

# 19 DX II

## (Service Manual)

Subject	Page	Issue No.	Application
SPECIFICATION	2	AA	19 DX II
OPERATING INSTRUCTIONS	4	AA	19 DX II
THRORY OF OPERATION	5	AA	19 DX II
THROUBLESHOOTING HINTS	11	AA	19 DX II
TEST EQUIPMENT SETUP AND ALIGNMENT INSTRUCTIONS	12	AA	19 DX II
BLOCK DIAGRAM	16	AA	19 DX II
SCHEMATIC DIAGRAM	17	AA	19 DX II
PLL CIRCUIT BLOCK DIAGRAM	15	AA	19 DX II
SEMI CONDUCTOR LEAD IDENTIFICATION AND IC INTERNAL CONNECTIONS	18	AA	19 DX II
TOP VIEW OF PCB BOARD	19	AA	19 DX II
BOTTOM VIEW OF PCB BOARD	20	AA	19 DX II
VOLTAGE CHART	21	AA	19 DX II
EXPLODED VIEW AND EXPLODED VIEW PARTS LIST	23	AA	19 DX II
PARTS LIST	25	AA	19 DX II
ISSUE NO. & DATE	AA (02/11/2000)		

# SPECIFICATION

## GENERAL

Transmitter.....Crystal controlled PLL synthesizer, amplitude modulation  
 Receiver.....Crystal controlled double conversion, superheterodyne system  
 Communicating frequency.....40 CB channels (26.965 to 27.405 MHz)  
 Voltage operation.....12-16V DC (negative ground)  
 Temperature and Humidity range.....-22°F ~ +140°F (-30°C ~ +60°C) at 10% ~ 90%  
 Transmitter/ Receiver switching.....Electrical

## STANDARD TEST CONDITIONS

Battery supply voltage.....13.8V DC  
 Modulation.....1000 Hz, 30%  
 Receiver output power.....500mW at external SP  
 Receiver output impedance.....8 ohms, non-inductive  
 ANT. load impedance of transmitter.....50 ohms, non-inductive  
 Ambient conditions  
   Temperature.....63°F ~ +73°F (17°C ~ 23°C)  
   Humidity.....40% ~ 70%

## TRANSMITTER

Description	Nominal	Limit
RF power output.....	4.0 watts	3.6~4.4 watts
Antenna spurious emission.....	70 dB	60 dB
Modulation capability (positive/ negative).....	+90%/-90%	+80%/-80%
AMC Range at 1 KHz.....	40 dB	30 dB
Frequency accuracy.....	±300 Hz	±500 Hz
Spurious accuracy & Harmonic		
Signal radiation ratio from fundamental.....	-65 dB	-60 dB
Current consumption		
at no modulation.....	1000 mA	1100 mA
at 80% modulation.....	1500 mA	1900 mA
Envelope distortion.....	10% max. 1000 Hz, 50% mod.	
Stability variation against antenna impedance.....	Satisfactory when dummy antenna is varied from 40 ohms to 200 ohms.	

## RECEIVER

Description	Nominal	Limit
Intermediate frequency		
1st IF.....	10.695 MHz	
2nd IF.....	455 KHz	
Sensitivity at 10 dB (S+N)/N.....	0.5 $\mu$ V	1.0 $\mu$ V
Adjacent channel rejection.....	40 dB	60 dB
Image rejection (1st IF/ 2nd IF).....	70 dB	60 dB
IF rejection ratio (1st IF/ 2nd IF).....	70 dB	60 dB
Signal-to-Noise ratio at 1mV input.....	45 dB	5%
Distortion at 1mV input, 30% mod. (500 mW output).....	2%	75 dB
Power output at 1mV input		
Undistorted (10% THD).....	4.0W	3.0W
Maximum.....	5.0W	4.0W
Electrical fidelity compared to 1000 Hz		
450 Hz.....	-6 dB	-6 dB $\pm$ 6 dB
2500 Hz.....	-6 dB	-6 dB $\pm$ 6 dB
Cross modulation.....	50 dB	40 dB
Squelch.....	1000 $\mu$ V	250~4000 $\mu$ V
Current consumption at no signal.....	200 mA	100 mA

## OTHER ITEMS

Fuse.....	1 Amps/ 250V
General power requirement.....	12-16V DC
Dimensions.....	109(W) X 33(H) X 162(D) milliliter
Weight.....	1 lbs 7 ozs (0.65 kg)

**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.

# OPERATING INSTRUCTIONS

Having properly installed and wired your new CB and connected the antenna, you are now ready to adjust your radio for optimum reception and voice transmission.

1. Insert the microphone cord plug into the microphone jack(mic). Push inward and tighten th locking nut provided on the end of the cord. When removing the microphone, unscrew the locking nut and pull out the microphone plug.

2. Turn the power "ON".

3. SEt to the desired channel.

4. Adjust the squelch control knob to reduce any undesirable background noise when no signal is being received. To do this, select a channel where no signals are present, or wait unit signal cease on your channel. Then rotate the squelch control knob to a point where the background noise ceases.

Note: When the squelch is set properly, the speaker will remain quiet until a signal is received. In order to receive weak signals, do not squelch too high.

5. Adjust the volume to the desired listening level.

6. To connect an optional external speaker, locate the external speaker jack on the rear of the unit and insert the speaker plug into the jack. The radio's speaker will be disconnected when an external speaker is engaged.

## To Transmit/To Receive

Press and hold the push-to-talk bar. Speak slowly and clearly in a normal voice, two to three inches from the microphone. A built-in modulation control circuit will automatically adjust the microphone input level. There is no need to speak loudly. To Receive-release the push-to-talk bar.

## PA System and optional PA speaker Operation

To use the public Address system feature, you must install a remote mounted (outside of the vehicle) PA speaker(not supply). After the speaker is installed and wiring completed to the rear panel of the radio insert the speaker's wire connector plug into the "PA-Speak" jack. To activate the PA system, manually switch from the "CB" mode to the "PA" mode. At this time you will no longer be able to send, or receive CB transmission. You are now ready to broadcast through the PA system using the radio's microphone and the volume control. When finished, switch back to the "CB" mode.

# THEORY OF OPERATION

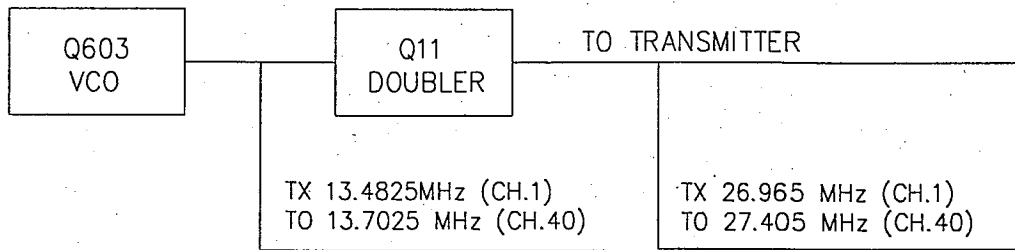
## 1. INTRODUCTION

The transmitter frequency and the receive first and second local oscillator are all derived from a signals 10.240 MHz crystal by means of a phase locked loop.

The transmitter frequency is from 26.965 MHz with first local oscillator is fixed at 10.240 MHz to yield a second IF at 455 MHz.

During transmit the VCO of the PLL operates from 13.4825 MHz (CH.1) to 13.7025 MHz (CH.40)

The VCO frequency is doubler Q11, which doubles the frequency to yield 26.965 MHz (CH.1) to 27.405 MHz (CH.40).



The VCO operating frequency of the receiver oscillates 16.270 MHz (CH.1) to 16.710 MHz (CH.40) as the first local oscillator. And is injected through buffer AMP Q601 into first mixer Q103.

## 2. BASIC SYNTHESIS SCHEMATIC

The crystal frequency (10.240 MHz) is divided by 4096 to yield 2.5 KHz which is fed to one side the phase detector. The VCO output is divided by a programmable divider. And fed to other side the phase detector. The feedback loop is closed by passing the phase detector output thru an active low pass filter and using the output to control the VCO frequency thru varicap D601. The net result is a second order phase locked loop.

Under locked condition. The frequency to both sides of phase detector must be identical at 2.5 KHz. The VCO frequency is then given by:

$$F_{VCO} / N = 0.0025 \text{ MHz} \quad \text{or} \quad F_{VCO} = 0.0025 * N \text{ MHz}$$

Since N is integer, The VCO frequency can be stepped up in 2.5 KHz increment. By suitable choice of the desired output frequency are obtained.

	CHANNEL 1		CHANNEL 40	
	N	FVCO	N	FVCO
TRANSMIT	5393	13.4825	5481	13.7025
RECEIVE	3254	16.2700	3342	16.7100

(SEE TABLE 1 FOR OTHER CHANNELS)

The VCO frequency is doubler input which then doubles the frequency.

	VCO OUTPUT FREQUENCY	DOUBLER OUTPUT FREQUENCY
TRANSMIT	CH 1 , 13.4825 MHz	26.965 MHz
TRANSMIT	CH 40 , 13.7025 MHz	27.405 MHz

For the first local oscillation, the buffer amp output is supplied. Since all frequencies are obtained from the crystal oscillator by linear processed all outputs are coherent with the crystal oscillator frequency and maintain the same percentage accuracy.

