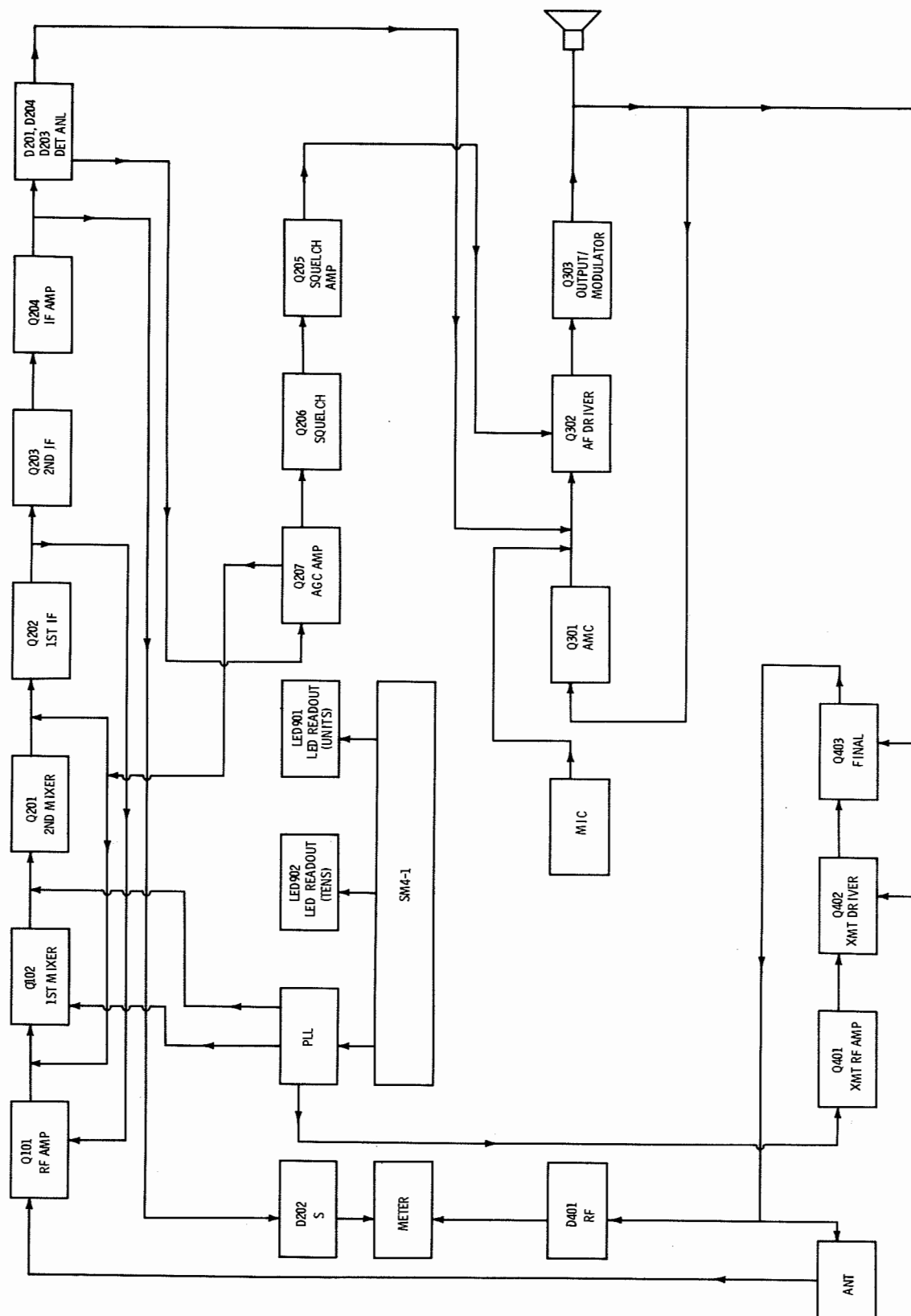
U-9 BOARD

# TRUTH CHART

1 = 7.42 Volts    0 = 0 Volts

| CHANNEL | PLL UNIT |   |   |   |    |    |  | REC<br>VCO<br>OUTPUT<br>IN MHz<br>AT TP2<br>(Pin 19 of<br>PLL Unit) | XMT<br>VCO<br>OUTPUT<br>IN MHz<br>AT TP3<br>(Pin 23 of<br>PLL Unit) |
|---------|----------|---|---|---|----|----|--|---------------------------------------------------------------------|---------------------------------------------------------------------|
|         | PINS     |   |   |   |    |    |  |                                                                     |                                                                     |
|         | 5        | 7 | 8 | 9 | 10 | 21 |  |                                                                     |                                                                     |
| 1       | 0        | 0 | 0 | 0 | 0  | 1  |  | 37.660                                                              | 26.965                                                              |
| 2       | 0        | 0 | 0 | 1 | 0  | 1  |  | 37.670                                                              | 26.975                                                              |
| 3       | 0        | 0 | 0 | 0 | 1  | 1  |  | 37.680                                                              | 26.985                                                              |
| 4       | 0        | 0 | 1 | 0 | 0  | 1  |  | 37.700                                                              | 27.005                                                              |
| 5       | 0        | 0 | 1 | 1 | 0  | 1  |  | 37.710                                                              | 27.015                                                              |
| 6       | 0        | 0 | 1 | 0 | 1  | 1  |  | 37.720                                                              | 27.025                                                              |
| 7       | 0        | 0 | 1 | 1 | 1  | 1  |  | 37.730                                                              | 27.035                                                              |
| 8       | 0        | 1 | 0 | 1 | 0  | 1  |  | 37.750                                                              | 27.055                                                              |
| 9       | 0        | 1 | 0 | 0 | 1  | 1  |  | 37.760                                                              | 27.065                                                              |
| 10      | 0        | 1 | 0 | 1 | 1  | 1  |  | 37.770                                                              | 27.075                                                              |
| 11      | 0        | 1 | 1 | 0 | 0  | 1  |  | 37.780                                                              | 27.085                                                              |
| 12      | 0        | 1 | 1 | 0 | 1  | 1  |  | 37.800                                                              | 27.105                                                              |
| 13      | 0        | 1 | 1 | 1 | 1  | 1  |  | 37.810                                                              | 27.115                                                              |
| 14      | 1        | 0 | 0 | 0 | 0  | 1  |  | 37.820                                                              | 27.125                                                              |
| 15      | 1        | 0 | 0 | 1 | 0  | 1  |  | 37.830                                                              | 27.135                                                              |
| 16      | 1        | 0 | 0 | 1 | 1  | 1  |  | 37.850                                                              | 27.155                                                              |
| 17      | 1        | 0 | 1 | 0 | 0  | 1  |  | 37.860                                                              | 27.165                                                              |
| 18      | 1        | 0 | 1 | 1 | 0  | 1  |  | 37.870                                                              | 27.175                                                              |
| 19      | 1        | 0 | 1 | 0 | 1  | 1  |  | 37.880                                                              | 27.185                                                              |
| 20      | 1        | 1 | 0 | 0 | 0  | 1  |  | 37.900                                                              | 27.205                                                              |
| 21      | 1        | 1 | 0 | 1 | 0  | 1  |  | 37.910                                                              | 27.215                                                              |
| 22      | 1        | 1 | 0 | 0 | 1  | 1  |  | 37.920                                                              | 27.225                                                              |
| 23      | 1        | 1 | 1 | 1 | 0  | 1  |  | 37.950                                                              | 27.255                                                              |

ROYCE MODEL 1-660



BLOCK DIAGRAM

# PARTS LIST AND DESCRIPTION

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

## SEMICONDUCTORS (Select replacement transistor for best results)

| ITEM No. | TYPE No. | MFR. 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. |
| D101     | 10D-1    |               | GE-504A                   | 5A4D                | PTC201           | HEPR0052          | RE 49             | SK3030       | RT-213           | ECG116            |
| D102A    | EQB01-09 |               | GE2D-9.1                  | Z1209               | ZB9.1A           | HEPZ0412          | RE 114            | SK3060       | RT-240           | ECG139            |
| D102B    | 10D-1    |               |                           | D172                | PTC216           |                   |                   | SK3043       |                  | ECG506            |
| D201     | 1N60     |               | 1N60                      | 1N60                | PTC206           | HEPR9135          | RE 47             | SK3088       | RT-263           | ECG109            |
| D202     | 1N60     |               | 1N60                      | 1N60                | PTC206           | HEPR9135          | RE 47             | SK3088       | RT-263           | ECG109            |
| D203     | 1S2075K  |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| D204     | 1N60     |               | 1N60                      | 1N60                | PTC206           | HEPR9135          | RE 47             | SK3088       | RT-263           | ECG109            |
| D205     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| D206     | HV-23    |               |                           |                     | PTC301           |                   |                   |              |                  | ECG601            |
