

**REALISTIC<sup>®</sup>**

# Service Manual

**21-1567**

## **TRC-465 40-CHANNEL AM/SSB CB RADIO**

**Catalog Number : 21-1567**

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# SPECIFICATIONS

## GENERAL

Channels	: 40
Frequency Range	: 26.965 MHz to 27.405 MHz
Semiconductors	: 41 Transistors, 50 Diodes, 7 ICs, 7 LEDs
Crystals	: 2
Microphone	: 600 ohm Dynamic Type
Speaker	: 16 ohm 3W
Antenna Connector	: M Type
Jacks & Connectors	: Mic (5P DIN), EXT. SP (3.5 dia.), PA SP (3.5 dia.), DC Power (3P)
Controls	: Channel Selector, Mode Selector (USB-AM-LSB), PA-CB Switch, NB & ANL-out Switch, Power ON/OFF-Volume Control, Clarifier, SQUELCH Control, RF GAIN Control
Meter	: S/RF Power Meter (5 Digits LED)
Indicators	: Channel Number Indicator, TX Indicator
Size	: 6-1/16''(154mm)W x 2-3/64''(52mm)H x 7-1/2''(190mm)D
Weight	: 2.6 Lbs (1.18 kg)
Accessories	: DC Power Cord with in-line fuse, Microphone, Microphone Hanger, Mounting Bracket

## MEASUREMENT CONDITIONS (90% Population)

Power Source	: 13.8V (DC)
Antenna Impedance	: 50 ohm
Test Temperature	: 77° F (25° C)
AM Modulation Frequency	: 1 kHz
SSB Modulation Frequency, Transmit	: Two Tones: 500 Hz & 2400 Hz Single Tone: 1 kHz
Mean Signal Input Level	: 1000 $\mu$ V
Reference Audio Output Power	: 0.5W
Reference AM Modulation Percentage	: 1 kHz 30%
Audio Frequency, SSB Receive	: 1 kHz
Audio Output Load	: 8 ohm resistive

## TRANSMITTER SECTION

ITEMS		UNIT	NOMINAL	LIMIT
Frequency Tolerance at 77° F (25° C)	AM	%	±0.0005	±0.003
(5 Minutes after switch on)	SSB	%	±0.0005	±0.003
Carrier Power at No Modulation	AM	W	3.8	3.5 – 4.4
PEP Power, Two Tones, SSB	SSB	W PEP	12	10 – 13.2
Modulation Distortion at 1 kHz, 80% Modulation	AM	%	3	8
Spurious Harmonic Suppression	AM	dB	–65	–60
	SSB	dB	–65	–60
Carrier Suppression	SSB	dB	–55	–40
Unwanted Sideband Suppression (at 2500 Hz 4W PEP 16 dB up)	SSB	dB	–55	–40
Battery Drain at No Modulation	AM	mA	2200	3000
	SSB	mA	500	1000
Battery Drain				
AM: Max Mod.		mA	2200	3000
SSB: Max Watt PEP, Two Tones		mA	2000	3000
Modulation Frequency Response (1 kHz, 0 dB Reference)				
Lower Frequency	AM	Hz	450	250 – 650
	SSB	Hz	450	250 – 650
Upper Frequency	AM	Hz	2500	2000 – 4000
	SSB	Hz	3500	2000 – 5000
Carrier Power Uniformity, CH to CH at No Modulation	AM	W	0.3	0.4
Mic Input Level Uniformity, CH to CH for 4 watts Output 2.5 kHz Single Tone –SSB	SSB	dB	2	3
Mic Input Level Uniformity, LSB to USB for 4 watts Output, 1.5 kHz Single Tone		dB	1	3
Microphone Sensitivity				
AM: For 50% Mod.		mV	0.4	1.0
SSB: For 4W P.E.P.		mV	0.4	1.0
AMC Range				
AM: 50 – 100% Mod.		dB	60	40
SSB: 10 – 13.2 Watts PEP		dB	60	40
Modulation Capability		%	95/95	80/85
Modulation Attack Time		m Sec	20	25
Modulation Release Time		m Sec	250	100 – 500
RF Meter (S-9) Indication 2.5 kHz Single Tone	SSB	W	3.8	2.5 – 5

## RECEIVER SECTION

ITEMS		UNIT	NOMINAL	LIMIT
(ANL & Noise Blanker Switch Off)				
Max Sensitivity	AM	$\mu\text{V}$	0.5	1
	SSB	$\mu\text{V}$	0.25	0.5
Sensitivity for 10 dB S/N	AM	$\mu\text{V}$	0.5	1
	SSB	$\mu\text{V}$	0.25	0.5
AGC Figure of Merit 100mV for 10 dB Change in Audio Output	AM	dB	90	80
	SSB	dB	90	80
Overload AGC Characteristics from 100mV to 1000mV	AM	dB	$\pm 3$	$\pm 5$
	SSB	dB	$\pm 3$	$\pm 5$
Overall Audio Fidelity at 6 dB Down				
Upper Frequency	AM	Hz	2100	1750 – 2500
	SSB	Hz	3500	2500 – 5000
Lower Frequency	AM	Hz	450	250 – 650
	SSB	Hz	450	250 – 650
Cross Modulations, RS Standard	AM	dB	60	50
Adjacent Channel Selectivity ( $\pm 10$ kHz)	AM	dB	70	60
	SSB	dB	70	60
Maximum Audio Output Power	AM	W	4	3
	SSB	W	4	3
Audio Output Power at 10% THD	AM	W	3	2
	SSB	W	3	2
THD at 500mW Audio Output				
AM: 1mV Input, 30%		%	3	6
80%		%	5	8
SSB: 1mV Input 1 kHz Single Tone		%	3	6
RF Gain Control Range at Max Sensitivity Level	AM	dB	40	30 – 60
	SSB	dB	40	30 – 60
S/N Ratio at Input 1mV	AM	dB	40	34
	SSB	dB	40	34
Squelch Sensitivity at Threshold	AM	$\mu\text{V}$	0.5	1
	SSB	$\mu\text{V}$	0.5	1
Squelch Sensitivity at Tight	AM	$\mu\text{V}$	1000	300 – 3000
	SSB	$\mu\text{V}$	1000	300 – 3000
Skirt Rejection ( $\pm 20$ kHz)	AM	dB	80	70
	SSB	dB	80	70
S Meter Sensitivity at "S-9" (No Modulation AM)	AM	$\mu\text{V}$	100	50 – 200
	SSB	$\mu\text{V}$	100	50 – 200
Image Rejection Ratio (fo – 2 x 10.695 MHz)	AM	dB	76	66
	SSB	dB	76	66
1/2 IF Rejection Ratio (fo – 10.695 MHz/2)	AM	dB	90	80
	SSB	dB	90	80
Adjacent Sideband Rejection	SSB	dB	60	40
IF Rejection Ratio 10.695 MHz	AM	dB	85	75
	SSB	dB	85	75
Oscillator Dropout Voltage	AM	V	9	11
	SSB	V	9	11
Battery Drain at No Signal	AM	mA	250	500
	SSB	mA	250	500
Battery Drain at Maximum Audio Output Power	AM	mA	1000	1500
	SSB	mA	1000	1500



ITEMS		UNIT	NOMINAL	LIMIT
Clarifier Range	AM	kHz	±1.25	±0.6 – ±2.5
	SSB	kHz	±1.25	±0.6 – ±2.5
Spurious Rejection Ratio In Band	AM	dB	65	56
	SSB	dB	65	56
Out of Band	AM	dB	60	50
	SSB	dB	60	50
Desensitization (3 dB Desensitivity) at 100μV	AM	dB	60	50
	SSB	dB	60	50
NB & ANL Performance	AM	dB	30	20
	SSB	dB	25	16
NB & ANL Loss	AM	dB	-4	-6
	SSB	dB	0	-6
Dynamic Range	SSB	dB	65	60

## PUBLIC ADDRESS

Microphone Sensitivity for 3W

Output Power at 1 kHz		mV	1.5	3
Power Output Maximum		W	4	3
10% Distortion		W	3	2
Audio Frequency Response at 6 dB Down				
Lower Frequency		Hz	450	250 – 650
Upper Frequency		Hz	4000	3000 – 7000
Battery Drain				
at No Signal		mA	250	500
at Max. AF Output		mA	1000	1500

**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 perform to less than any limit spec.

# DISASSEMBLY INSTRUCTIONS

To remove the Top and Bottom Cover (Figure 1)

1. Remove two mounting screws (A) from each side.
2. Remove four screws (B) from each side. Pull off the top and bottom covers.

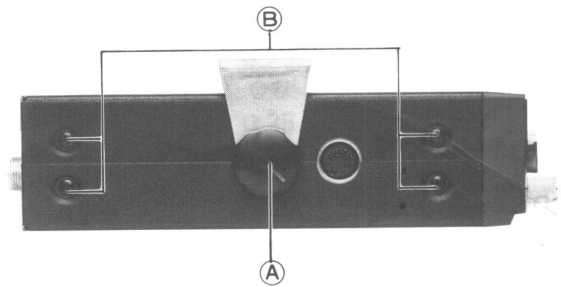


Figure 1

To remove the Front Panel Assembly (Figures 2, 3 and 4)

1. Remove one knob (C).
2. Remove four knobs (D) and five knobs (E) under these knobs.
3. Remove two screws (F) from each side. Pull out the front panel.

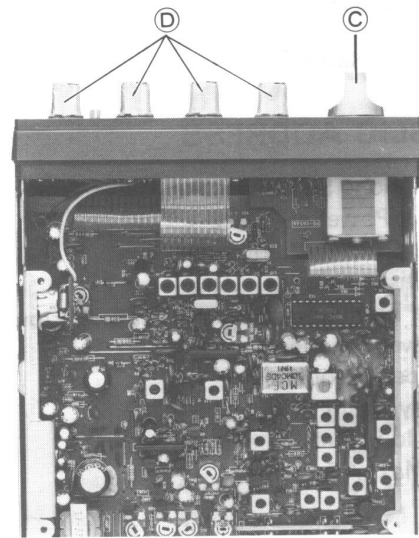


Figure 2

To remove Front P.C. Board (Figure 5)

1. Remove three screws (G) from the front panel. Pull out the front P.C. Board.

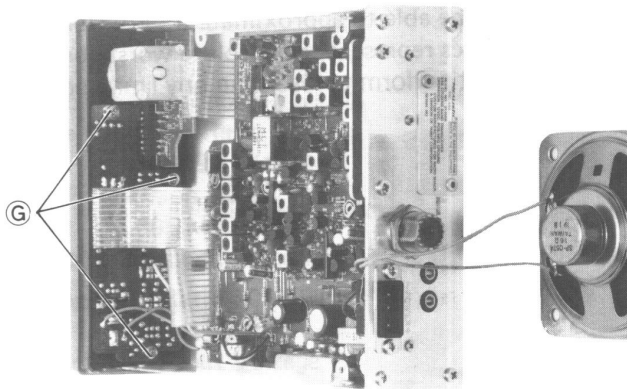


Figure 5

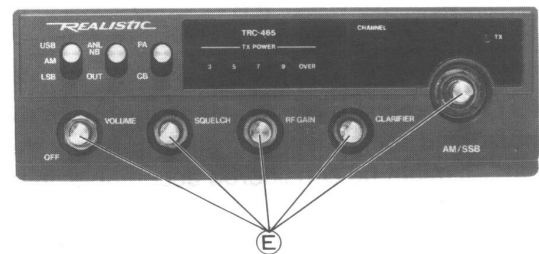


Figure 3

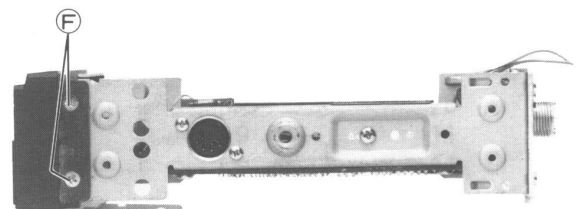
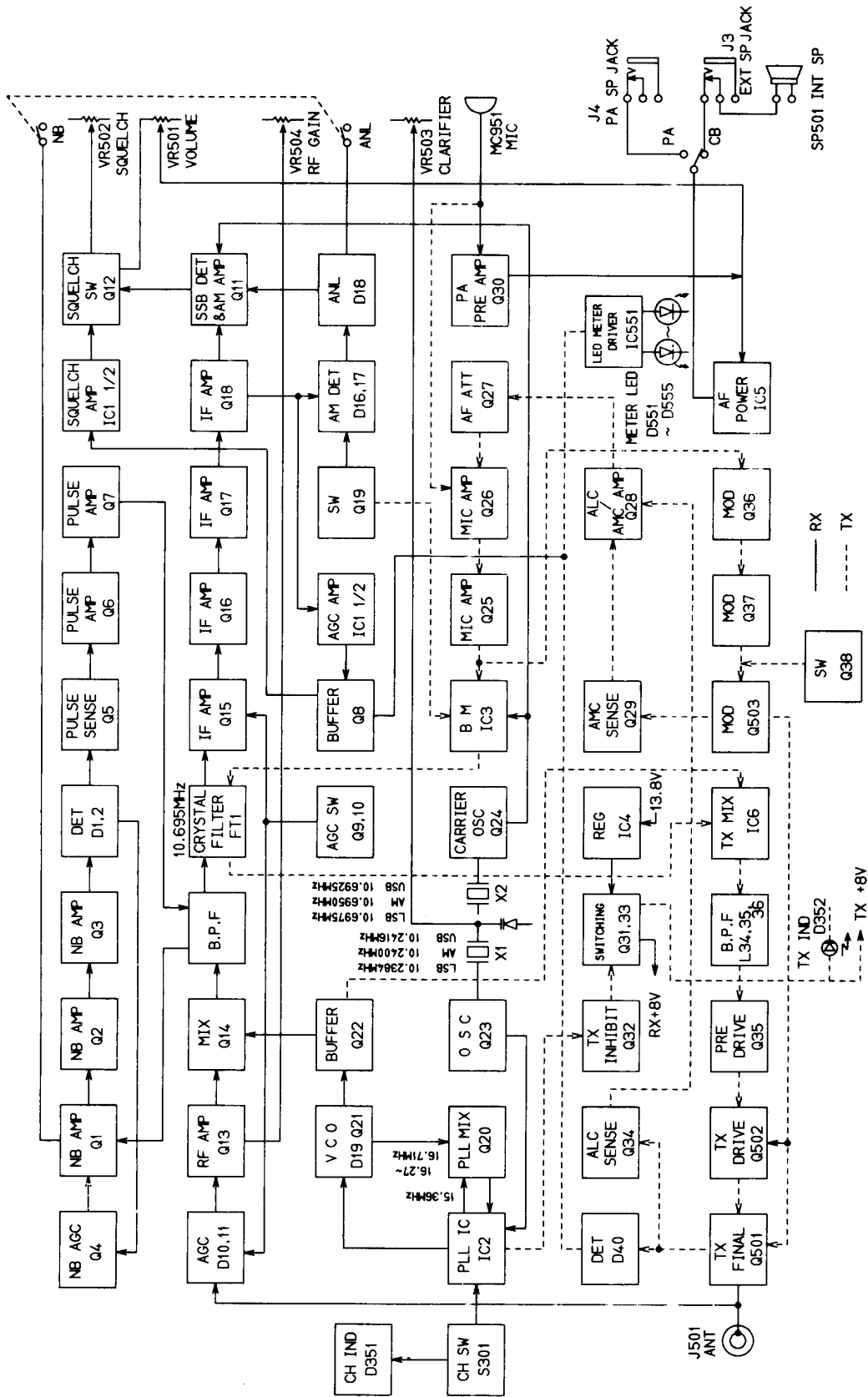


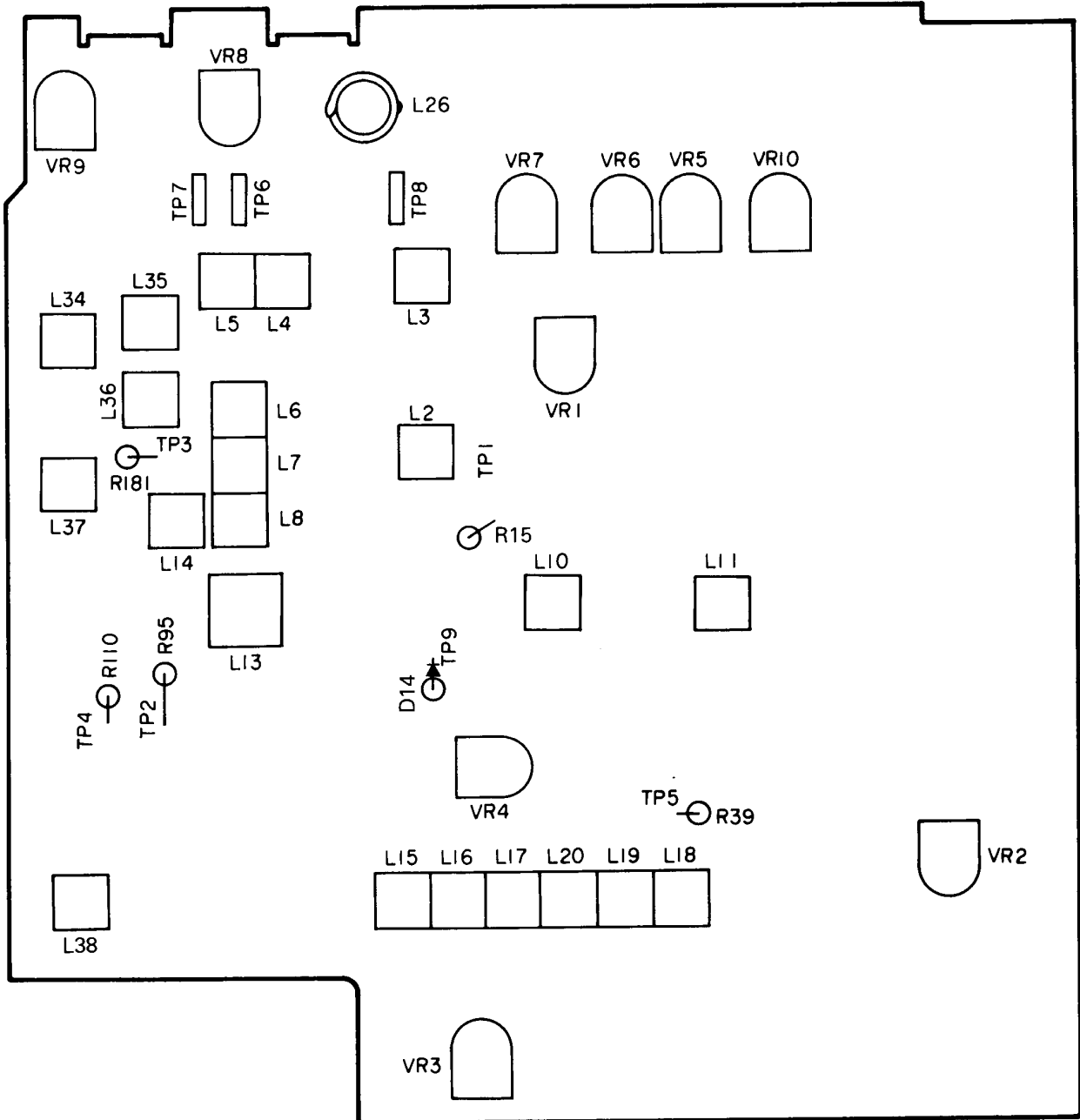
Figure 4

# BLOCK DIAGRAM



# ALIGNMENT PROCEDURES

## ALIGNMENT POINT LOCATIONS



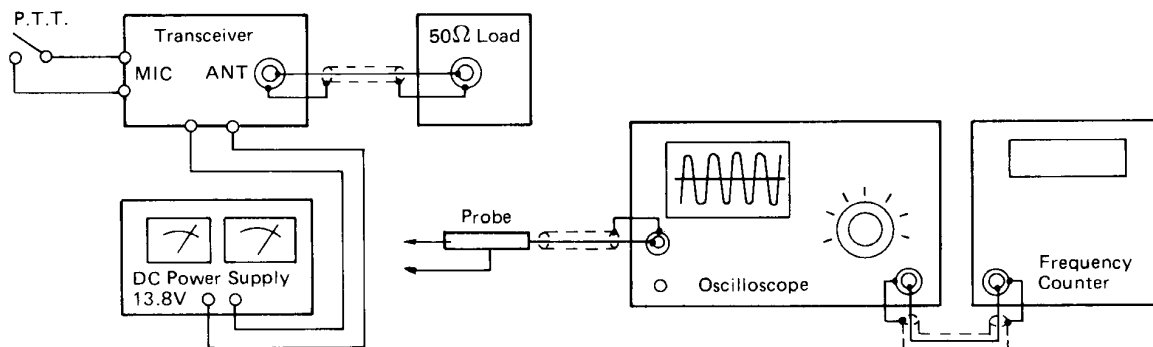
## ALIGNMENT OF CARRIER OSCILLATOR (PLL) PORTION

(Refer to ALIGNMENT POINT LOCATIONS on page 8.)

