

**Radio Shack®**

# Service Manual

19-1126

**HTX-242  
DELUXE 2-METER AMATEUR  
VHF•FM HAM TRANSCEIVER**

**Catalog Number: 19-1126**

## CONTENTS

	<b>Page</b>
Specifications .....	2
Block Diagrams .....	5
Disassembly Instructions.....	6
Theory of Operation.....	7
Alignment and Adjustment .....	12
Troubleshooting .....	17
Error Display .....	18
Printed Circuit Board .....	19
Wiring Diagram .....	24
Exploded View .....	25
Exploded View Parts List.....	26
Electrical Parts List .....	28
Semiconductor Lead Identification and IC Internal Diagram.....	46
Semiconductor Voltage Chart .....	57
Schematic Diagram .....	63

# SPECIFICATIONS

## General

Transmitter .....	PLL synthesizer, frequency modulation
Receiver.....	PLL synthesizer, superheterodyne system
Communication frequency range .....	144 MHz~148 MHz (5 kHz step)
Operating voltage.....	11.7 V DC~15.8 V DC (negative ground)
Temperature and humidity range.....	14 °F~140 °F (-10°C ~ +60°C) and 10 % ~ 90 %
Transmitter/Receiver switching .....	Electrical

## Standard Test Conditions

Battery supply voltage .....	13.8 V DC
Modulation.....	3 kHz
Receiver output impedance .....	8 ohms, non-inductive
Antenna load impedance of transmitter .....	50 ohms, non-inductive
Ambient conditions:	
Temperature .....	63 °F~91 °F (17 °C~33 °C)
Humidity .....	40 %~70 %

## Receiver

Description	Nominal	Limit
Intermediate frequency		
•1st IF	21.4 MHz	
•2st IF	455 kHz	
Sensitivity:		
•12 dB SINAD	0.2 uV	0.25 uV
•20 dB NQ	0.35 uV	0.5 uV
Squelch Sensitivity:		
•Threshold	0.1 uV	0.2 uV
•Tight	2 uV	4~1 uV
Spurious response attenuation	70 dB	60 dB
Intermodulation attenuation	70 dB	60 dB
Adjacent channel rejection (25 kHz)	70 dB	60 dB
Modulation acceptance bandwidth	7.8 kHz	7.5 kHz
Hum and noise	50 dB	40 dB
Audio output power (10% THD)	2.5 W	2.0 W
Audio distortion	2 %	10 %
Audio response	-6 dB/oct	+1/-3 dB, - 6 dB/oct
Current drain		300 mA
CTCSS sensitivity	0.15 uV	0.2 uV
DTMF squelch sensitivity	0.2 uV	0.25 uV

## Transmitter

Description	Nominal	Limit
RF power output:		
•11.7 V DC	30 W	25 W
•13.8 V DC	45 W	40 W
•15.8 V DC	55 W	45 W
•Low power	12 W	10 W
Maximum deviation	4.2 kHz	5 kHz
Hum and noise	40 dB	35 dB
Audio distortion	2.0%	5%
Audio response	+6 dB/oct	+1/-3 dB, +6 dB/oct
Spurious and harmonics emission	70 dB	60 dB
Frequency error	±0.0005 %	±0.001%
Microphone sensitivity	4 mV rms	5 mV rms
CTCSS tone deviation	0.7 kHz	0.5 kHz~1 kHz
DTMF tone deviation	3.5 kHz	3 kHz~4 kHz
Current drain:		
•11.7 V DC	5.5 A	6 A
•13.8 V DC	7 A	8 A
•15.8 V DC	8 A	9 A
•Low power	3.5 A	4 A

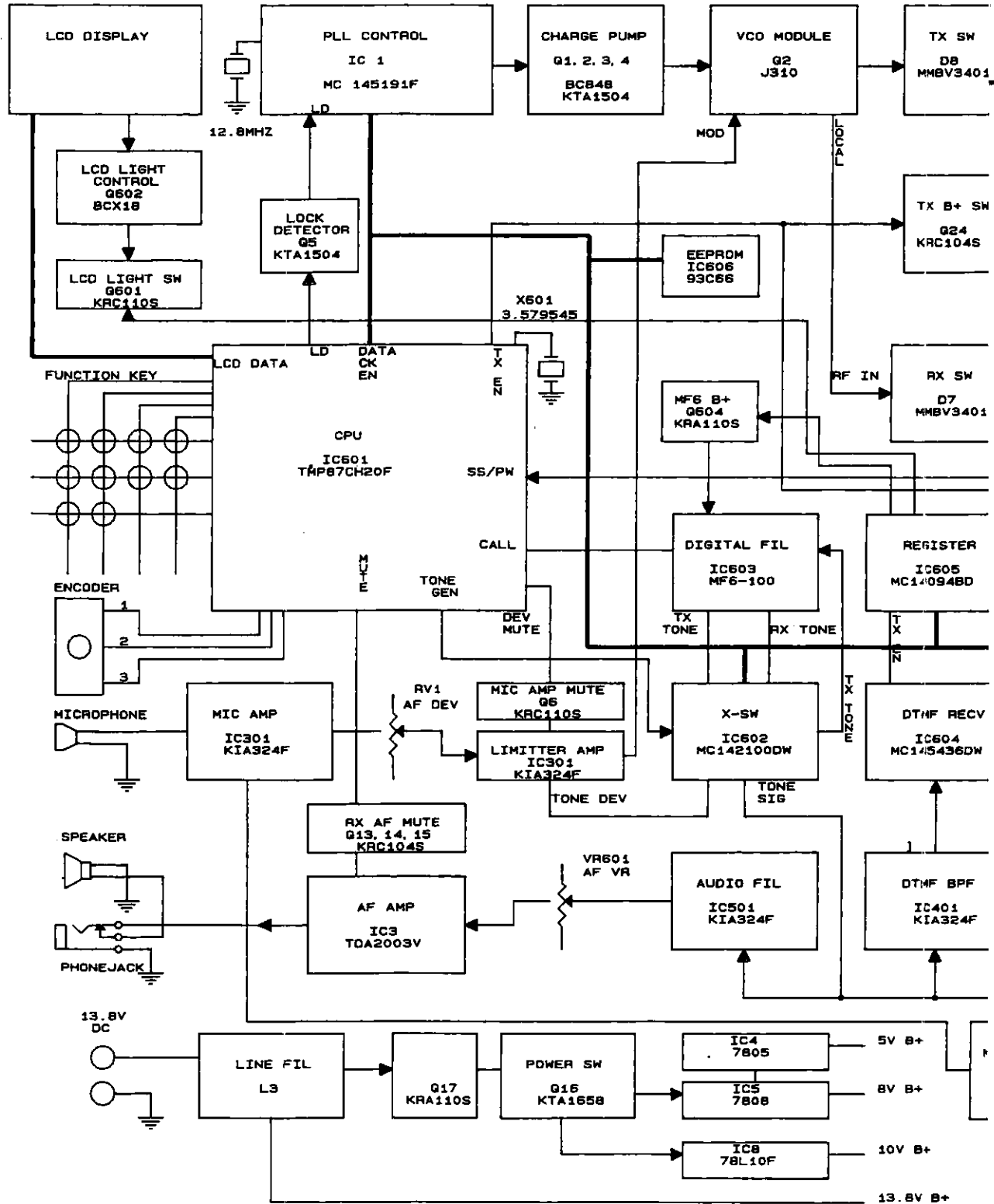
## Other Items

General power requirement	11.7 V DC~15.8 V DC
Dimensions (WHD)	2 9/16" (65 mm) × 4 5/18" (117 mm) × 1 7/16" (37 mm)
Weight	1 lb 3 oz (540 g)

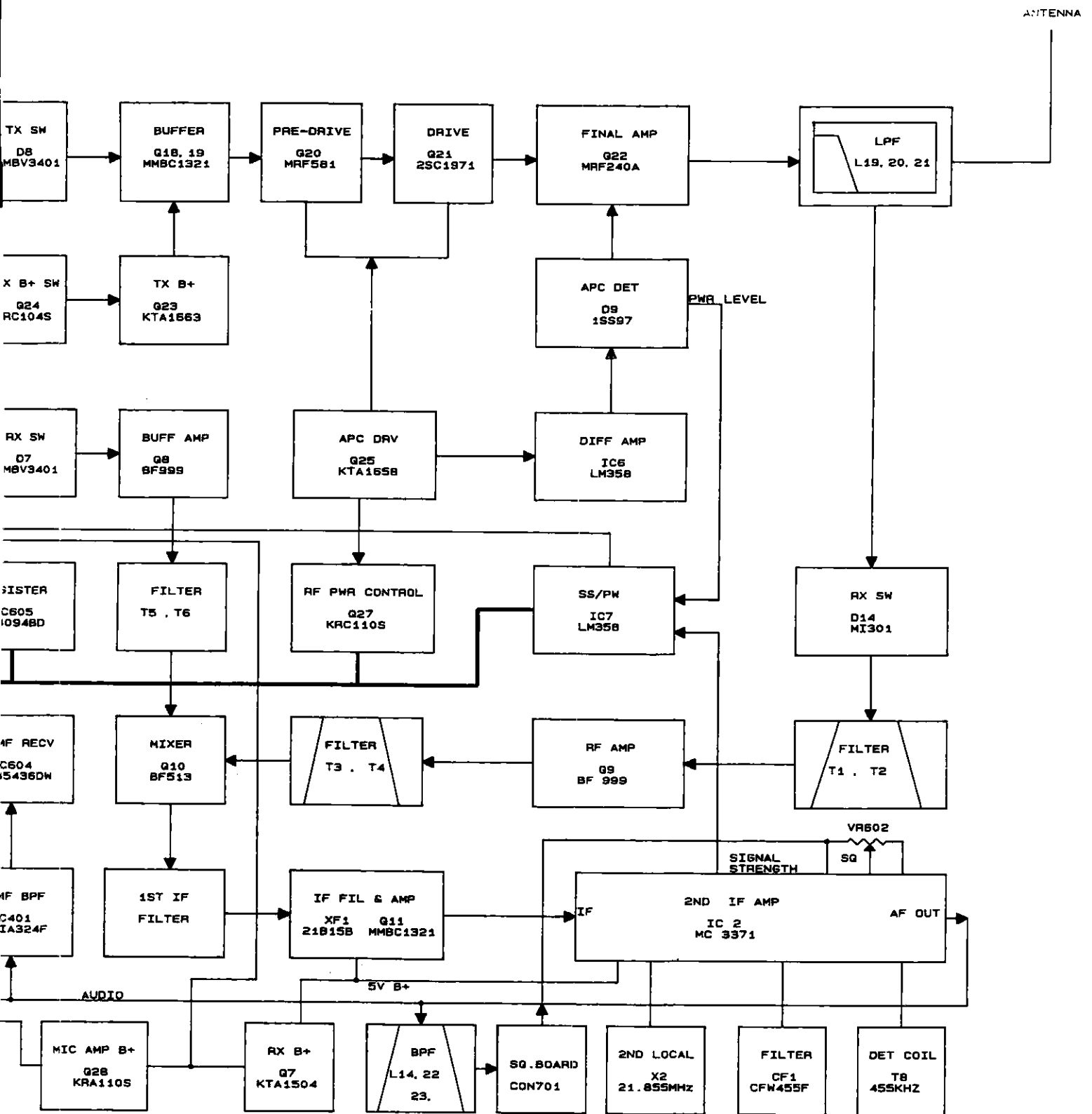
**Note:** Nominal specs represent the design specs. All units should be able to approximate these—some will exceed and some may drop slightly below these specs. Limit specs represent the absolute worst conditions that still might be considered acceptable; in no case should a unit fail to meet limit specs.

## NOTES

# BLOCK D

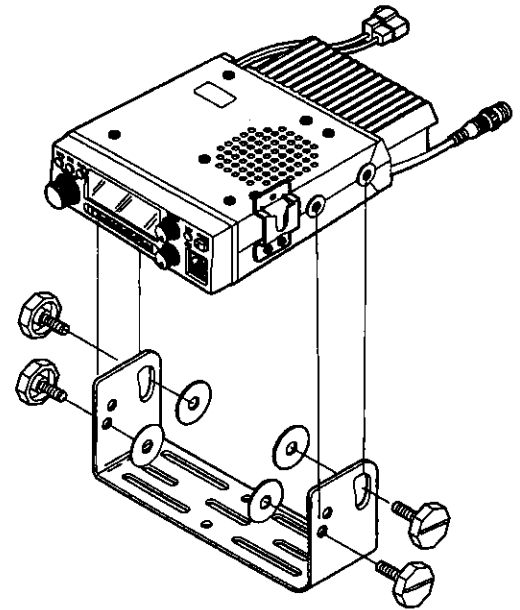


# BLOCK DIAGRAM

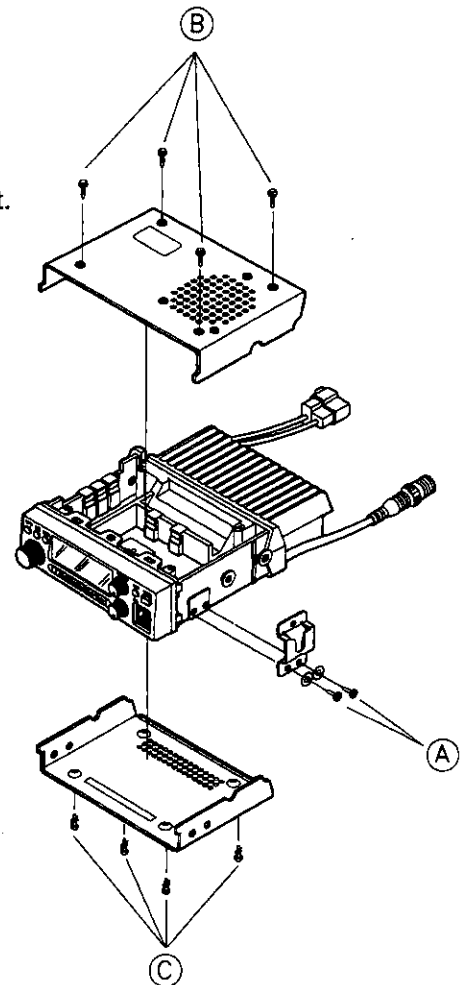


# DISASSEMBLY

1. • Remove four screws and washers to remove mounting bracket.



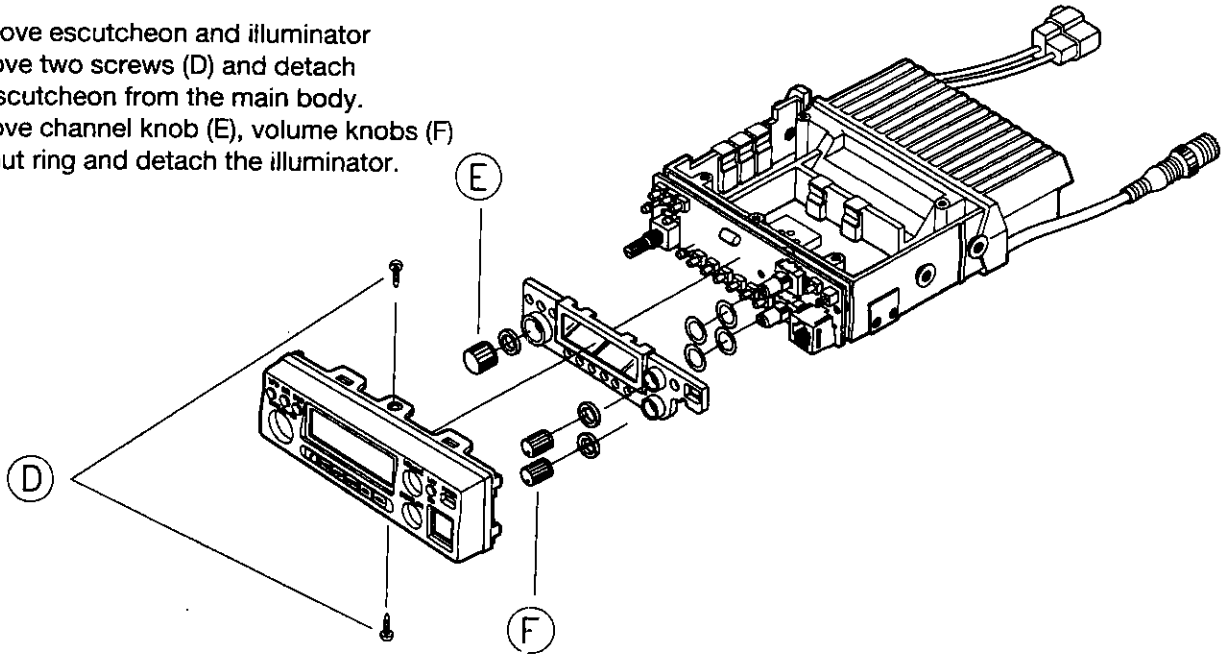
2. To remove upper cover and bottom cover
  - Remove two screws (A) to remove microphone bracket.
  - Remove four screws (B) to remove upper cover.
  - Remove four screws (C) to remove bottom cover.



## Y INSTRUCTIONS

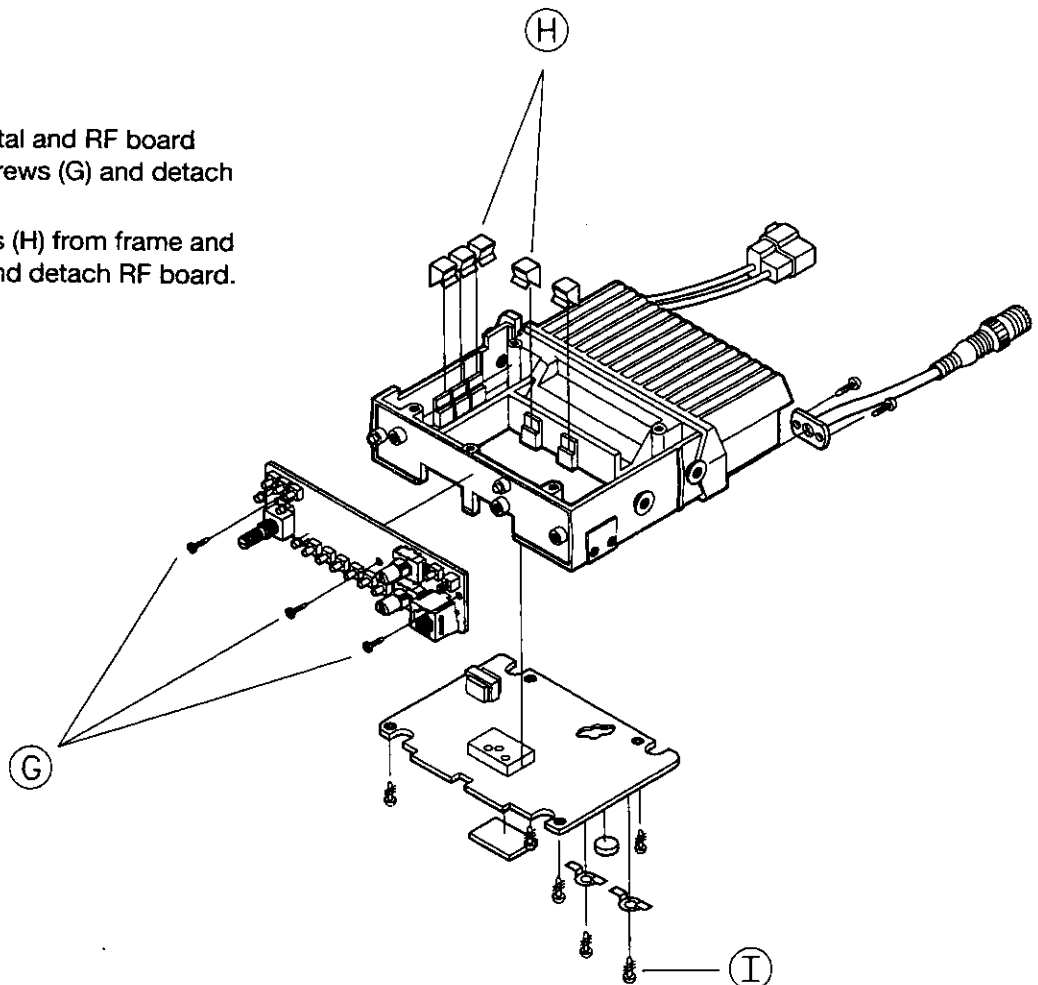
### 3. To remove escutcheon and illuminator

- Remove two screws (D) and detach the escutcheon from the main body.
- Remove channel knob (E), volume knobs (F) and nut ring and detach the illuminator.



### 4. To remove the digital and RF board

- Remove three screws (G) and detach digital board.
- Remove five crips (H) from frame and six screws (I), and detach RF board.





# THEORY OF OPERATION

The transceiver assembly, contains a dense RF PCB and a control PCB  
The RF PCB contains the transmitter and receiver circuits. The control PCB contains the microprocessor controller and associated digital circuits.

## TRANSMITTER

**The transmitter is consist of;**

- Microphone audio circuit
- Transmitter stage and harmonic filter
- Automatic power control
- Frequency synthesizer circuit

### Microphone audio circuit

The audio signals from the microphone (via CON1, pin 14, J603, pin 5) are amplified, pre-emphasized and limited by IC301 and associated components. The AF microphone signal is applied to MIC amp to produce an amplified and pre-emphasized audio signal. The signal is limited by IC301 B/C amp and applied to a lowpass filter via RVI and IC301 D/A. The lowpass filter rejects frequencies above 3 kHz of the voice spectrum. The filtered signal is applied to the pin 7 of VCO in the frequency synthesizer circuit. RV1 is used to adjust voice deviation.

### Transmitter stage and harmonic filter

The power amplifier contains transistors Q18 to Q22. When in transmit mode of operation diode D8 is forward biased, the RF signal enable to pass the input buffer Q18, Q19. The buffered RF signal is further amplified by power amplifier driver transistor Q20 and Q19 thru coupler C91. L8, C92 and C91 are configured to provide filtering with impedance matching. The output from Q20 is impedance matched by C99, C100, L11 and L12. The output from Q21 is also impedance matched by C105, C107, C120, C121 and micro-strip line and passed to the power amplifier Q22. Forward biased diodes D10, D14 are inhibiting the TX signal to the receiver stage. The amplified RF signal passes through the strip-line coupler and fed to the harmonic lowpass filter circuit C133 and C126, L19, C127, L20, C128, L21, C129 and then to the antenna connector. The coupler provides a sample of the RF signal for the automatic power control.

### Automatic power control

The automatic power control circuit is consist of IC6,Q26,Q25 and the strip-line coupler, diode D9 and variable resistor RV2. The RF signal in the coupler is rectified by D9 to produce a DC voltage and passed to RV2. The DC voltage is also applied to pin 2 of IC6A via RV2. The voltage 10 V DC is supplied to the pin 3 of IC6A via a potential divider. IC6A determines the RF power level by producing a difference signal. The difference signal is passed to Q26 and Q25 to produce a constant power output to the antenna. VR2 is used to adjust the RF power level.

### Frequency synthesizer circuit

With data received from the microprocessor (IC601), the frequency synthesizer circuit controls and produces the RF carrier frequency for the transmitter during transmit and local oscillator frequency for the receiver.

## **The frequency synthesizer circuit is consist of**

- RX and TX voltage controlled oscillator module
- Loop filter/charge pump
- PLL frequency synthesizer

### **RX and TX voltage controlled oscillator module**

A VCO module produces carrier frequencies during transmit and the local oscillator frequency during receive. The module also has a power line filter.

### **RX and TX power line filter**

Transistor Q3 is provided for ripple filter in 8 V power supply circuit.

### **RX VCO**

The RX VCO is consist of JFET Q2, coil T1 and varactor D1. D2 and L3 are for a Colpits oscillator. D1, D2 produces different DC voltage along the change of frequency and is controlled by the phase detector signal (via pin 6 of module) present at the anode. The local oscillator signal at the drain of Q2 is supplied to pin 4 of the module via Q4 buffer amp, when diode D8 is reverse biased and D7 is forward biased. T1 is used for PLL alignment.

### **TX VCO**

The TX VCO is consist of JFET Q2, coil T1 and varactor D1. D2 and L3 are for a Colpits oscillator. The AF signal at microphone amplifier is applied to the anode of D1 via pin 3 of the module. The control voltage from the loop filter is applied to the cathode of D1, D2 (via a module pin 7). The modulated TX RF signal produced at the collector of Q4 (module, pin 4) is passed to the power amplifier and harmonic filter via 3 dB pad and the buffer amplifier Q18 when diode D8 is forward biased and D7 is reverse biased.

### **Loop filter**

Transistors Q1, Q2, Q3, Q4 and resistors R3 to R13, R18 and capacitors C4 to C9 form the loop filter. The phase detector from pin 3, pin 4 of IC1 is filtered to remove any reference frequency harmonics and then applied to the pin 6 of the RX and TX voltage control module.

### **PLL frequency synthesizer**

The PLL frequency synthesizer consist of an oscillator for the reference crystal, a reference divider, a programmable divider, a phase/frequency comparator, an out of lock detector and a prescaler.

### **Reference oscillator**

The reference oscillator of IC1, along with a 12.8 MHz crystal X1, TC1, C1, C2, produces a 12.8 MHz reference signal at pin 1 and 20.

### **Programmable dividers**

IC1 has two dividers, a data programmable divider and a programmable reference divider.

### **Phase detector**

$\phi_R$ ,  $\phi_V$  are supplied to the VCO via the charge pump and loop filter.