| D207     | HV-23    |               |                           |                     | PTC301           |                   |                   |              |                  | ECG601            |
| D301     | 10D-1    |               | GE-504A                   | 5A4D                | PTC201           | HEPR0052          | RE 49             | SK3030       | RT-213           | ECG116            |
| D303     | 10D-1    |               | GE-504A                   | 5A4D                | PTC201           | HEPR0052          | RE 49             | SK3030       | RT-213           | ECG116            |
| D401     | 1N60     |               | 1N60                      | 1N60                | PTC206           | HEPR9135          | RE 47             | SK3088       | RT-263           | ECG109            |
| DM1      | 10D-1    |               | GE-504A                   | 5A4D                | PTC201           | HEPR0052          | RE 49             | SK3030       | RT-213           | ECG116            |
| DM3      | 10D-1    |               | GE-504A                   | 5A4D                | PTC201           | HEPR0052          | RE 49             | SK3030       | RT-213           | ECG116            |
| DM4      | 1S2075K  |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM7      | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM8      | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM9      | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM10     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM11     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM12     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM13     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM14     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM15     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM16     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM17     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM18     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM19     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM20     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM21     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM22     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM23     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM24     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM25     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM26     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM27     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM28     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM29     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM30     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| DM31     | WG713    |               | GE-300                    | D200                | PTC214           | HEPR0602          | RE 52             | SK3100       | RT-218           | ECG177            |
| Q101     | 25C1856  |               | GE-20 *                   | TR-24 *             | PTC132           | HEPS0015 *        | RE 13 *           | SK3018 *     | RT-107A *        | ECG123A *         |
| Q102     | 25C710   |               | GE-211 *                  | (IR)25C710          | PTC115           | HEPS0016 *        | RE 13 *           | SK3018 *     | RT-308 *         | ECG123A *         |
|          | 25C710C  | (1)           | GE-211 *                  | (IR)25C710          | PTC115           | HEPS0016 *        | RE 13 *           | SK3018 *     | RT-308 *         | ECG123A *         |
| Q201     | 25C711E  |               | GE-62 *                   | (IR)25C644          | PTC121           | HEPS0024 *        | RE 192 *          | SK3124 *     | RT-302 *         | ECG199 *          |
| Q202     | 25C711E  |               | GE-62 *                   | (IR)25C644          | PTC121           | HEPS0024 *        | RE 192 *          | SK3124 *     | RT-302 *         | ECG199 *          |
| Q203     | 25C711D  |               | GE-62 *                   | (IR)25C644          | PTC121           | HEPS0024 *        | RE 192 *          | SK3124 *     | RT-302 *         | ECG199 *          |
| Q204     | 25A695D  |               | GE-67 *                   | TR-88 *             | PTC103 *         | HEPS0013 *        | RE 18 *           | SK3025       | RT-126A *        | ECG294 *          |
| Q205     | 25C620D  |               | GE-20 *                   | (IR)25C644          | PTC125 *         | HEPS0015 *        | RE 13 *           | SK3020 *     | RT-107A *        | ECG123A *         |
| Q206     | 25C945L  |               | GE-212                    | (IR)25C945          | PTC121 *         | HEPS0015 *        | RE 192            | SK3124       | RT-107A          | ECG199            |
|          | 25C945L  | (1)           | GE-212                    | (IR)25C945          | PTC121 *         | HEPS0015 *        | RE 192            | SK3124       | RT-107A          | ECG199            |
| Q207     | 25C945L  |               | GE-212                    | (IR)25C945          | PTC121 *         | HEPS0015 *        | RE 192            | SK3124       | RT-107A          | ECG199            |
|          | 25C945L  | (1)           | GE-212                    | (IR)25C945          | PTC121 *         | HEPS0015 *        | RE 192            | SK3124       | RT-107A          | ECG199            |
| Q301     | 25B561B  |               | GE-244 *                  | TR-88 *             | PTC177           | HEPS3011          | RE 18 *           | SK3025 *     | RT-115 *         | ECG129 *          |
| Q302     | 25C711E  |               | GE-62 *                   | (IR)25C644          | PTC121           | HEPS0024 *        | RE 192 *          | SK3124 *     | RT-302 *         | ECG199 *          |
| Q303     | AN315    |               |                           |                     |                  |                   |                   |              |                  |                   |
| Q401     | 25C1908E |               | GE-20 *                   | TR-21 *             | PTC136 *         | HEPS0015 *        | RE 9 *            | SK3124 *     | RT-107A *        | ECG107 *          |
|          | 25C1908  | (1)           | GE-20 *                   | TR-21 *             | PTC136 *         | HEPS0015 *        | RE 9 *            | SK3124 *     | RT-107A *        | ECG107 *          |
| Q402     | 25C1728  | (11)          | GE-275                    | WEP918              |                  |                   | RE 204            |              | RT-310           | ECG302            |
| Q403     | 25C756A  | (12)          | GE-46                     | WEP909              | PTC158           |                   | RE 206            |              | RT-306F          | ECG282            |

