

All voltages measured from PC Board Ground with DC VTVM, No Signal, Unit Tuned to Ch. 9, 13.8V Power Supply. Voltages within  $\pm 20\%$  are considered normal.

Figure 11

## Tuning and Alignment

### TRANSMITTER ALIGNMENT

The equipment setup is shown in Fig. 12. Since the 14T275 control center is part of the mic./speaker unit, operating the transceiver with a dummy mic. connector is impractical. As a result, precautions must be taken to prevent inadvertent transmitter keying while servicing. See Caution, page 9.

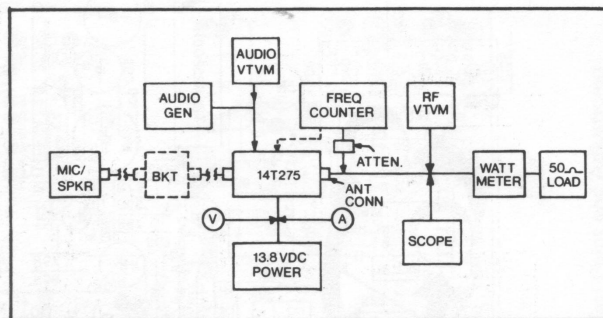


Figure 12. Equipment Setup, Transmitter Alignment

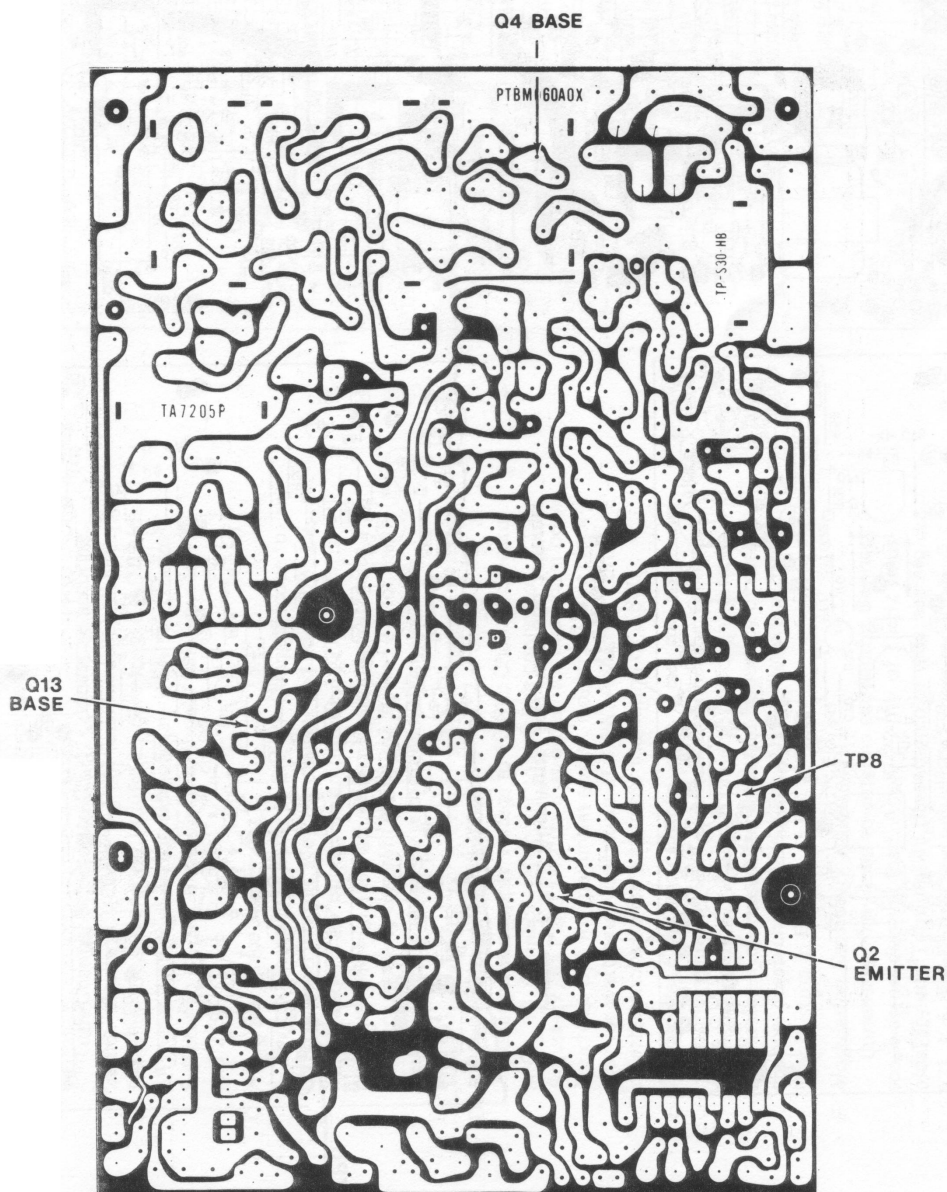


Figure 13. Transmitter Alignment Test Points, Foil Side

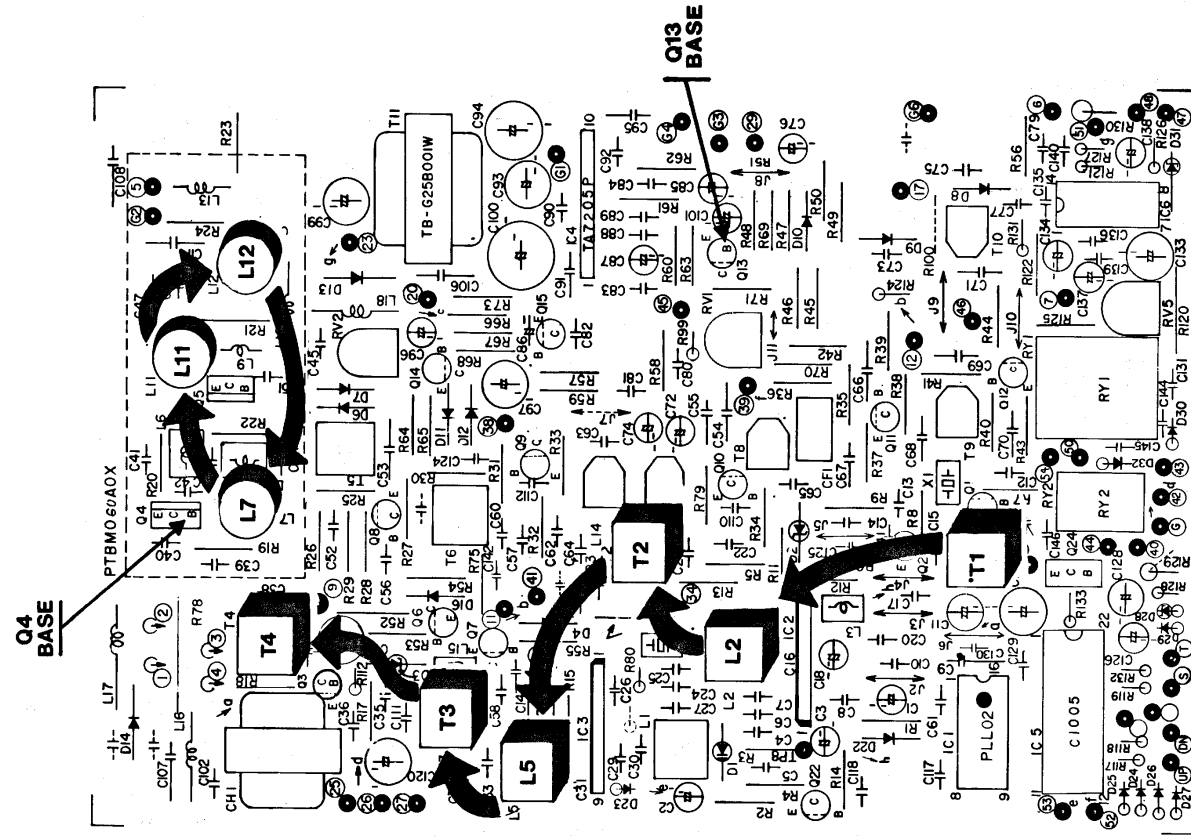


Figure 14. PLL Alignment, Test-Point and Trimmer

