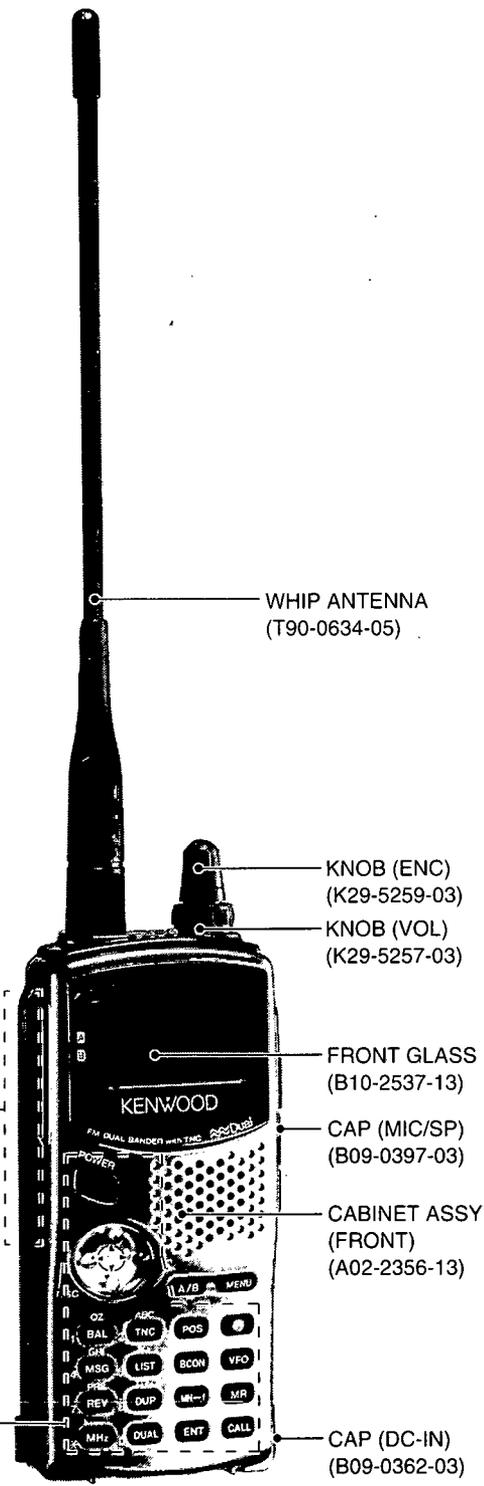


# TH-D7A/E

## SERVICE MANUAL

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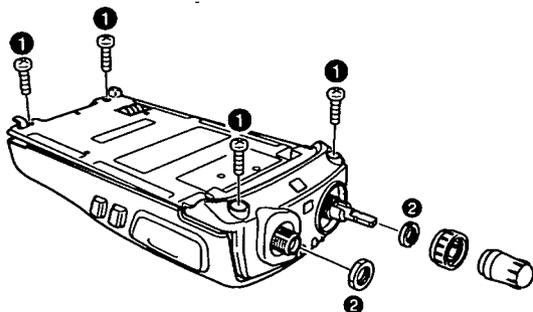
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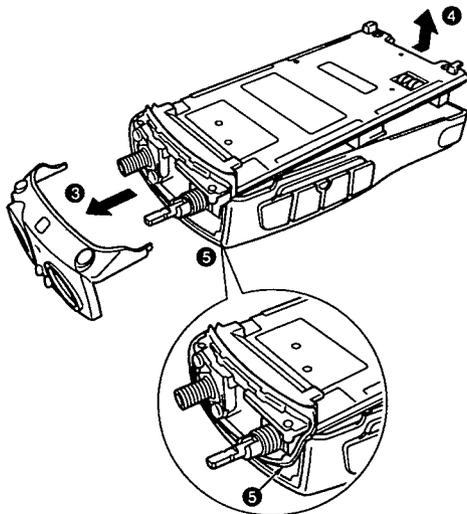
## DISASSEMBLY FOR REPAIR

### To open the main body:

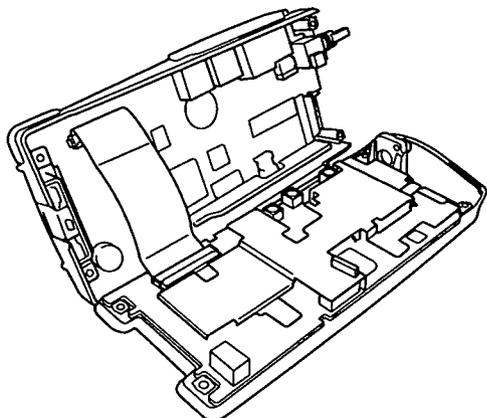
1. Remove the battery pack, whip antenna, and VOL/ENC knob, then remove the four screws (1) on the rear chassis and the two nuts (2) holding the VOL/ENC, SMA receptacle. (Use a special nut driver.)



2. Pull out the panel assembly (3) and separate the chassis from the case gradually, beginning with the bottom (4). Finally, remove the waterproof seal rubber (5) from the groove, being careful not to break the rubber.



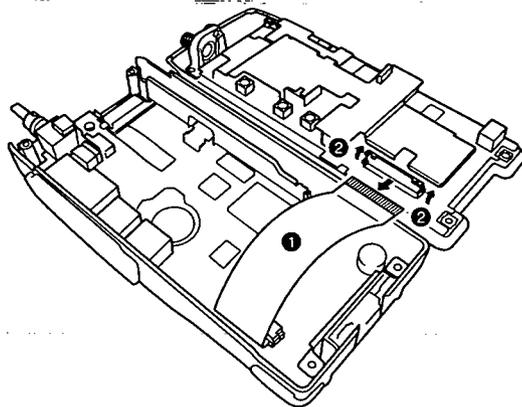
3. The main body is divided into two blocks: a case and a chassis. However, they are connected with a flat cable. The TH-D7A/E can be turned on, checked and adjusted.



