

# TM-V7A/E

## SERVICE MANUAL

# KENWOOD

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# TM-V7A/E

## CIRCUIT DESCRIPTION

### Outline

This device is a dual-band 144/430MHz FM car transceiver planned and designed for amateur radio communications and has the following features.

1. The use of a full dot matrix green LCD display and LED light sources (green LEDs + color conversion filters) has improved the visual verification, operability, and functionality. This also improves the lifespan compared to illumination with conventional light bulbs. Display can be switched between negative and positive.
2. The main unit is 40x140 mm. The detachable operation panel is 51.5x105 mm.
3. Maximum 280 channel memory (180 channels in memory name registration mode)
4. Top surface and front surface heat dispersion structure
5. Built-in CTCSS functions with 38 different selectable tones
6. New personal computer interface function added to 9600-bps data terminal
7. Functions can be controlled with received DTMF signals.
8. Visual scan functions/independently operable 4-channel PM function/key name switch function

### List of Destinations

Model		Guarantee frequency range (MHz)		Output power (W)	
		144	430	144	430
TM-V7A	K	144 ~ 148	438 ~ 450	50	35
	M2		430 ~ 440		
	M3				
TM-V7E	E	144 ~ 146	430 ~ 440	50	35
	E3				

### Accessories

Parts name	Parts No.	Q'ty	Destination
Warranty card	—	1	K, E, E3
Instruction manual	—	—	all
DC cord	E30-2111-15	1	all
Fuse (15A)	F51-0017-05	1	all
Microphone	T91-0396-05	1	M2, E, E3
Microphone (DTMF)	T91-0568-05	1	K, M3
Mobile bracket	J29-0632-03	1	all
Screw set	N99-0331-05	1	all

### Units for Each Model and Destination

Model		TX-RX UNIT (A/3, B/3, C/3)	LCD ASSY
TM-V7A	K	X57-5230-11 *(X57-5270-11)	B38-0772-XX
	M2	X57-5230-22 *(X57-5270-22)	
	M3		
TM-V7E	E	X57-5232-71 *(X57-5272-71)	
	E3		

\*( ) Singapore made

## CIRCUIT DESCRIPTION

### Frequency Configuration

The TM-V7A/E has separate VHF band and UHF band PLL and intermediate frequency units, so simultaneous 2-band reception is possible. There is also a VHF sub-receiver for receiving VHF band signals with the UHF section and UHF sub-receiver for receiving UHF band signals with the VHF section.

The 144MHz band receiver is mixed down with the first local oscillation 182.85 to 184.845MHz (E), 182.85 to 186.845MHz (K, M) to form the first intermediate frequency of 38.85MHz. It is further mixed down with the second local oscillation 38.4MHz to obtain the second intermediate frequency of 450kHz.

The 430MHz band receiver is mixed down with the first local oscillation 384.95 to 394.945MHz (M, E), 392.95 to 404.945MHz (K) to form the first intermediate frequency of 45.505MHz. It is further mixed down with the second local oscillation 45.505MHz to obtain the second intermediate frequency of 455kHz.

The 144MHz sub-band receiver is mixed down with the first local oscillation 189.05 to 191.045MHz (E), 189.05 to 193.045MHz (K, M) to form the first intermediate frequency of 45.05MHz. This output is input to the UHF receiver No.2 intermediate frequency section to obtain 455kHz.

The 430MHz sub-band receiver is mixed down with the first local oscillation 391.15 to 401.145 MHz (M, E), 399.15 to 411.145MHz (K) to form the first intermediate frequency of 38.85MHz. This output is input to the VHF receiver No.2 intermediate frequency section to obtain the second local frequency of 450kHz.

Thus, the 144MHz band and 430MHz band receivers and sub-receivers all use double conversion.

The 144MHz band and 430MHz band transmitters both have a PLL circuit with direct frequency division and direct oscillation and amplify as is with a straight amp and transmit. The main circuits are used to transmit signals even if a sub-band is being used.

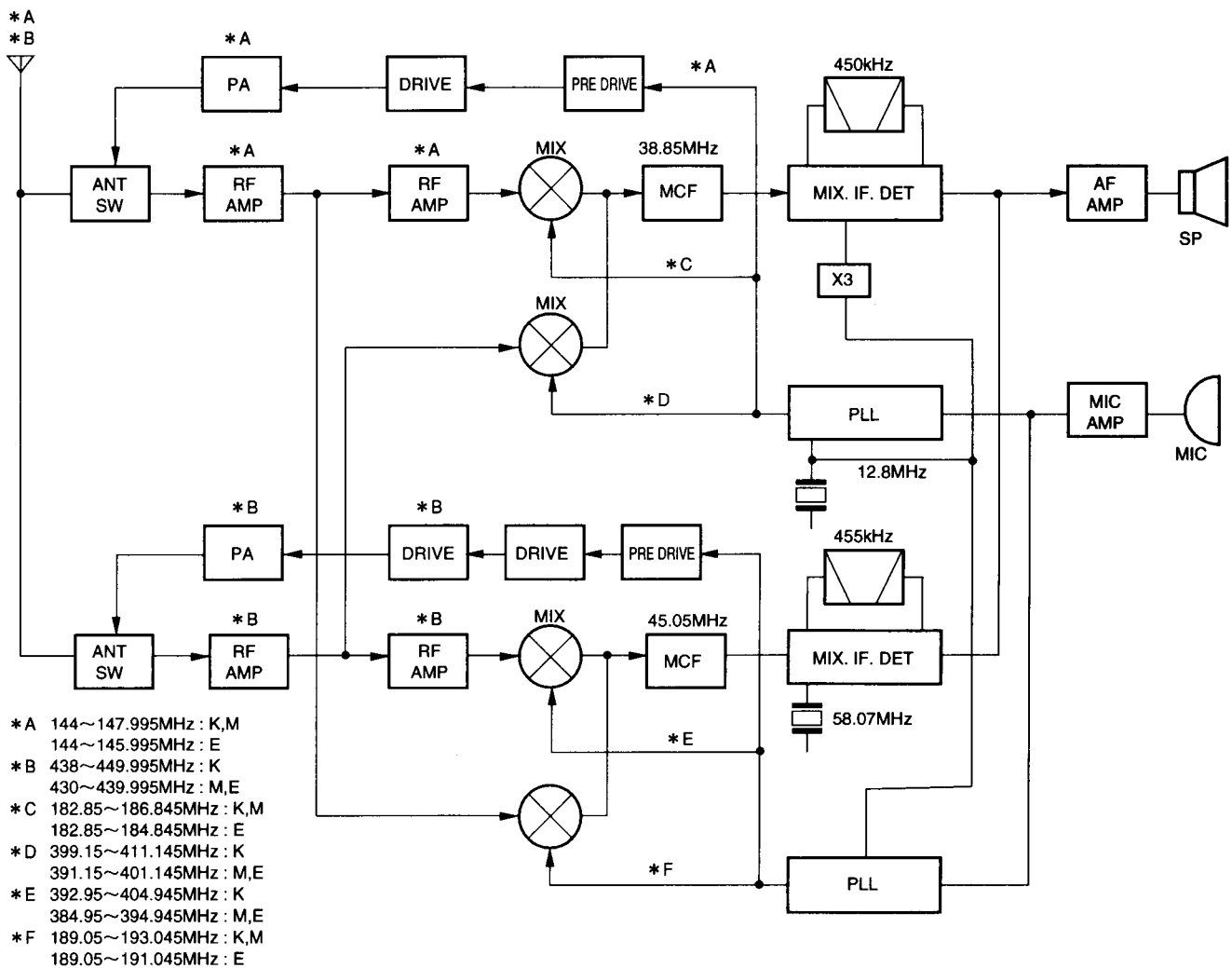


Fig.1 Frequency configuration

## CIRCUIT DESCRIPTION

### 144MHz Band Transmit Circuit

#### ●Outline

The transmitter directly oscillates the target frequency and directly frequency modulation is applied with a variable-capacity diode.

#### ●Modulation circuit

In the control unit, the audio signals are amplified and limited and passed through a splatter filter, then mixed with subtones from the microprocessor, and directly frequency modulated by a VCO (IC10) with a variable-capacity diode.

#### ●Younger stage circuit

The signals from the PLL unit are input to the drive circuit. Q56 and Q61 carry out stable amplification over a broad band without regulation and can obtain adequate output to drive the final module.

#### ●APC circuit

The automatic transmission output control circuit (APC) uses a differential amplifier circuit (IC16) to compare and amplify the reference voltage that forms the CPU PWM output and the DC voltage that detects part of the transmission power with diodes (VHF: D41 and D42; UHF: D37 and D39) and for that output controls the DB voltage with a preamp (Q67) and control transistor (Q66) and holds the transmission output constant.

### 430MHz Band Transmit Circuit

#### ●Outline

The transmitter directly oscillates the target frequency and directly frequency modulation is applied with a variable-capacity diode.

#### ●Modulation circuit

In the control unit, the audio signals are amplified and limited and passed through a splatter filter, then mixed with subtones from the microprocessor, and directly frequency modulated by a VCO (IC12) with a variable-capacity diode.

#### ●Younger stage circuit

The signals from the PLL unit are input to the drive circuit. Q53, Q57, and Q60 carry out stable amplification over a broad band without regulation and can obtain adequate output to drive the final module.

Six sets of PWM data, high-, medium-, and low-power each for VHF and UHF are stored into EEPROM memory (IC512) and for each power condition, the data is extracted from the EEPROM to control the power.

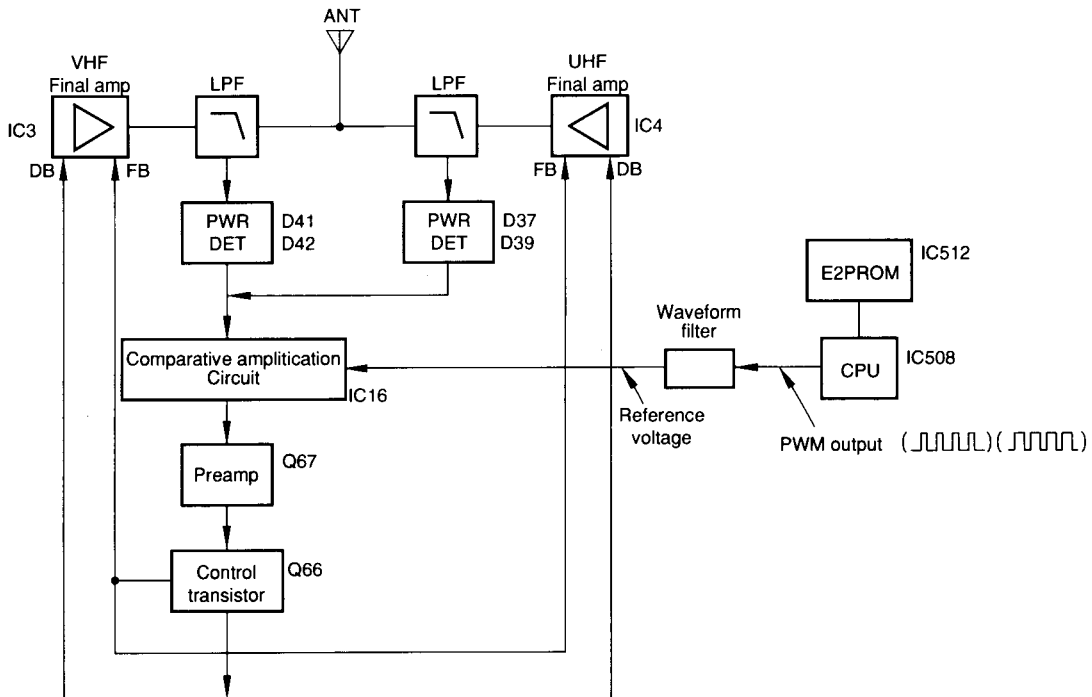


Fig.2 APC circuit

## CIRCUIT DESCRIPTION

### 144MHz Band Reception Circuit

After the 144MHz antenna input signals pass through the final section antenna switching diode, they go through the front section matching coil, are amplified with the GaAs field effect transistor, go through a divider, and are amplified with a single-stage junction field effect transistor. The unwanted signal is eliminated with a band pass filter made up of a 3-stage variable-capacity diode chain and the result goes to the first mixer. In the first mixer, the signals are mixed with the first local signal from the PLL and converted to the first intermediate frequency signal of 38.85MHz, then the unwanted proximate signal is eliminated in the 2-stage MCF.

The first intermediate frequency signal is amplified and input to the FM intermediate frequency (IC13). This intermediate frequency signal is mixed with the second local oscillator frequency of 38.4MHz to make the second intermediate frequency of 450kHz and after the unwanted proximate signal is eliminated with an FM ceramic filter, the signal is input to IC13 again. Here, second intermediate frequency amplification and detection are carried out to form the audio signal.

#### ●S meter circuit

The FM intermediate frequency IC13 S meter output voltage is connected to the control unit and A/D converted by the CPU to drive the LCD bar meter.

Item	Rating
Center Frequency	38.85MHz
Pass band width	±7.5kHz or more at 3dB
Attenuation band width	±25kHz or less at 36dB ±45kHz or less at 58dB
Guaranteed attenuation	80dB or more within Fo - (±1000kHz) (Spurious:40dB or more within ±1MHz)
Ripple	1dB or less
Insertion loss	3dB or less
Termination impedance	550Ω ±10%、2.5pF ±0.5pF

Table1 MCF(L71-0482-05) (TX-RX Unit XF1)

Item	Rating
Norminal center frequency	450kHz
6dB band width	±6.0kHz or more (from 450kHz)
50dB band width	±15.0kHz or more (from 450kHz)
Ripple	3dB or less (within 450±5kHz)
Insertion loss	6dB or less (at minimum lost point)
Guaranteed attenuation	35dB or more (within 450±100kHz)
I/O matching terminating impedance	

Table2 Ceramic filter(L72-0931-05)  
(TX-RX Unit CF1)

### 430MHz Band Reception Circuit

After the 430MHz antenna input signals pass through the final section antenna switching diode, they go through the front section matching coil, are amplified with the GaAs field effect transistor, go through a divider, go through a SAW filter to eliminate the unwanted signal and the result is input to the first mixer. Here, the signals are mixed with the first local signal from the PLL and converted to the first intermediate frequency signal of 45.05MHz, then the unwanted proximate signal is eliminated in the 2-stage MCF.

The first intermediate frequency signal is one-stage amplified and input to the FM intermediate frequency (IC15). This intermediate frequency signal is mixed with the second local oscillator frequency of 45.505MHz to make the second intermediate frequency of 455kHz and after the unwanted proximate signal is eliminated with an FM ceramic filter, second intermediate frequency amplification and detection are carried out to form the audio signal.

#### ●S meter circuit

The FM intermediate frequency IC15 S meter output voltage is connected to the control unit microprocessor and A/D converted by the CPU to drive the S meter.

Item	Rating
Center Frequency	45.050MHz
Pass band width	±7.5kHz or more at 3dB
Attenuation band width	±35kHz or less at 40dB
Guaranteed attenuation	80dB or more within Fo - (890~930kHz) (Spurious:40dB or more within ±1MHz)
Ripple	1dB or less
Insertion loss	4dB or less
Termination impedance	800Ω ±10%、2pF±0.5pF

Table3 MCF(L71-0481-05) (TX-RX Unit XF2)

Item	Rating
Norminal center frequency	455kHz
6dB band width	±6.0kHz or more (from 455kHz)
50dB band width	±12.5kHz or less (from 455kHz)
Ripple	3dB or less (within 455±5kHz)
Insertion loss	6dB or less (at maximum output point)
Guaranteed attenuation	35dB or more (within 455±100kHz)
I/O matching terminating impedance	2.0kΩ

Table4 Ceramic filter(L72-0366-05)  
(TX-RX Unit CF2)

## CIRCUIT DESCRIPTION

### 144MHz Sub-Band Reception Circuit

The signals input from the antenna first go into the 144MHz band main reception front end section. After they are amplified with a GaAs field effect transistor (Q11), the divider circuit divides them into two systems, the 144MHz main section and the 144MHz sub-section, and they are connected to the 430MHz band sub-receiver circuit. In the sub-receiver circuit, first the unwanted component is

eliminated with a filter circuit, then the signals are mixed with the first local oscillator by a field effect transistor (Q44) to convert them to the first intermediate frequency of 45.05MHz. After these signals are connected to the main 430MHz band circuit, the 144MHz sub-reception is carried out using the main circuit.

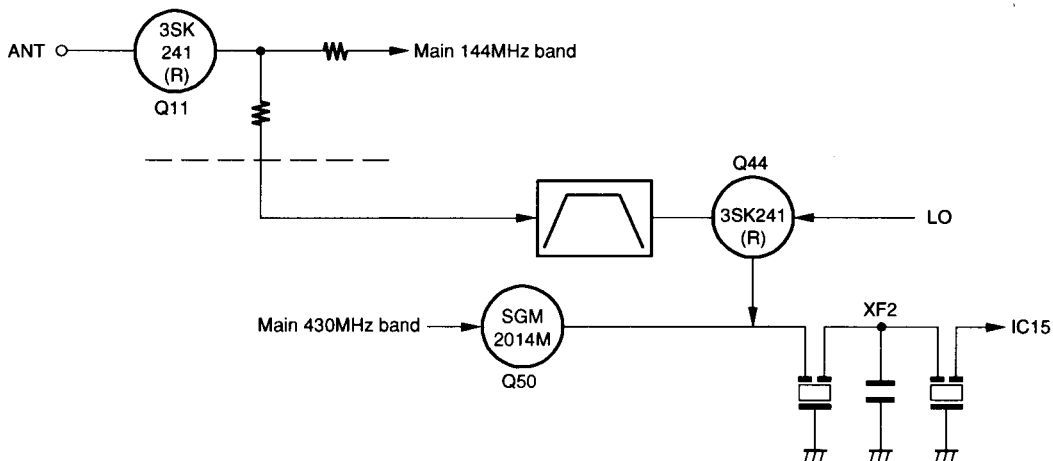


Fig.3 144MHz sub band receive circuit block diagram

### 430MHz Sub-Band Reception Circuit

430MHz band signals can be received with the 144MHz unit. First, the reception signals entering from the antenna pass through the 430MHz unit final section antenna switching diode, go through the matching coil, and are amplified by Q23, a GaAs field effect transistor. The amplified reception signals go through the divider, have the

unwanted signal eliminated by a band pass filter, and go into the first mixer. In the first mixer, the signals are mixed with the first local signal from the PLL, are converted to the first intermediate frequency of 38.85MHz, then are received with the same operations as for the 144MHz band.

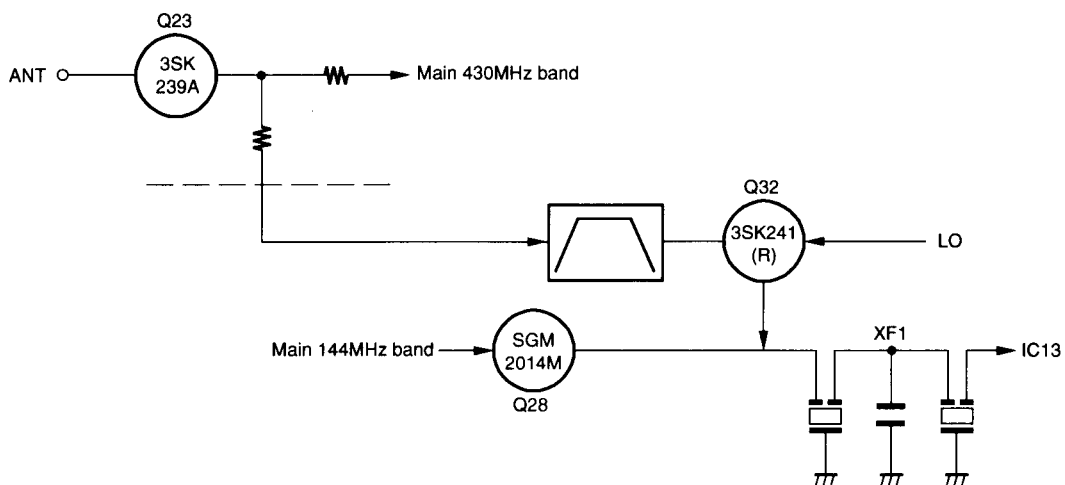


Fig.4 430MHz sub band receive circuit block diagram

## CIRCUIT DESCRIPTION

### Squelch Circuit

The squelch control angle is read into the panel section microprocessor and converted from analog to 6-bit digital. For adjustment mode, on the main unit side, the threshold level signal is received and the SQ voltages (SQV and SQU) at that time are stored into the microprocessor. The

microprocessor calculates the squelch release voltage using this voltage as the reference. This voltage and the panel section squelch control voltage are compared and the squelch switched on and off.

### Shift Register Circuits

The TX-RX units have two shift registers (IC19 and IC20: BU2090FS) and carry out the control below.

#### ●IC19 Control

Pin No.	Name	Function
1	Vss	GND
2	DATA	Serial data input
3	CLOCK	Clock
4	VRX	144 8RSW
5	UTX	430 8TSW
6	VTX	144 8TSW
7	AM2	AGC control
8	AM1	AGC control
9	V14RSW	144 band reception power control
10	V43RSW	Sub 430 band reception power control
11	VRX	430 8RSW
12		
13	U43RSW	430 band reception power control
14		
15	U14RSW	Sub 144 band reception power control
16	VDD	5V

#### ●IC20 Control

Pin No.	Name	Function
1	Vss	GND
2	DATA	Serial data input
3	CLOCK	Clock
4		
5	AM SW	AM switching
6		
7		
8	USHIFT	UHF VCO shift
9	FAN	Fan control
10	VPLL	VCO high-speed lock (VHF)
11	VSHIFT	VHF VCO shift
12	AGC	AGC switch
13	VAIP	VHF AIP switch
14	UAIP	UHF AIP switch
15	UPLL	VCO high-speed lock (UHF)
16	VDD	5V

## CIRCUIT DESCRIPTION

### Unlock Circuit

The signal whose phase has been compared from the PLL ICs (IC6 and IC7: MB1511PFV-GBND) is output, goes through the waveform circuit, and is input to the microprocessor. If the level after waveforming is low, the microprocessor judges this to be the unlock signal and does

not transmit and does not send the transmission signals to the shift registers. The microprocessor also generates the beep to announce the unlocking. Unlocking is announced in the same manner for reception too.

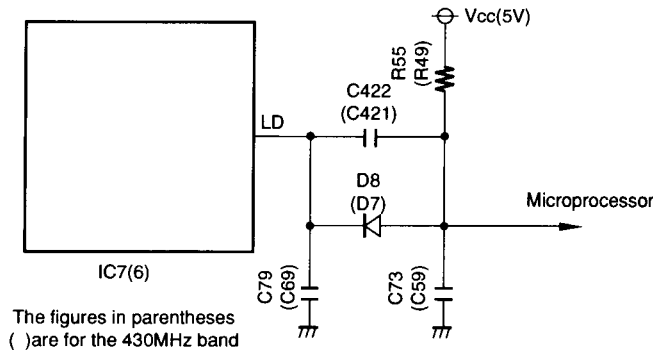


Fig.5 Unlock circuit

### AF Signal System

The RAV and RAU detection signals for the 144MHz band and the 430MHz band and the VO signal from the audio composite unit are converted to beep signals by the cross point switch (IC503: JLC1555F), the level is adjusted by the electronic control (IC504: MB87032APFGBND), the result goes into the cross point switch (IC503) again, goes through the speaker switching circuit, and is output to the power amp and headphone jack.

For DTSS operation, the signals are output from ANO1 of the microprocessor as the monitor. These signals are switched by the cross point switch (IC503) and are input to the electronic control (IC504). While the beep signal is output from the microprocessor, audio signals for each band are muted by the cross point switch (IC503) with the serial data from the microprocessor (IC508).

### ● Beep circuit and mute circuit

When a key is pressed, the beep is output from P32 of the microprocessor (IC508).

The signals output from the electronic control (IC504) go into the cross point switch (IC503) again, go through the audio output mute circuit (Q8 and Q9), and are input to the speaker switching circuit. The data transmission from the microprocessor to the electronic control (IC504) is the same as for the TM-733A/E.

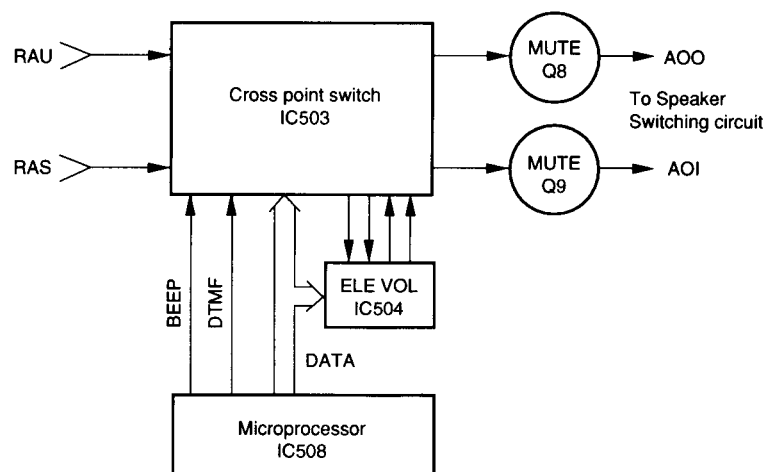


Fig.6 AF Block diagram



## CIRCUIT DESCRIPTION

### Digital Control Circuit

The digital control section controls each function with one microprocessor (IC508) and comprises the subtone signal, DTMF encode and DTMF decode circuit (IC506), the electronic control circuit (IC504), and the analog signal select cross point switch (IC503 and IC510) circuit. The reset and backup circuits, mic amp circuit, and microphone key input circuit are also included in the control unit.

### Panel and Control Unit Data Communications

Figure 7 shows the control unit data communication circuits. SI is the serial data in and SO is the serial data out. There is an inverter for protecting the microprocessor board.

Data communication is asynchronous, with a communications speed of 3125 bps. The control unit side microprocessor checks the connection once every 0.5 second and if the connection is NG twice in a row, in other words if the panel section is removed for more than one second, the power is cut off.

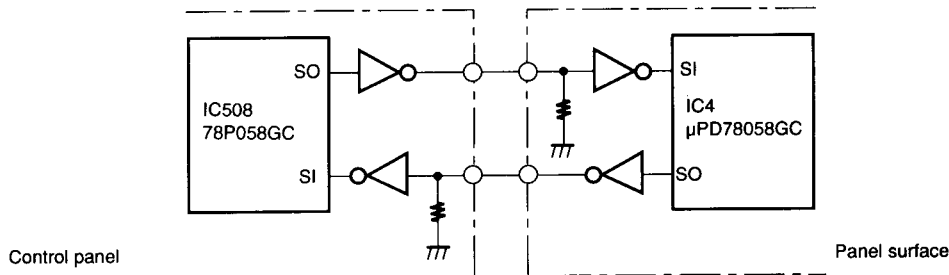


Fig.7 Panel, control unit data communications circuit

### Speaker Switching Circuit

There are two speaker jacks, J1 and J2. The AF signals can be output in various combinations matching the internal speakers.