\* Lead configuration may vary from original.

(1) Used in some versions.

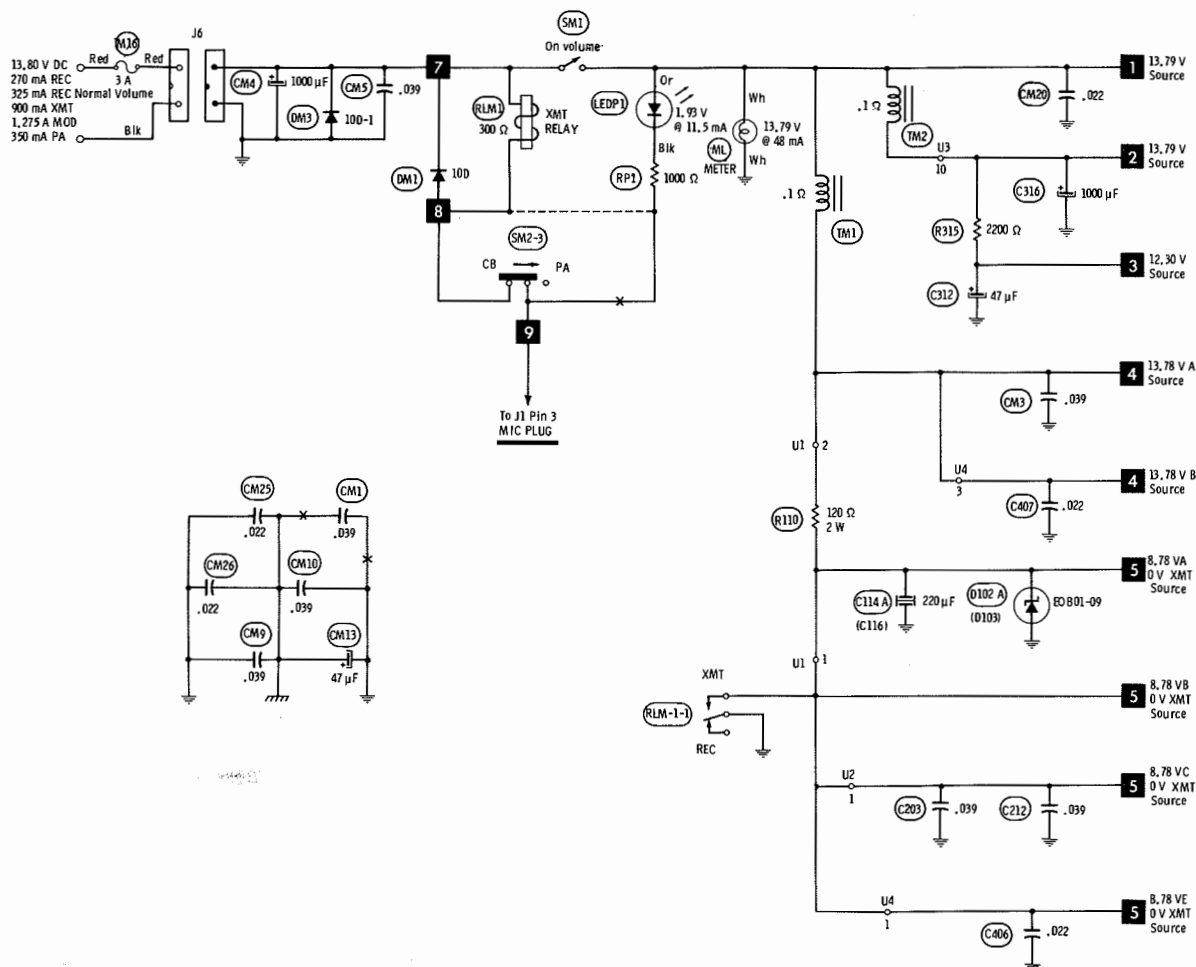
(11) Q402 950 MW @ 500 mA

(12) Q403 10 WATTS @ 4 AMPS.

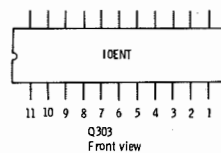
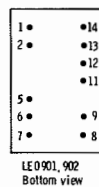
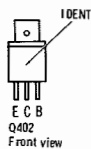
ROYCE MODEL 1-660

## ELECTROLYTIC CAPACITORS

| ITEM No. | RATING     | REPLACEMENT DATA |                           |                  |                  |              |
|----------|------------|------------------|---------------------------|------------------|------------------|--------------|
|          |            | MFR. PART No.    | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. |              |
|          |            |                  |                           |                  | Q-LINE           | GENERAL LINE |
| C107     | 10 16V     |                  | WBR10-25                  | TT15X10          | QE1-177          | TVA-1145     |
| C114A    | 220 16V NP |                  |                           |                  |                  |              |
| C206     | .33 50V    |                  |                           | TDC334M050EL     | QDT1-14          | SD50-R339    |
| C208     | 1 50V      |                  | WBR1-50                   | TT50X1           | QE1-11           | TVA-1300     |
| C211     | 47 10V     |                  | WBR50-25                  | TT10X50A         | QE1-351          | TVA-1150     |
| C301     | 1 50V      |                  | WBR1-50                   | TT50X1           | QE1-11           | TVA-1300     |
| C302     | 22 10V     |                  | WBR25-25                  | TT12X20          | QE1-259          | TVA-1147     |
| C304     | 1 50V      |                  | WBR1-50                   | TT50X1           | QE1-11           | TVA-1300     |
| C305     | .22 25V    |                  |                           | TDC224M050EL     | QDT1-10          | SD50-R229    |
| C306     | 1 50V      |                  | WBR1-50                   | TT50X1           | QE1-11           | TVA-1300     |
| C307     | 47 10V     |                  | WBR50-25                  | TT10X50A         | QE1-351          | TVA-1150     |
| C312     | 47 10V     |                  | WBR50-25                  | TT10X50A         | QE1-351          | TVA-1150     |
| C316     | 1000 16V   |                  | PCI000-16                 | VTT1000L16       | QV1-183          | EV-1260      |
| C318     | 47 10V     |                  | WBR50-25                  | TT10X50A         | QE1-351          | TVA-1150     |
| C319     | 10 16V     |                  | WBR10-25                  | TT15X10          | QE1-177          | TVA-1145     |
| C320     | 47 10V     |                  | WBR50-25                  | TT10X50A         | QE1-351          | TVA-1150     |



