



RadioShack®

Service Manual

19-1106

HTX-245

Mini Handheld 2m/70cm FM Amateur Transceiver

Catalog Number: 19-1106

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SPECIFICATIONS

General

Frequency Range.....	VHF : 144-148MHz UHF : 438 - 450 MHz
Frequency Step.....	5,10,12.5,15,25,50 KHz
Frequency Stability.....	+/- 10 ppm
Antenna Impedance.....	50 ohm
Speaker.....	8 ohm
Microphone	Condenser Mic 2.2 kohm
Channel Display.....	Lcd 7 Digit
Operating Temperature.....	14 °F to 140 °F(-10 °C to 60°C)
Size.....	58.5x103x28mm
Weight (w/o Battery).....	145g
Supply Voltage : Alkaline Battery	4.5 VDC
External Power Jack.....	4.5 - 6.7 VDC

Receiver

	Nominal	Limit
Intermediate Frequency:		
1st IF.....	VHF : 45 MHz UHF : 45 MHz	
2nd IF.....	VHF : 450 KHz UHF : 450 KHz	
Sensitivity:		
12 dB SINAD.....	VHF : 0.158μV UHF : 0.178μV	0.225μV 0.250μV
Squelch Sensitivity:		
SINAD.....	VHF : 6 dB UHF : 10 dB	10 dB 16 dB
Adjacent Channel Rejection (25Khz).....	VHF : 50 dB UHF : 50 dB	50dB 50dB
Modulation Acceptance Bandwidth.....	VHF : 4.5 KHz UHF : 4.5 KHz	3.5 KHz 3.5 KHz
Hum and Noise.....	VHF : 40 dB UHF : 40 dB	35 dB 35 dB
Audio Output Power:		
4.5 Vdc.....	VHF : 400 mW UHF : 400 mW	300mW 300mW
Audio Distortion.....	VHF : 3 % UHF : 3 %	10 % 10 %
Audio Response.....	VHF : -6 dB/oct UHF : -6 dB/oct	
Current Drain:		
Standby Without Power Save.....	VHF : 40mA UHF : 40mA	50mA 50mA
Standby With Power Save.....	VHF : 22 mA UHF : 22 mA	30mA 30mA
CTCSS Sensitivity.....	VHF : 0.125μV UHF : 0.125μV	

Transmitter

	Nominal	Limit
RF Power Output: 4.5Vdc.....	VHF : 0.7 W UHF : 0.7 W	0.45 W 0.45 W
Maximum Deviation.....	VHF : 4.5±0.5KHz UHF : 4.5±0.5KHz	
Hum and Noise.....	VHF : 40 dB UHF : 40 dB	35 dB 35 dB
Audio Distortion.....	VHF : 3 % UHF : 3 %	10 % 10 %
Audio Response.....	VHF : +6 dB/oct UHF : +6 dB/oct	
Spurious and Harmonic Emissions.....	VHF : 60 dB UHF : 60 dB	
Frequency Error.....	VHF : ±5 ppm UHF : ±5 ppm	±10 ppm ±10 ppm
Microphone Sensitivity.....	VHF : 4 mV UHF : 4 mV	8 mV 8 mV
CTCSS Tone Deviation.....	VHF : 0.7 Khz UHF : 0.7 Khz	
DTMS Tone Deviation.....	VHF : 2 Khz UHF : 2 Khz	
Current Drain: 4.5V.....	VHF : 550 mA UHF : 550 mA	800 mA 800 mA

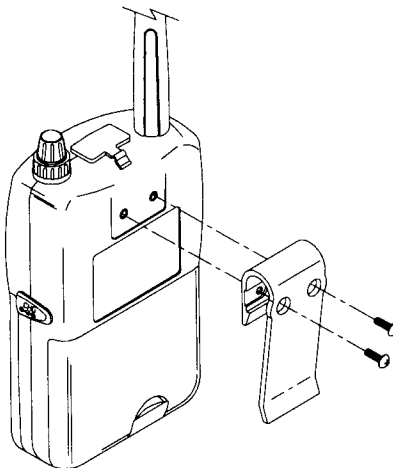
Note : Nominal specs represent the design specs. All units should be able to approximate these-some will exceed and some may drop slightly below these specs. Limit specs represent the absolute worst condition that still might be considered acceptable; in no case should a unit fail to meet limit specs.

TEST CONDITION

1.Power Source	4.5V
2.ANT Impedance	50ohm
3.Test Temperature	25°C
4.Main signal input level.....	-47 dBm
5.Reference audio output	150 mW
6.Reference FM modulation.....	3 kHz Dev.
7.Audio output load.....	8 ohm
8.Measuring channel	VHF 146.00 MHz WX 162.475 MHz UHF 440.00 MHz
9.Channel Spacing	25 KHz

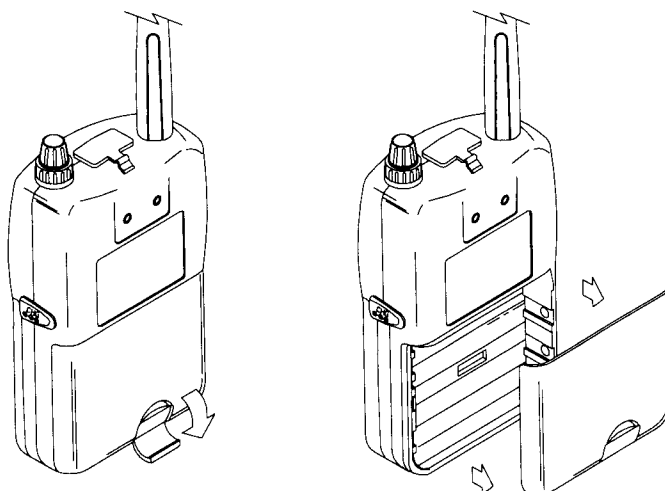
DISASSEMBLY INSTRUCTIONS

1. TO REMOVE THE CLIP, REMOVE TWO SCREWS(A)



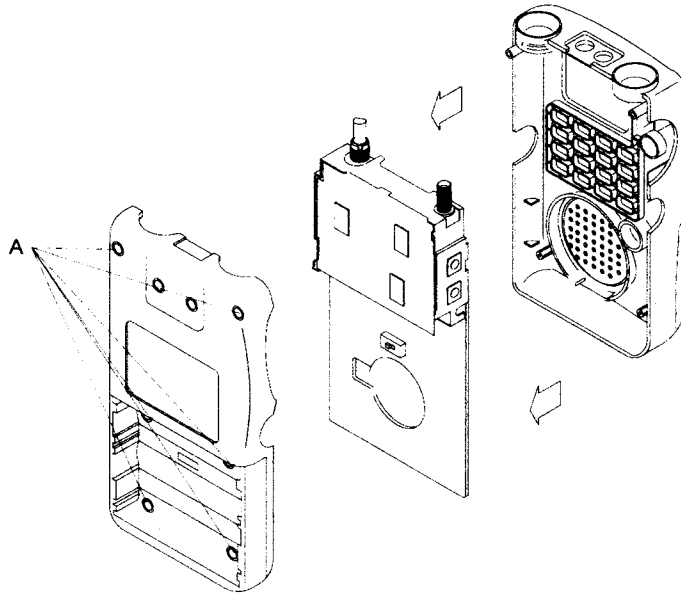
2. TO REMOVE THE BATTERY COVER

- A. Pull off battery cover lock
- B. Remove the battery cover



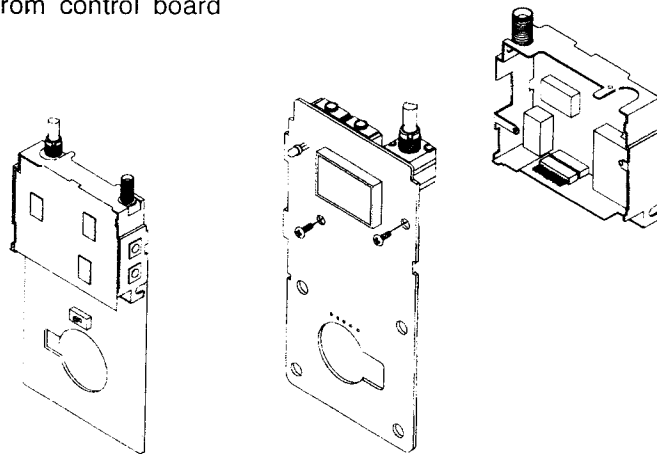
3. TO ACCESS THE RF AND CONTROL BOARD FROM COVER

- A. Remove six screws (A) from the back cover and lift the back cover
- B. Pull the back cover
- C. Desolder the connection of the speaker wire then remove the following items
 - Antenna
 - Rotary volume knob
 - Antenna connector nut
 - Volume nut
- D. Remove the PTT button rubber
- E. Then pull the board section out from the top and lift it out of the case



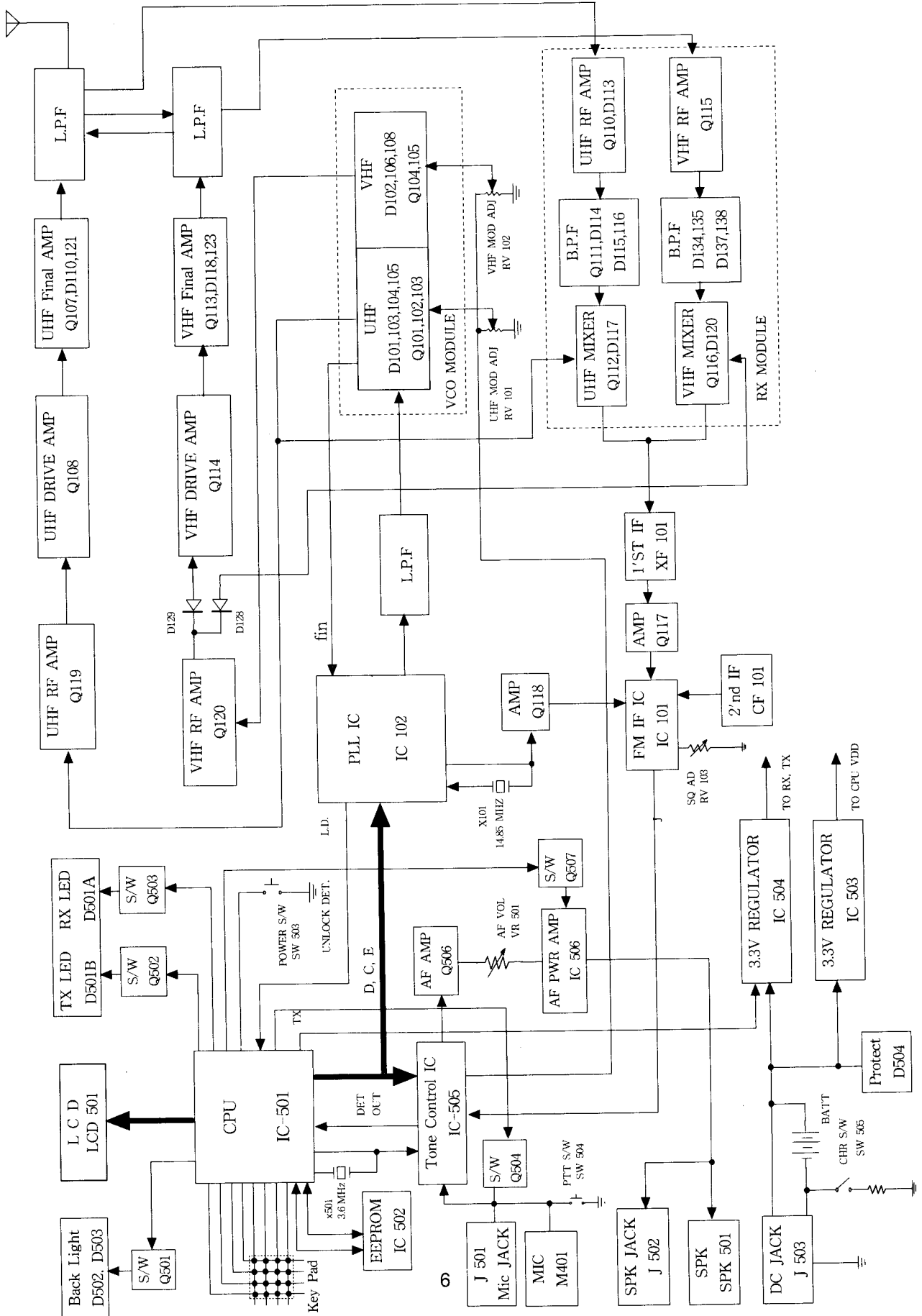
4. TO ACCESS THE BOARD SECTION (RF AND CONTROL BOARD)

- A. Remove two screws
- B. Separate RF board from control board



5. TO REASSEMBLE, FOLLOW THE DISASSEMBLY STEPS IN REVERSE ORDER

BLOCK DIAGRAM



THEORY OF OPERATION

The 19-1106 radio is comprised of two main populated PCBs (an RF PCB and control PCB). The RF PCB contains the transmitter and receiver circuits. The control PCB contains the microprocessor controller and associated digital circuits and keypad PCB.

TRANSMITTER

The transmitter is comprised of:

- Microphone audio circuit
- Transmitter stage and harmonic filter
- Frequency synthesizer circuit

Microphone audio input circuit

The audio signal from the microphone (Mic terminal) or the external microphone (via the MIC jack J501) are amplified, pre-emphasized, and limited by IC506 and associated component. The AF microphone signal is applied to IC506 to produce an amplified, pre-emphasized audio signal. The signal is limited by limiter and low-pass filter inside IC506. The low-pass rejects frequencies above 3Khz (outside the voice spectrum). The filter signal is applied to the VCO pin 7 and pin 12 (within the frequency synthesizer circuit). Pin 7 is UHF band input signal pin and pin 12 is VHF band input signal pin. RV101 and RV102 are used to adjust voice deviation

UHF mode transmitter stage and harmonic filter

The UHF power amplifier contains Q107 and associated components. When in the transmit UHF mode of operation, base of Q124 is low, enabling the RF signal to be amplified by Q108. The first amplified RF signal passes through the filter comprising L115,C146,C144 and then to Q107. The first amplified RF signal is secondly amplified by Q107. The secondly amplified RF signal passes through the harmonic filter comprising L113 and associated component, and then to the antenna connector(ANT).

VHF mode transmitter stage and harmonic filter

The VHF power amplifier contains Q113 and associated surrounding components. When in the transmit VHF mode of operation, base of Q125 is low, enabling the RF signal to be amplified by Q114. The first amplified RF is secondly amplified by Q113. The secondly amplified RF signal passes through the harmonic filter, and then to the antenna connector(ANT).

Frequency synthesizer

With data received from the microprocessor(IC501), the frequency synthesizer circuit controls and produces the RF carrier frequency for the transmitter during transmission and the local oscillator frequency for the receiver.

The frequency synthesizer circuit is comprised of:

- RX and TX voltage controlled oscillator circuit
- UHF RX VCO
- VHF RX VCO
- Loop filter
- PLL frequency synthesizer

RX and TX voltage controlled oscillator module

A VCO module produces carrier frequencies during transmission and the local oscillator frequency during reception. The VCO module uses the shift signal (via module pin 9). The shift signals are to divide the TX mode and RX mode.

UHF RX VCO

The UHF RX VCO is comprised of a low noise transistor Q102, coil L106, and varactor D105. Capacitance in D105 is varied by the change of DC voltage so that frequencies are controlled by the phase detector signal (via module pin7). The local oscillator signal comes out of the emitter of Q102, passes through D101 and then to pin 5 of the module. When uses both L104 and L105.

VHF RX VCO

The VHF RX VCO is comprised of a low noise transistor Q104, coil L110, and varactor D108. Capacitance in D108 is varied by the change of DC voltage so that frequencies are controlled by the phase detector signal (via module pin12). The local oscillator signal comes out of the emitter of Q104, passes through D102 and then to pin2 of the module.

UHF TX VCO

When UHF TX switching transistor Q103 is turned on by shift signal (via module pin9). Then the frequency range is changed for TX. The AF signal at IC506 pin4 is applied to R112,R112 via pin 8 of the module. The control voltage from the loop filter is applied to L106, L106 via pin7 of the module. The TX RF modulated signal produced at the emitter of Q102 is passed to the power amplifier and harmonic filter via the buffer amplifier(Q119). This mode uses L104.

VHF TX VCO

When UHF TX switching transistor Q105 is turned off by shift signal (via module pin9). Then, the frequency range is changed for TX. The AF signal at IC506 pin4 is applied to R120,R120 via pin11 of the module. The TX RF modulated signal produced at the emitter of Q102 is passed to the power amplifier and harmonic filter via the buffer amplifier(Q120). This mode uses both L108 and L109.

Loop filter

Resistor R219 and capacitors C244 to C245 are the loop filter. The phase detector signal from IC102 pin3 is filtered by R231,C246,R232,C247 to remove any reference frequency harmonic and then applied to the RX and TX voltage controlled oscillator module pin7 and pin12.

PLL frequency synthesizer

The PLL frequency synthesizer contains an oscillator for the reference crystal, a reference divider, a programmable divider, a phase/frequency comparator, an out-of-lock detector, an RX/TX switching signal(via module pin 9) a power control switching TR.

Reference oscillator

The reference oscillator of IC102 with a 14.85MHz crystal X101,TC101,C254,C255 produces a 14.85MHz reference signal at IC102 pin10 and pin11.

Programmable dividers

IC102 has two dividers - a data programmable divider and a programmable reference divider.

Phase detector

The phase detector (pin3 of the IC102) produces negative pulses when $F_r < F_v$ and positive pulses when $F_v > F_r$. When $F_v = F_r$ and the phase is the same, the phase detector presents a high impedance at pin3. The signal at pin3 is applied to the VCO via the loop filter.

Out-of-lock detector

The out-of-lock detector produces a high logic level when F_r and F_v are in the same phase and frequency, or low logic level pulses when the loop is out of lock at pin5 of IC102. The signal at IC102 pin5 is fed to microcontroller.

RECEIVER

The receiver uses dual-conversion superheterodyning techniques and is comprised of:

- RF module circuit
- First mixer and first IF amplifier, and FM detector
- Second mixer and second IF amplifier, and FM detector
- AF amplifier and filtering
- MUTE(SQUELCH) circuit

RF amplifier

The RF amplifier module comprises UHF amplifier, UHF first mixer, UHF amplifier and VHF first mixer. The UHF amplifier contains tuned circuit Q110, Q111 and associated components. The RF signal is fed into the RX module (via pin3). The RF signal passes through tuned circuit, enabling the RF signal of the operating frequency to pass to the VHF first mixer (Q112 etc). The VHF amplifier contains tuned circuit Q115 and associated components. The RF signal fed into the RX module (via pin1) passes through the C219. It passes through tuned circuit, enabling the RF signal at the operating frequency to pass to the VHF first mixer (Q116 and associated components).

First mixer and first IF amplifier

Crystal filter XF101 is the first IF filter. The VCO local oscillator signals are applied via module pin4 and pin10. Mixer transistor Q112 and Q116 produce a difference frequency of 45 MHz at the drain connection, from the filtered RF signal and the filtered VCO local oscillator signal. The 45 MHz difference frequency is filtered by crystal filter XF101. The IF signal is filtered by XF101 and passed to the second mixer, second IF, and FM detector.