When no external speaker is connected to J1, Pins 10 and 11 of the multiplexer (IC18: XBU4053BCF) go low, the AF signals AO 0 and AO 1 from the control unit are added and input to the power amp (IC1: LA4446).

When an external speaker is connected to J1, Pins 10 and 11 of the multiplexer (IC18) go high and AO 0 and AO 1 are input separately to the power amp.

The AF signal output combinations are as in the speaker combination cable on the right.

	AO0	AO1
Internal speakers only	Internal speaker	
1 external speaker (J2)	external speaker	
1 external speaker (J1)	Internal speaker	external speaker
2 external speaker	external speaker	external speaker

Speaker combination table

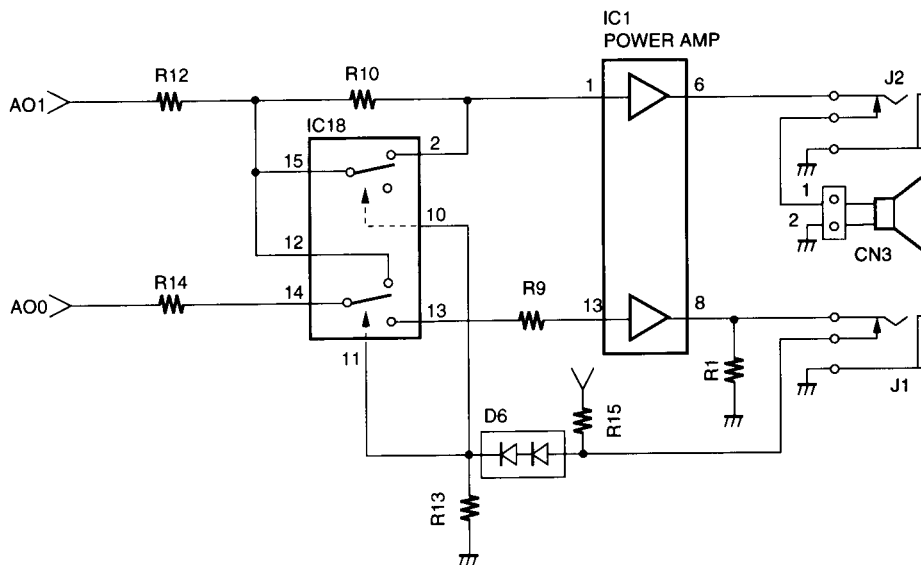


Fig.8 Speaker switching circuit

## CIRCUIT DESCRIPTION

### Tone Output Circuit

The tone signals (38 waves within 67.0 to 250.3Hz) are output from ANO0 of the microprocessor (IC408) analog output board.

### DTMF Encode/Decode Circuit

#### ●DTMF encode circuit

The DTMF signals are output from ANO1 of the microprocessor (IC508) analog output board.

#### ●DTMF decode signals

The reception signals, the DTMF signals from a mic with DTMF (M2, E, E3 : optional), go into the DTMF decoder IC (IC506: LC73881M). When a valid tone pair is detected, STD of the DTMF decoder IC (IC506) goes high. This is input to the P56 port of the microprocessor (IC508), the serial clock is output from P54 of the microprocessor (IC508) to the DTMF decoder IC (IC506), and the serial data is sent to the P55 port of the microprocessor.

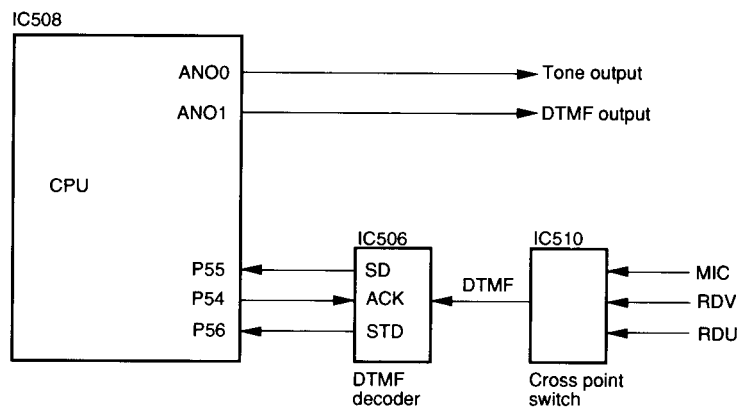


Fig.9 DTMF encode/decode circuit

### Analog Signal Switching Circuit

Cross point switches (IC503 and IC510: JLC1555F) are used for AF system signal switching and RD system signal switching. These cross point switches use serial data from the microprocessor to switch analog switches arrayed in a matrix.

Audio signal switching is carried out by a cross point switch (IC503). The destination for input from MIC RD, DTMF RD, and CTCSS RD is switched to either the 144-MHz band or the 430-MHz band by a cross point switch (IC510).

#### ●AF system signal switching

##### (IC503SW No. 16, 17, 20, and 21)

These switches (shown in Tables 5 and 6) output the 144MHz AF signals and 430MHz AF signals from the electrode control to either AO0 or AO1.

When SW No16 is ON, AO0- 430MHz	AF external SP output
When SW No21 is ON, AO1- 144MHz	AF internal SP output
When SW No20 is ON, AO0- 144MHz	AF external SP output
When SW No17 is ON, AO1- 430MHz	AF internal SP output

Table5

#### ●Beep output switching (IC503SW No. 6 and 7)

These switches output the Beep signal from the microprocessor (IC508) to either RIN or LIN of the electronic control (IC504: MB87032APFGBND) and to the corresponding band 144 MHz or 430 MHz. (See Tables 6 and 7.)

#### ●DTMF output switching (IC503SW No. 2 and 3)

These switches output the DTMF signals from the microprocessor (IC508) to either RIN or LIN of the electronic control (IC504) and to the corresponding band 144 MHz or 430 MHz. (See Table 6.)

## CIRCUIT DESCRIPTION

### ●IC503

SW No.	SW name	Function
0	Not used (Always set to OFF)	
1	Not used (Always set to OFF)	
2	Controls the DTMF monitor sound (430)	"L" : OFF "H" : During monitor output
3	Controls the DTMF monitor sound (144)	"L" : OFF "H" : During monitor output
4	Not used (Always set to OFF)	
5	Not used (Always set to OFF)	
6	Controls the BEEP monitor sound (430)	"L" : OFF "H" : During BEEP output
7	Controls the BEEP monitor sound (144)	"L" : OFF "H" : During BEEP output
8	Not used (Always set to OFF)	
9	Not used (Always set to OFF)	
10	During BEEP output AF MUTE (430)	"L" : MUTE "H" : OFF
11	Not used (Always set to OFF)	

SW No.	SW name	Function
12	Not used (Always set to OFF)	
13	Not used (Always set to OFF)	
14	Not used (Always set to OFF)	
15	During BEEP output AF MUTE (144)	"L" : MUTE "H" : OFF
16	External speaker output control (430)	"L" : OFF "H" : Output
17	Internal speaker output control (430)	"L" : OFF "H" : Output
18	Not used (Always set to OFF)	
19	Not used (Always set to OFF)	
20	External speaker output control (144)	"L" : OFF "H" : Output
21	Internal speaker output control (144)	"L" : OFF "H" : Output
22	Not used (Always set to OFF)	
23	Not used (Always set to OFF)	

Table6

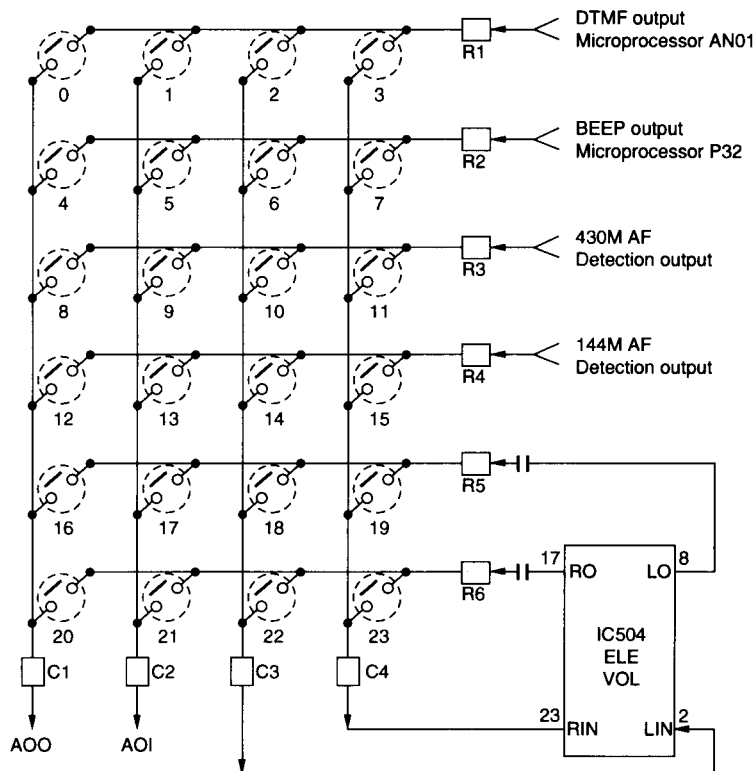


Fig.10 Cross point switch(AF system) (IC503)

## CIRCUIT DESCRIPTION

### ●DTMF MIC/RD switching (IC510 SW NO. 22 and 23)

These switch the input to the DTMF decoder (IC506: LC73881M) between DTMF signals including detection signals and DTMF signals from the mic.

### ●MIC RD144/430MHz band switching (IC510 SW No. 4 and 5)

These switch the signals output to RD of the MIC terminal to either RDU or RDS.

### ●DTMF RD 144/430MHz band switching (IC407 SW No. 16 and 17)

These switch the input to the DTMF decoder (IC506: LC73881M) to either RDU or RDS. After going through this circuit, the signals go through DTMF MIC/RD and are input to the DTMF decoder (IC506: LC73881M). When a busy detection signal (PSCU or PSCS) enters the microprocessor (IC508), the band for which the signal was detected is switched to when DTSS PAG ON. If a busy signal is detected for both bands at the same time, the band detected last is switched to.

### ●CTCSS RD 144/430MHz band switching (IC510 SW No. 0 and 1)

These switch the input to the CTCSS decoding IC (IC507:AK2343) to either RDV or RDU. When a busy signal (P SCU or P SCS) enters the microprocessor (IC508), that band is switched to when CTCSS is on. When both bands are busy, the circuit is switched every 500 ms.

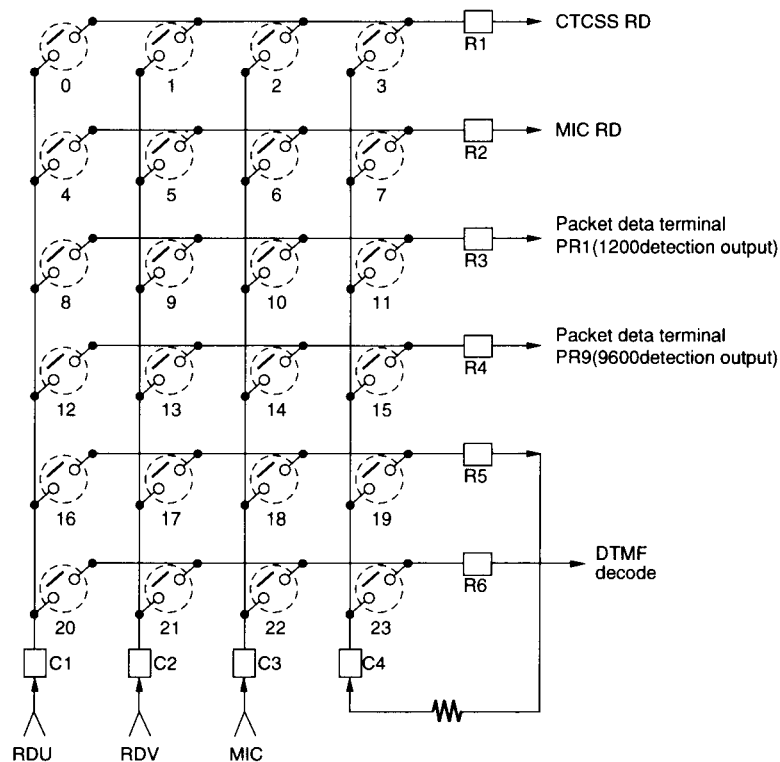


Fig.11 Cross point switch (RD system)

## CIRCUIT DESCRIPTION

### ●IC407 (RD system)

SW No.	SW name	Function
0	CTCSS decoder input	"L" : OFF "H" : RDV connection
1	CTCSS decoder input	"L" : OFF "H" : RDU connection
2	Not used (Always set to OFF)	
3	Not used (Always set to OFF)	
4	MIC RDV squelch control	"L" : CLOSE "H" : BUSY
5	MIC RDU squelch control	"L" : CLOSE "H" : BUSY
6	Not used (Always set to OFF)	
7	Not used (Always set to OFF)	
8	MIC RDV squelch control	"L" : CLOSE "H" : BUSY
9	MIC RDU squelch control	"L" : CLOSE "H" : BUSY
10	Not used (Always set to OFF)	
11	Not used (Always set to OFF)	

SW No.	SW名	機能
12	PTT BAND RDV control	"L" : Transmit band is 430 "H" : Transmit band is 144
13	PTT BAND RDU control	"L" : Transmit band is 144 "H" : Transmit band is 430
14	Not used (Always set to OFF)	
15	Not used (Always set to OFF)	
16	DTMF decoder input	"L" : OFF "H" : RDV connection
17	DTMF decoder input	"L" : OFF "H" : RDV connection
18	Not used (Always set to OFF)	
19	Not used (Always set to OFF)	
20	Not used (Always set to OFF)	
21	Not used (Always set to OFF)	
22	DTMF decoder switching input	"L" : RD input "H" : MIC input
23	DTMF decoder switching input	"L" : RD input "H" : MIC input

Table7

### Data Terminal and Peripheral Circuits

J402 (data terminal) is the data communications terminal on the front. It handles transmission control, data input/output, and squelch signals.

There are two data communications modes: 9600bps mode and 1200bps mode. 9600bps mode communications are GMSK and G3RUH packet communications. Unlike with 1200bps AFSK, with this type of high-speed modulation, frequency modulation is carried out after the

digital base band signals (rectangular wave) are passed through a band limiting filter. For 9600bps GMSK for example, compared to 4800Hz signals (nearly sine wave signals passed through a filter), these signals have a hissing sound like digital modulation when listened to by ear. Different types of modulation, such as GMSK and G3RUH, are distinguished by the type of band limiting filter.

### ●Transmission signals

Transmission modulation signals enter from PKD of the data terminals (J501). The path to the modulation depends on whether communications are 9600bps mode or not.

These paths are shown as ①, ②, and ③ in Figure 12. When PKS of the data terminals (J402) is low, the path switches to ① and ②. When PTT is active, the path switches to ③. The modulation input levels etc. are in Table 8. For 9600bps mode, the frequency shift depends on the input signal level, so there is an amplitude limiting circuit to hold the signal below 4 Vp-p to avoid extreme shifts.

The amplitude of the PKD signal from the data terminals (J402) is limited by D506 and D507.

Thanks to this circuit, the PKD signal does not go above 4 Vp-p and the frequency shift does not fluctuate extremely.

Pin No.	Pin name	Specification		
		bps switching	1200bps	9600bps
1	PKD	Modulation input	40mVp-p	2Vp-p
		Frequency shift	3±0.5kHz	2.2±0.5kHz
4	PR9	Output level 500mVp-p/10kΩ Always output during reception		
5	PR1	Output level 500mVp-p/10kΩ Not output when squelch off		

Table8 DATA terminal input/output level

### ●Reception signals

PR9 is the 9600bps data communications reception output. It outputs the FM detection circuit output (RD signals) through a buffer amp (Q506: 2SC4738 (GR)). These signals are always output whether the squelch is open or closed.

PR1 is the 1200bps data communications reception output. It outputs the FM detection circuit output (RDT signals) through a buffer amp (Q508: 2SC4738 (GR)). These signals are always output whether the squelch is open or closed.

## CIRCUIT DESCRIPTION

### ● Squelch signal output circuit

This is the squelch output input to the TNC in order to prevent collisions in packet communications. The logic is as shown in Table 9. This is digital transistor output pulled up to 5V.

SQC terminal output (J402 pin 6)	L:SQ CLOSE H:SQ BUSY
-------------------------------------	-------------------------

Table9

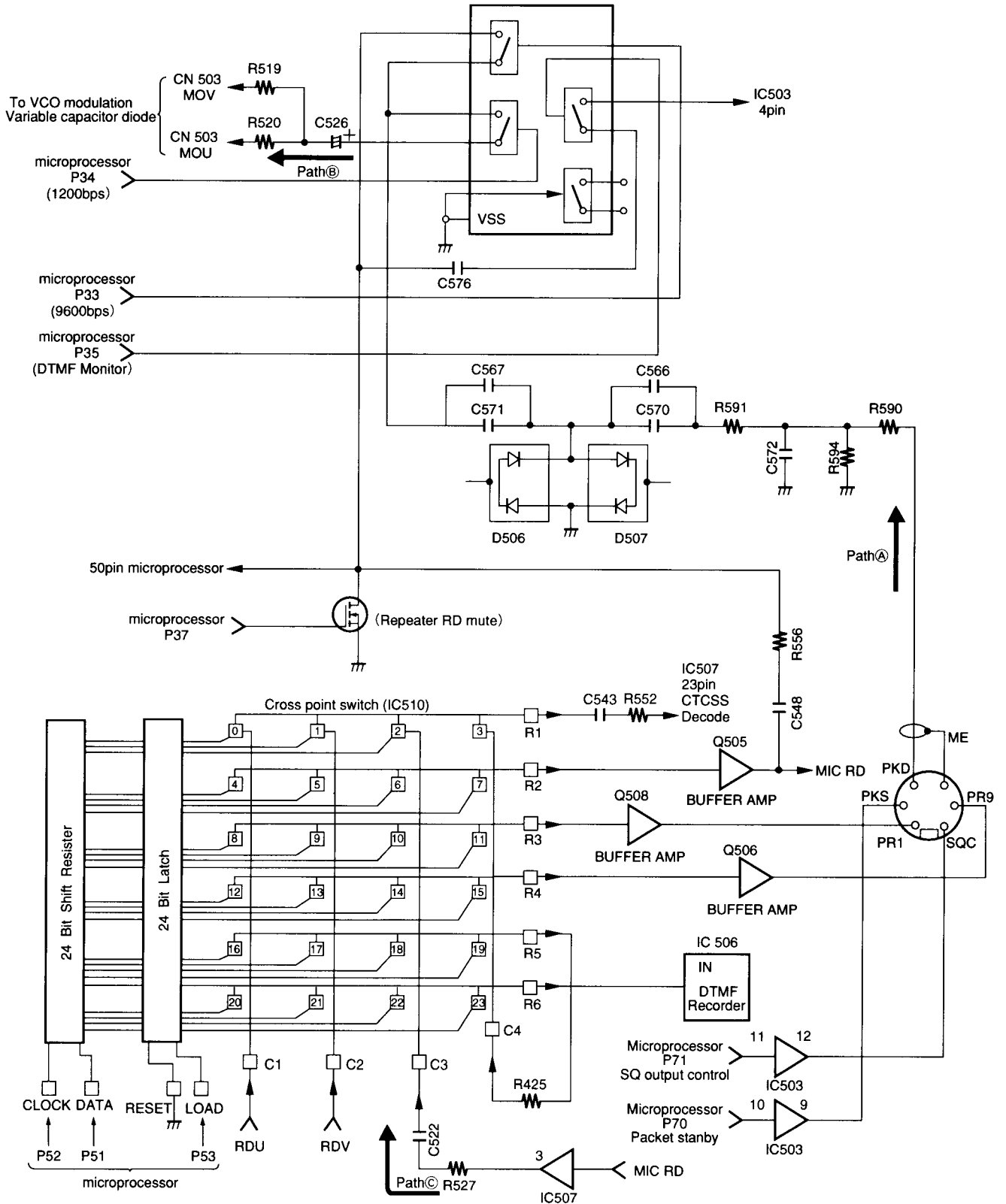


Fig.12 DATA terminal and peripheral circuit

## CIRCUIT DESCRIPTION

### Reset and Backup Circuits

When power is supplied to the set, the reset circuit generates a delay in the reset IC (IC505: PST9130NR) and the delay signal is input to the reset terminal of the main unit microprocessor to carry out a power ON reset. When the power voltage drops, the voltage is detected and the reset signal is generated.

The reset switch circuit resets the main unit microprocessor when the reset switch (S501) is pressed. After the reset operations are carried out, the microprocessor goes to

look at the RSTSW port. If the switch is released within 1 second (if the RSTSW port is low), the operations are the same as for an ALL reset (MR + power ON). The RSTSW port is normally low. The backup circuit detects any voltage drop in the power supply voltage 13.8V line and sets INTO of the microprocessor high, causing the microprocessor to send the backup data to the EEPROM (IC512) and go into STOP mode to reduce power consumption.

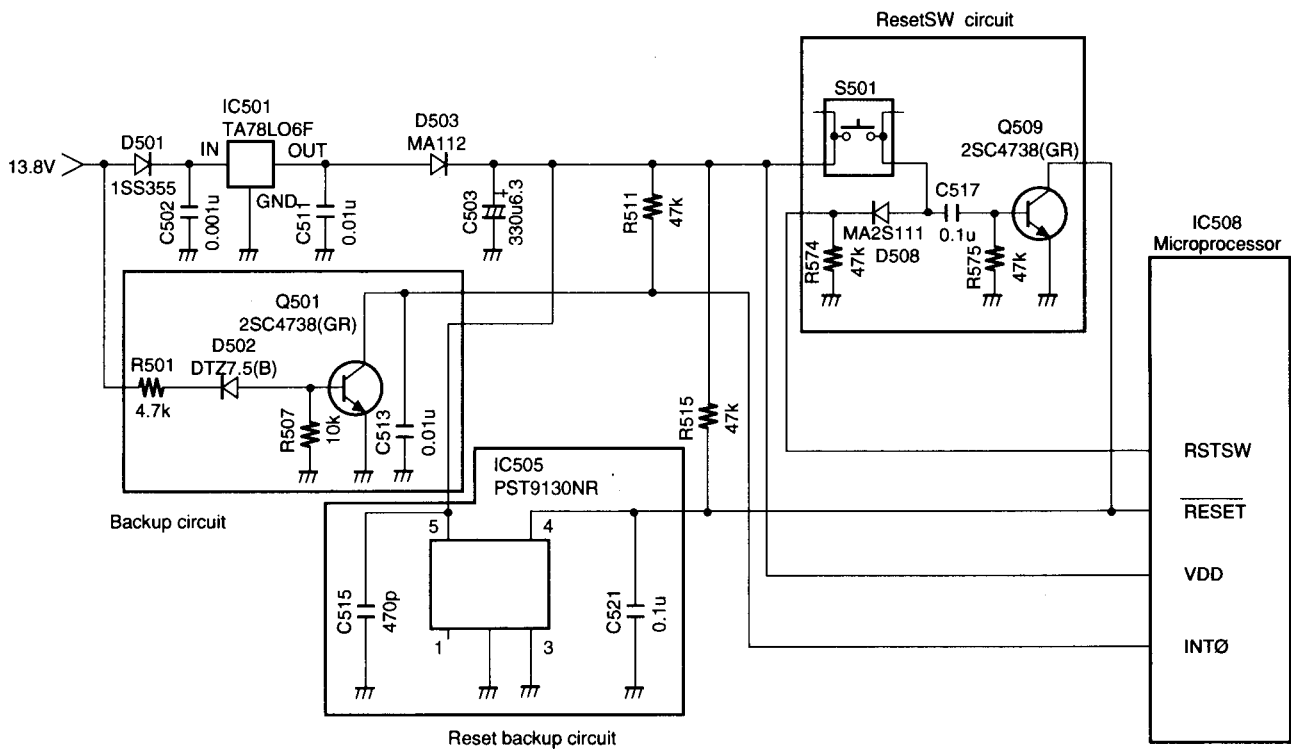


Fig.13 Reset backup circuit

## CIRCUIT DESCRIPTION

### Mic Amp Circuit

The audio signals from the microphone are impedance matched and enter AK2343 (IC507). AK2343 comprises a 2-stage amp, mute circuit, band pass filter circuit, limiter circuit, and splatter filter circuit. It provides the audio signal amplification and preemphasis characteristic. The mute circuit is used while transmitting DTMF signals and the like

from the microprocessor and during data transmission from the packet terminal. The modulation circuits are directly connected with the VCO variable-capacity diode for both the 144MHz band and the 430MHz band and apply frequency modulation.

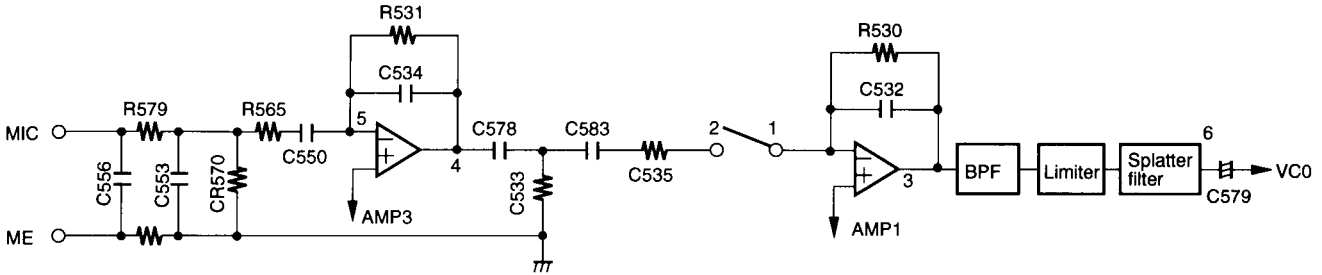


Fig.14 Mic amp circuit (IC507:AK2343)

### Microphone Key Input

The microphone UP/DOWN and function keys are connected to the microprocessor analog input. The voltage when a key is ON operates the corresponding function. Also, the key input interrupt circuit is for switching the power ON/OFF with the microphone. When the DOWN, MR, and

PF keys are pressed, an interrupt is generated and the microprocessor is awoken from stop mode. However, with the TM-V7A/E, the power key is on the microphone, so the set is designed to switch on the main unit power only when the PF key is pressed and other interrupts are ignored.

