

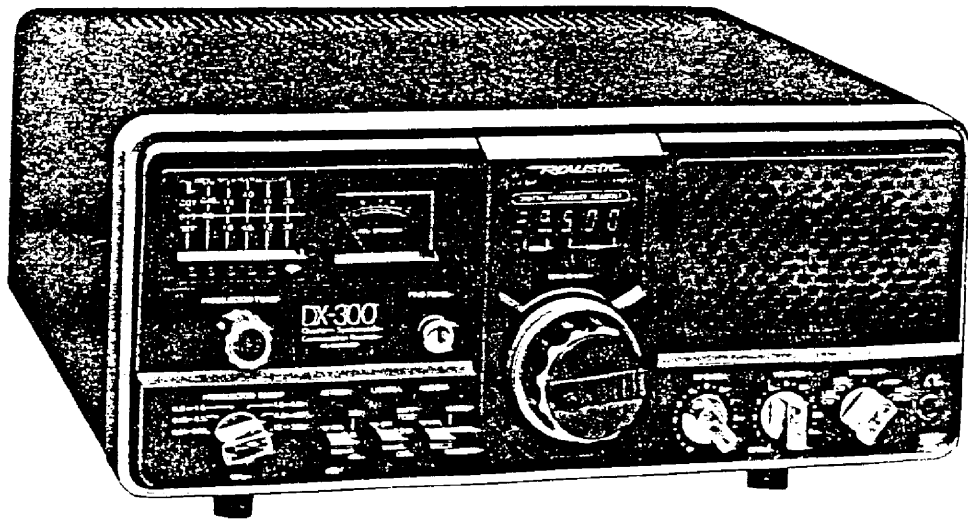
REALISTIC[®]

Service Manual

DX-300

QUARTZ-SYNTHESIZED DIGITAL LED-READOUT COMMUNICATIONS RECEIVER

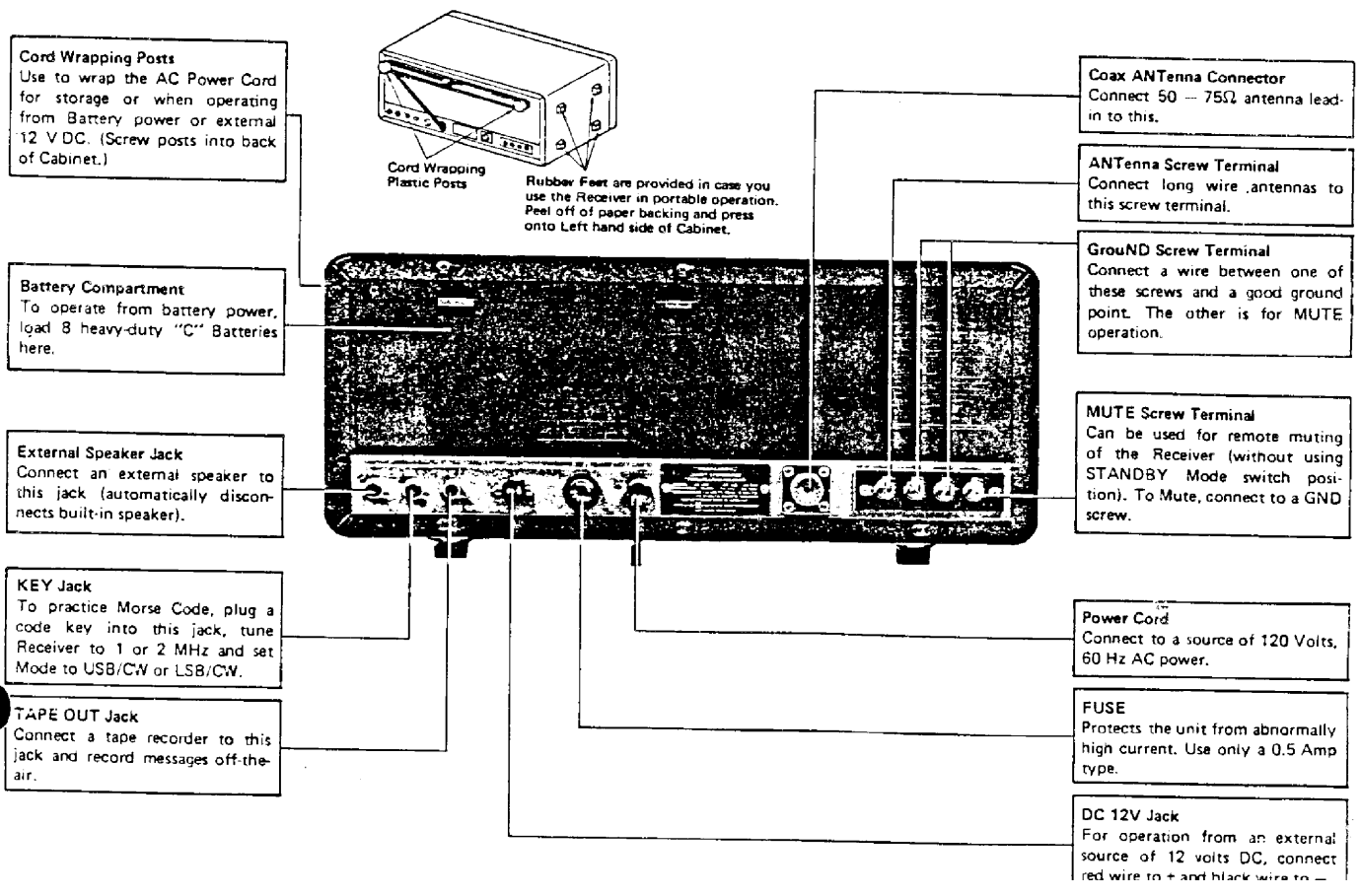
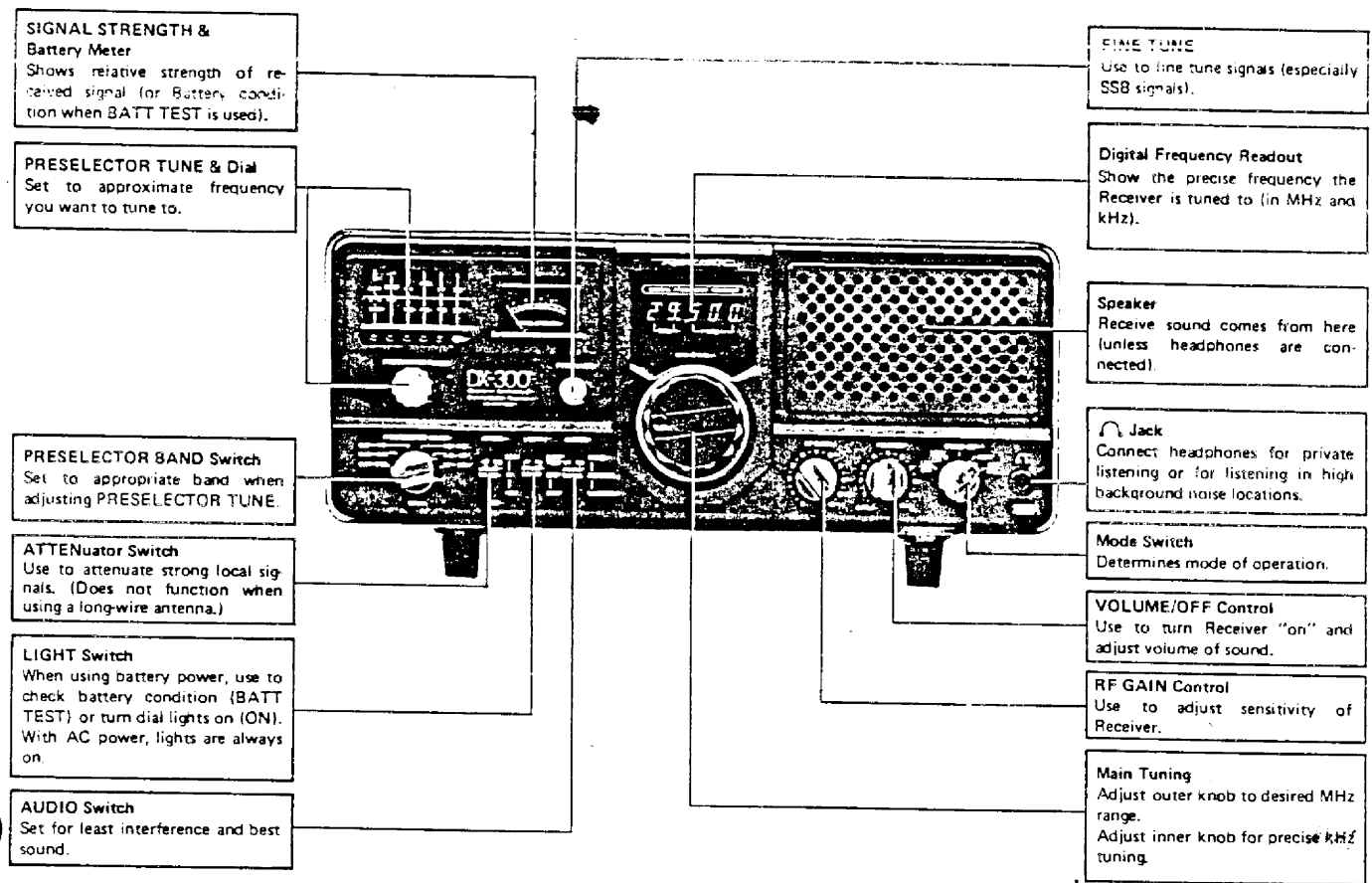
Catalog Number: 20-204



CUSTOM MANUFACTURED FOR RADIO SHACK  A DIVISION OF TANDY CORPORATION

CONTROLS AND THEIR FUNCTIONS

(For complete details on operation, refer to the Owner's Manual.)



SPECIFICATIONS

| Description | Condition | Nominal Spec. | Limit Spec. |
|---|---|------------------------------|------------------------------|
| Frequency Coverage | Band A | 10 – 150 kHz | 10 – 150 kHz |
| | Band B | 150 – 500 kHz | 150 – 500 kHz |
| | Band C | 500 – 1600 kHz | 500 – 1600 kHz |
| | Band D | 1.6 – 4.5 MHz | 1.6 – 4.5 MHz |
| | Band E | 4.5 – 12 MHz | 4.5 – 12 MHz |
| | Band F | 12 – 30 MHz | 12 – 30 MHz |
| Sensitivity (S+N)/N = 10 dB AF Output = 50 mW | 50 kHz | AM 30 μ V SSB 30 μ V | Not specified |
| | 150 kHz | 5 μ V 5 μ V | AM 50 μ V SSB 50 μ V |
| | 300 kHz | 1 μ V 0.5 μ V | 10 μ V 5 μ V |
| | 900 kHz | 0.5 μ V 0.3 μ V | 10 μ V 5 μ V |
| | 3.1 MHz | 0.5 μ V 0.3 μ V | 2 μ V 1 μ V |
| | 7.1 MHz | 0.5 μ V 0.3 μ V | 2 μ V 1 μ V |
| | 15.1 MHz | 0.5 μ V 0.3 μ V | 2 μ V 1 μ V |
| 28.1 MHz | 0.5 μ V 0.3 μ V | 2 μ V 1 μ V | |
| Loop Antenna Sensitivity (S+N)/N = 20 dB | 180 kHz | 11 mV | 50 mV |
| | 300 kHz | 4 mV | 15 mV |
| | 470 kHz | 2 mV | 8 mV |
| | 600 kHz | 1 mV | 2 mV |
| | 900 kHz | 550 μ V | 1.5 mV |
| | 1.4 MHz | 450 μ V | 1 mV |
| Image Ratio | 10 – 50 kHz | Not specified | Not specified |
| | 100 kHz | 70 dB | 50 dB |
| | 300 kHz | 70 dB | 50 dB |
| | 900 kHz | 70 dB | 50 dB |
| | 3.1 MHz | 60 dB | 50 dB |
| | 7.1 MHz | 60 dB | 50 dB |
| | 15.1 MHz | 60 dB | 50 dB |
| 28.1 MHz | 60 dB | 50 dB | |
| Intermediate Frequency | 1st | 54.5 – 55.5 MHz | |
| | 2nd | 3 – 2 MHz | |
| | 3rd | 455 kHz | |
| Spurious Rejection at 7.1 MHz | between 2 MHz and 150 MHz | 60 dB | 30 dB |
| Birdies at 7.0 MHz | (S+N)/N = 10 dB | 2.0 μ V | 10 μ V |
| Input Attenuator | 0 dB | | |
| | 20 dB | 22 dB | 16 – 28 dB |
| | 40 dB | 40 dB | 34 – 46 dB |
| Selectivity | \pm 10 kHz | 94 dB | 60 dB |
| | -6 dB | 5.5 kHz | 3.5 – 7.5 kHz |
| Audio Output | 8 Ω , 10% T.H.D. | 1.5 W | 1.2 W |
| Phone Jack Output | 8 Ω , 0.5 W AF Output | 100 mV | 50 – 200 mV |
| Tape Output | 7.1 MHz 1 mV (1 kHz 30% MOD), 0.5 W AF Output | 300 mV | 150 – 600 mV |
| Signal-to-Noise Ratio | 7.1 MHz 1 mV (1 kHz 30% MOD), 0.5 W AF Output | 40 dB | 35 dB |
| Hum & Noise (VOLUME : Minimum) | at 8 Ω Speaker Output | AM/SSB 2 mV | AM/SSB 5 mV |
| | at 8 Ω Phone Jack Output | AM/SSB 0.25 mV | AM/SSB 0.5 mV |

| Description | Condition | Nominal Spec. | Limit Spec. |
|-------------------------------------|--|---------------|------------------|
| Meter Sensitivity | S-9 at 7.1 MHz | 30 μ V | 15 – 100 μ V |
| Audio Response 0 dB NORMAL 1 kHz | NORMAL 300 Hz | -5 dB | -5 \pm 6 dB |
| | 3 kHz | -14 dB | Not specified |
| | WIDE 1 kHz | +3 dB | +3 \pm 3 dB |
| | 300 Hz | +0.5 dB | +0.5 \pm 6 dB |
| | 3 kHz | -7 dB | Not specified |
| | NARROW 1 kHz | -1 dB | -1 \pm 3 dB |
| | 300 Hz | 0 dB | 0 \pm 6 dB |
| | 3 kHz | -18 dB | Not specified |
| Frequency Display | 5-digit LED display (MHz/kHz) | | |
| Frequency Stability | Within \pm 1 kHz after one hour warm up | | |
| Antenna Impedance | 50 Ω unbalanced type (SO239 type connector) | | |
| | High impedance type (screw type terminal) | | |
| Operation Temperature | 0 $^{\circ}$ C to 43.3 $^{\circ}$ C | | |
| Power source | AC 120 V, 60 Hz for USA & CANADIAN models or AC 230 V, 50 Hz for EUROPEAN & AUSTRALIAN models. | | |
| | DC 12 V (negative ground only) or internal 8 PCS "C" cells | | |

NOTE: *Nominal Specs represent the design specs; all units should be able to approximate these – some will exceed and some may drop slightly below these specs. Limit Specs represent the absolute worst condition which still might be considered acceptable; in no case should a unit perform to less than within any Limit Spec.*

PRINCIPLES OF OPERATION

This Receiver is a triple-conversion type and employs a "double tuning" system. MHz Tuning tunes to the MHz "unit" of the receiving frequency (i.e. selects the desired 1 MHz portion to be tuned) and kHz Tuning tunes to the kHz "unit(s)".

Refer to the Block Diagram as you read through the following description:

An RF signal picked up by the Antenna goes to RF section via ATTenuator and Preselector. The RF signal is amplified by Q201, and up-mixed in 1st Mixer Q202 and Q203 with 1st Local Oscillator Q401 (MHz Tuning). Q401 produces 55.5 MHz to 84.5 MHz signals in 1 MHz spreads as required for the MHz portion of the receiving frequency (i.e. 55.5 MHz for "0" MHz spread ... from 10 kHz to 999 kHz, 56.5 MHz for 1 MHz to 1.999 MHz... etc. ...). The resulting frequency will always be from 55.5 MHz to 54.5 MHz. Note the frequency inversion as well as the up-conversion. This signal is amplified by 1st IF Amp Q205 and Q214.

The Reference Oscillator generates a 4 MHz crystal-controlled frequency using Q507. This is divided down to 1 MHz by IC502. D501 and D502 are used for the harmonics generator and produce integer harmonics of 1 MHz, which then are mixed in IC201 with 1st Local Oscillator frequency (55.5 MHz to 84.5 MHz). Of the harmonics mixed with the 1st Local Oscillator signal, only the 52.5 MHz signal is amplified by Q207 - Q209, and fed into Q206. In other words, only those harmonics that will produce 52.5 MHz when mixed with 1st Local Oscillator are applied to the 2nd Mixer. For example, to receive a 4 MHz signal, the 1st Local Oscillator frequency must be 59.5 MHz, so the 7th harmonic from the Harmonics Generator (i.e. 7 MHz) is used to produce required 52.5 MHz.

This 52.5 MHz frequency is down-mixed with 1st IF (55.5 - 54.5 MHz) and produces a 3 - 2 MHz 2nd IF (again note that the signal is "reversed" - i.e. 3 to 2, not 2 to 3 MHz). The 3rd Local Oscillator produces a signal 455 kHz higher than the 2nd IF, and is down-mixed with the 2nd IF at Q302, and a 3rd IF of 455 kHz is produced.

Note that the 55.5 - 84.5 MHz Local Oscillator is used both for 1st and 2nd mixing. This cancels frequency drift. For example, if the 1st heterodyning frequency drifts 1 kHz. The 2nd heterodyning frequency also drifts 1 kHz, thus the drift is cancelled.

For instance:

When tuned to CB Channel 1, 26.965 MHz, and if the Local Oscillator is running at 81.6 MHz (but it should be 81.5 MHz) this is what happens.

| | Actual | Should be |
|----------|------------------------------|------------------------------|
| 1st Mix. | $81.6 - 26.965 = 54.635$ MHz | $81.5 - 26.965 = 54.535$ MHz |
| 2nd Osc. | 29 MHz | 29 MHz |
| 3rd Mix. | $81.6 - 29 = 52.6$ MHz | $81.5 - 29 = 52.5$ MHz |
| 2nd Mix. | $54.635 - 52.6 = 2.035$ MHz | $54.535 - 52.5 = 2.035$ MHz |

Thus, drift is cancelled.

Frequency Readout:

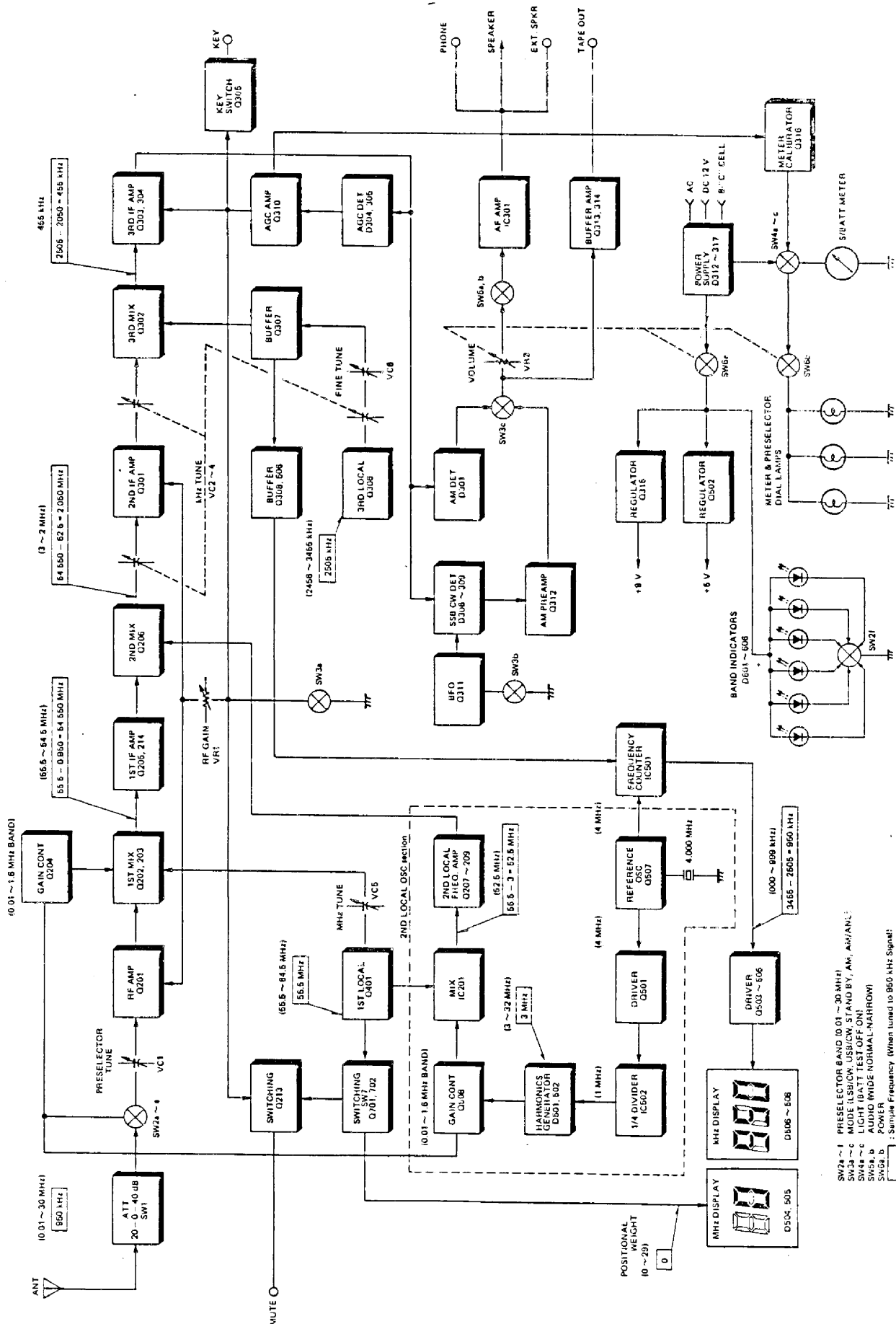
Just as with Tuning, frequency readout is done in two stages: MHz and kHz.

The MHz indicator is mechanical: MHz tuning capacitor VC5 is mechanically ganged with SW7.

SW7 makes the switch wafer to readout 0 - 29: it will indicate "0" when 1st Osc. is set to 55.5 MHz, "1" for 56.5 MHz, etc. ...

For kHz readout, IC501 counts the 3rd Local Oscillator frequency, which is, as described above, the kHz Tuning. The 3rd Osc. signal is buffered and amplified by Q307, Q308 and Q506, and applied to IC501. IC501 then converts this signal and drives the kHz display.

BLOCK DIAGRAM



SW2a ~ i PRESELECTOR BAND 10.01 ~ 30 MHz
 SW2a ~ c MODE LSB/CW, USB/CW, STAND BY, AM, AUCANCE
 SW2a ~ c LIGHT BATT TEST OFF/ON
 SW2a, b ADD'D (WIDE NORMAL-NARROW)
 SW2a, b TONE/TEST
 SW2a, b Sample Frequency (When tuned to 850 kHz Signal)

OPERATION CHECK/ALIGNMENT PREPARATION

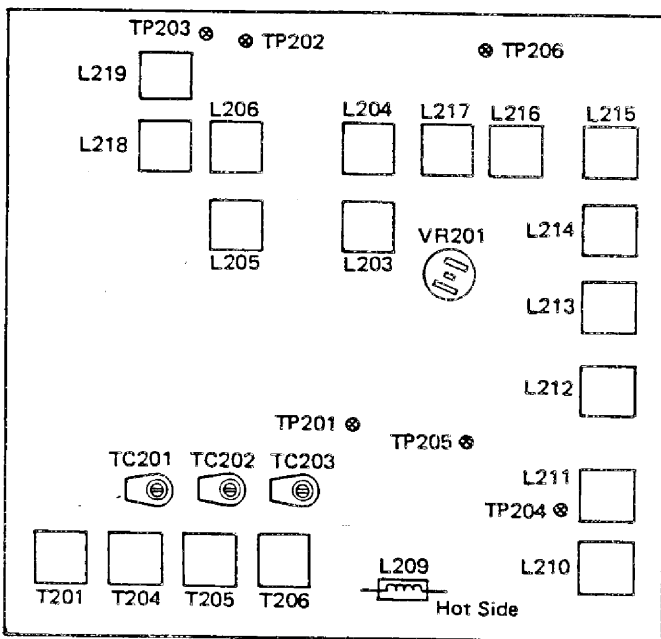
Test instruments required.