#### Terminal Guides

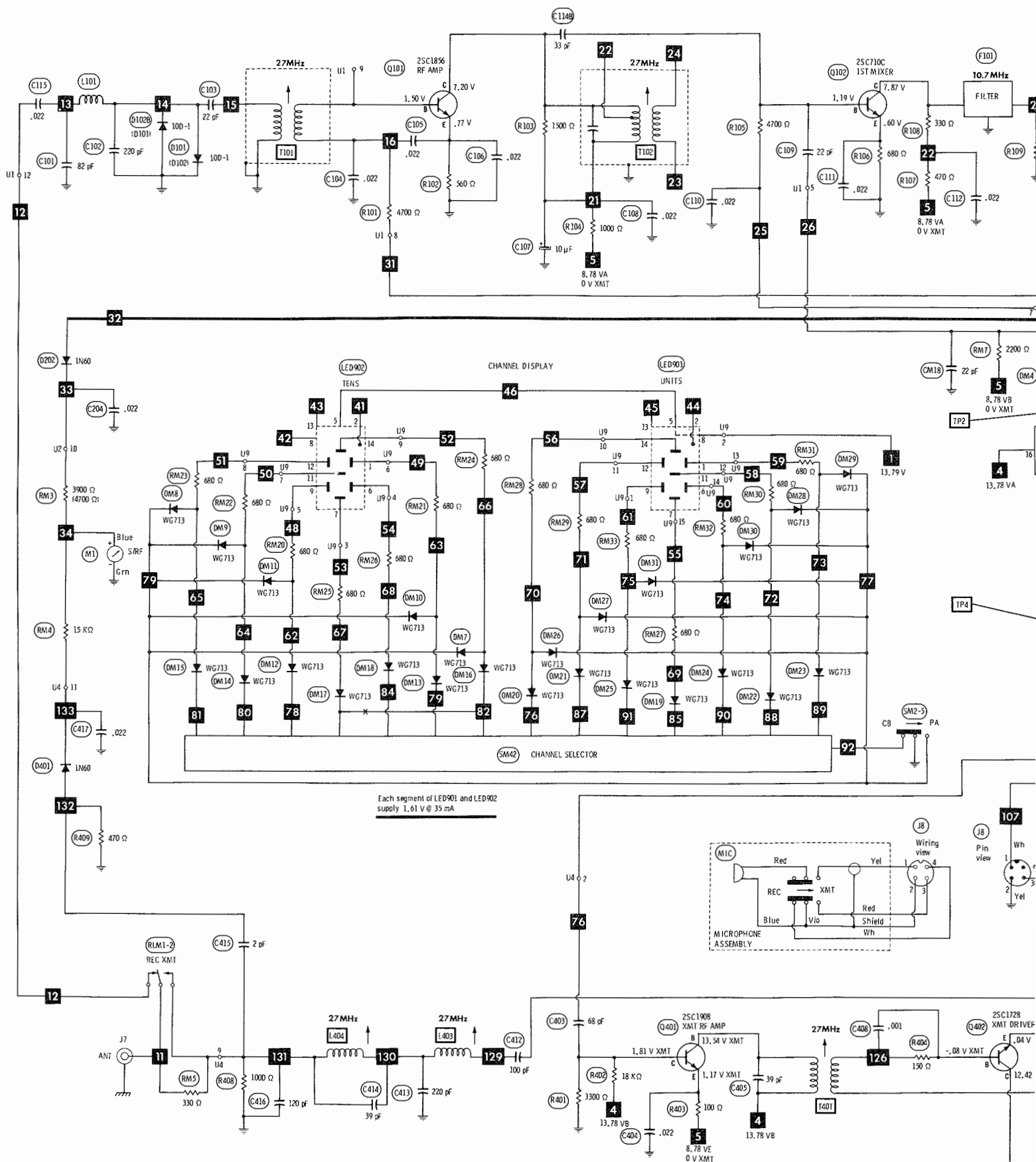


- ✱ Circuitry not used in some versions
  - Circuitry used in some versions
  - ⊕ See parts list
  - ✱ Nominal value
  - ⊥ Ground
  - ⏏ Chassis
  - ▽ Common tie point
- Measurements made in Channel 1 with switching as shown unless noted.  
Item numbers in rectangles appear in the alignment/adjustment instructions.  
Supply voltage maintained as shown at input.  
Voltages measured with digital meter, no signal.  
Controls adjusted for normal operation.  
Arrow at control indicates direction of advance.  
Terminal identification may not be found on unit.  
Resistors are 1/2W or less, 5% unless noted.  
Value in ( ) used in some versions.