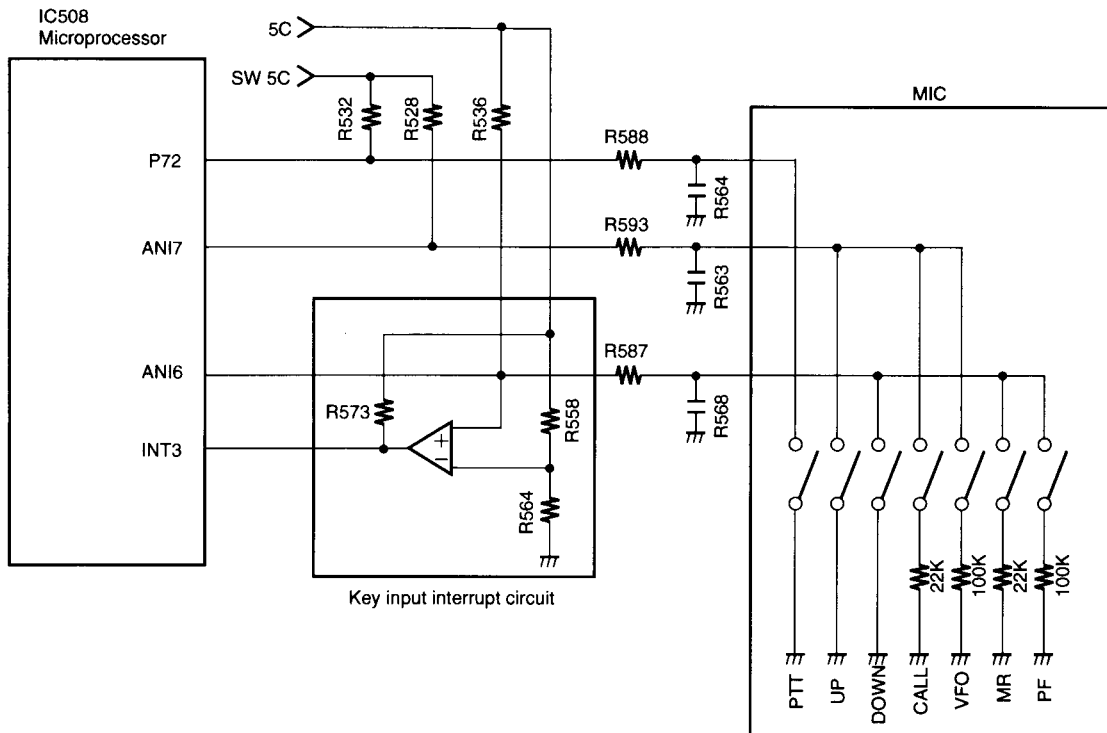


Fig.15 Microphone key input circuit



## CIRCUIT DESCRIPTION

### Panel Section (LCD ASSY: B38-0772-15)

The panel section controls serial communications with the main unit control section, the key input circuit, the display circuit, and the dimmer circuit through the microprocessor (IC4).

#### ●Serial communications circuit

A buffer is inserted in order to protect the microprocessor ports.

#### ●Key input circuit

There is one microprocessor port for each panel section key. The PSW key is pulled down and the other keys are pulled up with software within the microprocessor. The rotary encoder is input directly to the microprocessor.

#### ●Display circuit

The TM-V7A/E display section is a 152x45-dot full-dot matrix LCD controlled by two LCD. As shown in Figure 16, the master IC (IC5) side is connected to 32 common dots and 80 segment dots and the slave IC (IC6) side is connected to 13 common dots and 72 segment dots. The LCD drive voltage is obtained by raising the power supply voltage (5V) within the IC. Also, the contrast level (LEBEL8) for resetting is adjusted with R19 to be optimum.

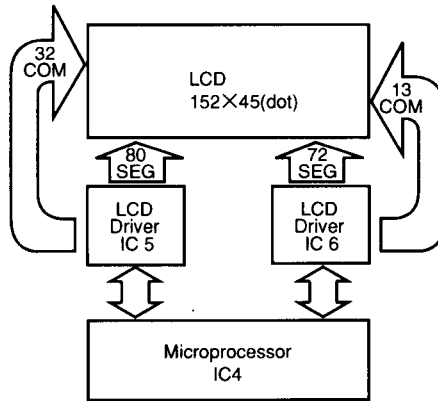


Fig.16 Display circuit

#### ●Dimmer circuit

The dimmer circuit switches the lamp brightness to one of four levels or OFF. (See Table 10.) The current flowing to the LEDs is varied by selecting resistors from R55 to R58.

Dimmer level	P60	P61	P62	P63
1	H	L	L	L
2	L	H	L	L
3	L	L	H	L
4	L	L	L	H
OFF	L	L	L	L

Table10 Port logic

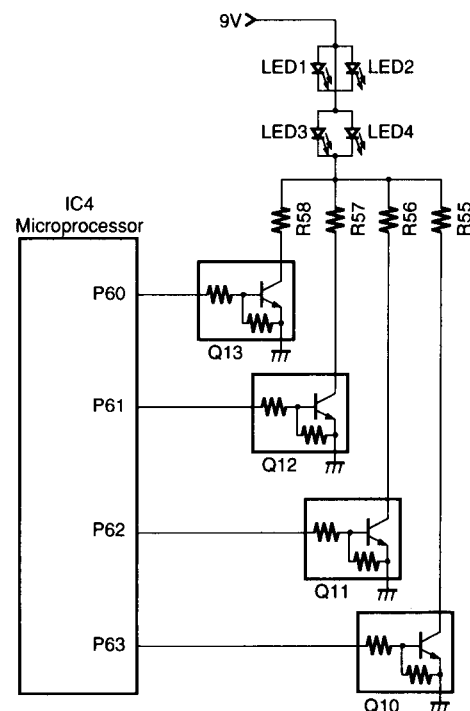


Fig.17 Dimmer circuit

## CIRCUIT DESCRIPTION

### ●144MHz band PLL synthesizer section

The VCO section is in the shielding case and the PLL section is on the TX-RX board. The 12.8MHz reference oscillator (X1) is oscillated with the PLL IC (IC7). The 5kHz and 6.25kHz reference frequencies are obtained by frequency dividing this signal. Part of the 12.8MHz oscillation output is also supplied to the 430MHz PLL circuit through a buffer amp.

5kHz, 10kHz, 15kHz, 20kHz, 12.5kHz, 25kHz, and 50kHz step PLL synthesizers are configured through phase

comparison with the reference frequencies obtained by frequency dividing X2. For VHF-band reception, oscillation is 182.85 to 184.845MHz (E), 182.85 to 186.845MHz (K, M) and for transmission, oscillation is 144.00 to 145.995MHz (E), 144.00 to 147.995MHz (K, M). For UHF-band sub-reception, oscillation is 195.575 to 200.5725 MHz (M, E), 199.575 to 205.5725MHz (K) using double the VCO oscillation frequency as the local frequency.

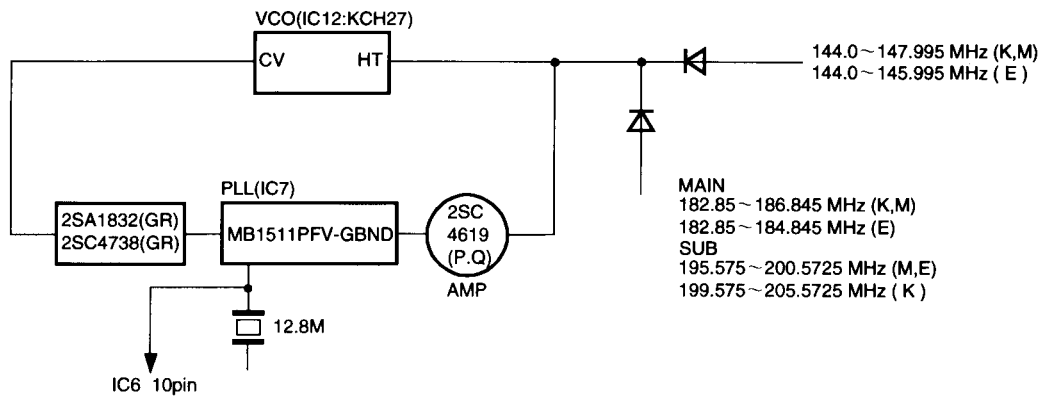


Fig.18

### ●430MHz band PLL synthesizer section

The VCO section is in the shielding case and the PLL section is on the TX-RX board. 5kHz, 10kHz, 15kHz, 20kHz, 12.5kHz, 25kHz, and 50kHz step PLL synthesizers are configured through phase comparison with the reference frequencies obtained by frequency dividing the 12.8MHz signal supplied from the 144MHz band PLL circuit.

For UHF band reception, oscillation is 384.95 to 394.945MHz (M, E), 392.95 to 404.945MHz (K) and for transmission, oscillation is 430 to 439.995MHz (M, E), 438.00 to 449.995MHz (K). For VHF-band sub-reception, oscillation is 378.1 to 382.09MHz (E), 378.1 to 386.09MHz (K, M) using double the VCO oscillation frequency as the local frequency.

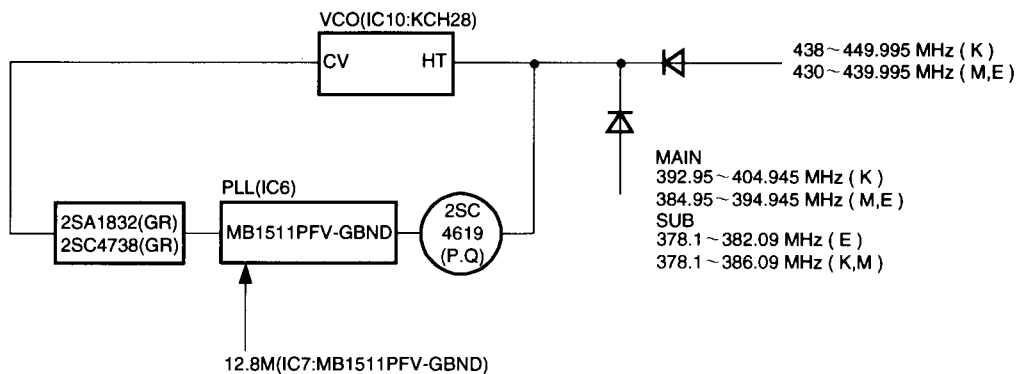


Fig.19

## SEMICONDUCTOR DATA

### I/O Port Specifications

UPD78058GC-468 (LCD ASSY:IC4)

Pin No.	Pin code	I/O	Function	Active level
1	P15/AN15	I	Connected to Vss	
2	P16/AN16	I		
3	P17/AN17	I		
4	AVss		A/D converter reference ground	
5	P_LCDLE	O	LCD driver latch enable	
6	P131/AN01	I	Connected to Vss	
7	AVREF1		Connected to VDD	
8	P70/RXD	I		
9	P71/TXD	I	Connected to Vss	
10	P72/ASCK	I		
11	P_LCDRST	O	LCD driver reset	
12	P_LCDDI	O	LCD driver data select (AO)	
13	P_LCDWR	O	LCD driver write select	
14	P_LCDCE1	O	LCD driver chip select 1	
15	P_LCDCE2	O	LCD driver chip select 2	
16	P_SI	I	Common microprocessor SO	
17	P_SO	O	Common microprocessor SI	
18	P27/SCK0	I/O	Not used (Open)	
19	P_LCDDT0	O	LCD driver data line 0	
20	P_LCDDT1	O	LCD driver data line 1	
21	P_LCDDT2	O	LCD driver data line 2	
22	P_LCDDT3	O	LCD driver data line 3	
23	P_LCDDT4	O	LCD driver data line 4	
24	P_LCDDT5	O	LCD driver data line 5	
25	P_LCDDT6	O	LCD driver data line 6	
26	P_LCDDT7	O	LCD driver data line 7	
27	P_LED5	O	LED5 CLF dark lighting	
28	P51/A9	I	Connected to Vss	
29	P52/A10	I		
30	P_5CSW	O	SW 5C control	
31	P54/A12	I	Connected to Vss	
32	P55/A13	I		
33	Vss		Microprocessor ground	
34	P56/A14	I	Connected to Vss	
35	P57/A15	I		
36	P60	I	Connected to VDD	
37	P61	I		
38	P62	I		
39	P63	I		
40	P64/RD	O	Connected to Vss	
41	P65/WR	O		
42	P66/WAIT	I		
43	P67/ASTB	I		
44	P_DIM	O	CFL dimmer adjustment	
45	P31/TO1	I	Connected to Vss	
46	P_KEY9	I	PM KEY	L
47	P_KEY10	I	MENU KEY	L
48	P_KEY11	I	CONT KEY	L
49	P_PCL	O	LCD driver clock	
50	P_KEY12	I	B. SEL KEY (VHF)	L
51	P_KEY13	I	B. SEL KEY (UHF)	L
52	P_KEY1	I	VFO KEY	L
53	P_KEY2	I	MR KEY	L
54	P_KEY3	I	CALL KEY	L

## SEMICONDUCTOR DATA

Pin No.	Pin code	I/O	Function	Active level
55	P_KEY4	I	MHz KEY	L
56	P_KEY5	I	F KEY	L
57	P_KEY6	I	TONE KEY	L
58	P_KEY7	I	REV KEY	L
59	P_KEY8	I	LOW KEY	L
60	RESET	I	Reset input	
61	P_ENCCK	I	Encoder clock (encoder A signal)	
62	P_INT1	I	Connected to P_SI	
63	P_PWR	I	Power switch	
64	P_ENCDT	I	Encoder data (encoder B signal)	
65	P_BCHK	I	Power voltage check	
66	P05/INTP5	I	Connected to Vss	
67	P06/INTP6	I		
68	VDD		Microprocessor power	
69	X2		Clock oscillator connection (4.19M)	
70	X1			
71	IC (VPP)			
72	XT2			
73	XT1/P07			
74	AVDD		A/D converter analog power	
75	AVREF		A/D converter reference voltage	
76	P_SQLU	I	430MHz band squelch input	
77	P_VOLU	I	430MHz band volume input	
78	P_SQLV	I	144MHz band squelch input	
79	P_VOLV	I	144MHz band volume input	
80	P14/AN14	I	Connected to Vss	

**78P058GCJRHC : K TX-RX (CONT):IC508**  
**JRJC : E, M**

Pin No.	Pin code	I/O	Function	Active level
1	P_SCU	I	Squelch input (UHF)	
2	P_DWAN	I	MIC DOWN, MR, PF	
3	P_UPAN	I	MIC UP, CALL, VFO	
4	AVss		A/D converter reference ground	
5	P_TONE	O	Sub-tone output	
6	P_DTMF	O	DTMF output	
7	AVREF1			
8	P_RXD	I	TNC RXD/P_PKS	
9	P_TXD	O	TNC TXD/P_SQ	
10	P_PTT	I	MIC PTT	L
11	P_EPV	O	PLL enable (VHF)	
12	P_CKV	O	PLL, shift register clock (VHF)	
13	P_DTV	O	PLL data (VHF)	
14	P_ULKU	I	PLL unlock detection (UHF)	
15	P_ULKVU	I	PLL unlock detection (VHF)	
16	P_SI	I	Panel microprocessor SO	
17	P_SO	O	Panel microprocessor SI	
18	P27/SCK0	I/O	Not used (Open)	
19	P_ESM	O	External speaker mute	H
20	P_ISM	O	Internal speaker mute	H
21	P_EPU	O	PLL enable (UHF)	
22	P_CKV	O	PLL, shift register clock (UHF)	
23	P_DTV	O	PLL data (UHF)	
24	P_ESU	O	Shift register clock (UHF)	

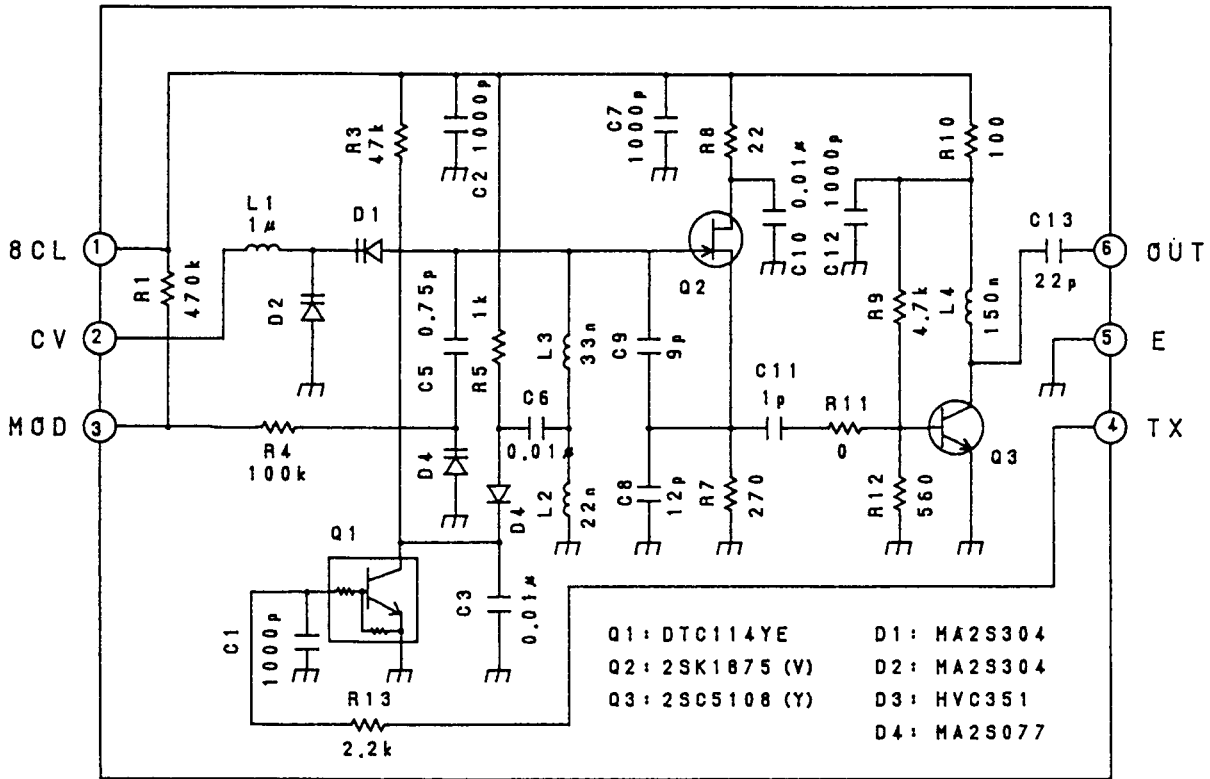
## SEMICONDUCTOR DATA

Pin No.	Pin code	I/O	Function	Active level
25	P_ESV	O	Shift register data (VHF)	
26	P_PSW	O	Power switch	H
27	P_STP2	O	Cross point switch latch (AF)	
28	P_DTP	O	Cross point switch data	
29	P_CKP	O	Cross point switch clock	
30	P_STP1	O	Cross point switch latch (RD)	
31	P_CKD	O	DTMF decoder clock	
32	P_DTD	I	DTMF decoder data	
33	Vss		Microprocessor ground	
34	P_STD	I	DTMF decoder detection	
35	P_5CSW	O	5C SW control	L
36	P_B0	I	Destination bit 0	
37	P_B1	I	Destination bit 1	
38	P_B2	I	Destination bit 2	
39	P_B3	I	Destination bit 3	
40	P_SOE	I	EEPROM SO	
41	P_CSE	O	EEPROM chip select	
42	P_CKE	O	EEPROM clock	
43	P_SIE	O	EEPROM SI	
44	P_APC	O	APC control	
45	P_PSEL	I	Packet connection check	
46	P_BEEP	O	BEEP output	
47	P_9600	O	9600bps	
48	P_1200	O	1200bps	
49	P_DMONI	O	DTMF monitor ON/OFF	
50	P_1750	O	1750Hz tone	
51	P_RRM	O	Repeater RD mute	H
52	P_RPT	I	Repeater alteration	
53	P_NAR	I	Audio composite IC serial input enable	
54	P_RST	O	Audio composite IC reset	
55	P_VCS	O	Audio composite IC chip select	
56	P_DTC	O	CTCSS data/audio composite IC data	
57	P_CKC	I/O	CTCSS clock/audio composite IC clock connection check	
58	P_SDO	I	CTCSS detection	H
59	P_STC	O	CTCSS enable	
60	RESET	I	Reset input	H
61	P_CHD	I	Channel display jumper	
62	P_BCHK	I	Power check	H
63	P_INTP2	I	Connected to P_SI	L
64	P_INTP3	I	Connected to P_DWAN	L
65	P_CKVR	O	Electronic control colck	
66	P_ENVR	O	Electronic control enable	
67	P_DTVR	O	Electronic control data	
68	VDD		Microprocessor power	
69	X2		Clock oscillator connection (4,19M)	
70	X1			
71	IC(VPP)		Vss	
72	XT2		Open	
73	XT1/P07		Vss	
74	AVDD		A/D converter analog power	
75	AVREF		A/D converter reference voltage	
76	P_SCV	I	Squelch input (VHF)	
77	P_SMV	I	S meter input (VHF)	
78	P_SMU	I	S metert input (UHF)	
79	P_AFMUTE	O	AF MUTE	
80	P_TCX0	I	TCXO voltage input	

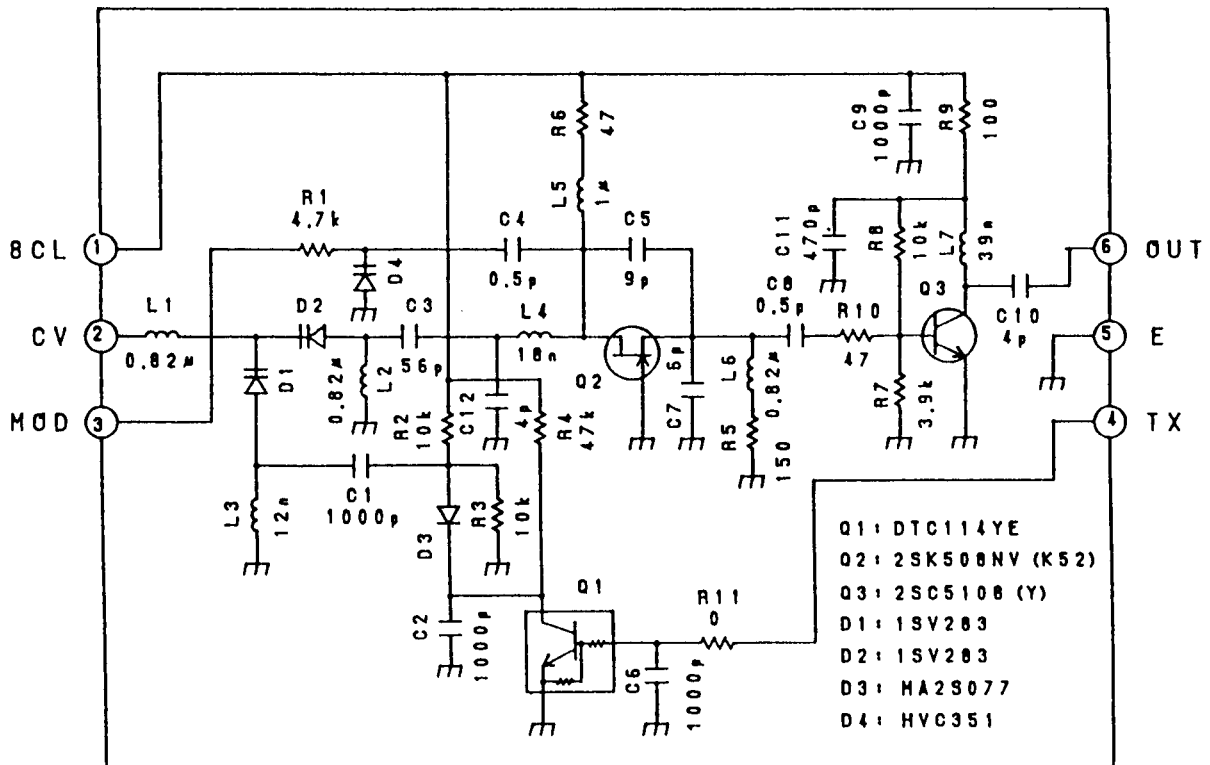
# TM-V7A/E

## SEMICONDUCTOR DATA

● Schematic diagram KCH27 (TX-RX : IC12) : HIC (VHF VCO)



● Schematic diagram KCH28 (TX-RX : IC10) : HIC (UHF VCO)



## DESCRIPTION OF COMPONENTS

**TX-RX UNIT (X57-52XX-XX : A/3)**  
**CONTROL UNIT (X57-52XX-XX : B/3)**

Ref No.	Use/Function	Operation/condition/Compatibility
Q1	Power select switch	ON for 430MHz reception
Q2	Power select switch	ON for 144MHz transmission
Q3	Power select switch	ON for main 144MHz reception/ON for 430MHz sub-reception
Q7	Power select switch	ON for 430MHz reception
Q8	Speaker output mute	ON for internal speaker
Q9	Speaker output mute	ON for external speaker
Q10	Power select switch	ON for 430MHz transmission
Q11	High-frequency amplification	Operates for main 144MHz reception
Q12	Buffer	12.8M
Q15	F IN amp	430M
Q16	Power select switch	ON for 800MHz reception (Except K type) /ON for main 430MHz reception
Q17	Power select switch	ON for 430MHz pass through/ON for 144MHz sub-reception
Q19	Amp	12.8M
Q20	F IN amp	144M
Q21	High-frequency amplification	Operates for main 144MHz reception
Q23	High-frequency amplification	Operates for main 430MHz reception
Q24, 25	Charge pump	430M
Q26	Filter switch	430MHz sub-reception
Q27	First mixer switch	ON for main 144MHz reception
Q28	First mixer	Operates for main 144MHz reception
Q29, 30	Charge pump	144M
Q31	First mixer switch	ON for 430MHz sub-reception
Q32	First mixer	Operates for 430MHz sub-reception
Q33	Modulation muting	430M
Q34	High-frequency amplification	Operates for main 430MHz pass through
Q35	Modulation muting	144M
Q36	PLL 8V ripple filter	
Q37	High-frequency amplification	Operates for main 430MHz reception
Q38	CV line buffer	
Q39	First mixer switch	ON for 144MHz sub-reception
Q40	First IF amplification	
Q41	PLL 8V ripple filter	
Q42	Power switch	For 430M through
Q43	Q40 gain control	AM AGC
Q44	First mixer	Operates for 144MHz sub-reception
Q45	VCO-PLL output amplification	430M
Q46	VCO-PLL output amplification	144M
Q47	Main 144M reception power	
Q48	First mixer switch	ON for main 430MHz reception
Q49	High-frequency amplification	Operates for 800MHz reception (Except K type)
Q50	First mixer	Operates for main 430MHz reception
Q51	High-frequency amplification	Hetero amplification for 800MHz reception (Except K type)
Q52	First mixer	Operates for 800MHz reception (Except K type)
Q53	Transmission driver	430M transmission
Q54	First mixer switch	ON for 800MHz reception (Except K type)
Q55	First IF amplification	
Q56	Transmission driver	144M transmission
Q57	Transmission driver	430M transmission
Q58	Noise amp	144M
Q60	Transmission driver	430M transmission