1. Oscilloscope
2. AC VTVM (RF)
3. DC VTVM
4. Spectrum Analyzer (if available) or Monitor Scope (40 MHz – 60 MHz)
5. Frequency Counter
6. 8Ω Dummy Load
7. RF Signal Generator (10 kHz – 30 MHz)
8. Audio Signal Generator
9. Distortion Meter
10. Sweep Signal Generator (40 MHz – 60 MHz)
11. Detector

NOTE: Prior to alignment allow instruments and unit to warm up for 15 minutes. Maintain Generator output level at minimum necessary (to avoid saturation and clipping).

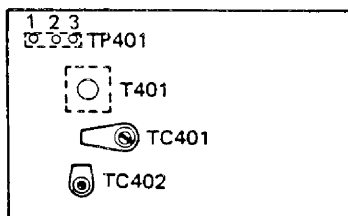
ALIGNMENT LOCATIONS AND POINTS

RF P.C.B.

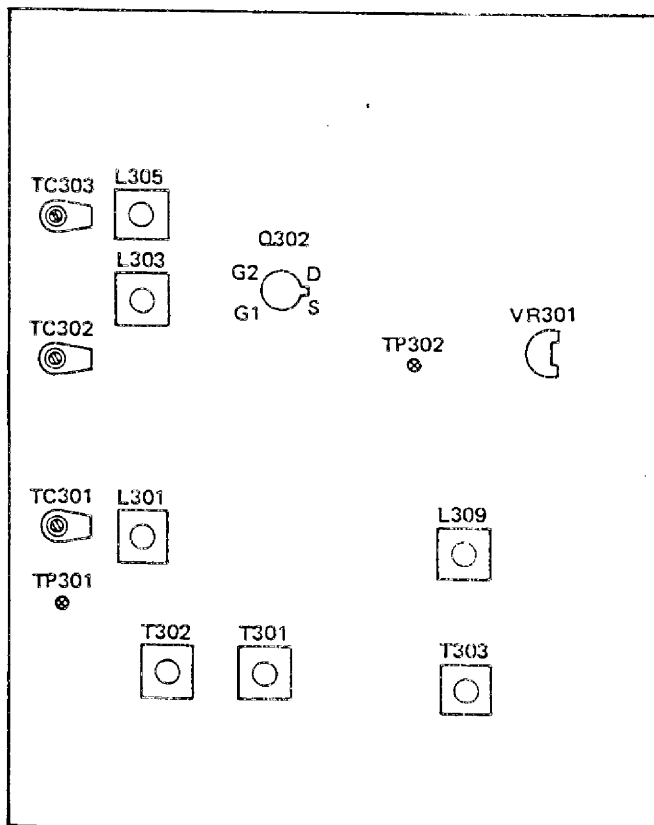


T202/T203 are bar antenna coil.

MHz P.C.B. (Soldering Side View)



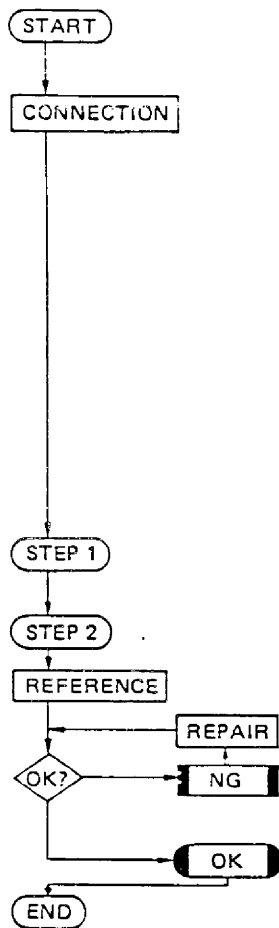
IF/AF P.C.B.



NOTE: T201 and T303 happen to be adjustable due to parts procurement ease. No need to adjust them.

VR302 is attached to lug terminal on bottom side of IF/AF PCB.

AF OPERATION CHECK



Connect AF Generator to "hot" end of VOLUME Control.
 Connect AC VTVM, Oscilloscope and Distortion Meter to EXT SPKR Jack J3 across 8Ω Dummy Load.
 See Figure 1.

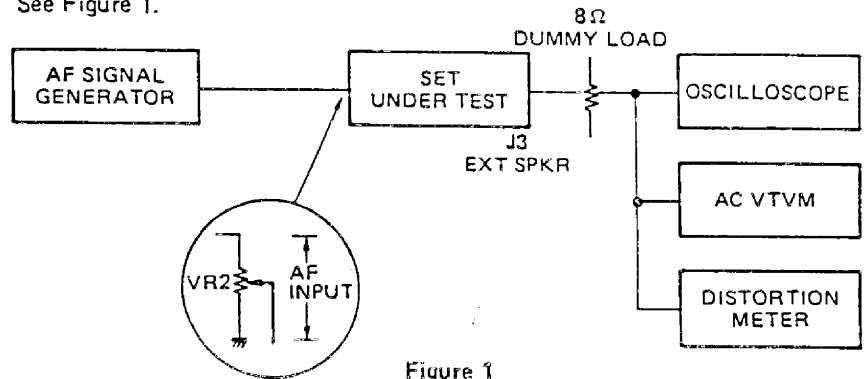


Figure 1

Control setting : VOLUME (max), AUDIO (NORMAL), Mode (AM)
 AF Generator setting : 1 kHz

Check AF Output with 10 – 20 mV input.

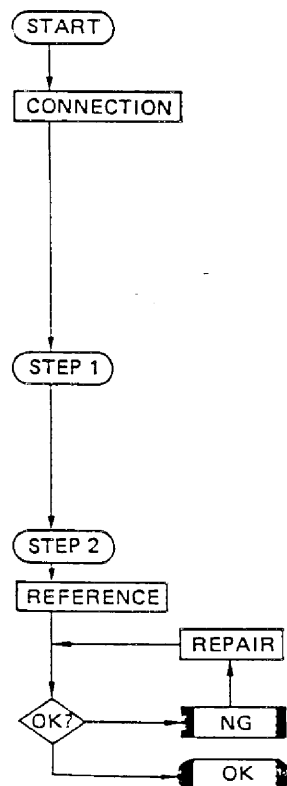
AF Output Power should be 0.5 W with 10 – 20 mV input.

Check AF circuit. See Troubleshooting 3).

AF Output Power is not 0.5 W with 10 – 20 mV input and/or Distortion is over 10%.

AF Output Power is 0.5 W with 10 – 20 mV input and Distortion is less than 10%.

2ND/3RD IF OPERATION CHECK



Connect SG to TP 202 through a 2pF capacitor. ✓
 Connect AC VTVM and Oscilloscope to EXT SPKR Jack J3 across 8Ω Dummy Load. See Figure 2.

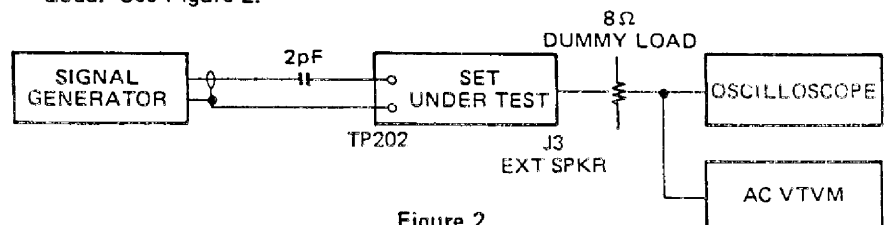


Figure 2

Control setting : Mode (AM), VOLUME (max), RF GAIN (max)
 AUDIO (NORMAL)

Signal Generator : 2.5 MHz (1 kHz, 30% Mod.) ✓

MHz/kHz Tuning : 10.500 MHz

Check AF Output level with 700 – 1400 μV input. ✓

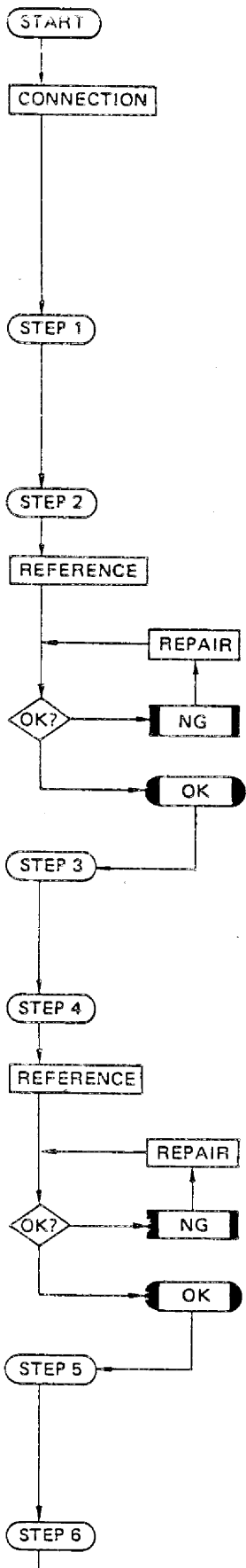
AF Output level should be 3 V with 700 – 1400 μV input. ✓

Check 2nd IF Stage, 3rd IF Stage, DET circuit and/or associated circuit components.

AF Output level is not 3 V with 700 – 1400 μV input. ✓

AF Output level is 3 V with 700 – 1400 μV input. ✓

TOTAL GAIN CHECK



Connect SG to ANT Jack A - 1 and DC VTVM to TP 301.
See Figure 3.



Figure 3

Control Setting : RF GAIN (max.)
PRESELECTOR BAND (0.01 - 0.15)
MHz/kHz Tuning (100 kHz)

SG Setting : 100 kHz

Increase SG output until 1.5 V reading is obtained on DC VTVM.

SG output is 7.5 - 30 μ V

Check RF and/or IF Stage and/or associated components.

SG output is more than 30 μ V

SG output is 7.5 - 30 μ V

Control Setting : PRESELECTOR BAND (0.15 - 0.5)
MHz/kHz Tuning (300 kHz)

SG Setting : 300 kHz

Increase SG output until 1.5 V reading is obtained on DC VTVM.

SG output is 0.75 - 3 μ V

Check RF Stage and/or associated circuit components.

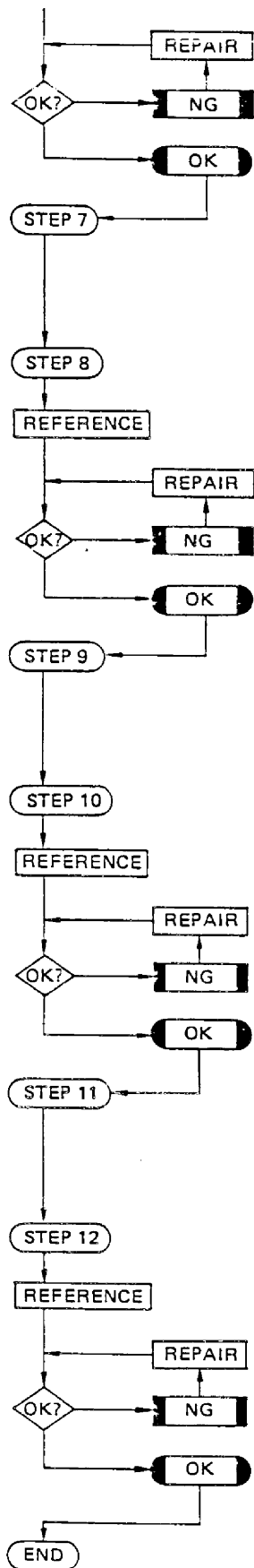
SG output is more than 3 μ V

SG output is 0.75 - 3 μ V

Control Setting : PRESELECTOR BAND (0.5 - 1.6)
MHz/kHz Tuning (900 kHz)

SG output : 900 kHz

Increase SG output until 1.5 V reading is obtained on DC VTVM.



Check RF Stage and/or associated circuit component.

SG output is more than $2 \mu\text{V}$

SG output is $0.5 - 2 \mu\text{V}$

Control Setting : PRESELECTOR BAND (1.6 -- 4.5)
MHz/kHz Tuning (3.1 MHz)

SG Setting : 3.1 MHz

Increase SG output until 1.5 V reading is obtained on DC VTVM.

SG output is $1.5 - 6 \mu\text{V}$

Check RF Stage and/or associated circuit components.

SG output is more than $6 \mu\text{V}$

SG output is $1.5 - 6 \mu\text{V}$

Control Setting : PRESELECTOR BAND (4.5 -- 12)
MHz/kHz Tuning (7.1 MHz)

SG Setting : 7.1 MHz

Increase SG output until 1 V reading is obtained on DC VTVM.

SG output is $0.75 - 3 \mu\text{V}$

Check RF Stage and/or associated circuit component.

SG output is more than $3 \mu\text{V}$

SG output is $0.75 - 3 \mu\text{V}$

Control Setting : PRESELECTOR BAND (12 -- 30)
MHz/kHz Tuning (21.1 MHz)

SG Setting : 21.1 MHz

Increase SG output until 1 V reading is obtained on DC VTVM.

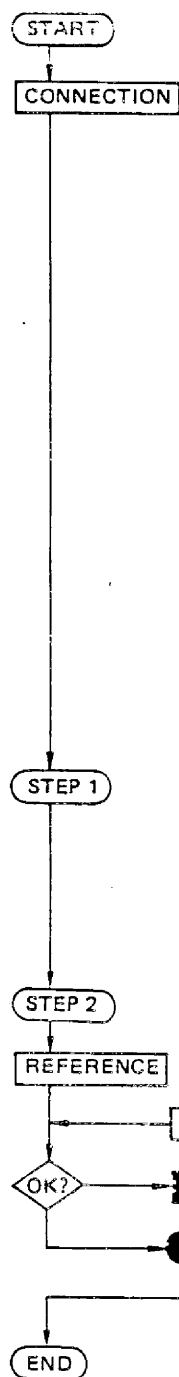
SG output is $1.5 - 6 \mu\text{V}$

Check RF Stage and/or associated circuit component.

SG output is less than $6 \mu\text{V}$

SG output is $1.5 - 6 \mu\text{V}$

1ST IF OPERATION CHECK



Connect SG to TP201 and DC VTVM to TP202. See Figure 4.

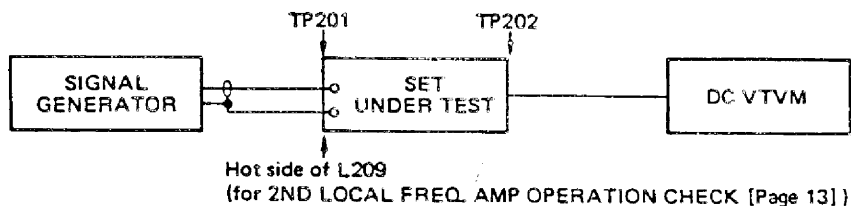


Figure 4

NOTE

1. Connect Pin-2 of TP401 to Pin-3 of TP401 in order to inhibit the 1st Local Oscillator.
2. Supply GND level to the point where C240 and a coaxial cable is joined in order to inhibit the output of Harmonics Generator (D501, D502).

Control Setting : Mode (AM)
 PRESELECTOR BAND (4.5 – 12 MHz)
 PRESELECTOR TUNE (10 MHz)
 MHz/kHz Tuning (10.5 MHz)

Signal Generator
 Setting : 55 MHz (No Mod.)

Increase SG output until 100 mV (250 mV) reading is obtained on DC VTVM.

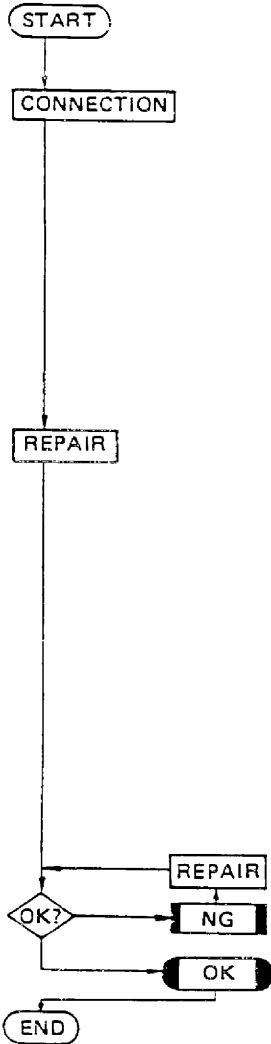
SG output is 2.14 – 4.22 mV (21.4 – 42.2 mV).

Check 1st IF stage and/or associated circuit components.

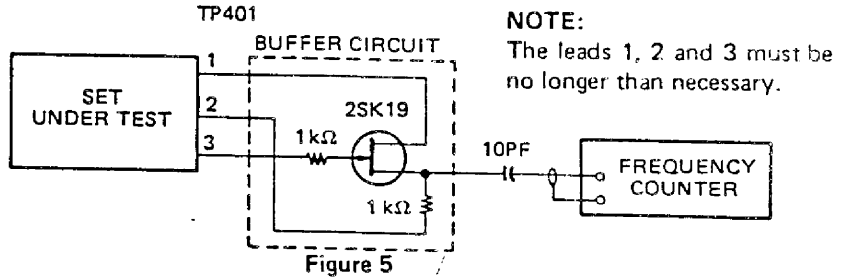
SG output is not 2.14 – 4.22 mV (21.4 – 42.2 mV).

SG output is 2.14 – 4.22 mV (21.4 – 42.2 mV).

1ST LOCAL OSC OPERATION CHECK



Connect Frequency Counter to TP401 through a Buffer circuit; See Figure 5.



The following readings should be obtained on Frequency Counter in accordance with MHz Tuning.

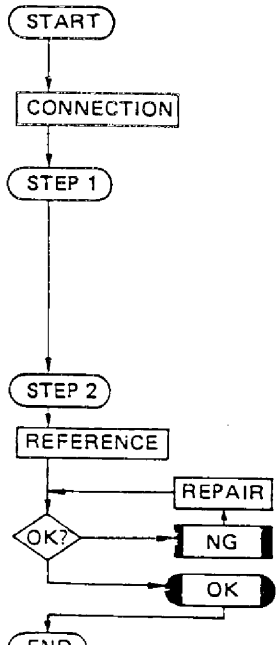
| MHz Readout (MHz) | Frequency Counter Readings (MHz) |
|-------------------|----------------------------------|
| 0 | 55.5 ± 0.1 |
| 1 | 56.5 ± 0.1 |
| 2 | 57.6 ± 0.1 |
| . | . |
| . | . |
| 28 | 83.5 ± 0.1 |
| 29 | 84.5 ± 0.1 |

See 1ST LOCAL OSC ALIGNMENT on page 19.

The reading does not meet the chart.

The reading meet the chart.

2ND LOCAL FREQ. AMP OPERATION CHECK



Connect SG to "hot" side of L209 and DC VTVM to TP202. See Figure 4.

Control Setting : Mode (AM)
 PRESELECTOR BAND (4.5 -- 12 MHz)
 PRESELECTOR TUNE (10 MHz)
 MHz/kHz Tuning (10.5 MHz)

Signal Generator Setting : 52.5 MHz (No Mod.)

Increase SG output until 100 mV (350 mV) reading is obtained on DC VTVM.

SG output is 2.14 -- 4.22 mV (21.4 -- 42.2 mV).

Check Q207 -- Q209 and/or associated circuit components.

SG output is not 2.14 -- 4.22 mV (21.4 -- 42.2 mV).

SG output is 2.14 -- 4.22 mV (21.4 -- 42.2 mV).

PRESELECTOR DIAL CALIBRATION

| | |
|-----------------|---|
| CONTROL SETTING | Set PRESELECTOR TUNE fully counter-clockwise. |
| CALIBRATION | Hold PRESELECTOR TUNE knob with your hand, and set the gear ①, shown in Figure 6, so that the Preselector Dial is as shown in Figure 7. |

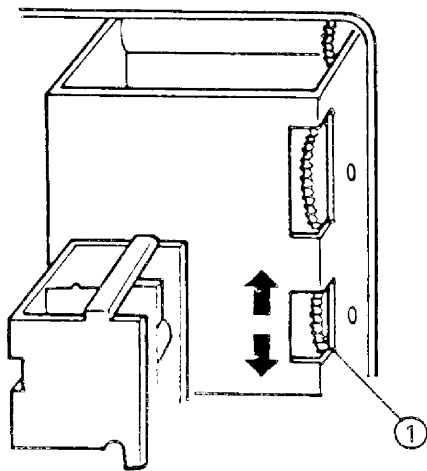


Figure 6

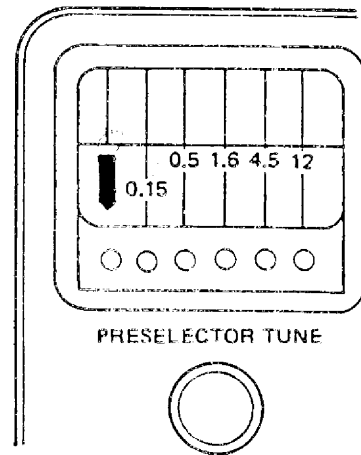
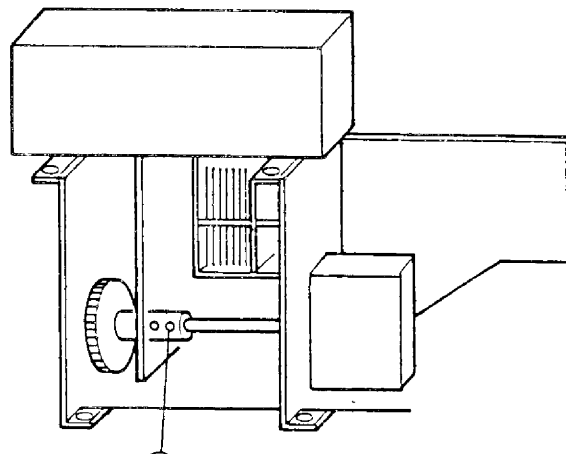


Figure 7

LINKAGE ADJUSTMENT OF MHz SWITCH

PRECAUTION: Do the mechanical adjustment only if it is actually necessary after CHECK or you replaced some parts.

| | |
|-----------------|---|
| CONTROL SETTING | OFF/VOLUME : ON MHz Tune : fully clockwise |
| CHECK | Check the MHz Tuning indication; rotating the MHz Tuning in the counter-clockwise direction causes the MHz Tuning display to vary in 29, 28, 1, 0, sequence and eventually disappear. |
| ADJUSTMENT | Loosen screw ① on MHz Switch shaft. Turn the shaft of MHz Switch in the direction that results in a MHz sequence indication of 0, 1, 28, 29; tighten screw ① at the precise point where the 29 MHz indication disappears. To avoid miss tracking be sure to make this shaft setting very precisely. |



3RD IF ALIGNMENT

| STEP | TEST INSTRUMENT CONNECTION | CONTROL SETTING | SIGNAL GENERATOR SETTING | ADJUSTMENT | REMARKS |
|------|----------------------------|---|--|----------------|--|
| 1 | Refer to Figure 9 | OFF/VOLUME: ON Mode: AM RF GAIN: Max. MHz Tuning: 1 MHz kHz Tuning: 500 kHz | 455 kHz 1 mV \pm 3 dB (NO MOD.) | T301, T302 | Adjust T301 and T302 for max. reading (approx. -2.3 V) on DC VTVM. |
| 2 | Same as Step 1 | Same as Step 1 | 455 kHz 10 mV \pm 3 dB (NO MOD.) | Same as Step 1 | Adjust T301 and T302 for max. reading (approx. -2.5 V) on DC VTVM. |