### 1. Test Equipment Required:

- a. Oscilloscope (DC – 50 MHz)
- b. Frequency Counter (0 – 30 MHz)
- c. DC Power Supply
- d. 50 ohm Load

### 2. Test Equipment Connection



### 3. Alignment Procedure

Connect test equipment as shown below.

STEP	PRESET TO	CONNECTION	ADJUSTMENT
1	CH: 40, AM, RX Clarifier in Center	TP4	Adjust L38 for maximum reading on Oscilloscope.
2	Same as Step 1.	TP2	Adjust L13 for 4.5V DC reading on Oscilloscope. (Oscilloscope in DC mode)
3	Same as step 1. CH: 1	TP2	Check that the voltage is more than 2V DC on Oscilloscope.
4	Same as step 3.	TP3	Adjust L14 for maximum reading on Oscilloscope.
5	Same as step 1. CH: 19, USB, RX	TP3	Adjust L16 for 16.4925 MHz $\pm$ 20 Hz.
6	Same as step 1. CH: 19, AM, RX	TP3	Adjust L15 for 16.4900 MHz $\pm$ 20 Hz.
7	Same as step 1. CH: 19, LSB, RX	TP3	Adjust L17 for 16.4875 MHz $\pm$ 20 Hz.
8	Same as step 1. CH: 19, LSB, TX	TP3	Adjust VR3 for 16.4875 MHz $\pm$ 20 Hz.
9	Same as step 1. CH: 19, LSB, <del>RX</del>	TP5	Adjust L20 for 10.6975 MHz $\pm$ 20 Hz.
10	Same as step 1. CH: 19, USB, <del>RX</del>	TP5	Adjust L19 for 10.6925 MHz $\pm$ 20 Hz.
11	Same as step 1. CH: 19, TX, AM. Disconnect TP6, TP7, TP8	TP9	Adjust L18 for 10.6950 MHz $\pm$ 5 Hz.

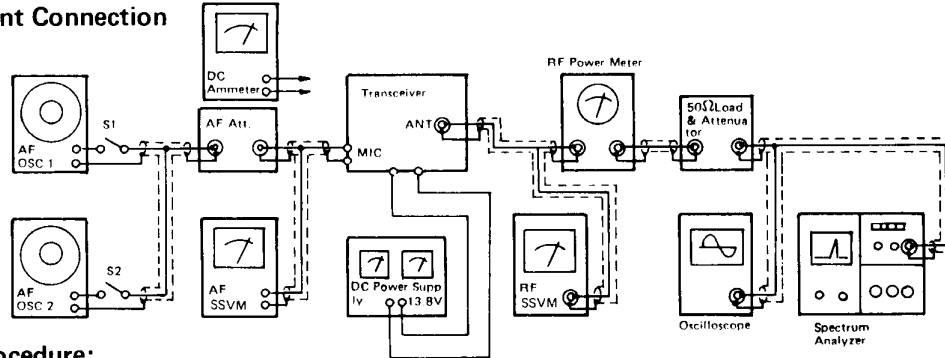
## ALIGNMENT OF TRANSMITTER SECTION

(Refer to ALIGNMENT POINT LOCATIONS on page 8.)

### 1. Equipment Required:

- |                                                                                                                                                                                                                                  |                                                                                                                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>a. AF Oscillator (two required)</li> <li>b. AF SSVM (Full scale: 1V DC with RF probe)</li> <li>c. DC Ammeter</li> <li>d. RF Power Meter</li> <li>e. 50 ohm load and Attenuator</li> </ul> | <ul style="list-style-type: none"> <li>f. Oscilloscope</li> <li>g. RF SSVM</li> <li>h. Monitor Receiver or Spectrum Analyzer</li> <li>i. DC Power Supply (13.8 V/3 Amp.)</li> </ul> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 2. Test Equipment Connection



### 3. Alignment Procedure:

Connect test equipment as shown below.

STEP	PRESET TO	ADJUSTMENT	REMARKS
1	CH: 19, PA/CB: CB USB mode, TX S1 and S2: OFF	VR9	Break circuit at TP8 and TP7, place DC mA meter in series. Adjust for 65 mA.
2	Same as step 1	VR8	Break circuit at TP8 and TP6, place DC mA meter in series. Adjust for 70 mA.
After steps 1 and 2, restore circuit at TP8 and TP7.			
3	Same as step 1 OSC1: 500 Hz OSC2: 2400 Hz S1, S2: ON	L37, 36, 35, 34, L14 and 26	Set VR6 to full clockwise rotation (ALC "off" condition). Keep the AF ATT for approx. 20V reading on RF SSVM. Then adjust coils for max. reading. Repeat this adjustment several times, reducing the AF input level to the microphone circuit.
4	Same as step 3	L36	Adjust Coils for max. reading on RF SSVM. Check the power difference between CH1 and CH40. If it is over 1V on RF SSVM, readjust coils to obtain within 1V.
5	Same as step 1 AM mode OSC1: 1 kHz S1: ON, S2: OFF	L26	Adjust level of OSC1 for 30mV reading on AF SSVM, then adjust L26 for maximum reading on RF SSVM.
6	Same as step 3 OSC1: 500 Hz S1, S2: ON	VR6	Adjust OSC1 and OSC2 for 5mV reading on AF SSVM, then adjust VR6 for 24.5V reading on RF SSVM.
7	Same as step 1 S1, S2: OFF	VR4	Adjust for minimum carrier leakage for both USB and LSB on Spectrum Analyzer or Oscilloscope.
8	Same as step 1 AM mode S1, S2: OFF	VR10	Adjust for 4.0W reading on RF Power meter.
9	Same as step 8	VR7	Adjust so that 4 digits light on the Transceiver's meter.
10	Same as step 5	VR5	Adjust output of OSC1 for 200mV reading on AF SSVM then adjust VR5 for 90 to 95% modulation on Scope.

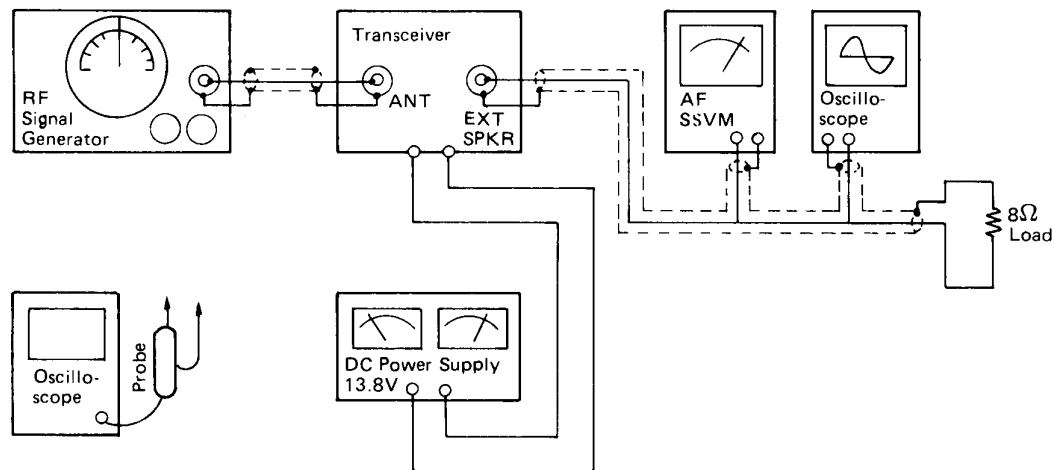
## ALIGNMENT OF RECEIVER SECTION

(Refer to ALIGNMENT POINT LOCATIONS on page 8.)

### 1. Equipment Required:

- a. RF Signal Generator (27 MHz Band, 50 ohm output impedance)
- b. AF SSVM
- c. Oscilloscope (For AF Signal)
- d. DC Power Supply
- e. 8 ohm Load
- f. Oscilloscope (0 – 50 MHz)

### 2. Test Equipment Connection



### 3. Procedure

Connect Test Equipment as shown below.

**Note:** SG = Signal Generator

STEP	PRESET TO	ADJUSTMENT	PROCEDURE
1	Channel : 19 Clarifier : center Volume : fully clockwise RF GAIN : fully clockwise Squelch : fully counter-clockwise NB/ANL : off Mode : AM		Set the SG on channel 19, 27.185 MHz with 1 kHz, 30% modulation.
2	Same as step 1	L11, 10, 8, 7, 6 5, 4, and 3	Adjust the level of SG to obtain 2V reading on AF SSVM. Then adjust coils for maximum reading on AF SSVM. Repeat this step reducing the SG output.
3	Same as step 1	L5	Adjust L3 for max. reading on AF SSVM. Check the sensitivity difference between CH1 and 40. If it is over 1 dB, re-adjust L3 to obtain within 1 dB.
4	Same as step 1 except squelch is fully clockwise.	VR2	Set the level of SG to 1000 $\mu$ V. Then adjust VR2 so that the AF signal will just appear on Oscilloscope.
5	Same as step 1	VR1	Set the level of SG to 100 $\mu$ V. Then adjust for "S-9" reading on Transceiver's meter.
6	Same as step 1 except NB/ANL switch is ON.	L2	Connect the Oscilloscope to TP1. Adjust the level of SG to approx. 5 $\mu$ V. Then adjust for max. DC reading.

# CHECK FOR COLD SOLDER JOINTS

## TROUBLESHOOTING HINTS

### UNIT WILL NOT TURN ON:

1. Broken/defective DC Power cable.
2. Blown fuse. Be sure you check for the cause.
3. Defective power switch.
4. Defective wires or poor soldering in power supply circuit.

### NO SOUND RECEIVED:

1. Defective RF circuit in receiver.
2. Defective Noise Blanker.
3. Defective audio power IC, IC5.  
Check Voltage at pin 6 of IC5; if approximately 6V, problem is not with this IC.
4. Squelch is "ON" all the time.  
If voltage at Base of Q12 is approx. 0V with Squelch Control set to fully counterclockwise position, problem is not with squelch circuit.  
Defective Q12.
5. Check whether the transceiver's signal strength meter deflects when a signal (27 MHz carrier with 1 kHz, 30% modulation, 100 $\mu$ V level) is applied to antenna.
  - a. The meter indicates "S-9".  
You can assume that antenna through IF stage is OK.  
NO AM . . . . Checks should be made on Detector (D16 and 17) ANL circuit (D18), Q24 and AF stage (Q11, Q12, VR501 and IC5).  
NO SSB BUT AM OK . . . . Check frequency and level on TP5, if no signal, checks should be made on X-tals and Q24.  
NO SSB . . . . Checks should be made on Detector, Q11, Q12 and AF stage, VR501 and IC5.
  - b. No deflecting of meter.  
Checks should be made on RF stage (Q13 and Q14), IF stage (Q15, Q16, Q17 and Q18) or AGC circuit (TP8, D7, D8 and IC1). Or trouble may be in PLL circuit. Check frequency on TP3; if it is as listed in the Table, problem is not with PLL circuit.
6. Defective AGC circuit.
7. Defective PLL circuit.
8. Defective antenna connector.

### NO NOISE:

1. Broken or bad contact in microphone connector and/or push-to-talk switch.
2. Defective RX power circuit.
3. Defective RX audio circuit.
4. Defective PLL circuit and/or channel switch.
5. Defective squelch.
6. Defective PA-CB switch.

### NO TRANSMISSION:

1. Broken or bad contact in microphone connector and/or push-to-talk switch.
2. Broken or bad contact in antenna connector.
3. Defect in power supply.
4. Defect in PLL and/or Carrier Oscillator (Improper adjustment).
5. Inoperative microphone amplifier and/or balanced modulator in SSB mode.
6. Check the frequency at TP3; carrier oscillation may have stopped; if no carrier, check Q24, D27, 28, 29 and X2.
7. Carrier is OK, but no TX; check the frequency at TP3. If not same as listed in Frequency Table, PLL circuit defective. If OK, check IC3, 6, Q35, 501 and 502.
8. If no TX on SSB modes and no modulation on AM mode, Mic amplifier or ALC/AMC section is defective. Check Q36, 37, 38 and 503.



**NO MODULATION:**

1. Defective microphone.
2. Defective microphone connector.
3. Inoperative microphone amplifier (on both AM and SSB modes.)

**NO NOISE BLANKER OPERATION:**

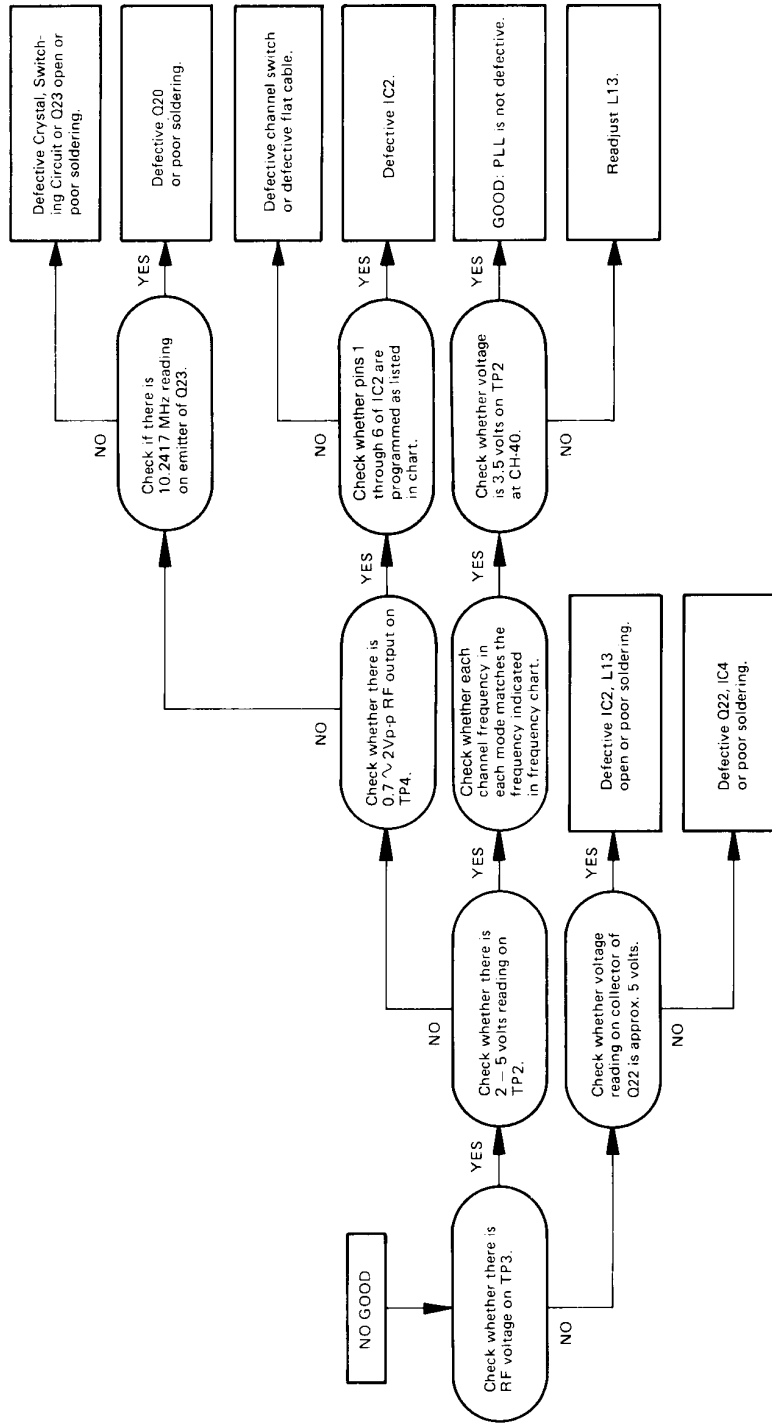
With NB Switch ON, apply a 27 MHz carrier signal to antenna. Then check DC voltage at TP1 varying the carrier signal from  $1\mu\text{V}$  to  $100\mu\text{V}$ .

1. When Q1 voltage stays on and does not vary: Check Q1, 2, 3, 4, 5, D1 and D2.
2. When TP1 voltage varies from 0V to approx. 2V: Check Q6 and 7.
3. If (A) and (B) are alright, L2 may be misaligned; go to alignment procedure for adjusting L2.

**CHANNEL LED DOES NOT LIGHT:**

When a specific segment fails to light, it is probable there is an open-circuit in the LED display or bad contact in the channel selector switch.