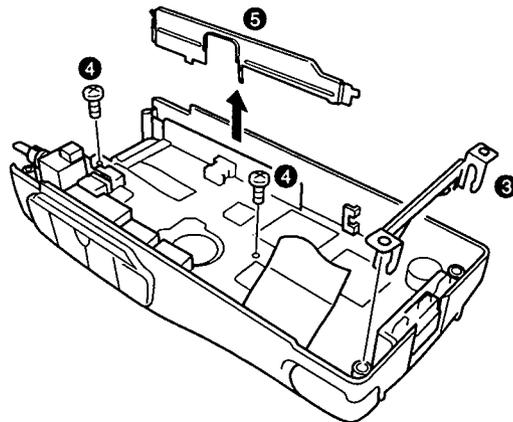
### To remove the PC boards:

Control PC board (case side)

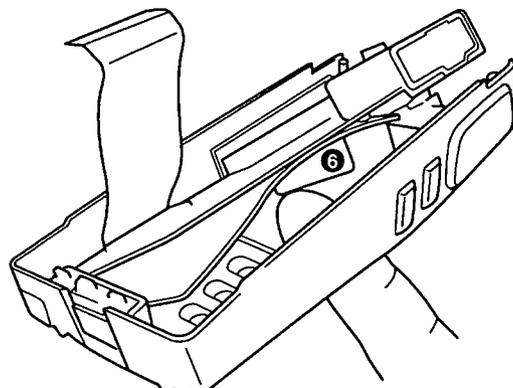
1. The flat cable (1) connecting the case and the chassis can be disconnected by erecting the stopper (2). (Do not force to remove the cable, or it may be damaged.)



2. To remove the control PC board, remove the holder (3) and the two screws (4) holding the PC board. Then slide the fitting (5) on the back of the PTT switch to remove it.



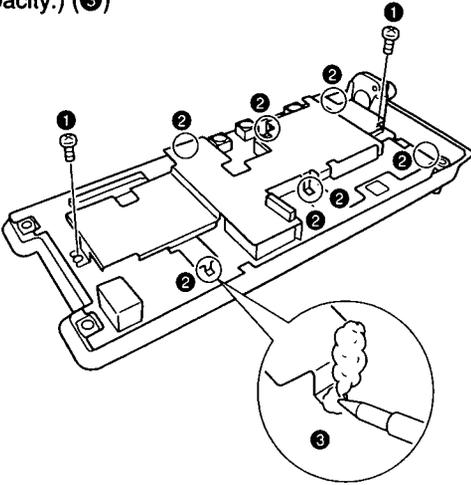
3. Push the cross key section (6) on the key top upward from the front with a finger. The control PC board is lifted and removed from the case.



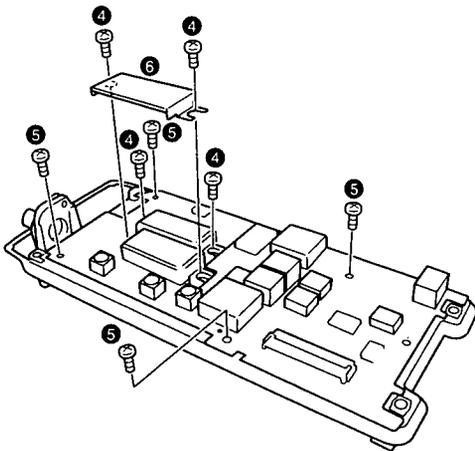
## DISASSEMBLY FOR REPAIR

### RF PC board (chassis side)

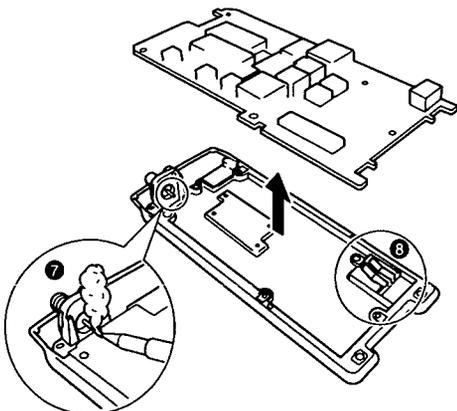
1. Remove the two screws (1) and the seven solders (2) to remove the shield. (Use a soldering iron with a large thermal capacity.) (3)



2. Remove the four screws (4) holding the power module and the four screws (5) holding the PC board. (The VHF power module and the shield case (6) are installed together.)

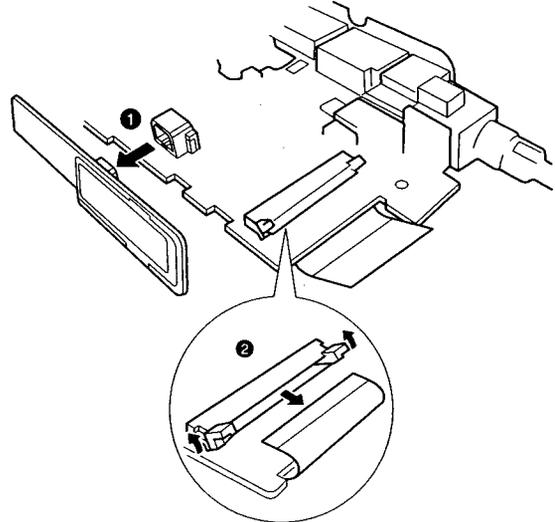


3. Finally, remove the solder (7) from the ANT terminal to remove the RF PC board from the chassis. Take care not to drop and lose the battery terminal (8) on the chassis.

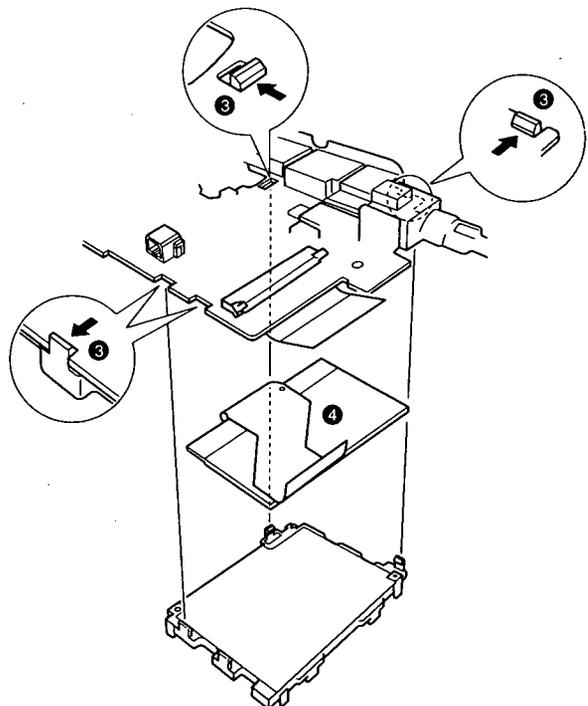


### To remove the LCD assembly:

1. Remove the PTT PC board (X57: C/4) from the control PC board (1). Remove the flat cable of the LCD assembly by erecting the connector stopper (2).