### **Out of lock detector**

An out of lock detector produces a high logic level pulse when  $\phi_R$ ,  $\phi_V$  are in the same phase and frequency and a low logic level pulses when the loop is out of lock at pin 2 of IC1. The signals at pin 2 of IC1 are buffered by Q5 and then integrated by R15 and C12. The product in the integrating circuit is fed to pin 5 of the CON2.

### **Prescaler**

The internal prescaler divides the VCO frequency by 64 or 65.

## **RECEIVER**

The receiver has dual-superheterodyne conversion consist of;

- RF amplifier
- First mixer and first IF amplifier and FM detector
- Receiver audio circuit
- Mute (squellch) circuit

### **RF amplifier**

The receiver RF amplifier contains coils (T1 to T4) and MOS FET Q9 and tuning ciodes (D1 to D4). Coils are function as 2-pole bandpass filter. The RF signal passes through the tuning circuit T1 and T2, RF amplifier Q9 and T3 and T4, enabling the RF signal to pass the first mixer as the operating frequency. Tuned RF signal is changed by tuning voltage from IC6B.

### **First mixer and first IF amplifier**

First IF amplifier consist of FET Q8, Q10 and crystal filter XF1 and coils T5 to T7. The VCO local oscillator signal, via buffer transistor Q8, is filtered by T5 and T6. Q10 produces a difference frequency of 21.4 MHz from the filtered RF signal at the gate connection and the filtered VCO local oscillator signal at the source connection. The 21.4 MHz difference frequency is filtered by the 2-pole crystal filter XF1. The tuning circuit T7 and the associated components are for matching the crystal filter to insure good passband response and sensitivity. The IF signal is amplified by Q11 and passed to the second mixer, second IF and FM detector.

### **Second mixer, second IF and FM detector**

A single conversion FM receiver integrated chip, IC2 contains the second mixer, second IF and FM detector functions. The second local oscillator frequency is determined by the crystal X2 connected to pin 1 of IC2. The IF signal is received at pin 16 of IC2 via R39 and coupling capacitor C45. The second IF frequency of 455 kHz is produced when the difference frequency is applied to the mixer via pin 6. The output of the second mixer via pin 3 is applied to a 455 kHz bandpass filter CF1. The output of CF1 is passed to a *high gain IF amplifier (limiter)* in IC2 via pin 5. The amplified signal is coupled to the *adjustable quadrature detector T8*. Any detected signal is produced at pin 9 of IC2 and supplied to the receiver audio circuit.

### **Receiver audio circuit**

The receiver audio circuit is consist of an audio and a high pass filter and de-emphasis circuit on the RX PCB.

### **High pass filter**

CTCSS signals from the received audio signal is removed by the high pass filter. The high pass filter is a 8-pole active filter that consist of IC501 and associated components. The de-emphasis is provided by resistor R55 and capacitor C62. The de-emphasized audio signal at pin 3 of the CON1, is fed to the audio amplifier on RF board via VR 601 of the digital PCB.

### **Audio amplifier**

IC3 is an audio amplifier. An audio signal at pin 3 of the CON1, is passed to VR601 on digital board. The gain of the amplifier is set by resistor R52. The amplified audio signal is applied to the internal speaker by J2 connector. The external speaker connection is via the connector J1.

### **Mute(squelch)circuit**

The squelch circuit switch off the audio power amplifier in the absence of audio signals. The squelch circuit comprises a 14 kHz band pass filter, squelch control (VR602), and a noise detect circuit.

### **14 kHz band pass filter**

The audio signal from pin 9 of IC2 is filtered by the 14 kHz band pass filter formed by L22, L23, C146 and C148. The noise in the IF pass-band is accepted and the frequency in the voice frequency band are rejected. Any noise present at the output of the filter is applied to the noise detect circuit.

### **Noise detect circuit (squelch board)**

The noise detect circuit in conjunction with IC2 consist of transistor Q701, and Q702 and diode D701. Any noise signal present is supplied to pin 2 of the squelch board from in 11 of IC2. The signal is amplified by Q701, rectified by D701 then buffered by Q702. The buffered signal is supplied to the squelch trigger pin12 of IC2. The squelch trigger output (pin 14, IC2) is supplied to the CPU on the digital PCB via pin 14 of CON2. When noise is present, the voltage at the pin 12 of IC2 exceeds 0.7 V, the squelch trigger output is 0 V (logic 0) muting the receiver audio circuit. When no noise is present, the voltage at the pin 12 of IC2 is less than 0.7 V and pin 14 of IC2 is at 5 V (logic 1) for unmuting the receiver audio circuit. Resistor R40 is used to provide hysteresis of 3dB to 6dB.

## **MICROPROCESSOR CONTROLLER**

The default of all functions in the radio is preset by the internal programmed microprocessor and any other user's options including the frequencies of receive and transmit are available by the microprocessor and associated interfacing circuit.

### **Microprocessor**

The microprocessor is a high speed 16k-byte ROM with 8-bit access. It contains the LCD driver, I/O controller. When the radio is turn on, the microprocessor resets power on by Q605 to operate in the preset order in the masked ROM. Whenever the key is activated, the data is saved in ROM after 2 seconds.

## **POWER SWITCHING CIRCUIT**

When the PTT switch is pressed, the microprocessor forwards clock and date sources to the pin 17, 18, 19 of the IC1. Accordingly, the pin 28 of the IC601 becomes low and the pin 27 becomes high causing the Q7 turn off and the Q28 turn on.

## **CTCSS/DTMF ENCODE AND DECODE CIRCUIT**

### **CTCSS receive**

The detected audio signal is supplied to pin 11 of IC602 for switching out to pin 12 and then supplied to pin 8 of IC603 to compare with OP AMP and passed to pin 3 to be supplied to pin 13 through C602 and R601. It is further amplified and referenced by OP AMP to be passed to pin 14. Again, by the same procedure, it is forwarded to pin 1 and out at pin 2 to be supplied to pin 34 of the microprocessor for control.

### **CTCSS transmit**

The datas received from the pins 10, 11, 16 of the microprocessor are supplied to pin 10 of the IC602 via R616, R617, R618 and VR603 for switching out at IC603. The signal received at pin 8 of IC603 via pin 12 of IC602 is filtered and passed to pin 3 and then to pins 14, 15 for being switched to transmit by pin 12 of CON 601.

### **DTMF decoding circuit**

The audio detection output supplied to the control board is also supplied to the bandpass filter (IC401) and passed to the DTMF decoding pin 8 of IC604 through the 8th active filter. With a data in the IC604, this audio detection output is passed to pin 14 of IC604 and supplied to pin 34 of microprocessor IC601 for control.

### **DTMF encoding circuit**

- DTMF encoding circuit is built in external DTMF microphone.
- DTMF signal is produced by microprocess or IC1 (LSC417487DW) and supplied to audio amp via VR604, R609, C605.

## **CONTROL AND INDICATOR CIRCUIT**

### **Channel select circuit**

The channel switch encodes the channel number selected into binary word. The binary word is passed through the channel to the pins 30, 31 of the microprocessor for control.

### **Signal level indicator**

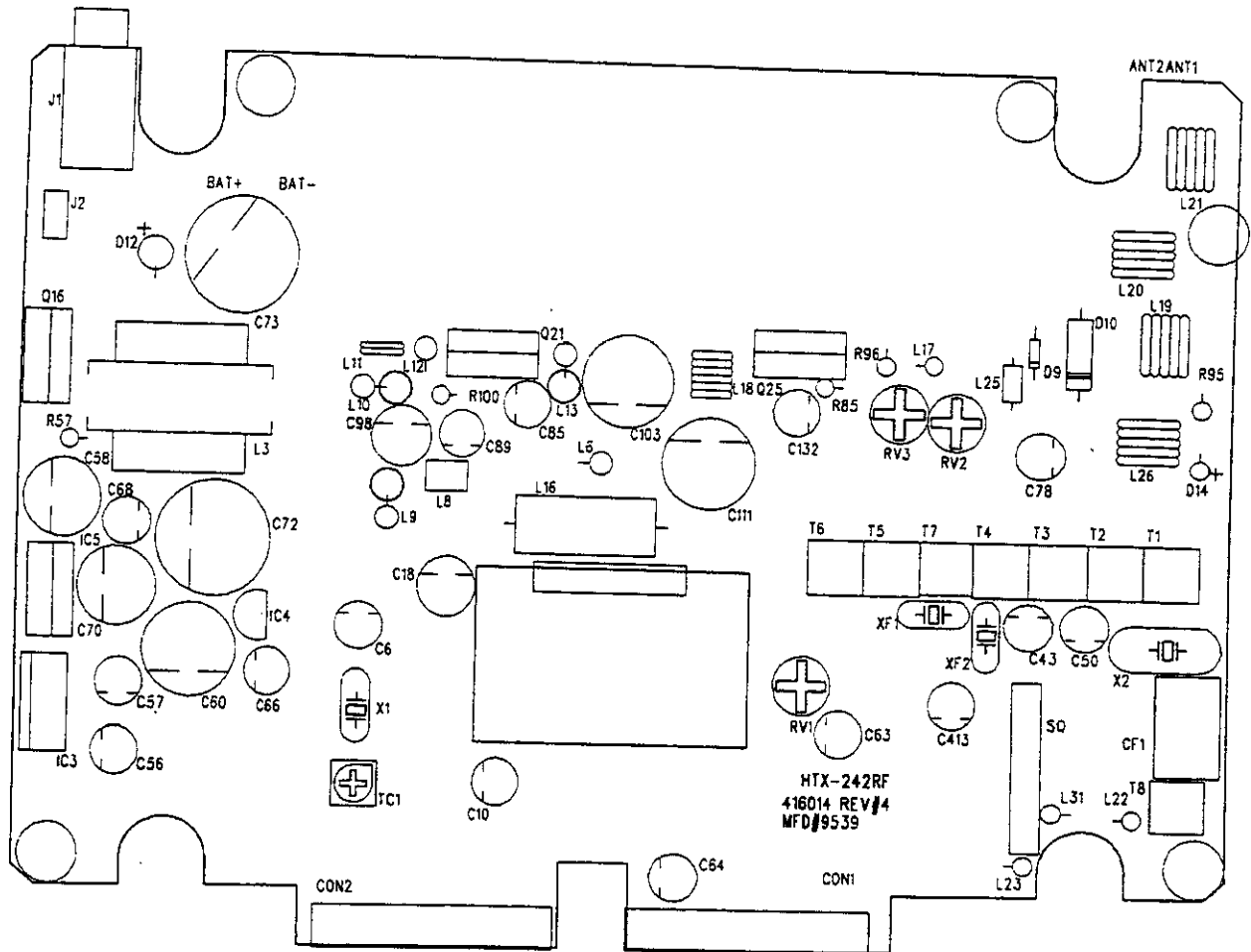
The received signal is supplied to IC7B and buffered to compare with the reference data from CPU. The microprocessor displays level of the signal strength.

### **TX level indicator**

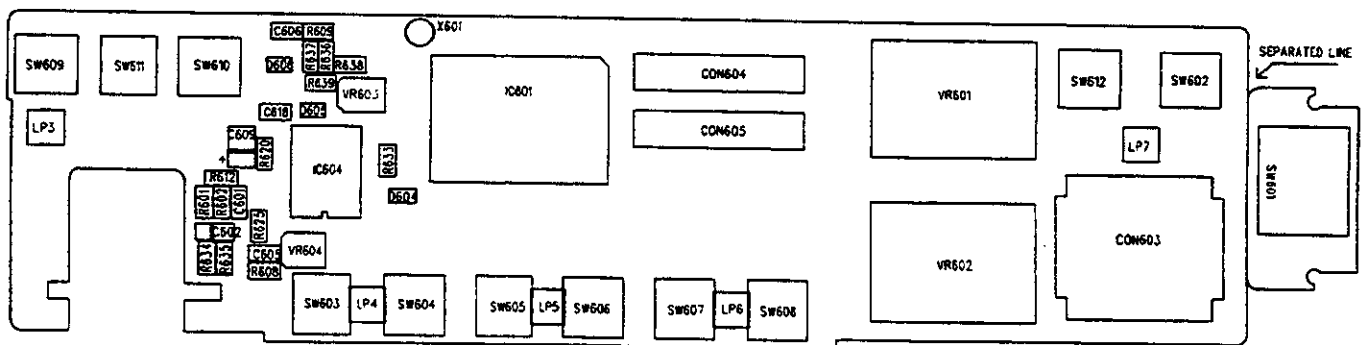
*The transmitted signal is supplied to the IC7A via a direction coupler D9, RV2 to compare with the reference data from CPU. When the output pin of IC7A is low, the microprocessor displays the TX level on the display.*

# ALIGNMENT AND ADJUSTMENT

## Alignment Test Points and Parts Locations



RF Board



Digital Board

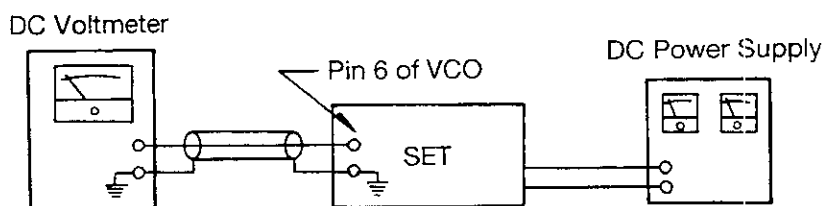
## Phase Locked Loop and CPU Section

### Test Equipment Required

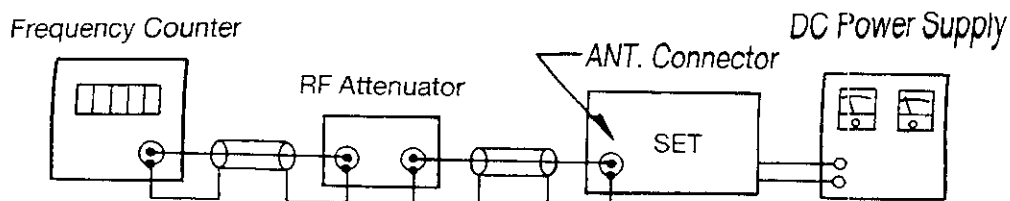
- Frequency counter
- DC power supply
- DC voltmeter (Input impedance 20 Mohms)
- RF attenuator (20 dB, impedance 50 ohms)

### General Alignment Procedure

Step	Setting	Connection	Adjust	Adjust for
1	VCO Voltage adjustment Frequency: 144.000 MHz MIC : Receive Volume : Optional Squelch : Optional	DC Voltmeter to pin 6 of VCO (figure 1-1)	T1 (VCO)	4.3 V DC – 4.6 V DC
2	Frequency adjustment Frequency: 146.000 MHz MIC : Transmit (no mode) Function : None Volume : Optional Squelch : Optional	Antenna to frequency counter through RF attenuator (figure 1-2)	TC1	Within 500 Hz



(Figure 1-1)



(Figure 1-2)

## Transmitter Section

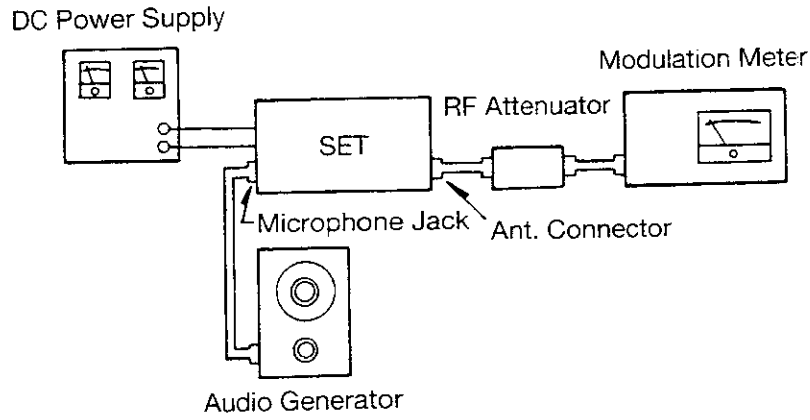
### Test Equipment Required

- RF power meter (100 W)
- 50 ohm dummy load (non-inductive)
- RF attenuator (50 ohms: non-inductive)
- Oscilloscope
- Audio generator
- DC power supply (13.8 V/10 A)
- Spectrum analyzer
- Frequency counter
- Coupler
- Modulation meter (FM)

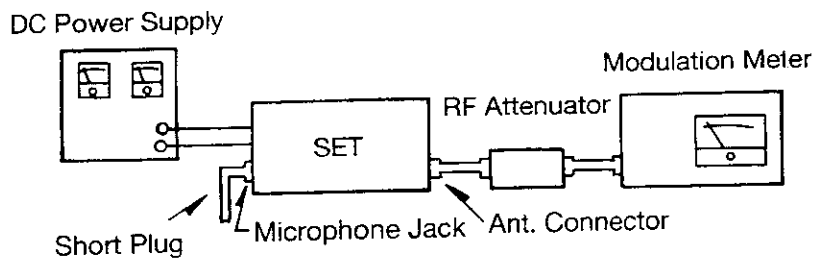
### Alignment Procedure

Step	Setting	Connection	Adjust	Adjust for
1	AF. modulation adjustment Frequency: 146.000 MHz MIC : Transmit Function : None Volume : Optional Squelch : Optional RF power selection : High	Connect the audio generator (Set to 1 kHz) to the microphone jack. Connect the modulation meter through the RF attenuator to the antenna jack. Adjust the audio signal level to obtain 3 kHz deviation. When you increase the audio signal by 20 dB, the deviation should not exceed 5 kHz deviation (Figure 2-1)	RV1	4.2 kHz (4.0 K-5 K)
2	CTCSS modulation adjustment Frequency: 146.000 MHz MIC : Transmit Function : Tone squelch mode (CTCSS: 100 Hz) Volume : Optional Squelch : Optional RF power selection: High	Connect the short plug to microphone jack. Connect modulation meter through RF attenuator. Connect RF power meter to antenna jack on the set. (Figure 2-2)	VR603	0.7 kHz (0.5 kHz-1 kHz)
3	DTMF modulation adjustment Frequency: 146.000 MHz MIC : Transmit Function : DTMF squelch mode Volume : Optional Squelch : Optional RF power selection: High	Connect the EXT. DTMF MIC to microphone jack. Connect modulation meter through RF attenuator to EXT-antenna jack on the set. Press a number button on the EXT. DTMF MIC (figure 2-3)	VR604	3.5 kHz (3 kHz-4 kHz)
4	Low power adjustment Frequency: 146.000 MHz MIC : Transmit Function : None Volume : Optional Squelch : Optional RF power selection: Low	Connect the short plug to microphone jack. Connect the dummy load to antenna jack on the set through RF power meter. (Figure 2-4)	RV2	13 W (10 W-15 W)

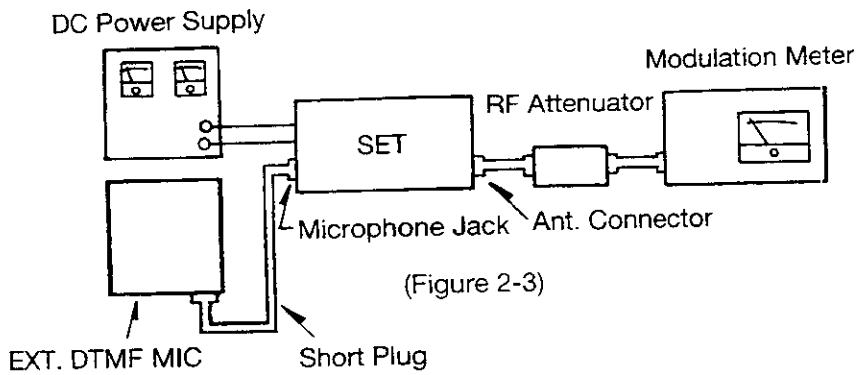




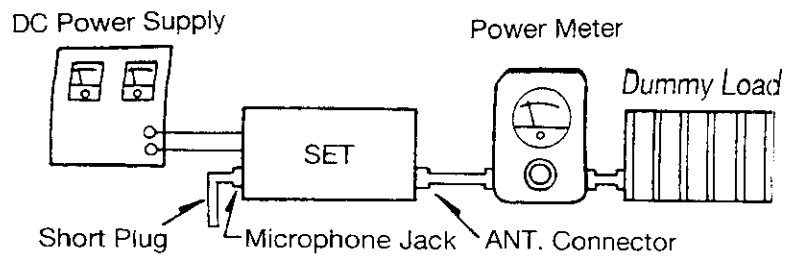
(Figure 2-1)



(Figure 2-2)



(Figure 2-3)



(Figure 2-4)

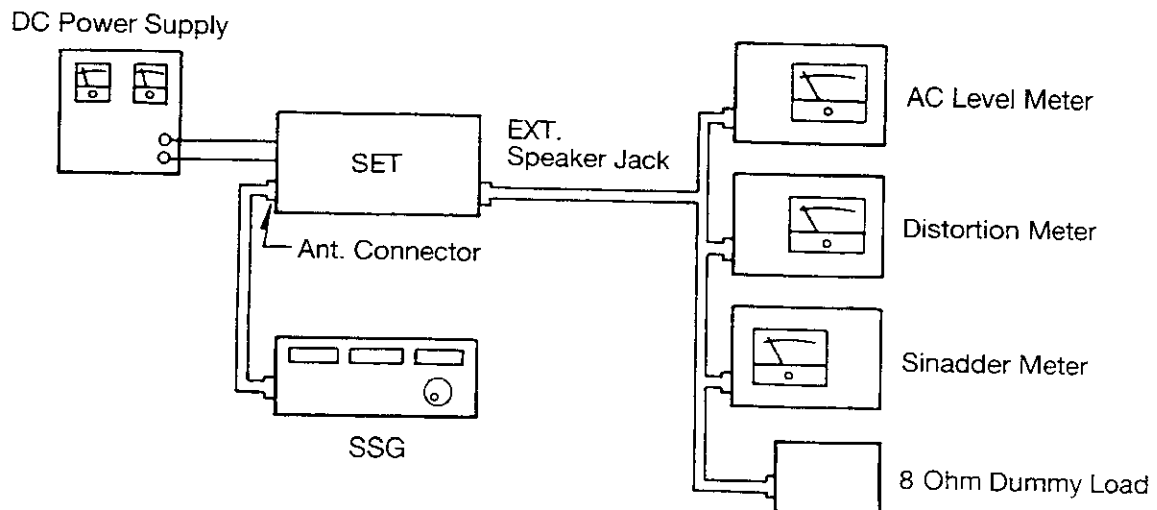
## Receiver Section

### Test Equipment Required

- Standard signal generator (SSG)
- AC level meter
- Distortion meter
- DC power supply
- 12 dB sinadder (signal-noise adder) meter

### Alignment Procedure

Step	Setting	Connection	Adjust	Adjust for
1	RX sensitivity adjustment Frequency: 144 MHz-148 MHz MIC :Receive Function :None Volume :Adjust for 1 V on the level meter. Squelch :Turn fully ccw SSG :Audio 1 kHz Modulation 3 kHz	Connect standard signal generator to EXT-antenna jack. Connect AC volt level meter, distortion meter and sinadder meter across EXT speaker jack with 8 ohm dummy load (Figure 3-1).	T8  T6 T5 T4 T3 T2 T1	Maximum indication on AC level meter. Maximum sensitivity indication on 12 dB sinadder meter. In the above condition, sensitivity is flat for 144 MHz-148 MHz
2	Distortion adjustment Frequency: 146.000 MHz MIC :Receive Function :None Volume :Adjust for 1 V on the AC level meter Squelch :Turn to counterclockwise SSG :Audio 1 KHz Modulation 3 KHz Level-47 dBm	Connect standard signal generator to EXT-antenna jack. Connect AC volt level meter, distortion meter across EXT speaker jack with 8 ohm dummy load. (Figure 3-1)	T7	Maximum indication on distortion meter.



(Figure 3-1)

## TROUBLESHOOTING

Symptom	Probable Cause	Remedy
Unit does not work at all	<ul style="list-style-type: none"> <li>• Defective power switch</li> <li>• Defective TR Q16, Q17</li>   <li>• Broken DC power cord</li> </ul>	<ul style="list-style-type: none"> <li>• Replace</li> <li>• Replace defective component (s)</li> <li>• Replace</li> </ul>
No output from speaker at all	<ul style="list-style-type: none"> <li>• Defective external speaker jack</li> <li>• Measure all the voltage of audio amplifier</li> <li>• Defective internal speaker</li> <li>• Turn off the DTMF and T-SQL Function</li> </ul>	<ul style="list-style-type: none"> <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 audio amplifier</li> <li>• Defective dquelch circuit components (VR602, R38, R40, R41, R42, R43, R44, C144)</li> <li>• Defective mute circuit components (R46, R47, R48, C77, Q13, Q14, Q15)</li> </ul>	<ul style="list-style-type: none"> <li>• Repair or Replace</li> <li>• Replace defective component (s)</li> <li>• Replace defective component (s)</li> </ul>
Squelch does not work	<ul style="list-style-type: none"> <li>• Defective squelch circuit components (VR602, R38, R40, R41, R42, R43, R44, C53, C54)</li> </ul>	<ul style="list-style-type: none"> <li>• Replace defective component (s)</li> </ul>
No modulation	<ul style="list-style-type: none"> <li>• Defective microphone</li> <li>• Measure all the voltage of MIC amplifier circuit.</li> <li>• Defective TX mute circuit components Q6.</li> </ul>	<ul style="list-style-type: none"> <li>• Replace</li> <li>• Replace</li>   <li>• Replace</li> </ul>
LCD display does not work	<ul style="list-style-type: none"> <li>• Measure all the voltage of Q603, C612, C607, R613, X601, C614, C615, R614 and the voltage of Q602's, Emitter</li> <li>• Defective LP1, LP2</li> </ul>	<ul style="list-style-type: none"> <li>• Replace defective component (s)</li> <li>• Check the voltage</li> </ul>
Back LED's do not light	<ul style="list-style-type: none"> <li>• Defective (Lp2~Lp7)</li> </ul>	<ul style="list-style-type: none"> <li>• Replace</li> </ul>

## ERROR DISPLAY

### 1. Internal RAM Error: Er1

Er1 indicates an internal RAM error. It appears when something else has caused the memory contents to become corrupt. To clear the error, turn on the unit while holding down the function button and T-SQL. This clears the memory.