# PLL TROUBLESHOOTING HINTS



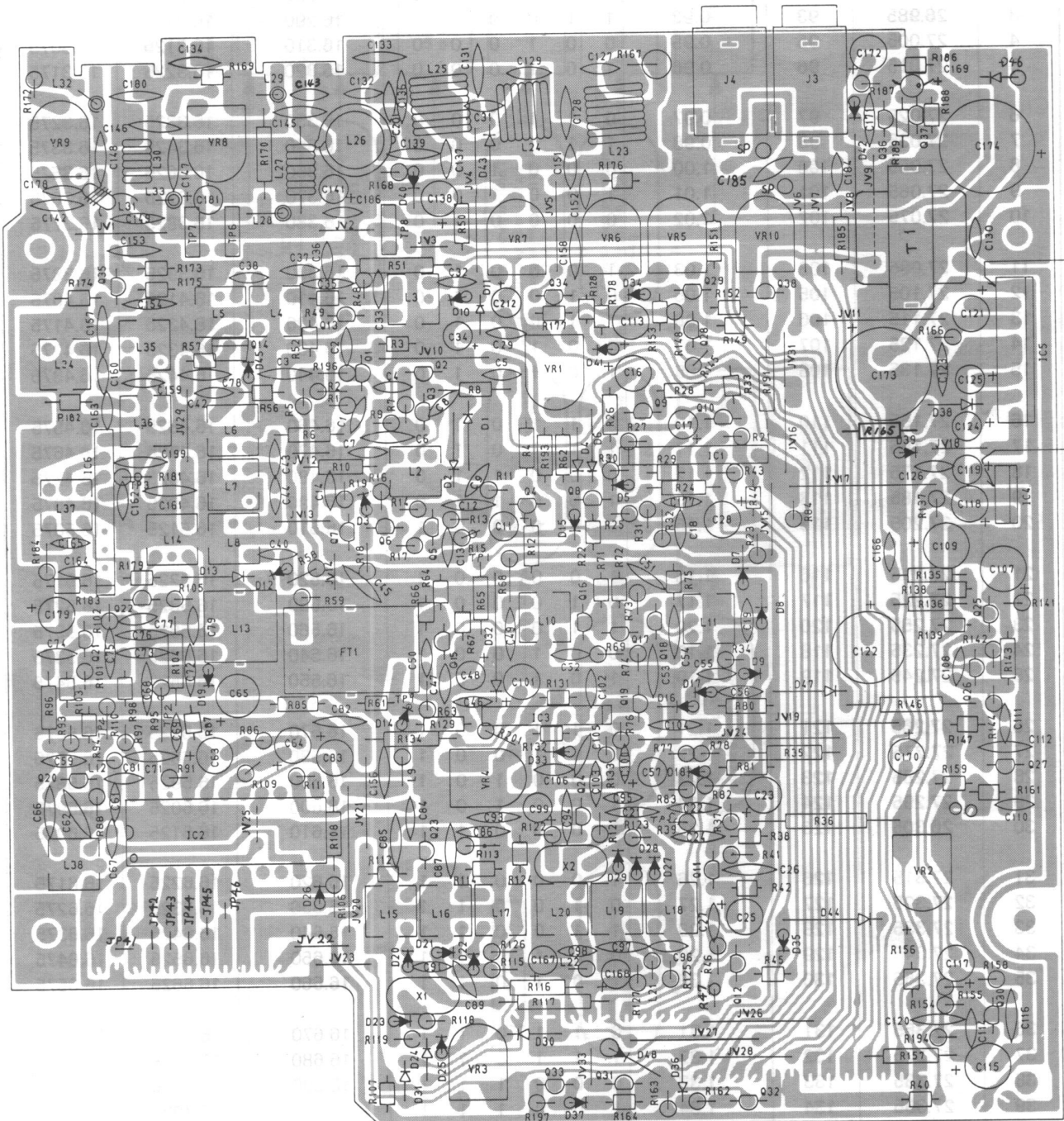
**FREQUENCY TABLE OF PLL**

CH	ANT. Frequency (MHz)	Dividing Ratio "N"	1/N INPUT FREQUENCY (MHz)	PROGRAM CODE (PIN NO. OF IC2)						LOCAL OSC (MHz) OUTPUT FREQUENCY		
				1	2	3	4	5	6	AM.RX & TX	USB	LSB
1	26.965	91	0.91	1	0	0	0	0	0	16.270	16.2725	16.2675
2	26.975	92	0.92	0	1	0	0	0	0	16.280	16.2825	16.2775
3	26.985	93	0.93	1	1	0	0	0	0	16.290	16.2925	16.2875
4	27.005	95	0.95	0	0	1	0	0	0	16.310	16.3125	16.3075
5	27.015	96	0.96	1	0	1	0	0	0	16.320	16.3225	16.3175
6	27.025	97	0.97	0	1	1	0	0	0	16.330	16.3325	16.3275
7	27.035	98	0.98	1	1	1	0	0	0	16.340	16.3425	16.3375
8	27.055	100	1.00	0	0	0	1	0	0	16.360	16.3625	16.3575
9	27.065	101	1.01	1	0	0	1	0	0	16.370	16.3725	16.3675
10	27.075	102	1.02	0	0	0	0	1	0	16.380	16.3825	16.3775
11	27.085	103	1.03	1	0	0	0	1	0	16.390	16.3925	16.3875
12	27.105	105	1.05	0	1	0	0	1	0	16.410	16.4125	16.4075
13	27.115	106	1.06	1	1	0	0	1	0	16.420	16.4225	16.4175
14	27.125	107	1.07	0	0	1	0	1	0	16.430	16.4325	16.4275
15	27.135	108	1.08	1	0	1	0	1	0	16.440	16.4425	16.4375
16	27.155	110	1.10	0	1	1	0	1	0	16.460	16.4625	16.4575
17	27.165	111	1.11	1	1	1	0	1	0	16.470	16.4725	16.4675
18	27.175	112	1.12	0	0	0	1	1	0	16.480	16.4825	16.4775
19	27.185	113	1.13	1	0	0	1	1	0	16.490	16.4925	16.4875
20	27.205	115	1.15	0	0	0	0	0	1	16.510	16.5125	16.5075
21	27.215	116	1.16	1	0	0	0	0	1	16.520	16.5225	16.5175
22	27.225	117	1.17	0	1	0	0	0	1	16.530	16.5325	16.5275
23	27.255	120	1.20	1	1	0	0	0	1	16.560	16.5625	16.5575
24	27.235	118	1.18	0	0	1	0	0	1	16.540	16.5425	16.5375
25	27.245	119	1.19	1	0	1	0	0	1	16.550	16.5525	16.5475
26	27.265	121	1.21	0	1	1	0	0	1	16.570	16.5725	16.5675
27	27.275	122	1.22	1	1	1	0	0	1	16.580	16.5825	16.5775
28	27.285	123	1.23	0	0	0	1	0	1	16.590	16.5925	16.5875
29	27.295	124	1.24	1	0	0	1	0	1	16.600	16.6025	16.5975
30	26.305	125	1.25	0	0	0	0	1	1	16.610	16.6125	16.6075
31	27.315	126	1.26	1	0	0	0	1	1	16.620	16.6225	16.6175
32	27.325	127	1.27	0	1	0	0	1	1	16.630	16.6325	16.6275
33	27.335	128	1.28	1	1	0	0	1	1	16.640	16.6425	16.6375
34	27.345	129	1.29	0	0	1	0	1	1	16.650	16.6525	16.6475
35	27.355	130	1.30	1	0	1	0	1	1	16.660	16.6625	16.6575
36	27.365	131	1.31	0	1	1	0	1	1	16.670	16.6725	16.6675
37	27.375	132	1.32	1	1	1	0	1	1	16.680	16.6825	16.6775
38	27.385	133	1.33	0	0	0	1	1	1	16.690	16.6925	16.6875
39	27.395	134	1.34	1	0	0	1	1	1	16.700	16.7025	16.6975
40	27.405	135	1.35	0	0	0	0	0	0	16.710	16.7125	16.7075

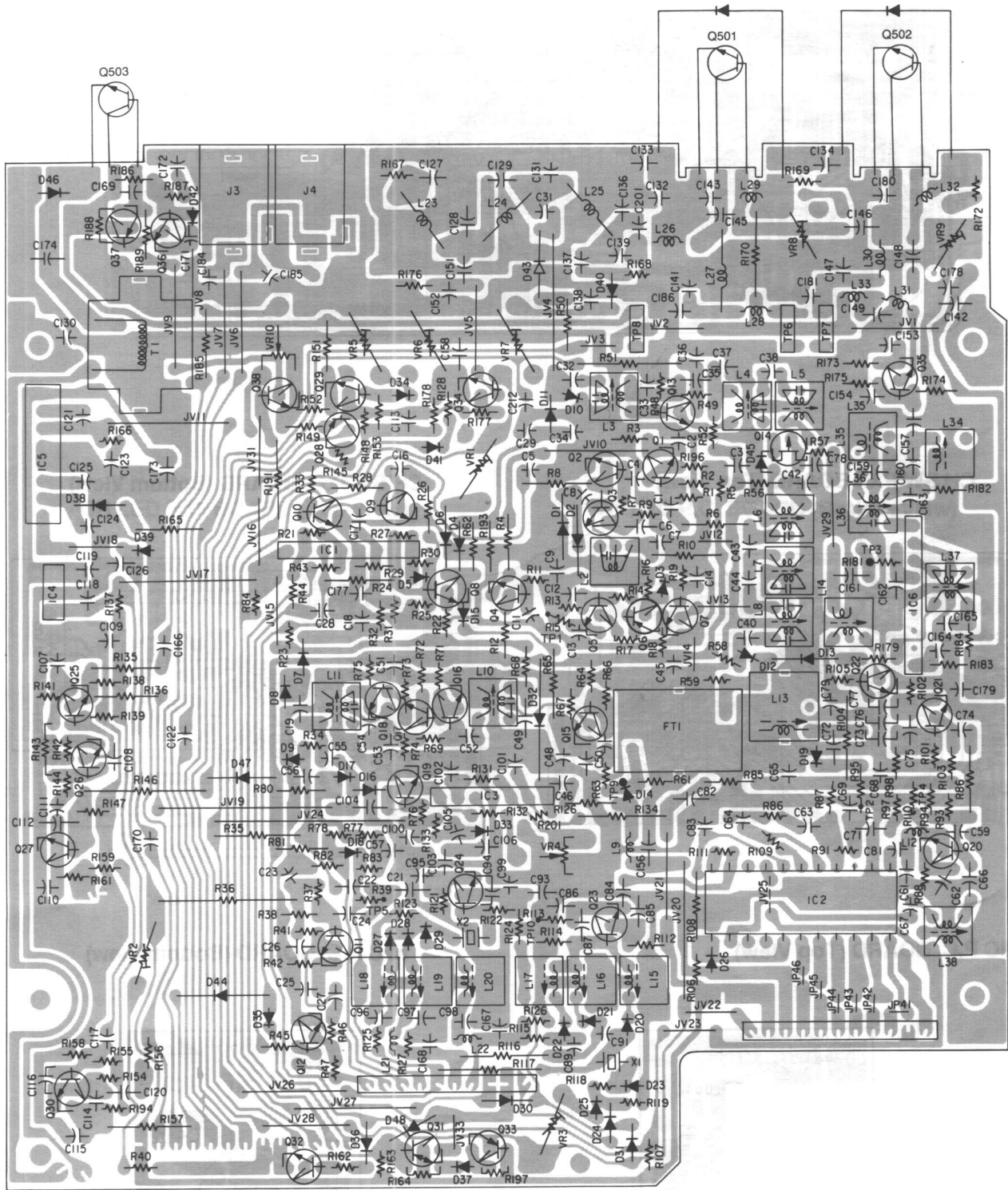
0 = Low level (0 – 1.0 volt)  
 1 = High level (3.5 – 6 volts)

# P.C. BOARD (Top and Bottom Views)

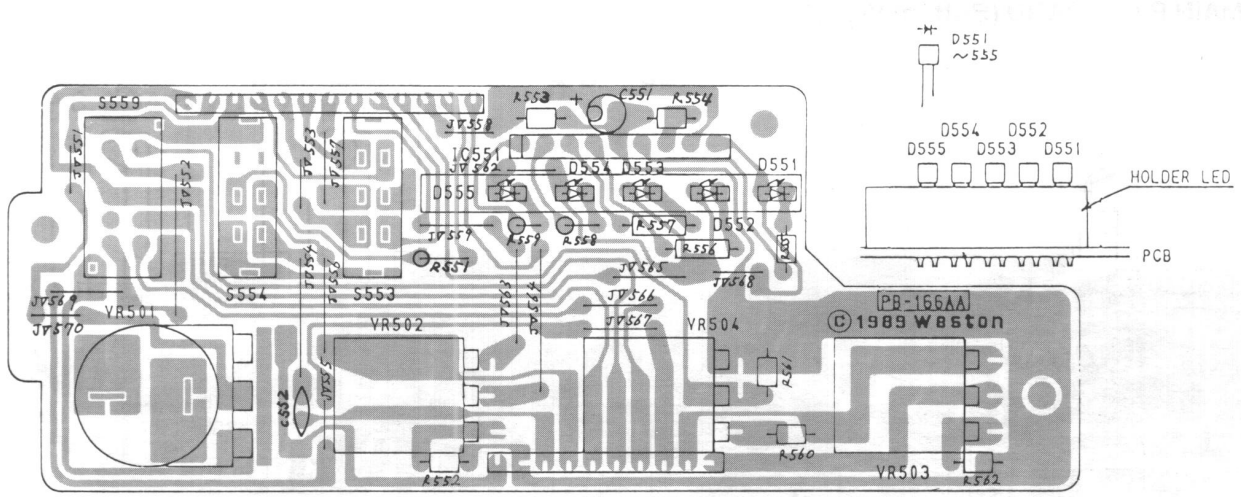
## MAIN P.C. BOARD (Top View)



# MAIN P.C. BOARD (Bottom View)

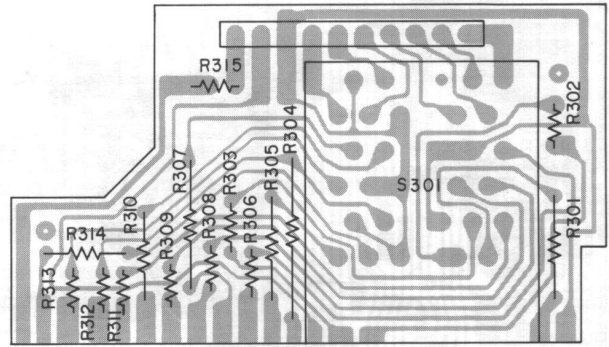
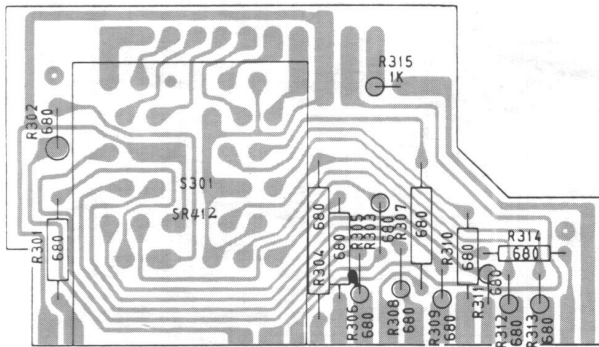


### CONTROL P.C. BOARD (Top View)



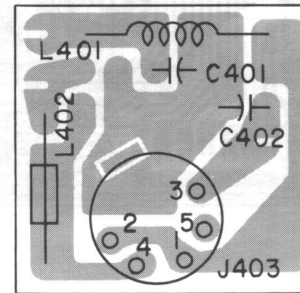
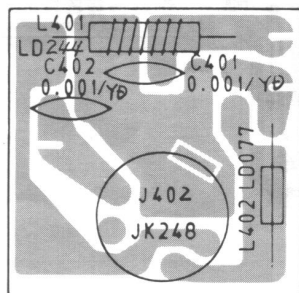
### CH SW P.C. BOARD (Top View)

### CH SW P.C. BOARD (Bottom View)



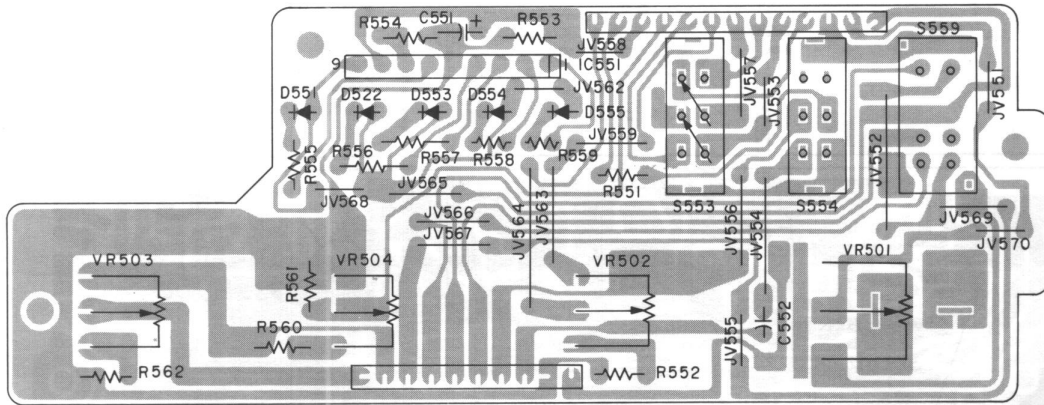
### MIC P.C. BOARD (Top View)

### MIC P.C. BOARD (Bottom View)

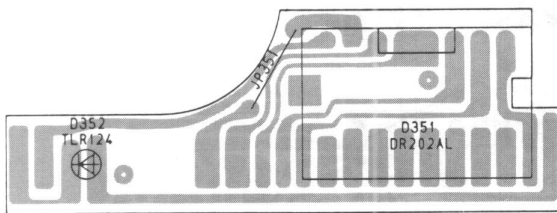




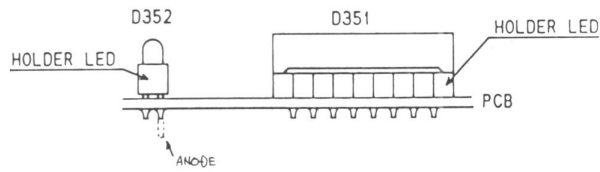
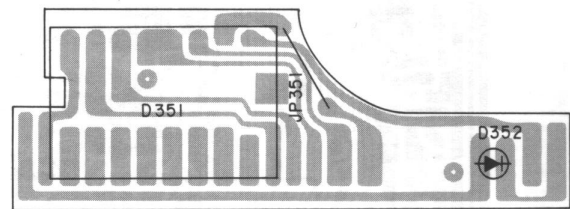
### CONTROL P.C. BOARD (Bottom View)