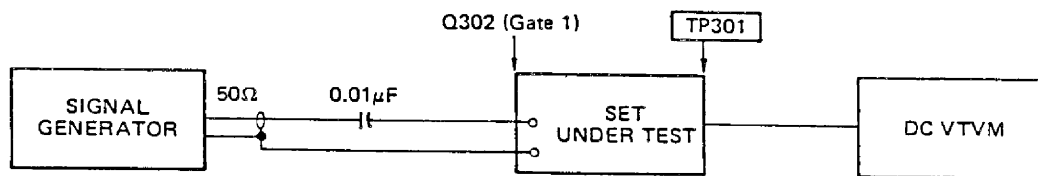


Figure 9

ALIGNMENT OF kHz TRACKING

| STEP | CONTROL SETTING | ADJUSTMENT | REMARKS |
|------|---|------------|---|
| 1 | OFF/VOLUME: ON Mode: AM MHz Tuning: 1 MHz Set FINE TUNE to minimum receiving frequency with FINE TUNE knob set to 9 o'clock position. Preset kHz Tuning to fully counterclockwise and return it approximately 1-1/4 turns from the point when slipping starts. | TC303 | Adjust TC303 for kHz Read-out of "000". |
| 2 | OFF/VOLUME: ON Mode: AM MHz Tuning: 1 MHz Set FINE TUNE to 3 o'clock position, and set kHz Tuning fully clockwise and return it approximately 1-1/4 turns from the point when slipping starts. | L305 | Adjust L305 for kHz Read-out of "999". |
| 3 | Repeat Steps 1 and 2 a couple of times. | | |

2ND IF ALIGNMENT

| STEP | TEST INSTRUMENT CONNECTION | CONTROL SETTINGS | SIGNAL GENERATOR SETTING | ADJUSTMENT | REMARKS |
|------|--|---|--|--------------|---|
| 1 | Refer to Figure 10 | OFF/VOLUME: ON Mode: AM RF GAIN: Max. VOLUME: Max. MHz Tuning: 2 MHz kHz Tuning: 900 kHz | 2.1 MHz 1 mV (10 mV) ± 3 dB 1 kHz 30% Mod. | L301, L303 | Adjust L301 and L303 for max. reading [approx. 3 V (3.5 V)] on AC VTVM. |
| 2 | Same as Step 1 | OFF/VOLUME: ON Mode: AM RF GAIN: Max. VOLUME: Max. MHz Tuning: 2 MHz kHz Tuning: 100 kHz | 2.9 MHz 1 mV (10 mV) ± 3 dB 1 kHz 30% Mod. | TC301, TC302 | Adjust TC301 and TC302 for max. reading [approx. 3 V (3.5 V)] on AC VTVM. |
| 3 | Repeat Steps 1 and 2 until no further improvement can be obtained. | | | | |

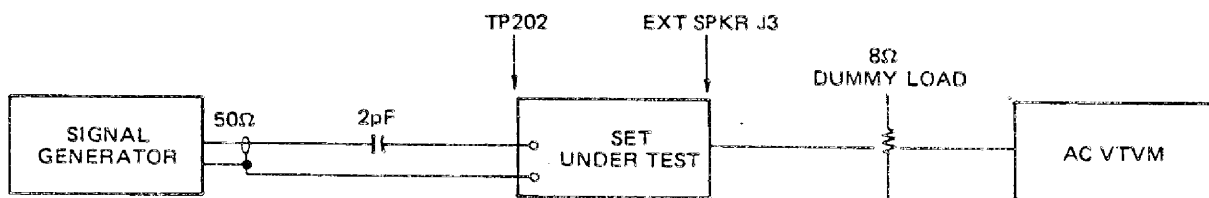
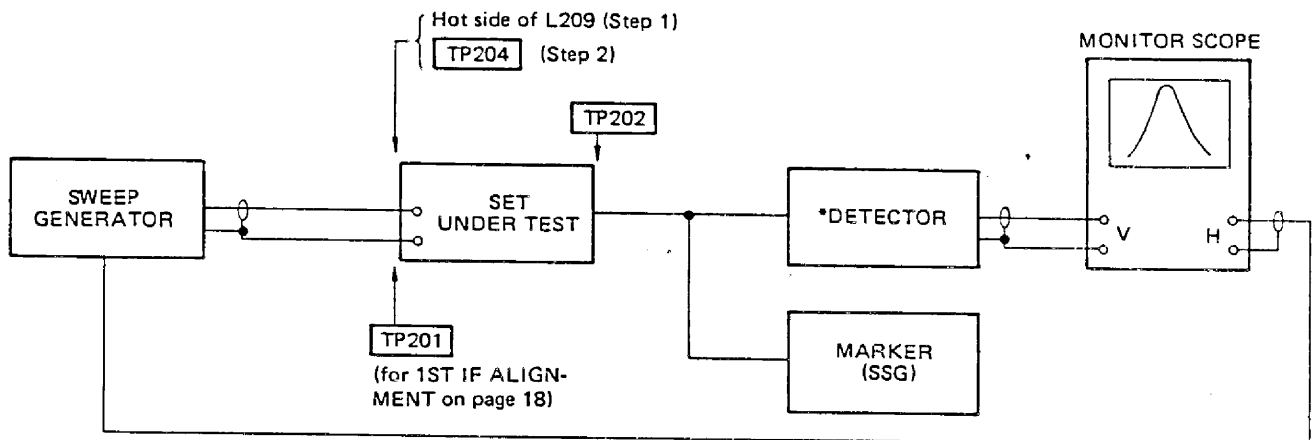


Figure 10

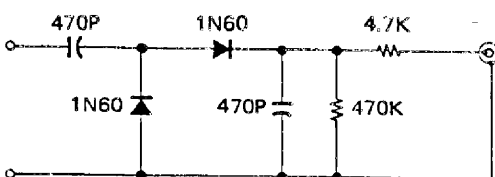
NOTE: Remember, 2nd IF is "reversed"; 3 to 2 MHz, not 2 to 3 MHz. Thus SG frequency should be 2.1 MHz for 2.9 MHz reception and 2.9 MHz for 2.1 MHz reception.

ALIGNMENT OF 2ND LOCAL FREQ. AMP

| STEP | TEST INSTRUMENT CONNECTION | CONTROL SETTING | SIGNAL GENERATOR SETTING | ADJUSTMENT | REMARKS |
|------|----------------------------|--|---|-------------|--|
| 1 | Refer to Figure 11 | OFF/VOLUME : ON Mode : AM PRESELECTOR BAND : 4.5 - 12 MHz PRESELECTOR TUNE : 10 MHz MHz Tuning : 10 MHz kHz Tuning : 500kHz | Center Freq. 52.5 MHz Sweep Width 52.5 ± 2 MHz | L212 ~ L217 | Set marker frequency to 52.5 MHz. Adjust L212 ~ L217 to peak on monitor scope. |
| 2 | Refer to Figure 11 | Same as Step 1 | Same as Step 1 | L210 ~ L217 | Set marker frequency to 52.5 MHz. Adjust L210 ~ L217 to obtain the characteristic curve as shown in Figure 12. The core position of each coil should be approximately as illustrated in Figure 13. |



* DETECTOR CIRCUIT



NOTE

1. Connect Pin-2 of TP401 to Pin-3 of TP401.
2. Keep leads between DET. and TP202 as short as possible.

Figure 11

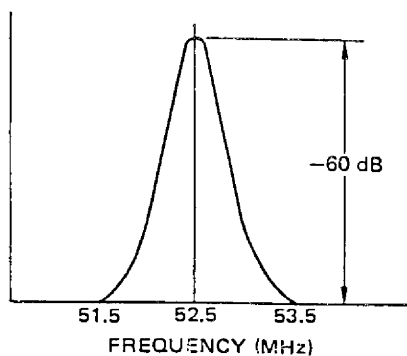


Figure 12

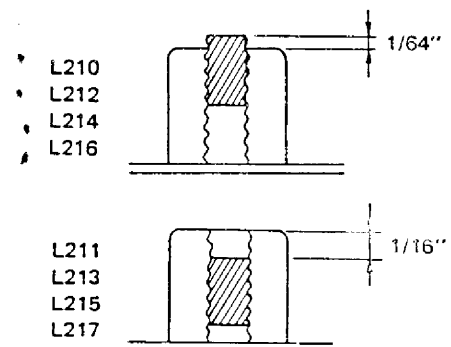


Figure 13

1ST IF ALIGNMENT

| STEP | TEST INSTRUMENT CONNECTION | CONTROL SETTING | SIGNAL GENERATOR SETTING | ADJUSTMENT | REMARKS |
|------|----------------------------|---|---|---------------------------|--|
| 1 | Refer to Figure 11 | OFF/VOLUME : ON Mode : AM PRESELECTION BAND : 4.5 - 12 MHz PRESELECTION TUNE : 10 MHz MHz Tuning : 10 MHz kHz Tuning : 500 kHz | Center Freq. 55 MHz Sweep Width 55 ± 2 MHz | L203 ~ L206 L218, L219 | Set marker frequency to 54.5 MHz, 55.0 MHz and 55.5 MHz. Adjust L203 ~ 206, L218 and L219 to obtain the characteristic curve as shown in Figure 14. The core positions of each coil should be approximately as illustrated in Figure 15. |

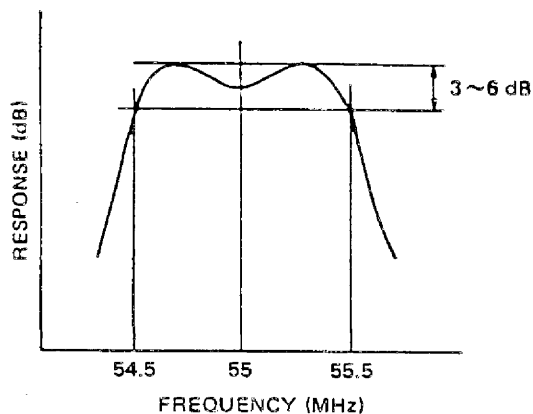


Figure 14

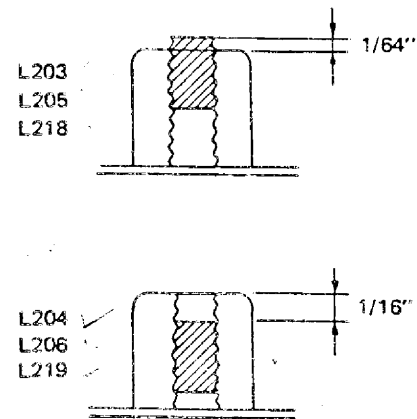


Figure 15

PRECAUTION FOR VR201 AND 1ST LOCAL OSC ALIGNMENT

Any adjustment of VR201, TC401, TC402 and T401 must be made with great precision. Do not attempt any adjustment unless absolutely necessary.

VR201 ALIGNMENT

NOTE: VR201 affects the MHz tracking. Thus, if you find it mandatory to adjust VR201, do so before finalizing MHz tracking. If VR201 adjustment has little effect, return it to the original setting.

| STEP | TEST INSTRUMENT CONNECTION | CONTROL SETTING | SIGNAL GENERATOR SETTING | ADJUSTMENT | REMARKS |
|------|----------------------------|---|--|------------|---|
| 1 | Refer to Figure 16 | OFF/VOLUME : ON Mode : AM RF GAIN : Max. PRESELECTION BAND : 0.15 - 0.5 MHz PRESELECTION TUNE : 0.5 MHz MHz Tuning : 0 MHz kHz Tuning : 500 kHz | 500 kHz output : For approx. "3" ~ "5" reading on S-Meter | VR201 | Adjust VR201 for max. reading on S-Meter. |

1ST LOCAL OSC ALIGNMENT

| STEP | TEST INSTRUMENT CONNECTION | CONTROL SETTING | SIGNAL GENERATOR SETTING | ADJUSTMENT | REMARKS |
|------|---|--|--------------------------|------------|--|
| 1 | Refer to Figure 16 | OFF/VOLUME : ON VOLUME : For the desired audio output. Mode : AM RF GAIN : Max. ATTEN : 0 dB PRESELECTOR BAND : 1.6 – 4.5 MHz PRESELECTOR TUNE : 3.5 MHz MHz Tuning : 3 MHz kHz Tuning : 500 kHz | 3.5 MHz | T401 | Set trimmers TC401 and TC402 to mid-capacity point. Adjust T401 to receive SG signal. |
| 2 | Same as Step 1 | OFF/VOLUME : ON VOLUME : For the desired audio output. Mode : AM RF GAIN : Max. ATTEN : 0 dB PRESELECTOR BAND : 12 – 30 MHz PRESELECTOR TUNE : 28 MHz MHz Tuning : 28 MHz kHz Tuning : 000 kHz | 3.5 MHz | TC402 | Adjust TC402 to receive the 8th harmonic of SG signal (28 MHz). |
| 3 | Repeat Step 1 and Step 2. Check tracking at 10.5 MHz, 17.5 MHz and 24.5 MHz. Adjust TC401 as required for optimum tracking. | | | | |
| 4 | As a final check, make sure 1 MHz step tracking is correct all the way from 500 kHz to 29 MHz. | | | | |

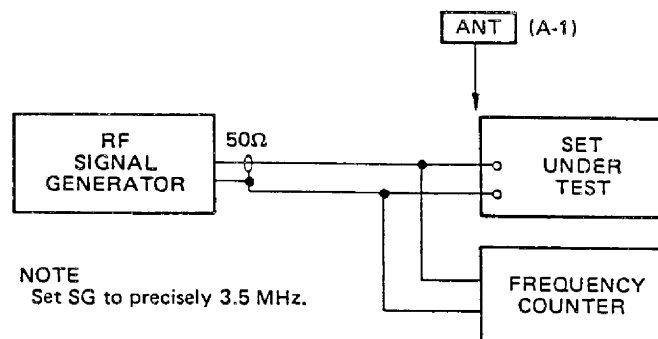


Figure 16

RF STAGE ALIGNMENT

- NOTE 1. Maintain SG output level at minimum necessary to obtain usable output (3-4 readings on S-Meter).
 2. T202, 203 (Bar. Antenna) : Refer to Wiring Diagram.

| STEP | TEST INSTRUMENT CONNECTION | CONTROL SETTING | SIGNAL GENERATOR SETTING | ADJUSTMENT | REMARKS |
|------|---|--|---------------------------------|------------|---|
| 1 | Refer to Figure 16 | OFF/VOLUME : ON VOLUME : For the desired audio output. Mode : AM RF GAIN : Max. ATTEN : 0 dB PRESELECTOR BAND : 0.15 – 0.5 MHz MHz Tuning : To the point where the max. noise appears with MHz readout at "0". kHz Tuning : 300 kHz PRESELECTOR TUNE : 300 kHz | 300 kHz 1 kHz 30% Mod. | T202 | Adjust T202 for max. reading on S-Meter. |
| 2 | Same as Step 1 | PRESELECTOR BAND : 0.5 – 1.6 MHz PRESELECTOR TUNE : 900 kHz kHz Tuning : 900 kHz Other Controls Setting : Same as Step 1 | 900 kHz 1 kHz 30% Mod. | T203 | Adjust T203 for max. reading on S-Meter. |
| 3 | Same as Step 1 | PRESELECTOR BAND : 1.6 – 4.5 MHz PRESELECTOR TUNE : 1.8 MHz MHz/kHz Tuning : 1.8 MHz Other Controls Setting : Same as Step 1 | 1.8 MHz 1 kHz 30% Mod. | T204 | Adjust T204 for max. reading on S-Meter. |
| 4 | Same as Step 1 | PRESELECTOR BAND : 1.6 – 4.5 MHz PRESELECTOR TUNE : 4.5 MHz MHz/kHz Tuning : 4.5 MHz Other Controls Setting : Same as Step 1 | 4.5 MHz 1 kHz 30% Mod. | TC201 | Adjust TC201 for max. reading on S-Meter. |
| 5 | Repeat Steps 3 and 4 until no further improvement can be obtained. | | | | |
| 6 | Same as Step 1 | PRESELECTOR BAND : 4.5 – 12 MHz PRESELECTOR TUNE : 5.010 MHz MHz/kHz Tuning : 5.010 MHz Other Controls Setting : Same as Step 1 | 5.010 MHz 1 kHz 30% Mod. | T205 | Adjust T205 for max. reading on S-Meter. |
| 7 | Same as Step 1 | PRESELECTOR BAND : 4.5 – 12 MHz PRESELECTOR TUNE : 11.010 MHz MHz/kHz Tuning : 11.010 MHz Other Controls Setting : Same as Step 1 | 11.010 MHz 1 kHz 30% Mod. | TC202 | Adjust TC202 for max. reading on S-Meter. |
| 8 | Repeat Steps 6 and 7 until no further improvement can be obtained. | | | | |
| 9 | Same as Step 1 | PRESELECTOR BAND : 12 – 30 MHz PRESELECTOR GUNE : 13.010 MHz MHz/kHz Tuning : 13.010 MHz Other Controls Setting : Same as Step 1 | 13.010 MHz 1 kHz 30% Mod. | T206 | Adjust T206 for max. reading on S-Meter. |
| 10 | Same as Step 1 | PRESELECTOR BAND : 12 – 30 MHz PRESELECTOR TUNE : 28.010 MHz MHz/kHz Tuning : 28.010 MHz Other Controls Setting : Same as Step 1 | 28.010 MHz 1 kHz 30% Mod. | TC203 | Adjust TC203 for max. reading on S-Meter. |
| 11 | Repeat Steps 9 and 10 until no further improvement can be obtained. | | | | |

BFO ALIGNMENT

NOTE : Set each control for max. reading on S-Meter.

| STEP | TEST INSTRUMENT CONNECTION | CONTROL SETTING | SIGNAL GENERATOR SETTING | ADJUSTMENT | REMARKS |
|------|----------------------------|---|-------------------------------------|----------------|--|
| 1 | Refer to Figure 16 | OFF/VOLUME : ON VOLUME : For the desired audio Mode : LSB/CW PRESELECTOR BAND : 4.5 – 12 MHz PRESELECTOR TUNE : 7.1 MHz RF GAIN : Max. ATTEN : 0 dB MHz/kHz : 7.1 MHz | 7.1 MHz 100 μ V (No Mod.) | L309 | Adjust L309 for zero-beat. Set Mode to USB/CW and adjust kHz Tuning to obtain zero-beat. At this time kHz Readout must be "108" – "109". |
| 2 | Same as Step 1 | Set MHz/kHz Tuning for max. reading on S-Meter. (7.1 MHz) Other Controls Setting : Same as Step 1 | Same as Step 1 | Same as Step 1 | Alternate between LSB and USB and adjust L309 so the zero-beat is obtained at the same level on S-Meter. |

S-METER ALIGNMENT

NOTE

1. After checking the specified sensitivities in all bands, adjust S-Meter sensitivity.
2. Set each control for max. reading on S-Meter.
3. VR302 : Refer to Wiring Diagram.

| STEP | TEST INSTRUMENT CONNECTION | CONTROL SETTING | SIGNAL GENERATOR SETTING | ADJUSTMENT | REMARKS |
|------|----------------------------|---|--|------------|---|
| 1 | Refer to Figure 16 | OFF/VOLUME : ON Mode : LSB/CW PRESELECTOR BAND : 4.5 – 12 MHz PRESELECTOR TUNE : 7.1 MHz RF GAIN : Max. ATTEN : 0 dB MHz/kHz Tuning : 7.1 MHz | 7.1 MHz 1 mV 1 kHz 30% Mod. | VR301 | Adjust VR301 for full-scale reading on S-Meter. |
| 2 | Same as Step 1 | Same as Step 1 | 7.1 MHz 30 μ V 1 kHz 30% Mod. | VR302 | Adjust VR302 for a reading of 9 on S-Meter. |

TROUBLESHOOTING GUIDE

| Symptom | Possible Cause |
|--|---|
| 1) Pilot Lamp does not light and/or set fails to operate when power is ON. | A) Faulty power cord. B) Defective Q315 and/or associated circuit components. C) Defective lamp. |
| 2) Fuse blows. | A) Short-circuit in the DC regulator circuit. B) Short-circuit in the power amplifier circuit. |
| 3) Pilot Lamp lights but no sound on any band. | A) Defective Speaker. B) Defective PHONE and/or EXT SPKR Jack. C) Defective IC301 and/or associated circuit components. Proceed to A.F. OPERATION CHECK on page 9. D) Defective Mode switch SW-3. |
| 4) No audio on any band. | A) Faulty Local Oscillator and/or associated circuit components. Proceed to 1ST/2ND LOCAL OSC CHECK on page 13. B) Faulty RF and/or IF Stage and/or associated circuit components. Proceed to TOTAL GAIN CHECK on page 10 – 11. |
| 5) LSB/CW, USB/CW Mode does not function, AM Mode is OK. | A) Defective SSB/CW Detector D306 – D309 and/or associated circuit components. B) Defective BFO Q311 and/or associated circuit components. |
| 6) Noisy | A) Faulty RF Stage amplifier and/or associated circuit components. Proceed to TOTAL GAIN CHECK on page 10 – 11. B) Faulty IF Stage amplifier and/or associated circuit components. Proceed to TOTAL GAIN CHECK on page 10 – 11. C) Defective AF amplifier IC301. Proceed to A.F. OPERATION CHECK on page 9. |
| 7) Incorrect MHz reading. | A) The 1st Local OSC is out of order. See 1ST LOCAL OSC ALIGNMENT on page 18. B) MHz switch and linkage. See LINKAGE ADJUSTMENT OF MHz SWITCH on page 14. |
| 8) Incorrect kHz reading. | A) Mistracking of kHz Tuning. See ALIGNMENT OF kHz TRACKING on page 15. B) IF Stage is out of order. See 1ST/2ND/3RD IF ALIGNMENT. |
| 9) kHz Display is blanked. | A) 3rd Local Osc and/or associated circuit is defective. B) The Reference OSC (4 MHz) is defective. C) Frequency Counter (IC501) is defective. |

- SPECIAL NOTE:** (1) If a user is annoyed by excessive birdies, which can not be eliminated by proper adjustment of the MHz tuning dial and/or the preselector and band switch, the problem may be caused by 1 MHz harmonics being passed through the 2nd I.F.

The best solution is to be sure that the shield case for the counter PCB is properly grounded (through the two wires from the RF PCB and the 4 screws). Be sure all shielding is secure. Also, try moving wires to see if you can obtain lower level birdies. Birdies with a level of more than 10 μ V (S + N/N equals 10 dB) are out of spec; nominal spec is no more than 2 μ V at 7.1 MHz.