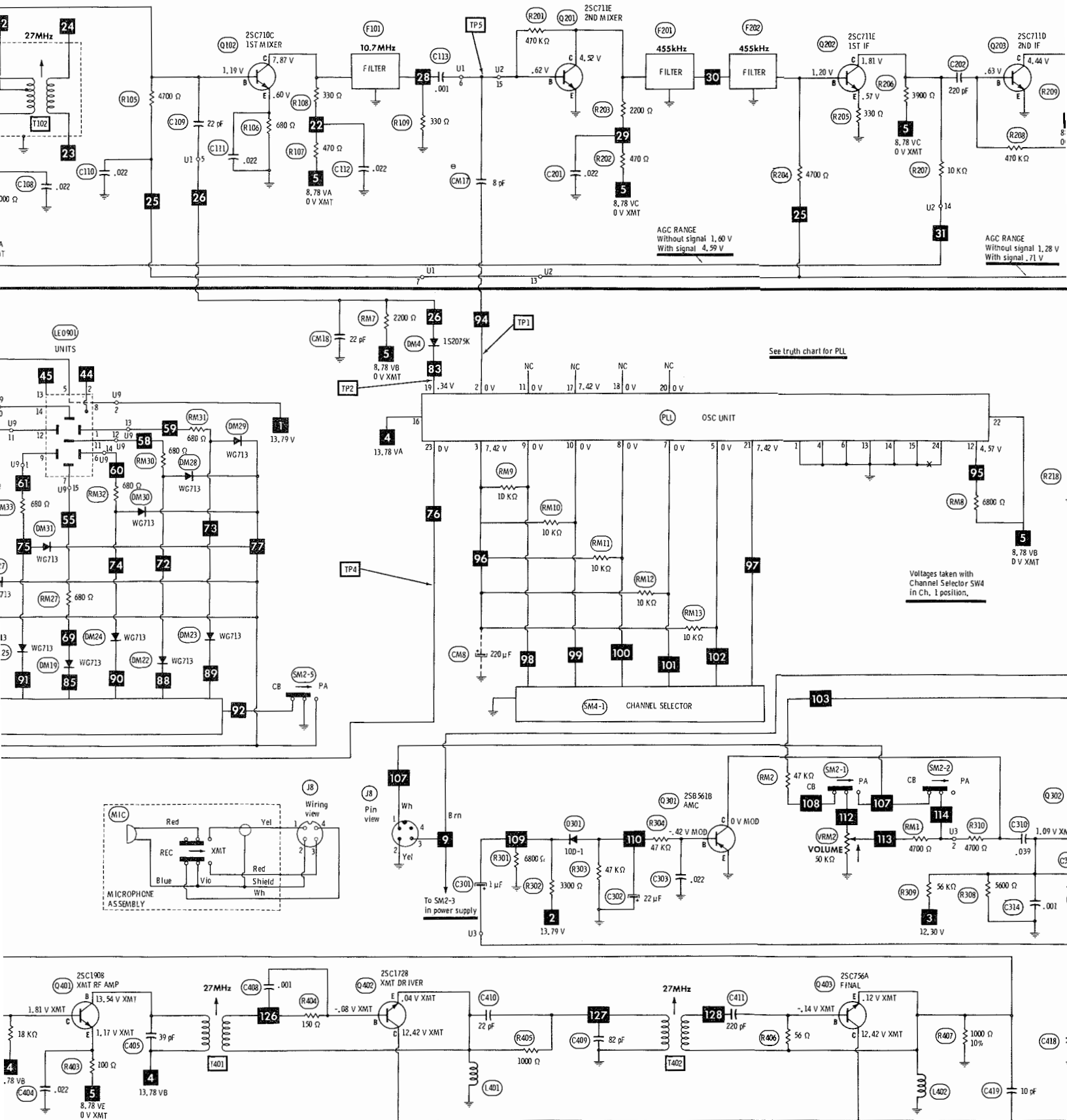
A PHOTOFAC STANDARD NOTATION SCHEMATIC

WITH **CIRCUITRACE**

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## PARTS LIST AND DESCRIPTION (CONTINUED)

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

### ELECTROLYTIC CAPACITORS (cont)

| ITEM No. | RATING   | REPLACEMENT DATA |                           |                  |                  |              |
|----------|----------|------------------|---------------------------|------------------|------------------|--------------|
|          |          | MFR. PART No.    | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. |              |
|          |          |                  |                           |                  | Q-LINE           | GENERAL LINE |
| C323     | 1 25V    | (1)              | WBRI-50                   | TT50X1           | QE1-11           | TVA-1300     |
| C324     | 47 10V   |                  | WBRI-50                   | TT10X50A         | QE1-351          | TVA-1150     |
| CM4      | 1000 16V |                  | PC1000-16                 | VTT1000L16       | QV1-183          | EV-1260      |
| CM7      | 220 16V  |                  | PC250-25                  | VTT220H16        | QV1-117          | EV-1240      |
| CM8      | 220 16V  |                  | PC250-25                  | VTT220H16        | QV1-117          | EV-1240      |
| CM13     | 47 16V   |                  | PC50-16                   | VTT47D16         | QV1-73           | EV-1226      |

(1) Used in some versions.