### CH LED P.C. BOARD (Top View)

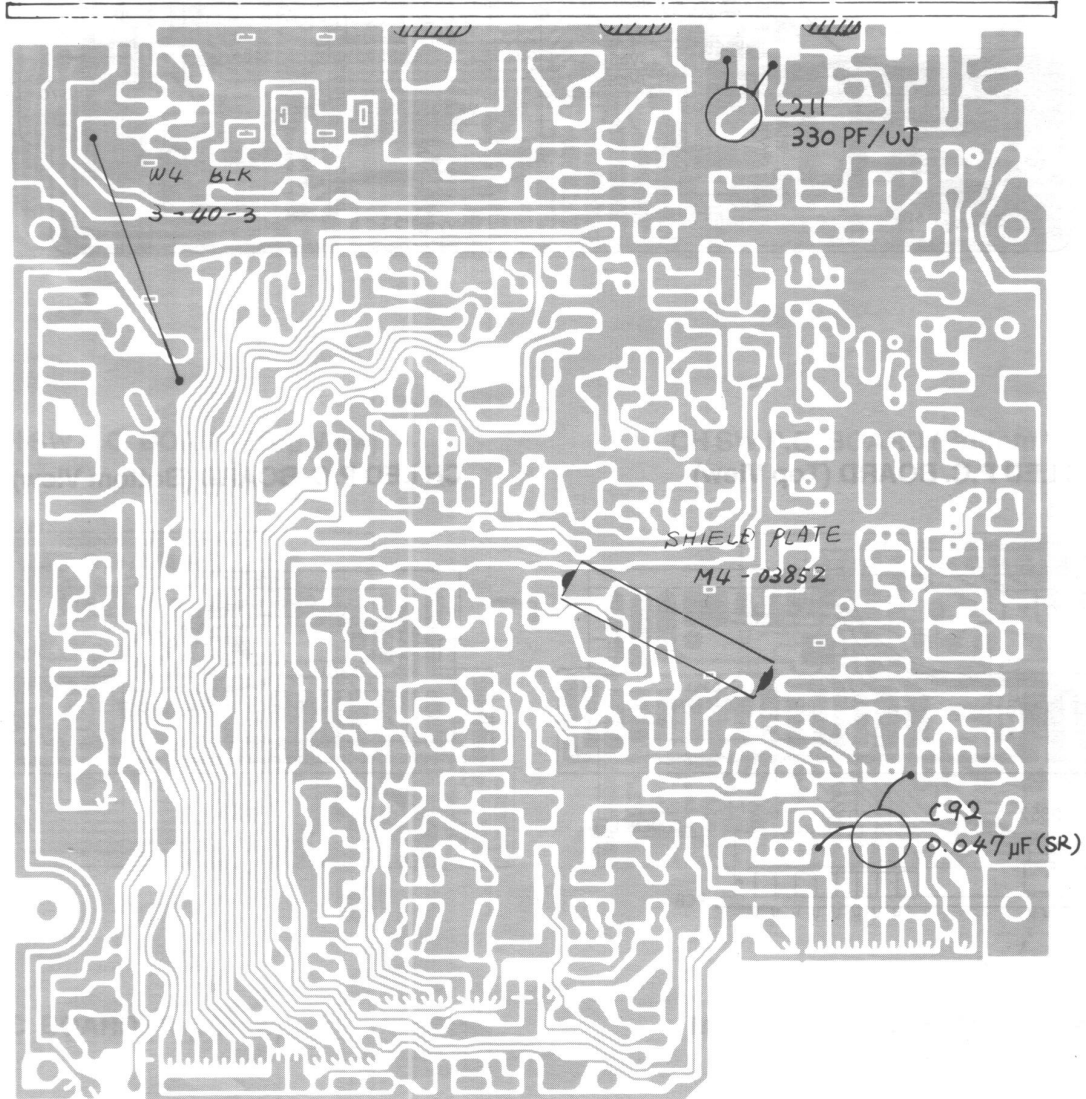


### CH LED P.C. BOARD (Bottom View)



# ADDITIONAL PARTS ON THE BOTTOM

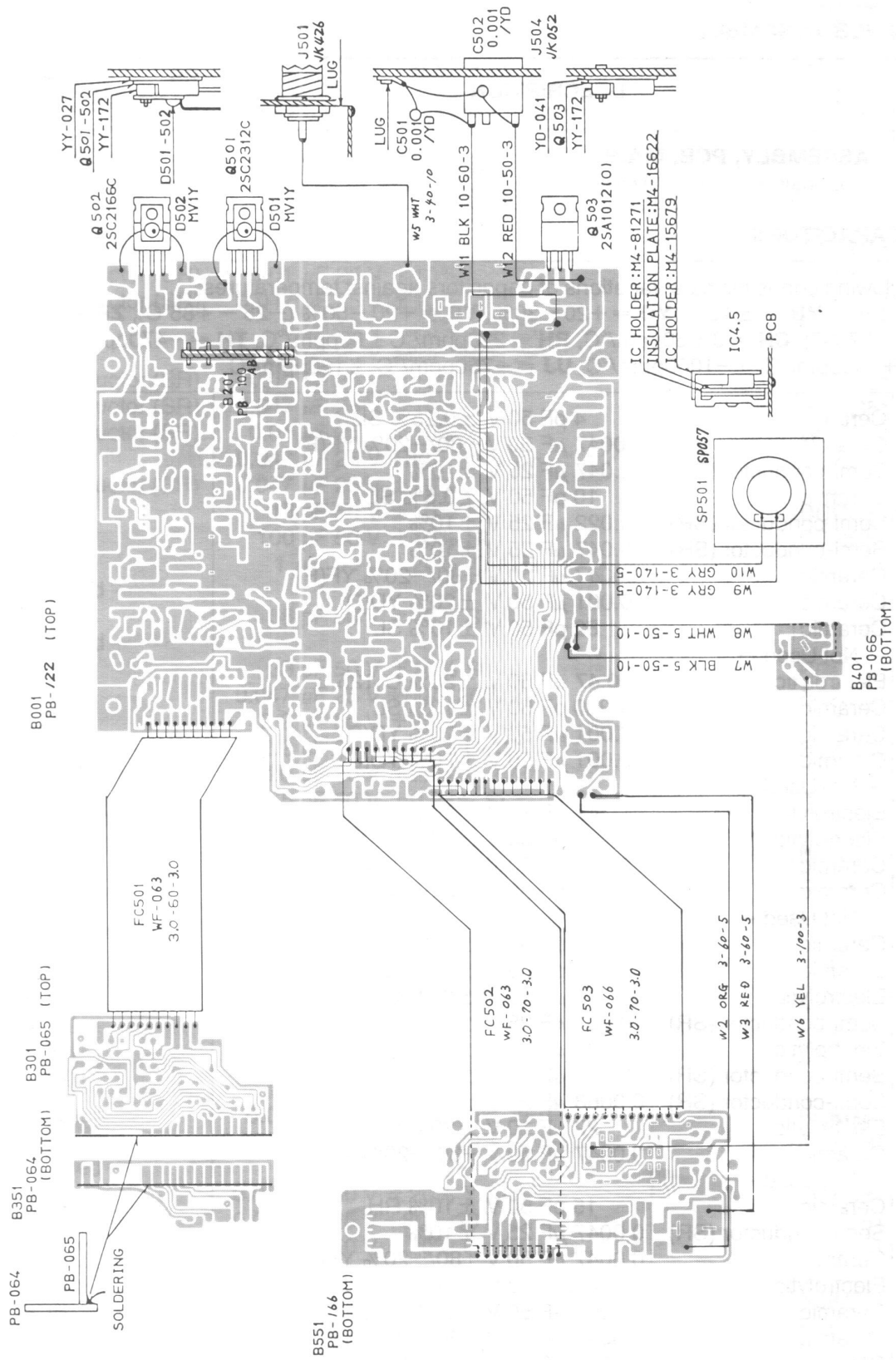
MAIN P.C. BOARD



Bottom View



# WIRING DIAGRAM



# ELECTRICAL PARTS LIST

## MAIN PCB ASSEMBLY

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
	<b>ASSEMBLY, PCB, MAIN</b> Consists of the following:		AT549FPBEA
<b>CAPACITORS</b>			
<p>The following codes indicate variations of capacitors against temperatures;  <b>YA</b> = ±5%, <b>YB</b> = ±10%, <b>YD</b> = +20 -30%, <b>YE</b> = +20 -50% (-25 - +85°C), <b>ZF</b> = +30 -80% (-10 - +70°C), <b>CH</b> = 0 ± 60ppm/°C, <b>RH</b> = 220ppm/°C ± 60ppm/°C, <b>TH</b> = -470ppm/°C ± 60ppm/°C, <b>SL</b> = +350ppm/°C - -1000ppm/°C, <b>UJ</b> = -750ppm/°C ± 120ppm/°C</p>			
C001	Ceramic 4 pF 50 V ± 0.25% SL		BCCG814091Z
C002	Ceramic 0.0047 μF 50 V +80/-20% YF(F)		BCKG814720Z
C003	Semi-conductor (SR) 0.047 μF 25 V ± 10%		BCGC514735Z
C004	Ceramic 10 pF 50 V ± 0.5% SL		BCCG811002Z
C005	Semi-conductor (SR) 0.022 μF 25 V ± 10%		BCGC512235Z
C006	Semi-conductor (SR) 0.047 μF 25 V ± 10%		BCGC514735Z
C007	Ceramic 0.0047 μF 50 V +80/-20% YF(F)		BCKG814720Z
C008	Ceramic 0.001 μF 50 V ± 20% YD(D)		BCKD811026Z
C009	Ceramic 82 pF 50 V ± 10% SL		BCCG818205Z
C010	— Not Used —		
C011	Electrolytic 0.47 μF 50 V ± 20% C-125		BCEQ814786Z
C012	Ceramic 330 pF 50 V ± 10% SL		BCCG813315Z
C013	Ceramic 0.001 μF 50 V ± 20% YD(D)		BCKD811026Z
C014	Ceramic 0.001 μF 50 V ± 20% YD(D)		BCKD811026Z
C015	— Not Used —		
C016	Electrolytic 47 μF 10 V ± 20% C-124		BCAX114706Z
C017	Electrolytic 1 μF 50 V ± 20% C-125		BCEQ811096Z
C018	Ceramic 0.001 μF 50 V ± 20% YD(D)		BCKD811026Z
C019	Ceramic 10 pF 50 V ± 0.5% CH		BCCC811002Z
C020	— Not Used —		
C021	Ceramic 18 pF 50 V ± 10% SL		BCCG811805Z
C022	Ceramic 10 pF 50 V ± 0.5% SL		BCCG811002Z
C023	Electrolytic 47 μF 10 V ± 20% C-124		BCAX114706Z
C024	Semi-conductor (SR) 0.001 μF 25 V ± 10%		BCGC511025Z
C025	Electrolytic 22 μF 10 V ± 20% C-124		BCAX112206Z
C026	Semi-conductor (SR) 0.027 μF 25 V ± 10%		BCGC512735Z
C027	Semi-conductor (SR) 0.0068 μF 25 V ± 10%		BCGC516825Z
C028	Electrolytic 22 μF 10 V ± 20% C-124		BCAX112206Z
C029	Ceramic 0.0047 μF 50 V +80/-20% YF(F)		BCKG814720Z
C030	— Not Used —		
C031	Ceramic 15 pF 50 V ± 10% RH		BCCR811505Z
C032	Semi-conductor (SR) 0.0047 μF 25 V ± 10%		BCGC514725Z
C033	Ceramic 0.0047 μF 50 V +80/-20% YF(F)		BCKG814720Z
C034	Electrolytic 47 μF 6.3 V ± 20% C-125		BCEQ904706Z
C035	Ceramic 0.001 μF 50 V ± 20% YD(D)		BCKD811026Z
C036	Ceramic 0.0047 μF 50 V +80/-20% YF(F)		BCKG814720Z
C037	Ceramic 0.0047 μF 50 V +80/-20% YF(F)		BCKG814720Z

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
C038	Ceramic		BCCG811591Z
C039	— Not Used —		
C040	Ceramic		BCKG814720Z
C041	— Not Used —		
C042	Ceramic		BCKG814720Z
C043	Ceramic		BCCG812091Z
C044	Ceramic		BCCG812091Z
C045	Semi-conductor (SR)		BCGC514735Z
C046	Semi-conductor (SR)		BCGC511035Z
C047	Semi-conductor (SR)		BCGC514735Z
C048	Electrolytic		BCEQ311006Z
C049	Ceramic		BCKC514730Z
C050	Semi-conductor (SR)		BCGC511035Z
C051	Semi-conductor (SR)		BCGC514735Z
C052	Semi-conductor (SR)		BCGC511035Z
C053	Ceramic		BCKC514730Z
C054	Semi-conductor (SR)		BCGC514735Z
C055	Ceramic		BCCG811505Z
C056	Ceramic		BCCG811015Z
C057	Electrolytic		BCEQ811096Z
C058	— Not Used —		
C059	Ceramic		BCCG815605Z
C060	— Not Used —		
C061	Ceramic		BCCG813305Z
C062	Ceramic		BCKC514730Z
C063	Electrolytic		BCAX812296Z
C064	Electrolytic		BCAX812296Z
C065	Electrolytic		BCAM112216Z
C066	Ceramic		BCCG815091Z
C067	Ceramic		BCCR817092Z
C068	Ceramic		BCKC514730Z
C069	Ceramic		BCKD811026Z
C070	— Not Used —		
C071	Semi-conductor (SR)		BCGC514735Z
C072	Ceramic		BCCU814705Z
C073	Ceramic		BCCC813305Z
C074	Ceramic		BCCG811505Z
C075	Ceramic		BCCG813915Z
C076	Ceramic		BCCG812715Z
C077	Ceramic		BCCG811002Z
C078	Ceramic		BCKG811030Z
C079	Ceramic		BCKG814720Z
C080	— Not Used —		
C081	Ceramic		BCKD811026Z
C082	Ceramic		BCKC514730Z
C083	Electrolytic		BCAX811096Z
C084	Ceramic		BCCG812205Z
C085	Ceramic		BCKC514730Z
C086	Ceramic		BCCG811815Z
C087	Ceramic		BCCG813915Z
C088	— Not Used —		

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
C089	Ceramic		BCKD811026Z
C090	— Not Used —		
C091	Ceramic		BCKD811026Z
C092	Semi-conductor (SR)		BCGC514735Z
C093	Ceramic		BCKG811030Z
C094	Ceramic		BCCG812715Z
C095	Ceramic		BCCG811015Z
C096	Ceramic		BCCR813305Z
C097	Ceramic		BCCR815605Z
C098	Ceramic		BCCR811205Z
C099	Electrolytic		BCEQ311006Z
C100	Ceramic		BCKG814720Z
C101	Electrolytic		BCEQ114706Z
C102	Semi-conductor (SR)		BCGC511035Z
C103	Ceramic		BCCC811505Z
C104	Semi-conductor (SR)		BCGC515635Z
C105	Ceramic		BCCU818205Z
C106	Ceramic		BCCG813305Z
C107	Electrolytic		BCAX111016Z
C108	Semi-conductor (SR)		BCGC511035Z
C109	Electrolytic		BCAM112216Z
C110	Ceramic		BCKD811026Z
C111	Semi-conductor (SR)		BCGC511035Z
C112	Semi-conductor (SR)		BCGC514735Z
C113	Electrolytic		BCAX112206Z
C114	Semi-conductor (SR)		BCGC512235Z
C115	Electrolytic		BCAX111016Z
C116	Ceramic		BCCG813915Z
C117	Electrolytic		BCAX812286Z
C118	Electrolytic		BCAX311006Z
C119	Electrolytic		BCEQ311006Z
C120	Semi-conductor (SR)		BCGC512235Z
C121	Electrolytic		BCAX114706Z
C122	Electrolytic		BCAK114716Z
C123	Semi-conductor (SR)		BCGC511045Z
C124	Electrolytic		BCEQ514796Z
C125	Electrolytic		BCEQ514796Z
C126	Semi-conductor (SR)		BCGC514725Z
C127	Ceramic		BCCG818205Z
C128	Ceramic		BCCC811815Z
C129	Ceramic		BCCR812704Z
C130	Semi-conductor (SR)		BCGC511035Z
C131	Ceramic		BCCC811815Z
C132	Ceramic		BCKD811026Z
C133	Ceramic		BCKD811036Z
C134	Ceramic		BCKC514730Z
C135	— Not Used —		
C136	Ceramic		BCCU813915Z
C137	Ceramic		BCCG815081Z
C138	Electrolytic		BCEQ811096Z
C139	Ceramic		BCCU813915Z

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
C140	— Not Used —		
C141	Electrolytic 0.47 $\mu$ F 50 V $\pm$ 20% C-125		BCEQ814786Z
C142	Ceramic 0.047 $\mu$ F 25 V +80/–20% ZF		BCKC514730Z
C143	Ceramic 180 pF 50 V $\pm$ 10% RH		BCCR811815Z
C144	— Not Used —		
C145	Ceramic 150 pF 50 V $\pm$ 10% UJ		BCCU811515Z
C146	Ceramic 470 pF 50 V $\pm$ 10% SL		BCCG814715Z
C147	Semi-conductor (SR) 0.047 $\mu$ F 25 V $\pm$ 10%		BCGC514735Z
C148	Ceramic 0.001 $\mu$ F 50 V $\pm$ 20% YD(D)		BCKD811026Z
C149	Ceramic 0.01 $\mu$ F 50 V $\pm$ 20% YD(D)		BCKD811036Z
C150	— Not Used —		
C151	Ceramic 3 pF 50 V $\pm$ 0.25% UJ		BCCU813091Z
C152	Ceramic 33 pF 50 V $\pm$ 10% CH		BCCC813305Z
C153	Ceramic 0.01 $\mu$ F 50 V $\pm$ 20% YD(D)		BCKD811036Z
C154	Ceramic 270 pF 50 V $\pm$ 10% UJ		BCCU812715Z
C155	— Not Used —		
C156	Ceramic 0.01 $\mu$ F 50 V +80/–20% YF(F)		BCKG811030Z
C157	Ceramic 47 pF 50 V $\pm$ 10% RH		BCCR814705Z
C158	Semi-conductor (SR) 0.047 $\mu$ F 25 V $\pm$ 10%		BCGC514735Z
C159	Ceramic 1.5 pF 50 V $\pm$ 0.25% SL		BCCG811591Z
C160	Ceramic 1.5 pF 50 V $\pm$ 0.25% SL		BCCG811591Z
C161	Ceramic 0.01 $\mu$ F 50 V +80/–20% YF(F)		BCKG811030Z
C162	Ceramic 100 pF 50 V $\pm$ 10% SL		BCCG811015Z
C163	Semi-conductor (SR) 0.01 $\mu$ F 25 V $\pm$ 10%		BCGC511035Z
C164	Semi-conductor (SR) 0.022 $\mu$ F 25 V $\pm$ 10%		BCGC512235Z
C165	Ceramic 0.0047 $\mu$ F 50 V +80/–20% YF(F)		BCKG814720Z
C166	Semi-conductor (SR) 0.01 $\mu$ F 25 V $\pm$ 10%		BCGC511035Z
C167	Electrolytic 4.7 $\mu$ F 25 V $\pm$ 20% C-125		BCEQ514796Z
C168	Electrolytic 4.7 $\mu$ F 25 V $\pm$ 20% C-125		BCEQ514796Z
C169	Tantalum 0.22 $\mu$ F 35 V $\pm$ 20%		BCSE662286Z
C170	Electrolytic 1 $\mu$ F 50 V $\pm$ 20% C-124		BCAX811096Z
C171	Semi-conductor (SR) 0.047 $\mu$ F 25 V $\pm$ 10%		BCGC514735Z
C172	Electrolytic 47 $\mu$ F 16 V $\pm$ 20% C-128		BCAM314706Z
C173	Electrolytic 1000 $\mu$ F 25 V $\pm$ 20% C-156		BCAZ511026Z
C174	Electrolytic 1000 $\mu$ F 25 V $\pm$ 20% C-156		BCAZ511026Z
C175	— Not Used —		
C176	— Not Used —		
C177	Semi-conductor (SR) 0.01 $\mu$ F 25 V $\pm$ 10%		BCGC511035Z
C178	Semi-conductor (SR) 0.01 $\mu$ F 25 V $\pm$ 10%		BCGC511035Z
C179	Electrolytic 4.7 $\mu$ F 35 V $\pm$ 20% C-124		BCAX664796Z
C180	Ceramic 150 pF 50 V $\pm$ 10% CH		BCCC811515Z
C181	Electrolytic 1 $\mu$ F 50 V $\pm$ 20% C-125		BCEQ811096Z
C182	— Not Used —		
C183	— Not Used —		
C184	Ceramic 0.001 $\mu$ F 50 V $\pm$ 20% YD(D)		BCKD811026Z
C185	Ceramic 0.001 $\mu$ F 50 V $\pm$ 20% YD(D)		BCKD811026Z
C186	Semi-conductor (SR) 0.01 $\mu$ F 25 V $\pm$ 10%		BCGC511035Z
C187	— Not Used —		
C188	— Not Used —		
C189	— Not Used —		
C190	— Not Used —		