Second mixer, second IF, and FM detector

A signal conversion FM receiver integrated chip, IC101, contains the second mixer, second IF, and FM detector functions. The second local oscillator frequency is determined by the crystal X101 connected to IC101 pin1. The IF signal is received at IC101 pin16. The second IF frequency of 450KHz is produced when the difference frequency is applied to the mixer via pin6. The output of the second mixer via pin3 is applied to a 450KHz bandpass filter, CF101. The amplifier signal is coupled to the adjusted quadrature detector T101. Any detected signal is produced at IC101 pin9 and applied to IC506.

AF amplifier and filtering

Any detected signal is supplied from IC101 pin9 to IC506 pin 23.

Any detected signal is divided into audio signal and tone signal by the high-passfilter. Audio signal is amplified and filtered to be applied to IC506 pin7. The de-emphasis is provided by resistor R566 and C538. IC507 is the final audio amplifier. The audio signal of IC506 pin7 is passed to IC507 pin4 (via Q506). The gain of the amplifier is set by resistor R574 and R575. The amplified audio signal at IC507 pin8 is applied to the internal speaker. The external speaker connection is via the connector jack (J502).

Mute (squelch) circuit

The squelch circuit switches off the audio power amplifier in the absence of RF signals. The squelch circuit is comprised of an internal carrier detector, squelch control, and RV103.

Internal detector circuit

The carrier signal is detected by IC101 pin12 and C228, and then DC amplified by the internal amplifier circuit via IC101 pin8. The amplified signal is applied to IC101 pin13 and then converted to logic level by the internal comparator IC101. The output level is applied as the busy signal to the microprocessor by connector pin11.

MICROPROCESSOR CONTROLLER

The default of all function 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 its associated circuit.

Microprocessor

The microprocessor is TOSHIBA H8/3834 32K-byte. It contains the LCD driver, I/O controller and voltage comparator. When the radio turns on, the microprocessor is power-on reset by IC501 of pin9 to operate in the preset order in the masked ROM. Memory contents are stored in EEPROM(IC502)

CTCSS/DTMF ENCODE AND DECODE CIRCUIT

CTCSS receive

The detected audio signal is applied to IC506 pin23.

When tone signal divided from IC506 inside is detected, it comes out through IC506. This signal is controlled by the input pin100 of microprocessor.

CTCSS transmit

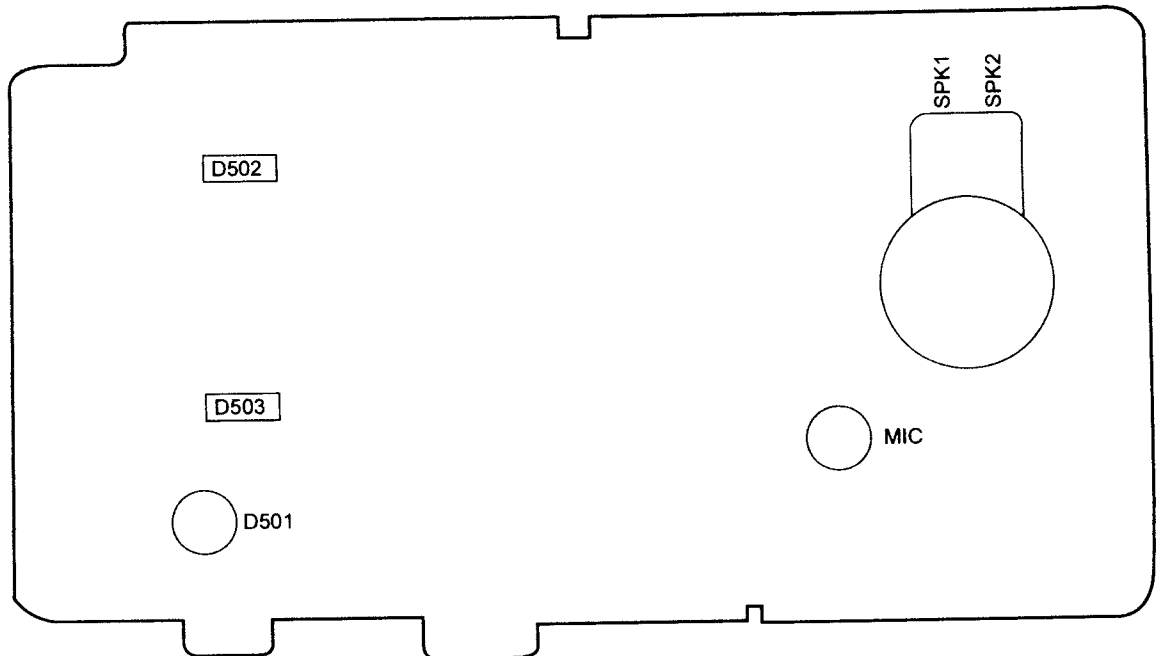
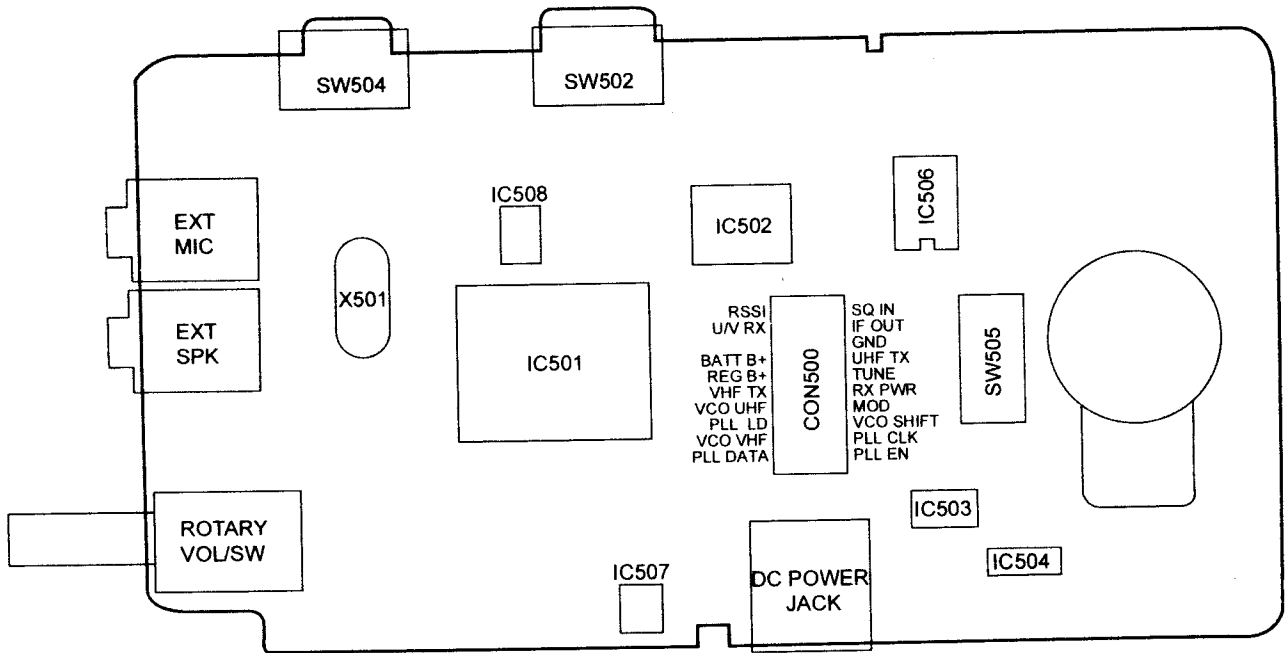
Tone signal from IC506 by data out of microprocessor pin22,23,26 goes to IC506 together with tx audio signal.

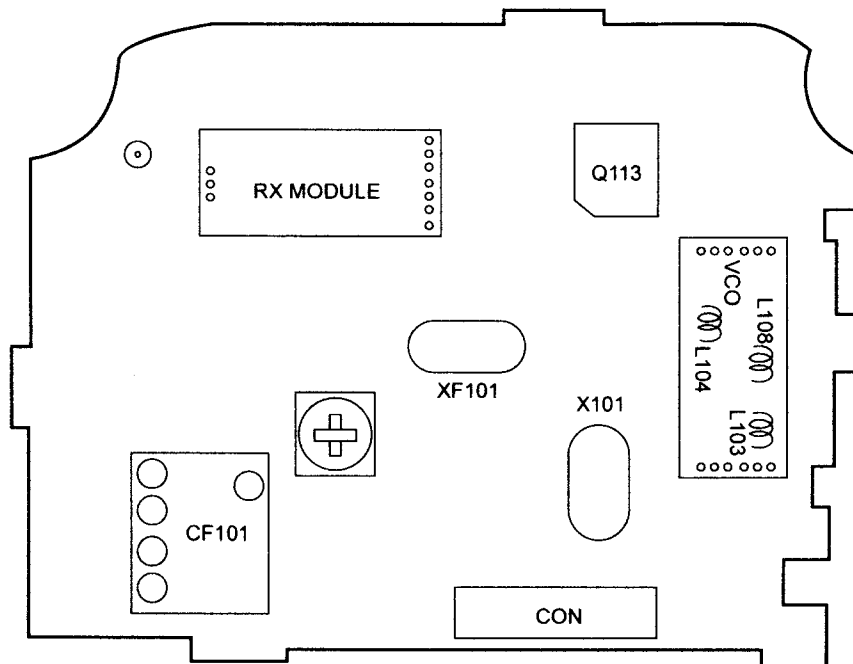
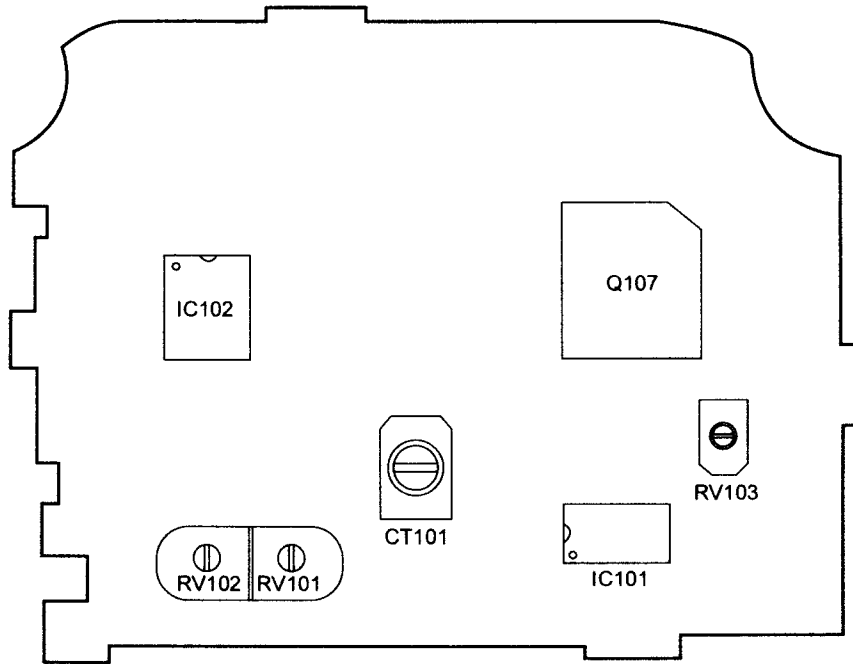
DTMF encoding circuit

DTMF signal from pin 81,82,83,84 of microprocessor is modulated through IC506.

ALIGNMENT INSTRUCTIONS

Alignment Test Points and Parts Locations





PHASE LOCKED LOOP (PLL)

Test Equipment Required

- Frequency counter
- DC power supply (4.5V DC)
- DC voltmeter
- RF attenuator (20 dB, impedance 50 ohm)

Alignment Procedure

Step.	Setting		Connection	Adjuster	Adjust for
1	RX VCO VHF	RX VCO voltage adjustment Frequency :162.4 MHz(WX-1) SPK: Receive Function : None Volume: Optional Squelch : Optional	DC voltmeter to VCO pin 12 (Figure 1)	L108	1.9~2.1 Vdc
	RX VCO UHF	RX VCO voltage adjustment Frequency : 450 MHz SPK: Receive Volume : Optional Squelch : Optional	DC voltmeter to VCO pin7 (Figure 1)	L104	1.9~2.1 Vdc
2	TX VCO VHF	TX VCO voltage adjustment Frequency : 148 MHz Mic : transmit(unmodulated) Function : None Volume : Optional Squelch : Optional	DC voltmeter to VCO pin12 (Figure 1)	L109	1.6~2.0 Vdc
	TX VCO UHF	TX VCO voltage adjustment Frequency : 450 MHz Mic : transmit(unmodulated) Function : None Volume : None Squelch : Optional	DC voltmeter to VCO pin7 (Figure 1)	L104	1.6~2.0 Vdc
3	Frequency	Frequency adjustment Frequency: 450 MHz Mic: transmit(unmodulated) Function: None Volume: Optional Squelch: Optional	Antenna to frequency counter, through attenuator (Figure 2)	TC101	±5 ppm

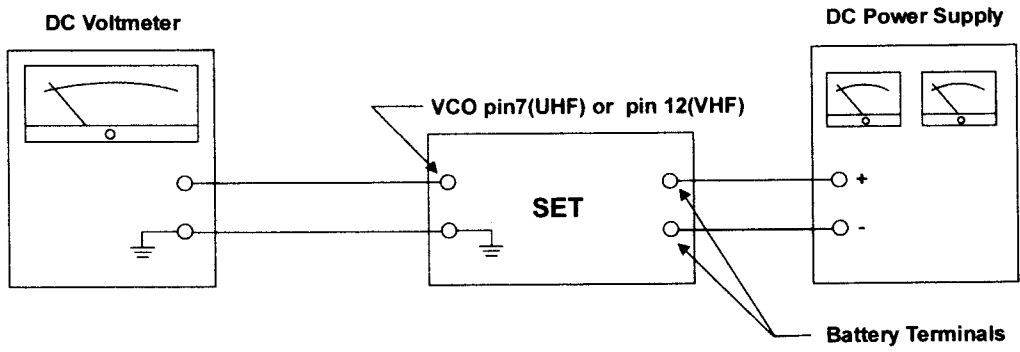


Figure 1

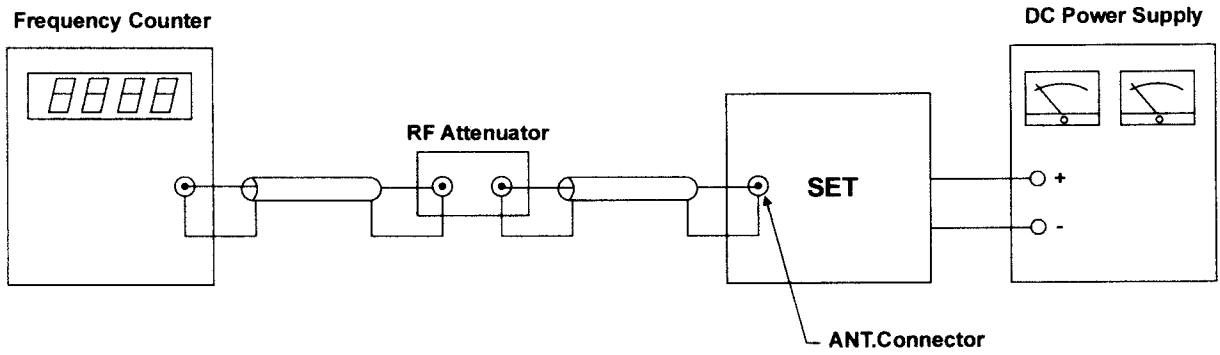


Figure 2

TRANSMITTER SECTION

Test Equipment Required

- RF power meter
- 50 ohm dummy load
- RF attenuator
- Oscilloscope
- Audio generator
- DC power supply (4.5VDC)
- Spectrum analyzer
- Frequency counter
- Modulation meter (FM)

Alignment Procedure

		Setting	Connection	Adjust	Adjust for
AF	VHF	AF modulation adjustment Frequency: 148 MHz Mic: Transmit Function: None Volume: Optional Squelch: Optional RF power selection: High	Connect the audio generator (set to 1KHz) to the mic jack. Connect the RF attenuator to the ANT jack. Adjust the audio signal level to obtain 3KHz deviation. When you increase the audio signal by 20dB, the deviation should not exceed 5KHz deviation. (Figure 3)	RV102	4.8 KHz
	UHF	AF modulation adjustment Frequency:450 MHz Mic: Transmit Function: None Volume: Optional Squelch: Optional RF power selection: High	Connect the audio generator (set to 1KHz) to the mic jack. Connect the RF attenuator to the ANT jack. Adjust the audio signal level to obtain 3KHz deviation. When you increase the audio signal by 20dB, the deviation should not exceed 5KHz deviation. (Figure 3)	RV101	4.8 KHz

Figure 3

RECEIVER SECTION

Test Equipment Required

- Standard signal generator
- AC level meter
- Distortion meter
- DC power supply
- SINAD meter

Alignment Procedure

		Setting	Connection	Adjust	Adjust for
RX Sens.	VHF	RX Sensitivity adjustment Frequency: 144~148MHz Function: None Volume: Adjust for 1V on the level meter Squelch: Set to 0 SSG: Audio 1KHz Modulation 3KHz	Connect the standard signal generator to the EXT-ANT jack. Connect the AC volt level meter, distortion meter, and SINAD meter across the EXT speaker jack with 8ohm dummy load. (Figure 5)	T101	Maximum indication on AC level meter. Maximum sensitivity indication on 12dB SINAD meter. In the above condition, sensitivity is for 144~148MHz.
	UHF	RX Sensitivity adjustment Frequency: 438~450MHz Function: None Volume: Adjust for 1V on the level meter Squelch: Set to 0 SSG: Audio 1KHz Modulation 3KHz	Connect the standard signal generator to the EXT-ANT jack. Connect the AC volt level meter, distortion meter, and SINAD meter across the EXT speaker jack with 8ohm dummy load. (Figure 5)	T101	Maximum indication on AC level meter. Maximum sensitivity indication on 12dB SINAD meter. In the above condition, sensitivity is for 438~450MHz.
Distortion	VHF	RX Distortion adjustment Frequency: 144~148MHz Function: None Volume: Adjust for 1V on the level meter Squelch: Set to 0 SSG: Audio 1KHz Modulation 3KHz	Connect the standard signal generator to the EXT-ANT jack. Connect the AC volt level meter, distortion meter, and SINAD meter across the EXT speaker jack with 8ohm dummy load. (Figure 5)	T101	Maximum indication on AC level meter. Maximum sensitivity indication on 12dB SINAD meter. In the above condition, sensitivity is for 144~148MHz.
	UHF	RX Distortion adjustment Frequency: 438~450MHz Function: None Volume: Adjust for 1V on the level meter Squelch: Set to 0 SSG: Audio 1KHz Modulation 3KHz	Connect the standard signal generator to the EXT-ANT jack. Connect the AC volt level meter, distortion meter, and SINAD meter across the EXT speaker jack with 8ohm dummy load. (Figure 5)	T101	Maximum indication on AC level meter. Maximum sensitivity indication on 12dB SINAD meter. In the above condition, sensitivity is for 438~450MHz.