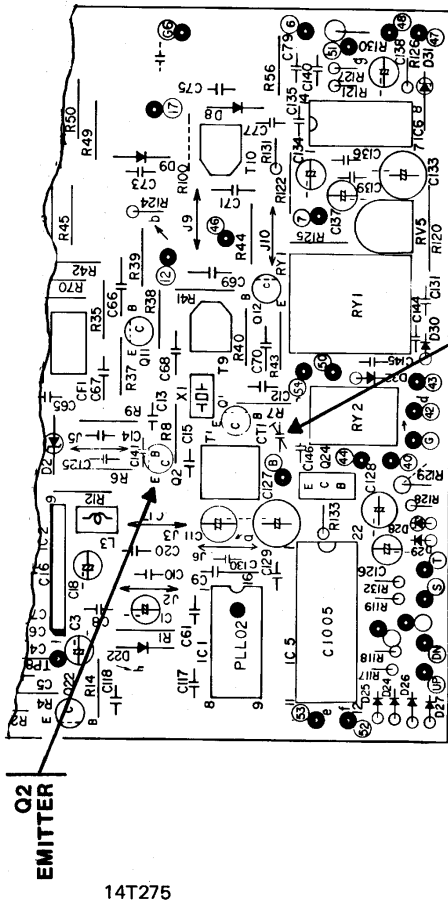


Figure 15. VCO Circuit Alignment, Test-Point and Adjustment

Figure 16. RF Driver and Power Amplifier Alignment

#### A. Phase-Lock Loop Alignment

Connect the frequency counter probe (100 pf capacitor in series) to the emitter of Q2 (near T1, see Fig. 14 for location). Adjust trimmer CT1 (between T1 and RY2, see Fig. 14) for a frequency readout of 10.24 MHz  $\pm$  50 Hz. Other frequencies in the PLL are included in Fig. 2.

#### B. VCO Circuit Adjustment

Turn Channel Selector to Ch. 1. Connect an accurate 20,000 ohm/volt VOM or VTVM (5 Vdc range) to TP8 (see Fig. 15) and ground. Adjust L1 core for 3.6  $\pm$  0.1 Vdc on meter with core on top side of travel. Switch Channel Selector to Ch. 40. Meter reading should fall between 1.4 and 2.3V.

