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**Craig L150 Service Manual**

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# SERVICE MANUAL

# CRAIG®

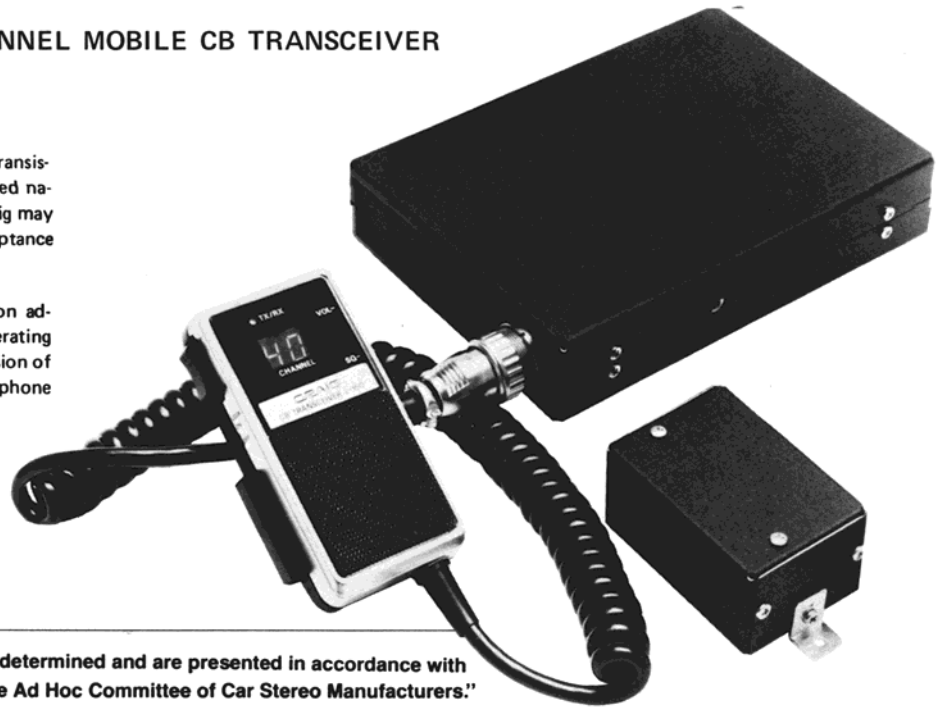
# L150

## 40-CHANNEL MOBILE CB TRANSCEIVER

### WARNING

Replacement or substitution of IC's, crystals, transistors, regulator diodes, or any other part of a specialized nature with parts other than those recommended by Craig may cause the operator to be in violation of the Type Acceptance requirements of Part 2 of the Rules.

FCC Rules require that ALL transmitter section adjustments, other than those supplied by Craig as operating controls, be made by or under the immediate supervision of the holder of an FCC First or Second Class Radio-Telephone Operator's License.



### SPECIFICATIONS

"The specifications for this product were determined and are presented in accordance with specification standards established by the Ad Hoc Committee of Car Stereo Manufacturers."

#### RECEIVER

SENSITIVITY AM: Better than 0.5  $\mu$ V for 10 dB (S+N)/N  
 BANDWIDTH 7 KHz @ -6.0 dB  
 AGC Change in audio output less than 10 dB  
 from 2.0  $\mu$ V to 1.0 volts  
 SQUELCH Adjustable, threshold less than 0.5  $\mu$ V  
 Tight, more than 250  $\mu$ V  
 IMAGE REJECTION Better than 70 dB  
 IF REJECTION Better than 60 dB @ 10.695 MHz  
 ADJACENT CHANNEL REJECTION Better than 60 dB  
 IF FREQUENCY AM: 10.695 MHz  
 NOISE BLANKER RF parallel gate type  
 OUTPUT POWER 4 W at 10 % THD

**NOTE:** Description and Data Subject to Change Without Notice.

#### GENERAL

CHANNELS 40 AM  
 FREQUENCY RANGE 26,965 to 27,405 MHz  
 FREQUENCY TOLERANCE  $\pm 0.005$  % from  $-30^{\circ}$  C to  $+50^{\circ}$  C  
 FREQUENCY STABILITY  $\pm 0.001$  %  
 POWER SOURCE 13.8 Vdc pos. or neg. ground  
 CURRENT DRAIN; Receive: 0.7 A @ maximum audio output  
 0.3 A standby (no signal)  
 TRANSMIT: AM full 1.5 A

#### TRANSMITTER

RF POWER OUTPUT AM: 4 W  
 MODULATION CAPABILITY 100 %  
 SPURIOUS ATTENUATION 60 dB minimum  
 OUTPUT IMPEDANCE 50 Ohm

### PARTS PRICE LIST

| CRAIG KEY No.    | DESCRIPTION                  | MFR's SUGG RET. PRICE |
|------------------|------------------------------|-----------------------|
| <b>PACKAGING</b> |                              |                       |
| L150001          | Individual Carton            | 3.30                  |
| L150003          | Carboard Sleeve              | .80                   |
| L150002          | Styrofoam Packing            | 1.65                  |
| L150507          | Microphone (Complete)        | 104.90                |
| L150395          | Mounting Bracket (Black Box) | 1.15                  |
| XFU002           | Spare Fuse, 2A               | 1.00                  |
| L150004          | Mounting Hardware Kit        | 2.35                  |
| 4101033          | D.C. Power Plug w/Cord       | 3.50                  |
| L150396          | Bracket, Mic Mounting        | .75                   |
| L150100          | External Spkr Patch Cord     | 3.00                  |
| L150101          | Relay Control Patch Cord     | 3.00                  |
| L150718          | Relay Box (Complete)         | 24.20                 |

SUBJECT TO CHANGE WITHOUT NOTICE. USE ALL AVAILABLE NUMBERS AND COMPLETE DESCRIPTION WHEN ORDERING, INCLUDING MODEL NUMBER  
 THESE PRICES HAVE BEEN REVISED AS OF 7/20/80

| REF. No.                                 | CRAIG KEY No. | DESCRIPTION                    | MFR's SUGG RET. PRICE |
|--|---------------|--------------------------------|-----------------------|
| <b>CABINET &amp; CHASSIS (BLACK BOX)</b> |               |                                |                       |
| 1  | NSP           | Chassis, Main                  | ----                  |
| 2  | NSP           | Chassis, Front                 | ----                  |
| 3  | NSP           | Cover, Top & Bottom            | ----                  |
| 4  | L150395       | Mounting Bracket               | 1.15                  |
| 5  | NSP           | Model No./FCC/Serial No. Plate | ----                  |
| 6  | L150102       | Label, Function Index          | .65                   |
| 7  | ----          | PH Screw, Plastic M3x6         | .25                   |
| 8  | ----          | PH Screw, Plastic M3x8         | .25                   |
| 9  | ----          | PH Screw M3x5                  | .25                   |
| 10                                       | NSP           | Heat Sink                      | ----                  |
| 11                                       | NSP           | Rivet                          | ----                  |