# TM-V7A/E

## DESCRIPTION OF COMPONENTS

Ref No.	Use/Function	Operation/Condition/Compatibility
Q61	Transmission driver	144M reception
Q63	Noise amp	430MHz
Q66, 67	APC control	
Q69	Power switch	
Q71	Power switch control	
Q73	RD buffer	144MHz
Q74	RD buffer	430MHz
Q75	FAN switch	
Q76	Constant voltage circuit	10V
Q77	Switch	Overvoltage protection
Q78	Constant voltage circuit	10V
Q81	Temperature protection switch	
Q91	Switch	AM select
Q501	Back up switch	
Q504	5C feed switch	
Q505	MIC RD buffer amp	
Q506	9600bps RD buffer amp	
Q507	MIC RD mute	
Q508	1200bps RD buffer amp	
Q509	Reset switch	
IC1	AF amplification	
IC2	8V AVR	
IC3	VHF band transmission driver	
IC4	UHF band transmission driver	
IC6	PLL frequency synthesizer	430MHz
IC7	PLL frequency synthesizer	144MHz
IC8	Analog switch	430MHz loop filter switching
IC9	Analog switch	144MHz loop filter switching
IC10	VCO-PLL	
IC11	Frequency divider (prescaler)	
IC12	VCO-PLL	
IC13	Second local oscillation, mixer, IF amplification, detection, low-frequency amplification, noise amplification, noise detection, squelch switching	
IC14	Multiplexer	
IC15	Second local oscillation, mixer, IF amplification, detection, low-frequency amplification, noise amplification, noise detection, squelch switching	
IC16	APC control	
IC17	5V AVR	
IC18	Multiplexer	
IC19, 20	Serial-parallel conversion	
IC501	6V AVR	
IC502	5V AVR	
IC503	Cross point switch	
IC504	Electronic control	
IC505	Reset IC	
IC506	DTMF decoding	
IC507	Mic amp, tone decoding	
IC508	MPU	
IC509	Analog switch	
IC510	Cross point switch	



## DESCRIPTION OF COMPONENTS

Ref No.	Use/Function	Operation/Condition/Compatibility
IC511	Low frequency amplification	
IC512	EEPROM	
IC513	Multiplexer	
D1	Voltage compensation	
D4, 5	Variable capacity diode tuning	
D7	For lock detector rectification	For 430MHz
D8	Lock detector	For 144MHz
D9	Filter switch	For 430MHz-sub
D10, 11	Variable capacity diode tuning	
D12	Loop filter switch	For 430MHz
D13, 14	Variable capacity diode tuning	
D15	High-frequency switch	
D16	Loop filter switch	For 144MHz
D17	High-frequency switch	
D18	Hetero switch	
D19	Constant voltage circuit	For frequency divider
D20	Speeds rise of Q36	
D21	Hetero switch	
D22	High-frequency switch	
D23	Speeds rise of Q41	
D24	Power switch	
D25 ~ 27	Hetero switch	
D28	Temperature assurance	For 144MHz
D29	Power switch	
D30	Temperature assurance	For 144MHz
D31	Temperature assurance	430M driver
D32	Noise amp detection	For 144MHz
D33, 34	Antenna switch	For 430MHz
D35, 36	Antenna switch	For 144MHz
D37	APC power detection	Operates for 430MHz transmission
D38	Noise amp detection	For 430MHz
D39	APC power detection	Operates for 430MHz transmission
D40	Transmission control	
D41, 42	APC power detection	Operates for 144MHz transmission
D43	Power reverse connection protection	
D44 ~ 47	Hetero switch	
D48	Constant voltage circuit	10V
D49	Switch	Overvoltage protection
D50	Antenna switch	For 144MHz
D51	Reverse power connection prevention	
D52	Antenna switch	430MHz
D501-505	Backflow prevention	
D502	Backup detection	
D508	Switch	For hardware reset
D509	Power feed	For PC control

# TM-V7A/E

## TERMINAL FUNCTION

### TX-RX UNIT (X57-52XX-XX: A/3)

CN No.	Pin No.	Name	Function
CN1	1	Not used	
	2	Not used	
	3	E	GND
	4	E	GND
	5	APC	APC reference voltage input
	6	ULV	VHF band unlock detection output
	7	ULU	UHF band unlock detection output
	8	DTPV	VHF PLL data input
	9	CKV	VHF PLL, shift register (IC20) clock input
	10	EPV	VHF PLL enable input
	11	E	GND
	12	MOU	UHF modulation input
	13	MOV	VHF modulation input
	14	E	GND
	15	E	GND
	16	AOI	Internal speaker audio signal input
	17	AOO	External speaker audio signal input
	18	E	GND
	19	RAU	UHF band audio output
	20	RAV	VHF band audio output
CN2	1	E	GND
	2	PB	Panel power output
	3	B	13.8V
	4	PSW	Power switch control input
	5	PE	Panel ground
	6	8C	8V common
	7	RDU	UHF band demodulated audio output
	8	RDV	VHF band demodulated audio output
	9	E	GND
	10	SQU	UHF band squelch voltage output
	11	SQV	VHF band squelch voltage output
	12	SMV	VHF band S meter voltage output
	13	SMU	UHF band S meter voltage output
	14	Not used	
	15	DTSV	Shift register (IC20) data input
	16	DTSU	Shift register (IC19) data input
	17	DTPU	UHF band PLL data input
	18	CKU	Shift register (IC19) clock input
	19	EPU	UHF band PLL enable input
	20	E	GND
CN3	1		Speaker output
	2		GND
CN4	1	FAN	FAN SB output
	2		GND

## TERMINAL FUNCTION

### CONTROL UNIT (X57-52XX-XX: B/3)

CN No.	Pin No.	Name	Function
CN502	1	E	GND
	2	PB	Panel power input
	3	B	13.8V
	4	PSW	Power switch control output
	5	PE	Panel ground
	6	8C	8V common
	7	RDU	UHF band demodulated audio input
	8	RDV	VHF band demodulated audio input
	9	E	GND
	10	SQU	UHF band squelch voltage input
	11	SQV	VHF band squelch voltage input
	12	SMV	VHF band S meter voltage input
	13	SMU	UHF band S meter voltage input
	14	Not used	
	15	DTSV	Shift register (IC20) data output
	16	DTSU	Shift register (IC19) data output
	17	DTPU	UHF band PLL data output
	18	CKU	Shift register (IC19) clock output
	19	EPU	UHF band PLL enable output
	20	E	GND
CN503	1	Not used	
	2	Not used	
	3	E	GND
	4	E	GND
	5	APC	APC reference voltage output
	6	ULV	VHF band unlock detection output
	7	ULU	UHF band unlock detection output
	8	DTPV	VHF PLL data output
	9	CKV	VHF PLL, shift register (IC20) clock output
	10	EPV	VHF PLL enable output
	11	E	GND
	12	MOU	UHF modulation output
	13	MOV	VHF modulation output
	14	E	GND
	15	E	GND
	16	AOI	Internal speaker audio output
	17	AOO	External speaker audio output
	18	E	GND
	19	RAU	UHF band audio input
	20	RAV	VHF band audio input
CN504	1	VCK	VS-3 clock output
	2	VDT	VS-3 data output
	3	VCS	VS-3 chip select
	4	RST	VS-3 reset output
	5	NAR	VS-3 input enable output
	6	E	GND
	7	5C	5V common
	8	VO	Audio output
CN501	1	PSI	Serial data input
	2	PSO	Serial data output
	3	PE	Panel Ground
	4	PB	Panel power output

# TM-V7A/E

## TERMINAL FUNCTION

CN No.	Pin No.	Name	Function
CN701	1	E	GND
	2	SQU	UHF band squelch output
	3	VOLU	UHF band volume output
	4	SWU	UHF band select switch output
	5	Vcc	Reference voltage output
	6	SQV	VHF band squelch output
	7	VOLV	VHF band volume output
	8	SWV	VHF band select switch output
	9	E	GND

### LCD ASSY (B38-0772-15)

CN No.	Pin No.	Name	Function
CN1	1	PSO	Serial data output
	2	PSI	Serial data input
	3	PE	Panel ground
	4	PB	Panel power
CN2	1	E	GND
	2	SQU	UHF band squelch input
	3	VOLU	UHF band volume input
	4	SWU	UHF band select switch input
	5	Vcc	Reference voltage input
	6	SQV	VHF band squelch input
	7	VOLV	VHF band volume input
	8	SWV	VHF band band select switch input
	9	E	GND

## PARTS LIST

\* New Parts.  $\Delta$  indicates safety critical components.  
 Parts without **Parts No.** are not supplied.  
 Les articles non mentionnés dans le **Parts No.** ne sont pas fournis.  
 Teile ohne **Parts No.** werden nicht geliefert.

L: Scandinavia      K: USA      P: Canada  
 Y: PX (Far East, Hawaii)      T: England      E: Europe  
 Y: AAFES (Europe)      X: Australia      M: Other Areas

### TM-V7A/E

#### TX-RX UNIT (X57-52XX-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
<b>TM-V7A/E</b>											
1	3B	*	A01-2121-13	METALLIC CABINET (LOWER)		54	3A	*	G11-0795-14	SHEET	
2	1B	*	A01-2122-13	METALLIC CABINET (UPPER)		55		*	G11-0796-04	SHEET	
3	3A	*	A22-0798-11	SUB PANEL		56	3A	*	G13-1573-24	CUSHION(PWR,CALL)	
4	3A	*	A62-0492-33	PANEL ASSY		57	2B	*	G13-1602-04	CUSHION	
5	3B	*	A82-0026-11	BACK PANEL		58		*	H10-6608-01	FOAM PACKING MOLD	
6	3A	*	B10-1270-12	FRONT GLASS		59		*	H11-0890-04	POLYSTYRENE FOAMED BOARD	
8		*	B30-2160-08	LED (BLUE)		60			H25-0103-04	BAG	
9	3A	*	B38-0772-15	LCD ASSY		61			H25-0337-04	BAG	
11		*	UPD78058GC-468	IC(CPU:LCD ASSY IC4)		62			H25-0723-04	BAG	
15			B46-0310-03	USER & WARRNTY CARD      ACSY	E,E3	63		*	H52-0920-02	ITEM CARTON CASE	K
16			B46-0410-40	USER & WARRNTY CARD      ACSY	K	63		*	H52-0921-02	ITEM CARTON CASE	M2,M3
17		*	B62-0678-00	INSTRUCTION MANUAL      ACSY	K,M2,M3,E	63		*	H52-0922-02	ITEM CARTON CASE	E,E3
18		*	B62-0679-00	INSTRUCTION MANUAL      ACSY	E	65		*	J29-0632-03	BRACKET      ACSY	
19		*	B62-0680-00	INSTRUCTION MANUAL      ACSY	E,E3	66	3A	*	K27-3164-13	KNOB (4+1KEY)	
20		*	B62-0681-00	INSTRUCTION MANUAL      ACSY	M3,E3	67	3A	*	K27-3165-03	KNOB (PWR,CALL)	
21		*	B62-0682-00	INSTRUCTION MANUAL      ACSY	E3	68	3A	*	K27-3166-23	KNOB (VFO)	
22		*	B62-0683-00	INSTRUCTION MANUAL      ACSY	M2	69	3A	*	K27-3167-23	KNOB (MR)	
23		*	B62-0715-00	INSTRUCTION MANUAL      ACSY	E3	70	3A	*	K27-3168-23	KNOB (PM)	
24	1B	*	B72-0651-14	MODEL NAME PLATE	E3	71	3A	*	K27-3169-33	KNOB (MNU)	
24	1B	*	B72-1175-04	MODEL NAME PLATE	K	72	3B	*	K27-3170-03	LEVER KNOB(RELEASE)	
24	1B	*	B72-1176-04	MODEL NAME PLATE	M2,M3	73	3A	*	K27-3172-03	BUTTON KNOB(MAIN PUSH)	
24	1B	*	B72-1177-14	MODEL NAME PLATE	E,E3	74	3A	*	K29-5133-03	KNOB (MAIN)	
25	1B		E04-0167-05	RF COAXIAL CABLE RECEPTACLE(M)	K,M2,M3	75	3A	*	K29-5134-03	KNOB (VOL)	
25	1B		E04-0170-05	RF COAXIAL CABLE RECEPTACLE(N)	E,E3	76	3A	*	K29-5135-03	KNOB (SQL)	
26			E30-2111-15	DC CORD      ACSY		A	3A		N14-0569-04	NUT (VOL)	
27	1B		E30-2137-15	DC CORD		B	1B,3B		N33-2606-45	OVAL HEAD MACHIN SCREW(CASE)	
-			E30-3206-08	MIC CURL CABLE(to SERVICE)		C	2B,3B		N67-3008-46	PAN HEAD SEMS SCREW(MODULE)	
29	1B		E31-3197-15	INSIDE CONNECTING WIR: E(SP)		D	3B		N80-2010-45	SCREW(PANEL)	
30	2A	*	E37-0632-05	FLAT CABLE (20P)		E	1B		N80-2610-45	SCREW(FAN COVER)	
31		*	E40-5413-05	PIN CONNECTOR FOR INSIDE(9P)		F	2A		N83-2005-46	SCREW(SUB PANEL)	
32		*	E40-5653-05	PIN CONNECTOR FOR INSIDE(4P)		G	1B,2B		N83-2608-46	BRAZIER HEAD TAPTITE SCREW(APC)	
33	2A	*	F07-1428-23	COVER (DIN 6P)		H	2B		N87-2606-46	BRAZIER HEAD TAPTITE SCREW(PCB)	
34	1B	*	F07-1429-03	COVER (FAN)		77			N99-0331-05	SCREW SET      ACSY	
37	2B	*	F10-2236-04	SHIELDING PLATE		78			S70-0408-05	TACT SWITCH	
38			F51-0017-05	FUSE (15A)      ACSY		79			S70-0439-05	TACT SWITCH	
39	1B		F51-0017-05	FUSE (15A)		SP	1B		T07-0331-05	LOUDSPEAKER(FULLRANGE)	
40			F51-0018-05	FUSE (20A)      ACSY		80	1B		T42-0311-15	FAN MOTOR	
41	2A	*	G02-0726-04	FLAT SPRING(CONT)		MIC			T91-0396-05	MICROPHONE      ACSY	M2,E3
42	1B	*	G02-0803-03	FLAT SPRING(AF AMP,AVR)		MIC			T91-0568-05	MICROPHONE(DTMF)      ACSY	K,M3
-		*	G02-0808-04	FLAT SPRING		81		*	W02-1921-05	ENCODER	
44	3B	*	G09-0434-14	SPRING(RELEASE)		<b>TX-RX UNIT (X57-5230-XX, X57-5270-XX:S)</b>					
46	2B,3A	*	G10-0792-14	AUXILIARY PART(SP)		<b>0-11:K 0-22:M2, M3 2-71:E, E3</b>					
47	2A	*	G10-0793-14	SHEET		C1			CC73GCH1H101J	CHIP C      100PF      J	
48	3B	*	G10-0794-14	SHEET		C2			CK73GB1H102K	CHIP C      1000PF      K	
49		*	G10-0795-04	SHEET		C3			C92-0610-05	ELECTR      47UF      16WV	
50		*	G10-0796-04	SHEET		C4			CE04EW1H470M	ELECTRO      47UF      50WV	
51	1B	*	G11-0778-04	RUBBER CUSHION		C5			CK73GB1C393K	CHIP C      0.039UF      K	
52	2A	*	G11-0779-04	SHEET							
53	3B	*	G11-0794-14	SHEET							

TX-RX UNIT S: Singapore made

## PARTS LIST

### TX-RX UNIT (X57-52XX-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C6			C92-0558-05	CHIP-ELE 100UF 16WV		C80			CC73GCH1H040C	CHIP C 4.0PF C	
C7			CE04EW1H470M	ELECTRO 47UF 50WV		C81 ,82			CK73GB1H471K	CHIP C 470PF C	
C8			CK73GB1C393K	CHIP C 0.039UF K		C83			CC73GCH1H070D	CHIP C 7.0PF D	E.E3
C9			C92-0610-05	ELECTRO 47UF 16WV		C83			CC73GCH1H070D	CHIP C 7.0PF D	M2,M3
C10			CE04EW1C471M	ELECTRO 470UF 16WV		C83			CC73GCH1H080D	CHIP C 8.0PF D	K
C11			CK73GB1C104K	CHIP C 0.10UF K		C84			CK73GB1H221K	CHIP C 220PF K	
C12			CE04EW1C471M	ELECTRO 470UF 16WV		C85			CK73GB1E103K	CHIP C 0.010UF K	
C13			CK73GB1C104K	CHIP C 0.10UF K		C86			CC73GCH1H050C	CHIP C 5.0PF C	
C14 ,15			C92-0610-05	ELECTRO 47UF 16WV		C87			CC73GCH1H0R5C	CHIP C 0.5PF C	
C16			CC73GCH1H330J	CHIP C 33PF J		C88			CK73GB1H471K	CHIP C 470PF K	
C17			CK73FB1A105K	CHIP C 1.0UF K		C89			CC73GCH1H101J	CHIP C 100PF J	
C18			CK73GB1E103K	CHIP C 0.010UF K		C90			CC73GCH1H050C	CHIP C 5.0PF C	
C19			CC73GCH1H060D	CHIP C 6.0PF D		C91			CK73GB1H102K	CHIP C 1000PF K	
C20			C93-0568-05	CHIP C 47PF J		C93			CC73GCH1H180J	CHIP C 18PF J	
C21			CK73FB1A105K	CHIP C 1.0UF K		C95			CK73GB1H471K	CHIP C 470PF K	
C22			CK73GB1H103K	CHIP C 0.010UF K		C96			CC73GCH1H180J	CHIP C 18PF J	
C23			C92-0558-05	CHIP-ELE 100UF 16WV		C97			CC73GCH1H050C	CHIP C 5.0PF C	
C24 ,25			CK73GB1H102K	CHIP C 1000PF K		C99			CC73GCH1H150J	CHIP C 15PF J	
C26			CK73FF1C105Z	CHIP C 1.0UF Z		C100			CC73GCH1H1R5C	CHIP C 1.5PF C	
C28 ,29			CK73GB1H102K	CHIP C 1000PF K		C101 ,102			CC73GCH1H060D	CHIP C 6.0PF D	
C30			CC73GCH1H010C	CHIP C 1.0PF C		C103 ,104			CK73GB1H471K	CHIP C 470PF K	
C31			C92-0610-05	ELECTRO 47UF 16WV		C105			CK73GB1E103K	CHIP C 0.010UF K	
C32			CK73GB1H102K	CHIP C 1000PF K		C106			CC73GCH1H050C	CHIP C 5.0PF C	
C33			CK73GB1E103K	CHIP C 0.010UF K		C107			CC73GCH1H080D	CHIP C 8.0PF D	
C35			C93-0557-05	CHIP C 7.0PF D		C108			CC73GCH1H470J	CHIP C 47PF J	
C37 ,38			CK73GB1H102K	CHIP C 1000PF K		C109			CC73GCH1H060D	CHIP C 6.0PF D	
C39			CC73GCH1H020C	CHIP C 2.0PF C		C110			CC73GCH1H120J	CHIP C 12PF J	
C44			CK73GB1H102K	CHIP C 1000PF K		C111			CC73GCH1H060D	CHIP C 6.0PF D	
C45			CC73GCH1H040C	CHIP C 4.0PF C		C112			CK73GB1H102K	CHIP C 1000PF K	
C46			CK73GB1H102K	CHIP C 1000PF K		C113			CC73GCH1H010C	CHIP C 1.0PF C	
C47			CC73GCH1H030C	CHIP C 3.0PF C		C114			CK73GB1C473K	CHIP C 0.047UF K	
C48			CK73GB1E103K	CHIP C 0.010UF K		C115			C92-0002-05	CHIP-TAN 0.22UF 35WV	
C49			CK73GB1E223K	CHIP C 0.022UF K		C116			CC73GCH1H1R5C	CHIP C 1.5PF C	
C50			CK73GB1H102K	CHIP C 1000PF K		C117			CC73GCH1H040C	CHIP C 4.0PF C	
C51			CK73GB1E103K	CHIP C 0.010UF K		C118			CK73GB1H102K	CHIP C 1000PF K	
C52			CC73GCH1H100D	CHIP C 10PF D		C119			CC73GCH1H060D	CHIP C 6.0PF D	
C53			CK73GB1E103K	CHIP C 0.010UF K		C120			CC73GCH1H180J	CHIP C 18PF J	
C54			CK73GB1H102K	CHIP C 1000PF K		C121			CC73GCH1H470J	CHIP C 47PF J	
C55			CC73GCH1H040C	CHIP C 4.0PF C		C122			CK73GB1H102K	CHIP C 1000PF K	
C56			CK73GB1C104K	CHIP C 0.10UF K		C124			C92-0695-05	ELECTRO 10UF 10WV	
C58			CC73GCH1H100D	CHIP C 10PF D		C125			CC73GCH1H030C	CHIP C 3.0PF C	
C59			CK73GB1C473K	CHIP C 0.047UF K		C126 ,127			CK73GB1H102K	CHIP C 1000PF K	
C60			CC73GCH1H060D	CHIP C 6.0PF D		C129			CK73GB1H471K	CHIP C 470PF K	
C61			CK73GB1H102K	CHIP C 1000PF K		C130			CK73GB1C473K	CHIP C 0.047UF K	
C62			CK73GB1E103K	CHIP C 0.010UF K		C131			CK73GB1H471K	CHIP C 470PF K	
C63			CK73GB1H471K	CHIP C 470PF K		C132			CC73GCH1H150J	CHIP C 15PF J	
C65 ,66			CK73GB1H102K	CHIP C 1000PF K		C133			CK73GB1H102K	CHIP C 1000PF K	
C67			CK73GB1E103K	CHIP C 0.010UF K		C134			CC73GCH1H820J	CHIP C 82PF J	
C69			CK73GB1H471K	CHIP C 470PF K		C135			CK73GB1H102K	CHIP C 1000PF K	
C70			CK73GB1C104K	CHIP C 0.10UF K		C136			C92-0002-05	CHIP-TAN 0.22UF 35WV	
C71			CC73GCH1H030C	CHIP C 3.0PF C		C137			C92-0511-05	CHIP-TAN 0.15UF 35WV	
C73			CK73GB1C104K	CHIP C 0.10UF K		C138 ,139			CK73GB1H102K	CHIP C 1000PF K	
C75			CK73GB1H102K	CHIP C 1000PF K		C140			C92-0606-05	CHIP-TAN 4.7UF 10WV	
C76			CC73GCH1H030C	CHIP C 3.0PF C		C141			CC73GCH1H030C	CHIP C 3.0PF C	
C77 -79			CK73GB1H471K	CHIP C 470PF K		C142			C92-0695-05	ELECTRO 10UF 10WV	

## PARTS LIST

TX-RX UNIT (X57-52XX-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C143			CC73GCH1H080D	CHIP C 8.0PF D		C198			CK73GB1H102K	CHIP C 1000PF K	
C144			CC73GCH1H101J	CHIP C 100PF J		C199			CC73GCH1H010C	CHIP C 1.0PF C	
C145			CK73GB1E103K	CHIP C 0.010UF K		C200			CC73GCH1H040C	CHIP C 4.0PF C	
C146			CC73GCH1H101J	CHIP C 100PF J		C201			CC73GCH1H080D	CHIP C 8.0PF D	K
C147			CK73GB1H471K	CHIP C 470PF K		C201			CC73GCH1H150J	CHIP C 15PF J	E,E3
C148			CC73GCH1H030C	CHIP C 3.0PF C		C202			CK73GB1C104K	CHIP C 0.10UF K	
C149			CK73GB1H471K	CHIP C 470PF K		C203			CC73GCH1H010C	CHIP C 1.0PF C	
C151			C92-0001-05	CHIP-TAN 0.10UF 35WV		C204			CK73GB1H471K	CHIP C 470PF K	
C152			CK73GB1H102K	CHIP C 1000PF K		C205			CK73GB1H471K	CHIP C 470PF K	E,E3
C153			CK73GB1E103K	CHIP C 0.010UF K		C205			CK73GB1H471K	CHIP C 470PF K	M2,M3
C154			C92-0606-05	CHIP-TAN 4.7UF 10WV		C206			CK73GB1E103K	CHIP C 0.010UF K	
C155			CK73GB1H102K	CHIP C 1000PF K		C207			CK73GB1H471K	CHIP C 470PF K	
C156			CK73GB1H471K	CHIP C 470PF K		C208			CK73GB1E103K	CHIP C 0.010UF K	
C157			CK73GB1H102K	CHIP C 1000PF K		C209			CK73GB1C104K	CHIP C 0.10UF K	
C158			CC73GCH1H101J	CHIP C 100PF J		C210			CC73GCH1H390J	CHIP C 39PF J	
C159			CK73GB1E103K	CHIP C 0.010UF K		C211			CC73GCH1H101J	CHIP C 100PF J	
C160			CC73GCH1H101J	CHIP C 100PF J		C212			CK73GB1H471K	CHIP C 470PF K	
C161			CC73GCH1H040C	CHIP C 4.0PF C		C213			CK73GB1H102K	CHIP C 1000PF K	
C162			CK73GB1H102K	CHIP C 1000PF K		C214			CC73GCH1H030C	CHIP C 3.0PF C	E,E3
C163			CC73GCH1H030C	CHIP C 3.0PF C	E,E3	C214			CC73GCH1H030C	CHIP C 3.0PF C	M2,M3
C164			CC73GCH1H050C	CHIP C 5.0PF C		C215			CC73GCH1H030C	CHIP C 3.0PF C	
C165			C92-0593-05	CHIP-ELE 33UF 10WV		C216			CC73GCH1H680J	CHIP C 68PF J	
C166			CK73GB1H102K	CHIP C 1000PF K		C217			CC73GCH1H180J	CHIP C 18PF J	
C167			CC73GCH1H040C	CHIP C 4.0PF C		C218			CC73GCH1H020C	CHIP C 2.0PF C	E,E3
C168			CK73GB1H471K	CHIP C 470PF K		C218			CC73GCH1H020C	CHIP C 2.0PF C	M2,M3
C169			CK73GB1E103K	CHIP C 0.010UF K		C219-221			CK73GB1C104K	CHIP C 0.10UF K	
C170			CC73GCH1H050C	CHIP C 5.0PF C		C222			CK73GB1E103K	CHIP C 0.010UF K	
C171			CK73GB1H102K	CHIP C 1000PF K		C223			CC73GCH1H101J	CHIP C 100PF J	
C172			CK73GB1H471K	CHIP C 470PF K		C224			CC73GCH1H560J	CHIP C 56PF J	
C173			CC73GCH1H150J	CHIP C 15PF J		C226			CK73GB1H102K	CHIP C 1000PF K	
C174			CK73GB1E103K	CHIP C 0.010UF K		C227			CC73GCH1H050C	CHIP C 5.0PF C	
C175			CK73GB1H471K	CHIP C 470PF K		C228			CK73GB1H471K	CHIP C 470PF K	E,E3
C176			CK73GB1H102K	CHIP C 1000PF K		C228			CK73GB1H471K	CHIP C 470PF K	M2,M3
C177			CK73GB1E103K	CHIP C 0.010UF K		C229			CK73GB1H102K	CHIP C 1000PF K	
C178			CC73GCH1H050C	CHIP C 5.0PF C		C230			CK73GB1H471K	CHIP C 470PF K	
C179			C92-0593-05	CHIP-ELE 33UF 10WV		C231			CK73GB1C333K	CHIP C 0.033UF K	
C180			CC73GCH1H1R5C	CHIP C 1.5PF C		C232			C92-0004-05	CHIP-TAN 1.0UF 16WV	
C181			CK73GB1H471K	CHIP C 470PF K		C233			CC73GCH1H050C	CHIP C 5.0PF C	
C182			CC73GCH1H150J	CHIP C 15PF J		C234,235			CK73GB1H102K	CHIP C 1000PF K	
C183			CK73GB1H102K	CHIP C 1000PF K		C236			CK73GB1C473K	CHIP C 0.047UF K	
C184			CC73GCH1H040C	CHIP C 4.0PF C		C237			CK73GB1E103K	CHIP C 0.010UF K	
C185			CK73GB1H471K	CHIP C 470PF K		C238			CK73GB1E102K	CHIP C 1000PF K	
C186-188			CK73GB1H102K	CHIP C 1000PF K		C239			CC73GCH1H101J	CHIP C 100PF J	
C189			CC73GCH1H1R5C	CHIP C 1.5PF C	E,E3	C240			CK73GB1H471K	CHIP C 470PF K	
C189			CC73GCH1H1R5C	CHIP C 1.5PF C	M2,M3	C241			CC73GCH1H101J	CHIP C 100PF J	
C190			CC73GCH1H040C	CHIP C 4.0PF C		C242			CK73GB1H102K	CHIP C 1000PF K	
C191			CK73GB1H102K	CHIP C 1000PF K		C243			CK73GB1H471K	CHIP C 470PF K	
C192			CC73GCH1H080D	CHIP C 8.0PF D		C244			CK73GB1H102K	CHIP C 1000PF K	
C193			CK73GB1E103K	CHIP C 0.010UF K		C245			CK73GB1E103K	CHIP C 0.010UF K	
C194			CK73GB1H471K	CHIP C 470PF K		C246			CK73GB1H102K	CHIP C 1000PF K	
C195			CC73GCH1H020C	CHIP C 2.0PF C	E,E3	C248			CK73GB1H102K	CHIP C 1000PF K	
C195			CC73GCH1H020C	CHIP C 2.0PF C	M2,M3	C249			CK73GB1C104K	CHIP C 0.10UF K	
C196			CC73GCH1H010C	CHIP C 1.0PF C		C250			CK73GB1H102K	CHIP C 1000PF K	
C197			CC73GCH1H010C	CHIP C 1.0PF C	E,E3	C251			CK73GB1C473K	CHIP C 0.047UF K	
C197			CC73GCH1H010C	CHIP C 1.0PF C	M2,M3	C252			CK73GB1H471K	CHIP C 470PF K	