- (2) Typically you can rule out any possibility of image response being responsible for birdies. Consider the following example for the image of 7.1 MHz....

$$F_i = F_r + 2IF$$

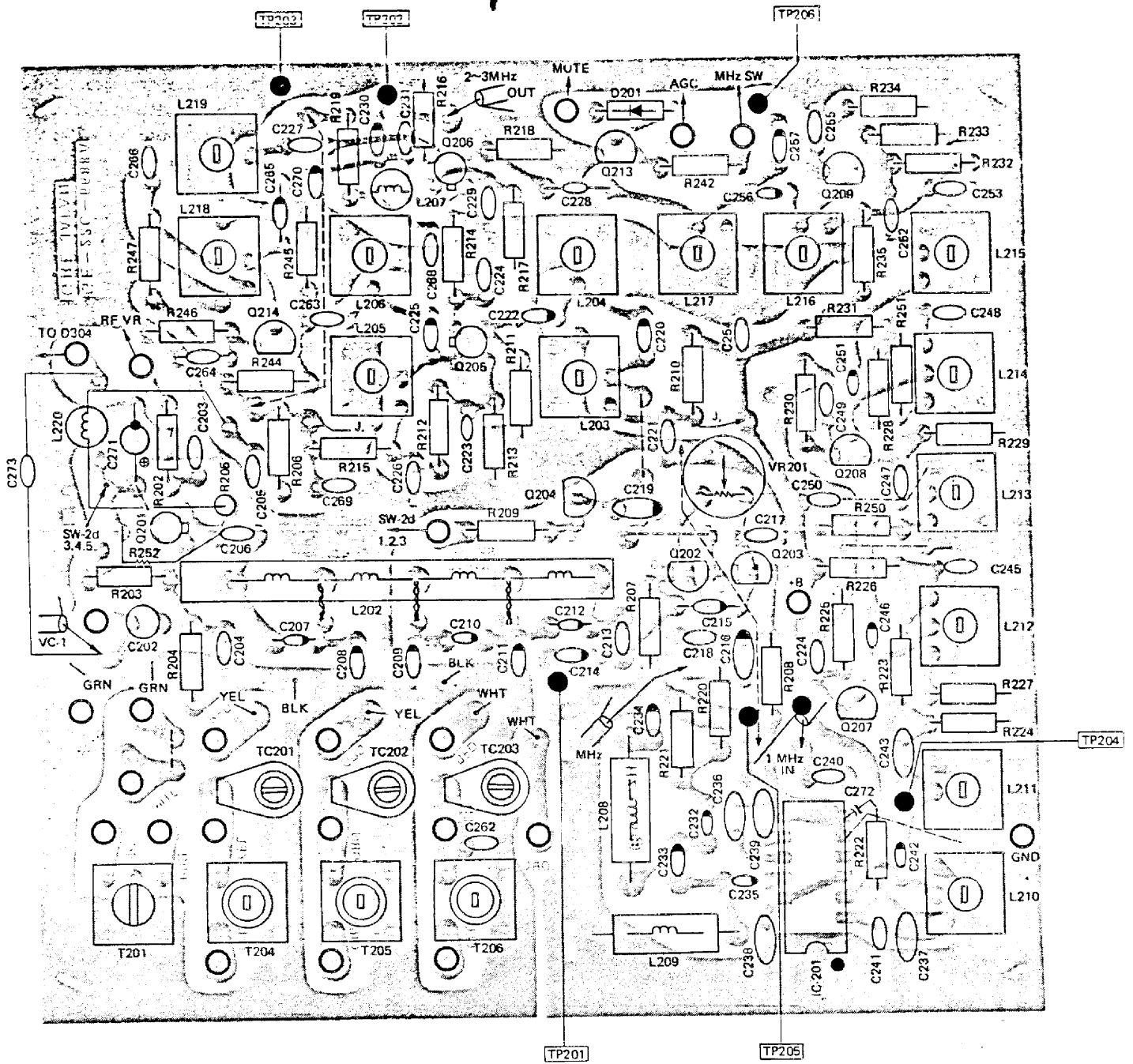
F_i : Image Frequency
 F_r : Receiving Frequency

For instance :

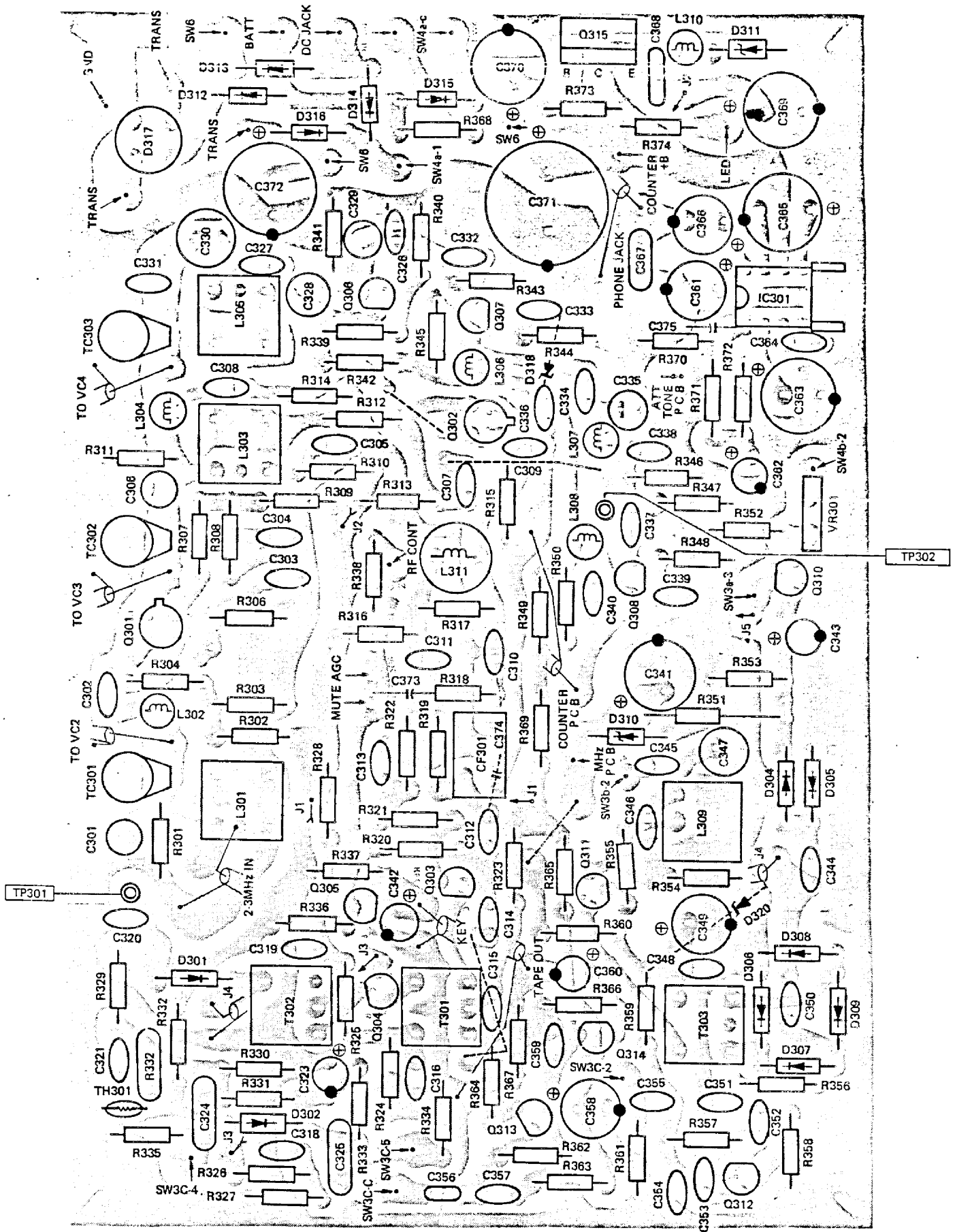
$$F_r = 7.1 \text{ MHz}$$

$$F_i = 7.1 + (2 \times 55.4) = 117.9 \text{ MHz}$$

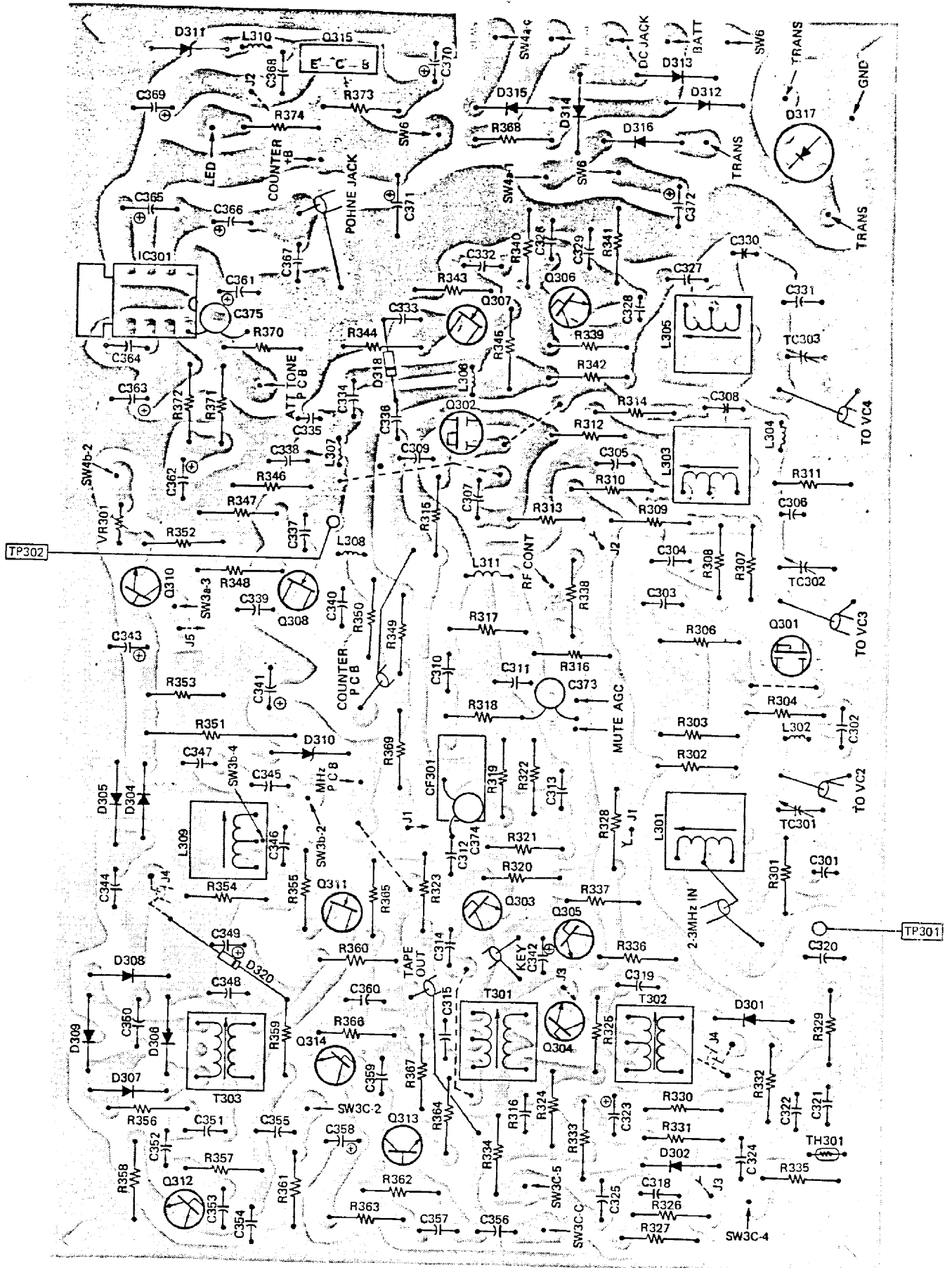
RF P.C. BOARD, TOP VIEW



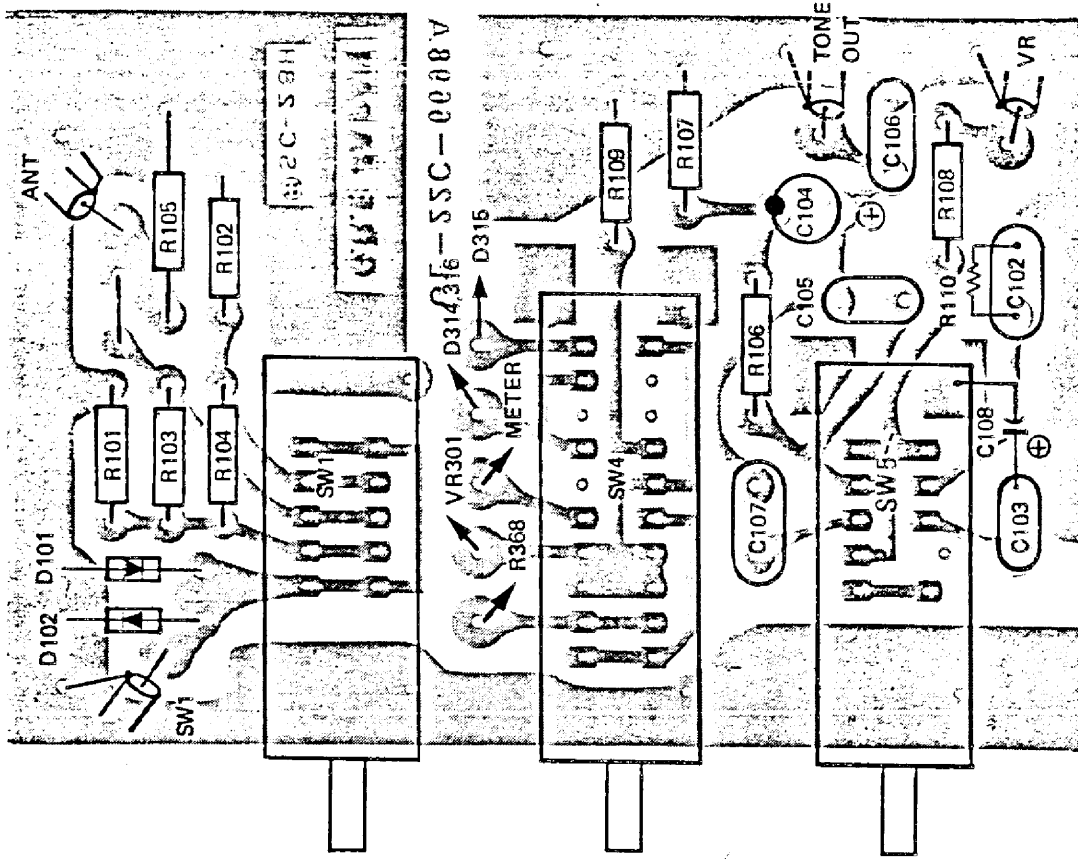
IF/AF P.C. BOARD, TOP VIEW



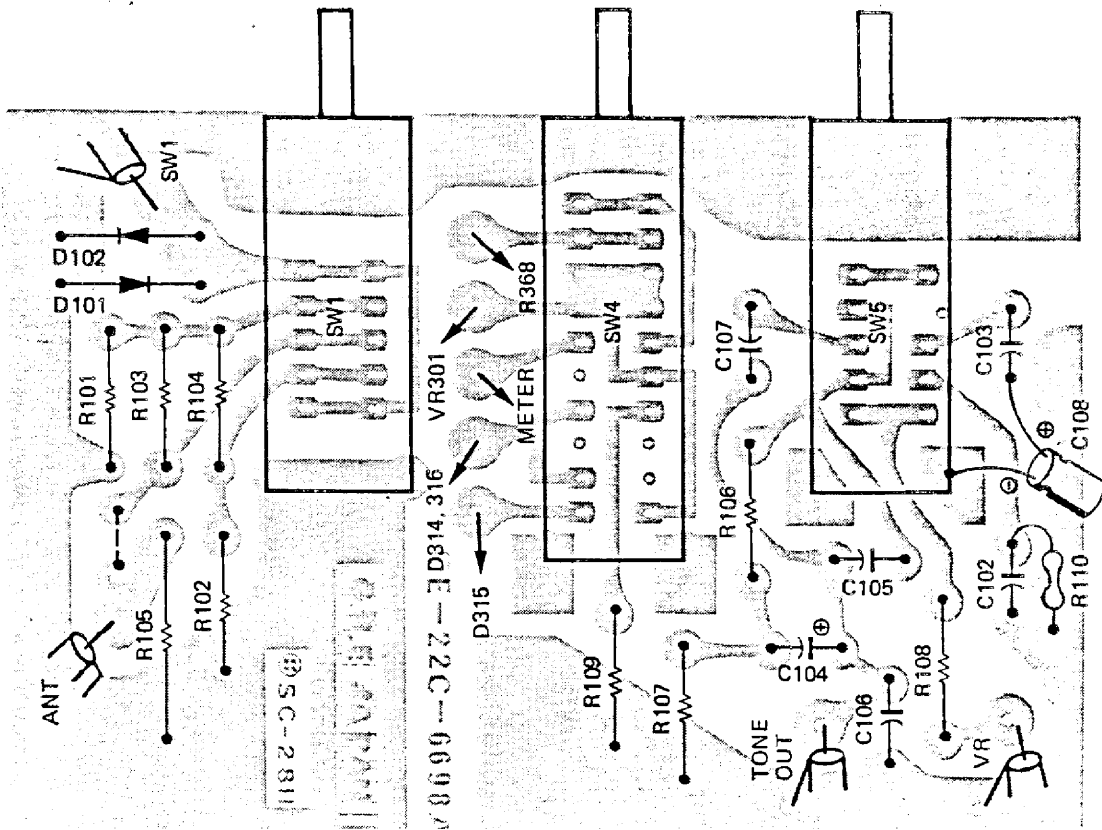
IF/AF P.C. BOARD, BOTTOM VIEW



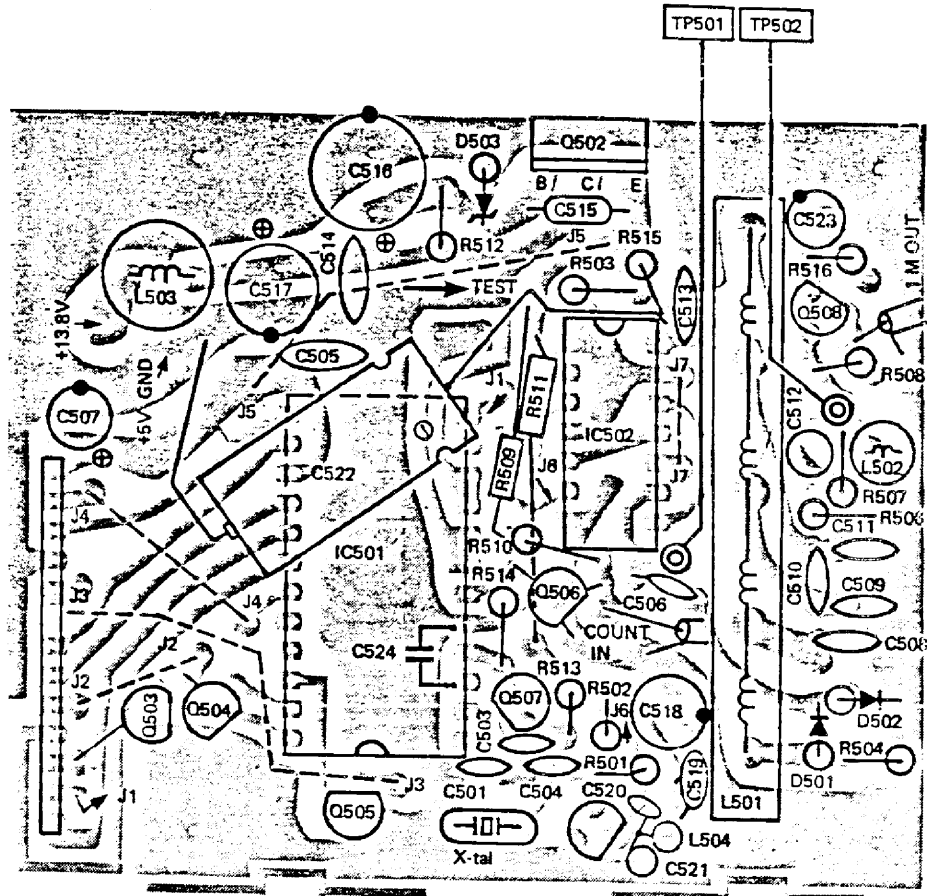
AUDIO/ATT. P.C. BOARD, TOP VIEW



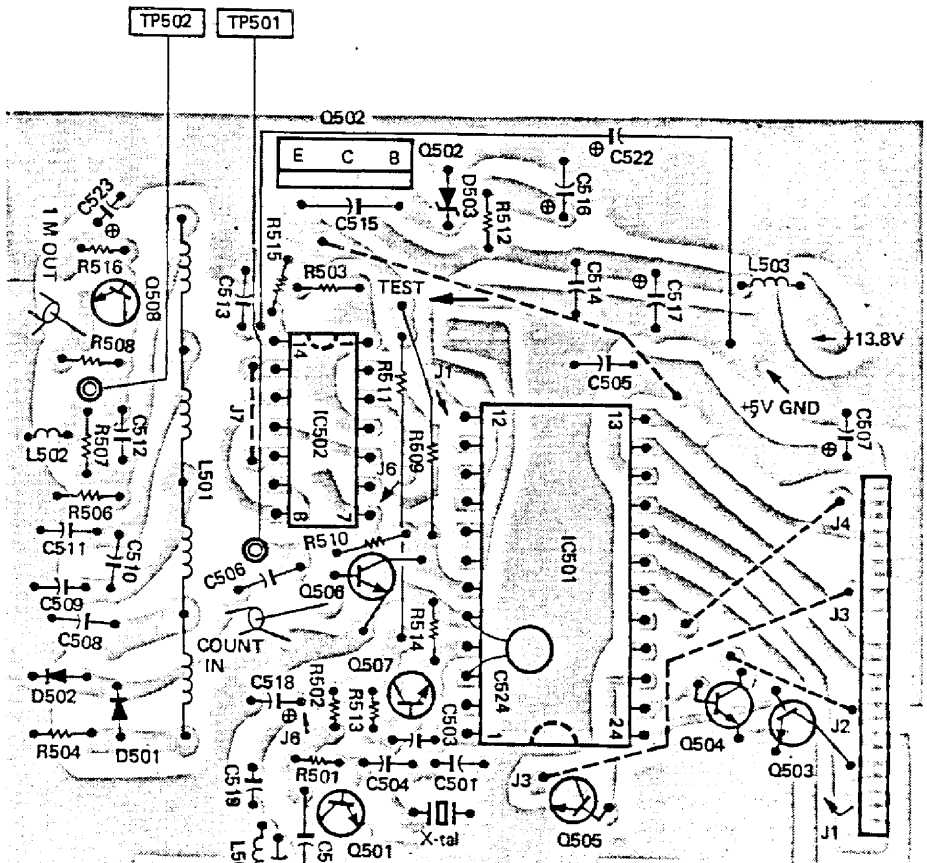
AUDIO/ATT. P.C. BOARD, BOTTOM VIEW



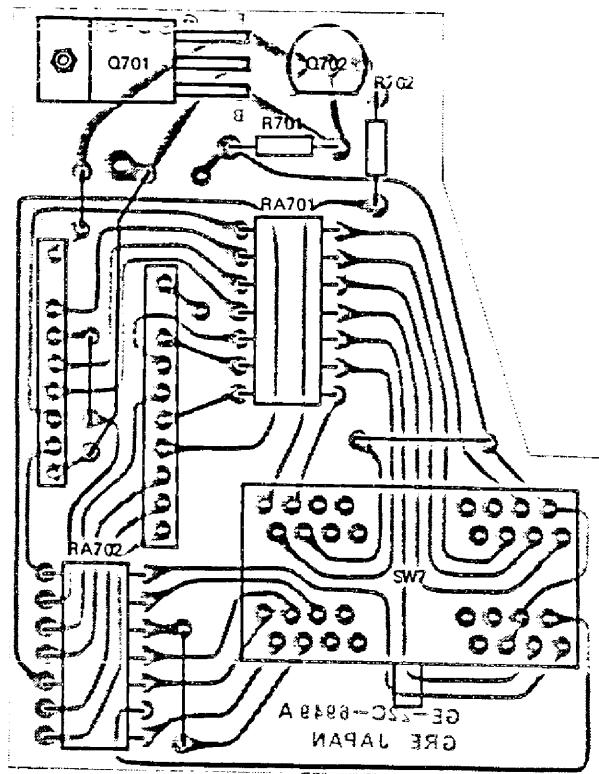
COUNTER P.C. BOARD, TOP VIEW



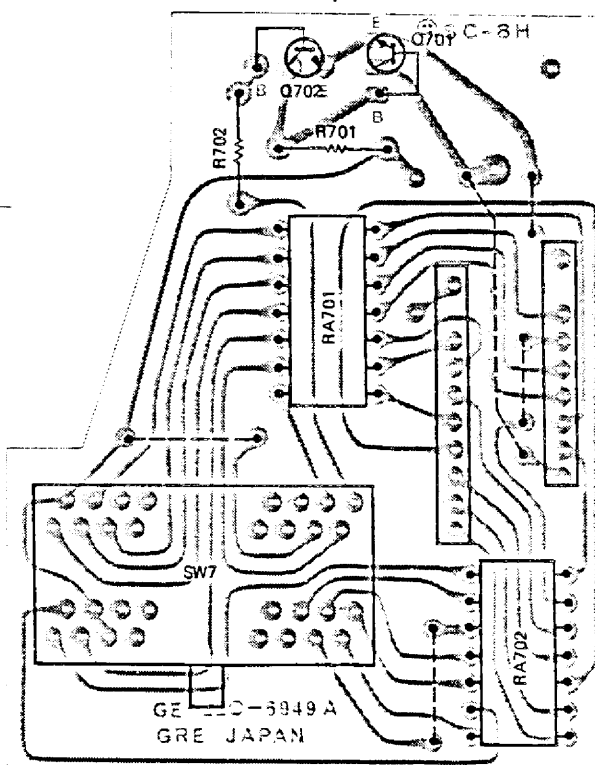
COUNTER P.C. BOARD, BOTTOM VIEW



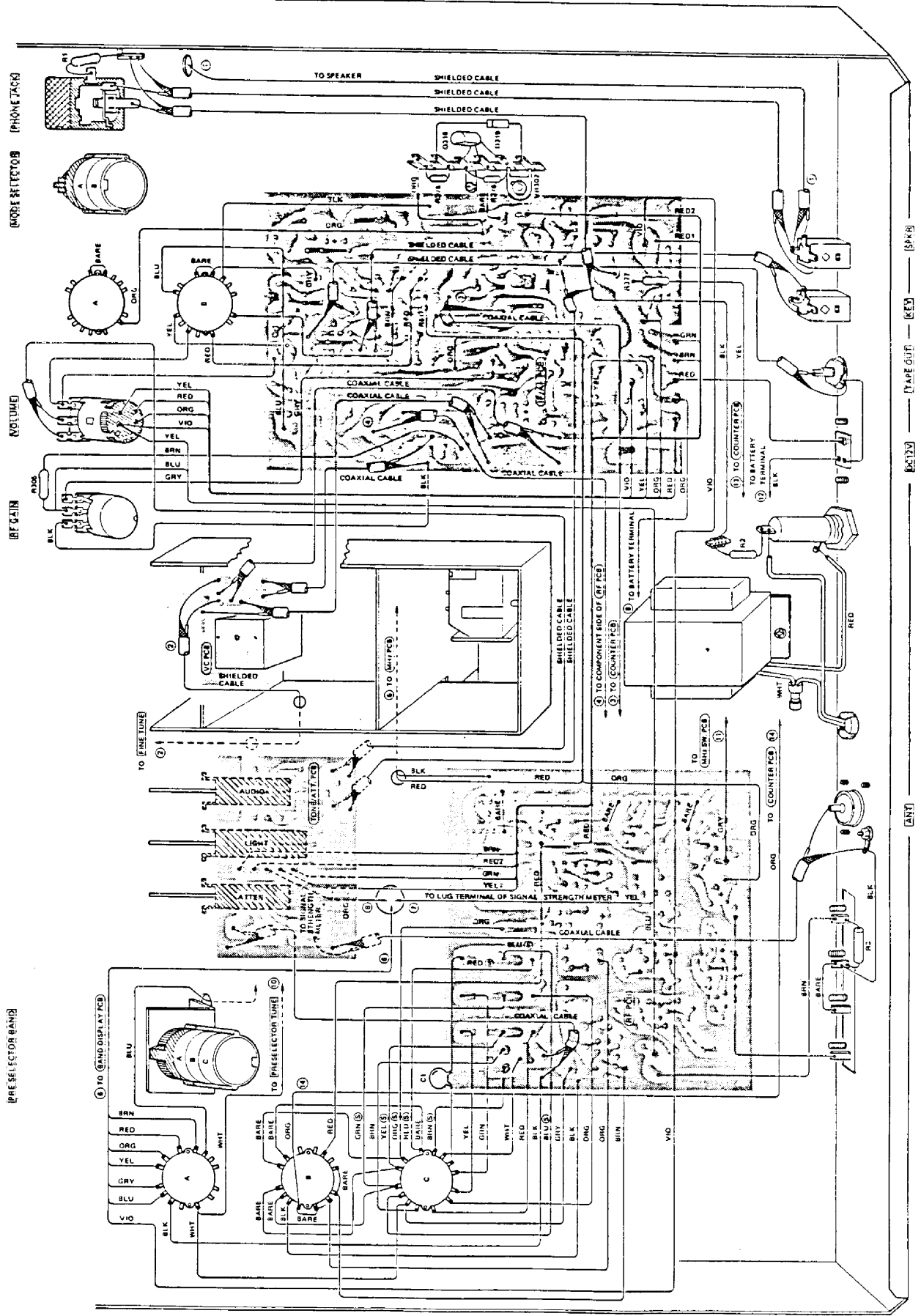
MHz SWITCH P.C. BOARD, TOP VIEW



MHz SWITCH P.C. BOARD, BOTTOM VIEW



WIRING DIAGRAM (BOTTOM)