A PRODUCT OF CRAIG CORPORATION

| REF. No.   | CRAIG KEY No. | DESCRIPTION                  | MFR's SUGG RET. PRICE |
|--|---------------|------------------------------|-----------------------|
| <b>CABINET &amp; CHASSIS (BLACK BOX continued)</b> |               |                              |                       |
| **   | L150004       | Mounting Hardware Kit        | 2.35                  |
|  | L150396       | Bracket, Mic Mounting        | .75                   |
|  | L150090       | "L" Mtg Bracket, Relay Box   | .25                   |
|  | -----         | RH Tapp Screw M3.5x8         | .25                   |
|  | -----         | Lock Washer M3.5             | .25                   |
| 12   | -----         | RH Tapp Screw M5x10          | .25                   |
| 13   | -----         | Star Washer M5               | .25                   |
| 14   | L150212       | Wing Bolts M5x8              | .45                   |
| 15   | -----         | Hex Nut M3                   | .25                   |
| FC1  | L150800       | 6 Lead Flexible Cable        | .65                   |
| IC3  | MB3712        | I.C. (AF POWER AMP)          | 4.50                  |
| J1   | L150607       | Socket, Microphone Connector | 5.85                  |
| J2   | L103607       | Connector, Coaxial Antenna   | 1.80                  |
| J3   | L103609       | Socket, External Spkr Jack   | .75                   |
| J4   | L150608       | Socket, Relay Control Jack   | .80                   |
| J5   | 4101027       | Socket, DC Power Connector   | 1.75                  |
| PC590  | NSP           | PCB w/Comp, MAIN             | ----                  |
| PC592  | L150517       | PCB w/Comp, MIC JACK         | 8.00                  |
| TR25   | 2SC2028       | Transistor (DRIV. AMP)       | 1.65                  |
| TR26   | 2SC2029       | Transistor (TX PWR AMP)      | 2.90                  |
| YD046  | NSP           | Mica Insulator               | ----                  |
| YY027  | NSP           | Insulation Sheet             | ----                  |

| REF. No.                                 | CRAIG KEY No. | DESCRIPTION                   | MFR's SUGG RET. PRICE |
|--|---------------|-------------------------------|-----------------------|
| <b>CABINET &amp; CHASSIS (RELAY BOX)</b> |               |                               |                       |
| **                                       | L150718       | Relay Box (Complete)          | 24.20                 |
| 101                                      | L150050       | Top Cover                     | 1.65                  |
| 102                                      | L150051       | Bottom Cover                  | 2.45                  |
| 103                                      | L150380       | Clamp, 9P Connector           | .50                   |
| 104                                      | L150330       | Bushing, Ext Sp Jack          | .25                   |
| 105                                      | L150231       | Stud, Mtg Spacer              | .85                   |
| 106                                      | -----         | PH Screw M3x10                | .25                   |
| 107                                      | -----         | Hex Nut M3                    | .25                   |
| 108                                      | -----         | PH Screw M3x5                 | .25                   |
| J501                                     | L150608       | Socket, Relay Control Jack    | .80                   |
| J502                                     | L103609       | Socket, External Spkr Jack    | .75                   |
| J503                                     | T615608       | 9P PWR/SP Connector (EXT SPK) | 7.25                  |
| J504                                     | T615620       | 9P PWR/SP Conn. (RADIO IN)    | 6.20                  |
| PC620                                    | L150518       | PCB w/Comp, RELAY SWITCH      | 21.40                 |
| RY501                                    | L150719       | Relay SW, CB/RADIO Select     | 19.70                 |

| REF. No.                                  | CRAIG KEY No. | DESCRIPTION                   | MFR's SUGG RET. PRICE |
|---|---------------|-------------------------------|-----------------------|
| <b>CABINET &amp; CHASSIS (REMOTE MIC)</b> |               |                               |                       |
| *   | L150507       | Microphone (Complete)         | 104.90                |
| **  | L150061       | Assy, FRONT PANEL             | 6.35                  |
| 250                                       | NSP           | Front Panel                   | ----                  |
| 251                                       | NSP           | Window, Front Display         | ----                  |
| 252                                       | NSP           | Dust Cover, Speaker           | ----                  |
| 253                                       | NSP           | Wire Mesh Grill               | ----                  |
| 254                                       | NSP           | Model No. Plate               | ----                  |
| 277                                       | NSP           | Optical Filter, Ch Display    | ----                  |
| 278                                       | NSP           | Speaker Cover                 | ----                  |
| 255                                       | L150702       | Speaker/Mic Element           | 6.65                  |
| 256                                       | L150430       | Front Cushion                 | .35                   |
| 257                                       | L150431       | Back Cushion                  | .40                   |
| 258                                       | L150620       | Assy, Coiled Cable w/16P Plug | 27.50                 |
| 259                                       | L150062       | Back Panel                    | 2.30                  |
| 260                                       | L150470       | Mic Hanger Knob               | .35                   |
| 261                                       | L150026       | Button, TX/RX Select Sw       | .70                   |
| 262                                       | L150530       | SW, TX/RX Select              | 1.85                  |
| 263                                       | L150432       | Cushion, TX/RX SW Mtg         | .25                   |
| 264                                       | L150027       | Knob, VOL & SQUEL Cont        | .85                   |
| 265                                       | -----         | PH Tapp Screw M3.1x16         | .25                   |
| 266                                       | -----         | Star Washer M3                | .25                   |
| 267                                       | -----         | PH Tapp Screw M3x8            | .25                   |
| 268                                       | -----         | PH Tapp Screw M2.6x6          | .25                   |
| 269                                       | L150531       | Slide SW, CH 9/CH Lock/ANL    | 2.50                  |
| 270                                       | L150570       | VR 10K Ohm, VOLUME Cont       | 2.15                  |
| 271                                       | L150571       | VR 50K Ohm, SQUELCH Cont      | 2.15                  |
| 272                                       | NSP           | Ground Lug                    | ----                  |
| 273                                       | -----         | PH Tapp Screw M2x6            | .25                   |
| 274                                       | -----         | PH Screw M1 7x4               | .25                   |
| 275                                       | L150381       | Clamp, Coiled Cable           | .35                   |
| 276                                       | -----         | PH Tapp Screw M2 6x10         | .25                   |
| LED                                       | UR202         | LED, Channel Indicator (D304) | 9.15                  |
| PCMIC                                     | L150519       | PCB w/Comp, MICROPHONE        | 55.10                 |
| 8PC                                       | L150609       | 8P LED Connector              | 1.00                  |

| REF. No.                              | CRAIG KEY No. | DESCRIPTION                      | MFR's SUGG RET. PRICE |
|---------------------------------------|---------------|----------------------------------|-----------------------|
| <b>COILS, TRIMMERS &amp; XFORMERS</b> |               |                                  |                       |
| CF1                                   | L103670       | Ceramic Filter 10 695MHz (FL048) | 1.40                  |
| CF2                                   | L103671       | Ceramic Filter 455KHz (FL066)    | 6.45                  |
| L1                                    | L104670       | Trimmer (LA029)                  | .90                   |
| L2                                    | L104671       | Trimmer (LA138)                  | .90                   |
| L3,4                                  | L103675       | Trimmer (LA181)                  | .90                   |