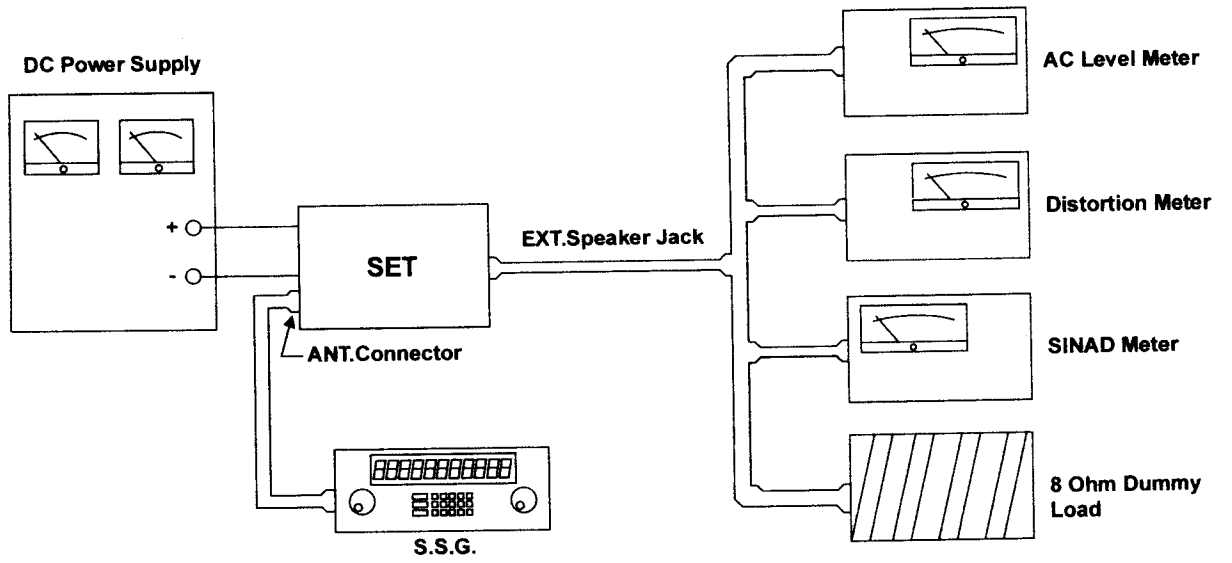


Figure 5

TROUBLESHOOTING HINTS

Symptom	Probable Cause	Remedy
Unit does not work at all	<ul style="list-style-type: none"> • Broken DC power cord • Low voltage of the battery • Defective voltage regulator IC503,504 	<ul style="list-style-type: none"> • Replace • Replace • Replace
No output from speaker at all	<ul style="list-style-type: none"> • Defective external speaker jack • Poor connection of microphone jack 	<ul style="list-style-type: none"> • Repair or Replace • Repair or Replace
No noise on speaker	<ul style="list-style-type: none"> • Measure components of IC506 PIN7,Q506,IC507 PIN4,PIN8 and Q507 	<ul style="list-style-type: none"> • Repair or Replace
Squelch does not work	<ul style="list-style-type: none"> • Defective squelch circuit components (RV103,C221,C231,C232,R211,212,201,200 ,Q132,Q128,Q129)compare with the voltage chart 	<ul style="list-style-type: none"> • Replace defective component(s)
No modulation	<ul style="list-style-type: none"> • Defective microphone • Defecitve IC506,Q504 • Defective TX PWR component (Q124,Q125, Q121,Q122) 	<ul style="list-style-type: none"> • Replace • Replace defective component(s) • Replace defective component(s)
LCD does not work	<ul style="list-style-type: none"> • Measure all the voltage (IC501,PIN76,31 is Vcc) 	<ul style="list-style-type: none"> • Replace
Back light does not work	<ul style="list-style-type: none"> • Defective components of Q501 ,IC501,PIN21 	<ul style="list-style-type: none"> • Replace

ERROR DISPLAY

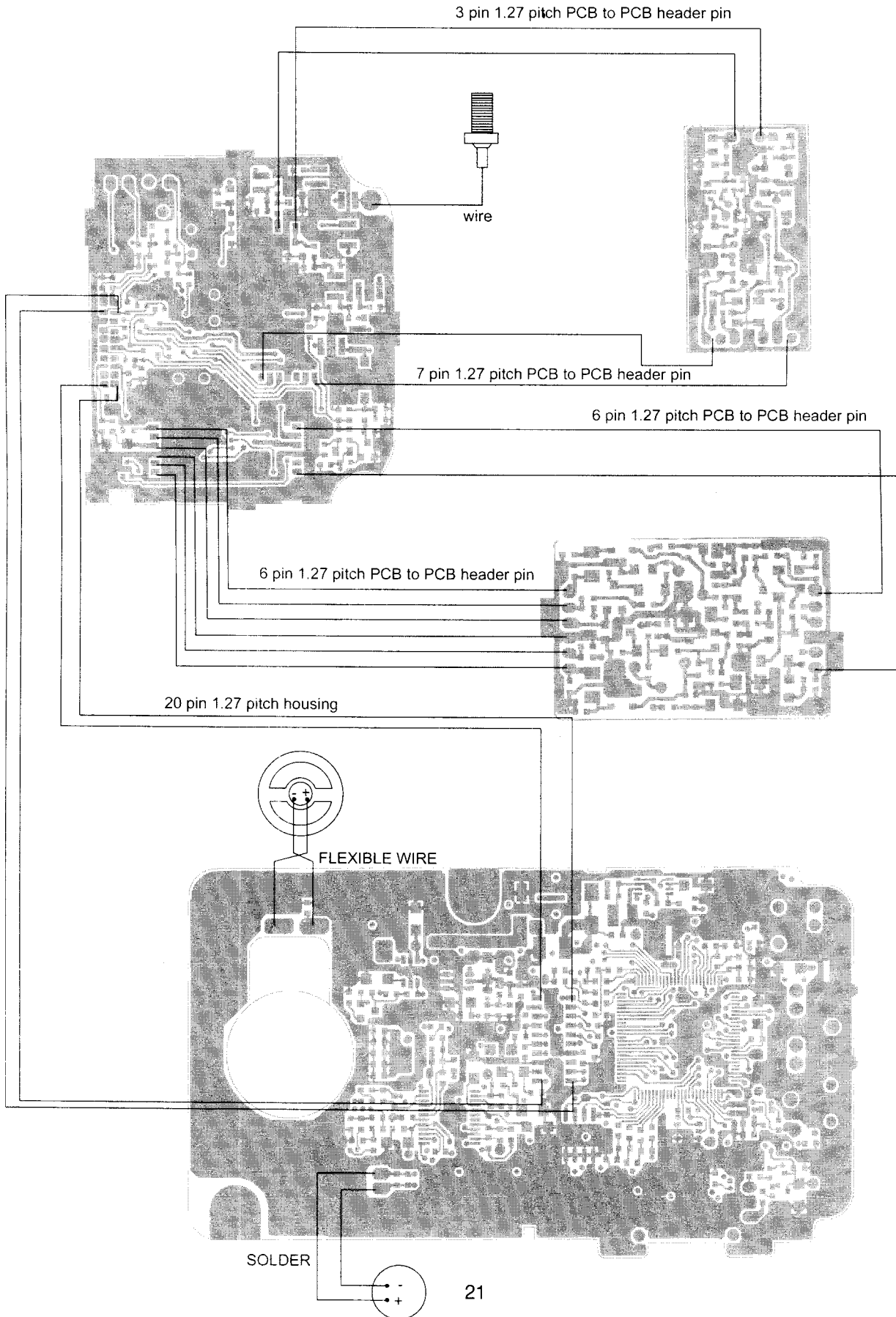
PLL Unlock Error : ERR

Err indicates the PLL unlocked. Check the following:

- PLL alignment (from page 14)
- 2.0V at module pin7 (UHF)
- Confirm that X101 is oscillating. If not, check the connection to IC1 pin1 and 2.
If the connection is good, check for 3.2V at IC101 pin15.
If 3.2V is not preset, check connections to pin5 and power.
- Confirm that there is a 5KHz signal at IC1 pin2. If is not there, check connections pin(DT), pin19(CLK),pin20(EN).

If the error message does not go away, replace IC102.

WIRING DIAGRAM



3 pin 1.27 pitch PCB to PCB header pin



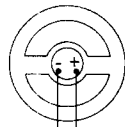
wire

7 pin 1.27 pitch PCB to PCB header pin

6 pin 1.27 pitch PCB to PCB header pin

6 pin 1.27 pitch PCB to PCB header pin

20 pin 1.27 pitch housing



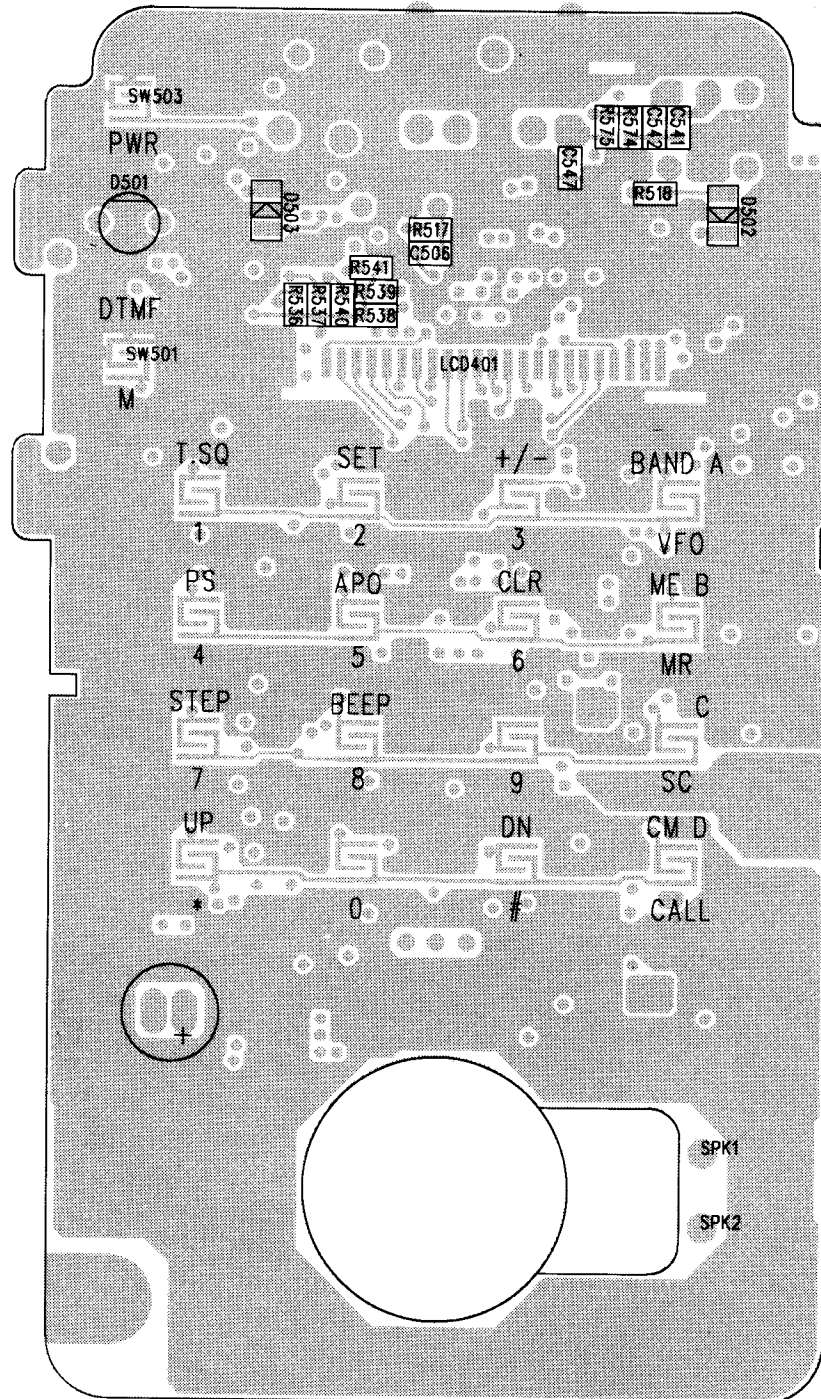
FLEXIBLE WIRE

SOLDER

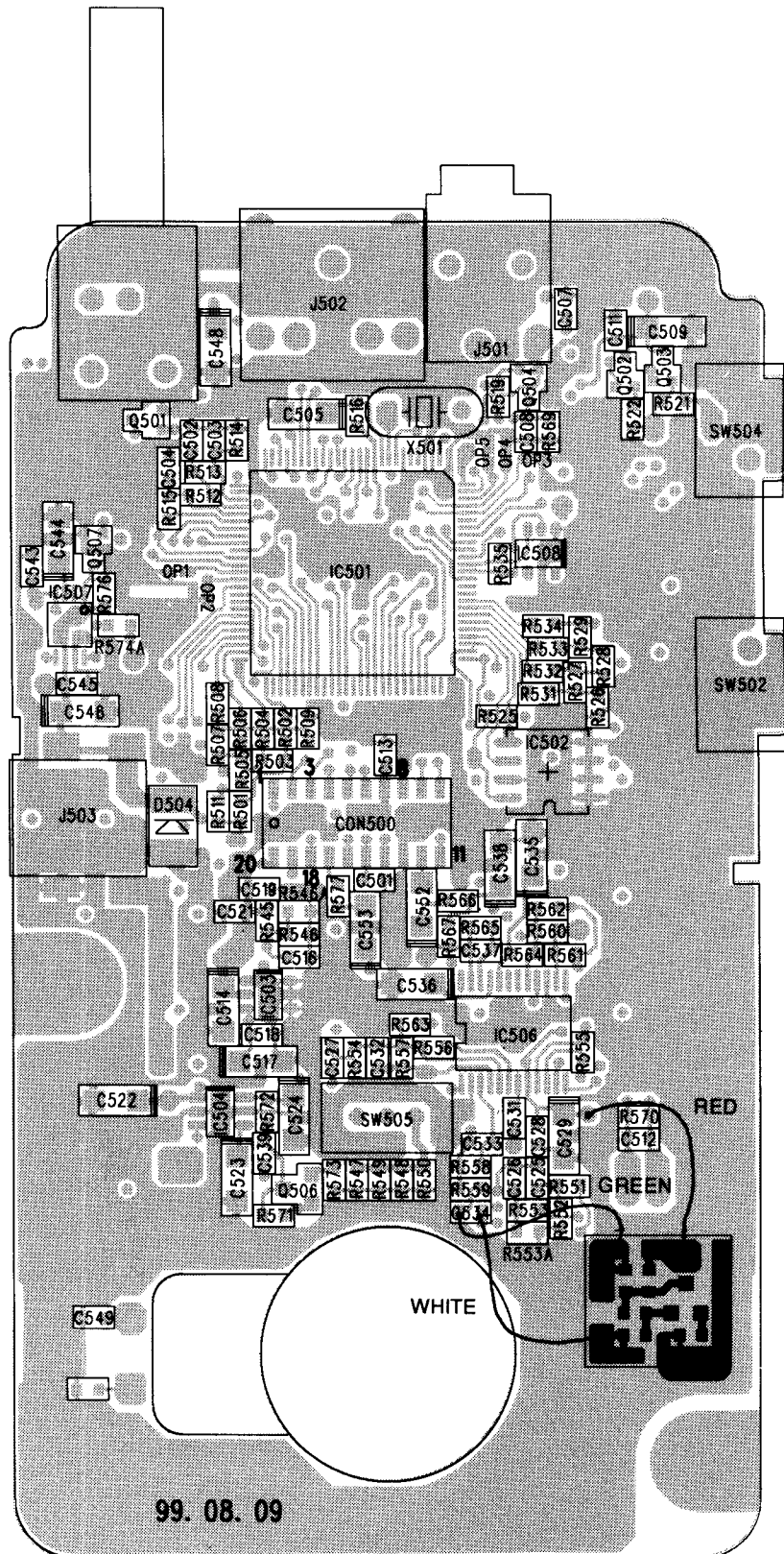


PRINTED CIRCUIT BOARD

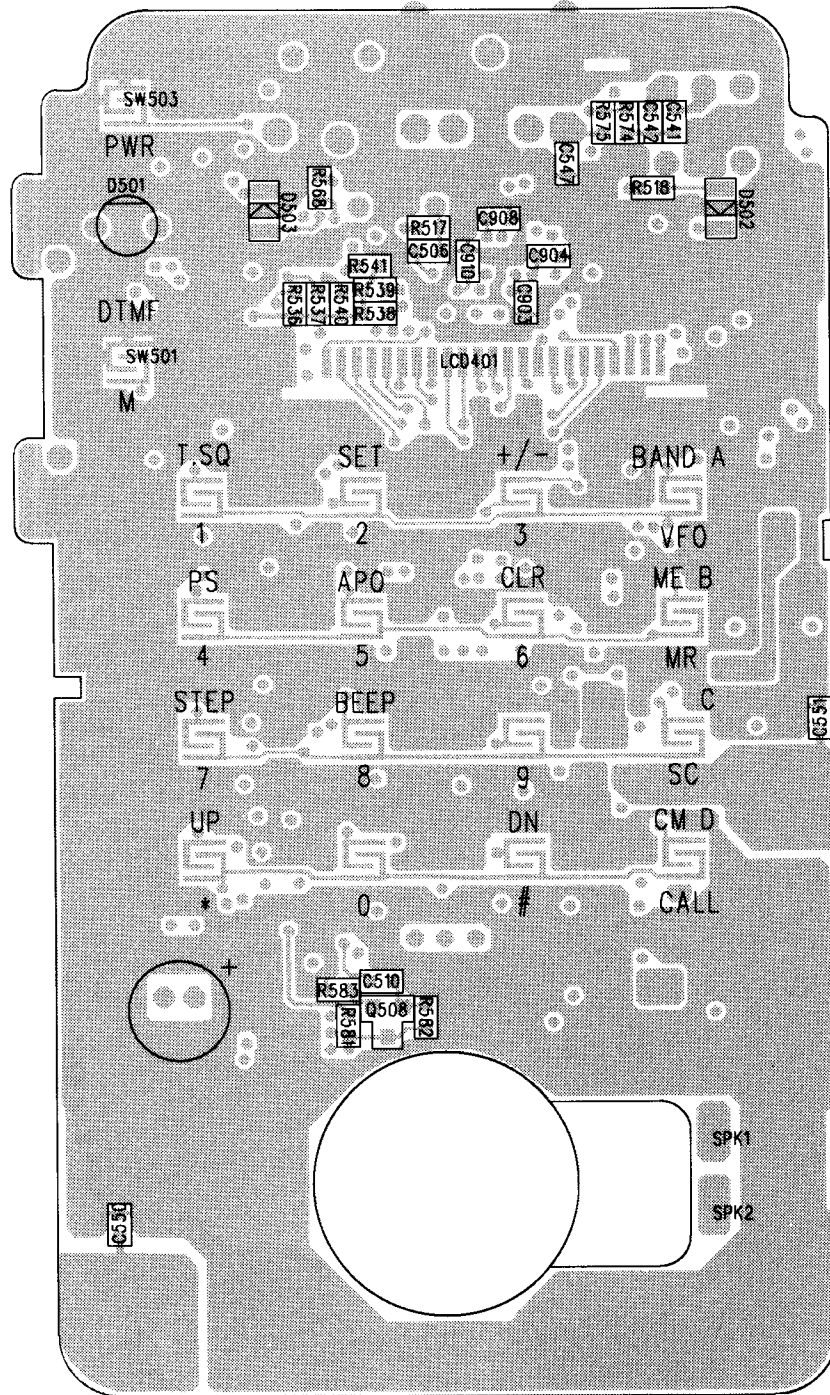
Digital PCB : Top View (Rev #01)