**PROGRAM DATA & FREQUENCY (TABLE 1)**

CHANNEL	FREQUENCY (MHz)	RX (TX=1)		TX (TX=0)	
		N	Fvco	N	Fvco
1	26.965	6508	16.27	5393	13.4825
2	26.967	6512	16.28	5395	13.4875
3	26.985	6516	16.29	5397	13.4925
4	27.005	6524	16.31	5401	13.5025
5	27.015	6528	16.32	5403	13.5075
6	27.025	6532	16.33	5405	13.5125
7	27.035	6536	16.34	5407	13.5175
8	27.055	6544	16.36	5411	13.5275
9	27.065	6548	16.37	5413	13.5325
10	27.075	6552	16.38	5415	13.5375
11	27.085	6556	16.39	5417	13.5425
12	27.105	6564	16.41	5421	13.5525
13	27.115	6568	16.42	5423	13.5575
14	27.125	6572	16.43	5425	13.5625
15	27.135	6576	16.44	5427	13.5675
16	27.155	66584	16.46	5431	13.5775
17	27.165	6588	16.47	5433	13.5825
18	27.175	6592	16.48	5435	13.5875
19	27.185	6596	16.49	5437	13.5925
20	27.205	6604	16.51	5441	13.6025
21	27.215	6608	16.52	5443	13.6075
22	27.225	6512	16.53	5445	13.6125
23	27.255	6624	16.56	5451	13.6275
24	27.235	6616	16.54	5447	13.6175
25	27.245	6620	16.55	5449	13.6225
26	27.265	6628	16.57	5453	13.6325
27	27.275	6632	16.58	5455	13.6375
28	27.285	6636	16.59	5457	13.6425
29	27.295	6640	16.60	5459	13.6475
30	27.305	6644	16.61	5461	13.6525
31	27.315	6648	16.62	5463	13.6575
32	27.325	6652	16.63	5465	13.6625
33	27.335	6656	16.64	5467	13.6675
34	27.345	6660	16.65	5469	13.6725
35	27.355	6664	16.66	5471	13.6775
36	27.365	6668	16.67	5473	13.6825
37	27.375	6672	16.68	5475	13.6875
38	27.385	6676	16.69	5477	13.6925
39	27.395	6680	16.70	5479	13.6975
40	27.405	6684	16.71	5481	13.7025

### 3. DETAILED DESCRIPTION

(SEE FREQUENCY SYNTHESIZER BLOCK DIAGRAM AND SCHEMATIC)

#### (1) INSTRUCTION

The synthesizer is implemented with the following components;

- PLL IC (IC1)
- X-TAL (X1)
- Varactor Diode (D601)
- LED Display (LED)

IC1 is a COMS LSI that includes most of PLL block the VCO with varicap diode D601 as part of the oscillator tank circuit. Q602 is a switching transistor to connect or disconnect the tuning capacitor C609 in the VCO oscillator tank circuit for transmitter or receiver.

#### (2) Reference Frequency

The crystal, X1(10.240 MHz) and other components at Pin 9 and of IC1 form an oscillator with an amplifier internal to IC1.

#### (3) VCO

Q603 is connected as a hartley type oscillator with varicap diode as part of the tank circuit. With appropriate control voltage on D601, the VCO can be made to oscillate over the required range of 13.4825 MHz to 16.710 MHz

#### (4) Programmable Divider and Its Control

The programmable inputs (7-segment code) are fed to pins 1 to 7 IC1. The programmable input consists of a 7-segment code to light channel indicator LED (LED Display). For CH. 1 "b" and "c" of the LED element of LED display will light. The programmable input "b" goes low to produce CH.1 device (RX:N=3254, TX:N=5393)

For each channel number input an internal code converter provides the appropriate binary control to the programmable divider for that channel. Since the binary number required is different during transmit and receive, an additional bit is required at pin 18 of IC1 to allow the rom to recognize the TX/RX status. Pin 22 is internally tied to plus 5 volts which is the receive status.

During transmit the pulse to talk switch rounds pin 22 thru diode (D12,D13) which is the transmit status.

The programmable divider output is fed to the phase detector for comparison with the 2.5 KHz reference. See table 1 for actual input and device ratio on all channels.

#### (5) Phase Detector and Control

The phase detector is a digital phase comparator which compares the leading edges of the reference with programmable divider output square waves and develops a series of pulses whose DC level depends on the phase error is leading. The phase detector pulse output is fed to a charge pump and then to pin 16 of IC1. The charge pump output is fed to an active low pass filter which consists of R20,R608,C20 and the amplifier between pin 14 and 15 of IC1. The low pass filter output at pin 14 of IC1 is further filtered and fed to varicap D601 control the VCO frequency.

The result is a second order PLL with loop dynamics essentially controlled by the active low pass filter.



#### (6) Transmit/Receive, Buffer AMP

The VCO output is fed into buffer AMP Q601 from the secondary of L4.

#### (7) Transmitter Doubler

The Q603 output is obtained as emitter follower output tank circuit is double transistor Q11. At this stage, the frequency is doubled. Q11 output tank circuit is double tuning circuit (27MHz) L5 and L6 to stop the 13.5 MHz frequency.

#### (8) Switching of Tuning Capacitor in VCO Oscillator Tank Circuit

The VCO circuit must tune with a wide range of frequencies 13.4825~13.7025 MHz for transmitter and 16.27 MHz~16.710 MHz for receiver. The use of one tuning capacitor in common has adverse effects as a decrease in C in the tuning circuit and the occurrence of many spurious signals. To eliminate these effects, the tuning capacitance is switched for transmission or reception. The circuit consists of the primaries of L4, C602, C609. When receiving Q602 becomes off. So, primary of L4, and make tuning function.

When transmitting, Q602 becomes on. So the primary of L4 and the parallel capacitance of C603 and C609 make tuning function.

#### (9) Receiver Local Oscillator Outputs

##### First Mixer:

The secondary output of VCO tank circuit L4 is injected through buffer AMP Q601 and the emitter follower output through the base of 1st mixer Q103.

##### Second Mixer:

The oscillation output oscillated with 10.240 MHz crystal X1 across pin9 and 10 of IC1 is output from pin9 and injected into the base of Q201.

### 4. FREQUENCY STABILITY

LET : FO = Crystal Oscillator Frequency

FR = Phase Detector Reference

FVCO = VCO Frequency

FT = Transmit Frequency

THEN : FR = FO/4096

and under locked conditions : Fr = VCO / N

where N is the programmable divider ration.

THEN : FVCO = N = FR = N(FO/4096)

From which it can be seen that the percentage error in FT is the percentage error in FO. The stability of the oscillator is determined primarily by the crystal and to a lesser extent by the active and passive components of the oscillator.

He choice of crystal and components is such that the required stability is maintained over the required voltage and temperature range.

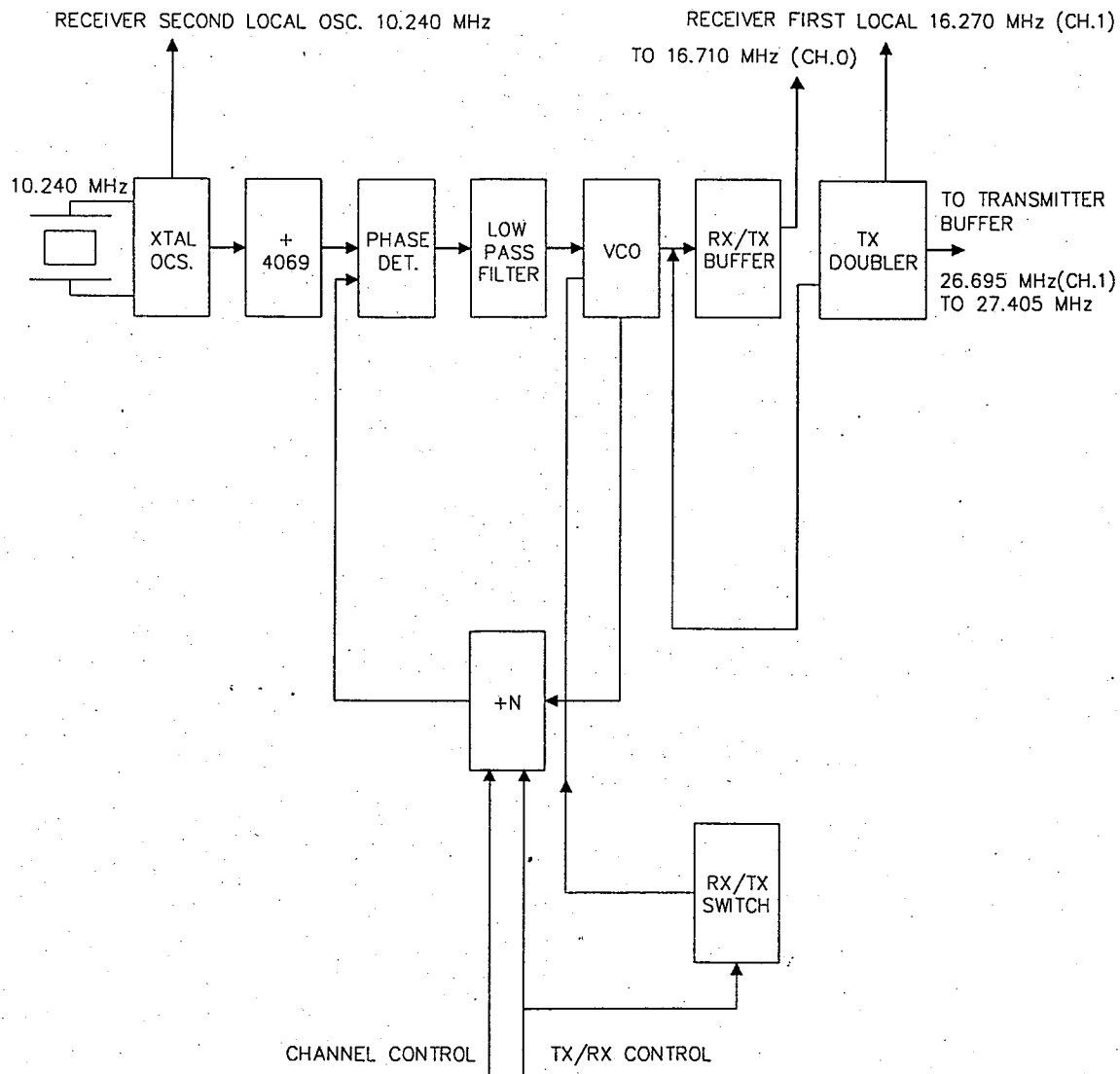
#### Receiver

The receiver is a double conversion super heterodyne with the first IF at 10.965 MHz and the second IF at 455 KHz. The synthesizer local oscillator 10.965 MHz below the receiver frequency and the second local oscillator at 10.240 MHz.

The detector output provides AGC to all previous stage except Q204.

Squelch is controlled by Q10.