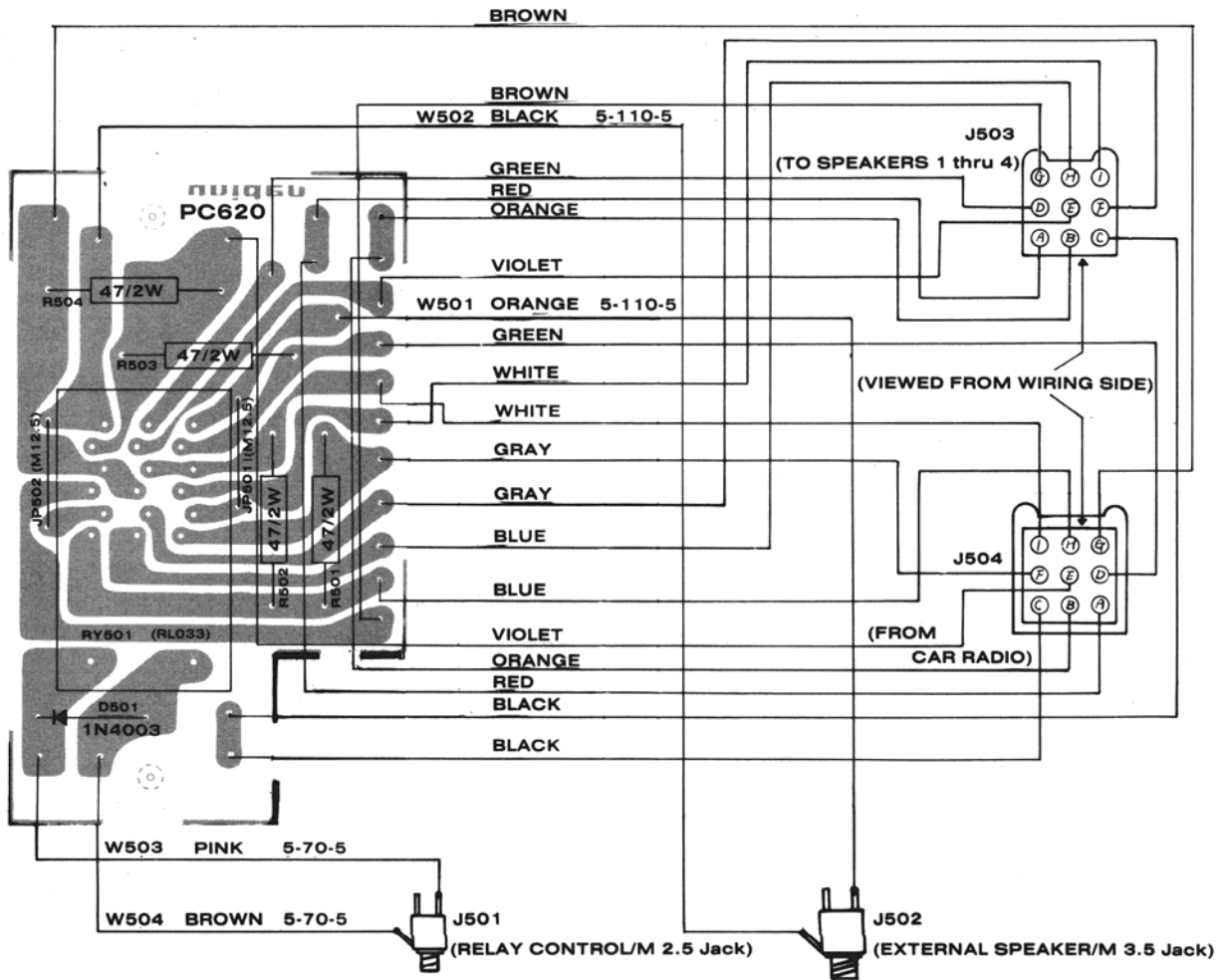
**NOTE: NSP; Non Serviceable Part**

| REF. No.  | CRAIG KEY No. | DESCRIPTION                  | MFR's SUGG RET. PRICE |
|---|---------------|------------------------------|-----------------------|
| <b>COILS, TRIMMERS &amp; XFORMERS (continued)</b> |               |                              |                       |
| L6  | L103678       | Trimmer (LA204)              | .85                   |
| L7  | L104673       | Trimmer (LA276)              | .90                   |
| L8  | L150670       | Trimmer (LA286)              | .90                   |
| L9  | S609680       | Coil 100uH (LZ016)           | .90                   |
| L10   | L104677       | Trimmer (LA165)              | .90                   |
| L11   | L104678       | Trimmer (LA201)              | .90                   |
| L12   | L104680       | Trimmer (LA198)              | 1.75                  |
| L13   | L104679       | Trimmer (LA088)              | .90                   |
| L14   | L103683       | Trimmer (LA208)              | .90                   |
| L15   | L103684       | Trimmer (LC072)              | .80                   |
| L16   | L103685       | Coil (LD033)                 | .40                   |
| L17   | L103684       | Trimmer (LC072)              | .80                   |
| L18   | L150671       | Coil (LE092)                 | .25                   |
| L19   | L103687       | Coil (LE093)                 | .25                   |
| L20   | L103684       | Trimmer (LC072)              | .80                   |
| RY1,2   | L150720       | Relay SW (RL031)             | 5.60                  |
| RY501   | L150719       | Relay SW, RADIO/CB (RL033)   | 19.70                 |
| T1  | L103642       | Coil, AF Choke (TF083)       | 1.05                  |
| T2  | L150641       | Output Transformer (TF175)   | 17.15                 |
| T301  | L150642       | Matching Transformer (TF190) | .65                   |

