

***REALISTIC***<sup>®</sup>

# **ServiceManual**

20-145/9145

**PRO-2006**  
**Programmable Scanner**

**Catalog Number:20-145/9145**

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## PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special characteristics. These characteristics often pass unnoticed and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, etc. Replacement parts that have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by a ⚡ in the schematic diagram and the parts list.

Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts that do not have the same safety characteristics as specified in the parts list may create shock, fire or other hazards.

# SPECIFICATIONS

## Frequency Range

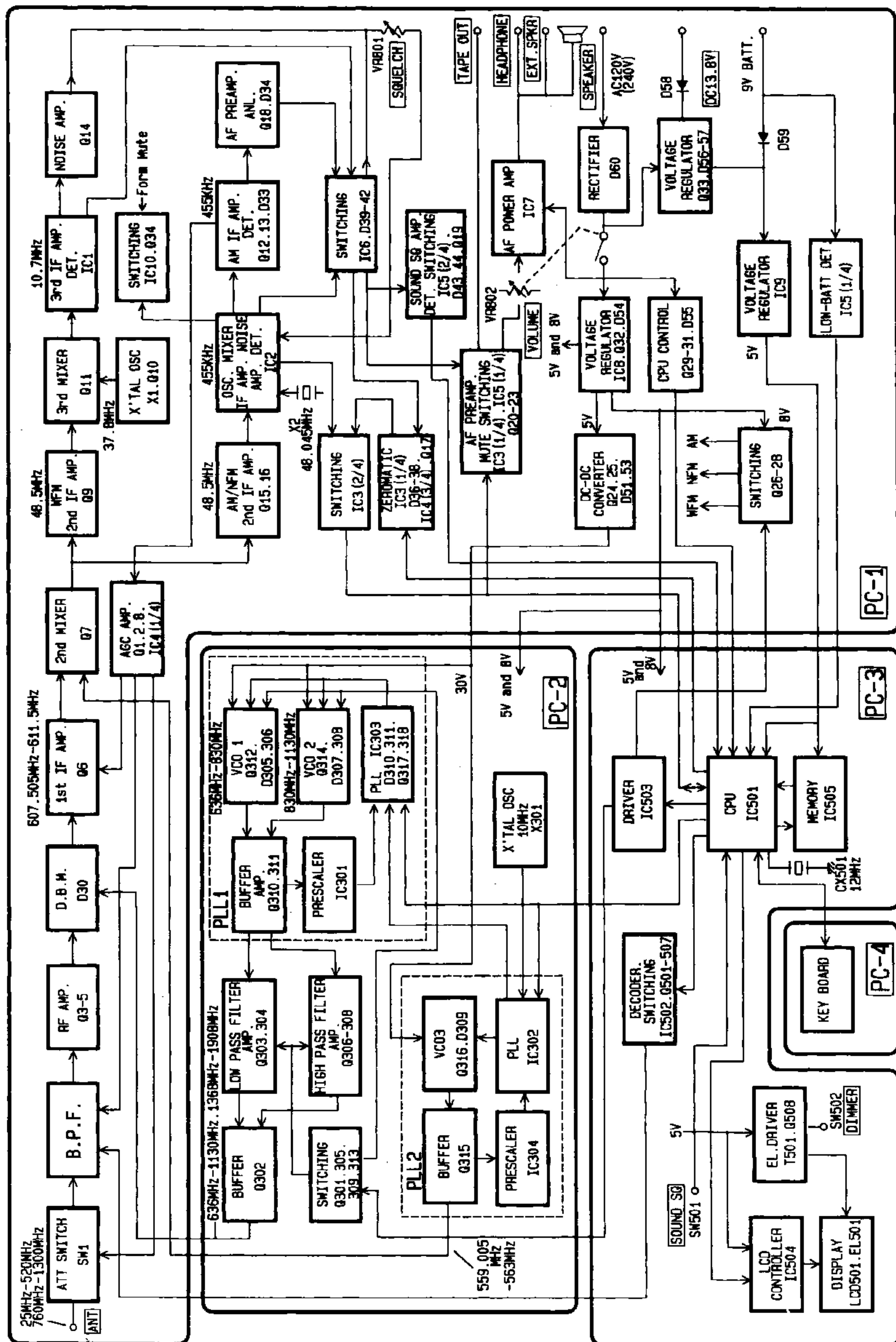
25.000 MHz – 520.000 MHz  
 760.000 MHz – 823.945 MHz  
 851.000 MHz – 868.945 MHz  
 896.000 MHz – 1300.000 MHz

|                       |                                                   |                     | UNIT    | NOMINAL | LIMIT |
|-----------------------|---------------------------------------------------|---------------------|---------|---------|-------|
| Sensitivity           | NFM: (S + N)/N = 20 dB<br>DEV.: 3 kHz at 1 kHz    | 25 MHz – 520 MHz    | $\mu$ V | 0.5     | 2     |
|                       |                                                   | 760 MHz – 1100 MHz  | $\mu$ V | 0.5     | 2     |
|                       |                                                   | 1100 MHz – 1300 MHz | $\mu$ V | 3       | 10    |
|                       | AM: (S + N)/N = 20 dB<br>MOD.: 60% at 1 kHz       | 25 MHz – 520 MHz    | $\mu$ V | 2       | 5     |
|                       |                                                   | 760 MHz – 1100 MHz  | $\mu$ V | 2       | 5     |
|                       |                                                   | 1100 MHz – 1300 MHz | $\mu$ V | 5       | 20    |
|                       | WFM: (S + N)/N = 30 dB<br>DEV.: 22.5 kHz at 1 kHz | 25 MHz – 520 MHz    | $\mu$ V | 3       | 10    |
|                       |                                                   | 760 MHz – 1100 MHz  | $\mu$ V | 3       | 10    |
|                       |                                                   | 1100 MHz – 1300 MHz | $\mu$ V | 10      | 25    |
|                       |                                                   |                     |         |         |       |
| Squelch Sensitivity   | NFM and AM<br>Threshold                           | 25 MHz – 520 MHz    | $\mu$ V | 0.5     | 2     |
|                       |                                                   | 760 MHz – 1100 MHz  | $\mu$ V | 0.5     | 2     |
|                       |                                                   | 1100 MHz – 1300 MHz | $\mu$ V | 3       | 10    |
|                       | Tight: (S + N)/N                                  | 25 MHz – 520 MHz    | dB      | 25      | 15    |
|                       |                                                   | 760 MHz – 1100 MHz  | dB      | 25      | 15    |
|                       |                                                   | 1100 MHz – 1300 MHz | dB      | 20      | 10    |
|                       | WFM<br>Threshold                                  | 25 MHz – 520 MHz    | $\mu$ V | 3       | 10    |
|                       |                                                   | 760 MHz – 1100 MHz  | $\mu$ V | 3       | 10    |
|                       |                                                   | 1100 MHz – 1300 MHz | $\mu$ V | 15      | 30    |
|                       | Tight: (S + N)/N                                  | 25 MHz – 520 MHz    | dB      | 40      | 30    |
|                       |                                                   | 760 MHz – 1100 MHz  | dB      | 40      | 30    |
|                       |                                                   | 1100 MHz – 1300 MHz | dB      | 40      | 30    |
| Selectivity           | NFM and AM:                                       | –6 dB               | kHz     | ± 9     | ± 12  |
|                       |                                                   | –50 dB              | kHz     | ± 15    | ± 18  |
|                       | WFM                                               | –6 dB               | kHz     | ± 150   | ± 200 |
|                       |                                                   | –50 dB              | kHz     | ± 300   | ± 400 |
| Spurious Rejection    | at 328 MHz (NFM)                                  |                     | dB      | 40      | 35    |
| If Rejection          | 610 MHz at 70 MHz (NFM)                           |                     | dB      | 60      | 40    |
|                       | 608 MHz at 1000 MHz (NFM)                         |                     | dB      | 60      | 40    |
| Modulation Acceptance | EIA RS204A                                        |                     | kHz     | ± 8     | ± 5   |

|                                      |                                                                           |                                | UNIT  | NOMINAL | LIMIT   |
|--------------------------------------|---------------------------------------------------------------------------|--------------------------------|-------|---------|---------|
| Signal to Noise Ratio                | NFM and AM                                                                | 25 MHz—520 MHz                 | dB    | 40      | 30      |
|                                      | DEV.: 3 kHz at 1 kHz                                                      | 760 MHz—1100 MHz               | dB    | 40      | 30      |
|                                      | MOD.: 60% at 1 kHz                                                        | 1100 MHz—1300 MHz              | dB    | 35      | 25      |
|                                      | INPUT: 100 $\mu$ V                                                        |                                |       |         |         |
|                                      | WFM                                                                       | 25 MHz—520 MHz                 | dB    | 45      | 35      |
|                                      | DEV.: 22.5 kHz at 1 kHz                                                   | 760 MH—1100 MHz                | dB    | 45      | 35      |
|                                      | INPUT: 100 $\mu$ V                                                        | 1100 MHz—1300 MHz              | dB    | 45      | 35      |
| Residual Noise (Vol. Min.)           |                                                                           |                                | mV    | 3       | 5       |
| Scanning Speed                       | Slow                                                                      | channels/sec                   |       | 13      | 12–14   |
|                                      | Fast                                                                      | channels/sec                   |       | 26      | 24–28   |
| Scan delay time                      |                                                                           |                                | sec   | 2       | 1.5–2.5 |
| Audio Output Power                   | T.H.D. 10%                                                                |                                | watts | 1.3     | 1.0     |
| Channels of Operation                | Any 400 channels in any band combination                                  |                                |       |         |         |
| Channels, Frequency and Mode display | Liquid crystal display                                                    |                                |       |         |         |
| Receiving System                     | Direct Key entry Digital-Controlled Synthesizer, Superheterodyne          |                                |       |         |         |
|                                      | 1st IF (607.505—611.5 MHz)                                                | Upper side 1st local frequency |       |         |         |
|                                      | 2nd IF (48.5 MHz)                                                         | Lower side 2nd local frequency |       |         |         |
|                                      | 3rd IF (10.7 MHz) for Wide FM mode                                        |                                |       |         |         |
|                                      |                                                                           | Lower side 3rd local frequency |       |         |         |
|                                      | 3rd IF (455 MHz) for Narrow FM and AM mode                                |                                |       |         |         |
|                                      |                                                                           | Lower side 3rd local frequency |       |         |         |
| Power Source                         | AC 120 V, 60 Hz, 18 W                                                     |                                |       |         |         |
|                                      | DC 13.8 V, 10 W                                                           |                                |       |         |         |
| Jacks                                | Headphone, External speaker, Tape output and "BNC" type antenna connector |                                |       |         |         |

**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 that still might be considered acceptable. In no case should a unit fail to meet limit specs.

# BLOCK DIAGRAM



# PRINCIPLES OF OPERATION

The PRO-2006 is a Phase Locked Loop (PLL) synthesized VHF/UHF, AM/FM receiver controlled by a Central Processing Unit (CPU) via a keyboard.

Receiving mode and search step are initially set to correspond with the frequencies entered. When a frequency within FM broadcast band is keyed in, receiving mode is set to wideband FM (WFM). When a frequency in active radio band, police, fire, ham radio etc. is keyed in, the mode is set to narrowband FM (NFM), and when a frequency in aircraft and CB band is keyed in, it sets to AM mode. Also the mode and step can be changed by MODE, STEP Keys.

The CPU (IC501) controls receiving frequency range, frequency determination, scanning speed and delay time etc. The CPU is able to do only the assigned functions, and no modification of the CPU is feasible.

The following paragraphs explain the operation of the circuit in terms of the functional blocks:

RF input circuit comprises 10 dB attenuator and bandpass filter. A signal generated by VCO1 or VCO2 is applied to double balanced mixer (D.B.M.) via low-pass or high-pass filter and mixed with the RF signal. The D.B.M. is employed to facilitate 25 MHz to 1300 MHz mixing.

The 1st IF (Q6) is 607.505 MHz to 611.500 MHz, and the signal is mixed with VCO3 frequency at the 2nd mixer (Q7) to produce 48.5 MHz signal, which is applied to WFM IF (Q9) or AM/NFM IF (Q15, Q16). Corresponding with input from the keyboard, CPU determines which of VCO1 or VCO2 WFM IF, AM/NFM, AM IF, Data of PLL circuit to be functioned, and outputs the necessary data.

A signal entered to AM/NFM IF is mixed with X'tal oscillation frequency 48.045 MHz at the 3rd mixer (IC2) and converted to 455 kHz signal. A signal entered to WFM IF is mixed with X'tal oscillation frequency 37.8 MHz at the 3rd mixer (Q11) and converted to 10.7 MHz signal. The signals are further amplified and detected to AF signal.

AF signals of WFM, AM and NFM are CPU controlled and applied to AF power amplifier (IC7) via switching circuit. Squelch signal is comprised of noise product from WFM/NFM detector output, and amplified by IC2 to switching signal, which controls AF mute and CPU.

Any unstable supply voltage to the CPU can produce CPU mal-functions, such as wrong data processing, wrong data transfer, etc. To overcome this, C508 and R517 "initialize" the CPU. Initialization is done when RESTART switch is pushed. Figure A shows initializing waveform.

CX501 (12.0 MHz) is a clock which is used for CPU control. Figure B shows 1/4 divided waveform at Pin 28 of IC501.

CPU output data display frequency and function etc. on LCD. LCD is back lighted with Electro Luminescence, which works with 70 V rms, 300 Hz A.C.

Power supply comprises DC 30 V, 8 V and two 5 V lines.

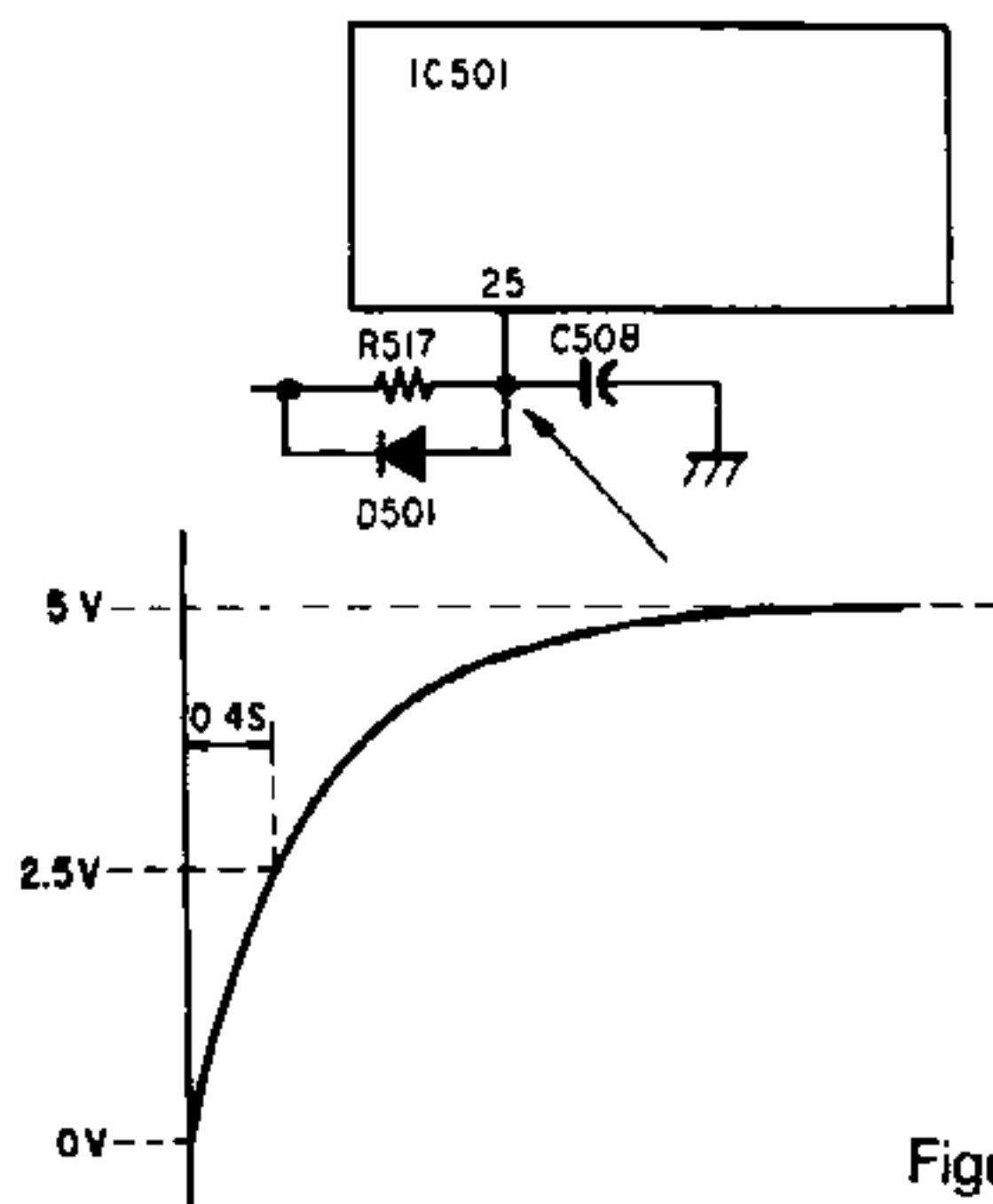


Figure A

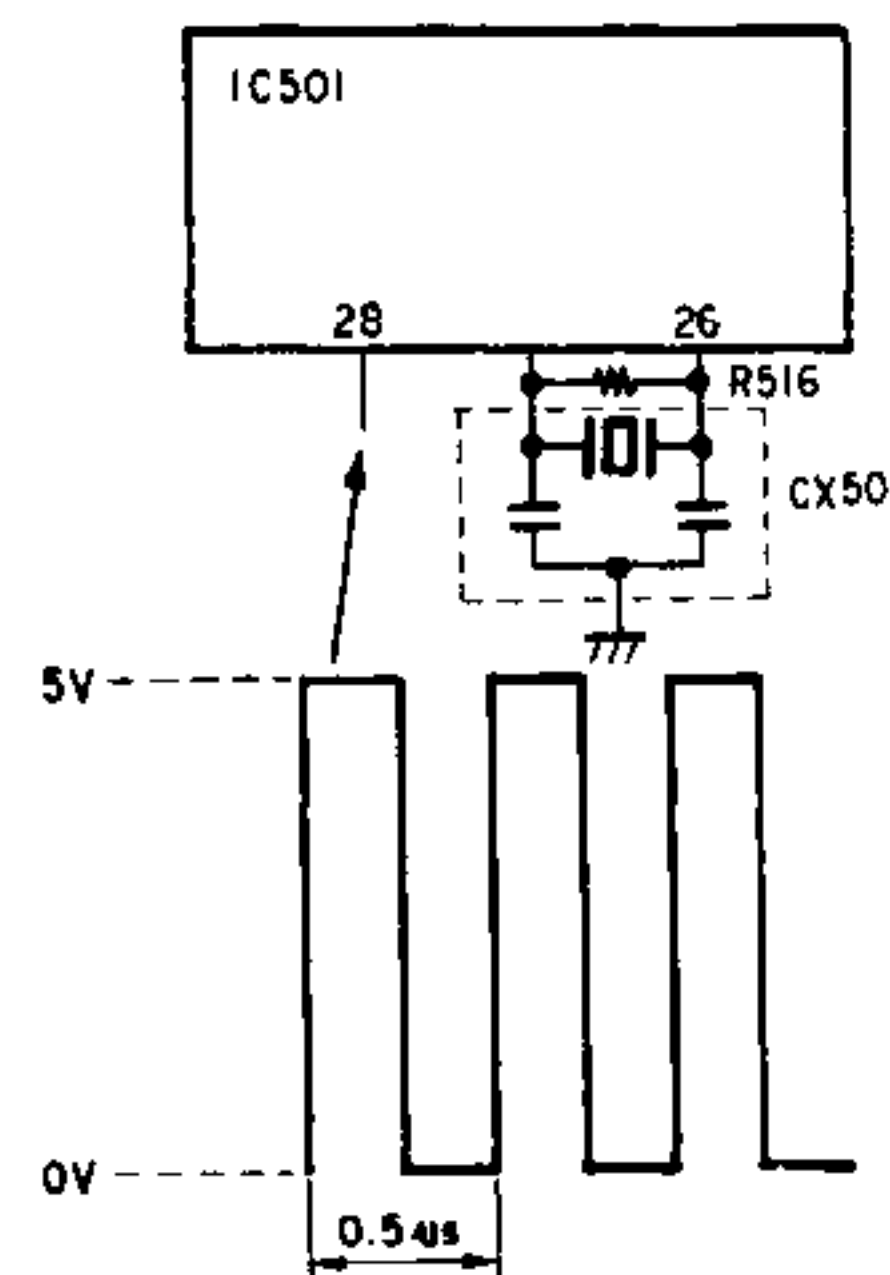
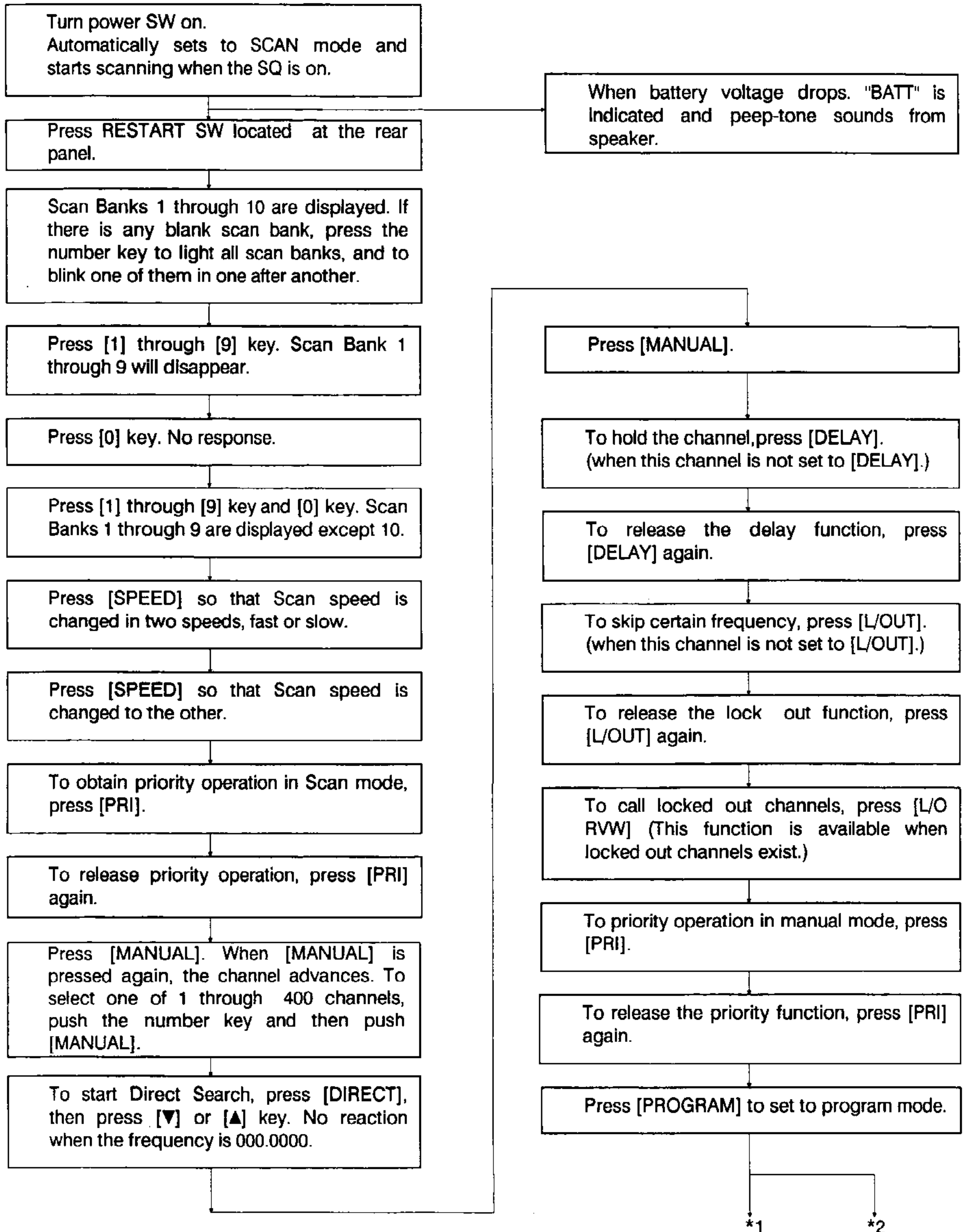
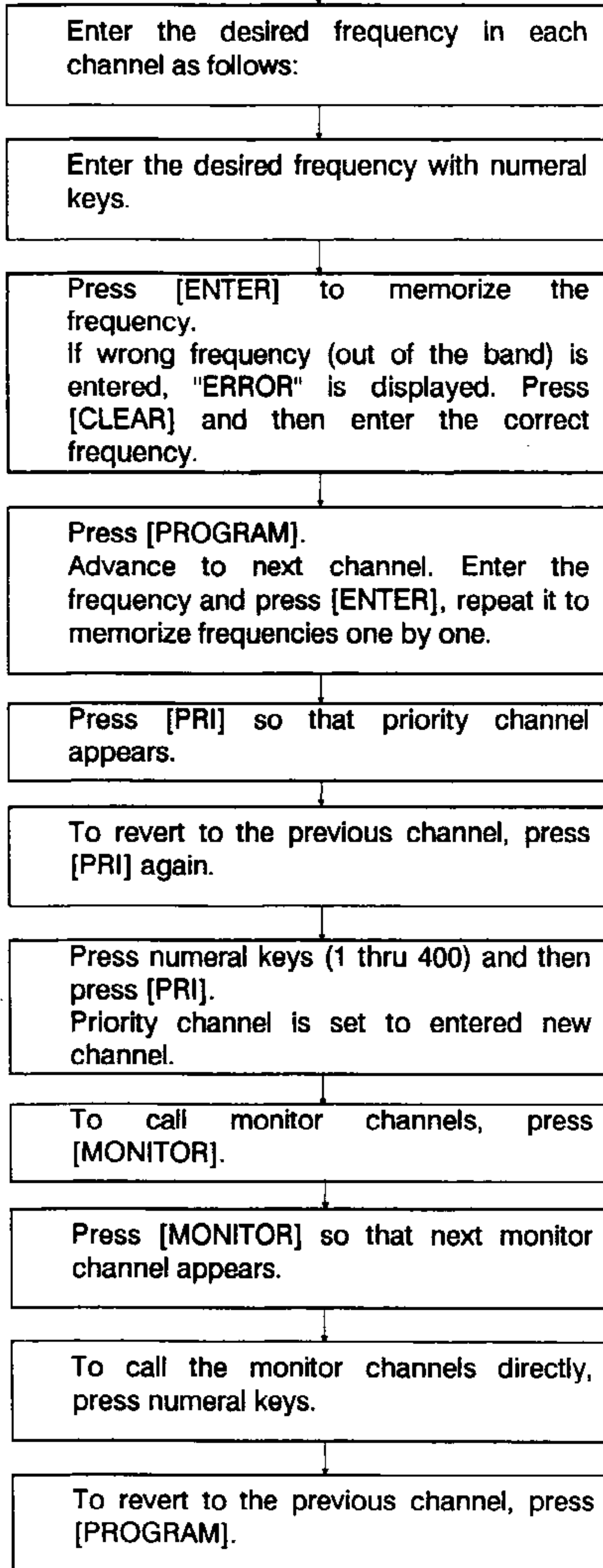


Figure B

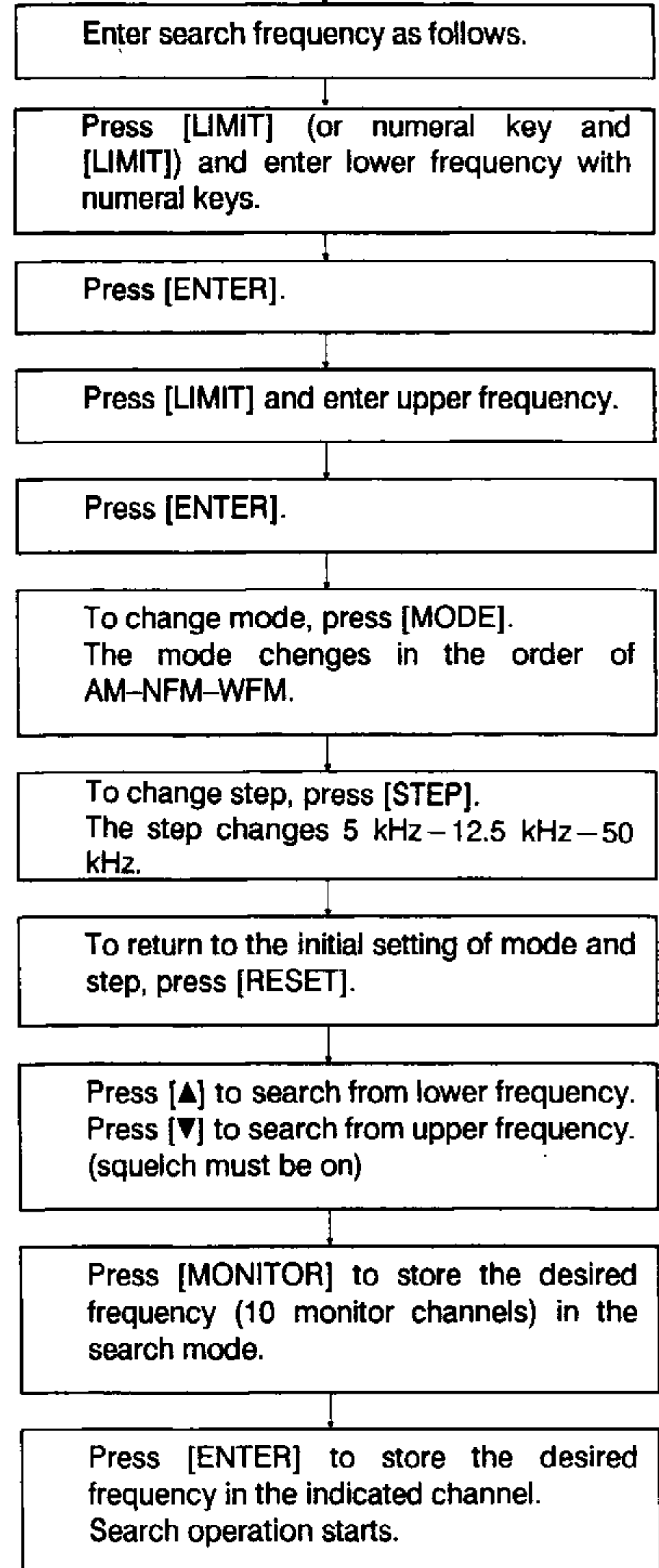
# GENERAL OPERATION OUTLINE



\*1



\*2

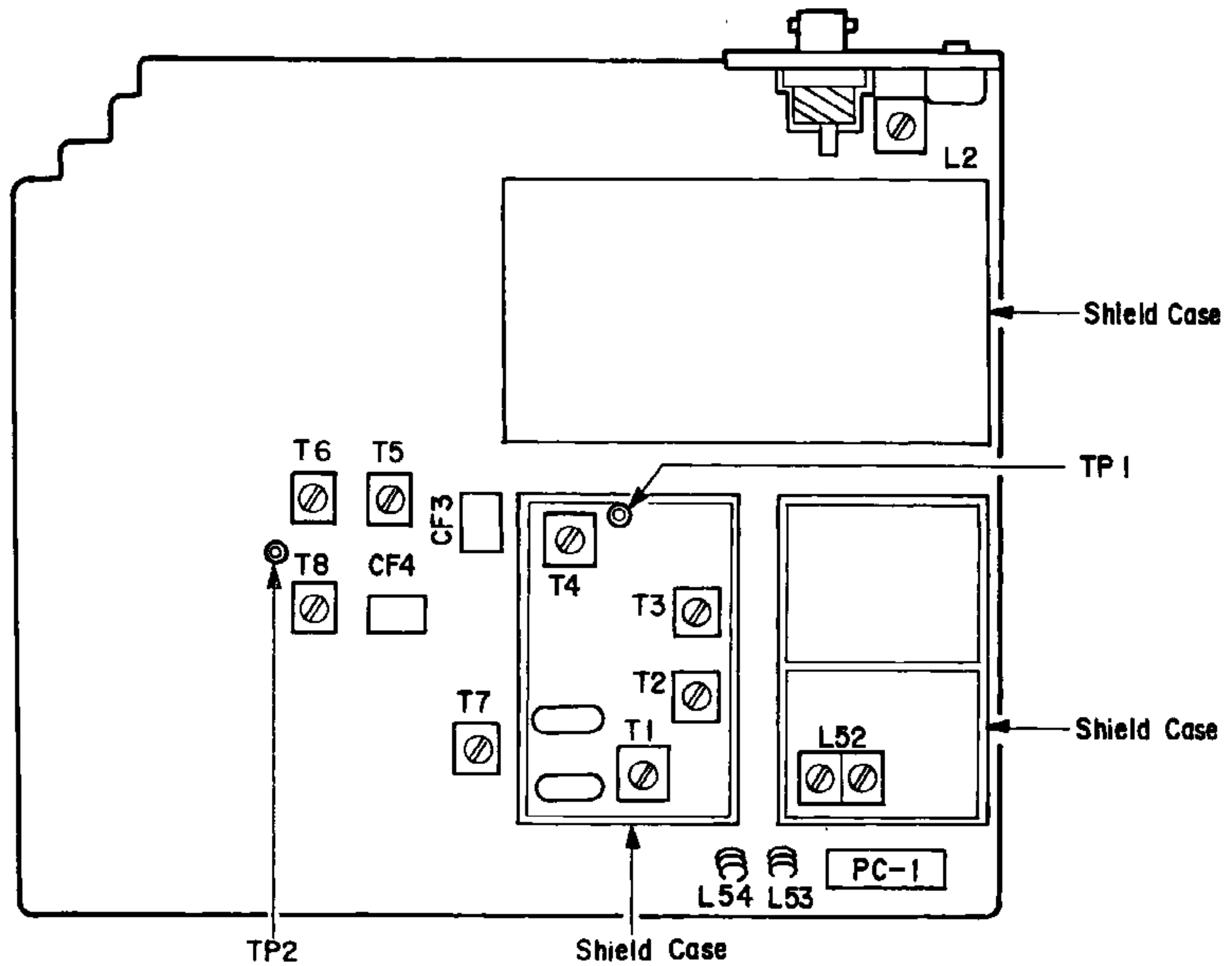


# ALIGNMENT

## Alignment and Test Points

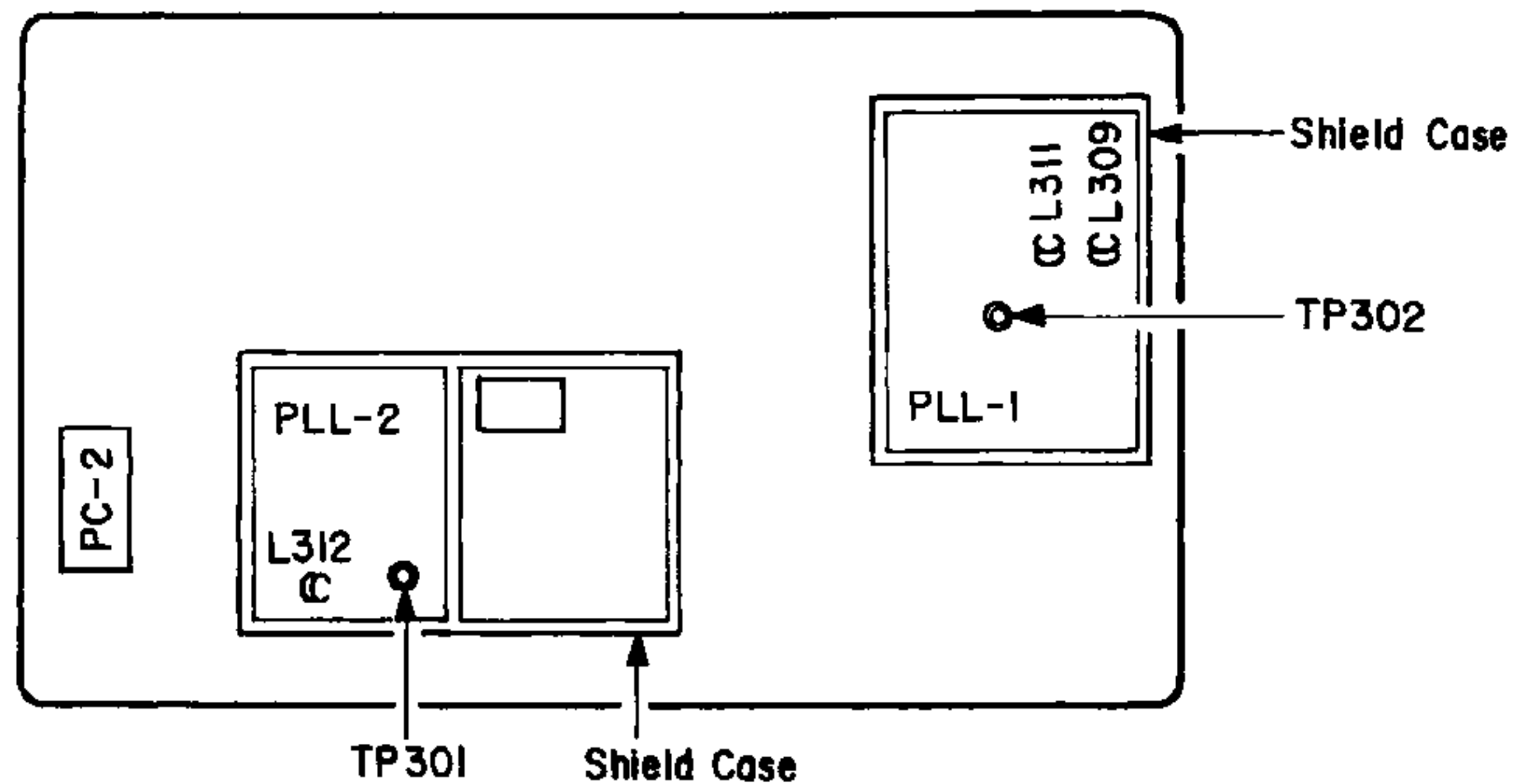
### Linear PCB

PC-1



### PLL PCB

PC-2



# Alignment Preparation

## Test equipment required

Oscilloscope  
AC SSVM  
DC SSVM  
8-ohm dummy load  
AM, FM, Signal Generator (25 to 1300 MHz)  
Distortion Meter

## Note:

- Use non-metallic tuning tools.
- The test equipment and Receiver should be warmed up at least 15 minutes before proceeding to alignment.
- The signal level from the Generator should be kept as low as possible obtain usable output.