### CAPACITORS

|          |              |               | REPLACEMENT DATA   |                           |                  |                  |              |
|----------|--------------|---------------|--------------------|---------------------------|------------------|------------------|--------------|
| ITEM No. | RATING       | MFR. PART No. | CENTRALAB PART No. | CORNELL-DUBILIER PART No. | MALLORY PART No. | SPRAGUE PART No. |              |
|          |              |               |                    |                           |                  | Q-LINE           | GENERAL LINE |
| CM1      | .039         | (1)           | UK25-223           |                           | GP140            | QW1-5            | 5GA-S40      |
| CM2      | .022         |               |                    |                           |                  |                  | HY-725       |
| CM3      | .039         |               |                    |                           | GP140            |                  | 5GA-S40      |
| CM5      | .039         |               |                    |                           | GP140            |                  | 5GA-S40      |
| CM9      | .039         |               | GP140              | 5GA-S40                   |                  |                  |              |
| CM10     | .039         |               | GP140              | 5GA-S40                   |                  |                  |              |
| CM17     | 8            |               |                    | MMA-080                   |                  |                  |              |
|          | 10           |               | DTZ-10             | CD15CD080D03 NP010        | CN0410 *         |                  |              |
| CM18     | 22 N220 10%  |               |                    |                           |                  |                  | 10TCR-Q22    |
| CM19     | .022         |               | UK25-223           |                           |                  |                  | HY-725       |
| CM20     | .022         |               | UK25-223           |                           |                  |                  | HY-725       |
| CM25     | .022         |               | UK25-223           |                           |                  |                  | HY-725       |
| CM26     | .022         |               | UK25-223           |                           |                  |                  | HY-725       |
| C101     | 82 N750 10%  |               |                    |                           |                  | CN7482           | 10TCU-Q82    |
| C102     | 220 N750 10% |               | DTN-220            | N220                      |                  | CN7322 *         | 10TCU-T22    |
| C103     | 22 N220 10%  |               |                    |                           |                  |                  | 10TCR-Q22    |
| C104     | .022         |               | UK25-223           |                           |                  |                  | HY-725       |
| C105     | .022         |               | UK25-223           |                           |                  |                  | HY-725       |
| C106     | .022         |               | UK25-223           |                           |                  |                  | HY-725       |
| C108     | .022         |               | UK25-223           |                           |                  |                  | HY-725       |
| C109     | 22 N220 10%  |               |                    |                           |                  |                  |              |
| C110     | .022         |               | UK25-223           |                           |                  |                  | HY-725       |
| C111     | .022         |               | UK25-223           |                           |                  |                  | HY-725       |
| C112     | .022         |               | UK25-223           |                           |                  |                  | HY-725       |
| C113     | .001 10%     |               | DD-102             |                           |                  | GP210            | 10TS-D10     |
| C114B    | 33 10%       |               | DTZ-33             | NP033                     |                  | CN0433           | 10TCC-Q33    |
| C115     | .022         |               | UK25-223           |                           |                  |                  | HY-725       |
| C201     | .022         |               | UK25-223           |                           |                  |                  | HY-725       |
| C202     | 220 N750 10% |               | DTN-220            | N220                      |                  | CN7322           | 10TCU-T22    |
| C203     | .039         |               |                    |                           |                  | GP140            | 5GA-S40      |
| C204     | .022         |               | UK25-223           |                           |                  |                  | HY-725       |
| C205     | .001 10%     |               | DD-102             |                           |                  | GP210            | 10TS-D10     |
| C207     | .01 50V 10%  |               |                    | WMF1S1                    |                  | EWF1A110         | 1PB-S10      |
| C209     | .039         |               |                    |                           |                  | GP140            | 5GA-S40      |
| C210     | .022         |               | UK25-223           |                           |                  |                  | HY-725       |