| REF. No.                        | CRAIG KEY No. | DESCRIPTION   | MFR's SUGG RET. PRICE |
|---------------------------------|---------------|---|-----------------------|
| <b>MISCELLANEOUS ELECTRICAL</b> |               |   |                       |
| FC1                             | L150800       | 6 Lead Flexible Cable                                 | .65                   |
| J1                              | L150607       | Socket, Microphone Conn                               | 5.85                  |
| J2                              | L103607       | Connector, Coaxial Antenna                            | 1.80                  |
| J3                              | L103609       | Socket, External Spkr Jack                            | .75                   |
| J4                              | L150608       | Socket, Relay Control Jack                            | .80                   |
| J5                              | 4101027       | Socket, D.C Power Conn                                | 1.75                  |
| J301                            | L150620       | Assy, Coiled Cable w/16P Plug                         | 27.50                 |
| J501                            | L150608       | Socket, Relay Control Jack                            | .80                   |
| J502                            | L103609       | Socket, External Spkr Jack                            | .75                   |
| J503                            | T615608       | 9P PWR/SP Conn(EXT SPK)                               | 7.25                  |
| J504                            | T615620       | 9P PWR/SP Conn(RADIO IN)                              | 6.20                  |
| MIC1                            | L150507       | Microphone (Complete)                                 | 104.90                |
| MIC/SP                          | L150702       | Speaker/Mic Element                                   | 6.65                  |
| P5                              | 4101033       | D.C. Power Plug w/Cord                                | 3.50                  |
| PC590                           | NSP           | PCB w/Comp, MAIN                                      | ----                  |
| PC592                           | L150517       | PCB w/Comp, MIC JACK                                  | 8.00                  |
| PC620                           | L150518       | PCB w/Comp, RELAY SWITCH                              | 21.40                 |
| PCMIC                           | L150519       | PCB w/Comp, MICROPHONE                                | 55.10                 |
| RY1,2                           | L150720       | Relay Switch  | 5.60                  |
| RY501                           | L150719       | Relay SW, RADIO/CB Select SW, POWER On/Off(See VR301) | 19.70                 |
| S301                            | -----         | Slide SW, ANL On/Off                                  | 2.50                  |
| S302                            | L150531       | Slide SW, CH 9 (Auto)                                 | 2.50                  |
| S303                            | L150531       | Slide SW, CH LOCK On/Off                              | 2.50                  |
| S304                            | L150531       | Slide SW, CH LOCK On/Off                              | 2.50                  |
| S305                            | L150532       | Rocker SW, UP/DOWN CH Select                          | 5.00                  |
| S306                            | L150530       | Push SW, TX/RX Select                                 | 1.85                  |
| VR1                             | L104590       | Semi-Fixed Res 500 Ohm                                | .65                   |
| VR2                             | L132590       | Semi-Fixed Res 1K Ohm                                 | .70                   |
| VR3                             | L132592       | Semi-Fixed Res 100K Ohm                               | .85                   |
| VR301                           | L150570       | VR 10K, VOLUME Cont                                   | 2.15                  |
| S301                            | -----         | Slide SW, POWER On/Off                                | 1                     |
| VR302                           | L150571       | VR 50K, SQUELCH Cont                                  | 2.15                  |
| X1                              | L103722       | Crystal, 10 240 MHz                                   | 4.55                  |

| REF. No.   | CRAIG KEY No. | DESCRIPTION            | MFR's SUGG RET. PRICE |
|--|---------------|------------------------|-----------------------|
| <b>SEMICONDUCTORS</b>                                      |               |                        |                       |
| D1,2,3,8,501, D4,5,6,7,9,11,12,13,14,15,17,19,20,23,24,302 | IN4003        | Diode                  | .65                   |
| D10  | 1S2075K       | Diode                  | .35                   |
| D16  | RD9.1EB1      | Zener Diode            | .45                   |
| D21  | RD5.1EB2      | Zener Diode            | .40                   |
| D301   | 1S2688EA      | Var1-Cap Diode         | 1.05                  |
| D303   | TLRG101       | LED, TX/RX Indicator   | 2.05                  |
| D304   | 0.5Z5.1U      | Zener Diode            | .45                   |
| IC1  | UR202         | LED, CHANNEL Indicator | 9.15                  |
| IC2  | UPD2814C      | I.C. (PLL)             | 10.90                 |
| IC3  | TA7310P       | I.C. (TX MIX)          | 1.75                  |
| IC301  | MB3712        | I.C. (AF POWER)        | 4.50                  |
| TR1  | UPD2803C      | I.C. (CH SELECT)       | 35.60                 |
| TR2  | 2SC763        | Transistor             | .50                   |
| TR3,4,5,6,18,19,20,21,22,24                                | 2SK19         | FET                    | 4.40                  |
| TR7,8,9,10,12,13,14,17                                     | 2SC710        | Transistor             | 1.15                  |
| TR11   | 2SC711        | Transistor             | .95                   |
| TR16,23  | 2SD355        | Transistor             | 1.50                  |
| TR25   | 2SA628        | Transistor             | .95                   |
| TR26   | 2SC2028       | Transistor             | 1.65                  |
| TR301  | 2SC2029       | Transistor             | 2.90                  |
|  | 2SC1815       | Transistor             | 1.15                  |