## PARTS LIST

### TX-RX UNIT (X57-52XX-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C253			CC73GCH1H390J	CHIP C 39PF J		C328			C93-0558-05	CHIP C 8.0PF D	
C255			CC73GCH1H080D	CHIP C 8.0PF D		C330			CK73GB1H102K	CHIP C 1000PF K	
C256			CK73GB1E103K	CHIP C 0.010UF K		C331			C92-0004-05	CHIP-TAN 1.0UF 16WV	
C257			CK73GB1H471K	CHIP C 470PF K		C332			CC73GCH1H390J	CHIP C 39PF J	
C258			CK73GB1E103K	CHIP C 0.010UF K		C334			C93-0572-05	CHIP C 100PF J	
C259			CC73GCH1H220J	CHIP C 22PF J		C336			CC73GCH1H0R5C	CHIP C 0.5PF C	
C260			C92-0610-05	ELECTRO 47UF 16WV		C337			CC73GCH1H020C	CHIP C 2.0PF C	
C262			CK73GB1H272K	CHIP C 2700PF K		C338			C93-0564-05	CHIP C 22PF J	
C263			CK73GB1E103K	CHIP C 0.010UF K		C339			CK73GB1E103K	CHIP C 0.010UF K	
C264			CK73GB1H471K	CHIP C 470PF K		C342			CK73GB1C104K	CHIP C 0.10UF K	
C265			CC73GCH1H220J	CHIP C 22PF J		C344			CC73GCH1H010C	CHIP C 1.0PF C	
C267			CK73GB1H102K	CHIP C 1000PF K		C345			CC73GCH1H020C	CHIP C 2.0PF C	
C269			CK73GB1C104K	CHIP C 0.10UF K		C346			C93-0557-05	CHIP C 7.0PF D	
C270			CK73GB1H102K	CHIP C 1000PF K		C347			CK73GB1C104K	CHIP C 0.10UF K	
C271			CK73GB1C104K	CHIP C 0.10UF K		C348			CC73GCH1H0R5C	CHIP C 0.5PF C	
C272			CC73GCH1H120J	CHIP C 12PF J		C349			CC73GCH1H010C	CHIP C 1.0PF C	
C273			C92-0001-05	CHIP-C 0.1UF 35WV		C350			CC73GCH1H0R5C	CHIP C 0.5PF C	E,E3
C274			CK73GB1H471K	CHIP C 470PF K		C350			CC73GCH1H0R5C	CHIP C 0.5PF C	M2,M3
C275			CK73GB1H102K	CHIP C 1000PF K		C351			CK73GB1E103K	CHIP C 0.010UF K	
C276			CK73FF1C105Z	CHIP C 1.0UF Z		C352			C92-0558-05	CHIP-ELE 100UF 16WV	
C277			CK73GB1H102K	CHIP C 1000PF K		C353			CC73FCH1H0R5C	CHIP C 0.5PF C	E,E3
C278			CC73GCH1H050C	CHIP C 5.0PF C		C353			CC73FCH1H0R5C	CHIP C 0.5PF C	M2,M3
C279			C92-0004-05	CHIP-TAN 1.0UF 16WV		C354			CK73GB1H102K	CHIP C 1000PF K	
C280			CK73GB1H471K	CHIP C 470PF K	E,E3	C355			CC73GCH1H101J	CHIP C 100PF J	
C280			CK73GB1H471K	CHIP C 470PF K	M2,M3	C356			CK73GB1E103K	CHIP C 0.010UF K	
C281			CC73GCH1H330J	CHIP C 33PF J		C357			C93-0555-05	CHIP C 5.0PF C	
C282,283			CC73GCH1H820J	CHIP C 82PF J		C358			C93-0564-05	CHIP C 22PF J	
C284			CC73GCH1H101J	CHIP C 100PF J		C359			CK73GB1C104K	CHIP C 0.10UF K	
C285			CC73GCH1H560J	CHIP C 56PF J		C360			C93-0555-05	CHIP C 5.0PF C	
C288			CC73GCH1H101J	CHIP C 100PF J		C362			CK73GB1H102K	CHIP C 1000PF K	
C289			C92-0523-05	CHIP-ELE 10UF 16WV		C363			C93-0567-05	CHIP C 39PF J	
C292			CK73GB1H102K	CHIP C 1000PF K		C364,365			CK73GB1E103K	CHIP C 0.010UF K	
C294			CK73GB1H102K	CHIP C 1000PF K		C366			C93-0555-05	CHIP C 5.0PF C	
C298			CK73GB1E103K	CHIP C 0.010UF K		C367			CC73GCH1H0R5C	CHIP C 0.5PF C	
C300			CK73GB1E103K	CHIP C 0.010UF K		C368			CC73GCH1H010C	CHIP C 1.0PF C	
C302,303			CK73GB1H102K	CHIP C 1000PF K		C369			C93-0564-05	CHIP C 22PF J	
C304			CK73GB1E103K	CHIP C 0.010UF K		C370			CK73GB1H102K	CHIP C 1000PF K	
C305			CK73GB1H102K	CHIP C 1000PF K		C371			C90-4053-05	ELECTRO 1000UF 16WV	
C307			CK73GB1H102K	CHIP C 1000PF K		C372			CK73GB1H102K	CHIP C 1000PF K	
C308			CC73GCH1H101J	CHIP C 100PF J		C376,377			CK73GB1H102K	CHIP C 1000PF K	
C309			C92-0523-05	CHIP-ELE 10UF 16WV		C382,383			CK73GB1H471K	CHIP C 470PF K	
C310			CK73GB1H102K	CHIP C 1000PF K		C385			CK73GB1H471K	CHIP C 470PF K	
C311			CC73GCH1H101J	CHIP C 100PF J		C386,387			CC73GCH1H030C	CHIP C 3.0PF C	
C312			CC73GCH1H0R5C	CHIP C 0.5PF C		C388,389			CK73GB1H471K	CHIP C 470PF K	E,E3
C313			CK73GB1C104K	CHIP C 0.10UF K		C388,389			CK73GB1H471K	CHIP C 470PF K	M2,M3
C314,315			CK73GB1H102K	CHIP C 1000PF K		C390			C92-0610-05	ELECTRO 47UF 16WV	
C316			C92-0554-05	CHIP-TAN 33UF 16WV		C391			CK73GB1E103K	CHIP C 0.010UF K	
C317			CK73GB1H821K	CHIP C 820PF K		C392,393			CK73GB1H102K	CHIP C 1000PF K	
C318			CK73GB1H102K	CHIP C 1000PF K		C394,395			CK73GB1E123K	CHIP C 0.012UF K	
C319,320			CK73GB1E103K	CHIP C 0.010UF K		C396			CK73GB1C104K	CHIP C 0.10UF K	
C321			CK73GB1C104K	CHIP C 0.10UF K		C397			CK73GB1C393K	CHIP C 0.039UF K	
C322			C93-0555-05	CHIP C 5.0PF C		C398,399			CK73GB1E123K	CHIP C 0.012UF K	
C324			C92-0001-05	CHIP-C 0.1UF 35WV		C400			CK73GB1C393K	CHIP C 0.039UF K	
C325			C93-0560-05	CHIP C 10PF D		C401			CK73GB1C104K	CHIP C 0.10UF K	
C326,327			CK73GB1H102K	CHIP C 1000PF K		C402			CK73GB1E103K	CHIP C 0.010UF K	



## PARTS LIST

TX-RX UNIT (X57-52XX-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C403			C92-0558-05	CHIP-ELE 100UF 16WV		C538			C92-0004-05	CHIP-TAN 1.0UF 16WV	
C404			CC73GCH1H020C	CHIP C 2.0PF C	E,E3	C539			CK73GB1H681K	CHIP C 680PF K	
C404			CC73GCH1H020C	CHIP C 2.0PF C	M2,M3	C540			CK73GB1H102K	CHIP C 1000PF K	
C405,406			CK73GB1H471K	CHIP C 470PF K		C541			CC73GCH1H100D	CHIP C 10PF D	
C407			CK73GB1E103K	CHIP C 0.010UF K		C542			C92-0004-05	CHIP-TAN 1.0UF 16WV	
C408			CK73GB1H471K	CHIP C 470PF K		C543			CK73GB1C104K	CHIP C 0.10UF K	
C409			CK73GB1H102K	CHIP C 1000PF K		C544			CK73GB1E223K	CHIP C 0.022UF K	
C410			CK73GB1E103K	CHIP C 0.010UF K		C545			CK73GB1H222K	CHIP C 2200PF K	
C411			CC73GCH1H101J	CHIP C 100PF J	E,E3	C546			CK73GB1C104K	CHIP C 0.10UF K	
C411			CC73GCH1H101J	CHIP C 100PF J	M2,M3	C547			CK73FB1A105K	CHIP C 1.0UF K	
C412			CK73GB1H471K	CHIP C 470PF K	E,E3	C548			CK73GB1H102K	CHIP C 1000PF K	
C412			CK73GB1H471K	CHIP C 470PF K	M2,M3	C549,550			CK73GB1E103K	CHIP C 0.010UF K	
C413			CK73GB1H102K	CHIP C 1000PF K		C551			CK73GB1C104K	CHIP C 0.10UF K	
C415			CK73GB1E103K	CHIP C 0.010UF K		C552			CC73GCH1H101J	CHIP C 100PF J	
C416			CK73GB1H471K	CHIP C 470PF K	E,E3	C553			CK73GB1H471K	CHIP C 470PF K	
C416			CK73GB1H471K	CHIP C 470PF K	M2,M3	C554			C92-0606-05	CHIP-TAN 4.7UF 10WV	
C418			CC73GCH1H020C	CHIP C 2.0PF C	E,E3	C555			CC73GCH1H101J	CHIP C 100PF J	
C418			CC73GCH1H020C	CHIP C 2.0PF C	M2,M3	C556			CK73GB1H471K	CHIP C 470PF K	
C421,422			CC73GCH1H470J	CHIP C 47PF J		C557			CK73GB1H102K	CHIP C 1000PF K	
C423,424			CK73GB1H102K	CHIP C 1000PF K		C558			CC73GCH1H101J	CHIP C 100PF J	
C425			CC73GCH1H040C	CHIP C 4.0PF C K		C559			CK73GB1H102K	CHIP C 1000PF K	
C426			CK73GB1C104K	CHIP C 0.10UF K		C560			CK73GB1C104K	CHIP C 0.10UF K	
C427			C92-0610-05	ELECTRO 47UF 16WV		C561,562			CC73GCH1H101J	CHIP C 100PF J	
C428			CC73GCH1H101J	CHIP C 100PF J		C563,564			CK73GB1H103K	CHIP C 0.010UF K	
C429			C90-4053-05	ELECTRO 1000UF 16WV		C565-567			CK73FB1A105K	CHIP C 1.0UF K	
C430			C90-0566-05	ELECTRO 2200UF 25WV		C568,569			CC73GCH1H101J	CHIP C 100PF J	
C501,502			CK73GB1H102K	CHIP C 1000PF K		C570,571			CK73FB1A105K	CHIP C 1.0UF K	
C503			CE04CW0J331M	ELECTRO 330UF 6.3WV		C572,573			CC73GCH1H101J	CHIP C 100PF J	
C504			CC73GCH1H101J	CHIP C 100PF J		C574,575			CK73GB1C104K	CHIP C 0.10UF K	
C505,506			CK73FB1A105K	CHIP C 1.0UF K		C576			CK73GB1E223K	CHIP C 0.022UF K	
C507			C92-0606-05	CHIP-TAN 4.7UF 10WV		C578			CK73GB1C104K	CHIP C 0.10UF K	
C508			CC73GCH1H101J	CHIP C 100PF J		C579			C92-0005-05	CHIP-TAN 2.2UF 6.3WV	
C511			CK73GB1H103K	CHIP C 0.010UF K		C582			CK73GB1H152K	CHIP C 1500PF K	
C512			CK73GB1H272K	CHIP C 2700PF K		C583			CK73GB1C333K	CHIP C 0.033UF K	
C513			CK73GB1E103K	CHIP C 0.010UF K		C584,585			CK73GB1H102K	CHIP C 1000PF K	E,E3
C514			C92-0558-05	CHIP-ELE 100UF 16WV		C701-706			CK73GB1H103K	CHIP C 0.010UF K	
C515			CK73GB1H471K	CHIP C 470PF K		TC1			C05-0384-05	TRIMMER CAPACITOR 10PF	
C517			CK73GB1C104K	CHIP C 0.10UF K		CN1, 2			E40-5744-05	PIN CONNECTOR FOR INSIDE(20P)	
C518,519			CK73FB1A105K	CHIP C 1.0UF K		CN3, 4			E40-3237-05	PIN CONNECTOR FOR INSIDE(2P)	
C520			C92-0606-05	CHIP-TAN 4.7UF 10UF		CN5			E23-0486-05	TERMINAL	
C521			CK73GB1C104K	CHIP C 0.10UF K		CN501			E40-5652-45	PIN CONNECTOR FOR INSIDE(4P)	
C522			CK73GB1E103K	CHIP C 0.010UF K		CN502,503			E40-5744-05	PIN CONNECTOR FOR INSIDE(20P)	
C523			C92-0558-05	CHIP-ELE 100UF 16WV		CN504			E40-5618-05	PIN CONNECTOR FOR INSIDE(8P)	
C524			CK73GB1H562K	CHIP C 5600PF K		CN701			E40-5396-05	PIN CONNECTOR FOR INSIDE(9P)	
C525			CK73GB1H222K	CHIP C 2200PF K		J1,2			E11-0425-05	PHONE JACK	
C526			C92-0606-05	CHIP-TAN 4.7UF 10WV		J501			E56-0404-05	DATA CONNECTOR (6P)	
C527-529			CK73GB1E103K	CHIP C 0.010UF K		J502			E08-0877-05	MIC CONNECTOR	
C530			CK73GB1H152K	CHIP C 1500PF K		W501,502			E37-0458-05	LEAD WIRE	
C531			CK73GB1E223K	CHIP C 0.022UF K		F1,2			F53-0108-05	FUSE (1.8A)	
C532			CC73GCH1H220J	CHIP C 22PF J		F3			F53-0128-05	FUSE (0.5A)	
C533			CC73GCH1H101J	CHIP C 100PF J		F501			F53-0108-05	FUSE (1.8A)	
C534			CC73GCH1H820J	CHIP C 82PF J		CD1			L79-1113-05	TUNING COIL (450K)	
C535			CC73GCH1H330J	CHIP C 33PF J		CD2			L79-1013-05	TUNING COIL (455K)	
C536			CK73GB1E103K	CHIP C 0.010UF K							
C537			CC73GCH1H100D	CHIP C 10PF D							

## PARTS LIST

### TX-RX UNIT (X57-52XX-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
CF1		*	L72-0931-05	CERAMIC FILTER		L53			L40-2271-36	SMALL FIXED INDUCTOR (22NH)	
CF2			L72-0366-05	CERAMIC FILTER		L54, 55			L40-6861-36	SMALL FIXED INDUCTOR (6.8NH)	E,E3
L1			L40-8271-34	SMALL FIXED INDUCTOR (82NH)		L54, 55			L40-6861-36	SMALL FIXED INDUCTOR (6.8NH)	M2,M3
L2			L40-1881-37	SMALL FIXED INDUCTOR (0.18UH)		L56, 57			L40-1571-36	SMALL FIXED INDUCTOR (15NH)	
L3			L40-2781-37	SMALL FIXED INDUCTOR (0.27UH)		L58			L40-3371-36	SMALL FIXED INDUCTOR (33NH)	
L4			L40-4771-36	SMALL FIXED INDUCTOR (47NH)		L59			L40-1095-34	SMALL FIXED INDUCTOR (1.0UH)	
L6			L34-4343-05	COIL		L60			L40-2771-36	SMALL FIXED INDUCTOR (22NH)	
L7			L40-3971-36	SMALL FIXED INDUCTOR (39NH)		L62			L40-4771-36	SMALL FIXED INDUCTOR (47NH)	
L9			L40-2281-37	SMALL FIXED INDUCTOR (0.22UH)		L63			L34-0742-05	COIL (5T)	
L12			L34-4344-05	COIL		L64			L34-1239-05	COIL (0.5T)	
L13			L40-4771-36	SMALL FIXED INDUCTOR (47NH)		L65			L34-4404-05	COIL (3.5T)	
L14			L40-1001-37	SMALL FIXED INDUCTOR (10UH)		L66			L34-1239-05	COIL (0.5T)	
L17			L34-4344-05	COIL		L67			L34-1185-05	COIL (2.5T)	
L18			L40-2771-36	SMALL FIXED INDUCTOR (27NH)		L68			L34-0895-05	COIL (6T)	
L19			L40-6871-34	SMALL FIXED INDUCTOR (68NH)		L70			L34-1185-05	COIL (2.5T)	
L20			L40-3371-36	SMALL FIXED INDUCTOR (33NH)		L71			L34-0499-05	COIL (4T)	
L21		*	L40-1075-44	SMALL FIXED INDUCTOR (10NH)		L72			L34-1239-05	COIL (0.5T)	
L22			L40-1581-37	SMALL FIXED INDUCTOR (0.15UH)		L73			L34-1058-05	COIL (2.5T)	E,E3
L23			L40-4771-36	SMALL FIXED INDUCTOR (47NH)		L73			L34-1058-05	COIL (2.5T)	M2,M3
L24			L40-6871-34	SMALL FIXED INDUCTOR (68NH)		L74			L34-1228-05	COIL (1T)	
L25			L40-2771-36	SMALL FIXED INDUCTOR (27NH)		L75			L34-1052-05	COIL (1.5T)	E,E3
L26, 27			L40-1871-36	SMALL FIXED INDUCTOR (18NH)		L75			L34-1052-05	COIL (1.5T)	M2,M3
L28		*	L79-1432-05	FILTER (435MHZ)	E,E3	L76			L34-4402-05	COIL (2.5T)	
L28		*	L79-1432-05	FILTER (435MHZ)	M2,M3	L77			L34-0499-05	COIL (4T)	
L28		*	L79-1433-05	FILTER (444MHZ)	K	L78			L34-4402-05	COIL (2.5T)	
L29		*	L40-1075-44	SMALL FIXED INDUCTOR (10NH)		L79, 80			L34-0499-05	COIL (4T)	
L30			L40-4771-36	SMALL FIXED INDUCTOR (47NH)		L81			L40-1581-37	SMALL FIXED INDUCTOR (0.15UH)	
L31			L40-1081-37	SMALL FIXED INDUCTOR (0.1UH)		L83			L40-2271-36	SMALL FIXED INDUCTOR (22NH)	
L32			L40-3971-36	SMALL FIXED INDUCTOR (39NH)		L84			L40-6861-36	SMALL FIXED INDUCTOR (6.8NH)	
L33			L40-2271-36	SMALL FIXED INDUCTOR (22NH)		L85			L40-1071-36	SMALL FIXED INDUCTOR (10NH)	E,E3
L34			L40-1271-36	SMALL FIXED INDUCTOR (12NH)		L85			L40-1071-36	SMALL FIXED INDUCTOR (10NH)	M2,M3
L35			L40-2281-37	SMALL FIXED INDUCTOR (0.22UH)		L87, 88			L40-3971-34	SMALL FIXED INDUCTOR (39NH)	
L36			L40-4771-36	SMALL FIXED INDUCTOR (47NH)		L89			L40-2771-36	SMALL FIXED INDUCTOR (27NH)	K
L37			L40-3971-36	SMALL FIXED INDUCTOR (39NH)		L501			L40-1091-42	SMALL FIXED INDUCTOR (1.0UH)	
L38			L40-5671-36	SMALL FIXED INDUCTOR (56NH)		L502			L92-0131-05	CORE	
L39			L40-1091-37	SMALL FIXED INDUCTOR (1.0UH)		X1			L77-1573-05	CRYSTAL RESONATOR (12.8MHZ)	
L40		*	L79-1432-05	FILTER (435MHZ)	E,E3	X2	*		L77-1678-05	CRYSTAL RESONATOR (45.505MHZ)	
L40		*	L79-1433-05	FILTER (444MHZ)	M2,M3	X501	*		L77-1476-05	CRYSTAL RESONATOR (4.19MHZ)	
L41			L40-3971-36	SMALL FIXED INDUCTOR (39NH)	E,E3	XF1	*		L71-0481-05	CRYSTAL FILTER	
L41			L40-3971-36	SMALL FIXED INDUCTOR (39NH)	M2,M3	XF2	*		L71-0482-05	CRYSTAL FILTER	
L42			L40-2271-36	SMALL FIXED INDUCTOR (22NH)		CP501			R90-0724-05	MULTI-COMP 1K X4	
L43			L40-2281-37	SMALL FIXED INDUCTOR (0.22UH)		CP502			R90-0714-05	MULTI-COMP 10K X4	
L44			L40-2271-36	SMALL FIXED INDUCTOR (22NH)		R1			RK73GB1J471J	CHIP R 470 J 1/16W	
L45			L40-5681-37	SMALL FIXED INDUCTOR (0.56UH)		R2			R92-1252-05	CHIP R 0 OHM	
L46			L40-6861-36	SMALL FIXED INDUCTOR (6.8NH)	E,E3	R3,4			RK73GB1J473J	CHIP R 47K J 1/16W	
L46			L40-6861-36	SMALL FIXED INDUCTOR (6.8NH)	M2,M3	R5			R92-1252-05	CHIP R 0 OHM	
L47			L40-1871-36	SMALL FIXED INDUCTOR (18NH)	E,E3	R6,7			RK73GB1J4R7J	CHIP R 4.7 J 1/16W	
L47			L40-1871-36	SMALL FIXED INDUCTOR (18NH)	M2,M3	R8			RK73GB1J182J	CHIP R 1.8K J 1/16W	
L48			L40-1281-37	SMALL FIXED INDUCTOR (0.12UH)		R9			RK73GB1J392J	CHIP R 3.9K J 1/16W	
L49			L40-6861-36	SMALL FIXED INDUCTOR (6.8NH)	E,E3	R10			RK73GB1J472J	CHIP R 4.7K J 1/16W	
L49			L40-6861-36	SMALL FIXED INDUCTOR (6.8NH)	M2,M3	R11			R92-1252-05	CHIP R 0 OHM	
L50			L40-1881-37	SMALL FIXED INDUCTOR (0.18UH)		R12			RK73GB1J153J	CHIP R 15K J 1/16W	
L52			L40-6861-36	SMALL FIXED INDUCTOR (6.8NH)	E,E3	R13			RK73GB1J474J	CHIP R 470K J 1/16W	
L52			L40-6861-36	SMALL FIXED INDUCTOR (6.8NH)	M2,M3	R14			RK73GB1J153J	CHIP R 15K J 1/16W	
						R15			RK73GB1J473J	CHIP R 47K J 1/16W	