Program CH1 to CH10 as follows.

| Channel | Frequency (MHz) and MODE | Channel | Frequency (MHz) and MODE |
|---------|--------------------------|---------|--------------------------|
| 1       | 804.500 (NFM)            | 6       | 120.000 (AM)             |
| 2       | 220.495 (NFM)            | 7       | 300.495 (NFM)            |
| 3       | 520.000 (NFM)            | 8       | 240.495 (NFM)            |
| 4       | 250.000 (NFM)            | 9       | 800.495 (NFM)            |
| 5       | 98.000 (WFM)             | 10      | 800.500(NFM)             |

Table 1

# Alignment Procedures

## Alignment of VCO (PLL 2)

| Step | Control Setting<br>Channel Programming                                                                | Test Instrument<br>Connection          | Adjust | Remarks                                              |
|------|-------------------------------------------------------------------------------------------------------|----------------------------------------|--------|------------------------------------------------------|
| 1    | OFF/VOLUME control:<br>ON<br>SQUELCH control:<br>Fully CCW<br>(counterclockwise)<br>Select channel 1. | Connect DC SSVM to TP301<br>(Figure 1) | L312   | Adjust L312 for 3V on the DC<br>SSVM.<br>See Table2. |

## Alignment of VCO (PLL 1)

| Step | Control Setting<br>Channel Programming                                                | Test Instrument<br>Connection             | Adjust       | Remarks                                                                                                                                                               |
|------|---------------------------------------------------------------------------------------|-------------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2    | OFF/VOLUME control:<br>ON<br>SQUELCH control:<br>Fully CCW<br>Select channel 2 and 3. | Connect DC SSVM to<br>TP302<br>(Figure 2) | L309<br>L311 | 1) Select channel 2 and adjust<br>L309 for 20 V on the DC<br>SSVM. See Table 2.<br><br>2) Select channel 3 and adjust<br>L311 for 19 V in the DC SSVM<br>See Table 2. |

Figure 1

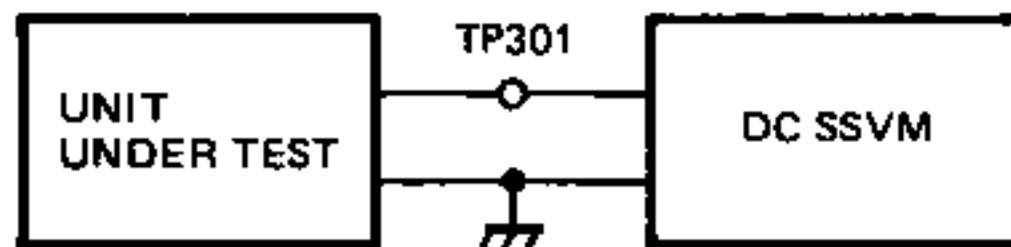


Figure 2

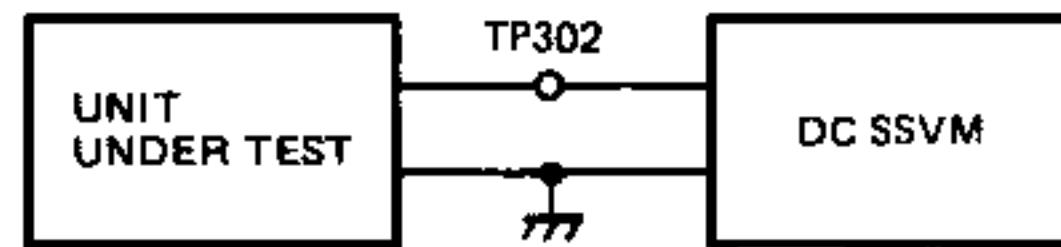


Table 2

| Coil L309, L311, L312                                                                                                                                                                                                                                                                                                                                          | Coil alignment (open)                                                                                                                                                                      | Coil alignment (close)                                                                                                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Figure 3</p> <p>PLL P.C.B.</p> <p>Note:</p> <ul style="list-style-type: none"> <li>Perform coils interval alignment delicately because it greatly affects the frequency .</li> <li>Fix the coils with glue after alignment and then repeat the ALIGNMENT PROCEDURES Step 1 and Step 2. After checking the fixation and temperature being normal.</li> </ul> | <p>Figure 4</p> <p>PLL P.C.B.</p> <p>* Open the coil as shown above by using non metallic tuning tool when the measuring voltage at TP301 or TP302 is higher than the setting voltage.</p> | <p>Figure 5</p> <p>PLL P.C.B.</p> <p>* Close the coil as shown above by using non metallic tuning tool when the measuring voltage as TP301 or TP302 is lower than the setting voltage.</p> |

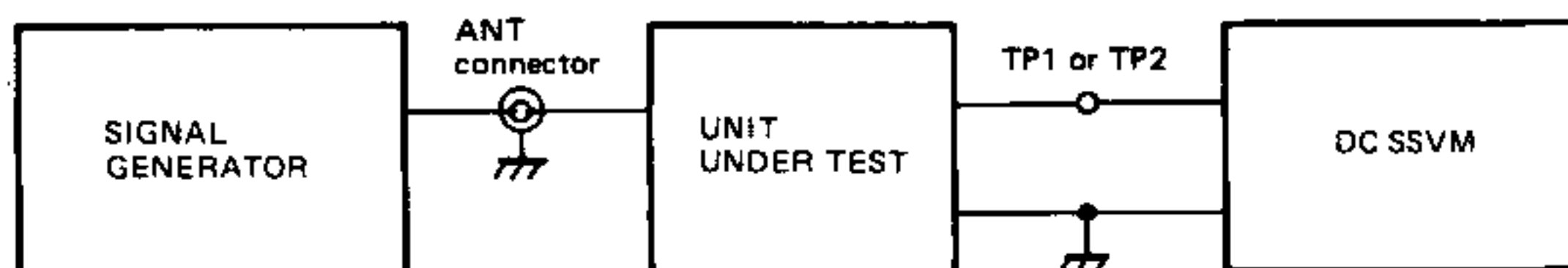
### Alignment of 455 kHz NFM Discriminator coil

| Step | Control Setting Channel Programming                                             | Test Instrument Connection                                               | Adjust | Remarks                                                                                                                         |
|------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------|---------------------------------------------------------------------------------------------------------------------------------|
| 3    | OFF/VOLUME control:<br>ON<br>SQUELCH control:<br>Fully CCW<br>Select channel 4. | Connect Signal Generator to ANT connector and DC SSVM to TP2 (Figure 6). | T8     | Set the Signal Generator frequency to 250 MHz, 100 $\mu$ V output (NO MOD) and adjust T8 for 3.8 V ( $\pm$ 0.1) on the DC SSVM. |

### Alignment of 10.7 MHz WFM Discriminator coil

| Step | Control Setting Channel Programming                                             | Test Instrument Connection                                               | Adjust | Remarks                                                                                                                        |
|------|---------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------|--------------------------------------------------------------------------------------------------------------------------------|
| 4    | OFF/VOLUME control:<br>ON<br>SQUELCH control:<br>Fully CCW<br>Select channel 5. | Connect Signal Generator to ANT connector and DC SSVM to TP1 (Figure 6). | T4     | Set the Signal Generator frequency to 98 MHz, 100 $\mu$ V output (NO MOD) and adjust T4 for 3.9 V ( $\pm$ 0.1) on the DC SSVM. |

Figure 6



### Alignment of 48.5 MHz and 10.7 MHz WFM IF coil

| Step | Control Setting Channel Programming                                             | Test Instrument Connection                                                                                                         | Adjust   | Remarks                                                                                                                                                       |
|------|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5    | OFF/VOLUME control:<br>ON<br>SQUELCH control:<br>Fully CCW<br>Select channel 5. | Connect Signal Generator to ANT connector, and oscilloscope, AC SSVM, distortion meter and 8 ohm load to EXT SPKR jack. (Figure 7) | T2<br>T3 | 1) Set the Signal Generator frequency to 98 MHz.<br>FM: 22.5 kHz Dev. at 1 kHz and output at S/N 20 dB point.<br>2) Adjust T2 and T3 for maximum sensitivity. |

### Alignment of 48.5 MHz 2nd IF coil

| Step | Control Setting Channel Programming                                             | Test Instrument Connection | Adjust   | Remarks                                                                                                                                                   |
|------|---------------------------------------------------------------------------------|----------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6    | OFF/VOLUME control:<br>ON<br>SQUELCH control:<br>Fully CCW<br>Select channel 6. | Same as step 5.            | T1<br>T7 | 1) Set the Signal Generator frequency to 120 MHz.<br>AM: 60% Mod. at 1 kHz and output at S/N 20 dB point.<br>2) Adjust T1 and T7 for maximum sensitivity. |

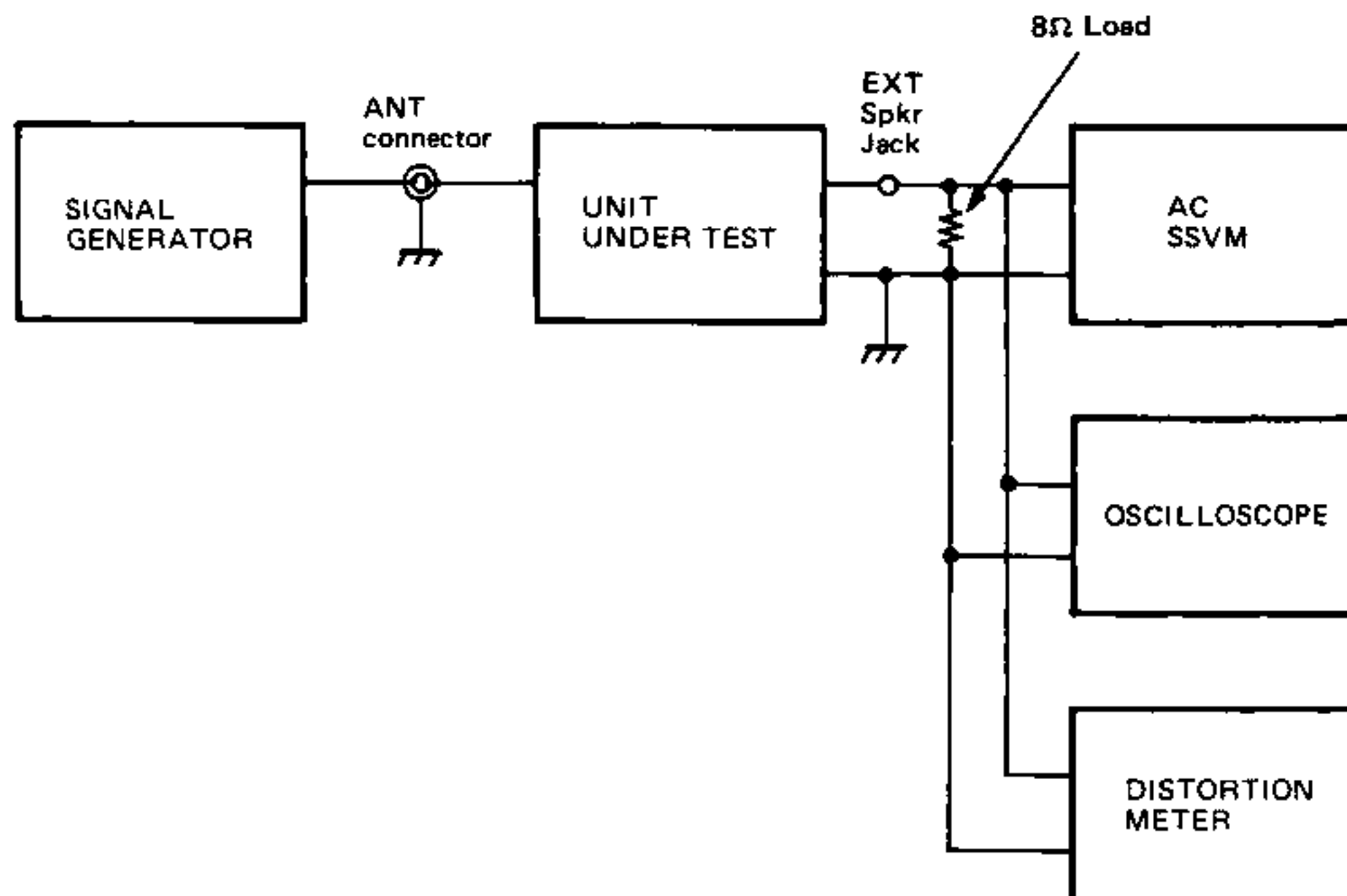
### Alignment of 455 kHz IF coil

| Step | Control Setting Channel Programming                                             | Test Instrument Connection                                                                                                        | Adjust | Remarks                                                                                                                                           |
|------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| 7    | OFF/VOLUME control:<br>ON<br>SQUELCH control:<br>Fully CCW<br>Select channel 6. | Connect Signal Generator to ANT connector and oscilloscope, AC SSVM, Distortion meter and 8 ohm load to EXT SPKR jack. (Figure 7) | T5     | 1) Set the Signal Generator frequency to 120 MHz.<br>AM: 60% Mod. at 1 kHz and output at S/N 20 dB point.<br>2) Adjust T5 to maximum sensitivity. |

### Alignment of 455 kHz AM DET. coil

| Step | Control Setting Channel Programming | Test Instrument Connection | Adjust | Remarks                                                                                                                                        |
|------|-------------------------------------|----------------------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------|
| 8    | Same as step 7                      | Same as step 7             | T6     | 1) Set the Signal Generator frequency to 120 MHz.<br>AM: 60% Mod. at 1 kHz and output at 100 $\mu$ V.<br>2) Adjust T6 to minimum T.H.D. point. |

Figure 7



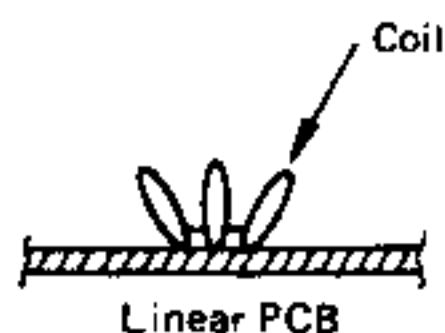
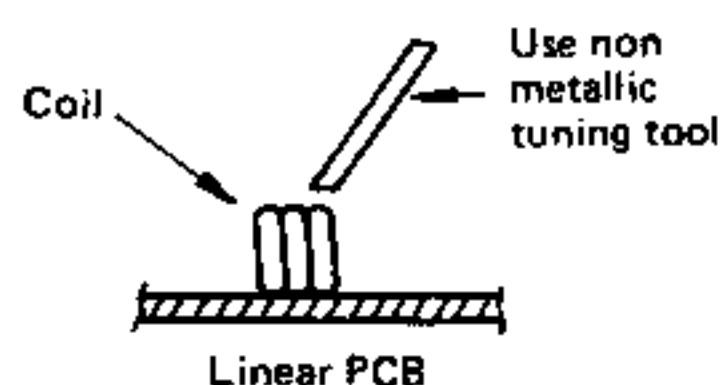
### Alignment of IF TRAP coils

| Step | Control Setting Channel Programming                                             | Test Instrument Connection | Adjust. | Remarks                                                                                                                                                   |
|------|---------------------------------------------------------------------------------|----------------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9    | OFF/VOLUME control:<br>ON<br>SQUELCH control:<br>Fully CCW<br>Select channel 7. | Same as step 5             | L2      | 1) Set the Signal Generator frequency to 609.505 MHz.<br>FM: 3 kHz Dev. 1 kHz Mod.<br>Output approx. 300 $\mu$ V.<br>2) Adjust L2 to maximum sensitivity. |

### Alignment of 512 MHz TRAP coil

| Step | Control Setting Channel Programming                                             | Test Instrument Connection | Adjust     | Remarks                                                                                                                                                                      |
|------|---------------------------------------------------------------------------------|----------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10   | OFF/VOLUME control:<br>ON<br>SQUELCH control:<br>Fully CCW<br>Select channel 8. | Same as step 5             | L53<br>L54 | 1) Set the Signal Generator frequency to 337.495 MHz.<br>FM: 3 kHz Dev. 1 kHz Mod.<br>Output approx. 3 mV.<br>2) Adjust L53 and L54 to minimum sensitivity.<br>See Figure 8. |

Figure 8



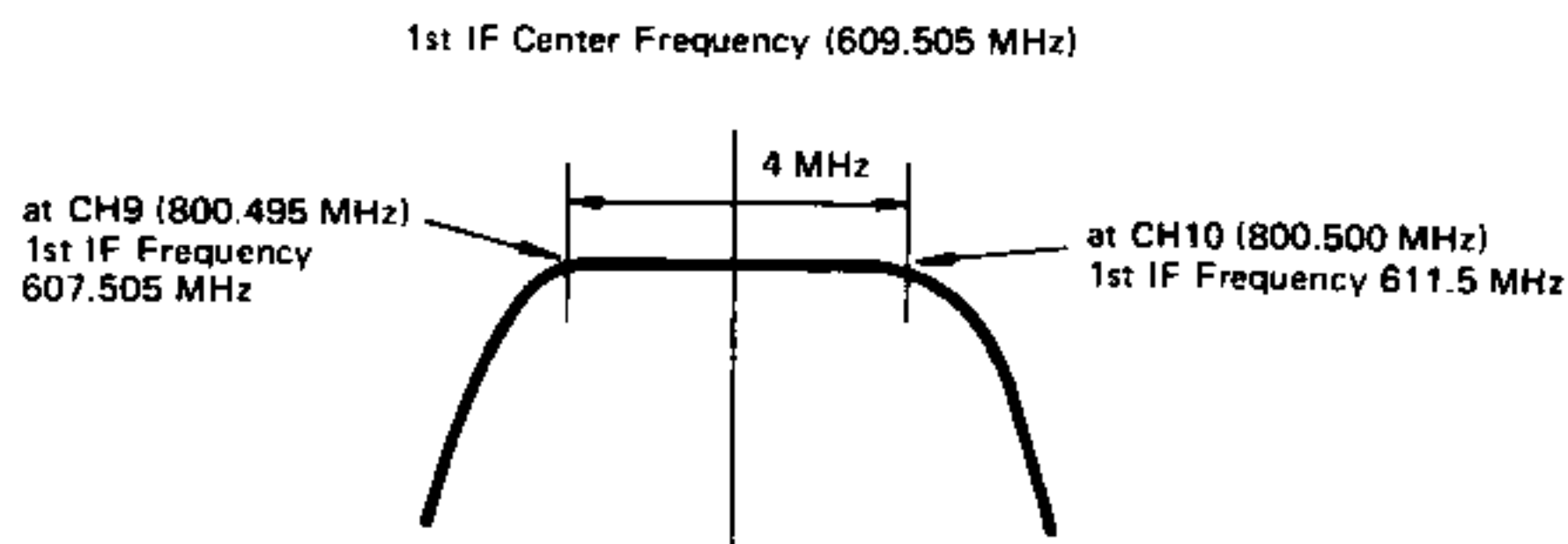
Adjust L53 and L54  
open or close

**Note:** Alignment of L52 (HF-62H14 B.P.F. coil)  
 Do not adjust this coil because of L52 is already adjusted at factory.  
 If the coil is moved by mistake, adjust it as per below.  
 B.P.F. characteristic is Figure 9.

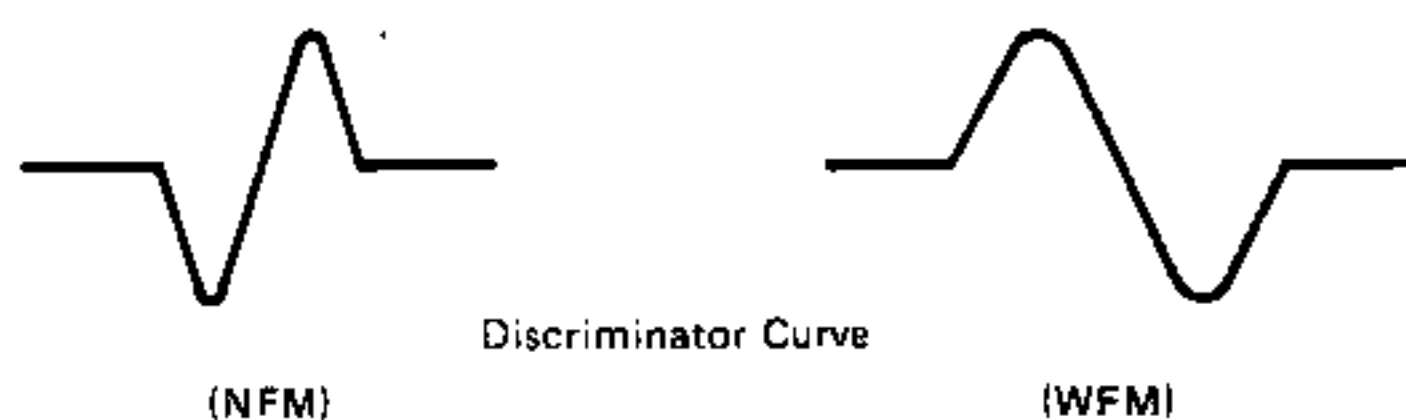
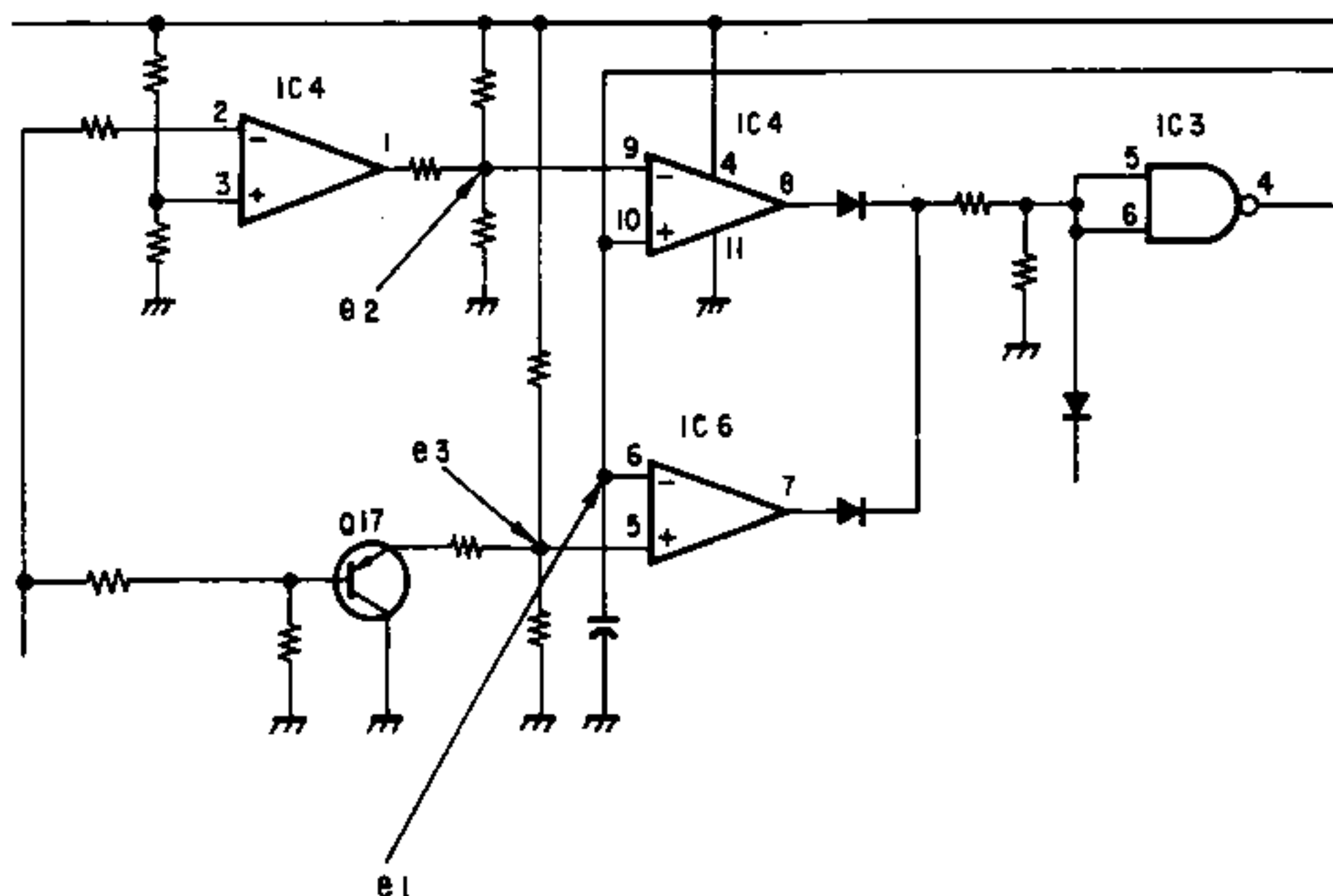
**Alignment 1st IF (611.5 to 607.505 MHz) B.P.F. coil**

| Step | Control Setting Channel Programming                                                    | Test Instrument Connection | Adjust | Remarks                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------|----------------------------------------------------------------------------------------|----------------------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11   | OFF/VOLUME control:<br>ON<br>SQUELCH control:<br>Fully CCW<br>Select channel 9 and 10. | Same as step 7             | L52    | 1) Select channel 9 and set the Signal Generator frequency to 800.495 MHz.<br>FM: 3 kHz Dev. at 1 kHz and 1 $\mu$ V output.<br>2) Adjust L52 to maximum sensitivity.<br>3) Select channel 10 and set the Signal Generator frequency to 800.500 MHz.<br>FM: 3 kHz Dev. at 1 kHz and 1 $\mu$ V output.<br>4) Readjust L52 to maximum sensitivity.<br><br>NOTE: Align the balance of CH 9, CH10 sensitivity to become same. |

**Figure 9**



## Zeromatic Function Test Procedure



(Zeromatic functions when OUTPUT is in "H" level.)

|                        |               |                |                 |
|------------------------|---------------|----------------|-----------------|
|                        | $0 < e1 < e3$ | $e3 < e1 < e2$ | $e2 < e1 < VCC$ |
| OUTPUT (IC3 Pin No. 4) | L             | H              | L               |

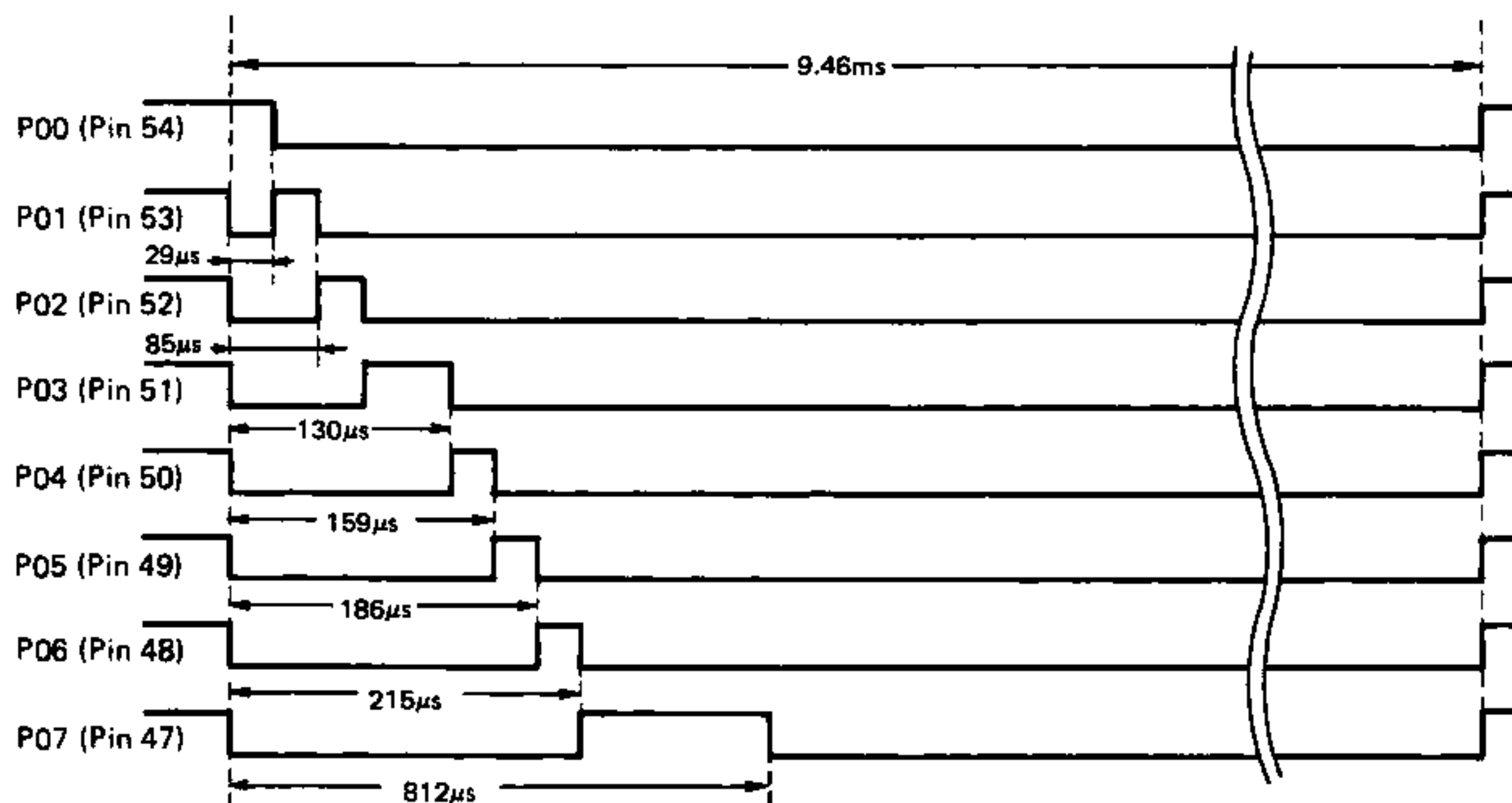
(NFM MOD.)

To adjust e1 voltage, receive signal in Manual mode, and set T8 to obtain 3.8 V (+ 0.1 V) at TP2. It is convenient to use the National Weather Service signal for the adjustment.

## (WFM MOD.)

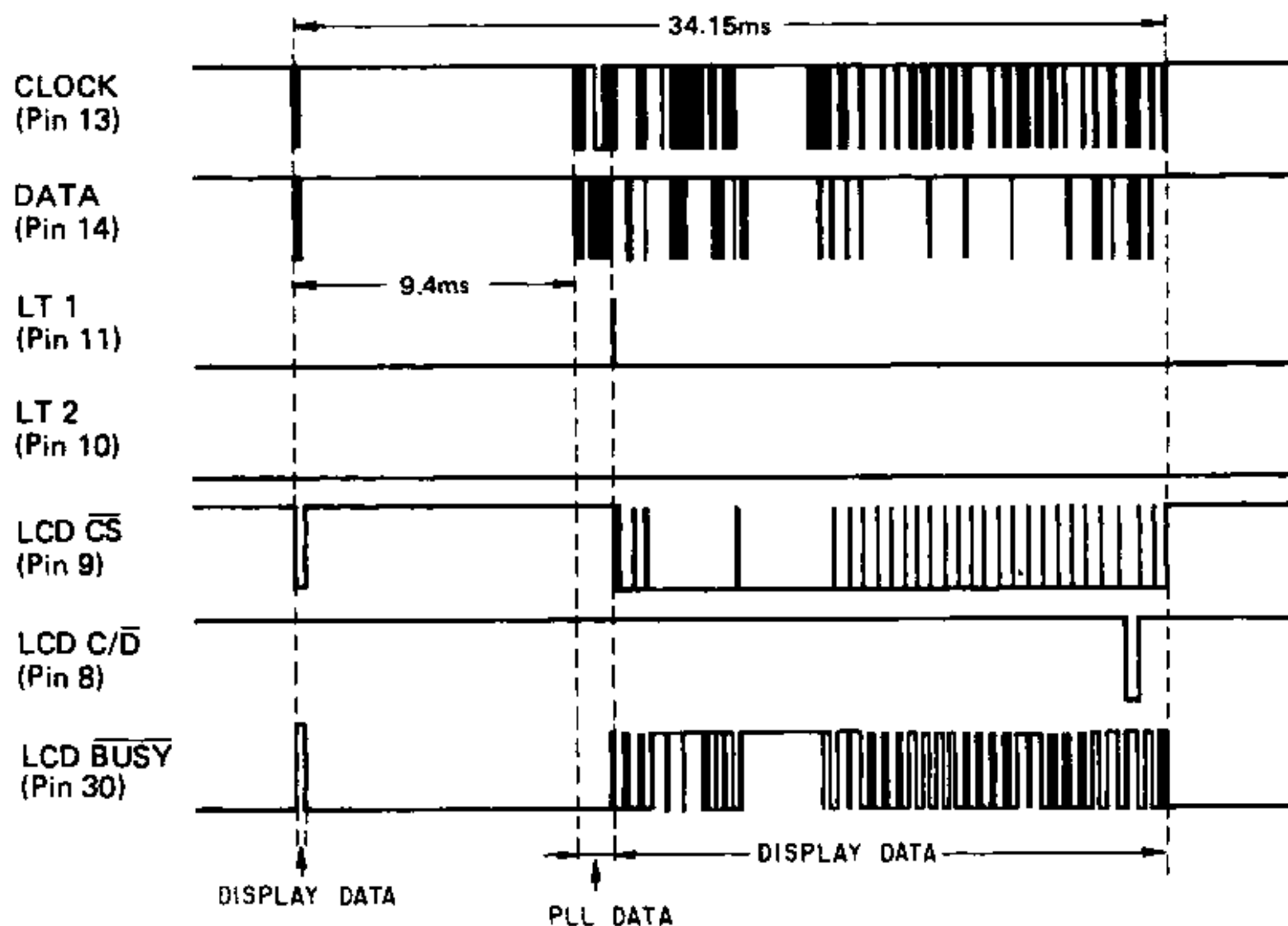
To adjust e1 voltage, receive signal in Manual mode and set T4 to obtain 3.9 V (+ 0.1 V) at TP1. It is convenient to use the FM or TV sound signal for the adjustment.