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
C191	— Not Used —		
C192	— Not Used —		
C193	— Not Used —		
C194	— Not Used —		
C195	— Not Used —		
C196	— Not Used —		
C197	— Not Used —		
C198	— Not Used —		
C199	Ceramic 33 pF 50 V $\pm$ 10% RH		BCCR813305Z
C200	— Not Used —		
C201	Ceramic 47 pF 50 V $\pm$ 10% CH		BCCC814705Z
C202	— Not Used —		
C203	— Not Used —		
C204	— Not Used —		
C205	— Not Used —		
C206	— Not Used —		
C207	— Not Used —		
C208	— Not Used —		
C209	— Not Used —		
C210	— Not Used —		
C211	Ceramic 330 pF 50 V $\pm$ 10% UJ		BCCU813315Z
C212	Electrolytic 10 $\mu$ F 16 V $\pm$ 20% C-125		BCEQ311006Z
<b>DIODES</b>			
D001	Germanium 1N60 AM		BDAY0001001
D002	Germanium 1N60 AM		BDAY0001001
D003	Silicon 1S1555		BDAY0181001
D004	Zener HZ3B3		BDAY0269003
D005	Silicon 1S1555		BDAY0181001
D006	Zener HZ3B3		BDAY0269003
D007	Germanium 1N60 AM		BDAY0001001
D008	Germanium 1N60 AM		BDAY0001001
D009	Silicon 1S1555		BDAY0181001
D010	Silicon MC-301		BDAY0090001
D011	Silicon MC-301		BDAY0090001
D012	Silicon 1S1555		BDAY0181001
D013	Silicon 1S1555		BDAY0181001
D014	Silicon 1S1555		BDAY0181001
D015	Silicon 1S1555		BDAY0181001
D016	Silicon 1S1555		BDAY0181001
D017	Silicon 1S1555		BDAY0181001
D018	Silicon 1S1555		BDAY0181001
D019	Silicon Varicap 1SV73-EB		BDAY0220001
D020	Silicon 1S1555		BDAY0181001
D021	Silicon 1S1555		BDAY0181001
D022	Silicon 1S1555		BDAY0181001
D023	Silicon Varicap 1SV73-EB		BDAY0220001
D024	Silicon 1S1555		BDAY0181001
D025	Silicon 1S1555		BDAY0181001
D026	Zener HZ5C-1		BDAY0269002

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
D027	Silicon 1S1555		BDAY0181001
D028	Silicon 1S1555		BDAY0181001
D029	Silicon 1S1555		BDAY0181001
D030	Silicon 1S1555		BDAY0181001
D031	Silicon 1S1555		BDAY0181001
D032	Silicon 1S1555		BDAY0181001
D033	Silicon 1S1555		BDAY0181001
D034	Silicon 1S1555		BDAY0181001
D035	Silicon 1S1555		BDAY0181001
D036	Silicon 1S1555		BDAY0181001
D037	Silicon 1S1555		BDAY0181001
D038	Silicon 1S1555		BDAY0181001
D039	Silicon 1S1555		BDAY0181001
D040	Silicon 1S1555		BDAY0181001
D041	Silicon 1S1555		BDAY0181001
D042	Silicon 1S1555		BDAY0181001
D043	Silicon 1S1555		BDAY0181001
D044	Silicon 1S1555		BDAY0181001
D045	Silicon 1S1555		BDAY0181001
D046	AX TS 26 + S5566G Taping		BDAY0529001
D047	Silicon 1S1555		BDAY0181001
D048	AX TS 26 + S5566G Taping		BDAY0529001
<b>COILS</b>			
L001	— Not Used —		
L002	10.695MHz RX Noise Blanker LB-343 199CC-13568Y		BLBY0343001
L003	27 MHz RX. RF. LB-335 199CC-13485X		BLBY0335001
L004	27 MHz RX RF Band Pass LB-439 199CC-14252N		BLBY0439001
L005	27 MHz RX Band Pass LB-451 199CC-14368N		BLBY0451001
L006	10.695MHz RX. IF. LB-341 199CC-13499A		BLBY0341001
L007	10.695MHz RX. IF. LB-341 199CC-13499A		BLBY0341001
L008	10.695MHz RX. IF. LB-341 199CC-13499A		BLBY0341001
L009	Inductor Molded LZ-035 470UH		BLZY0035471
L010	10.695MHz RX. IF. LB-438 199CC-14250N		BLBY0438001
L011	10.695MHz RX IF. TX Buffer LB-342 199CC-13524R		BLBY0342001
L012	Inductor Molded LZ-035 470UH		BLZY0035471
L013	V.C.O. LA-165 VTKXNA-XT231ZO-TW		BLAY0165001
L014	16 MHz Local LB-452 199CC-14411X		BLBY0452001
L015	10.24 MHz FRQ. ADJ LB-137 113CN-6344Z		BLBY0137001
L016	10.24 MHz FRQ. ARD LB-209 113CN-6485Z		BLBY0209001
L017	10.24 MHz FRQ. ADJ LB-137 113CN-6344Z		BLBY0137001
L018	10.24 MHz FRQ. ADJ LB-137 113CN-6344Z		BLBY0137001
L019	10.24 MHz FRQ. ADJ LB-137 113CN-6344Z		BLBY0137001
L020	10.24 MHz FRQ. ARD LB-209 113CN-6485Z		BLBY0209001
L021	Inductor Molded LZ-035 470UH		BLZY0035471
L022	Inductor Molded LZ-035 470UH		BLZY0035471
L023	LE-376 L-3E6-5(R22-E528)		BLEY0376001
L024	LE-375 D6 7 1/2T		BLEY0375001
L025	LE-376 L-3E6-5(R22-E528)		BLEY0376001
L026	LC-218		BLCY0218001

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
L027			BLEY0377001
L025			BLEY0376001
L026			BLCY0218001
L027			BLEY0377001
L028	Ferrite Beads	LD-087 BF04-3*5*1	BLDY0087001
L029	Ferrite Beads	LD-087 BF04-3*5*1	BLDY0087001
L030		LE-403 L-1E3-S(R22-E709X)	BLEY0403001
L031		LD-228 AT0502T-3012	BLDY0228001
L032	Ferrite Beads	LD-087 BF04-3*5*1	BLDY0087001
L033	Ferrite Beads	LD-087 BF04-3*5*1	BLDY0087001
L034	27 MHz TX Band Pass	LB-440 199CN-14251Z	BLBY0440001
L035	27 MHz TX Band Pass	LB-339 199CC-13490X	BLBY0339001
L036	27 MHz RX Band Pass	LB-451 199CC-14368N	BLBY0451001
L037	10.695MHz RX IF. TX Buffer	LB-342 199CC-13524R	BLBY0342001
L038		LB-464 199CC-14480Y	BLBY0464001
<b>TRANSISTORS</b>			
Q001	Silicon NPN	DB-259 2SC1675-L	BDBC1675111
Q002	Silicon NPN	DB-259 2SC1675-L	BDBC1675111
Q003	Silicon NPN	DB-259 2SC1675-L	BDBC1675111
Q004	Silicon NPN	DB-224 2SC945A-Q	BDBC0945507
Q005	Silicon NPN	DB-224 2SC945A-Q	BDBC0945507
Q006	Silicon PNP	DB-027 2SA733A-PB	BDBA0733541
Q007	Silicon NPN	DB-224 2SC945A-Q	BDBC0945507
Q008	Silicon NPN	DB-224 2SC945A-Q	BDBC0945507
Q009	Silicon NPN	DB-224 2SC945A-Q	BDBC0945507
Q010	Silicon NPN	DB-224 2SC945A-Q	BDBC0945507
Q011	Silicon NPN	DB-224 2SC945A-Q	BDBC0945507
Q012	Silicon NPN	DB-224 2SC945A-Q	BDBC0945507
Q013	Silicon NPN	DB-295 2SC1674-L	BDBC1674111
Q014	Field Effect	DC-019 2SK192A-BL	BDCB0192533
Q015	Silicon NPN	DB-295 2SC1674-L	BDBC1674111
Q016	Silicon NPN	DB-259 2SC1675-L	BDBC1675111
Q017	Silicon NPN	DB-259 2SC1675-L	BDBC1675111
Q018	Silicon NPN	DB-269 2SC1730-L	BDBC1730111
Q019	Silicon NPN	DB-224 2SC945A-Q	BDBC0945507
Q020	Silicon NPN	DB-259 2SC1675-L	BDBC1675111
Q021	Silicon NPN	DB-259 2SC1675-L	BDBC1675111
Q022	Silicon NPN	DB-259 2SC1675-L	BDBC1675111
Q023	Silicon NPN	DB-259 2SC1675-L	BDBC1675111
Q024	Silicon NPN	DB-259 2SC1675-L	BDBC1675111
Q025	Silicon NPN	DB-224 2SC945A-Q	BDBC0945507
Q026	Silicon NPN	DB-224 2SC945A-Q	BDBC0945507
Q027	Silicon NPN	DB-224 2SC945A-Q	BDBC0945507
Q028	Silicon PNP	DB-027 2SA733A-PB	BDBA0733541
Q029	Silicon NPN	DB-224 2SC945A-Q	BDBC0945507
Q030	Silicon NPN	DB-224 2SC945A-Q	BDBC0945507
Q031	Silicon NPN	DB-383 2SC3242A-E	BDBC3242536
Q032	Silicon NPN	DB-224 2SC945A-Q	BDBC0945507
Q033	Silicon PNP	DB-106 2SB525-C UNI	BDBB0525103



REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
Q034	Silicon NPN	DB-259 2SC1675-L	BDBC1675111
Q035	Silicon NPN	DB-272 2SC1973-SSB	BDBC1973315
Q036	Silicon NPN	DB-224 2SC945A-Q	BDBC0945507
Q037	Silicon PNP	DB-106 2SB525-C UNI	BDBB0525103
Q038	Silicon NPN	DB-383 2SC3242A-E	BDBC3242536
<b>RESISTORS</b>			
R001	Carbon Formed Vert	10 k ohm 1/6 W $\pm$ 5%	BRUB611034Z
R002	Carbon Formed Vert	33 k ohm 1/6 W $\pm$ 5%	BRUB613334Z
R003	Carbon AX TS 26	680 ohm 1/6 W $\pm$ 5% Taping	BRPA616814Z
R004	Carbon AX TS 26	330 ohm 1/6 W $\pm$ 5% Taping	BRPA613314Z
R005	Carbon Formed Vert	100 ohm 1/6 W $\pm$ 5%	BRUB611014Z
R006	Carbon AX TS 26	220 ohm 1/6 W $\pm$ 5% Taping	BRPA612214Z
R007	Carbon Formed Vert	47 k ohm 1/6 W $\pm$ 5%	BRUB614734Z
R008	Carbon AX TS 26	1.5K ohm 1/6 W $\pm$ 5% Taping	BRPA611524Z
R009	Carbon Formed Vert	330 ohm 1/6 W $\pm$ 5%	BRUB613314Z
R010	Carbon AX TS 26	68 ohm 1/6 W $\pm$ 5% Taping	BRPA616804Z
R011	Carbon Formed Vert	100 k ohm 1/6 W $\pm$ 5%	BRUB611044Z
R012	Carbon AX TS 26	56 ohm 1/6 W $\pm$ 5% Taping	BRPA615604Z
R013	Carbon Formed Vert	10 k ohm 1/6 W $\pm$ 5%	BRUB611034Z
R014	Carbon Formed Vert	10 k ohm 1/6 W $\pm$ 5%	BRUB611034Z
R015	Carbon Axial Lead	470 k ohm 1/8 W $\pm$ 5%	BRPB184744Z
R016	Carbon Formed Vert	10 k ohm 1/6 W $\pm$ 5%	BRUB611034Z
R017	Carbon Formed Vert	10 k ohm 1/6 W $\pm$ 5%	BRUB611034Z
R018	Carbon Formed Vert	330 ohm 1/6 W $\pm$ 5%	BRUB613314Z
R019	Carbon Formed Vert	3.3 k ohm 1/6 W $\pm$ 5%	BRUB613324Z
R020	— Not Used —		
R021	Carbon Formed Vert	3.3 M ohm 1/6 W $\pm$ 5%	BRUB613354Z
R022	Carbon AX TS 26	1 k ohm 1/6 W $\pm$ 5% Taping	BRPA611024Z
R023	Carbon Formed Vert	560 k ohm 1/6 W $\pm$ 5%	BRUB615644Z
R024	Carbon AX TS 26	100 k ohm 1/6 W $\pm$ 5% Taping	BRPA611044Z
R025	Carbon Formed Vert	39 k ohm 1/6 W $\pm$ 5%	BRUB613934Z
R026	Carbon AX TS 26	1 k ohm 1/6 W $\pm$ 5% Taping	BRPA611024Z
R027	Carbon Formed Vert	100 k ohm 1/6 W $\pm$ 5%	BRUB611044Z
R028	Carbon AX TS 26	3.3 k ohm 1/6 W $\pm$ 5% Taping	BRPA613324Z
R029	Carbon AX TS 26	100 k ohm 1/6 W $\pm$ 5% Taping	BRPA611044Z
R030	Carbon Formed Vert	150 k ohm 1/6 W $\pm$ 5%	BRUB611544Z
R031	Carbon Formed Vert	100 k ohm 1/6 W $\pm$ 5%	BRUB611044Z
R032	Carbon Formed Vert	100 k ohm 1/6 W $\pm$ 5%	BRUB611044Z
R033	Carbon AX TS 26	3.3 k ohm 1/6 W $\pm$ 5% Taping	BRPA613324Z
R034	Carbon Formed Vert	15 k ohm 1/6 W $\pm$ 5%	BRUB611534Z
R035	Carbon Axial Lead	3.3 k ohm 1/8 W $\pm$ 5% Taping	BRFT183324Z
R036	Carbon Axial Lead	220 ohm 1/8 W $\pm$ 5% Taping	BRFT182214Z
R037	Carbon Formed Vert	120 k ohm 1/6 W $\pm$ 5%	BRUB611244Z
R038	Carbon AX TS 26	33 k ohm 1/6 W $\pm$ 5% Taping	BRPA613334Z
R039	Carbon Axial Lead	560 k ohm 1/8 W $\pm$ 5%	BRPB185644Z
R040	Carbon AX TS 26	10 k ohm 1/6 W $\pm$ 5% Taping	BRPA611034Z
R041	Carbon Formed Vert	3.3 k ohm 1/6 W $\pm$ 5%	BRUB613324Z
R042	Carbon AX TS 26	1 k ohm 1/6 W $\pm$ 5% Taping	BRPA611024Z
R043	Carbon Formed Vert	15 k ohm 1/6 W $\pm$ 5%	BRUB611534Z

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
R044	Carbon AX TS 26	3.3 k ohm 1/6 W ± 5% Taping	BRPA613324Z
R045	Carbon AX TS 26	470 ohm 1/6 W ± 5% Taping	BRPA614714Z
R046	Carbon Formed Vert	10 k ohm 1/6 W ± 5%	BRUB611034Z
R047	Carbon Formed Vert	10 k ohm 1/6 W ± 5%	BRUB611034Z
R048	Carbon Formed Vert	1 k ohm 1/6 W ± 5%	BRUB611024Z
R049	Carbon AX TS 26	2.2 k ohm 1/6 W ± 5% Taping	BRPA612224Z
R050	Carbon AX TS 26	1 k ohm 1/6 W ± 5% Taping	BRPA611024Z
R051	Carbon Axial Lead	680 ohm 1/8 W ± 5% Taping	BRFT186814Z
R052	Carbon AX TS 26	100 ohm 1/6 W ± 5% Taping	BRPA611014Z
R053	— Not Used —		
R054	— Not Used —		
R055	— Not Used —		
R056	Carbon AX TS 26	100 ohm 1/6 W ± 5% Taping	BRPA611014Z
R057	Carbon AX TS 26	2.2 k ohm 1/6 W ± 5% Taping	BRPA612224Z
R058	Carbon Formed Vert	3.3 k ohm 1/6 W ± 5%	BRUB613324Z
R059	Carbon Formed Vert	10 k ohm 1/6 W ± 5%	BRUB611034Z
R060	— Not Used —		
R061	Carbon AX TS 26	6.8 k ohm 1/6 W ± 5% Taping	BRPA616824Z
R062	Carbon AX TS 26	8.2 k ohm 1/6 W ± 5% Taping	BRPA618224Z
R063	Carbon Formed Vert	1 k ohm 1/6 W ± 5%	BRUB611024Z
R064	Carbon AX TS 26	22 k ohm 1/6 W ± 5% Taping	BRPA612234Z
R065	Carbon AX TS 26	820 ohm 1/6 W ± 5% Taping	BRPA618214Z
R066	Carbon AX TS 26	5.6 k ohm 1/6 W ± 5% Taping	BRPA615624Z
R067	Carbon AX TS 26	680 ohm 1/6 W ± 5% Taping	BRPA616814Z
R068	Carbon Formed Vert	100 ohm 1/6 W ± 5%	BRUB611014Z
R069	Carbon Formed Vert	47 k ohm 1/6 W ± 5%	BRUB614734Z
R070	— Not Used —		
R071	Carbon AX TS 26	1.5 k ohm 1/6 W ± 5% Taping	BRPA611524Z
R072	Carbon AX TS 26	100 ohm 1/6 W ± 5% Taping	BRPA611014Z
R073	Carbon Formed Vert	270 ohm 1/6 W ± 5%	BRUB612714Z
R074	Carbon Formed Vert	150 ohm 1/6 W ± 5%	BRUB611514Z
R075	Carbon AX TS 26	68 ohm 1/6 W ± 5% Taping	BRPA616804Z
R076	Carbon Formed Vert	3.3 k ohm 1/6 W ± 5%	BRUB613324Z
R077	Carbon Formed Vert	100 k ohm 1/6 W ± 5%	BRUB611044Z
R078	Carbon Formed Vert	47 k ohm 1/6 W ± 5%	BRUB614734Z
R079	— Not Used —		
R080	Carbon AX TS 26	1 M ohm 1/6 W ± 5% Taping	BRPA611054Z
R081	Carbon AX TS 26	150 k ohm 1/6 W ± 5% Taping	BRPA611544Z
R082	Carbon Formed Vert	47 k ohm 1/6 W ± 5%	BRUB614734Z
R083	Carbon Formed Vert	100 k ohm 1/6 W ± 5%	BRUB611044Z
R084	Carbon Formed Vert	1 k ohm 1/6 W ± 5%	BRUB611024Z
R085	Carbon AX TS 26	56 ohm 1/6 W ± 5% Taping	BRPA615604Z
R086	Carbon Formed Vert	5.6 k ohm 1/6 W ± 5%	BRUB615624Z
R087	Carbon AX TS 26	2.2 k ohm 1/6 W ± 5% Taping	BRPA612224Z
R088	Carbon Formed Vert	1 k ohm 1/6 W ± 5%	BRUB611024Z
R089	— Not Used —		
R090	— Not Used —		
R091	Carbon Formed Vert	10 k ohm 1/6 W ± 5%	BRUB611034Z
R092	— Not Used —		
R093	Carbon Formed Vert	2.2 k ohm 1/6 W ± 5%	BRUB612224Z
R094	Carbon AX TS 26	10 k ohm 1/6 W ± 5% Taping	BRPA611034Z