#### C. RF Driver Stage Alignment

Switch Channel Selector to Ch. 19. Connect scope to Q13 base and ground. Key transmitter and adjust T1, L2, T2, L5 and T3 for maximum amplitude of 27.185 MHz on scope. See Fig. 16. Reduce power supply voltage to 7V. Connect scope to base of Q4. Adjust T3 and T4 for maximum amplitude on scope with transmitter keyed. See Fig. 16.

#### D. RF Power Amplifier Alignment

Reset power supply voltage to 13.8V; Channel Selector at Ch. 19. Connect wattmeter to antenna connector. Adjust L7, L11 and L12 (in that order) for maximum power. Touch up L11 for maximum power. Adjust L7 core clockwise for wattmeter indication of 4.4W. Adjust L7 core counterclockwise for wattmeter indication of 3.8W.

#### E. Transmitter Frequency Check

Connect dummy load to antenna connector. Connect frequency meter to antenna connector through suitable attenuator. Key transmitter and read frequency of each channel. Each channel frequency should be within  $\pm$ 800 Hz of listing in Fig. 2.

#### F. Modulation Sensitivity Adjustment

Connect dummy load to antenna connector. Connect scope across dummy load. Apply 20 mV of 1 kHz sinusoidal tone to Terminal 46 (lavender color wire, see Fig. 17). Key transmitter and adjust RV2 (near modulation transformer) for 85% modulation as indicated on the scope.

Decrease 1 KHz amplitude to 6mV. Modulation percentage, as observed on the scope, should exceed 60%. This completes transmitter alignment.

