MT-900

2 Way Radio

(SERVICE MANUAL)

TRANSMITTER

Test Item	Nominal	Limit
Conducted Tx power (@ 6.0 V DC Input)	500 mW	400~800 mW
Maximum Current (@ 6.0 V DC Input)	300 mA	< 350 mA
Conducted Spurious Emission	-60 dBc	-50 dBc
Audio frequency Response (@ 0.7 KHz Dev.)		
300 Hz	-10.0 dB	±3.0 dB
2.5 KHz	+4.0 dB	±3.0 dB
Audio Frequency Deviation (AF 1 KHz / 20 dB up 1.5 KHz Dev.)	2.0 KHz	1.8 KHz ~ 2.3 KHz
CTCSS Tone Deviation	0.5 KHz	0.3 KHz ~ 0.6 KHz
Peak Deviation (Audio Dev. CTCSS Tone Dev.)	2.3 KHz	2.0 KHz ~ 2.5 KHz
Call deviation	1.5 KHz	1.0 KHz ~ 2.5 KHz
TX Hum & Noise (AF 1 KHZ / 1.5 KHz Dev.)	35.0 dB	30.0 dB
TX Distortion (AF 1 KHZ / 1.5 KHz Dev.)	3.0 %	5.0 %
Carrier Frequency Tolerance (2.5 ppm)	±300 Hz	±1000 Hz
Mic. Sensitivity (AF 1 KHZ / 1.5 KHz Dev.)	10 mV	±3 mV

SPECIFICATION

GENERAL

Transmitter.....CPU Controlled PLL Synthessizer
Receiver.....CPU Controlled double conversion, superheterodyne system
Operating Frequencies.....CH 1: 446.00625 MHz ~ CH 8: 446.09375 MHz
Battery Life.....8 hours (typical)
Battery.....6 V DC @400 mAH
Alkaline Batteries
Test Temperature.....25°C
Frequency Stability.....0.0025%
Transmitter/Receiver Switching.....Electrical

STANDARD TEST CONDITIONS

Battery Supply Voltage.....6 V DC
Modulation..... MT : AF 1 KHz / 1.5 KHz Dev.
Receiver Output.....300 mW at external Speaker
Receiver Output Impedance.....8 ohms, non-inductive
Ambient Conditions
Temperature.....-20°c ~ 50°C
Humidity.....40% ~ 70%

RECEIVER

Test Item	Nominal	Limit
Sensitivity (12 dB Sinad)	-119 dBm	< -116 dBm
Squelch-Threshold	-119 dBm	< -116 dBm
Hum & Noise Ratio (S/N) at 1 mV	45 dB	> 40 dB
Max Audio Output at 1 kHz / 1.5 kHz Dev.		> 100 mW
Rx STBY current	40 mA	< 50 mA
OFF current		< 10 μA
Audio Frequency Response		
300 Hz	-15.0 dB	±3.0 dB
2.5 kHz	-10.0 dB	±3.0 dB
Audio distortion at 1 mV	3.0%	< 10.0%
In Band Conducted RX Spurious	-60 dBm	-55 dBm
Spurious Rejection Ratio (1^{st} IF / 2^{nd} IF)	65 dB	60 dB
Image Rejection Ratio (1^{st} IF / 2^{nd} IF)	60 dB	50 dB
Adjacent Channel Rejection Ratio	60 dB	50 dB
Inter Modulation Distortion ±2,4 CH	65 dB	55 dB
Batt. Low Indicate	4.2 V	±0.2 V

Intermediate Frequency
1^{st} IF.....21.7 MHz
2^{nd} IF..... 450 KHz

Select CTCSS Privacy Code (00~38)

The CTCSS Privacy Code allows the user to utilize a lese channel rang (00~38) within a main Channel.

• After select a main channel Press and release the mode button. A small numbers will flash next to the channel display LCD indicating the Privacy Code.

• Select Privacy Code number by push the channel button up or down to select a Privacy Code. You can hold the button up or down fast advance

• When desired privacy code is displayed press and release the ENTER button.

Battery Low

Note : Battery power is indicated by the segment appearing at the bottom of the LCD. As battery power decreases, fewer segments will be visible. When the last segment begin to flash, the batteries should be recharge or replace.

Note : Only the Cobra NiMH battery pack can be recharged.

Replace alkaline batteries as soon as possible and/or recharge NiMH battery pack.

Note : NiMH rechargeable battery Pack (item # FA-BP) and Wall mount charger (part No. PA-CR).

Calling Another Person

To alert another person that you wish to communicate:

Note : Both the calling and receiving units must be on same channel and subchannel for the call function to work.

• Select a channel by press and release the channel button up or down.

Note : Your incoming "Call" audio ringing level is dependent on your unit's volume setting.

• Press and release ***Call*** button. The other person will hear a 2-second ringing tone. You cannot send or receive transmission during the 2-second call tone.

Talking to Another Person

To send your outgoing message:

Note : Both unit must be on same channel and subchannel to communicate.

Note : While Talk button is depressed you can not receive incoming calls.

• Press and hold **Talk** button.
• The TX indicator will be displayed.
• Hold mic about 2 inches from mouth. Speak in a normal voice.

Note : When you release the Talk button. The person you are talking to will hear a tone indicating that it's ok to talk.

• Release **Talk** button when you have finish talking and listen for a response. You cannot receive incoming calls while pressing the TALK button.

OPERATING INSTRUCTION

Install Batteries

Note : Batteries not included with MT-900 2-way radio.

Note : Always use high quality alkaline or NiMH batteries.
Incorrect positioning can damage both the batteries and the unit.
Only the Cobra NiMH battery (Part # FA-BP) pack can be recharged.

- Pull lock tab down to remove battery cover.
- Insert four "AAA" batteries. Position batteries according to polarity markings.

Note : Battery power is indicated by the segments appearing at the bottom of LCD. As battery Power decreases, fewer segments will be visible. When the last segment begins to flash, The battery should be recharged or replace.

Turning on Your MT-900

- Rotate the NO/OFF VOLUME switch clockwise to turn on the unit (and adjust the volume). An audible tone will indicate that the radio is on.

Note : Your microTALK is now in standby mode except when the TALK, CALL, or MODE buttons Are pressed.

Auto Battery Power Saver

If there are on transmission within 10 seconds, the unit will automatically switch to battery save mode and POWER SEVER will appear in the display. This will not affect the unit's ability to receive incoming transmissions.

Illuminating the display

- Press and release the LIGHT/MAX RANGE button to illuminate the display for 10 seconds.

Select Main Channel (1~ 8)

- With the radio on, select any the 8 channels by pushing the CHANNEL UP or CHANNEL DOWN

Note : Units must be on same channel and subchannels to communicate.

Note : Push and hold the ***chan*** buttons for fast channel advance.

THEORY OF OPERATION

Circuit Composition and Operation Theory

The basic explanation for the circuit composition the one board controlling the analog circuit parts and the digital circuit parts for the other control.

Receiver

Receive parts is composed in the double conversion system, which has the 1st IF Frequency of 21.7 MHz And 2nd Frequency of 450 KHz. The 3 pole MCF used in the 1st IF, and the sensitivity repression are reduced for the more stable reception.

RF Front-End

The signal received by the antenna will be transmitted to the band pass filter through the antenna switching circuit consisted of L32. The front RF amplifier transistor Q1 consists of the L301, L302, C62, C70, C301, C304 input band pass filter and L303, L305, C76, C308, Saw filter output band pass filter primarily diminishes the other signal rather then the 1st IF image and other signal within the reception band and amplifier only the necessary signal within the RF.

1st Mixer

The receiver which has been amplifier in the RF front end is provided to the base of the 1st mixer Q2. The 1st L/O signal provide from the VCO is supplied to the emitter of Q2 and converted to the 1st IF 21.7 MHz

1st IF Filter and 1st IF Amplifier

The signal converted by Q2 to 21.7 MHz, the 1st frequency, change its impedance through L14, C61 and then is infused to the fundamental MCF which has the center frequency of 21.7 MHz and the width of ±3.75 KHz. Here, the signal reduces the image and other unwanted signal for the 2nd IF, and changes its impedance again through C35. Then the signal is infused to the Q3, the 1st IF amplifier. The signal infused to the Q3 is amplifier approximately by 20 dB in other to acquire the required reception sensitivity, and infused to the IC1 which functions as the 2nd mixer, the 2nd IF amplifier, and the FM detector.

2nd Mixer, and IF, FM Detector (IC1)

The receiver IF signal of 21.7 MHz, which has been infuse to IC1 is mixed with the 2nd L/O signal of 21.25 MHz, and converted to 450 KHz, the 2nd IF frequency. The receiver signal converted to the 2nd IF signal frequency passed through the CF1, the ceramic filter of 450 KHz again. After the limiting inside the IC1 and the FM demodulating by the quadrature detector inside the IC1, the signal offers the output through the 9th pin of IC1. The 2nd L/O signal of 21.25 MHz which infused to the IC1 filter and uses directly the 9th pin of IC2. The squelch circuit is composed to detect the noised from the received signal demodulate in the 9th pin of the IC1. For this purpose, the noise filter is using the OP Amplifier inside the IC1.

De-Emphasis and 300 Hz (IC103)

The audio signal which has been FM demodulate in the IC1 is supplies to the IC103 which function as the De-emphasis and 300 Hz HPF. See the schematic one line go to IC2 (KIA358-B) change sine wave signal to square wave signal sending to CPU for call Tx data. And one more line go to the IC103-B has the 300 Hz HPF with the 1st characteristics and the De-emphasis characteristics with the center frequency of approximately 200 Hz, the IC103-C has the 300 Hz HPF with the 6th characteristics, they function as a normal De-emphasis and also reduce the signal such as CTCSS to unwanted noised and sending to IC12(Scrambler IC)detect signal without 3.58Mhz again ,then forward to IC2(KIA358-A) is a buffer and filter to Audio Amp.

Roger Beep Confirmation Tone

Your listen will hear an audible tone when you release the Talk button.
This alerts the other party that you are finished talking and it's ok for them begin talking.

Listening For a Response

When finished talking :

Note : While Talk button is depressed you can not receive incoming communications.

- Release the Talk button to receive incoming transmissions.

Your MT-900 is always in standby mode except when the Talk, Call, or Mode buttons are pressed.

- Adjust volume by rotating the NO/OFF VOLUME switch.

Auto Squelch

Your MT-900 is equipped with Auto squelch, Which automatically shuts off weak transmissions and unwanted noise due to terrain conditions or if you have reached your rang limit.

Maximum Range Extender

Auto squelch can be temporarily removed to allow all signals to enter (Maximum Rang Extender).

Note : Range is dependent on battery condition and geographic territory.

- Push and hold the LIGHT/MAX RANGE button for 5 seconds. You will hear 2 bees indicating that Maximum range extender is ON.
- To turn Maximum range extender off, press and hold the LIGHT/MAX RANGE button for 1 second, or change channels.

Lock Function

The purpose of the LOCK function is to lock most buttons to avoid accidental operation.

- While in standby mode, Press and hold Lock button for one second. The lock icon will blink when the unit is locked.
- To "unlock" press and release the Lock button again. The Lock icon disappears and all buttons will be unlocked.

Note : Call , Range Extender, Talk, volume buttons do not lock and are fully operational while The unit is locked. The unit cannot lock while in function mode.

RX/TX Buffer Amplifier (Q7)

The RF signal oscillate at the VCO is provide to the Q2 RX 1st mixer through the Q7 during the reception, and is provide to the Q16 power driver amplifier through the Q7 during the transmission.

PLL Frequency Synthesizer (IC3)

The PLL synthesizer of the signal loop PLL circuit with the reference of 6.25 kHz. The IC2 PLL IC includes all the function such as the reference oscillator, the driver, the phase detector, the lock detector, and the programmable divider. At the reference oscillator, the 21.25 MHz TCXO of the TCXO is connected to the pin 11 of the IC2 to oscillate the frequency of 21.25 MHz. The TCXO (21.25 MHz) is the temperature compensation circuit to maintain the frequency within the allowable error rang even under a low temperature of -30° C. The phase detector send out the output power to the loop filter through 3rd pin of the IC2. If the oscillation frequency of the VCO is low compared to the reference frequency, the phase detector sends out output power in positive pulse. If the oscillation frequency of the VCO is high, phase detector send put can maintain the frequency set. The programmable divider maintain the desired frequency with control from the CPU. The dividing ratio, "N" to oscillate the desired frequency is as below :

N = VCO oscillation frequency / reference frequency

If the desired frequency is 446.00625 MHz

TX

N = 446.00625 MHz / 0.00625 MHz = 71361

RX

N = [446.00625 MHz – 21.7 MHz] / 0.00625 MHz = 67889

CTCSS PROCESSING

RX CTCSS Tone Processing

The received CTCSS tone is sent out through 9th pin of the IC1 and supplies to the IC107 switching capacitor filter. The voice signal which can effected the reception of the CTCSS tone is decreased enough at the IC107. The cut off frequency at the IC107 is adjusted by the IC106 CPU to suit the characteristic of the CTCSS tone. The CTCSS tone received at the IC107 is supplies to the 2nd pin of the IC106 CPU, and receives the desired CTCSS tone.

TX CTCSS Tone Processing

The Tx CTCSS tone composed at the IC106 supplies to the IC104-C switched capacitor filter reduce enough the components in the high frequency which can effect the voice communication. And the Tx CTCSS tone is combined with the Tx voice signal through the IC104-C and CTCSS signal from 8 pin of IC104-C (If used CTCSS channel) to the filter and buffer IC(IC104-D) became the audio out for modulation with carrier at D12 by used RV3 adjust the modulation level.