# RELAY SWITCH PCB LAYOUT with WIRING DIAGRAM

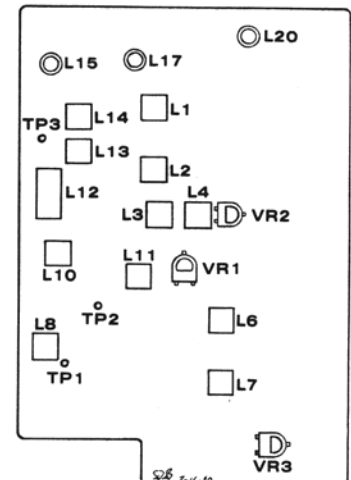


## ALIGNMENT PROCEDURES

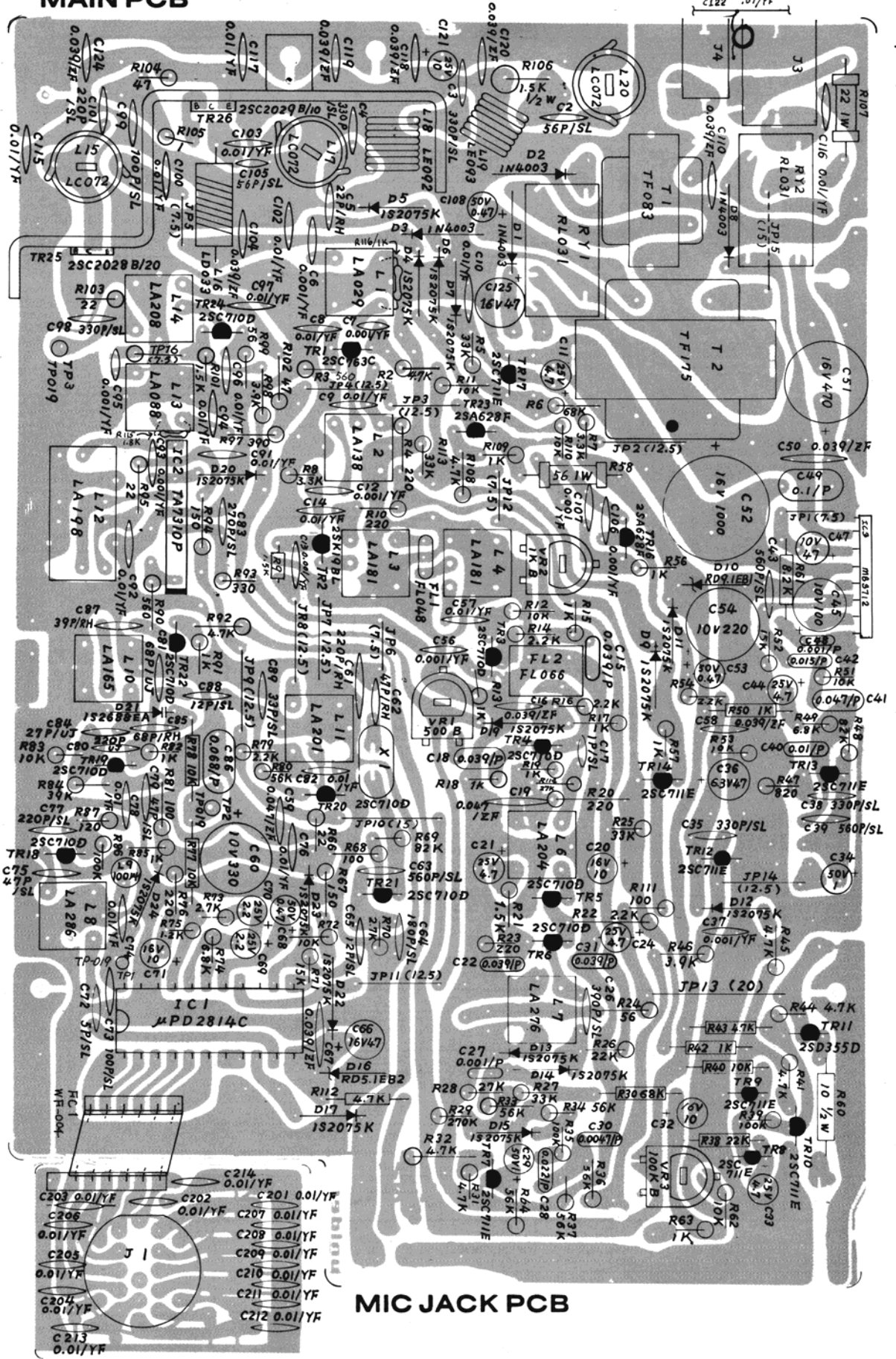
| STEP                  | SET TO   | CONNECTIONS  | ADJUST                | ADJUST FOR  |
|-----------------------|--|--|-----------------------|---|
| <b>P.L.L. CIRCUIT</b> |  |  |                       |   |
| 1                     | Channel 19. RX Mode.   | Oscilloscope To Pin #22 Of I.C. 1 (TP 1).  | L8                    | Maximum Indication On Oscilloscope.                 |
| 2                     | Channel 40. TX Mode. No Modulation.                                | D.C. Volt Meter To Pin #19 Of I.C. 1 (TP 2).   | L10                   | Reading Of Approximately 4.0 V.                     |
| <b>TRANSMITTER</b>    |  |  |                       |   |
| 1                     | Channel 19. TX Mode. No Modulation.                                | RF Wattage Meter To Antenna Jack (J2).   | L12, 13               | Maximum Indication On RF Wattage Meter.             |
| 2                     | Same As Step 1   | Same As Step 1.  | L14, 15, 17           | Same As Step 1.                                     |
| 3                     | Same As Step 1   | Same As Step 1.  | L17                   | Nominal 3.8 W Of RF Output Power.                   |
| 4                     | Repeat Steps 1, 2 & 3 To Insure That Adjustments Made Are Correct. |  |                       |   |
| 5                     | Channel 19. 1 KHz (120mV) Applied Through Mic Input.               | Signal Generator To Mic Jack (J1). Oscilloscope To Antenna Jack (J2) Through 50 Ohm Load And Attenuator. | VR2                   | 95% Modulation.                                     |
| 6                     | All Channels. TX Mode. No Modulation.                              | Frequency Counter To Antenna Jack (J2) Through 50 Ohm Load And Attenuator.                               |                       | Check All Channels For Correct Frequency Operation. |
| <b>RECEIVER</b>       |  |  |                       |   |
| 1                     | Volume; MAX. Squelch; MIN.   | Signal Generator To Antenna Jack (J2); (27.185 MHz). VTVM To EXT. SPKR Jack (J3)                         | L1, 2, 3, 4, 6, 7, 11 | Maximum Audio Output.                               |
| 2                     | Same As Step 1   | Same As Step 1.  | VR1                   | 1.4 V Reading On VTVM. S/G Output Level Of 0.5 uV.  |
| 3                     | Volume; MAX. Squelch; MAX.   | Same As Step 1.  | VR3 (Squelch)         | 1.4 V Reading On VTVM. S/G Output Level Of 700 uV   |

### TEST EQUIPMENT REQUIRED

- a) Oscilloscope
- b) D.C. Volt Meter
- c) VTVM
- d) RF Wattage Meter
- e) Frequency Counter
- f) 50 Ohm Dummy Load
- g) Signal Generator