If the error returns after you disconnect power, check the IC606 and check for any point of cold solder around.

### 2. PLL unlock Error: Er2

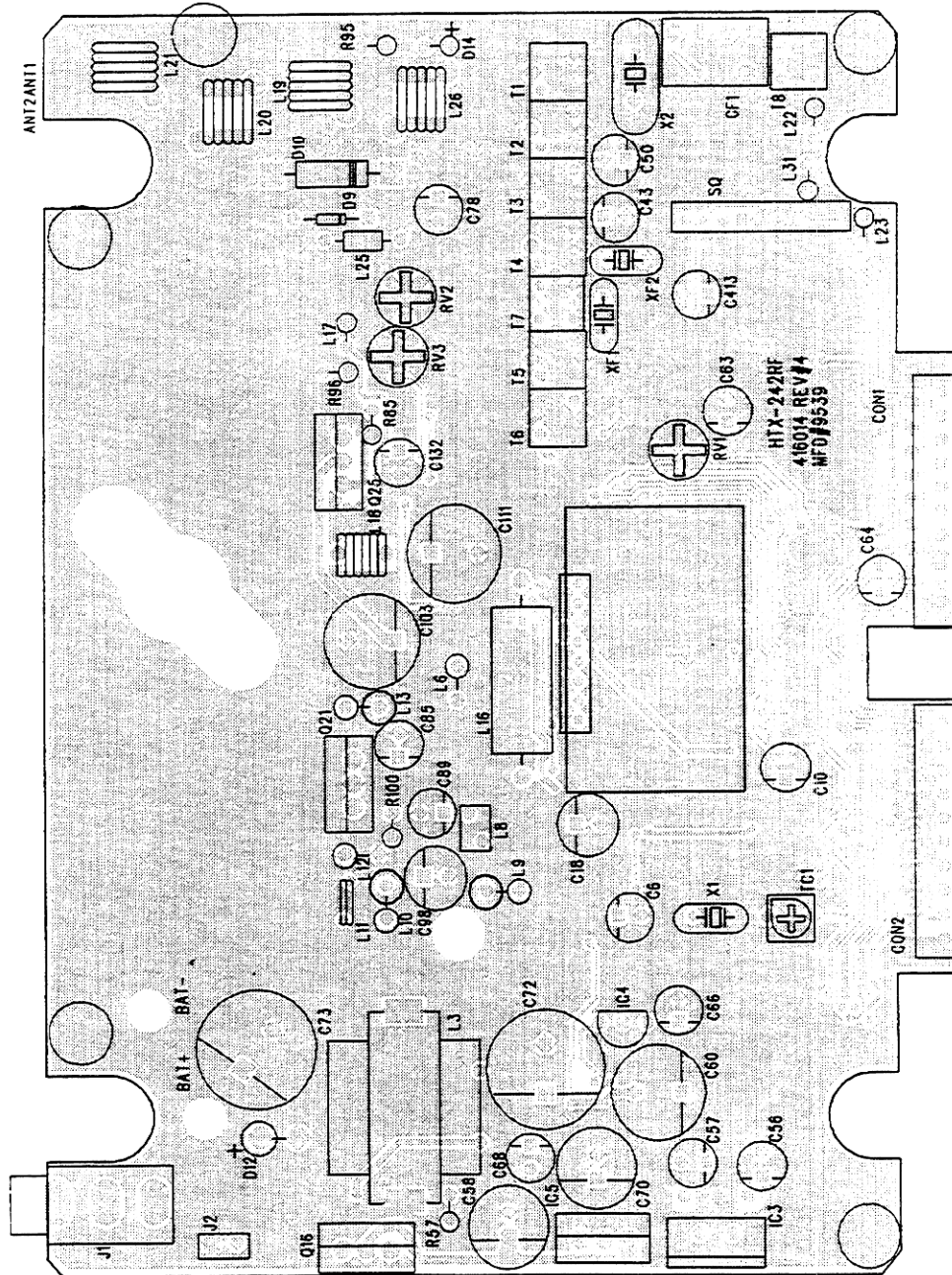
Er2 indicates the PLL has unlocked. Check the following:

- PLL alignment
- Check for 5 V at collector of Q5.
- Confirm that X1 is oscillating. If not, check the connections to pins 1 and 20 of IC1. If the connections are good, check for 5 V at pin 12, 14 of IC1. If not present 5 V, check connections to L1 and power.
- Confirm 5 kHz signal at pin 2 of IC1. If not, check connections to pin 19(DT), pin 17(EN), and pin 18(CK).
- Check if Q5 is in normal condition.

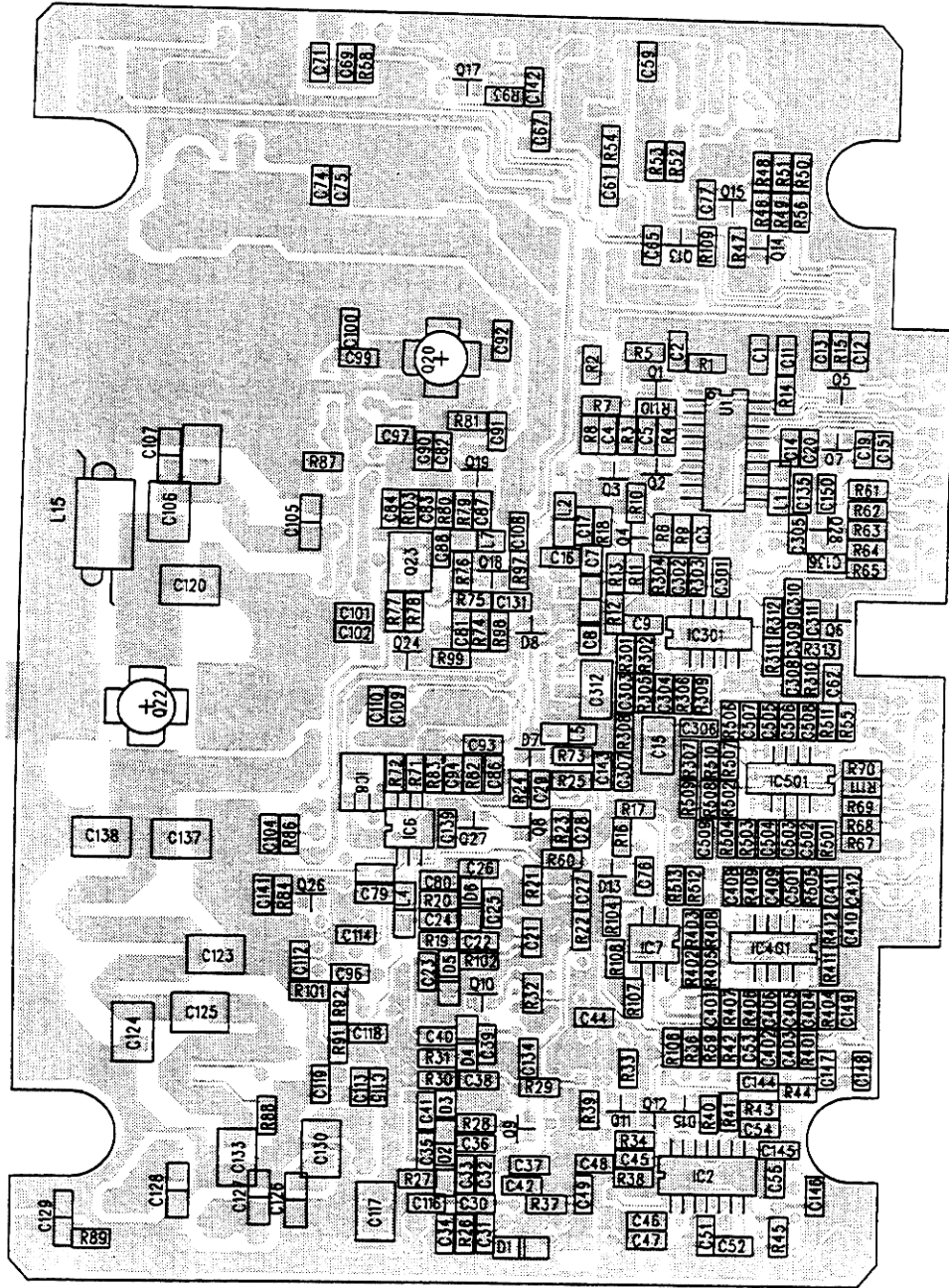
If the above errors are not fixed yet, then replace IC1.

# PRINTED CIRCUIT BOARD

RF PCB

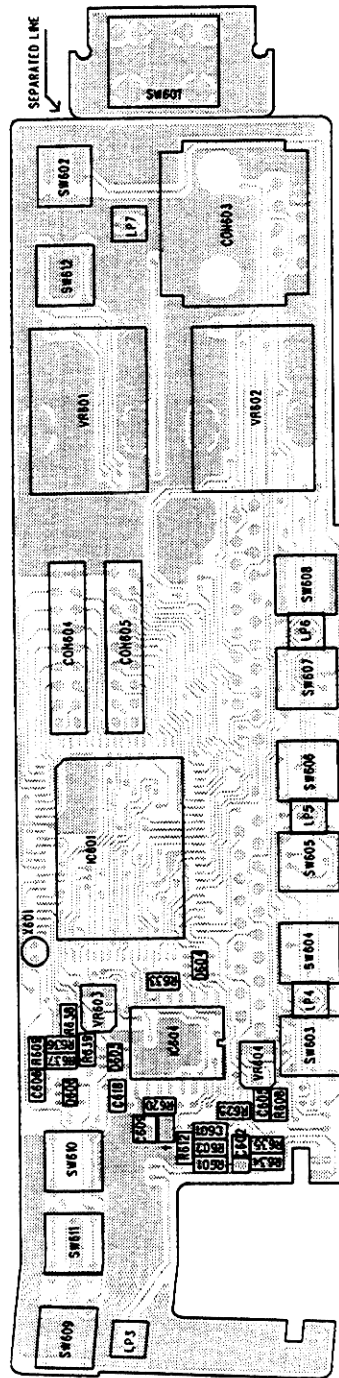


Top View

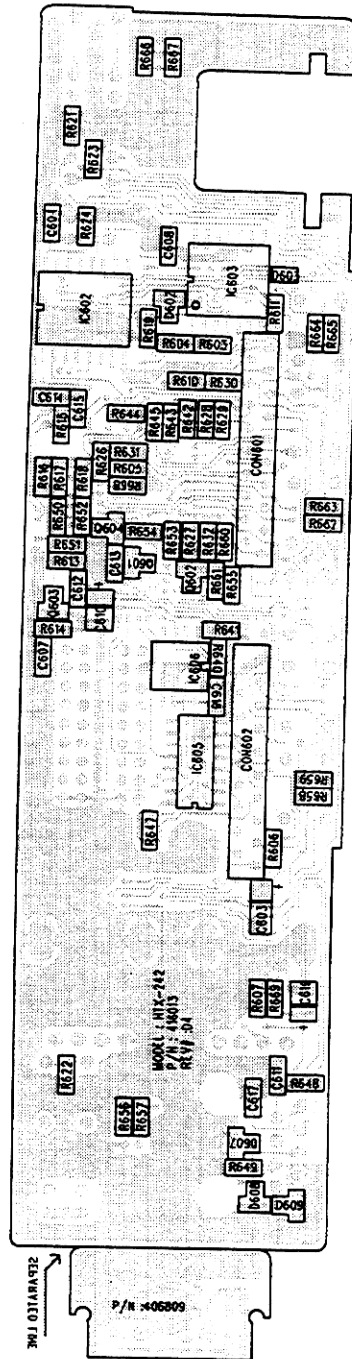


Bottom View

# Digital PCB



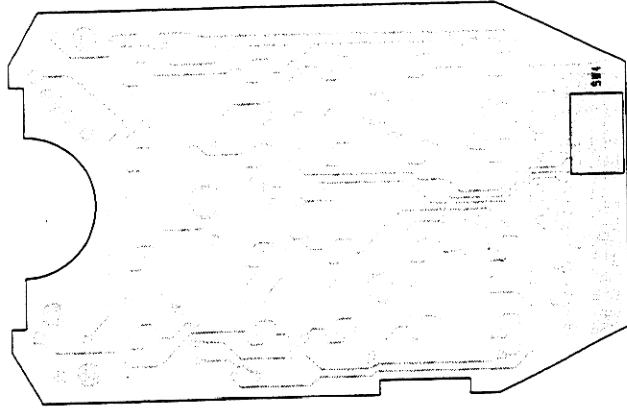
Top View



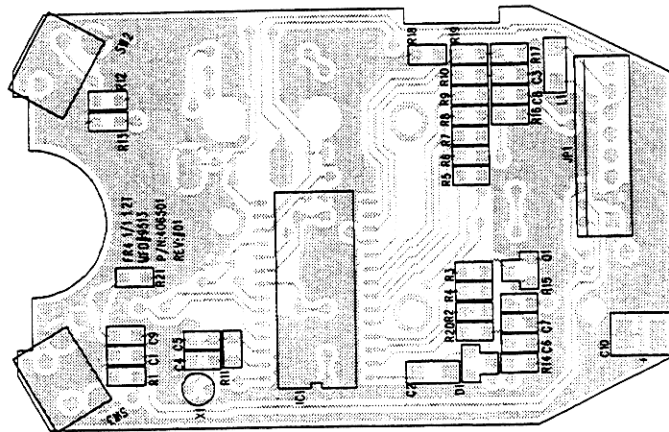
Bottom View



# Microphone PCB

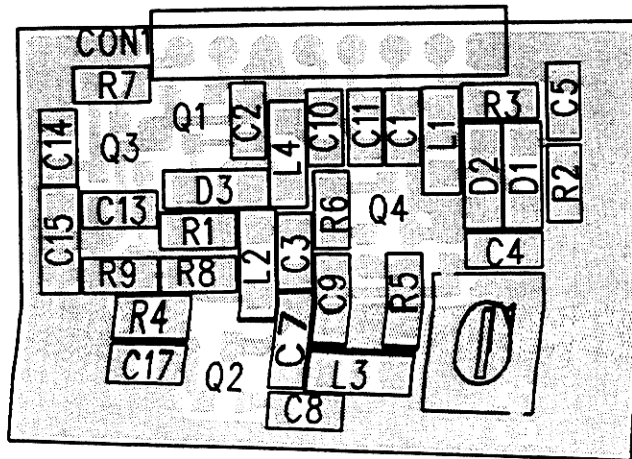


Top View



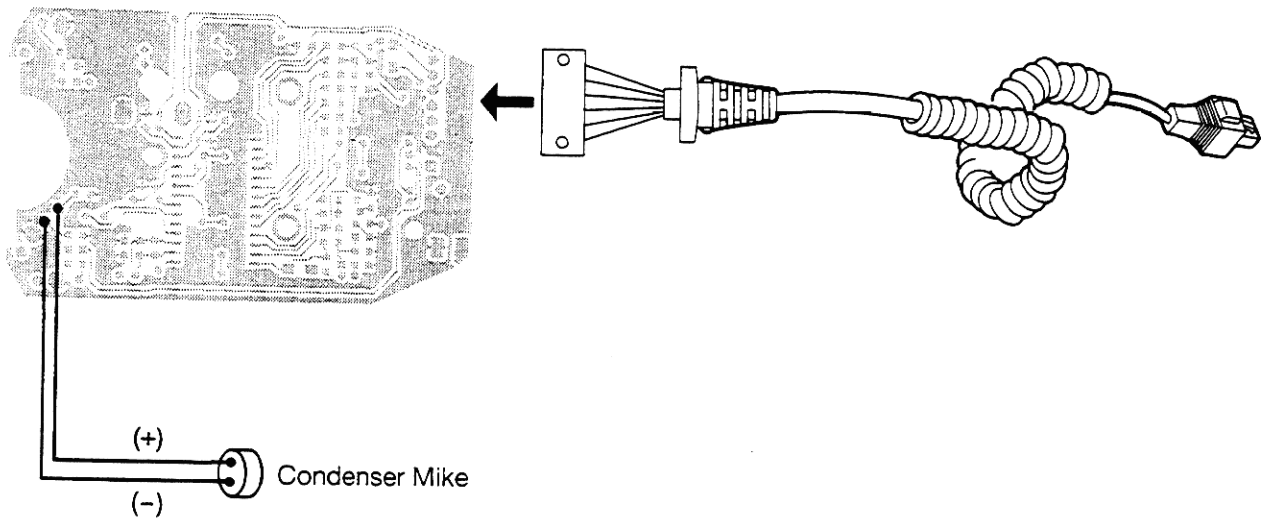
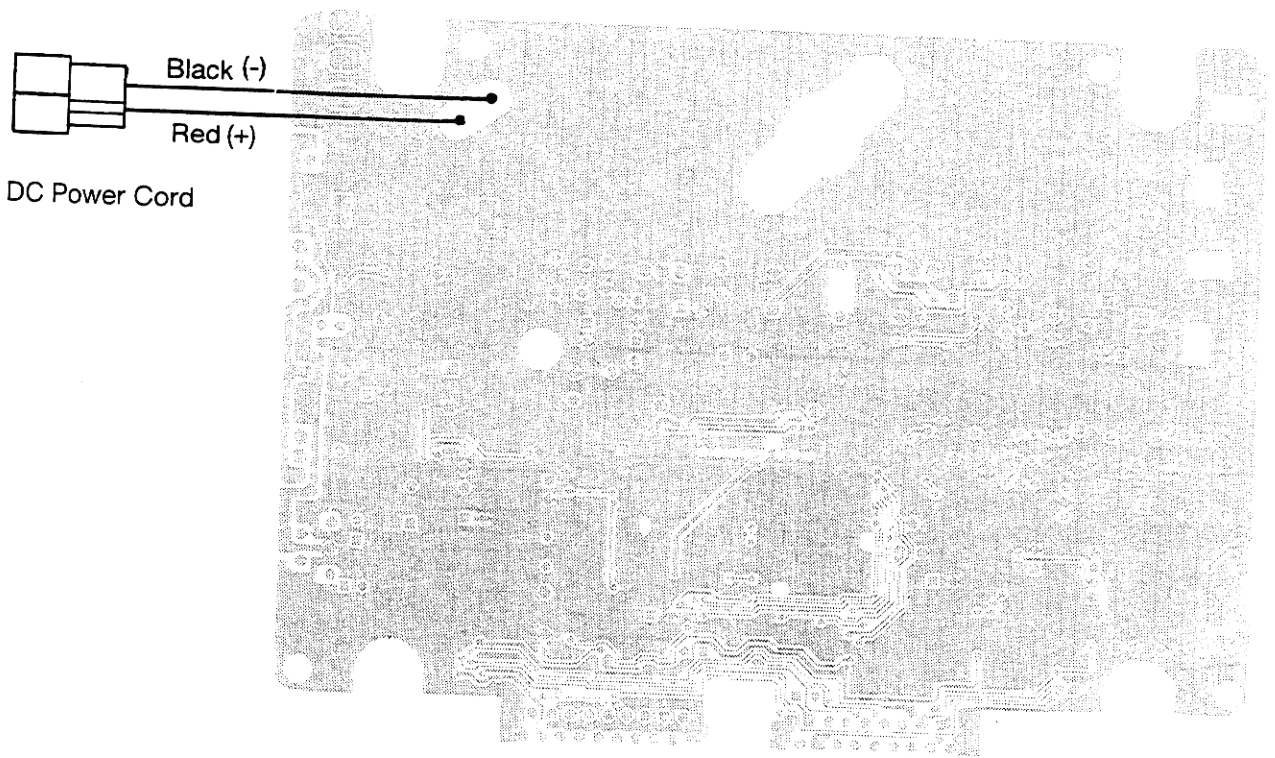
Bottom View

# VCO PCB

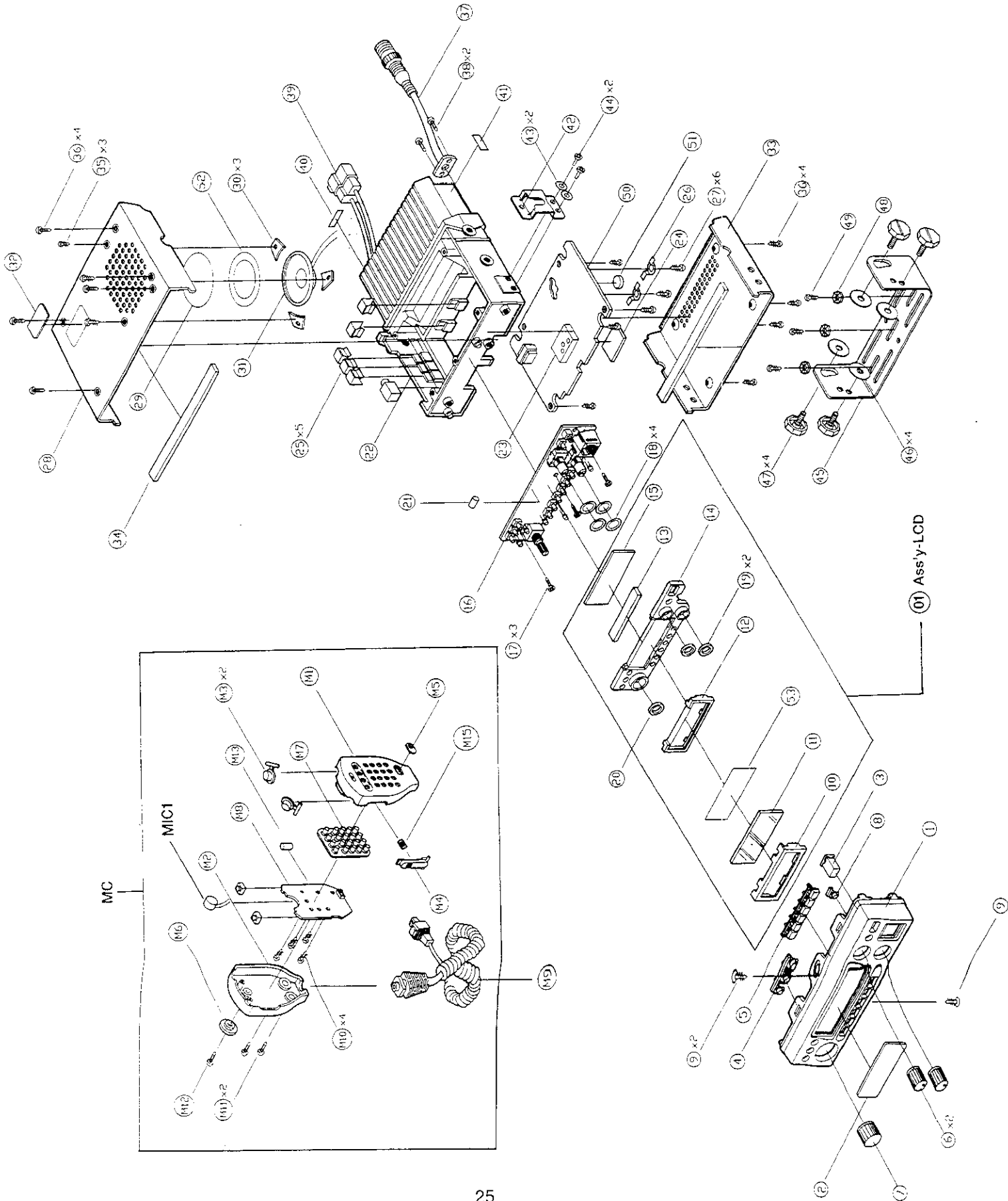


Top View

# WIRING DIAGRAM



# EXPLODED VIEW



## EXPLODED VIEW PARTS LIST

### MAINSET

Ref. No.	Description	RS Part No.	Mfr.'s Part No.
1	Escutcheon NORYL, black		801-292
2	LCD Window PC Clear (#900) T1.0 For USA		813-928-C
2	LCD Window PC Clear (#900) T1.0 For CA		813-928-A
3	Knob, Power ABS 94HB, black		826-148
4	Button (3) ABS 94HB, clear		826-149-A
5	Button (6) ABS 94HB, black		826-150-B
6	Knob, Volume/Squelch ABS 94HB, black		826-151
7	Knob, Channel ABS 94HB, black		826-152
8	Button (Single) ABS 94HB, clear		826-153-A
9	(+) Machine screw (FH) 3 × 8, black		613-570
10	LCD can SPTe T0.3		732-848-A
11	LCD display XO-134		252-129-1
12	Holder LCD ABS 94HB, white		732-855-A
13	Zebra connector YP-Type, 52.9 × 7.5 × 2		895-206
14	Illuminator acryl, clear		813-929-A
15	PCB LCD 66 × 24.7 × T1.0 FR 4 1/1, blank		406-802
16	PCB digital 135.5 × 36 × T1.6 FR 4 1/1, blank		416-008
17	(+) Machine screw (BH) 3 × 8 Ni-Plat		613-323
18	Washer (Vol., Sq., S/W) 13 × 9.3 × 0.5 SPC		662-901
19	Nut ring BSBM M9 × 0.75 (P)		650-330
20	Nut ring BSBM M7 × 0.75 (P)		650-335
21	Holder silicone rubber gray HS50		894-772
22	Frame ALDC12 black spray		719-078-A
23	Shield can BSP T0.4 Sn-plat		772-010-A
24	Assembly, VCO PCB		593-417
25	Bracket TR SUS304 T0.5		723-844
26	Plate ground SPTe T0.3		772-227
27	(+) Machine screw (BH) 3 × 8 Ni-plate		613-323
28	Cover upper SECC+PVC T0.95		719-039
29	Felt ø68 × T0.3		900-133
30	Bracket speaker EGI T1.0		723-843
31	Speaker ER-066-A4927		420-116-7
32	Label name polyester 34.2 × 17.5 For USA		959-602-E
33	Cover, Bttom SECC+PVC T0.95		903-370
34	FELT 6 × 72 × T0.3 FELT blk Stic		719-040-A
35	(+) Machine screw (PH) 3 × 6, black		613-059
36	(+) Machine screw (BH) 3 × 8, black		613-314
37	Antenna cable assembly MJ-RG, 58/U		509-136-Y
38	(+) Machine screw (BH) 3 × 8, Ni-plate		613-324
39	2P plug assembly SH-40908		504-367-A
40	Label voltage polyester 14 × 3.5		959-971
41	Label date code polyester 12 × 6		959-102-A
42	Bracket SUS T0.8		723-788
43	Washer (flat) M3 ø3.2 × ø7 × T0.5 Zn-plat		661-300
44	(+) Machine screw (BH) 3 × 8 Ni-plat		713-323
45	Bracket SPC T1.6 black		723-827
46	Washer rubber ø7 × ø25 × T1.5, black		660-138
47	(-) Securing screw ABS M6 × 8 (P:1), black		600-718
48	Washer (lock "B" type) M5 Zn-plat		665-518
49	(+) Tapping screw (TH) 5 × 12-1S Zn-plat		625-007
50	Assembly, RF PCB		593-414