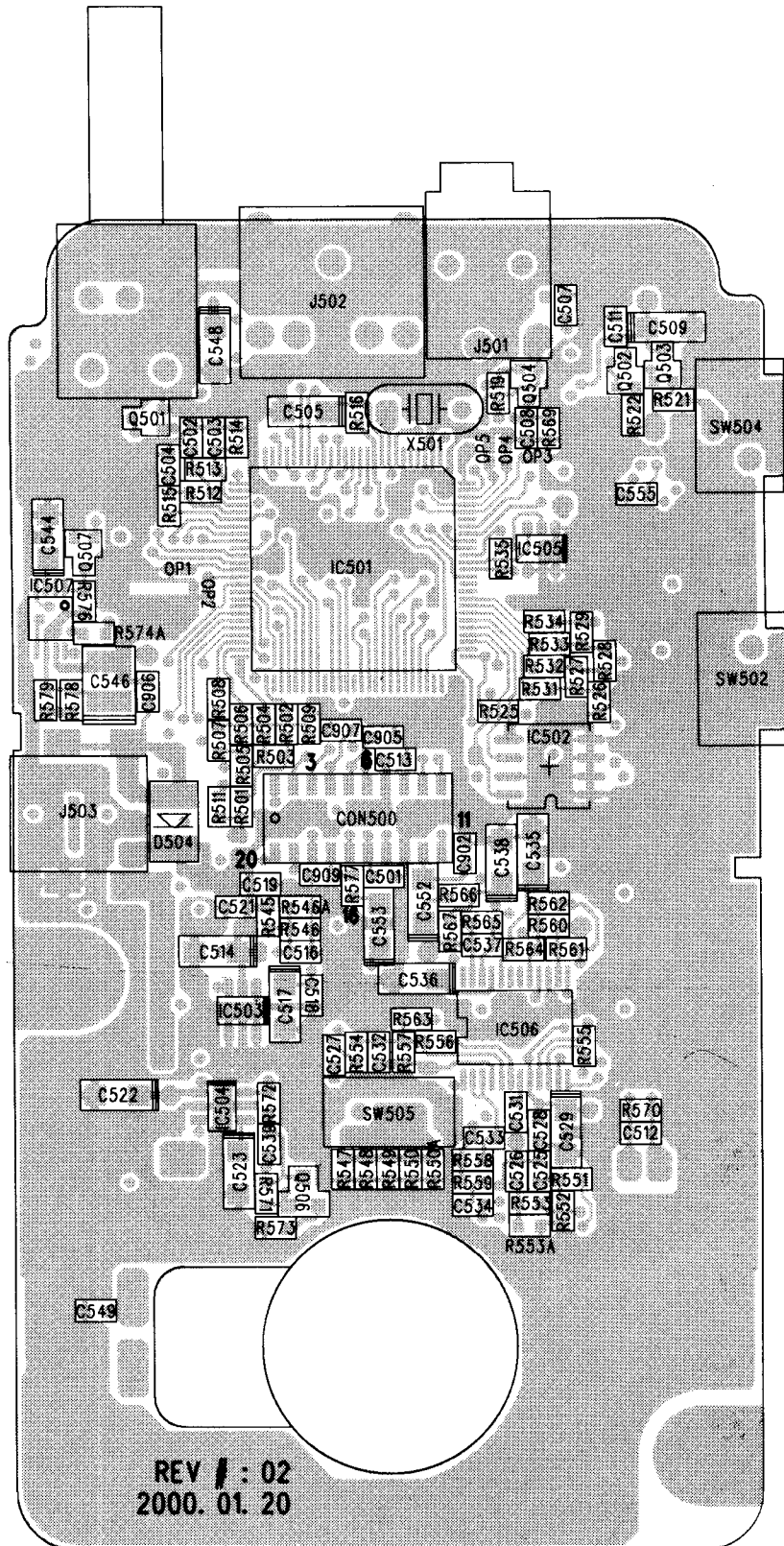
Digital PCB : Bottom View (Rev #01)



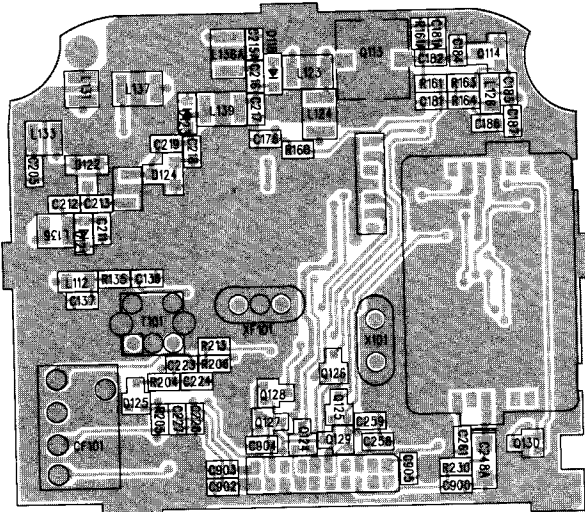
Digital PCB : Top View (Rev #02)



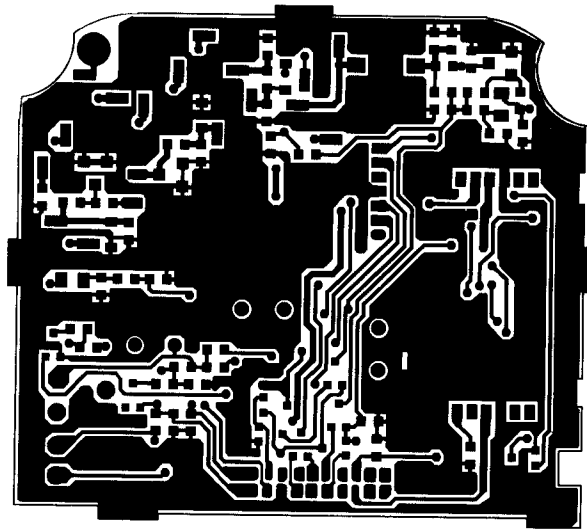
Digital PCB : Bottom View (Rev #02)



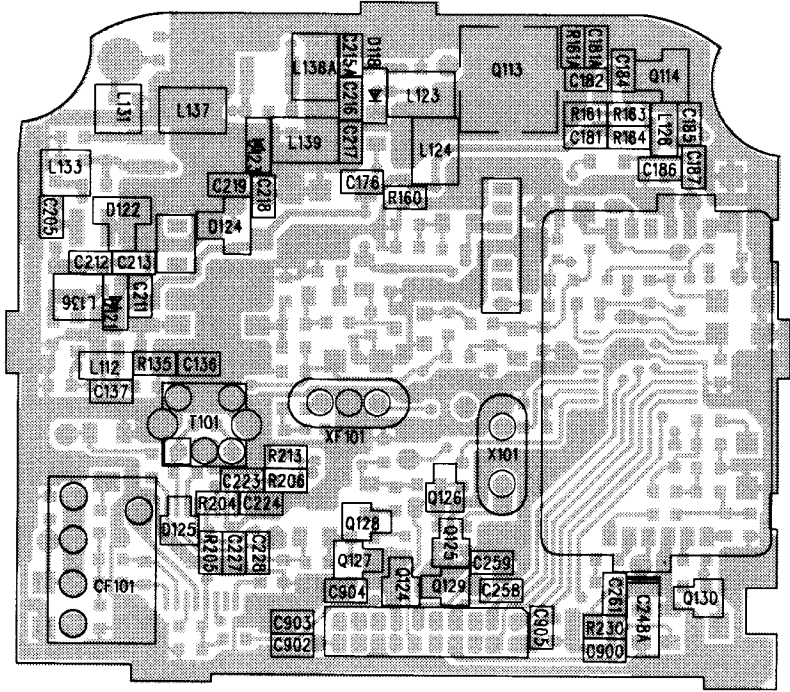
RF PCB : Top View (Rev #01)



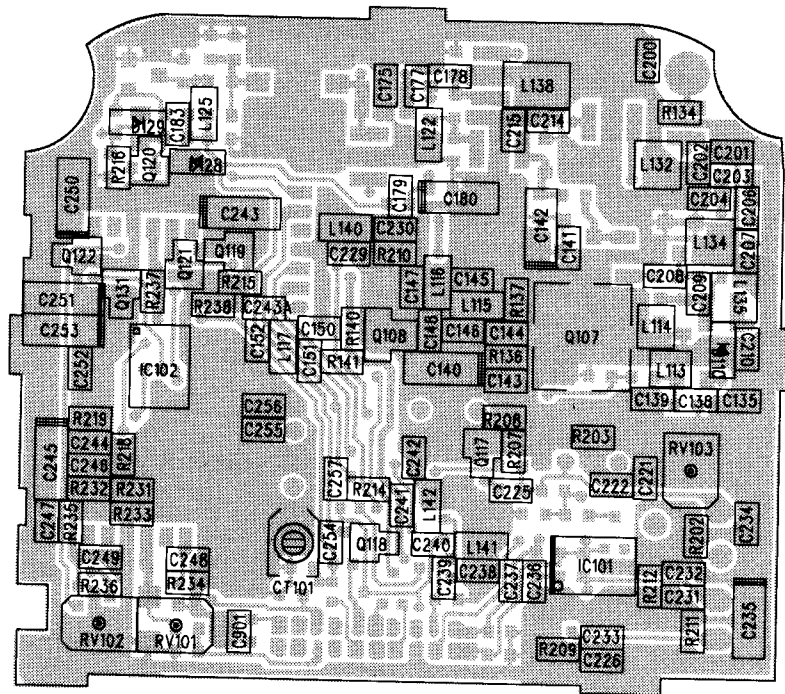
RF PCB : Bottom View (Rev #01)



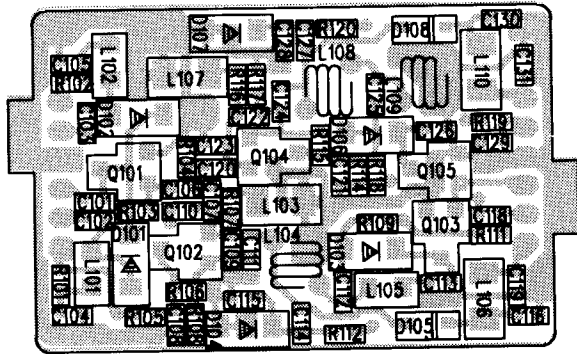
RF PCB : Top View (Rev #02)



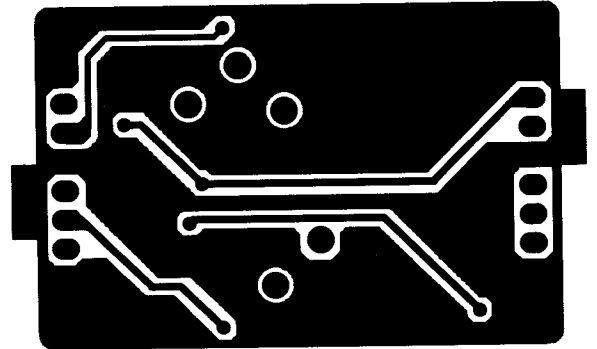
RF PCB : Bottom View (Rev #02)



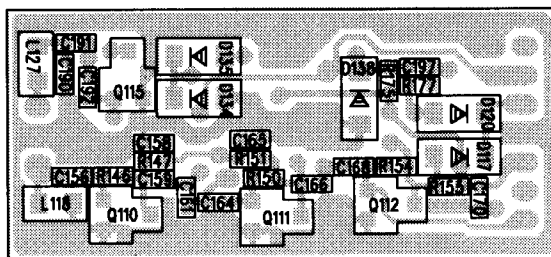
VCO PCB : Top View



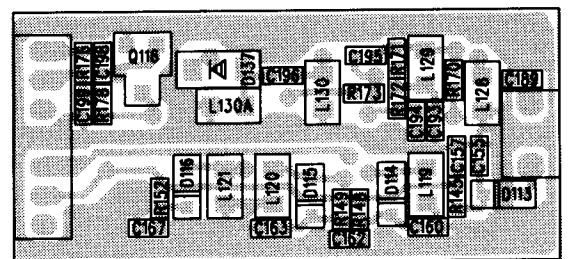
VCO PCB : Bottom View



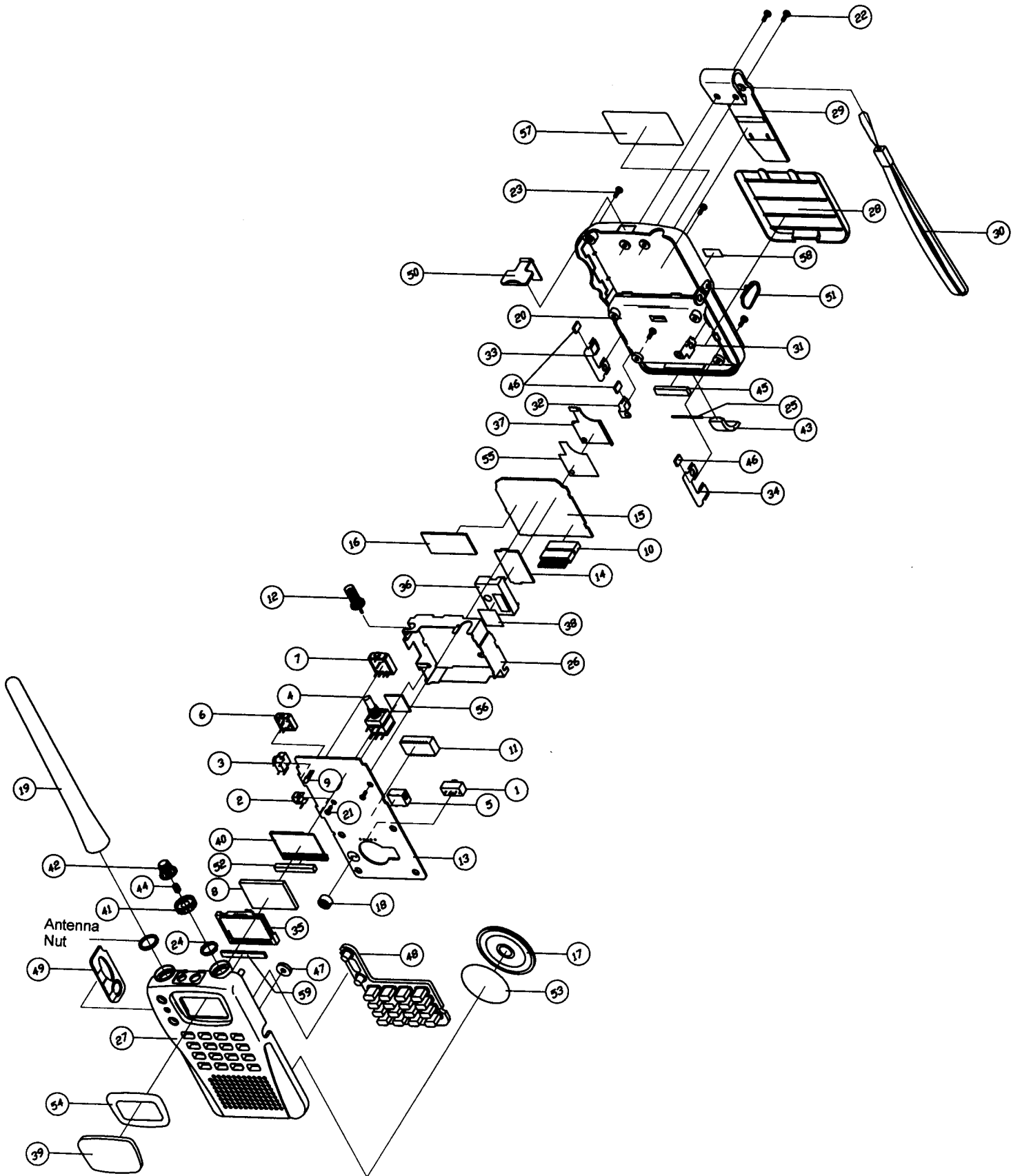
RX PCB : Top View



Bottom View



EXPLODED VIEW



EXPLODED VIEW PARTS LIST

Ref. No.	Description	RS Part No.	Mfr's Part No.
1	Slide Switch THS-1201S		24010011420
2	Tact Switch THTS-1102VHA		24100011320
3	Tact Switch THTS-1101VA		24100021320
4	Rotary/Vol Switch TP96D96E20		24110011520
5	DC Power Jack		26020010010
6	Mic Jack HSJ0838-01-010		26030010020
7	Speaker Jack		26030020020
8	LCD KXN3390AAP		31020010020
9	LED LTL-1BEHJ		31030016110
10	Head Pin F127-M-DSGW(12.7)		34030040120
11	Connector Socket F127-F-20DSG(SMD)		34050010020
12	Antenna Connector SMA-J-P		34070011020
13	Main PCB Digital PCB		36010011120
14	VCO PCB		36010012120
15	RF Main PCB		36010013120
16	RX Module PCB		36010022120
17	Speaker U3208B07		38000111020
18	Mic OB27P40A		39010011020
19	Antenna		42030011020
20	Bottom Ass'y L153-89268 Gray		5000000001
21	(+)Machine Screw (P.H)M2X4 ZN-PLAT		6110000001
22	(+)Machine Screw (B.H)M2.6X5 Black		6130000001
23	(+)Plus Screw (P.H)2X6 Black		6400000001
24	Nut M7 BsBM		6500000001
25	Pin SUS304 \varnothing 1.0		6700000001
26	Main Body SPTE=0.5		7000000001
27	Cover Upper ABS94HB L153-89268 Gray		7100000001
28	Cover Battery ABS94HB L153-89268 Gray		7100000003
29	Belt Clip PC Black		7200000001
30	Hand Strap Nylon Black		7300000001
31	Terminal(+) SUS304 t=0.2		7500000001
32	Terminal(-) SUS304 t=0.2		7500000002
33	Terminal (+,-) SUS304 T=0.2		7500000003
34	Terminal(-,+) SUS304 T=0.2		7500000004
35	Shield Housing SPTE=0.3		7700000001
36	VCO Can t=0.3		7700000002
37	Shield Plate spte t=0.3		7700000011