# PLL CIRCUIT BLOCK DIAGRAM



## TROUBLESHOOTING HINTS

Symptom	Probable Cause	Remedy
Unit does not work at all	<ul style="list-style-type: none"> <li>• Defective power switch VR102.</li> <li>• Blown fuse</li> <li>• Broken DC power cord</li> </ul>	<ul style="list-style-type: none"> <li>• Replace</li> <li>• Replace</li> <li>• Replace</li> </ul>
No output from speaker at all	<ul style="list-style-type: none"> <li>• Defective external speaker jack</li> <li>• Poor connection on microphone connector</li> <li>• Defective push switch on microphone</li> <li>• Defective internal speaker</li> </ul>	<ul style="list-style-type: none"> <li>• Repair or Replace</li> <li>• Repair or Replace</li> <li>• Repair or Replace</li> <li>• Replace</li> </ul>
No noise on speaker	<ul style="list-style-type: none"> <li>• Measure all the voltage of Q101, Q102, Q103, Q104, Q105, Q106 and IC2. Compare with voltage chart on the page (21~22).</li> <li>• Defective squelch circuit components. (RV1, VR2, IC2, Q203, Q206, Q207)</li> </ul>	<ul style="list-style-type: none"> <li>• Replace</li> <li>• Replace</li> </ul>
Squelch does not work	<ul style="list-style-type: none"> <li>• Defective RV2, Q203, Q206 or Q207.</li> <li>• Improperly adjusted RV2</li> </ul>	<ul style="list-style-type: none"> <li>• Replace the defective components</li> <li>• Readjust</li> </ul>
No modulation	<ul style="list-style-type: none"> <li>• Defective microphone</li> <li>• Poor audio output and defective modulation microphone amplifier components Q201, Q202, IC 2</li> <li>• Defective microphone connector component</li> <li>• Defective ALC circuit Q202, Q204, Q205, D4</li> </ul>	<ul style="list-style-type: none"> <li>• Replace</li> <li>• Replace the defective components(s)</li> <li>• Replace</li> <li>• Replace the defective components(s)</li> </ul>
LED display does not work	<ul style="list-style-type: none"> <li>• Defective Orange wire fuse</li> <li>• Defective LED display IC1, Q501, Q502</li> </ul>	<ul style="list-style-type: none"> <li>• Replace</li> <li>• Replace</li> </ul>
Channel selector does not work	<ul style="list-style-type: none"> <li>• Defective IC1, SW1</li> </ul>	<ul style="list-style-type: none"> <li>• Replace</li> </ul>

# TEST EQUIPMENT SETUP AND ALIGNMENT INSTRUCTIONS

## 1. PHASE LOCKED LOOP AND CPU SECTION

### A. Test Equipment Required

- Frequency Counter
- DC Power Supply
- DC Voltmeter
- Oscilloscope

### B. Alignment Procedure

Step	Setting	Connection	Adjust	Adjust for
1	Frequency adjustment — MIC: Receive Volume: Optional Squelch: Optional CH Selector: Optional	Frequency counter to output pin 19 of IC1 (Figure 1).	C512	10.240 MHz $\pm$ 100 Hz
2	RX VCO voltage adjustment — MIC: Receive Volume: Optional Squelch: Turn Clockwise CH Selector: 1	Connect DC voltmeter between R514 and RF516 (Figure 2).	L6	2.5 V
3	TX VCO voltage adjustment — MIC: Transmit Volume: Optional Squelch: Optional CH Selector: 1	Connect DC voltmeter between R514 and RF516 (Figure 2).	L6	Indication on DC voltmeter must be 2~2.5 volt. If DC voltmeter does not indicate 2~2.5 volt, readjust L6.

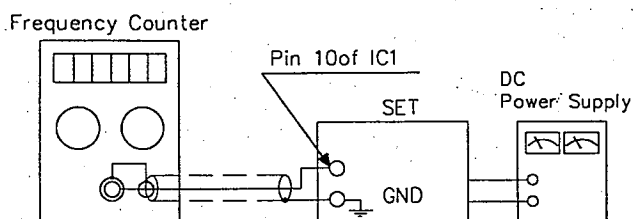


Figure 1

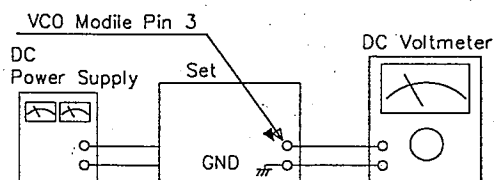


Figure 2

## 2. Transmitter Section

### A. Test Equipment Section

- RF Power Meter (RF SSVM)
- 50 ohm load (non-inductive)
- RF Attenuator
- Oscilloscope
- Audio generator
- DC power supply
- Spectrum analyzer
- Frequency counter
- Coupler

### B. Alignment Procedure

Step	Setting	Connection	Adjust	Adjust for
1	RF driver stage — MIC: Transmit Volume: Optional Squelch: Optional CH Selector: 19	Connect RF power meter to base of Q13 (Figure 3).	L7 L8	Maximum indication on the RF power meter.
2	RF power stage — MIC: Transmit Volume: Optional Squelch: Optional CH Selector: 19	Connect dummy load and RF power meter to the EXT-ANT jack on the set (Figure 4).	L9 L12	Maximum indication on the RF power meter (4 watts). If indication is not in 4 watts range, go back to step 1 and readjust L9, L12.
3	Modulation adjustment — MIC: Transmit Volume: Optional Squelch: Optional CH Selector: 19	Connect audio generator (1 KHz) to pin 4 of microphone jack (Figure 5). Connect dummy load and oscilloscope through coupler to RF power meter. Connect RF power meter to EXT-ANT jack on the set. Adjust audio signal level to obtain 80%~90% of the modulation level.	RV2	Proper modulation pattern on the oscilloscope.
4	Second harmonic check — MIC: Transmit Volume: Optional Squelch: Optional CH Selector: 19	Connect the input terminal of RF power meter to the EXT-ANT jack on the set through the -40dB attenuator and the output terminal to the spectrum analyzer through the dummy load/coupler (Figure 6).		At no modulation, compare the level of fundamental frequency to the level of harmonic frequency. Suppression of the 2nd harmonic frequency level must be lower than -60dB. Check for the other channels.
5	Frequency check — MIC: Transmit Volume: Optional Squelch: Optional CH Selector: 19	Connect dummy load and frequency counter through coupler to RF power meter. Connect RF power meter to EXT-ANT jack on the set (Figure 7).	C512	Be sure that the indication of the transmitter frequency is 27.185 MHz $\pm$ 300 Hz on the frequency counter.