2. Release the four hooks (3) on the right guide from the control PC board. The right guide and LCD assembly (4) will be detached.



### Reassembly notes

- When replacing the power module, first install the screws, then solder the leads.
- Install the waterproof seal rubber with a special care not to deform it.

## CIRCUIT DESCRIPTION

Note: See the block diagrams and circuit diagrams as required.

### 1. Frequency configuration

The TH-D7A/E has a VCO and a PLL unit for each of the VHF and UHF bands, so it can receive signals in these bands at the same time and implements full duplexing.

The VHF VCO is used for VHF transmission, the first local oscillator for the main VHF reception, and first local oscillator (doubled) for sub UHF reception. The UHF VCO is used for UHF transmission, the first local oscillator for the main UHF reception, and the first local oscillator (divided by two) for sub VHF reception.

The PLL reference signal is produced by the 12.8MHz oscillator circuit and used for both bands. The second local oscillator for the VHF band uses the tripled 12.8MHz reference signal frequency. The second local oscillator for the UHF band uses 45.05 MHz generated by the IF IC crystal oscillator circuit.

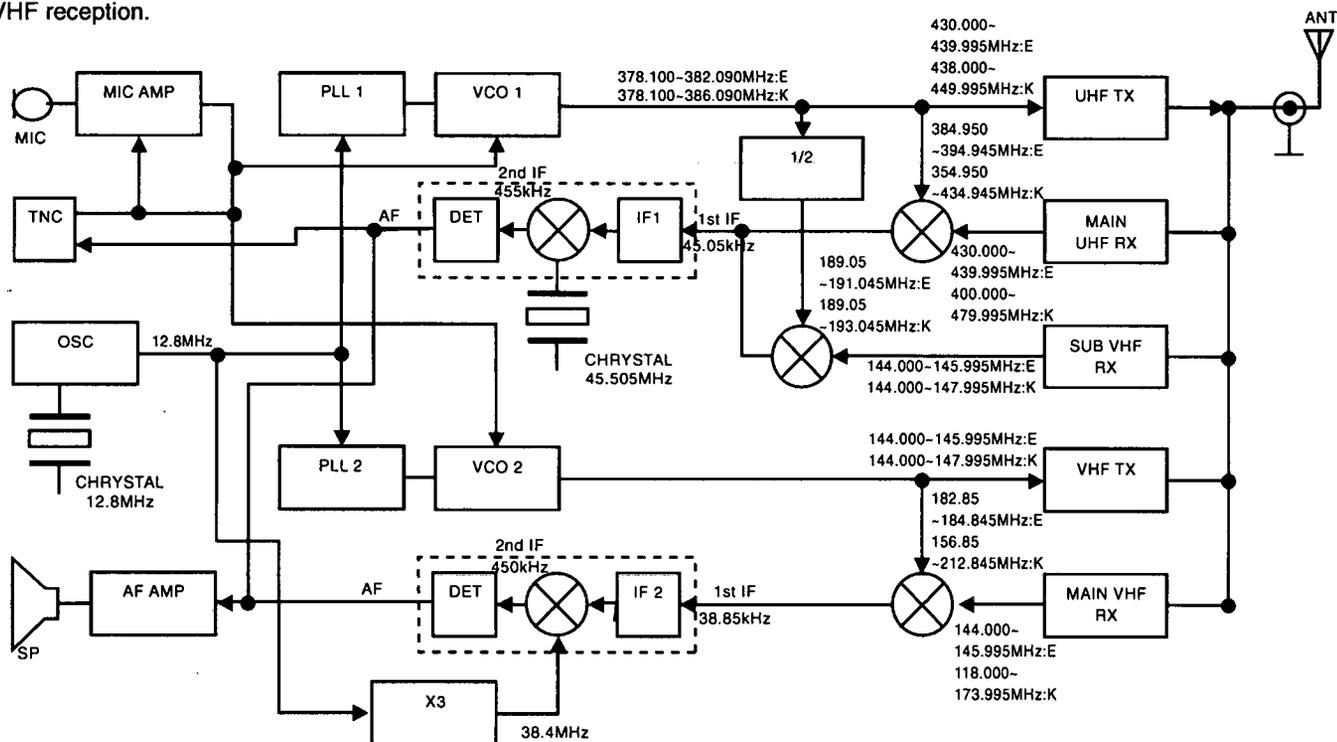


Fig.1 Frequency Configuration

### 2. Receiver system

#### ■ Main VHF Receiver

The incoming signal from the antenna passes through a duplexer (LC) and a filter circuit. The signal is divided into the main and sub VHF receiver circuits. In the main VHF receiver, the signal enters the helical resonator (L72). This signal is amplified by the RF amplifier (Q53), passes through the two helical resonators (L71, L69) and goes to the mixer (Q50). The frequency of the signal is converted by the first local oscillator and upper hetero to produce a first IF signal of 38.85 MHz. The signal passes through the MCF (XF2) and enters IF IC (IC13). The signal is converted to the second IF signal of 450 kHz by the second local oscillator, which is three times 12.8 MHz, and the lower hetero, and detected to produce an audio signal.

#### ■ Main UHF Receiver

The incoming signal from the antenna passes through a duplexer (LC) and a filter circuit, and enters the RF amplifier (Q40). The amplified signal is divided into the main UHF receiver and the sub VHF receiver. In the main UHF receiver, the signal passes through the SAW filter (L30) and enters the mixer (Q39). The frequency of the signal is converted by the first local oscillator and lower hetero to produce a first IF signal of 45.05 MHz. The signal passes through the MCF (XF1) and enters the IF IC (IC12). The signal is converted to the second IF signal of 455 kHz by the second local oscillator and upper hetero, and detected to produce an audio signal.