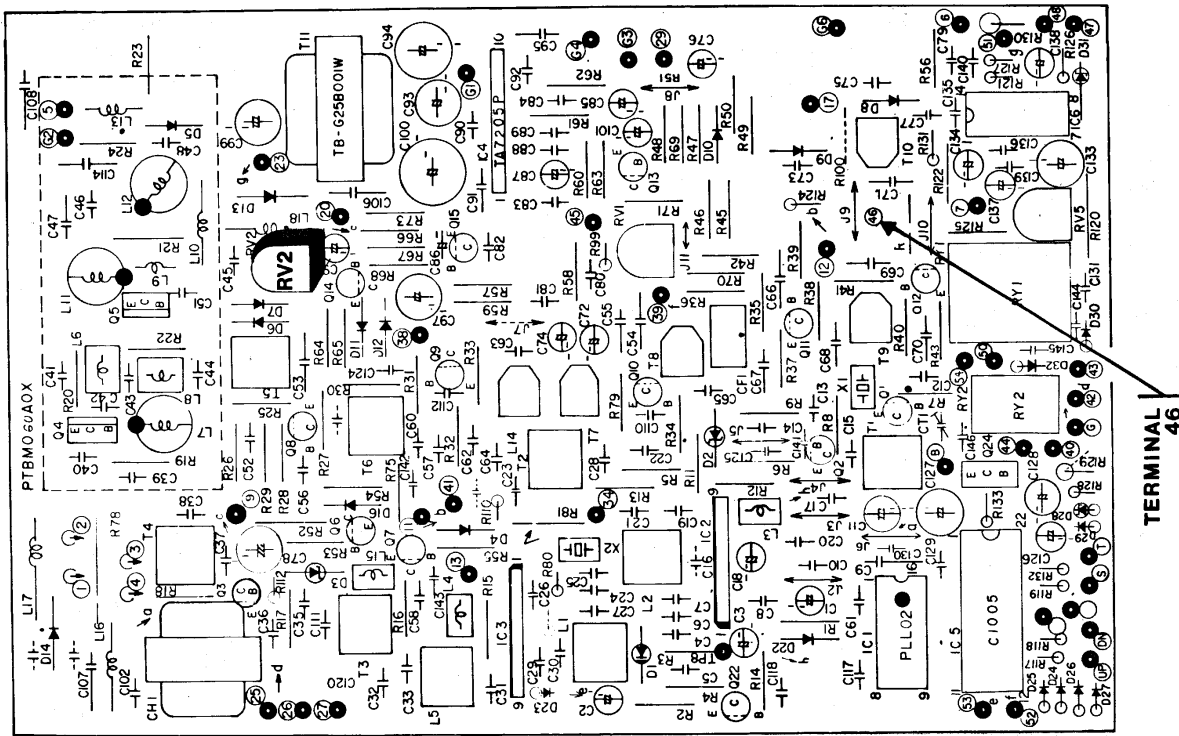


Figure 17. Modulation Sensitivity Test Point and Adjustment

TERMINAL 46

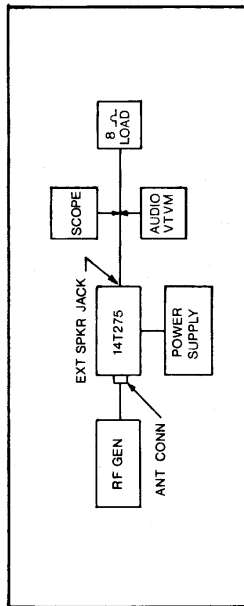
**RECEIVER ALIGNMENT**

**A. Sensitivity Alignment**

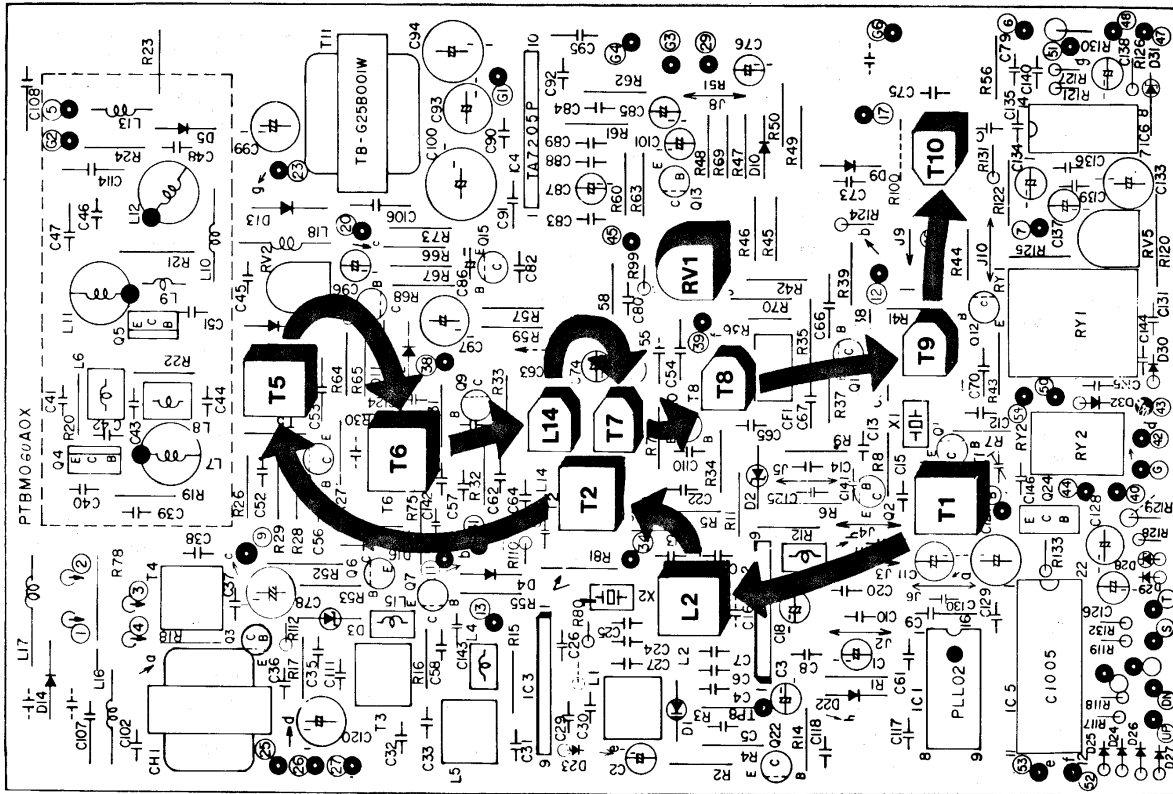
See equipment setup in Fig. 18. Set signal generator at 27.185 MHz with 30% AM at 1 kHz. Set transceiver on Ch. 19 with volume control fully clockwise. Keep generator output just high enough to get scope indication and minimize AGC action. Adjust T1, L2, T2, T5, T6, L14, T7, T8, T9 and T10 (in that order) for maximum audio output. See Fig. 19 for locations. Reduce generator output level as required to avoid AGC action. Readjust T5 core one turn clockwise.

**B. Squelch Circuit Alignment**

Set signal generator at 27.185 MHz with 30% AM at 1 kHz. Adjust generator output level to 100 uV. Set transceiver on Ch. 19. Rotate Squelch and Volume controls fully clockwise. Adjust RV1 (see Fig. 19 for location) for maximum audio output across 8-ohm load resistor. Take note of output level. Readjust RV1 to reduce audio output by 6dB.