CPU and Memory

Most of the control functions of the MT-900 are controlled by the IC106 CPU. The IC106 CPU has the internal ROM in the capacity of 32 K byte, and the program for the operation of the IC106. When the power of turned on, the IC106 reads the data necessity for the operation from the IC108 EEPROM, and decide the operation channel, frequency, etc. If the user alters any parameter of the radio, the IC106 updates the altered parameter to the IC108.

Audio Power Amplifier (IC101)

Audio Power Amplifier (IC101) The receiver audio signal which has been manual adjusted to the appropriate volume in by RV1 are supplied to the 2nd pin of the IC101 amplifier approximately by 20 dB. Then, it turns up the speaker with the maximum output of 0.3 watts. The 7th pin of the IC101 is the audio mute terminal. If a voltage supply to the 6th pin of IC101 is supplied to this terminal, the IC101 stops functioning as the audio power amplifier regardless of the signal supplied to the 2nd pin of the IC101. And there is no sound from the speaker.

Transmitter

The transmitter parts of the MT-900 is designed to amplify the RF signal oscillated and modulated by the synthesizer to approximately 500 mW by the power transistor of Q17.

Pre-emphasis (IC104)

The voice signal input from the microphone is pre-emphasized at the IC104-B output go to IC12(Scrambler IC) modulation within 3.58MHz. The signal comes out of the IC104-A is limited to a certain amplitude for the voice signal not to exceed the allowable bandwidth assigned for transmission. And then signal from pin1(IC104-A) will mixed with CTCSS signal from pin8(IC104-C)(If used CTCSS channel) to the filter and buffer IC(IC104-D) became the audio out for modulation with carrier .

Tx Power (Q17)

The transmitted signal of approximately 7 mW, combined at the driver TR is supplied to the base of the Q17 amplifier. The transmitted signal amplifier to 0.47 W here passes the Tx LPF of the 2nd characteristics of the L29, L30 and L31 and Rx/Tx switching takes place by the D16. After this, the signal is provided to the antenna the Tx LPF of the 1st characteristics consisted of the C91 and R69.

VOX Mode of Operation

At VOX mode condition, whenever the modulating frequency is present, unit goes on TX Mode or is transmitting automatically for hands-free operation. As discussed above whenever the speech or modulating signal is converted into electrical signal by the microphone is always low due to inverter's electrical characteristic. At VOX Mode, Q8 is on and the low signal from microphone goes to pin Base of Q103 unit into Tx mode, the signal though IC104-A amplify then goes to D6, C45 and R112 which is the VOX level control (control the sensitivity or amount of voice level trigger to CPU.).

MT Frequency Synthesizer

Voltage Control Oscillator (VCO)

The VCO of oscillates 446.00625 MHz to 446.09375 MHz under the transmission condition and 424.30625 MHz to 424.39375 MHz under the reception condition. The VCO consist of the clip oscillator of the Q4 and contains the oscillator frequency of approximately 21.7 MHz during the transmission/reception conversion. That is since the VCO should oscillate relatively low frequency during reception compared to transmission, the D3 is biased by the Q11.
Therefore as a result, the C19 is added in parallel to the resonance circuit of the VCO to oscillate a low frequency. During transmission, a relatively high frequency should be oscillation compared to reception. Therefore, the D3 is adversely biased by the Q11, and as a result, the C19 is added unparallel to the circuit of the VCO is removed to oscillate the desired transmission frequency. The VCO is controlled by the IC2 (PLL IC) in order to oscillate accurate frequency. The output frequency of the VCO is supplied to the IC2 PLL IC immediately. At the IC2, TCXO (21.25 MHz) by the TCXO (X3) is compared to the output frequency of the VCO. The VCO is controlled the loop filter consisted of the R28, R29 and the C33, C41, C68 in order to oscillate the stable frequency wanted for the radio. The VCO controlled voltage as passed the loop filter is supplies to the D4 varicap diode, and the VCO an oscillator the PLL programmed frequency by the capacity variance in the D4. In addition, the L4 on the VCO circuit function as frequency for the VCO to be properly controlled by the IC2 PLL IC.

TEST EQUIPMENT SETUP AND ALIGNMENT INSTRUCTIONS

ALIGNMENT PROCEDURE

Step	Setting	Connection	Adjuster	Adjust for
1	RX VCO voltage adjustment Frequency : 446.00625 MHz Mic : Receive Function : None Volume : Optional Squelch : Optional	DC voltmeter to VCO Test point (Figure 1)	L4	1.0 V DC
2	TX VCO voltage adjustment Frequency : 446.00625 MHz Mic : Transmit (Unmodulated) Function : None Volume : Optional Squelch : Optional	DC voltmeter to VCO Test point (Figure 1)	L4	1.0 ±0.3 V DC
3	Frequency adjustment Frequency : 446.04375 MHz Mic : Transmit (Unmodulated) Function : None Volume : Optional Squelch : Optional	Antenna to frequency Counter, Through Attenuator (Figure 2)	CT1	±300 Hz

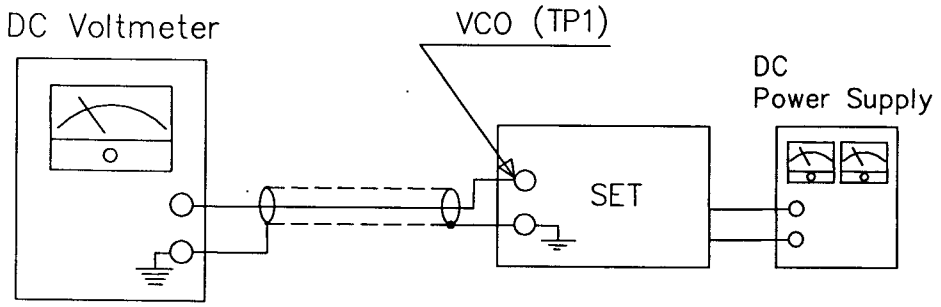


Figure 1

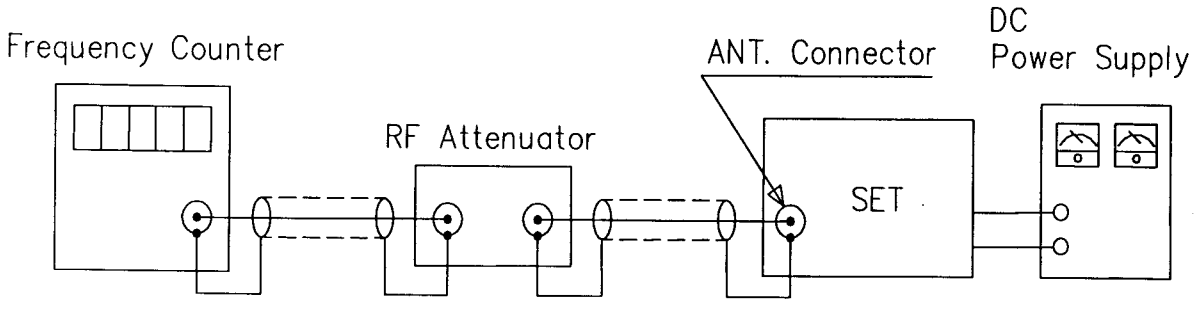


Figure 2

TROUBLESHOOTING HINTS

Symptom	Probable Cause	Remedy
Unit does not work at all	• Defective regulator IC105. • Defective components of X101. • Broken DC power terminal.	• Replace • Replace defective component(s) • Replace
No out from speaker at all	• Defective external speaker line. • Measure all the voltage of IC101, Q102, Q113, IC103, Q106, Q101, Q112. • Defective internal speaker.	• Repair or replace • Repair or replace • Replace
No noise on speaker	• Measure all the voltage of RF. • Defective squelch circuit components compare with the voltage chart.	• Replace defective component(s)
No modulation	• Defective microphone. • Measure all the voltage of IC104, RV3 on the RF digital compare with the voltage chart.	• Replace • Replace
LCD does not work	• Measure all the voltage of X101, IC106, IC108	• Replace defective component(s)
Black light does not work	• Defective components of LD101, LD102, Q107.	• Replace

RECEIVER SECTION

Test Equipment Required

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

Alignment Procedure

Step	Setting	Connection	Adjuster	Adjust for
1	RX squelch adjustment Frequency : 446.04375 MHz Mic : Receive Function : None Volume : Step 6 on the displayed SSG : Audio 1 KHz Modulation 1.5 KHz	Connect the standard signal Generator to the EXT-ANT Jack. Connect the AC volts level meter, distortion meter and SINAD meter across the EXT speaker jack with an 8 ohm dummy load. (Figure 4)	RV2	Maximum sensitivity indication on 12 dB SINAD meter. Adjust until the audio output appears
2	Distortion adjustment Frequency : 446.04375 MHz Mic : receive Function : None Volume : Step 6 on the displayed SSG : Audio 1 KHz Modulation 1.5 KHz	Connect the standard signal Generator to the EXT-ANT Jack. Connect the AC volts level meter, distortion meter and SINAD meter across the EXT speaker jack with an 8 ohm dummy load. (Figure 4)	T1	Maximum indication on distortion meter

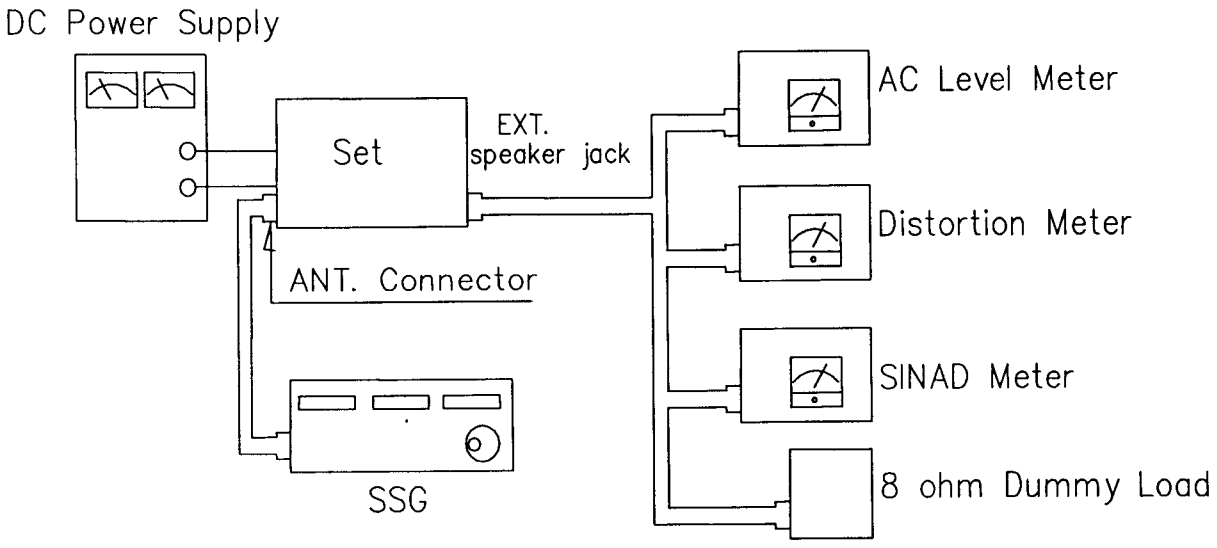


Figure 4

TRANSMITTER SECTION

Test Equipment Required

- RF power meter (RF SSVM)
- 50 ohms dummy load (non-inductive)
- RF attenuator (50 ohms non-inductive)
- Oscilloscope
- Audiogenerator
- DC power supply
- Spectrum analyzer
- Frequency counter
- Coupler
- Modulation meter (FM)

ALIGNMENT PROCEDURE

Step	Setting	Connection	Adjuster	Adjust for
1	AF Modulation adjustment Frequency: 446.04375 MHz Mic : Transmit Function : None Volume : Optional Squelch : Optional	Connection the audiogenerator (set to 1 KHz)to the microphone jack. Connect the modulation meter through the RF attenuator to the ANT jack. Adjust the audio signal level to obtain by 1.5 KHz deviation. When you increase the audio Signal by 20 dB, the deviation Should not exceed 2.3 KHz deviation (Figure 3)	RV3	2.0 KHz (1.8 ~ 2.1 KHz)

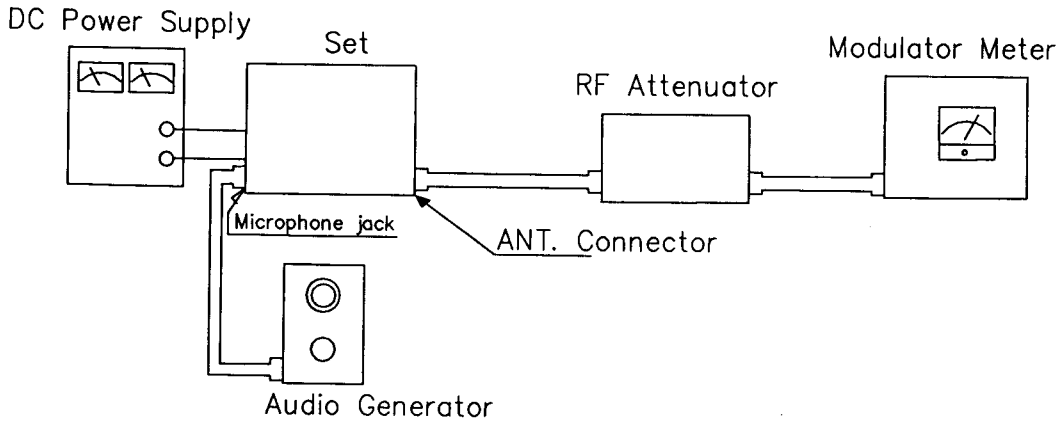


Figure 3

CHANNEL FREQUENCY GENERATION TABLE

FREQUENCY CHART

CHANNEL	FREQUENCY (MHz)	CHANNEL	FREQUENCY (MHz)
1	446.00625	5	446.05625
2	446.01875	6	446.06875
3	446.03125	7	446.08125
4	446.04375	8	446.09375

CTCSS TONE FREQUENCY CHART

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	67.0	20	131.8
2	71.9	21	136.5
3	74.4	22	141.3
4	77.0	23	146.2
5	79.7	24	151.4
6	82.5	25	156.7
7	85.4	26	162.2
8	88.5	27	167.9
9	91.5	28	173.8
10	94.8	29	179.9
11	97.4	30	186.2
12	100.0	31	192.8
13	103.5	32	203.5
14	107.2	33	210.7
15	110.9	34	218.1
16	114.8	35	225.7
17	118.8	36	233.6
18	123.0	37	241.8
19	127.3	38	250.3

ALIGNMENT INSTRUCTIONS

WARNING
Any repairs or adjustment should be made under the supervision of a qualified radio-telephone technician.