# MAIN PCB

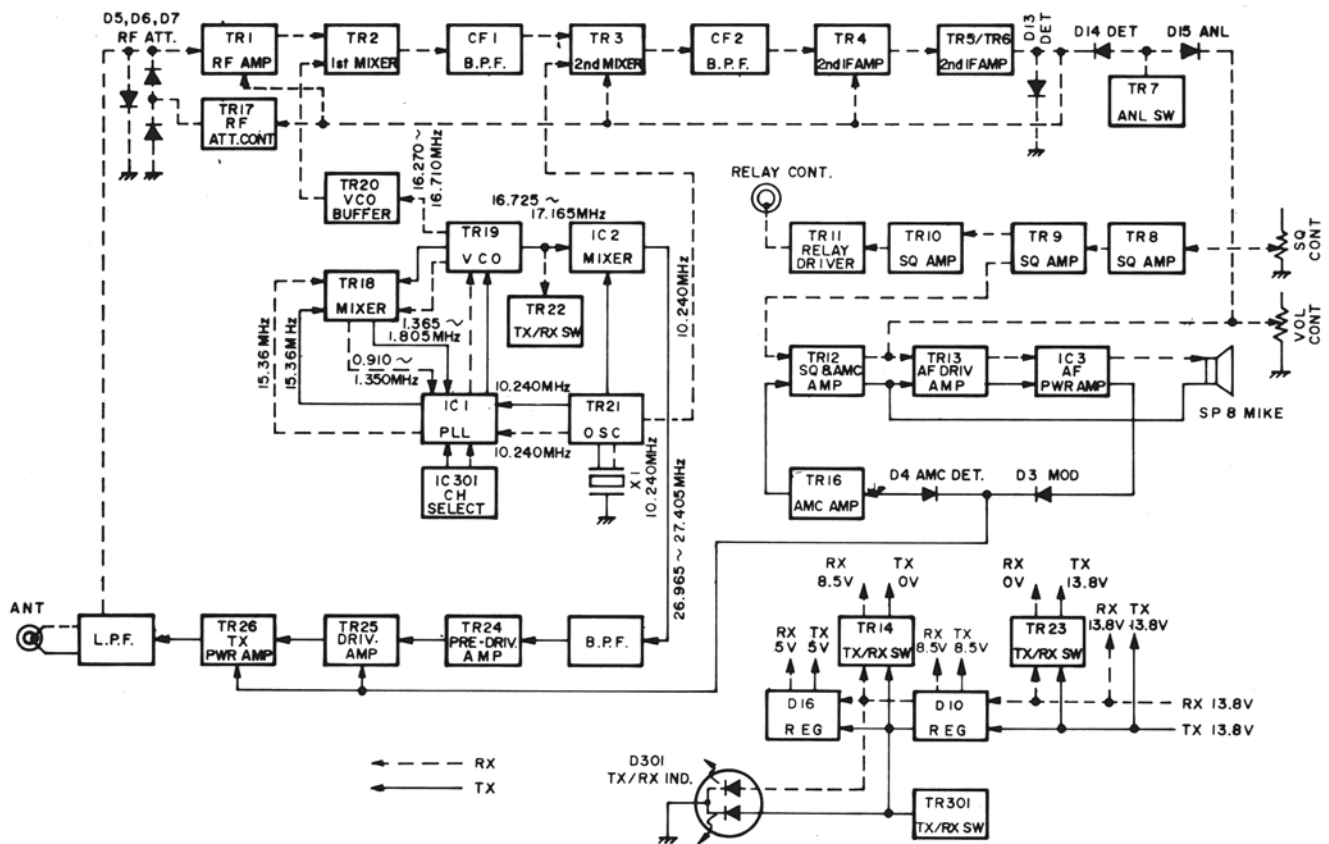


PC-590

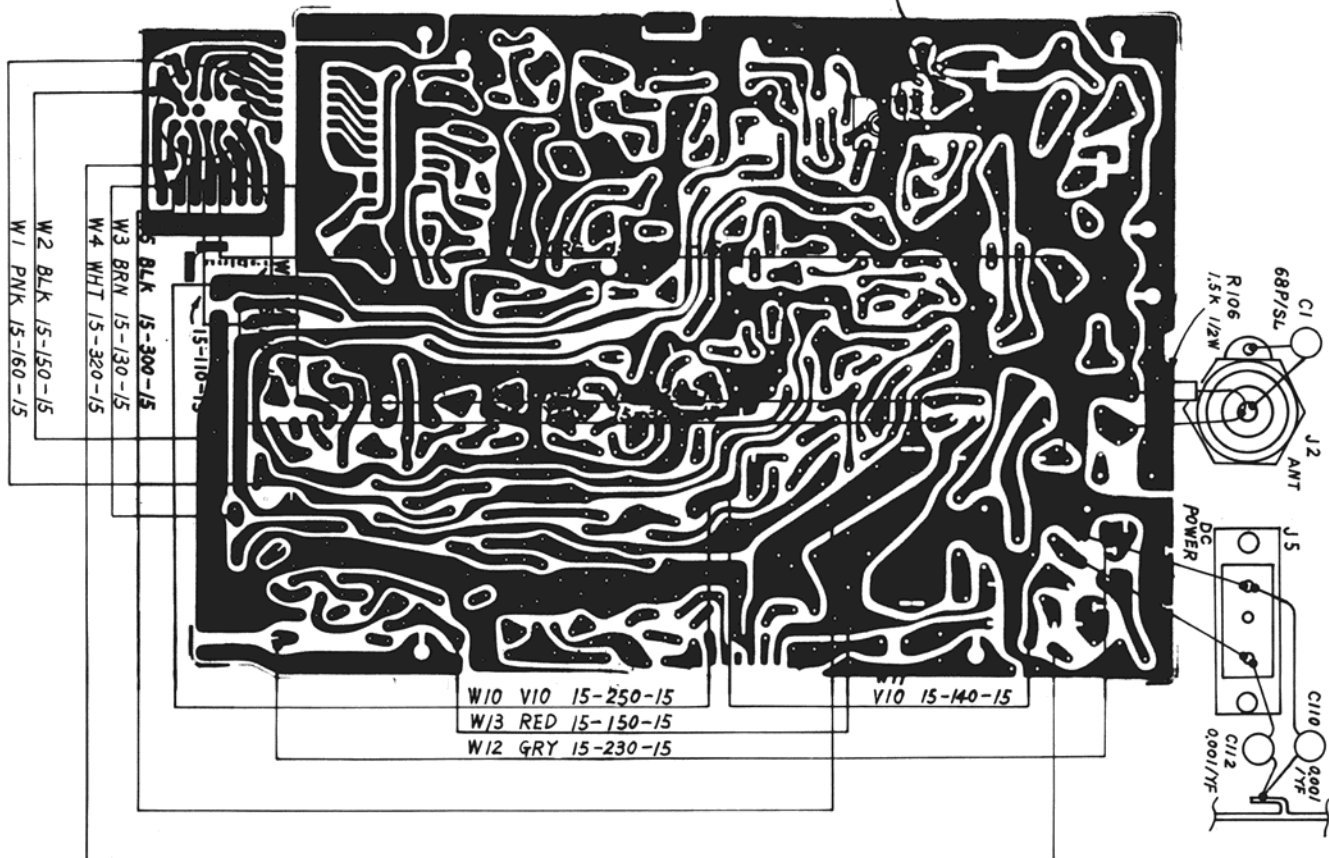
# MIC JACK PCB

PC-592