**Figure 18. Equipment Setup, Sensitivity and Squelch Adjustment**



**Figure 19. Receiver Sensitivity Alignment and Squelch Adjustment (RV1)**

## Replacement Parts

| Symbol | Stock No. | Description                      | Symbol | Stock No. | Description              |
|--------|-----------|----------------------------------|--------|-----------|--------------------------|
|        |           | MAIN CHASSIS<br>ELECTRICAL PARTS |        |           |                          |
| C1     | 122522    | .1 UF 10V ELECT                  | C96    | 742C74    | 3.3 UF 25V ELYT          |
| C2     | 742072    | 10UF 16V ELYT                    | C97    | 742077    | 47UF 10V ELYT            |
| C3     | 742553    | 0.22UF 10V AROX                  | C99    | 742081    | 47UF 25V ELYT            |
| C4     | 741788    | 68PF 10% 50V CERAMIC             | C100   | 742080    | 1000UF 16V ELYT          |
| C5     | 742070    | .01 UF 50V CER                   | C101   | 741794    | 33 UF 6.3V ELYT          |
| C6     | 741807    | 22PF 10% 50V CERAMIC             | C102   | 742070    | .01 UF 50V CER           |
| C7     | 423555    | 330 PF 50V CER                   | C106   | 741779    | 47000PF 10% 50V CER      |
| C8     | 437385    | 150 PF 50V CER                   | C107   | 741779    | 47000PF 10% 50V CER      |
| C9     | 741779    | 47000PF 10% 50V CER              | C108   | 741779    | 47000PF 10% 50V CER      |
| C10    | 742524    | 47PF 50V CER                     | C110   | 742570    | 18PF 50V CER             |
| C11    | 742077    | 47UF 10V ELYT                    | C114   | 742927    | 390 PF 500V CER          |
| C12    | 741807    | 22PF 10% 50V CERAMIC             | C117   | 432515    | 4700 PF 50V CER          |
| C13    | 741754    | .001 UF 10% 50V FILM MYLAR       | C118   | 742536    | .022UF 50V CER           |
| C14    | 741788    | 68PF 10% 50V CERAMIC             | C124   | 742070    | .01 UF 50V CER           |
| C15    | 742070    | .01 UF 50V CER                   | C125   | 742070    | .01 UF 50V CER           |
| C17    | 245245    | 47 PF 50V CER                    | C126   | 742535    | .47UF 10V AROX           |
| C18    | 742076    | 1UF 50V ELYT                     | C127   | 742928    | 100 UF 6.3V ELYT         |
| C19    | 741754    | .001 UF 10% 50V FILM MYLAR       | C128   | 742077    | 47UF 10V ELYT            |
| C20    | 741754    | .001 UF 10% 50V FILM MYLAR       | C129   | 742592    | 1200 PF 50V FILM (MYLAR) |
| C21    | 741754    | .001 UF 10% 50V FILM MYLAR       | C131   | 742070    | .01 UF 50V CER           |
| C22    | 423295    | 2 PF 5% 50V CER DISC             | C133   | 742529    | 100 UF 10V ELYT          |
| C23    | 742527    | 7PF 50V CER                      | C134   | 742076    | 1UF 50V ELYT             |
| C24    | 741781    | 33PF 10% 50V CERAMIC             | C135   | 423274    | 1000 PF 50V CER          |
| C25    | 742528    | 4PF 50V CER                      | C136   | 742070    | .01 UF 50V CER           |
| C26    | 423555    | 330 PF 50V CER                   | C137   | 742076    | 1UF 50V ELYT             |
| C27    | 742530    | 390PF 50V CER                    | C138   | 742082    | 4.7 UF 25V ELYT          |
| C28    | 742070    | .01 UF 50V CER                   | C139   | 742070    | .01 UF 50V CER           |
| C29    | 423291    | 68 PF 50V CER                    | C140   | 742070    | .01 UF 50V CER           |
| C30    | 742531    | 56PF 50V CER                     | C141   | 741787    | 100 PF 50V CER           |
| C31    | 742070    | .01 UF 50V CER                   | C142   | 432515    | 4700 PF 50V CER          |
| C32    | 423295    | 2 PF 5% 50V CER DISC             | C143   | 432515    | 4700 PF 50V CER          |
| C33    | 742070    | .01 UF 50V CER                   | C146   | 742070    | .01 UF 50V CER           |
| C35    | 423291    | 68 PF 50V CER                    | C201   | 422318    | 150 PF 10% 500V CER DISC |
| C36    | 742070    | .01 UF 50V CER                   | C202   | 742087    | .01UF 50V CER            |
| C37    | 741763    | 100 PF 50V CER                   | C203   | 742087    | .01UF 50V CER            |
| C38    | 742070    | .01 UF 50V CER                   | C204   | 742087    | .01UF 50V CER            |
| C39    | 741755    | .01 UF 10% 50V FILM MYLAR        | C205   | 742087    | .01UF 50V CER            |
| C40    | 426384    | 470 PF 50V CER                   | C206   | 742569    | .047 UF 50V CER          |
| C41    | 742070    | .01 UF 50V CER                   | C207   | 742910    | .0047 UF 50V CER         |
| C42    | 426475    | 120 PF 50V CER                   | C208   | 742910    | .0047 UF 50V CER         |
| C43    | 437367    | 220 PF 50V CER                   | C951   | 742084    | .0047UF 50V CER          |
| C44    | 426475    | 120 PF 50V CER                   | C952   | 742084    | .0047UF 50V CER          |