Ref. No.	Description	RS Part No.	Mfr's Part No.
38	Shield Plate AL FOIL T=0.07		7700000013
39	Lens Acryl Clear		8100000001
40	LCD Plate PC Clear		8100000002
41	Knob Volume ABS94HB L380-9001 Black		8200000001
42	Knob Channel ABS94HB L380-9001 Black		8200000002
43	Knob Locking ABS94HB L153-89268 Gray		8200000003
44	Spring SK5 T=0.25		8700000001
45	Cushion Rubber Black Sticker		8800000001
46	Rubber Cushion Rubber Black Sticker		8800000002
47	Cushion Sponge gray Ø8.5		8800000003
48	Key Pad Silicone Rubber Black		8900000001
49	PTT Button Silicone Rubber Black		8900000002
50	Cap Mic Spk Silicone Rubber Black		8900000003
51	Cap Charger N.B.R.		8900000004
52	Zebra Silicone Rubber		8900000005
53	Felt Speaker Felt t=0.2		9000000001
54	Double Side Tape 3M-Y9448HK T=0.16		9000000002
55	Insulation Plate Paper t=0.18 Sticker		9010000001
56	Insulation Plate Paper 11x9 t=0.18 Sticker		9010000002
57	Name Label Polyester 38x25.5 t=0.2		9500000001
58	Date Code Label Polyester 13x5 t=0.1		9500000004
59	Cushion Rubber Sponge 25x7		8800000006

ELECTRICAL PARTS LIST

Ref. No.	Description	RS Part No.	Mfr's Part No.
Assembly, Control PCB			
	Digital PCB		3601-001112-0
R501	Metal Film Chip Resistor 10K 1/16W 5%		0502-103163-0
R502	Metal Film Chip Resistor 20K 1/16W 5%		0502-203163-0
R503	Metal Film Chip Resistor 10K 1/16W 5%		0502-103163-0
R504	Metal Film Chip Resistor 20K 1/16W 5%		0502-203163-0
R505	Metal Film Chip Resistor 10K 1/16W 5%		0502-103163-0
R506	Metal Film Chip Resistor 20K 1/16W 5%		0502-203163-0
R507	Metal Film Chip Resistor 10K 1/16W 5%		0502-103163-0
R508	Metal Film Chip Resistor 20K 1/16W 5%		0502-203163-0
R509	Metal Film Chip Resistor 20K 1/16W 5%		0502-203163-0
R511	Metal Film Chip Resistor 20K 1/16W 5%		0502-203163-0
R512	Metal Film Chip Resistor 3K 1/16W 5%		0502-302163-0
R513	Metal Film Chip Resistor 3K 1/16W 5%		0502-302163-0
R514	Metal Film Chip Resistor 3K 1/16W 5%		0502-302163-0
R515	Metal Film Chip Resistor 3K 1/16W 5%		0502-302163-0
R516	Metal Film Chip Resistor 100K 1/16W 5%		0502-104163-0
R517	Metal Film Chip Resistor 1M 1/16W 5%		0502-105163-0
R518	Metal Film Chip Resistor 220 1/16W 5%		0502-221163-0
R519	Metal Film Chip Resistor 220 1/16W 5%		0502-221163-0
R521	Metal Film Chip Resistor 220 1/16W 5%		0502-221163-0
R522	Metal Film Chip Resistor 220 1/16W 5%		0502-221163-0
R525	Metal Film Chip Resistor 100K 1/16W 5%		0502-105163-0
R526	Metal Film Chip Resistor 20K 1/16W 5%		0502-203163-0
R527	Metal Film Chip Resistor 10K 1/16W 5%		0502-103163-0
R528	Metal Film Chip Resistor 10K 1/16W 5%		0502-103163-0
R529	Metal Film Chip Resistor 10K 1/16W 5%		0502-103163-0
R531	Metal Film Chip Resistor 20K 1/16W 5%		0502-203163-0
R532	Metal Film Chip Resistor 20K 1/16W 5%		0502-203-1630
R533	Metal Film Chip Resistor 20K 1/16W 5%		0502-203163-0
R534	Metal Film Chip Resistor 20K 1/16W 5%		0502-203163-0
R535	Metal Film Chip Resistor 100K 1/16W 5%		0502-104163-0
R536	Metal Film Chip Resistor 100K 1/16W 5%		0502-104163-0
R537	Metal Film Chip Resistor 100K 1/16W 5%		0502-104163-0
R538	Metal Film Chip Resistor 100K 1/16W 5%		0502-104163-0
R539	Metal Film Chip Resistor 100K 1/16W 5%		0502-104163-0
R540	Metal Film Chip Resistor 100K 1/16W 5%		0502-104163-0
R541	Metal Film Chip Resistor 100K 1/16W 5%		0502-104163-0
R545	Metal Film Chip Resistor 1.5M 1/16W 5%		0502-155163-0
R546	Metal Film Chip Resistor 1M 1/16W 5%		0502-105163-0
R546A	Metal Film Chip Resistor 1M 1/16W 5%		0502-105163-0
R547	Metal Film Chip Resistor 22 1/16W 5%		0502-220163-0
R548	Metal Film Chip Resistor 22 1/16W 5%		0502-220163-0
R549	Metal Film Chip Resistor 22 1/16W 5%		0502-220163-0
R550	Metal Film Chip Resistor 22 1/16W 5%		0502-220163-0
R550A	Metal Film Chip Resistor 22 1/16W 5%		0502-220163-0
R551	Metal Film Chip Resistor 330K 1/16W 5%		0502-334163-0
R552	Metal Film Chip Resistor 10K 1/16W 5%		0502-103163-0
R553	Metal Film Chip Resistor 470K 1/16W 5%		0502-474163-0
R553A	Metal Film Chip Resistor 47K 1/16W 5%		0502-473163-0
R554	Metal Film Chip Resistor 330K 1/16W 5%		0502-334163-0
R555	Metal Film Chip Resistor 1M 1/16W 5%		0502-105163-0
R556	Metal Film Chip Resistor 56K 1/16W 5%		0502-563163-0

Ref. No.	Description	RS Part No.	Mfr's Part No.
R557	Metal Film Chip Resistor 120K 1/16W 5%		0502-124163-0
R558	Metal Film Chip Resistor 1M 1/16W 5%		0502-105163-0
R559	Metal Film Chip Resistor 2.2K 1/16W 5%		0502-222163-0
R560	Metal Film Chip Resistor 100K 1/16W 5%		0502-104163-0
R561	Metal Film Chip Resistor 15K 1/16W 5%		0502-153163-0
R562	Metal Film Chip Resistor 22K 1/16W 5%		0502-223163-0
R563	Metal Film Chip Resistor 330K 1/16W 5%		0502-334163-0
R564	Metal Film Chip Resistor 6.8K 1/16W 5%		0502-682163-0
R565	Metal Film Chip Resistor 47K 1/16W 5%		0502-473163-0
R566	Metal Film Chip Resistor 4.7K 1/16W 5%		0502-472163-0
R567	Metal Film Chip Resistor 22K 1/16W 5%		0502-223163-2
R568	Metal Film Chip Resistor 1.8K 1/16W 5%		0502-182163-0
R569	Metal Film Chip Resistor 100K 1/16W 5%		0502-104163-0
R570	Metal Film Chip Resistor 2.2K 1/16W 5%		0502-222163-0
R571	Metal Film Chip Resistor 470K 1/16W 5%		0502-474163-0
R572	Metal Film Chip Resistor 5.6K 1/16W 5%		0502-562163-0
R573	Metal Film Chip Resistor 820 1/16W 5%		0502-821163-0
R574	Metal Film Chip Resistor 10K 1/16W 5%		0502-103163-0
R574A	Metal Film Chip Resistor 47K 1/16W 5%		0502-473163-0
R575	Metal Film Chip Resistor 100K 1/16W 5%		0502-104163-0
R576	Metal Film Chip Resistor 100K 1/16W 5%		0502-104163-0
R577	Metal Film Chip Resistor 10K 1/16W 5%		0502-103163-0
R578	Metal Film Chip Resistor 2.2 1/16W 5%		0502-2R2163-0
R579	Metal Film Chip Resistor 2.2 1/16W 5%		0502-2R2163-0
R581	Metal Film Chip Resistor 10K 1/16W 5%		0502-103163-0
R582	Metal Film Chip Resistor 100K 1/16W 5%		0502-104163-0
R583	Metal Film Chip Resistor 6.8K 1/16W 5%		0502-682163-0
C501	M.Ceramic Capacitor 1nF C168 102K		0702-102553-0
C502	M.Ceramic Capacitor 100nF C1608 104Z		0702-104373-0
C503	M.Ceramic Capacitor 100nF C1608 104Z		0702-104373-0
C504	M.Ceramic Capacitor 100nF C1608 104Z		0702-104373-0
C505	Tantal Capacitor 1 μ F TMCS A 105K 35V		0710-105053-0
C506	M.Ceramic Capacitor 100pF C1608 101J		0702-101543-0
C507	M.Ceramic Capacitor 1nF C1608 102K		0702-102553-0
C508	M.Ceramic Capacitor 1nF C1608 102K		0702-102553-0
C509	Tantal Capacitor TMCS A 106K 10V		0710-106253-0
C510	M.Ceramic Capacitor 10nF C1608 103K		0702-102553-0
C511	M.Ceramic Capacitor 1nF C1608 102K		0702-102553-0
C512	M.Ceramic Capacitor 470pF C1608 471J		0702-471543-0
C513	M.Ceramic Capacitor 10nF C1608 103K		0702-103553-0
C514	Tantal Capacitor 10 μ F TMCS A 106K 10V		0710-106253-0
C516	M.Ceramic Capacitor 10nF C1608 103K		0702-103553-0
C517	Tantal Capacitor 10 μ F TMCS A 106K 10V		0710-106253-0
C518	M.Ceramic Capacitor 10nF C1608 103K		0702-103553-0
C519	M.Ceramic Capacitor 1nF C1608 102K		0702-102553-0
C521	M.Ceramic Capacitor 220pF C1608 221J		0702-221543-0
C522	Tantal Capacitor 10 μ F TMCS A 106K 10V		0710-106253-0
C523	Tantal Capacitor 0.47 μ F TMCS A 106K 35V		0710-474053-0
C525	M.Ceramic Capacitor 10nF C1608 103K		0702-103553-0
C526	M.Ceramic Capacitor 10nF C1608 103K		0702-103553-0
C527	M.Ceramic Capacitor 10nF C1608 103K		0702-103553-0
C528	M.Ceramic Capacitor 10nF C1608 103K		0702-103553-0
C529	Tantal Capacitor 10 μ F TMCS A 106K 10V		0710-106253-0
C531	M.Ceramic Capacitor 100nF C1608 104Z		0702-104473-0
C532	M.Ceramic Capacitor 220nF C1608 221J		0702-221543-0
C533	M.Ceramic Capacitor 33pF C1608 330J		0702-330543-0
C534	M.Ceramic Capacitor 10nF C1608 103J		0710-103553-0
C535	Tantal Capacitor 1 μ F TMCS A 105K 35V		0710-105053-0
C536	Tantal Capacitor 1 μ F TMCS A 105K 35V		0710-105053-0

Ref. No.	Description	RS Part No.	Mfr's Part No.
C537	M.Ceramic Capacitor 1.5nF C1608 152K		0702-152553-0
C538	Tantal Capacitor 0.22nF TMCS A 224K 35V		0710-224053-0
C539	M.Ceramic Capacitor 100nF C1608 104Z		0702-104473-0
C541	M.Ceramic Capacitor 100nF C1608 104Z		0702-104473-0
C542	M.Ceramic Capacitor 10nF C1608 103K		0702-103553-0
C544	Tantal Capacitor 1uF TMCS A 105K 35V		0710-105053-0
C546	Tantal Capacitor 47uF TMCS 476M 6.3V		0710-476153-0
C547	M.Ceramic Capacitor 470pF C1608 471J		0702-471543-0
C548	Tantal Capacitor 0.1uF TMCS A 104K 35V		0710-104053-0
C549	M.Ceramic Capacitor 470pF C1608 471J		0702-471543-0
C550	M.Ceramic Capacitor 470pF C1608 471J		0702-471543-0
C551	M.Ceramic Capacitor 470pF C1608 471J		0702-471543-0
C552	Tantal Capacitor 0.47uF TMCS 474K 35V		0710-474053-0
C553	Tantal Capacitor 1uF TMCS A 105K 35V		0710-105053-0
D501	Diode Led LTL-1BEHJ		3103-001611-0
D502	Diode Led LTST-S320YKT		3101-001423-0
D503	Diode Led LTST-S320YKT		3101-001423-0
D504	Diode M2		1006-001943-0
Q501	Transistor KRC410		0901-007313-0
Q502	Transistor KRC410		0901-007313-0
Q503	Transistor KRC410		0901-010013-0
Q504	Transistor KRA301		0901-011323-0
Q506	Transistor C3876		0901-007313-0
Q507	Transistor KRC410		1301-001015-0
IC501	I.C H8 643835 C99H CPU		1304-001443-0
IC502	I.C CSI24WC08J-2.7 EEPROM		1104-001343-0
IC503	I.C S081233SG-QF-T1 VOL.Regulator		1104-002343-0
IC504	I.C TK1633SCLH VOL.Regulator		1104-003143-0
IC505	I.C S-81227SG-QZ-T1 VOL.Regulator		1503-001004-0
IC506	I.C AK2345-E2 CTCSS		1102-001143-0
IC507	I.C LM4864 MM Audio Amp		2202-001302-0
X501	Resonator Ceramic CRA3.69MHz		2411-001152-0
VR501	SW Rotray/Vol. TP96D96E20		3102-001002-0
LCD501	LCD KXN 3390 AAP		2401-001132-0
SW502	SW Tact THTS-1102VHA		2401-001142-0
SW503	SW SLIDE THS1201S		2401-002132-0
SW504	SW Tact THTS-1101VA		2603-001002-0
J501	Mic Jack HSJ0838-01-010		2603-002002-0
J502	SPK.Jack ST-5		2602-001001-0
J503	DC-PWR Jack HEC2751-01-620		3801-001112-0
	SPK.U3208B07		3901-001102-0
	MIC OB-27P40A		3405-001002-0
	Connector 20p 1.27pitch F127-F-20DSG		3301-005032-0
	Speaker Wire 1571 AWG26		
Assembly,VCO Module			
	VCO PCB		3601-001212-0
R101	Metal Film Chip Resistor 100 1/16S W 5%		0501-101163-0
R102	Metal Film Chip Resistor 100 1/16S W 5%		0501-101163-0
R103	Metal Film Chip Resistor 10K 1/16S W 5%		0501-103163-0
R104	Metal Film Chip Resistor 390 1/16S W 5%		0501-391163-0
R105	Metal Film Chip Resistor 10 1/16S W 5%		0501-100163-0
R106	Metal Film Chip Resistor 2.7K 1/16S W 5%		0501-272163-0
R107	Metal Film Chip Resistor 150 1/16S W 5%		0501-151163-0
R108	Metal Film Chip Resistor 10K 1/16S W 5%		0501-103163-0
R109	Metal Film Chip Resistor 1K 1/16S W 5%		0501-102163-0
R111	Metal Film Chip Resistor 100K 1/16S W 5%		0501-104163-0
R112	Metal Film Chip Resistor 10K 1/16S W 5%		0501-103163-0
R114	Metal Film Chip Resistor 100 1/16S W 5%		0501-101163-0

Ref. No.	Description	RS Part No.	Mfr's Part No.
R115	Metal Film Chip Resistor 3.3K 1/16S W 5%		0501-332163-0
R116	Metal Film Chip Resistor 100 1/16S W 5%		0501-101163-0
R117	Metal Film Chip Resistor 10K 1/16S W 5%		0501-103163-0
R118	Metal Film Chip Resistor 1K 1/16S W 5%		0501-102163-0
R119	Metal Film Chip Resistor 100K 1/16S W 5%		0501-104163-0
R120	Metal Film Chip Resistor 10K 1/16S W 5%		0501-103163-0
C101	M.Ceramic Capacitor 4pF C1005 040C		0701-040513-0
C102	M.Ceramic Capacitor 10pF C1005 100D		0701-100523-0
C103	M.Ceramic Capacitor 10pF C1005 100D		0701-100523-0
C104	M.Ceramic Capacitor 1nF C1005 102K		0701-102553-0
C105	M.Ceramic Capacitor 1nF C1005 102K		0701-102553-0
C106	M.Ceramic Capacitor 10pF C1005 100D		0701-100523-0
C107	M.Ceramic Capacitor 3pF C1005 030C		0701-030513-0
C108	M.Ceramic Capacitor 1nF C1005 102K		0701-102553-0
C109	M.Ceramic Capacitor 12pF C1005 120J		0701-120543-0
C110	M.Ceramic Capacitor 7pF C1005 070D		0701-070523-0
C111	M.Ceramic Capacitor 5pF C1005 050C		0701-050513-0
C112	M.Ceramic Capacitor 1nF C1005 102K		0701-102553-0
C113	M.Ceramic Capacitor 10nF C1005 103K		0701-103353-0
C114	M.Ceramic Capacitor 0.5pF C1005 0R5C		0701-0R5513-0
C115	M.Ceramic Capacitor 2pF C1005 020C		0701-020513-0
C116	M.Ceramic Capacitor 100pF C1005 101J		0701-101543-0
C118	M.Ceramic Capacitor 100pF C1005 101J		0701-101543-0
C119	M.Ceramic Capacitor 1nF C1005 102K		0701-102553-0
C120	M.Ceramic Capacitor 3pF C1005 030C		0701-030513-0
C121	M.Ceramic Capacitor 1nF C1005 102K		0701-102553-0
C122	M.Ceramic Capacitor 15pF C1005 150J		0701-150543-0
C123	M.Ceramic Capacitor 27pF C1005 270J		0701-270543-0
C124	M.Ceramic Capacitor 27pF C1005 270J		0701-270543-0
C125	M.Ceramic Capacitor 10pF C1005 103K		0701-103353-0
C126	M.Ceramic Capacitor 10pF C1005 103K		0701-103353-0
C127	M.Ceramic Capacitor 1pF C1005 010J		0701-010513-0
C128	M.Ceramic Capacitor 1pF C1005 010J		0701-010513-0
C129	M.Ceramic Capacitor 1nF C1005 102K		0701-102553-0
C130	M.Ceramic Capacitor 470pF C1005 471K		0701-471553-0
C131	M.Ceramic Capacitor 1nF C1005 102K		0701-102553-0
L101	Chip Coil 33nH HK1608 33NJ		2003-337223-0
L102	Chip Coil 100nH HK1608 R10J		2003-108223-0
L103	Chip Coil 1uH LK2125 1R0 K		2003-109333-0
L104	Coil spring 0.3x1x3.5t(R)		2003-001302-0
L105	Chip Coil 4.7nH HK1608 4N7 S		2003-476213-0
L106	Chip Coil 1uH LK2125 1R0 K		2003-109333-1
L107	Chip Coil 1uH LK2125 1R0 K		2003-103999-1
L108	Coil Spring 0.3x1x6.5T(L)		2002-002302-0
L109	Coil Spring 0.3x1x6.5T(L)		2002-002302-0
L110	Chip Coil 4.7uH LK2125 4R7 K		2003-479333-0
D101	Diode KDS114		1005-001443-0
D102	Diode KDS114		1005-001443-0
D103	Diode KDS114		1005-001443-0
D104	Diode KDS114		1005-001443-0
D105	Diode HVC355B		1004-001234-0
D106	Diode KDS114		1005-001443-0