TRANSMITTER
1. Power Supply Voltage
The power supply voltage should be set for 6.0 V DC measured at the radio during transmit. Periodically check the supply voltage during the alignment procedure.

2. Frequency Setting
A. Connect a frequency counter or Communications Service Monitor to the antenna connector through an RF
power attenuator (10 watt minimum rating, 20 dB minimum attenuation).
B. Depress the PTT switch.
C. Adjust the CT1 for output frequency is equal to the channel frequency with a maximum error of ±300 Hz.
D. Release the PTT switch.

3. Output Power Alignment
A. Set the power supply voltage for 6.0 V DC.
B. Connect a Communications Service Monitor or a wattmeter and dummy load to the antenna connector
C. Depress the PTT switch.
D. To be convinced for 0.5 watt output power with a maximum error of ±0.1 watt.
E. Release the PTT switch.

4. Deviation Adjustment
A. Connect an audio generator to the microphone jack JIG. The audio frequency should be set at 1 KHz
B. Connect an FM deviation meter or Communication Service Minitor to the antenna connector through an RF
power attenuator (10 watt minimum rating, 20 dB minimum attenuator). Set the monitor to read peak
deviation.
C. Depress the PTT switch.
D. Adjust the audio generator level 100 mV rms.
E. Adjust RV3 for 2.3 KHz maximum deviation (with CTCSS tone)
F. To be convinced 2.0 KHz without CTCSS tone (1 KHz dev. 20 dB up)
F. Release the PTT switch.

RECEIVER
Note : Insure that the proper channel has been selected before proceeding with the alignment procedure.

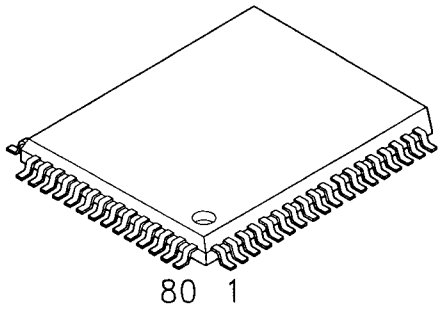
1. Power Supply Voltage
The proper voltage for testing is 6.0 V DC.

2. Receiver Alignment
A. Connect an RF signal generator or Communications Service Monitor to the antenna connector.
B. Connect a SINAD meter and oscilloscope across the speaker terminals.
C. Set the output level of the RF signal generator for - 47 dBm the generator should be set for ±1.5 KHz deviation
of a 1 KHz tone.
D. Set the audio output level for 0.6 Vrms by adjusting volume.
E. Adjust T1 for maximum audio output.
F. Reduce the output level of the RF signal generator for produce a 12 dB SINAD indication.

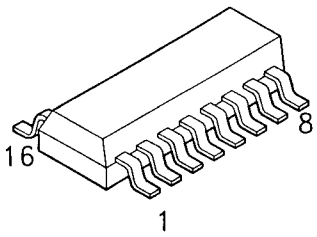
SEMICONDUCTOR LEAD IDENTIFICATION AND IC INTERNAL CONNECTIONS

INTEGRATED CIRCUITS

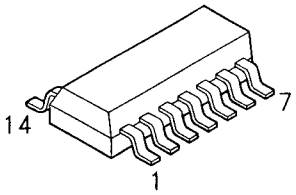
IC106 H8-38024



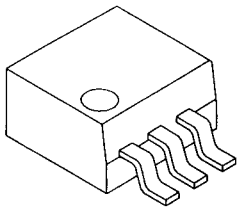
IC1 MC3361
IC3 KB8825-F



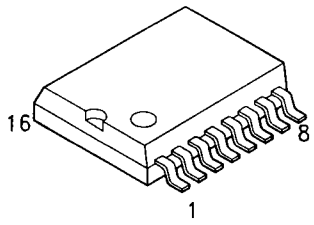
IC103 KIA324F
IC104 KIA324F
IC107 KIA324F



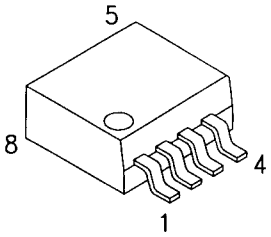
IC105 TK11140MC



IC12 M64026FP

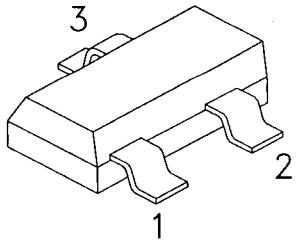


IC2 KIA358
IC101 IL386
IC108 KS24C010

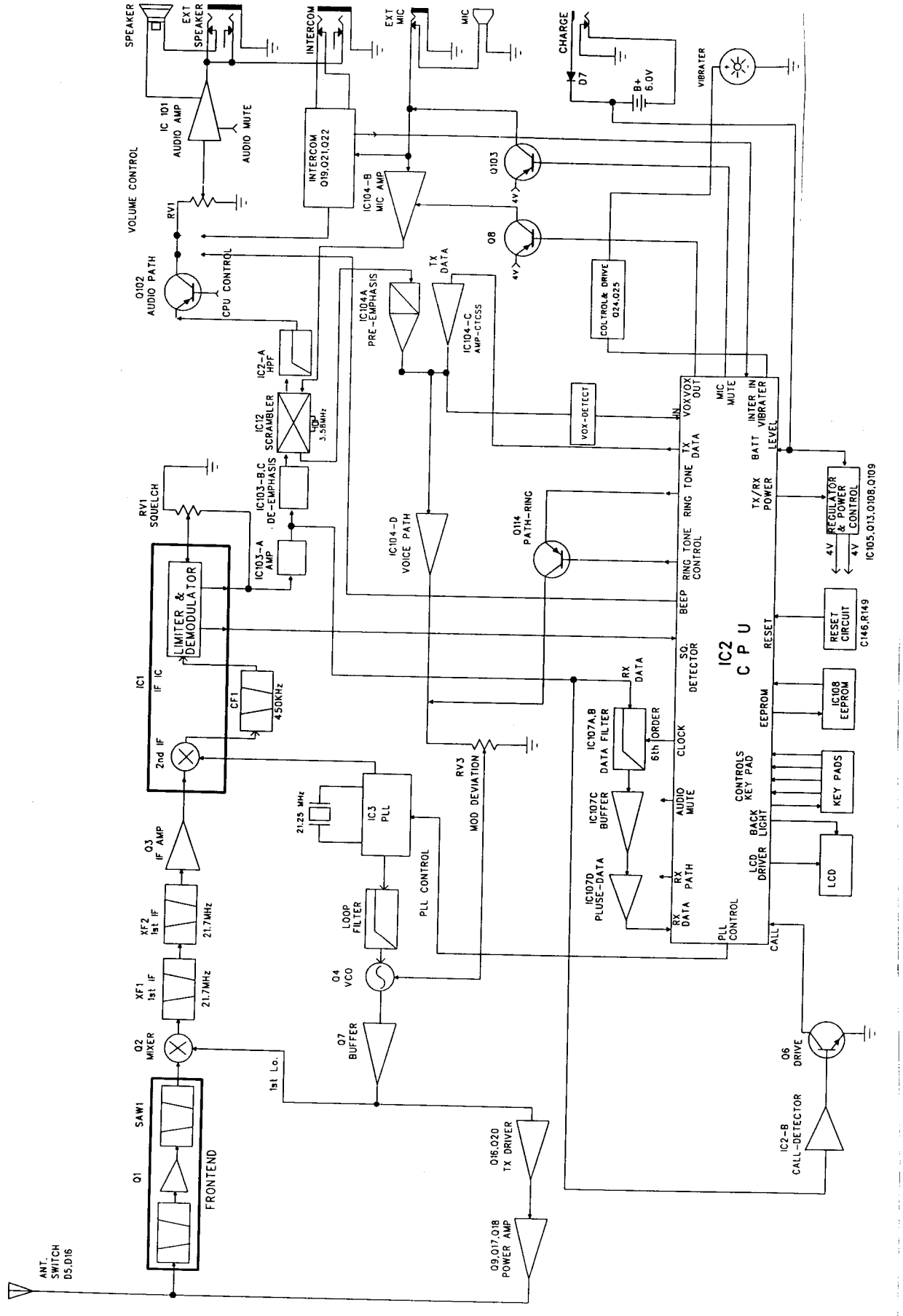


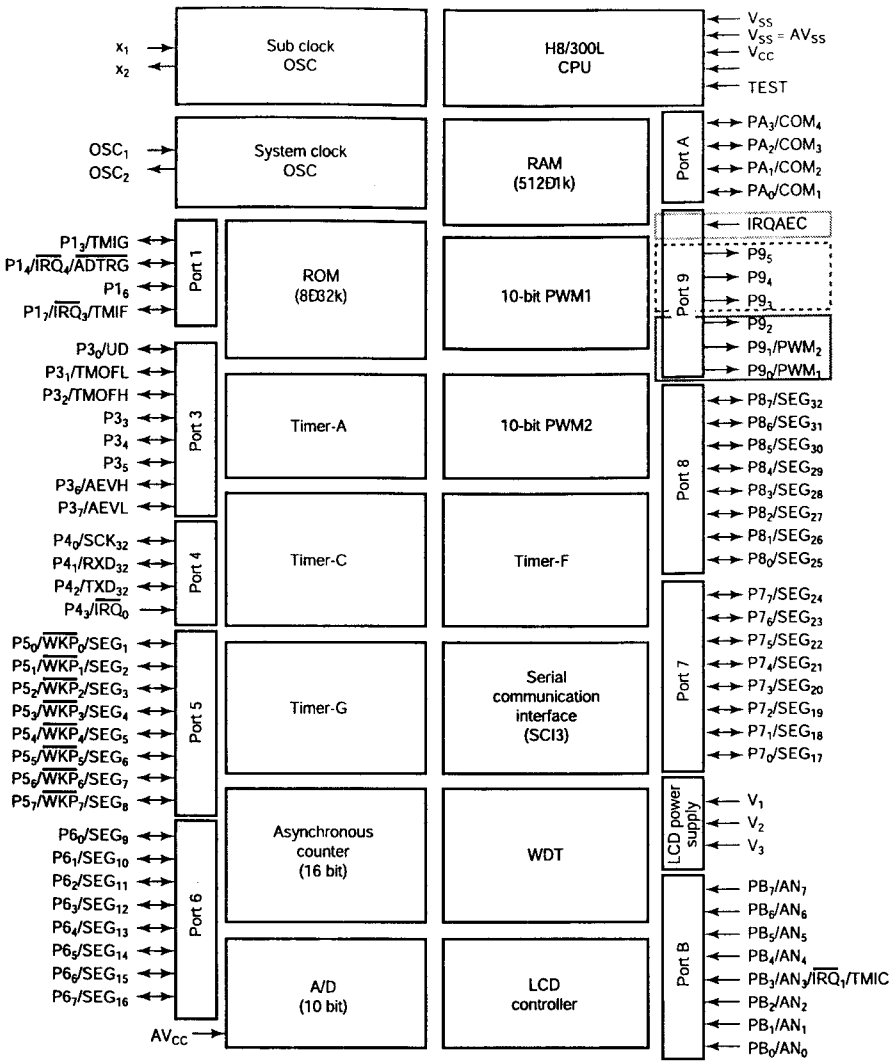
TRANSISTOR

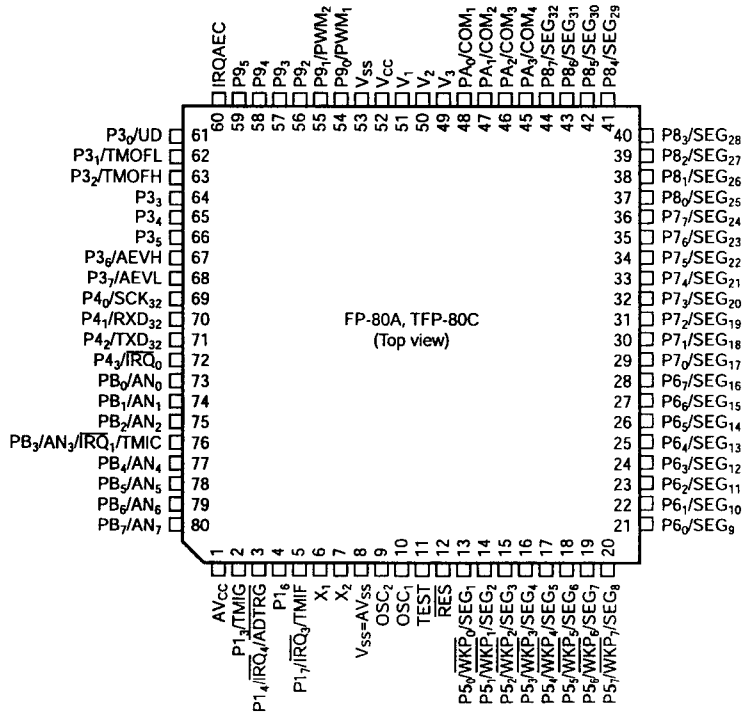
2SC5084
BFQ67W
DRF1601
KRA105
KRA226
KRC104
KRC110
KTA1504
KTC3875
KTC3880
MMBR951