# CIRCUIT DESCRIPTION

## ■ Sub VHF receiver

The signal divided from the main VHF receiver circuit enters the RF amplifier (Q49). The amplified signal goes to the mixer (Q48). The frequency of the signal is converted by the first local oscillator generated by dividing the UHF VCO oscillator frequency by two by the prescaler (IC17) and the upper hetero to produce a first IF signal of 45.05 MHz. The signal passes through the MCF (XF1) and enters the IF IC (IC12). The signal is converted to the second IF signal of 455 kHz by the second local oscillator and upper hetero, and detected to produce an audio signal.

## ■ Audio Circuit

The detected VHF and UHF audio signal passes through the balance control circuit (Q522, Q523, Q525, and Q526), is mixed, passes through the buffer amplifier (IC517) and de-emphasized by Q520. The signal passes through the AF mute (Q539) and variable resistor, is mixed with the beep DTMF signal and goes to the AF amplifier (IC500). The amplified signal is fed to the speaker.

The detected VHF and UHF audio signal is switched by the AF SW (IC513) and used as a 1200bps packet signal, 9600bps packet signal, high-speed FM mode SSTV signal and CTCSS decode signal.

The 1200bps packet signal is amplified by the AF amplifier (IC514), passes through the audio filter (Q527), rectified to a rectangular wave by the comparator (IC512), goes to the TNC ASIC (IC510), passes through the filter (Q524, Q528, IC515), returns to IC510, converted to digital data and output to the PC pin from the TNC CPU (IC511). The 9600bps packet signal is amplified by the AF amplifier (IC514), passes through the audio filter (Q529), rectified to a rectangular wave by the comparator (IC512), goes to the TNC ASIC (IC510), converted to digital data and output to the PC pin from TNC CPU (IC511). The high-speed SSTV signal is amplified by the AF amplifier (IC506), switched by Q532 and output to the external SP terminal without passing through the audio amplifier. The CTCSS decode signal passes through the CR LPF and enters the CTCSS decoder (IC509).

## 3. Transmitter system

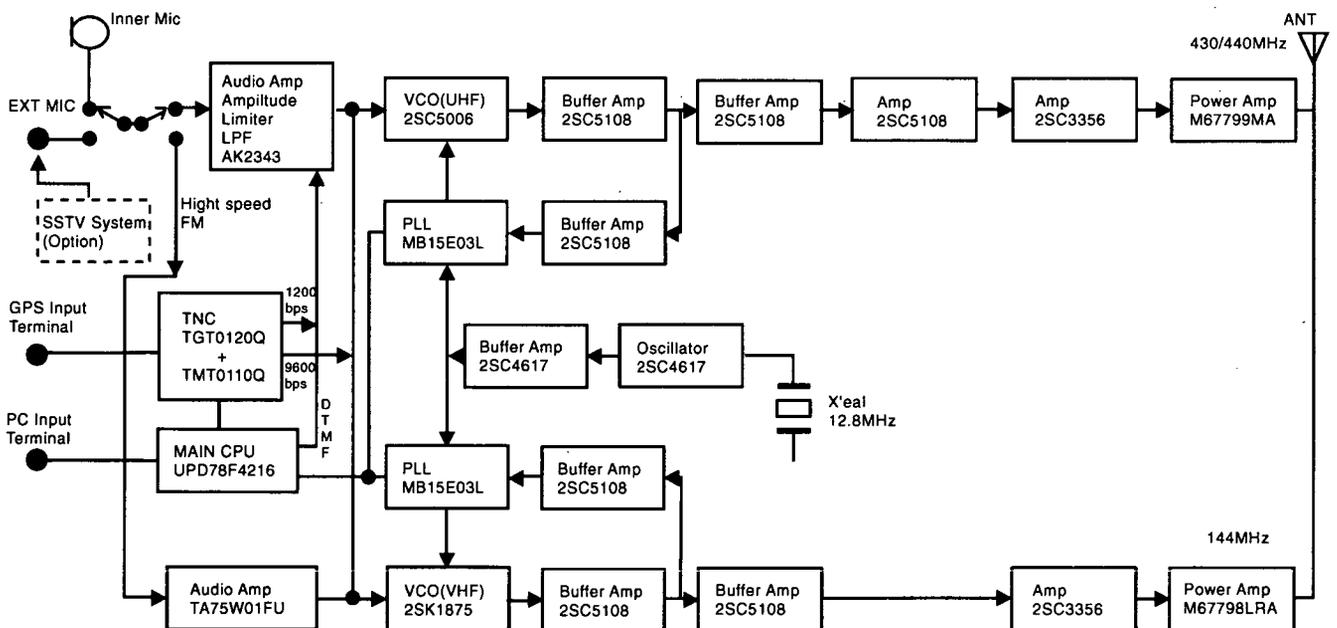


Fig.2 Transmitter Block Diagram

## CIRCUIT DESCRIPTION

**□ Modulator Circuit**

The audio modulation input is switched between the internal microphone and the external microphone via the external microphone terminal. The baseband is processed by the microphone amplifier/preemphasis/limiter (IC509), mixed with the DTMF subtone, and adjusted by VR1 and VR2. The modulation signal is input to each VCO of VHF and UHF. The high-speed FM mode SSTV transmit signal input from the external microphone terminal is switched by Q517, amplified by AF amplifier (IC506), and adjusted directly by VR1 and VR2. The modulation signal is input to each VCO of VHF and UHF. The 1200bps packet signal is produced according to data input from the PC pin by the TNC CPU (IC511) and TNC ASIC (IC510). It is limited by IC509, adjusted by VR1 and VR2, and the modulation signal is input to each VCO of VHF and UHF. The 9600bps packet signal is produced according to data input from the PC pin by TNC CPU (IC511) and TNC ASIC (IC510). The signal is adjusted directly by VR1 and VR2, and the modulation signal is input to each VCO of VHF and UHF.

**□ Transmitter circuit**

The VHF VCO output is amplified by the RF amplifier (Q28) and driver amplifier (Q46), and finally by the power module (IC16). The signal passes through antenna switch (D30), LPF, and the duplexer consisting of LC, and is fed to the antenna. The UHF VCO output is amplified by the RF amplifier (Q23) and driver amplifier (Q36 and Q37), and finally by the power module (IC15). The signal passes through antenna switch (D20), LPF, and the duplexer consisting of LC, and is fed to the antenna.