ELECTRICAL PARTS LIST

NOTE: Temperature characteristics

(C) NPO

(U) N750

(X) N2200

| CAPACITORS | | | | |
|------------|----------|-------------|---------------|--------------|
| Ref. No. | Value | Voltage (V) | Tolerance (%) | Material |
| C1 | 220pF | 50 | ±10 | Ceramic |
| C2 | Not used | | | |
| C3 | 2pF | 50 | ±0.25pF | Ceramic (C) |
| C101 | Not used | | | |
| C102 | 0.056μF | 50 | ±10 | Mylar |
| C103 | 0.022μF | 50 | ±10 | Mylar |
| C104 | 1μF | 50 | -10, +75 | Electrolytic |
| C105 | 0.033μF | 50 | ±10 | Mylar |
| C106 | 0.033μF | 50 | ±10 | Mylar |
| C107 | 0.027μF | 50 | ±10 | Mylar |
| C108 | 47μF | 10 | -10, +50 | Electrolytic |
| C201 | Not used | | | |
| C202 | 270pF | 50 | ±5 | Polystyrene |
| C203 | 0.047μF | 25 | -20, +80 | Ceramic |
| C204 | 0.01μF | 25 | -20, +80 | Ceramic |
| C205 | 0.01μF | 25 | -20, +80 | Ceramic |
| C206 | 0.01μF | 25 | -20, +80 | Ceramic |
| C207 | 3pF | 50 | ±0.25pF | Ceramic (C) |
| C208 | 33pF | 50 | ±10 | Ceramic (C) |
| C209 | 33pF | 50 | ±10 | Ceramic (C) |
| C210 | 3pF | 50 | ±0.25pF | Ceramic (C) |
| C211 | 27pF | 50 | ±10 | Ceramic (C) |
| C212 | 5pF | 50 | ±0.25pF | Ceramic (C) |
| C213 | 0.01μF | 25 | -20, +80 | Ceramic |
| C214 | 22pF | 50 | ±10 | Ceramic (C) |
| C215 | 22pF | 50 | ±10 | Ceramic (C) |
| C216 | 100pF | 50 | ±10 | Ceramic |
| C217 | 47pF | 50 | ±10 | Ceramic |
| C218 | 0.01μF | 25 | -20, +80 | Ceramic |
| C219 | 33pF | 50 | ±10 | Ceramic (C) |
| C220 | 5pF | 50 | ±0.25pF | Ceramic (C) |
| C221 | 0.01μF | 25 | -20, +80 | Ceramic |
| C222 | 15pF | 50 | ±10 | Ceramic (C) |
| C223 | 0.01μF | 25 | -20, +80 | Ceramic |
| C224 | 0.01μF | 25 | -20, +80 | Ceramic |
| C225 | 3pF | 50 | ±0.25pF | Ceramic (C) |
| C226 | 0.01μF | 25 | -20, +80 | Ceramic |
| C227 | 82pF | 50 | ±10 | Ceramic |
| C228 | 0.01μF | 25 | -20, +80 | Ceramic |
| C229 | 0.01μF | 25 | -20, +80 | Ceramic |
| C230 | 22pF | 50 | ±10 | Ceramic (C) |
| C231 | 0.01μF | 25 | -20, +80 | Ceramic |
| C232 | 10pF | 50 | ±0.5pF | Ceramic (C) |
| C233 | 5pF | 50 | ±0.25pF | Ceramic (C) |
| C234 | 22pF | 50 | ±10 | Ceramic (C) |
| C235 | 10pF | 50 | ±0.5pF | Ceramic (C) |
| C236 | 0.047μF | 25 | -20, +80 | Ceramic |
| C237 | 0.047μF | 25 | -20, +80 | Ceramic |
| C238 | 0.047μF | 25 | -20, +80 | Ceramic |
| C239 | 0.047μF | 25 | -20, +80 | Ceramic |
| C240 | 0.01μF | 25 | -20, +80 | Ceramic |
| C241 | 0.001μF | 50 | ±10 | Ceramic |
| C242 | 2pF | 50 | ±0.25pF | Ceramic (C) |

| Ref. No. | Value | Voltage (V) | Tolerance (%) | Material |
|----------|----------|-------------|---------------|--------------|
| C243 | 47pF | 50 | ±10 | Ceramic |
| C244 | 0.01μF | 25 | -20, +80 | Ceramic |
| C245 | 0.01μF | 25 | -20, +80 | Ceramic |
| C246 | 1pF | 50 | ±0.25pF | Ceramic (C) |
| C247 | 47pF | 50 | ±10 | Ceramic |
| C248 | 0.01μF | 25 | -20, +80 | Ceramic |
| C249 | 0.01μF | 25 | -20, +80 | Ceramic |
| C250 | 0.01μF | 25 | -20, +80 | Ceramic |
| C251 | 1pF | 50 | ±0.25pF | Ceramic (C) |
| C252 | 0.001μF | 50 | ±10 | Ceramic |
| C253 | 0.01μF | 25 | -20, +80 | Ceramic |
| C254 | 0.01μF | 25 | -20, +80 | Ceramic |
| C255 | 0.01μF | 25 | -20, +80 | Ceramic |
| C256 | 5pF | 50 | ±0.25pF | Ceramic (C) |
| C257 | 3pF | 50 | ±0.25pF | Ceramic (C) |
| C258 | Not used | | | |
| C259 | Not used | | | |
| C260 | Not used | | | |
| C261 | Not used | | | |
| C262 | 27pF | 50 | ±10 | Ceramic (C) |
| C263 | 47pF | 50 | ±10 | Ceramic |
| C264 | 0.01μF | 25 | -20, +80 | Ceramic |
| C265 | 3pF | 50 | ±0.25pF | Ceramic (C) |
| C266 | 0.01μF | 25 | -20, +80 | Ceramic |
| C267 | Not used | | | |
| C268 | 0.047μF | 25 | -20, +80 | Ceramic |
| C269 | 0.01μF | 25 | -20, +80 | Ceramic |
| C270 | Not used | | | |
| C271 | 1μF | 50 | -10, +75 | Electrolytic |
| C272 | 0.01μF | 25 | -20, +80 | Ceramic |
| C273 | 10pF | 50 | ±0.5pF | Ceramic |
| C301 | 150pF | 50 | ±5 | Polystyrene |
| C302 | 0.01μF | 25 | -20, +80 | Ceramic |
| C303 | 0.047μF | 25 | -20, +80 | Ceramic |
| C304 | 0.047μF | 25 | -20, +80 | Ceramic |
| C305 | 0.047μF | 25 | -20, +80 | Ceramic |
| C306 | 150pF | 50 | ±5 | Polystyrene |
| C307 | 0.01μF | 25 | -20, +80 | Ceramic |
| C308 | 0.01μF | 25 | -20, +80 | Ceramic |
| C309 | 0.01μF | 25 | -20, +80 | Ceramic |
| C310 | 0.01μF | 25 | -20, +80 | Ceramic |
| C311 | 0.047μF | 25 | -20, +80 | Ceramic |
| C312 | 0.01μF | 25 | -20, +80 | Ceramic |
| C313 | 0.047μF | 25 | -20, +80 | Ceramic |
| C314 | 2pF | 50 | ±0.25pF | Ceramic (C) |
| C315 | 0.047μF | 25 | -20, +80 | Ceramic |
| C316 | 0.047μF | 25 | -20, +80 | Ceramic |
| C317 | Not used | | | |
| C318 | 0.047μF | 25 | -20, +80 | Ceramic |
| C319 | 0.047μF | 25 | -20, +80 | Ceramic |
| C320 | 0.01μF | 25 | -20, +80 | Ceramic |
| C321 | 0.01μF | 25 | -20, +80 | Ceramic |
| C322 | 0.1μF | 50 | ±10 | Mylar |
| C323 | 10μF | 16 | -10, +50 | Electrolytic |
| C324 | 0.01μF | 50 | ±10 | Mylar |
| C325 | 0.1μF | 50 | ±10 | Mylar |
| C326 | 0.01μF | 25 | -20, +80 | Ceramic |
| C327 | 120pF | 50 | ±10 | Ceramic (C) |
| C328 | 680pF | 50 | ±5 | Polystyrene |
| C329 | 1000pF | 50 | ±5 | Polystyrene |
| C330 | 3300pF | 50 | ±5 | Polystyrene |

THIS IS
WHAT MY
ORIGINAL
SOURCE
HAS FOR
THIS
PAGE.

COILS & TRANSFORMERS

| Ref. No. | Description | RS Part No. | MFR's Part No. |
|----------|---|-------------|----------------|
| L201 | Not used | | |
| L202 | BPF Coil | CA-5014 | 6NNB-134 |
| L203 | RF Coil (52.5 – 55 MHz) | CA-5022 | 10SSB-127 |
| L204 | RF Coil (52.5 – 55 MHz) | CA-5022 | 10SSB-127 |
| L205 | RF Coil (52.5 – 55 MHz) | CA-5022 | 10SSB-127 |
| L206 | RF Coil (52.5 – 55 MHz) | CA-5022 | 10SSB-127 |
| L207 | Inductor (330 μ H) | | LF1-331K |
| L208 | Choke Coil (1.2 μ H) | CB-2437 | 4LNC-135 |
| L209 | Choke Coil (0.84 μ H) | CB-2195 | 4LNC-027 |
| L210 | RF Coil (52.5 – 55 MHz) | CA-5022 | 10SSB-127 |
| L211 | RF Coil (52.5 – 55 MHz) | CA-5022 | 10SSB-127 |
| L212 | RF Coil (52.5 – 55 MHz) | CA-5022 | 10SSB-127 |
| L213 | RF Coil (52.5 – 55 MHz) | CA-5022 | 10SSB-127 |
| L214 | RF Coil (52.5 – 55 MHz) | CA-5022 | 10SSB-127 |
| L215 | RF Coil (52.5 – 55 MHz) | CA-5022 | 10SSB-127 |
| L216 | RF Coil (52.5 – 55 MHz) | CA-5022 | 10SSB-127 |
| L217 | RF Coil (52.5 – 55 MHz) | CA-5022 | 10SSB-127 |
| L218 | RF Coil (52.5 – 55 MHz) | CA-5022 | 10SSB-127 |
| L219 | RF Coil (52.5 – 55 MHz) | CA-5022 | 10SSB-127 |
| L220 | Inductor (1 mH) | CB-2434 | LF5-102K |
| L301 | IF Coil (3 – 2 MHz) | CA-7955 | 10SSA-128 |
| L302 | Inductor (4.7 μ H) | CA-3891 | LF4-4R7K |
| L303 | IF Coil (3 – 2 MHz) | CA-7955 | 10SSA-128 |
| L304 | Inductor (4.7 μ H) | CA-3891 | LF4-4R7K |
| L305 | OSC Coil (3 – 2 MHz) | CA-5012 | 10SSO-129 |
| L306 | Inductor (100 μ H) | CB-2427 | LF1-101K |
| L307 | Inductor (27 μ H) | CA-3730 | LF1-270K |
| L308 | Inductor (270 μ H) | CB-2429 | LF1-271K |
| L309 | BFO Coil (455 kHz) | CA-5016 | 10SSO-131 |
| L310 | Inductor (470 μ H) | C-0835 | LF1-471K |
| L311 | Inductor (1 mH) | CB-2434 | LF5-102K |
| L501 | BPF Coil | CA-5014 | 6NNB-134 |
| L502 | Inductor (8.2 μ H) | CB-2438 | LF4-8R2K |
| L503 | Inductor (1 mH) | CB-2434 | LF5-102K |
| L504 | Inductor (8.2 μ H) | CB-2438 | LF4-8R2K |
| T1 | Power Transformer (See APPENDIX for Australian, EC, UK and Canadian Models) | TA-0708 | TK-1284 |
| T201 | Antenna Coil (0.01 – 0.15 MHz) | CA-5017 | 10SSA-123 |
| T202 | Bar Antenna Coil (0.15 – 0.5 MHz) | CA-0676 | 12BNA-143 |
| T203 | Bar Antenna Coil (0.5 – 1.6 MHz) | CA-0676 | 12BNA-143 |
| T204 | Antenna Coil (1.6 – 4.5 MHz) | CA-5018 | 6PNA-124 |
| T205 | Antenna Coil (4.5 – 12 MHz) | CA-5019 | 6PNA-125 |
| T206 | Antenna Coil (12 – 30 MHz) | CA-5020 | 6PNA-126 |
| T301 | IF Transformer (455 kHz) | CA-7953 | 10SSI-132 |
| T302 | IF Transformer (455 kHz) | CA-7954 | 10SSI-133 |
| T303 | IF Transformer (455 kHz) | CA-7954 | 10SSI-133 |
| T401 | MHz OSC Coil | CA-5013 | 10SSO-130 |

| CERAMIC FILTERS & CRYSTALS | | | |
|----------------------------|--|-------------------|----------------|
| Ref. No. | Description | RS Part No. | MFR's Part No. |
| CF301 X1 | Filter (455 kHz) X'tal (4.000 MHz) | C-0978 MX-2378 | KBF-455R-4A |

| DIODE | | | |
|------------|---------------|-------------|------------------|
| Ref. No. | Description | RS Part No. | MFR's Part No. |
| D101, 102 | Silicon | DX-0270 | 1S1555 |
| D201 | Germanium | DX-0161 | 1N60 |
| D301, 302 | Germanium | CS-0161 | 1N60 |
| D303 | Not used | | |
| D304 - 309 | Germanium | DX-0161 | 1N60 |
| D310 | Zener (9 V) | DX-0110 | EQA01-09 (R) |
| D311 | Zener (10 V) | DX-1213 | EQA01-10 (S) |
| D312 - 316 | Silicon | DX-1108 | ERB12-01 |
| D317 | Rectifier | DX-1212 | 1B4B or 1B4B1 |
| D318 | Zener (4.7 V) | DX-1214 | 02BZ4.7V |
| D319 | Zener (4 V) | DX-1216 | HZ4B3 |
| D320 | Zener (4.7 V) | DX-1214 | 02BZ4.7V |
| D501, 502 | Germanium | DX-0161 | 1N60 |
| D503 | Zener (6 V) | DX-1217 | EQA01-06 (R) |
| D504 - 508 | LED | | TLR312 |
| D601 - 606 | LED | DX-0496 | TLR102 |

| INTEGRATED CIRCUITS | | | |
|---------------------|---------------|-------------|----------------|
| Ref. No. | Description | RS Part No. | MFR's Part No. |
| IC201 | Mixer | MX-3809 | SN76514N |
| IC301 | AF Amp | MX-3383 | μPC575C2 |
| IC501 | Freq. Counter | MX-3807 | M54826P |
| IC502 | Divider | MX-3808 | SN74LS74N |

| LAMPS | | | |
|----------|-----------------------------------|-------------|----------------|
| Ref. No. | Description | RS Part No. | MFR's Part No. |
| PL1, 2 | Preselector Dial (12 V, 50 mA) | L-0990 | L50-F12V50 |
| PL3 | Meter (12 V, 50 mA) | L-0990 | L50-F12V50 |

NOTE 1: Unless otherwise specified all resistors are carbon film, wattage 1/4W, tolerance ±5%.

NOTE 2: R2 is not used for Australian/European Models.

| RESISTORS | | | | | |
|-----------|----------|-------------|-------------|---------------|----------|
| Ref. No. | Value | RS Part No. | Wattage (W) | Tolerance (%) | Material |
| R1 | 180Ω | NEG-0144 | 1 | ±5 | Metal |
| •R2 | 1.8MΩ | NEF-0521 | 1/2 | ±5 | Carbon |
| R3 | 1.8MΩ | NEF-0521 | 1/2 | ±5 | Carbon |
| R101 | 82Ω | NEE-0122 | | | |
| R102 | 82Ω | NEE-0122 | | | |
| R103 | 1kΩ | NEE-0196 | | | |
| R104 | 1kΩ | NEE-0196 | | | |
| R105 | 1.8MΩ | NEF-0521 | 1/2 | ±5 | Carbon |
| R106 | 3.3kΩ | NEE-0230 | | | |
| R107 | 10kΩ | NEE-0281 | | | |
| R108 | 2.2kΩ | NEE-0216 | | | |
| R109 | 390Ω | NEE-0162 | | | |
| R110 | 3.3kΩ | NEE-0230 | | | |
| R201 | Not used | | | | |
| R202 | 33kΩ | NEE-0324 | | | |
| R203 | 100kΩ | NEE-0371 | | | |
| R204 | 220Ω | NEE-0149 | | | |
| R205 | 560Ω | NEE-0176 | | | |
| R206 | 220Ω | NEE-0149 | | | |
| R207 | 560Ω | NEE-0176 | | | |
| R208 | 100kΩ | NEE-0371 | | | |
| R209 | 22kΩ | NEE-0311 | | | |
| R210 | 220Ω | NEE-0149 | | | |
| R211 | 100kΩ | NEE-0371 | | | |
| R212 | 33kΩ | NEE-0324 | | | |
| R213 | 33kΩ | NEE-0324 | | | |
| R214 | 220Ω | NEE-0149 | | | |
| R215 | 220Ω | NEE-0149 | | | |
| R216 | 100kΩ | NEE-0371 | | | |
| R217 | 220Ω | NEE-0149 | | | |
| R218 | 100kΩ | NEE-0371 | | | |
| R219 | 220Ω | NEE-0149 | | | |
| R220 | 1kΩ | NEE-0196 | | | |
| R221 | 470Ω | NEE-0169 | | | |
| R222 | 220Ω | NEE-0149 | | | |
| R223 | 27kΩ | NEE-0316 | | | |
| R224 | 6.8kΩ | NEE-0262 | | | |
| R225 | 1kΩ | NEE-0196 | | | |
| R226 | 220Ω | NEE-0149 | | | |
| R227 | 56kΩ | NEE-0345 | | | |
| R228 | 22kΩ | NEE-0311 | | | |
| R229 | 6.8kΩ | NEE-0262 | | | |
| R230 | 1kΩ | NEE-0196 | | | |
| R231 | 220Ω | NEE-0149 | | | |
| R232 | 15kΩ | NEE-0297 | | | |
| R233 | 4.7kΩ | NEE-0247 | | | |
| R234 | 1kΩ | NEE-0196 | | | |
| R235 | 22Ω | NEE-0078 | | | |
| R236 | Not used | | | | |
| R237 | Not used | | | | |
| R238 | Not used | | | | |
| R239 | Not used | | | | |
| R240 | Not used | | | | |

| Ref. No. | Value | RS Part No. | Watt- age (W) | Toler- ance (%) | Material |
|----------|----------|-------------|---------------------|-----------------------|----------|
| R241 | Not used | | | | |
| R242 | 33kΩ | NEE-0324 | | | |
| R243 | Not used | | | | |
| R244 | 22kΩ | NEE-0311 | | | |
| R245 | 6.8kΩ | NEE-0262 | | | |
| R246 | 1kΩ | NEE-0196 | | | |
| R247 | 220Ω | NEE-0149 | | | |
| R248 | Not used | | | | |
| R249 | Not used | | | | |
| R250 | 47kΩ | NEE-0340 | | | |
| R251 | 47kΩ | NEE-0340 | | | |
| R252 | 220Ω | NEE-0149 | | | |
| R301 | 56kΩ | NEE-0345 | | | |
| R302 | 47kΩ | NEE-0340 | | | |
| R303 | 10kΩ | NEE-0281 | | | |
| R304 | 100kΩ | NEE-0371 | | | |
| R305 | 47kΩ | NEE-0340 | | | |
| R306 | 68kΩ | NEE-0354 | | | |
| R307 | 100Ω | NEE-0132 | | | |
| R308 | 470Ω | NEE-0169 | | | |
| R309 | 2.2kΩ | NEE-0216 | | | |
| R310 | 220Ω | NEE-0149 | | | |
| R311 | 56kΩ | NEE-0345 | | | |
| R312 | 100kΩ | NEE-0371 | | | |
| R313 | 1MΩ | NEE-0445 | | | |
| R314 | 100kΩ | NEE-0371 | | | |
| R315 | 220Ω | NEE-0149 | | | |
| R316 | 220Ω | NEE-0149 | | | |
| R317 | 1.5kΩ | NEE-0206 | | | |
| R318 | 1.5kΩ | NEE-0206 | | | |
| R319 | 3.3kΩ | NEE-0230 | | | |
| R320 | 220kΩ | NEE-0396 | | | |
| R321 | 100Ω | NEE-0132 | | | |
| R322 | 1kΩ | NEE-0196 | | | |
| R323 | 220 Ω | NEE-0149 | | | |
| R324 | 3.3kΩ | NEE-0230 | | | |
| R325 | 10kΩ | NEE-0281 | | | |
| R326 | 15Ω | NEE-0074 | | | |
| R327 | 470 Ω | NEE-0169 | | | |
| R328 | 220Ω | NEE-0149 | | | |
| R329 | 470Ω | NEE-0169 | | | |
| R330 | 10kΩ | NEE-0281 | | | |
| R331 | 33kΩ | NEE-0324 | | | |
| R332 | 470kΩ | NEE-0423 | | | |
| R333 | 10kΩ | NEE-0281 | | | |
| R334 | 470kΩ | NEE-0423 | | | |
| R335 | 470kΩ | NEE-0423 | | | |
| R336 | 3.9kΩ | NEE-0237 | | | |
| R337 | 22kΩ | NEE-0311 | | | |
| R338 | 33kΩ | NEE-0324 | | | |
| R339 | 18kΩ | NEE-0303 | | | |
| R340 | 33kΩ | NEE-0324 | | | |
| R341 | 1kΩ | NEE-0196 | | | |
| R342 | 1kΩ | NEE-0196 | | | |
| R343 | 100kΩ | NEE-0371 | | | |
| R344 | 100Ω | NEE-0132 | | | |
| R345 | 2.2kΩ | NEE-0216 | | | |
| R346 | 1kΩ | NEE-0196 | | | |
| R347 | 100kΩ | NEE-0371 | | | |
| R348 | 220Ω | NEE-0149 | | | |