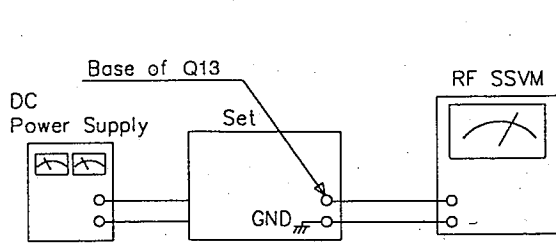


Figure 3

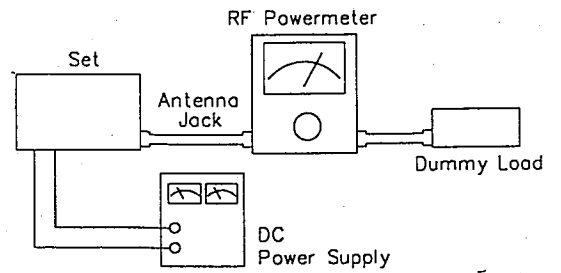


Figure 4

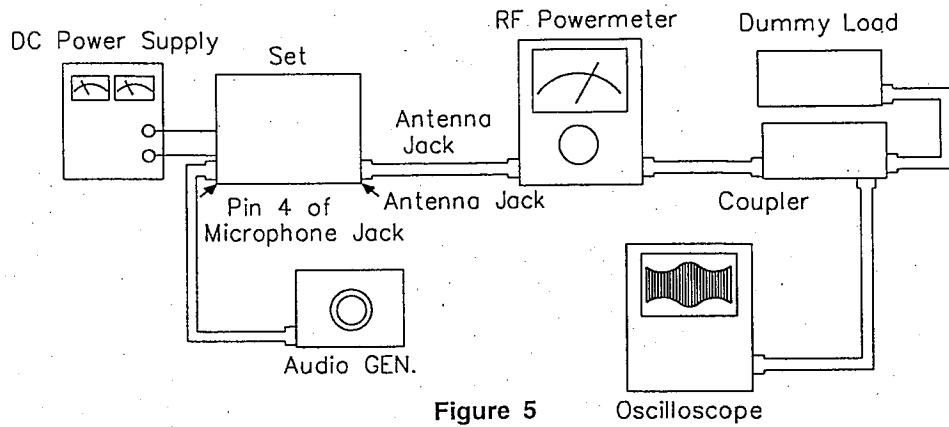


Figure 5

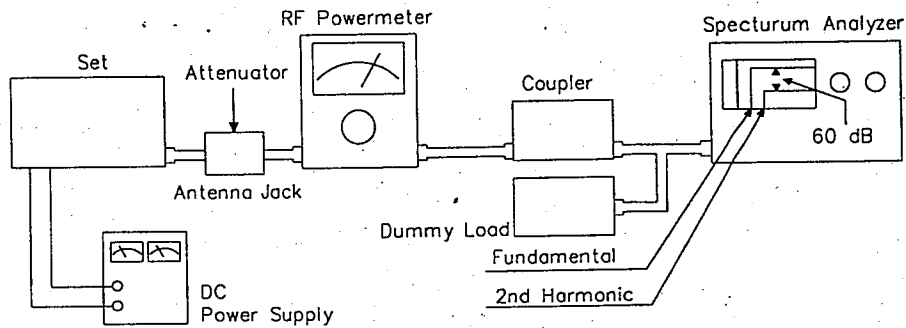


Figure 6

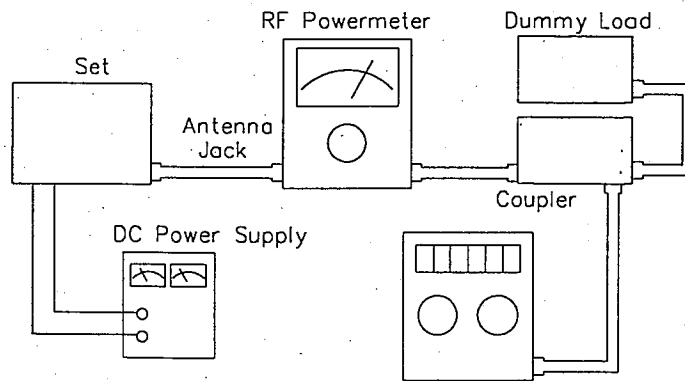
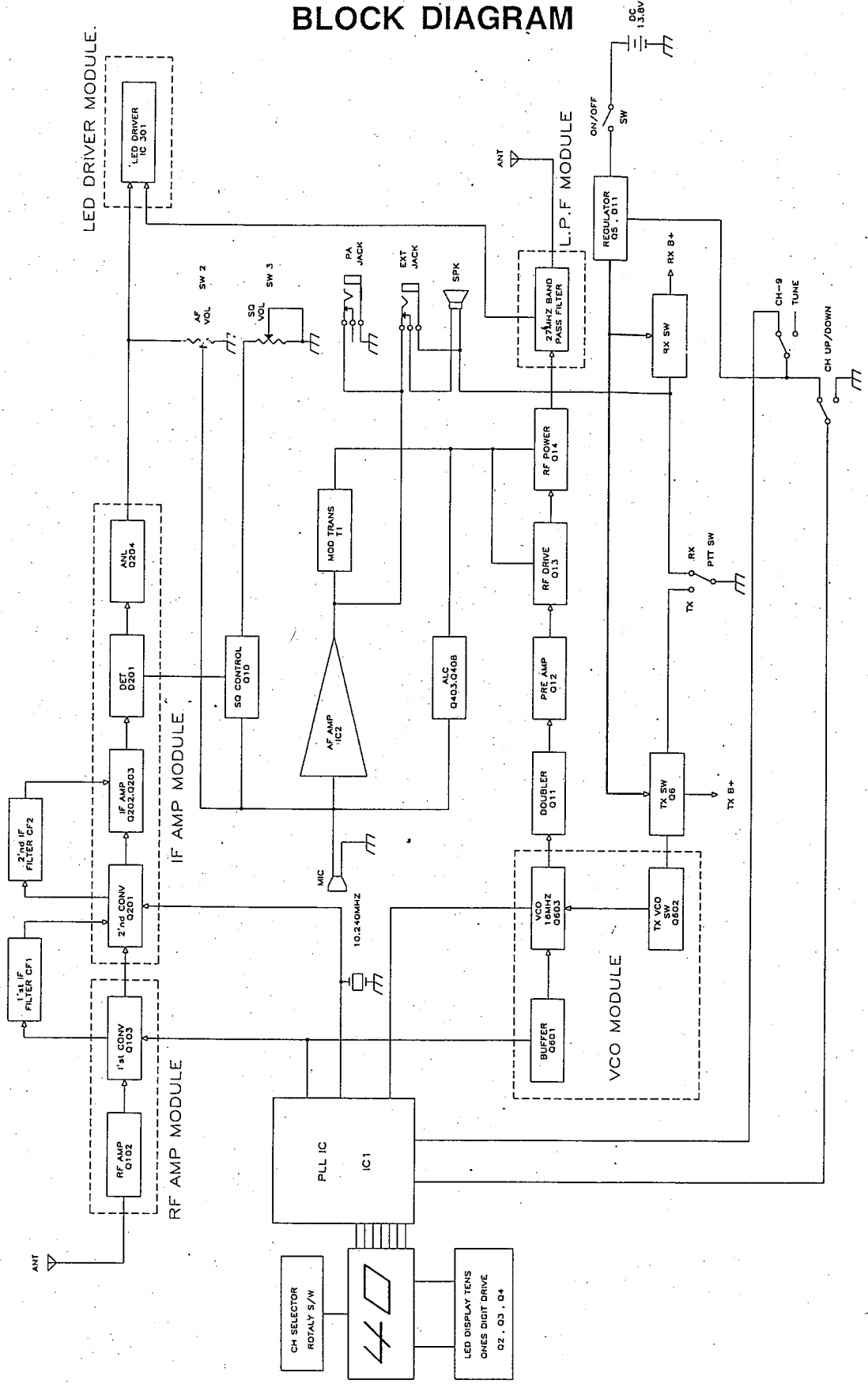


Figure 7

Frequency Counter



# BLOCK DIAGRAM

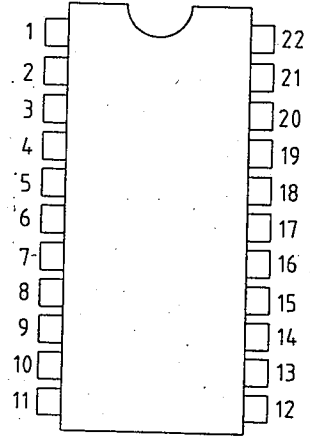
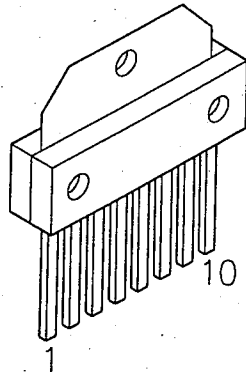




# SEMICONDUCTORS LEAD IDENTIFICATION AND IC INTERNAL DIAGRAM

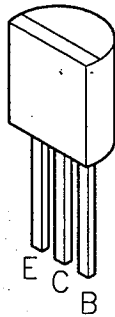
## 1.IC

KIA 7217AP

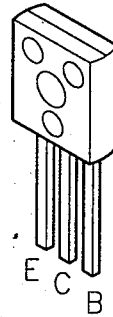


## 2.TR

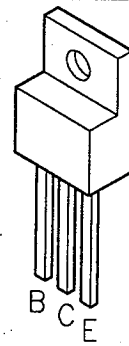
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KTC 3198  
KTC 3194



KTC1006

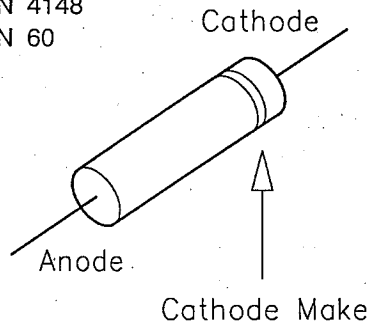


KTC2078

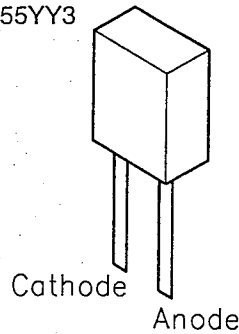


## 3.DIODE

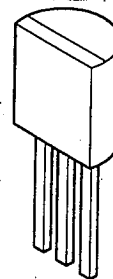
IN 4004  
IN 4148  
IN 60



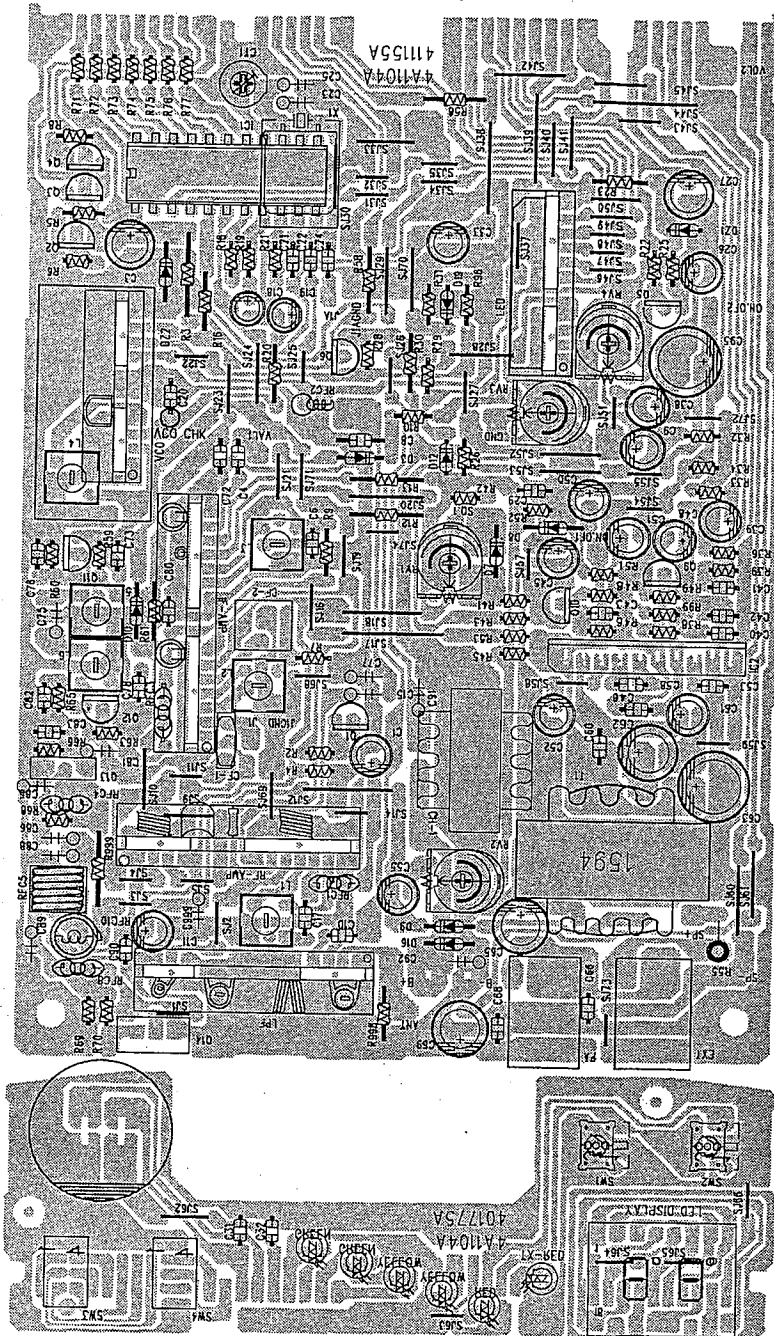
SLB 55V123 RED  
SLB 55HG3  
SLB 55YY3



MV 2209



# TOP VIEW OF PCB BOARD





# VOLTAGE CHART

## 1. TR's

Ref No.	RX			TX		
	E	B	C	E	B	C
Q1	0	0.77	0.14	0	0.41	0
Q2	5.26	5.08	4.82	5.24	5.07	4.79
Q3	5.27	4.82	3.53	5.25	4.80	3.49
Q4	5.25	5.04	3.28	5.25	5.03	3.26
Q5	8.52	13.66	9.23	8.44	12.42	9.20
Q6	8.53	8.52	0	3.44	7.71	8.38
Q8	5.70	6.35	13.54	5.70	6.35	13.15
Q9	0	0	0	0	0	0
Q10	0	3.52	0.2	0	3.39	0.1
Q11	0	0	0	1.27	2.02	8.4
Q12	0	0	13.94	1.24	2.1	13.25
Q13	0	0	17.2	0	0	15.6
Q14	0	0	15.3	0	0	13.6