## Key Access Pulse Output (IC501)

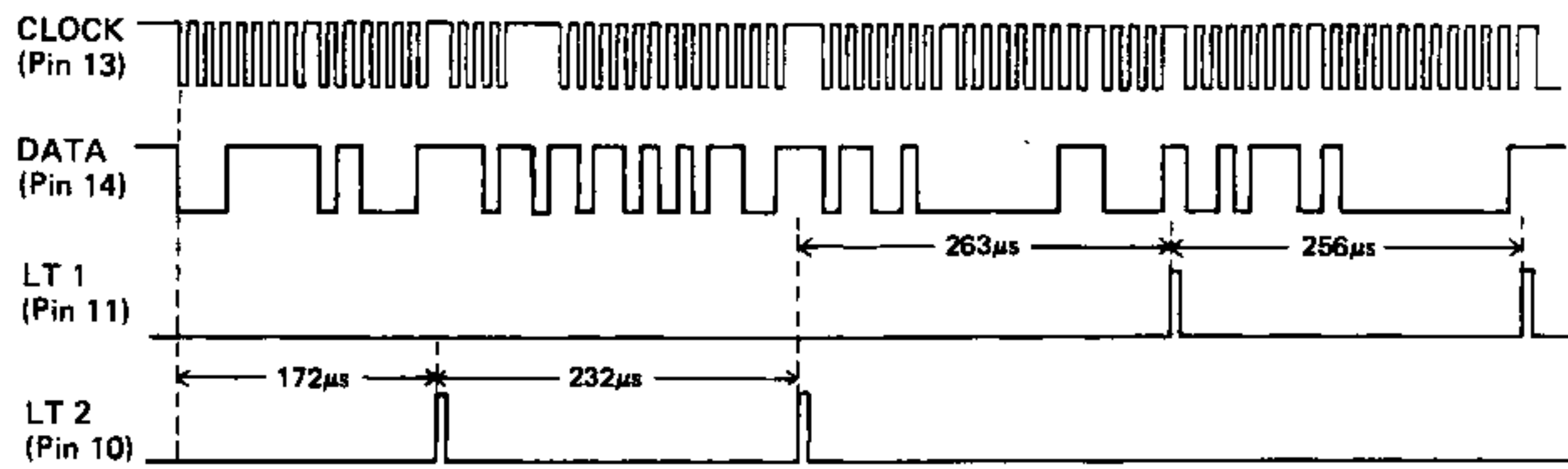


Note: Use a signal at P01 of IC501 as trigger, and then observe the keys access pulse when [PROGRAM] key pressed.

## Data Waveform (IC-501)

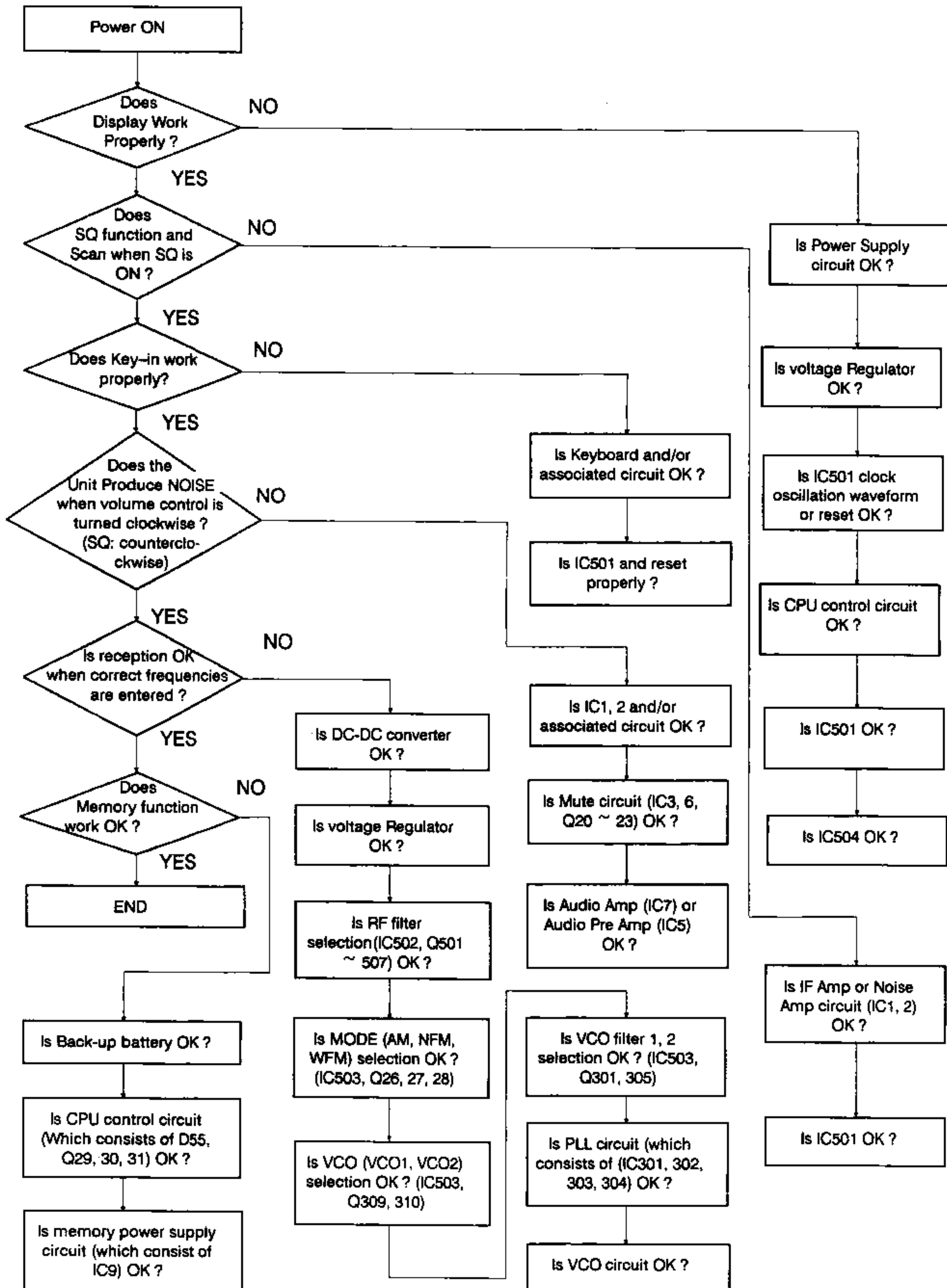


## PLL Data Waveform

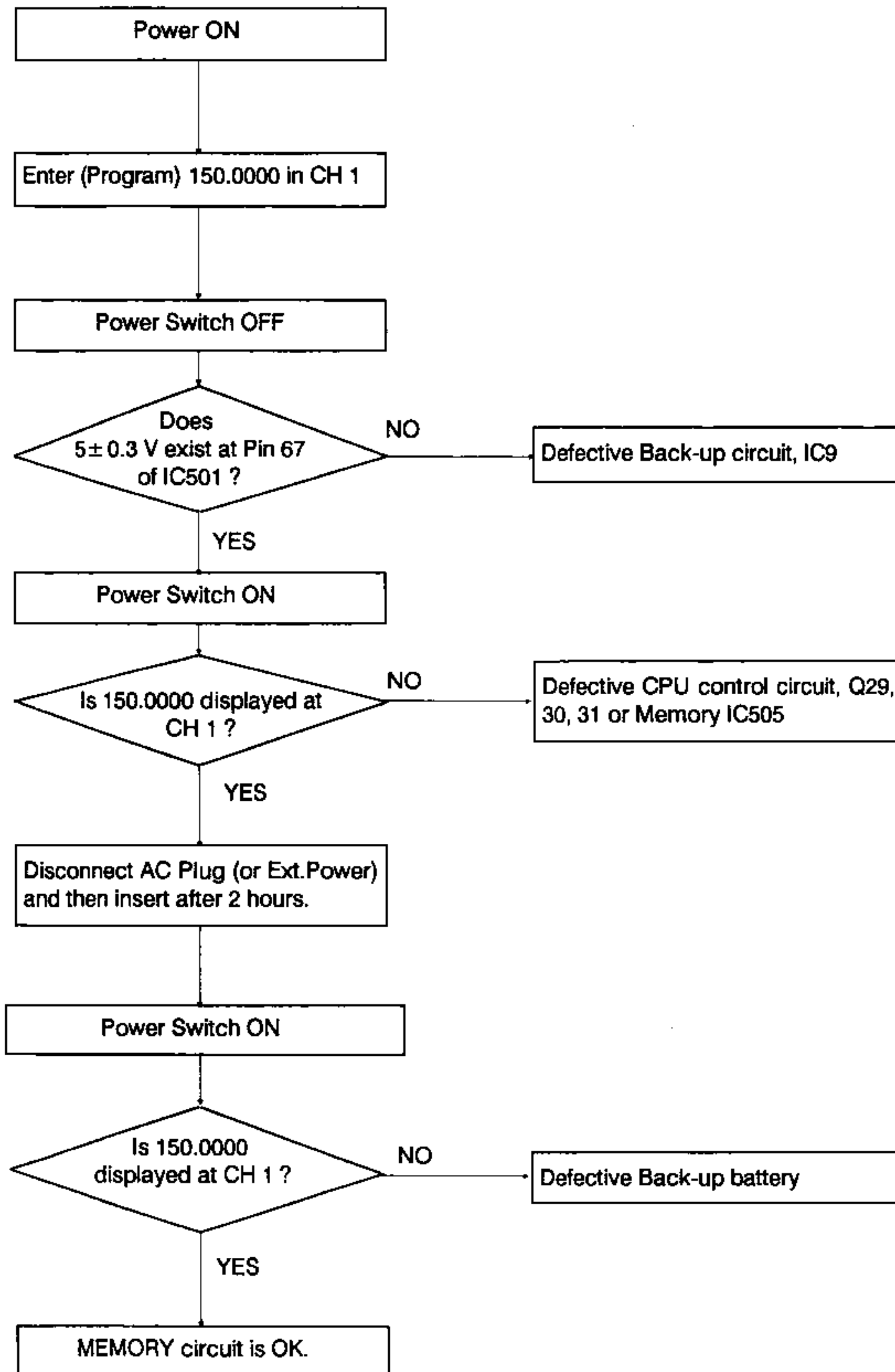


Note: Data in Program mode when 150.000 MHz is entered.

# RECEPTION CHECK



# MEMORY CHECK



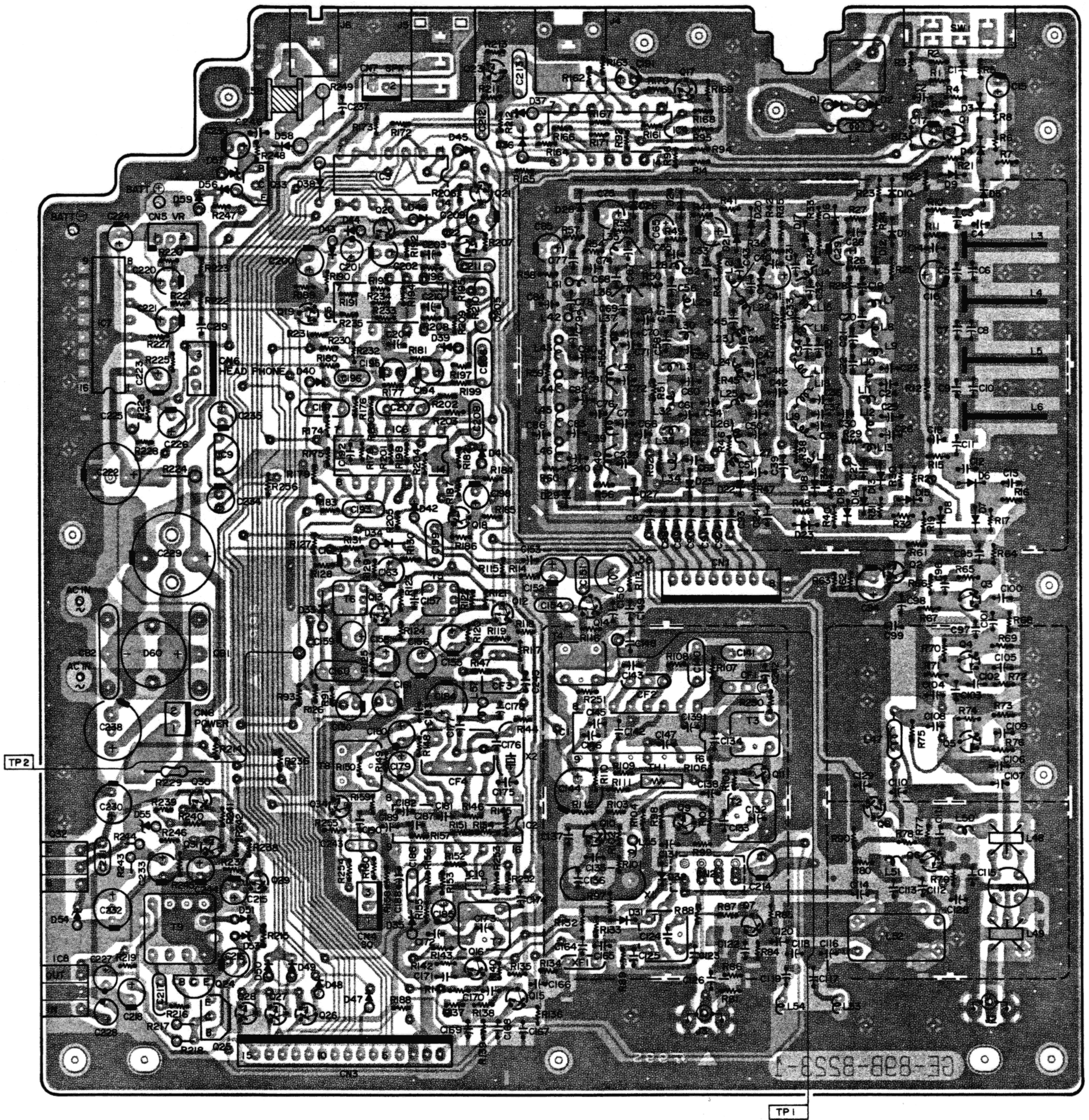
# TROUBLESHOOTING

| Symptom                                                                                                                  | Cause/Remedy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Display does not light and no sound when POWER is ON.<br>Volume control: MAX.<br>Squelch control: CCW (counterclockwise) | <ol style="list-style-type: none"> <li>1) Defective AC line cord: Replace.</li> <li>2) Defective Power transformer T801: Replace.</li> <li>3) Defective Off/Volume control VR802: Replace.</li> <li>4) Defective Rectifier D60: Replace.</li> <li>5) Defective Voltage regulator circuit: Replace the defective components.</li> <li>6) Defective CPU control circuit which consists of Q29, Q30, Q31, D55: Replace the defective components.</li> </ol>                                                                                                                                                                                                                                                                                                                                 |
| Displays but no sound.                                                                                                   | <ol style="list-style-type: none"> <li>1) Defective speaker or headphone jack: Replace.</li> <li>2) Defective audio amp. circuit which consists of IC7: Replace the defective components.</li> <li>3) Defective IF amp. circuit which consists of IC1, IC2: Replace the defective components.</li> <li>4) Defective Squelch control circuit which consists of IC3, IC6: Replace the defective components.</li> <li>5) Defective AF pre amp. circuit which consists of IC5: Replace the defective components.</li> <li>6) Defective audio mute switching circuit which consists of IC3, IC5, Q20, Q21, Q22 and Q23: Replace the defective components.</li> <li>7) Defective switching circuit which consists of IC6, D39, D40, D41, and D42: Replace the defective components.</li> </ol> |
| Sound comes out but display does not light.                                                                              | <ol style="list-style-type: none"> <li>1) IC501 is running "wild": Press RESTART Switch.</li> <li>2) Defective initiate control circuit: Replace the defective components.</li> <li>3) Defective voltage regulator circuit which consists of IC9: Replace the defective components.</li> <li>4) Defective LCD: Replace.</li> <li>5) Defective CPU circuit which consists of IC501: Replace the defective components.</li> <li>6) Defective LCD controller circuit with consists of IC504: Replace the defective components.</li> </ol>                                                                                                                                                                                                                                                   |
| Backlight does not light.                                                                                                | <ol style="list-style-type: none"> <li>1) Defective EL Driver circuit which consists of T501, Q508: Replace the defective components.</li> <li>2) Defective EL: Replace.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Does not squelch and does not scan.                                                                                      | <ol style="list-style-type: none"> <li>1) Defective switching circuit which consists of IC3: Replace IC3.</li> <li>2) Defective IC2 squelch control output terminal: Replace IC2.</li> <li>3) Defective voltage regulator circuit which consists of Q32, D54: Replace the defective components.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Squelch operates but does not scan.                                                                                      | <ol style="list-style-type: none"> <li>1) IC501 is running "wild": Press RESTART Switch.</li> <li>2) Defective CPU circuit: Replace the defective components.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Operates in MANUAL but does not operate in SCAN.                                                                         | <ol style="list-style-type: none"> <li>1) Squelch control is not adjusted correctly: Adjust Squelch (VR801).</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Displays but PROGRAM does not operate.                                                                                   | <ol style="list-style-type: none"> <li>1) Defective keyboard or connector and/or associated circuit: Replace the defective components.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

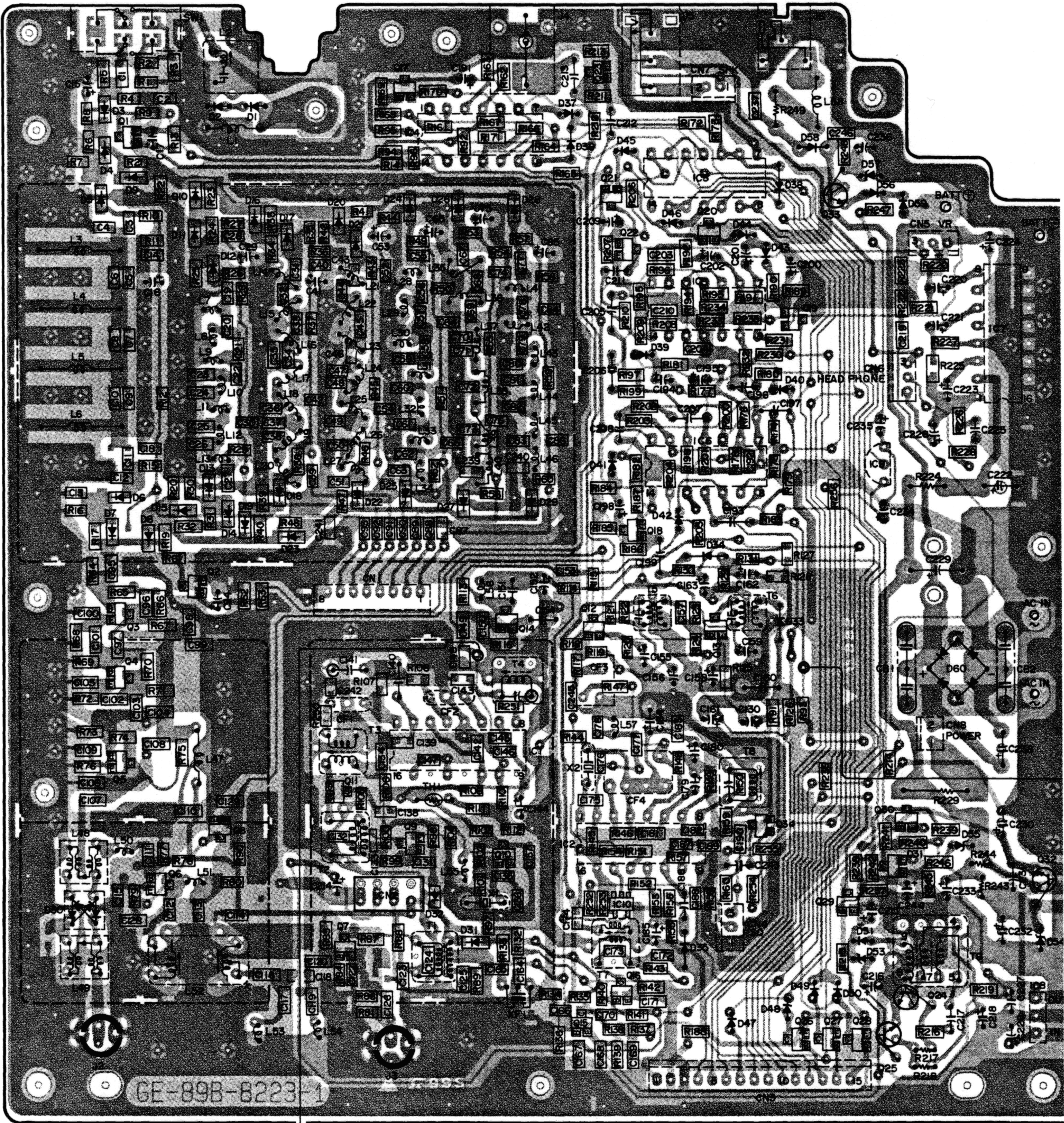
| Symptom                                                                          | Cause/Remedy                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No sound in AM mode but NFM and WFM operate.                                     | <ol style="list-style-type: none"> <li>1) Defective IC501 or IC503: Replace.</li> <li>2) Defective switching circuit which consists of Q28, D41, D50: Replace the defective components.</li> <li>3) Defective ANL,AF pre amp. circuit which consists of Q18, D34: Replace the defective components.</li> <li>4) Defective AM IF DET.circuit which consists of Q12, Q13, D33: Replace the defective components.</li> </ol> |
| No sounds in NFM mode but AM and WFM operate.                                    | <ol style="list-style-type: none"> <li>1) Defective IC501 or IC503: Replace.</li> <li>2) Defective switching circuit which consists of Q27, D40, D49: Replace the defective components.</li> </ol>                                                                                                                                                                                                                        |
| No sound in AM and NFM modes but WFM operates.                                   | <ol style="list-style-type: none"> <li>1) Defective IC2: Replace.</li> </ol>                                                                                                                                                                                                                                                                                                                                              |
| No sound in WFM mode but AM and NFM operate.                                     | <ol style="list-style-type: none"> <li>1) Defective IC501,503 or IC1: Replace.</li> <li>2) Defective switching circuit which consists of Q26, D48: Replace the defective components.</li> </ol>                                                                                                                                                                                                                           |
| Low sensitivity between 25.0000 and 39.9950 MHz.                                 | <ol style="list-style-type: none"> <li>1) Defective decoder switching circuit which consists of IC502, Q501: Replace the defective components.</li> <li>2) Defective Bandpass filter (B.P.F.): Replace the defective components.</li> </ol>                                                                                                                                                                               |
| Low sensitivity between 40.0000 and 67.9950 MHz.                                 | <ol style="list-style-type: none"> <li>1) Defective decoder switching circuit which consists of IC502, Q502: Replace the defective components.</li> <li>2) Defective B.P.F.: Replace the defective components.</li> </ol>                                                                                                                                                                                                 |
| Low sensitivity between 68.0000 and 107.9950 MHz.                                | <ol style="list-style-type: none"> <li>1) Defective decoder switching circuit which consists of IC502, Q503: Replace the defective components.</li> <li>2) Defective B.P.F.: Replace the defective components.</li> </ol>                                                                                                                                                                                                 |
| Low sensitivity between 108.0000 and 173.9950 MHz.                               | <ol style="list-style-type: none"> <li>1) Defective decoder switching circuit which consists of IC502, Q504: Replace the defective components.</li> <li>2) Defective B.P.F.: Replace the defective components.</li> </ol>                                                                                                                                                                                                 |
| Low sensitivity between 174.0000 and 279.9950 MHz.                               | <ol style="list-style-type: none"> <li>1) Defective decoder switching circuit which consists of IC502, Q505: Replace the defective components.</li> <li>2) Defective B.P.F.: Replace the defective components.</li> </ol>                                                                                                                                                                                                 |
| Low sensitivity between 280.0000 and 520.0000 MHz.                               | <ol style="list-style-type: none"> <li>1) Defective decoder switching circuit which consists of IC502, Q506: Replace the defective components.</li> <li>2) Defective B.P.F.: Replace the defective components.</li> </ol>                                                                                                                                                                                                 |
| Low sensitivity between 760.0000 and 1300.0000 MHz.                              | <ol style="list-style-type: none"> <li>1) Defective decoder switching circuit which consists of IC502, Q507: Replace the defective components.</li> <li>2) Defective B.P.F.: Replace the defective components.</li> </ol>                                                                                                                                                                                                 |
| Does not operate between 25.0000 and 220.4950 MHz or 760.0000 and 1052.4950 MHz. | <ol style="list-style-type: none"> <li>1) Defective IC501 Pin 46, IC503, Q309 and/or VCO1 circuit: Replace the defective components.</li> </ol>                                                                                                                                                                                                                                                                           |

| Symptom                                                                            | Cause/Remedy                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Does not operate between 220.0000 and 520.0000 MHz or 1052.5000 and 1300.0000 MHz. | 1) Defective IC501 pin 45, IC503, Q313 and/or VCO2 circuit: Replace the defective components.                                                                                                                                                        |
| Low sensitivity between 25.0000 and 520.0000 MHz.                                  | 1) Defective IC501 pin 69, IC503, Q301 and/or low-pass filter circuit: Replace the defective components.                                                                                                                                             |
| Low sensitivity between 760.0000 and 1300.0000 MHz.                                | 1) Defective IC501 pin 68, IC503, Q305 and/or high-pass filter circuit: Replace the defective components.                                                                                                                                            |
| All bands do not operate but display is OK.                                        | 1) Defective PLL circuit IC301, IC302, IC303, IC304 and/or associated circuit: Replace the defective components.<br>2) Defective Q317, Q318 and/or associated circuit: Replace the defective components.                                             |
| Searches but does not halt on the correct frequency.                               | 1) Defective IC4: Replace.<br>2) Discriminator Coil T8 (AM and NFM modes) or T4 (WFM mode) is out of adjustment:<br>TP2 shall have approx. 3.8 V in normal receiving AM and NFM modes.<br>TP1 shall have approx. 3.9 V in normal receiving WFM mode. |

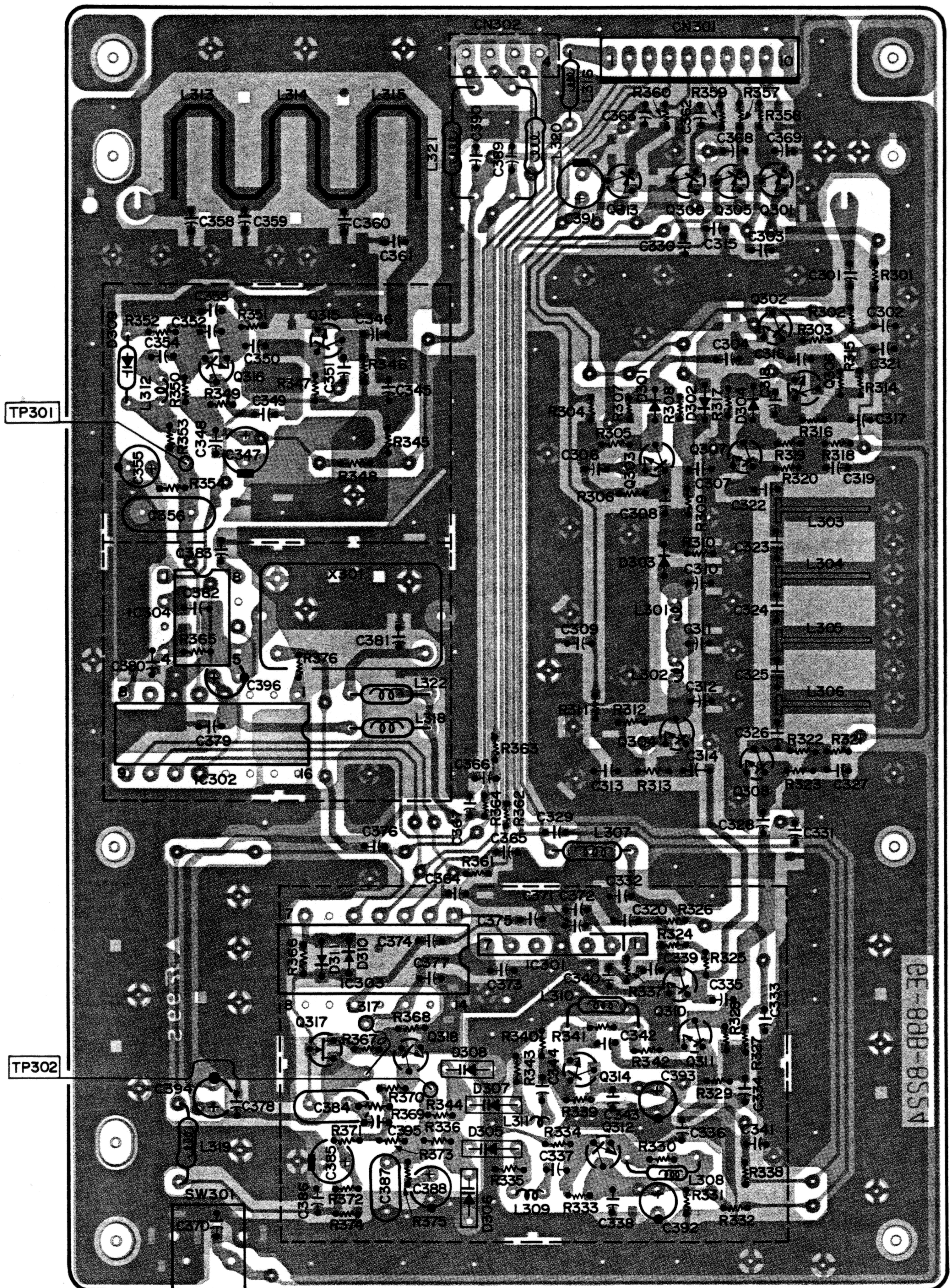
# LINEAR PCB (Top View)



LINEAR PCB (Bottom View)



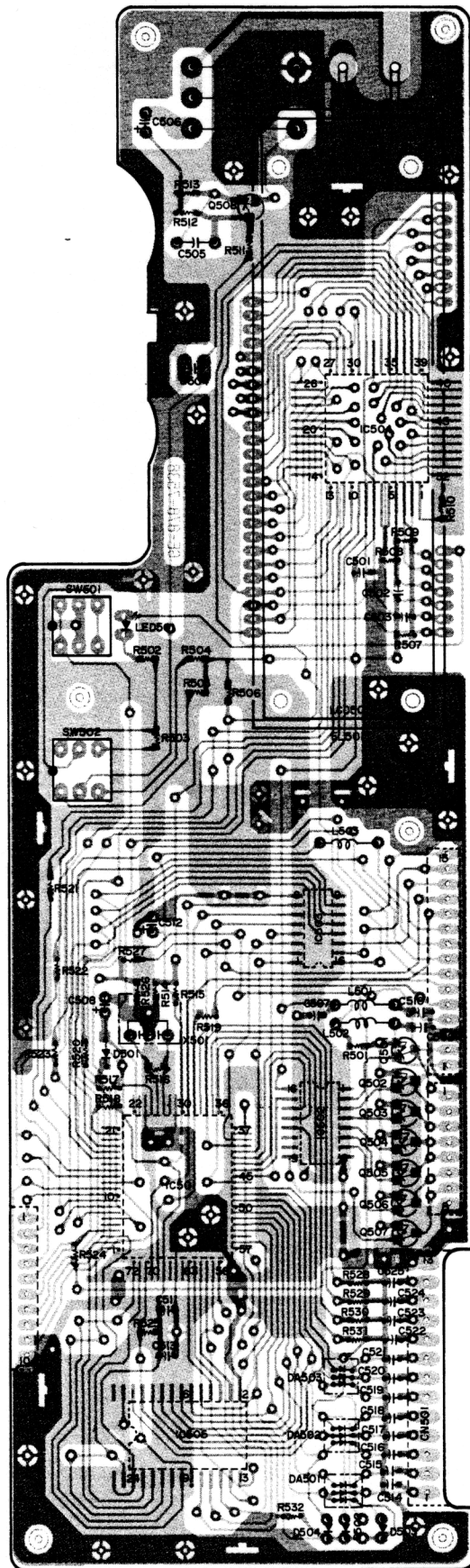
# PLL PCB (Top View)





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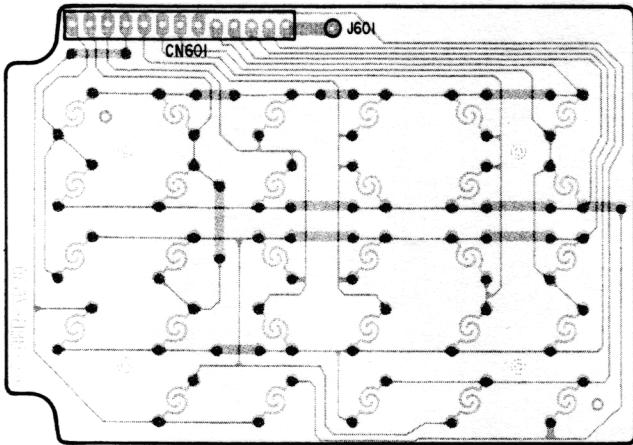
## LOGIC & DISPLAY PCB (Bottom View)



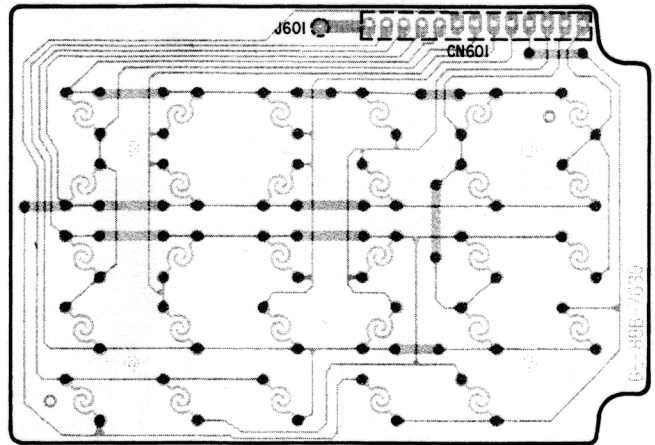
|                                         |         |         |
|-----------------------------------------|---------|---------|
|                                         | D502    | D504    |
| U.S.A., CANADA MODELS                   | USE     | NOT USE |
| AUSTRALIA, UK<br>BELGIUM, FRANCE MODELS | NOT USE | USE     |

## KEY BOARD PCB

(Top View)

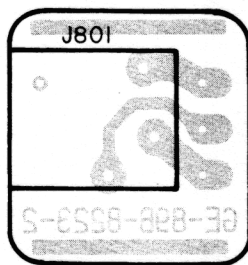


(Bottom View)