## PARTS LIST

TX-RX UNIT (X57-52XX-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R16			RK73GB1J104J	CHIP R 100K J 1/16W		R73			RK73GB1J104J	CHIP R 100K J 1/16W	
R17			RK73GB1J182J	CHIP R 1.8K J 1/16W		R74			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R18			RK73GB1J101J	CHIP R 100 J 1/16W		R75			RK73GB1J103J	CHIP R 10K J 1/16W	
R19			RK73GB1J683J	CHIP R 68K J 1/16W		R76			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R20			RK73GB1J223J	CHIP R 22K J 1/16W		R77			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R21			RK73GB1J333J	CHIP R 33K J 1/16W		R78			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R22			RK73GB1J274J	CHIP R 270K J 1/16W		R79			RK73GB1J473J	CHIP R 47K J 1/16W	
R23			RK73GB1J182J	CHIP R 1.8K J 1/16W		R80			RK73GB1J101J	CHIP R 100 J 1/16W	
R24			RK73GB1J101J	CHIP R 100 J 1/16W		R81			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R25			RK73GB1J473J	CHIP R 47K J 1/16W		R82			RK73GB1J221J	CHIP R 220 J 1/16W	
R28			RK73GB1J222J	CHIP R 2.2K J 1/16W		R83			RK73GB1J273J	CHIP R 27K J 1/16W	
R29			RK73GB1J471J	CHIP R 470 J 1/16W		R84			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R30			RK73GB1J103J	CHIP R 10K J 1/16W		R85			RK73GB1J223J	CHIP R 22K J 1/16W	
R31			RK73GB1J221J	CHIP R 220 J 1/16W		R86			RK73GB1J272J	CHIP R 2.7K J 1/16W	
R32			RK73GB1J471J	CHIP R 470 J 1/16W		R87			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R33			RK73GB1J104J	CHIP R 100K J 1/16W		R88			RK73GB1J183J	CHIP R 18K J 1/16W	
R34			RK73GB1J101J	CHIP R 100 J 1/16W		R89			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R35			RK73GB1J223J	CHIP R 22K J 1/16W		R90			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R36			RK73GB1J103J	CHIP R 10K J 1/16W		R91			RK73GB1J103J	CHIP R 10K J 1/16W	
R38			RK73GB1J331J	CHIP R 330 J 1/16W		R93			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R39			RK73GB1J223J	CHIP R 22K J 1/16W		R94			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R40			RK73GB1J184J	CHIP R 180K J 1/16W		R96			RK73GB1J470J	CHIP R 47 J 1/16W	
R41			RK73GB1J473J	CHIP R 47K J 1/16W		R98			RK73GB1J101J	CHIP R 100 J 1/16W	
R42			RK73GB1J823J	CHIP R 82K J 1/16W		R99			RK73GB1J681J	CHIP R 680 J 1/16W	
R43			RK73GB1J223J	CHIP R 22K J 1/16W		R102			RK73GB1J470J	CHIP R 47 J 1/16W	M2,M3
R44			RK73GB1J103J	CHIP R 10K J 1/16W		R102			RK73GB1J470J	CHIP R 47 J 1/16W	E,E3
R45			RK73GB1J104J	CHIP R 100K J 1/16W		R103			RK73GB1J220J	CHIP R 22 J 1/16W	
R46			RK73GB1J220J	CHIP R 22 J 1/16WK		R104			RK73GB1J562J	CHIP R 5.6K J 1/16W	
R46			R92-1252-05	CHIP R 0 OHM	E,E3	R105			RK73GB1J101J	CHIP R 100 J 1/16W	
R46			R92-1252-05	CHIP R 0 OHM	M2,M3	R106			RK73GB1J103J	CHIP R 10K J 1/16W	
R47			RK73GB1J102J	CHIP R 1.0K J 1/16W		R108			RK73GB1J122J	CHIP R 1.2K J 1/16W	
R48			RK73GB1J151J	CHIP R 150 J 1/16W		R109			RK73GB1J470J	CHIP R 47 J 1/16W	
R49			RK73GB1J473J	CHIP R 47K J 1/16W		R110			RK73GB1J331J	CHIP R 330 J 1/16W	
R50			RK73GB1J103J	CHIP R 10K J 1/16W		R111			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R51			RK73GB1J331J	CHIP R 330 J 1/16W		R112			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R52			RK73GB1J103J	CHIP R 10K J 1/16W		R113			RK73GB1J101J	CHIP R 100 J 1/16W	
R53			RK73GB1J101J	CHIP R 100 J 1/16W		R114			RK73GB1J104J	CHIP R 100K J 1/16W	
R54			RK73GB1J103J	CHIP R 10K J 1/16W		R115			RK73GB1J681J	CHIP R 680 J 1/16W	
R55			RK73GB1J223J	CHIP R 22K J 1/16W		R116			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R56			RK73FB2A821J	CHIP R 820 J 1/10W		R117			RK73GB1J184J	CHIP R 180K J 1/16W	
R57			RK73FB2A5R6J	CHIP R 5.6 J 1/10W		R118			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R58			RK73FB2A821J	CHIP R 820 J 1/10W		R119			RK73GB1J101J	CHIP R 100 J 1/16W	
R59			RK73GB1J222J	CHIP R 2.2K J 1/16W		R120			RK73GB1J331J	CHIP R 330 J 1/16W	
R60			RK73GB1J103J	CHIP R 10K J 1/16W		R121			RK73GB1J103J	CHIP R 10K J 1/16W	
R61			RK73GB1J102J	CHIP R 1.0K J 1/16W		R122			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R62			RK73GB1J184J	CHIP R 180K J 1/16W		R123			RK73GB1J471J	CHIP R 470 J 1/16W	
R63			RK73GB1J104J	CHIP R 100K J 1/16W		R124			RK73GB1J823J	CHIP R 82K J 1/16W	
R64			RK73GB1J102J	CHIP R 1.0K J 1/16W		R125			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R65			RK73GB1J823J	CHIP R 82K J 1/16W		R126			RK73GB1J100J	CHIP R 10 J 1/16W	
R66			RK73GB1J473J	CHIP R 47K J 1/16W		R127			RK73GB1J104J	CHIP R 100K J 1/16W	
R67			RK73GB1J102J	CHIP R 1.0K J 1/16W		R128			RK73GB1J103J	CHIP R 10K J 1/16W	
R68			RK73GB1J273J	CHIP R 27K J 1/16W		R129			RK73GB1J473J	CHIP R 47K J 1/16W	
R69			RK73GB1J183J	CHIP R 18K J 1/16W		R130			RK73GB1J103J	CHIP R 10K J 1/16W	
R70,71			RK73GB1J101J	CHIP R 100 J 1/16W		R131			RK73GB1J471J	CHIP R 470 J 1/16W	
R72			RK73GB1J102J	CHIP R 1.0K J 1/16W		R133			RK73GB1J221J	CHIP R 220 J 1/16W	

## PARTS LIST

### TX-RX UNIT (X57-52XX-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R134			R92-1252-05	CHIP R 0	K,M2,M3	R182			RK73GB1J474J	CHIP R 470K J 1/16W	
R134			RK73GB1J101J	CHIP R 100 J 1/16W	E,E3	R183			RK73GB1J224J	CHIP R 220K J 1/16W	
R135			RK73GB1J221J	CHIP R 220 J 1/16W		R184			RK73GB1J471J	CHIP R 470 J 1/16W	
R136			RK73GB1J471J	CHIP R 470 J 1/16W		R185			RK73GB1J221J	CHIP R 220 J 1/16W	
R137			RK73GB1J101J	CHIP R 100 J 1/16W		R186			RK73GB1J182J	CHIP R 1.8K J 1/16W	
R138			RK73GB1J122J	CHIP R 1.2K J 1/16W		R187			RK73GB1J561J	CHIP R 560 J 1/16W	
R139			RK73GB1J184J	CHIP R 180K J 1/16W		R188			RK73GB1J470J	CHIP R 47 J 1/16W	
R140			RK73GB1J152J	CHIP R 1.5K J 1/16W		R189			RK73GB1J100J	CHIP R 10 J 1/16W	
R141			RK73GB1J472J	CHIP R 4.7K J 1/16W		R190			RK73GB1J104J	CHIP R 100K J 1/16W	
R142			RK73GB1J332J	CHIP R 3.3K J 1/16W		R191			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R143			RK73GB1J471J	CHIP R 470 J 1/16W		R192			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R144			RK73GB1J272J	CHIP R 2.7K J 1/16W		R193			RK73GB1J331J	CHIP R 330 J 1/16W	
R145			RK73GB1J471J	CHIP R 470 J 1/16W		R194			RK73GB1J100J	CHIP R 10 J 1/16W	
R146			RK73GB1J103J	CHIP R 10K J 1/16W		R195			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R147			RK73GB1J182J	CHIP R 1.8K J 1/16W		R196			RK73GB1J560J	CHIP R 56 J 1/16W	
R148			RK73GB1J470J	CHIP R 47 J 1/16W		R197			RK73GB1J100J	CHIP R 10 J 1/16W	
R149			R92-1252-05	CHIP R 0 OHM		R198			RK73GB1J334J	CHIP R 330K J 1/16W	
R150			RK73GB1J471J	CHIP R 470 J 1/16W		R199			RK73GB1J470J	CHIP R 47 J 1/16W	E,E3
R151			RK73GB1J103J	CHIP R 10K J 1/16W		R199			R92-1252-05	CHIP R 0	K,M2,M3
R152			RK73GB1J182J	CHIP R 1.8K J 1/16W		R200			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R153			RK73GB1J223J	CHIP R 22K J 1/16W		R201			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R154			RK73GB1J222J	CHIP R 2.2K J 1/16W		R202			RK73GB1J681J	CHIP R 680 J 1/16W	
R155			RK73GB1J334J	CHIP R 330K J 1/16W		R204			RK73GB1J182J	CHIP R 1.8K J 1/16W	
R156			RK73GB1J222J	CHIP R 2.2K J 1/16W		R205			RK73GB1J473J	CHIP R 47K J 1/16W	
R157			RK73GB1J823J	CHIP R 82K J 1/16W	E,E3	R206			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R157			RK73GB1J823J	CHIP R 82K J 1/16W	M2,M3	R207			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R158			RK73GB1J470J	CHIP R 47 J 1/16W		R208			RK73GB1J331J	CHIP R 330 J 1/16W	
R159			RK73GB1J823J	CHIP R 82K J 1/16W	E,E3	R209			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R159			RK73GB1J823J	CHIP R 82K J 1/16W	M2,M3	R210			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R160			RK73GB1J222J	CHIP R 2.2K J 1/16W	E,E3	R211			RK73GB1J470J	CHIP R 47 J 1/16W	
R160			RK73GB1J222J	CHIP R 2.2K J 1/16W	M2,M3	R212			RK73GB1J152J	CHIP R 1.5K J 1/16W	
R161			RK73GB1J221J	CHIP R 220 J 1/16W		R213			RK73GB1J103J	CHIP R 10K J 1/16W	
R162			RK73GB1J222J	CHIP R 2.2K J 1/16W		R218			RK73FB2A100J	CHIP R 10 J 1/10W	
R163			RK73GB1J471J	CHIP R 470 J 1/16W	E,E3	R219			RK73GB1J103J	CHIP R 10K J 1/16W	
R163			RK73GB1J471J	CHIP R 470 J 1/16W	M2,M3	R224			R92-0685-05	CHIP R 22 J 1/2W	
R164			RK73GB1J222J	CHIP R 2.2K J 1/16W		R225			R92-0670-05	CHIP R 0 OHM	
R165			RK73GB1J272J	CHIP R 2.7K J 1/16W		R226			R92-1252-05	CHIP R 0 OHM	
R166			RK73GB1J222J	CHIP R 2.2K J 1/16W	E,E3	R229			RK73GB1J474J	CHIP R 470K J 1/16W	
R166			RK73GB1J222J	CHIP R 2.2K J 1/16W	M2,M3	R230			RK73GB1J222J	CHIP R 2.2K J 1/16W	
R167			RK73GB1J222J	CHIP R 2.2K J 1/16W		R231			RK73FB2A5R6J	CHIP R 5.6 J 1/10W	
R168			RK73GB1J331J	CHIP R 330 J 1/16W		R232			RK73FB2A821J	CHIP R 820 J 1/10W	
R169			RK73GB1J222J	CHIP R 2.2K J 1/16W		R233			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R170			RK73GB1J103J	CHIP R 10K J 1/16W		R234			RK73FB2A821J	CHIP R 820 J 1/10W	
R171			RK73GB1J472J	CHIP R 4.7K J 1/16W		R235			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R172			RK73GB1J122J	CHIP R 1.2K J 1/16W		R236			RK73GB1J331J	CHIP R 330 J 1/16W	
R173			RK73GB1J222J	CHIP R 2.2K J 1/16W		R237			RK73GB1J683J	CHIP R 68K J 1/16W	
R174			RK73GB1J822J	CHIP R 8.2K J 1/16W		R238			R92-1213-05	CHIP R 100 J 1/2W	
R175			RK73GB1J331J	CHIP R 330 J 1/16W		R239			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R176			RK73GB1J222J	CHIP R 2.2K J 1/16W		R240			R92-1213-05	CHIP R 100 J 1/2W	
R177			RK73GB1J221J	CHIP R 220 J 1/16W	E,E3	R241			RK73GB1J334J	CHIP R 330K J 1/16W	
R177			RK73GB1J221J	CHIP R 220 J 1/16W	M2,M3	R243			RK73GB1J103J	CHIP R 10K J 1/16W	
R178			RK73GB1J822J	CHIP R 8.2K J 1/16W		R244			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R179			RK73GB1J331J	CHIP R 330 J 1/16W		R245			RK73GB1J102J	CHIP R 1.0K J 1/16W	
R180			RK73GB1J101J	CHIP R 100 J 1/16W		R248			RK73GB1J103J	CHIP R 10K J 1/16W	
R181			RK73GB1J472J	CHIP R 4.7K J 1/16W		R251			RK73GB1J222J	CHIP R 2.2K J 1/16W	

## PARTS LIST

TX-RX UNIT (X57-52XX-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R255			RK73GB1J103J	CHIP R 10K J 1/16W		R326,327			R92-1252-05	CHIP R 0 OHM	
R256			RK73GB1J152J	CHIP R 1.5K J 1/16W		R328,329			RK73GB1J104J	CHIP R 100K J 1/16W	
R257			RK73GB1J153J	CHIP R 15K J 1/16W		R330			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R258			RK73GB1J222J	CHIP R 2.2K J 1/16W		R331			RK73GB1J121J	CHIP R 120 J 1/16W	
R259			RK73GB1J683J	CHIP R 68K J 1/16W		R332			RK73GB1J332J	CHIP R 3.3K J 1/16W	
R260			RK73GB1J222J	CHIP R 2.2K J 1/16W		R334,335			R92-1252-05	CHIP R 0 OHM	
R261-263			RK73GB1J103J	CHIP R 10K J 1/16W		R501			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R264			RK73GB1J223J	CHIP R 22K J 1/16W		R502			RK73GB1J473J	CHIP R 47K J 1/16W	
R265			RK73GB1J473J	CHIP R 47K J 1/16W		R503,504			RK73GB1J104J	CHIP R 100K J 1/16W	
R266			RK73GB1J223J	CHIP R 22K J 1/16W		R505			R92-1252-05	CHIP R 0 OHM	
R270			RK73GB1J182J	CHIP R 1.8K J 1/16W		R506			RK73GB1J274J	CHIP R 270K J 1/16W	
R271			RK73GB1J103J	CHIP R 10K J 1/16W		R507			RK73GB1J103J	CHIP R 10K J 1/16W	
R272			R92-1276-05	CHIP R 820 J 1/4W		R508			RK73GB1J101J	CHIP R 100 J 1/16W	
R273,274			RK73GB1J103J	CHIP R 10K J 1/16W		R509			RK73GB1J224J	CHIP R 220K J 1/16W	
R275			RK73GB1J220J	CHIP R 22 J 1/16W		R510			RK73GB1J394J	CHIP R 390K J 1/16W	
R277			RK73GB1J333J	CHIP R 33K J 1/16W		R511			RK73GB1J473J	CHIP R 47K J 1/16W	
R278			RK73GB1J104J	CHIP R 100K J 1/16W		R512			RK73GB1J184J	CHIP R 180K J 1/16W	
R279,280			RK73GB1J103J	CHIP R 10K J 1/16W		R513			RK73GB1J104J	CHIP R 100K J 1/16W	
R281			RK73GB1J220J	CHIP R 22 J 1/16W		R514			RK73GB1J103J	CHIP R 10K J 1/16W	
R282			RK73GB1J101J	CHIP R 100 J 1/16W		R515			RK73GB1J473J	CHIP R 47K J 1/16W	
R283			RK73GB1J222J	CHIP R 2.2K J 1/16W		R516			RK73GB1J104J	CHIP R 100K J 1/16W	
R284			RK73GB1J222J	CHIP R 2.2K J 1/16W	E,E3	R517			RK73GB1J124J	CHIP R 120K J 1/16W	
R284			RK73GB1J222J	CHIP R 2.2K J 1/16W	M2,M3	R518			RK73GB1J824J	CHIP R 820K J 1/16W	
R285			R92-1252-05	CHIP R 0 OHM		R519			RK73GB1J823J	CHIP R 82K J 1/16W	
R286			RK73GB1J333J	CHIP R 33K J 1/16W		R520			RK73GB1J334J	CHIP R 330K J 1/16W	
R287			RK73GB1J223J	CHIP R 22K J 1/16W		R521			RK73GB1J223J	CHIP R 22K J 1/16W	
R288			R92-1371-05	FIXED R 180 1W		R522			RK73GB1J823J	CHIP R 82K J 1/16W	
R289			RK73GB1J683J	CHIP R 68K J 1/16W		R523			RK73GB1J103J	CHIP R 10K J 1/16W	
R290			RK73GB1J472J	CHIP R 4.7K J 1/16W		R524			RK73GB1J473J	CHIP R 47K J 1/16W	
R291			RK73GB1J103J	CHIP R 10K J 1/16W		R525			RK73GB1J103J	CHIP R 10K J 1/16W	
R292			RK73GB1J392J	CHIP R 3.9K J 1/16W		R526			RK73GB1J564J	CHIP R 560K J 1/16W	
R293			RK73GB1J472J	CHIP R 4.7K J 1/16W		R527			RK73GB1J104J	CHIP R 100K J 1/16W	
R294			RK73GB1J274J	CHIP R 270K J 1/16W		R528			RK73GB1J473J	CHIP R 47K J 1/16W	
R295			RK73GB1J471J	CHIP R 470 J 1/16W		R529			RK73GB1J472J	CHIP R 4.7K J 1/16W	
R296			R92-1252-05	CHIP R 0 OHM		R530			RK73GB1J684J	CHIP R 680K J 1/16W	
R297			RK73GB1J473J	CHIP R 47K J 1/16W		R531			RK73GB1J184J	CHIP R 180K J 1/16W	
R298			RK73GB1J472J	CHIP R 4.7K J 1/16W		R532			RK73GB1J473J	CHIP R 47K J 1/16W	
R299			RK73GB1J471J	CHIP R 470 J 1/16W		R533			RK73GB1J822J	CHIP R 8.2K J 1/16W	
R300			RK73GB1J274J	CHIP R 270K J 1/16W		R534			RK73GB1J473J	CHIP R 47K J 1/16W	
R301			RK73GB1J103J	CHIP R 10K J 1/16W		R535			RK73GB1J333J	CHIP R 33K J 1/16W	
R302			RK73GB1J392J	CHIP R 3.9K J 1/16W		R536			RK73GB1J473J	CHIP R 47K J 1/16W	
R303			RK73GB1J472J	CHIP R 4.7K J 1/16W		R537			RK73GB1J103J	CHIP R 10K J 1/16W	
R304			R92-0685-05	CHIP R 22 J 1/2W		R539			RK73GB1J103J	CHIP R 10K J 1/16W	
R305			R92-0670-05	CHIP R 0 OHM		R541			R92-1252-05	CHIP R 0 OHM	
R310			RK73GB1J471J	CHIP R 470 J 1/16W	E,E3	R542,543			R92-0670-05	CHIP R 0 OHM	E,E3
R310			RK73GB1J471J	CHIP R 470 J 1/16W	M2,M3	R544			R92-0670-05	CHIP R 0 OHM	K,M2,M3
R311			R92-0685-05	CHIP R 22 J 1/2W		R545			RK73GB1J334J	CHIP R 330K J 1/16W	
R312			RK73GB1J473J	CHIP R 47K J 1/16W		R546			R92-0670-05	CHIP R 0 OHM	K,E,E3
R313			R92-1252-05	CHIP R 0 OHM		R547			RK73GB1J123J	CHIP R 12K J 1/16W	
R314			RK73GB1J333J	CHIP R 33K J 1/16W		R548			R92-1252-05	CHIP R 0 OHM	
R315			RK73GB1J222J	CHIP R 2.2K J 1/16W		R549			RK73GB1J124J	CHIP R 120K J 1/16W	
R316-320			RK73GB1J473J	CHIP R 47K J 1/16W		R550			RK73GB1J274J	CHIP R 270K J 1/16W	
R321			RK73GB1J472J	CHIP R 4.7K J 1/16W		R551			RK73GB1J104J	CHIP R 100K J 1/16W	
R322-324			RK73GB1J473J	CHIP R 47K J 1/16W		R552			RK73GB1J473J	CHIP R 47K J 1/16W	
R325			RK73GB1J102J	CHIP R 1.0K J 1/16W		R553			RK73GB1J822J	CHIP R 8.2K J 1/16W	

# TM-V7A/E

## PARTS LIST

### TX-RX UNIT (X57-52XX-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R554			RK73GB1J682J	CHIP R 6.8K J 1/16W		D15			MA2S077	DIODE	
R555			RK73GB1J223J	CHIP R 22K J 1/16W		D16			DA221	DIODE	
R556			RK73GB1J224J	CHIP R 220K J 1/16W		D17,18			MA2S077	DIODE	
R557			RK73GB1J473J	CHIP R 47K J 1/16W		D19			DTZ5.6(A)	DIODE	
R558			RK73GB1J123J	CHIP R 12K J 1/16W		D20			1SS355	DIODE	
R559			RK73GB1J473J	CHIP R 47K J 1/16W		D21,22			MA2S077	DIODE	
R560			RK73GB1J274J	CHIP R 270K J 1/16W		D23			1SS355	DIODE	
R561			RK73GB1J102J	CHIP R 1.0K J 1/16W		D24			DAN222	DIODE	
R562-564			RK73GB1J473J	CHIP R 47K J 1/16W		D25			MA2S077	DIODE	
R565			RK73GB1J222J	CHIP R 2.2K J 1/16W		D26			MA2S077	DIODE	E,E3
R566			RK73GB1J564J	CHIP R 560K J 1/16W		D26			MA2S077	DIODE	M2,M3
R567			RK73GB1J224J	CHIP R 220K J 1/16W		D27			MA2S077	DIODE	
R568			RK73GB1J473J	CHIP R 47K J 1/16W		D28			1SS355	DIODE	
R569			RK73GB1J102J	CHIP R 1.0K J 1/16W		D29			MA2S111	DIODE	
R570			RK73GB1J472J	CHIP R 4.7K J 1/16W		D30,31			DA221	DIODE	
R571			R92-1252-05	CHIP R 0 OHM		D32			MA742	DIODE	
R572			RK73GB1J334J	CHIP R 330K J 1/16W		D33			MA4PH633	DIODE	
R573-575			RK73GB1J473J	CHIP R 47K J 1/16W		D34			M1809	DIODE	
R576			RK73GB1J102J	CHIP R 1.0K J 1/16W		D35			MA4PH633	DIODE	
R577			RK73GB1J472J	CHIP R 4.7K J 1/16W		D36			M1809	DIODE	
R578			RK73GB1J103J	CHIP R 10K J 1/16W		D37-39			MA742	DIODE	
R579			RK73GB1J152J	CHIP R 1.5K J 1/16W	E,E3	D40			DAN222	DIODE	
R579			RK73GB1J822J	CHIP R 8.2K J 1/16W	K,M2,M3	D41,42			MA742	DIODE	
R580			RK73GB1J224J	CHIP R 220K J 1/16W		D43			DSM3MA1	DIODE	
R581			RK73GB1J103J	CHIP R 10K J 1/16W		D44-47			MA2S077	DIODE	
R582,583			RK73GB1J102J	CHIP R 1.0K J 1/16W		D48		*	UDZ10(B)	DIODE	
R584			RK73GB1J330J	CHIP R 33 J 1/16W		D49		*	UDZ18(B)	DIODE	
R585			RK73GB1J102J	CHIP R 1.0K J 1/16W		D50			MA4PH633	DIODE	
R586			RK73GB1J224J	CHIP R 220K J 1/16W		D51			DSM3MA1	DIODE	
R587,588			RK73GB1J102J	CHIP R 1.0K J 1/16W		D52			HVU131	DIODE	
R589			RK73GB1J104J	CHIP R 100K J 1/16W		D501			1SS355	DIODE	
R590			R92-1252-05	CHIP R 0 OHM		D502			DTZ7.5(B)	DIODE	
R591			RK73GB1J100J	CHIP R 10 J 1/16W		D503			MA112	DIODE	
R592			RK73GB1J104J	CHIP R 100K J 1/16W		D504,505			1SS355	DIODE	
R593			RK73GB1J102J	CHIP R 1.0K J 1/16W		D506,507			DA221	DIODE	
R594			RK73GB1J103J	CHIP R 10K J 1/16W		D508,509			MA2S111	DIODE	
R595			RK73GB1J474J	CHIP R 470K J 1/16W		IC1	2B		LA4446	IC(AF POWER AMP)	
R596			RK73GB1J222J	CHIP R 2.2K J 1/16W		IC2	2B		TA7808S	IC(REGULATOR)	
R597			RK73GB1J473J	CHIP R 47K J 1/16W		IC3	2B	*	S-AV17(KENW-1)	IC(POWER MODULE VHF)	
R598			RK73GB1J222J	CHIP R 2.2K J 1/16W		IC4	2B		M57788MR	IC(POWER MODULE/430-450MHz35W)	
R599			R92-1252-05	CHIP R 0 OHM		IC6,7			MB1511PFV-GBND	IC(PLL FREQUENCY SYNTHESIZER)	
R600			RK73GB1J103J	CHIP R 10K J 1/16W		IC8,9			TC4S66F	IC(BILATERAL SWITCH)	
R601			RK73GB1J473J	CHIP R 47K J 1/16W		IC10		*	KCH28	HIC(UHF VCO)	
R602,603			RK73GB1J102J	CHIP R 1.0K J 1/16W		IC11		*	MB511PF-G-BND	IC(PRE SCALER)	
VR1,2		*	R12-6718-05	SEMI VR 68K		IC12		*	KCH27	HIC(VHF VCO)	
VR701,702		*	R31-0614-05	VARIABLE RESISTOR 50K		IC13			TK10930V	IC	
SS01			S70-0424-05	TACT SWITCH		IC14			TC4W53FU	IC(2 INPUT NAND GATE)	
D1			DA221	DIODE		IC15			MC3372SV	IC(LO POWER FMIC)	
D4,5			1SV214	DIODE(VARI CAP)		IC16			TA75S01F	IC(OP AMP)	
D7,8			MA2S111	DIODE		IC17			TA78L05F	IC(VOLTAGE REGULATOR/ +5V)	
D9			MA2S077	DIODE		IC18			BU4053BCF	IC	
D10,11			1SV214	DIODE(VARI CAP)		IC19,20			BU2090FS	IC(SHIFT/STORE REGISTER)	
D12			DA221	DIODE		IC501			TA78L06F	IC(VOLTAGE REGULATOR/ +6V)	
D13,14			1SV214	DIODE		IC502			TA78L05F	IC(VOLTAGE REGULATOR/ +5V)	