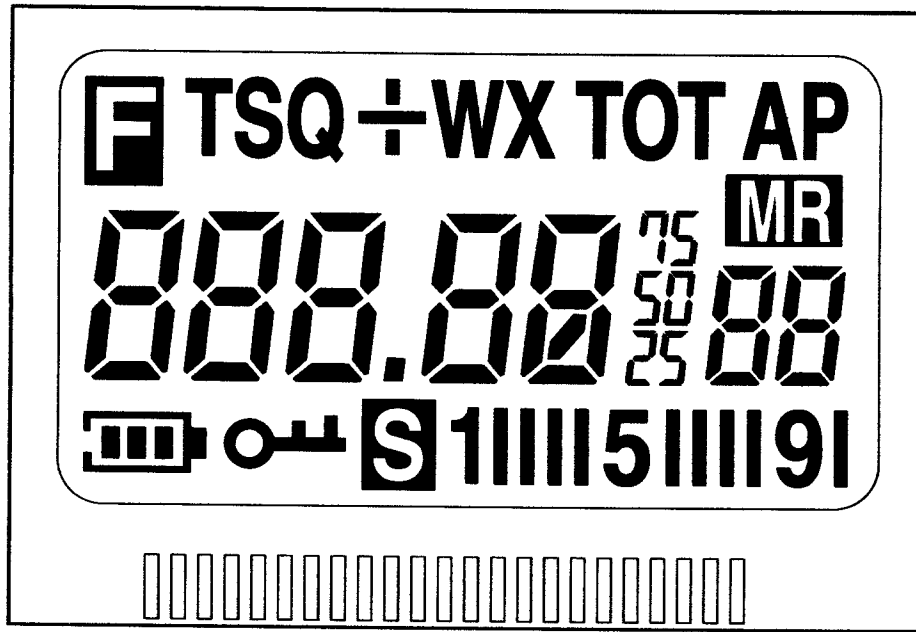
Ref. No.	Description	RS Part No.	Mfr's Part No.
D107	Diode KDS114		1005-001443-0
D108	Diode HVC358B		1004-002234-0
Q101	Transistor 2SC4901		0901-002313-0
Q102	Transistor 2SC4901		0901-002313-0
Q103	Transistor KRC401		0901-001313-0
Q104	Transistor 2SC4901		0901-002313-0
Q105	Transistor KRC401		0901-101313-0
	Connector 6P 1.27pitch F127-M-6SSG(1.5)		3403-001512-0
Assembly, RX Module			
	RX Module PCB		3601-002212-0
R145	Metal Film Chip Resistor 100K 1/16S W 5%		0501-104163-0
R146	Metal Film Chip Resistor 47K 1/16S W 5%		0501-4731630
R147	Metal Film Chip Resistor 330 1/16S W 5%		0501-331163-0
R148	Metal Film Chip Resistor 100K 1/16S W 5%		0501-104163-0
R149	Metal Film Chip Resistor 100K 1/16S W 5%		0501-104163-0
R150	Metal Film Chip Resistor 47K 1/16S W 5%		0501-473163-0
R151	Metal Film Chip Resistor 330 1/16S W 5%		0501-331163-0
R152	Metal Film Chip Resistor 100K 1/16S W 5%		0501-104163-0
R154	Metal Film Chip Resistor 100K 1/16S W 5%		0501-104163-0
R155	Metal Film Chip Resistor 330 1/16S W 5%		0501-331163-0
R170	Metal Film Chip Resistor 33K 1/16S W 5%		0501-333163-0
R171	Metal Film Chip Resistor 470 1/16S W 5%		0501-471163-0
R172	Metal Film Chip Resistor 220 1/16S W 5%		0501-221163-0
R173	Metal Film Chip Resistor 100K 1/16S W 5%		0501-104163-0
R175	Metal Film Chip Resistor 100K 1/16S W 5%		0501-104163-0
R176	Metal Film Chip Resistor 220 1/16S W 5%		0501-221163-0
R177	Metal Film Chip Resistor 100K 1/16S W 5%		0501-104163-0
R178	Metal Film Chip Resistor 330 1/16S W 5%		0501-331163-0
C155	M.Ceramic Capacitor 27pF C1005 270J		0701-270543-0
C156	M.Ceramic Capacitor 10pF C1005 100D		0701-100523-0
C157	M.Ceramic Capacitor 1nF C1005 102K		0701-102553-0
C158	M.Ceramic Capacitor 10nF C1005 103K		0701-103553-0
C159	M.Ceramic Capacitor 5pF C1005 050C		0701-050513-0
C160	M.Ceramic Capacitor 12pF C1005 120J		0701-120543-0
C161	M.Ceramic Capacitor 0.5pF C1005 0R5C		0701-0R5513-0
C162	M.Ceramic Capacitor 2pF C1005 020C		0701-020513-0
C163	M.Ceramic Capacitor 12pF C1005 120J		0701-120543-0
C164	M.Ceramic Capacitor 4pF C1005 040C		0701-040513-0
C165	M.Ceramic Capacitor 1nF C1005 102K		0701-102553-0
C166	M.Ceramic Capacitor 4pF C1005 040C		0701-040513-0
C167	M.Ceramic Capacitor 12pF C1005 120J		0701-120543-0
C168	M.Ceramic Capacitor 2pF C1005 020C		0701-020513-0
C170	M.Ceramic Capacitor 1nF C1005 102K		0701-102553-0
C189	M.Ceramic Capacitor 8pF C1005 080D		0701-080523-0
C190	M.Ceramic Capacitor 27pF C1005 270J		0701-270543-0
C191	M.Ceramic Capacitor 33pF C1005 330J		0701-330543-0
C192	M.Ceramic Capacitor 33pF C1005 330J		0701-330543-0
C193	M.Ceramic Capacitor 1nF C1005 102K		0701-102553-0
C194	M.Ceramic Capacitor 1nF C1005 102K		0701-102553-0
C195	M.Ceramic Capacitor 22pF C1005 220J		0701-220543-0
C196	M.Ceramic Capacitor 12pF C1005 120J		0701-120543-0
C197	M.Ceramic Capacitor 22pF C1005 220J		0701-220543-0
C198	M.Ceramic Capacitor 2pF C1005 020C		0701-020513-0
C199	M.Ceramic Capacitor 1nF C1005 102K		0701-102553-0

Ref. No.	Description	RS Part No.	Mfr's Part No.
L118	Chip Coil 6.8nH 1608 6N8J		2003-686223-0
L119	Chip Coil 10nH 1608 10NJ		2003-107223-0
L120	Chip Coil 10nH 1608 10NJ		2003-107223-0
L121	Chip Coil 10nH 1608 10NJ		2003-107223-0
L127	Chip Coil 56nH 1608 56NJ		2003-567223-0
L128	Chip Coil 82nH 1608 82NJ		2003-827223-0
L129	Chip Coil 100nH 1608 R10J		2003-108223-0
L130	Chip Coil 82nH 1608 82NJ		2003-827223-0
L130A	Chip Coil 82nH 1608 82NJ		2003-827223-0
D113	Diode HVC 358B		1004-002243-0
D114	Diode HVC 358B		1004-002243-0
D115	Diode HVC 358B		1004-002243-0
D116	Diode HVC 358B		1004-002243-0
D117	Diode KDS114		1005-001443-0
D120	Diode KDS114		1005-001443-0
D134	Diode HVU362		1004-003243-0
D135	Diode HVU362		1004-003243-0
D137	Diode HVU362		1004-003243-0
D138	Diode HVU362		1004-003243-0
Q110	Transistor 2SC4901		0901-002313-0
Q111	Transistor 2SC4901		0901-002313-0
Q112	Transistor 2SC4901		0901-002313-0
Q115	Transistor 2SC4226		0901-012313-0
Q116	Transistor 2SC4901		0901-002313-0
	Connector 7P 1.27pitch F127-M-7SSG (3.05)		3403-002612-0
	Connector 3P 1.27pitch F127-M-7SSG (3.05)		3403-003212-0
Assembly, RF PCB			
	RF PCB		3601-001312-0
R134	Metal Film Chip Resistor 47K 1/16W 5%		0502-473163-0
R135	Metal Film Chip Resistor 100 1/16W 5%		0502-101163-0
R136	Metal Film Chip Resistor 2.2K 1/16W 5%		0502-222163-0
R137	Metal Film Chip Resistor 4.7K 1/16W 5%		0502-472163-0
R140	Metal Film Chip Resistor 6.8K 1/16W 5%		0502-682163-0
R141	Metal Film Chip Resistor 10 1/16W 5%		0502-100163-0
R160	Metal Film Chip Resistor 100 1/16W 5%		0502-101163-0
R161	Metal Film Chip Resistor 2.2K 1/16W 5%		0502-222163-0
R161A	Metal Film Chip Resistor 2.2K 1/16W 5%		0502-222163-0
R163	Metal Film Chip Resistor 15K 1/16W 5%		0502-153163-0
R164	Metal Film Chip Resistor 10 1/16W 5%		0502-100163-0
R200	Metal Film Chip Resistor 22K 1/16W 5%		0502-223163-0
R202	Metal Film Chip Resistor 82K 1/16W 5%		0502-823163-0
R203	Metal Film Chip Resistor 22K 1/16W 5%		0502-223163-0
R204	Metal Film Chip Resistor 82K 1/16W 5%		0502-823163-0
R205	Metal Film Chip Resistor 100K 1/16W 5%		0502-104163-0
R206	Metal Film Chip Resistor 3.3K 1/16W 5%		0502-332163-0
R207	Metal Film Chip Resistor 470K 1/16W 5%		0502-474163-0
R208	Metal Film Chip Resistor 470 1/16W 5%		0502-471163-0
R209	Metal Film Chip Resistor 10 1/16W 5%		0502-100163-0
R210	Metal Film Chip Resistor 470 1/16W 5%		0502-471163-0
R211	Metal Film Chip Resistor 2.7K 1/16W 5%		0502-272163-0
R212	Metal Film Chip Resistor 100K 1/16W 5%		0502-104163-0
R213	Metal Film Chip Resistor 330 1/16W 5%		0502-331163-0

Ref. No.	Description	RS Part No.	Mfr's Part No.
R214	Metal Film Chip Resistor 680K 1/16W 5%		0502-684163-0
R215	Metal Film Chip Resistor 33K 1/16W 5%		0502-333163-0
R216	Metal Film Chip Resistor 33K 1/16W 5%		0502-333163-0
R218	Metal Film Chip Resistor 470 1/16W 5%		0502-471163-0
R219	Metal Film Chip Resistor 1K 1/16W 5%		0502-102163-0
R230	Metal Film Chip Resistor 1K 1/16W 5%		0502-103163-0
R231	Metal Film Chip Resistor 1.5K 1/16W 5%		0502-152163-0
R232	Metal Film Chip Resistor 6.8K 1/16W 5%		0502-682163-0
R233	Metal Film Chip Resistor 1K 1/16W 5%		0502-102163-0
R234	Metal Film Chip Resistor 4.7K 1/16W 5%		0502-472163-0
R235	Metal Film Chip Resistor 1K 1/16W 5%		0502-102163-0
R236	Metal Film Chip Resistor 47K 1/16W 5%		0502-473163-0
R237	Metal Film Chip Resistor 4.7K 1/16W 5%		0502-472163-0
R238	Metal Film Chip Resistor 10 1/16W 5%		0502-100163-0
RV101	Resistor Trimer POZ3AN-1-103N 10K		0602-001083-0
RV102	Resistor Trimer POZ3AN-1-103N 10K		0602-001083-0
RV103	Resistor Trimer POZ3AN-1-203N 10K		0602-002083-0
C135	M.Ceramic Capacitor 6pF C1608 060D		0702-060523-0
C136	M.Ceramic Capacitor 1nF C1608 102K		0702-102553-0
C137	M.Ceramic Capacitor 1nF C1608 102K		0702-102553-0
C138	M.Ceramic Capacitor 22pF C1608 220J		0702-220543-0
C139	M.Ceramic Capacitor 10pF C1608 100D		0702-100523-0
C140	Tantal Capacitor 10uF TMCS A 106K 10V		0710-106253-0
C141	M.Ceramic Capacitor 10nF C1608 103K		0702-103553-0
C142	Tantal Capacitor 10uF TMCS A 106K 10V		0710-106253-0
C143	M.Ceramic Capacitor 1nF C1608 102K		0702-102553-0
C144	M.Ceramic Capacitor 18pF C1608 180J		0702-180543-0
C145	M.Ceramic Capacitor 8pF C1608 080D		0702-080523-0
C146	M.Ceramic Capacitor 22pF C1608 220J		0702-220543-0
C147	M.Ceramic Capacitor 1nF C1608 102K		0702-102553-0
C150	M.Ceramic Capacitor 5pF C1608 050C		0702-050513-0
C151	M.Ceramic Capacitor 1nF C1608 102K		0702-102543-0
C175	M.Ceramic Capacitor 18pF C1608 180J		0702-180543-0
C176	M.Ceramic Capacitor 1nF C1608 102K		0702-102553-0
C177	M.Ceramic Capacitor 47pF C1608 470J		0702-470543-0
C178	M.Ceramic Capacitor 27pF C1608 270J		0702-270543-0
C179	M.Ceramic Capacitor 1nF C1608 102K		0702-102543-0
C180	Tantal Capacitor 10uF TMCS A 106K 10V		0710-106253-0
C181	M.Ceramic Capacitor 1nF C1608 102K		0702-102553-0
C182	M.Ceramic Capacitor 100pF C1608 101J		0702-101543-0
C183	M.Ceramic Capacitor 1nF C1608 102K		0702-102553-0
C185	M.Ceramic Capacitor 15pF C1608 150J		0702-150543-0
C186	M.Ceramic Capacitor 1nF C1608 102K		0702-102553-0
C187	M.Ceramic Capacitor 15pF C1608 150J		0702-150543-0
C200	M.Ceramic Capacitor 10pF C1608 100D		0702-100523-0
C201	M.Ceramic Capacitor 13pF C1608 130J		0702-130543-0
C203	M.Ceramic Capacitor 3pF C1608 030C		0702-030513-0
C204	M.Ceramic Capacitor 10pF C1608 100D		0702-100523-0
C205	M.Ceramic Capacitor 33pF C1608 330J		0702-330543-0
C206	M.Ceramic Capacitor 18pF C1608 180J		0702-180543-0
C207	M.Ceramic Capacitor 10pF C1608 100D		0702-100523-0
C210	M.Ceramic Capacitor 10pF C1608 100D		0702-100523-0
C211	M.Ceramic Capacitor 5pF C1608 050C		0702-050513-0
C212	M.Ceramic Capacitor 100pF C1608 101J		0702-101543-0
C213	M.Ceramic Capacitor 10pF C1608 100D		0702-100523-0

Ref. No.	Description	RS Part No.	Mfr's Part No.
C214	M.Ceramic Capacitor 56pF C1608 560J		0702-560543-0
C215	M.Ceramic Capacitor 82pF C1608 820J		0702-820543-0
C215A	M.Ceramic Capacitor 33pF C1608 330J		0702-330543-0
C216	M.Ceramic Capacitor 18pF C1608 180J		0702-180543-0
C217	M.Ceramic Capacitor 4pF C1608 040C		0702-040513-0
C218	M.Ceramic Capacitor 3pF C1608 030C		0702-030513-0
C219	M.Ceramic Capacitor 1nF C1608 102K		0702-102553-0
C221	M.Ceramic Capacitor 470pF C1608 472K		0702-472553-0
C222	M.Ceramic Capacitor 20pF C1608 200J		0702-200543-0
C223	M.Ceramic Capacitor 100nF C1608 104Z		0702-104473-0
C224	M.Ceramic Capacitor 100nF C1608 104Z		0702-104473-0
C225	M.Ceramic Capacitor 1nF C1608 102K		0702-102553-0
C226	M.Ceramic Capacitor 100nF C1608 104Z		0702-104473-0
C227	M.Ceramic Capacitor 47nF C1608 473K		0702-473453-0
C228	M.Ceramic Capacitor 100nF C1608 104Z		0702-104473-0
C229	M.Ceramic Capacitor 27pF C1608 270J		0702-270543-0
C230	M.Ceramic Capacitor 10nF C1608 103K		0702-103553-0
C231	M.Ceramic Capacitor 220pF C1608 221J		0702-221543-0
C232	M.Ceramic Capacitor 220pF C1608 221J		0702-221543-0
C233	M.Ceramic Capacitor 100nF C1608 104Z		0702-104473-0
C234	M.Ceramic Capacitor 100nF C1608 104Z		0702-104473-0
C235	Tantal Capacitor 10uF TMCS A 106K 10V		0710-106253-0
C236	M.Ceramic Capacitor 100pF C1608 101J		0702-101543-0
C238	M.Ceramic Capacitor 56pF C1608 560J		0702-560543-0
C239	M.Ceramic Capacitor 68pF C1608 680J		0702-680543-0
C240	M.Ceramic Capacitor 68pF C1608 680J		0702-680543-0
C242	M.Ceramic Capacitor 1nF C1608 102K		0702-102553-0
C243	Tantal Capacitor 10uF TMCS A 106K 10V		0710-106253-0
C243A	M.Ceramic Capacitor 1pF C1608 010C		0702-010513-0
C244	M.Ceramic Capacitor 100nF C1608 104K		0702-104473-0
C245	Tantal Capacitor 4.7uF TMCS A 475K 10V		0710-475253-0
C246	M.Ceramic Capacitor 100nF C1608 104Z		0702-104473-0
C247	M.Ceramic Capacitor 10nF C1608 103K		0702-103553-0
C248	M.Ceramic Capacitor 100nF C1608 104Z		0702-104473-0
C248A	Tantal Capacitor 10uF TMCS A 106K 10V		0710-106253-0
C249	M.Ceramic Capacitor 100nF C1608 104Z		0702-104473-0
C250	Tantal Capacitor 10uF TMCS A 106K 10V		0710-106253-0
C251	Tantal Capacitor 10uF TMCS A 106K 10V		0710-106253-0
C252	M.Ceramic Capacitor 100nF C1608 104Z		0702-104473-0
C253	Tantal Capacitor 10uF TMCS A 106K 10V		0710-106253-0
C254	M.Ceramic Capacitor 47pF C1608 470J		0702-470543-0
C255	M.Ceramic Capacitor 56pF C1608 560J		0702-560543-0
C256	M.Ceramic Capacitor 47pF C1608 470J		0702-470543-0
C257	M.Ceramic Capacitor 33pF C1608 330J		0702-330543-0
C258	M.Ceramic Capacitor 1nF C1608 102K		0702-102553-0
C259	M.Ceramic Capacitor 100nF C1608 104Z		0702-104473-0
C261	High Capacitor M.Ceramic Cap.100nF TMK212 104K		0703-104453-0
CT101	Capacitor Trimer TX03R100A110		0802-001003-0
L112	Chip Coil 1uH LK2125 1R0K		2003-109333-0
L113	Coil Spring 0.3x1.2x2T(R)		2002-003202-0
L114	Coil Spring 0.3x1x3T(R)		2002-004202-0
L115	Chip Coil 33nH HK2125 33NJ		2003-337323-0
L116	Chip Coil 18nH HK2125 18NJ		2003-187323-0
L117	Chip Coil 15nH HK2125 15NJ		2003-157323-0
L122	Chip Coil 2.7uH LK2125 2R7K		2003-279333-0