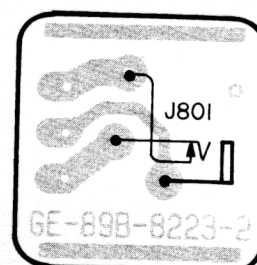


## HEADPHONE JACK PCB

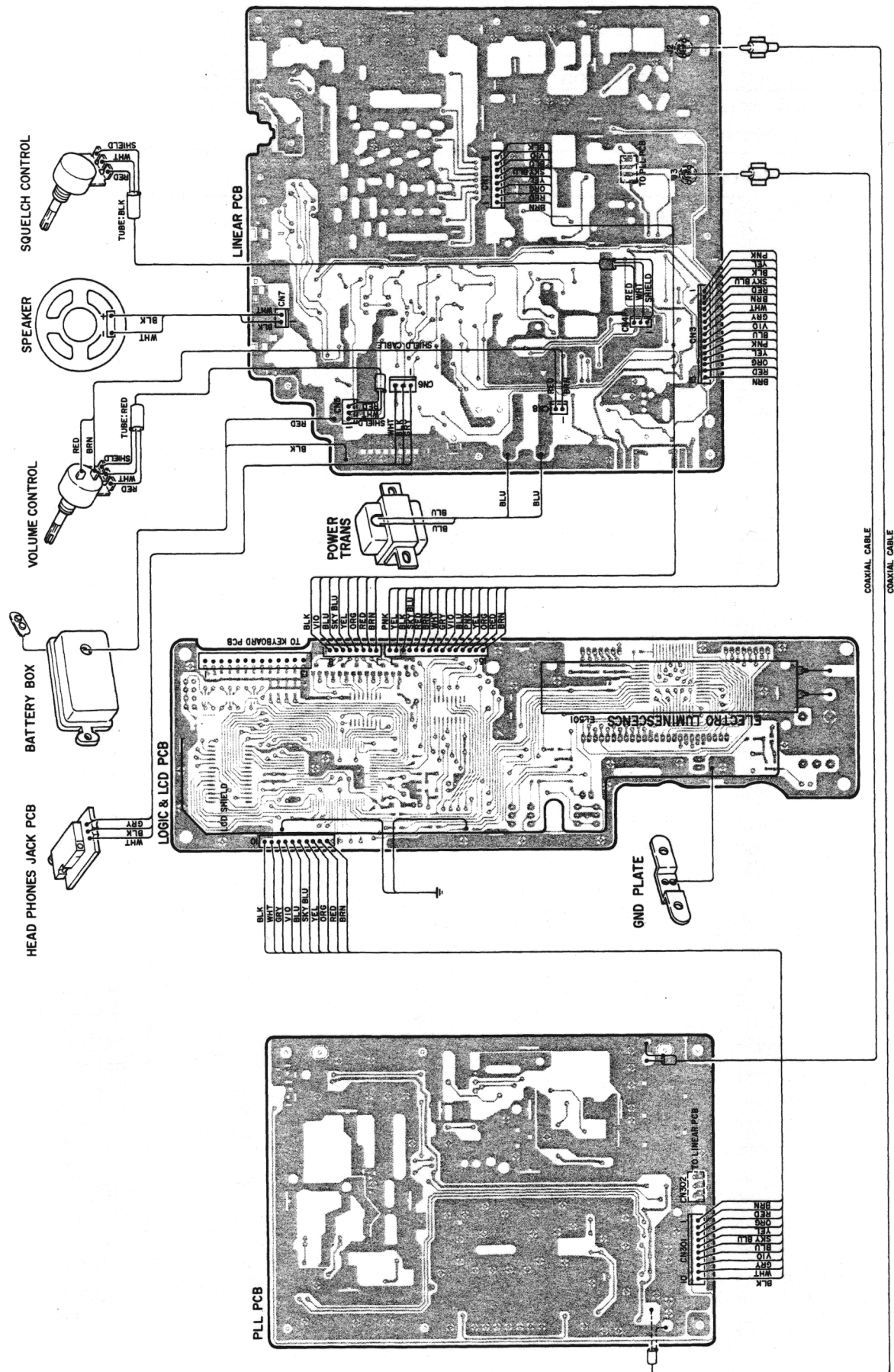
(Top view)



(Bottom View)



# WIRING DIAGRAM



# Electrical Parts List

## Linear PCB Assembly

| Ref. No.   | Description                                              |               |      |               |  | RS Part No. | MFR's Part No. |
|------------|----------------------------------------------------------|---------------|------|---------------|--|-------------|----------------|
| ⑦          | PCB Assembly, Linear Board<br>Consists of the following: |               |      |               |  |             | GA-89D-8300    |
| Capacitors |                                                          |               |      |               |  |             |                |
| C1         | Ceramic                                                  | 0.001 $\mu$ F | 50 V | $\pm 10\%$    |  |             | RMUMK212B102K  |
| C2         | Ceramic                                                  | 0.001 $\mu$ F | 50 V | $\pm 10\%$    |  |             | RMUMK212B102K  |
| C3         | Ceramic                                                  | 5 pF          | 50 V | $\pm 0.25$ pF |  |             | RMUMK212SL050C |
| C4         | Ceramic                                                  | 2 pF          | 50 V | $\pm 0.25$ pF |  |             | RMUMK212SL020C |
| C5         | Ceramic                                                  | 2 pF          | 50 V | $\pm 0.25$ pF |  |             | RMUMK212SL020C |
| C6         | Ceramic                                                  | 0.5 pF        | 50 V | $\pm 0.25$ pF |  |             | RMUMK212SL0R5C |
| C7         | Ceramic                                                  | 2 pF          | 50 V | $\pm 0.25$ pF |  |             | RMUMK212SL020C |
| C8         | Ceramic                                                  | 0.5 pF        | 50 V | $\pm 0.25$ pF |  |             | RMUMK212SL0R5C |
| C9         | Ceramic                                                  | 2 pF          | 50 V | $\pm 0.25$ pF |  |             | RMUMK212SL020C |
| C10        | Ceramic                                                  | 0.5 pF        | 50 V | $\pm 0.25$ pF |  |             | RMUMK212SL0R5C |
| C11        | Ceramic                                                  | 5 pF          | 50 V | $\pm 0.25$ pF |  |             | RMUMK212SL050C |
| C12        | Ceramic                                                  | 2 pF          | 50 V | $\pm 0.25$ pF |  |             | RMUMK212SL020C |
| C13        | Ceramic                                                  | 2 pF          | 50 V | $\pm 0.25$ pF |  |             | RMUMK212SL020C |
| C14        | Ceramic                                                  | 0.001 $\mu$ F | 50 V | $\pm 10\%$    |  |             | RMUMK212B102K  |
| C15        | Electrolytic                                             | 10 $\mu$ F    | 16 V | $\pm 20\%$    |  |             | ECEA1CU100     |
| C16        | Electrolytic                                             | 1 $\mu$ F     | 50 V | $\pm 20\%$    |  |             | ECEA1HU010     |
| C17        | Electrolytic                                             | 33 $\mu$ F    | 16 V | $\pm 20\%$    |  |             | ECEA1CU330     |
| C18        | Ceramic                                                  | 0.001 $\mu$ F | 50 V | $\pm 10\%$    |  |             | RMUMK212B102K  |
| C19        | Ceramic                                                  | 12 pF         | 50 V | $\pm 5\%$     |  |             | RMUMK212SL120J |
| C20        | Ceramic                                                  | 6 pF          | 50 V | $\pm 0.5$ pF  |  |             | RMUMK212SL060D |
| C21        | Ceramic                                                  | 6 pF          | 50 V | $\pm 0.5$ pF  |  |             | RMUMK212SL060D |
| C22        | Ceramic                                                  | 15 pF         | 50 V | $\pm 5\%$     |  |             | RMUMK212SL150J |
| C23        | Ceramic                                                  | 7 pF          | 50 V | $\pm 0.5$ pF  |  |             | RMUMK212SL070D |
| C24        | Ceramic                                                  | 12 pF         | 50 V | $\pm 5\%$     |  |             | RMUMK212SL120J |
| C25        | Ceramic                                                  | 15 pF         | 50 V | $\pm 5\%$     |  |             | RMUMK212SL150J |
| C26        | Ceramic                                                  | 15 pF         | 50 V | $\pm 5\%$     |  |             | RMUMK212SL150J |
| C27        | Ceramic                                                  | 5 pF          | 50 V | $\pm 0.25$ pF |  |             | RMUMK212SL050C |
| C28        | Ceramic                                                  | 0.001 $\mu$ F | 50 V | $\pm 10\%$    |  |             | RMUMK212B102K  |
| C29        | Electrolytic                                             | 1 $\mu$ F     | 50 V | $\pm 20\%$    |  |             | ECEA1HU010     |
| C30        | Ceramic                                                  | 0.001 $\mu$ F | 50 V | $\pm 10\%$    |  |             | RMUMK212B102K  |
| C31        | Ceramic                                                  | 12 pF         | 50 V | $\pm 5\%$     |  |             | RMUMK212SL120J |
| C32        | Ceramic                                                  | 7 pF          | 50 V | $\pm 0.5$ pF  |  |             | RMUMK212SL070D |
| C33        | Ceramic                                                  | 7 pF          | 50 V | $\pm 0.5$ pF  |  |             | RMUMK212SL070D |
| C34        | Ceramic                                                  | 12 pF         | 50 V | $\pm 5\%$     |  |             | RMUMK212SL120J |
| C35        | Ceramic                                                  | 12 pF         | 50 V | $\pm 5\%$     |  |             | RMUMK212SL120J |
| C36        | Ceramic                                                  | 22 pF         | 50 V | $\pm 5\%$     |  |             | RMUMK212SL220J |
| C37        | Ceramic                                                  | 22 pF         | 50 V | $\pm 5\%$     |  |             | RMUMK212SL220J |
| C38        | Ceramic                                                  | 22 pF         | 50 V | $\pm 5\%$     |  |             | RMUMK212SL220J |
| C39        | Ceramic                                                  | 7 pF          | 50 V | $\pm 0.5$ pF  |  |             | RMUMK212SL070D |
| C40        | Ceramic                                                  | 0.001 $\mu$ F | 50 V | $\pm 10\%$    |  |             | RMUMK212B102K  |
| C41        | Electrolytic                                             | 1 $\mu$ F     | 50 V | $\pm 20\%$    |  |             | ECEA1HU010     |
| C42        | Ceramic                                                  | 0.001 $\mu$ F | 50 V | $\pm 10\%$    |  |             | RMUMK212B102K  |
| C43        | Ceramic                                                  | 27 pF         | 50 V | $\pm 5\%$     |  |             | RMUMK212SL270J |
| C44        | Ceramic                                                  | 12 pF         | 50 V | $\pm 5\%$     |  |             | RMUMK212SL120J |
| C45        | Ceramic                                                  | 12 pF         | 50 V | $\pm 5\%$     |  |             | RMUMK212SL120J |

| Ref. No. | Description  |               |      |         | RS Part No. | MFR's Part No. |
|----------|--------------|---------------|------|---------|-------------|----------------|
| C46      | Ceramic      | 27 pF         | 50 V | ±5%     |             | RMUMK212SL270J |
| C47      | Ceramic      | 33 pF         | 50 V | ±5%     |             | RMUMK212SL330J |
| C48      | Ceramic      | 47 pF         | 50 V | ±5%     |             | RMUMK212SL470J |
| C49      | Ceramic      | 47 pF         | 50 V | ±5%     |             | RMUMK212SL470J |
| C50      | Ceramic      | 47 pF         | 50 V | ±5%     |             | RMUMK212SL470J |
| C51      | Ceramic      | 15 pF         | 50 V | ±5%     |             | RMUMK212SL150J |
| C52      | Ceramic      | 0.001 $\mu$ F | 50 V | ±10%    |             | RMUMK212B102K  |
| C53      | Electrolytic | 1 $\mu$ F     | 50 V | ±20%    |             | ECEA1HU010     |
| C54      | Ceramic      | 0.001 $\mu$ F | 50 V | ±10%    |             | RMUMK212B102K  |
| C55      | Ceramic      | 56 pF         | 50 V | ±5%     |             | RMUMK212SL560J |
| C56      | Ceramic      | 22 pF         | 50 V | ±5%     |             | RMUMK212SL220J |
| C57      | Ceramic      | 22 pF         | 50 V | ±5%     |             | RMUMK212SL220J |
| C58      | Ceramic      | 33 pF         | 50 V | ±5%     |             | RMUMK212SL330J |
| C59      | Ceramic      | 33 pF         | 50 V | ±5%     |             | RMUMK212SL330J |
| C60      | Ceramic      | 82 pF         | 50 V | ±5%     |             | RMUMK212SL820J |
| C61      | Ceramic      | 82 pF         | 50 V | ±5%     |             | RMUMK212SL820J |
| C62      | Ceramic      | 82 pF         | 50 V | ±5%     |             | RMUMK212SL820J |
| C63      | Ceramic      | 33 pF         | 50 V | ±5%     |             | RMUMK212SL330J |
| C64      | Ceramic      | 0.001 $\mu$ F | 50 V | ±10%    |             | RMUMK212B102K  |
| C65      | Electrolytic | 1 $\mu$ F     | 50 V | ±20%    |             | ECEA1HU010     |
| C66      | Ceramic      | 0.001 $\mu$ F | 50 V | ±10%    |             | RMUMK212B102K  |
| C67      | Ceramic      | 82 pF         | 50 V | ±5%     |             | RMUMK212SL820J |
| C68      | Ceramic      | 33 pF         | 50 V | ±5%     |             | RMUMK212SL330J |
| C69      | Ceramic      | 56 pF         | 50 V | ±5%     |             | RMUMK212SL560J |
| C70      | Ceramic      | 68 pF         | 50 V | ±5%     |             | RMUMK212SL680J |
| C71      | Ceramic      | 150 pF        | 50 V | ±5%     |             | RMUMK212SL151J |
| C72      | Ceramic      | 150 pF        | 50 V | ±5%     |             | RMUMK212SL151J |
| C73      | Ceramic      | 150 pF        | 50 V | ±5%     |             | RMUMK212SL151J |
| C74      | Ceramic      | 0.001 $\mu$ F | 50 V | ±10%    |             | RMUMK212B102K  |
| C75      | Electrolytic | 1 $\mu$ F     | 50 V | ±20%    |             | ECEA1HU010     |
| C76      | Ceramic      | 0.001 $\mu$ F | 50 V | ±10%    |             | RMUMK212B102K  |
| C77      | Ceramic      | 100 pF        | 50 V | ±5%     |             | RMUMK212SL101J |
| C78      | Ceramic      | 47 pF         | 50 V | ±5%     |             | RMUMK212SL470J |
| C79      | Ceramic      | 68 pF         | 50 V | ±5%     |             | RMUMK212SL680J |
| C80      | Ceramic      | 56 pF         | 50 V | ±5%     |             | RMUMK212SL560J |
| C81      | Ceramic      | 150 pF        | 50 V | ±5%     |             | RMUMK212SL151J |
| C82      | Ceramic      | 180 pF        | 50 V | ±5%     |             | RMUMK212SL181J |
| C83      | Ceramic      | 150 pF        | 50 V | ±5%     |             | RMUMK212SL151J |
| C84      | Ceramic      | 0.001 $\mu$ F | 50 V | ±10%    |             | RMUMK212B102K  |
| C85      | Electrolytic | 1 $\mu$ F     | 50 V | ±20%    |             | ECEA1HU010     |
| C86      | Ceramic      | 0.001 $\mu$ F | 50 V | ±10%    |             | RMUMK212B102K  |
| C87      | Ceramic      | 100 pF        | 50 V | ±5%     |             | RMUMK212SL101J |
| C88      | Ceramic      | 100 pF        | 50 V | ±5%     |             | RMUMK212SL101J |
| C89      | Ceramic      | 100 pF        | 50 V | ±5%     |             | RMUMK212SL101J |
| C90      | Ceramic      | 100 pF        | 50 V | ±5%     |             | RMUMK212SL101J |
| C91      | Ceramic      | 100 pF        | 50 V | ±5%     |             | RMUMK212SL101J |
| C92      | Ceramic      | 100 pF        | 50 V | ±5%     |             | RMUMK212SL101J |
| C93      | Ceramic      | 100 pF        | 50 V | ±5%     |             | RMUMK212SL101J |
| C94      | Electrolytic | 33 $\mu$ F    | 16 V | ±20%    |             | ECEA1CU330     |
| C95      | Ceramic      | 100 pF        | 50 V | ±5%     |             | RMUMK212SL101J |
| C96      | Ceramic      | 10 pF         | 50 V | ±0.5 pF |             | RMUMK212SL100D |

| Ref. No. | Description  |               |      |           | RS Part No. | MFR's Part No. |
|----------|--------------|---------------|------|-----------|-------------|----------------|
| C97      | Ceramic      | 100 pF        | 50 V | ±5%       |             | RMUMK212SL101J |
| C98      | Ceramic      | 0.001 $\mu$ F | 50 V | ±10%      |             | RMUMK212B102K  |
| C99      | Ceramic      | 0.01 $\mu$ F  | 50 V | ±10%      |             | RMUMK212B103K  |
| C100     | Ceramic      | 10 pF         | 50 V | ±0.5 pF   |             | RMUMK212SL100D |
| C101     | Ceramic      | 3 pF          | 50 V | ±0.25 pF  |             | RMUMK212SL030C |
| C102     | Ceramic      | 3 pF          | 50 V | ±0.25 pF  |             | RMUMK212SL030C |
| C103     | Ceramic      | 100 pF        | 50 V | ±5%       |             | RMUMK212SL101J |
| C104     | Ceramic      | 100 pF        | 50 V | ±5%       |             | RMUMK212SL101J |
| C105     | Ceramic      | 5 pF          | 50 V | ±0.25 pF  |             | RMUMK212SL050C |
| C106     | Ceramic      | 2 pF          | 50 V | ±0.25 pF  |             | RMUMK212SL020C |
| C107     | Ceramic      | 100 pF        | 50 V | ±5%       |             | RMUMK212SL101J |
| C108     | Ceramic      | 0.001 $\mu$ F | 50 V | ±10%      |             | RMUMK212B102K  |
| C109     | Ceramic      | 4 pF          | 50 V | ±0.25 pF  |             | RMUMK212SL040C |
| C110     | Ceramic      | 0.001 $\mu$ F | 50 V | ±10%      |             | RMUMK212B102K  |
| C111     | Ceramic      | 10 pF         | 50 V | ±0.5 pF   |             | RMUMK212SL100D |
| C112     | Ceramic      | 33 pF         | 50 V | ±5%       |             | RMUMK212SL330J |
| C113     | Ceramic      | 470 pF        | 50 V | ±5%       |             | RMUMK212SL471J |
| C114     | Ceramic      | 0.001 $\mu$ F | 50 V | ±10%      |             | RMUMK212B102K  |
| C115     | Ceramic      | 100 pF        | 50 V | ±5%       |             | RMUMK212SL101J |
| C116     | Ceramic      | 4 pF          | 50 V | ±0.25 pF  |             | RMUMK212SL040C |
| C117     | Ceramic      | 4 pF          | 50 V | ±0.25 pF  |             | RMUMK212SL040C |
| C118     | Ceramic      | 2 pF          | 50 V | ±0.25 pF  |             | RMUMK212SL020C |
| C119     | Ceramic      | 4 pF          | 50 V | ±0.25 pF  |             | RMUMK212SL040C |
| C120     | Ceramic      | 4 pF          | 50 V | ±0.25 pF  |             | RMUMK212SL040C |
| C121     | Not used     |               |      |           |             |                |
| C122     | Ceramic      | 12 pF         | 50 V | ±5%       |             | RMUMK212SL120J |
| C123     | Ceramic      | 0.001 $\mu$ F | 50 V | ±10%      |             | RMUMK212B102K  |
| C124     | Ceramic      | 18 pF         | 50 V | ±5%       |             | RMUMK212SL180J |
| C125     | Ceramic      | 0.001 $\mu$ F | 50 V | ±10%      |             | RMUMK212B102K  |
| C126     | Ceramic      | 22 pF         | 50 V | ±5%       |             | RMUMK212SL220J |
| C127     | Not used     |               |      |           |             |                |
| C128     | Ceramic      | 0.001 $\mu$ F | 50 V | ±10%      |             | RMUMK212B102K  |
| C129     | Ceramic      | 0.001 $\mu$ F | 50 V | ±10%      |             | RMUMK212B102K  |
| C130     | Electrolytic | 10 $\mu$ F    | 16 V | ±20%      |             | ECEA1CU100     |
| C131     | Ceramic      | 47 pF         | 50 V | ±5%       |             | RMUMK212SL470J |
| C132     | Ceramic      | 0.001 $\mu$ F | 50 V | ±10%      |             | RMUMK212B102K  |
| C133     | Ceramic      | 18 pF         | 50 V | ±5%       |             | RMUMK212SL180J |
| C134     | Ceramic      | 0.001 $\mu$ F | 50 V | ±10%      |             | RMUMK212B102K  |
| C135     | Ceramic      | 22 pF         | 50 V | ±5%       |             | RMUMK212SL220J |
| C136     | Ceramic      | 56 pF         | 50 V | ±5%       |             | RMUMK212SL560J |
| C137     | Ceramic      | 0.001 $\mu$ F | 50 V | ±10%      |             | RMUMK212B102K  |
| C138     | Ceramic      | 0.001 $\mu$ F | 50 V | ±10%      |             | RMUMK212B102K  |
| C139     | Ceramic      | 0.022 $\mu$ F | 50 V | ±10%      |             | RMUMK212B223K  |
| C140     | Mylar *      | 0.047 $\mu$ F | 50 V | ±10%      |             | AMZ-473K50     |
| C141     | Mylar        | 0.047 $\mu$ F | 50 V | ±10%      |             | AMZ-473K50     |
| C142     | Ceramic      | 0.022 $\mu$ F | 50 V | ±10%      |             | RMUMK212B223K  |
| C143     | Ceramic      | 0.01 $\mu$ F  | 50 V | ±10%      |             | RMUMK212B103K  |
| C144     | Electrolytic | 100 $\mu$ F   | 16 V | ±20%      |             | ECEA1CU101     |
| C145     | Ceramic      | 0.022 $\mu$ F | 50 V | ±10%      |             | RMUMK212B223K  |
| C146     | Ceramic      | 0.047 $\mu$ F | 50 V | + 80%–20% |             | RMUMK212F473Z  |

\* Mylar is a registered trademark of E.I. Du pont de Nemours and Company.

| Ref. No. | Description  |                |      |               | RS Part No. | MFR's Part No. |
|----------|--------------|----------------|------|---------------|-------------|----------------|
| C147     | Ceramic      | 0.01 $\mu$ F   | 50 V | $\pm 10\%$    |             | RMUMK212B103K  |
| C148     | Ceramic      | 100 pF         | 50 V | $\pm 5\%$     |             | RMUMK212SL101J |
| C149     | Ceramic      | 100 pF         | 50 V | $\pm 5\%$     |             | RMUMK212SL101J |
| C150     | Ceramic      | 47 pF          | 50 V | $\pm 5\%$     |             | RMUMK212SL470J |
| C151     | Mylar        | 0.0022 $\mu$ F | 50 V | $\pm 10\%$    |             | AMZ-222K50     |
| C152     | Electrolytic | 10 $\mu$ F     | 16 V | $\pm 20\%$    |             | ECEA1CU100     |
| C153     | Ceramic      | 100 pF         | 50 V | $\pm 5\%$     |             | RMUMK212SL101J |
| C154     | Mylar        | 0.01 $\mu$ F   | 50 V | $\pm 10\%$    |             | AMZ-103K50     |
| C155     | Electrolytic | 1 $\mu$ F      | 50 V | $\pm 20\%$    |             | ECEA1HU010     |
| C156     | Electrolytic | 10 $\mu$ F     | 16 V | $\pm 20\%$    |             | ECEA1CU100     |
| C157     | Ceramic      | 0.01 $\mu$ F   | 50 V | $\pm 10\%$    |             | RMUMK212B103K  |
| C158     | Electrolytic | 1 $\mu$ F      | 50 V | $\pm 20\%$    |             | ECEA1HU010     |
| C159     | Electrolytic | 10 $\mu$ F     | 16 V | $\pm 20\%$    |             | ECEA1CU100     |
| C160     | Mylar        | 0.056 $\mu$ F  | 50 V | $\pm 10\%$    |             | AMZ-563K50     |
| C161     | Electrolytic | 22 $\mu$ F     | 16 V | $\pm 20\%$    |             | ECEA1CU220     |
| C162     | Electrolytic | 1 $\mu$ F      | 50 V | $\pm 20\%$    |             | ECEA1HU010     |
| C163     | Electrolytic | 1 $\mu$ F      | 50 V | $\pm 20\%$    |             | ECEA1HU010     |
| C164     | Ceramic      | 0.001 $\mu$ F  | 50 V | $\pm 10\%$    |             | RMUMK212B102K  |
| C165     | Ceramic      | 5 pF           | 50 V | $\pm 0.25$ pF |             | RMUMK212SL050C |
| C166     | Ceramic      | 0.001 $\mu$ F  | 50 V | $\pm 10\%$    |             | RMUMK212B102K  |
| C167     | Ceramic      | 0.01 $\mu$ F   | 50 V | $\pm 10\%$    |             | RMUMK212B103K  |
| C168     | Ceramic      | 0.01 $\mu$ F   | 50 V | $\pm 10\%$    |             | RMUMK212B103K  |
| C169     | Ceramic      | 0.001 $\mu$ F  | 50 V | $\pm 10\%$    |             | RMUMK212B102K  |
| C170     | Ceramic      | 0.001 $\mu$ F  | 50 V | $\pm 10\%$    |             | RMUMK212B102K  |
| C171     | Ceramic      | 0.01 $\mu$ F   | 50 V | $\pm 10\%$    |             | RMUMK212B103K  |
| C172     | Ceramic      | 0.001 $\mu$ F  | 50 V | $\pm 10\%$    |             | RMUMK212B102K  |
| C173     | Ceramic      | 18 pF          | 50 V | $\pm 5\%$     |             | RMUMK212SL180J |
| C174     | Ceramic      | 0.001 $\mu$ F  | 50 V | $\pm 10\%$    |             | RMUMK212B102K  |
| C175     | Ceramic      | 33 pF          | 50 V | $\pm 5\%$     |             | RMUMK212SL330J |
| C176     | Ceramic      | 10 pF          | 50 V | $\pm 0.5$ pF  |             | RMUMK212SL100D |
| C177     | Ceramic      | 0.001 $\mu$ F  | 50 V | $\pm 10\%$    |             | RMUMK212B102K  |
| C178     | Ceramic      | 10 pF          | 50 V | $\pm 0.5$ pF  |             | RMUMK212SL100D |
| C179     | Tantalum     | 0.47 $\mu$ F   | 35 V | $\pm 10\%$    |             | TSD-S-1VR47K   |
| C180     | Tantalum     | 0.47 $\mu$ F   | 35 V | $\pm 10\%$    |             | TSD-S-1VR47K   |
| C181     | Ceramic      | 0.047 $\mu$ F  | 50 V | +80%-20%      |             | RMUMK212F473Z  |
| C182     | Ceramic      | 10 pF          | 50 V | $\pm 0.5$ pF  |             | RMUMK212SL100D |
| C183     | Ceramic      | 0.01 $\mu$ F   | 50 V | $\pm 10\%$    |             | RMUMK212B103K  |
| C184     | Electrolytic | 220 $\mu$ F    | 16 V | $\pm 20\%$    |             | ECEA1CU221     |
| C185     | Tantalum     | 0.22 $\mu$ F   | 35 V | $\pm 10\%$    |             | TSD-S-1VR22K   |
| C186     | Mylar        | 0.01 $\mu$ F   | 50 V | $\pm 10\%$    |             | AMZ-103K50     |
| C187     | Ceramic      | 8 pF           | 50 V | $\pm 0.5$ pF  |             | RMUMK212SL080D |
| C188     | Ceramic      | 0.001 $\mu$ F  | 50 V | $\pm 10\%$    |             | RMUMK212B102K  |
| C189     | Ceramic      | 470 pF         | 50 V | $\pm 5\%$     |             | RMUMK212SL471J |
| C190     | Ceramic      | 470 pF         | 50 V | $\pm 5\%$     |             | RMUMK212SL471J |
| C191     | Tantalum     | 0.1 $\mu$ F    | 35 V | $\pm 10\%$    |             | TSD-S-1V0R1K   |
| C192     | Ceramic      | 0.01 $\mu$ F   | 50 V | $\pm 10\%$    |             | RMUMK212B103K  |
| C193     | Mylar        | 0.047 $\mu$ F  | 50 V | $\pm 10\%$    |             | AMZ-473K50     |
| C194     | Electrolytic | 0.1 $\mu$ F    | 50 V | $\pm 20\%$    |             | ECEA1HU0R1     |
| C195     | Electrolytic | 1 $\mu$ F      | 50 V | $\pm 20\%$    |             | ECEA1HU010     |
| C196     | Mylar        | 0.022 $\mu$ F  | 50 V | $\pm 10\%$    |             | AMZ-223K50     |

| Ref. No. | Description  |                |      |               | RS Part No. | MFR's Part No.               |
|----------|--------------|----------------|------|---------------|-------------|------------------------------|
| C197     | Mylar        | 0.056 $\mu$ F  | 50 V | $\pm 10\%$    |             | AMZ-563K50                   |
| C198     | Electrolytic | 0.1 $\mu$ F    | 50 V | $\pm 20\%$    |             | ECEA1HU0R1                   |
| C199     | Mylar        | 0.056 $\mu$ F  | 50 V | $\pm 10\%$    |             | AMZ-563K50                   |
| C200     | Electrolytic | 4.7 $\mu$ F    | 50 V | $\pm 20\%$    |             | ECEA1HU4R7                   |
| C201     | Tantalum     | 0.1 $\mu$ F    | 35 V | $\pm 10\%$    |             | TSD-S-1V0R1K                 |
| C202     | Electrolytic | 1 $\mu$ F      | 50 V | $\pm 20\%$    |             | ECEA1HU010                   |
| C203     | Ceramic      | 330 pF         | 50 V | $\pm 5\%$     |             | RMUMK212SL331J               |
| C204     | Ceramic      | 0.01 $\mu$ F   | 50 V | $\pm 10\%$    |             | RMUMK212B103K                |
| C205     | Mylar        | 0.082 $\mu$ F  | 50 V | $\pm 10\%$    |             | AMZ-823K50                   |
| C206     | Mylar        | 0.047 $\mu$ F  | 50 V | $\pm 10\%$    |             | AMZ-473K50                   |
| C207     | Mylar        | 0.056 $\mu$ F  | 50 V | $\pm 10\%$    |             | AMZ-563K50                   |
| C208     | Mylar        | 0.0047 $\mu$ F | 50 V | $\pm 10\%$    |             | AMZ-472K50                   |
| C209     | Electrolytic | 2.2 $\mu$ F    | 50 V | $\pm 20\%$    |             | ECEA1HU2R2                   |
| C210     | Ceramic      | 0.0015 $\mu$ F | 50 V | $\pm 10\%$    |             | RMUMK212B152K                |
| C211     | Mylar        | 0.0068 $\mu$ F | 50 V | $\pm 10\%$    |             | AMZ-682K50                   |
| C212     | Mylar        | 0.0068 $\mu$ F | 50 V | $\pm 10\%$    |             | AMZ-682K50                   |
| C213     | Mylar        | 0.047 $\mu$ F  | 50 V | $\pm 10\%$    |             | AMZ-473K50                   |
| C214     | Electrolytic | 4.7 $\mu$ F    | 50 V | $\pm 20\%$    |             | ECEA1HU4R7                   |
| C215     | Electrolytic | 1 $\mu$ F      | 50 V | $\pm 20\%$    |             | ECEA1HU010                   |
| C216     | Electrolytic | 47 $\mu$ F     | 16 V | $\pm 20\%$    |             | ECEA1CU470                   |
| C217     | Mylar        | 0.001 $\mu$ F  | 50 V | $\pm 10\%$    |             | AMZ-102K50                   |
| C218     | Electrolytic | 100 $\mu$ F    | 16 V | $\pm 20\%$    |             | ECEA1CU101                   |
| C219     | Ceramic      | 0.01 $\mu$ F   | 50 V | $\pm 10\%$    |             | RMUMK212B103K                |
| C220     | Electrolytic | 1 $\mu$ F      | 50 V | $\pm 20\%$    |             | ECEA1HU010                   |
| C221     | Electrolytic | 2.2 $\mu$ F    | 50 V | $\pm 20\%$    |             | ECEA1HU2R2                   |
| C222     | Electrolytic | 1000 $\mu$ F   | 25 V | $\pm 20\%$    |             | ECEA1EU102                   |
| C223     | Electrolytic | 47 $\mu$ F     | 16 V | $\pm 20\%$    |             | ECEA1CU470                   |
| C224     | Electrolytic | 10 $\mu$ F     | 16 V | $\pm 20\%$    |             | ECEA1CU100                   |
| C225     | Ceramic      | 0.1 $\mu$ F    | 50 V | + 80%–20%     |             | PRE131F104Z<br>or SR295F104Z |
| C226     | Electrolytic | 100 $\mu$ F    | 16 V | $\pm 20\%$    |             | ECEA1CU101                   |
| C227     | Tantalum     | 0.1 $\mu$ F    | 35 V | $\pm 10\%$    |             | TSD-S-1V0R1K                 |
| C228     | Tantalum     | 0.33 $\mu$ F   | 35 V | $\pm 10\%$    |             | TSD-S-1VR33K                 |
| △C229    | Electrolytic | 2200 $\mu$ F   | 25 V | $\pm 20\%$    |             | ECEA1EU222                   |
| C230     | Electrolytic | 220 $\mu$ F    | 16 V | $\pm 20\%$    |             | ECEA1CU221                   |
| C231     | Mylar        | 0.033 $\mu$ F  | 50 V | $\pm 10\%$    |             | AMZ-333K50                   |
| C232     | Electrolytic | 220 $\mu$ F    | 16 V | $\pm 20\%$    |             | ECEA1CU221                   |
| C233     | Electrolytic | 100 $\mu$ F    | 16 V | $\pm 20\%$    |             | ECEA1CU101                   |
| C234     | Electrolytic | 0.1 $\mu$ F    | 50 V | $\pm 20\%$    |             | ECEA1HU0R1                   |
| C235     | Electrolytic | 10 $\mu$ F     | 16 V | $\pm 20\%$    |             | ECEA1CU100                   |
| C236     | Electrolytic | 10 $\mu$ F     | 16 V | $\pm 20\%$    |             | ECEA1CU100                   |
| C237     | Ceramic      | 0.01 $\mu$ F   | 50 V | $\pm 10\%$    |             | RMUMK212B103K                |
| C238     | Electrolytic | 470 $\mu$ F    | 25 V | $\pm 20\%$    |             | ECEA1EU471                   |
| C239     | Ceramic      | 47 pF          | 50 V | $\pm 5\%$     |             | RMUMK212SL470J               |
| C240     | Ceramic      | 68 pF          | 50 V | $\pm 5\%$     |             | RMUMK212SL680J               |
| C241     | Ceramic      | 3 pF           | 50 V | $\pm 0.25$ pF |             | RMUMK212SL030C               |
| C242     | Ceramic      | 33 pF          | 50 V | $\pm 5\%$     |             | RMUMK212SL330J               |
| C243     | Mylar        | 0.0082 $\mu$ F | 50 V | $\pm 10\%$    |             | AMZ-822K50                   |
| C244     | Electrolytic | 10 $\mu$ F     | 16 V | $\pm 20\%$    |             | ECEA1CU100                   |