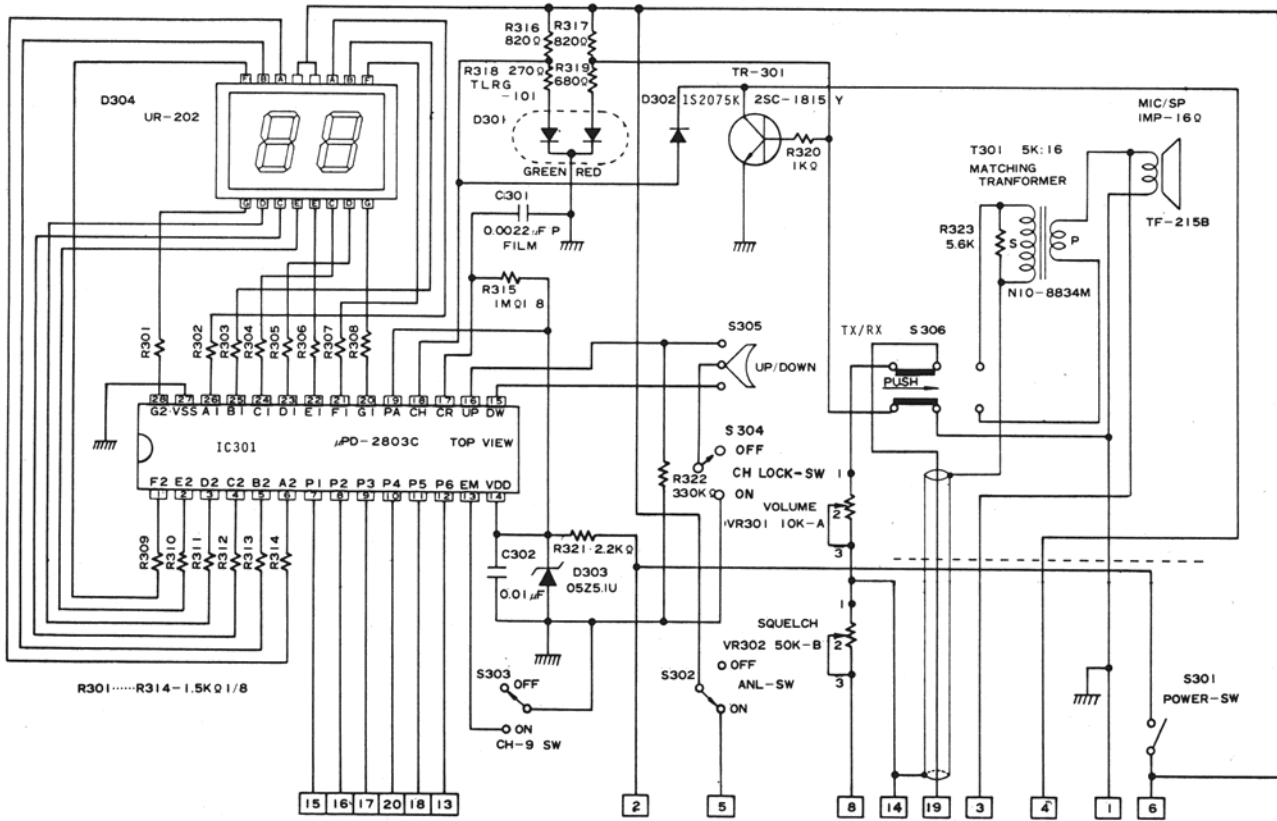
# BLOCK DIAGRAM



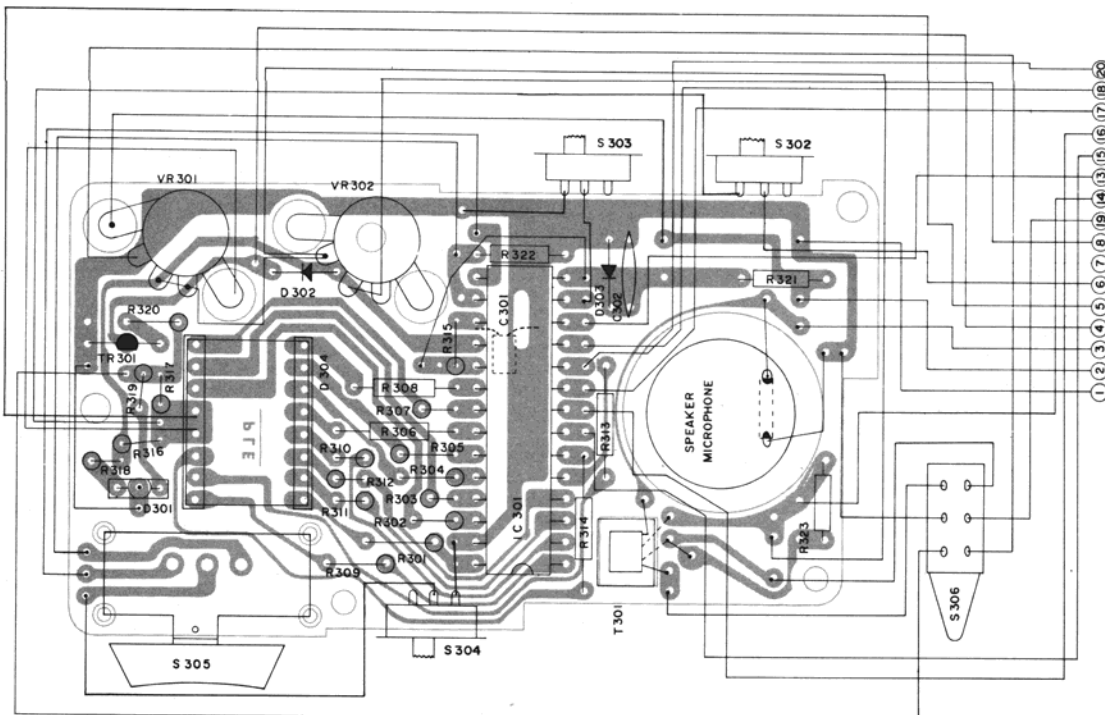
# WIRING DIAGRAM (MAIN PCB)