Ref. No.	Description	RS Part No.	Mfr's Part No.
L123	Coil Spring 0.3x1.4x7T(R)		2002-006202-0
L124	Coil Spring 0.3x1.4x7T(R)		2002-006202-0
L125	Chip Coil 47nH HK2125 47NJ		2003-477323-0
L126	Chip Coil 82nH HK2125 82NJ		2003-827323-0
L131	Coil Spring 0.3x1.4x4T(R)		2002-005202-0
L132	Coil Spring 0.3x1.4x4T(R)		2002-005202-0
L133	Coil Spring 0.3x1.4x4T(R)		2002-005202-0
L134	Coil Spring 0.3x1.4x4T(R)		2002-005202-0
L135	Coil Spring 0.3x1.4x4T(R)		2002-005202-0
L136	Coil Spring 0.3x1.4x4T(R)		2002-005202-0
L137	Coil Spring 0.3x1.4x4T(R)		2002-006202-0
L138	Coil Spring 0.3x1.4x4T(R)		2002-006202-0
L138A	Coil Spring 0.3x1.4x4T(R)		2002-006202-0
L139	Coil Spring 0.3x1.4x4T(R)		2002-006202-0
L140	Chip Coil 0.33uH LK2125 R33K		2003-338333-0
L141	Chip Coil 0.18uH HK2125 R18J		2003-188323-0
L142	Chip Coil 0.33uH LK2125 R33K		2003-338333-0
T101	Coil 450KHz I.F.T.		2001-001212-0
D110	Diode MA77		1005-002443-0
D118	Diode MA77		1005-002443-0
D121	Diode MA77		1005-002443-0
D122	Diode KDS226		1005-003943-0
D123	Diode MA77		1005-002443-0
D124	Diode KDS226		1005-003943-0
D125	Diode KDS120		1005-004943-0
D128	Diode KDS114		1005-001443-0
D129	Diode KDS114		1005-001443-0
Q107	FET MRF 9382 T1		1005-001003-0
Q108	Transistor C3356		0902-009023-0
Q113	FET MRF 9382 T1		0901-001003-0
Q114	Transistor C3356		0902-009023-0
Q117	Transistor 2SC4901		0901-002313-0
Q118	Transistor KTC4079		0901-008313-0
Q119	Transistor 2SC4901		0901-002313-0
Q120	Transistor 2SC4901		0901-002313-0
Q121	Transistor KRA311		0901-004013-0
Q122	Transistor KRA311		0901-004013-0
Q124	Transistor KRA311		0901-004013-0
Q125	Transistor KRA311		0901-004013-0
Q126	Transistor KRA311		0901-004013-0
Q127	Transistor KRC412		0901-005313-0
Q128	Transistor KRA302		0901-003013-0
Q129	Transistor KRA311		0901-004013-0
Q130	Transistor KRC410		0901-007313-0
Q131	Transistor KTC4075		0901-006313-0
Q132	Transistor KRC412		0901-005313-0
IC101	I.C TA31136FN		1103-001044-0
IC102	I.C TB31202FN		1106-001044-0
X101	Crystal 14.85MHz		2201-001102-0
XF101	Crystal Filter MF 45R2		2302-001002-0
CF101	Filter Ceramic CF 450E		2301-001002-0
	Antenna Conector SMA-J-P		3407-001102-0
	Ant HG-V/UHF-HSA		4203-001102-0



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
T	F	1F	1A	2F	2A	3F	3A	4F	4A		5F	5A	75	6F	6A	7F	7A	MR	.	.	.	CO M4
SQ	S4	1G	1B	2G	2B	3G	3B	4G	4B	T2	5G	5B	50	6G	6B	7G	7B	AP	.	.	CO M3	.
S1	S5	1E	1C	2E	2C	3E	3C	4C	4C	T1	5C	5C	25	6E	6C	7E	7C	TOT	.	CO M2	.	.
S2	S6	S3	1D	S7	2D	S	3D	4D	4D	T3	5D	5D	T4	.	6D	T5	7D	WX	CO M1	.	.	.

SEMICONDUCTOR VOLTAGE CHART

- Frequency : (VHF) 144.00MHz , (UHF) 449.00MHz
- Power supply : 4.5 Vdc
- Unit : Volts (average)

RF Board Function

- RX : Modulation 3KHz AF 1KHz RF level -47dBm
- TX : Press button "PTT"(Unmodulated)

IC102

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
1	2.56	2.56	2.56	2.59
2	3.27	3.28	3.27	3.27
3	1.71	1.55	1.28	1.47
4	0	0	0	0
5	3.21	3.23	3.22	3.22
6	0	3.32	0	3.32
7	0	3.32	0	3.32
8	0	0	0	0
9	2.21	2.22	2.21	2.21
10	2.59	2.59	2.58	2.58
11	3.22	3.21	3.21	3.21
12	0	0	0	0
13	0	0	0	0
14	-	-	-	-
15	3.27	3.27	3.27	3.27
16	-	-	-	-

Q121

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	2.35	2.35	2.34	2.34
B	0	0	2.78	2.78
C	2.23	2.23	0	0

Q122

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	2.35	2.35	2.35	2.35
B	1.80	1.80	0	0
C	0	0	2.22	2.22

Q124

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	3.33	3.33	3.33	3.33
B	2.76	0	2.76	2.76
C	0	2.99	0	0

Q125

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	3.32	3.33	3.32	3.32
B	2.76	2.76	2.76	2.76
C	0	0	0	0

Q126

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	3.16	0	3.14	0
B	2.59	0	0	0
C	0	0	3.02	0

Q127

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	0	0	0	0
B	0	0	2.70	0
C	2.60	0	0	0

Q128

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	3.16	0	3.13	0.36
B	0	0	2.69	0.36
C	3.03	0	0	0

Q129

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	3.32	3.33	3.32	3.33
B	0	2.76	0	2.77
C	3.16	0	3.14	0.4

Q130

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	0	0	0	0
B	2.22	2.22	0	0
C	0	0	0	0

Q131

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	2.36	2.35	2.34	2.34
B	3.06	3.05	3.04	3.04
C	3.33	3.33	3.32	3.32

RX Module

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0.70	0	0	0
5	2.07	2.08	2.38	2.38
6	3.03	0	0	0
7	0	0	0	0
8	1.04	0	1.01	0
9	0	0	3.01	0
10	0	0	2.21	0

IC101

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
1	3.05	0	3.06	0.60
2	-	-	-	-
3	1.89	0	1.87	0
4	3.01	0.45	3.09	0.60
5	2.75	0.45	2.72	0.64
6	2.75	0.45	2.72	0.64
7	0.68	0	0.70	0
8	0.68	0	0.66	0
9	1.36	0	1.63	0.32
10	0	0	0	0.20
11	1.24	0	1.21	0
12	1.75	0	1.87	0
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0.69	0	0.96	0

Q117

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	0	0	0	0
B	0.70	0.50	0.70	0.54
C	1.88	0.50	1.88	0.54

Q118

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	0	0	0	0
B	0.70	0.50	0.70	0.54
C	1.88	0.50	1.88	0.54

Q132

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	0	0	0	0
B	0	0	0	0
C	3.04	0	0	0

Q108

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	0	0	0	0
B	0	0.73	0	0
C	4.50	4.39	4.50	4.39

Q113

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	4.50	4.41	4.50	4.23
B	0	0	0	1.50
C	0	0	0	0

Q114

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	0	0	0	0
B	0	0	0	0.53
C	4.50	5.41	5.50	4.23

Q119

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	0	0	0	0
B	0	0.81	0	0
C	0	2.91	0	0

Q120

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	0	0	0	0
B	0.20	0	0.65	0.50
C	0.20	0	1.40	2.15

D125

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
1	0	0	0	0.25
2	0.30	0	0.25	0
3	0	0	0	0

D121

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
A	0	0.89	0	0
C	0	0	0	0

D123

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
A	0	0	0	0.75
C	0	0	0	0

D128

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
A	0	0	2.20	0
C	0	0	1.39	2.15

D129

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
A	0	0	0	2.97
C	0	0	1.38	2.14

VCO Module Function

- RX: Modulation 3KHz AF 1KHz RF level -47dBm
- TX: Press button "PTT" (Unmodulated)

Q101

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	0	0	0	0
B	0.80	0.80	0.70	0.70
C	1.20	1.20	1.00	1.00

Q102

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	0.40	0.40		
B	1.10	1.10		
C	1.80	1.80		

Q103

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	0	0		
B	0	3.10		
C	1.90	0		

Q104

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E			0.70	1.20
B			1.30	1.20
C			1.60	1.60

Q105

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E			0	0
B			3.10	0
C			0	2.40

D103

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
A	2.10	0.80	0	0
C	1.80	0	0	0

D106

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
A	0	0	0.80	2.10
C	0	0	0	2.20

D107

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
A	0	0	0	0
C	0	0	2.10	2.10

Power Function

- RX: Modulation 3KHz AF 1KHz RF level -47dBm
- TX: Press bottom "PTT" (Unmodulated)

IC503

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
1	4.50	4.50	4.50	4.50
2	0	0	0	0
3	4.50	4.50	4.50	4.50
4	1.31	1.31	1.31	1.31
5	3.32	3.32	3.32	3.32

IC504

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
1	4.50	4.50	4.50	4.50
2	0	0	0	0
3	3.32	3.32	3.32	4.50
4	1.31	1.31	1.31	1.31
5	3.32	3.32	3.32	3.32

IC505

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
1	0	0	0	0
2	3.31	3.31	3.31	3.31
3	2.75	2.75	2.75	2.75
4	-	-	-	-
5	-	-	-	-

D504

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
	0	0	0	0
A	0	0	4.50	4.50
C	4.50	4.50	4.50	4.50

Back Light Function

D501

PinNo.	Busy No	Busy off	TX on	TX off
1	1.92	0.47	0.28	0.47
2	0	0	0	0
3	0.26	0.39	1.75	0.39

D502

PinNo.	Busy No	Busy off	TX on	TX off
1	0.39	0.27	2.62	0.27
2	0	0	3.33	0
3	3.33	3.33	3.33	3.33

Q503

PinNo.	Busy No	Busy off	TX on	TX off
E	2.63	0.45	0.45	0.45
B	3.33	0	0	0
C	3.33	3.33	3.33	3.33

Q501

PinNo.	On	Off
E	0	0
B	3.32	0
C	0	2.00

D502

PinNo.	On	Off
1	1.95	3.33
2	0	2.00

Audio Input Function

- RX: Modulation 3KHz AF 1KHz RF level -47dBm
- TX: Press button "PTT" (Unmodulated)

RX Module

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
1	0	4.47	0	4.43
2	2.22	0	2.22	0
3	2.22	0	2.22	0
4	2.22	0	2.22	0
5	2.22	0	2.22	0
6	4.50	4.48	4.50	4.47
7	0	0	0	0
8	2.22	0	2.22	0

Q504

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	3.33	3.33	3.33	3.33
B	3.33	0.96	3.33	0.96
C	0	3.33	0	3.33

Q506

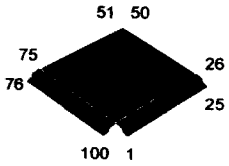
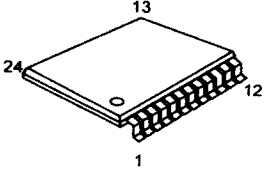
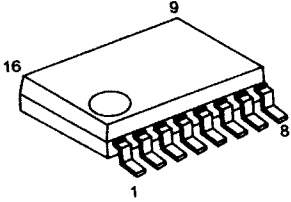
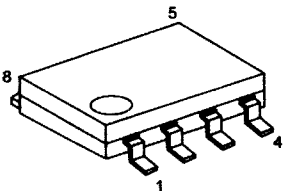
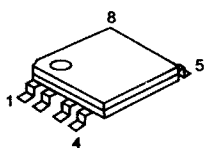
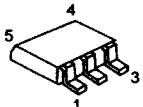

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	0.25	0.25	0.25	0.25
B	0.83	0.83	0.83	0.83
C	1.57	1.57	1.57	1.57

Tone Squelch Function

CTCSS: 100Hz, only T-SQL ON, Squelch volume must be set to 0
 MIC : Receive (SSG: AF 1KHz Modulation 3KHz RF level -47dBm)
 Transmit (Unmodulated)

Pin No.	UHF			VHF		
	Without tone	With tone	TX	Without tone	With tone	TX
1	0	0	1.68	0	0	1.68
2	0	0	0	0	0	0
3	3.31	3.31	1.68	3.30	3.31	1.68
4	2.62	2.62	1.82	2.62	2.62	1.80
5	1.67	1.68	1.68	1.67	1.68	1.68
6	1.23	1.24	1.61	1.23	1.66	1.61
7	1.65	1.66	1.68	1.65	3.33	1.68
8	3.31	3.33	3.33	3.32	0.81	3.33
9	0.81	0.81	0.81	0.81	0.91	0.81
10	0.91	1.92	0.91	0.91	0	0.87
11	0	0	0	0	0	0
12	3.31	0.31	3.32	0	0	3.33
13	3.31	3.32	3.32	0	0	3.33
14	3.15	0	3.16	3.15	0	3.16
15	0	0	0	0	0	0
16	1.67	1.68	1.67	1.67	1.68	1.65
17	2.12	1.96	2.13	2.12	1.96	2.13
18	-	-	-	-	-	-
19	-	-	-	-	-	-
20	1.67	1.68	1.68	1.67	1.68	1.69
21	1.65	1.65	1.67	1.65	1.65	1.67
22	1.67	1.67	1.68	1.67	1.67	1.68
23	1.67	1.67	1.68	1.67	1.67	1.68
24	-	-	-	-	-	-

SEMICONDUCTOR LEAD IDENTIFICATION

Base Diagram	Manufacture's No.	Schematic Ref.No.	Description
	HD6433835C99H	IC501	Microprocessor
	AK2345-E2	IC506	CTCSS
	TA31136FN	IC101	IF
	TB31202FN	IC102	PLL
	CSI24WC08J-2.7	IC502	EEPROM
	LM4864MM	IC507	AUDIO Amp
	TK71633SCLH	IC504	VOL.REG.
	S-81227SG-QZ-T1	IC505	VOL.REG.
	S-81233SG-QF-T1	IC503	VOL.REG.
	MRF9382 T1	Q113,117	FET

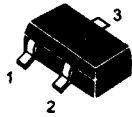
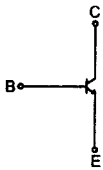
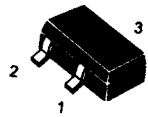
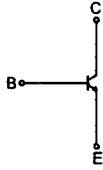
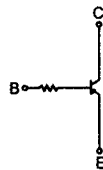
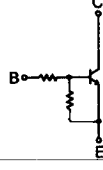
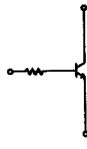
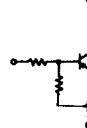
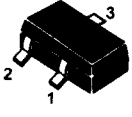
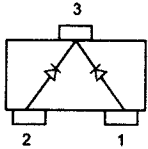
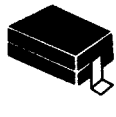
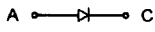
Q506

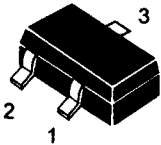
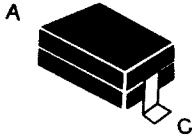

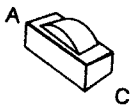

PinNo.	UHF		VHF	
	Receive	Transmit	Receive	Transmit
E	0.25	0.25	0.25	0.25
B	0.83	0.83	0.83	0.83
C	1.57	1.57	1.57	1.57

Tone Squelch Function

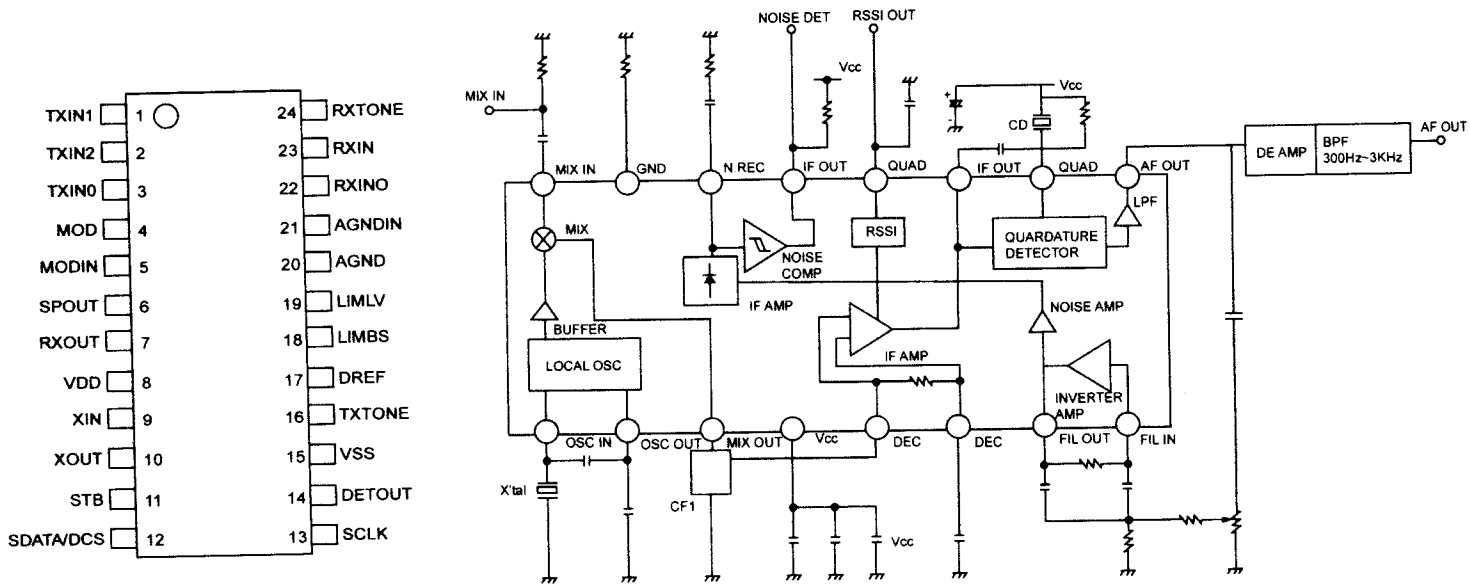
CTCSS: 100Hz, only T-SQL ON, Squelch volume must be set to 0
 MIC : Receive (SSG: AF 1KHz Modulation 3KHz RF level -47dBm)
 Transmit (Unmodulated)