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
R095	Carbon Axial Lead 22 k ohm 1/8 W ±5%		BRPB182234Z
R096	Carbon Axial Lead 100 ohm 1/6 W ±5%		BRPB611014Z
R097	Carbon Formed Vert 1 k ohm 1/6 W ±5%		BRUB611024Z
R098	Carbon AX TS 26 8.2 k ohm 1/6 W ±5% Taping		BRPA618224Z
R099	— Not Used —		
R100	— Not Used —		
R101	Carbon Formed Vert 6.8 k ohm 1/6 W ±5%		BRUB616824Z
R102	Carbon Formed Vert 330 ohm 1/6 W ±5%		BRUB613314Z
R103	Carbon AX TS 26 56 ohm 1/6 W ±5% Taping		BRPA615604Z
R104	Carbon Axial Lead 1.5 k ohm 1/8 W ±5% Taping		BRFT181524Z
R105	Carbon Formed Vert 220 k ohm 1/6 W ±5%		BRUB612244Z
R106	Carbon Formed Vert 100 ohm 1/6 W ±5%		BRUB611014Z
R107	Carbon AX TS 26 10 k ohm 1/6 W ±5% Taping		BRPA611034Z
R108	Carbon AX TS 26 12 k ohm 1/6 W ±5% Taping		BRPA611234Z
R109	Carbon Formed Vert 1.5 k ohm 1/6 W ±5%		BRUB611524Z
R110	Carbon Axial Lead 3.3 k ohm 1/8 W ±5%		BRPB183324Z
R111	Carbon Formed Vert 10 k ohm 1/6 W ±5%		BRUB611034Z
R112	Carbon AX TS 26 470 ohm 1/6 W ±5% Taping		BRPA614714Z
R113	Carbon Axial Lead 680 ohm 1/8 W ±5%		BRPB186814Z
R114	Carbon AX TS 26 6.8 k ohm 1/6 W ±5% Taping		BRPA616824Z
R115	Carbon Formed Vert 4.7 k ohm 1/6 W ±5%		BRUB614724Z
R116	Carbon Axial Lead 4.7 k ohm 1/6 W ±5%		BRPB614724Z
R117	Carbon Axial Lead 4.7 k ohm 1/6 W ±5%		BRPB614724Z
R118	Carbon Formed Vert 10 k ohm 1/6 W ±5%		BRUB611034Z
R119	Carbon Formed Vert 6.8 k ohm 1/6 W ±5%		BRUB616824Z
R120	— Not Used —		
R121	Carbon Formed Vert 1 k ohm 1/6 W ±5%		BRUB611024Z
R122	Carbon Formed Vert 180 k ohm 1/6 W ±5%		BRUB611844Z
R123	Carbon Formed Vert 2.2 k ohm 1/6 W ±5%		BRUB612224Z
R124	Carbon AX TS 26 220 ohm 1/6 W ±5% Taping		BRPA612214Z
R125	Carbon Formed Vert 4.7 k ohm 1/6 W ±5%		BRUB614724Z
R126	Carbon Formed Vert 1 k ohm 1/6 W ±5%		BRUB611024Z
R127	Carbon Formed Vert 1 k ohm 1/6 W ±5%		BRUB611024Z
R128	Carbon AX TS 26 1.5 k ohm 1/6 W ±5% Taping		BRPA611524Z
R129	Carbon AX TS 26 820 ohm 1/6 W ±5% Taping		BRPA618214Z
R130	— Not Used —		
R131	Carbon AX TS 26 120 k ohm 1/6 W ±5% Taping		BRPA611244Z
R132	Carbon AX TS 26 270 k ohm 1/6 W ±5% Taping		BRPA612744Z
R133	Carbon Formed Vert 3.3 k ohm 1/6 W ±5%		BRUB613324Z
R134	Carbon Axial Lead 100 ohm 1/8 W ±5% Taping		BRFT181014Z
R135	Carbon AX TS 26 6.8 k ohm 1/6 W ±5% Taping		BRPA616824Z
R136	Carbon AX TS 26 1 k ohm 1/6 W ±5% Taping		BRPA611024Z
R137	Carbon Formed Vert 100 ohm 1/6 W ±5%		BRUB611014Z
R138	Carbon AX TS 26 3.3 k ohm 1/6 W ±5% Taping		BRPA613324Z
R139	Carbon AX TS 26 15 k ohm 1/6 W ±5% Taping		BRPA611534Z
R140	— Not Used —		
R141	Carbon Formed Vert 680 ohm 1/6 W ±5%		BRUB616814Z
R142	Carbon Formed Vert 330 ohm 1/6 W ±5%		BRUB613314Z
R143	Carbon AX TS 26 100 k ohm 1/6 W ±5% Taping		BRPA611044Z
R144	Carbon Formed Vert 10 k ohm 1/6 W ±5%		BRUB611034Z
R145	Carbon Formed Vert 470 ohm 1/6 W ±5%		BRUB614714Z

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
R146	Carbon Axial Lead	4.7 k ohm 1/8 W ± 5% Taping	BRFT184724Z
R147	Carbon AX TS 26	4.7 k ohm 1/6 W ± 5% Taping	BRPA614724Z
R148	Carbon Formed Vert	68 k ohm 1/6 W ± 5%	BRUB616834Z
R149	Carbon AX TS 26	1 M ohm 1/6 W ± 5% Taping	BRPA611054Z
R150	— Not Used —		
R151	Carbon AX TS 26	2.2 k ohm 1/6 W ± 5% Taping	BRPA612224Z
R152	Carbon AX TS 26	15 k ohm 1/6 W ± 5% Taping	BRPA611534Z
R153	Carbon AX TS 26	6.8 k ohm 1/6 W ± 5% Taping	BRPA616824Z
R154	Carbon Formed Vert	1.8 k ohm 1/6 W ± 5%	BRUB611824Z
R155	Carbon Formed Vert	10 k ohm 1/6 W ± 5%	BRUB611034Z
R156	Carbon AX TS 26	22 k ohm 1/6 W ± 5% Taping	BRPA612234Z
R157	Carbon Axial Lead	1 k ohm 1/8 W ± 5% Taping	BRFT181024Z
R158	Carbon Formed Vert	4.7 k ohm 1/6 W ± 5%	BRUB614724Z
R159	Carbon AX TS 26	1 k ohm 1/6 W ± 5% Taping	BRPA611024Z
R160	— Not Used —		
R161	Carbon AX TS 26	10 k ohm 1/6 W ± 5% Taping	BRPA611034Z
R162	Carbon Formed Vert	10 k ohm 1/6 W ± 5%	BRUB611034Z
R163	Carbon Formed Vert	1 k ohm 1/6 W ± 5%	BRUB611024Z
R164	Carbon AX TS 26	1.5 k ohm 1/6 W ± 5% Taping	BRPA611524Z
R165	Carbon AX TS 26	10 k ohm 1/6 W ± 5% Taping	BRPA611034Z
R166	Carbon Formed Vert	1 ohm 1/6 W ± 5%	BRUB611094Z
R167	Carbon Axial Lead	10 k ohm 1/2 W ± 5%	BRPB121034Z
R168	Carbon Formed Vert	560 ohm 1/6 W ± 5%	BRUB615614Z
R169	Carbon AX TS 26	15 ohm 1/6 W ± 5% Taping	BRPA611504Z
R170	Carbon Axial Lead	120 ohm 1/2 W ± 5%	BRPB121214Z
R171	— Not Used —		
R172	Carbon Formed Vert	12 ohm 1/6 W ± 5%	BRUB611204Z
R173	Carbon AX TS 26	15 ohm 1/6 W ± 5% Taping	BRPA611504Z
R174	Carbon AX TS 26	1.2 k ohm 1/6 W ± 5% Taping	BRPA611224Z
R175	Carbon AX TS 26	330 ohm 1/6 W ± 5% Taping	BRPA613314Z
R176	Carbon AX TS 26	470 ohm 1/6 W ± 5% Taping	BRPA614714Z
R177	Carbon AX TS 26	470 ohm 1/6 W ± 5% Taping	BRPA614714Z
R178	Carbon AX TS 26	22 k ohm 1/6 W ± 5% Taping	BRPA612234Z
R179	Carbon AX TS 26	470 ohm 1/6 W ± 5% Taping	BRPA614714Z
R180	— Not Used —		
R181	Carbon Axial Lead	100 ohm 1/8 W ± 5%	BRPB181014Z
R182	Carbon AX TS 26	100 ohm 1/6 W ± 5% Taping	BRPA611014Z
R183	Carbon AX TS 26	10 ohm 1/6 W ± 5% Taping	BRPA611004Z
R184	Carbon Formed Vert	100 ohm 1/6 W ± 5%	BRUB611014Z
R185	Carbon AX TS 26	5.6 k ohm 1/6 W ± 5% Taping	BRPA615624Z
R186	Carbon AX TS 26	560 ohm 1/6 W ± 5% Taping	BRPA615614Z
R187	Carbon Formed Vert	10 ohm 1/6 W ± 5%	BRUB611004Z
R188	Carbon AX TS 26	10 k ohm 1/6 W ± 5% Taping	BRPA611034Z
R189	Carbon AX TS 26	220 ohm 1/6 W ± 5% Taping	BRPA612214Z
R190	— Not Used —		
R191	Carbon Axial Lead	3.3 k ohm 1/8 W ± 5% Taping	BRFT183324Z
R192	— Not Used —		
R193	Carbon AX TS 26	10 k ohm 1/6 W ± 5% Taping	BRPA611034Z
R194	Carbon Formed Vert	47 k ohm 1/6 W ± 5%	BRUB614734Z
R195	— Not Used —		
R196	Carbon Formed Vert	100 ohm 1/6 W ± 5%	BRUB611014Z

REF. NO.	DESCRIPTION		RS PART NO.	MFR'S PART NO.
R197	Carbon Formed Vert	47 k ohm 1/6 W $\pm$ 5%		BRUB614734Z
R198	— Not Used —			
R199	— Not Used —			
R200	— Not Used —			
R201	Carbon Formed Vert	4.7 k ohm 1/6 W $\pm$ 5%		BRUB614724Z
<b>INTEGRATED CIRCUITS</b>				
IC001	Silicon Monolithic	M5223L		BDEY0582001
IC002	C-MOS	D2824C		BDEY0907001
IC003	Silicon Monolithic	AN612		BDEY0130001
IC004		L7808CV		BDEY0924001
IC005	Silicon Monolithic	UPC1242H		BDEY0471001
IC006	Silicon Monolithic	TA7320P		BDEY0364001
<b>VARIABLE RESISTORS</b>				
VR001	Semi-fixed	RT-182 TT24R 50KB		BRTY0182503
VR002	Semi-fixed	RT-182 TT24R 100KB		BRTY0182104
VR003	Semi-fixed	RT-182 TT24R 30KB		BRTY0182303
VR004	Semi-fixed	RT-182 TT24R 10KB		BRTY0182103
VR005	Semi-fixed	RT-182 TT24R1KB		BRTY0182102
VR006	Semi-fixed	RT-182 TT24R 10KB		BRTY0182103
VR007	Semi-fixed	RT-182 TT24R 100KB		BRTY0182104
VR008	Semi-fixed	RT-182 TT24R 100B		BRTY0182101
VR009	Semi-fixed	RT-182 TT24R1KB		BRTY0182102
VR010	Semi-fixed	RT-182 TT24R5KB		BRTY0182502
<b>MISCELLANEOUS</b>				
J003	Jack EXT Speaker	3P JK-089 HSJ0615		BJKY0089001
J004	Jack EXT Speaker	3P JK-089 HSJ0615		BJKY0089001
T001	Transformer	TF-374		BTFY0374001
X001	Crystal	10.2417 MHz QX-122 10.2417		BQXY0122001
X002	Crystal	10.6975 MHz QX-122 10.6975		BQXY0122002
FT001	Filter Crystal	FL-090 UMF-058(10.695)		BFLY0090001
TP006	Terminal Check Point	TP-044		BTPY0044001
TP007	Terminal Check Point	TP-044		BTPY0044001
TP008	Terminal Check Point	TP-044		BTPY0044001

## CONTROL PCB ASSEMBLY

REF. NO.	DESCRIPTION		RS PART NO.	MFR'S PART NO.
	<b>ASSEMBLY, PCB, CONTROL</b> Consists of the following:			AT549FPBEB
<b>CAPACITORS</b>				
The following codes indicate variations of capacitors against temperatures; <b>YA</b> = ± 5%, <b>YB</b> = ± 10%, <b>YD</b> = +20 -30%, <b>YE</b> = +20 -50% (-25 - +85°C), <b>ZF</b> = +30 -80% (-10 - +70°C), <b>CH</b> = 0 ± 60ppm/°C, <b>RH</b> = 220ppm/°C ± 60ppm/°C, <b>TH</b> = -470ppm/°C ± 60ppm/°C, <b>SL</b> = +350ppm/°C - -1000ppm/°C, <b>UJ</b> = -750ppm/°C ± 120ppm/°C				
C551	Electrolytic	1 μF 50 V ± 20% C-125		BCEQ811096Z
C552	Semi-conductor (SR)	0.01 μF 25 V ± 10%		BCGC511035Z
<b>DIODES</b>				
D551	LED	GL8PR21T(B)		BDAY0489002
D552	LED	GL8PR21T(B)		BDAY0489002
D553	LED	GL8PR21T(B)		BDAY0489002
D554	LED	GL8PR21T(B)		BDAY0489002
D555	LED	GL8PR21T(B)		BDAY0489002
<b>RESISTORS</b>				
R551	Carbon Formed Vert	100 ohm 1/6 W ± 5%		BRUB611014Z
R552	Carbon AX TS 26	22 k ohm 1/6 W ± 5% Taping		BRPA612234Z
R553	Carbon AX TS 26	6.8 k ohm 1/6 W ± 5% Taping		BRPA616824Z
R554	Carbon AX TS 26	10 k ohm 1/6 W ± 5% Taping		BRPA611034Z
R555	Carbon AX TS 26	680 ohm 1/6 W ± 5% Taping		BRPA616814Z
R556	Carbon AX TS 26	680 ohm 1/6 W ± 5% Taping		BRPA616814Z
R557	Carbon AX TS 26	680 ohm 1/6 W ± 5% Taping		BRPA616814Z
R558	Carbon Formed Vert	680 ohm 1/6 W ± 5%		BRUB616814Z
R559	Carbon Formed Vert	680 ohm 1/6 W ± 5%		BRUB616814Z
R560	Carbon AX TS 26	2.2 k ohm 1/6 W ± 5% Taping		BRPA612224Z
R561	Carbon AX TS 26	1.8 k ohm 1/6 W ± 5% Taping		BRPA611824Z
R562	Carbon AX TS 26	2.2 k ohm 1/6 W ± 5% Taping		BRPA612224Z
<b>SWITCHES</b>				
S553	Slide	SW-430 SSFU22-145K		BSWY0430001
S554	Slide	SW-430 SSFU22-145K		BSWY0430001
S559	Slide	SW-521 SKE23P-15.5K		BSWY0521001
<b>INTEGRATED CIRCUIT</b>				
IC551	LED Meter Driver	LB1423N		BDEY0430001

**LED PCB ASSEMBLY**

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
	<b>ASSEMBLY, PCB, LED</b> Consists of the following:		AT549FPBED
D351	Diode LED DR-202AL		BDAY0175001
D352	Diode LED TLR-124		BDAY0100001

**MIC JACK PCB ASSEMBLY**

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
	<b>ASSEMBLY, PCB, MIC JACK</b> Consists of the following:		AT549FPBEE
C401	Capacitor Ceramic 0.001 $\mu$ F 50 V $\pm$ 20% YD(D)		BCKD811026Z
C402	Capacitor Ceramic 0.001 $\mu$ F 50 V $\pm$ 20% YD(D)		BCKD811026Z
J402	Jack 4P JK-248		BJKY0248001
L401	Coil LD-244		BLDY0244001
L402	Coil Ferrite Read LD-077 BF03-1.8*5*0.7		BLDY0077001

**CH SW PCB ASSEMBLY**

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
	<b>ASSEMBLY, PCB, CH SW</b> Consists of the following:		AT549FPBEC
<b>RESISTORS</b>			
R301	Carbon Axial Lead		BRPB616814Z
R302	Carbon Formed Vert		BRUB616814Z
R303	Carbon Formed Vert		BRUB616814Z
R304	Carbon Axial Lead		BRPB616814Z
R305	Carbon Axial Lead		BRPB616814Z
R306	Carbon Formed Vert		BRUB616814Z
R307	Carbon Axial Lead		BRPB616814Z
R308	Carbon Formed Vert		BRUB616814Z
R309	Carbon Formed Vert		BRUB616814Z
R310	Carbon Axial Lead		BRPB616814Z
R311	Carbon Formed Vert		BRUB616814Z
R312	Carbon Formed Vert		BRUB616814Z
R313	Carbon Formed Vert		BRUB616814Z
R314	Carbon Axial Lead		BRPB616814Z
R315	Carbon Formed Vert		BRUB611024Z
<b>SWITCH</b>			
S301	SR-412		BSRY0412001