Ref. No.	Description	RS Part No.	Mfr.'s Part No.
51	Transistor		203-082-1
52	Gasket (SPK) Neoprene Rubber		895-205
53	Plate Diffusing Lexan Sheet T0.2 EMBO		795-724
01	Assembly, LED		

## MICROPHONE

Ref. No.	Description	RS Part No.	Mfr.'s Part No.
MC	Assembly, MICROPHONE		
M1	Cover, upper ABS 94HB, black		719-080
M2	Cover, bottom ABS 94HB, black		719-081
M3	Knob up/down ABS 94HB, black		826-156
M4	Knob PTT ABS 94HB, black		826-154
M5	Knob on/off ABS 94HB, black		826-155
M6	Holder PC, black		732-860
M7	Key pad silicone rubber, black		895-108
M8	Assembly-mic SMD for USA		416-986
M8	Assembly-mic SMD for CA		593-417
M9	Cord curl(MIC) 7CO, 1SH, PUT, black(KSK-23108)		420-363-8
M10	(+) Tapping screw (BH) 2×6-1S, Zn-plat		622-039
M11	(+) Tapping screw (BH) 3×8-2S, black		623-344
M12	(+) Tapping screw (BH) 3×10-2S, black		623-405
M13	Holder silicone rubber gray HS 50		894-772
M14	Label MIC polyester 19.5×11.5		959-995-A
M15	Spring		881-602
MIC1	Mike Condenser, KUC4023-010010		420-205-9Y

## ELECTRICAL PARTS LIST

Ref. No.	Description	RS Part No.	Mfr.'s Part No.
<b>Assembly, RF PCB</b>			
<b>Capacitors</b>			
C1	Ceramic, Chip, 27 pF 50 V, 0805, $\pm 5\%$		132-714-2Z
C2	Ceramic, Chip, 33 pF 50 V, 0805, $\pm 5\%$		133-306-2Z
C3	Ceramic, Chip, 220 pF 50 V, 0805, $\pm 5\%$		132-220-2Z
C4	Ceramic, Chip, 5 pF 50 V, 0805, $\pm 0.25\text{ pF}$		135-010-4Z
C5	Ceramic, Chip, 5 pF 50 V, 0805, $\pm 0.25\text{ pF}$		135-010-4Z
C6	Electrolytic, 10 $\mu\text{F}$ 16V, 4dia $\times$ 7, $\pm 20\%$		101-043-5
C7	Tantalum, Chip, 2.2 $\mu\text{F}$ 16 V, A, $\pm 20\%$		142-227-2Z
C8	Tantalum, Chip, 0.1 $\mu\text{F}$ 35 V, A, $\pm 20\%$		140-114-3Z
C9	Ceramic, Chip, 0.01 $\mu\text{F}$ 50 V, 0805, $\pm 10\%$		130-172-2Z
C10	Electrolytic 10 $\mu\text{F}$ 16V, 4dia $\times$ 7, $\pm 20\%$		101-043-5
C11	Ceramic, Chip, 220 pF 50 V, 0805, $\pm 5\%$		132-220-2Z
C12	Ceramic, Chip, 0.1 $\mu\text{F}$ 25 V, 0805, +80 %--20 %		130-170-0Z
C13	Ceramic, Chip, 220 pF 50 V, 0805, $\pm 5\%$		132-220-2Z
C14	Ceramic, Chip, 220 pF 50 V, 0805, $\pm 5\%$		132-220-2Z
C15	Tantalum, Chip, 10 $\mu\text{F}$ 10 V, B, $\pm 20\%$		141-046-0Z
C16	Ceramic, Chip, 220 pF 50 V, 0805, $\pm 5\%$		132-220-2Z
C17	Ceramic, Chip, 220 pF 50 V, 0805, $\pm 5\%$		132-220-2Z
C18	Electrolytic 100 $\mu\text{F}$ 25V 6.3dia $\times$ 11, $\pm 20\%$		101-023-7
C19	Ceramic, Chip, 220 pF 50 V, 0805, $\pm 5\%$		132-220-2Z
C20	Ceramic, Chip, 0.1 $\mu\text{F}$ 25 V, 0805, +80 %--20 %		130-170-0Z
C21	Ceramic, Chip, 5 pF 50 V, 0805, $\pm 0.25\text{ pF}$		135-010-4Z
C22	Ceramic, Chip, 33 pF 50 V, 0805, $\pm 10\%$		133-306-2Z
C23	Ceramic, Chip, 0.001 $\mu\text{F}$ 50 V, 0805, $\pm 10\%$		130-A17-6Z
C24	Ceramic, Chip, 0.001 $\mu\text{F}$ 50 V, 0805, $\pm 10\%$		130-A17-6Z
C25	Ceramic, Chip, 1.5 pF 50 V, 0805, $\pm 0.25\text{ pF}$		131-559-4Y
C26	Ceramic, Chip, 33 pF 50 V, 0805, $\pm 5\%$		133-306-2Z
C27	Ceramic, Chip, 0.001 $\mu\text{F}$ 50 V, 0805, $\pm 10\%$		130-A17-6Z
C28	Ceramic, Chip, 0.001 $\mu\text{F}$ 50 V, 0805, $\pm 10\%$		130-A17-6Z
C29	Ceramic, Chip, 22 pF 50 V, 0805, $\pm 5\%$		132-216-9Z
C30	Ceramic, Chip, 5 pF 50 V, 0805, $\pm 0.25\text{ pF}$		135-010-4Z
C31	Ceramic, Chip, 27 pF 50 V, 0805, $\pm 5\%$		132-714-2Z
C32	Ceramic, Chip, 2 pF 50 V, 0805, $\pm 0.25\text{ pF}$		132-011-0Z
C33	Ceramic, Chip, 27 pF 50 V, 0805, $\pm 0.25\text{ pF}$		132-714-2Z
C34	Ceramic, Chip, 0.001 $\mu\text{F}$ 50 V, 0805, $\pm 10\%$		130-A17-6Z
C35	Ceramic, Chip, 0.001 $\mu\text{F}$ 50 V, 0805, $\pm 10\%$		130-A17-6Z
C36	Ceramic, Chip, 0.001 $\mu\text{F}$ 50 V, 0805, $\pm 10\%$		103-A17-6Z
C37	Ceramic, Chip, 0.001 $\mu\text{F}$ 50 V, 0805, $\pm 10\%$		103-A17-6Z

Ref. No.	Description	RS Part No.	Mfr.'s Part No.
C38	Ceramic, Chip, 27 pF 50 V, 0805, $\pm 5$ %		132-714-2Z
C39	Ceramic, Chip, 27 pF 50 V, 0805, $\pm 5$ %		132-714-2Z
C40	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm 10$ %		130-A17-6Z
C41	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm 10$ %		130-A17-6Z
C42	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm 10$ %		130-A17-6Z
C43	Electrolytic, 10 $\mu$ F 16V, 4 dia $\times$ 7, $\pm 20$ %		101-043-5
C44	Ceramic, Chip, 5 pF 50 V, 0805, $\pm 0.25$ pF		135-010-4Z
C45	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm 10$ %		130-A17-6Z
C46	Ceramic, Chip, 39 pF 50 V, 0805, $\pm 5$ %		133-932-7Z
C47	Ceramic, Chip, 68 pF 50 V, 0805, $\pm 5$ %		136-816-5Z
C48	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, +80 %--20 %		130-170-0Z
C49	Ceramic, Chip, 0.01 $\mu$ F 50 V, 0805, $\pm 10$ %		130-172-2
C50	Electrolytic 10 $\mu$ F 16V, 4 dia $\times$ 7, $\pm 20$ %		101-043-5
C51	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, +80 %--20 %		130-170-0Z
C52	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, +80 %--20 %		130-170-0Z
C53	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, +80 %--25 %		130-170-0Z
C54	Ceramic, Chip, 10 pF 50 V, 0805, $\pm 10$ %		131-039-1Y
C55	Ceramic, Chip, 220 pF 50 V, 0805, $\pm 5$ %		132-220-2Z
C56	Electrolytic, 1 $\mu$ F 50V, $\pm 20$ %		101-006-2
C57	Electrolytic, 10 $\mu$ F 16 V, 4 dia $\times$ 7, $\pm 20$ %		101-043-5
C58	Electrolytic, 220 $\mu$ F 16 V, 8 dia $\times$ 11.5, $\pm 20$ %		102-242-3
C59	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm 10$ %		130-A17-6Z
C60	Electrolytic, 470 $\mu$ F 16 V, 10 dia $\times$ 12.5, $\pm 20$ %		104-723-1
C61	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, $\pm 10$ %		130-170-0Z
C62	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, $\pm 10$ %		130-170-0Z
C63	Electrolytic, 10 $\mu$ F 16 V, 4 dia $\times$ 7, $\pm 20$ %		101-043-5
C64	Electrolytic, 1 $\mu$ F 50V, $\pm 20$ %		101-006-2
C65	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, +80 %--20 %		130-170-0Z
C66	Electrolytic, 10 $\mu$ F 16 V, 4 dia $\times$ 7, $\pm 20$ %		101-043-5
C67	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, +80 %--20 %		130-170-0Z
C68	Electrolytic, 10 $\mu$ F 16 V, 4 dia $\times$ 7, $\pm 20$ %		101-043-5
C69	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, +80 %--20 %		130-170-0Z
C70	Electrolytic, 220 $\mu$ F 16 V, 8 dia $\times$ 11.5, $\pm 20$ %		102-242-3
C71	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, +80 %--20 %		130-170-0Z
C72	Electrolytic, 2200 $\mu$ F 25 V, 16 dia $\times$ 25, $\pm 20$ %		102-278-6
C73	Electrolytic, 2200 $\mu$ F 25 V, 16 dia $\times$ 25, $\pm 20$ %		102-278-6
C74	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, +80 %--20 %		130-170-0Z
C75	Ceramic, Chip, 220 pF 50 V, 0805, $\pm 5$ %		132-220-2Z
C77	Ceramic, Chip, 0.68 $\mu$ F 50 V, 0805, +80 %--20 %		130-624-4

Ref. No.	Description	RS Part No.	Mfr.'s Part No.
C78	Electrolytic 10 $\mu$ F 16 V, 4 dia $\times$ 7, $\pm$ 20 %		101-043-5
C79	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-A17-6Z
C80	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-A17-6Z
C81	Ceramic, Chip, 51 pF 50 V, 0805, $\pm$ 5 %		135-103-5Z
C82	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, +80 %--20 %		130-170-0Z
C83	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-A17-6Z
C84	Ceramic, Chip, 220 pF 50 V, 0805, $\pm$ 5 %		132-220-2Z
C85	Electrolytic, 10 $\mu$ F 16 V, 4 dia $\times$ 7, $\pm$ 20 %		101-043-5
C86	Ceramic, Chip, 220 pF 50 V, 0805, $\pm$ 5 %		132-220-2Z
C87	Ceramic, Chip, 15 pF 50 V, 0805, $\pm$ 5 %		131-511-0Z
C88	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, +80 %--20 %		130-170-0Z
C89	Electrolytic, 10 $\mu$ F 16 V, 4 dia $\times$ 7, $\pm$ 20 %		101-043-5
C90	Ceramic, Chip, 220 pF 50 V, 0805, $\pm$ 5 %		132-220-2Z
C91	Ceramic, Chip, 22 pF 50 V, 0805, $\pm$ 5 %		132-216-9Z
C92	Ceramic, Chip, 15 pF 50 V, 0805, $\pm$ 5 %		131-511-0Z
C93	Ceramic, Chip, 0.01 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-172-2Z
C94	Ceramic, Chip, 220 pF 50 V, 0805, $\pm$ 5 %		132-220-2Z
C96	Ceramic, Chip, 220 pF 50 V, 0805, $\pm$ 5 %		132-220-2Z
C97	Ceramic, Chip, 220 pF 50 V, 0805, $\pm$ 5 %		132-220-2Z
C98	Electrolytic, 100 $\mu$ F 25 V, 6.3 dia $\times$ 11, $\pm$ 20 %		101-023-7
C99	Ceramic, Chip, 47 pF 50 V, 0805, $\pm$ 5 %		134-722-1Z
C100	Ceramic, Chip, 68 pF 50 V, 0805, $\pm$ 5 %		136-816-5Z
C101	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-A17-6Z
C102	Ceramic, Chip, 220 pF 50 V, 0805, $\pm$ 5 %		132-220-2Z
C103	Electrolytic, 1000 $\mu$ F 16 V, 12 dia $\times$ 16, $\pm$ 20 %		101-048-0
C104	Ceramic, Chip, 220 pF 50 V, 0805, $\pm$ 5 %		132-220-2Z
C105	Ceramic, Chip, 150 pF, 50 V, 1206, $\pm$ 5 %		131-522-0Y
C106	Ceramic, Chip, 0.001 $\mu$ F 100 V, 1210, $\pm$ 5 %		131-025-8Y
C107	Ceramic, Chip, 91 pF, 100 V, 1206, $\pm$ 5 %		139-105-7
C108	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-A17-6Z
C109	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-A17-6Z
C110	Ceramic, Chip, 220 pF 50 V, 0805, $\pm$ 5 %		132-220-2Z
C111	Electrolytic, 1000 $\mu$ F 16 V, 12 dia $\times$ 16, $\pm$ 20 %		101-048-0
C112	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm$ 5 %		130-A17-6Z
C113	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm$ 5 %		130-A17-6Z
C114	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm$ 5 %		130-A17-6Z
C115	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm$ 5 %		130-A17-6Z
C116	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm$ 5 %		130-A17-6Z
C117	Ceramic, Chip, 0.001 $\mu$ F 100 V 1210, $\pm$ 10 %		131-025-8Y
C118	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm$ 5 %		130-A17-6Z



Ref. No.	Description	RS Part No.	Mfr.'s Part No.
C119	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm 5$ %		130-A17-6Z
C120	Ceramic, Chip, 180 pF 300 V, GR111, $\pm 5$ %		131-815-5Z
C121	Ceramic, Chip, 180 pF 300 V, GR111, $\pm 5$ %		131-815-5Z
C123	Ceramic, Chip, 82 pF 500 V, GR111, $\pm 5$ %		138-216-9Z
C124	Ceramic, Chip, 22 pF 500 V, GR111, $\pm 5$ %		132-255-7Z
C125	Ceramic, Chip, 0.001 $\mu$ F 100 V, 1210, $\pm 10$ %		131-025-8Y
C126	Ceramic, Chip, 22 pF 200 V, 1206, $\pm 5$ %		132-217-0Y
C127	Ceramic, Chip, 43 pF 200 V, 1206, $\pm 5$ %		134-302-2Z
C128	Ceramic, Chip, 43 pF 200 V, 1206, $\pm 5$ %		134-302-2Z
C129	Ceramic, Chip, 20 pF 200 V, 1206, $\pm 5$ %		132-021-9
C130	Ceramic, Chip, 0.001 $\mu$ F 100 V, 1210, $\pm 10$ %		131-025-8Y
C131	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm 10$ %		130-A17-6Z
C132	Electrolytic, 10 $\mu$ F 16 V, 4 dia $\times$ 7, $\pm 20$ %		101-043-5
C133	Ceramic, Chip, 8.2 pF 500 V, GR111, $\pm 5$ %		138-215-8
C134	Ceramic, Chip, 1 pF 50 V, 0805, $\pm 0.25$ pF		131-030-2Y
C135	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm 10$ %		130-A17-6Z
C136	Ceramic, Chip, 220 pF 50 V, 0805, $\pm 5$ %		132-220-2Z
C137	Ceramic, Chip, 3.9 pF 300 V, GR111, $\pm 5$ %		133-907-5Z
C138	Ceramic, Chip, 3.9 pF 300 V, GR111, $\pm 5$ %		133-907-5Z
C139	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm 10$ %		130-A17-6Z
C141	Ceramic, Chip, 220 pF 50 V, 0805, $\pm 5$ %		132-220-2Z
C142	Ceramic, Chip, 0.01 $\mu$ F 50 V, 0805, $\pm 10$ %		130-172-2Z
C143	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, +80--20 %		130-170-0Z
C144	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm 10$ %		130-A17-6Z
C145	Ceramic, Chip, 0.01 $\mu$ F 50 V, 0805, $\pm 10$ %		130-172-2Z
C146	Ceramic, Chip, 0.01 $\mu$ F 50 V, 0805, $\pm 10$ %		130-172-2Z
C147	Ceramic, Chip, 0.01 $\mu$ F 50 V, 0805, $\pm 10$ %		130-172-2Z
C148	Ceramic, Chip, 0.01 $\mu$ F 50 V, 0805, $\pm 10$ %		130-172-2Z
C149	Ceramic, Chip, 220 pF 50 V, 0805, $\pm 5$ %		132-220-2Z
C150	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm 10$ %		130-A17-6Z
C151	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm 10$ %		130-A17-6Z
C301	Ceramic, Chip, 0.0018 $\mu$ F 50 V, 0805, $\pm 10$ %		130-A22-0Z
C302	Ceramic, Chip, 0.022 $\mu$ F 50 V, 0805, $\pm 10$ %		130-263-1Z
C303	Ceramic, Chip, 0.0039 $\mu$ F 50 V, 0805, $\pm 10$ %		130-329-8Z
C304	Ceramic, Chip, 0.0056 $\mu$ F 50 V, 0805, $\pm 10$ %		130-514-8Z
C305	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, +80 %--20 %		130-170-0Z
C306	Ceramic, Chip, 0.01 $\mu$ F 50 V, 0805, $\pm 10$ %		130-172-2Z
C307	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, +80 %--20 %		130-170-0Z
C308	Ceramic, Chip 56 pF 50 V, 0805, $\pm 5$ %		135-613-9Z

Ref. No.	Description	RS Part No.	Mfr.'s Part No.
C309	Ceramic, Chip, 0.022 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-263-1Z
C310	Ceramic, Chip, 56 pF 50 V, 0805, $\pm$ 5 %		135-613-9Z
C311	Ceramic, Chip, 0.033 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-314-5Z
C312	Tantalum, Chip, 10 $\mu$ F 10 V, $\pm$ 20 %		141-046-0Z
C401	Ceramic, Chip, 0.01 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-172-2Z
C402	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, +80 %--20 %		130-170-0Z
C403	Ceramic, Chip, 0.015 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-A44-0Z
C404	Ceramic, Chip, 0.015 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-A44-0Z
C405	Ceramic, Chip, 0.015 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-A44-0Z
C406	Ceramic, Chip, 0.015 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-A44-0
C408	Ceramic, Chip 0.0033 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-315-6Z
C409	Ceramic, Chip, 0.0022 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-239-0Z
C410	Ceramic, Chip, 0.0082 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-804-0Z
C411	Ceramic, Chip, 470 pF 50 V, 0805, $\pm$ 5 %		134-761-4Z
C412	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, +80%--20 %		130-170-0Z
C413	Electrolytic, 10 $\mu$ F 16 V, 4 dia $\times$ 7, $\pm$ 20 %		101-043-5
C501	Ceramic, Chip, 0.047 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-424-0Z
C502	Ceramic, Chip, 0.047 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-424-0Z
C503	Ceramic, Chip, 0.047 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-424-0Z
C504	Ceramic, Chip, 0.047 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-424-0Z
C505	Ceramic, Chip, 0.047 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-424-0Z
C506	Ceramic, Chip, 0.047 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-424-0Z
C507	Ceramic, Chip, 0.047 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-424-0Z
C508	Ceramic, Chip, 0.047 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-424-0Z
C509	Ceramic, Chip, 0.01 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-172-2
TC1	Trimmer, 20 pF (ECR-LA020E52V), +50 %~0 %		172-019-0
<b>Resistors Carbon</b>			
R1	Chip, 1 Mohm, 1/10 W, 0805, $\pm$ 5 %		060-105-0Z
R2	Chip, 2.2 kohm, 1/10 W, 0805, $\pm$ 5 %		060-222-2Z
R3	Chip, 100 kohm, 1/10 W, 0805, $\pm$ 5 %		060-104-9Z
R4	Chip, 100 kohm, 1/10 W, 0805, $\pm$ 5 %		060-104-9Z
R5	Chip, 22 kohm, 1/10 W, 0805, $\pm$ 5 %		060-223-3Z
R6	Chip, 22 kohm 1/10 W, 0805, $\pm$ 5 %		060-223-3Z
R7	Chip, 2.2 kohm, 1/10 W, 0805, $\pm$ 5 %		060-222-2Z
R8	Chip, 330 ohm, 1/10 W, 0805, $\pm$ 5 %		060-331-7Z
R9	Chip, 10 kohm, 1/10 W, 0805, $\pm$ 5 %		060-103-8Z
R10	Chip, 330 ohm, 1/10 W, 0805, $\pm$ 5 %		060-331-7Z
R11	Chip, 2.7 kohm, 1/10 W, 0805, $\pm$ 5 %		060-272-7Z
R12	Chip, 7.5 kohm, 1/10 W, 0805, $\pm$ 5 %		060-752-4Z

Ref. No.	Description	RS Part No.	Mfr.'s Part No.
R13	Chip, 2.2 kohm, 1/10 W, 0805, $\pm 5\%$		060-222-2Z
R14	Chip, 1 Mohm, 1/10 W, 0805, $\pm 5\%$		060-105-0Z
R15	Chip, 2.2 kohm, 1/10 W, 0805, $\pm 5\%$		060-222-2Z
R16	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z
R17	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z
R18	Chip, 1.5 kohm, 1/10 W, 0805, $\pm 5\%$		060-152-2Z
R19	Chip, 270 kohm, 1/10 W, 0805, $\pm 5\%$		060-274-9Z
R20	Chip, 270 kohm, 1/10 W, 0805, $\pm 5\%$		060-274-9Z
R21	Chip, 2.2 kohm, 1/10 W, 0805, $\pm 5\%$		060-222-2Z
R22	Chip, 10 ohm, 1/10 W, 0805, $\pm 5\%$		060-100-5Z
R23	Chip, 10 ohm, 1/10 W, 0805, $\pm 5\%$		060-100-5Z
R24	Chip, 47 kohm, 1/10 W, 0805, $\pm 5\%$		060-473-2Z
R25	Chip, 1 kohm, 1/10 W, 0805, $\pm 5\%$		060-102-7Z
R26	Chip, 270 kohm, 1/10 W, 0805, $\pm 5\%$		060-274-9Z
R27	Chip, 270 kohm, 1/10 W, 0805, $\pm 5\%$		060-274-9Z
R28	Chip, 330 ohm, 1/10 W, 0805, $\pm 5\%$		060-331-7Z
R29	Chip, 3.3 kohm, 1/10 W, 0805, $\pm 5\%$		060-332-8Z
R30	Chip, 270 kohm, 1/10 W, 0805, $\pm 5\%$		060-274-9Z
R31	Chip, 270 kohm, 1/10 W, 0805, $\pm 5\%$		060-274-9Z
R32	Chip, 3.3 kohm, 1/10 W, 0805, $\pm 5\%$		060-332-8Z
R33	Chip, 820 ohm, 1/10 W, 0805, $\pm 5\%$		060-821-3Z
R34	Chip, 100 kohm, 1/10 W, 0805, $\pm 5\%$		060-104-9Z
R36	Chip, 47 kohm, 1/10 W, 0805, $\pm 5\%$		060-473-2Z
R37	Chip, 10 ohm, 1/10 W, 0805, $\pm 5\%$		060-100-5Z
R38	Chip, 22 kohm, 1/10 W, 0805, $\pm 5\%$		060-223-3Z
R39	Chip, 3.3 kohm, 1/10 W, 0805, $\pm 5\%$		060-332-8Z
R40	Chip, 470 kohm, 1/10 W, 0805, $\pm 5\%$		060-474-3Z
R41	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z
R42	Chip, 22 kohm, 1/10 W, 0805, $\pm 5\%$		060-223-3Z
R43	Chip, 220 kohm, 1/10 W, 0805, $\pm 5\%$		060-224-4Z
R44	Chip, 120 kohm, 1/10 W, 0805, $\pm 5\%$		060-124-6Z
R45	Chip, 47 kohm, 1/10 W, 0805, $\pm 5\%$		060-473-2Z
R46	Chip, 22 kohm, 1/10 W, 0805, $\pm 5\%$		060-223-3Z
R47	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z
R48	Chip, 22 kohm, 1/10 W, 0805, $\pm 5\%$		060-223-3Z
R49	Chip, 100 kohm, 1/10 W, 0805, $\pm 5\%$		060-104-9Z
R50	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z
R51	Chip, 560 kohm, 1/10 W, 0805, $\pm 5\%$		060-564-1Z
R52	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z