| C45    | 742070    | .01 UF 50V CER                   | C953   | 742084    | .0047UF 50V CER          |
| C46    | 426475    | 120 PF 50V CER                   | C954   | 742084    | .0047UF 50V CER          |
| C47    | 742926    | 270 PF 500V CER                  | C955   | 742084    | .0047UF 50V CER          |
| C51    | 437390    | 27PF 5% 50V CERAMIC              | C956   | 742084    | .0047UF 50V CER          |
| C52    | 742070    | .01 UF 50V CER                   | C957   | 742084    | .0047UF 50V CER          |
| C53    | 741779    | 47000PF 10% 50V CER              | C958   | 742084    | .0047UF 50V CER          |
| C54    | 741779    | 47000PF 10% 50V CER              | C959   | 742084    | .0047UF 50V CER          |
| C55    | 741780    | .047UF 10% 50V FILM MYLAR        | C960   | 423274    | .001 UF 50V CER          |
| C56    | 742070    | .01 UF 50V CER                   | C961   | 742084    | .0047 UF 50V CER         |
| C57    | 742069    | 10PF 50V CER                     | C962   | 423274    | .001 UF 50V CER          |
| C58    | 742070    | .01 UF 50V CER                   | C963   | 742532    | 330PF 50V CER            |
| C59    | 742070    | .01 UF 50V CER                   | C964   | 742084    | .0047 UF 50V CER         |
| C60    | 742070    | .01 UF 50V CER                   | CF1    | 741812    | FILTER, CER.             |
| C61    | 742070    | .01 UF 50V CER                   | CH1    | 742611    | COIL-CHOKE               |
| C62    | 742070    | .01 UF 50V CER                   | CT1    | 741721    | CAPACITOR TRIMMER        |
| C63    | 423295    | 2 PF 5% 50V CER DISC             | D1     | 741689    | DIODE - TYPE ITT410      |
| C64    | 742070    | .01 UF 50V CER                   | D2     | 741738    | DIODE - TYPE ZM2205      |
| C65    | 742525    | 18PF 50V CER                     | D3     | 741739    | DIODE - TYPE RD9.1E      |
| C66    | 741782    | 2.2PF 10% 500V CERAMIC           | D4     | 741741    | DIODE - TYPE 1S1555      |
| C67    | 741780    | .047UF 10% 50V FILM MYLAR        | D6     | 741741    | DIODE - TYPE 1S1555      |
| C68    | 741780    | .047UF 10% 50V FILM MYLAR        | D7     | 741741    | DIODE - TYPE 1S1555      |
| C69    | 741780    | .047UF 10% 50V FILM MYLAR        | D9     | 226344    | DIODE - TYPE 1N60        |
| C70    | 741780    | .047UF 10% 50V FILM MYLAR        | D10    | 741741    | DIODE - TYPE 1S1555      |
| C71    | 741780    | .047UF 10% 50V FILM MYLAR        | D11    | 741741    | DIODE - TYPE 1S1555      |
| C72    | 742068    | 10UF 16V ELYT                    | D12    | 741741    | DIODE - TYPE 1S1555      |
| C73    | 742534    | 6800PF 50V FILM MYLAR            | D13    | 166593    | DIODE - TYPE V06C        |
| C74    | 742074    | 3.3 UF 25V ELYT                  | D14    | 741740    | DIODE - TYPE 1S1885      |
| C75    | 741669    | 4700 PF 50V FILM (MYLAR)         | D16    | 741741    | DIODE - TYPE 1S1555      |
| C76    | 742076    | 1UF 50V ELYT                     | D22    | 741741    | DIODE - TYPE 1S1555      |
| C77    | 741787    | 100 PF 50V CER                   | D23    | 741741    | DIODE - TYPE 1S1555      |
| C78    | 742079    | 47UF 16V ELYT                    | D24    | 741741    | DIODE - TYPE 1S1555      |
| C80    | 742078    | .0022UF 50V CER                  | D25    | 741741    | DIODE - TYPE 1S1555      |
| C81    | 741789    | .022 UF 10% 50V FILM MYLAR       | D26    | 741741    | DIODE - TYPE 1S1555      |
| C82    | 437367    | 220 PF 50V CER                   | D27    | 741741    | DIODE - TYPE 1S1555      |
| C83    | 741755    | .01 UF 10% 50V FILM MYLAR        | D28    | 741738    | DIODE - TYPE ZM2205      |
| C84    | 742078    | .0022UF 50V CER                  | D29    | 741741    | DIODE - TYPE 1S1555      |
| C85    | 741793    | 3.9 UF 25V TANTALUM              | D30    | 741740    | DIODE - TYPE 1S1885      |
| C86    | 742535    | .47UF 10V AROX                   | D31    | 742922    | DIODE - TYPE RD8.2F      |
| C87    | 741794    | 33 UF 6.3V ELYT                  | D32    | 741741    | DIODE - TYPE 1S1555      |
| C88    | 423291    | 68 PF 50V CER                    | IC1    | 741686    | I.C. - TYPE PLLO2A       |
| C89    | 423291    | 68 PF 50V CER                    | IC2    | 742510    | IC - TYPE TA7310P        |
| C90    | 741787    | 100 PF 50V CER                   | IC3    | 742510    | IC - TYPE TA7310P        |
| C91    | 741795    | .068 UF 10% 50V FILM MYLAR       | IC4    | 741687    | I.C. - TYPE TA7205P      |
| C92    | 741787    | 100 PF 50V CER                   | IC5    | 742920    | IC - TYPE C1005A         |
| C93    | 742079    | 47UF 16V ELYT                    | IC6    | 742921    | IC - TYPE AN8295         |
| C94    | 741797    | 220 UF 16V ELYT                  |        |           |                          |
| C95    | 741795    | .068 UF 10% 50V FILM MYLAR       |        |           |                          |