BLOCK DIAGRAM

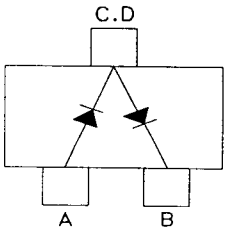



Sub clock OSC
System clock OSC
H8/300L CPU
RAM (512B/1k)
ROM (8B/32k)
10-bit PWM1
10-bit PWM2
Timer-A
Timer-C
Timer-F
Timer-G
Serial communication interface (SCI3)
Asynchronous counter (16 bit)
WDT
A/D (10 bit)
LCD controller
Port 1
Port 3
Port 4
Port 5
Port 6
Port A
Port 9
Port 8
Port 7
LCD power supply
Port B
Large-current (25 mA/pin) high-voltage open-drain pin (7 V)
Large-current (10 mA/pin) high-voltage open-drain pin (7 V)
High-voltage (7 V) input pin

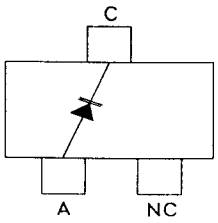

FP-80A, TFP-80C
(Top view)

DIODES

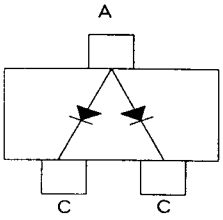
KDS226



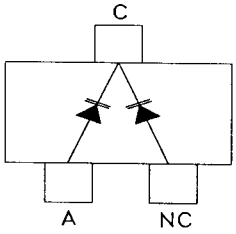
MMBV3401



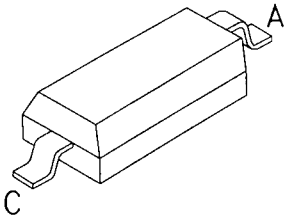
KDS181



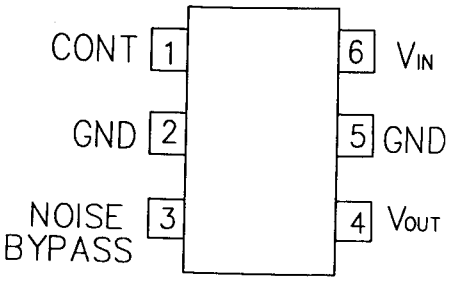
KDS184

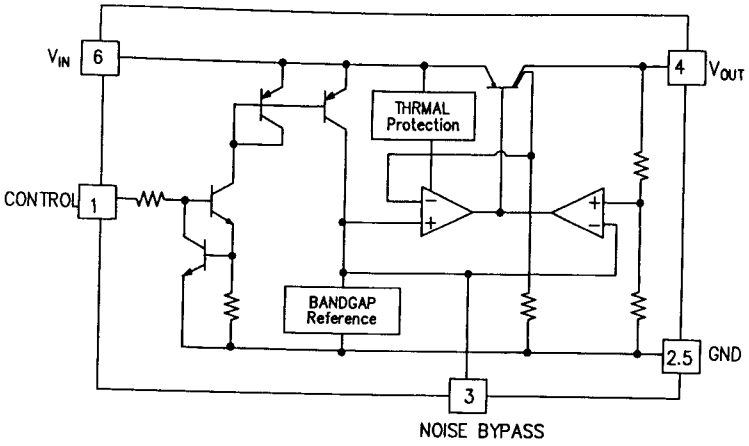


ISS314
ISV229
KDS160

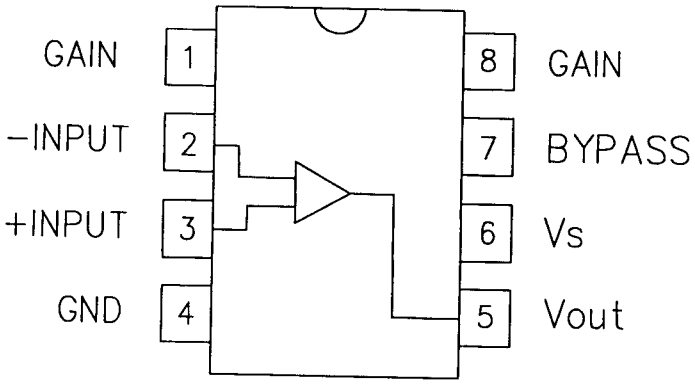


TK11140MC

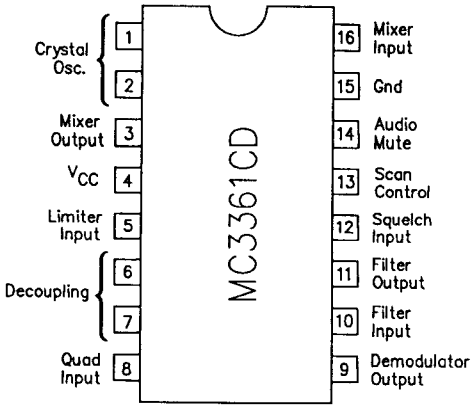


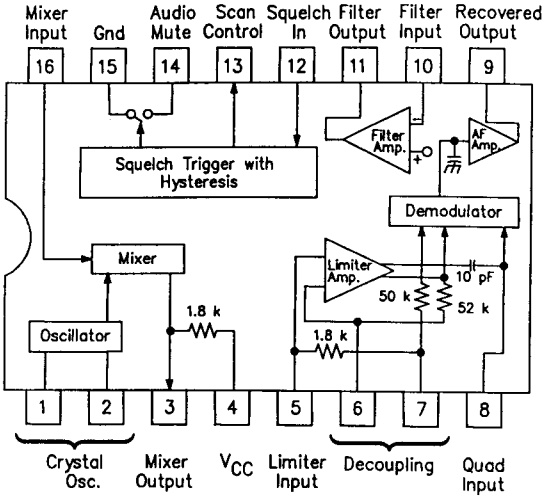


LM386

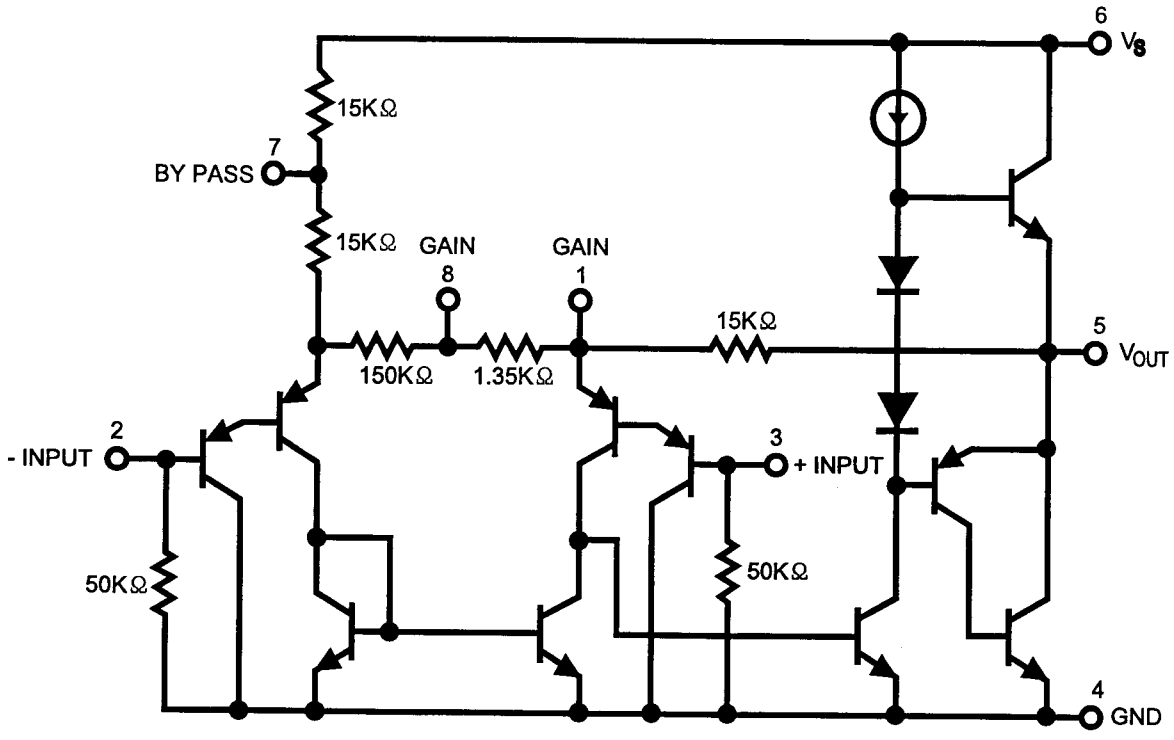


MC3361

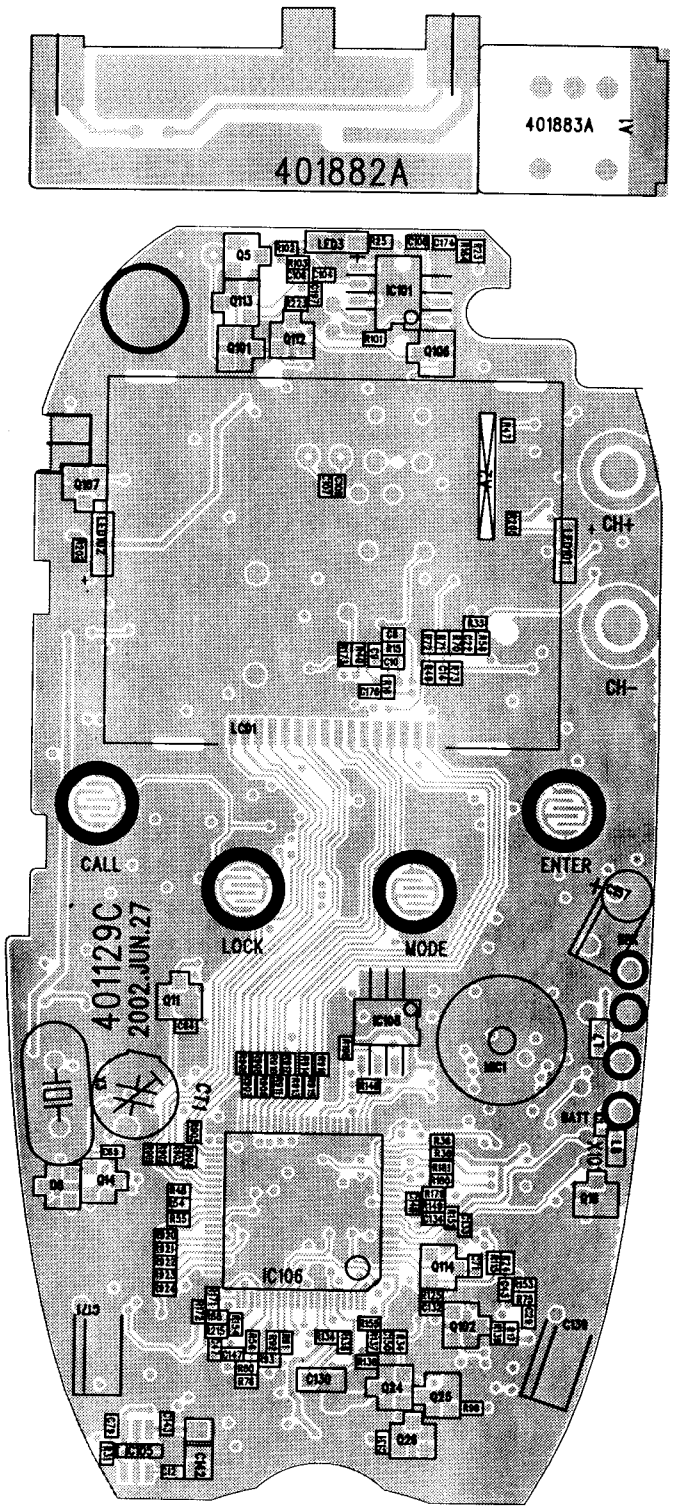




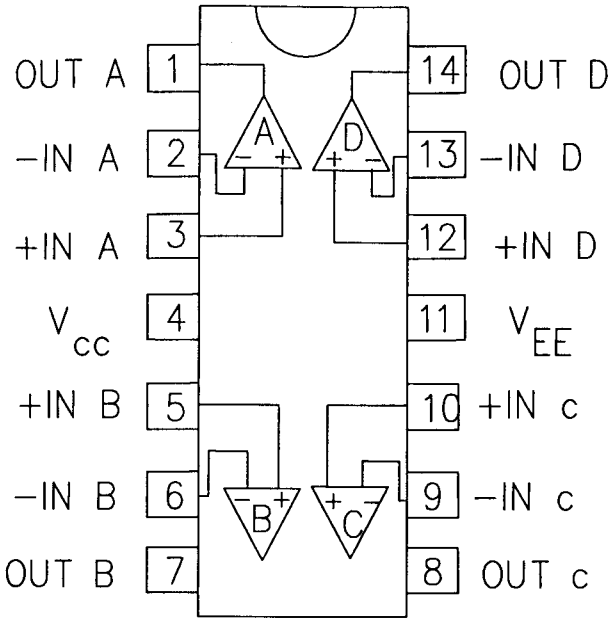
IL386



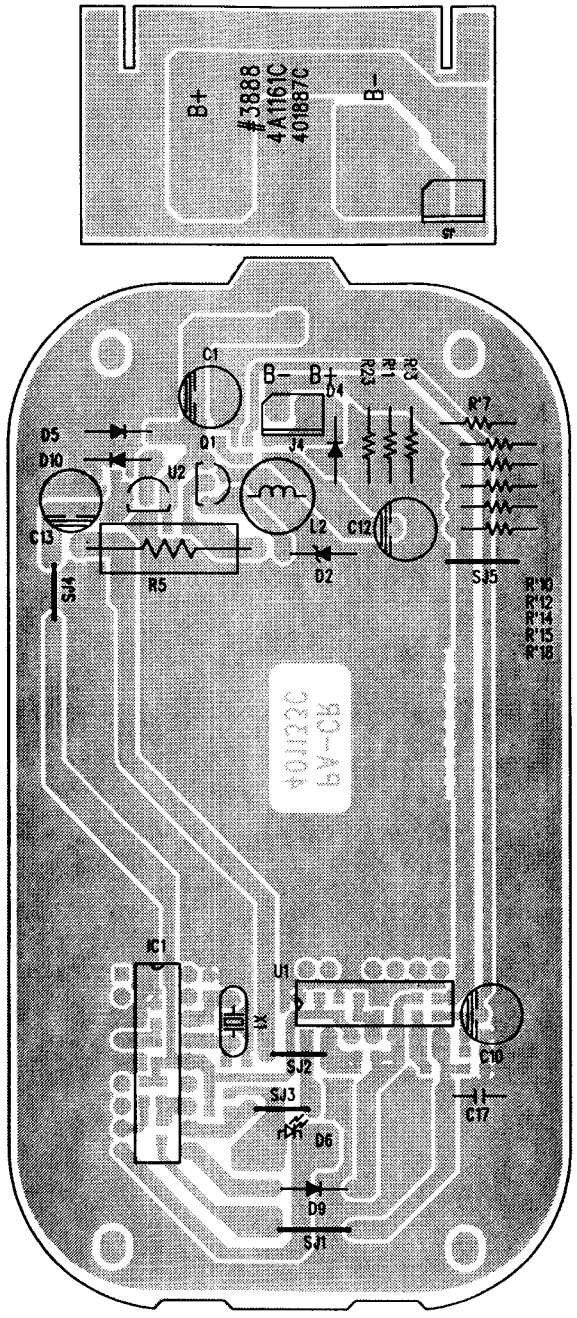
TOP VIEW OF PCB BOARD



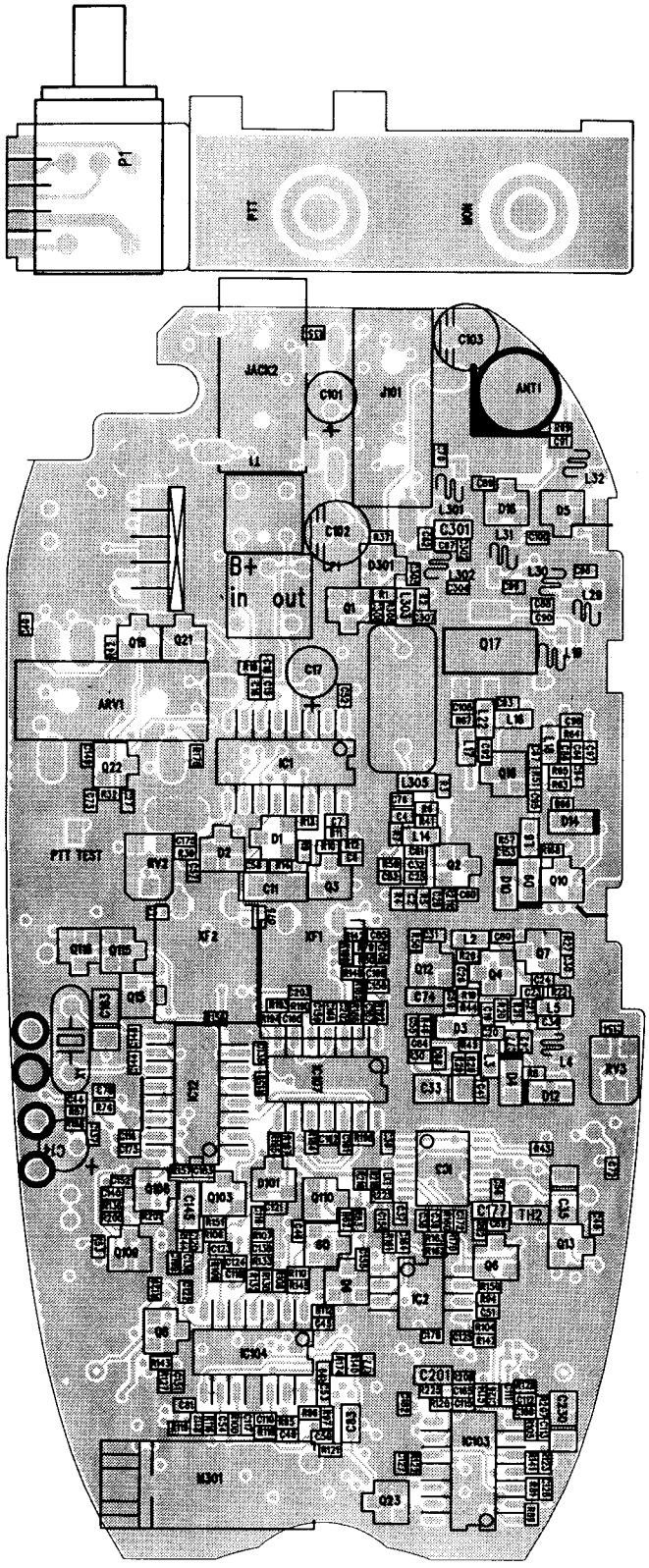
KIA324F


OUT A
1
−IN A
2
+IN A
3
V CC
4
+IN B
5
−IN B