**MISCELLANEOUS**

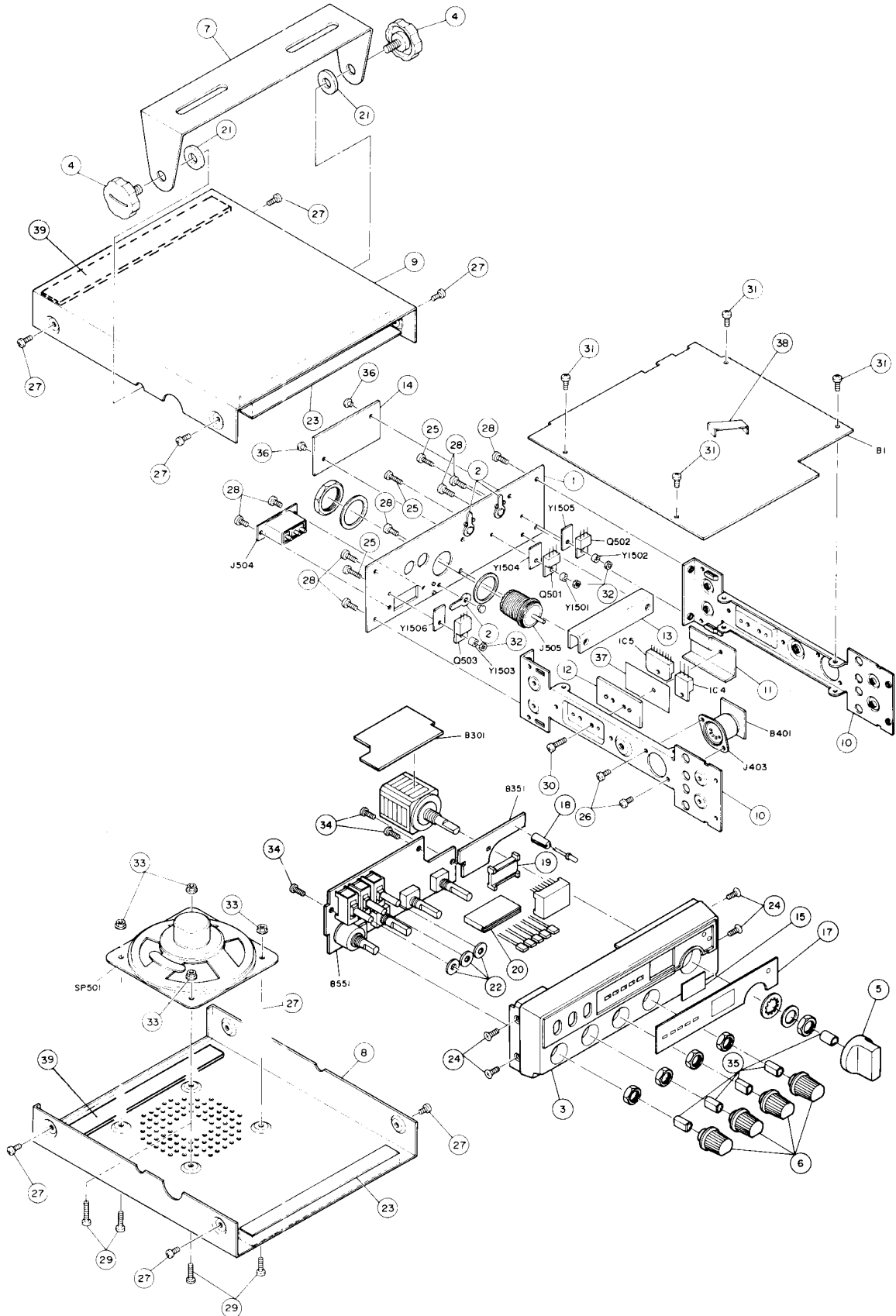
<b>REF. NO.</b>	<b>DESCRIPTION</b>	<b>RS PART NO.</b>	<b>MFR'S PART NO.</b>
B201	PC Board Check Point	PB-100AB	BPBY0100ABZ
C501	Capacitor Ceramic	0.001 $\mu$ F 50 V $\pm$ 20% YD(D)	BCKD811026Z
C502	Capacitor Ceramic	0.001 $\mu$ F 50 V $\pm$ 20% YD(D)	BCKD811026Z
D501	Varistor	MV-1Y	BDFY0020001
D502	Varistor	MV-1Y	BDFY0020001
J501	JACK Antenna Jack	JK-426 M-RM-L	BJKY0426001
J504	JACK Black 3P DC Power	JK-052 Black	BJKY0052002
Q501	Transistor Silicon NPN	DB-332 2SC2312-C	BDBC2312103
Q502	Transistor Silicon NPN	DB-331 2SC2166-C	BDBC2166103
Q503	Transistor Silicon PNP	DB-029 2SA1012-O	BDBA1012114
FC501	Flat Cable	WF-063 3- 60- 3	BWfy0630609
FC502	Flat Cable	WF-063 3- 70- 3	BWfy0630709
FC503	Flat Cable	WF-066 3- 70- 3	BWfy0660709
SP501	Speaker 16 ohm 3W	SP-057	BSPY0057001
VR501	Resistor Variable	RV-708 50KA	BRVY0708001
VR502	Resistor Variable	RV-650 VB12L PVB20F B50K	BRVY0650001
VR503	Resistor Variable	RV-679 10KB	BRVY0679001
VR504	Resistor Variable	RV-652 VB12L PVB20F B1K	BRVY0652001
YI501	Bushing Tight Ceramic	YY-172	BYYY0172001
YI502	Bushing Tight Ceramic	YY-172	BYYY0172001
YI503	Bushing Tight Ceramic	YY-172	BYYY0172001
YI504	Insulation Sheet	YY-027	BYYY0027001
YI505	Insulation Sheet	YY-027	BYYY0027001
YI506	Insulation Sheet	YD-041 AC223	BYDY0041001
F951	Fuse	FS-014 3A	BFSY0014309
MC951	Microphone	MK-215	BMKY0215001
WA950	Wires Assembled	W-070234A	CZDZ070234A
W002	Wire	UL 1007 -24 5- 60- 3 ORG	CUAC006021Z
W003	Wire	UL 1007 -24 5- 60- 3 RED	CUAB006021Z
W004	Wire	UL 1007 -24 3- 40- 3 BLK	CUAK004011Z
W005	Wire	UL 1007 -24 10- 40- 3 WHT	CUAJ004041Z
W006	Wire	UL 1007 -24 3-100- 3 YEL	CUAD010011Z
W007	Wire	UL 1007 -24 10- 50- 5 BLK	CUAK005042Z
W008	Wire	UL 1007 -24 10- 50- 5 WHT	CUAJ005042Z
W009	Wire	UL 1007 -24 5-140- 3 GRy	CUAH014021Z
W010	Wire	UL 1007 -24 5-140- 3 GRy	CUAH014021Z
W011	Wire	UL 1007 -24 10- 60- 3 BLK	CUAK006041Z
W012	Wire	UL 1007 -24 10- 50- 3 RED	CUAB005041Z

## SUBSTITUTION PARTS

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
	Capacitor Electrolytic	0.47 $\mu$ F 50 V $\pm$ 20% C-125	BCEQ814786Z or
	Capacitor Electrolytic	0.47 $\mu$ F 50 V $\pm$ 20% C-095	BCER814786Z
	Capacitor Electrolytic	47 $\mu$ F 10 V $\pm$ 20% C-124	BCAX114706Z or
	Capacitor Electrolytic	47 $\mu$ F 10 V $\pm$ 20% C-126	BCAG114706Z
	Capacitor Electrolytic	1 $\mu$ F 50 V $\pm$ 20% C-125	BCEQ811096Z or
	Capacitor Electrolytic	1 $\mu$ F 50 V $\pm$ 20% C-095	BCER811096Z
	Capacitor Electrolytic	22 $\mu$ F 10 V $\pm$ 20% C-124	BCAX112206Z or
	Capacitor Electrolytic	22 $\mu$ F 10 V $\pm$ 20% C-126	BCAG112206Z
	Capacitor Electrolytic	47 $\mu$ F 6.3 V $\pm$ 20% C-125	BCEQ904706Z or
	Capacitor Electrolytic	47 $\mu$ F 6.3 V $\pm$ 20% C-095	BCER904706Z
	Capacitor Electrolytic	10 $\mu$ F 16 V $\pm$ 20% C-125	BCEQ311006Z or
	Capacitor Electrolytic	10 $\mu$ F 16 V $\pm$ 20% C-095	BCER311006Z
	Capacitor Electrolytic	2.2 $\mu$ F 50 V $\pm$ 20% C-124	BCAX812296Z or
	Capacitor Electrolytic	2.2 $\mu$ F 50 V $\pm$ 20% C-126	BCAG812296Z
	Capacitor Electrolytic	1 $\mu$ F 50 V $\pm$ 20% C-124	BCAX811096Z or
	Capacitor Electrolytic	1 $\mu$ F 50 V $\pm$ 20% C-126	BCAG811096Z
	Capacitor Electrolytic	47 $\mu$ F 10 V $\pm$ 20% C-125	BCEQ114706Z or
	Capacitor Electrolytic	47 $\mu$ F 10 V $\pm$ 20% C-095	BCER114706Z
	Capacitor Electrolytic	100 $\mu$ F 10 V $\pm$ 20% C-124	BCAX111016Z or
	Capacitor Electrolytic	100 $\mu$ F 10 V $\pm$ 20% C-126	BCAG111016Z
	Capacitor Electrolytic	0.22 $\mu$ F 50 V $\pm$ 20% C-124	BCAX812286Z or
	Capacitor Electrolytic	0.22 $\mu$ F 50 V $\pm$ 20% C-126	BCAG812286Z
	Capacitor Electrolytic	10 $\mu$ F 16 V $\pm$ 20% C-124	BCAX311006Z or
	Capacitor Electrolytic	10 $\mu$ F 16 V $\pm$ 20% C-126	BCAG311006Z
	Capacitor Electrolytic	4.7 $\mu$ F 25 V $\pm$ 20% C-125	BCEQ514796Z or
	Capacitor Electrolytic	4.7 $\mu$ F 25 V $\pm$ 20% C-095	BCER514796Z
	Capacitor Electrolytic	4.7 $\mu$ F 35 V $\pm$ 20% C-124	BCAX664796Z or
	Capacitor Electrolytic	1 $\mu$ F 50 V $\pm$ 20% C-126	BCAG811096Z
	Diode Silicon	1S1555	BDAY0181001 or
	Diode	1N4148	BDAY0246001 or
	Diode	1S2075K	BDAY006300
	Diode AX TS 26	+ S5566G Taping	BDAY0529001 or
	Diode	1N4003	BDAY013300
	Coil	LE-376 L-3E6-5(R22-E528)	BLEY0376001 or
	Coil	LE-096 8 1/2T	BLEY009600
	Coil	LE-375 D6 7 1/2T	BLEY0375001 or
	Coil	LE-093 7 1/2T	BLEY009300
	Coil	LC-218	BLCY0218001 or
	Coil	LC-072	BLCY007200
	Coil	LE-377 L-2E4-5(R22-529)	BLEY0377001 or
	Coil	LE-187 D4.0 7T	BLEY018700
	Coil	LE-403 L-1E3-S(R22-E709X)	BLEY0403001 or
	Coil	LE-188 D3.0 7T	BLEY018800
	Transistor Silicon PNP	DB-106 2SB525-C UNI	BDBB0525103 or
	Transistor Silicon PNP	DB-106 2SB525-D UNI	BDBB0525104 or
	Transistor	DB-106 2SB525-E UNI	BDBB0525105
	Transformer	TF-374	BTFY0374001 or
	Transformer AF CHOKE	TF-083	BTFY008300

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
	Capacitor Electrolytic		BCEQ811096Z or
	Capacitor Electrolytic	1 $\mu$ F 50 V $\pm$ 20% C-125	BCER811096Z
	Capacitor Electrolytic	1 $\mu$ F 50 V $\pm$ 20% C-095	BDAY0489002 or
	Diode LED	GL8PR21T(B)	BDAY0489001 or
	Diode LED	GL8PR21T(A)	BDAY0489003
	Diode LED	GL8PR21T(C)	BLDY0244001 or
	Coil	LD-244	BLDY0238001 or
	Coil	LD-238 L-303W(R22-E564)	BLDY009900
	Coil	LD-099 6.0U 23T	BDFY0020001 or
	Varistor	MV-1Y	BDFY006300
	Varistor	MV-1YHU	BJKY0426001 or
	JACK Antenna Jack	JK-426 M-RM-L	BJKY006800
	JACK Antenna Jack	JK-068 N-7512	

# EXPLODED VIEW



## MECHANISM PARTS LIST

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
1	Chassis, Rear ALP 2.0T Non Oil		ECSR315676B
2	Terminal, Lug Solder D3.2 x 14		TSTD0150007
3	Panel, Front, ABS INST CLR Paint Silk		GCMF292212Z
4	Screw, Mounting, ABS INST CLR Black		GMSC405736Z
5	Knob, Channel, ABS CR		GNBC493017Z
6	Knob, ABS CR		GNBY415683Z
7	Mounting Bracket SPCC 1.6T ZMC-3		HBCT314529Z
8	Cover, Bottom, Vinytop SB-K08		HCMB315681A
9	Cover, Top, Vinytop SB-K08 Black		HCMT314531A
10	Chassis, Side, SPCC, 1.0T ZMC		HCSS381270A
11	Holder, IC (B) SECC 1.2T Non Oil		HHDE415679A
12	Holder, IC (A) ALP 2T Non Oil		HHDE481271Z
13	Heat Sink, ALP 2T		HHSK415680Z
14	Plate, FCC ALP 1T (for USA Model)		JDPF392213Z
	Plate, DOC ALP 1T (for Canada Model)		JDPF392323Z
	Plate, Rear ALP 1T (for Australia Model)		JDPF392326Z
15	Optical Filter, Display Acryl, 1.0T, Purple		KDPC405265Z
16	— Not Used —		
17	Plate, Display, Polycarbonate 0.5T Black		KDPT492214Z
18	Holder, LED, EPT Black H = 9.5		LHDL414936Z
19	Holder, LED, EPT Black		LHDL413243Z
20	Holder, LED, EPT Rubber		LHDL414799Z
21	Washer, Rubber, Neoprene, Black 7 x 15 x 2.0T		LWSR400638Z
22	Blind, Himelon, 0.3T, Black (for USA Model)		RBLD413766Z
23	Wool-Coated Paper, Wool Tack, 10 x 150 x 0.3T		RUTC403865Z
24	Screw, Machine Flat HD M3 x 5 NI		SSCW133005N
25	Screw, Machine Bind HD M2 x 12 NI		SSCW192012N
26	Screw, Machine Bind HD M2.6 x 4 NI		SSCW192604N
27	Screw, Machine Bind HD M3 x 5 BNI		SSCW193005B
28	Screw, Machine Bind HD M3 x 6 NI		SSCW193006N
29	Screw, Machine Bind HD M3 x 8 BNI		SSCW193008B
30	Screw, Machine Bind HD M3 x 12 NI		SSCW193012N
31	Screw, Taptight Bind HD M3 x 6 NI		SSCW343006N
32	Nut, Hex, M2 NI		SSCW430020N
33	Nut, Flange, M3 ZMC		SSCW480030Z
34	Screw, P Tight Bind HD D3 x 8 NI		SSCW803008N
35	Spring Plate, Knob D6.02 x L9.53		TSTD0200003
36	Rivet, AL, ID Plate D3.2 x 3.2		TSTD021323Z
37	Insulation Plate, Mylar 0.1T		RZEB416622A
38	Shield Plate, SPTE 0.3T Non Oil		HSDP403852Z
39	Cushion Neoprene SP 1.5T		RCUN491956Z
ACC1	Hanger, Microphone SPCC 1.0T NI		HHMG402919Z
ACC2	Screw, Tapping Round HD D3.5 x 8 NI		SSCW293508N
ACC3	Screw, Tapping Round HD D5 x 10 NI		SSCW295010N
ACC4	Washer, Lock, D3.5 NI		SSCW530035N

REF. NO.	DESCRIPTION	RS PART NO.	MFR'S PART NO.
ACC5	Washer, Star, D5 NI Label, Warning, DC Cord Paper Print Label, Production Date Paper Label, Fuse (3A) Tetron Film 0.05T Panel Ass'y, Front (Ref. No. 3, 15 & 17) Bracket Ass'y, Mounting (Ref. No. 4, 7 & 21) Case Ass'y, Bottom (Ref. No. 8, 23 & 39) Case Ass'y, Top (Ref. No. 9, 23 & 39) Chassis Ass'y, Rear (Ref. No. 1, 2, 14 & 36) Knob Ass'y, Channel (Ref. No. 5 & 35) Knob Ass'y, Vol./Clarifier/RF Gain/Squelch (Ref. No. 6 & 35) Hardware Kit (Ref. No. 24~36 & ACC2~5)		SSCW540050N PLBC419000Z PLBS414512A PLBZ416603Z FPNL549FPASY BRKT549FPASY CVBM549FPASY CVTP549FPASY CHSS549FPASY CNOB549FPASY NBVL549FPASY  HDWR549FP

(Ref. No. in this Mechanical Parts List corresponds with the number in Exploded View.)

# VOLTAGE CHART

Symbol No.	Name	T/RX	Base Gate	Collector Drain	Emitter Source
Q1		RX NB ON	0.8	5.3	0
Q2		RX NB ON	0.8	2.6	0
Q3		RX NB ON	2.6	6.8	1.9
Q4		RX NB ON	0.8	7.2	0.2
Q5		RX NB ON	0.4	1.3	0.9
Q6		RX NB ON	6.6	0	7.2
Q7		RX NB ON	0	0	0
Q8		RX	0.4	8.1	0
Q9		RX SSB	0.7	0	0
Q10		RX	0.7	0	0
Q11		RX	1.6	4.7	1
Q12			0 0.7	0 0	0 0
Q13		RX	2.1	6.8	1.4
Q14		RX	0	6.5	2.8
Q15		RX	1.5	8	0.7
Q16		RX	0.7	3.3	0
Q17		RX	3.3	6.3	2.6
Q18		RX	2.6	6.4	1.8
Q19		RX AM SSB	0.7 0	0 3	0 6
Q20		RX TX	0.7	5.7	0.5
Q21		RX TX	3	6.9	2.5
Q22		RX TX	0.7	4.4	0

Symbol No.	Name	T/RX	Base Gate	Collector Drain	Emitter Source
Q23		RX TX	4.3	5.6	3.6
Q24		RX TX	0.4 2.9	0.5 6.8	0 2.3
Q25		TX	1.7	3.2	1
Q26		TX	0.8	1.7	0.3
Q27		TX	0.6	0	0
Q28		TX	7.5	1.3	8
Q29		TX	1.1	7.5	4.4
Q30		PA	2.4	4.6	1.8
Q31		RX TX	7.8 0.2	8 8.1	7.2 0.7
Q32		RX TX	4.9 0.8	7.8 0.2	4.7 0
Q33		RX TX	8 8.1	0 7.9	7.9 7.3
Q34		TX SSB	0	7.5	1.4
Q35		TX	1.3	7.9	0.6
Q36		TX	5.6	12.3	5.1
Q37		TX	13	5	12.3
Q38		TX AM SSB	0 0.7	13.1 0	0 0
Q538		TX AM SSB	0.5 0.6	5 13.5	0 0
Q539		TX AM SSB	0.7 0.7	5 13.6	0 0
Q544		TX AM SSB	13 13	5 13.6	13.8 13.9

**Measurement Conditions:**

Power supply voltage: 13.8V

Test equipment: Digital voltmeter HP3476A

Measurement channel: 190H

Unless otherwise specified, set controls as follows:

MODE: AM

SQ: MIN

ANL/NB: OFF

RF GAIN: MAX.