Pin No.	UHF			VHF		
	Without tone	With tone	TX	Without tone	With tone	TX
1	0	0	1.68	0	0	1.68
2	0	0	0	0	0	0
3	3.31	3.31	1.68	3.30	3.31	1.68
4	2.62	2.62	1.82	2.62	2.62	1.80
5	1.67	1.68	1.68	1.67	1.68	1.68
6	1.23	1.24	1.61	1.23	1.66	1.61
7	1.65	1.66	1.68	1.65	3.33	1.68
8	3.31	3.33	3.33	3.32	0.81	3.33
9	0.81	0.81	0.81	0.81	0.91	0.81
10	0.91	1.92	0.91	0.91	0	0.87
11	0	0	0	0	0	0
12	3.31	0.31	3.32	0	0	3.33
13	3.31	3.32	3.32	0	0	3.33
14	3.15	0	3.16	3.15	0	3.16
15	0	0	0	0	0	0
16	1.67	1.68	1.67	1.67	1.68	1.65
17	2.12	1.96	2.13	2.12	1.96	2.13
18	-	-	-	-	-	-
19	-	-	-	-	-	-
20	1.67	1.68	1.68	1.67	1.68	1.69
21	1.65	1.65	1.67	1.65	1.65	1.67
22	1.67	1.67	1.68	1.67	1.67	1.68
23	1.67	1.67	1.68	1.67	1.67	1.68
24	-	-	-	-	-	-

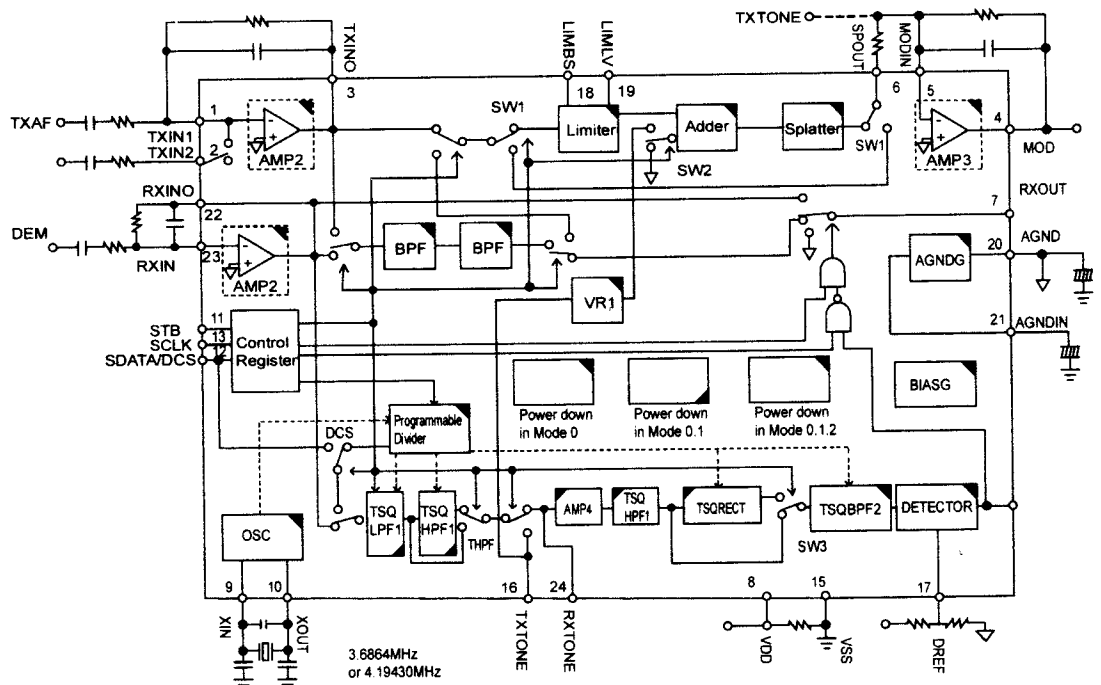
Base Diagram	Manufacturer's No.	Schematic Ref No.	Description
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	KTC4079	Q118	
	KTC4075	Q131	
	2SC4226	Q115	
	KRA311	Q121,122,1124,125,126,129	
	KRC401	Q103,105	
	KRC410	Q130,501,502,503,507	
	KRC412	Q127	
KRA301	Q504		
KRA302	Q128		
	KDS226	D122,124	
	KDS114	D101,102,103,104,106,107,117,120,128,129	
	MA77	D110,118,121,123	

Base Diagram	Manufacturer's No.	Schematic Ref No.	Description
	KDS120	D125	
	HVC355B	D105	
	HVC358B	D108,113,114,115,116	
	HVU362	D134,135,137,1387	
	M2	D504	
	LTST-S320YKT	D502,503	
	LTL-1BEHJ	D501	

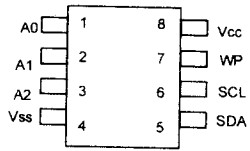
IC INTERNAL CONNECTION



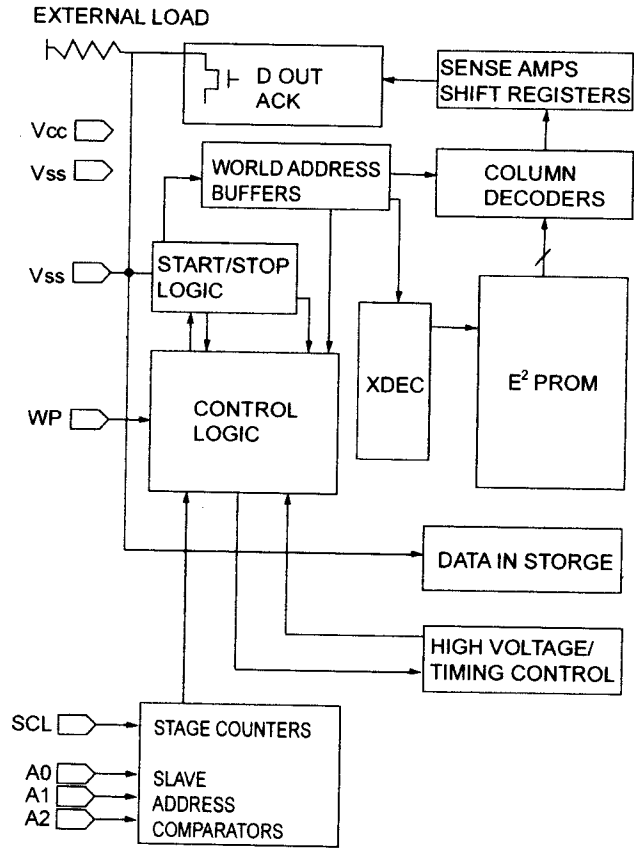
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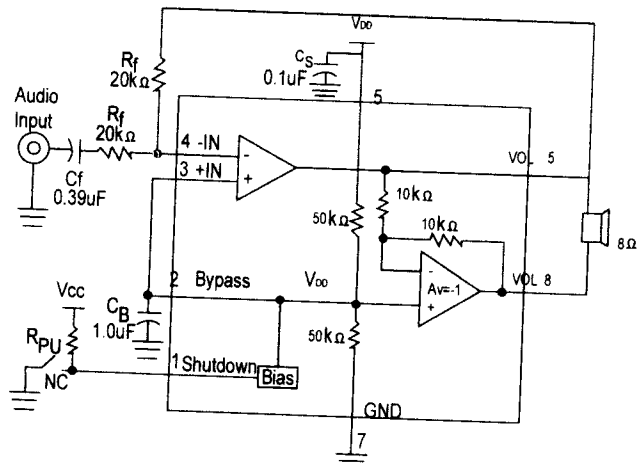
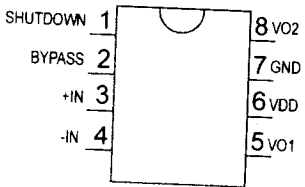
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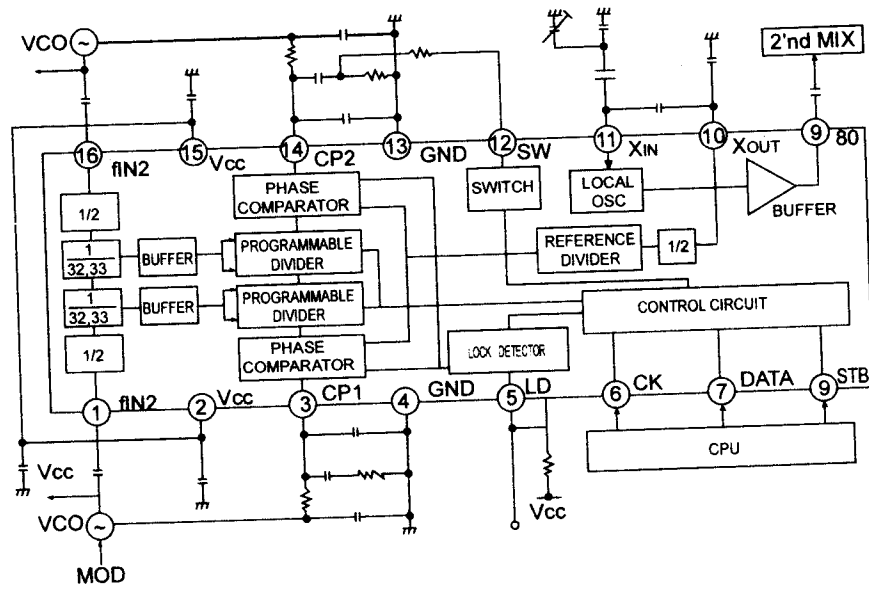
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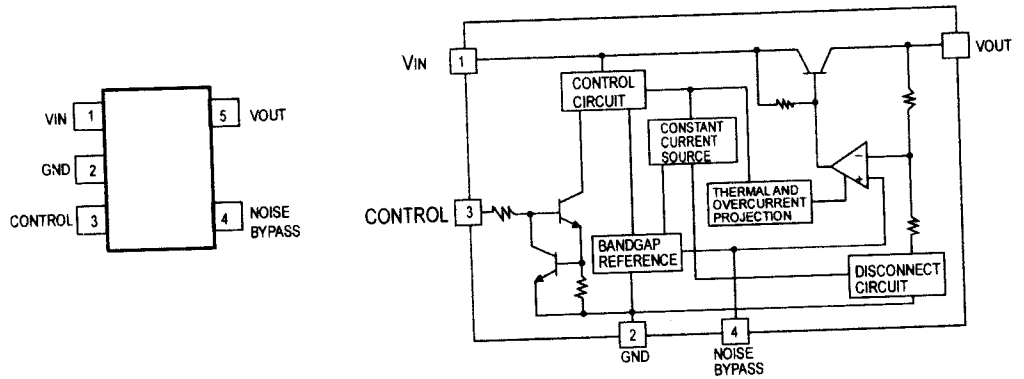
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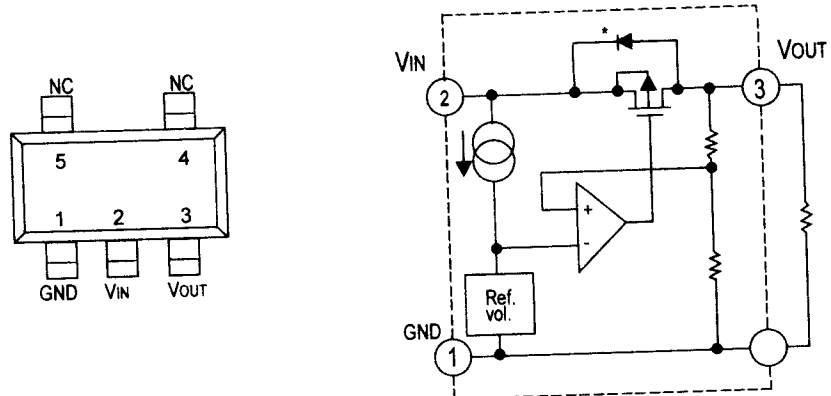
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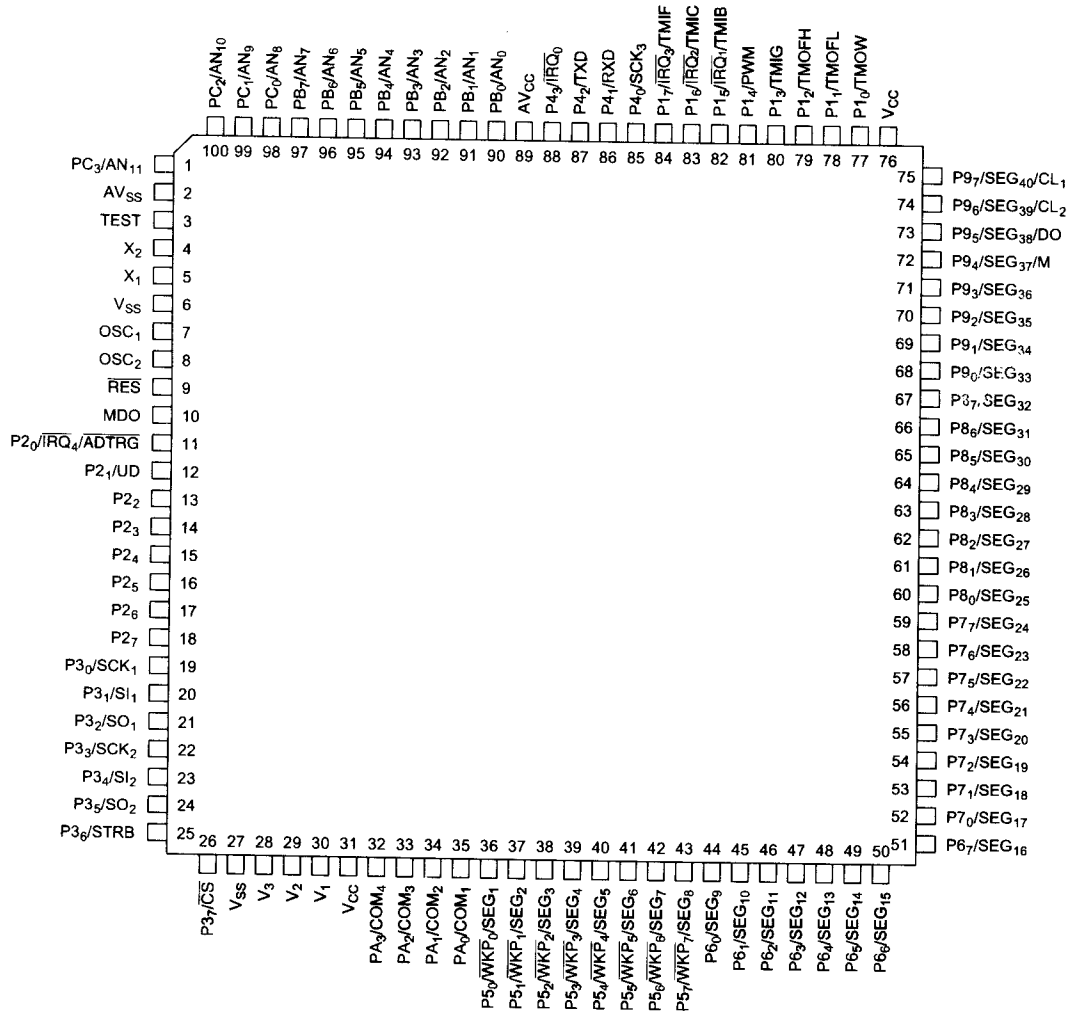


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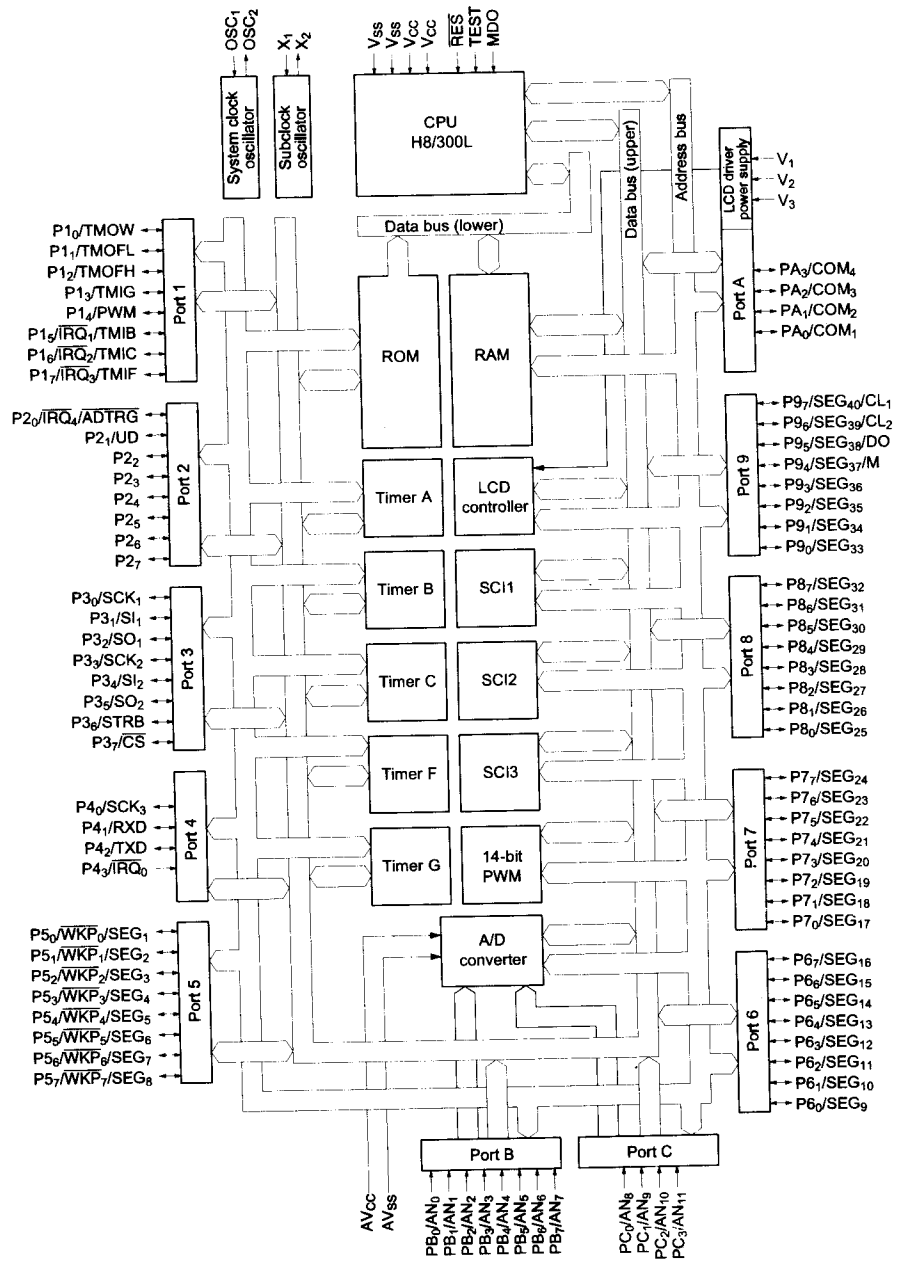


S81227SG





HD6433835C99H



HD6433835C99H