**□ APC circuit**

The APC circuit detects the drain current of the power module and controls transmission output to provide stable transmission output. The voltage generated by R10, R11, and R13 is amplified, and the difference between this voltage and the reference voltage output of each band power from the CPU (IC505) is detected by IC2 to produce the APC voltage. This voltage is used to control the control terminal of the power module.

**□ Temperature protection circuit**

To prevent thermal destruction of the power module, the voltage of the thermistor located near the power module is monitored by the CPU (IC505). If it exceeds about 80°C, the APC voltage is reduced to suppress heating.

**4. PLL circuit****□ Reference oscillator circuit**

The 12.8MHz signal is generated by the Q60 oscillator circuit and supplied to the two PLL ICs through the buffer amplifier (Q18). Each PLL divides this frequency to produce a reference frequency of 5 kHz or 6.25 kHz. The 12.8MHz signal is tripled by Q30 and used for the second local oscillator for the VHF band.

**□ Phase comparison**

Part of the VHF VCO output is amplified by Q27, and input to VHF PLL IC (IC9). Part of the UHF VCO output is amplified by Q22, and input to the UHF PLL IC (IC6). The pulse-swallow type PLL IC divides the input VCO oscillator frequency using the data from the CPU (IC505), compares its phase with the phase of the reference frequency to implement the PLL synthesizer with the desired step.

**□ Lock voltage (VCO control voltage)**

The result of the phase comparison by the PLL IC is output as a phase difference. This pulse is amplified by a charge pump (Q19 and Q20, or Q24 and Q25), ripples are removed by a LPF, and it is supplied as the oscillator frequency control voltage for each VCO. About 7 V doubled by the DC/DC converter (IC3) is used for the charge pump power supply to widen the control voltage range.

**□ Unlock detection circuit**

When the PLL is unlocked, a low signal is output from the PLL IC pin 14. This signal is detected by the CPU (IC505) to control the transmission/reception switching timing.

**□ VHF VCO**

The desired frequency is generated directly by a colpitts oscillation circuit consisting of a FET (Q55). The oscillation frequency is varied by applying the frequency control voltage to the varicap (D37 and D38). The gate of the shift switch (Q59) goes high and Q56 turns off during reception to change the oscillation frequency. The modulation signal is applied to D36 to modulate the oscillation frequency.

**□ UHF VCO (X58-460 sub unit)**

The desired frequency is generated directly by a colpitts oscillation circuit consisting of a bipolar transistor Q2. The oscillation frequency is varied by applying the frequency control voltage to the varicap (D2 and D3). The gate of the shift switch Q58(X57-570) goes high and Q3 turns off during reception to change the oscillation frequency. The modulation signal is applied to D1 to modulate the oscillation frequency.

## CIRCUIT DESCRIPTION

### 5. Power supply circuit

#### ■ Ni-Cd charging circuit

The constant-current circuit consisting of Q6 and D5 supplies the constant current of about 70 mA to the Ni-Cd battery from the external power supply connected to the DC-IN terminal. The voltage supplied from the battery terminal or the DC-IN terminal is directed to each circuit by the power supply switching circuit.

### 6. Microcomputers and peripheral circuits

#### ■ Reset and backup circuits

The CPU reset signal is generated with the CR time constant by detecting a rising edge of the M3 line voltage with the voltage detection IC (IC504). The TNC reset signal is generated by Q531 at a rising edge of MDMV. When the voltage supplied to the set decreases and the M3 line voltage falls below the detection voltage of the voltage detection IC (IC503), the CPU (IC505) detects it through the interrupt pin, backs up data in the EEPROM (IC501), and shuts the power off.

#### ■ Voltage detection processing

The voltages are measured through the A/D port of the CPU (IC505) for processing. The battery voltage is input through a resistor, the battery meter during transmission and a warning sound is made when an abnormal power supply voltage (17.5 to 22.0 V) is applied. The squelch voltage is input from the IF IC, and a change in the noise voltage is detected to control squelch. The S meter voltage is input from the IF IC to control the S meter display. The thermistor voltage (temperature) is detected and the remote control microphone key operation is detected through the A/D port.

#### ■ Battery save

The battery power is saved by controlling Q7 and Q10 through the SAVE port.

#### ■ LED drive circuit

LEDs are turned on to illuminate the LCD and keys by controlling Q534. The ON AIR/BUSY LED is directly controlled via the open drain port of the CPU (IC505).

#### ■ Key/encoder input circuit

The PWR key is assigned to the interrupt port. The other keys and destination diodes form a 6x6 matrix. Pressing a key is detected by scanning the matrix by software. The encoder uses the interrupt port for reading.

#### ■ CTCSS

The encode signal is output from the D/A port of the CPU (IC505) by software. The signal level is adjusted and the resulting signal is mixed with the modulation signal. The CPU (IC505) detects that the specified tone frequency (low level) is detected by the decoder (IC509) through the SDO pin and controls muting.

#### ■ DTMF

The DTMF signal is output from the D/A port of the CPU (IC505) by software means. The signal level is adjusted and the resulting signal is mixed with the modulation signal and goes to the baseband IC (IC509).

#### ■ Serial control

The CPU (IC505) controls the TNC CPU (IC511) through 9600bps serial communication. In the APRS/"navi-tra" mode, the settings and transmission data are sent from the CPU to the TNC and received packet data is sent from the TNC to the CPU. In the packet transmission mode, the personal computer is connected through the RS-232C driver (IC516) from the CPU (IC505). The data from the personal computer is received by the CPU (IC505) and transferred to the TNC CPU. The received packet data is sent from the TNC CPU to the CPU, which transfers it to the personal computer as it is. In the personal computer control mode, data from the personal computer is received, processed, and returned by the CPU.