## 2. IC

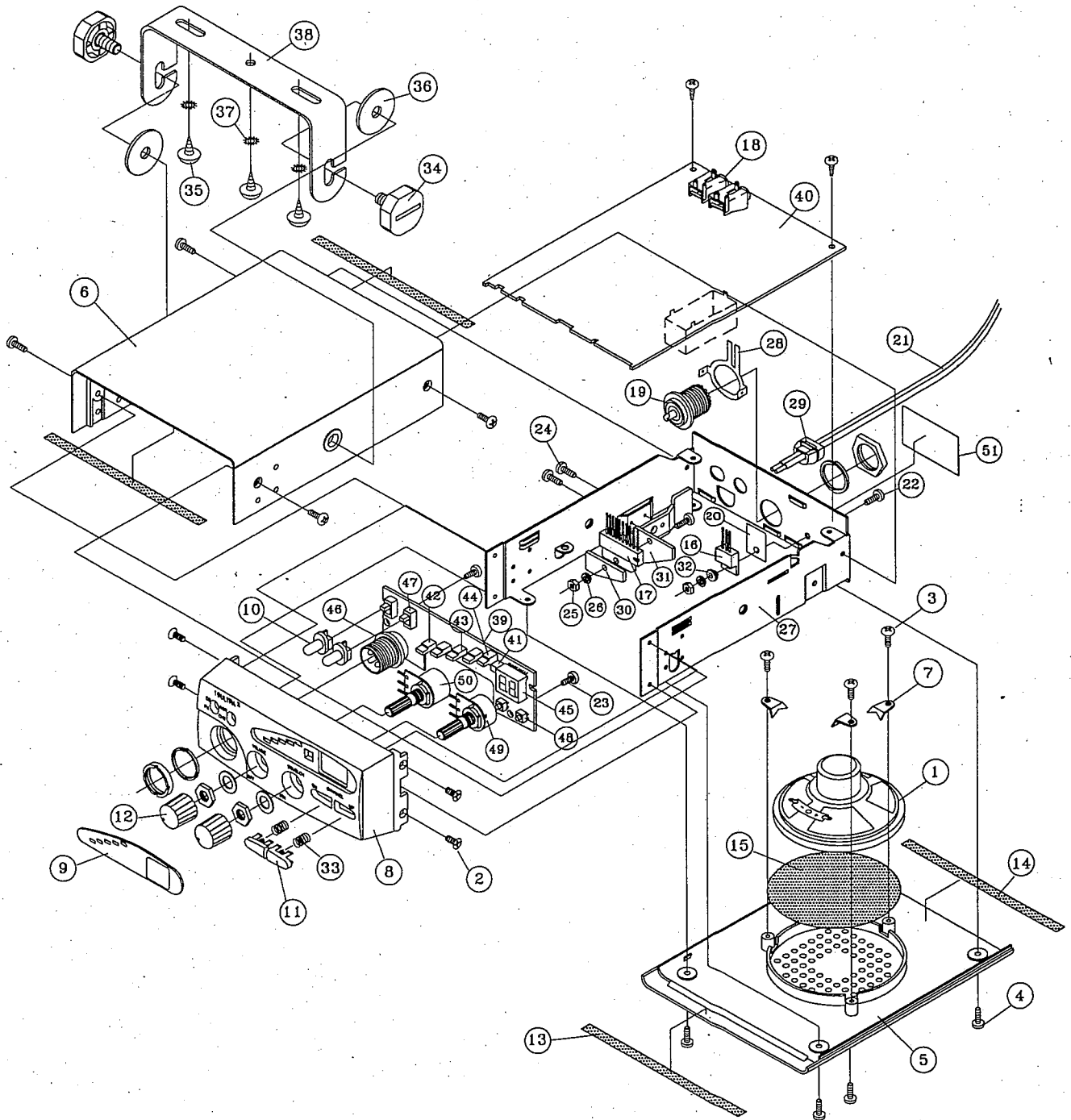
IC No.	Pin	RX	RX
IC1	1	3.31	3.31
	2	0.96	0.96
	3	0.97	0.97
	4	3.30	3.30
	5	5.70	5.70
	6	3.28	3.28
	7	3.28	3.28
	8	0	0
	9	2.78	2.78
	10	2.73	2.73
	11	0	0

IC No.	Pin	RX	RX
IC1	12	2.57	2.54
	13	5.69	5.69
	14	2.59	2.24
	15	2.94	2.96
	16	2.94	2.96
	17	2.11	4.95
	18	0	4.81
	19	0.06	0.06
	20	2.98	2.98
	21	N.C	N.C
	22	2.92	2.92

IC No.	Pin	RX	RX
IC2	1	14.12	13.68
	2	12.88	12.44
	3	4.09	3.98
	4	8.43	8.22
	5	1.49	1.49
	6	3.51	3.41
	7	3.53	3.42
	8	1.26	1.26
	9	0	0
	10	7.16	6.94
RF AMP	1	0	0
	2	0	0
	3	13.95	12.80
	4	6.15	0.82
	5	0.91	0.43
	6	0.93	0.41
	7	0	0
	8	0.23	0
	9	0.15	0
	10	0.24	0
	11	0	0
IF AMP	1	0	0
	2	0.79	0
	3	4.95	0.82
	4	4.94	.82
	5	1.15	0.43
	6	6.15	0.82
	7	0.93	0.41
	8	N.C	N.C
	9	13.81	12.81

IC No.	Pin	RX	RX
IF AMP	10	0	0
	11	0.18	0.1
	12	0.55	0.11
	13	0.55	0.12
	14	0	0
LPF	1	0	0
	2	0	0
	3	0	0
	4	0	0
	5	0	0
	6	0	0
	7	13.01	13.35
VCO	1	0	0
	2	0	0
	3	2.75	2.49
	4	0	0
	5	8.55	8.47
	6	2.0	1.77
	7	0	8.41
	8	0	0
LED Driver	1	0	0
	2	0	1.64
	3	0	6.5
	4	0	0.13
	5	12.81	11.68
	6	12.62	11.63
	7	12.44	11.60
	8	12.44	11.56
	9	12.59	11.53
	10	14.11	13.68

# EXPLODED VIEW AND EXPLODED VIEW OF PARTS LIST



No.	Part No.	Part Name & Description	Q'ty
1	420-105-7	Speaker Bohm 0.3 W 66MM R-250	1.000
2	611-086	(+)Machine Screw(FH) 2.6X4 Zn-Plat	4.000
3	623-265	(+)Tapping Screw (BH) 3X6-2S Zn-Plat	3.000
4	633-170	(+)Taptite Screw (BH) 3X8 BLK	8.000
5	717-290	Cover Bottom ABS 94 HB BLK	1.000
6	717-296	Cover Upper ABS BLK	1.000
7	730-176	Holder (SPK. MTG)	3.000
8	801-315-A	E.S.C ABS 94 HB L380-9001	1.000
9	814-240-A	Lens PC t1.0	1.000
10	826-333	Knob Slide ABS 94 HB	2.000
11	826-334	Knob Push ABS 94 HB	2.000
12	826-335-A	Knob Volume ABS 94 HB	2.000
13	901-031	Felt 6X110Xt0.3 Felt Stic.	2.000
14	901-032	Felt 6X110Xt0.5 Felt Stic.	2.000
15	901-226	Felt ø65Xt0.3 Felt BLK	1.000
16	202-057-5	Transistor KTC2078	1.000
17	222-006-4	I.C KIA721AP	1.000
18	420-705-1	Jack Earphone	2.000
19	421-046-7	Connector CH-239(A) SW-1229	1.000
20	440-004-0	Mica For TR MTG	1.000
21	504-734	Power Cord Ass'y	1.000
22	613-332	(+)Machine Screw (BH) 3X10 Zn-Plat	2.000
23	621-159	(+)Tapping Screw (BH) 2.6X8 Zn-Plat	2.000
24	623-265	(+)Tapping Screw (BH) 3X6-2S Zn-Plat	4.000
25	651-024	Nut SS41 M3-1S Zn-Plat	2.000
26	662-305	Washer (Spring)	2.000
27	702-005-A	Body Main EGI t1.0 U.S Coating	1.000
28	730-478	Holder (ANT MTG) SPC Ni-Plat	1.000
29	750-039	Cord Stopper Nylon66 BLK	1.000
30	760-704	Heat Sink (IC MTG)	1.000
31	761-576	Heat Sink ALP3 t2.0	1.000
32	853-105	Bushing Nylon66 Glass	1.000
33	880-880	Spring SUS304 ø0.25	2.000
34	600-092	Screw (Securing) ABS 94 HB	2.000
35	642-053	(+)Wood Screw (R-FH) 2.7X18 Ni-Plat	3.000
36	660-138	Washer Rubb.	2.000
37	664-518	Washer (Lock"B"Type)	3.000
38	720-915	Bracket (SET MTG)	1.000
39	401-775	P.C.B SUB	1.000
40	411-155	P.C.B Main	1.000
41	251-016-7Z	LED Lamp LTL-13221AL RED 5 V 100mV	1.000
42	251-029-9Z	LED Lamp LTL-13231AL Green	2.000
43	251-060-6	LED Lamp SLB-26YY3 Yellow	2.000
44	251-064-0	LED Lamp SLB55VR3 RED 3 V 60mV	1.000
45	252-026-1	LED Display LTD-482G-YE	1.000
46	421-559-4A	Connector SCN-16-4 PCB	1.000
47	431-192-8Z	SW Slide	2.000
48	436-021-2	SW Tact	2.000
49	450-417-3Y	VR 10KC:155K 161S	1.000
50	450-604-5	VR 50KA:RK	1.000
51	95A-347-A	Label Name 40X24	1.000