6
OUT B
7
14
OUT D
13
−IN D
12
+IN D
11
V EE
10
+IN c
9
−IN c
8
OUT c
A
D
B
C

TOP VIEW OF PCB BOARD (CHARGER)



BOTTOM VIEW OF PCB BOARD



Issue No. AA (2002-11-23) MT-900

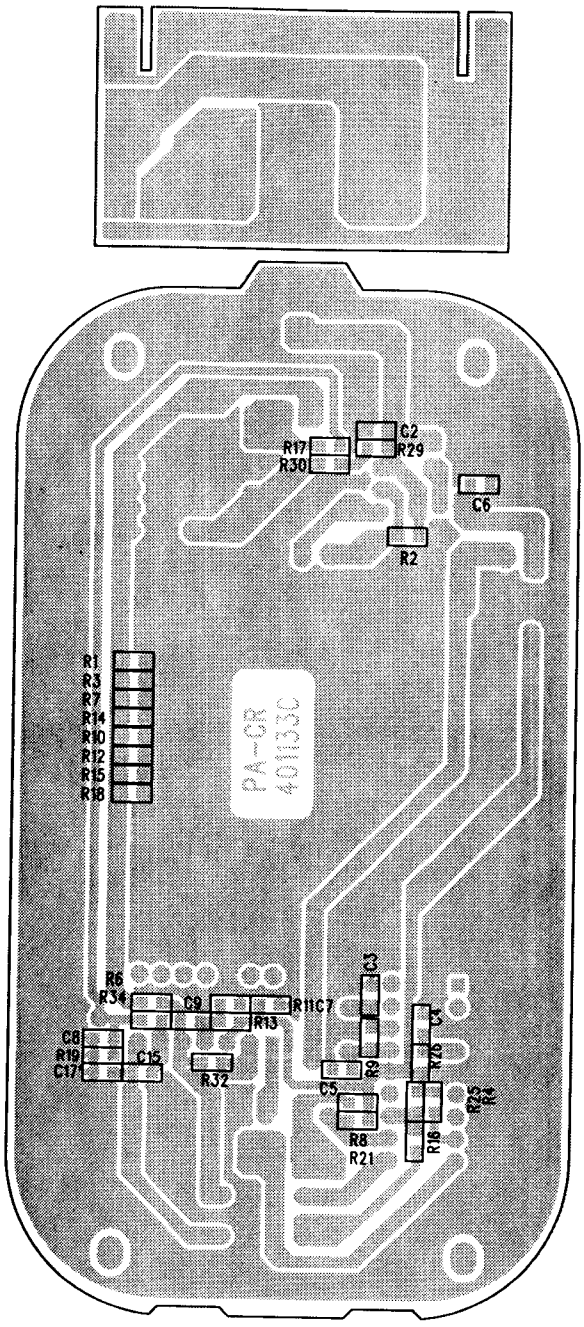
VOLTAGE CHART

1. IC's

IC	Pin NO.	RX	TX
IC1	1	3.8	0
	2	3.24	0.15
	3	3.34	0
	4	3.9	0
	5	3.5	0
	6	3.5	0
	7	3.5	0
	8	3.9	0
	9	1.5	0
	10	0.65	0
	11	0.7	0
	12	1.0	0
	13	0	0
	14	3.9	0
	15	0	0
	16	3.9	0
IC2	1	1.4	0
	2	1.4	0
	3	1.3	0
	4	0	0
	5	1.25	0
	6	1.25	0
	7	1.3	0
	8	3.98	0
IC3	1	3.84	3.95
	2	3.84	3.95
	3	1.0	1.1
	4	0	0
	5	1.7	1.7
	6	0	0.1
	7	0	0.1
	8	0	0.1

IC	Pin NO.	RX	TX
IC3	9	2.55	2.67
	10	3.09	3.18
	11	3.73	3.83
	12	0	0
	13	0	0
	14	0	0
	15	3.85	3.95
	16	0	0
IC12	1	4	4
	2	2	2.1
	3	2	2.1
	4	4	4.1
	5	0.42	0.45
	6	0	0
	7	0	0
	8	0	0
	9	4	4.1
	10	4	4.1
	11	3.75	3.85
	12	0	0
	13	0	0
	14	0	0
	15	2.0	2.1
	16	2.0	2.1
IC101	1	1.26	1.36
	2	0	0
	3	0	0
	4	0	0.1
	5	1.25	1.36
	6	6	5.7
	7	5.9	5.62
	8	1.34	1.44

BOTTOM VIEW OF PCB BOARD (CHARGER)



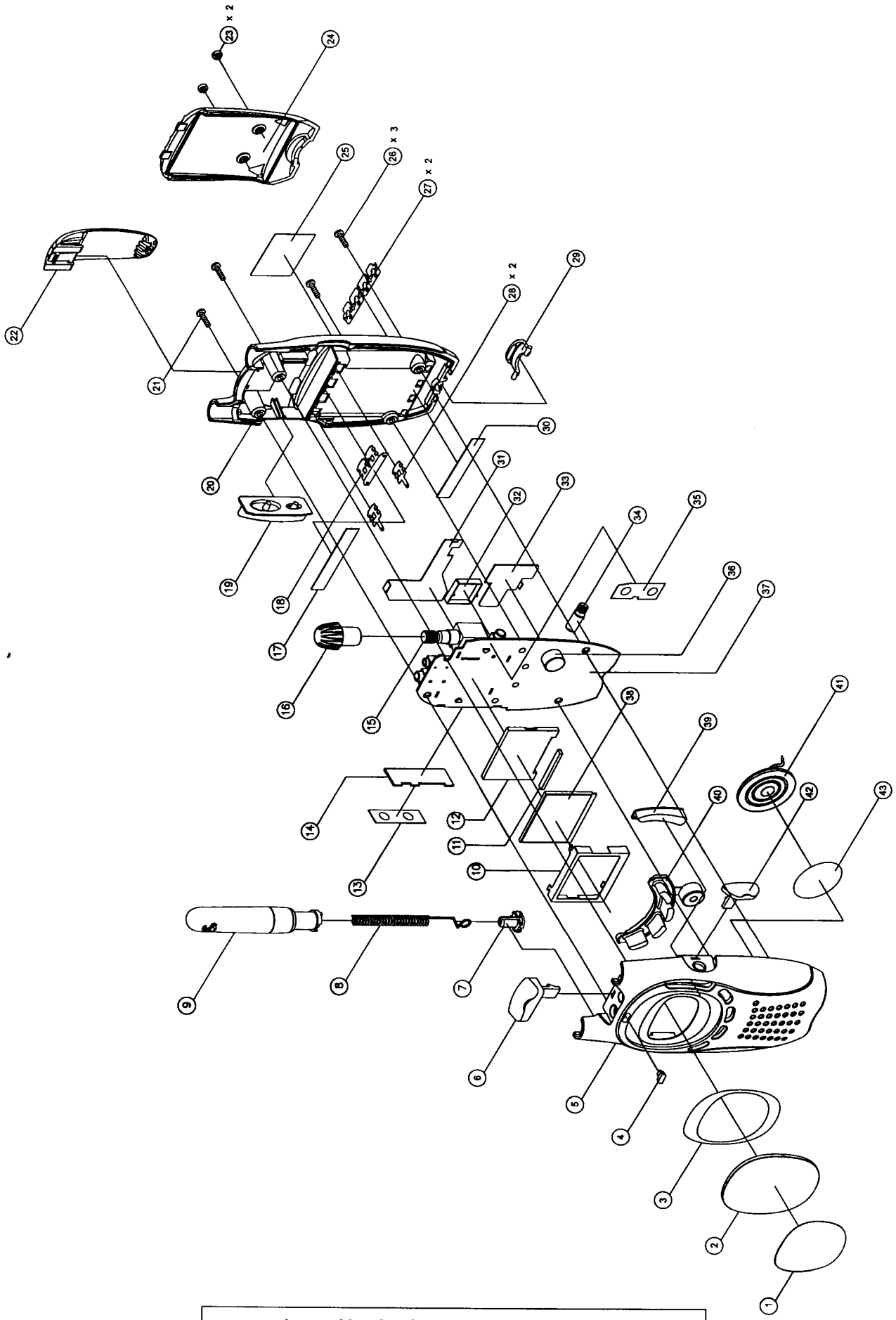
IC	Pin NO.	RX	TX
IC106	36	2	2
	37	2	2
	38	2	2
	39	2	2
	40	2	2
	41	2	2
	42	2	2
	43	2	2
	44	2	2
	45	2	2
	46	2	2
	47	2	2
	48	2	2
	49	1.3	1.4
	50	2.6	2.6
	51	4	4
	52	4	4
	53	0	0
	54	0	0
	55	0	0
	56	0	0
	57	0	0
	58	0	2.4
	59	0	0
	60	0	0
	61	4	4
	62	0	0
	63	0	0
	64	4	0
	65	0	0
	66	4	4
	67	4	4
	68	4	4
	69	0	0
	70	0	0
	71	0	0