Ref. No.	Description	RS Part No.	Mfr.'s Part No.
R53	Chip, 47 ohm 1/10 W, 0805, $\pm 5\%$		060-470-9Z
R54	Chip, 2.2 ohm, 1/10 W, 0805, $\pm 5\%$		060-229-9Z
R55	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z
R56	Chip, 560 kohm, 1/10 W, 0805, $\pm 5\%$		060-564-1Z
R57	Resistor, 330 ohm, 1/2 W, $\pm 5\%$		030-331-8
R58	Chip, 3.3 kohm, 1/10 W, 0805, $\pm 5\%$		060-332-8Z
R59	Chip, 100 kohm, 1/10 W, 0805, $\pm 5\%$		060-104-9Z
R60	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z
R61	Chip, 82 kohm, 1/10 W, 0805, $\pm 5\%$		060-823-5Z
R62	Chip, 39 kohm, 1/10 W, 0805, $\pm 5\%$		060-393-3Z
R63	Chip, 20 kohm, 1/10 W, 0805, $\pm 5\%$		060-203-5Z
R64	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z
R65	Chip, 9.1 kohm, 1/10 W, 0805, $\pm 5\%$		060-912-2Z
R66	Chip, 8.2 kohm, 1/10 W, 0805, $\pm 5\%$		060-822-4Z
R67	Chip, 82 kohm, 1/10 W, 0805, $\pm 5\%$		060-823-5Z
R68	Chip, 39 kohm, 1/10 W, 0805, $\pm 5\%$		060-393-3Z
R69	Chip, 20 kohm, 1/10 W, 0805, $\pm 5\%$		060-203-5Z
R70	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z
R71	Chip, 5.1 kohm, 1/10 W, 0805, $\pm 5\%$		060-512-4Z
R72	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z
R73	Chip, 470 ohm, 1/10 W, 0805, $\pm 5\%$		060-471-0Z
R74	Chip, 470 ohm, 1/10 W, 0805, $\pm 5\%$		060-471-0Z
R75	Chip, 3.3 kohm, 1/10 W, 0805, $\pm 5\%$		060-332-8Z
R76	Chip, 15 kohm, 1/10 W, 0805, $\pm 5\%$		060-153-3Z
R77	Chip, 1.8 kohm, 1/10 W, 0805, $\pm 5\%$		060-182-9Z
R78	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z
R79	Chip, 2.2 kohm, 1/10 W, 0805, $\pm 5\%$		060-222-2Z
R80	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z
R81	Chip, 100 ohm, 1/10 W, 0805, $\pm 5\%$		060-101-6Z
R82	Chip, 47 kohm, 1/10 W, 0805, $\pm 5\%$		060-473-2Z
R83	Chip, 15 kohm, 1/10 W, 0805, $\pm 5\%$		060-153-3Z
R84	Chip, 3.3 kohm, 1/10 W, 0805, $\pm 5\%$		060-332-8Z
R85	Resistor, 330 ohm, 1/2 W, $\pm 5\%$		030-331-8Z
R86	Chip, 3.3 kohm, 1/10 W, 0805, $\pm 5\%$		060-332-8Z
R87	Chip, 100 ohm, 1/10 W, 0805, $\pm 5\%$		060-101-6Z
R88	Chip, 300 ohm, 1/10 W, 0805, $\pm 5\%$		060-301-8Z
R89	Chip, 470 kohm, 1/10 W, 0805, $\pm 5\%$		060-474-3Z
R91	Chip, 1 kohm, 1/10 W, 0805, $\pm 5\%$		060-102-7Z
R92	Chip, 100 ohm, 1/10 W, 0805, $\pm 5\%$		060-101-6Z

Ref. No.	Description	RS Part No.	Mfr.'s Part No.
R93	Chip, 2.2 kohm, 1/10 W, 0805, $\pm 5\%$		060-222-2Z
R95	Resistor, 100 ohm, 1/2 W, $\pm 5\%$		030-101-7Z
R96	Resistor, 150 ohm, 1/2 W, $\pm 5\%$		030-151-2Z
R97	Chip, 330 ohm, 1/10 W, 0805, $\pm 5\%$		060-331-7Z
R98	Chip, 18 ohm, 1/10 W, 0805, $\pm 5\%$		060-180-7Z
R99	Chip, 330 ohm, 1/10 W, 0805, $\pm 5\%$		060-331-7Z
R100	Resistor, 22 ohm, 1/4 W, $\pm 5\%$		009-220-7Z
R101	Chip, 1 kohm, 1/10 W, 0805, $\pm 5\%$		060-102-7Z
R102	Chip, 1.2 kohm, 1/10 W, 0805, $\pm 5\%$		060-122-5Z
R103	Chip, 22 ohm, 1/10 W, 0805, $\pm 5\%$		060-220-0Z
R104	Chip, 47 kohm, 1/10 W, 0805, $\pm 5\%$		060-473-2Z
R105	Resistor, 68 ohm, 1/2 W, 0805, $\pm 5\%$		030-680-3Z
R106	Chip, 100 kohm, 1/10 W, 0805, $\pm 5\%$		060-104-9Z
R107	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z
R108	Chip, 15 kohm, 1/10 W, 0805, $\pm 5\%$		060-153-3Z
R109	Resistor, 47 kohm, 1/8 W, $\pm 5\%$		002-473-4Z
R110	Chip, 2.2 kohm, 1/10 W, 0805, $\pm 5\%$		060-202-4Z
R111	Chip, 1 kohm 1/10 W, 0805, $\pm 5\%$		060-102-7Z
R112	Chip, 330 kohm, 1/10 W, 0805, $\pm 5\%$		060-334-0Z
R301	Chip, 1 kohm, 1/10 W, 0805, $\pm 5\%$		060-102-7Z
R302	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z
R303	Chip, 8.2 kohm, 1/10 W, 0805, $\pm 5\%$		060-822-4Z
R304	Chip, 6.8 kohm, 1/10 W, 0805, $\pm 5\%$		060-682-4Z
R305	Chip, 15 kohm, 1/10 W, 0805, $\pm 5\%$		060-153-3Z
R306	Chip, 100 kohm, 1/10 W, 0805, $\pm 5\%$		060-104-9Z
R307	Chip, 20 kohm, 1/10 W, 0805, $\pm 5\%$		060-203-5Z
R308	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z
R309	Chip, 33 kohm, 1/10 W, 0805, $\pm 5\%$		060-333-9Z
R310	Chip, 120 kohm, 1/10 W, 0805, $\pm 5\%$		060-124-6Z
R311	Chip, 1.8 kohm, 1/10 W, 0805, $\pm 5\%$		060-182-9Z
R312	Chip, 270 kohm, 1/10 W, 0805, $\pm 5\%$		060-274-9Z
R313	Chip, 15 kohm, 1/10 W, 0805, $\pm 5\%$		060-153-3Z
R401	Chip, 2 kohm 1/10 W, 0805, $\pm 5\%$		060-202-4Z
R402	Chip, 20 kohm, 1/10 W, 0805, $\pm 5\%$		060-203-5Z
R403	Chip, 33 kohm, 1/10 W, 0805, $\pm 5\%$		060-333-9Z
R404	Chip, 8.2 kohm, 1/10 W, 0805, $\pm 5\%$		060-822-4Z
R405	Chip, 15 kohm, 1/10 W, 0805, $\pm 5\%$		060-153-3Z
R406	Chip, 3.9 kohm, 1/10 W, 0805, $\pm 5\%$		060-392-2Z
R407	Chip, 75 kohm, 1/10 W, 0805, $\pm 5\%$		060-753-5Z

Ref. No.	Description	RS Part No.	Mfr.'s Part No.
R408	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R409	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R411	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R412	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R501	Chip, 2.7 kohm, 1/10 W, 0805, $\pm 5$ %		060-272-7Z
R502	Chip, 4.7 kohm, 1/0 W, 0805, $\pm 5$ %		060-472-1Z
R503	Chip, 2.2 kohm, 1/10 W, 0805, $\pm 5$ %		060-222-2Z
R504	Chip, 22 kohm, 1/10 W, 0805, $\pm 5$ %		060-223-3Z
R505	Chip, 3.3 kohm, 1/10 W, 0805, $\pm 5$ %		060-332-8Z
R506	Chip, 1.5 kohm, 1/10 W, 0805, $\pm 5$ %		060-152-2Z
R507	Chip, 56 kohm, 1/10 W, 0805, $\pm 5$ %		060-563-0Z
R508	Chip, 12 kohm, 1/10 W, 0805, $\pm 5$ %		060-123-6Z
R509	Chip, 180 kohm, 1/10 W, 0805, $\pm 5$ %		060-184-1Z
R510	Chip, 15 kohm, 1/10 W, 0805, $\pm 5$ %		060-153-3Z
R511	Chip, 680 ohm, 1/10 W, 0805, $\pm 5$ %		060-681-3Z
R512	Chip, 10 kohm, 1/10 W, 0805, $\pm 5$ %		060-103-8Z
R513	Chip, 10 kohm, 1/10 W, 0805, $\pm 5$ %		060-103-8Z
RV1	Resistor-Semifixed, 22 kB, 6 dia		071-223-1
RV2	Resistor-Semifixed, 22 kB, 6 dia		071-223-1
RV3	Resistor-Semifixed, 22 kB, 6 dia		071-223-1
<b>Coils</b>			
L1	Inductor, Chip, 10 $\mu$ H, 01, $\pm 20$ %		310-659-2
L2	Inductor, Chip, 10 $\mu$ H, 01, $\pm 20$ %		310-659-2
L3	Transformer, Choke		300-008-1
L4	Inductor, Chip, 10 $\mu$ H, 01, $\pm 20$ %		310-659-2
L5	Inudctor, Chip, 1 $\mu$ H, 01, $\pm 20$ %		310-657-0
L6	Inductor, Axial, 1 $\mu$ H, 02, $\pm 20$ %		310-293-4
L7	Inductor, Chip, 1 $\mu$ H, 01, $\pm 20$ %		310-657-0
L8	Coil Choke, MK-4		310-092-9
L9	Axial Coil, 2.2 $\mu$ H, LAL02TB2R2K		310-378-7
L10	Coil Choke, 0.3 dia $\times$ 7T $\times$ 1 kohm RES.		310-218-7
L11	Spring, 3 $\times$ 0.65 $\times$ 1.5t: L		310-224-2
L12	Axial Coil, 1 $\mu$ H, LAL02TB1R0K		310-293-4
L13	Coil Choke, 0.3 dia $\times$ 7T $\times$ 1 kohm RES		310-218-7
L15	Coil Assembly		509-772
L16	Coil Assembly		509-772
L17	Axial Coil, 0.22 $\mu$ H, LAL03TBR22K		310-377-7
L18	Coil Spring, 0.225 $\mu$ H		310-172-8
L19	Coil Spring, 4.0 $\times$ 1.2 $\times$ 4.5 t: L		311-175-6

Ref. No.	Description	RS Part No.	Mfr.'s Part No.
L20	Coil Spring, 4.0 × 1.2 × 4.5 t:L		311-175-6
L21	Coil Spring, 4.0 × 1.2 × 4.5 t:L		311-175-6
L22	Coil Axial 1 mH		310-381-0
L23	Coil Axial 1mH		310-381-0
L25	Spring Coil, 4 dia × 0.45 dia × 12 T		310-536-4
L26	Spring Coil, 0.32 μH, Coil Choke		310-054-5
L31	Coil Axial 1 mH		310-381-0
FB1	Bead Core, FC3 × 2		320-253-1
FB2	Bead Core, 56, 59065-4B		320-536-5
FB3	Bead Core, 56, 59065-4B		320-536-5
FB4	Bead Core, 56, 59065-4B		320-536-5
FB5	Bead Core, 56, 59065-4B		320-536-5
T1	Coil, 140 MHz 5.5 T RX, 5 mm SQ, Black		310-571-5
T2	Coil, 140 MHz 5.5 T RX, 5 mm SQ, Black		310-571-5
T3	Coil, 140 MHz 5.5 T RX, 5 mm SQ, Black		310-571-5
T4	Coil, 140 MHz 5.5 T RX, 5 mm SQ, Black		310-571-5
T5	Coil, 130 MHz 6.5 T RX, 5 mm SQ, Black		310-572-6
T6	Coil, 130 MHz 6.5 T RX, 5 mm SQ, Black		310-572-6
T7	21.4 MHz RX Mixer, 5 mm SQ, Red		320-597-2
T8	Coil, 455 kHz, Detector		320-232-2
<b>Connectors</b>			
CON1	Angle Connector		421-686-9
CON2	Angle Connector		421-686-9
<b>Crystals</b>			
X1	12.8 MHz, 5 PPM, NR-213		262-256-5Z
X2	21.855 MHz, 30 PPM, HC39/T		262-213-6Z
<b>Diodes</b>			
D1	BB619, Tuning diode		243-054-8Z
D2	BB619, Tuning diode		243-054-8Z
D3	BB619, Tuning diode		243-054-8Z
D4	BB619, Tuning diode		243-054-8Z
D5	BB619, Tuning diode		243-054-8Z
D6	BB619, Tuning diode		243-054-8Z
D7	MMBV3401 LT1		243-012-0
D8	MMBV3401 LT1		243-012-0
D9	1SS97, Axial, Schottky Detector		243-026-3
D10	UM9401, Pin		243-016-4
D12	IN5404T/R, Rectifier		245-008-7
D13	KDS193, SI		243-052-6

Ref. No.	Description	RS Part No.	Mfr.'s Part No.
D14	MI301		243-058-2
<b>Filters</b>			
CF1	Ceramic, CFW455F, 455 kHz		270-027-8Z
XF1	Crystal, 21M15BU, 21.4 MHz		271-002-0
<b>IC's</b>			
IC1	MC14519F, PLL		220-131-3
IC2	MC3371DR2, FM IF		223-421-0
IC3	TDA2003V, Audio Amp		229-289-8
IC4	KA78L05, 5V Regulator		223-119-8
IC5	KIA7808PI, Regulator		222-013-0
IC6	LM358M, OP Amp		231-064-4
IC7	LM358M, OP Amp		231-064-4
IC8	KIA78L10F, Regulator		220-382-5
IC301	KIA324F, Quad OP Amp		222-018-5
IC401	KIA324F, Quand OP Amp		222-018-5
IC501	KIA324F, Quand OP Amp		222-018-5
<b>Jacks</b>			
J1	Miniature, HSJ1785-01-030		420-728-5
J2	Molex, 6267-02A		422-523-6
J3 (39)			504-367-A
<b>Assembly, Antenna Cable</b>			
37	<b>Assembly, Antenna Cable</b>		<b>509-136</b>
	2P Housing Assembly 2P 150 mm (SM-93090)		504-723-A
<b>Transistors</b>			
Q1	BC848C (IL) SOT-23, NPN		200-001-3
Q2	KTA1504S (ASG), SOT-23, NPN		202-082-6
Q3	KTA1504S (ASG), SOT-23, NPN		202-082-6
Q4	BC848C (IL) SOT-23, NPN		200-001-3
Q5	KTA1504S (ASG), SOT-23, NPN		202-082-6
Q6	KRC110S (NK), SOT-23, NPN		202-096-9
Q7	KTA1504S (ASG), SOT-23, NPN		202-082-6
Q8	BF999 (LB), SOT-23, N-MOSFET		213-001-1
Q9	BF999 (LB), SOT-23, N-MOSFET		213-001-1
Q10	BF513 (S9), SOT-23, N-JFET		200-024-4
Q11	MMBC1321 (Q4), SOT, 23, NPN		203-096-4
Q12	KRC110S (NK), SOT-23, NPN		202-096-9
Q13	KRC104S (ND)		202-092-5
Q14	KRC104S (ND)		202-095-8Z
Q15	KRC104S (ND)		202-095-8Z



Ref. No.	Description	RS Part No.	Mfr.'s Part No.
Q16	KTA1658, TO-220IS, NPN		202-125-2
Q17	KRA110S (PK)		202-092-5
Q18	MMBC1321 (Q4), SOT-23, NPN		203-096-4
Q19	MMBC1321 (Q4), SOT, 2 $\bar{N}$ NPN		203-096-4
Q20	MRF581, 317-01 (MA CR-X), NPN		203-055-7
Q21	2SC1971, TO-220		203-043-6
Q22	MRF240A		203-082-1
Q23	KTA1663(HO), SOT-89, PNP		202-116-4
Q24	KRC104S (ND), SOT-23, NPN		202-095-8
Q25	KTA1658, TO-220IS, NPN		202-125-2
Q26	KTC3875S (ALG), SOT-23, NPN		202-112-0
Q27	KTC110S (NK), SOT-23, PNP		202-096-9
Q28	KRA110S (PK), SOT-23, PNP		202-092-5
<b>Assembly, Digital PCB</b>			<b>509-136</b>
<b>Capacitors</b>			
C601	Ceramic, Chip, 470 pF 50 V, 0805, $\pm 5$ %		134-761-4Z
C602	Tantalum, Chip, 0.1 $\mu$ F 35 V, $\pm 20$ %		140-114-3Z
C603	Tantalum, Chip, 1 $\mu$ F 16 V, $\pm 20$ %		141-036-1
C604	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, $\pm 10$ %		130-A60-4Y
C605	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, $\pm 10$ %		130-A60-4Y
C606	Ceramic, Chip, 0.68 $\mu$ F 16 V, 0805, +80 %--20 %		130-624-4
C607	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, $\pm 10$ %		130-A60-4Y
C608	Ceramic, Chip, 0.01 $\mu$ F 50 V, 0805, $\pm 10$ %		130-172-2Y
C609	Tantalum, Chip, 10 $\mu$ F 10 V, $\pm 20$ %		141-046-0Z
C610	Tantalum, Chip, 10 $\mu$ F 10 V, $\pm 20$ %		141-046-0Z
C611	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, $\pm 10$ %		130-A60-4Y
C612	Ceramic, Chip, 1 $\mu$ F 16V, 0805, +80 %--20 %		131-089-7Y
C613	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm 10$ %		130-A17-6Z
C614	Ceramic, Chip, 20 pF 50 V, 0805, $\pm 5$ %		132-012-1Z
C615	Ceramic, Chip, 20 pF 50 V, 0805, $\pm 5$ %		132-012-1Z
C616	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, $\pm 10$ %		130-A60-4Y
C617	Ceramic, Chip, 47 pF 50 V, 0805, $\pm 5$ %		134-722-1Z
C618	Ceramic, Chip, 47 pF 50 V, 0805, $\pm 5$ %		134-722-1Z
C619	Tantalum, Chip, 10 $\mu$ F 10 V, $\pm 20$ %		141-046-0Z
<b>Connectors</b>			
CON601	5082-3010 19 Pin		421-095-1
CON602	5082-3010 19 Pin		421-095-1
CON604A	Header Pin Connector GDH2-18DBC (1,2)		422-385-8
CON604B	TDI Connector TDH2-18SG		422-722-9

Ref. No.	Description	RS Part No.	Mfr.'s Part No.
CON605A	Header Pin Connector GDH2-18DBC (1,2)		422-385-8
CON605B	TDI Connector TDH2-18 SG		422-722-9
<b>Diodes</b>			
D602	KDS193S (F3), SOT-23		234-052-6
D603	RB471E, FMD (DUAL)		249-043-8
D604	RB471E, FMD (DUAL)		249-043-8
D605	RB471E, FMD (DUAL)		249-043-8
D606	RB471E, FMD (DUAL)		249-043-8
D607	Diode Zener. BZX84C-5V1		241-099-9
D608	Diode Zener. BZX84C-5V1		241-099-9
D609	Diode Zener. BZX84-C5V1		241-099-9
<b>Lamp</b>			
LP1	Pilot Lamp. 6.3 V, 40 mA		251-232-5
LP2	Pilot Lamp. 6.3 V, 40 mA		251-232-5
LP3	Pilot Lamp. 6.3 V, 40 mA		251-232-5
LP4	Pilot Lamp. 6.3 V, 40 mA		251-232-5
LP5	Pilot Lamp. 6.3 V, 40 mA		251-232-5
LP6	Pilot Lamp. 6.3 V, 40 mA		251-232-5
LP7	Pilot Lamp. 6.3 V, 40 mA		251-232-5
<b>Assembly, Digital PCB</b>			<b>509-136</b>
IC601	TMP87CH20F, CPU		220-568-5
IC602	MC142100DW, Cross-Point SW		223-378-5
IC603	MF6CWM-100, Digital-Filter		231-073-3
IC604	MC145436DWR2, DTMF Receiver		223-419-9
IC605	MC14094BDR2, SO-16, Shift-Resistor		223-233-7
IC606	AT93C66W-10SC-2.7 EEP ROM		229-376-3Z
<b>Resistors</b>			
R601	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z
R602	Chip, 220 kohm, 1/10 W, 0805, $\pm 5\%$		060-224-4Z
R603	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z
R604	Chip, 200 kohm, 1/10 W, 0805, $\pm 5\%$		060-204-2Z
R605	Chip, 0 ohm, 1/10 W, 0805, $\pm 5\%$		060-000-8Z
R606	Chip, 100 kohm, 1/10 W, 0805, $\pm 5\%$		060-104-9Z
R607	Chip, 0 ohm, 1/10 W, 0805, $\pm 5\%$		060-000-8Z
R608	Chip, 1 kohm, 1/10 W, 0805, $\pm 5\%$		060-102-7Z
R609	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z
R610	Chip, 47 kohm, 1/10 W, 0805, $\pm 5\%$		060-473-2Z
R611	Chip, 15 kohm, 1/10 W, 0805, $\pm 5\%$		060-153-3Z
R612	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z

Ref. No.	Description	RS Part No.	Mfr.'s Part No.
R613	Chip, 100 kohm, 1/10 W, 0805, $\pm 5$ %		060-104-9Z
R614	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R615	Chip, 1 Mohm, 1/10 W, 0805, $\pm 5$ %		060-105-0Z
R616	Chip, 39 kohm, 1/10 W, 0805, $\pm 5$ %		060-393-3Z
R617	Chip, 20 kohm, 1/10 W, 0805, $\pm 5$ %		060-203-5Z
R618	Chip, 10 kohm, 1/10 W, 0805, $\pm 5$ %		060-103-8Z
R619	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R620	Chip, 1 Mohm, 1/10 W, 0805, $\pm 5$ %		060-105-0Z
R621	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R622	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R623	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R624	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R625	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R626	Chip, 1 kohm, 1/10 W, 0805, $\pm 5$ %		060-102-7Z
R627	Chip, 1 kohm, 1/10 W, 0805, $\pm 5$ %		060-102-7Z
R628	Chip, 1 kohm, 1/10 W, 0805, $\pm 5$ %		060-102-7Z
R629	Chip, 1 kohm, 1/10 W, 0805, $\pm 5$ %		060-102-7Z
R630	Chip, 1 kohm, 1/10 W, 0805, $\pm 5$ %		060-102-7Z
R631	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R632	Chip, 33 ohm, 1/10 W, 0805, $\pm 5$ %		060-330-6Z
R633	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R634	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R635	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R636	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R637	Chip, 1 kohm, 1/10 W, 0805, $\pm 5$ %		060-102-7Z
R638	Chip, 1 kohm, 1/10 W, 0805, $\pm 5$ %		060-102-7Z
R639	Chip, 1 kohm, 1/10 W, 0805, $\pm 5$ %		060-102-7Z
R640	Chip 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R641	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R642	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R643	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R644	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R645	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R647	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R648	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R649	Chip, 1 kohm, 1/10 W, 0805, $\pm 5$ %		060-102-7Z
R650	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R651	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z
R652	Chip, 47 kohm, 1/10 W, 0805, $\pm 5$ %		060-473-2Z

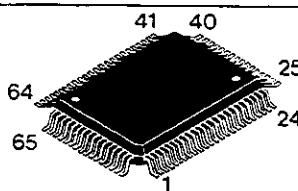
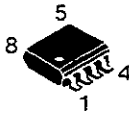
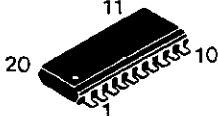
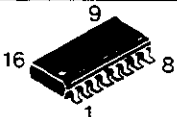
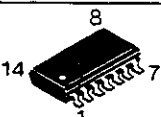
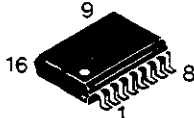
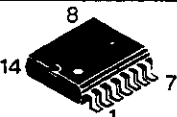