## PARTS LIST

Seq.	Part No.	Name & Description	Q'ty	Reference No.		
1	516-93C-A	Cover Ass'y	1.000	Escutcheon & Main Body:4 SPK.MTG:3 Cover & Main Bodt MTG  SPK.MTG:3  Cover MTG (Rear) Air Vent		
	420-105-7	Speaker 8 ohm 0.3W 66MM P-250	1.000			
	611-086	(+)Machine Screw(FH) 2.6X4 Zn-Plat	4.000			
	623-265	(+)Tapping Screw (BH) 3X6-2S Zn-Plat	3.000			
	633-170	(+)Taptite Screw (BH) 3X8 BLK	8.000			
	717-290	Cover Bottom ABS 94 HB BLK	1.000			
	717-296	Cover Upper ABS BLK	1.000			
	730-176-A	Holder (SPK) EGI T1.0 Us Coating	3.000			
	801-315-A	E.S.C ABS 94 HB L380-9001	1.000			
	814-240-A	Lens PC t1.0	1.000			
	826-333	Knob Slide ABS 94 HB L380-9001	2.000			
	826-334	Knob Push ABS 94 HB L380-9001	2.000			
	826-335-A	Knob Volume ABS 94 HB L380-9001	2.000			
	901-032	Felt 6X110Xt0.5 Felt Stic.	2.000			
	901-226	Felt ø65Xt0.3 Felt BLK	1.000			
	2	516-93C-01	Crystal Ass'y		1.000	X1
		260-863-3Z	Crystal HCl18U 10.240M 30PM		1.000	
	3	516-93F-B	Front Body Ass'y		1.000	Q14 IC2 J1.2  TR MTG:1 IC MTG:1 SUB PCB MTG:2 Heak Sink:2 Main PCB:2 TR IC MTG TR IC MTG  CH UP Down
		204-010-1	Transistor 2SC2078(E)		1.000	
222-006-4		I.C KIA7217AP	1.000			
420-705-1		Jack Earphone DHJ-3T	2.000			
421-046-7		Connector CH-239(A) SW-1229	1.000			
427-179-4		Wire Braid	0.120			
440-004-0		Mica (For T.R KTC2078)	2.000			
504-734		Power Cord Ass'y	1.000			
613-332		(+)Machine Screw (BH) M3X10 (+)BH Zn-Plat	2.000			
621-159		(+)Tapping Screw (BH) t2.6X8-1S (+)BH Zn-Plat	2.000			
623-265		(+)Tapping Screw (BH) M3X6-2S (+)BH Zn-Plat	4.000			
651-024		Nut M3-1S SS41 Zn-Plat	2.000			
662-305		Washer Spring M3 Zn-Plat	2.000			
702-005-A		Body Main EGI t1.0 U.S Coating	1.000			
730-478		Holder (ANT MTG) SPC 42X40Xt0.5 Ni-Plat	1.000			
750-039-A		Cord Stopper Nylong66 BLK	1.000			
760-704		Heat Sink(IC MTG) ALP 30X18Xt2	1.000			
761-576		Heat Sink ALP3 t2	1.000			
853-105		Bushing Nylon66+Glass	1.000			
880-880		Spring SUS304 ø0.25	2.000			
4		516-93M-A	MIC Ass'y	1.000	C100	
		130-101-8Y	Disk Ceramic 0.001µF F 102Z 50V	1.000		
		420-205-9Y	MIC Condenser KUC4023-010010	1.000		
		420-349-6Z	Curd Curled 3CON 1SH 300MM BLK (KSK-23059)	1.000		
		421-038-0	Connector Plug SW-1461	1.000		
		432-058-3	SW Push SPS-9522	1.000		
		600-092	Securing Screw M6X10 (P:1) ABS 94 HB	2.000		
	623-265	(+)Tapping Screw (BH) t3X6-2S (+)BH Zn-Plat	1.000			
	623-663	(+)Tapping Screw (BH) t3X10-2S (+)BH Ni-Plat	2.000			
	625-007	(+)Tapping Screw (TH) t5X12-1S (+)TH Zn-Plat	3.000			
	642-053	(+)Wood Screw (R+FH)2.7X18-1S (+)R+FH Ni-Plat	3.000			



Seq.	Part No.	Name & Description	Q'ty	Reference No.
	660-138	Washer 7X25X1.5t BLK Rubber	2.000	ACC
	664-320	Washer (Lock"B"Type) M3 "B" Ni-Plat	2.000	For MIC Bracket
	664-518	Washer (Lock"B"Type) M5 "B" Zn-Plat	3.000	For SET Bracket
	714-882-A	Cover Bottom ABS 94HB BLK	1.000	
	717-300-A	Cover Upper(MIC) ABS 95HB BLK	1.000	
	720-050	Bracket(MIC MTG) SPC 60X35Xt1	1.000	ACC
	720-916	Bracket(SET MTG) SPC t1.5 Zn-Plating	1.000	
	731-940-A	Holder(MIC) PC BLK	1.000	
	823-191-A	Knob(Lever) ABS 94HB Gray	1.000	
	870-036	Wire Clamp(Cord) Nylon	1.000	
	890-908	Holder(MIC) Rubb.(UL)BLK	1.000	
	921-010-P	Polybag P.P 100X100Xt0.05	2.000	ACC
	921-020-E	Ploybag P.E 100X200Xt0.05	1.000	MIC
	953-750	Label Caution 2A 40X28Xt0.02	1.000	
5	516-93M-PA	Main PCB Auto Ass'y	1.000	
	002-101-8Z	Film Resistor 100 1/8W 5% ST	3.000	R25.66.69
	002-102-9Z	Film Resistor 1K 1/8W 5% ST	5.000	R51.52.56.58.68
	002-103-0Z	Film Resistor 10K 1/8W 5% ST	7.000	R5.19.21.29.33.48.61
	002-104-1M	Film Resistor 100K 1/8W 5% ST	1.000	R31
	002-122-7Z	Film Resistor 1.2K 1/8W 5% ST	1.000	R41
	002-151-3Z	Film Resistor 150K 1/8W 5% ST	7.000	R71-77
	002-152-4Z	Film Resistor 1.5K 1/8W 5% ST	1.000	R34
	002-154-6Z	Film Resistor 150K 1/8W 5% ST	1.000	R59
	002-220-2Z	Film Resistor 22 1/8W 5% ST	1.000	R22
	002-222-4Z	Film Resistor 2.2K 1/8W 5% ST	4.000	R7.18.32.46
	002-223-5Z	Film Resistor 22K 1/8W 5% ST	3.000	R2.39.2
	002-229-1Z	Film Resistor 2.2 1/8W 5% ST	1.000	R70
	002-272-9Z	Film Resistor 2.7K 1/8W 5% ST	1.000	R45
	002-273-0Z	Film Resistor 27K 1/8W 5% ST	2.000	R10.12
	002-331-9Z	Film Resistor 330 1/8W 5% ST	1.000	R26
	002-332-0Z	Film Resistor 3.3K 1/8W 5% ST	2.000	R36.38
	002-333-1Z	Film Resistor 33K 1/8W 5% ST	1.000	R30
	002-394-6Z	Film Resistor 390K 1/8W 5% ST	1.000	R13
	002-391-3Z	Film Resistor 390 1/8W 5% ST	1.000	R60
	002-470-1Z	TFilm Resistor 47 1/8W 5% ST	2.000	R9.53
	002-471-2Z	Film Resistor 470 1/8W 5% ST	2.000	R23.98
	002-472-3Z	Film Resistor 4.7K 1/8W 5% ST	3.000	R8.28.63
	002-473-4Z	Film Resistor 47K 1/8W 5% ST	1.000	R16
	002-560-9Z	Film Resistor 56 1/8W 5% ST	1.000	R99
	002-561-0Z	Film Resistor 560 1/8W 5% ST	1.000	R6
	002-562-1Z	Film Resistor 5.6K 1/8W 5% ST	1.000	R43
	002-680-4Z	Film Resistor 68 1/8W 5% ST	1.000	R65
	016-153-8Z	Film Resistor 15K 1/8W 5% ST	2.000	R42.49
	100-101-9T	Elect Capacitor 0.1 $\mu$ F 50V 20% 5X11	1.000	C39
	101-006-2T	Elect Capacitor 1 $\mu$ F 50V 20% 5X11	3.000	C18.19.55
	101-012-7T	Elect Capacitor 10 $\mu$ F 16V 20% 5X11	2.000	C11.51
	101-022-6R	Elect Capacitor 100 $\mu$ F 16V 20% 8X11	2.000	C65.69
	101-002-6T	Elet Capacitor 100 $\mu$ F 16V 20% 8X11 2.5PT	2.000	C3.27
	101-048-0R	Elet Capacitor 1000 $\mu$ F 16V 20% 12X16 5.0PT	2.000	C63.95
	102-210-4T	Elect Capacitor 22 $\mu$ F 16V 20% 5X11	2.000	C1.38
	102-242-3R	Elect Capacitor 220 $\mu$ F 16V 20% 8X11	1.000	C62
	103-308-5T	Elect Capacitor 3.3 $\mu$ F 50V 20% 5X11	1.000	C50
	103-313-9T	Elect Capacitor 33 $\mu$ F 16V 20% 5X11	3.000	C45.48.52
	104-707-7T	Elect Capacitor 4.7 $\mu$ F 50V 20% 5X11	1.000	C9
	104-712-1T	Elect Capacitor 47 $\mu$ F 16V 20% 6X11	3.000	C26.33.61