PA 289

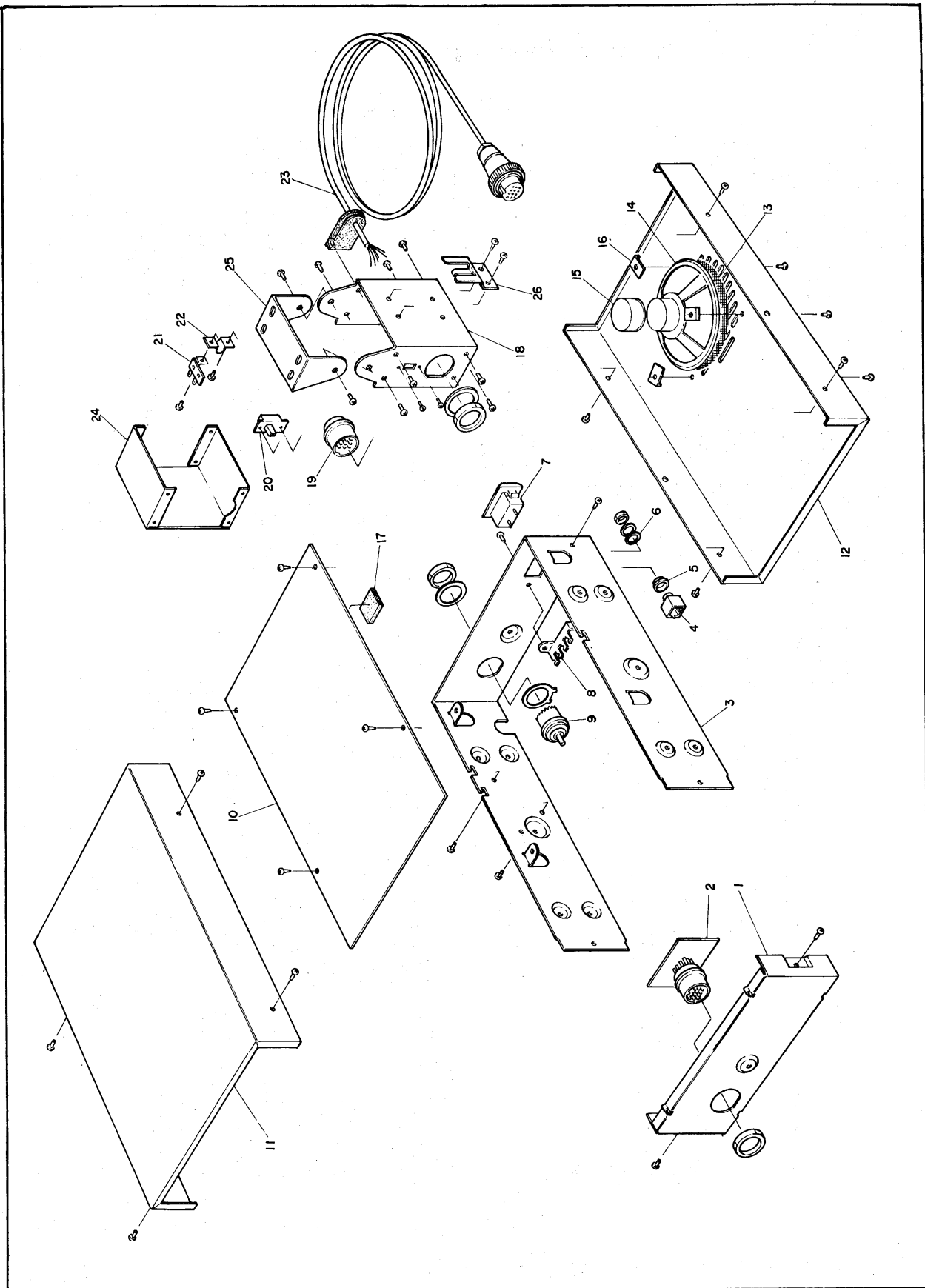


Figure 20. Assembly, Main Chassis and Mic Connector Box





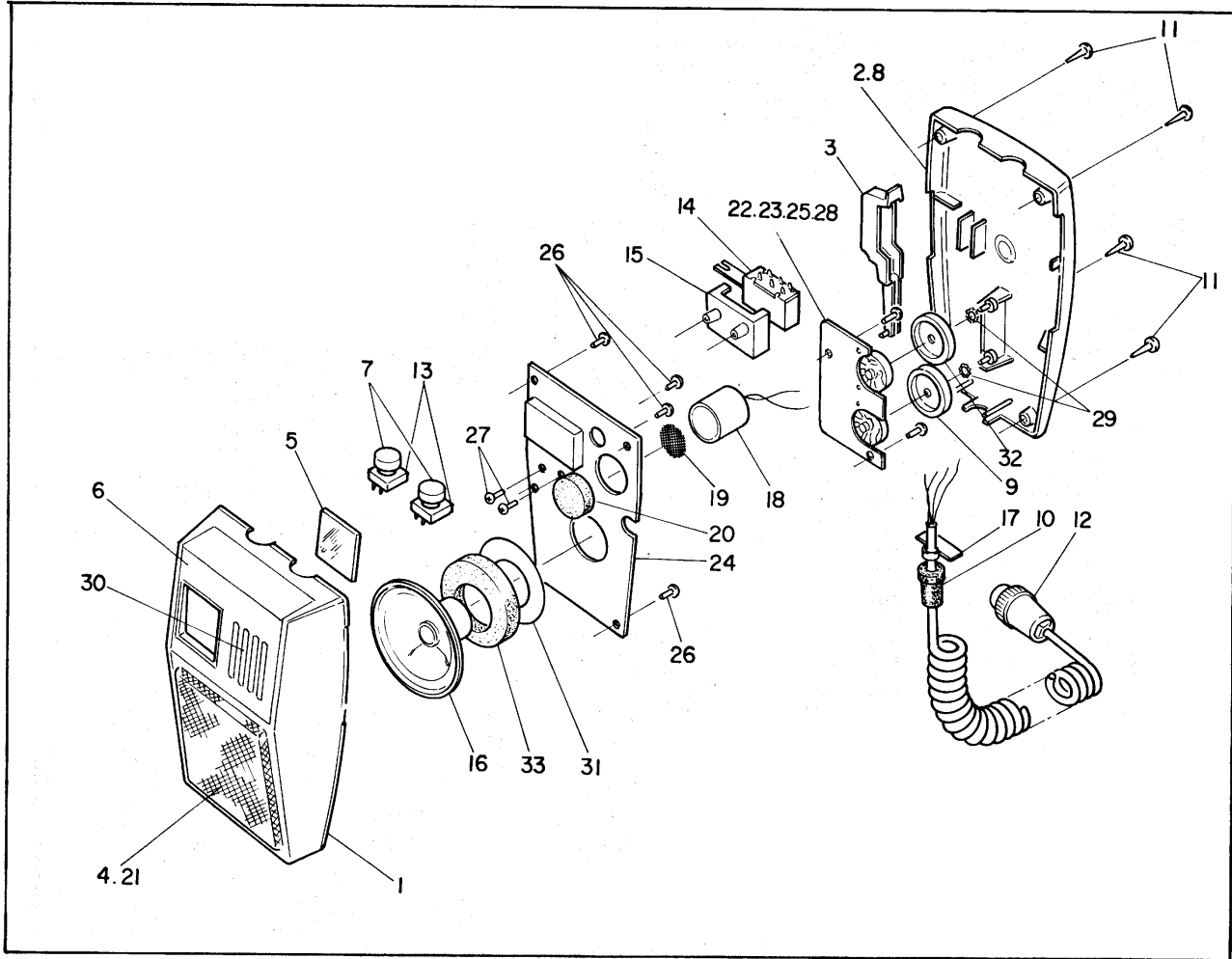


Figure 21. Assembly, Mic/Speaker/Control Unit

### Replacement Parts (Continued)

| Symbol              | Stock No. | Description             |
|---------------------|-----------|-------------------------|
| MICROPHONE ASSEMBLY |           |                         |
| ELECTRICAL PARTS    |           |                         |
| C1                  | 741795    | .068 UF 10% 50V CER     |
| C2                  | 423274    | .001 UF 50V CER         |
| C3                  | 741467    | 10 UF 16V ELYT          |
| C4                  | 742087    | .01 UF 50V CER          |
| C5                  | 741467    | 10 UF 16V ELYT          |
| C6                  | 740840    | 47 UF 10V ELYT          |
| C7                  | 742087    | .01 UF 50V CER          |
| C8                  | 740840    | 47 UF 10V ELYT          |
| D1                  | 741051    | DIODE - TYPE 1S1588     |
| D2                  | 741051    | DIODE - TYPE 1S1588     |
| IC1                 | 742586    | IC - TYPE C1006A        |
| LED                 | 742589    | LED - TYPE TLR321       |
| R1                  | 420319    | 180 OHM 5% 1/4W FILM    |
| R2                  | 239457    | 2700 OHM 5% 1/4W FILM   |
| R3                  | 428106    | 68 OHM 5% 1/4W FILM     |
| R4                  | 239452    | 510 OHM 5% 1/4W FILM    |
| R5                  | 240580    | 470 OHM 5% 1/4W FILM    |
| R6                  | 243078    | 4700 OHM 5% 1/4W FILM   |
| R7                  |           |                         |
| THRU                |           |                         |
| R20                 | 240580    | 470 OHM 5% 1/4W FILM    |
| R21                 | 249553    | 100 OHM 1% 1/4W FILM    |
| R22                 | 241593    | 100000 OHM 5% 1/4W FILM |
| R23                 | 241593    | 100000 OHM 5% 1/4W FILM |
| R24                 | 435515    | 10000 OHM 5% 1/4W FILM  |
| R25                 | 435515    | 10000 OHM 5% 1/4W FILM  |

| Symbol                  | Stock No. | Description                        |