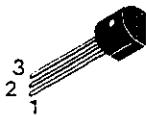



Ref. No.	Description	RS Part No.	Mfr.'s Part No.
R653	Chip, 10 kohm, 1/10 W, 0805, $\pm 5\%$		
R654	Chip, 3.3 kohm, 1/10 W, 0805, $\pm 5\%$		060-103-8Z
R655	Chip, 33 ohm, 1/10 W, 0805, $\pm 5\%$		060-332-8Z
R656	Chip, 100 ohm, 1/10 W, 0805, $\pm 5\%$		060-330-6Z
R657	Chip, 100 ohm, 1/10 W, 0805, $\pm 5\%$		060-101-6Z
R658	Chip, 100 ohm, 1/10 W, 0805, $\pm 5\%$		060-101-6Z
R659	Chip, 100 ohm, 1/10 W, 0805, $\pm 5\%$		060-101-6Z
R660	Chip, 33 ohm, 1/10 W, 0805, $\pm 5\%$		060-101-6Z
R661	Chip, 33 ohm, 1/10 W, 0805, $\pm 5\%$		060-330-6Z
R662	Chip, 100 ohm, 1/10 W, 0805, $\pm 5\%$		060-330-6Z
R663	Chip, 100 ohm, 1/10 W, 0805, $\pm 5\%$		060-101-6Z
R664	Chip, 100 ohm, 1/10 W, 0805, $\pm 5\%$		060-101-6Z
R665	Chip, 100 ohm, 1/10 W, 0805, $\pm 5\%$		060-101-6Z
R666	Chip, 100 ohm, 1/10 W, 0805, $\pm 5\%$		060-101-6Z
R667	Chip, 100 ohm, 1/10 W, 0805, $\pm 5\%$		060-101-6Z
R668	Chip, 47 kohm, 1/10 W, 0805, $\pm 5\%$		060-473-2Z
R669	Chip, 47 kohm, 1/10 W, 0805, $\pm 5\%$		060-473-2Z
VR601	20KA:RK1140306		450-527-9
VR602	20KB:RK1140306		450-527-9A
VR604	Semifixed(VR), 47 kohm, TMC3KJB		067-473-7Y
VR603	Semifixed(VR), 47 kohm, TMC3KJB		067-473-7Y
<b>Transistors</b>			
Q601	KRC110S(NK), SOT-23, NPN		202-096-9
Q602	BCX-18LT1, SOT-23, PNP		203-111-4
Q604	KRA110S(PK), SOT-23, PNP		202-092-5
Q063	KTC3875S(GR), SOT-23, NPN		202-112-0
<b>Crystal</b>			
X601	3.579545M:50 PPM		262-253-2Z
<b>Jack</b>			
J603	Modular Jack, MIC 8 Pin Top Entry Type		420-801-7
<b>Switches</b>			
SW601	YPS210120SK, Rotary W/nut		430-049-8Y
SW602	SPPH221B1011, Push Power		432-063-7
SW603-12	SKHH10914A, Tact Switch		436-038-8
<b>Assembly Microphone PCB For USA</b>			<b>593-416</b>
<b>Assembly Microphone PCB For CA</b>			<b>595-417</b>
<b>Capacitors</b>			
C1	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, +80 %~-20 %		130-170-0Z
C2	Tantalum, Chip, 1 $\mu$ F 16 V, $\pm 20\%$		141-036-1Z

Ref. No.	Description	RS Part No.	Mfr.'s Part No.
C3	Ceramic, Chip, 0.022 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-263-1Z
C4	Ceramic, Chip, 20 pF 50 V, 0805, $\pm$ 5 %		132-012-1Z
C5	Ceramic, Chip, 20 pF 50 V, 0805, $\pm$ 5%		132-012-1Z
C6	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, $\pm$ 80 %--20 %		130-170-0Z
C7	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-A17-6Z
C8	Ceramic, Chip, 0.1 $\mu$ F 25 V, 0805, $\pm$ 80 %--20 %		130-170-0Z
C9	Ceramic, Chip, 470 pF 50 V, 0805, $\pm$ 5 %		134-761-4Y
C10	Tantalum, Chip, 10 $\mu$ F 10 V, $\pm$ 20 %		141-046-0Z
<b>Resistors Carbon</b>			
R1	Chip, 10 kohm, 1/10 W, 0805, $\pm$ 5 %		060-130-8Z
R2	Chip, 47 kohm, 1/10 W, 0805, $\pm$ 5 %		060-473-2Z
R3	Chip, 47 kohm, 1/10 W, 0805, $\pm$ 5 %		060-473-2Z
R4	Chip, 47 kohm, 1/10 W, 0805, $\pm$ 5 %		060-473-2Z
R5	Chip, 10 kohm, 1/10 W, 0805, $\pm$ 5 %		060-103-8Z
R6	Chip, 20 kohm, 1/10 W, 0805, $\pm$ 5 %		060-203-5Z
R7	Chip, 39 kohm, 1/10 W, 0805, $\pm$ 5 %		060-393-3Z
R8	Chip, 82 kohm, 1/10 W, 0805, $\pm$ 5 %		060-823-5Z
R9	Chip, 160 kohm, 1/10 W, 0805, $\pm$ 5 %		060-164-3Z
R10	Chip, 330 kohm, 1/10 W, 0805, $\pm$ 5 %		060-334-0Z
R11	Chip, 1 Mohm, 1/10 W, 0805, $\pm$ 5 %		060-105-0Z
R12	Chip, 47 kohm, 1/10 W, 0805, $\pm$ 5 %		060-473-2Z
R13	Chip, 47 kohm, 1/10 W, 0805, $\pm$ 5 %		060-473-2Z
R14	Chip, 47 kohm, 1/10 W, 0805, $\pm$ 5 %		060-473-2Z
R15	Chip, 47 kohm, 1/10 W, 0805, $\pm$ 5 %		060-473-2Z
R16	Chip, 47 kohm, 1/10 W, 0805, $\pm$ 5 %		060-473-2Z
R17	Chip, 47 kohm, 1/10 W, 0805, $\pm$ 5 %		060-473-2Z
R18	Chip, 100 kohm, 1/10 W, 0805, $\pm$ 5 %		060-104-9Z
R19	Chip, 100 kohm, 1/10 W, 0805, $\pm$ 5 %		060-104-9Z
R20	Chip, 100 kohm, 1/10 W, 0805, $\pm$ 5 %		060-104-9Z
R21	Chip, 1.2 kohm, 1/10 W, 0805, $\pm$ 5 %		060-122-5Z
<b>IC</b>			
IC1	LSC417597		229-573-9
<b>Diode</b>			
D1	KDS193, Silicon		243-052-6
<b>X-tal</b>			
X1	3.57945 M :50 ppm		262-253-2Z
<b>TR</b>			
Q1	KRC110SNK (SOT-23)		202-096-9

Ref. No.	Description	RS Part No.	Mfr.'s Part No.
<b>COIL</b>			
L1	Coil Chip 10 $\mu$ H		310-659-2
<b>MIC</b>			
MIC1	MIC Condenser KUC4023-010010		420-205-9Y
<b>SW</b>			
SW1	Micro SW JMS-012A		439-033-8
SW2,3	Tack SW SKHHLN002		436-010-2
SW4	SW Slide SSS222ND021		431-188-5Z
<b>Assembly</b>			
<b>Capacitors</b>			
C1	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-A17-6Z
C2	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-A17-6Z
C3	Ceramic, Chip, 13 pF 50 V, 0805, $\pm$ 5 %		131-304-0Y
C4	Ceramic, Chip, 47 pF 50 V, 0805, $\pm$ 5 %		134-722-1Z
C5	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-A17-6Z
C7	Ceramic, Chip, 15 pF 50 V, 0805, $\pm$ 10 %		131-511-0Z
C8	Ceramic, Chip, 15 pF 50 V, 0805, $\pm$ 10 %		131-511-0Z
C9	Ceramic, Chip, 1 pF 50 V, 0805, $\pm$ 0.25 pF		131-030-1Y
C10	Ceramic, Chip, 15 pF 50 V, 0805, $\pm$ 5 %		131-511-0Z
C11	Ceramic, Chip, 10 pF 50 V, 0805, $\pm$ 0.25 pF		131-039-1Y
C13	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-A17-6Z
C14	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-A17-6Z
C15	Tantalum, Chip, 3.3 $\mu$ F 10 V, $\pm$ 20 %		143-312-0Z
C17	Ceramic, Chip, 0.001 $\mu$ F 50 V, 0805, $\pm$ 10 %		130-A17-6Z
<b>Coils</b>			
L1	Inductor, Chip, 1 $\mu$ H, 01, $\pm$ 20 %		310-657-0
L2	Inductor, Chip, 10 $\mu$ H, 01, $\pm$ 10 %		310-659-2
L3	Inductor, Chip, 1 $\mu$ H, 01, $\pm$ 20 %		310-657-0
L4	Inductor, Chip, 1 $\mu$ H, 01, $\pm$ 20 %		310-657-0
T1	Coil Spring, E558CN-100022		311-117-4
<b>Connector</b>			
CON1	Header Pin GDH2-8SBT (7.5)		422-391-3
<b>Diodes</b>			
D1	BB619		243-054-8Z
D2	BB619		243-054-8Z
D3	ISS241, Pin		243-073-5
<b>Resistors Carbon</b>			
R1	Chip, 2.2 kohm, 1/10 W, 0805, $\pm$ 5 %		060-222-2Z
R2	Chip, 33 ohm, 1/10 W, 0805, $\pm$ 5 %		060-330-6Z

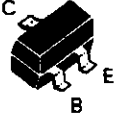
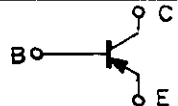
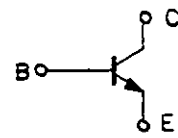
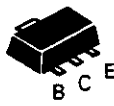
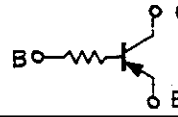
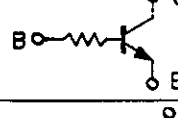
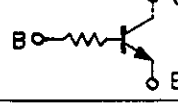
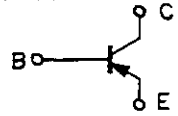
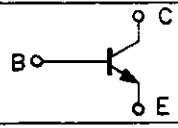
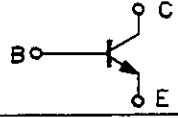
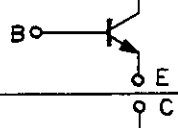
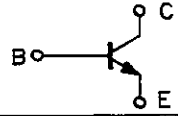
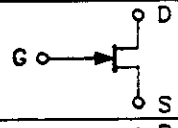
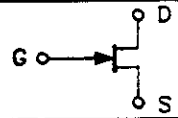
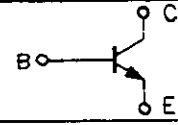
Ref. No.	Description	RS Part No.	Mfr.'s Part No.
R3	Chip, 2.7 kohm, 1/10 W, 0805, ±5 %		060-272-7Z
R4	Chip, 220 ohm, 1/10 W, 0805, ±5 %		060-221-1Z
R5	Chip, 330 ohm, 1/10 W, 0805, ±5 %		060-331-7Z
R6	Chip, 82 kohm, 1/10 W, 0805, ±5 %		060-823-5Z
R7	Chip, 2.7 kohm, 1/10 W, 0805, ±5 %		060-272-7Z
R8	Chip, 2.2 kohm, 1/10 W, 0805, ±5 %		060-222-2Z
R9	Chip, 2.2 kohm, 1/10 W, 0805, ±5 %		060-222-2Z
<b>Transistor</b>			
Q1	KRC110S(NK), SOT-23, NPN		202-096-9
Q2	MMBFJ310LT1, SOT-23, J-FET		203-116-9
Q3	KTC3295S (TB), SOT-23, NPN		202-181-2
Q4	MMBC1321(Q4), SOT-23, NPN		203-096-4
<b>Assembly, Squelch PCB</b>			
<b>Capacitors</b>			
C701	Ceramic, Chip, 0.01 μF 50 V, 0805, ±10 %		103-172-2Z
C702	Ceramic, Chip 47 pF 50 V, 0805, ±10 %		134-722-1Y
C703	Ceramic, Chip, 0.001 μF 50 V, 0805, ±10 %		103-A17-6Y
C704	Ceramic, Chip, 0.1 μF 25 V, 0805, ±10 %		103-A60-4Y
<b>Resistors Carbon</b>			
R701	Chip, 220 ohm, 1/10 W, 0805, ±5 %		060-221-1Z
R702	Chip, 39 kohm, 1/10 W, 0805, ±5 %		060-393-3Z
R703	Chip, 10 kohm, 1/10 W, 0805, ±5 %		060-103-8Z
R704	Chip, 27 kohm, 1/10 W, 0805, ±5 %		060-273-8Z
R705	Chip, 2.7 kohm, 1/10 W, 0805, ±5 %		060-272-7Z
R706	Chip, 22 kohm, 1/10 W, 0805, ±5 %		060-223-3Z
R707	Chip, 22 kohm, 1/10 W, 0805, ±5 %		060-223-3Z
R708	Chip, 2.7 kohm, 1/10 W, 0805, ±5 %		060-272-7Z
R709	Chip, 22 kohm, 1/10 W, 0805, ±5 %		060-223-3Z
R710	Chip, 12 kohm, 1/10 W, 0805, ±5 %		060-123-6Z
<b>Transistor</b>			
Q701	KTC3875S (GR)		202-112-0
Q702	KTC3875S (GR)		202-112-0
<b>DIODE</b>			
D701	KDS103 (F3) SOT-23		243-052-6

## SEMICONDUCTOR LEAD IDENTIFICATION AND IC INTERNAL DIAGRAMS

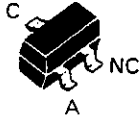
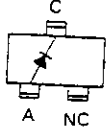
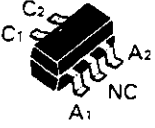
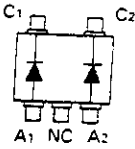




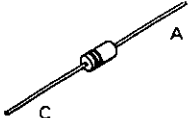

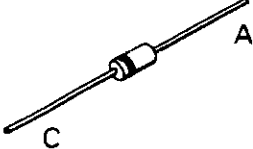

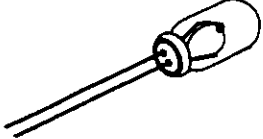
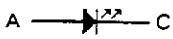
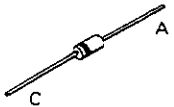
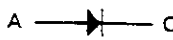
Base Diagram	Manufacturer's NBR	Ref. No.	IC's
	TMP87CH20F	IC601	CPU mask ROM
	LM358M	IC6, IC7	OP amplifier
	AT93C66-10S1	IC606	EEPROM
	MC14519IF	IC1	PLL (RF board)
	MC14094BDR2	IC605	Shift register
	MC3371DR2	IC2	IF
	KIA324F	IC301, IC401, IC501	
	MC142100DW	IC602	Cross point switch
	MC145436DWR2	IC604	DTMF receiver
	MF6CWM-100	IC603	Digital filter
	TDA2003V	IC3	Audio amp
 <p>1: OUT 2: GND 3: IN</p>	KA78L05	IC4	Regulator
 <p>1: IN 2: GND 3: OUT</p>	KIA7808PI	IC5	Regulator
 <p>1: OUT 2: GND 3: IN</p>	KIA78L10F	IC8	Regulator
	LSC417487DW	IC1	CPU (EXT. MIC)



B: Base C: Collector D: Drain  
 E: Emitter G: Gate S: Source

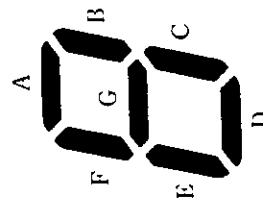
Base Diagram	Manufacturer's No.	Ref. No.	Schematics		
	KTA1504S (ASG)	Q2, Q3, Q5, Q7			
	BCX-18LT1	Q602			
	MMBC1321 (Q4)	Q11, Q18, Q19, Q4 (VCO)			
	KTC3875S (ALG)	Q26			
	KTC3295S (TB)	Q3 (VCO)			
	BC848 (1L)	Q1, Q4			
		KRA110S (PK)	Q17, Q28, Q604		
		KRC110S (NK)	Q6, 12, 27, 601, Q1 (VCO)		
			KRC104S (ND)	Q13, 14, 15, Q24, Q605	
			KTA1663 (HO)	Q23	
	MRF581	Q20			
	MRF240A	Q22			
	2SC1971	Q21			
	BF513 (S9)	Q10			
	BF999 (LB)	Q8, Q9			
	MMBFJ310LT1	Q2(VCO)			
	KTA1658	Q16, Q25			


A: Anode B: Cathode  
 NC: No Connection

Base Diagram	Manufacturer's No.	Ref. No.	Schematics
	MMBV3401 (4D)	D7, D8	
	KDS193S (F3)	D11, D13, D602	
	RB471E (D3G)	D603, D604, D605, D606	
	1SS241 (TY)	D3 (VCO)	
	BB619A	D1-D6, D1(VCO), D2(VCO)	
	1SS97	D9	
	MI310	D14	
	IN5404	D12	
	PILOT LAMP	LAMP (1-7)	
	UM9401	D10	

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
com1				com1	VFO-A	T1	LOCK	s1	s8	s9	T3	1A		2A		3A		4A
com2			com2		VFO-B	T2	FUNC	s2	s7	s10	-SQL	1F	1B	2F	2B	3F	3B	4F
com3		com3			BUSY	LOW	M-CH	s3	s6	s11	ALT	1G	1C	2G	2C	3G	3C	4G
com4	com4				ON-AIR	DTMF	BAR-SIG	s4	s5	HIGH	P	1E	1D	2E	2D	3E	3D	4E

	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
com1		5A		6A		7A		8A		9A		10A		+	com1			
com2	4B	5F	5B	6F	6B	7F	7B	8F	8B	9F	9B	10F	10B	-		com2		
com3	4C	5G	5C	6G	6C	7G	7C	8G	8C	9G	9C	10G	10C	5			com3	
com4	4D	5E	5D	6E	6D	7E	7D	8E	8D	9E	9D	10E	10D	☎				com4



**FUNC**   **LOCK**   **T-SQL**   **ALT**   **+-**   

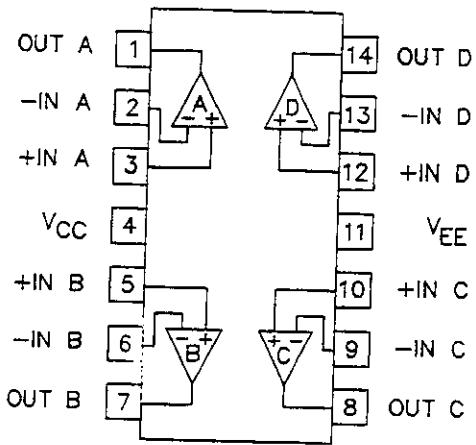
**VFO-A·T**   **M-CH**   **5**   **DTMF**  
**VFO-B·T**   **8888.888**   **88**   **99**   **HIGH**   **LOW**

**BUSY**   **ON-AIR**   **1**   **3**   **5**   **7**   **9**   **+20**

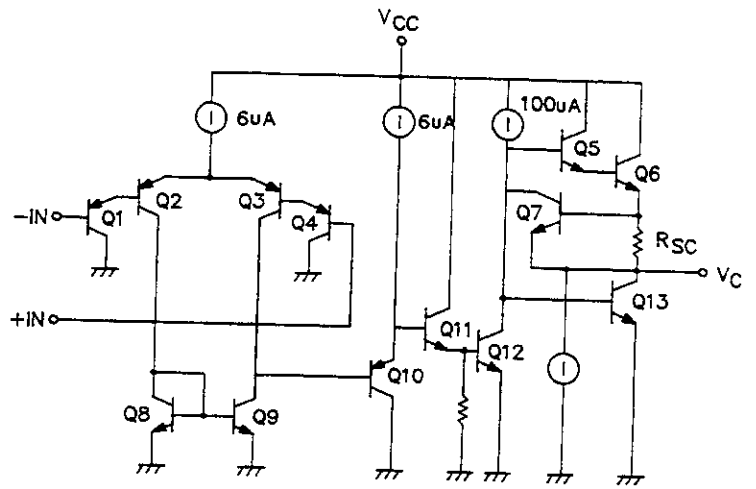
S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11

# KIA324F

Pin Connection

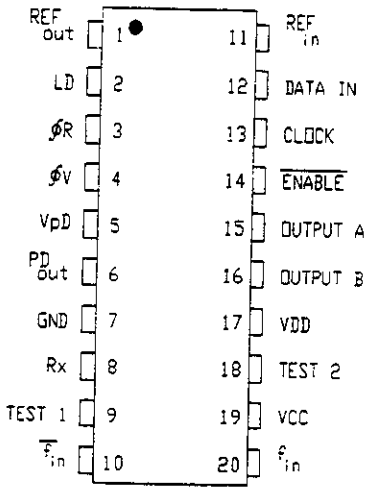


Equivalent Circuit

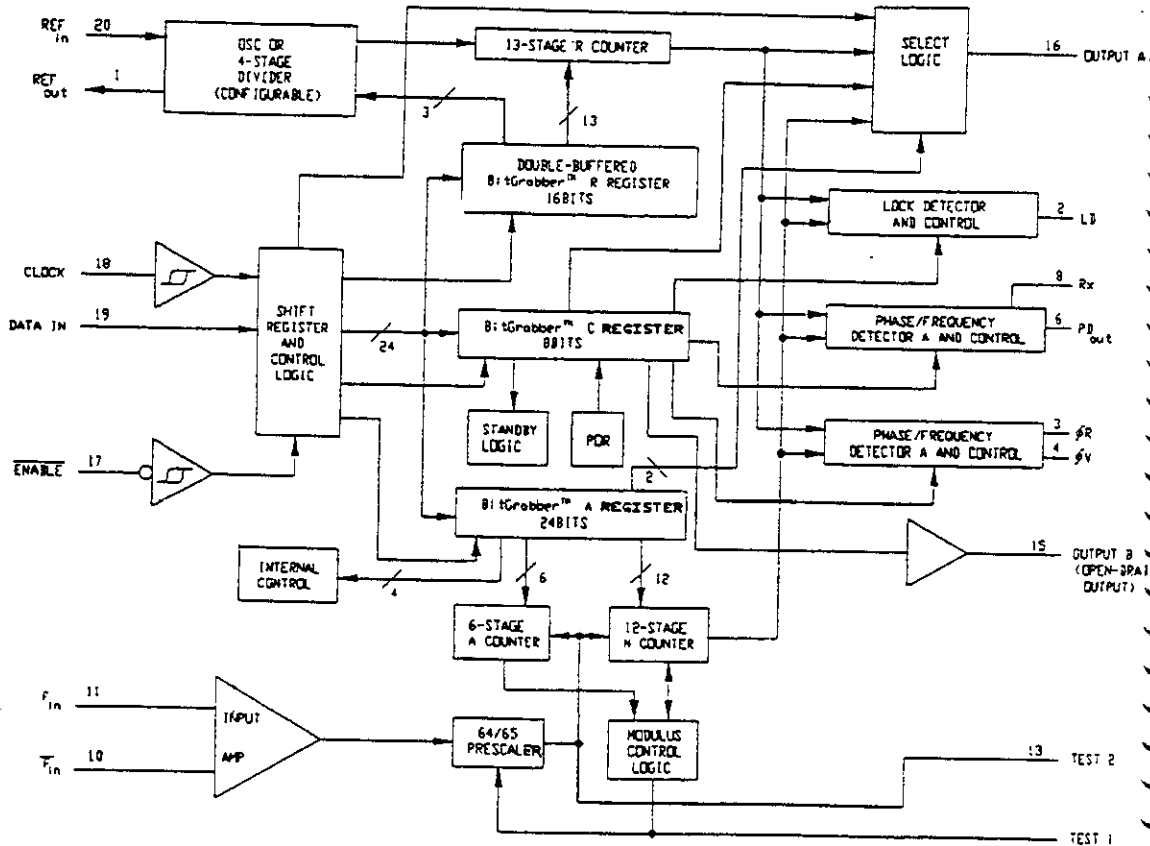


# MC145191F

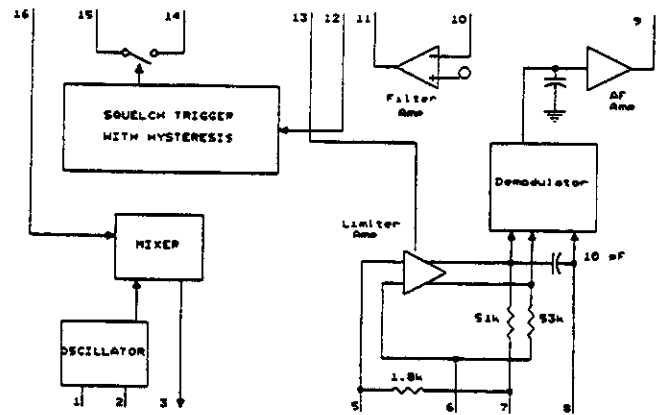
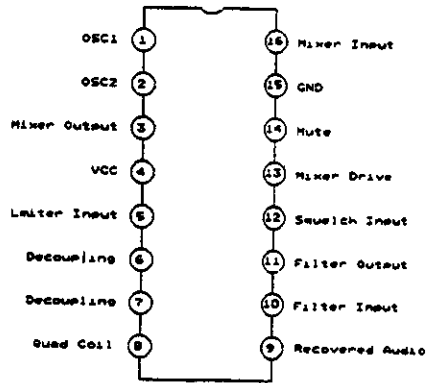
Pin Connection