Seq.	Part No.	Name & Description	Q'ty	Reference No.
	130-102-9R	Disk Ceramic 0.1 $\mu$ F DD312B 103K 50V 794	3.000	C999.91.92
	130-102-9Z	Disk Ceramic 0.01 $\mu$ F DD312B 103K 50V	1.000	C42
	130-187-7	Axial Ceramic 0.001 $\mu$ F UP050B102MK 50V	4.000	C17.22.46.68
	130-188-8	Axial Ceramic 0.01 $\mu$ F EP050Y103MN 16V	11.000	C4.6.8.20.21.29.40.43.66 72.80
	130-277-9	Axial Ceramic 0.022 $\mu$ F RH050F 223Z 50V	1.000	C76
	130-227-9R	Disk Ceramic 0.022 $\mu$ F DD350257Y5V223M50V	1.000	C85
	130-613-4	Axial Ceramic 0.068 $\mu$ F EP050X682K 16V	1.000	C41
	131-004-9R	Disk Ceramic 100pF DD340SL 101K 794 50V	3.000	C81.86.89
	131-204-3R	Disk Ceramic 12pF DD330CH 120K 794 50V	1.000	C77
	131-502-2R	Disk Ceramic 15pF DD330CH 150K 50V 794	1.000	C25
	132-005-5R	Disk Ceramic 20pF DD330CH 200K 50V 794	1.000	C23
	132-204-8R	Disk Ceramic 220pF DD360SL 221K 50V 794	1.000	C88
	132-248-8	Axial Ceramic 220pF UP050B221K 50V	1.000	C53
	133-926-2	Axial Ceramic 39pF UP050SL390J 50V	1.000	C73
	134-003-3R	Disk Ceramic 4pF DD330SL 040C 794 50V	1.000	C75
	134-743-8	Disk Ceramic 470pF DD104J30Y5P471K50	1.000	C83
	138-002-2R	Axial Ceramic 8pF DD380CH 080D 50V 794	1.000	C15
	138-213-6	Axial Ceramic 82pF UP050B820K 50V	1.000	C78
	202-017-8R	Transistor KTC3194(O) AT	3.000	Q1.11.12
	202-023-3R	Transistor KTC3198(O) AT	2.000	Q5.10
	202-036-5R	Transistor KTA1266(GR) AT	5.000	Q2.3.4.6.9
	241-020-7Z	Diode Zener 1N5239B 9.1V 0.5W (DO-35)	1.000	DZ1
	241-063-6Z	Diode Zener 1N4733A 5.1V 1W (DO-41)	1.000	DZ2
	243-019-7	Diode 1N4148(R.L)	7.000	D3.5.7.8.10.12.19
	4A1-104-A	P.C.B Ass'y 188X137X1.6 94HB 1/0	1.000	
	401-775-A	P.C.B SUB 108X37.5X1.6 94HB 1/0	1.000	
	411-155-A	P.C.B Main 149.5X106X1.6 94HB 1/0	1.000	
6	516-93M-PM	Main PCB Manual Ass'y	1.000	
	018-121-9	Metal Oxide Resistor 120 1W 5% ST	1.000	R3
	019-150-0	Metal Oxide Resistor 15 2W 5% ST	1.000	R55
	030-100-6Z	Film Resistor 10 1/2W 5% ST Mini	1.000	R999
	030-472-2Z	Film Resistor 4.7K 1/2W 5% ST Mini	1.000	R998
	061-103-1	Resistor Semifixed 10KB RVM083H H 8Dia	1.000	RV1
	061-202-0	Resistor Semifixed 2K RVM083H	1.000	RV2
	061-203-1	Resistor Semifixed 20K RVM083H	2.000	RV3.4
	130-227-9Y	Disk Ceramic 0.0022 $\mu$ F F 223Z 50V	1.000	C82
	131-002-7Y	Disk Ceramic 10pF SL 100D 50V	1.000	C24
	131-510-9Y	Disk Ceramic 150pF NPO151K 50V	1.000	C58
	133-902-0Y	Disk Ceramic 39pF NPO390K 50V	1.000	C90
	134-003-3Y	Disk Ceramic 4pF SL 040D 50V	1.000	C10
	172-015-6	Dip Trimmer 20pF 6Dia CVN	1.000	CT1
	196-803-7Z	Mylar Capacitor 0.006 $\mu$ F 683K 50V	1.000	C60
	202-124-1	Transistor KTC3194(O)	1.000	Q13
	229-012-4	I.C C5121	1.000	IC1
	245-015-3Z	Diode Rectifier 1N4004T/R 400V 1A	2.000	D9.16
	270-006-9Z	Filter Ceramic LTU455HT	1.000	CF2
	270-010-2Z	Filter Ceramic SK107M4-AC-20	1.000	CF1
	300-116-5	Transformer Choke EI-19	1.000	CH1
	300-159-4	Transformer Power EI-24	1.000	T1
	310-289-1	VCoil Axial 2.2UH:LAL05TB2R2M	1.000	RFC4
	310-291-2	Coil Axial 6.8UH:LAL03TB6R8K	2.000	RFC2.8
	310-380-9	Coil Axial 100UH:LAL03TB101K	1.000	RFC1

Seq.	Part No.	Name & Description	Q'ty	Reference No.
	310-407-1	Coil Spring 5X0.6X13.5T:R	1.000	RFC10
	310-655-8	Coil Axial 0.39UH:LAL02TBR39K	1.000	RFC3
	310-812-3	Coil Spring 3.4X0.55X9.5T:R	1.000	RFC5
	320-154-5	Coil IFT 455KHZ-A	1.000	L2
	320-155-6	Coil IFT 455KHZ-B	1.000	L3
	320-314-3	Coil 27MHZ RX ANT	1.000	L1
	320-317-6	Coil VCO VCO	1.000	L4
	320-318-7	Coil RF PRE AMP A TX27MHZ	2.000	L5.6
	771-525	Shielded Housing SPTE t0.3	1.000	
7	516-93M-PS	Main PCB SMD Ass'y	1.000	
	594-009	RF AMP Module Ass'y	1.000	
	060-000-8Z	Chip Resistor 0 1/10W 5% T2012	3.000	R1000.101.102
	060-101-6Z	Chip Resistor 100 1/10W 5% T2012	1.000	R107
	060-180-7Z	Chip Resistor 18 1/10W 5% T2012	1.000	R104
	060-221-1Z	Chip Resistor 220 1/10W 5% T2012	1.000	R109
	060-272-7Z	Chip Resistor 2.7K 1/10W 5% T2012	1.000	R108
	060-331-7Z	Chip Resistor 330 1/10W 5% T2012	1.000	R103
	060-333-9Z	Chip Resistor 33K 1/10W 5% T2012	1.000	R105
	060-471-0Z	Chip Resistor 470 1/10W 5% T2012	1.000	R110
	060-681-3Z	Chip Resistor 680 1/10W 5% T2012	1.000	R106
	130-172-2Z	Chip Ceramic 0.01 $\mu$ F CM21 X7R103K 50V AT	7.000	C103.105.106.107.111.112.113
	131-529-7Z	Chip Ceramic 150pF CM21 CG 151J 50V AT	1.000	C109
	132-216-9Z	Chip Ceramic 22pF CM21 CG 220J 50V AT	1.000	C102
	132-220-2Z	Chip Ceramic 220pF CM21 CG 221J 50V AT	1.000	C108
	134-722-1Z	Chip Ceramic 47pF CM21 CG 470J 50V AT	1.000	C104
	135-626-1Z	Chip Ceramic 560pF CM21 CG 561J 50V AT	1.000	C114
	202-153-7	Transistor KTC3880SY	2.000	Q102.103
	243-049-4	Diode Si Chip KDS226	1.000	D101
	411-921	P.C.B RF Module 39.25X16.88X1.6 94HB1/1	1.000	
	509-110	6.5T Sprin.Coil Assy	2.000	L102.104
	310-809-1	Coil Spring 3.4X0.55X6.5T:R	1.000	
	321-053-2	Core 1108-KA-058 M9DTH3.7X6	1.000	
	594-010	IF AMP Module Ass'y	1.000	
	060-000-8Z	Chip Resistor 0 1/10W 5% T 2012	2.000	R600.609
	060-101-6Z	Chip Resistor 100 1/10W 5% T 2012	1.000	R203
	060-102-7Z	Chip Resistor 1K 1/10W 5% T 2012	1.000	R209
	060-103-8Z	Chip Resistor 10K 1/10W 5% T 2012	1.000	R207
	060-123-6Z	Chip Resistor 12K 1/10W 5% T 2012	1.000	R211
	002-153-3Z	Chip Resistor 15K 1/10W 5% T 2012	1.000	R218
	060-154-4Z	Chip Resistor 150K 1/10W 5% T 2012	1.000	R205
	060-182-9Z	Chip Resistor 1.8K 1/10W 5% T 2012	1.000	R206
	060-221-1Z	Chip Resistor 220 1/10W 5% T 2012	1.000	R212
	060-223-3Z	Chip Resistor 22K 1/10W 5% T 2012	1.000	R213
	060-332-8Z	Chip Resistor 3.3K 1/10W 5% T 2012	1.000	R210
	060-333-9Z	Chip Resistor 33K 1/10W 5% T 2012	1.000	R217
	060-392-2Z	Chip Resistor 3.9K 1/10W 5% T 2012	1.000	R202
	060-471-0Z	Chip Resistor 470 1/10W 5% T 2012	2.000	R204.208
	060-473-2Z	Chip Resistor 47K 1/10W 5% T 2012	2.000	R214.216
	060-561-8Z	Chip Resistor 560 1/10W 5% T 2012	1.000	R201
	060-823-5Z	Chip Resistor 82K 1/10W 5% T 2012	1.000	R215
	101-007-3	Elect Capacitor 1 $\mu$ F 50V 20% 4X7	1.000	C209
	101-043-5	Elect Capacitor 10 $\mu$ F 50V 20% 4X7	1.000	C204
	130-A17-6Z	Chip Ceramic 0.001 $\mu$ F CM21 X7R102K 50V AT	1.000	C206
	130-172-2Z	Chip Ceramic 0.01 $\mu$ F CM21 X7R103K 50V AT	2.000	C201.203