| Ref. No.                | Description                           | RS Part No. | MFR's Part No. |
|-------------------------|---------------------------------------|-------------|----------------|
| C245                    | Ceramic 220 pF 50 V $\pm 5\%$         |             | RMUMK212SL221J |
| C246                    | Ceramic 0.001 $\mu$ F 50 V $\pm 10\%$ |             | RMUMK212B102K  |
| <b>Capacitor Arrays</b> |                                       |             |                |
| △CB1                    | 0.01 $\mu$ F x 2 250 V +80%–20%       |             | EXR-FS203ZS    |
| CB2                     | 0.01 $\mu$ F x 2 250 V +80%–20%       |             | EXR-FS203ZS    |
| <b>Ceramic Filters</b>  |                                       |             |                |
| CF1                     | Ceramic 10.7 MHz                      |             | SFE10.7MA5W-A  |
| CF2                     | Ceramic 10.7 MHz                      |             | SFE10.7MA5W-A  |
| CF3                     | Ceramic 455 kHz                       |             | KBF-455M-6A    |
| CF4                     | Ceramic 455 kHz                       |             | KBF-455R-15A   |
| <b>Diodes</b>           |                                       |             |                |
| D1                      | 1S1585 (Silicon)                      |             | 1S1585         |
| D2                      | 1S1585 (Silicon)                      |             | 1S1585         |
| D3                      | HSR277 (Silicon)                      |             | HSR277         |
| D4                      | HSR277 (Silicon)                      |             | HSR277         |
| D5                      | HSR277 (Silicon)                      |             | HSR277         |
| D6                      | HSR277 (Silicon)                      |             | HSR277         |
| D7                      | HSR277 (Silicon)                      |             | HSR277         |
| D8                      | HSR277 (Silicon)                      |             | HSR277         |
| D9                      | HSR277 (Silicon)                      |             | HSR277         |
| D10                     | HSR277 (Silicon)                      |             | HSR277         |
| D11                     | HSR277 (Silicon)                      |             | HSR277         |
| D12                     | HSR277 (Silicon)                      |             | HSR277         |
| D13                     | HSR277 (Silicon)                      |             | HSR277         |
| D14                     | HSR277 (Silicon)                      |             | HSR277         |
| D15                     | HSR277 (Silicon)                      |             | HSR277         |
| D16                     | HSR277 (Silicon)                      |             | HSR277         |
| D17                     | HSR277 (Silicon)                      |             | HSR277         |
| D18                     | HSR277 (Silicon)                      |             | HSR277         |
| D19                     | HSR277 (Silicon)                      |             | HSR277         |
| D20                     | HSR277 (Silicon)                      |             | HSR277         |
| D21'                    | HSR277 (Silicon)                      |             | HSR277         |
| D22                     | HSR277 (Silicon)                      |             | HSR277         |
| D23                     | HSR277 (Silicon)                      |             | HSR277         |
| D24                     | HSR277 (Silicon)                      |             | HSR277         |
| D25                     | HSR277 (Silicon)                      |             | HSR277         |
| D26                     | HSR277 (Silicon)                      |             | HSR277         |
| D27                     | HSR277 (Silicon)                      |             | HSR277         |
| D28                     | HSR277 (Silicon)                      |             | HSR277         |

| Ref. No. | Description    |                           |             | RS Part No. | MFR's Part No.  |
|----------|----------------|---------------------------|-------------|-------------|-----------------|
| D29      | Quad.          | HSR277                    | (Silicon)   |             | HSR277          |
| D30      |                | ND487C1-3R                | (Silicon)   |             | ND487C1-3R      |
| D31      |                | HSR277                    | (Silicon)   |             | HSR277          |
| D32      |                | HSR277                    | (Silicon)   |             | HSR277          |
| D33      |                | 1K261 or OA90-R           | (Germanium) |             | 1K261 or OA90-R |
| D34      |                | 1K261 or OA90-R           | (Germanium) |             | 1K261 or OA90-R |
| D35      |                | 1K261 or OA90-R           | (Germanium) |             | 1K261 or OA90-R |
| D36      |                | 1S2076A                   | (Silicon)   |             | 1S2076A         |
| D37      |                | 1S2076A                   | (Silicon)   |             | 1S2076A         |
| D38      |                | 1S2076A                   | (Silicon)   |             | 1S2076A         |
| D39      |                | 1S2076A                   | (Silicon)   |             | 1S2076A         |
| D40      |                | 1S2076A                   | (Silicon)   |             | 1S2076A         |
| D41      |                | 1S2076A                   | (Silicon)   |             | 1S2076A         |
| D42      |                | 1S2076A                   | (Silicon)   |             | 1S2076A         |
| D43      |                | 1S2076A                   | (Silicon)   |             | 1S2076A         |
| D44      |                | 1S2076A                   | (Silicon)   |             | 1S2076A         |
| D45      |                | 1S2076A                   | (Silicon)   |             | 1S2076A         |
| D46      |                | 1S2076A                   | (Silicon)   |             | 1S2076A         |
| D47      |                | 1S2076A                   | (Silicon)   |             | 1S2076A         |
| D48      |                | 1S2076A                   | (Silicon)   |             | 1S2076A         |
| D49      |                | 1S2076A                   | (Silicon)   |             | 1S2076A         |
| D50      |                | 1S2076A                   | (Silicon)   |             | 1S2076A         |
| D51      |                | 1SS81                     | (Silicon)   |             | 1SS81           |
| D52      |                | Not used                  |             |             |                 |
| D53      | Zener          | HZ33E B1 or B2            | (Silicon)   |             | HZ33E B1 or B2  |
| D54      | Zener          | HZ9B2L                    | (Silicon)   |             | HZ9B2L          |
| D55      | Zener          | HZ6B2L                    | (Silicon)   |             | HZ6B2L          |
| D56      |                | 1S2076A                   | (Silicon)   |             | 1S2076A         |
| D57      | Zener          | HZ11B2L                   | (Silicon)   |             | HZ11B2L         |
| D58      |                | 1N4002                    | (Silicon)   |             | 1N4002          |
| D59      |                | 1S2076A                   | (Silicon)   |             | 1S2076A         |
| D60      | Rectifier      | RC202                     | (Silicon)   |             | RC202           |
| ICs      |                |                           |             |             |                 |
| IC1      | KA2243         | (IF Amp./Det.)            | (Bipolar)   |             | KA2243          |
|          | or HA12413     |                           |             |             | or HA12413      |
| IC2      | TK10420        | (IF Amp./Noise Amp./Det.) | (Bipolar)   |             | TK10420         |
| IC3      | $\mu$ PD4011BC | (Switching)               | (C-MOS)     |             | $\mu$ PD4011BC  |
|          | or HD14011BP   |                           |             |             | or HD14011BP    |
| IC4      | $\mu$ PC324C   | (Zeromatic)               | (Bipolar)   |             | $\mu$ PC324C    |
| IC5      | $\mu$ PC324C   | (Low-BATT Det.)           | (Bipolar)   |             | $\mu$ PC324C    |
| IC6      | $\mu$ PD4066BC | (Switching)               | (C-MOS)     |             | $\mu$ PD4066BC  |
|          | or HD14066BP   |                           |             |             | or HD14066BP    |
| IC7      | TDA1905        | (AF Power Amp.)           | (Bipolar)   |             | TDA1905         |
| IC8      | MC7805C        | (Voltage Regulator)       | (Bipolar)   |             | MC7805C         |
|          | or TA78005AP   |                           |             |             | or TA78005AP    |
| IC9      | S-81250HG      | (Voltage Regulator)       | (C-MOS)     |             | S-81250HG       |
| IC10     | TC4S66F        | (Switching)               | (L-MOS)     |             | TC4S66F         |

| Ref. No.     | Description                           | RS Part No. | MFR's Part No. |
|--------------|---------------------------------------|-------------|----------------|
| <b>Coils</b> |                                       |             |                |
| L1           | Coil, Choke 1 $\mu$ H                 |             | LAL03NA1R0M    |
| L2           | Coil, Trap (609.5 MHz)                |             | GR-H761        |
| L3           | Stripline on PCB                      |             |                |
| L4           | Stripline on PCB                      |             |                |
| L5           | Stripline on PCB                      |             |                |
| L6           | Stripline on PCB                      |             |                |
| L7           | Coil, B.P.F. (280 MHz to 520 MHz)     |             | 2LNB-253       |
| L8           | Coil, B.P.F. (280 MHz to 520 MHz)     |             | 2LNB-253       |
| L9           | Coil, B.P.F. (280 MHz to 520 MHz)     |             | 2LNB-253       |
| L10          | Coil, B.P.F. (280 MHz to 520 MHz)     |             | 2LNB-253       |
| L11          | Coil, B.P.F. (280 MHz to 520 MHz)     |             | 2LNB-253       |
| L12          | Coil, B.P.F. (280 MHz to 520 MHz)     |             | 2LNB-253       |
| L13          | Coil, B.P.F. (280 MHz to 520 MHz)     |             | 2LNB-253       |
| L14          | Coil, B.P.F. (174 MHz to 279.995 MHz) |             | 2LNB-252       |
| L15          | Coil, B.P.F. (174 MHz to 279.995 MHz) |             | 2LNB-252       |
| L16          | Coil, B.P.F. (174 MHz to 279.995 MHz) |             | 2LNB-252       |
| L17          | Coil, B.P.F. (174 MHz to 279.995 MHz) |             | 2LNB-252       |
| L18          | Coil, B.P.F. (174 MHz to 279.995 MHz) |             | 2LNB-252       |
| L19          | Coil, B.P.F. (174 MHz to 279.995 MHz) |             | 2LNB-252       |
| L20          | Coil, B.P.F. (174 MHz to 279.995 MHz) |             | 2LNB-252       |
| L21          | Coil, B.P.F. (108 MHz to 173.995 MHz) |             | 3LNB-251       |
| L22          | Coil, B.P.F. (108 MHz to 173.995 MHz) |             | 3LNB-251       |
| L23          | Coil, B.P.F. (108 MHz to 173.995 MHz) |             | 3LNB-251       |
| L24          | Coil, B.P.F. (108 MHz to 173.995 MHz) |             | 3LNB-251       |
| L25          | Coil, B.P.F. (108 MHz to 173.995 MHz) |             | 3LNB-251       |
| L26          | Coil, B.P.F. (108 MHz to 173.995 MHz) |             | 3LNB-251       |
| L27          | Coil, B.P.F. (108 MHz to 173.995 MHz) |             | 3LNB-251       |
| L28          | Coil, B.P.F. (68 MHz to 107.995 MHz)  |             | 4LNB-250       |
| L29          | Coil, B.P.F. (68 MHz to 107.995 MHz)  |             | 4LNB-250       |
| L30          | Coil, B.P.F. (68 MHz to 107.995 MHz)  |             | 4LNB-250       |
| L31          | Coil, B.P.F. (68 MHz to 107.995 MHz)  |             | 4LNB-250       |
| L32          | Coil, B.P.F. (68 MHz to 107.995 MHz)  |             | 4LNB-250       |
| L33          | Coil, B.P.F. (68 MHz to 107.995 MHz)  |             | 4LNB-250       |
| L34          | Coil, B.P.F. (68 MHz to 107.995 MHz)  |             | 4LNB-250       |
| L35          | Coil, B.P.F. (40 MHz to 67.995 MHz)   |             | 4LNB-249       |
| L36          | Coil, B.P.F. (40 MHz to 67.995 MHz)   |             | 4LNB-249       |
| L37          | Coil, B.P.F. (40 MHz to 67.995 MHz)   |             | 4LNB-249       |
| L38          | Coil, B.P.F. (40 MHz to 67.995 MHz)   |             | 4LNB-249       |
| L39          | Coil, B.P.F. (40 MHz to 67.995 MHz)   |             | 4LNB-249       |
| L40          | Coil, B.P.F. (40 MHz to 67.995 MHz)   |             | 4LNB-249       |
| L41          | Coil, B.P.F. (25 MHz to 39.995 MHz)   |             | LAL03NAR33M    |
| L42          | Coil, B.P.F. (25 MHz to 39.995 MHz)   |             | LAL03NAR33M    |
| L43          | Coil, B.P.F. (25 MHz to 39.995 MHz)   |             | LAL03NAR33M    |
| L44          | Coil, B.P.F. (25 MHz to 39.995 MHz)   |             | LAL03NAR33M    |
| L45          | Coil, B.P.F. (25 MHz to 39.995 MHz)   |             | LAL03NAR33M    |
| L46          | Coil, B.P.F. (25 MHz to 39.995 MHz)   |             | LAL03NAR33M    |
| L47          | Coil, Choke 10 $\mu$ H                |             | LAL03NA100K    |
| L48          | Coil, DBM                             |             | 2LNM-258       |
| L49          | Coil, DBM                             |             | 2LNM-258       |

| Ref. No.           | Description                           | RS Part No. | MFR's Part No.           |
|--------------------|---------------------------------------|-------------|--------------------------|
| L50                | Coil, Choke                           |             | 2LNO-255                 |
| L51                | Coil, Choke                           |             | 2LNO-256                 |
| L52                | Coil, IF (1st)                        |             | HF-62H14<br>or R12-H756X |
| L53                | Coil, Trap 512.5 MHz                  |             | 2LNO-254                 |
| L54                | Coil, Trap 512.5 MHz                  |             | 2LNO-254                 |
| L55                | Coil, Choke 0.68 $\mu$ H              |             | LAL03NAR68M              |
| L56                | Coil, Choke 2.2 mH                    |             | FL5HS222J                |
| L57                | Coil, Choke 1 $\mu$ H                 |             | LAL03NA1R0M              |
| L58                | Coil, Choke                           |             | 3B-037T                  |
| <b>Transistors</b> |                                       |             |                          |
| Q1                 | 2SC2712(GR) or (Y) (Marked LG,LY) NPN |             | 2SC2712(GR) or (Y)       |
| Q2                 | 2SC2712(GR) or (Y) (Marked LG,LY) NPN |             | 2SC2712(GR) or (Y)       |
| Q3                 | 2SC3356 (Marked R22) NPN              |             | 2SC3356                  |
| Q4                 | 2SC3356 (Marked R22) NPN              |             | 2SC3356                  |
| Q5                 | 2SC3356 (Marked R22) NPN              |             | 2SC3356                  |
| Q6                 | 2SC3356 (Marked R22 ) NPN             |             | 2SC3356                  |
| Q7                 | 2SC3356 (Marked R22) NPN              |             | 2SC3356                  |
| Q8                 | 2SC2712(GR) or (Y) (Marked LG,LY) NPN |             | 2SC2712(GR) or (Y)       |
| Q9                 | 2SC2714(Y) (Marked QY) NPN            |             | 2SC2714(Y)               |
| Q10                | 2SC2714(Y) (Marked QY) NPN            |             | 2SC2714(Y)               |
| Q11                | FET 2SK210(GR) (Marked YG) MOS        |             | 2SK210(GR)               |
| Q12                | 2SC2712(GR) or (Y) (Marked LG,LY) NPN |             | 2SC2712(GR) or (Y)       |
| Q13                | 2SC2712(GR) or (Y) (Marked LG,LY) NPN |             | 2SC2712(GR) or (Y)       |
| Q14                | 2SC2712(GR) or (Y) (Marked LG,LY) NPN |             | 2SC2712(GR) or (Y)       |
| Q15                | 2SC2714(Y) (Marked QY) NPN            |             | 2SC2714(Y)               |
| Q16                | 2SC2714(Y) (Marked QY) NPN            |             | 2SC2714(Y)               |
| Q17                | 2SA1162(GR) or (Y) (Marked SG,SY) PNP |             | 2SA1162(GR) or (Y)       |
| Q18                | 2SC2712(GR) or (Y) (Marked LG,LY) NPN |             | 2SC2712(GR) or (Y)       |
| Q19                | 2SC2712(GR) or (Y) (Marked LG,LY) NPN |             | 2SC2712(GR) or (Y)       |
| Q20                | RN1408 (Marked XI) NPN                |             | RN1408                   |
| Q21                | RN1408 (Marked XI) NPN                |             | RN1408                   |
| Q22                | 2SC2712(GR) or (Y) (Marked LG,LY) NPN |             | 2SC2712(GR) or (Y)       |
| Q23                | 2SC2712(GR) or (Y) (Marked LG,LY) NPN |             | 2SC2712(GR) or (Y)       |
| Q24                | 2SC3243 NPN                           |             | 2SC3243                  |
| Q25                | 2SC2603 (F) NPN                       |             | 2SC2603(F)               |
| Q26                | RN2405 (Marked YE) PNP                |             | RN2405                   |
| Q27                | RN2405 (Marked YE) PNP                |             | RN2405                   |
| Q28                | RN2405 (Marked YE) PNP                |             | RN2405                   |
| Q29                | 2SC2712(GR) or (Y) (Marked LG,LY) NPN |             | 2SC2712(GR) or (Y)       |
| Q30                | 2SC2712(GR) or (Y) (Marked LG,LY) NPN |             | 2SC2712(GR) or (Y)       |
| Q31                | 2SC2712(GR) or (Y) (Marked LG,LY) NPN |             | 2SC2712(GR) or (Y)       |
| Q32                | 2SD1406(GR) NPN                       |             | 2SD1406(GR)              |
| Q33                | 2SC2458(GR) NPN                       |             | 2SC2458(GR)              |
| Q34                | 2SC2712(GR) or (Y) (Marked LG,LY) NPN |             | 2SC2712(GR) or (Y)       |

| Ref. No.         | Description                           | RS Part No. | MFR's Part No. |
|------------------|---------------------------------------|-------------|----------------|
| <b>Resistors</b> |                                       |             |                |
| R1               | Metal Glaze 100 ohm 1/10 W $\pm 5\%$  |             | RCM101J55      |
| R2               | Metal Glaze 82 ohm 1/10 W $\pm 5\%$   |             | RCM820J55      |
| R3               | Metal Glaze 100 ohm 1/10 W $\pm 5\%$  |             | RCM101J55      |
| R4               | Metal Glaze 3.3 kohm 1/10 W $\pm 5\%$ |             | RCM332J55      |
| R5               | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R6               | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R7               | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R8               | Metal Glaze 3.3 kohm 1/10 W $\pm 5\%$ |             | RCM332J55      |
| R9               | Metal Glaze 4.7 kohm 1/10 W $\pm 5\%$ |             | RCM472J55      |
| R10              | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R11              | Metal Glaze 4.7 kohm 1/10 W $\pm 5\%$ |             | RCM472J55      |
| R12              | Metal Glaze 220 ohm 1/10 W $\pm 5\%$  |             | RCM221J55      |
| R13              | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R14              | Metal Glaze 47 kohm 1/10 W $\pm 5\%$  |             | RCM473J55      |
| R15              | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R16              | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R17              | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R18              | Not used                              |             |                |
| R19              | Metal Glaze 100 kohm 1/10 W $\pm 5\%$ |             | RCM104J55      |
| R20              | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R21              | Metal Glaze 100 kohm 1/10 W $\pm 5\%$ |             | RCM104J55      |
| R22              | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R23              | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R24              | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R25              | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R26              | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R27              | Metal Glaze 4.7 kohm 1/10 W $\pm 5\%$ |             | RCM472J55      |
| R28              | Metal Glaze 220 ohm 1/10 W $\pm 5\%$  |             | RCM221J55      |
| R29              | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R30              | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R31              | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R32              | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R33              | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R34              | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R35              | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R36              | Metal Glaze 4.7 kohm 1/10 W $\pm 5\%$ |             | RCM472J55      |
| R37              | Metal Glaze 220 ohm 1/10 W $\pm 5\%$  |             | RCM221J55      |
| R38              | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R39              | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R40              | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R41              | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R42              | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R43              | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R44              | Metal Glaze 4.7 kohm 1/10 W $\pm 5\%$ |             | RCM472J55      |
| R45              | Metal Glaze 220 ohm 1/10 W $\pm 5\%$  |             | RCM221J55      |
| R46              | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R47              | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R48              | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R49              | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |

| Ref. No. | Description                           | RS Part No. | MFR's Part No. |
|----------|---------------------------------------|-------------|----------------|
| R50      | Metal Glaze 4.7 kohm 1/10 W $\pm 5\%$ |             | RCM472J55      |
| R51      | Metal Glaze 220 ohm 1/10 W $\pm 5\%$  |             | RCM221J55      |
| R52      | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R53      | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R54      | Metal Glaze 4.7 kohm 1/10 W $\pm 5\%$ |             | RCM472J55      |
| R55      | Metal Glaze 220 ohm 1/10 W $\pm 5\%$  |             | RCM221J55      |
| R56      | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R57      | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R58      | Metal Glaze 4.7 kohm 1/10 W $\pm 5\%$ |             | RCM472J55      |
| R59      | Metal Glaze 220 ohm 1/10 W $\pm 5\%$  |             | RCM221J55      |
| R60      | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R61      | Metal Glaze 3.3 kohm 1/10 W $\pm 5\%$ |             | RCM332J55      |
| R62      | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R63      | Metal Glaze 47 kohm 1/10 W $\pm 5\%$  |             | RCM473J55      |
| R64      | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R65      | Metal Glaze 270 ohm 1/10 W $\pm 5\%$  |             | RCM271J55      |
| R66      | Metal Glaze 2.2 kohm 1/10 W $\pm 5\%$ |             | RCM222J55      |
| R67      | Metal Glaze 470 ohm 1/10 W $\pm 5\%$  |             | RCM471J55      |
| R68      | Metal Glaze 22 ohm 1/10 W $\pm 5\%$   |             | RCM220J55      |
| R69      | Metal Glaze 820 ohm 1/10 W $\pm 5\%$  |             | RCM821J55      |
| R70      | Metal Glaze 1.5 kohm 1/10 W $\pm 5\%$ |             | RCM152J55      |
| R71      | Metal Glaze 330 ohm 1/10 W $\pm 5\%$  |             | RCM331J55      |
| R72      | Metal Glaze 56 ohm 1/10 W $\pm 5\%$   |             | RCM560J55      |
| R73      | Metal Glaze 680 ohm 1/10 W $\pm 5\%$  |             | RCM681J55      |
| R74      | Metal Glaze 1.5 kohm 1/10 W $\pm 5\%$ |             | RCM152J55      |
| R75      | Metal Glaze 100 ohm 1/10 W $\pm 5\%$  |             | RCM101J55      |
| R76      | Metal Glaze 47 ohm 1/10 W $\pm 5\%$   |             | RCM470J55      |
| R77      | Metal Glaze 1.5 kohm 1/10 W $\pm 5\%$ |             | RCM152J55      |
| R78      | Metal Glaze 2.2 kohm 1/10 W $\pm 5\%$ |             | RCM222J55      |
| R79      | Metal Glaze 100 ohm 1/10 W $\pm 5\%$  |             | RCM101J55      |
| R80      | Metal Glaze 330 ohm 1/10 W $\pm 5\%$  |             | RCM331J55      |
| R81      | Metal Glaze 56 ohm 1/10 W $\pm 5\%$   |             | RCM560J55      |
| R82      | Not used                              |             |                |
| R83      | Not used                              |             |                |
| R84      | Metal Glaze 47 kohm 1/10 W $\pm 5\%$  |             | RCM473J55      |
| R85      | Metal Glaze 220 kohm 1/10 W $\pm 5\%$ |             | RCM224J55      |
| R86      | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R87      | Metal Glaze 100 ohm 1/10 W $\pm 5\%$  |             | RCM101J55      |
| R88      | Metal Glaze 220 ohm 1/10 W $\pm 5\%$  |             | RCM221J55      |
| R89      | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R90      | Metal Glaze 120 kohm 1/10 W $\pm 5\%$ |             | RCM124J55      |
| R91      | Metal Glaze 15 kohm 1/10 W $\pm 5\%$  |             | RCM153J55      |
| R92      | Metal Glaze 180 kohm 1/10 W $\pm 5\%$ |             | RCM184J55      |
| R93      | Metal Glaze 27 kohm 1/10 W $\pm 5\%$  |             | RCM273J55      |
| R94      | Metal Glaze 56 kohm 1/10 W $\pm 5\%$  |             | RCM563J55      |
| R95      | Metal Glaze 5.6 kohm 1/10 W $\pm 5\%$ |             | RCM562J55      |
| R96      | Metal Glaze 220 kohm 1/10 W $\pm 5\%$ |             | RCM224J55      |
| R97      | Metal Glaze 47 kohm 1/10 W $\pm 5\%$  |             | RCM473J55      |
| R98      | Metal Glaze 2.2 kohm 1/10 W $\pm 5\%$ |             | RCM222J55      |
| R99      | Metal Glaze 220 kohm 1/10 W $\pm 5\%$ |             | RCM224J55      |

| Ref. No. | Description                           | RS Part No. | MFR's Part No. |
|----------|---------------------------------------|-------------|----------------|
| R100     | Metal Glaze 220 ohm 1/10 W $\pm 5\%$  |             | RCM221J55      |
| R101     | Metal Glaze 2.2 kohm 1/10 W $\pm 5\%$ |             | RCM222J55      |
| R102     | Metal Glaze 6.8 kohm 1/10 W $\pm 5\%$ |             | RCM682J55      |
| R103     | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R104     | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R105     | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R106     | Metal Glaze 220 ohm 1/10 W $\pm 5\%$  |             | RCM221J55      |
| R107     | Metal Glaze 150 ohm 1/10 W $\pm 5\%$  |             | RCM151J55      |
| R108     | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R109     | Metal Glaze 10 ohm 1/10 W $\pm 5\%$   |             | RCM100J55      |
| R110     | Metal Glaze 39 kohm 1/10 W $\pm 5\%$  |             | RCM393J55      |
| R111     | Metal Glaze 8.2 kohm 1/10 W $\pm 5\%$ |             | RCM822J55      |
| R112     | Metal Glaze 8.2 kohm 1/10 W $\pm 5\%$ |             | RCM822J55      |
| R113     | Metal Glaze 1 Mohm 1/10 W $\pm 5\%$   |             | RCM105J55      |
| R114     | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R115     | Metal Glaze 22 kohm 1/10 W $\pm 5\%$  |             | RCM223J55      |
| R116     | Metal Glaze 470 ohm 1/10 W $\pm 5\%$  |             | RCM471J55      |
| R117     | Metal Glaze 1.5 kohm 1/10 W $\pm 5\%$ |             | RCM152J55      |
| R118     | Metal Glaze 270 kohm 1/10 W $\pm 5\%$ |             | RCM274J55      |
| R119     | Metal Glaze 15 kohm 1/10 W $\pm 5\%$  |             | RCM153J55      |
| R120     | Metal Glaze 470 ohm 1/10 W $\pm 5\%$  |             | RCM471J55      |
| R121     | Metal Glaze 100 ohm 1/10 W $\pm 5\%$  |             | RCM101J55      |
| R122     | Metal Glaze 4.7 kohm 1/10 W $\pm 5\%$ |             | RCM472J55      |
| R123     | Metal Glaze 180 kohm 1/10 W $\pm 5\%$ |             | RCM184J55      |
| R124     | Metal Glaze 33 kohm 1/10 W $\pm 5\%$  |             | RCM333J55      |
| R125     | Metal Glaze 100 ohm 1/10 W $\pm 5\%$  |             | RCM101J55      |
| R126     | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R127     | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R128     | Metal Glaze 4.7 kohm 1/10 W $\pm 5\%$ |             | RCM472J55      |
| R129     | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R130     | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R131     | Metal Glaze 390 kohm 1/10 W $\pm 5\%$ |             | RCM394J55      |
| R132     | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R133     | Metal Glaze 220 ohm 1/10 W $\pm 5\%$  |             | RCM221J55      |
| R134     | Metal Glaze 100 ohm 1/10 W $\pm 5\%$  |             | RCM101J55      |
| R135     | Metal Glaze 390 kohm 1/10 W $\pm 5\%$ |             | RCM394J55      |
| R136     | Metal Glaze 3.3 kohm 1/10 W $\pm 5\%$ |             | RCM332J55      |
| R137     | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R138     | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R139     | Metal Glaze 470 ohm 1/10 W $\pm 5\%$  |             | RCM471J55      |
| R140     | Metal Glaze 390 kohm 1/10 W $\pm 5\%$ |             | RCM394J55      |
| R141     | Metal Glaze 5.6 kohm 1/10 W $\pm 5\%$ |             | RCM562J55      |
| R142     | Metal Glaze 100 ohm 1/10 W $\pm 5\%$  |             | RCM101J55      |
| R143     | Metal Glaze 100 ohm 1/10 W $\pm 5\%$  |             | RCM101J55      |
| R144     | Metal Glaze 47 ohm 1/10 W $\pm 5\%$   |             | RCM470J55      |
| R145     | Metal Glaze 33 kohm 1/10 W $\pm 5\%$  |             | RCM333J55      |
| R146     | Metal Glaze 1.5 kohm 1/10 W $\pm 5\%$ |             | RCM152J55      |
| R147     | Metal Glaze 3.3 kohm 1/10 W $\pm 5\%$ |             | RCM332J55      |
| R148     | Metal Glaze 1.5 kohm 1/10 W $\pm 5\%$ |             | RCM152J55      |
| R149     | Metal Glaze 100 kohm 1/10 W $\pm 5\%$ |             | RCM104J55      |

| Ref. No. | Description |          |        |     | RS Part No. | MFR's Part No. |
|----------|-------------|----------|--------|-----|-------------|----------------|
| R150     | Metal Glaze | 33 kohm  | 1/10 W | ±5% |             | RCM333J55      |
| R151     | Metal Glaze | 33 kohm  | 1/10 W | ±5% |             | RCM333J55      |
| R152     | Metal Glaze | 33 kohm  | 1/10 W | ±5% |             | RCM333J55      |
| R153     | Metal Glaze | 2.2 kohm | 1/10 W | ±5% |             | RCM222J55      |
| R154     | Metal Glaze | 47 kohm  | 1/10 W | ±5% |             | RCM473J55      |
| R155     | Metal Glaze | 100 kohm | 1/10 W | ±5% |             | RCM104J55      |
| R156     | Metal Glaze | 4.7 kohm | 1/10 W | ±5% |             | RCM472J55      |
| R157     | Metal Glaze | 1 Mohm   | 1/10 W | ±5% |             | RCM105J55      |
| R158     | Metal Glaze | 10 kohm  | 1/10 W | ±5% |             | RCM103J55      |
| R159     | Metal Glaze | 10 kohm  | 1/10 W | ±5% |             | RCM103J55      |
| R160     | Metal Glaze | 4.7 kohm | 1/10 W | ±5% |             | RCM472J55      |
| R161     | Metal Glaze | 10 kohm  | 1/10 W | ±5% |             | RCM103J55      |
| R162     | Metal Glaze | 100 kohm | 1/10 W | ±5% |             | RCM104J55      |
| R163     | Metal Glaze | 47 kohm  | 1/10 W | ±5% |             | RCM473J55      |
| R164     | Metal Glaze | 8.2 kohm | 1/10 W | ±5% |             | RCM822J55      |
| R165     | Metal Glaze | 1.5 kohm | 1/10 W | ±5% |             | RCM152J55      |
| R166     | Metal Glaze | 2.7 kohm | 1/10 W | ±5% |             | RCM272J55      |
| R167     | Metal Glaze | 4.7 kohm | 1/10 W | ±5% |             | RCM472J55      |
| R168     | Metal Glaze | 1 kohm   | 1/10 W | ±5% |             | RCM102J55      |
| R169     | Metal Glaze | 4.7 kohm | 1/10 W | ±5% |             | RCM472J55      |
| R170     | Metal Glaze | 3.3 kohm | 1/10 W | ±5% |             | RCM332J55      |
| R171     | Metal Glaze | 2.7 kohm | 1/10 W | ±5% |             | RCM272J55      |
| R172     | Metal Glaze | 33 kohm  | 1/10 W | ±5% |             | RCM333J55      |
| R173     | Metal Glaze | 47 kohm  | 1/10 W | ±5% |             | RCM473J55      |
| R174     | Metal Glaze | 100 kohm | 1/10 W | ±5% |             | RCM104J55      |
| R175     | Metal Glaze | 100 kohm | 1/10 W | ±5% |             | RCM104J55      |
| R176     | Metal Glaze | 10 kohm  | 1/10 W | ±5% |             | RCM103J55      |
| R177     | Metal Glaze | 33 kohm  | 1/10 W | ±5% |             | RCM333J55      |
| R178     | Metal Glaze | 100 kohm | 1/10 W | ±5% |             | RCM104J55      |
| R179     | Metal Glaze | 5.6 kohm | 1/10 W | ±5% |             | RCM562J55      |
| R180     | Metal Glaze | 10 kohm  | 1/10 W | ±5% |             | RCM103J55      |
| R181     | Metal Glaze | 10 kohm  | 1/10 W | ±5% |             | RCM103J55      |
| R182     | Metal Glaze | 10 kohm  | 1/10 W | ±5% |             | RCM103J55      |
| R183     | Metal Glaze | 33 kohm  | 1/10 W | ±5% |             | RCM333J55      |
| R184     | Metal Glaze | 33 kohm  | 1/10 W | ±5% |             | RCM333J55      |
| R185     | Metal Glaze | 4.7 kohm | 1/10 W | ±5% |             | RCM472J55      |
| R186     | Metal Glaze | 1 Mohm   | 1/10 W | ±5% |             | RCM105J55      |
| R187     | Metal Glaze | 1.2 kohm | 1/10 W | ±5% |             | RCM122J55      |
| R188     | Metal Glaze | 4.7 kohm | 1/10 W | ±5% |             | RCM472J55      |
| R189     | Metal Glaze | 100 kohm | 1/10 W | ±5% |             | RCM104J55      |
| R190     | Metal Glaze | 4.7 kohm | 1/10 W | ±5% |             | RCM472J55      |
| R191     | Metal Glaze | 220 kohm | 1/10 W | ±5% |             | RCM224J55      |
| R192     | Metal Glaze | 10 kohm  | 1/10 W | ±5% |             | RCM103J55      |
| R193     | Metal Glaze | 47 kohm  | 1/10 W | ±5% |             | RCM473J55      |
| R194     | Metal Glaze | 47 kohm  | 1/10 W | ±5% |             | RCM473J55      |
| R195     | Metal Glaze | 10 kohm  | 1/10 W | ±5% |             | RCM103J55      |
| R196     | Metal Glaze | 100 kohm | 1/10 W | ±5% |             | RCM104J55      |
| R197     | Metal Glaze | 10 kohm  | 1/10 W | ±5% |             | RCM103J55      |
| R198     | Metal Glaze | 100 kohm | 1/10 W | ±5% |             | RCM104J55      |
| R199     | Metal Glaze | 10 kohm  | 1/10 W | ±5% |             | RCM103J55      |