## PARTS LIST

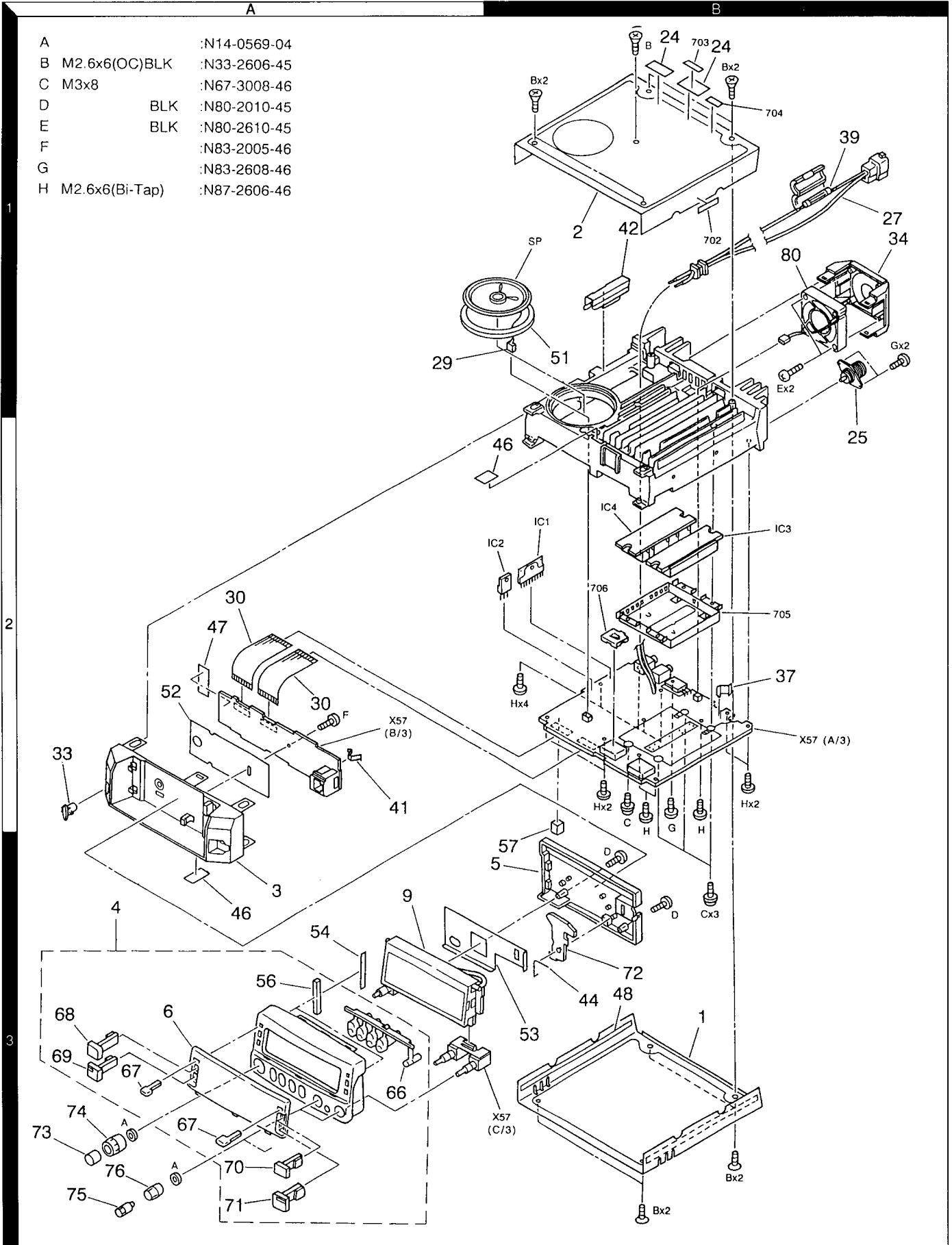
TX-RX UNIT (X57-52XX-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
IC503			JLC1555F	IC(6X4 CROSSPOINT SWITCH)		Q51			2SC5066(O)	TRANSISTOR	E,E3
IC504			MB87032APFGBND	IC(ELECTRONIC VOLUME)		Q51			2SC5066(O)	TRANSISTOR	M2,M3
IC505			PST9130NR	IC(SYSTEM RESET)		Q52			3SK241(R)	FET	E,E3
IC506			LC73881M	IC(DTMF DECODER)		Q52			3SK241(R)	FET	M2,M3
IC507			AK2343	IC(CTCSS ENCODER/DECODER)		Q53			2SC4093	TRANSISTOR	
IC508		*	78P058GCJRH	IC(CPU)	K	Q54			DTC114EE	DIGITAL TRANSISTOR	E,E3
IC508		*	78P058GCJRJC	IC(CPU)	E,E3	Q54			DTC114EE	DIGITAL TRANSISTOR	M2,M3
IC508		*	78P058GCJRJC	IC(CPU)	M2,M3	Q55			2SC4619(P,Q)	TRANSISTOR	
IC509			BU4066BCF	IC(ANALOG SWITCH X4)		Q56			2SC4988	TRANSISTOR	
IC510			JLC1555F	IC(6X4 CROSSPOINT SWITCH)		Q57			2SC3357	TRANSISTOR	
IC511			TA75S393F	IC		Q58			2SC4738(GR)	TRANSISTOR	
IC512		*	AT25640N10SI27 IC	I		Q60 ,61			2SC2954	TRANSISTOR	
IC512		*	X25320SI-2.7	IC		Q63			2SC4738(GR)	TRANSISTOR	
IC513		*	TC74HC4050AF	IC(BUFFER CONVERTER)		Q66			2SB1565(E,F)	TRANSISTOR	
Q1			2SA1362(Y)	TRANSISTOR		Q67			2SC4738(GR)	TRANSISTOR	
Q2			2SB1132(Q,R)	TRANSISTOR		Q69			2SB1386(R)	TRANSISTOR	
Q3			FMA5	TRANSISTOR		Q71			DTC114EE	DIGITAL TRANSISTOR	
Q7			2SA1362(Y)	TRANSISTOR		Q73 ,74			2SC4738(GR)	TRANSISTOR	
Q8,9			2SK1824	FET		Q75			DTD143EK	DIGITAL TRANSISTOR	
Q10			2SB1132(Q,R)	TRANSISTOR		Q76			2SC4738(GR)	TRANSISTOR	
Q11			3SK241(R)	FET		Q77			DTC114EE	DIGITAL TRANSISTOR	
Q12			2SC4738(GR)	TRANSISTOR		Q78			2SB1132(Q,R)	TRANSISTOR	
Q15			2SC4619(P,Q)	TRANSISTOR		Q79 ,80			DTC143EE	DIGITAL TRANSISTOR	
Q16 ,17			FMA5	TRANSISTOR		Q81			DTC144EU	DIGITAL TRANSISTOR	
Q19 ,20			2SC4619(P,Q)	TRANSISTOR		Q91			2SK1824	FET	
Q21		*	3SK298	FET		Q501			2SC4738(GR)	TRANSISTOR	
Q23			3SK239A	FET		Q504			2SA1519	TRANSISTOR	
Q24			2SA1832(GR)	TRANSISTOR		Q505,506			2SC4738(GR)	TRANSISTOR	
Q25			2SC4738(GR)	TRANSISTOR		Q507			2SK1824	FET	
Q26			DTC144EE	DIGITAL TRANSISTOR		Q508,509			2SC4738(GR)	TRANSISTOR	
Q27			DTC114EE	DIGITAL TRANSISTOR		TH1			157-153-65001	THERMISTOR(15K)	
Q28			SGM2014M	FET							
Q29			2SA1832(GR)	TRANSISTOR							
Q30			2SC4738(GR)	TRANSISTOR							
Q31			DTC114EE	DIGITAL TRANSISTOR							
Q32			3SK241(R)	FET							
Q33			2SK1824	FET							
Q34			2SC5066(O)	TRANSISTOR							
Q35			2SK1824	FET							
Q36			2SC4738(GR)	TRANSISTOR							
Q37			3SK239A	FET							
Q38			2SK879(Y)	FET							
Q39			DTC114EE	DIGITAL TRANSISTOR							
Q40			2SC4619(P,Q)	TRANSISTOR							
Q41			2SC4738(GR)	TRANSISTOR							
Q42			DTC114EE	DIGITAL TRANSISTOR							
Q43			2SK879(Y)	FET							
Q44			3SK241(R)	FET							
Q45 ,46			2SC5066(O)	TRANSISTOR							
Q47			2SC4619(P,Q)	TRANSISTOR							
Q48			DTC114EE	DIGITAL TRANSISTOR							
Q49			2SC5066(O)	TRANSISTOR	E,E3						
Q49			2SC5066(O)	TRANSISTOR	M2,M3						
Q50			SGM2014M	FET							

# TM-V7A/E

## EXPLODED VIEW

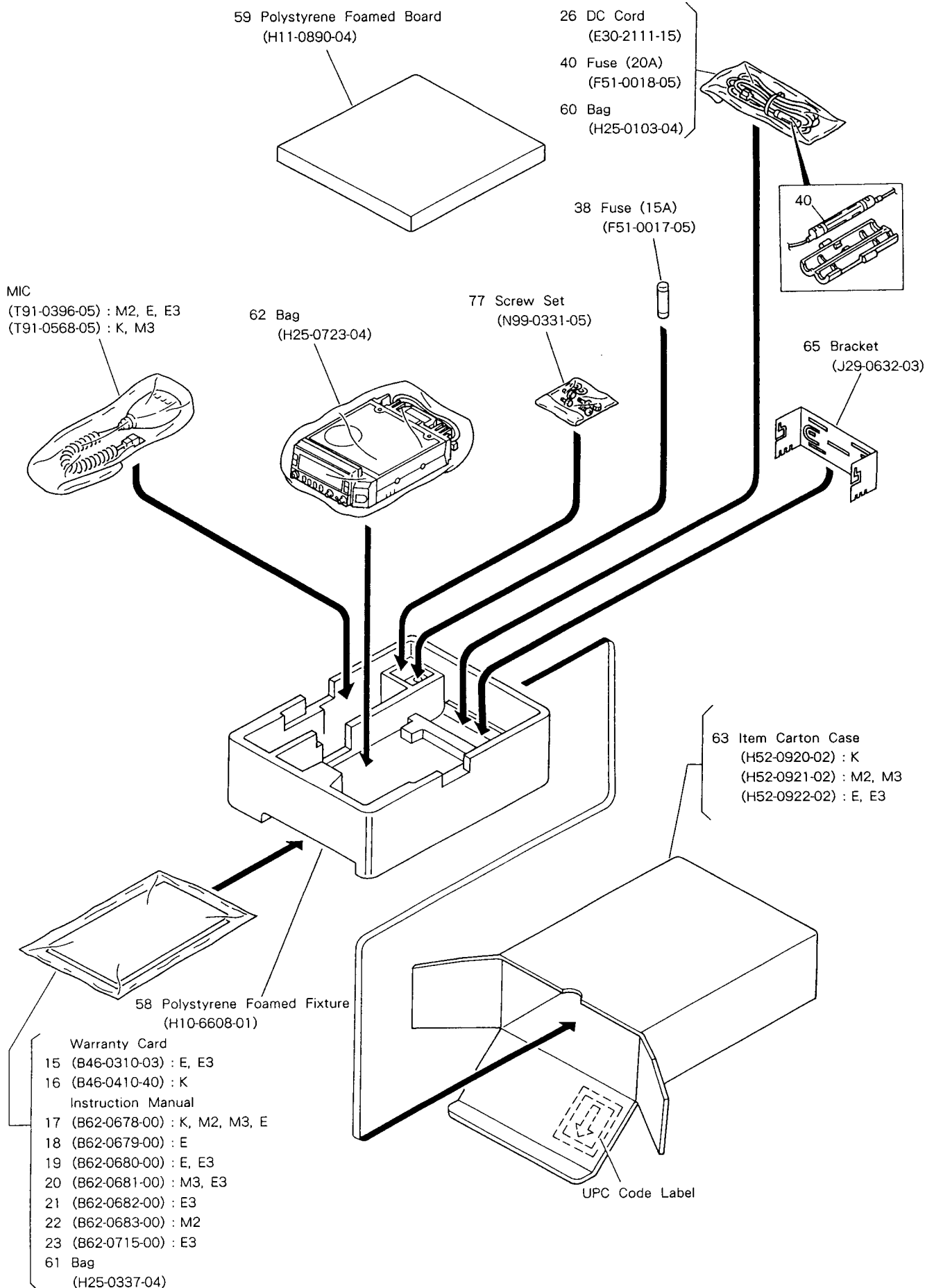
A		:N14-0569-04
B	M2.6x6(OC)BLK	:N33-2606-45
C	M3x8	:N67-3008-46
D	BLK	:N80-2010-45
E	BLK	:N80-2610-45
F		:N83-2005-46
G		:N83-2608-46
H	M2.6x6(Bi-Tap)	:N87-2606-46



Parts with the exploded numbers larger than 700 are not supplied.



## PACKING



## ADJUSTMENT

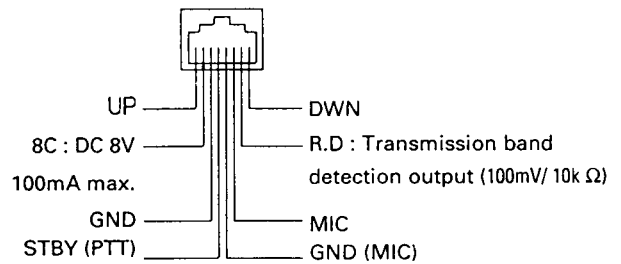
### Measuring Equipment for Adjustment

1. **Digital voltmeter (D.V.M)**  
Input impedance: High
2. **RF valve voltmeter (RF V.M)**  
Input impedance:  $1\text{M}\Omega$  or more, 2 pF or less  
Voltage range: Full scale = 10mV to 300V  
Measurable frequency range: up to 450MHz
3. **Frequency counter (f. counter)**  
Input sensitivity: About 50mV  
Measurable frequency: 450MHz or more
4. **DC power supply**  
Voltage: Variable in the range 10 to 17V  
Current: 13A or more
5. **Power meter**  
Measurement power: 60W, 30W, 10W  
Impedance:  $50\Omega$   
Measurable frequency: 450MHz
6. **AF valve voltmeter (AF V.M)**  
Input impedance:  $1\text{M}\Omega$  or more  
Voltage range: Full scale = 1mV to 30 V  
Measurable frequency range: 50Hz to 10kHz
7. **AF generator (AG)**  
Output frequency: 100Hz to 10kHz  
Output voltage: 0.5mV to 1V
8. **Line detector**  
Measurable frequency: 450MHz
9. **Spectrum analyzer**  
Measurable frequency: 450MHz
10. **Directional coupler**
11. **Oscilloscope**  
High sensitivity with horizontal input terminal
12. **Standard signal generator (SSG)**  
The standard signal generator must be able to generate the 1GHz band frequencies and vary the amplitude and frequency.  
Output: -133dBm to greater than -13dBm
13. **Dummy load (for AF)**  
 $8\Omega$ , about 5W
14. **Noise generator**  
The noise generator must be able to generate noise similar to ignition noise containing high-frequency components of 450MHz or more.
15. **Sweep generator**  
The sweep generator must be able to sweep the 144 and 430MHz bands.
16. **Tracking generator**
17. **Adjustment jig**

### Preparation

- Set the controls and switches to the positions listed below unless otherwise specified.

VOL control	Fully counterclockwise
SQL control	Fully counterclockwise
POWER switch	OFF
(For fixed stations) DC power supply POWER switch	OFF

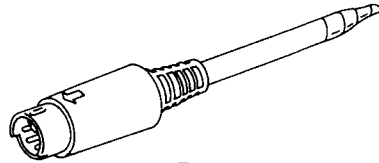


**Microphone socket**  
(as viewed from the front of the set)

- Use an insulated rod, such as a plastic rod, for adjustment (especially for trimmers, coils, etc.).
- To protect the signal generator, never connect the microphone to the microphone socket when the receiver section is adjusted.
- Before the power cord is connected, make sure the power switch is off.
- Without specification of SSG, standard modulation is applied (MOD : 1kHz, DEV :  $\pm 3\text{kHz}$ , AF output :  $0.63\text{V} / 8\Omega$ )
- See the instruction manual for transmit and receive operations.

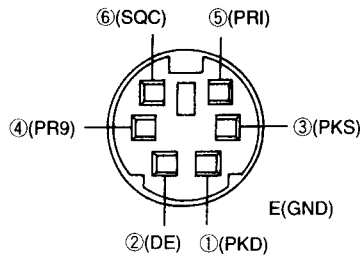
## ADJUSTMENT

### Adjustment Service Jig

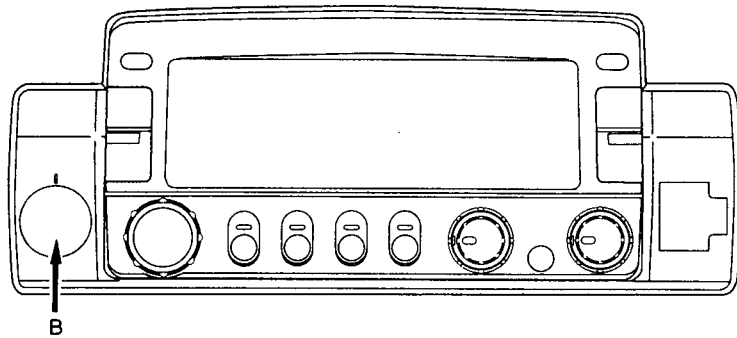


Data terminal short plug (W05-0611-00)

### ●Service jigs usage



Pin assignment seen from direction B



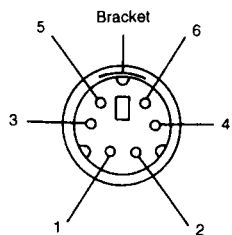
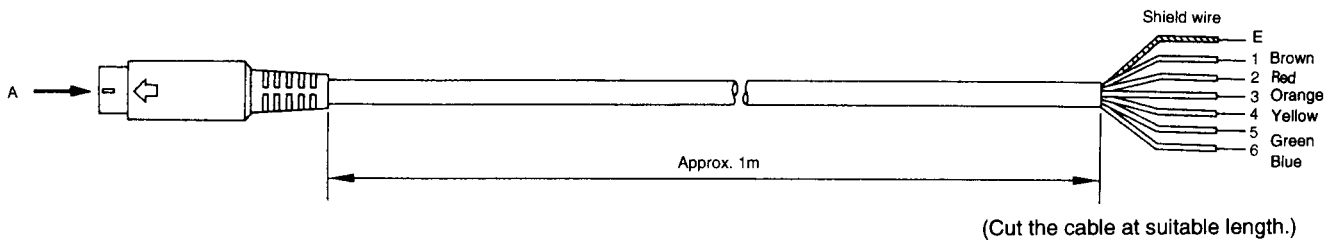
Short plug

Terminals ③ and ⑥ are short circuited.

[Reference] ③ PKS (SEND switch for DATA terminal)  
Connect PTT output. If PKS is set to "L", data are sent and the microphone will be mute.  
⑥ SQC (Squelch control output)  
This outputs squelch control output.

### ●Service jigs specification

Plug cable with 6P mini-DIN : Model PG-5A (cable parts No. : E30-3202-05) processed like under fig.

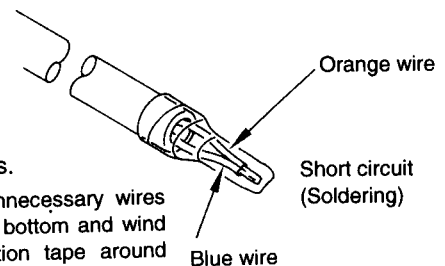


Pin assignment seen from direction A

DIN pin No.	Color
1	Brown
2	Red
(3)	Orange
4	Yellow
5	Green
(6)	Blue
Bracket	Shield

Join these DIN pins.

Cut unnecessary wires at the bottom and wind insulation tape around top edge.

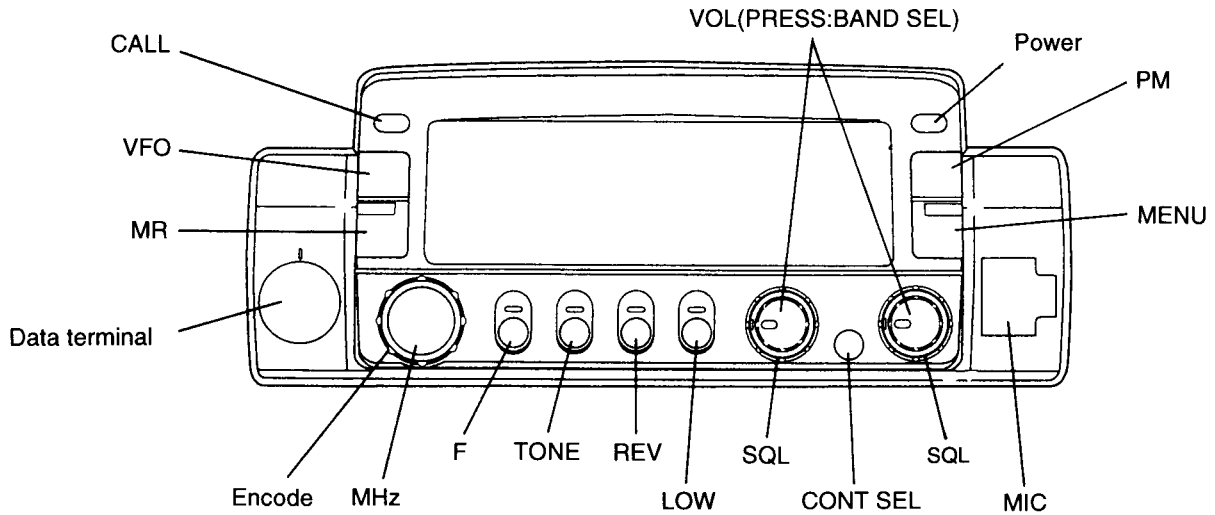


# TM-V7A/E

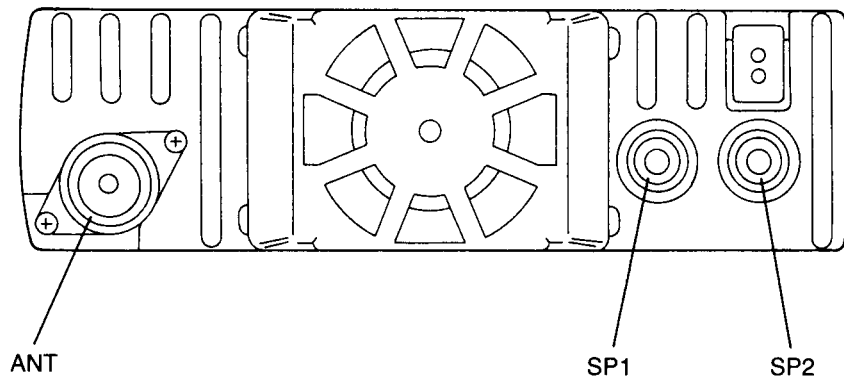
## ADJUSTMENT

### Parts layout

#### Front panel



#### Rear panel



### Adjustment parts layout

●TX-RX UNIT  
(Unit under)

●Adjustment parts No.

TC1 : Transmission frequency(UHF)

L6 : BPF(VHF)

L12 : BPF(VHF)

L17 : BPF(VHF)

VR1 : DEV(VHF)

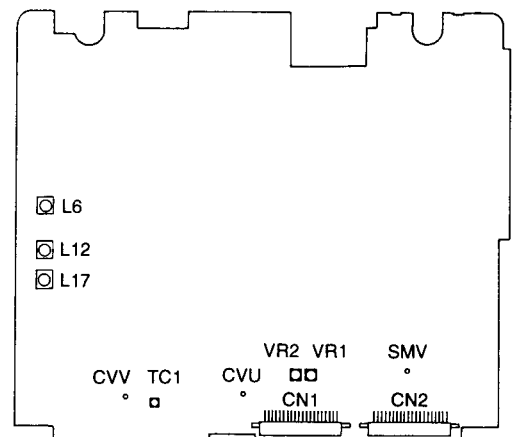
VR2 : DEV(UHF)

●Test point

CVV : VCO lock voltage (VHF)

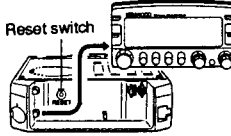
CVU : VCO lock voltage (UHF)

SMV : BPF



## ADJUSTMENT

### Common section

Item	Condition	Measurement			Adjustment			Specifications/ Remarks																																																																																																																																																																																															
		Test-equipment	Unit	Terminal	Unit	Parts	Method																																																																																																																																																																																																
1. Setting	1) Power voltage:13.8V 2) VOL:SQL knob:MIN																																																																																																																																																																																																						
2. Reset	<p><b>●VFO reset of full band</b> Return the setting contents of the full band of VFO to the original status at factory shipment. However, the contents of call channel, memory channel, program scan memory, memory channel lock out, and PM are not reset.</p> <p><b>OPERATION</b></p> <ol style="list-style-type: none"> <li>Turn OFF the power by depressing <b>[PWR]</b> key, while depressing <b>[VFO]</b> key, turn ON the power by depressing <b>[PWR]</b> key. "VFO Reset? Press [PWR]" is displayed.</li> </ol> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px 0;">                     VFO Reset? Press [VFO]                 </div> <ol style="list-style-type: none"> <li>Depress <b>[VFO]</b> key. Confirmation sound will be heard and full band data of VFO is reset. If you do not operate anything for 10 seconds, or press any key other than <b>[VFO]</b> key, the set does not execute VFO reset and return to frequency display.</li> </ol>	<p><b>●Hardware reset</b> If abnormal display or abnormal activity has occurred caused by static electricity, electric lighting etc., reset the set with the following procedures.</p>  <p><b>OPERATION</b></p> <ol style="list-style-type: none"> <li>Press <b>[PWR]</b> key while connecting the power cable to turn ON the power. Refer to the page 11 for removing method.</li> <li>Remove the panel.</li> <li>Press the reset switch (within 0.5 second) If pressing the reset switch for less than 1 second, the memory contents are not reset. If this switch is pressed longer than 1 second, the memory contents are reset.</li> </ol>	<p><b>●All reset</b> Return all the data to the original status at factory shipment! Do not interrupt your operation during resetting.</p> <p><b>OPERATION</b></p> <ol style="list-style-type: none"> <li>Turn OFF the power by depressing <b>[PWR]</b> key.</li> <li>While depressing <b>[MR]</b> key, turn ON the power by depressing <b>[PWR]</b> key. 1 second is required to light on all LCD. Do not release <b>[MR]</b> key until all LCD lights on.</li> <li>Release <b>[MR]</b> key. "All Reset? Press [MR]" is displayed.</li> </ol> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px 0;">                     All Reset? Press [MR]                 </div> <ol style="list-style-type: none"> <li>Depress <b>[MR]</b> key again. Confirmation sound will be heard and all the data is reset and the display returns to the initial value. If you do not operate anything for 10 seconds, or depress any key other than <b>[MR]</b> key, the set does not execute VFO reset and return to frequency display.</li> </ol>																																																																																																																																																																																																				
3. For adjustment Enter the memory frequency (Use this at the time of checking and operation confirmation.)	<ol style="list-style-type: none"> <li><b>[PWR]</b> Turn off this control and insert the short tool into the data terminal of the set.</li> <li>Turn ON <b>[PWR]</b> while depressing <b>[F]</b> key and <b>[TONE]</b> key simultaneously.</li> <li>Memory entering mode activates and the values shown in the table right are entered automatically.</li> <li>Turn OFF <b>[PWR]</b> and pull out the short plug.</li> <li>Perform all reset when erasing the entered memory contents.</li> </ol>	<p style="text-align: center;">&lt;List of memory frequency&gt;</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th></th> <th style="text-align: center;">K</th> <th style="text-align: center;">M</th> <th style="text-align: center;">E</th> <th></th> </tr> <tr> <th></th> <th></th> <th></th> <th style="text-align: center;">(M2, M3)</th> <th style="text-align: 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Low)	438.000	430.000	430.000		CH 6	(TX High)	449.975	439.975	439.975		CH 7	(CTCSS)	445.100	435.100	435.100	CT (88.5Hz)	CH 8	(CTCSS)	445.100	435.100	435.100	CT (151.4Hz)	CH 9	(DTSS)	445.200	435.200	435.200	DT (123)	CH 10	(DTSS)	445.200	435.200	435.200	DT (456)	CH 11		410.050	410.050	-----		CH 12		469.975	469.975	-----		CH 13		370.100	370.100	370.100		CH 14		-----	870.100	870.100	
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4. Lock voltage	<ol style="list-style-type: none"> <li>VHF band...CH1 FREQ.:146.050MHz:K,M FREQ.:145.050MHz:E</li> <li>UHF band...CH1 FREQ.:444.050MHz:K FREQ.:435.050MHz:M,E</li> <li>UHF band FREQ.:443.980MHz:K FREQ.:434.980MHz:M,E transmission</li> <li>VHF band FREQ.:145.980MHz:K,M FREQ.:144.980MHz:E transmission</li> </ol>	DC V.M	TX-RX	CVV (TP6)	Check	1.9~3.0V																																																																																																																																																																																																	
				CVU (TP7)		3.5~5.5V:K 3.0~5.0V:M,E																																																																																																																																																																																																	
		Power meter DC V.M	Rear panel	ANT CVU (TP7)		2.0~4.0V:K 1.5~4.0V:M,E																																																																																																																																																																																																	
				CVV (TP6)		1.4~2.5V																																																																																																																																																																																																	

## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
5. BPF	1) FREQ...CH1 :146.050MHz:K,M :145.050MHz:E SSG:-93dBm	SSG DC V.M	TX-RX Rear panel	ANT SMV (TP5)	TX-RX	L6 L12 L17	Voltage max	2.5V or more

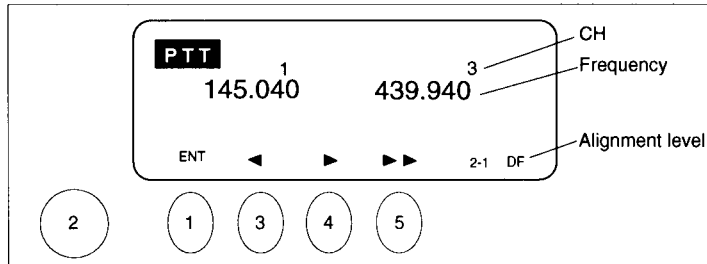
Carry out the following procedures after rising up the set in the adjustment mode.