Seq.	Part No.	Name & Description	Q'ty	Reference No.
	202-106-5	Transistor KTA1504SY	1.000	Q204
	202-153-7	Transistor KTC3880SY	3.000	Q201.202.203
	244-001-5	Diode GE 1N60	1.000	D201
	411-922	P.C.B IF Module 44X16.88X1.6 94HB 1/1	1.000	
	594-012	VCO Module Ass'y	1.000	
	060-000-8Z	Chip Resistor 0 1/10W 5% T 2012	2.000	R600.609
	060-103-8Z	Chip Resistor 10K 1/10W 5% T2012	2.000	R606.607
	060-154-4Z	Chip Resistor 150K 1/10W 5% T2012	1.000	R603
	060-223-3Z	Chip Resistor 22K 1/10W 5% T2012	1.000	R608
	060-224-4Z	Chip Resistor 220K 1/10W 5% T2012	1.000	R604
	060-272-7Z	Chip Resistor 2.7K 1/10W 5% T2012	1.000	R605
	060-470-9Z	Chip Resistor 47 1/10W 5% T2012	1.000	R601
	060-821-3Z	Chip Resistor 820 1/10W 5% T2012	1.000	R602
	130-172-2Z	Chip Ceramic 0.01 $\mu$ F CM21 X7R103K 50V AT	3.000	C601.610.611
	131-107-9Z	Chip Ceramic 120pF CM21 CG 121J 50V AT	1.000	C608
	131-816-6Z	Chip Ceramic 18pF CM21 CG 180J 50V AT	1.000	C602
	132-216-9Z	Chip Ceramic 22pF CM21 CG 220J 50V AT	1.000	C603
	132-220-2Z	Chip Ceramic 220pF CM21 CG 221J 50V AT	1.000	C607
	132-714-2Z	Chip Ceramic 27pF CM21 CG 270J 50V AT	1.000	C609
	133-306-2Z	Chip Ceramic 33pF CM21 CG 330J 50V AT	1.000	C606
	134-722-1Z	Chip Ceramic 47pF CM21 CG 470J 50V AT	1.000	C605
	202-103-2	Transistor KTC3875SY	1.000	Q602
	202-153-7	Transistor KTC3880SY	2.000	Q601.603
	242-006-0	Diode Varicap LV2209	1.000	D601
	411-925	P.C.B VCO Module 30.7X16.88X1.6 94HB1/1	1.000	P.C.B. VCO Module <sup>LC</sup>
	594-013	Low Pass Filter Module	1.000	
	132-220-2Z	Chip Ceramic 220pF CM21 CG 221J 50V AT	2.000	C801.805
	134-761-4Z	Chip Ceramic 470pF CM21 CG 471J 50V AT	2.000	C802.803
	310-809-1	Coil Spring 3.4X0.55X6.5T:R	1.000	L802
	310-810-1	Coil Spring 3.4X0.55X7.5T:R	1.000	L803
	310-811-2	Coil Spring 3.4X0.55X8.5T:R	1.000	L804
	411-923	P.C.B LPF Module 15.39X40.5X1.6 94HB1/1	1.000	P.C.B. LPF Module <sup>LC</sup>
	509-098	4.5T Spring Coil Ass'y	1.000	L801
	310-807-9	Coil Spring 3.4X0.55X4.5T:R	1.000	
	321-053-2	Core 1108-KA-058 M9DTH3.7X6	1.000	
	594-050	LED Driver Module-2	1.000	
	060-102-7Z	Chip Resistor 1K 1/10W 5% T 2012	6.000	
	060-103-8Z	Chip Resistor 10K 1/10W 5% T 2012	1.000	R304.305.306.307.308.309
	060-151-1Z	Chip Resistor 150 1/10W 5% T 2012	1.000	R312
	060-152-2Z	Chip Resistor 1.5K 1/10W 5% T 2012	1.000	R303
	060-472-1Z	Chip Resistor 4.7K 1/10W 5% T 2012	2.000	R301
	060-561-8Z	Chip Resistor 560 1/10W 5% T 2012	1.000	R302.311
	098-501-3	Thermistor Disk 500 KC5C150L 15%	1.000	R310
	101-012-7	Elect Capacitor 10 $\mu$ F 16V 20% 5X11	1.000	TH301
	130-172-2Z	Chip Ceramic 0.01 $\mu$ F CM21 X7R103K 50V AT	2.000	C303
	235-001-7Z	I.C DBL1018	1.000	C301.302
	243-071-3	Diode Switching ChipKDS190(E3)	1.000	IC301
	411-947	P.C.B LED Module 24X26.7X1.6 94HB1/1	1.000	D301
8	516-93P-A	Packing Ass'y	1.000	
	91B-430	Box Tray DW2S 221(W)X156(D)X54(H)	1.000	
	91B-453-GA	Box Inner SW1S 234(W)X232(D)X58(H)	1.000	
	91B-649	Box MIC SW2E 221(W)X70(D)X54(H)	1.000	

Seq.	Part No.	Name & Description	Q'ty	Reference No.
	91C-344-A	Box Out DW1S 366(W)X240(D)X236(H)	0.167	Made in Thailand
	922-030-E	Polybag P.P 200X300Xt0.05	1.000	SET:1
	937-260-AC	Manual Owner's	1.000	
	942-935	Card Bord	0.334	
	943-052-AA	CB Rule Woodfrepaper 410X290	1.000	
	943-601-B	Card Assistance Woodfrepaper 95X152	1.000	
	943-605	Card Registration Artpaper 324X140	1.000	Printed in Thailand
	95A-347-A	Label Name Polyester 40X24	1.000	
	959-640-A	Label FCC Polyester 67X10Xt0.05	1.000	
9	516-93S-A	SUB PCB Ass'y	1.000	
	130-101-8Y	Disk Ceramic 0.001 $\mu$ F F 102Z 50V	2.000	C31.32
	251-016-7Z	LED Lamp LTL-13221AL RED 5 V 100MW	1.000	LED5
	251-029-9Z	LED Lamp LTL-13231AL GRN 5 V 100MW	2.000	LED1.2
	251-060-6	LED Lamp SLB-26YY3 YEL 3 V 60MW	2.000	LED3.4
	251-064-0	LED Lamp SLB55VR3 RED 3 V 60MW	1.000	LED6
	252-014-0	LED Display LTD-482LC GRN	1.000	
	421-559-4A	Connector SCN-16-4 PCB(R)	1.000	
	431-192-8	SW Slide JSS2207	2.000	
	436-021-1	SW Tact SAT-1102-1	2.000	
	450-417-3Y	VR 10KC:15SK 161S	1.000	VR2(SQ)
	450-604-5	VR 50KA:RK1611111A0153A	1.000	VR1(VOL)
10	516-93S-MA	SUB Material Ass'y	1.000	
	427-174-9	Wire Strip 0.5 DIA	0.200	
	960-274	Tube UL/CSA KEIT-30 AWG 12 (2 $\emptyset$ ) Clesr Vinyl	0.050	
	960-371	Tube UL/CSA KEIT-30 AWG 2 (6.5 $\emptyset$ ) Clesr Vinyl	0.050	
	964-052	Tube HIS 11M/M	0.100	
	964-098	Tape Empire 1 $\emptyset$	0.250	
	965-020	Tape Scotch 15M/M (0.015X20M)	0.250	
	965-039	Tape Packing OPP (0.05X50M)	0.500	
	965-048	Tape Packing O.P.P. (0.05X25M) Ivory	0.150	
	968-007	Solder Bar 63:37	20.000	
	966-016	Solder Rosin Co.Wire 60:40 0.04"-0.05"	13.000	
	966-025	Flux Rosin	8.000	
	966-034	Thinner For Flux	8.000	
	966-061	Silicone Grease YG-6111 or XG-6111	0.1020	
	967-002	Stavilazer Material	50.000	
	967-011	Bond #201	10.000	
	967-048	Compound #1200 500GR	0.050	
	967-057	Wax Micro	5.000	
	967-066	Wax Poly	0.080	
	967-084	Screw Locking Paint AGP	0.200	
	967-118	Antistatic OIL	0.500	
	967-145	Tie Wire Bind Wire Steel(BLK)	0.500	
	967-163	Tie Wire Vinyl 1.2 DIA	0.400	
11	516-93W-CA	Wire Cover Ass'y	1.000	
	427-045-6	Wire 1007 AWG 26 7/0.16 YEL	0.150	PCB SP(+)--SP(+) (0.5:0.5)
	427-046-7	Wire 1007 AWG 26 7/0.16 GRN	0.150	PCB SP(-)--SP(-) (0.5:0.5)
12	516-93W-MA	Wire MIC Ass'y	1.000	
	427-045-6	Wire 1007 AWG 26 7/0.16 YEL	0.050	Push SW---Cartridge 0.5:0.5
	427-046-7	Wire 1007 AWG 26 7/0.16 GRN	0.050	Push SW---Cartridge 0.5:0.5

Seq.	Part No.	Name & Description	Q'ty	Reference No.
13	516-93W-MP	Wire Main PCB Ass'y	1.000	
	427-316-1	Wire Shiled 1533 AWG 26 1/0.41 GRY	0.140	MP J1----J1 1.5:1.5
14	516-93W-SA	Wire SUB PCB Ass'y	1.000	
	427-003-8	Wire 1007 AWG 24 1/0.51 RED	0.130	SW ON/OFF B+-PCB Main ON/OFF2 0.5:0.5
	427-004-9	Wire 1007 AWG 24 1/0.51 ORG	0.100	SW ON/OFF -PCB Main ON/OFF2 0.5:0.5
	427-005-0	Wire 1007 AWG 24 1/0.51 YEL	0.110	VR VOL----PCB VOL1 0.5:0.5
	427-008-3	Wire 1007 AWG 24 1/0.51 VIO	0.110	VR SQ----PCB SQ1 0.5:0.5
	427-010-4	Wire 1007 AWG 24 1/0.51 WHT	0.090	VR VOL----PCB VOL2 0.5:0.5