|-------------------------|-----------|------------------------------------|
| R26                     | 239465    | 47000 OHM 5% 1/4W FILM             |
| RES                     | 742587    | 3300 OHM 5% 1/4W COMP              |
| TR1                     | 742591    | TRANSISTOR - TYPE 2SC536F          |
| TR2                     | 742590    | TRANSISTOR - TYPE 2SA562-0         |
| MICROPHONE CONTROL UNIT |           |                                    |
| MECHANICAL PARTS        |           |                                    |
| F-CASE                  | 742572    | CASE ASSEMBLY (FRONT) CONSISTS OF: |
| 1                       |           | CASE-FRONT                         |
| 4                       |           | NET COVER (FRONT CASE)             |
| 6                       |           | NAME PLATE                         |
| 21                      |           | SHADE-MIKE ELEMENT                 |
| 30                      |           | SHADE                              |
| R-CASE                  | 742573    | CASE ASSEMBLY (REAR) CONSISTS OF:  |
| 2                       |           | CASE-REAR                          |
| 8                       |           | STUD-MIKE HANGER                   |
| 3                       | 742574    | KNOB-ON/OFF                        |
| 7                       | 742575    | BUTTON-CH                          |
| 9                       | 742576    | KNOB-SQ                            |
| 10                      | 742577    | BUSHING-CONNECTION CORD            |
| 12                      | 742579    | CORD ASSEM-CONNECTION              |
| 13                      | 742580    | SWITCH-CH                          |
| 14                      | 742581    | SWITCH-ON/OFF                      |
| 16                      | 742582    | SPEAKER                            |
| 18                      | 742583    | ELEMENT-MIKE (300 OHM)             |
| 22                      | 742584    | 100000 OHM LINEAR VAR W/SWITCH     |
| 23                      | 742585    | 100000 OHM LINEAR VAR              |
| 32                      | 742588    | KNOB-VR                            |