IC	Pin NO.	RX	TX
IC106	72	1.7	1.5
	73	0	4
	74	2.5	2.4
	75	3.9	3.95
	76	1.8	4
	77	0	0
	78	3.9	0
	79	0	0
	80	1.85	1.2
IC107	1	1.8	1.9
	2	1.8	1.9
	3	1.7	1.8
	4	4	4.1
	5	1.7	1.8
	6	1.8	1.9
	7	1.8	1.9
	8	1.8	1.9
	9	1.8	1.9
	10	1.7	1.8
	11	0	0
	12	1.8	0
	13	1.8	0
	14	1.4	0
IC108	1	0	0
	2	0	0
	3	0	0
	4	0	0
	5	4	4.1
	6	4	4.1
	7	0.3	0.3
	8	4	4.1

IC	Pin NO.	RX	TX
IC103	1	1.77	1.79
	2	1.77	1.80
	3	1.77	1.79
	4	4	4
	5	1.76	1.76
	6	1.77	1.79
	7	1.77	1.79
	8	1.77	1.79
	9	1.77	1.79
	10	1.77	1.79
	11	0	0
	12	0.3	0.44
	13	0.4	0.4
	14	0	0
IC104	1	0	1.46
	2	0	1.51
	3	0	1.35
	4	0	3.97
	5	0	1.34
	6	0	1.48
	7	0	1.46
	8	0	0
	9	0	0
	10	0	0
	11	0	0
	12	0	1.40
	13	0	1.44
	14	0	1.44
IC105	1	5.9	5.73
	2	0	0
	3	1.29	1.30
	4	3.99	4.0
	5	-	-
	6	5.91	5.74

IC	Pin NO.	RX	TX
IC106	1	4	4.1
	2	1.3	0
	3	0	0
	4	4	4
	5	4	4
	6	0	0
	7	0	0
	8	0	0
	9	1.6	1.7
	10	1.5	1.5
	11	0	0
	12	4	4
	13	4	4
	14	0	0
	15	0	0
	16	0	0
	17	0	4
	18	4	4
	19	0	0
	20	4	4
	21	4	0
	22	0	4
	23	0	4
	24	0	0
	25	0	0
	26	0	0
	27	4	4
	28	4	4
	29	2	2
	30	2	2
	31	2	2
	32	2	2
	33	2	2
	34	2	2
	35	2	2

EXPLODED VIEW AND EXPLODED VIEW PART LIST



2. TRANSISTORS

Ref. No.	Receiver			Transmitter		
	B	E	C	B	E	C
Q1	0.76	0.01	3.47	-0.66	0	-0.08
Q2	0.9	0.20	3.83	0	0	-0.12
Q3	0.7	0	1.45	-0.12	0	-0.13
Q4	1.25	0.6	3.0	1.30	0.6	3.06
Q5	0.05	0	3.8-4.5	2.28	0	0.08
Q6	0.3	0	1.95	0.25	0	3.96
Q7	1.18	0	3.89	1.20	0.44	3.90
Q8	3.98	3.98	0	0.09	4.0	3.99
Q10	3.98	3.98	0	0.07	3.99	3.97
Q11	2.88	0	0	0	0	3.8
Q12	3.85	3.18	3.89	3.87	3.20	3.91
Q13	0.68	3.98	3.9	0.68	4.0	3.92
Q14	3.99	3.99	0.01	0.10	0.08	3.97
Q15	3.97	0	0	3.98	0	0
Q16	0	0	5.88	0.78	0	4.9
Q17	0	0	5.88	0.5	0	5.77
Q19	0.89	0	0	0.83	0	0
Q21	0	0	3.99	0	0	3.99
Q22	0	0	0	0	0	0
Q23	3.92	0	0	-0.08	0.02	1.40
Q24	3.98	3.98	0.01	3.99	3.99	0.01
Q25	0	0	3.98	0	0	3.98
Q26	0	0	3.97	0	0	3.98
Q101	5.32	5.76	2.90	5.23	5.73	5.73
Q102	0.18	0.74	0.74	4.0	1.97	0
Q103	3.6	3.99	0	3.34	4.0	4.0
Q106	0	0	5.26	3.98	0	0
Q107	0	0	4.37	0	0	4.24
Q108	3.97	0	0	0	0	3.99
Q109	0	0	2.89	4	0	0
Q110	0	0	3.99	3.99	0	0
Q112	3.98	0	0	3.98	0	0
Q113	3.62	5.87	5.76	3.56	5.71	5.71
Q114	3.99	0	0	3.99	0	0
Q115	3.95	0	0	0	0	0
Q116	3.95	0	0	0	0	0

Ref.No	PART NAME	Q'ty	PART NO.
37	P.C.B MAIN	1	401-129-C
38	LCD DISPLAY	1	252-280-4
39	KEY "CH"	1	895-986
40	KEY "F"	1	895-987
41	SPEAKER MICRO	1	420-125-6Z
42	CAP DUST INTERCOM	1	895-985
43	FELT	1	907-101

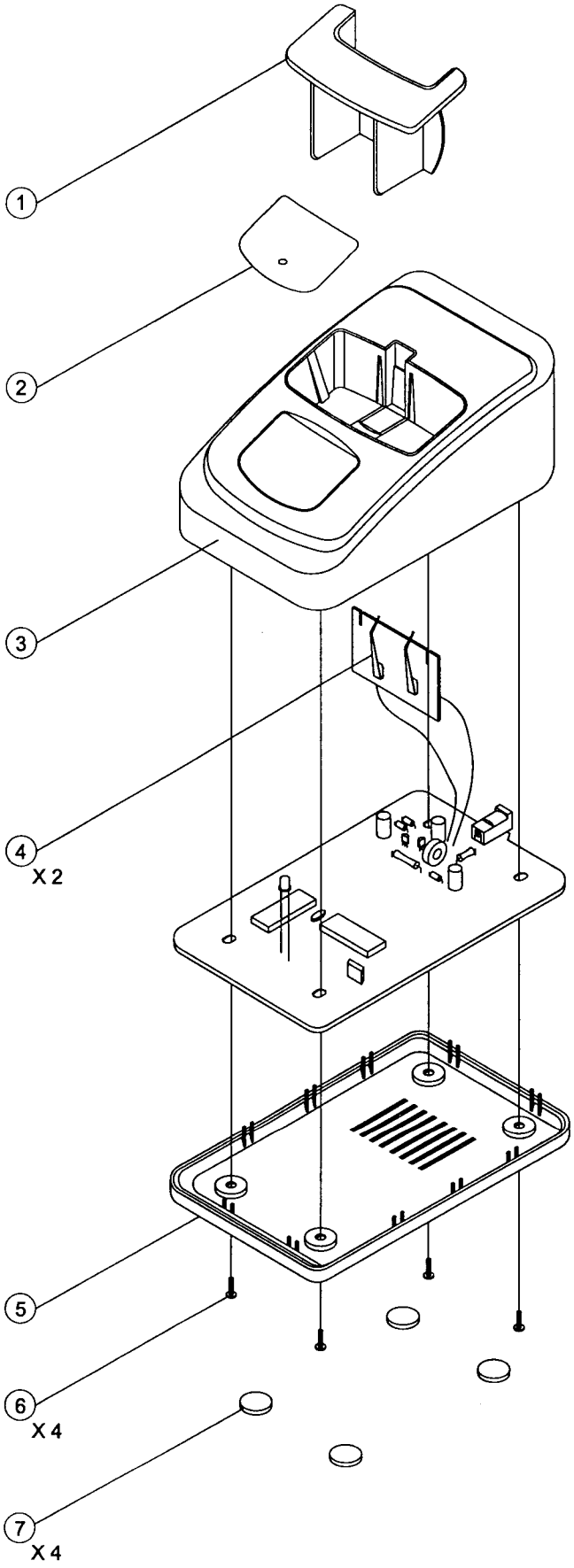
EXPLODED VIEW AND EXPLODED VIEW PART LIST

Ref.No	PART NAME	Q'ty	PART NO.
1	LCD LABEL	1	95B-031
2	LENS LCD	1	814-408
3	DOUBLE TAPE	1	907-175
4	LENS LED	1	814-407
5	UPPER COVER ASS'Y	1	518-002-A
6	CAP DUST	1	895-984
7	HOLDER ANT	1	733-023
8	SPRING ANT	1	881-695
9	ANT TUBE	1	753-210
10	BRACKET LCD	1	723-995
11	ZEBRA	1	895-989
12	REFLECTOR LCD	1	733-024
13	PTT DOME SWITCH	1	509-364
14	P.C.B PTT	1	401-882-A
15	VOLUME S/W	1	450-457-9
16	KNOB VOL	1	826-510
17	INSULATION PLATE	1	
18	TERMINAL "B"	1	753-150
19	KEY PTT	1	895-988
20	COVER BOTTOM	1	71A-040
21	(+) MACHINE SCREW (PH) M2.6X5	1	611-390
22	BELT CLIP	1	753-209
23	CONNECTOR(FOR BATT)	2	853-198
24	COVER BATT	1	71A-042
25	NAME LABEL	1	95A-997-C
26	(+) TAPPING SCREW (PH) T2.6X6	3	621-471
27	TERMINAL	2	753-167
28	TERMINAL "A"	2	753-149
29	KNOB LOCK	2	826-509
30	INSULATION PLATE	1	
31	SHIELD PLATE "B"	1	772-593
32	SHIELD CPU	1	772-615
33	SHIELD PLATE "A"	1	772-592
34	MOTOR VIBRATION	1	420-923-4Z
35	CH DOME ASS'Y	1	509-363

PART LIST

Seq	Part No.	Name & Description	Q'ty	Reference
1	538-75C-CA	CHG. COVER ASS'Y	1	
	017-028-4	METAL OXIDE RESISTOR 0.2 1/2W 5% ST	1	R23
	019-471-0	METAL OXIDE RESISTOR 470 2W 5% ST	1	R5
	101-124-5	ELECT CAPACITOR 100UF 25V 20% 6.3X11	3	C1, 12, 13
	111-009-8Z	MYLAR CAPACITOR 0.1UF 50V 10% S	1	C17
	218-016-0Z	TRANSISTOR KTC8550D	1	Q1
	221-737-6	I.C MCU MDT1005EP	1	IC1
	223-119-8	I.C KA78L05	1	U2
	223-157-2Z	I.C COMPARATORS KIA339P	1	U1
	243-019-7Z	DIODE 1N4148	1	D9
	245-015-3X	DIODE RECTIFIER 1N4004	2	D5, 10
	245-024-1	DIODE REC 1N5819	1	D2
	251-052-9Z	LED LAMP LTL-16KE RED 5V 100MW	1	D6
	270-131-8W	RESONATOR CERAMIC ZTA4.0MG	1	X1
	310-917-5Z	COIL CHOKE 300UH:RIC7-868888	1	L2
	420-782-3Y	DC POWER JACK KTC18-038-02	1	J1
	621-478	(+)TAPPING SCREW(BH) &2.6X14-2S BLK	4	
	71A-050	COVER UPPER ABS 94HB BLACK	1	
	719-716	COVER BOTTOM ABS 94HB L380-9001 BLK	1	
	733-025	HOLDER ABS 94HB BLACK	1	
	752-850-B	TERMINAL PBSP T0.3 NI-PLATING	0.5	
	795-883-A	OVERLAY LEXAN T0.25	1	
	894-105	FOOT &8XT1.6 RUBB. BLK STIC. 3M	4	
	95B-028	LABEL NAME (CHG.) POLYESTER 49.5X29.5	1	
2	538-75C-H	CHARGER ASS'Y	1	
	060-104-9Z	CHIP RESISTOR 100K 1/10W 5% T2012	1	R13
	060-105-0Z	CHIP RESISTOR 1M 1/10W 5% T2012	2	R9, 32
	060-151-1Z	CHIP RESISTOR 150 1/10W 5% T2012	1	R2
	060-152-2Z	CHIP RESISTOR 1.5K 1/10W 5% T2012	1	R11
	060-153-3Z	CHIP RESISTOR 15K 1/10W 5% T2012	1	R17
	060-203-5Z	CHIP RESISTOR 20K 1/10W 5% T2012	1	R19
	060-302-1Z	CHIP RESISTOR 3K 1/10W 5% T2012	1	R25
	060-303-2Z	CHIP RESISTOR 30K 1/10W 5% T2012	1	R16
	060-473-2Z	CHIP RESISTOR 47K 1/10W 5% T2012	4	R4, 21, 26, 34
	060-512-4Z	CHIP RESISTOR 5.1K 1/10W 5% T2012	2	R29, 30
	060-561-8Z	CHIP RESISTOR 560 1/10W 5% T2012	1	R6
	060-681-3Z	CHIP RESISTOR 680 1/10W 5% T2012	1	R8
	130-170-0Y	CHIP CERAMIC 0.1UF GRM40 Y5V104Z 25V PT	5	C2, 4, 6, 7, 8
	131-027-0Y	CHIP CERAMIC 100PF GRM40 COG101J 50V PT	1	C15
	132-710-8Y	CHIP CERAMIC 270PF GRM40 COG271J 50V PT	1	C9
	133-010-4Y	CHIP CERAMIC 30PF GRM40 COG300J 50V PT	2	C3, 5
	4A1-161-C	P.C.B ASS'Y 157X137X1.2 XPC-94VO 1/0	1	
	401-133-C	P.C.B MAIN 119X64X1.2 XPC-94VO 1/0	1	