| C212     | .039         |               |                    |                           |                  | GP140            | 5GA-S40      |
| C303     | .022         |               | UK25-223           |                           |                  |                  | HY-725       |
| C308     | .01 50V 10%  |               |                    | WMF1S1                    |                  | EWF1A110         | 1PB-S10      |
| C310     | .039 50V     |               |                    |                           |                  | M192P3939R8      | 192P3939R8   |
| C314     | .001 10%     |               | DD-102             |                           |                  | GP210            | 10TS-D10     |
| C321     | .001 10%     |               | DD-102             |                           |                  | GP210            | 10TS-D10     |
| C322     | .001 10%     |               | DD-102             |                           |                  | GP210            | 10TS-D10     |
| C401     | .022         |               | UK25-223           |                           |                  |                  | HY-725       |
| C402     | .022         |               | UK25-223           |                           |                  |                  | HY-725       |
| C403     | 68 N220 10%  |               |                    |                           |                  | *                | 10TCR-Q68    |
| C404     | .022         |               | UK25-223           |                           |                  | *                | HY-725       |
| C405     | 39 N220 10%  |               |                    |                           |                  |                  | 10TCR-Q39    |
| C406     | .022         | UK25-223      |                    |                           |                  | HY-725           |              |
| C407     | .022         | UK25-223      |                    |                           |                  | HY-725           |              |
| C408     | .001 10%     | DD-102        |                    |                           | GP210            | 10TS-D10         |              |
| C409     | 82 N220 10%  |               |                    |                           | *                | 10TCR-Q82        |              |
| C410     | 22 N220 10%  |               |                    |                           | *                | 10TCR-Q22        |              |
| C411     | 220 N750 10% | DTN-220       | N220               |                           | CN7322           | 10TCU-T22        |              |
| C412     | 100 N470 10% |               |                    |                           |                  | 10TCT-T10        |              |
| C413     | 220 N750 10% | DTN-220       | N220               |                           | CN7322           | 10TCU-T22        |              |
| C414     | 39 N220 10%  |               |                    |                           | *                | 10TCR-Q39        |              |
| C415     | 2 NPO        | DTZ-2R2       | NP02P2             |                           | CN0522           | 10TCC-V22        |              |
| C416     | 120 N750 10% | DTN-120       |                    |                           |                  | 10TCU-T12        |              |
| C417     | .022         | UK25-223      |                    |                           |                  | HY-725           |              |
| C418     | .022         | UK25-223      |                    |                           |                  | HY-725           |              |
| C419     | 10 NPO       | DTZ-10        | NP010              |                           | CN0410           | 10TCC-Q10        |              |

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

(1) Used in some versions.

### CONTROLS (All wattages 1/2 watt, or less, unless listed)

| ITEM No. | FUNCTION      | RESISTANCE | REPLACEMENT DATA |                    |                    |              |
|----------|---------------|------------|------------------|--------------------|--------------------|--------------|
|          |               |            | MFR. PART No.    | CENTRALAB PART No. | CLAROSTAT PART No. | TRW PART No. |
| VRM1     | Squelch       | 10K        | 09-059           |                    |                    |              |
| VRM2     | Volume/Switch | 50K        | 09-011           |                    |                    |              |

## PARTS LIST A

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

### RESISTORS (P

| ITEM No. | RATING     |
|----------|------------|
| THM1     | 600 Cold M |

### COILS (RF-IF)

| ITEM No. | FUNCTION         |
|----------|------------------|
| L101     | Pi Filter        |
| L301     | RF Choke (27M)   |
| L401     | RF Choke         |
| L402     | RF Choke         |
| L403     | Final Amp (27M)  |
| L404     | Antenna Match    |
| T101     | Rec Antenna      |
| T102     | Rec RF (27MHz)   |
| T201     | IF (455kHz)      |
| T401     | XMT RF (27MHz)   |
| T402     | XMT Driver (27M) |

### FILTER CHOK

| ITEM No. | RATING             |    |
|----------|--------------------|----|
|          | CURRENT (Measured) | DC |
| TM1      | 1.275A             |    |
| TM2      | 1.275A             |    |

### TRANSFORM

| ITEM No. | IMPEDANCE |   |
|----------|-----------|---|
|          | PRI.      | S |
| T301     | 3.92      | 8 |

### SPEAKER

| ITEM No. | DESCRIPTION |
|----------|-------------|
| SP       | 3" PM       |

### FUSE DEVICES

| ITEM No. | DESCRIPTION  |
|----------|--------------|
| M16      | 3A Quick-Act |



## ND DESCRIPTION (CONTINUED)

(state Model, Part Number, and Description.)