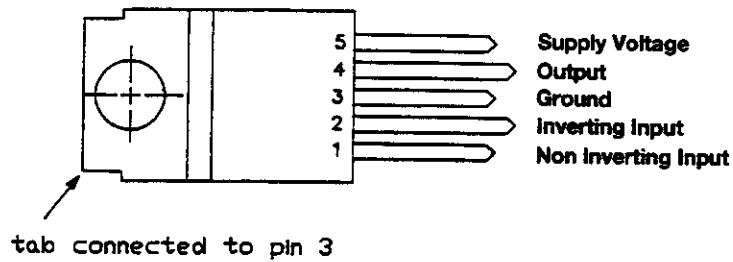
Equivalent Circuit



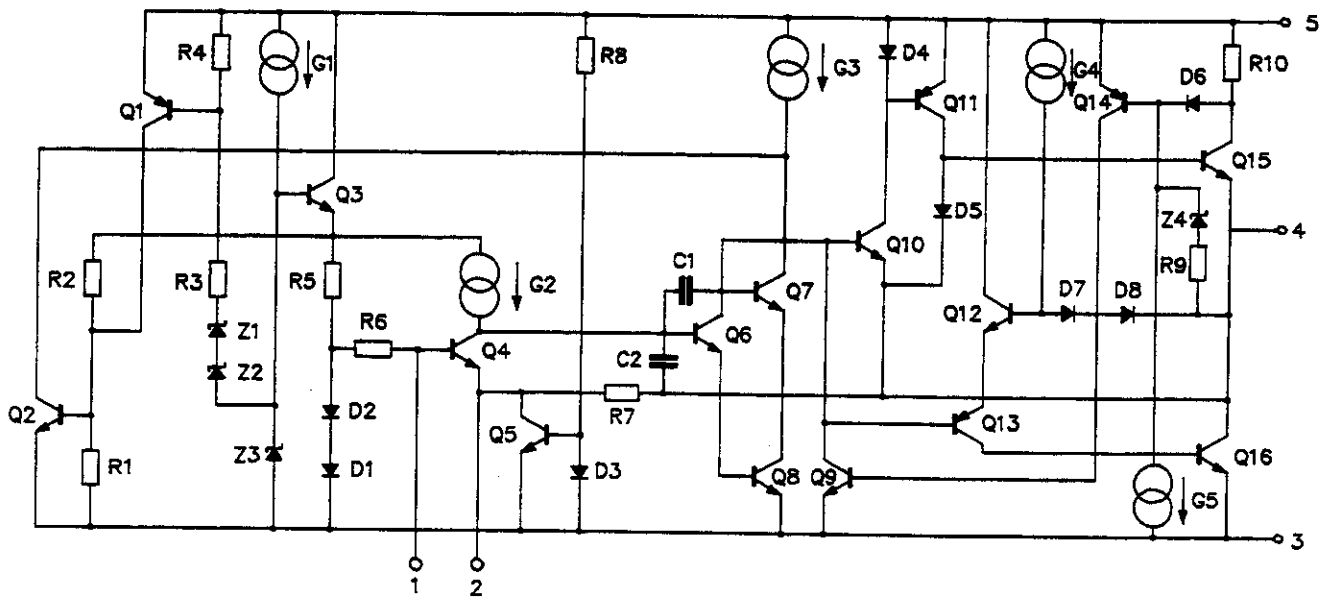
### MC3371DR2



### TDA2003

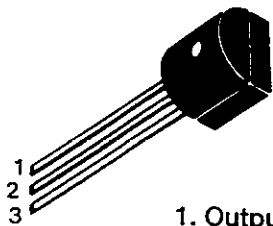


### Schematic Diagram

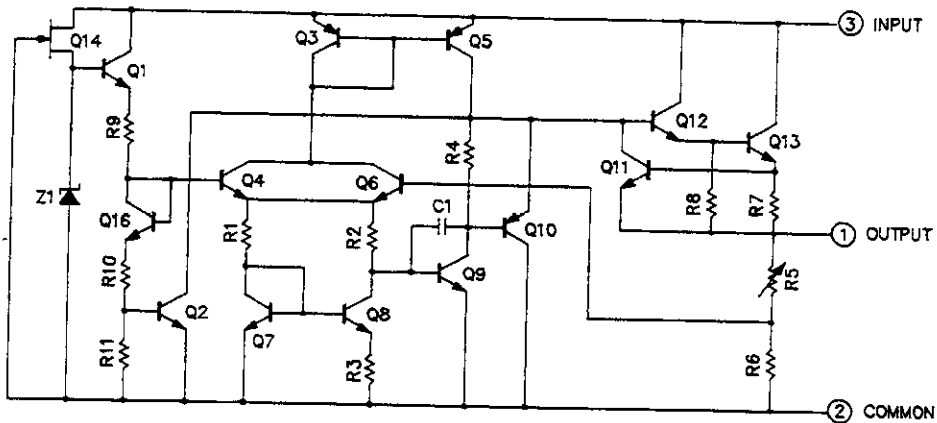


### KIA78L05

Equivalent Circuit

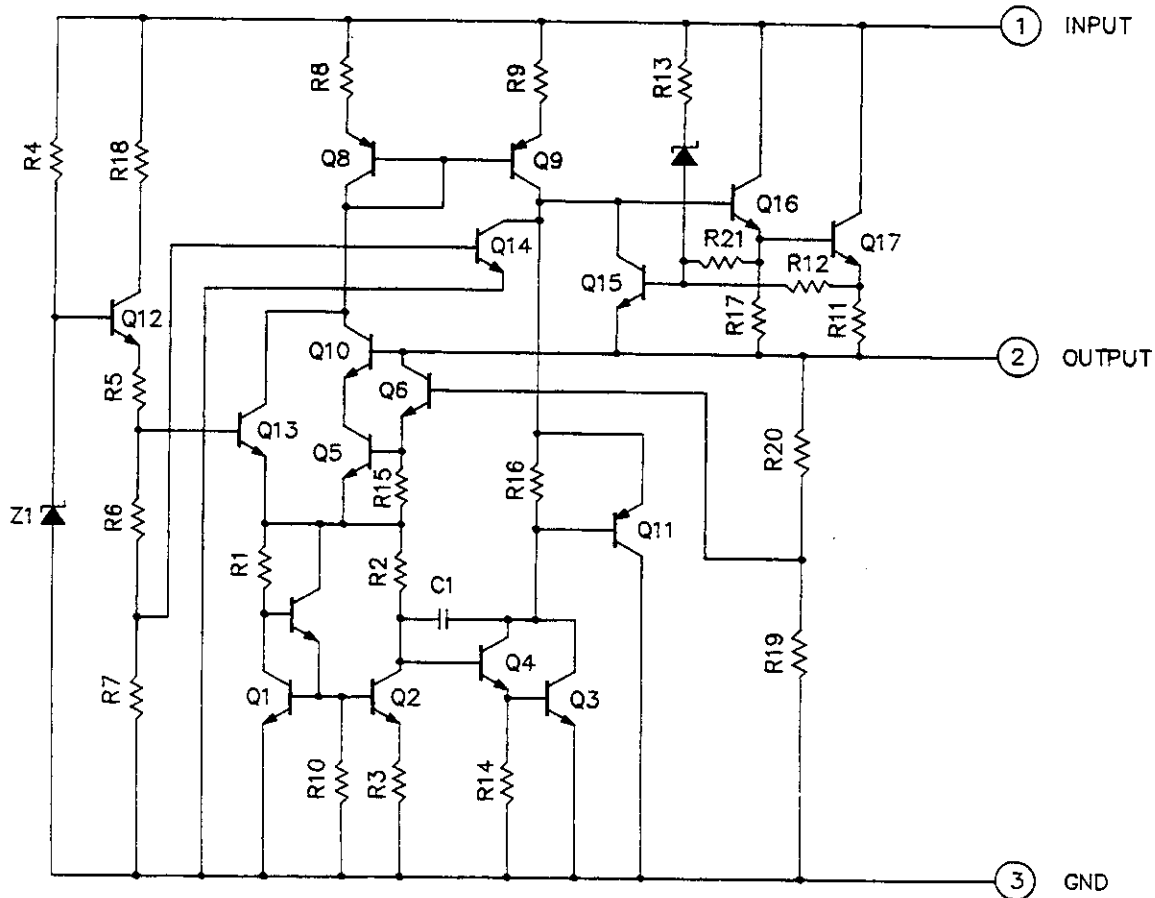


- 1. Output
- 2. Common
- 3. Input



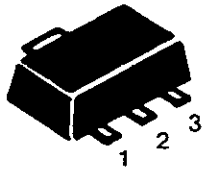
### KIA7808PI

Equivalent Circuit

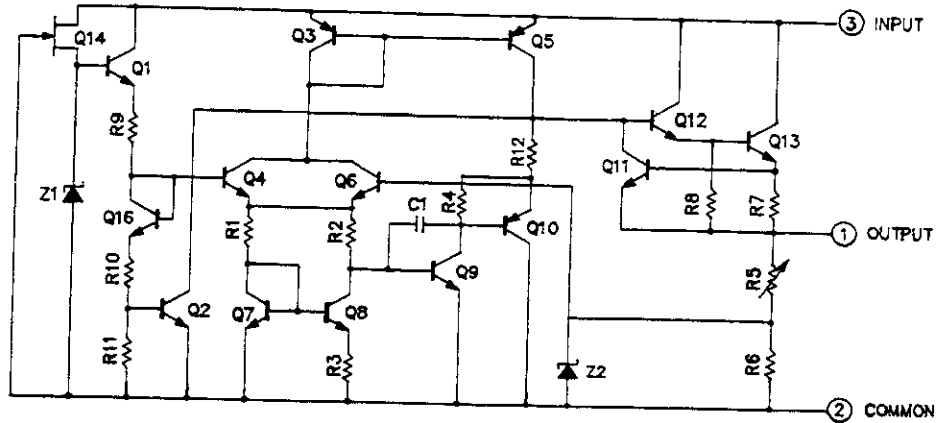


# KIA78L10F

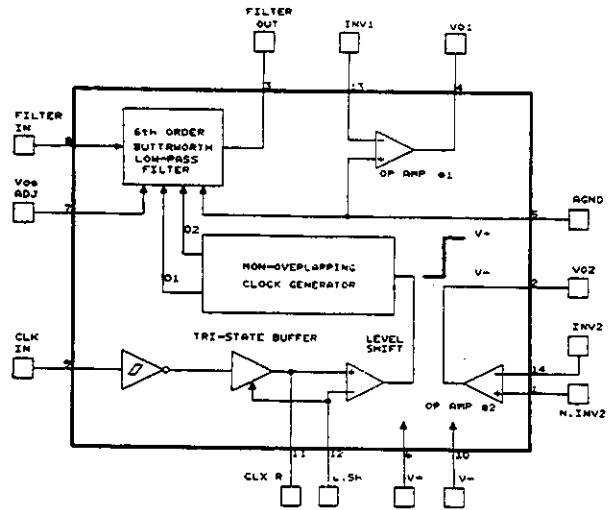
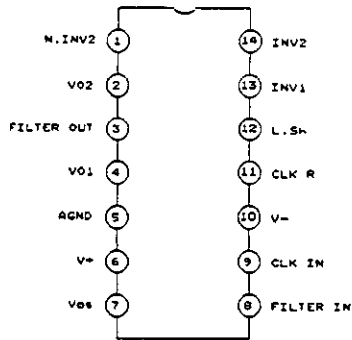
## Equivalent Circuit



- 1. Input
- 2. Common(Case)
- 3. Output

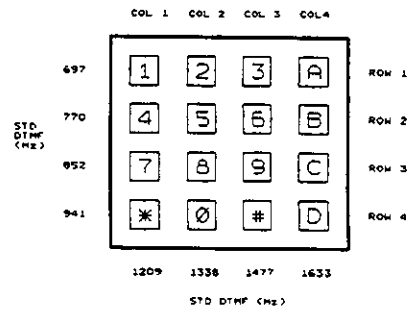


# MF6 CWM-100



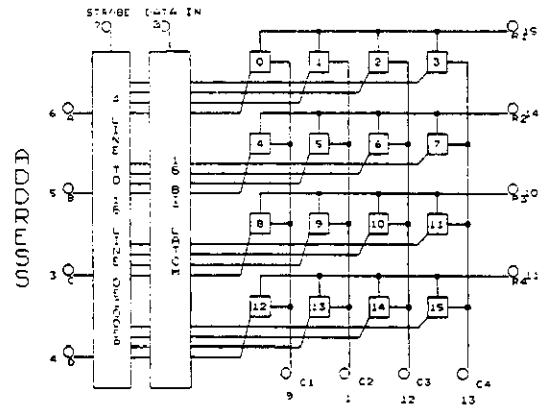
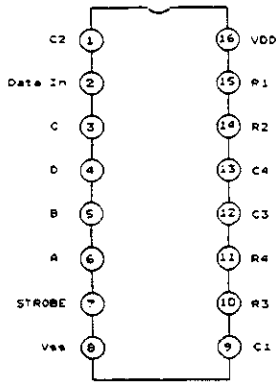
### Hexadecimal Codes

DIGIT	OUTPUT CODE			
	D0	D4	D2	D1
1	0	0	0	0
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
0	1	0	1	0
■	1	0	1	1
*	1	1	0	0
A	1	1	1	0
B	1	1	1	1
C	1	1	1	1
D	0	0	0	0

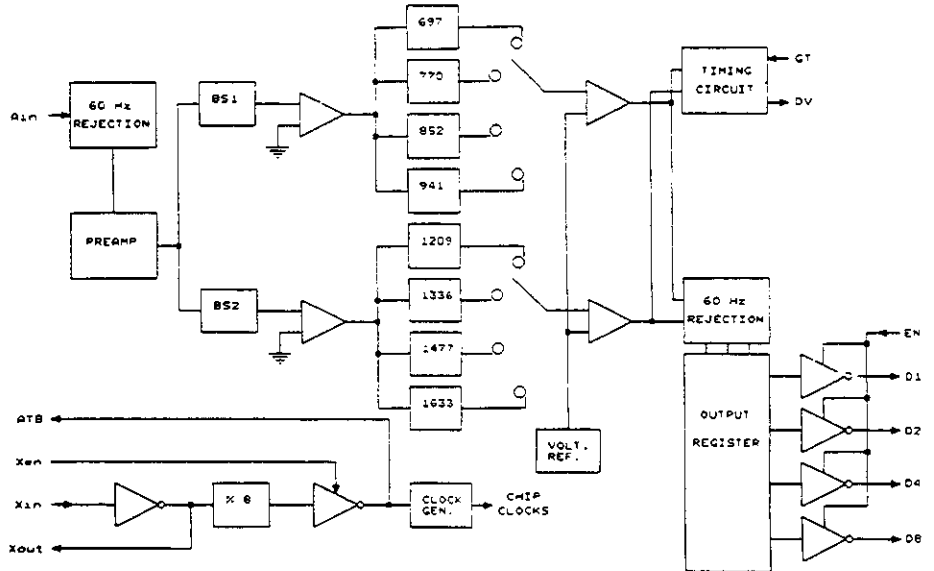
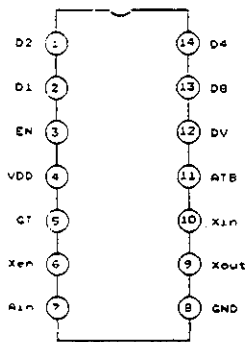


4 x 4 Keyboard Matrix

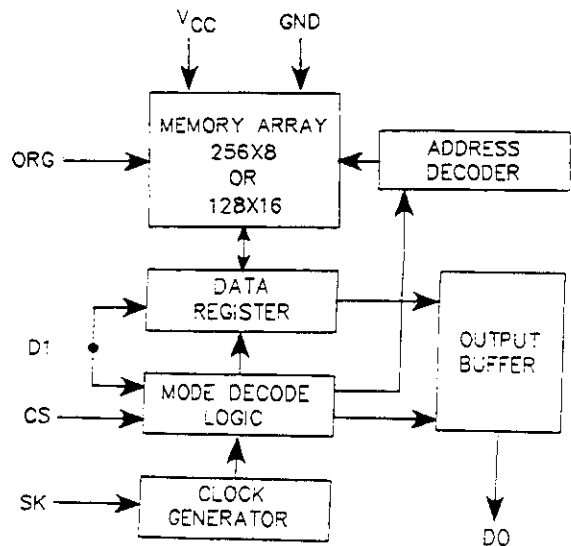
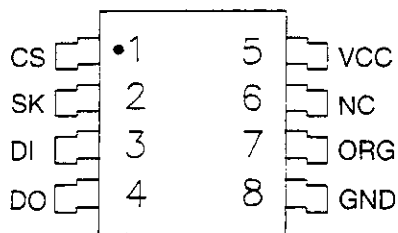
### MC142100DW



### MC 145436 DWR2

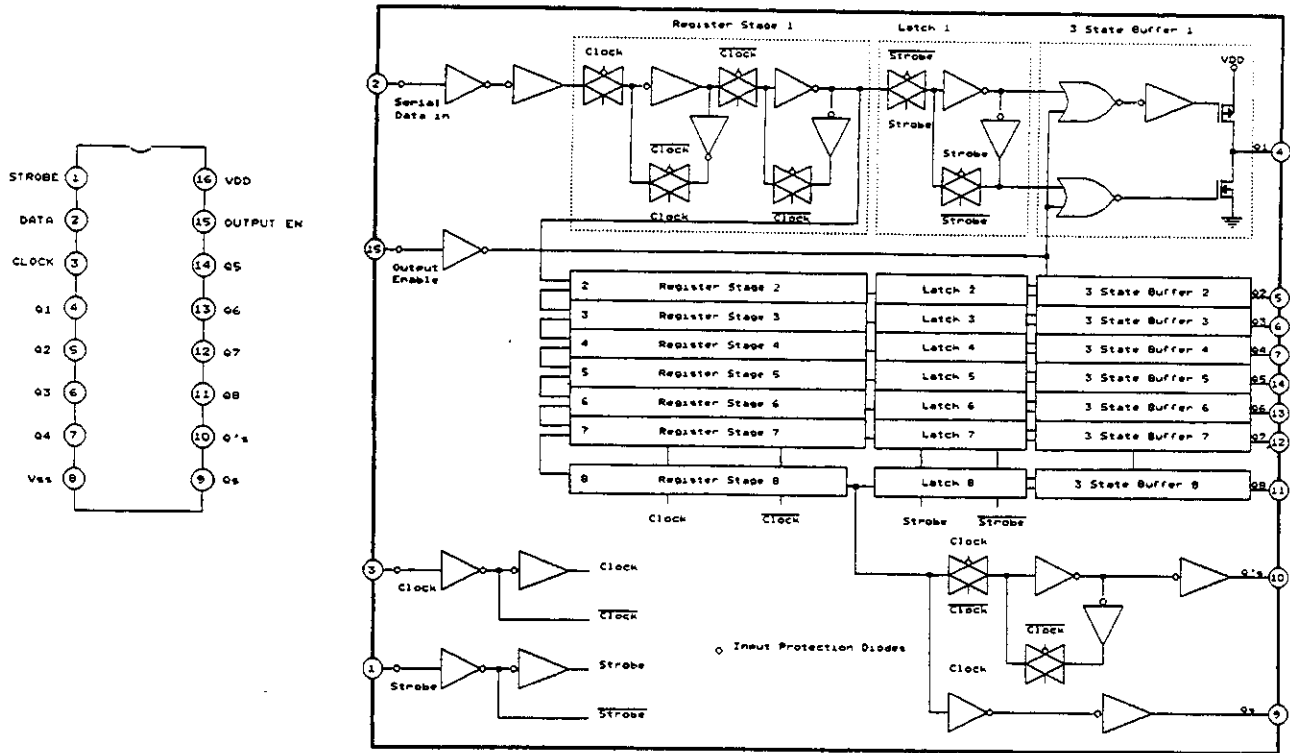


### AT93C6610S I

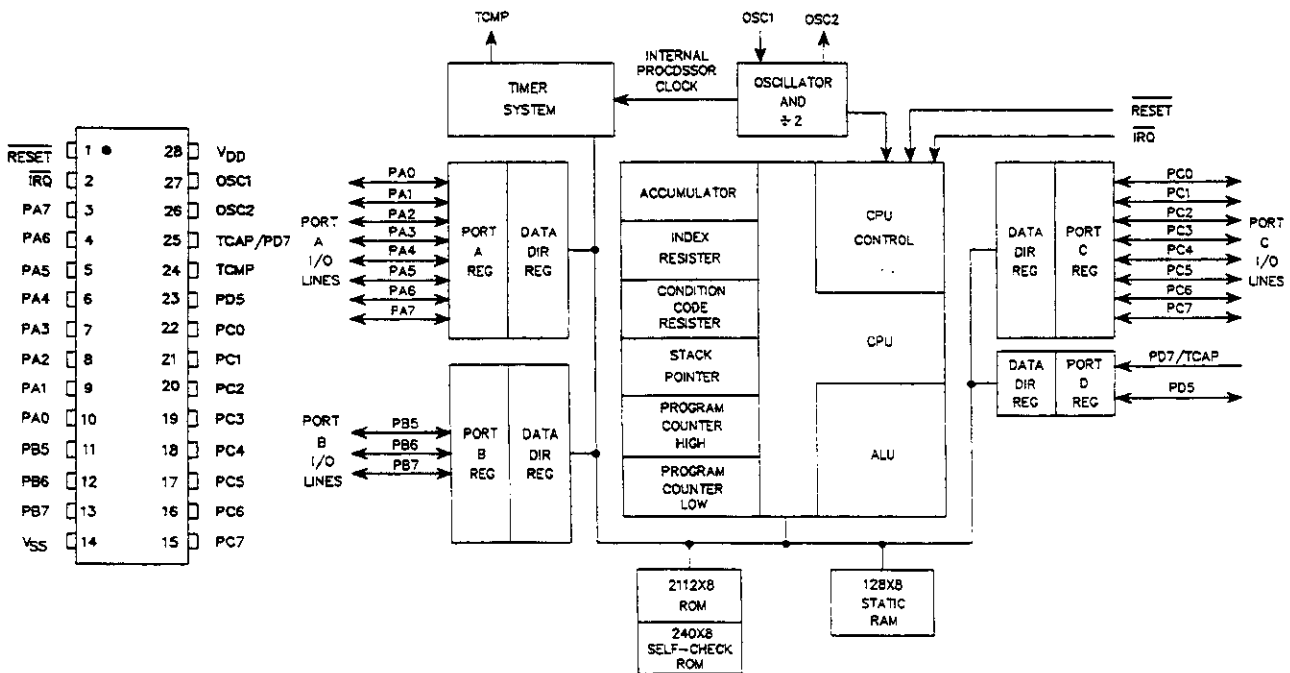




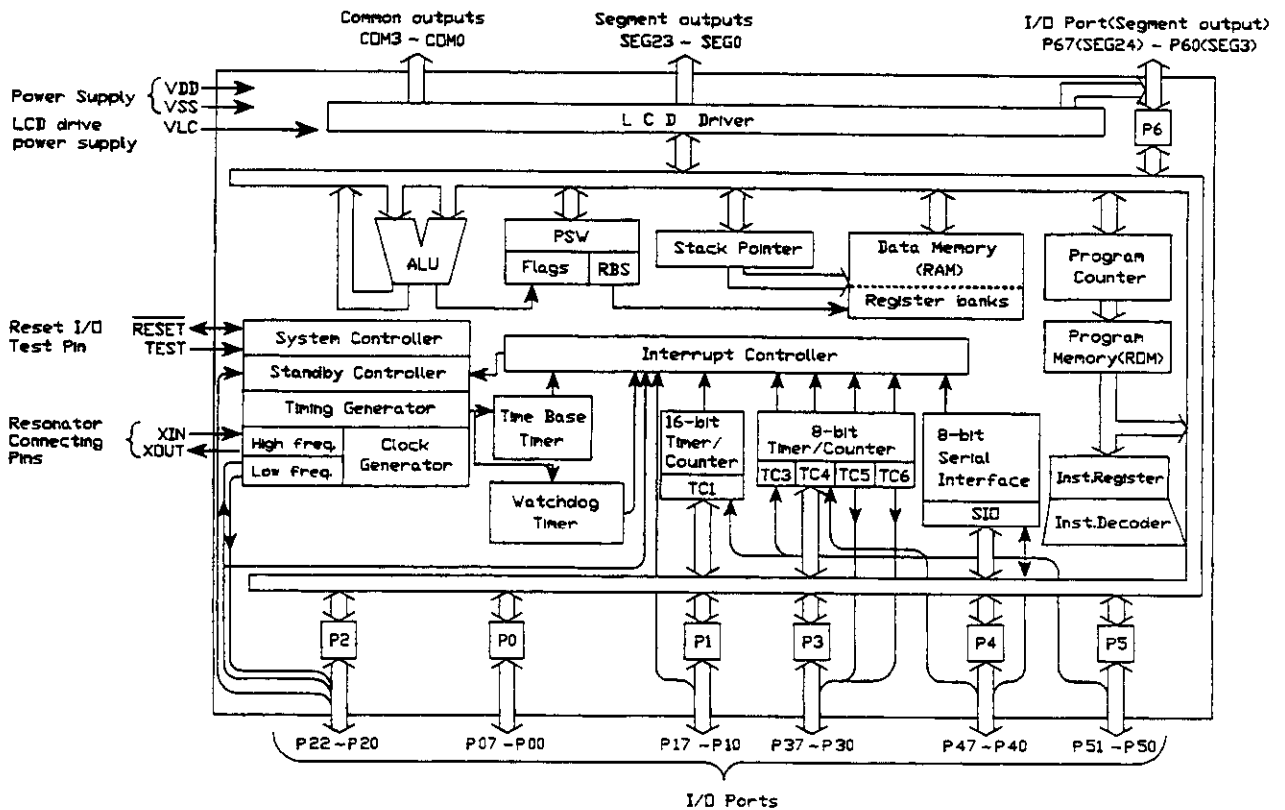
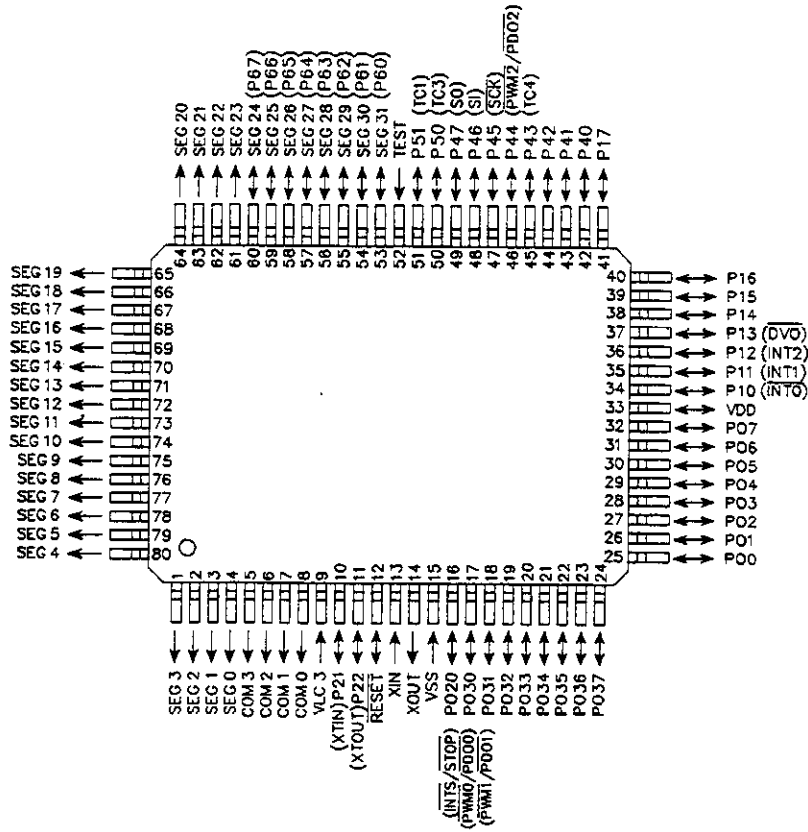
### MC 14094BDR2