Method of rising up the adjustment mode (Mode for adjustment and level setting)

1. Turn OFF (PWR) and insert the short plug into the data terminal of the set.
2. After 1 second of turning ON (PWR) while depressing the (F) key and the (TONE) key simultaneously, all LCDs light on and the screen will be white.
3. When setting all keys to free, the right figure will be displayed on the screen.

All Reset?  
Press [MR]

4. All reset is executed when (MR) key is depressed. The frequencies which are specified by frequency entering mode will be entered and the next procedure is executed. However, when any key other than (MR) key is depressed or no operation is activated for 10 seconds, the adjustment mode is released.
5. Key operation



1. ENT Key . . . Decide the setting value and proceed to the next step.  
\* During adjustment of transmission system, depress ENT key after turning OFF the transmission.
2. ENC Knob . . . UP/DOWN for the setting value
3. ► key . . . Return to the previous step
4. ◀ key . . . Proceed to the next step
5. ►► key . . . Change the adjustment item

(Note) Adjustment mode is released when turning OFF (PWR) .

6. Refer to the separate table on page 50 for the adjustment items and their contents of the set.

### Receiver section

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. High level input S/N and distortion	1) V band...CH1 step 1-1 FREQ.:146.050MHz:K,M FREQ.:145.050MHz:E SSG:-53dBm AF output:2.83V/8Ω	Oscilloscope AF V.M SSG Distortion meter	Rear panel	EXT. SP2			Check	S/N 44dB or more Distortion rate: 5% or less
	2) U band...CH1 step 1-2 FREQ.:444.050MHz:K FREQ.:435.050MHz:M,E SSG:-53dBm AF output:2.83V/8Ω			EXT. SP1				S/N 42dB or more Distortion rate: 5% or less

## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
2. Sensitivity	1) V band step 2-1 FREQ.:CH1 step 2-2 FREQ.:CH2 step 2-3 FREQ.:CH3 SSG: -122dBm	Distortion meter Oscilloscope AF V.M	Rear panel	EXP. SP1			Check	SINAD 12dB or more
	2) U band step 2-4 FREQ.:CH1 step 2-5 FREQ.:CH2 step 2-6 FREQ.:CH3 SSG: -122dBm							SINAD 12dB or more
	3) U2 band step 2-7 FREQ.:CH1 SSG: -118dBm							SINAD 12dB or more
	4) V2 band step 2-8 FREQ.:CH1 SSG: -118dBm							SINAD 12dB or more
3. Squelch	1) V band step 3-1 FREQ.:CH1 Set to the point where noise will be erased by turning the squelch knob.	Oscilloscope SSG	Rear panel	EXP. SP1			Check	Knob position: 8:00~11:00 BUSY lights off.
	2) SSG: -130dBm							Squelch open. BUSY lights on.
	3) Squelch knob: clockwise MAX							AF output disappear. BUSY lights off.
	4) U band step 3-2 FREQ.:CH1 Set to the point where noise will be erased by turning the squelch knob.							Knob position: 8:00~11:00 BUSY lights off.
	5) SSG: -130dBm							Squelch open. BUSY lights on.
	6) Squelch knob: clockwise MAX							AF output disappear. BUSY lights off.
	7) U2 band step 3-3 FREQ.:CH1 SSG: -125dBm							Squelch open. Note: If not squelch opened, minimum 20dB NQ is acceptable.
	8) V2 band step 3-4 FREQ.:CH1 SSG: -125dBm							

# TM-V7A/E

## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
4. S-meter	1) V band step 4-1 FREQ.:CH1 SSG: -118dBm	SSG	Rear panel	ANT			Check	S-meter one segment (S1) lights on.
	2) step 4-2 SSG: -96dBm							S-meter all segments (S7) lights on.
	3) U band step 4-3 FREQ.:CH1 SSG: -118dBm							S-meter one segment (S1) lights on.
	4) step 4-4 SSG: -96dBm							S-meter all segments (S7) lights on.
	5) U2 band step 4-5 SSG: -116dBm							S-meter one segment (S1) lights on.
	6) step 4-6 SSG: -96dBm							S-meter all segments (S7) lights on.
	7) V2 band step 4-7 SSG: -116dBm							S-meter one segment (S1) lights on.
	8) step 4-8 SSG: -96dBm							S-meter all segments (S7) lights on.
	9) U-800 band step 4-9 FREQ.:CH14 SSG: -105dBm							S-meter one segment (S1) lights on.
	10) step 4-10 SSG: -85dBm							S-meter all segments (S7) lights on.
	11) U-300 band step 4-11 FREQ.:CH13 SSG: -110dBm							S-meter one segment (S1) lights on.
	12) step 4-12 SSG: -90dBm							S-meter all segments (S7) lights on.
	13) V-118 band step 4-13 FREQ.:CH11 SSG: -100dBm							S-meter one segment (S1) lights on.
	14) step 4-14 SSG: -83dBm							S-meter all segments (S7) lights on.



## ADJUSTMENT

### Transmission section

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
1. Transmission frequency	1) U band FREQ.:444.000MHz:K FREQ.:435.000MHz:M,E	f.counter Dummy	Rear panel	ANT	TX-RX (A/4)	TC1	444.000MHz:K 435.000MHz:M,E	Not warm up the set. ±100Hz
2-1. POWER VHF band	1) POWER:LOW step6-1 FREQ.:CH4 Transmission.	Power meter Ammeter	Rear panel	ANT	Display	Encode	UP/DOWN	5.0W±0.5W
	2) POWER:MID step6-2 Transmission.							12.0W±1.0W
	3) POWER:MAX step6-3 Transmission.					Check	48.0W	
	4) POWER:HI step6-3 Transmission.				Display	Encode	UP/DOWN	MAX Power 52W or more . 50.0W±1.0W MAX Power 48W or more . (MAX Power -2W) ±1.0W
	5) FREQ.:CH5 POWER:HI Transmission.						Check	44~60W
	6) POWER:MID Transmission.							10~14W
	7) POWER:LOW Transmission.							3~10W
2-2. POWER UHF band	1) POWER:LOW step6-4 FREQ.:CH4 Transmission.	Power meter	Rear panel	ANT	Display	Encode	UP/DOWN	5.0W±0.5W
	2) POWER:MID step6-5 Transmission.							12.0W±1.0W
	3) POWER:MAX step6-6 Transmission.					Check	33.0W or more	
	4) POWER:HI step6-6 Transmission.				Display	Encode	UP/DOWN	MAX Power 37W or more . 35.0W±1.0W MAX Power 33W or more . (MAX Power -2W) ±1.0W
	5) FREQ.:CH5 FREQ.:CH6 POWER:HI Transmission.						Check	28~42W
	6) POWER:MID Transmission.							10~14W
	7) POWER:LOW Transmission.							1~4W

## ADJUSTMENT

Item	Condition	Measurement			Adjustment			Specifications/ Remarks
		Test-equipment	Unit	Terminal	Unit	Parts	Method	
3. DEV	1) V band Step 7-1 FREQ.:CH4 AG:1kHz25mV:E AG:1kHz50mV:K,M Transmission	Linear detector Oscilloscope AG	Rear panel	ANT	TX-RX	VR2	±4.2kHz (+, - with a larger value)	±200Hz
	Check						±2.3~4.2kHz:E ±2.4~4.1kHz:K,M	
	3) U band Step 7-2 FREQ.:CH4 AG:1kHz25mV:E AG:1kHz50mV:K,M Transmission				TX-RX	VR1	±4.2kHz (+, - with a larger value)	±200Hz
	4) Down AG output from the above state by 20dB (1kHz/2.5mV):E 20dB (1kHz/5.0mV):K,M Transmission						Check	
4. TONE	1) V band Step 8-1 FREQ.:CH7 Transmission	Linear detector Oscilloscope	Rear panel	ANT			Check	±0.5~1.3kHz
	2) U band Step 8-2 FREQ.:CH7 Transmission							
5. Protection	1) V band Step 10-1 FREQ.:CH4 ANT:short circuit and open Transmission	Ammeter					Check	12.0A or less
	2) U band Step 10-2 FREQ.:CH4 ANT:short circuit and open Transmission							10.0A or less

### [Reference] Adjustment modes and their contents of the set

No.	Item	Information display	Remarks
1	All displays lighting	"All lighting"	LCD lights off when depressing [F] and [TONE] keys.
	All reset	"All Reset? Press[MR]"	All reset is executed by depressing [MR] key. All reset is not executed by depressing other than [MR] key.
2	High level input S/N, Distortion, AF output and Current confirmation	[1-1]	VHF(V-C)、MR1ch
		[1-2]	UHF(U-C)、MR1ch
3	Receiving sensitivity confirmation	[2-1]	VHF(V-C)、MR1ch
		[2-2]	VHF(V-L)、MR2ch
		[2-3]	VHF(V-H)、MR3ch
		[2-4]	UHF(U-C)、MR1ch
		[2-5]	UHF(U-L)、MR2ch
		[2-6]	UHF(U-H)、MR3ch
		[2-7]	UHF(SU-C)、UXU ON、MR1ch
		[2-8]	VHF(SV-C)、VXV ON、MR1ch

## ADJUSTMENT

No.	Item	Information display	Remarks
4	Squelch open sensitivity setting	[3-1XX]	VHF(V-C), MR1ch, set with [ENT] key
		[3-2XX]	UHF(U-C), MR1ch, set with [ENT] key
		[3-3XX]	UHF(SU-C), MR1ch, UXU ON, set with [ENT] key
		[3-4XX]	VHF(SV-C), MR1ch, VXV ON, set with [ENT] key
5	S-meter adjustment setting	[4-1XX]	VHF(V-C), MR1ch, set with [ENT] key (One light on setting)
		[4-2XX]	VHF(V-C), MR1ch, set with [ENT] key (Seven lights on setting)
		[4-3XX]	UHF(U-C), MR1ch, set with [ENT] key (One light on setting)
		[4-4XX]	UHF(U-C), MR1ch, set with [ENT] key (Seven lights on setting)
		[4-5XX]	UHF(SU-C), UXU ON, MR1ch, set with [ENT] key (One light on setting)
		[4-6XX]	UHF(SU-C), UXU ON, MR1ch, set with [ENT] key (Seven lights on setting)
		[4-7XX]	VHF(SV-C), VXV ON, MR1ch, set with [ENT] key (One light on setting)
		[4-8XX]	VHF(SV-C), VXV ON, MR1ch, set with [ENT] key (Seven lights on setting)
		[4-9XX]	UHF(800), 800MHz ON, MR14ch, set with [ENT] key (One light on setting)
		[4-10XX]	UHF(800), 800MHz ON, MR14ch, set with [ENT] key (Seven lights on setting)
		[4-11XX]	UHF(300), MR13ch, set with [ENT] key (One light on setting)
		[4-12XX]	UHF(300), MR13ch, set with [ENT] key (Seven lights on setting)
		[4-13XX]	VHF(118), MR11ch, set with [ENT] key (One light on setting)
		[4-14XX]	VHF(118), MR11ch, set with [ENT] key (Seven lights on setting)
6	Unused	[5-1]	VHF(V-C), MR1ch
		[5-2]	UHF(U-C), MR1ch
7	Transmission output setting	[6-1XX]	VHF(V-C), MR4ch, LOW, [ENC]:Output adjustment, [ENT]:Setting *
		[6-2XX]	VHF(V-C), MR4ch, MID, [ENC]:Output adjustment, [ENT]:Setting
		[6-3XX]	VHF(V-C), MR4ch, HI, [ENC]:Output adjustment, [ENT]:Setting
		[6-4XX]	UHF(U-C), MR4ch, LOW, [ENC]:Output adjustment, [ENT]:Setting *
		[6-5XX]	UHF(U-C), MR4ch, MID, [ENC]:Output adjustment, [ENT]:Setting
		[6-6XX]	UHF(U-C), MR4ch, HI
8	Deviation confirmation	[7-1]	VHF(V-C), MR4ch
		[7-2]	UHF(U-C), MR4ch
9	Tone	[8-1]	VHF(V-C), MR7ch
		[8-2]	UHF(U-C), MR7ch
10	Spurious abnormal oscillation	[9-1]	VHF(V-C), MR4ch
		[9-2]	VHF(V-L), MR5ch
		[9-3]	VHF(V-H), MR6ch
		[9-4]	UHF(U-C), MR4ch
		[9-5]	UHF(U-L), MR5ch
		[9-6]	UHF(U-H), MR6ch
21	Protection	[10-1]	VHF(V-C), MR4ch
		[10-2]	UHF(U-C), MR4ch
22	Data terminal	[11-1]	UHF(U-C), MR15ch, 1200bps
		[11-2]	UHF(U-C), MR15ch, 9600bps

Note: For "XX" in (4) squelch open sensitivity confirmation, (5) S-meter adjustment setting, and (7) send transmission output setting, the set data is displayed with two digits of HEX data.

Note: For (7) send transmission output setting, FF (full power) should be an initial value at the time of first power ON with EEPROM.

Note: For (10) spurious abnormal oscillation, the transmission output changes in the order  $\boxed{H \rightarrow M \rightarrow L}$  with each depression of the [MNU] key.



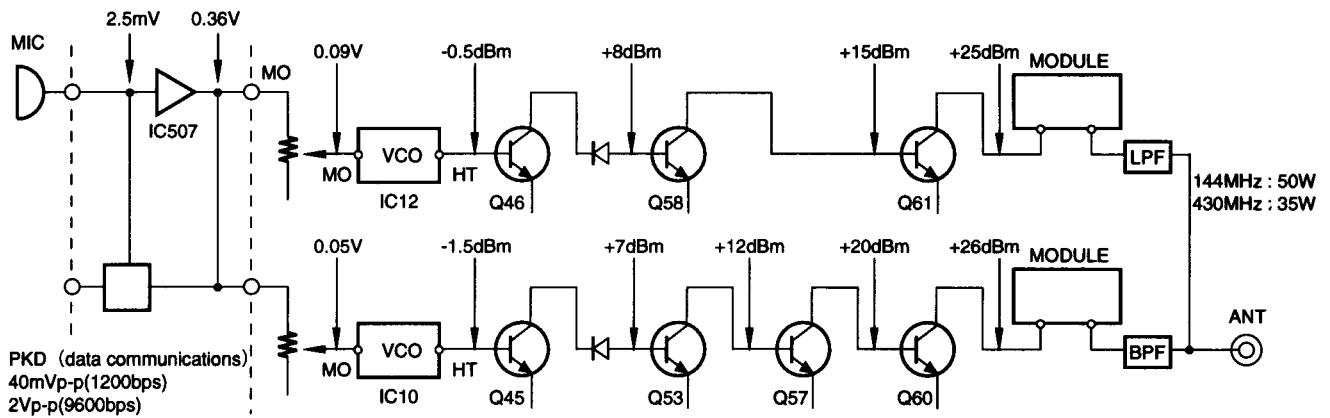




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## LEVEL DIAGRAM

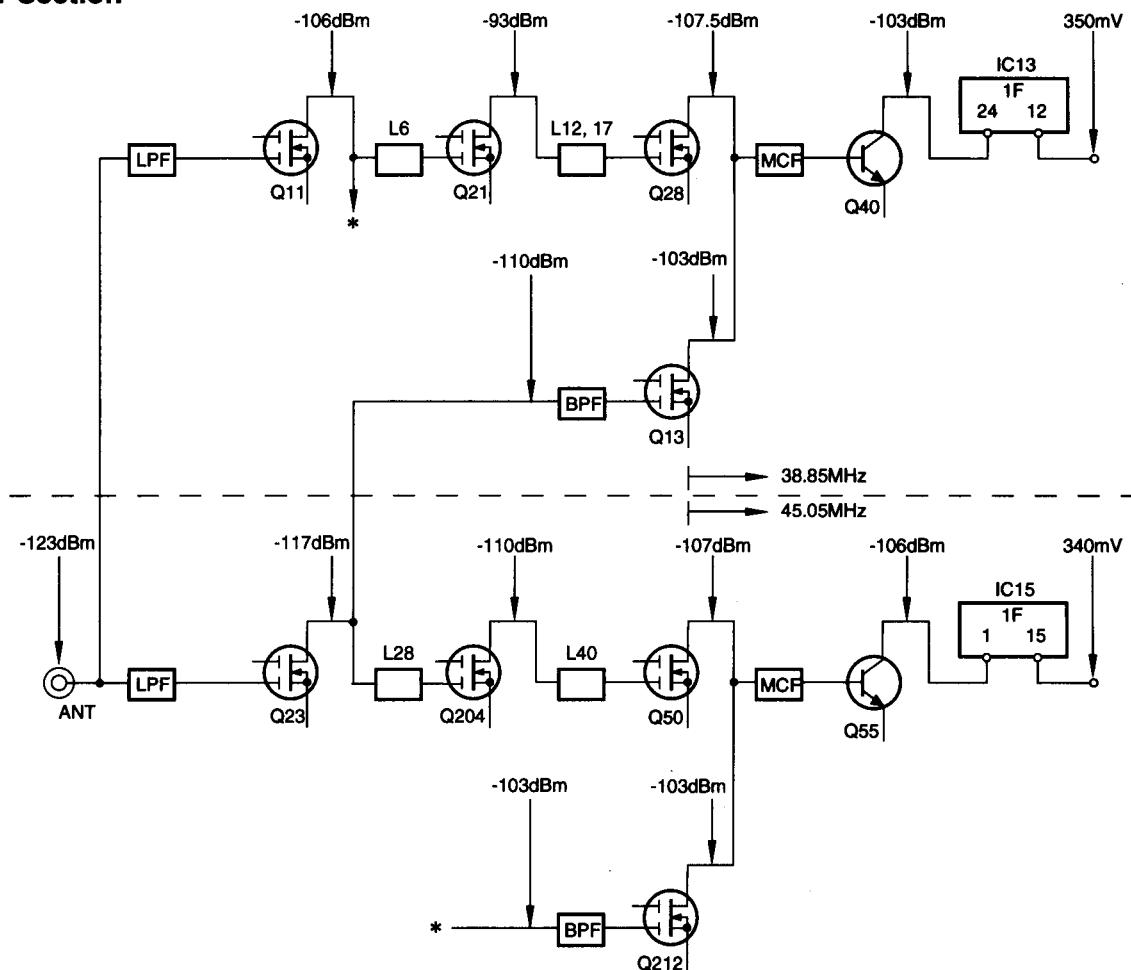
### Transmitter Section



Note 1: Set the AG so that the microphone socket input is 3kHz deviation at 1kHz modulation.  
The data communication connector input level is 3kHz deviation at 1kHz modulation for 1200bps and 2kHz deviation at 1kHz modulation for 9600bps.

Note 2: The transmit frequency is 145.0 or 435.0MHz.  
Note 3: The HI/MID/LOW switch is set to HI.  
Note 4: The measurements with the power meter, except for the ANT connector, are the values with the APC off.

### Receiver Section

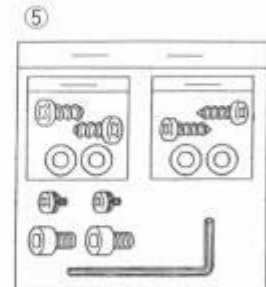
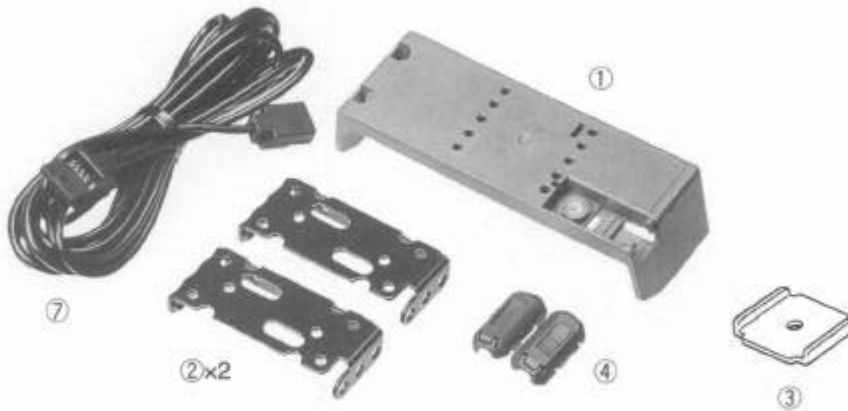


Note 1: The 12dB SINAD levels were plotted using a standard signal generator through a 0.01μF ceramic capacitor at each point from the RF to the first IF.

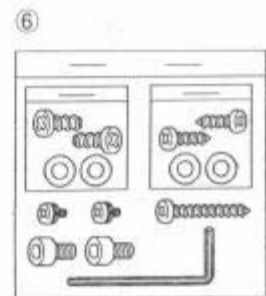
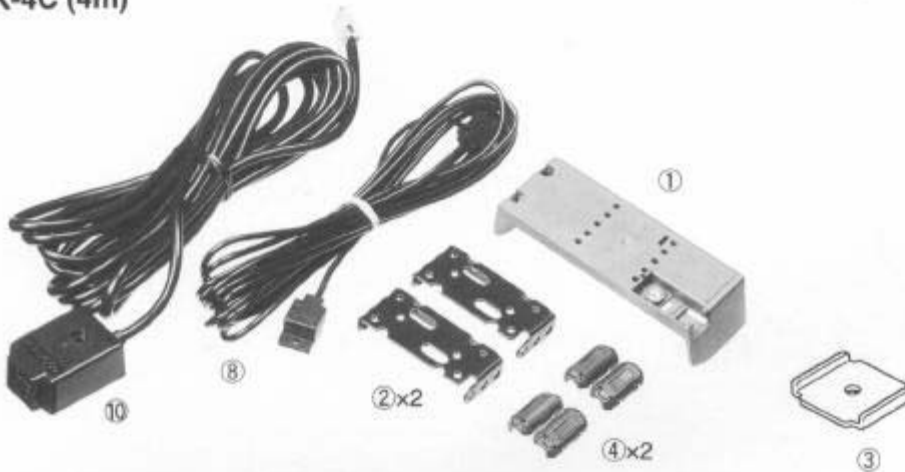
Note 2: The AF levels were measured with an AF voltmeter when the -73dBm (50μV) standard signal generator signal modulated by a 1kHz modulation frequency and a 3kHz deviation was received and the AF output was adjusted to 0.63V/8Ω by the AF VR.

## DETACHABLE FRONT PANEL KIT (DFK-3C/4C/7C)

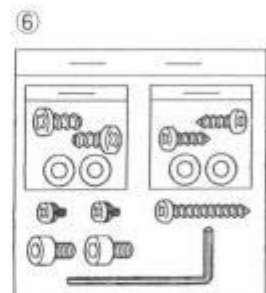
### DFK-3C (3m)



### DFK-4C (4m)



### DFK-7C (7m)



### DFK-3C/4C/7C MAIN PARTS LIST

Ref. No.	New Parts	Parts No.	Q'ty	Parts Name	Model
1	.	A62-0495-03	1	One touch panel	
2		J29-0475-04	2	Bracket	
3		J21-4457-04	1	Cable connector bracket	
4		L79-1417-05	1	Line filter	3C
4		L79-1417-05	2	Line filter	4C / 7C
5		N99-0381-15	1	Screw set	3C
6		N99-0389-15	1	Screw set	4C / 7C
7		E30-3189-15	1	Panel cable (3m)	3C

Ref. No.	New Parts	Parts No.	Q'ty	Parts Name	Model
8		E30-3190-15	1	Panel cable(4m)	4C
9		E30-3192-15	1	Panel cable (7m)	7C
10		E30-3151-05	1	Microphone cable (4m)	4C
11		E30-3153-05	1	Microphone cable (7m)	7C
12		E30-3191-05	1	Speaker cable (5m)	7C
13		E30-3199-05	1	DC power cable (6m)	7C
-		F51-0018-05	2	Fuse (20A)	7C



# TM-V7A/E

## SPECIFICATIONS

Specifications are subject to change without notice due to advancements in technology.

General		VHF Band	UHF Band
Frequency range	U.S.A./Canada	144~148MHz	438~450MHz
	General	144~148MHz	430~440MHz
	Europe	144~146MHz	430~440MHz
Mode		F3E (FM)	
Antenna impedance		50 Ω	
Usable temperature range		-20°C ~ +60°C (-4°F ~ +140°F)	
Power supply		13.8V DC ±15% (11.7~15.8V)	
Grounding method		Negative ground	
Current	Transmit (max.)	11.0A or less	10.0A or less
	Receive (at 2W output)	1.0A or less	
Frequency stability (-10°C ~ +50°C)		Within ±3ppm	
Dimensions (W×H×D projections included)		140×54.5×205.5mm / 5.51"×2.15"×8.09"	
Weight		1.2kg / 2.6lb	
<b>Transmitter</b>			
Power output	High	50W	35W
	Mid	Approx. 10W	
	Low	Approx. 5W	
Modulation		Reactance	
Spurious emissions		-60dB or less	
Maximum frequency deviation		±5kHz	
Audio distortion (at 60% modulation)		3% or less	
Microphone impedance		600 Ω	
<b>Receiver</b>			
Circuitry		Double conversion	
Intermediate frequency (1st / 2nd)		38.85MHz / 450kHz	45.05MHz / 455kHz
Sensitivity (12dB SINAD)	VHF or UHF band	0.16μV or less	
	Sub VHF or UHF band (in VHF/VHF or UHF/UHF mode)	0.25μV or less	
Selectivity (-6dB)		12kHz or more	
Selectivity (-60dB)		28kHz or less	
Squelch sensitivity		0.1μV or less	
Audio output (8 ohms, 5% distortion)		2W or higher	
Audio output impedance		8 Ω	

**Note:** Receiver specifications apply only when using the main VHF or UHF band. They do not apply to the sub VHF or UHF band in VHF/VHF or UHF/UHF mode.

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