# Schematic Diagram, REMOTE MICROPHONE

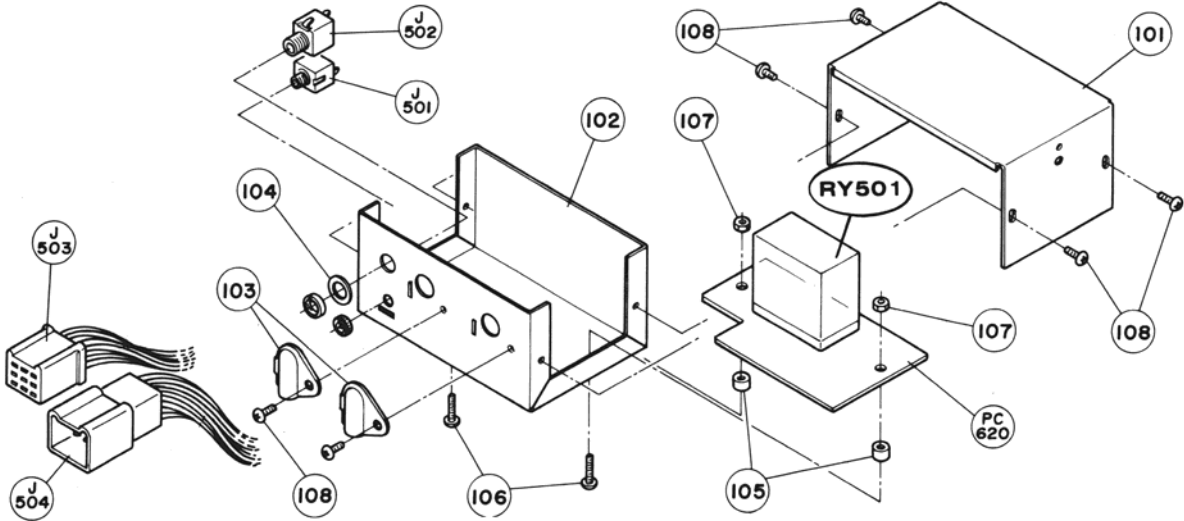


## REMOTE MICROPHONE PCB LAYOUT with WIRING DIAGRAM

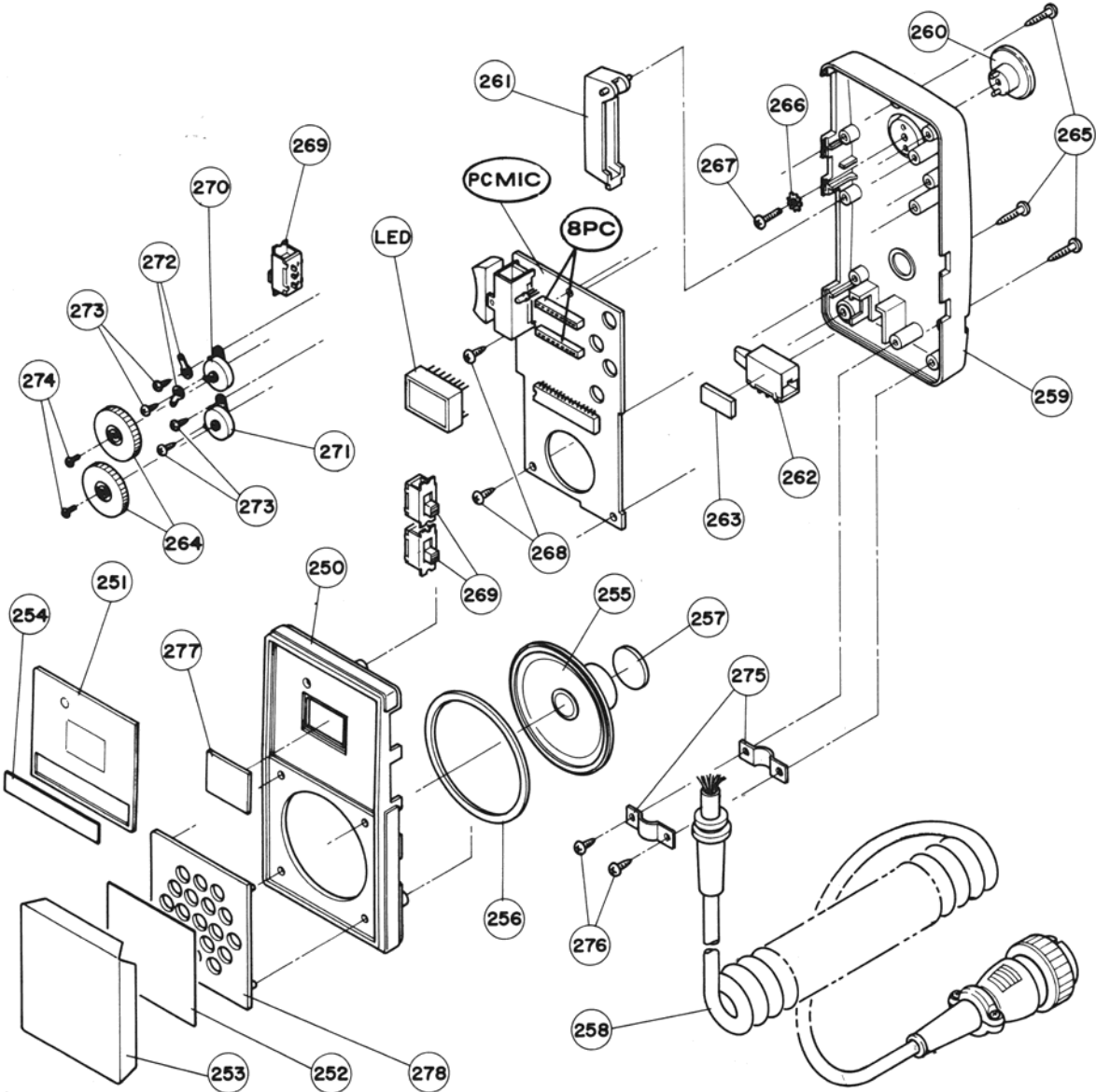


| PIN NUMBER | WIRE COLOR   |
|------------|--------------|
| 1          | BLACK        |
| 2          | RED/BLACK    |
| 3          | PURPLE       |
| 4          | BLUE         |
| 5          | PINK         |
| 6          | GRAY         |
| 7          | YELLOW/BLACK |
| 8          | WHITE/BLACK  |
| 9          | NC           |
| 10         | NC           |
| 11         | NC           |
| 12         | NC           |
| 13         | GREEN        |
| 14         | SHIELDED     |
| 15         | BLUE/BLACK   |
| 16         | BROWN        |
| 17         | RED          |
| 18         | YELLOW       |
| 19         | WHITE        |
| 20         | ORANGE       |

# CABINET & CHASSIS, RELAY BOX



# CABINET & CHASSIS, REMOTE MICROPHONE





# CABINET & CHASSIS, BLACK BOX