### LSC417487DW



# TMP87CH20F



## SEMICONDUCTOR VOLTAGE CHART

- Frequency : 146.125
- Power Supply : 13.8 V DC
- Unit : Volts (average)
- At Normal Function

### Transistors

Ref. No.	Receive			Transmit		
	E	B	C	E	B	C
Q1	5.6	2.7	13.4	5.6	2.3	12.5
Q2	4.9	4.4	0	4.9	4.4	0
Q3	13.8	13.8	5.2	13.2	13.2	5.9
Q4	0	0	5.2	0	0	5.9
Q5	4.9	4.5	1.4	4.9	4.4	1.4
Q6	0	4.8	0	0	0	0
Q7	5	4.1	4.8	4.9	4.3	0.1
Q8	0 (S)	0 (G)	4.6 (D)	0 (S)	0 (G)	0 (D)
Q9	0.6 (S)	0 (G)	4.8 (D)	0 (S)	0 (G)	0 (D)
Q10	2.3 (S)	0 (G)	4.8 (D)	0 (S)	0 (G)	0 (D)
Q11	0	0.6	1.5	0	0	0
Q12	0	0	4.8	0	0	0
Q13	0	0	4.9	3.6	4.9	4.9
Q14	0	0	0	0	3.6	0
Q15	0	0	0	0	3.6	0
Q16	13.8	13.1	13.8	13.2	12.4	13.1
Q17	1.5	0	0	1.5	0	0
Q18	0	0	0	0	0.6	7.4
Q19	0	0	0	0	0	7.4
Q20	0	0	0	0	0	3.2
Q21	0	0	13.8	0	0	5.2
Q22	0	0	13.8	0	0	13.8
Q23	8.1	8.1	0	8.1	7.3	8.0
Q24	0	0	8	0	4.8	0
Q25	13.8	13.1	13.8	13.2	12.5	5.1
Q26	4.1	5	4.3	0.2	0.7	12
Q27	0	0	0	0	0	2.0
Q28	4.9	4.7	0	4.9	0	4.9

IC's

Pin No.	Transmit										
	IC1	IC2	IC3	IC4	IC5	IC6	IC7	IC8	IC301	IC401	IC501
1	2.3	0	1.3	8	13.8	0.8	3.7	13.8	1.9	1.9	2.5
2	4.9	0	0.8	0	0	1.9	0.1	0	1.9	1.9	2.5
3	5.7	0	0	5	8	1.9	2.0	10	1.8	0	2.4
4	4.7	0	6.1	-	-	0	0	-	4.9	4.9	4.9
5	4.5	0	13.8	-	-	0.9	0	-	1.8	1.8	2.4
6	0	0	-	-	-	1.2	0.6	-	1.9	2.0	2.4
7	0	0	-	-	-	2.9	0.1	-	1.9	2.0	2.4
8	0	0	-	-	-	10	4.9	-	1.9	2.2	2.4
9	0	0	-	-	-	-	-	-	1.9	2.2	2.4
10	0	0	-	-	-	-	-	-	1.9	1.8	2.4
11	2.7	0	-	-	-	-	-	-	0	0	0
12	0	0	-	-	-	-	-	-	1.9	1.8	2.4
13	3.5	0	-	-	-	-	-	-	1.9	2.0	2.4
14	4.9	0	-	-	-	-	-	-	1.9	2.0	2.4
15	0	0	-	-	-	-	-	-	-	-	-
16	0	0	-	-	-	-	-	-	-	-	-
17	4.7	-	-	-	-	-	-	-	-	-	-
18	0	-	-	-	-	-	-	-	-	-	-
19	0	-	-	-	-	-	-	-	-	-	-
20	2.3	-	-	-	-	-	-	-	-	-	-

IC's

Pin No.	Receive										
	IC1	IC2	IC3	IC4	IC5	IC6	IC7	IC8	IC301	IC401	IC501
1	2.3	4.6	1.4	8	13.8	8.7	3.7	13.8	0	1.8	2.4
2	4.9	3.9	0.8	0	0	0	0.5	0	0	1.8	2.4
3	5.6	0	0	5	8	2.0	3.4	10	0	1.8	2.4
4	4.7	0	6.4	-	-	0	0	-	0	4.9	4.9
5	4.5	3.7	13.8	-	-	1.0	1.8	-	0	1.8	2.4
6	0	3.7	-	-	-	0.9	1.8	-	0	1.8	2.4
7	0	3.7	-	-	-	2.9	3.4	-	0	1.8	2.4
8	0	4.7	-	-	-	10	4.9	-	0	1.8	2.4
9	0	2.0	-	-	-	-	-	-	0	1.8	2.4
10	0	0.6	-	-	-	-	-	-	0	1.8	2.4
11	2.7	2.5	-	-	-	-	-	-	0	0	0
12	0	0.4	-	-	-	-	-	-	0	1.8	2.4
13	3.5	0.4	-	-	-	-	-	-	0	1.8	2.4
14	4.9	0	-	-	-	-	-	-	0	1.8	2.4
15	0	0	-	-	-	-	-	-	-	-	-
16	0	1.7	-	-	-	-	-	-	-	-	-
17	4.7	-	-	-	-	-	-	-	-	-	-
18	0	-	-	-	-	-	-	-	-	-	-
19	0	-	-	-	-	-	-	-	-	-	-
20	2.3	-	-	-	-	-	-	-	-	-	-

**Diodes**

Ref. No.	Receive		Transmit	
	A	K	A	K
D1	2.8	0	2.8	0
D2	2.8	0	2.8	0
D3	2.8	0	2.8	0
D4	2.8	0	2.8	0
D5	2.8	0	2.8	0
D6	2.8	0	2.8	0
D7	2.0	1.2	4.4	3.6
D8	0	1.2	4.4	3.6
D9	0	0		2.5
D10	0	0	8	4.3
D11	0	4.1	4.8	4.3
D12	0	13.8	0	13.8
D13	0	3.4	2.1	2.2
D14	0	0	7.2	6.3

**•At Squelch Function**

Ref. No.	Unsquench			Squelch		
	E	B	C	E	B	C
Q12	0	0	4.7	0	1.3	0

•At Tone Squelch Function

- CTCSS Tone : 88.5 Hz, Only T-SQL ON, Squelch volume must be turned counterclockwise
- Receive : SSG (AF 100 Hz, Modulation 700 Hz, RF Level-47 dBm)
- Transmit : Unmodulation

IC's

Pin No.	Receive				Transmit	
	Without Tone		With Tone			
	IC602	IC603	IC602	IC603	IC602	IC603
1	0	0.6	0	1.9	1.4	2.0
2	0	0	3.8	2.0	0	2.0
3	0	1.7	0	1.4	0	1.4
4	0.2	0.7	0.2	1.9	0.2	1.9
5	0.2	1.7	0.2	1.9	0.2	1.9
6	0.2	1.2	0.2	4.8	0.2	4.8
7	0	1.7	0	1.9	0	1.9
8	0	0	0	0.2	0	0.2
9	0	4.9	0	1.7	0	1.7
10	0.4	0	0.4	0	0.4	0
11	1.9	0	1.9	2.4	0	2.5
12	0	0	1.9	0	0.4	0
13	0	0.7	0	1.9	0	1.9
14	1.7	1.7	1.4	1.9	1.4	2.0
15	0	-	0	-	1.4	-
16	1.9	-	4.9	-	4.9	-

Transistors

Ref. No.	T-Squelch OFF			T-Squelch ON		
	E	B	C	E	B	C
Q604	4.9	4.9	1.2	4.9	0	4.9

•At DTMF Squelch Function

DTMF Tone : Only D-SQL ON, squelch volume must be turned counterclockwise

Micro phone : Receive (SSG : AF1 69 Hz, AF2 1209 Hz, Modulation 3.5 KHz, RF Level 0.25 uVpd)

IC's

Pin No.	Receive	
	D-Squelch OFF	D-Squelch ON
	IC604	IC604
1	0	0
2	0	0
3	0	0
4	4.9	4.9
5	4.1	4.1
6	4.9	4.9
7	4.9	4.9
8	0	0
9	0	0
10	2.0	2.0
11	2.0	2.0
12	2.0	2.0
13	0	0
14	0.2	4.1
15	0	0
16	0	0

•At Back Light Function

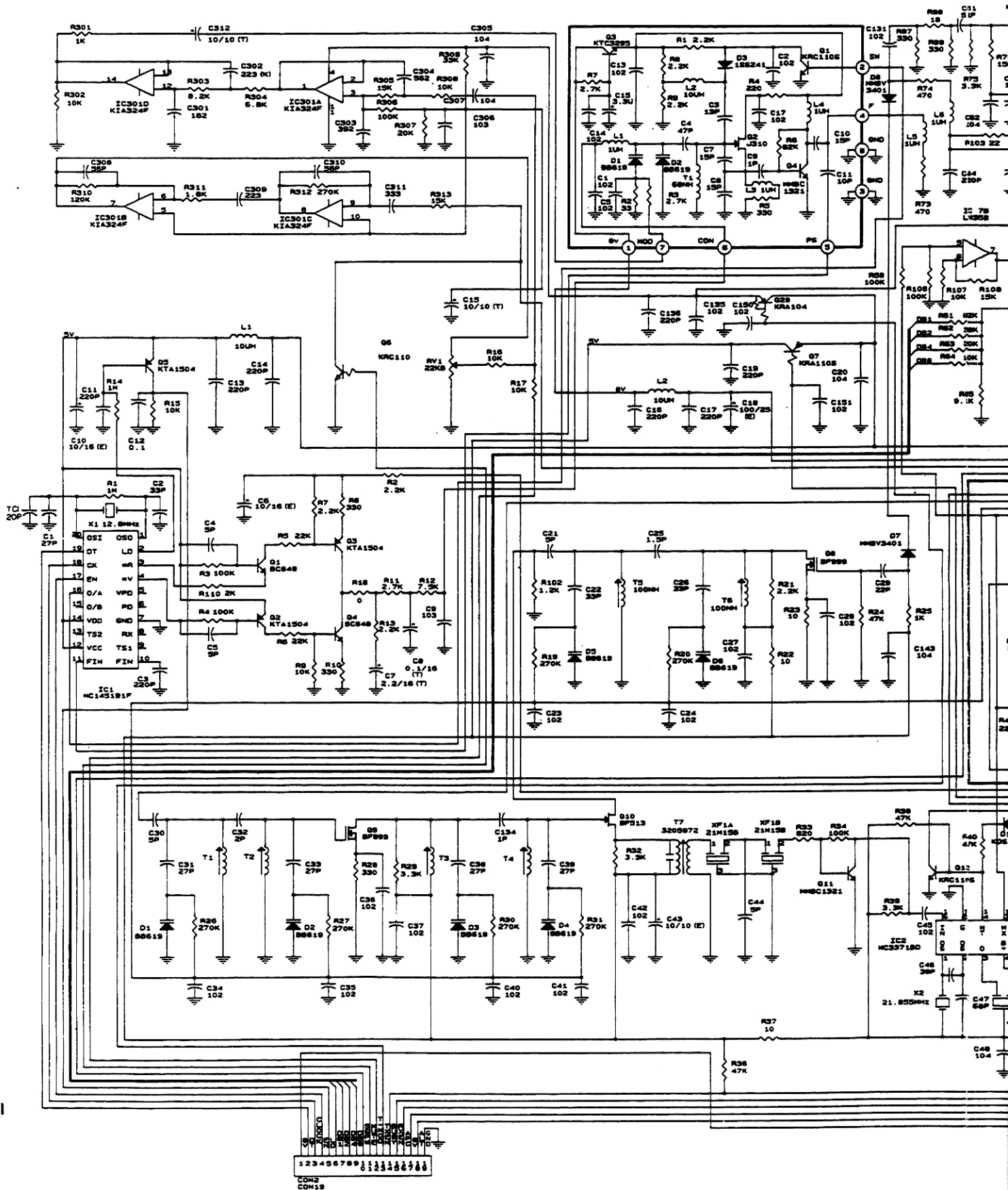
Transistors

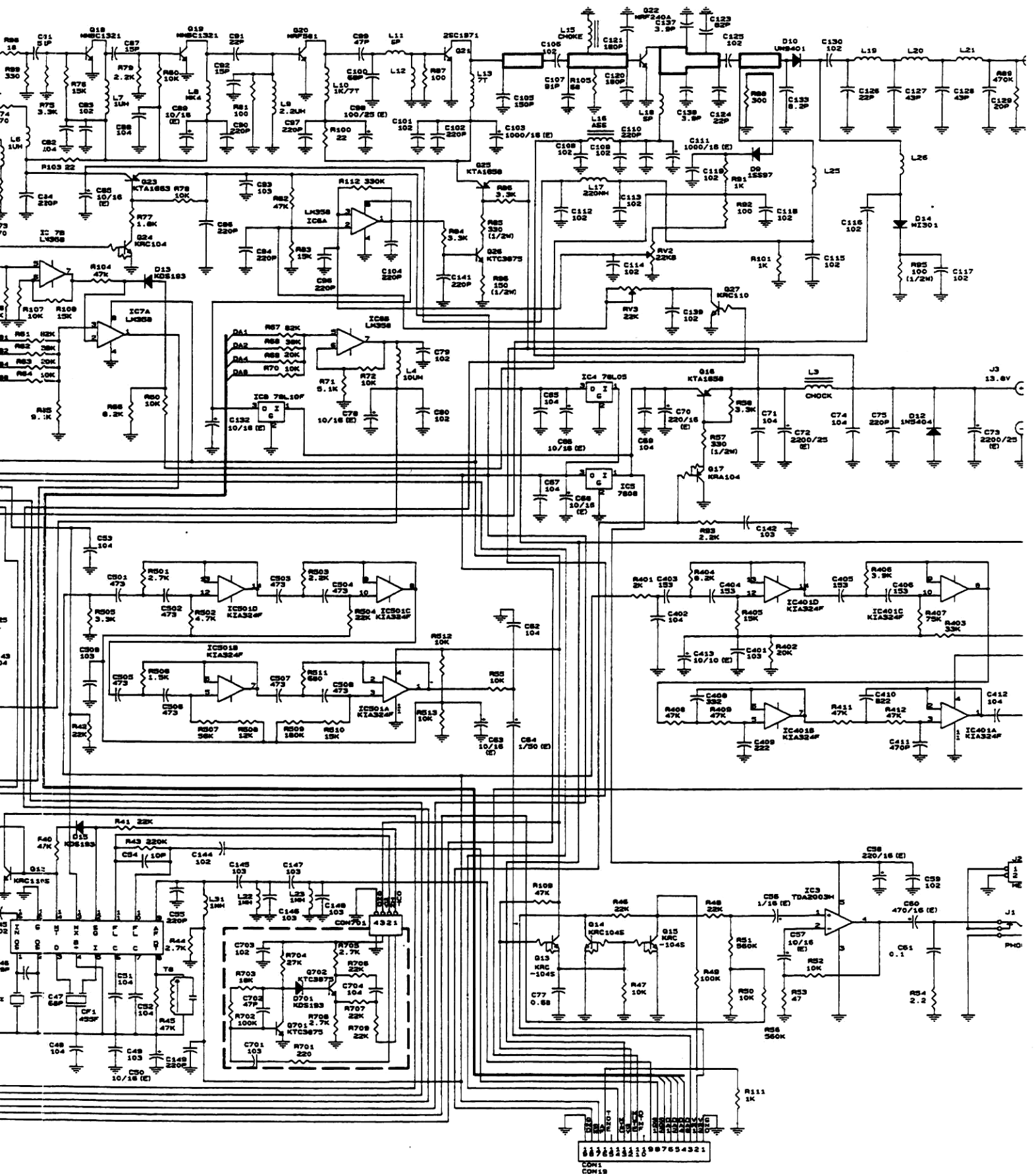
Ref. No.	Back Light OFF (60%)			Back Light ON (100%)		
	E	B	C	E	B	C
Q601	0	0	8	0	4.5	0
Q602	8	8	7.5	8	7.4	8.1



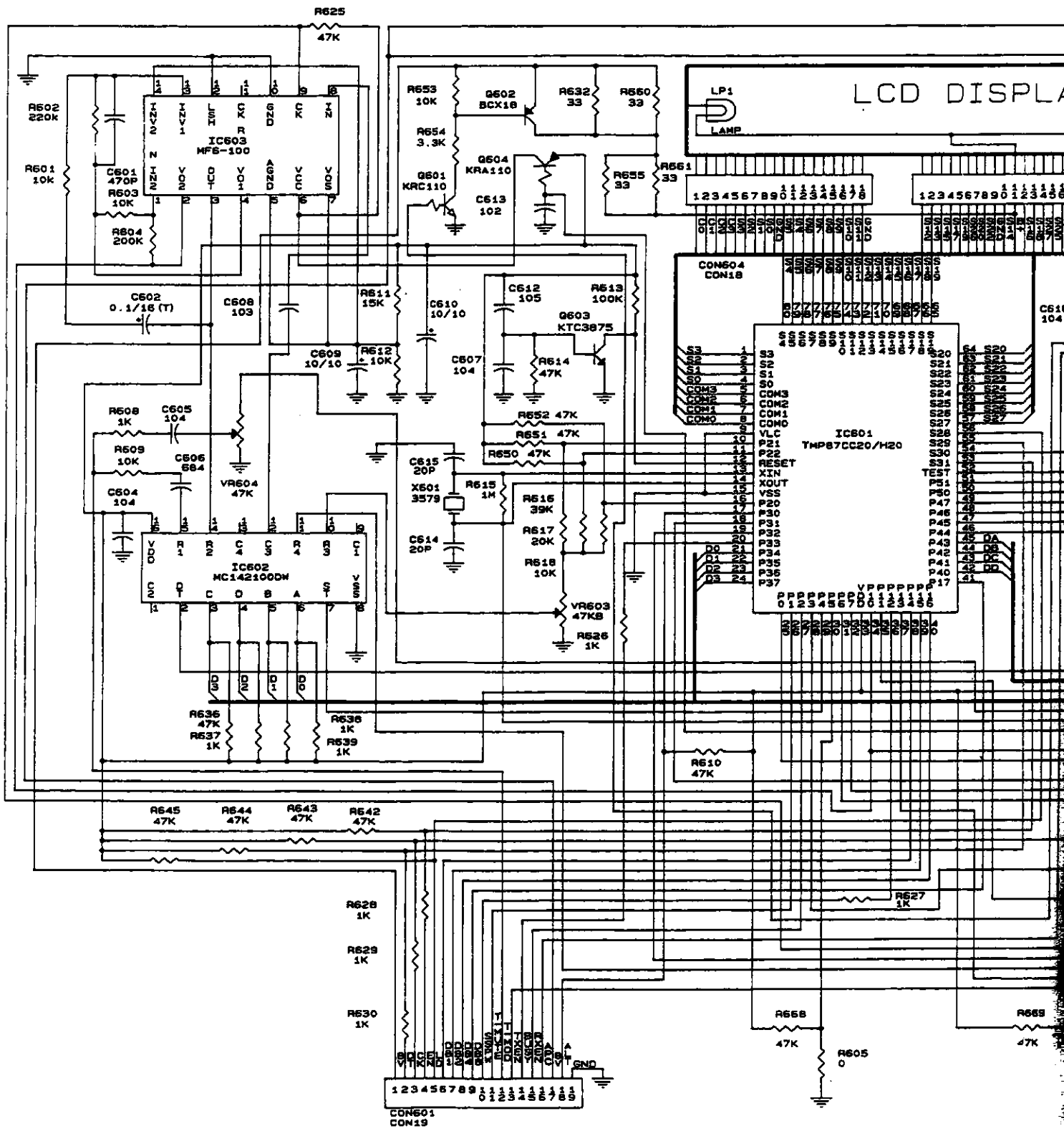
# RF SCHEMATIC

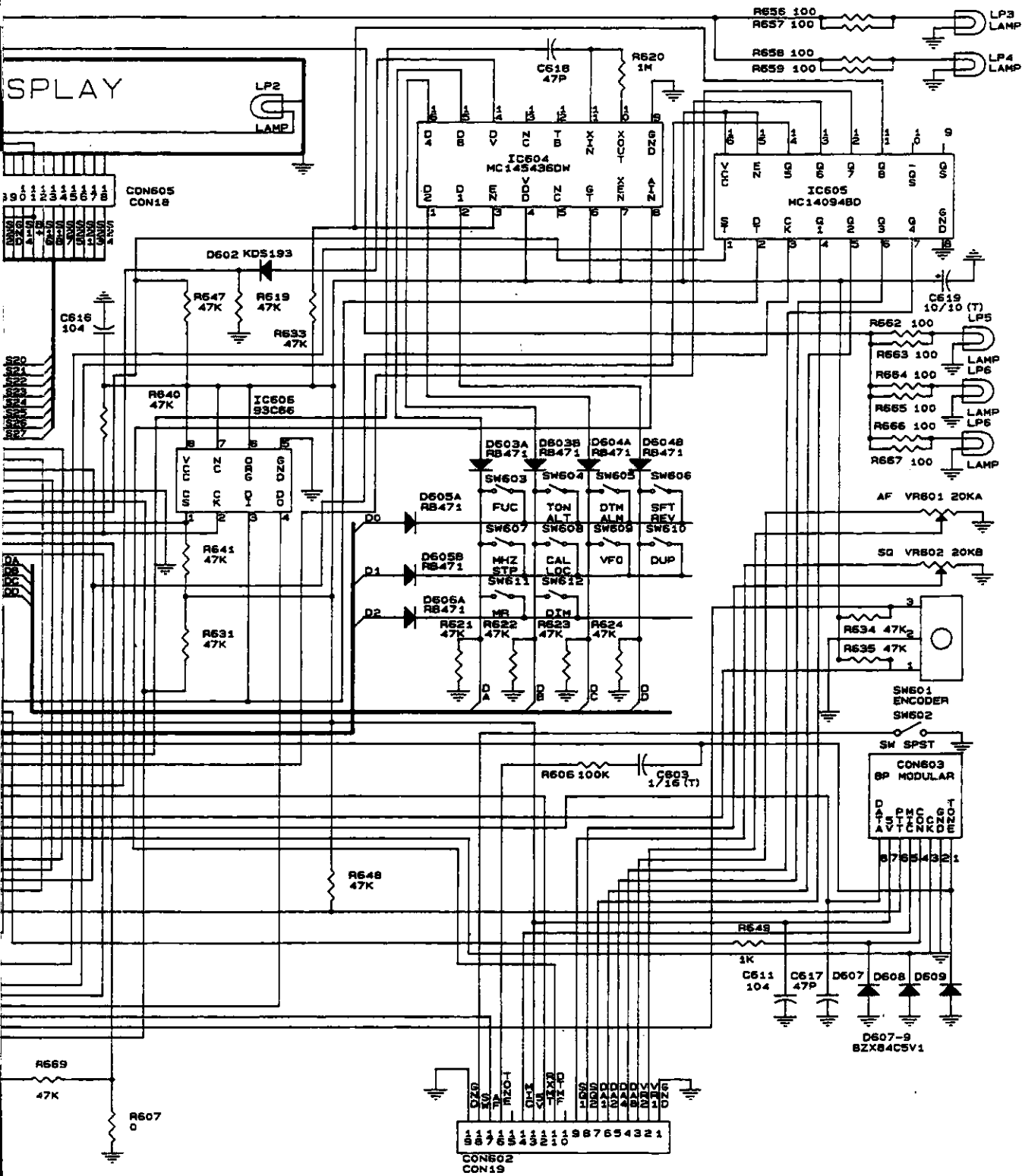
# SCHEMATIC DIA





# DIGITAL SCHEMATIC







## NOTES

## NOTES

**RADIO SHACK**  
**A Division of Tandy Corporation**  
**Fort Worth, Texas 76102**