CLARIFIER: CENTER

Symbol No.	T/RX	Pin No.	Voltage
IC1	RX	1	—
		2	0.2
		3	0.1
		4	0.1
		5	0
		6	1.2
		7	1.5
		8	0
		9	8
IC2	RX/TX	1	5.1
		2	0
		3	0
		4	5.1
		5	5.1
		6	0
		7	5.1
		8	—
		9	—
		10	1.7
		11	5.2
		12	2.5
		13	2.5
14	—		
15	5.2		
16	5.1		
17	1.6		
18	1.6		
19	3.5		
20	—		
21	0		
22	2.3		

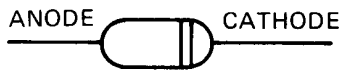
Symbol No.	T/RX	Pin No.	Voltage
IC3	RX/TX	1	0
		2	3.3
		3	3.2
		4	0
		5	5.8
		6	7.3
		7	3.7
IC4	RX/TX	1	8.1
		2	0
		3	13.6
IC5	RX	1	0.1
		2	1.9
		3	1.3
		4	0
		5	0
		6	7
		7	12.7
		8	13.8
IC6	TX	1	7.8
		2	—
		3	—
		4	—
		5	0
		6	2.8
		7	4.1
		8	4.1
		9	7.5

Symbol No.	T/RX	Pin No.	Voltage
IC551	RX/TX	1	1.5
		2	1.5
		3	1.5
		4	1.5
		5	0
		6	1.7
		7	2.9
		8	0.4
		9	8.0

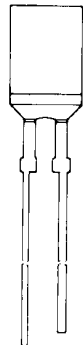


# SEMICONDUCTOR LEAD IDENTIFICATION

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S5566G  
MC-301  
1SV73-EB  
HZ3B-3  
HZ5C-1  
1S1555

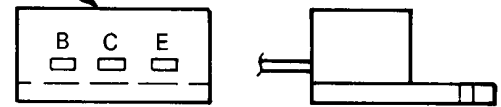


LED GL-8PR21T

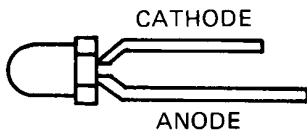


2SA1012-O  
2SC2166-C  
2SC2312-C

MARKING SIDE



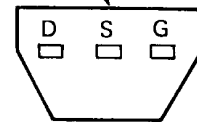
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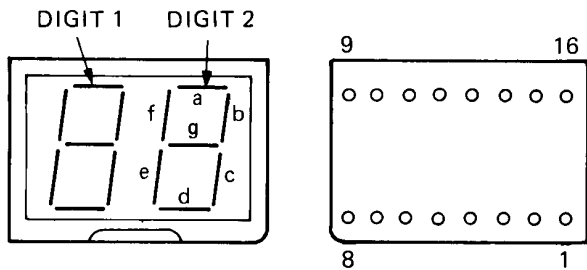
ANODE CATHODE

2SK192A

MARKING SIDE



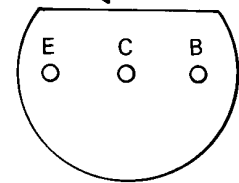
DR-202AL



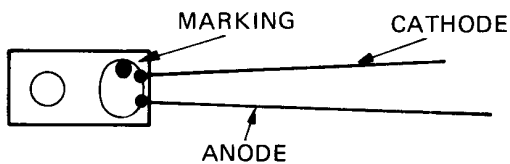
Pin No.		Pin No.	
1	c-1	9	g-2
2	e-1	10	a-2
3	d-1	11	f-2
4	common-1	12	b-2
5	common-2	13	b-1
6	d-2	14	f-1
7	e-2	15	a-1
8	c-2	16	g-1

2SA733-P  
2SC945A-Q  
2SC1674-L  
2SC1675-L  
2SC1730-L  
2SC1973-SSB  
2SC3242A-E

MARKING SIDE

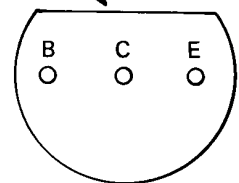


MV-1Y



2SB525-C

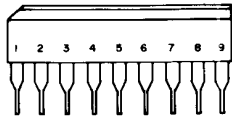
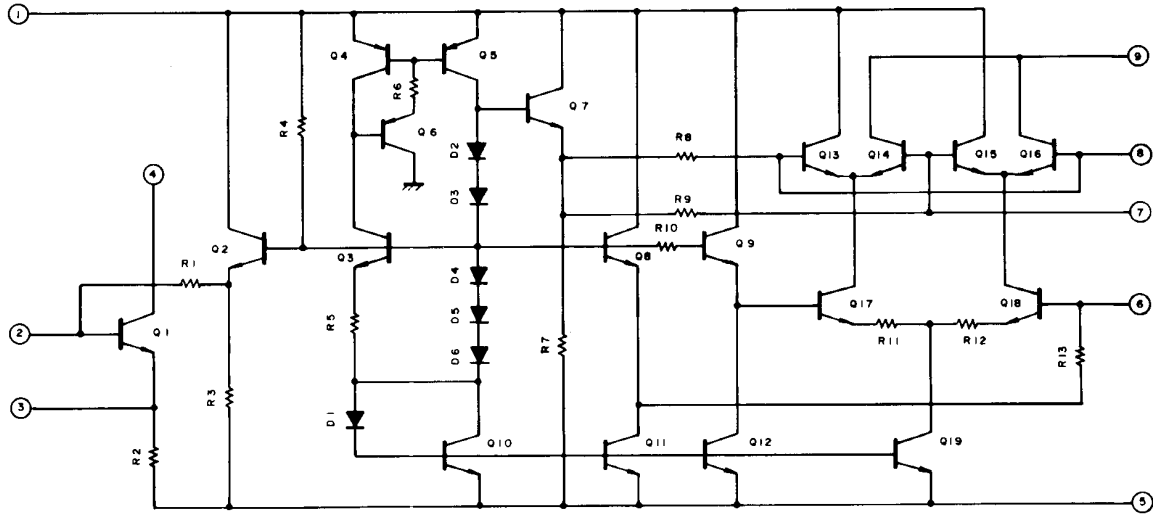
MARKING SIDE



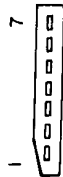
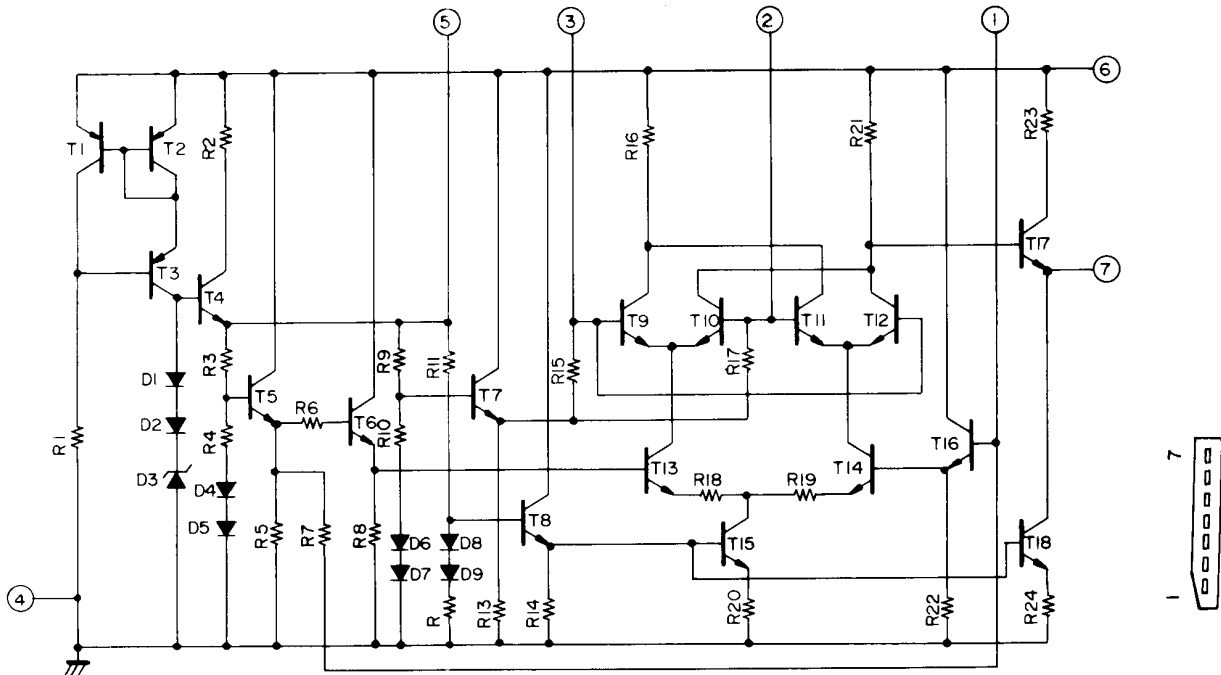
E: Emitter  
C: Collector  
B: Base

# IC INTERNAL DIAGRAMS

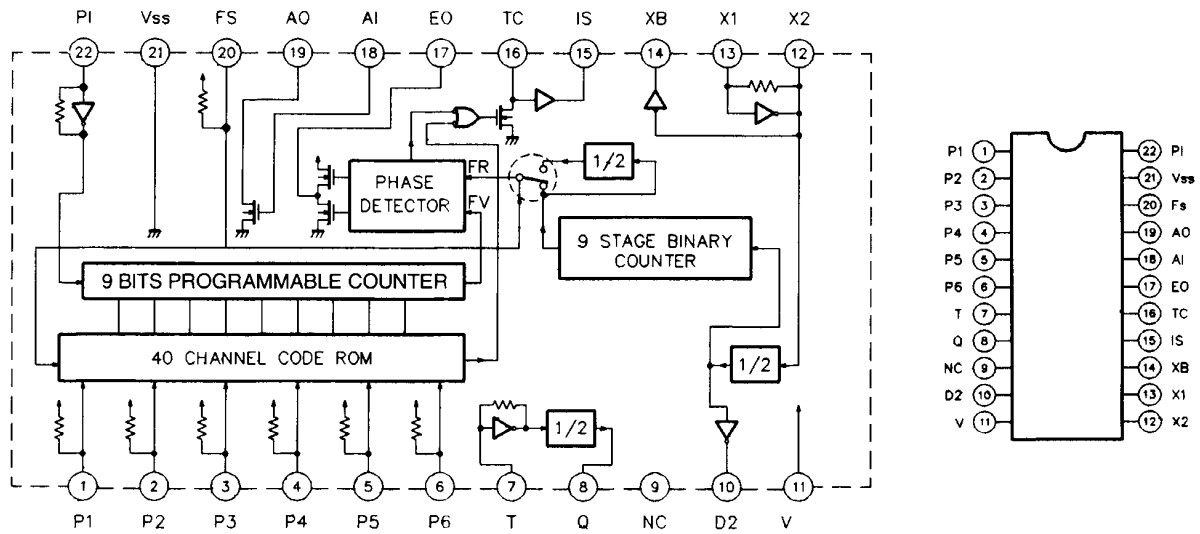
IC6, TA7320P



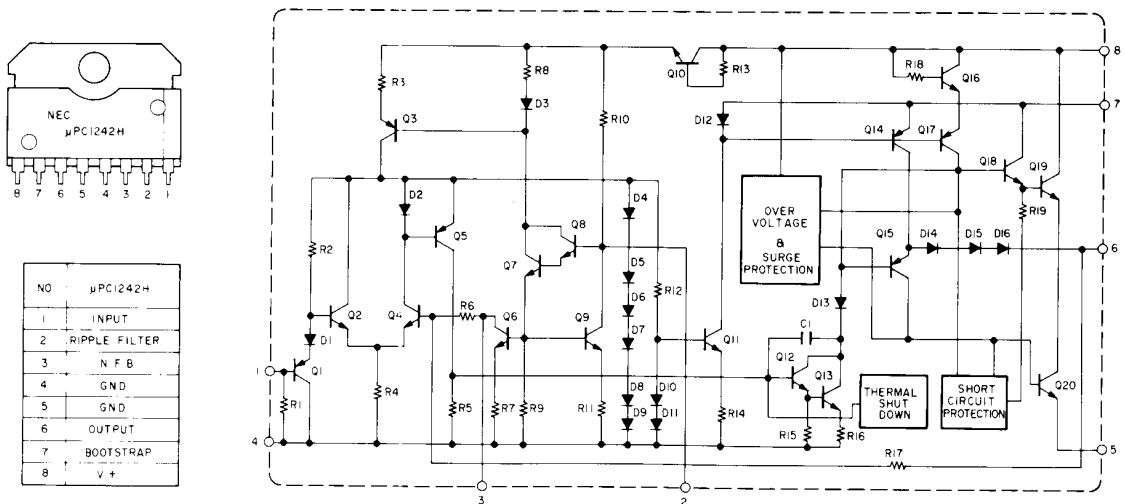
IC3, AN612



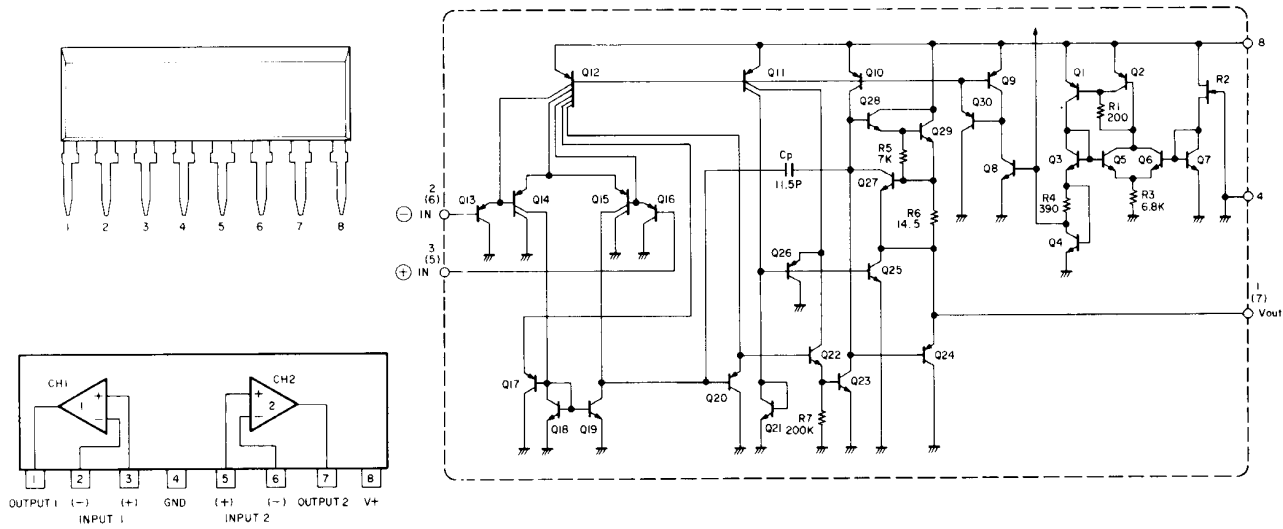
## IC2, D2824C



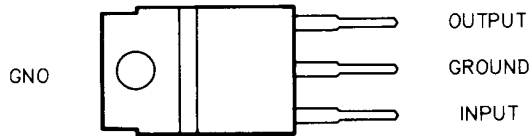
## IC5, $\mu$ PC1242H



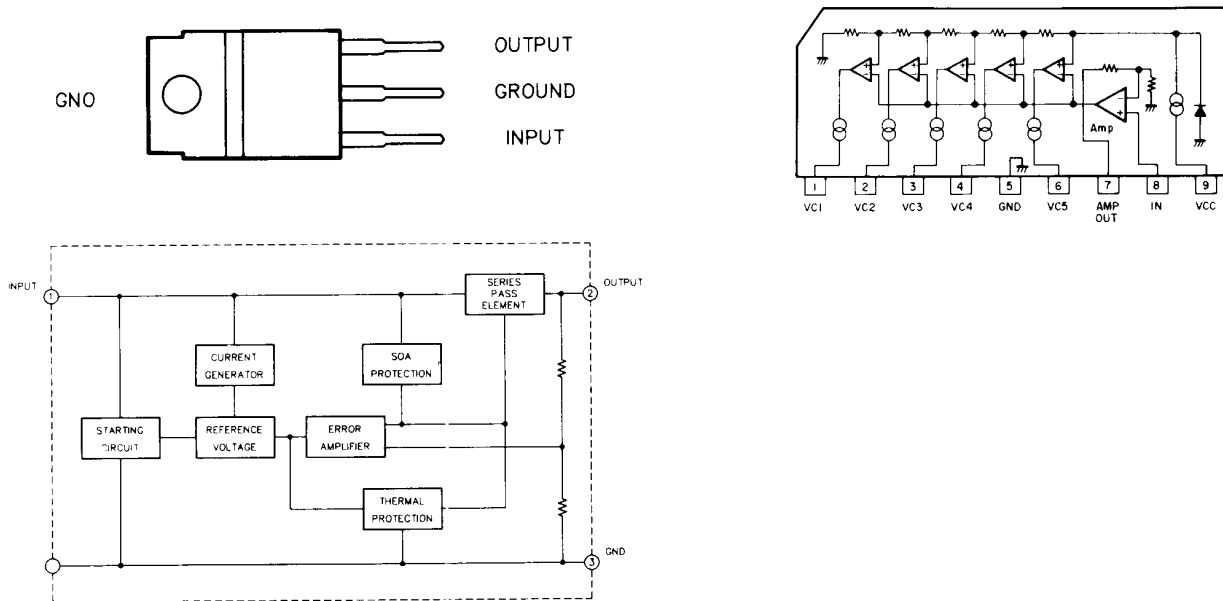
**IC1, M5223L**



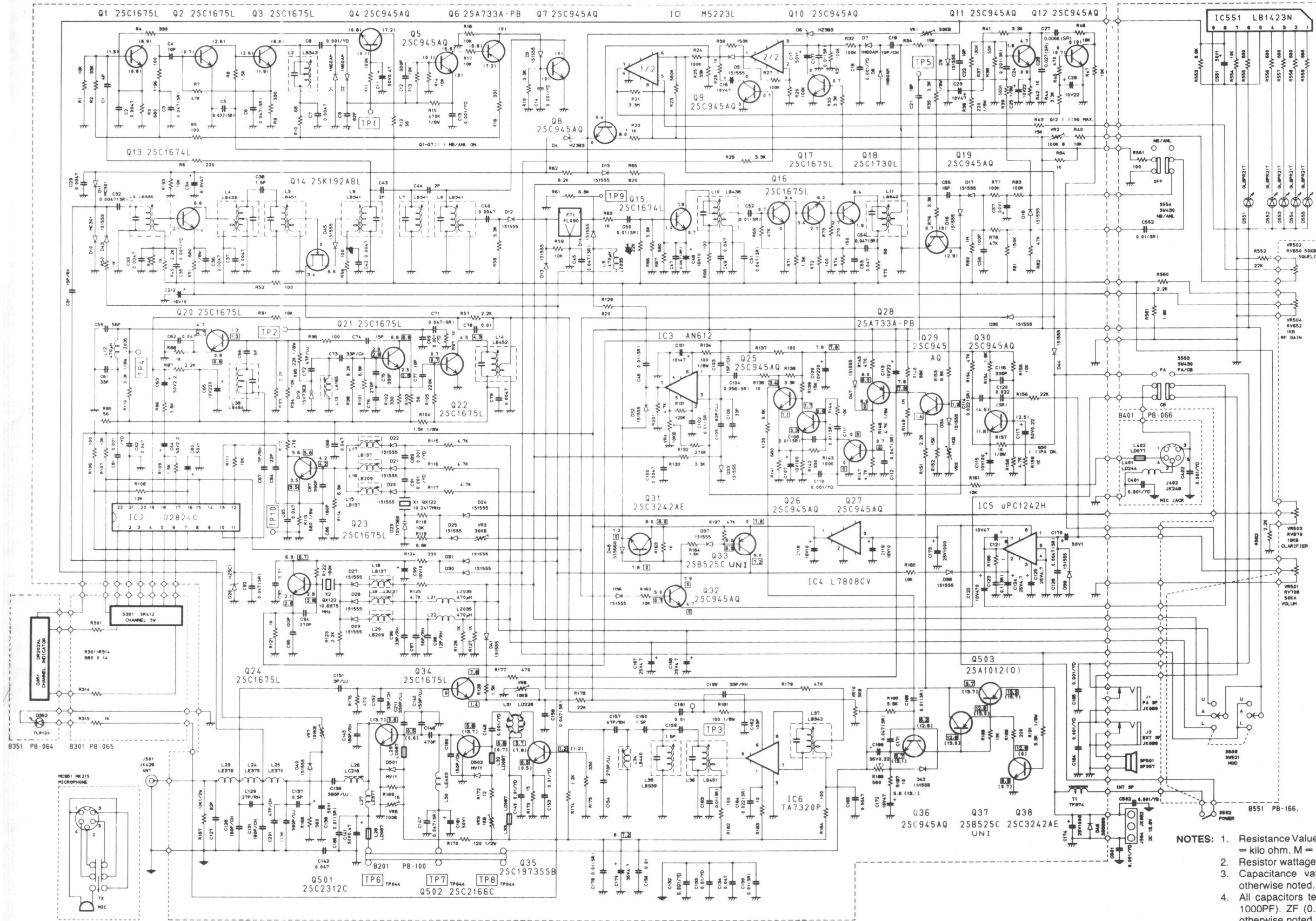
**IC4, L7808CV**



**IC551, LB1423N**



# SCHEMATIC DIAGRAM



- NOTES:**
1. Resistance Values are shown in ohms unless otherwise noted. (K = kilo ohm, M = meg ohm)
  2. Resistor wattages are 1/6W unless otherwise noted.
  3. Capacitance values are indicated in micro farads unless otherwise noted. (P = micro micro farad)
  4. All capacitors temperature (characteristics are SL (less than 1000PF), ZF (0.047  $\mu$ F) or YF (0.001  $\mu$ F — 0.039  $\mu$ F) unless otherwise noted.
  5. DC Voltage in   shows TX AM condition.
  6. DC Voltage in [ ] shows TX SSB condition.
  7. DC Voltage in no mark shows RX condition.
  8. DC Voltage in ( ) shows RX condition under operation of each function.