EXPLODED VIEW AND EXPLODED VIEW PART LIST
(CHARGER)



No.	Part Number
1	733-025
2	795-883-A
3	71A-050
4	752-850-B
5	719-716
6	621-478
7	894-105

Seq	Part No.	Name & Description	Q'ty	Reference
	05D-104-6Z	CHIP RESISTOR 100K 1/16W 5% T 1005	17	R48, 54, 55, 138, 139, 141, 150, 155, 181, 208, 218, 901, 902, 903, 904, 915, 112
	05D-105-7Z	CHIP RESISTOR 1M 1/16W 5% T 1005	4	R109, 132, 152, 162
	05D-121-1Z	CHIP RESISTOR 120 1/16W 5% T 1005	1	R22
	05D-123-3Z	CHIP RESISTOR 12K 1/16W 5% T 1005	1	R108
	05D-124-4Z	CHIP RESISTOR 120K 1/16W 5% T 1005	4	R49, 184, 187, 192
	05D-152-9Z	CHIP RESISTOR 1.5K 1/16W 5% T 1005	2	R161, 225
	05D-153-0Z	CHIP RESISTOR 15K 1/16W 5% T 1005	5	R6, 89, 130, 170, 190
	05D-154-1Z	CHIP RESISTOR 150K 1/16W 5% T 1005	2	R10, 24
	05D-182-6Z	CHIP RESISTOR 1.8K 1/16W 5% T 1005	1	R77
	05D-183-7Z	CHIP RESISTOR 18K 1/16W 5% T 1005	1	R186
	05D-184-8Z	CHIP RESISTOR 180K 1/16W 5% T 1005	1	R76
	05D-203-2Z	CHIP RESISTOR 20K 1/16W 5% T 1005	1	R174
	05D-204-3Z	CHIP RESISTOR 200K 1/16W 5% T 1005	1	R180
	05D-220-7Z	CHIP RESISTOR 22 1/16W 5% T 1005	2	R34, 64
	05D-221-8Z	CHIP RESISTOR 220 1/16W 5% T 1005	5	R4, 12, 43, 57, 65
	05D-222-9Z	CHIP RESISTOR 2.2K 1/16W 5% T 1005	2	R106, 128
	05D-223-0Z	CHIP RESISTOR 22K 1/16W 5% T 1005	7	R40, 127, 148, 198, 200, 201, 219
	05D-224-1Z	CHIP RESISTOR 220K 1/16W 5% T 1005	15	R32, 53, 60, 121, 194, 905, 906, 907 908, 909, 910, 911, 912, 913, 914
	05D-272-4Z	CHIP RESISTOR 2.7K 1/16W 5% T 1005	4	R50, 51, 96, 97
	05D-273-5Z	CHIP RESISTOR 27K 1/16W 5% T 1005	1	R26
	05D-274-6Z	CHIP RESISTOR 270K 1/16W 5% T 1005	1	R185
	05D-275-7Z	CHIP RESISTOR 2.7M 1/16W 5% T 1005	1	R94
	05D-330-3Z	CHIP RESISTOR 33 1/16W 5% T 1005	1	R19
	05D-331-4Z	CHIP RESISTOR 330 1/16W 5% T 1005	1	R101
	05D-332-5Z	CHIP RESISTOR 3.3K 1/16W 5% T 1005	2	R11, 83
	05D-333-6Z	CHIP RESISTOR 33K 1/16W 5% T 1005	2	R137, 147
	05D-334-7Z	CHIP RESISTOR 330K 1/16W 5% T 1005	1	R193
	05D-362-2Z	CHIP RESISTOR 3.6K 1/16W 5% T 1005	1	R206
	05D-393-0Z	CHIP RESISTOR 39K 1/16W 5% T 1005	1	R13
	05D-394-1Z	CHIP RESISTOR 390K 1/16W 5% T 1005	1	R179
	05D-470-6Z	CHIP RESISTOR 47 1/16W 5% T 1005	3	R27, 35, 37
	05D-471-7Z	CHIP RESISTOR 470 1/16W 5% T 1005	3	R16, 33, 176
	05D-472-8Z	CHIP RESISTOR 4.7K 1/16W 5% T 1005	13	R3, 23, 41, 58, 59, 61, 62, 92, 93, 95, 154, 168, 223
	05D-473-9Z	CHIP RESISTOR 47K 1/16W 5% T 1005	11	R1, 14, 42, 46, 69, 71, 73, 118, 119, 149, 157
	05D-474-0Z	CHIP RESISTOR 470K 1/16W 5% T 1005	5	R70, 82, 102, 103, 145
	05D-512-1Z	CHIP RESISTOR 5.1K 1/16W 5% T 1005	6	R207, 920, 921, 922, 923, 924
	05D-514-3Z	CHIP RESISTOR 510K 1/16W 5% T 1005	1	R15
	05D-562-6Z	CHIP RESISTOR 5.6K 1/16W 5% T 1005	3	R39, 63, 140

Seq	Part No.	Name & Description	Q'ty	Reference
	401-887-C	P.C.B SUB 47X27X1.2 XPC-94VO 1/0	1	
3	538-75M-CA	MAIN COVER ASS'Y	1	
	611-390	(+)MACHINE SCREW (PH) M2.6X5 S=3.5 BLK	1	
	621-471	(+)TAPPING SCREW (PH) 2.6X6-2S BLK	3	
	71A-040	COVER BOTTOM ABS	1	
	71A-041	COVER UPPER ABS	1	
	71A-042	COVER BATT. ABS	1	
	723-995	BRACKET LCD SPTE T0.3	1	
	733-023	HOLDER ANT. ABS	1	
	733-024	REFLECTOR LCD PC CLEAR	1	
	753-149	TERMINAL "A" SUS304-3/4H T0.2	2	
	753-150	TERMINAL "B" SUS304-3/4H T0.2	1	
	753-167	TERMINAL SUS304-1/4H T0.2	2	
	753-209	BELT CLIP PC BLACK	1	
	753-210	ANT. YUBE URETHANE	1	
	772-592	SHIELD PLATE A NSP T0.2	1	
	772-593	SHIELD PALTE B NSP T0.2	1	
	772-615	CHIELD CPU SPTE T0.3	1	
	814-407	LENS LED PC CLEAR	1	
	814-408	LENS LCD PC CLEAR	1	
	826-509	KNOB LOCK PC	1	
	826-510	KNOB VOL ABS	1	
	853-198	CONNECTOR(FOR BATT) C3604 NI-PLATE	2	
	881-695	SPRING ANT SWP &0.8	1	
	894-533-A	HOLDER BUZZER(RT) &5X&12XT3 CR BLK STICKER	1	STICK UP. COV. AT C-MIC AREA
	895-984	CAP DUST NBR	1	
	895-985	CAP DUST INTERCOM NBR	1	
	895-986	KEY "CH" SILICONE RUBBER	1	
	895-987	KEY "F" SILICONE RUBBER	1	
	895-988	KEY PTT SILICONE RUBBER	1	
	895-989	ZEBRA SILICONE RUBBER	1	
	896-044	CUSHION(VOL. S/W) EVA SPONGE T2.0	1	
	907-175	DOUBLE TAPE 3M 9448HK T0.16	1	
	95A-997-C	LABEL NAME POLYESTER 29X23	1	
	95B-031	LABEL LCD PVC CLEAR 35X32.5	1	
	538-75M-PA	MAIN PCB AUTO ASS'Y	1	
	05D-000-5Z	CHIP RESISTOR 0 1/16W 5% T 1005	7	R79, 110, 115, 222, 31, 916, C147
	05D-100-2Z	CHIP RESISTOR 10 1/16W 5% T 1005	9	R30, 38, 67, 123, 129, 159, 160, 173, 189
	05D-101-3Z	CHIP RESISTOR 100 1/16W 5% T 1005	6	R2, 7, 47, 136, 196, 215
	05D-102-4Z	CHIP RESISTOR 1K 1/16W 5% T 1005	5	R8, 9, 72, 143, 144
	05D-103-5Z	CHIP RESISTOR 10K 1/16W 5% T 1005	13	R20, 21, 28, 44, 45, 75, 81, 98, 104, 125, 156, 172, 195

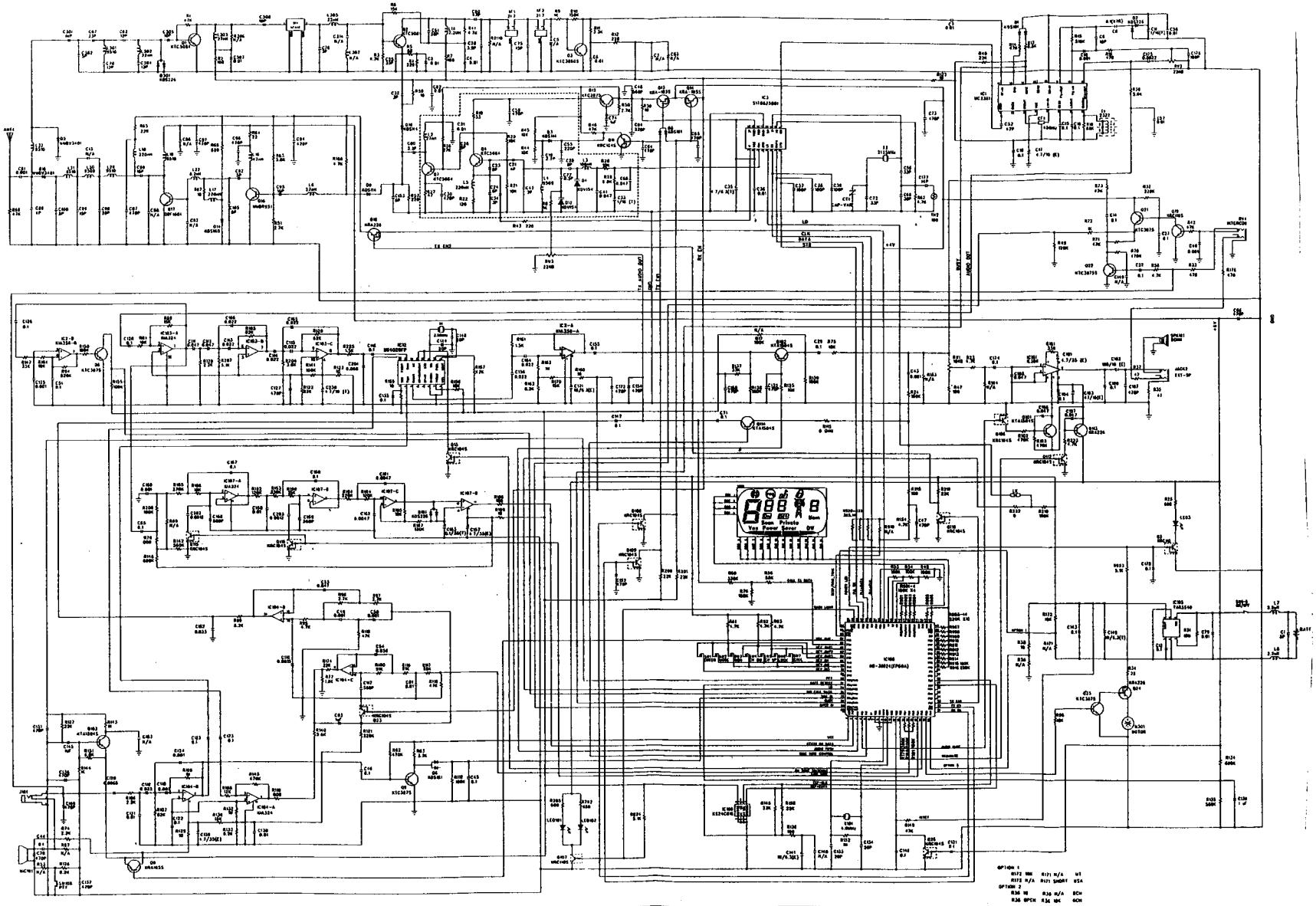
Seq	Part No.	Name & Description	Q'ty	Reference
	132-288-1X	CHIP CERAMIC 220PF CLO5C221JBNC	2	C55, 84
	132-749-4X	CHIP CERAMIC 2.7PF CLO5C2R7CBNC	1	C19
	133-110-1X	CHIP CERAMIC 3PF CLO5C030CBNC	2	C32, 34
	133-365-5X	CHIP CERAMIC 3.3PF CLO5C0R0CBNC	1	C80
	133-366-6X	CHIP CERAMIC 33PF CLO5C330JBNC	3	C25, 56, 67
	133-367-7Y	CHIP CERAMIC 330PF GRM36 X7R331K 50V	1	C124
	133-941-8X	CHIP CERAMIC 3.9PF CLO5C3R9CBNC	1	C28
	133-942-9X	CHIP CERAMIC 39PF CLO5C390JBNC	1	C69
	134-018-7X	CHIP CERAMIC 4PF CLO5C040CBNC	2	C21, 89
	134-779-1X	CHIP CERAMIC 47PF CLO5C470JBNC	2	C52, 60
	134-785-6X	CHIP CERAMIC 470PF CLO5B471KBNC	22	C30, 47, 59, 64, 65, 66, 73, 78, 87, 96, 97, 107, 127, 132, 136, 137, 150, 151, 152, 154, 172, 199
	135-023-6X	CHIP CERAMIC 5PF CLO5C050CBNC	3	C1, 92, 302
	135-652-4X	CHIP CERAMIC 56PF CLO5C560JBNC	1	C72
	135-656-8X	CHIP CERAMIC 560PF CLO5B561KBNC	4	C48, 117, 159, 168
	136-018-7X	CHIP CERAMIC 6PF CLO5C060DBNC	2	C24, 153
	137-017-1X	CHIP CERAMIC 7PF CLO5C070DBNC	1	C100
	138-014-3X	CHIP CERAMIC 8PF CLO5C080DBNC	4	C20, 23, 26, 105
	140-108-8	CHIP TANTALUM 0.1UF TCM1VR10AS#R 35V	1	C163
	141-036-1Z	CHIP TANTALUM 1UF 293D105X0016A2T 16V	2	C11, 33
	141-059-2	CHIP TANTALUM 10UF 293D106X06R3A2T 6.3V	1	C142
	144-722-2Z	CHIP TANTALUM 4.7UF 293D475X0010A2T 10V	2	C35, 230
	172-015-6W	DIP TRIMMER 20PF CVN620	1	CT1
	200-067-3Z	TRANSISTOR KTC5084(0)	4	Q1, 2, 4, 7
	200-082-8	TRANSISTOR KRA226S (SOT-23)	3	Q10, 24, 113
	200-272-1	TRANSISTOR POWER DRF1601	1	Q17
	202-082-6	TRANSISTOR KTA1504ST1(G)	4	Q101, 102, 103, 104
	202-095-8Z	TRANSISTOR KRC104SND	12	Q11, 15, 18, 23, 26, 106, 108, 109, 110, 112, 115, 116
	202-096-9	BRT KRC110S NK	3	Q5, 19, 107
	202-112-0	TRANSISTOR KTC3875S (GR)	6	Q6, 9, 12, 21, 22, 25
	202-153-7	TRANSISTOR KTC3880SY	1	Q3
	202-155-9	TRANSISTOR KRA105S	3	Q8, 13, 14
	203-181-7Z	TRANSISTOR PBR951	1	Q16
	220-110-4	I.C OP AMP KIA358F	1	IC2
	220-366-9Z	I.C PLL S1T8825B01-ROBO	1	IC3
	221-234-8	I.C GNOK-M64026FP-650	1	IC12
	221-372-9	I.C EEPROM S3C524C20D11	1	IC108
	221-373-0Z	I.C VOLT. REGULATOR TAR5S40	1	IC105
	221-493-5	I.C LOW VOLT. AUDIO IL386D	1	IC101
	221-739-8	I.C MCU HD64338024A23W	1	IC106
	222-018-5A	I.C KIA324F-EL	3	IC103, 4, 7