| Ref. No. | Description                           | RS Part No. | MFR's Part No. |
|----------|---------------------------------------|-------------|----------------|
| R200     | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R201     | Metal Glaze 22 kohm 1/10 W $\pm 5\%$  |             | RCM223J55      |
| R202     | Metal Glaze 15 kohm 1/10 W $\pm 5\%$  |             | RCM153J55      |
| R203     | Metal Glaze 33 kohm 1/10 W $\pm 5\%$  |             | RCM333J55      |
| R204     | Metal Glaze 100 kohm 1/10 W $\pm 5\%$ |             | RCM104J55      |
| R205     | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R206     | Metal Glaze 22 kohm 1/10 W $\pm 5\%$  |             | RCM223J55      |
| R207     | Metal Glaze 47 kohm 1/10 W $\pm 5\%$  |             | RCM473J55      |
| R208     | Metal Glaze 82 kohm 1/10 W $\pm 5\%$  |             | RCM823J55      |
| R209     | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R210     | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R211     | Metal Glaze 1 Mohm 1/10 W $\pm 5\%$   |             | RCM105J55      |
| R212     | Metal Glaze 2.7 kohm 1/10 W $\pm 5\%$ |             | RCM272J55      |
| R213     | Metal Glaze 470 ohm 1/10 W $\pm 5\%$  |             | RCM471J55      |
| R214     | Metal Glaze 4.7 kohm 1/10 W $\pm 5\%$ |             | RCM472J55      |
| R215     | Metal Glaze 47 ohm 1/10 W $\pm 5\%$   |             | RCM470J55      |
| R216     | Metal Glaze 150 ohm 1/10 W $\pm 5\%$  |             | RCM151J55      |
| R217     | Carbon Film 1 kohm 1/6 W $\pm 5\%$    |             | ERD16EJ102     |
| R218     | Carbon Film 1 kohm 1/6 W $\pm 5\%$    |             | ERD16EJ102     |
| R219     | Metal Glaze 10 ohm 1/10 W $\pm 5\%$   |             | RCM100J55      |
| R220     | Metal Glaze 22 kohm 1/10 W $\pm 5\%$  |             | RCM223J55      |
| R221     | Metal Glaze 100 kohm 1/10 W $\pm 5\%$ |             | RCM104J55      |
| R222     | Metal Glaze 1 Mohm 1/10 W $\pm 5\%$   |             | RCM105J55      |
| R223     | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R224     | Metal Film 3.3 ohm 1/2 W $\pm 5\%$    |             | RNF1/2S3.3ohmJ |
| R225     | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R226     | Metal Glaze 2.2 ohm 1/10 W $\pm 5\%$  |             | RCM2R2J55      |
| R227     | Metal Glaze 47 ohm 1/10 W $\pm 5\%$   |             | RCM470J55      |
| R228     | Metal Glaze 270 ohm 1/10 W $\pm 5\%$  |             | RCM271J55      |
| R229     | Metal Film 2.2 ohm 1 W $\pm 5\%$      |             | ERQ-1AJ-2R2    |
| R230     | Metal Glaze 56 kohm 1/10 W $\pm 5\%$  |             | RCM563J55      |
| R231     | Metal Glaze 33 kohm 1/10 W $\pm 5\%$  |             | RCM333J55      |
| R232     | Metal Glaze 2.2 Mohm 1/10 W $\pm 5\%$ |             | RCM225J55      |
| R233     | Metal Glaze 180 kohm 1/10 W $\pm 5\%$ |             | RCM184J55      |
| R234     | Metal Glaze 470 kohm 1/10 W $\pm 5\%$ |             | RCM474J55      |
| R235     | Metal Glaze 2.2 Mohm 1/10 W $\pm 5\%$ |             | RCM225J55      |
| R236     | Metal Glaze 100 kohm 1/10 W $\pm 5\%$ |             | RCM104J55      |
| R237     | Metal Glaze 15 kohm 1/10 W $\pm 5\%$  |             | RCM153J55      |
| R238     | Metal Glaze 33 kohm 1/10 W $\pm 5\%$  |             | RCM333J55      |
| R239     | Metal Glaze 4.7 kohm 1/10 W $\pm 5\%$ |             | RCM472J55      |
| R240     | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R241     | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R242     | Metal Glaze 220 kohm 1/10 W $\pm 5\%$ |             | RCM224J55      |
| R243     | Carbon Film 330 ohm 1/6 W $\pm 5\%$   |             | ERD16EJ331     |
| R244     | Carbon Film 220 ohm 1/6 W $\pm 5\%$   |             | ERD16EJ221     |
| R245     | Metal Glaze 15 kohm 1/10 W $\pm 5\%$  |             | RCM153J55      |
| R246     | Metal Glaze 33 kohm 1/10 W $\pm 5\%$  |             | RCM333J55      |
| R247     | Metal Glaze 10 ohm 1/10 W $\pm 5\%$   |             | RCM100J55      |
| R248     | Metal Glaze 5.6 kohm 1/10 W $\pm 5\%$ |             | RCM562J55      |
| R249     | Metal Film 1 ohm 1/2 W $\pm 5\%$      |             | RNF1/2S1ohmJ   |

| Ref. No.              | Description                              | RS Part No. | MFR's Part No. |
|-----------------------|------------------------------------------|-------------|----------------|
| R250                  | Metal Glaze 470 ohm 1/10 W $\pm 5\%$     |             | RCM471J55      |
| R251                  | Metal Glaze 15 kohm 1/10 W $\pm 5\%$     |             | RCM153J55      |
| R252                  | Metal Glaze 10 kohm 1/10 W $\pm 5\%$     |             | RCM103J55      |
| R253                  | Metal Glaze 100 kohm 1/10 W $\pm 5\%$    |             | RCM104J55      |
| R254                  | Metal Glaze 22 kohm 1/10 W $\pm 5\%$     |             | RCM223J55      |
| R255                  | Metal Glaze 100 kohm 1/10 W $\pm 5\%$    |             | RCM104J55      |
| R256                  | Metal Glaze 10 ohm 1/10 W $\pm 5\%$      |             | RCM100J55      |
| <b>Transformers</b>   |                                          |             |                |
| T1                    | Coil, IF (2nd)                           |             | 7SSI-298       |
| T2                    | Coil, IF (2nd)                           |             | 7SSI-298       |
| T3                    | Coil, IF (3rd)                           |             | GR-A470033     |
| T4                    | Coil, Quadrature/Det. (WFM Band) 10.7MHz |             | GR-A793        |
| T5                    | Coil, IF (3rd) (AM Band)                 |             | 5SSI-292       |
| T6                    | Coil, IF (3rd) (AM Band)                 |             | 5SSI-293       |
| T7                    | Coil, IF (2nd)                           |             | 7SSI-298       |
| T8                    | Coil, Quadrature/Det. (NFM Band)         |             | GR-P792        |
| T9                    | Coil, DC-DC Converter                    |             | 10SSO-297      |
| <b>Thermistor</b>     |                                          |             |                |
| TH1                   | Thermistor 1.7 kohm                      |             | TD5-C217D2     |
| <b>Crystals</b>       |                                          |             |                |
| X1                    | 37.8 MHz TC-43 Type                      |             | 37.8 MHz       |
| X2                    | 48.045 MHz TC-43 Type                    |             | 48.045 MHz     |
| <b>Crystal Filter</b> |                                          |             |                |
| XF1                   | Filter Crystal 48.5 MHz                  |             | MR48R48.5 MHz  |
| <b>Miscellaneous</b>  |                                          |             |                |
| CN1                   | Connector 8 Pin Male                     |             | PI22A08M       |
| CN2                   | Connector 4 Pin Female                   |             | 5224-04CHPB    |
| CN3                   | Connector 15 Pin Male                    |             | PI22A15M       |
| CN4                   | Connector 3 Pin Male                     |             | PI22A03M       |
| CN5                   | Connector 3 Pin Male                     |             | PI22A03M       |
| CN6                   | Connector 3 Pin Male                     |             | PI22A03M       |
| CN7                   | Connector 2 Pin Male                     |             | PI22A02M       |
| CN8                   | Connector 2 Pin Male                     |             | PI22A02M       |

| Ref. No. | Description                | RS Part No. | MFR's Part No. |
|----------|----------------------------|-------------|----------------|
| J1 ④⑥    | Jack Ant                   |             | GE-85D-5383    |
| J2       | Jack (PLL)                 |             | TMP-J01X-V6    |
| J3       | Jack (PLL)                 |             | TMP-J01X-V6    |
| J4       | Jack (Tape Out)            |             | S-Q3097 #01    |
| J5       | Jack (Ext. Speaker)        |             | S-G8036        |
| J6       | Jack (Power Jack)          |             | MOJ-D14        |
| SW1      | Switch, Slide (ATT SW)     |             | SSFZUB22-07    |
| TP1      | Pin Test                   |             | ERD-25TC0      |
| TP2      | Pin Test                   |             | ERD-25TC0      |
| ④⑦       | Bracket, Antenna Connector |             | GE-86D-6362    |
| ④⑧       | Shield, BPF (Case)         |             | GE-79D-0178B   |
| ④⑨       | Shield, BPF (Top)          |             | GE-88D-7570    |
| ⑤⑩       | Shield, BPF (Bottom)       |             | GE-88D-7730    |
| ⑤①       | Shield, Case (C)           |             | GE-86D-6376    |
| ⑤②       | Shield, Case (B)           |             | GE-86D-6372    |
| ⑤③       | Shield, Top (B)            |             | GE-88D-7571    |
| ⑤④       | Fiber, BPF Shield          |             | GE-88D-7728    |
|          | Pipe, Tight                |             | 1 x 3 x 15 mm  |

PLL PCB Assembly

| Ref. No.   | Description                |          |      |          | RS Part No. | MFR's Part No. |
|------------|----------------------------|----------|------|----------|-------------|----------------|
| ⑧          | Assembly, PCB PLL          |          |      |          |             |                |
|            | Consists of the following: |          |      |          |             | GA-89D-8301    |
| Capacitors |                            |          |      |          |             |                |
| C301       | Ceramic                    | 5 pF     | 50 V | ±0.25 pF |             | RMUMK212SL050C |
| C302       | Ceramic                    | 0.001 μF | 50 V | ±10%     |             | RMUMK212B102K  |
| C303       | Ceramic                    | 0.001 μF | 50 V | ±10%     |             | RMUMK212B102K  |
| C304       | Ceramic                    | 1 pF     | 50 V | ±0.25 pF |             | RMUMK212SL010C |
| C305       | Not used                   |          |      |          |             |                |
| C306       | Ceramic                    | 0.001 μF | 50 V | ±10%     |             | RMUMK212B102K  |
| C307       | Ceramic                    | 0.001 μF | 50 V | ±10%     |             | RMUMK212B102K  |
| C308       | Ceramic                    | 5 pF     | 50 V | ±0.25 pF |             | RMUMK212SL050C |
| C309       | Ceramic                    | 0.01 μF  | 50 V | ±10%     |             | RMUMK212B103K  |
| C310       | Ceramic                    | 3 pF     | 50 V | ±0.25 pF |             | RMUMK212SL030C |
| C311       | Ceramic                    | 5 pF     | 50 V | ±0.25 pF |             | RMUMK212SL050C |
| C312       | Ceramic                    | 3 pF     | 50 V | ±0.25 pF |             | RMUMK212SL030C |
| C313       | Ceramic                    | 0.001 μF | 50 V | ±10%     |             | RMUMK212B102K  |
| C314       | Ceramic                    | 10 pF    | 50 V | ±0.5 pF  |             | RMUMK212SL100D |
| C315       | Ceramic                    | 0.001 μF | 50 V | ±10%     |             | RMUMK212B102K  |
| C316       | Ceramic                    | 5 pF     | 50 V | ±0.25 pF |             | RMUMK212SL050C |
| C317       | Ceramic                    | 0.001 μF | 50 V | ±10%     |             | RMUMK212B102K  |
| C318       | Ceramic                    | 2 pF     | 50 V | ±0.25 pF |             | RMUMK212SL020C |
| C319       | Ceramic                    | 0.001 μF | 50 V | ±10%     |             | RMUMK212B102K  |
| C320       | Ceramic                    | 10 pF    | 50 V | ±0.5 pF  |             | RMUMK212SL100D |
| C321       | Ceramic                    | 0.01 μF  | 50 V | ±10%     |             | RMUMK212B103K  |
| C322       | Ceramic                    | 2 pF     | 50 V | ±0.25 pF |             | RMUMK212SL020C |
| C323       | Ceramic                    | 1 pF     | 50 V | ±0.25 pF |             | RMUMK212SL010C |
| C324       | Ceramic                    | 1 pF     | 50 V | ±0.25 pF |             | RMUMK212SL010C |
| C325       | Ceramic                    | 1 pF     | 50 V | ±0.25 pF |             | RMUMK212SL010C |
| C326       | Ceramic                    | 2 pF     | 50 V | ±0.25 pF |             | RMUMK212SL020C |
| C327       | Ceramic                    | 0.001 μF | 50 V | ±10%     |             | RMUMK212B102K  |
| C328       | Ceramic                    | 1 pF     | 50 V | ±0.25 pF |             | RMUMK212SL010C |
| C329       | Ceramic                    | 0.001 μF | 50 V | ±10%     |             | RMUMK212B102K  |
| C330       | Ceramic                    | 5 pF     | 50 V | ±0.25 pF |             | RMUMK212SL050C |
| C331       | Ceramic                    | 5 pF     | 50 V | ±0.25 pF |             | RMUMK212SL050C |
| C332       | Ceramic                    | 0.001 μF | 50 V | ±10%     |             | RMUMK212B102K  |
| C333       | Ceramic                    | 2 pF     | 50 V | ±0.25 pF |             | RMUMK212SL020C |
| C334       | Ceramic                    | 0.001 μF | 50 V | ±10%     |             | RMUMK212B102K  |
| C335       | Ceramic                    | 2 pF     | 50 V | ±0.25 pF |             | RMUMK212SL020C |
| C336       | Ceramic                    | 1 pF     | 50 V | ±0.25 pF |             | RMUMK212SL010C |
| C337       | Ceramic                    | 22 pF    | 50 V | ±5%      |             | RMUMK212SL220J |
| C338       | Ceramic                    | 22 pF    | 50 V | ±5%      |             | RMUMK212SL220J |
| C339       | Ceramic                    | 10 pF    | 50 V | ±0.5 pF  |             | RMUMK212SL100D |
| C340       | Ceramic                    | 2 pF     | 50 V | ±0.25 pF |             | RMUMK212SL020C |
| C341       | Ceramic                    | 5 pF     | 50 V | ±0.25 pF |             | RMUMK212SL050C |
| C342       | Ceramic                    | 1 pF     | 50 V | ±0.25 pF |             | RMUMK212SL010C |
| C343       | Ceramic                    | 22 pF    | 50 V | ±5%      |             | RMUMK212SL220J |
| C344       | Ceramic                    | 10 pF    | 50 V | ±0.5 pF  |             | RMUMK212SL100D |
| C345       | Ceramic                    | 0.001 μF | 50 V | ±10%     |             | RMUMK212B102K  |
| C346       | Ceramic                    | 10 pF    | 50 V | ±0.5 pF  |             | RMUMK212SL100D |
| C347       | Electrolytic               | 220 μF   | 16 V | ±20%     |             | ECEA1CU221     |

| Ref. No. | Description  |               |      |               | RS Part No. | MFR's Part No. |
|----------|--------------|---------------|------|---------------|-------------|----------------|
| C348     | Ceramic      | 0.001 $\mu$ F | 50 V | $\pm 10\%$    |             | RMUMK212B102K  |
| C349     | Ceramic      | 100 pF        | 50 V | $\pm 5\%$     |             | RMUMK212SL101J |
| C350     | Ceramic      | 2 pF          | 50 V | $\pm 0.25$ pF |             | RMUMK212SL020C |
| C351     | Ceramic      | 5 pF          | 50 V | $\pm 0.25$ pF |             | RMUMK212SL050C |
| C352     | Ceramic      | 10 pF         | 50 V | $\pm 0.5$ pF  |             | RMUMK212SL100D |
| C353     | Ceramic      | 6 pF          | 50 V | $\pm 0.5$ pF  |             | RMUMK212SL060D |
| C354     | Ceramic      | 12 pF         | 50 V | $\pm 5\%$     |             | RMUMK212SL120J |
| C355     | Tantalum     | 0.47 $\mu$ F  | 35 V | $\pm 10\%$    |             | TSD-A-1VR47K   |
| C356     | Mylar        | 0.047 $\mu$ F | 50 V | $\pm 10\%$    |             | AMZ-473K50     |
| C357     | Not used     |               |      |               |             |                |
| C358     | Ceramic      | 8 pF          | 50 V | $\pm 0.5$ pF  |             | RMUMK212SL080D |
| C359     | Ceramic      | 12 pF         | 50 V | $\pm 5\%$     |             | RMUMK212SL120J |
| C360     | Ceramic      | 8 pF          | 50 V | $\pm 0.5$ pF  |             | RMUMK212SL080D |
| C361     | Ceramic      | 4 pF          | 50 V | $\pm 0.25$ pF |             | RMUMK212SL040C |
| C362     | Ceramic      | 0.001 $\mu$ F | 50 V | $\pm 10\%$    |             | RMUMK212B102K  |
| C363     | Ceramic      | 0.001 $\mu$ F | 50 V | $\pm 10\%$    |             | RMUMK212B102K  |
| C364     | Ceramic      | 47 pF         | 50 V | $\pm 5\%$     |             | RMUMK212SL470J |
| C365     | Ceramic      | 47 pF         | 50 V | $\pm 5\%$     |             | RMUMK212SL470J |
| C366     | Ceramic      | 47 pF         | 50 V | $\pm 5\%$     |             | RMUMK212SL470J |
| C367     | Ceramic      | 47 pF         | 50 V | $\pm 5\%$     |             | RMUMK212SL470J |
| C368     | Ceramic      | 0.001 $\mu$ F | 50 V | $\pm 10\%$    |             | RMUMK212B102K  |
| C369     | Ceramic      | 0.001 $\mu$ F | 50 V | $\pm 10\%$    |             | RMUMK212B102K  |
| C370     | Ceramic      | 0.1 $\mu$ F   | 25 V | +80%–20%      |             | RMTMK212F104Z  |
| C371     | Ceramic      | 0.001 $\mu$ F | 50 V | $\pm 10\%$    |             | RMUMK212B102K  |
| C372     | Ceramic      | 10 pF         | 50 V | $\pm 0.5$ pF  |             | RMUMK212SL100D |
| C373     | Ceramic      | 0.01 $\mu$ F  | 50 V | $\pm 10\%$    |             | RMUMK212B103K  |
| C374     | Ceramic      | 5 pF          | 50 V | $\pm 0.25$ pF |             | RMUMK212SL050C |
| C375     | Ceramic      | 0.01 $\mu$ F  | 50 V | $\pm 10\%$    |             | RMUMK212B103K  |
| C376     | Ceramic      | 0.001 $\mu$ F | 50 V | $\pm 10\%$    |             | RMUMK212B102K  |
| C377     | Ceramic      | 0.01 $\mu$ F  | 50 V | $\pm 10\%$    |             | RMUMK212B103K  |
| C378     | Ceramic      | 0.001 $\mu$ F | 50 V | $\pm 10\%$    |             | RMUMK212B102K  |
| C379     | Ceramic      | 0.001 $\mu$ F | 50 V | $\pm 10\%$    |             | RMUMK212B102K  |
| C380     | Ceramic      | 0.001 $\mu$ F | 50 V | $\pm 10\%$    |             | RMUMK212B102K  |
| C381     | Ceramic      | 0.01 $\mu$ F  | 50 V | $\pm 10\%$    |             | RMUMK212B103K  |
| C382     | Ceramic      | 0.01 $\mu$ F  | 50 V | $\pm 10\%$    |             | RMUMK212B103K  |
| C383     | Ceramic      | 0.01 $\mu$ F  | 50 V | $\pm 10\%$    |             | RMUMK212B103K  |
| C384     | Mylar        | 0.01 $\mu$ F  | 50 V | $\pm 10\%$    |             | AMZ-103K50     |
| C385     | Electrolytic | 10 $\mu$ F    | 16 V | $\pm 20\%$    |             | ECEA1CU100     |
| C386     | Ceramic      | 0.001 $\mu$ F | 50 V | $\pm 10\%$    |             | RMUMK212B102K  |
| C387     | Mylar        | 0.047 $\mu$ F | 50 V | $\pm 10\%$    |             | AMZ-473K50     |
| C388     | Tantalum     | 0.1 $\mu$ F   | 35 V | $\pm 10\%$    |             | TSD-A-1V0R1K   |
| C389     | Ceramic      | 5 pF          | 50 V | $\pm 0.25$ pF |             | RMUMK212SL050C |
| C390     | Ceramic      | 0.01 $\mu$ F  | 50 V | $\pm 10\%$    |             | RMUMK212B103K  |
| C391     | Electrolytic | 220 $\mu$ F   | 16 V | $\pm 20\%$    |             | ECEA1CU221     |
| C392     | Electrolytic | 0.47 $\mu$ F  | 50 V | $\pm 20\%$    |             | ECEA1HUR47     |
| C393     | Electrolytic | 0.47 $\mu$ F  | 50 V | $\pm 20\%$    |             | ECEA1HUR47     |
| C394     | Electrolytic | 3.3 $\mu$ F   | 50 V | $\pm 20\%$    |             | ECEA1HU3R3     |
| C395     | Ceramic      | 150 pF        | 50 V | $\pm 5\%$     |             | RMUMK212SL151J |
| C396     | Tantalum     | 0.47 $\mu$ F  | 35 V | $\pm 10\%$    |             | TSD-A-1VR47K   |

| Ref. No. | Description      |                |           | RS Part No. | MFR's Part No. |
|----------|------------------|----------------|-----------|-------------|----------------|
| Diodes   |                  |                |           |             |                |
| D301     |                  | HSR277         | (Silicon) |             | HSR277         |
| D302     |                  | HSR277         | (Silicon) |             | HSR277         |
| D303     |                  | HSR277         | (Silicon) |             | HSR277         |
| D304     |                  | HSR277         | (Silicon) |             | HSR277         |
| D305     | Varactor         | 1T25 or 1T32   | (Silicon) |             | 1T25 or 1T32   |
| D306     | Varactor         | 1T25 or 1T32   | (Silicon) |             | 1T25 or 1T32   |
| D307     | Varactor         | 1T25 or 1T32   | (Silicon) |             | 1T25 or 1T32   |
| D308     | Varactor         | 1T25 or 1T32   | (Silicon) |             | 1T25 or 1T32   |
| D309     | Varactor         | 1SV89          | (Silicon) |             | 1SV89          |
| D310     |                  | HSR277         | (Silicon) |             | HSR277         |
| D311     |                  | HSR277         | (Silicon) |             | HSR277         |
| ICs      |                  |                |           |             |                |
| IC301    | TD6105AP         | Pre-Scaler     | (Bipolar) |             | TD6105AP       |
| IC302    | MC145158         | PLL            | (C-MOS)   |             | MC145158       |
| IC303    | CX-7925B         | PLL/Pre-Scaler | (N-MOS)   |             | CX-7925B       |
| IC304    | MB501LP          | Pre-Scaler     | (C-MOS)   |             | MB501LP        |
| Coils    |                  |                |           |             |                |
| L301     | Low-Pass Filter  |                |           |             | 2.5LNB-257     |
| L302     | Low-Pass Filter  |                |           |             | 2.5LNB-257     |
| L303     | Stripline on PCB |                |           |             |                |
| L304     | Stripline on PCB |                |           |             |                |
| L305     | Stripline on PCB |                |           |             |                |
| L306     | Stripline on PCB |                |           |             |                |
| L307     | Coil, Choke      | 10 $\mu$ H     |           |             | LAL03NA100K    |
| L308     | Coil, Choke      | 0.47 $\mu$ H   |           |             | LAL03NAR47M    |
| L309     | Coil, VCO        |                |           |             | 2LNO-254       |
| L310     | Coil, Choke      | 0.47 $\mu$ H   |           |             | LAL03NAR47M    |
| L311     | Coil, VCO        |                |           |             | 2LNO-255       |
| L312     | Coil, VOC        |                |           |             | 2LNB-253       |
| L313     | Stripline on PCB |                |           |             |                |
| L314     | Stripline on PCB |                |           |             |                |
| L315     | Stripline on PCB |                |           |             |                |
| L316     | Coil, Choke      | 10 $\mu$ H     |           |             | LAL03NA100K    |
| L317     | Coil, Choke      | 10 $\mu$ H     |           |             | LAL03NA100K    |
| L318     | Coil, Choke      | 10 $\mu$ H     |           |             | LAL03NA100K    |
| L319     | Coil, Choke      | 10 $\mu$ H     |           |             | LAL03NA100K    |
| L320     | Coil, Choke      | 10 $\mu$ H     |           |             | LAL04NA100K    |
| L321     | Coil, Choke      | 10 $\mu$ H     |           |             | LAL04NA100K    |
| L322     | Coil, Choke      | 10 $\mu$ H     |           |             | LAL03NA100K    |

| Ref. No.           | Description                           | RS Part No. | MFR's Part No. |
|--------------------|---------------------------------------|-------------|----------------|
| <b>Transistors</b> |                                       |             |                |
| Q301               | RN2405 (Marked YE) PNP                |             | RN2405         |
| Q302               | 2SC3356 (Marked R22) NPN              |             | 2SC3356        |
| Q303               | 2SC3356 (Marked R22) NPN              |             | 2SC3356        |
| Q304               | 2SC3356 (Marked R22) NPN              |             | 2SC3356        |
| Q305               | RN2405 (Marked YE) PNP                |             | RN2405         |
| Q306               | 2SC3356 (Marked R22) NPN              |             | 2SC3356        |
| Q307               | 2SC3356 (Marked R22) NPN              |             | 2SC3356        |
| Q308               | 2SC3356 (Marked R22) NPN              |             | 2SC3356        |
| Q309               | RN2405 (Marked YE) PNP                |             | RN2405         |
| Q310               | 2SC3356 (Marked R22) NPN              |             | 2SC3356        |
| Q311               | 2SC3356 (Marked R22) NPN              |             | 2SC3356        |
| Q312               | 2SC3356 (Marked R22) NPN              |             | 2SC3356        |
| Q313               | RN2405 (Marked YE) PNP                |             | RN2405         |
| Q314               | 2SC3356 (Marked R22) NPN              |             | 2SC3356        |
| Q315               | 2SC3356 (Marked R22) NPN              |             | 2SC3356        |
| Q316               | 2SC3356 (Marked R22) NPN              |             | 2SC3356        |
| Q317               | FET 2SK209(GR) (Marked XG) N-Junction |             | 2SK209(GR)     |
| Q318               | 2SC2712(GR) (Marked LG) NPN           |             | 2SC2712(GR)    |
| <b>Resistors</b>   |                                       |             |                |
| R301               | Metal Glaze 100 ohm 1/10 W $\pm 5\%$  |             | RCM101J55      |
| R302               | Metal Glaze 100 ohm 1/10 W $\pm 5\%$  |             | RCM101J55      |
| R303               | Metal Glaze 33 kohm 1/10 W $\pm 5\%$  |             | RCM333J55      |
| R304               | Metal Glaze 220 ohm 1/10 W $\pm 5\%$  |             | RCM221J55      |
| R305               | Metal Glaze 100 ohm 1/10 W $\pm 5\%$  |             | RCM101J55      |
| R306               | Metal Glaze 47 kohm 1/10 W $\pm 5\%$  |             | RCM473J55      |
| R307               | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R308               | Metal Glaze 2.2 kohm 1/10 W $\pm 5\%$ |             | RCM222J55      |
| R309               | Metal Glaze 2.2 kohm 1/10 W $\pm 5\%$ |             | RCM222J55      |
| R310               | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R311               | Metal Glaze 220 ohm 1/10 W $\pm 5\%$  |             | RCM221J55      |
| R312               | Metal Glaze 100 ohm 1/10 W $\pm 5\%$  |             | RCM101J55      |
| R313               | Metal Glaze 100 kohm 1/10 W $\pm 5\%$ |             | RCM104J55      |
| R314               | Metal Glaze 100 ohm 1/10 W $\pm 5\%$  |             | RCM101J55      |
| R315               | Metal Glaze 100 ohm 1/10 W $\pm 5\%$  |             | RCM101J55      |
| R316               | Metal Glaze 47 kohm 1/10 W $\pm 5\%$  |             | RCM473J55      |
| R317               | Metal Glaze 1 kohm 1/10 W $\pm 5\%$   |             | RCM102J55      |
| R318               | Metal Glaze 220 ohm 1/10 W $\pm 5\%$  |             | RCM221J55      |
| R319               | Metal Glaze 100 ohm 1/10 W $\pm 5\%$  |             | RCM101J55      |
| R320               | Metal Glaze 100 kohm 1/10 W $\pm 5\%$ |             | RCM104J55      |
| R321               | Metal Glaze 220 ohm 1/10 W $\pm 5\%$  |             | RCM221J55      |
| R322               | Metal Glaze 100 ohm 1/10 W $\pm 5\%$  |             | RCM101J55      |
| R323               | Metal Glaze 100 kohm 1/10 W $\pm 5\%$ |             | RCM104J55      |
| R324               | Metal Glaze 100 ohm 1/10 W $\pm 5\%$  |             | RCM101J55      |
| R325               | Metal Glaze 100 kohm 1/10 W $\pm 5\%$ |             | RCM104J55      |
| R326               | Metal Glaze 220 ohm 1/10 W $\pm 5\%$  |             | RCM221J55      |

| Ref. No. | Description |          |        |     | RS Part No. | MFR's Part No. |
|----------|-------------|----------|--------|-----|-------------|----------------|
| R327     | Metal Glaze | 220 ohm  | 1/10 W | ±5% |             | RCM221J55      |
| R328     | Metal Glaze | 100 ohm  | 1/10 W | ±5% |             | RCM101J55      |
| R329     | Metal Glaze | 47 kohm  | 1/10 W | ±5% |             | RCM473J55      |
| R330     | Metal Glaze | 1 kohm   | 1/10 W | ±5% |             | RCM102J55      |
| R331     | Metal Glaze | 470 ohm  | 1/10 W | ±5% |             | RCM471J55      |
| R332     | Metal Glaze | 220 ohm  | 1/10 W | ±5% |             | RCM221J55      |
| R333     | Metal Glaze | 2.7 kohm | 1/10 W | ±5% |             | RCM272J55      |
| R334     | Metal Glaze | 2.2 kohm | 1/10 W | ±5% |             | RCM222J55      |
| R335     | Metal Glaze | 100 kohm | 1/10 W | ±5% |             | RCM104J55      |
| R336     | Metal Glaze | 10 kohm  | 1/10 W | ±5% |             | RCM103J55      |
| R337     | Metal Glaze | 100 ohm  | 1/10 W | ±5% |             | RCM101J55      |
| R338     | Metal Glaze | 220 ohm  | 1/10 W | ±5% |             | RCM221J55      |
| R339     | Metal Glaze | 2.7 kohm | 1/10 W | ±5% |             | RCM272J55      |
| R340     | Metal Glaze | 2.2 kohm | 1/10 W | ±5% |             | RCM222J55      |
| R341     | Metal Glaze | 1 kohm   | 1/10 W | ±5% |             | RCM102J55      |
| R342     | Metal Glaze | 470 ohm  | 1/10 W | ±5% |             | RCM471J55      |
| R343     | Metal Glaze | 100 kohm | 1/10 W | ±5% |             | RCM104J55      |
| R344     | Metal Glaze | 10 kohm  | 1/10 W | ±5% |             | RCM103J55      |
| R345     | Metal Glaze | 100 ohm  | 1/10 W | ±5% |             | RCM101J55      |
| R346     | Metal Glaze | 470 ohm  | 1/10 W | ±5% |             | RCM471J55      |
| R347     | Metal Glaze | 150 kohm | 1/10 W | ±5% |             | RCM154J55      |
| R348     | Metal Glaze | 100 ohm  | 1/10 W | ±5% |             | RCM101J55      |
| R349     | Metal Glaze | 100 ohm  | 1/10 W | ±5% |             | RCM101J55      |
| R350     | Metal Glaze | 15 kohm  | 1/10 W | ±5% |             | RCM153J55      |
| R351     | Metal Glaze | 470 ohm  | 1/10 W | ±5% |             | RCM471J55      |
| R352     | Metal Glaze | 4.7 kohm | 1/10 W | ±5% |             | RCM472J55      |
| R353     | Metal Glaze | 3.3 kohm | 1/10 W | ±5% |             | RCM332J55      |
| R354     | Metal Glaze | 4.7 kohm | 1/10 W | ±5% |             | RCM472J55      |
| R355     | Not used    |          |        |     |             |                |
| R356     | Not used    |          |        |     |             |                |
| R357     | Metal Glaze | 100 ohm  | 1/10 W | ±5% |             | RCM101J55      |
| R358     | Metal Glaze | 100 ohm  | 1/10 W | ±5% |             | RCM101J55      |
| R359     | Metal Glaze | 100 ohm  | 1/10 W | ±5% |             | RCM101J55      |
| R360     | Metal Glaze | 100 ohm  | 1/10 W | ±5% |             | RCM101J55      |
| R361     | Metal Glaze | 8.2 kohm | 1/10 W | ±5% |             | RCM822J55      |
| R362     | Metal Glaze | 8.2 kohm | 1/10 W | ±5% |             | RCM822J55      |
| R363     | Metal Glaze | 8.2 kohm | 1/10 W | ±5% |             | RCM822J55      |
| R364     | Metal Glaze | 8.2 kohm | 1/10 W | ±5% |             | RCM822J55      |
| R365     | Metal Glaze | 2.2 kohm | 1/10 W | ±5% |             | RCM222J55      |
| R366     | Metal Glaze | 18 kohm  | 1/10 W | ±5% |             | RCM183J55      |
| R367     | Metal Glaze | 2.2 kohm | 1/10 W | ±5% |             | RCM222J55      |
| R368     | Metal Glaze | 820 ohm  | 1/10 W | ±5% |             | RCM821J55      |
| R369     | Metal Glaze | 39 kohm  | 1/10 W | ±5% |             | RCM393J55      |
| R370     | Metal Glaze | 100 ohm  | 1/10 W | ±5% |             | RCM101J55      |
| R371     | Metal Glaze | 10 kohm  | 1/10 W | ±5% |             | RCM103J55      |
| R372     | Metal Glaze | 1 kohm   | 1/10 W | ±5% |             | RCM102J55      |
| R373     | Metal Glaze | 1 kohm   | 1/10 W | ±5% |             | RCM102J55      |
| R374     | Metal Glaze | 33 kohm  | 1/10 W | ±5% |             | RCM333J55      |
| R375     | Metal Glaze | 1 kohm   | 1/10 W | ±5% |             | RCM102J55      |
| R376     | Metal Glaze | 10 kohm  | 1/10 W | ±5% |             | RCM103J55      |

| Ref. No.             | Description                  | RS Part No. | MFR's Part No. |
|----------------------|------------------------------|-------------|----------------|
| <b>Crystal</b>       |                              |             |                |
| X301                 | Crystal 10 MH                |             | TX1824G-3      |
| <b>Miscellaneous</b> |                              |             |                |
| CN301                | Connector 10 Pin Male        |             | PI22A10M       |
| CN302                | Connector 4 Pin Male         |             | 3022-04A       |
| SW301                | Switch                       |             | SKHHLP         |
| TP301                | Pin, Test                    |             | GE-87D-7290    |
| TP302                | Pin, Test                    |             | GE-87D-7290    |
| 55                   | Shield, Case (C)             |             | GE-86D-6376    |
| 56                   | Shield, Case (B)             |             | GE-86D-6372    |
| 57                   | Shield, Cover Top            |             | GE-88D-7571    |
| 58                   | Shield, Cover Bottom         |             | GE-86D-6510    |
| 59                   | Shield, Plate Bottom         |             | GE-88D-7890    |
| 61                   | Fiber, Cover Shield (Bottom) |             | GE-86D-6514    |