### Power and Special)

|    | REPLACEMENT DATA |                | ITEM No. | RATING | REPLACEMENT DATA |                |
|----|------------------|----------------|----------|--------|------------------|----------------|
|    | WORKMAN PART No. | MFGR. PART No. |          |        | WORKMAN PART No. | MFGR. PART No. |
| TC |                  |                |          |        |                  |                |

| ION                                           | REPLACEMENT DATA |                                                                                                                              |                                   | REMARKS |
|-----------------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|---------|
|                                               | PART No.         | OTHER IDENTIFICATION                                                                                                         | MILLER PART No.                   |         |
| (h)<br>(MHz)<br>(27MHz)<br>(27MHz)<br>(27MHz) |                  | ETC49169<br>20080<br>ETC49170<br>ETC4056<br>ETC49168<br>ETC49166<br>ETC15089<br>ETC15061<br>ETC15090<br>ETC20105<br>ETC49167 | CBS774<br>CBS708-TC<br>CBS506-4TC |         |

### E

| INGS |                              | REPLACEMENT DATA     |                     |                | NOTES               |
|------|------------------------------|----------------------|---------------------|----------------|---------------------|
| RES. | INDUCTANCE (0 CURRENT 1000~) | MFGR. PART No.       | THORDARSON PART No. | TRIAD PART No. |                     |
|      | 1.45mH<br>1.45mH             | 1002 (1)<br>1002 (1) | TR509<br>TR509      |                | (1) Number on unit. |

### ER (Audio Output)

| E                | REPLACEMENT DATA |                     |                | NOTES               |
|------------------|------------------|---------------------|----------------|---------------------|
|                  | MFGR. PART No.   | THORDARSON PART No. | TRIAD PART No. |                     |
| EC.<br>2<br>20.4 | 62017 (1)        | TR827               |                | (1) Number on unit. |

| TYPE   | REPLACEMENT DATA |               | NOTES                                |
|--------|------------------|---------------|--------------------------------------|
|        | MFGR. PART No.   | QUAM PART No. |                                      |
| 8 Ohms | 06-004           | 30A0528R (1)  | (1) Requires original mounting unit. |

### S

| ON | REPLACEMENT DATA |        |               |        |                     |        |
|----|------------------|--------|---------------|--------|---------------------|--------|
|    | PART No.         |        | BUSS PART No. |        | LITTELFUSE PART No. |        |
|    | DEVICE           | HOLDER | DEVICE        | HOLDER | DEVICE              | HOLDER |
| ng |                  |        | AGC3          | HDJ    | 312003              | 150145 |

## PARTS LIST AND DESC

(When ordering parts, state Model, Pa

### MICROPHONE

| ITEM No. | REPLACEMENT DATA |             |
|----------|------------------|-------------|
|          | MFGR. PART No.   | GC PART No. |
| MIC      |                  | 18-032      |

### MISCELLANEOUS

| ITEM No. | PART NAME |
|----------|-----------|
| F101     | Filter    |
| F201     | Filter    |
| F202     | Filter    |
| J6       | Jack      |
| J7       | Jack      |
| J8       | Jack      |
| J9       | Jack      |
| J10      | Jack      |
| LED901   | Led       |
| LED902   | Led       |
| LEDP1    | Led       |
| M1       | Meter     |
| PLL      | Module    |
| RLM1     | Relay     |
| SM1      | Switch    |
| SM2      | Switch    |
| SM3      | Switch    |
| SM4      | Switch    |

### CABINETS & CABINE

| ITEM                 |
|----------------------|
| Case, Main           |
| Front Panel          |
| Knob, Channel Select |

### WIRING DATA

General-use Hook-up Wire (availab  
Shielded Hook-up Wire (spiral wra  
(braided)  
Speaker Cable (available in 4 col  
Bonding Strap . . . . .  
AC Power Cord . . . . .

## 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      |                  | 18-032      | 18-034          | 18-010   | 18-092          | 1      | 2         | 3         | NC      | NC       | 2        |

### MISCELLANEOUS

| ITEM No. | PART NAME | PART No. | NOTES                          |
|----------|-----------|----------|--------------------------------|
| F101     | Filter    |          | 10.7MHz (SFE 10.7mA)           |
| F201     | Filter    |          | 455kHz (CFU455H)               |
| F202     | Filter    |          | 455kHz (CFU455H)               |
| J6       | Jack      |          | Power                          |
| J7       | Jack      | 10-002   | Antenna                        |
| J8       | Jack      | 10-001   | Microphone                     |
| J9       | Jack      | 10-003   | PA/SP                          |
| J10      | Jack      | 10-003   | External Speaker               |
| LED901   | Led       |          | Channel Display                |
| LED902   | Led       |          | Channel Display                |
| LEDP1    | Led       |          | TX Ind.                        |
| M1       | Meter     | 05-018   | S/Rf                           |
| PLL      | Module    |          | Phase Locked Loop              |
| RLM1     | Relay     | 15-005   | XMT                            |
| SM1      | Switch    |          | Power (Part of Volume Control) |
| SM2      | Switch    | 09-146   | PA/CB                          |
| SM3      | Switch    |          | ANL                            |
| SM4      | Switch    | 09-155   | Channel Select                 |

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

| ITEM                 | PART No. | ITEM                   | PART No. |
|----------------------|----------|------------------------|----------|
| Case, Main           | 19-144   | Knob, Volume/Squelch   | 19-618   |
| Front Panel          | 19-219   | Push Button, PA-CB/ANL | 19-637   |
| Knob, Channel Select | 19-618   | Lens, Channel Display  | 19-719   |

### 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')    |