| Ref. No. | Value | RS Part No. | Watt- age (W) | Toler- ance (%) | Material |
|----------|----------|-------------|---------------------|-----------------------|----------|
| R349 | 100Ω | NEE-0132 | | | |
| R350 | 2.2kΩ | NEE-0216 | | | |
| R351 | 220kΩ | NEE-0396 | | | |
| R352 | 220Ω | NEE-0149 | | | |
| R353 | 4.7kΩ | NEE-0247 | | | |
| R354 | 47kΩ | NEE-0340 | | | |
| R355 | 100Ω | NEE-0132 | | | |
| R356 | 3.3kΩ | NEE-0230 | | | |
| R357 | 1.5MΩ | NEE-0450 | | | |
| R358 | 1kΩ | NEE-0196 | | | |
| R359 | 4.7kΩ | NEE-0247 | | | |
| R360 | 220Ω | NEE-0149 | | | |
| R361 | 470k | NEE-0423 | | | |
| R362 | 1.5M | NEE-0450 | | | |
| R363 | 10kΩ | NEE-0281 | | | |
| R364 | 5.6kΩ | NEE-0257 | | | |
| R365 | 470Ω | NEE-0169 | | | |
| R366 | 3.9kΩ | NEE-0237 | | | |
| R367 | 22kΩ | NEE-0311 | | | |
| R368 | 33kΩ | NEE-0324 | | | |
| R369 | 33Ω | NEE-0087 | | | |
| R370 | 43kΩ | NEE-0337 | | | |
| R371 | 150kΩ | NEE-0384 | | | |
| R372 | 100kΩ | NEE-0371 | | | |
| R373 | 390Ω | NEE-0162 | | | |
| R374 | 2.2kΩ | NEE-0216 | | | |
| R375 | 15k Ω | NEE-0297 | | | |
| R376 | 10kΩ | NEE-0281 | | | |
| R377 | 10Ω | NEE-0063 | | | |
| R401 | 22kΩ | NEE-0311 | | | |
| R402 | 4.7kΩ | NEE-0247 | | | |
| R403 | 680 Ω | NEE-0183 | | | |
| R404 | 100Ω | NEE-0132 | | | |
| R405 | 100Ω | NEE-0132 | | | |
| R501 | 100kΩ | NEE-0371 | | | |
| R502 | 4.7kΩ | NEE-0247 | | | |
| R503 | 4.7kΩ | NEE-0247 | | | |
| R504 | 100Ω | NEE-0132 | | | |
| R505 | Not used | | | | |
| R506 | 100Ω | NEE-0132 | | | |
| R507 | 100Ω | NEE-0132 | | | |
| R508 | 3.3kΩ | NEE-0230 | | | |
| R509 | 2.2kΩ | NEE-0216 | | | |
| R510 | 150kΩ | NEE-0384 | | | |
| R511 | 330Ω | NEE-0159 | | | |
| R512 | 470Ω | NEE-0169 | | | |
| R513 | 270kΩ | NEE-0402 | | | |
| R514 | 1kΩ | NEE-0281 | | | |
| R515 | 100Ω | NEE-0132 | | | |
| R516 | 22kΩ | NEE-0311 | | | |
| R701 | 15kΩ | NEE-0297 | | | |
| R702 | 2.2kΩ | NEE-0216 | | | |

| RESISTOR ARRAYS | | | |
|-----------------|--------------------|-------------|----------------|
| Ref. No. | Description | RS Part No. | MFR's Part No. |
| RA701 | 1.5 k Ω x 7 | RX-0090 | EXB-R7152M |
| RA702 | 1.5 k Ω x 7 | RX-0090 | EXB-R7152M |

| SWITCHES | | | |
|----------|--|-------------|----------------|
| Ref. No. | Description | RS Part No. | MFR's Part No. |
| SW1 | Lever Switch (ATTEN) | S-0919 | SLR-523 |
| SW2a - f | Rotary Switch (PRESELECTOR BAND) | S-1326 | SRN3066N |
| SW3a - c | Rotary Switch (Mode) | S-1327 | SRN2045N |
| SW4a - c | Lever Switch (LIGHT/BATT) | S-0920 | SLR-643-02 |
| SW5a, b | Lever Switch (AUDIO) | S-0919 | SLR-523 |
| SW6a, b | Power Switch included in VOLUME Control VR2 | | |
| SW7 | Rotary Switch (included in MHz/kHz Tune Ass'y) | S-1325 | CB-2-29 |

| THERMISTOR | | | |
|------------|---------------|-------------|----------------|
| Ref. No. | Description | RS Part No. | MFR's Part No. |
| TH301 | 10 k Ω | T-1012 | M-10K |

| TRANSISTORS | | | |
|-------------|--------------------------|-------------|-----------------------|
| Ref. No. | Description | RS Part No. | MFR's Part No. |
| Q201 | RF Amp. | | 3SK45(B)-9 |
| Q202 | 1st Mixer | | 2SK19(Y) or 2SK19(GR) |
| Q203 | 1st Mixer | | 2SK19(Y) or 2SK19(GR) |
| Q204 | Gain Control | | 2SC1815(GR) |
| Q205 | 1st IF Amp. | | 3SK45(B)-9 |
| Q206 | 2nd Mixer | | 3SK45(B)-9 |
| Q207 | 52.5 MHz Local Freq. Amp | | 2SC1923(R) |
| Q208 | 52.5 MHz Local Freq. Amp | | 2SC1923(O) |
| Q209 | 52.5 MHz Local Freq. Amp | | 2SC1923(O) |
| Q210 | Not used | | |
| Q211 | Not used | | |
| Q212 | Not used | | |
| Q213 | Switching | | 2SC1815(GR) |
| Q214 | 1st IF Amp. | | 2SC1923(O) |
| Q301 | 2nd IF Amp. | | 3SK45(B)-9 |
| Q302 | 3rd Mixer | | 3SK45(B)-9 |
| Q303 | 3rd IF Amp. | | 2SC1815(Y) |
| Q304 | 3rd IF Amp. | | 2SC1815(Y) |
| Q305 | AGC Switch | | 2SC1815(GR) |
| Q306 | 3rd Local OSC | | 2SC1815(Y) |
| Q307 | Buffer Amp. | | 2SK19(GR) |
| Q308 | Buffer Amp. | | 2SK19(GR) |
| Q309 | Not used | | |
| Q310 | AGC Amp. | | 2SC1815(GR) |
| Q311 | BFO | | 2SK19(GR) |
| Q312 | AF Preamp. | | 2SC1815(GR) |
| Q313 | Buffer Amp. | | 2SC1815(GR) |
| Q314 | Buffer Amp. | | 2SC1815(GR) |
| Q315 | Regulator | | 2SD526(O) |
| Q316 | Meter Calibrator | | 2SC1815(GR) |
| Q401 | 1st Local OSC | | 2SC1923(O) |
| Q501 | Driver Amp. | | 2SC1815(GR) |
| Q502 | Regulator | | 2SD526(O) |
| Q503 | kHz Display Driver | | 2SC1815(GR) |
| Q504 | kHz Display Driver | | 2SC1815(GR) |
| Q505 | kHz Display Driver | | 2SC1815(GR) |
| Q506 | Buffer | | 2SC1815(GR) |
| Q507 | 2nd Local OSC | | 2SC1815(GR) |
| Q508 | Gain Control | | 2SC1815(GR) |
| Q701 | MHz Display SW | | 2SD526(O) |
| Q702 | MHz Display SW | | 2SC1815(GR) |

| VARIABLE CAPACITORS | | | |
|---------------------|--|-------------|----------------|
| Ref. No. | Description | RS Part No. | MFR's Part No. |
| TC201 - 203 | Trimmer (50pF) | C-0979 | ECV-1ZW50X32 |
| TC301 - 303 | Trimmer (50pF) | C-0561 | ECV-1ZW50X32 |
| TC401 | Trimmer (50pF) | C-0561 | ECV-1ZW50X32 |
| TC402 | Trimmer (10pF) | C-0870 | ECV-1ZW50X53 |
| VC1 | PRESELECTOR TUNE included in Preselector Dial Ass'y (29) | C-4671 | C123A214 |
| VC2 - 4 | kHz Tune included in MHz/kHz Tune Ass'y (30) | C-4673 | PVC-20G3J1-10H |
| VC5 | MHz Tune included in MHz/kHz Tune Ass'y (30) | C-4764 | C521C133 |
| VC6 | FINE TUNE | C-4675 | FT7-25-NE |

| VARIABLE RESISTORS | | | |
|--------------------|---|-------------|-----------------------|
| Ref. No. | Description | RS Part No. | MFR's Part No. |
| VR201 | Semi-fixed (4.7 k Ω B) | P-1936 | SR 19R3 4.7kB |
| VR301 | Semi-fixed (500 Ω B) | | EVN-J0AA00B52 |
| VR302 | Semi-fixed (20 k Ω B) | | EVL-T0AA00B24 |
| VR1 | RF GAIN Control (50 k Ω B) | P-1937 | VM10A620C-50kB |
| VR2/(SW6) | VOLUME Control (50 k Ω A) w/Power Switch | P-1938 | VM11AA90C-5M1222-50kA |

| MISCELLANEOUS | | | |
|---------------|--------------------------------------|-------------|----------------|
| Ref. No. | Description | RS Part No. | MFR's Part No. |
| | RF P.C. Board | | GE-22C-6688A |
| | IF/AF P.C. Board | | GE-22C-6695C |
| | AUDIO/ATT P.C. Board | | GE-22C-6698A |
| | MHz P.C. Board | | GE-22D-6696A |
| | MHz Switch P.C. Board | | GE-22C-6949A |
| | Counter P.C. Board | | GE 22D-6948 |
| | LED P.C. Board | | GE-22D-6947 |
| | Band Display P.C. Board | | GE-22D-6946 |
| A-1 | ANT Jack | J-1009 | NC-552-D |
| J1 | KEY Jack | J-0840 | S-G8022 |
| J2 | Phone Jack | J-1013 | S-G7625 |
| J3 | External SPKR Jack | J-0840 | S-G8022 |
| J4 | DC 12 V Jack | J-1010 | ND-409 |
| J5 | TAPE OUT Jack | J-1011 | NR-205-2 |
| | 8P Wire Connector Ass'y | | GE-23D-7082 |
| | 9P Wire Connector Ass'y | | GE-23D-7083 |
| | Connector (8P : male) | | 5048-08A |
| | Connector (9P : male) | | 5048-09A |
| TP401 | Connector (3P : male) for Test Point | | 5048-03A |
| TP201 - 206 | Test Point | | CHP-01 |
| TP301, 302 | Test Point | | CHP-01 |
| TP501, 502 | Test Point | | CHP-01 |

MECHANICAL PARTS LIST

NOTE: * Australian, EC, UK and Canadian Models employ different part. Refer to the APPENDIX for these models.

| Ref. No. | Description | RS Part No. | MFR's Part No. |
|----------|---|-------------|-----------------------|
| (1) | RF GAIN Control | P-1937 | VM10A620C-50kB |
| (2) | VOLUME Control with Power Switch | P-1938 | VM11AA90C-5M1222-50kA |
| (3) | Rotary Switch (Mode) | S-1327 | SRN2045N |
| (4) | Rotary Switch (PRESELECTOR BAND) | S-1326 | SRN3066N |
| (5) | Variable Capacitor (FINE TUNE) | C-4675 | FT7-25-NE |
| (6) | Knob (PRESELECTOR TUNE) | K-3326 | GE-23D-7069 |
| (7) | Knob (FINE TUNE) | K-3327 | GE-23D-7036 |
| (8) | Knob (VOLUME/RF GAIN/PRESELECTOR BAND/Mode) | K-3330 | GE-23D-7070 |
| (9) | Knob (ATTEN/LIGHT/AUDIO) | K-3331 | GE-23D-7071 |
| (10) | Knob (kHz Tune) | K-3328 | GE-23B-7068 |
| (11) | Knob (MHz Tune) | K-3329 | GE-23B-7067 |
| (12) | IF/AF P.C. Board Ass'y | X-8002 | GE-23E-7389 |
| (13) | RF P.C. Board Ass'y | X-8003 | GE-23E-7390 |
| (14) | MHz P.C. Board Ass'y | X-8004 | GE-23E-7391 |
| (15) | MHz Switch P.C. Board Ass'y | X-8005 | GE-23E-7392 |
| (16) | Audio/Att P.C. Board Ass'y | X-8006 | GE-23E-7393 |
| (17) | Counter P.C. Board Ass'y | X-8007 | GE-23E-7394 |
| (18) | LED P.C. Board Ass'y | X-8008 | GE-23E-7395 |
| (19) | Band Display P.C. Board Ass'y | X-8009 | GE-23E-7396 |
| (20) | Speaker | S-4793 | SR-305-10B |
| (21) | Meter (S/BATT) | M-0412 | 49C334 |
| A-2 (22) | 4P Screw Terminal Strips (ANT/GND/MUTE) | J-4584 | UB-1004 |
| (23) | ANT Jack | J-1009 | NC-552-D |
| (24) | FUSE Holder (0.5 A) | F-1069 | S-N1301 |
| (25) | DC 12 V Jack | J-1010 | ND-409 |
| (26) | TAPE OUT Jack | J-1011 | NR-205-2 |
| (27) | KEY Jack/SPKR Jack | J-0840 | S-G8022 |
| (28) | PHONE Jack | J-1013 | S-G7625 |
| (29) | Preselector Dial Ass'y | D-3264 | GE-23E-7398 |
| | Preselector Gear Ass'y | RA-2664 | GE-23-E-7197 |
| | Dial | D-0407 | GE-23C-7196 |
| | Variable Capacitor | C-4671 | C123A214 |
| (30) | MHz/kHz Tune Ass'y | C-4672 | GE-23E-7399 |
| | MHz/kHz Gear Ass'y | | GE-23E-7198 |
| | Rotary Switch | S-1325 | CB-2-29 |
| | Variable Capacitor | C-4673 | PVC-20G3J1-10H |
| | VC P.C. Board | X-8010 | GE-22D-6990 |
| | Variable Capacitor | C-4674 | C521C133 |
| (31) | Bar Antenna | CA-0676 | 12BNA-143 |
| (32) | Holder for Bar Antenna | | No. 152 |
| * (33) | Power Transformer | TA-0708 | TK-1284 |
| (34) | Front Panel Ass'y | Z-4522 | GE-23A-7064 |
| | Front Panel | | |
| | Preselector Window | | |
| | Frequency Window | | |
| (35) | Chassis | | GE-23A-7058 |
| (36) | Cabinet | | GE-23A-7059 |
| (37) | Rear Panel Ass'y | Z-4523 | GE-23E-7401 |
| | Rear Panel | | GE-23A-7065 |
| | Battery Terminal (A), + | HB-8335 | GE-23D-7117 |
| | Battery Terminal (B), - | HB-8336 | GE-23D-7118 |
| | Battery Terminal (C), ± | HB-8337 | GE-23D-7119 |
| | Battery Tube | B-0384 | GE-23D-7384 |
| (38) | Battery Cover | DB-0265 | GE-23B-7066 |

| Ref. No. | Description | RS Part No. | MFR's Part No. | |
|----------|---|-------------------------|------------------|-----------|
| (39) | Bracket for RF GAIN/VOLUME Controls and Mode SW | HB-8339 | GE-23D-7241 | |
| (40) | Bracket for PRESELECTOR BAND SW | HB-8340 | GE-23D-7062 | |
| (41) | Bracket for Meter | HB-8341 | GE-23D-7061 | |
| (42) | Bracket for Preselector Dial Lamp | HB-8342 | GE-23D-7063 | |
| (43) | Lug Terminal (2P) | | 1L2P | |
| (44) | Lug Terminal (5P) | | 1L5P | |
| (45) | Shaft, PRESELECTOR BAND SW | RT-1953 | GE-23D-7120 | |
| (46) | Coupler, Shaft and PRESELECTOR BAND SW | HB-8344 | GE-23D-7194 | |
| (47) | Bracket for Front Panel (A) | | GE-23D-7060 | |
| (48) | Bracket for Front Panel (B) | | GE-23D-7060 | |
| (49) | Foot (L) | | NO. 7112 | |
| (50) | Foot (S) | F-0249 | NO. 7105 | |
| (51) | Hand Strap | F-0250 | GE-23D-7121 | |
| (52) | Shield Case (Top) for Counter P.C. Board | H-6250 | GE-23C-7115 | |
| (53) | Shield Case (Bottom) for Counter P.C. Board | | GE-23C-7116 | |
| (54) | Pressure Terminal | | 1-SD | |
| | Solder Lug Terminals | | 3φ | |
| | Wrapping Posts | | 1.2 x 12.5 mm | |
| | Insulator for Band Display P.C. Board | | GE-23D-7313 | |
| | Protection Cloth for Lever SW (ATTEN/LIGHT/AUDIO) | | GE-23D-7374 | |
| | Protection Cloth for FINE TUNE Control | | GE-23D-7375 | |
| | Protection Cloth for Rear Panel | | GE-23D-7472 | |
| | Protection Cloth for Counter Case and Cabinet | | GE-20D-5297 | |
| | Protector for Hand Strap | | GE-23D-7404 | |
| | Lamp, Meter and Preselector Dial | H-6251 | L50-F12V50 | |
| | Lamp Grommet for Meter | L-0990 | BU687 | |
| | Lamp Grommet for Preselector Dial | HB-1182 | GE-23D-7243 | |
| | Wire Clip | HB-8338 | 220-JD485210-01 | |
| | Wire Clip (A1) | | GE-23D-7319 | |
| | Wire Binder | | BK-1 | |
| | Wire Grommet | | OCB-500 | |
| | * AC Power Cord (6 Feet, UL, Black) | | KP-10, AWG-18 | |
| | * Cord Strain Relief | | SR-3P4 | |
| | Wrapping Post for AC Power Cord | | GE-18D-4215 | |
| | Fuse | | 0.5A, UL | |
| | Fuse Caution Label (0.5 A) | HF-0025 | GE-23D-7537 | |
| | Caution Label | | GE-19D-4860 | |
| | * Model Label | | GE-22D-6998 | |
| | Screws | | | |
| | (55) | Pan-Head Taptite Screws | | 3 x 10 mm |
| | (56) | Pan-Head Taptite Screws | | 4 x 8 mm |
| (57) | Binding-Head Self Tapping Screws | HD-3020 | 2.6 x 7 mm | |
| (58) | Pan-Head Self Tapping Screws | HD-3026 | 3 x 6 mm | |
| (59) | Pan-Head Self Tapping Screws | HD-2057 | 3 x 8 mm | |
| (60) | Round-Head Self Tapping Screws | HD-3108 | 3 x 6 mm | |
| (61) | Binding-Head Screws | | 2 x 6 mm | |
| (62) | Binding-Head Screws | HD-3030 | 3 x 12 mm | |
| (63) | Binding-Head Screws | | 4 x 8 mm | |
| (64) | Binding-Head Screws | HD-3047 | 4 x 10 mm | |
| (65) | Binding-Head Screws | HD-3049 | 4 x 15 mm | |
| (66) | Pan-Head Screws | HD-2044 | 2.6 x 6 mm | |
| (67) | Pan-Head Screws | HD-2054 | 3 x 5 mm | |
| (68) | Pan-Head Screws | HD-2055 | 3 x 6 mm | |
| (69) | Pan-Head Screws | HD-2057 | 3 x 8 mm | |
| (70) | Flat-Head Screws | HD-4019 | 3 x 6 mm | |
| (71) | Pan-Head Screws | HD-1181 | 3 x 6 mm (Nylon) | |
| (72) | Binding-Head Screws | | 3 x 6 mm (Black) | |

| Ref. No. | Description | RS Part No. | MFR's Part No. |
|----------|----------------------------|-------------|----------------|
| (73) | Internal Star Lock Washers | HD-8045 | 2.6 φ |
| (74) | Internal Star Lock Washers | HD-8041 | 3 φ |
| (75) | Flat Washers | | 3 φ |
| (76) | Hex Nuts | HD-7003 | 3 φ |
| (77) | Hex Nuts | HD-7088 | 9 φ (Black) |
| (78) | Speed Nuts | HC-7013 | PSN-3 |

ACCESSORY LIST

| Ref. No. | Description | RS Part No. | MFR's Part No. |
|----------|---------------------|-------------|----------------|
| | DC Power Cord Ass'y | | DC-1021 |
| | Fuse Caution Label | | GE-23D-7491 |
| | Antenna Ass'y | A-0323 | GE-23E-7402 |
| | Antenna | | |
| | Connector (Plug) | | |
| | Rubber Feet | | SJ-5112 |

APPENDIX TO PARTS LIST

For Australian, EC, UK and Canadian Models, some parts are changed. Following parts list information applies to these models.