**Logic & Display PCB Assembly**

| Ref. No.          | Description                         |               |           |            | RS Part No. | MFR's Part No. |
|-------------------|-------------------------------------|---------------|-----------|------------|-------------|----------------|
| ⑨                 | PCB Assembly, Logic & Display Board |               |           |            |             |                |
|                   | Consists of the following:          |               |           |            |             | GA-88D-7817    |
| Capacitors        |                                     |               |           |            |             |                |
| C501              | Ceramic                             | 0.01 $\mu$ F  | 50 V      | $\pm 10\%$ |             | RMUMK212B103K  |
| C502              | Ceramic                             | 0.01 $\mu$ F  | 50 V      | $\pm 10\%$ |             | RMUMK212B103K  |
| C503              | Ceramic                             | 0.01 $\mu$ F  | 50 V      | $\pm 10\%$ |             | RMUMK212B103K  |
| C504              | Electrolytic                        | 100 $\mu$ F   | 10 V      | $\pm 20\%$ |             | ECEA1AU101     |
| C505              | Mylar                               | 0.047 $\mu$ F | 50 V      | $\pm 10\%$ |             | AMZ-473K50     |
| C506              | Tantalum                            | 6.8 $\mu$ F   | 10 V      | $\pm 10\%$ |             | TSD-S-1A6R8K   |
| C507              | Ceramic                             | 0.01 $\mu$ F  | 50 V      | $\pm 10\%$ |             | RMUMK212B103K  |
| C508              | Electrolytic                        | 4.7 $\mu$ F   | 50 V      | $\pm 20\%$ |             | ECEA1HU4R7     |
| C509              | Ceramic                             | 0.001 $\mu$ F | 50 V      | $\pm 10\%$ |             | RMUMK212B102K  |
| C510              | Ceramic                             | 0.001 $\mu$ F | 50 V      | $\pm 10\%$ |             | RMUMK212B102K  |
| C511              | Ceramic                             | 0.01 $\mu$ F  | 50 V      | $\pm 10\%$ |             | RMUMK212B103K  |
| C512              | Electrolytic                        | 10 $\mu$ F    | 16 V      | $\pm 20\%$ |             | ECEA1CU100     |
| C513              | Ceramic                             | 0.01 $\mu$ F  | 50 V      | $\pm 10\%$ |             | RMUMK212B103K  |
| C514              | Ceramic                             | 100 pF        | 50 V      | $\pm 5\%$  |             | RMUMK212SL101J |
| C515              | Ceramic                             | 100 pF        | 50 V      | $\pm 5\%$  |             | RMUMK212SL101J |
| C516              | Ceramic                             | 100 pF        | 50 V      | $\pm 5\%$  |             | RMUMK212SL101J |
| C517              | Ceramic                             | 100 pF        | 50 V      | $\pm 5\%$  |             | RMUMK212SL101J |
| C518              | Ceramic                             | 100 pF        | 50 V      | $\pm 5\%$  |             | RMUMK212SL101J |
| C519              | Ceramic                             | 100 pF        | 50 V      | $\pm 5\%$  |             | RMUMK212SL101J |
| C520              | Ceramic                             | 100 pF        | 50 V      | $\pm 5\%$  |             | RMUMK212SL101J |
| C521              | Ceramic                             | 100 pF        | 50 V      | $\pm 5\%$  |             | RMUMK212SL101J |
| C522              | Ceramic                             | 100 pF        | 50 V      | $\pm 5\%$  |             | RMUMK212SL101J |
| C523              | Ceramic                             | 100 pF        | 50 V      | $\pm 5\%$  |             | RMUMK212SL101J |
| C524              | Ceramic                             | 100 pF        | 50 V      | $\pm 5\%$  |             | RMUMK212SL101J |
| C525              | Ceramic                             | 100 pF        | 50 V      | $\pm 5\%$  |             | RMUMK212SL101J |
| Ceramic Resonator |                                     |               |           |            |             |                |
| CX501             | CST12.0MT                           |               |           |            |             | CST12.0MT      |
| Diodes            |                                     |               |           |            |             |                |
| D501              | Chip                                | HSR277        | (Silicon) |            |             | HSR277         |
| D502              |                                     | 1S2076A       | (Silicon) |            |             | 1S2076A        |
| D503              |                                     | 1S2076A       | (Silicon) |            |             | 1S2076A        |
| Diode Arrays      |                                     |               |           |            |             |                |
| DA501             | Chip                                | IMN10         | (Silicon) |            |             | IMN10          |
| DA502             | Chip                                | IMN10         | (Silicon) |            |             | IMN10          |
| DA503             | Chip                                | IMN10         | (Silicon) |            |             | IMN10          |

| Ref. No.          | Description                                                                                                | RS Part No. | MFR's Part No.                                                                              |
|-------------------|------------------------------------------------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------|
| <b>EL</b>         |                                                                                                            |             |                                                                                             |
| EL501             | Electro Luminescent                                                                                        |             | GE-88D-7738                                                                                 |
| <b>ICs</b>        |                                                                                                            |             |                                                                                             |
| IC501             | GRE-0918 CPU (C-MOS)                                                                                       |             | GRE-0918                                                                                    |
| IC502             | SN74LS145NS Decoder (Bipolar)                                                                              |             | SN74LS145NS                                                                                 |
| IC503             | TD62504F Driver (Bipolar)                                                                                  |             | TD62504F                                                                                    |
| IC504             | $\mu$ PD-7225G LCD Cont. (C-MOS)                                                                           |             | $\mu$ PD-7225G                                                                              |
| IC505             | LC3517BM-10,12,15 Memory (C-MOS)<br>or LC3517BML-10,12,<br>15 or UM6116M-2D or<br>CXK5816M-10L,12L,<br>15L |             | LC3517BM-10,12,15<br>or LC3517BML-10,12,<br>15 or UM6116M-2D or<br>CXK5816M-10L,12L,<br>15L |
| <b>Inductors</b>  |                                                                                                            |             |                                                                                             |
| L501              | Coil, Choke 100 $\mu$ H                                                                                    |             | LAL03NA101K                                                                                 |
| L502              | Coil, Choke 100 $\mu$ H                                                                                    |             | LAL03NA101K                                                                                 |
| L503              | Coil, Choke 100 $\mu$ H                                                                                    |             | LAL03NA101K                                                                                 |
| <b>LCD</b>        |                                                                                                            |             |                                                                                             |
| LCD501            | LCD                                                                                                        |             | LTP8E3011A                                                                                  |
| <b>LED</b>        |                                                                                                            |             |                                                                                             |
| LED501            | TLR226                                                                                                     |             | TLR226                                                                                      |
| <b>Transistor</b> |                                                                                                            |             |                                                                                             |
| Q501              | RN2401 (Marked YA) PNP                                                                                     |             | RN2401                                                                                      |
| Q502              | RN2401 (Marked YA) PNP                                                                                     |             | RN2401                                                                                      |
| Q503              | RN2401 (Marked YA) PNP                                                                                     |             | RN2401                                                                                      |
| Q504              | RN2401 (Marked YA) PNP                                                                                     |             | RN2401                                                                                      |
| Q505              | RN2401 (Marked YA) PNP                                                                                     |             | RN2401                                                                                      |
| Q506              | RN2401 (Marked YA) PNP                                                                                     |             | RN2401                                                                                      |
| Q507              | RN2401 (Marked YA) PNP                                                                                     |             | RN2401                                                                                      |
| Q508              | 2SC1623 (Marked L5) NPN                                                                                    |             | 2SC1623                                                                                     |
| <b>Resistor</b>   |                                                                                                            |             |                                                                                             |
| R501              | Metal Glaze 100 ohm 1/10 W $\pm$ 5%                                                                        |             | RCM101J55                                                                                   |
| R502              | Metal Glaze 3.3 kohm 1/10 W $\pm$ 5%                                                                       |             | RCM332J55                                                                                   |
| R503              | Metal Glaze 5.6 kohm 1/10 W $\pm$ 5%                                                                       |             | RCM562J55                                                                                   |
| R504              | Metal Glaze 150 ohm 1/10 W $\pm$ 5%                                                                        |             | RCM151J55                                                                                   |
| R505              | Metal Glaze 47 ohm 1/10 W $\pm$ 5%                                                                         |             | RCM470J55                                                                                   |
| R506              | Metal Glaze 100 kohm 1/10 W $\pm$ 5%                                                                       |             | RCM104J55                                                                                   |
| R507              | Metal Glaze 10 kohm 1/10 W $\pm$ 5%                                                                        |             | RCM103J55                                                                                   |

| Ref. No.             | Description                           | RS Part No. | MFR's Part No. |
|----------------------|---------------------------------------|-------------|----------------|
| R508                 | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R509                 | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R510                 | Metal Glaze 180 kohm 1/10 W $\pm 5\%$ |             | RCM184J55      |
| R511                 | Metal Glaze 22 ohm 1/10 W $\pm 5\%$   |             | RCM220J55      |
| R512                 | Metal Glaze 6.8 kohm 1/10 W $\pm 5\%$ |             | RCM682J55      |
| R513                 | Metal Glaze 150 ohm 1/10 W $\pm 5\%$  |             | RCM151J55      |
| R514                 | Metal Glaze 560 kohm 1/10 W $\pm 5\%$ |             | RCM564J55      |
| R515                 | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R516                 | Metal Glaze 1 Mohm 1/10 W $\pm 5\%$   |             | RCM105J55      |
| R517                 | Metal Glaze 100 kohm 1/10 W $\pm 5\%$ |             | RCM104J55      |
| R518                 | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R519                 | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R520                 | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R521                 | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R522                 | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R523                 | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R524                 | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R525                 | Metal Glaze 47 kohm 1/10 W $\pm 5\%$  |             | RCM473J55      |
| R526                 | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R527                 | Metal Glaze 10 kohm 1/10 W $\pm 5\%$  |             | RCM103J55      |
| R528                 | Metal Glaze 47 kohm 1/10 W $\pm 5\%$  |             | RCM473J55      |
| R529                 | Metal Glaze 47 kohm 1/10 W $\pm 5\%$  |             | RCM473J55      |
| R530                 | Metal Glaze 47 kohm 1/10 W $\pm 5\%$  |             | RCM473J55      |
| R531                 | Metal Glaze 47 kohm 1/10 W $\pm 5\%$  |             | RCM473J55      |
| R532                 | Metal Glaze 47 kohm 1/10 W $\pm 5\%$  |             | RCM473J55      |
| <b>Transformer</b>   |                                       |             |                |
| T501                 | Transformer                           |             | 5N75TK         |
| <b>Miscellaneous</b> |                                       |             |                |
| CN501                | Connector, Socket 13 Pin Female       |             | 5124-13BHPB    |
| SW501                | Switch, Push                          |             | SPF-P220NLB    |
| SW502                | Switch Push                           |             | SPF-P220NLB    |
| 62                   | Holder, LCD                           |             | GE-88D-7609    |
| 63                   | Cushion, LCD                          |             | GE-88D-7835    |
| 64                   | Shield, Logic                         |             | GE-88D-7569    |

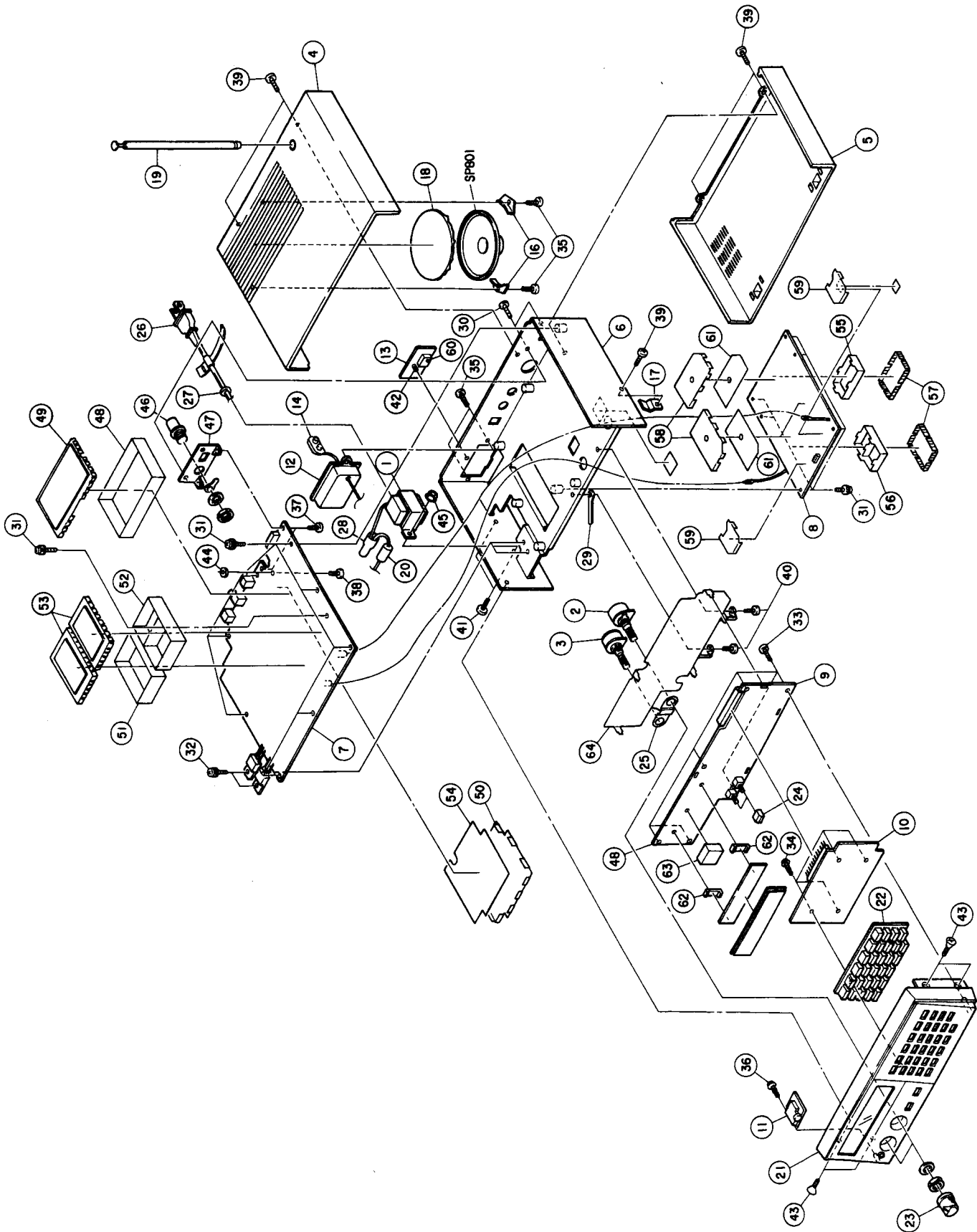
## Key Board PCB Assembly

| Ref. No.      | Description                                          | RS Part No. | MFR's Part No.          |
|---------------|------------------------------------------------------|-------------|-------------------------|
| ⑩             | Assembly, PCB KeyBoard<br>Consists of the following: |             | GA-88D-7818             |
| Miscellaneous |                                                      |             |                         |
| CN601<br>J601 | Connector, Pin<br>Pin, Test (Jumper)                 | 13 Pin Male | 3022-13B<br>GE-87D-7290 |

## Headphone PCB Assembly

| Ref. No.      | Description                                           | RS Part No. | MFR's Part No. |
|---------------|-------------------------------------------------------|-------------|----------------|
| ⑪             | Assembly, PCB Headphone<br>Consists of the following: |             | GA-89D-8302    |
| Miscellaneous |                                                       |             |                |
| J801          | Jack, Headphone                                       |             | MOJ-B24-5      |

# DISASSEMBLY/EXPLODED VIEW



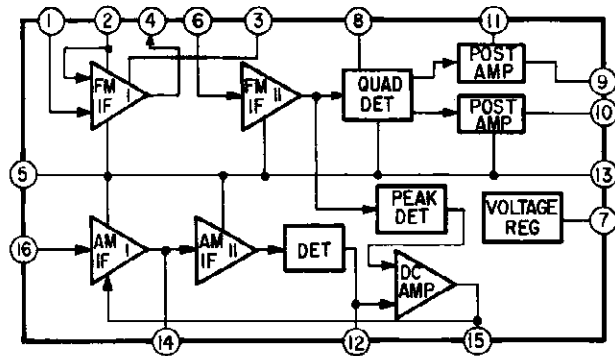
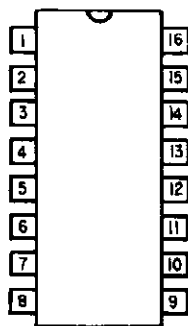
# EXPLODED VIEW PARTS LIST (Disassembly/Exploded View)

| Ref. No.  | Description                      | RS Part No. | MFR's Part No.     |
|-----------|----------------------------------|-------------|--------------------|
| SP801     | Speaker 8 ohm 1 W                |             | S08J18             |
| ① T801    | Transformer, Power               |             | GE-84D-5158        |
| ② VR801   | Pot. Squelch Control 10 kohm (C) |             | K1611008TE-10KC-20 |
| ③ VR802   | Pot. Volume Control 50 kohm (A)  |             | VM11A-5M1411       |
|           |                                  |             | -50KA-20           |
| ④         | Cabinet, Top                     |             | GE-88A-7603        |
| ⑤         | A'ssy, Cabinet Bottom            |             | GE-88D-7888        |
| ⑥         | Chassis                          |             | GE-88A-7611        |
| ⑫         | Box, Battery                     |             | GE-21D-5728        |
| ⑬         | Cover, Battery                   |             | GE-79D-0113        |
| ⑭         | Snap, Battery L = 250 mm         |             | I Type             |
| ⑯         | Holder, Speaker                  |             | GE-84D-4580        |
| ⑰         | Holder, Wire                     |             | GE-88D-7892        |
| ⑱         | Himelon, Speaker                 |             | GE-88D-7681        |
| ⑲         | Antenna, Telescopic              |             | GE-88D-7597        |
| △ 20 R801 | Solid 1.8 Mohm 1/2 W ±10%        |             | ERC-12GK185        |
| 21        | A'ssy, Escutcheon Front          |             | GA-89D-8303        |
| 22        | Top, Key                         |             | GE-88D-7610        |
| 23        | Knob, Volume/Squelch             |             | GE-88D-7607        |
| 24        | Knob, Switch Push                |             | GE-88D-7608        |
| 25        | Plate, Ground                    |             | GE-88D-7613        |
| 26        | Cord, AC                         |             | APC-7W-SPT1        |
|           |                                  |             | AWG2/18            |
| 27        | Strainrelief, Line Cord          |             | SR-3P-4            |
| 28        | Terminal                         |             | 1-SD               |
| 29        | Lug, L = 27 mm                   |             | 3 mm               |
| 30        | Screw, Panhead with SW (Ni)      |             | PM 2.6 x 5         |
| 31        | Screw, Panhead with SW/FW (Ni)   |             | PM 3 x 6           |
| 32        | Screw, Panhead with SW/FW (Ni)   |             | PM 3 x 8           |
| 33        | Screw, Panhead P tight           |             | P tight 2.6 x 6    |
| 34        | Screw, Panhead P tight           |             | P tight 2 x 8      |
| 35        | Screw, Panhead P tight           |             | P tight 3 x 8      |
| 36        | Screw, TP Tapping                |             | TP 2 x 6           |
| 37        | Screw, Panhead Tapping           |             | PT 2.6 x 6         |
| 38        | Screw, Panhead (Ni)              |             | PM 3 x 8           |
| 39        | Screw, Bindinghead (Ni)          |             | BM 3 x 6           |
| 40        | Screw, Bindinghead Tapping       |             | BT 3 x 5           |
| 41        | Screw, Special Bindinghead       |             | BM 4 x 8           |
| 42        | Screw, Bindinghead               |             | GE-79D-0541        |
| 43        | Screw, Countersunkhead           |             | CM 3 x 6           |
| 44        | Nut                              |             | 3-DIA              |
| 45        | Nut Flange Serrated              |             | 4-DIA              |
| 60        | Cushion, Battery                 |             | GE-21D-5795        |
|           | Wire Kit                         |             | #918(A)            |
|           | Hardware Kit                     |             | #918(B)            |
|           | Wire Binder                      |             | PLT1M-M or BK-1    |

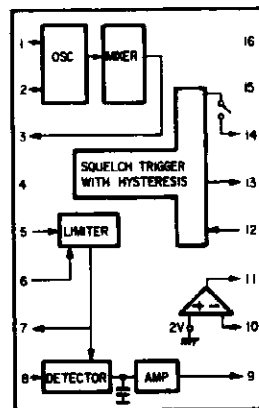
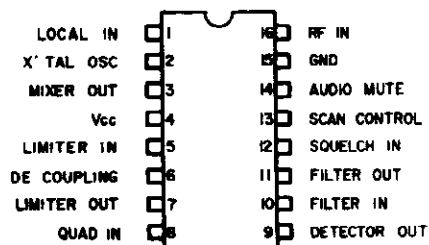
# SEMICONDUCTOR LEAD IDENTIFICATION AND IC CIRCUIT DIAGRAM

## Integrated Circuit Lead Identification, Liner PCB

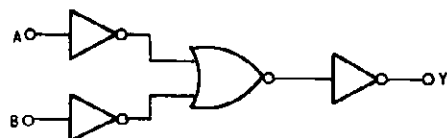
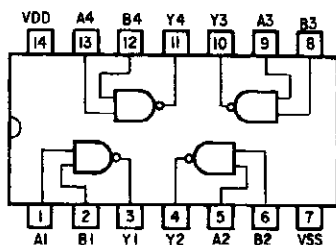
IC1 HA12413 or KA2243N



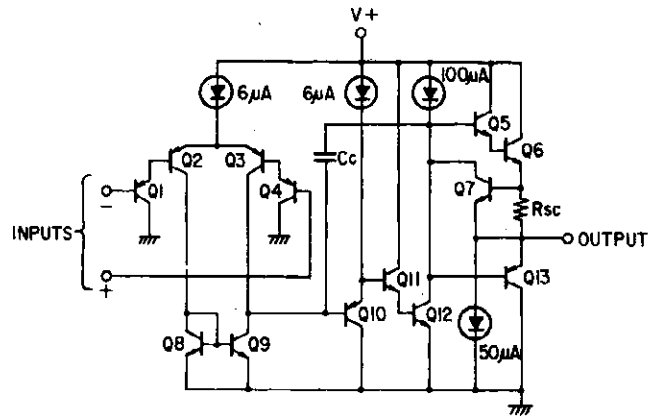
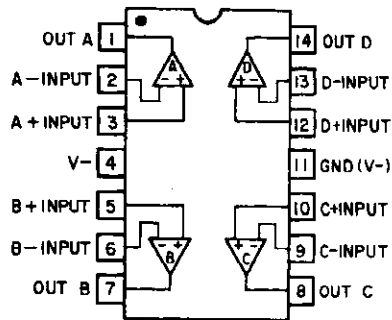
IC2 TK10420



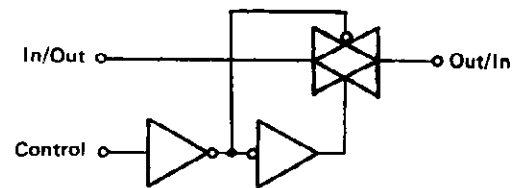
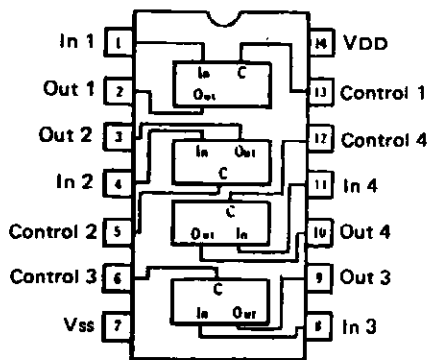
IC3  $\mu$ PD4011BC or HD14011BP



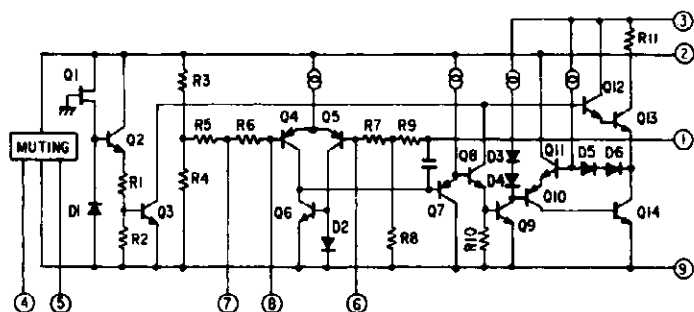
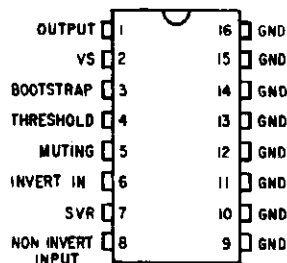
# IC4,5 $\mu$ PC324C



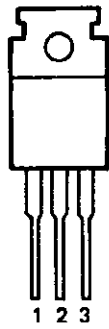
# IC6 HD14066BP or $\mu$ PD4066BC



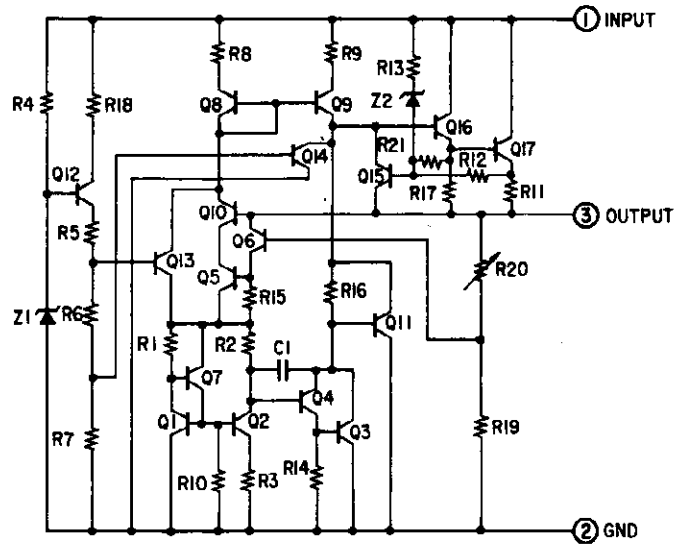
# IC7 TDA1905



**IC8 MC7805C or TA78005AP**



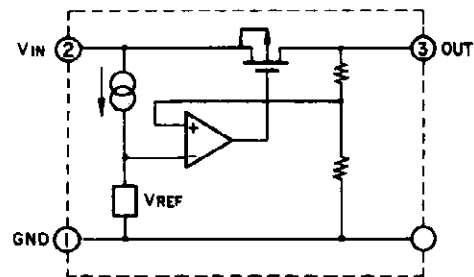
- 1. INPUT
- 2. GND
- 3. OUTPUT



**IC9 S-81250HG**

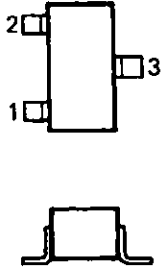


- 1. GND
- 2. INPUT
- 3. OUTPUT



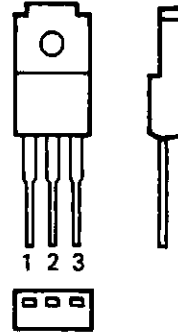
# Transistor Lead Identification, Liner PCB

(A) 2SC2712 (Y,GR)(Marked LY,LG)  
2SC2714 (Y)(Marked QY)  
2SA1162 (Y,GR)(Marked SY,SG)  
2SC3356 (Marked R22)  
RN2405 (Marked YE)  
RN1408 (Marked XI)



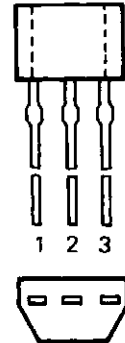
1. EMITTER
2. BASE
3. COLLECTOR

(B) 2SD1406 (GR)



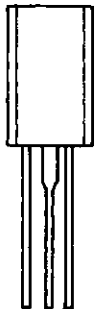
1. BASE
2. COLLECTOR
3. EMITTER

(C) 2SC2458 (GR)



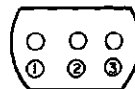
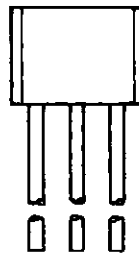
1. EMITTER
2. COLLECTOR
3. BASE

(D) 2SC3243



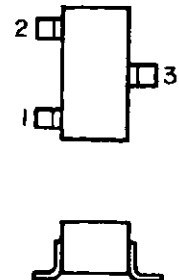
- ① EMITTER
- ② COLLECTOR
- ③ BASE

(E) 2SC2603(F)



- ① EMITTER
- ② COLLECTOR
- ③ BASE

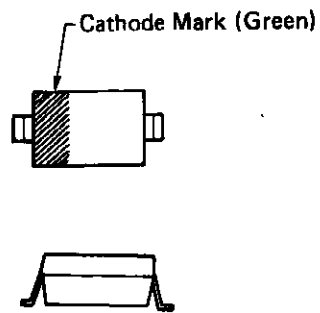
(F) 2SK210 (GR)  
(Marked YG)



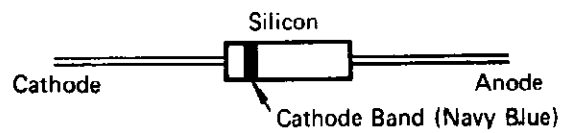
1. GATE
2. DRAIN
3. SOURCE

## Diode Identification and Lead Polarity, Liner PCB

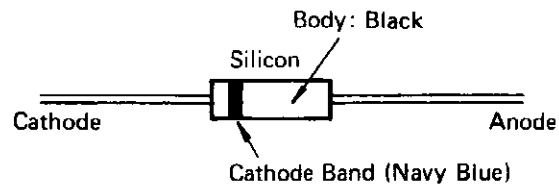
### (A) HSR277



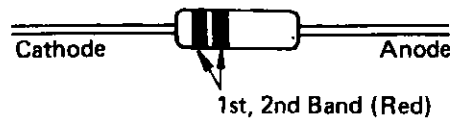
### (B) 1S2076A



### (C) 1S1585



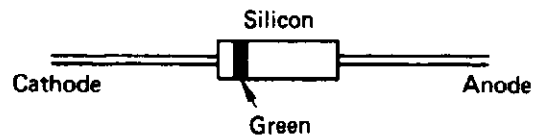
### (D) 1K261



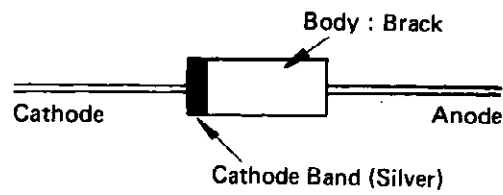
### (E) 0A90R



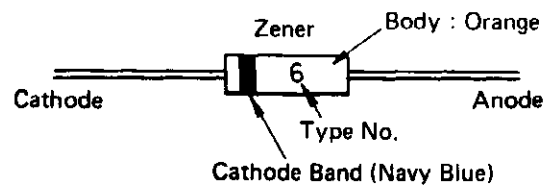
### (F) 1SS81



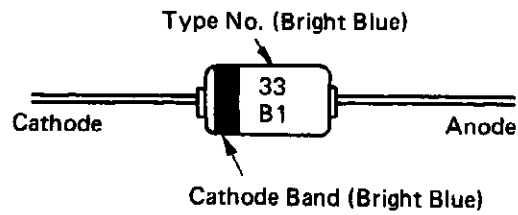
(G) 1N4002



(H) HZ6B2L, HZ9BLL  
HZ11BLL

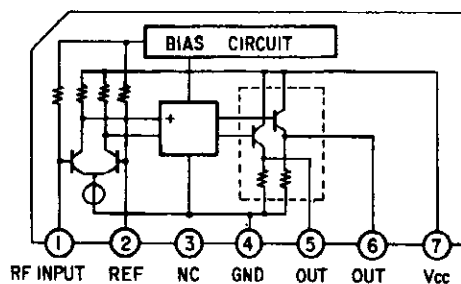
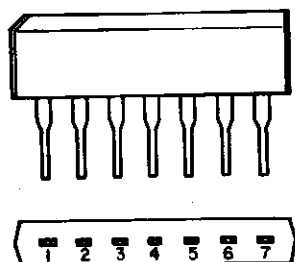


(I) HZ33E

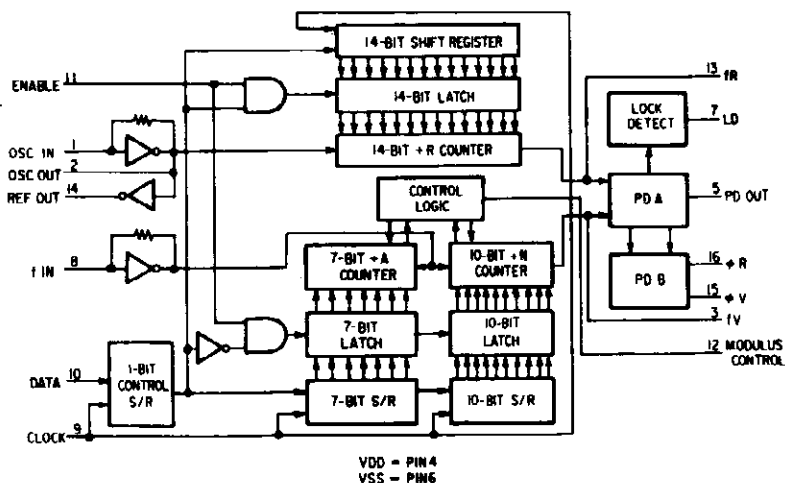
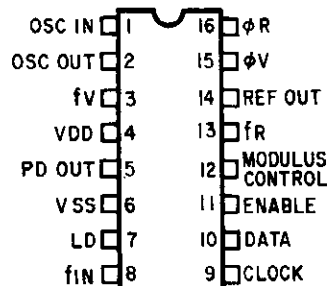


## Integrated circuit Lead Identification, PLL PCB

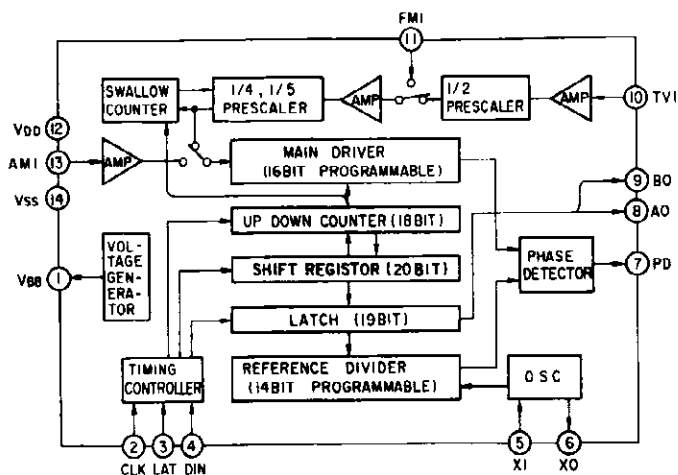
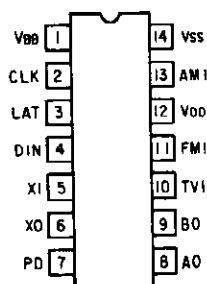
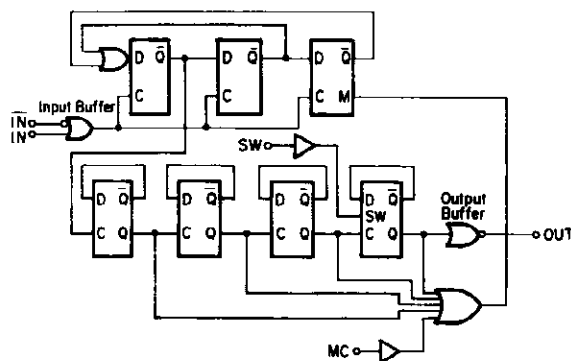
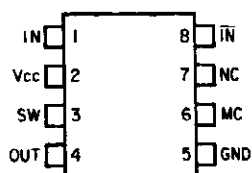
**IC301 TD6105AP**



**IC302 MC145158**



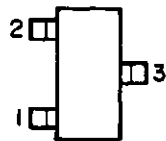
**IC303 CX7925B**

**IC304 MB501L**

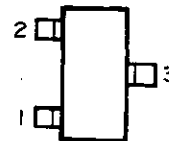
## Transistor Lead Identification, Logic & Display

(A) 2SC3356 (Marked R22)  
RN2405 (Marked YE)  
2SC2712 (GR)(Marked LG)

(B) 2SK209 (Marked XG)