## DESCRIPTION OF COMPONENTS

### (X57-570X-XX)

Ref. No.	DESCRIPTION NAME	Use/function
IC1,2	IC	APC circuit
IC3	IC	Double voltage DC-DC converter
IC4	IC	Shift register power supply switching
IC6	IC	UHF PLL
IC7	IC	UHF PLL speedup switch
IC9	IC	VHF PLL
IC10	IC	VHF PLL speedup switch
IC12	IC	UHF IF
IC13	IC	VHF IF
IC14	IC	VHF AM/FM switching analog switch
IC15	IC	POWER MODULE : UHF
IC16	IC	POWER MODULE : VHF
IC17	IC	Sub VHF VCO1/2 divider
IC18	IC	VHF helical tuning voltage amplifier
IC500	IC	AF amplifier
IC501	IC	EEPROM setting, memory
IC503	IC	Reset
IC504	IC	Domestic CPU
IC505	IC	International CPU
IC506	IC	High-speed FM mode SSTV transmit/ receive signal amplifier
IC507	IC	M3 line AVR
IC508	IC	TNC AVR
IC509	IC	Baseband, CTCSS decoder
IC510	IC	TNC ASIC
IC511	IC	TNC CPU
IC512	IC	FSK/GMSK receive waveform rectification comparator
IC513	IC	Analog switch for detection output switching
IC514	IC	FSK/GMSK receive signal amplifier
IC515	IC	FSK receive signal amplifier
IC516	IC	EEPROM memory
IC517	IC	Audio amplifier
IC518	IC	RS-232C driver
Q1	TRANSISTOR	APC circuit
Q2	FET	APC circuit switch
Q3	TRANSISTOR	APC circuit switch
Q4	TRANSISTOR	APC circuit output
Q5	FET	APC circuit shutdown
Q6	TRANSISTOR	Ni-Cd battery recharging circuit
Q7,8	TRANSISTOR	T4V AVR
Q9,10	TRANSISTOR	C3V AVR
Q11	TRANSISTOR	TV43 switch
Q12	TRANSISTOR	TV14 switch
Q13	TRANSISTOR	RV40 RVS 14 switch
Q14	TRANSISTOR	RV43 RVS 43 switch
Q15	TRANSISTOR	RV14 RVAM switch
Q16	TRANSISTOR	FM14 FM43 switch
Q17	TRANSISTOR	CV43 CV14 switch
Q18	TRANSISTOR	Reference oscillation buffer amplifier
Q19,20	TRANSISTOR	UHF PLL charge pump
Q21	TRANSISTOR	UHF PLL ripple filter
Q22,23	TRANSISTOR	UHF PLL buffer amplifier

Ref. No.	DESCRIPTION NAME	Use/function
Q24,25	TRANSISTOR	VHF PLL charge pump
Q26	TRANSISTOR	VHF PLL ripple filter
Q27,28	TRANSISTOR	VHF PLL buffer amplifier
Q29	TRANSISTOR	UHF IF amplifier
Q30	TRANSISTOR	VHF second local oscillator doubling circuit
Q31	TRANSISTOR	VHF IF amplifier
Q32-34	TRANSISTOR	AM detection circuit
Q35	TRANSISTOR	AM AGC circuit
Q36,37	TRANSISTOR	UHF transmission drive amplifier
Q38	FET	UHF mixer switch
Q39	FET	UHF mixer
Q40	FET	UHF receive RF amplifier
Q45	FET	APC voltage shutdown switch
Q46	TRANSISTOR	VHF transmission driver amplifier
Q47	TRANSISTOR	Sub VHF mixer switch
Q48	FET	Sub VHF mixer
Q49	FET	Sub VHF receive RF amplifier
Q50	FET	VHF mixer
Q51	TRANSISTOR	VHF mixer switch
Q52	TRANSISTOR	AGC voltage supply
Q53	FET	VHF receive RF amplifier
Q54	TRANSISTOR	VHF VCO buffer amplifier
Q55	FET	VHF VCO oscillation
Q56	TRANSISTOR	VHF VCO frequency shift
Q57	FET	T4V switch
Q58	FET	UHF VCO shift switch
Q59	FET	VHF VCO shift switch
Q60	TRANSISTOR	Reference oscillator circuit
Q61	FET	VHF narrow modulation switch (E)
Q62,63	FET	AIP reception
Q504	FET	AF mute switch
Q510,512	TRANSISTOR	AF amplifier AVR
Q511,513	TRANSISTOR	LED AVR
Q514	FET	AF amplifier AVR
Q515	FET	AF amplifier AVR switch
Q516	FET	M3SV switch
Q517	FET	High-speed FM mode transmission switch
Q518	FET	High-speed FM mode switch
Q519	FET	Microphone mute switch
Q520	TRANSISTOR	Deemphasis circuit
Q521	TRANSISTOR	TNC AVR switch
Q522,523	FET	Balance circuit
Q524	TRANSISTOR	FSK reception filter
Q525,526	FET	Balance circuit
Q527,528	TRANSISTOR	FSK reception filter
Q529	TRANSISTOR	GMSK reception filter
Q530	FET	Modulation band switch
Q531	FET	TNC reset
Q532	FET	High-speed FM mode reception switch
Q533	FET	High-speed FM mode reception switch
Q534	FET	Illumination LED switch
Q535	FET	M3 switch

## DESCRIPTION OF COMPONENTS

Ref. No.	DESCRIPTION NAME	Use/function
Q536	TRANSISTOR	Beat shift circuit
Q537	FET	M3SV switch
Q538	TRANSISTOR	Illumination LED switch
Q539	FET	AF mute switch
D1	DIODE	APC voltage supply
D2	ZENER DIODE	APC voltage control
D3	DIODE	Prevent reverse connection of external power supply.
D4,5	DIODE	Constant-current circuit for Ni-Cd recharging
D6	DIODE	Double voltage DC-DC converter
D8	DIODE	UHF charge pump circuit
D9	DIODE	UHF PLL ripple filter
D10	DIODE	VCO output switch for UHF transmission
D11	DIODE	VCO output switch for main UHF reception
D12	DIODE	VCO output switch for sub VHF reception
D13	DIODE	VHF charge pump circuit
D14	DIODE	VHF PLL ripple filter
D15	DIODE	VCO output switch for VHF transmission
D17	DIODE	VCO output switch for main VHF reception
D18	DIODE	AM detection circuit
D19	DIODE	UHF drive amplifier bias
D20	DIODE	UHF transmission antenna switch \ (signal line)
D21,22	DIODE	UHF transmission antenna switch (receiver circuit protection)
D23	DIODE	Main UHF mixer switch OR
D24-26	DIODE	UHF band in/out switch
D27,28	VARIABLE CAPACITANCE DIODE	Filter tuning outside UHF band
D29	DIODE	VHF drive amplifier bias
D30	DIODE	VHF transmission antenna switch (signal line)
D31	DIODE	VHF transmission antenna switch (receiver circuit protection)
D32-34	VARIABLE CAPACITANCE DIODE	VHF helical tuning
D36	VARIABLE CAPACITANCE DIODE	VHF VCO modulation
D37,38	VARIABLE CAPACITANCE DIODE	VHF VCO control
D40	DIODE	UHF RF amplifier switch OR
D42	DIODE	UHF band in/out switch
D43	DIODE	UHF MAIN/SUB switch
D44	DIODE	
D500,501	DIODE	Key matrix
D502,503	DIODE	Destination
D506	DIODE	Key matrix
D507,508	DIODE	Destination
D509,510	LED	Key illumination yellow
D511	LED	LCD illumination YG
D512	LED	A band TX/BUSY
D513	LED	B band TX/BUSY