Seq	Part No.	Name & Description	Q'ty	Reference
	05D-564-8Z	CHIP RESISTOR 560K 1/16W 5% T 1005	2	R135, 142
	05D-623-8Z	CHIP RESISTOR 62K 1/16W 5% T 1005	1	R120
	05D-680-9Z	CHIP RESISTOR 68 1/16W 5% T 1005	1	R5
	05D-681-0Z	CHIP RESISTOR 680 1/16W 5% T 1005	3	R25, 202, 205
	05D-682-1Z	CHIP RESISTOR 6.8K 1/16W 5% T 1005	2	R29, 151
	05D-683-2Z	CHIP RESISTOR 68K 1/16W 5% T 1005	3	R18, 56, 117
	05D-684-3Z	CHIP RESISTOR 680K 1/16W 5% T 1005	2	R134, 146
	05D-821-0Z	CHIP RESISTOR 820 1/16W 5% T 1005	1	R66
	05D-822-1Z	CHIP RESISTOR 8.2K 1/16W 5% T 1005	5	R74, 99, 126, 133, 163
	05D-823-2Z	CHIP RESISTOR 82K 1/16W 5% T 1005	3	R105, 107, 122
	05D-913-0Z	CHIP RESISTOR 91K 1/16W 5% T 1005	2	R100, 116
	075-223-1	RES. CHIP TRIMMER 22K RHO3E1CJ4X	2	RV2, 3
	097-101-0	THERMISTOR 100 NTCG163EH101J	1	TH2
	130-B12-1X	CHIP CERAMIC 0.001UF CLO5B102KBNC	8	C10, 40, 43, 49, 50, 91, 118, 169
	130-B13-2X	CHIP CERAMIC 0.0012UF CLO5B122KBNC	2	C202, 203
	130-B14-3X	CHIP CERAMIC 0.0015UF CLO5B152KBNC	1	C110
	130-B16-5X	CHIP CERAMIC 0.01UF CLO5B103KONC	15	C2, 4, 6, 7, 31, 36, 57, 58, 79, 81, 82, 121, 138, 158, 307
	130-B36-3C	CHIP CERAMIC 0.1UF CLO5B104KPNC	34	C8, 12, 14, 15, 16, 18, 22, 27, 29, 44, 45, 46, 51, 71, 85, 104, 109, 116, 122, 123, 126, 128, 131, 135, 143, 146, 155, 160, 167, 173, 74, 178, 125, 94
	130-286-9X	CHIP CERAMIC 0.0022UF CLO5B222KBNC	1	C175
	130-289-2Y	CHIP CERAMIC 0.022UF GRM36 Y5V223Z 25V	8	C113, 114, 115, 119, 156, 164, 165, 166
	130-365-0X	CHIP CERAMIC 0.033UF CLO5B333KPNC	1	C182
	130-447-1X	CHIP CERAMIC 0.0047UF CLO5B472KBNC	2	C161, 162
	130-454-7X	CHIP CERAMIC 0.047UF CLO5B473KPNC	8	C41, 53, 58, 106, 108, 111, 112, 197
	130-525-8X	CHIP CERAMIC 0.5PF CLO5COR5CBNC	1	C77
	130-533-5Y	CHIP CERAMIC 0.056UF GRM36 X7R563K 16V	1	C54
	130-622-2	CHIP CERAMIC 0.068UF GRM36 Y5V683K 16V PT	1	C201
	130-629-9X	CHIP CERAMIC 0.0068UF CLO5B682KBNC	1	C120
	131-092-8Y	CHIP CERAMIC 10PF GRM39 COG100D 50V PT	1	C177
	131-129-9X	CHIP CERAMIC 100PF CLO5C101JBNC	4	C37, 38, 39, 176
	131-135-4Y	CHIP CERAMIC 1UF GRM39 Y5V105Z 10V	4	C74, 83, 130, 145
	131-256-4X	CHIP CERAMIC 12PF CLO5C120JBNC	3	C62, 70, 304
	131-405-8Y	CHIP CERAMIC 14PF GRM39 COG140J 50V PT	1	C301
	131-584-6X	CHIP CERAMIC 15PF CLO5C150JBNC	3	C75, 99, 305
	131-608-5X	CHIP CERAMIC 16PF CLO5C160JBNC	3	C90, 95, 76
	131-851-7X	CHIP CERAMIC 18PF CLO5C180JBNC	1	C9
	132-033-0X	CHIP CERAMIC 2PF CLO5C020CBNC	1	C42
	132-034-1X	CHIP CERAMIC 20PF CLO5C200JBNC	7	C61, 98, 133, 134, 144, 148, 308

Seq	Part No.	Name & Description	Q'ty	Reference
6	538-75P-A	PACKING ASS'Y	1	
	420-514-2Z	BATTERY (RECHARGEABLE) H-AAAA600BX4 600MA 4.8V	1	
	503-337	ADAPTOR AC/DC AC230V 50HZ DC12V 600MA	1	
	732-750-B	HAND STRAP NYLON BLK	1	
	91D-196	BOX GIFT SW1 "E" 229(W)X210(D)X62(H)	1	
	91D-197	PAD SW1 "E" 468(W)X366(D)	1	
	91D-200	BOX OUT SW1 "E" 229(W)X210(D)X62(H)	0.017	
	920-505-E	POLYBAG P.E 50X50XT0.05	1	
	921-020-E	POLYBAG P.E 100X200XT0.05	2	
	921-520-E	POLYBAG P.E 150X200XT0.05	1	
	937-735	MANUAL OWNER'S MANUAL OWNER'S	1	
	943-816A	CARD DESTRIBUTOR WOOD FREE PAPER 124X89	1	
	943-830	CARD INSTALL BATT. ART PAPER 41X47.5	1	INSERT TO BATT HOUSING
	95A-691	SENSOR LABEL PVC 44X18	1	
	95A-692	CHECK POINT LABEL POLYESTER 42X38	1	
7	538-75U-P	UPPER COVER ASS'Y	1	
	420-125-6Z	SPEAKER MICRO 8OHM 0.5W 28MM YD28-1B	1	SPK101
8	538-75W-CH	WIRE CHA. MODEL MT900	1	
	427-041-2	WIRE 1007 AWG 26 (7/0.16) BLK	0.1	B- ---- B- 0.5:0.5
	427-043-4	WIRE 1007 AWG 26 (7/0.16) RED	0.1	B+ ---- B+ 0.5:0.5
9	538-75W-MP	WIRE MAIN PCB ASS'Y	1	
	427-188-2	WIRE VINYL 080D (7/0.12) BLK	0.085	MP-B --- BATT(-) 0.2:0.2
	427-190-3	WIRE VINYL 080D (7/0.12) RED	0.085	MP+B --- BATT(+) 0.2:0.2
	427-192-5	WIRE VINYL 080D (7/0.12) YEL	0.75	MP SPK(+) --- SPK(+) 0.2:0.2
	427-193-6	WIRE VINYL 080D (7/0.12) GRN	0.75	MP SPK(-) --- SPK(-) 0.2:0.2

Seq	Part No.	Name & Description	Q'ty	Reference
	223-116-5Z	I.C IF S1T3361D01	1	IC1
	242-022-4Z	DIODE KDV154	2	D4, 12
	243-012-0	DIODE MMBV3401LT1	2	D5, 16
	243-049-4Z	DIODE CHIP KDS226	3	D2, 101, 301
	243-063-6	DIODE SWTCHING KDS181S A3	3	D1, 6, 8
	243-080-1Z	DIODE KDS114	3	D3, 9, 10
	243-104-0	DIODE KDS160	1	D14
	251-290-7	LED LAMP CHIP KPA-3010SGC	2	LED101, 102
	251-310-2	BACK LIGHT KPA-3010SRC RED	1	LED3
	311-269-8	COIL CHIP 8.2NH HK16088N2J-T	1	L22
	311-306-8Z	COIL CHIP 22NH CIH10T22NJNC	1	L305
	311-324-4Z	COIL CHIP 27NH CIH10T27NJNC	4	L2, 6, 16, 303
	311-376-1Z	COIL CHIP 220NH CIL10NR22KNC	3	L5, 17, 18
	311-377-2Z	COIL CHIP 100NH CIH10TR10JNC	1	L3
	311-951-0X	COIL SPRING 1X0.3X5T:R	1	L302
	311-991-6	CHIP INDUCTOR 2.2UH (CIL10T2R2JNC)	3	L7, 8, 14
	4A1-157-C	P.C.B ASS'Y 203.5X124.8X1.0 FR4 2/S	1	
	401-129-C	P.C.B MAIN 49.3X96X1.0 FR4 2/S	1	
	401-882-A	P.C.B PTT 34X13.9X1.0 FR4 2/S	1	
	401-883-A	P.C.B VOLUME 14.3X11.3X1.0 FR4 2/S	1	
5	538-75M-PM	MAIN PCB MANUAL ASS'Y	1	
'	101-A17-2Z	ELECT CAPACITOR 10UF 6.3V 20% 3X5	2	C141, 171
	101-053-4Z	CAPACITOR ELECT 100UF 10V SMS(M):5X11	2	C17, 102
	104-745-1	ELECT CAPACITOR 4.7UF 35V 20% 4X7	3	C101, 139, 157
	104-820-5	ELECT CAPACITOR 47UF 6.3V 4X7	1	C103
	252-280-4	LCD DISPLAY TCM-3119	1	LCD1
	263-468-5	CRYSTAL OSCILLATOR 21.25MHZ	1	X3
	263-471-7	CRYSTAL OSCILLATOR 4M 30PPM 20PF	1	X101
	270-065-2X	RESONATOR CERAMIC ZTA 3.587MG	1	X1
	270-352-1	FILTER CERAMIC LTM450HTU	1	CF1
	271-193-9Z	FILTER SAW HDF446B	1	SF1
	271-220-0Y	FILTER CRYSTAL UM-5-21T7B	2	XF1, 2
	311-950-9	COIL SPRING 1.0X0.3X4T:R	2	L4, 30
	311-951-0X	COIL SPRING 1X0.3X5T:R	5	L19, 29, 31, 32, 301
	320-232-2W	COIL IFT 455KHZ	1	T1
	420-274-1Z	MIC CONDENSER EM-54L-P	1	MIC101
	420-806-2V	JACK EXT SPK SKJS-3501S	1	JACK2
	420-807-3W	JACK EXT MIC SKJS-2501S	1	JACK1
	420-857-8	JACK PHONE SKJS-3515S	1	JACK3
	420-923-4Z	MOTOR VIBRATOR QX6C01	1	M301
	450-457-9	VOLUME A10K:SJ093VS 17-5SK	1	RV1
	509-363	DOM KEY ASS'Y(CHANNEL KEY) SKDS-52001MA	1	CHANNEL KEY
	509-364	DOM KEY ASSY(PTT KEY) SKDS-52001MB	1	PTT KEY

SCHEMATIC DIAGRAM



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