Australian model

| Ref. No. | Description | RS Part No. | MFR's Part No. |
|----------|--------------------------|-------------|----------------|
| (33) | Power Transformer | | K6218 |
| | AC Power Cord | | SAA 3p 2 m |
| | Strain Relief | | SR-5N-4 |
| | Model Label | | GE-23D-7332 |
| | Terminal Block 12 pins | | 3012PT-12 |
| | Fiber for Terminal Block | | GE-23D-7435 |
| R2 | Not used | | |

EC model

| Ref. No. | Description | RS Part No. | MFR's Part No. |
|----------|-------------------|-------------|------------------|
| (33) | Power Transformer | | K6218 |
| | AC Power Cord | | KP-419C, LTCE-2F |
| | Strain Relief | | SR-4N-4 |
| | Model Label | | GE-23D-7184 |
| | Cord Label | | |
| R2 | Not used | | |

UK model

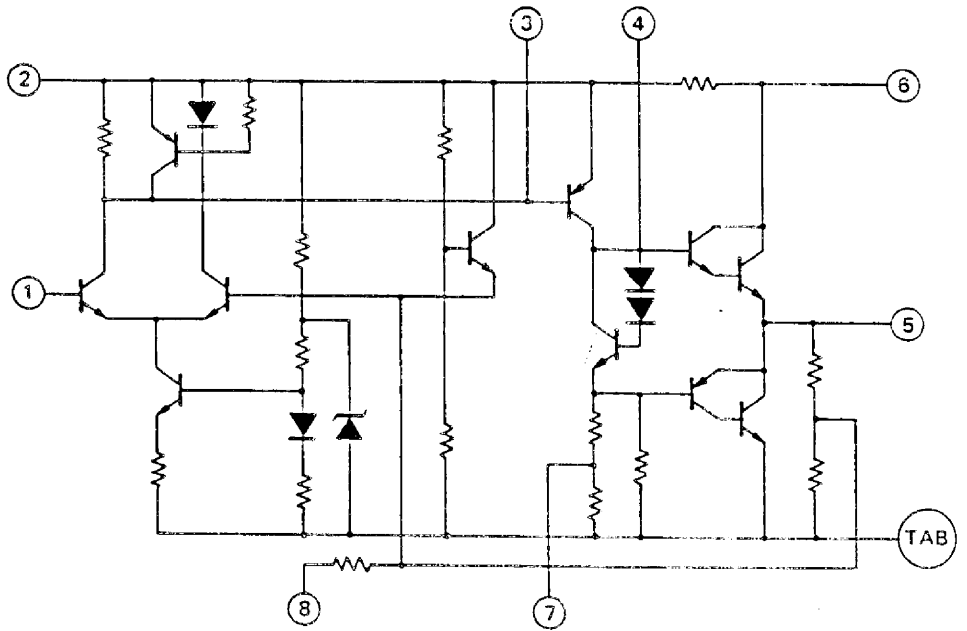
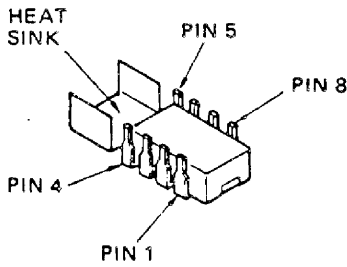
| Ref. No. | Description | RS Part No. | MFR's Part No. |
|----------|-------------------|-------------|----------------|
| (33) | Power Transformer | | K6218 |
| | AC Power Cord | | BS 2p 2m |
| | Strain Relief | | SR-4N-4 |
| | Model Label | | GE-23D-7184 |
| | Cord Label | | |
| R2 | Not used | | |

Canadian model

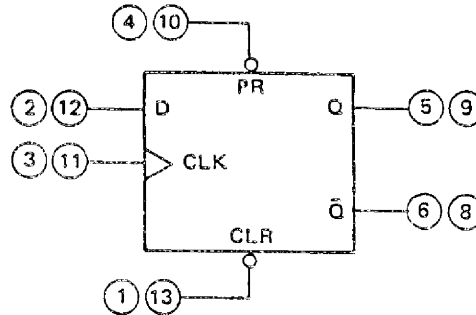
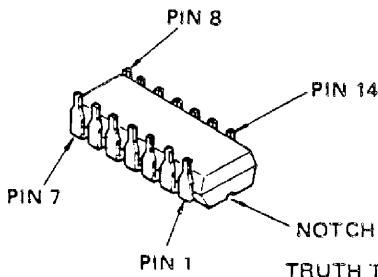
| Ref. No. | Description | RS Part No. | MFR's Part No. |
|----------|-------------------|-------------|----------------|
| (33) | Power Transformer | | TK1284B |
| | AC Power Cord | | CSA 6 feet 3p |
| | Strain Relief | | SR-5N-4 |
| | Model Label | | GE-23D-7183 |

INTEGRATED CIRCUIT IDENTIFICATION

μ PC575C2



SN74LS74A



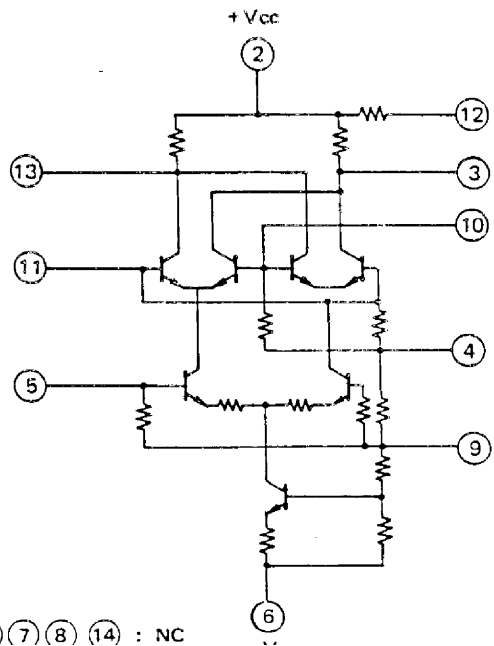
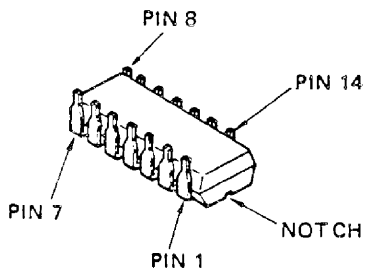
TWO F.F.S
IN ONE PACKAGE

TRUTH TABLE

| INPUTS | | | | OUTPUTS | |
|--------|-------|--------|-------|---------|-----------|
| D | CLOCK | PRESET | CLEAR | Q | \bar{Q} |
| H | ↑ | H | H | H | L |
| L | ↑ | H | H | L | H |

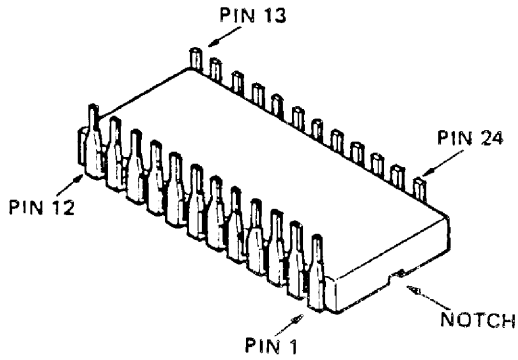
↑: POSITIVE TRANSITION

SN76514N



(1) (7) (8) (14) : NC

M54826P

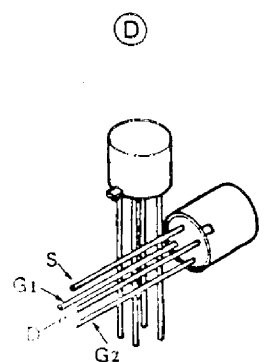
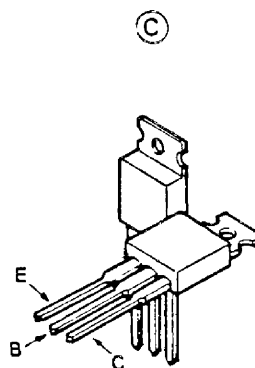
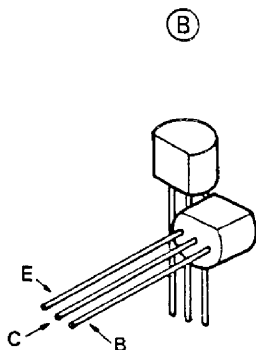
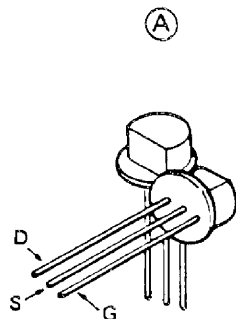


NOTE

- 1 Not used
- 2 Not used
- 3 } 4 MHz Crystal Oscillator
- 4 }
- 5 Ground
- 6 INPUT (2456 ~ 3455 kHz)
- 7 Count Mode/Preset Selection Input S1; Low
- 8 Count Mode/Preset Selection Input S2; Low
- 9 Count Mode/Preset Selection Input S3; Low
- 10 Count Mode/Preset Selection Input S4; Low
- 11 Not used
- 12 Segment Output; g
- 13 Segment Output; f
- 14 Segment Output; e
- 15 Vcc (+5 V)
- 16 Segment Output; d
- 17 Segment Output; c
- 18 Segment Output; b
- 19 Segment Output; a
- 20 Not used
- 21 Not used
- 22 Digital Output; D506
- 23 Digital Output; D507
- 24 Digital Output; D508

TRANSISTOR LEAD IDENTIFICATION

- (A); 2SK19(Y)
- (B); 2SC1815, 2SC1923
- (C); 2SD526
- (D); 3SK45(B)-9



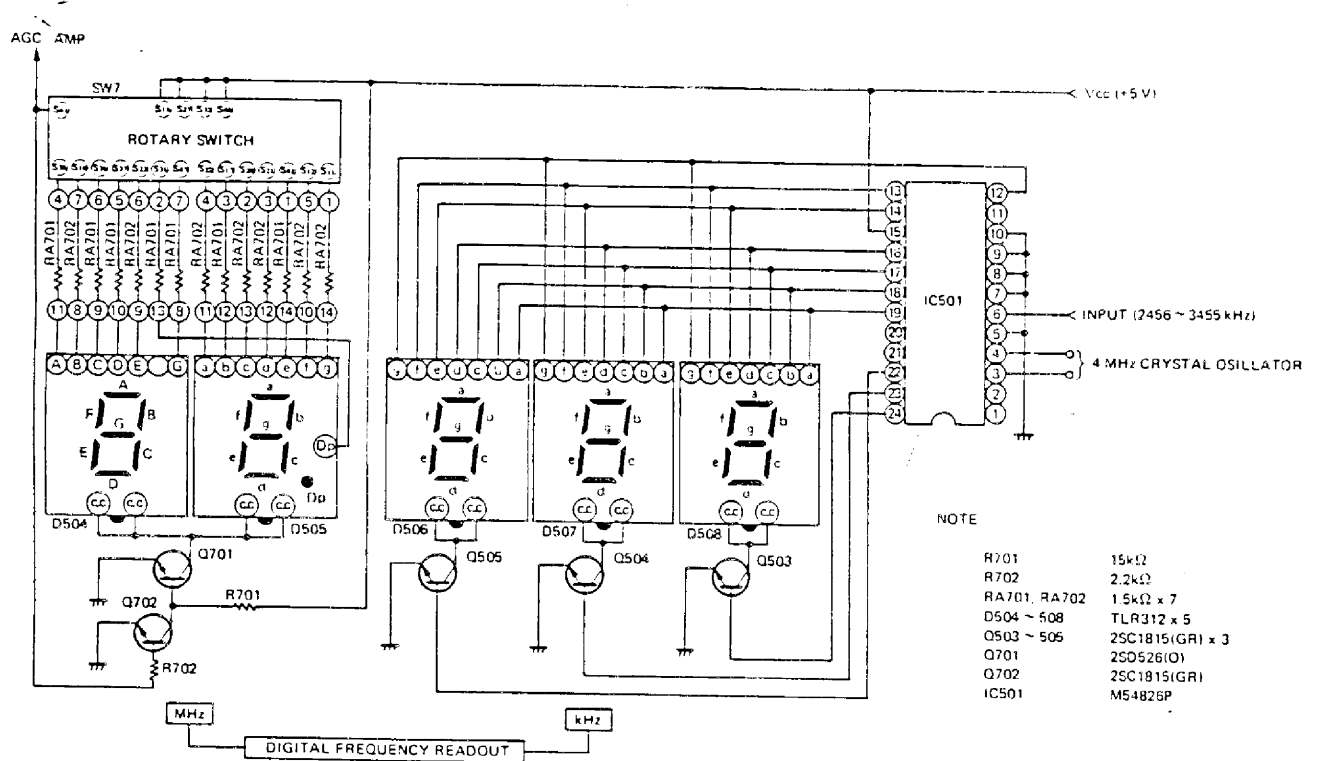
SEMICONDUCTOR VOLTAGE READINGS

| Ref No | | Value (V DC) | Ref. No. | | Value (V DC) | Ref. No. | | Value (V DC) | |
|--------|----------------|--|----------|----------|--------------|----------|------|--|------|
| Q201 | G ₁ | 1.8 | Q303 | B | 4.6 | Q504 | B | 2.3 | |
| | G ₂ | 5.3 | | C | 8.0 | | C | 0.3 | |
| | D | 3.2 | | E | 3.9 | | E | 0 | |
| | S | 1.85 | Q304 | B | 2.2 | Q505 | B | 0.15 | |
| Q202 | G | 0 | | C | 8.4 | | C | 0.3 | |
| | D | 9.2 | | E | 1.5 | | E | 0 | |
| | S | 1.8 | Q305 | B | 0.65 | Q506 | B | 0.4 | |
| Q203 | G | 0 | | C | 0 | | C | 1.65 | |
| | D | 9.2 | | E | 0 | | E | 0 | |
| | S | 1.8 | Q306 | B | 2.3 | Q507 | B | 1.0 | |
| Q204 | B | 0.65 | | C | 3.8 | | C | 3.8 | |
| | C | 0 | | E | 1.8 | | E | 0.65 | |
| | E | 0 | Q307 | G | 0 | Q508 | B | 0.75 | |
| Q205 | G ₁ | 0 | | D | 5.6 | | C | 0 | |
| | G ₂ | 4.4 | | S | 0.6 | | E | 0 | |
| | D | 8.9 | Q308 | G | 0 | IC501 | 1 | 1.4 | |
| S | 0.6 | D | | 5.6 | 2 | | 1.8 | | |
| Q206 | G ₁ | 0 | | S | 0.75 | | 3 | 0.2 | |
| | G ₂ | 0 | Q309 | Not used | | | 4 | 0.65 | |
| | D | 9.3 | | Q310 | B | | 0.2 | 5 | 0 |
| | S | 0.23 | C | | 8.5 | | 6 | 1.65 | |
| Q207 | B | 1.8 | E | | 0 | | 7 | 0 | |
| | C | 9.2 | Q311 | G | 0 | | 8 | 0 | |
| | E | 1.05 | | D | 4.5 | | 9 | 0 | |
| Q208 | B | 2.1 | | S | 1.2 | | 10 | 0 | |
| | C | 9.1 | Q312 | B | 1.6 | | 11 | 0.15 | |
| | E | 1.35 | | C | 2.6 | | 12 | ** 0.9 | |
| Q209 | B | 2.2 | | E | 0.95 | | 13 | 0.9 | |
| | C | 9.5 | Q313 | B | 2.3 | | 14 | 0.9 | |
| | E | 1.5 | | C | 4.5 | | 15 | 5.0 | |
| Q210 | | Not used | | E | 1.65 | | 16 | 0.9 | |
| Q211 | | Not used | Q314 | B | 4.5 | | 17 | 0.9 | |
| Q212 | | Not used | | C | 8.9 | | 18 | 0.9 | |
| Q213 | B | *** $\begin{bmatrix} 0.65 & 0 \\ 0 & 8.5 \\ 0 & 0 \end{bmatrix}$ | | E | 3.9 | | 19 | 0.9 | |
| | C | | Q315 | B | 10.3 | | 20 | 0.5 | |
| | E | | | C | 13.8 | | 21 | 0.5 | |
| Q214 | B | 2.2 | | E | 9.6 | | 22 | 0.15 | |
| | C | 9.2 | Q316 | B | 0.6 | | 23 | 0.15 | |
| | E | 1.6 | | C | 0 | | 24 | 0.15 | |
| IC201 | 1 | - | | E | 0 | IC502 | 1 | 1.65 | |
| | 2 | 8.75 | IC301 | 1 | 1.75 | | 2 | 1.65 | |
| | 3 | 8.75 | | 2 | 13.5 | | 3 | 5.0 | |
| | 4 | 4.35 | | 3 | 13.0 | | 4 | 1.5 | |
| | 5 | 2.8 | | 4 | 7.9 | | 5 | 1.65 | |
| | 6 | 0 | | 5 | 6.6 | | 6 | 5.0 | |
| | 7 | - | | 6 | 13.8 | | 7 | 4.5 | |
| | 8 | - | | 7 | 0.24 | | 8 | 5.0 | |
| | 9 | 2.8 | | 8 | 1.9 | | 9 | 1.6 | |
| | 10 | 4.3 | Q401 | B | 1.5 | | 10 | 0.75 | |
| | 11 | 4.3 | | C | 8.4 | | 11 | 5.0 | |
| | 12 | 4.35 | | E | 1.3 | | 12 | 1.6 | |
| | Q301 | G ₁ | 1.7 | Q501 | B | | 1.0 | 13 | 1.6 |
| | | G ₂ | 2.7 | | C | | 0.5 | 14 | 0 |
| D | | 9.3 | E | | 0 | Q701 | B | *** $\begin{bmatrix} 0 & 0.65 \\ 3.5 & 0 \\ 0 & 0 \end{bmatrix}$ | |
| S | | 2.3 | Q502 | | B | | 5.6 | | Q702 |
| Q302 | G ₁ | 0 | | C | 13.8 | | C | | |
| | G ₂ | 0.86 | | E | 5.0 | E | 0 | | |
| | D | 8.5 | Q503 | B | 0.15 | Q702 | B | 0.65 | |
| S | 0.5 | C | | 0.3 | C | | 0.65 | | |
| | | | E | 0 | E | 0 | | | |

NOTE

- DC voltage measured with DC VTVM (input impedance = more than 100 kΩ) under the following conditions ;
RF GAIN : Maximum
No input signal
- (*) The voltage readings are under the condition that PRESELECTOR BAND switch is set to ranges of 0.01 ~ 1.6 MHz.
- (**) The voltage readings of IC501 are under the condition of kHz readout "000".
- (***) The voltage readings are under the condition that MHz readout is blanked.

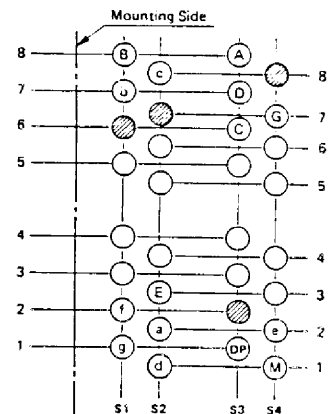
SCHEMATIC DIAGRAM OF DIGITAL FREQUENCY READOUT SECTION



- NOTE
- R701 15kΩ
 - R702 2.2kΩ
 - RA701, RA702 1.5kΩ x 7
 - D504 ~ 508 TLR312 x 5
 - Q503 ~ 505 2SC1815(GR) x 3
 - Q701 2SD526(O)
 - Q702 2SC1815(GR)
 - IC501 M54826P

ROTARY SWITCH SW7 (FOR MHz READ OUT)

1. TERMINAL DESIGNATIONS (Soldering Side View)



2. CONTACT FOR LED SEGMENTS

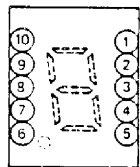
| LED Segments | Contact |
|--------------------|-----------------|
| A | S ₁₈ |
| B | S ₁₈ |
| C | S ₁₆ |
| D | S ₁₇ |
| E | S ₁₃ |
| G | S ₄₇ |
| a | S ₂₂ |
| b | S ₁₇ |
| c | S ₂₈ |
| d | S ₁₁ |
| e | S ₂₂ |
| f | S ₁₂ |
| g | S ₁₁ |
| Dp (Decimal Point) | S ₁₁ |

M — While the rotary switch steps UP/DOWN to next contact. S₄₁ contacts and it not only disables LEDs (D504, 505) but mute the unit.
 ● — Common (+5 V)
 ○ — Not used

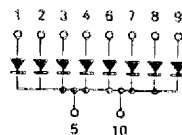
LEDs (D504~508)

1. LEAD IDENTIFICATION

Soldering Side View



2. EQUIVALENT CIRCUIT



3. FREQUENCY READOUT POSITIONAL WEIGHT

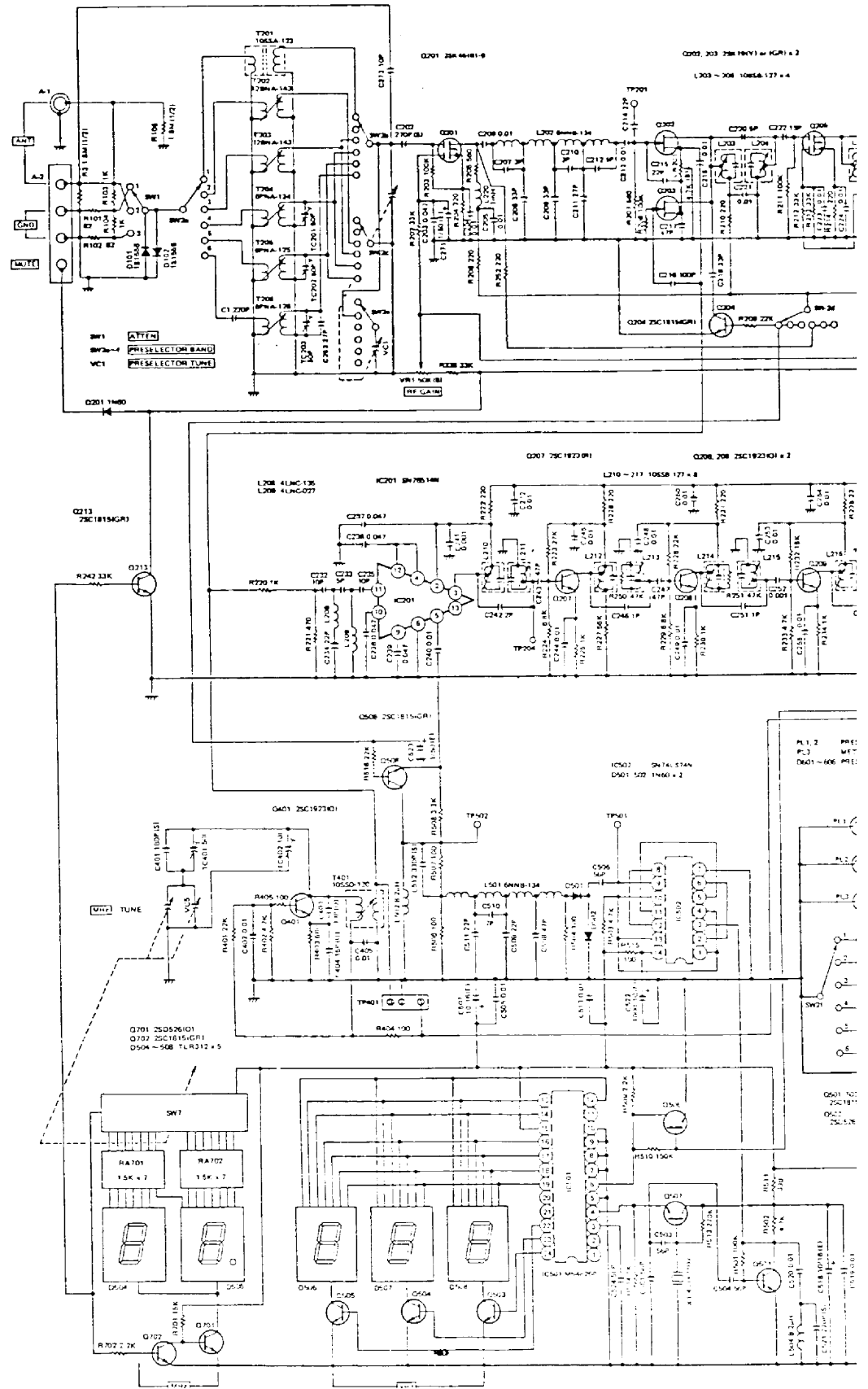
- 10 MHz --- D504
- 1 MHz --- D505
- 100 kHz --- D506
- 10 kHz --- D507
- 1 kHz --- D508