Ref. No.	DESCRIPTION NAME	Use/function
D514,515	LED	Key illumination yellow
D516	DIODE	Key matrix
D517	DIODE	
D518	LED	LCD illumination YG
D526	DIODE	AF mute time constant
D527	ZENER DIODE	AF amp AVR reference voltage
D528	ZENER DIODE	LED AVR reference voltage
D529	DIODE	M3 line electric charge loss prevention
D530	ZENER DIODE	PTT line overvoltage input protection
D531	DIODE	AF amplifier AVR reference voltage
D532	LED	LCD illumination YG
D533,534	DIODE	AF mute switch OR
D535	LED	LCD illumination YG
D536-539	LED	Key illumination yellow

### (X58-460X-XX)

Ref. No.	DESCRIPTION NAME	Use/function
D1	DIODE	Modulation
D2,3	VARIABLE CAPACITANCE DIODE	Oscillation frequency control
Q1	TRANSISTOR	VCO output buffer amplifier
Q2	TRANSISTOR	VCO oscillation
Q3	TRANSISTOR	Oscillation frequency shift switch

## SEMICONDUCTOR DATA

### Microcomputer pin functions : $\mu$ PD78F4216 (IC505)

#### ■ Terminal function

Pin No.	I/O	Pin name	Active level	Function
1	O	APCG	H	APC circuit power H:ON
2	I	LD43	H	430MHz PLL lock detect H:LOCK
3	O	SAVE	L	Save power supply (C3) L:ON
4	O	DS		Shift register data output pin
5	O	T43	H	430MHz transmission power supply H:ON
6	O	EP43		430MHz PLL enable H:Enable
7	O	T14	H	144MHz transmission power supply H:ON
8	O	SH43	-	430MHz VCO switch L:RX
9	-	-	-	Positive power
10	O	-	-	System clock
11	I	-	-	System clock
12	-	-	-	Ground
13	-	-	-	Open
14	-	-	-	Connect to VSS
15	I	RST	H	System reset L:Reset 2.5V
16	I	INT		Power supply voltage drop detection interrupt 3.2V
17	O	EP14		118, 144MHz PLL enable H:Enable
18	O	SH14	-	144MHz VCO switch H:RX
19	I	EN1		Encoder interrupt
20	I	EN2		Encoder data input
21	I	PWR		[PWR] switch interrupt L: Pressed
22	O	PS	L	Transceiver main power (M3VS) switch L:ON
23,24	-	-	-	Connect to VDD
25	I	BATT	-	Battery voltage level A/D input
26	I	SQ14	-	Noise level A/D input (VHF IF)
27	I	SM14	-	S meter level A/D input (VHF IF)
28	I	PTP	-	Temperature-compensated thermistor voltage A/D input
29	I	REM	-	Remote control microphone key A/D input
30	I	SQ43	-	Noise level A/D input (UHF IF)
31	I	SM43	-	S meter level A/D input (UHF IF)
32	I	LD14	H	144MHz PLL lock detect H:Lock
33	-	-	-	Connect to VSS
34	O	BEEP/DTMF		Beep, DTMF tone, 1750Hz tone D/A output
35	O	TONE		Subtone D/A output
36	-	-	-	Connect to VDD
37	I	RxD2	L	UART data input from PC pin
38	O	TxD2	L	UART data output to PC pin
39	O	AFS	-	Tone detection line AF switch H:VHF
40	I	RxD1	L	UART data input from internal TNC (TNC HOSTTX)

Pin No.	I/O	Pin name	Active level	Function
41	O	TxD1	L	UART data output to internal TNC (TNC HOSTRX)
42	O	TNCB	-	TNC demodulation line switch H:VHF
43	O	SSTVB	-	High-speed SSTV receive band switch H:VHF
44	O	AOLCD	-	LCD driver data type bit L: Control; H: Display
45	O	ELCD		LCD driver enable H: Enable
46	O	RWLCD	-	LCD driver read/write L: Write
47	O	RESLCD	H	LCD driver reset L: Reset
48-55	I/O	D0 ~ 7	-	LCD driver data line
56	I	KEY11	L	Key matrix input 1
57	I	KEY12	L	Key matrix input 2
58	I	KEY13	L	Key matrix input 3
59	I	KEY14	L	Key matrix input 4
60	I	KEY15	L	Key matrix input 5
61	I	TYPE	L	Destination, channel display mode diode input
62	I	PKS	L	Packet standby modem transmission request H: Transmission
63	I	PTT	L	[PTT] key input L: Pressed
64-68	O	KEY01-05	L	Key matrix output 1-5
69	O	LAMP	H	Key, LCD illumination, TX/BUSY lamp power supply H:ON
70	O	MODEM	H	AX.25 modem power switch H:ON
71	O	SQLOUT	L	TNC squelch signal L:BUSY
72	-	-	-	Ground
73	I	CONLED	L	Packet transmission connect detection L: Connect
74	I	STALED	L	Packet transmission standby detection L: Standby
75	I	GPSLED	H	GPS receiver receive status L: No measurement; H: Measurement
76	O	AFAT43	H	AF43 line attenuation switch H:ATT ON
77	O	AFAT14	H	AF14 line attenuation switch H:ATT ON
78	O	AFM43	L	AF43 mute switch L:MUTE
79	O	AFM14	L	AF14 mute switch L:MUTE
80	O	AFC	L	Audio amplifier power supply L:ON
81	-	-	-	Positive power supply
82	O	SSTVH	L	High-speed SSTV microphone amplifier bus L: High speed
83	O	BP14	-	144MHz band bus tuning PWM output
84	O	BP43	-	430MHz band bus tuning PWM output