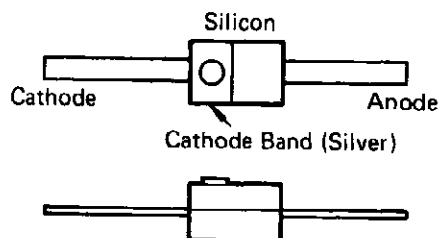
1. EMITTER
2. BASE
3. COLLECTOR



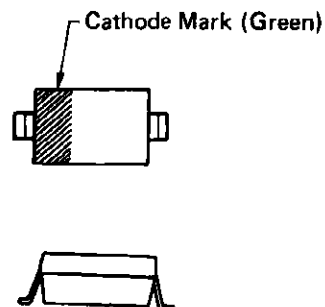
1. DRAIN
2. SOURCE
3. GATE

## Diode Identification and Lead Polarity, Logic & Display

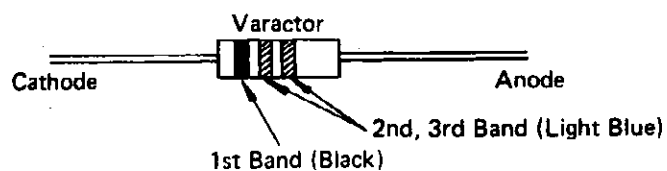
(A) 1T25



(B) HSR277

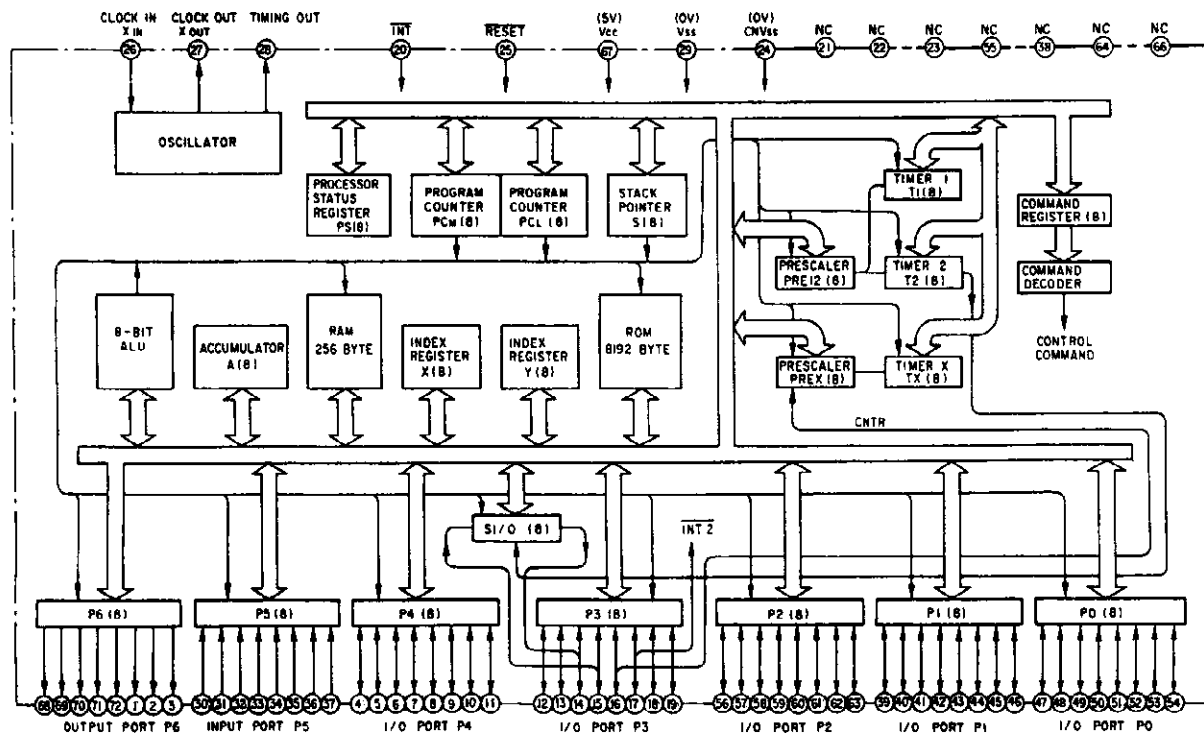
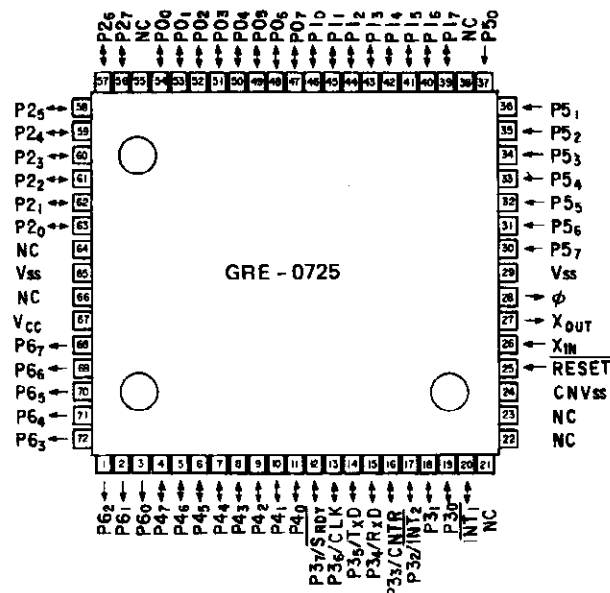


(C) 1SV89

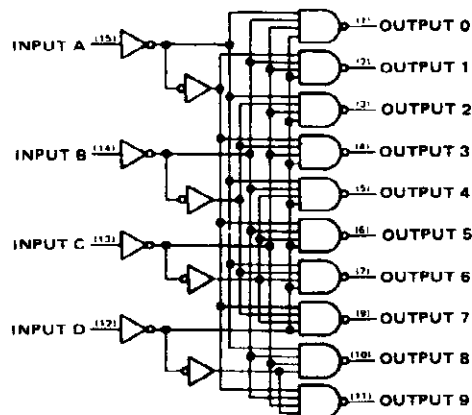
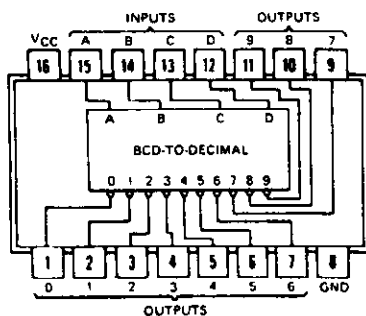


# Integrated Circuit Lead Identification, Logic & Display

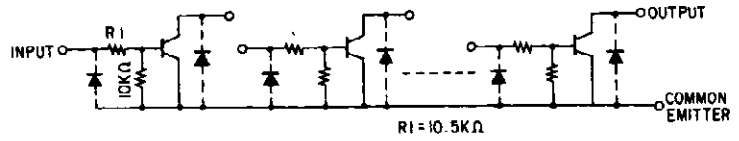
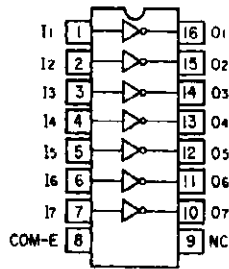
IC501 GRE-0918



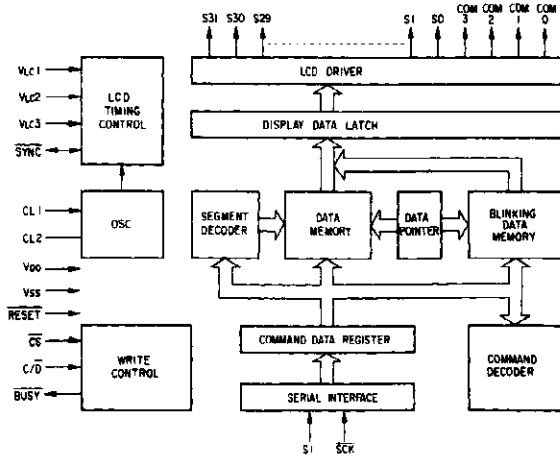
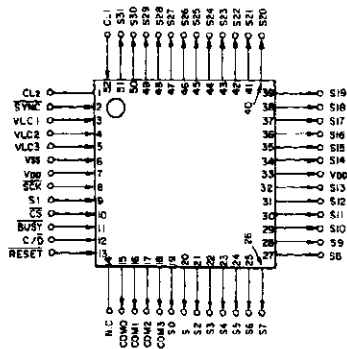
IC502 SN74LS145NS



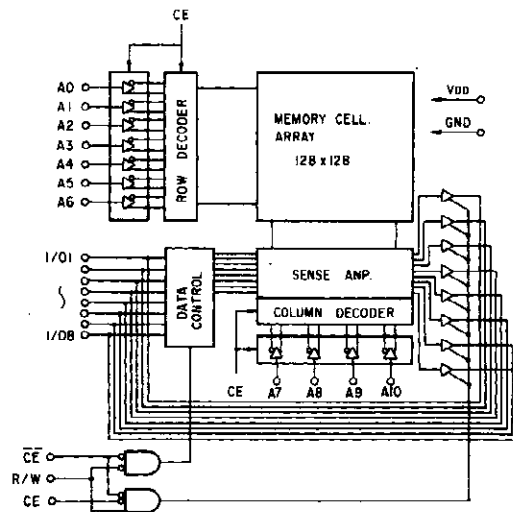
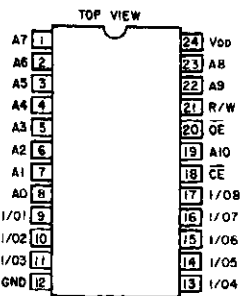
# IC503 TD62504F



# IC504 $\mu$ PD7225G

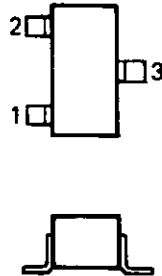


# IC505 TC5517CF-20 or LC3517BM-15



## Transistor Lead Identification, Logic & Display

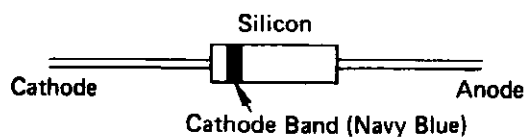
(A) RN2401  
2SC1623



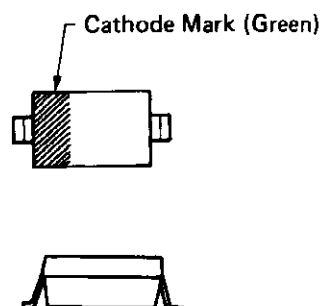
- 1. EMITTER
- 2. BASE
- 3. COLLECTOR

## Integrated Circuit Lead Identification, Logic & Display

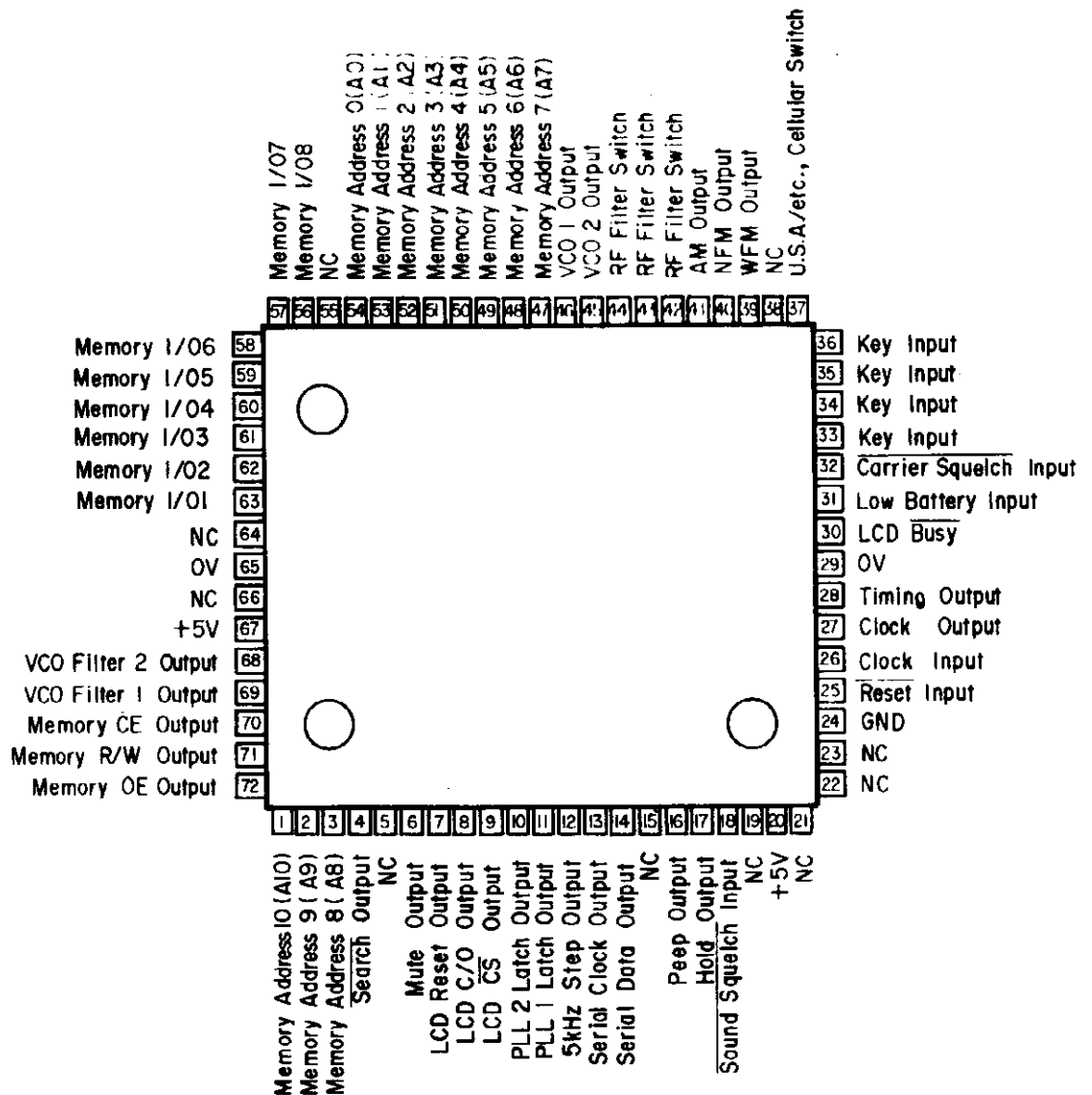
(A) 1S2076A



(B) HSR277



# MICROPROCESSOR (IC-501) PIN ALLOCATION



# MICROPROCESSOR (IC-501) PIN LOCATION

| Pin No. | Symbol   | Function                | Pin No. | Symbol | Function                  |
|---------|----------|-------------------------|---------|--------|---------------------------|
| 1       | P62      | Memory address 10 (A10) | 37      | P50    | USA/etc., Cellular Switch |
| 2       | P61      | Memory address 9 (A9)   | 38      | NC     | NC                        |
| 3       | P60      | Memory address 8 (A8)   | 39      | P17    | WFM Output                |
| 4       | P47      | Search Output           | 40      | P16    | NFM Output                |
| 5       | P46      | NC                      | 41      | P15    | AM Output                 |
| 6       | P45      | Mute Output             | 42      | P14    | RF Filter Switch          |
| 7       | P44      | LCD Reset Output        | 43      | P13    | RF Filter Switch          |
| 8       | P43      | LCD C/D Output          | 44      | P12    | RF Filter Switch          |
| 9       | P42      | LCD CS Output           | 45      | P11    | VCO2 Output               |
| 10      | P41      | PLL2 Latch Output       | 46      | P10    | VCO1 Output               |
| 11      | P40      | PLL1 Latch Output       | 47      | P07    | Memory address 7 (A7)     |
| 12      | P37/SRDY | 5 kHz Step Output       | 48      | P06    | Memory address 6 (A6)     |
| 13      | P36/CLK  | Serial Clock Output     | 49      | P05    | Memory address 5 (A5)     |
| 14      | P35/TXD  | Serial Data Output      | 50      | P04    | Memory address 4 (A4)     |
| 15      | P34/RXD  | NC                      | 51      | P03    | Memory address 3 (A3)     |
| 16      | P33/CNTR | Peep Output             | 52      | P02    | Memory address 2 (A2)     |
| 17      | P32/INT2 | Hold Output             | 53      | P01    | Memory address 1 (A1)     |
| 18      | P31      | Sound Squelch Input     | 54      | P00    | Memory address 0 (A0)     |
| 19      | P30      | NC                      | 55      | NC     | NC                        |
| 20      | INT1     | +5 V                    | 56      | P27    | Memory I/O 8              |
| 21      | NC       | NC                      | 57      | P26    | Memory I/O 7              |
| 22      | NC       | NC                      | 58      | P25    | Memory I/O 6              |
| 23      | NC       | NC                      | 59      | P24    | Memory I/O 5              |
| 24      | CNVSS    | GND                     | 60      | P23    | Memory I/O 4              |
| 25      | RESET    | RESET Input             | 61      | P22    | Memory I/O 3              |
| 26      | XIN      | Clock Input             | 62      | P21    | Memory I/O 2              |
| 27      | XOUT     | Clock Output            | 63      | P20    | Memory I/O 1              |
| 28      | ø        | Timing Output           | 64      | NC     | NC                        |
| 29      | VSS      | 0 V                     | 65      | VSS    | 0 V                       |
| 30      | P57      | LCD Busy                | 66      | NC     | NC                        |
| 31      | P56      | Low Battery Input       | 67      | VCC    | +5 V                      |
| 32      | P55      | Carrier Squelch Input   | 68      | P67    | VCO Filter 2 Output       |
| 33      | P54      | Key Input               | 69      | P66    | VCO Filter 1 Output       |
| 34      | P53      | Key Input               | 70      | P65    | Memory CE Output          |
| 35      | P52      | Key Input               | 71      | P64    | Memory R/W Output         |
| 36      | P51      | Key Input               | 72      | P63    | Memory OE Output          |

## MICROPROCESSOR (IC-501) FUNCTION TABLE

(1) Outputs of VCO (P10, P11) and VCO filter (P66, P67)

| Receiving Frequency (MHz) | VCO Output         | VCO filter Output               |
|---------------------------|--------------------|---------------------------------|
| 25.0000 to 220.4950       | VCO 1 (P10)<br>"H" | VCO filter 1 (P66)<br>"H" Level |
| 220.5000 to 520.0000      | VCO 2 (P11)<br>"H" |                                 |
| 760.0000 to 1052.4950     | VCO 1 (P10)<br>"H" | VCO filter 2 (P67)<br>"H" Level |
| 1052.5000 to 1300.0000    | VCO 2 (P11)<br>"H" |                                 |

(2) Outputs of RF filter (P12, P13, P14)

| Receiving Frequency (MHz) | P12 | P13 | P14 |
|---------------------------|-----|-----|-----|
| 25.0000 to 39.9950        | H   | L   | L   |
| 40.0000 to 67.9950        | L   | H   | L   |
| 68.0000 to 107.9950       | H   | H   | L   |
| 108.0000 to 173.9950      | L   | L   | H   |
| 174.0000 to 279.9950      | H   | L   | H   |
| 280.0000 to 520.0000      | L   | H   | H   |
| 760.0000 to 1300.0000     | H   | H   | H   |

(3) Outputs of Search (P47) and 5 kHz Step (P37)

|                     |                                     |               | Search Output (P47) | 5 kHz Step Output (P37) |
|---------------------|-------------------------------------|---------------|---------------------|-------------------------|
| MANUAL Operation    |                                     |               | H                   | L                       |
| PROGRAM Operation   |                                     |               | H                   | L                       |
| SCAN Operation      |                                     |               | H                   | L                       |
| In SEARCH Operation | Receiving Frequency 25 to 520 MHz   | at 5 kHz Step | L                   | H                       |
|                     |                                     | at Other Step | L                   | L                       |
|                     | Receiving Frequency 760 to 1300 MHz | at 5 kHz Step | L                   | H                       |
|                     |                                     | at Other Step | L                   | L                       |

# APPENDIX

| Ref. No | Description                         | USA                     | CANADA                  | AUSTRALIA     | U.K.                                   | BELGUIM               |
|---------|-------------------------------------|-------------------------|-------------------------|---------------|----------------------------------------|-----------------------|
| D502    | 1S2076A (Silicon)                   | 1S2076A                 | 1S2076A                 | Not used      | Not used                               | Not used              |
| D504    | 1S2076A (Silicon)                   | Not used                | Not used                | 1S2076A       | 1S2076A                                | 1S2076A               |
| R801    | Resistor Solid 1/2W<br>1.8Mohm 1/2W | ERC-12GK185             | ERC-12GK185             | Not used      | Not used                               | Not used              |
| T801    | Transformer, Power                  | GE84D-5158              | GE-84D-5158             | K6862         | K6862                                  | K6862                 |
|         | Cord, AC                            | APL-7W-SPT1<br>AWG 2/18 | APL-7W-SPT1<br>AWG 2/18 | P2-VCTF-LD-AS | 2-VCTFK-LD-BS<br>2x0.75mm <sup>2</sup> | HARCLASS II<br>BLK 2m |
|         | Strain relief, Line cord            | SR-3P-4                 | SR-3P-4                 | SR-5N-4       | SR-4N-4                                | SR-4N-4               |
|         | Chassis                             | GE-88A-7611             | GE-88A-7611             | GE-88A-7611A  | GE-88A-7611A                           | GE-88A-7611A          |

# POWER TRANSFORMER SPECIFICATION

for U.S.A, CANADA

Rated primary voltage and frequency

Open circuit primary current

secondary output voltage

(No load voltage)

(Reated voltage)

Protector

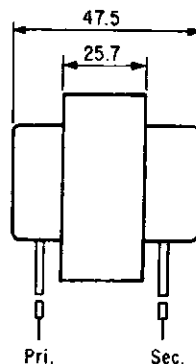
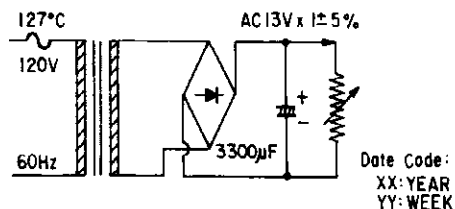
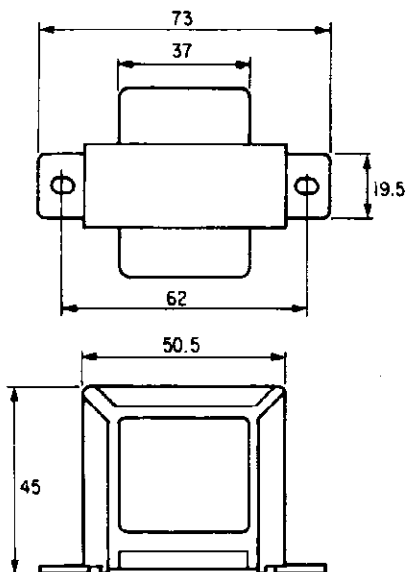
120 V 60 Hz

Less then 100 mA at 120 V 60 Hz

DC 17 V  $\pm 5\%$

DC 13 V  $\pm 5\%$  at DC 500 mA

127 °C 250 V 2.5 A



for BELGIUM, FRANCE, U.K. and AUSTRALIA

Rated primary voltage and frequency

Open circuit primary current

Secondary output voltage

(No load voltage)

(Rated voltage)

Protector

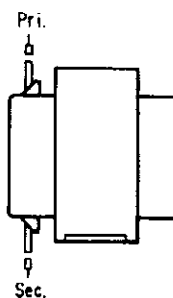
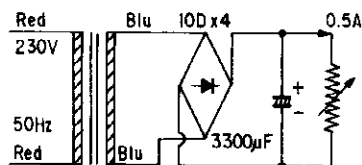
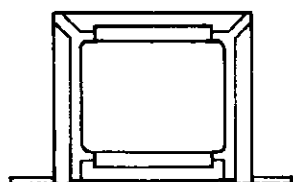
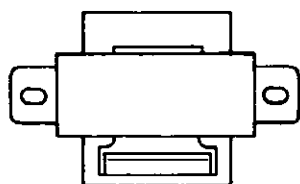
230 V 50 Hz

Less then 50 mA at 230 V 50 Hz

DC 17.3 V  $\pm 5\%$

DC 13 V  $\pm 5\%$

133 °C 250 V 1.5 A



ANT

SW1

ATT

0dB

100dB

D1.2 151585

D9-29 HSR277

D10 470K

D11 470K

D12 470K

D13 470K

D14 470K

D15 470K

D16 470K

D17 470K

D18 470K

D19 470K

D20 470K

D21 470K

D22 470K

D23 470K

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D109 470K

D110 470K

D111 470K

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D115 470K

D116 470K

D117 470K

D118 470K

D119 470K

D120 470K

D121 470K

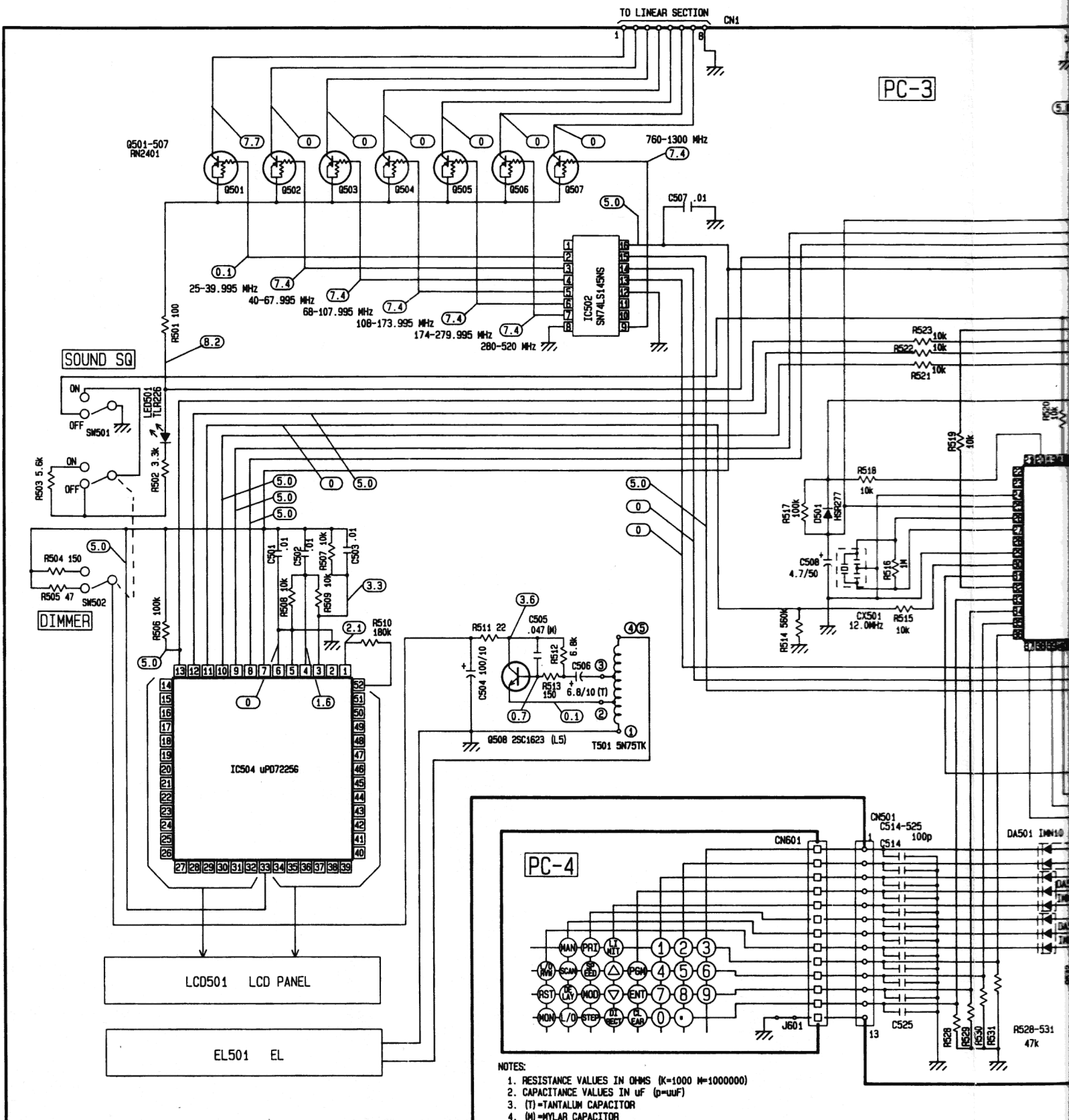
D122 470K

D123 470K

D



## SCHEMATIC DIAGRAM (CPU SECT



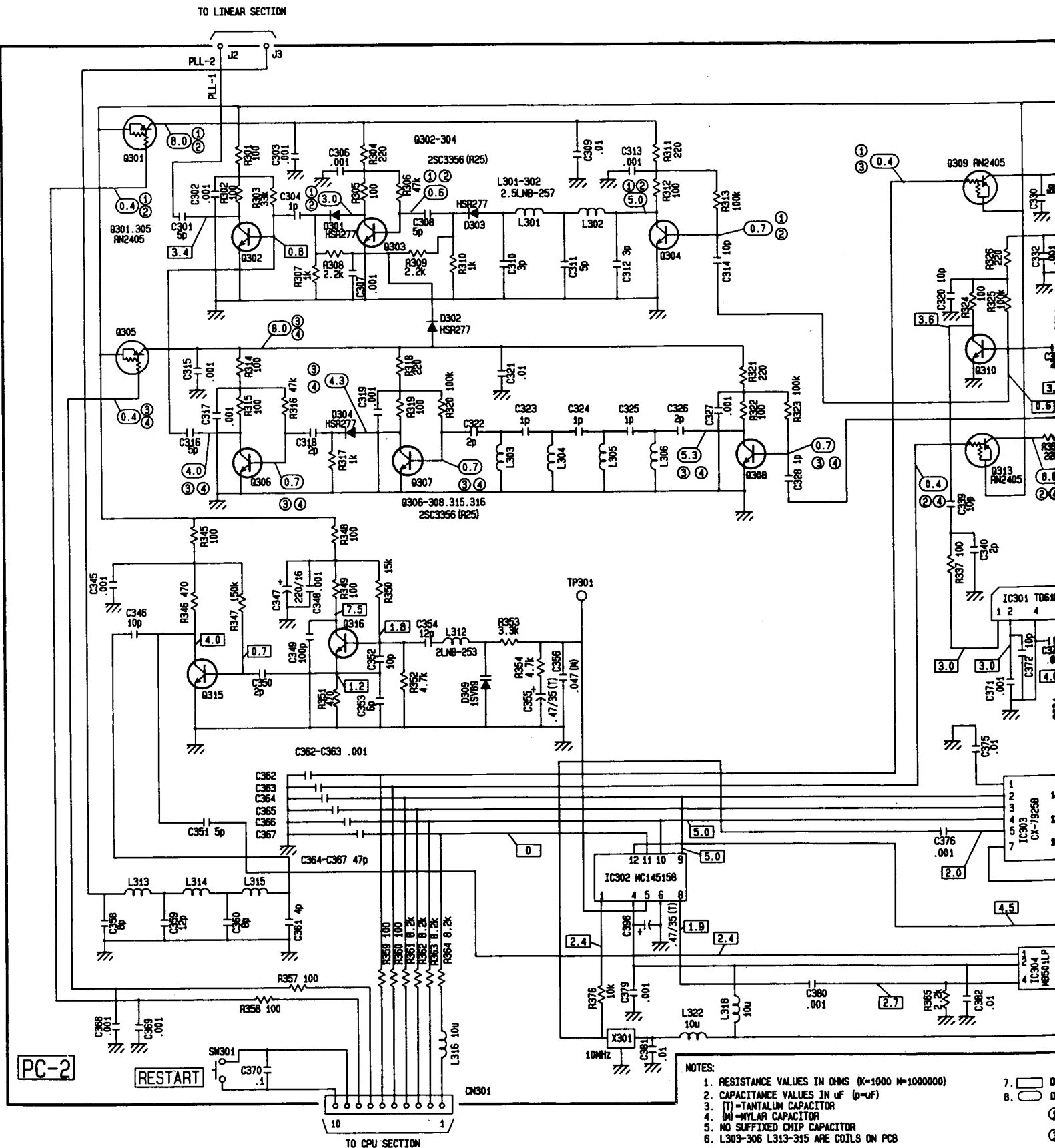
**NOTES:**

1. RESISTANCE VALUES IN OHMS (K=1000 M=1000000)
2. CAPACITANCE VALUES IN UF (P=PUF)
3. (T)=TANTALUM CAPACITOR
4. (M)=MYLAR CAPACITOR
5. NO SUFFIXED CHIP CAPACITOR
6.  DENOTES VOLTAGE UNDER FOLLOWING CONDITION  
CH1 VHF LO BAND AT 25 MHz AN MANUAL OPERATION.  
VOLTAGE AT MINIMUM AND SQUELCH CCW.

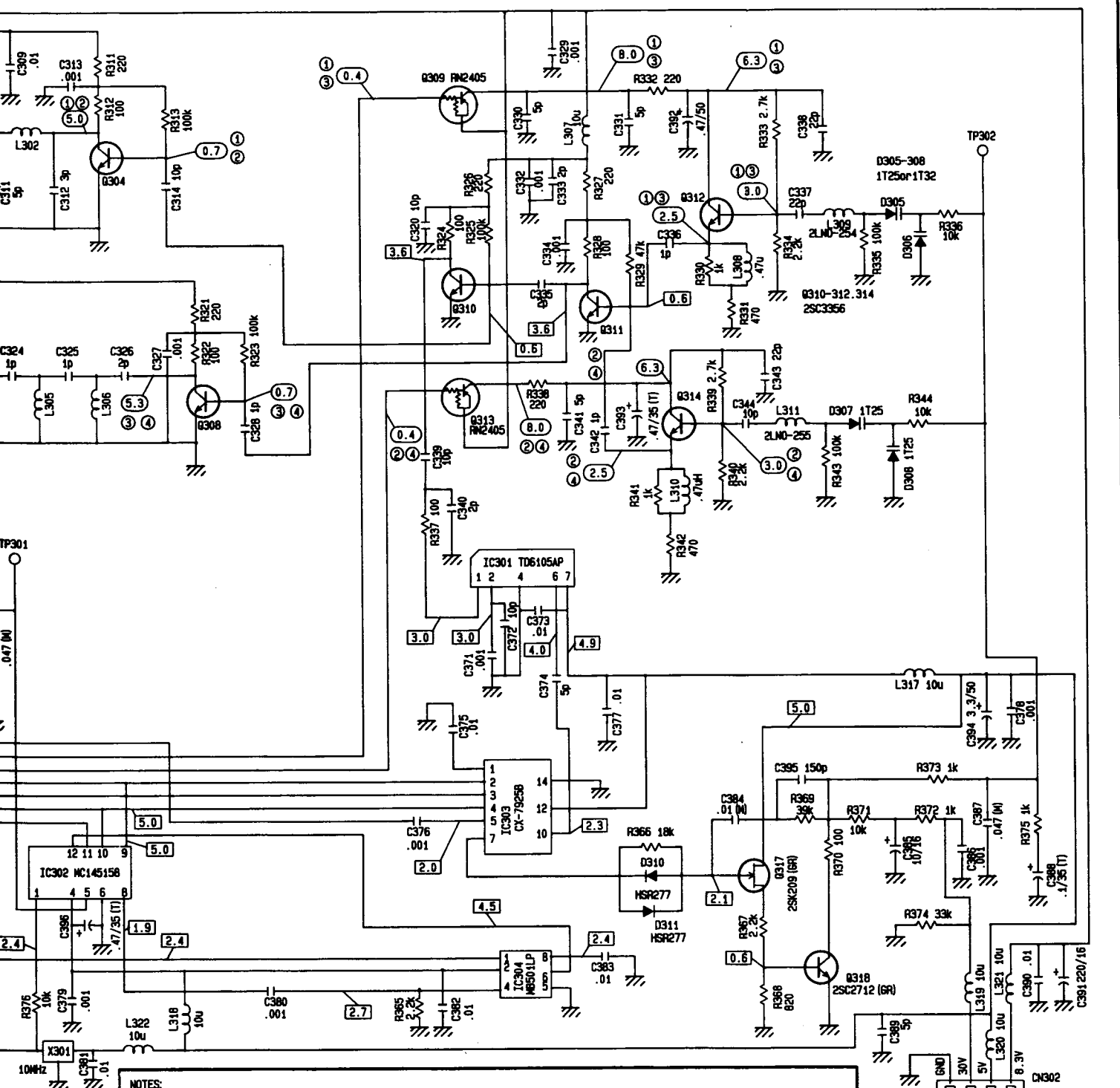
|            |
|------------|
| USA CANADA |
| AUSTRALIA  |
| BELGIUM FR |

CONDITION  
OPERATION.

## SCHEMATIC DIAGRAM (PLL SECTION)



# EMATIC DIAGRAM (PLL SECTION)



**CUSTOM MANUFACTURED FOR TANDY/INTERTAN  
FABRIQUE POUR TANDY/INTERTAN**

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|                  |                                                                                   |
|------------------|-----------------------------------------------------------------------------------|
| <b>CANADA</b>    | RADIO SHACK DIVISION INTERTAN CANADA LTD.<br>BARRIE, ONTARIO L4M 4W5              |
| <b>AUSTRALIA</b> | INTERTAN AUSTRALIA LIMITED (INC. IN N.S.W.)<br>91 KURRAJONG AVE., M1 DRIITT, 2770 |
| <b>BELGIUM</b>   | RUE DES PIEDS D'ALOUETTE 39, 5140 NANINNE                                         |
| <b>FRANCE</b>    | BP 147-86022 CERGY PONTOISE CEDEX                                                 |
| <b>U.K.</b>      | BILSTON ROAD WEDNESBURY, WEST MIDLANDS WS10 7JN                                   |