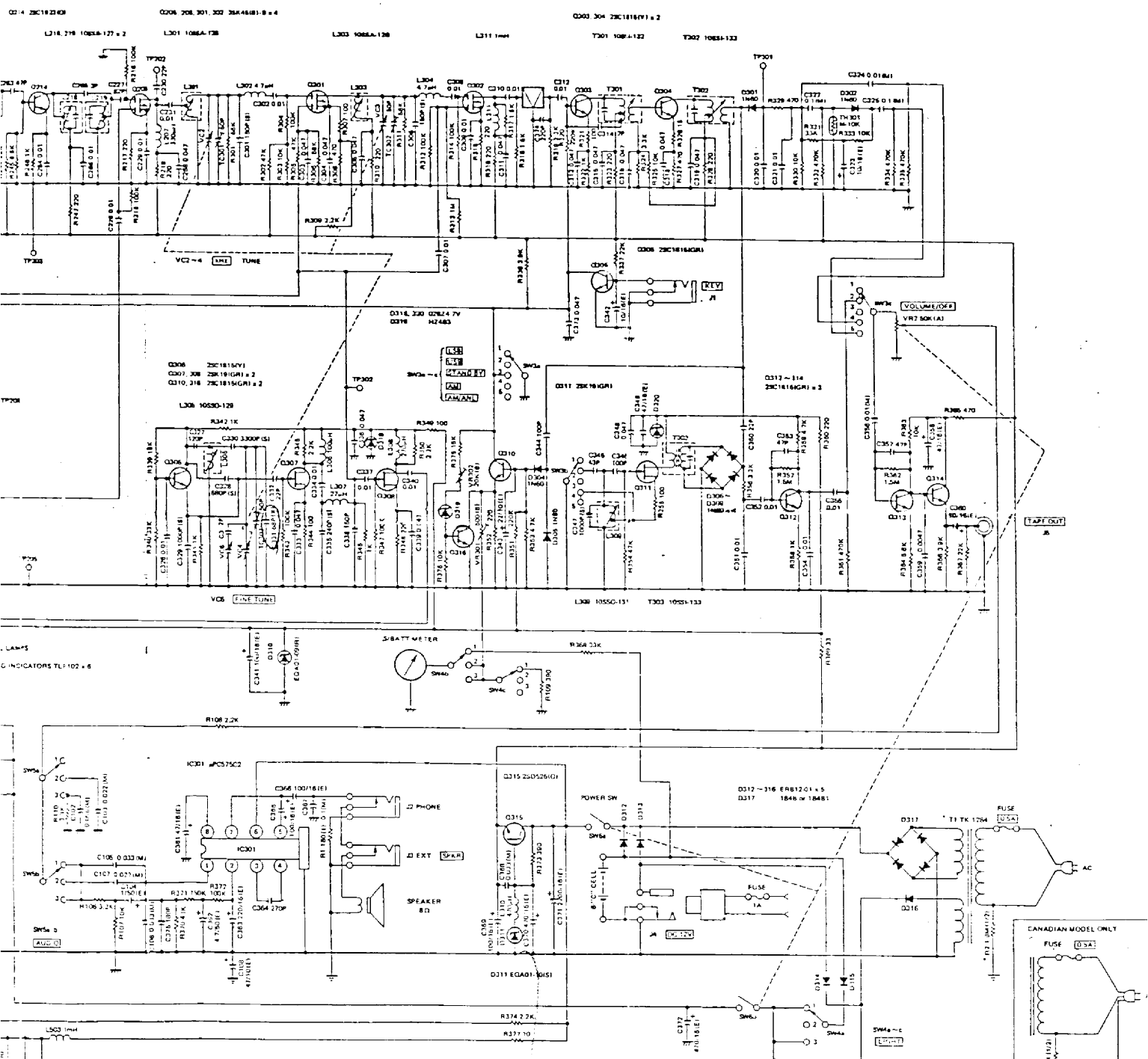
FREQUENCY COUNTER IC501 LEAD IDENTIFICATION

UP/DOWN COUNT MODE . DOWN COUNT

- 1 Not used
- 2 Not used
- 3 4 MHz Crystal Oscillator
- 4 Ground
- 5 Ground
- 6 INPUT (2456 ~ 3455 kHz)
- 7 Count Mode/Presel Selection Input S1; Low
- 8 Count Mode/Presel Selection Input S2; Low
- 9 Count Mode/Presel Selection Input S3; Low
- 10 Count Mode/Presel Selection Input S4; Low
- 11 Not used
- 12 Segment Output; g
- 13 Segment Output; f
- 14 Segment Output; e
- 15 Vcc (+5 V)
- 16 Segment Output; d
- 17 Segment Output; c
- 18 Segment Output; b
- 19 Segment Output; a
- 20 Not used
- 21 Not used
- 22 Digital Output; D506
- 23 Digital Output; D507
- 24 Digital Output; D508

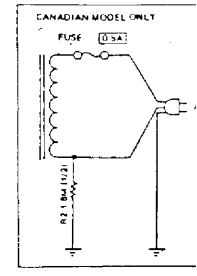
SCHEMATIC DIAGRAM



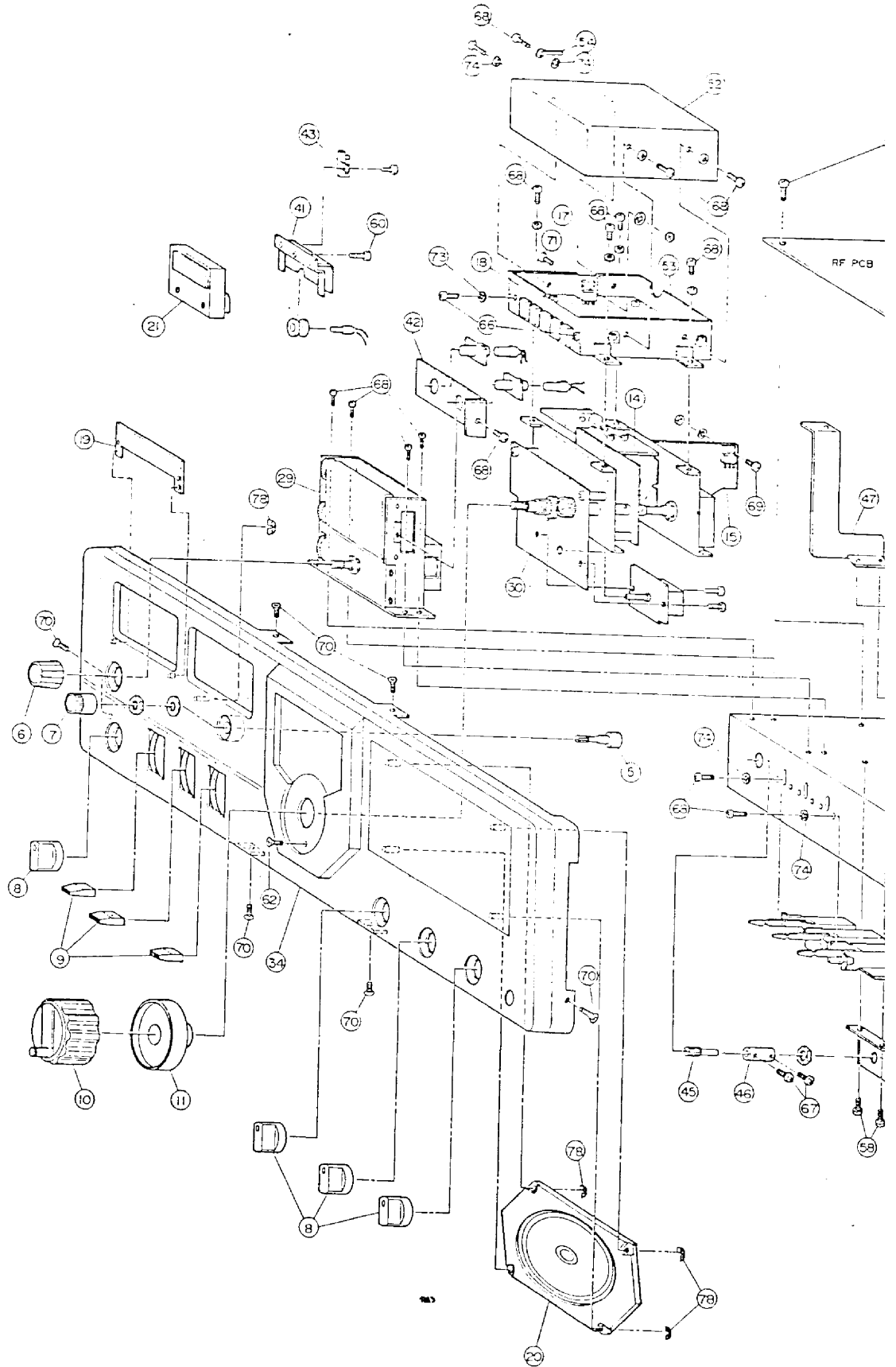


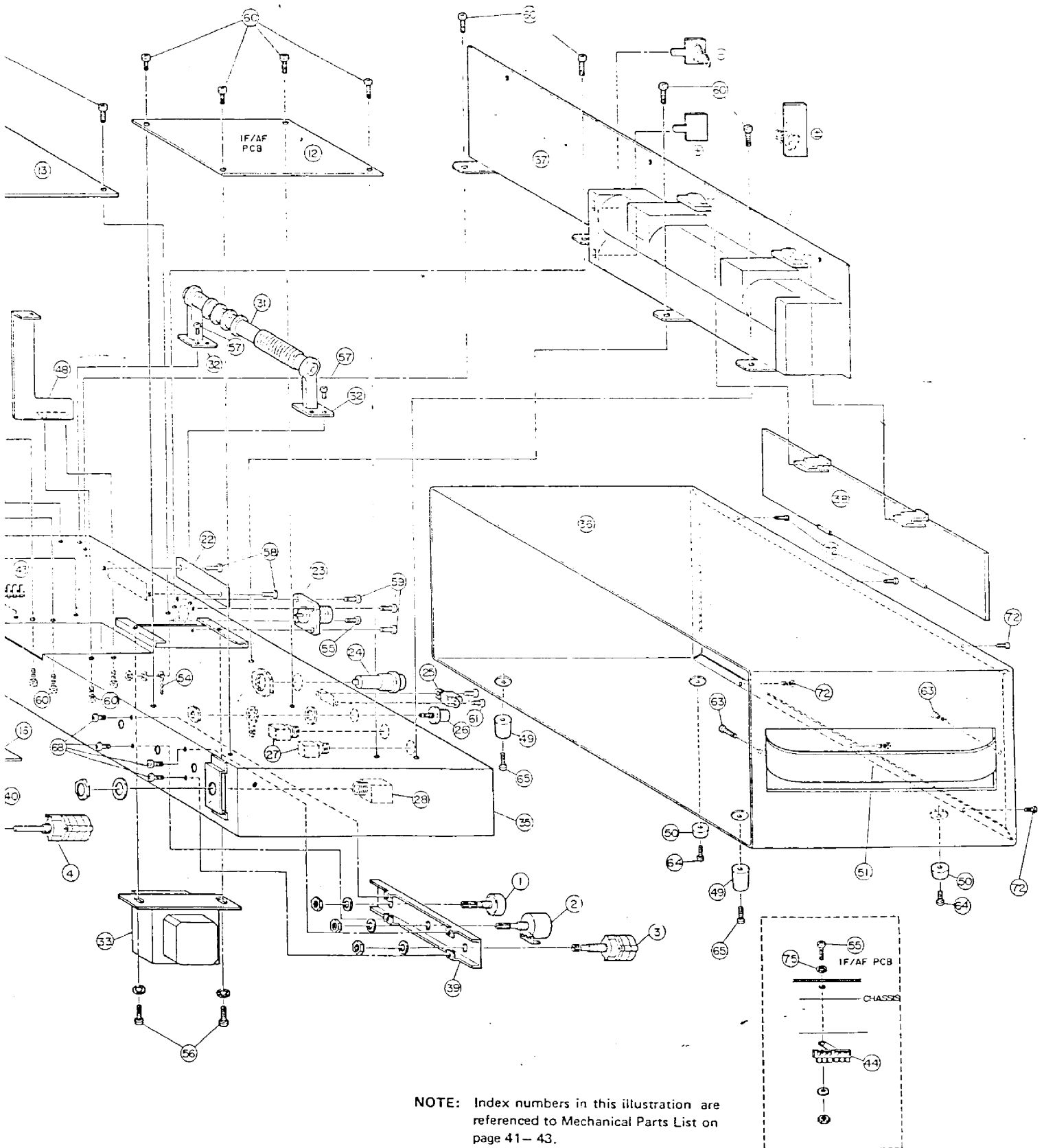
- NOTE
1. ALL RESISTANCE VALUES IN OHMS, $1K = 10^3$ OHMS, $M = 10^6$ OHMS
 2. ALL RESISTOR WATTAGES IN μW UNLESS OTHERWISE SPECIFIED
 3. ALL CAPACITANCE VALUES IN MICROFARADS (P - MICROMICROFARADS)
 4. (E) - ELECTROLYTIC CAPACITORS
 5. (M) - MYLAR CAPACITORS
 6. (S) - POLYSTYRENE CAPACITORS
 7. (C) - CERAMIC CAPACITORS IN PPM
 8. (K) - CERAMIC CAPACITORS IN 2000
 9. (N) - CERAMIC CAPACITORS IN 2000
 10. NO SUFFIXED - CERAMIC CAPACITORS
 11. RATING OR TYPE NUMBER OF COMPONENT PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT WITHOUT NOTICE
 12. (1) DENOTES THAT FOR EUROPEAN/AUSTRALIAN MODELS PARTS NO. OF T1 IS K6218 AND R2 IS NOT USED.

Pool
with
L307810



DISASSEMBLY/EXPLODED VIEW





Radio Shack®

NO. 1136

Service Information Bulletin

Catalog No.: 20-204

Description: DX-300 Communications Receiver

NOTE: First shipments of the DX-300 showed various problems with spurious responses on the bands and improper centering of BFO (for SSB reception). The manufacturer has instituted a number of changes which help to reduce or eliminate such "birdies" and "spurs", plus the BFO setting. This addendum covers those and other changes.

Modification for improvement of 2nd Local Oscillator Circuit (From Date Code 3A9)

See Figure 1.

1. Resistor R227 location has been changed and PC pattern is cut as marked.
2. Resistor R251 location has been changed and PC pattern is cut as marked.

You may want to make both of these changes on all units brought in for service/repair which have a date code prior to 3A9. Be sure to realign the 2nd Local Oscillator as stated on page 17 of Service Manual since above changes affect frequencies of L212 and L214.

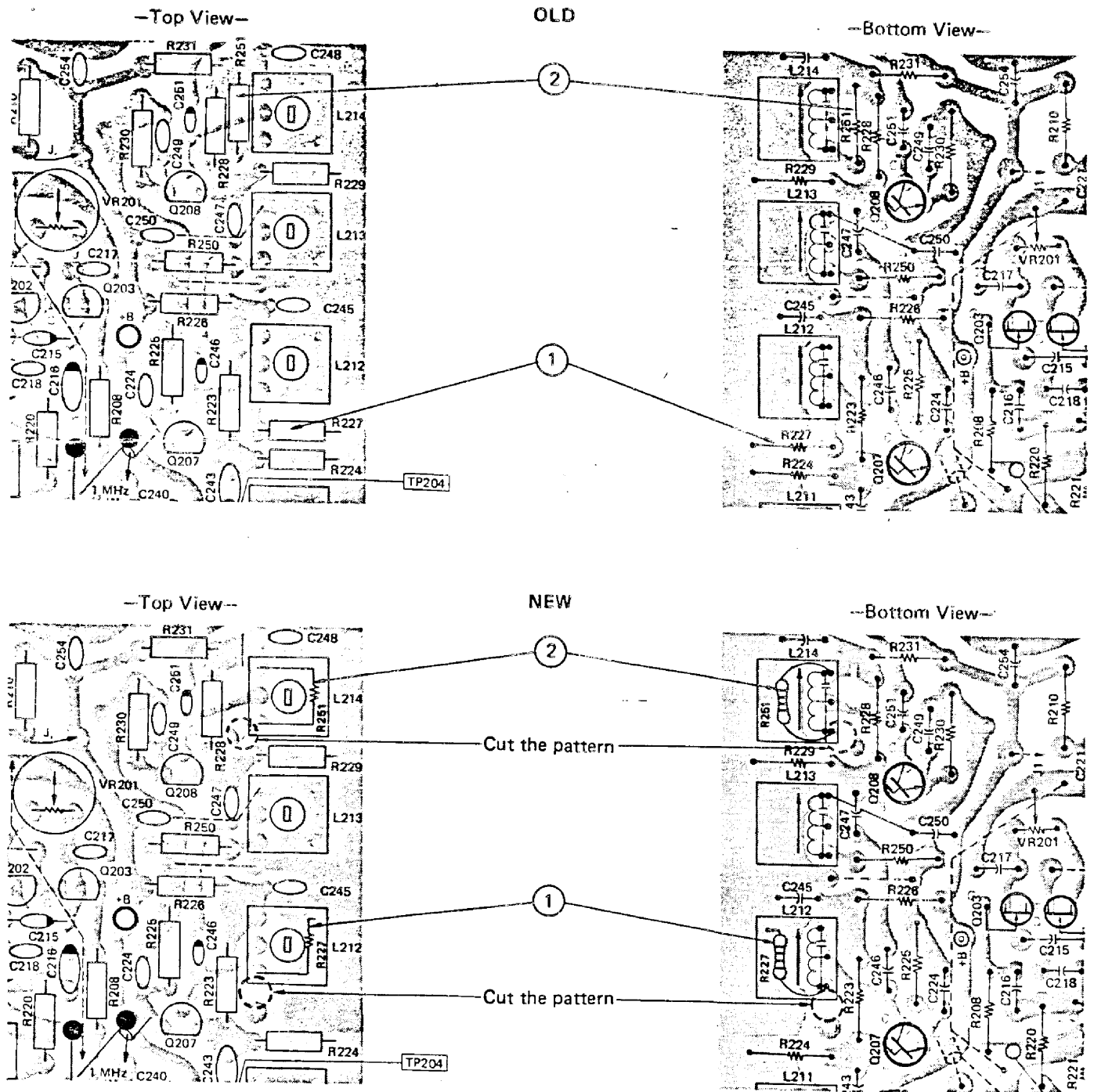


Figure 1 : RF P.C. BOARD PARTS LOCATION

- At an early stage of production, coaxial lead for 2nd IF input to L301 was soldered as shown in "old" of Figure 2. If a unit with such wiring is brought in for repair/service, change the wiring as shown in "new" figure.

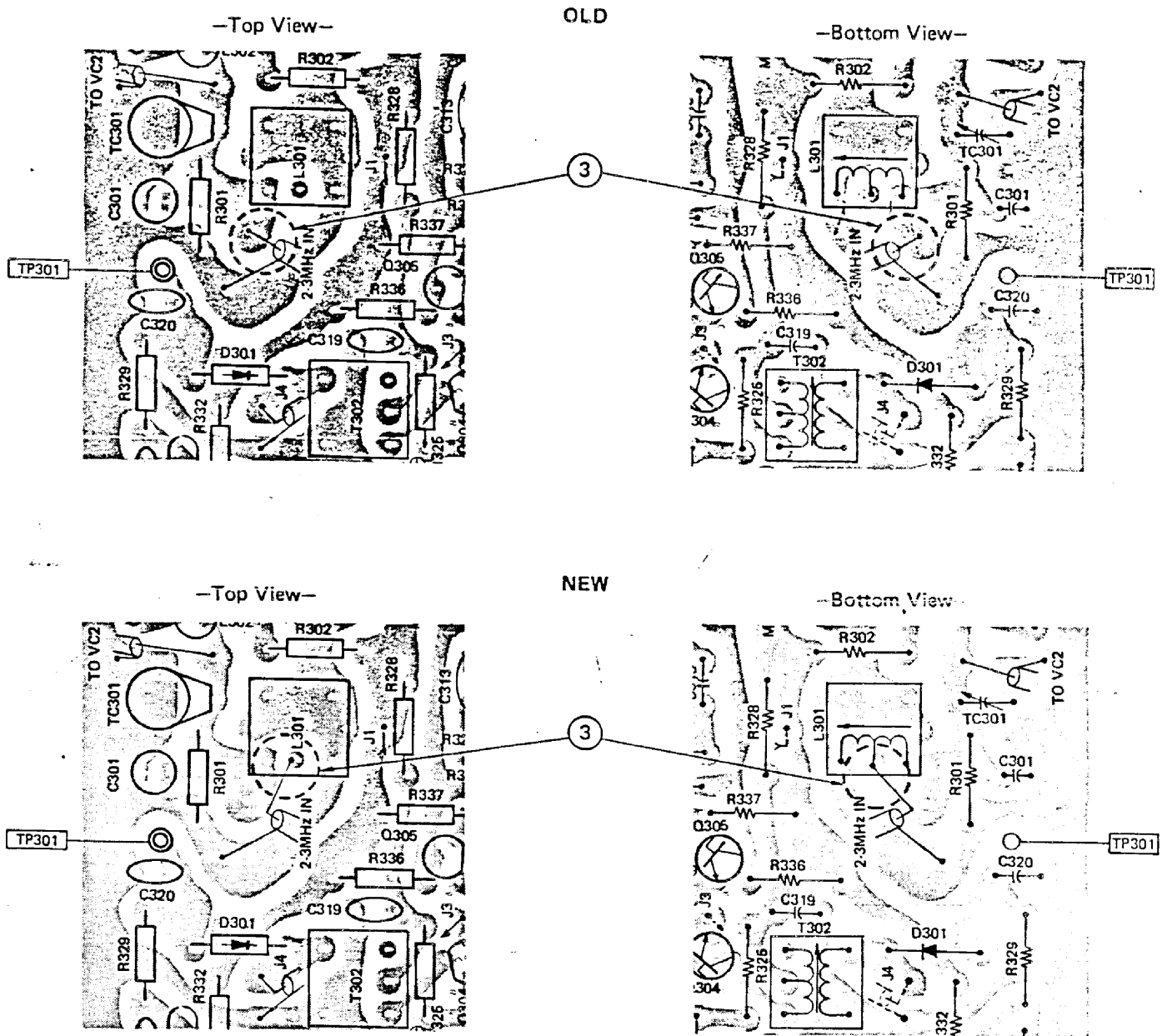


Figure 2 : IF/AF P.C.BOARD PARTS LOCATION

Modification of BFO (From Date Code 3A9)

C345 was changed from 43pF (NP0) to 27pF (NP0). Units which have a date code prior to 3A9 should have this change made. After the change, realign BFO as stated on page 21 of Service Manual.

Modification for improvement of 2nd IF circuit (From date code 4A9)

To avoid oscillation when the kHz readout is indicating below "050".

R301 was changed from 56 K ohms to 33 K ohms. Units which have a date code prior to 4A9 should have this change made.

Modification of AGC time constant for improvement for SSB reception (From Date Code 3A9)

To lengthen the release time of AGC when receiving strong SSB signals, make the following changes. See Figures 3 and 4.

1. Delete C343 22 μ F electrolytic capacitor.
2. Change R353 from 4.7k Ω to 10k Ω .
3. Add following parts.

| | | | |
|------|------------------------|-----------------------------|-------------|
| Q317 | Transistor | 2SC1815(GR) | |
| C376 | Electrolytic Capacitor | 100 μ F/16WV | CE02W1C101C |
| C377 | Electrolytic Capacitor | 1 μ F/50WV | CE04W1H010 |
| C378 | Electrolytic Capacitor | 1 μ F/50WV | CE04W1H010 |
| R378 | Carbon Film Resistor | 10k Ω 1/4W \pm 5% | R25-103J |
| R379 | Carbon Film Resistor | 6.8k Ω 1/4W \pm 5% | R25-682J |
| R380 | Carbon Film Resistor | 100k Ω 1/4W \pm 5% | R25-104J |
| | Lug Terminal | | 1L3P |

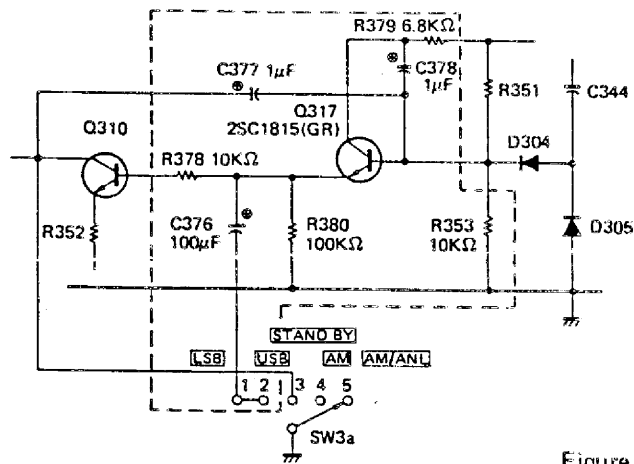


Figure 3

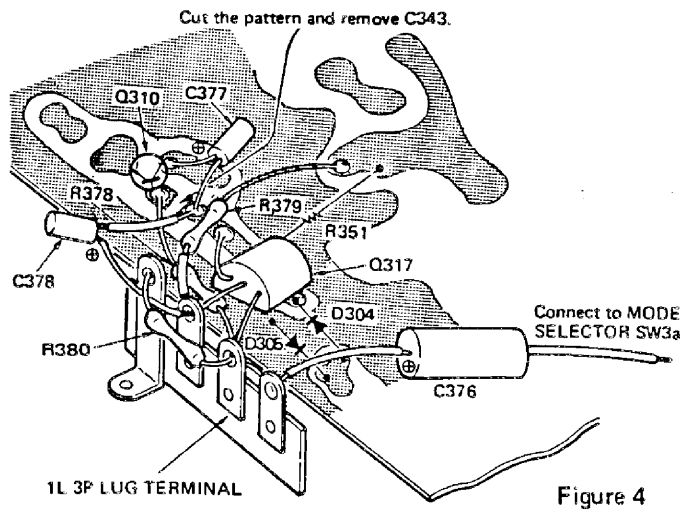
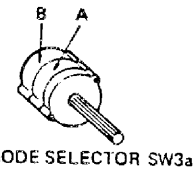
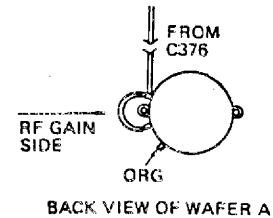


Figure 4



MODE SELECTOR SW3a



BACK VIEW OF WAFER A

RADIO SHACK  A DIVISION OF TANDY CORPORATION

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CANADA: BARRIE, ONTARIO L4M 4W5

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