# SEMICONDUCTOR DATA

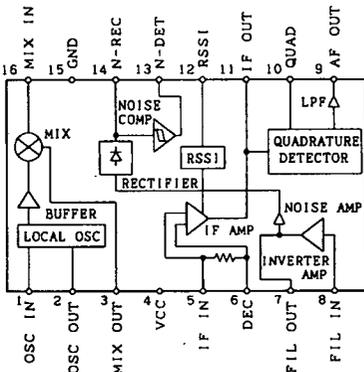
# TH-D7A/E

Pin No.	I/O	Pin name	Active level	unction
85	O	APC	-	APC PWM output
86	O	DTMFM	L	DTMF, packet modulation line mute L:MUTE
87	I	SDO	L	AK2343 tone match detection L: Match
88	O	ET		AK2343 enable H:Enable
89	O	CLK		Common clock line
90	O	DATA		Common data line
91	I	SI		EEPROM data input line (EEPROM SO pin)
92	O	CS1		EEPROM1 chip select L:Enable

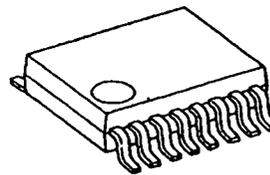
Pin No.	I/O	Pin name	Active level	Function
93	O	CS2		EEPROM2 chip select L:Enable
94	I	VPP	pulse	Flash write 10V application pin Normally low
95	O	TLEDA	L	A band transmission LED L: ON
96	O	RLEDA	L	A band busy LED L: ON
97	O	TLEDB	L	B band transmission LED L: ON
98	O	RLEDB	L	B band busy LED L: ON
99	O	SU14	H	PLL speedup (interval: 4 ms or less) H:SU
100	O	SU43	H	PLL speedup (interval: 4 ms or less) H:SU

## FM IF DETECTOR : TA31136FN (IC12, 13)

### ■ Block diagram



### ■ External view



### ■ Pin Function

Pin No.	Pin Name	Function
1	OSC IN	Local oscillator input and output terminals. Colpitts oscillator is formed by internal emitter follower and external X'tal. And external injection is possible from pin 2 or pin 1.
2	OSC OUT	MIX output terminal. Output impedance is around 1.8kΩ.
3	MIX OUT	Vcc
4	Vcc	Power supply
5	IF IN	2nd IF input and decoupling for bias. Input impedance is around 1.8kΩ.
6	DEC	INVERTER AMP input and output terminals. BPF is composed of external capacitors and resistors. Connected internally to rectifier circuit by coupling capacitor.
7	FIL OUT	FIL IN
8	FIL IN	Demodulate signal output terminal. Carrier leak is small as LPP is built-in. output impedance is around 360Ω.
9	AF OUT	

Pin No.	Pin Name	Function
10	QUAD	Phase shift signal input terminal of FM demodulator.
11	IF OUT	Output terminal of IF AMP.
12	RSSI	This terminal outputs DC level according to input signal level to IF AMP. Dynamic range is around 70dB.
13	N-DET	The result of noise detection is output by comparing output voltage of N-REC terminal with internal reference. Hysteresis range is about 100mV and output is open collector.
14	N-REC	After output of INVERTER AMP amplified around 20dB, noise signal is rectified by external capacitor.
15	GND	GND terminal.
16	MIX IN	1st IF signal input terminal. Input impedance is around 4kΩ at 21.7MHz.

## TERMINAL FUNCTION

Connector No.	Terminal No.	Terminal name	Terminal function
CN1 ↓ CN504	1	GND	GND
	2	GND	GND
	3	SH14	VHF VCO shift control
	4	SQ14	VHF squelch voltage
	5	MD14	VHF modulation signal
	6	SU14	VHF PLL speedup control
	7	LD14	VHF PLL lock signal
	8	EP14	VHF PLL data enable signal
	9	PTP	Final power module temperature detection voltage
	10	SM14	VHF S meter voltage
	11	AF43	UHF detection audio signal
	12	SM43	UHF S meter voltage
	13	SQ43	UHF squelch voltage
	14	C3V	Common power supplies
	15	MD43	UHF modulation signal
	16	SH43	UHF VCO shift control
	17	SU43	UHF PLL speedup control
	18	DATA	PLL data (common data line)
	19	EP43	UHF PLL data enable signal
	20	LD43	UHF PLL lock signal
	21	AF14	VHF detection audio signal
	22	BP14	VHF helical tuning signal
	23	NC	NC
	24	CLK	PLL clock, shift register clock (common clock line)
	25	DS1	Shift register data
	26	T14	VHF transmission power supply
	27	BP43	Reception filter tuning signal outside the UHF band
	28	T43	UHF transmission power supply
	29	GND	GND
	30	APC	Transmission output control signal
	31	GND	GND
	32	APCG	APC circuit ON/OFF control
	33	B	Power supply
	34	B	Power supply
	35	SAVE	Battery save control
	36	M3S	AVR reference voltage

# 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

TH-D7A/E

TX-RX UNIT (X57-570X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination
<b>TH-D7A/E (Y50-483)</b>					
1	1B	*	A02-2356-13	CABINET ASSY(FRONT)	
2	1A	*	A62-0624-03	PANEL ASSY (TOP)	
3	1B	*	B09-0362-03	CAP (DC IN)	
4	1A	*	B09-0397-03	CAP (MIC/SP/PC/GPS)	
5	1A	*	B10-2537-13	FRONT GLASS	
6	2A	*	B11-1210-02	ILLUMINATION GUIDE(LCD)	
7	2A	*	B38-0805-05	LCD ASSY	
8	-	*	B46-0310-03	WARRANTY CARD ACSY	E
8	-	*	B46-0410-40	WARRANTY CARD ACSY	K
10	-	*	B62-1004-00	INSTRUCTION MANUAL(ENG) ACSY	
11	-	*	B62-1076-00	INSTRUCTION MANUAL(SPA) ACSY	
13	3A	*	E04-0407-05	RF COAXIAL RECEPTACLE(SMA)	
14	2A	*	E23-0904-05	TERMINAL (ANT)	
15	2B	*	E23-1042-14	TERMINAL (BATTERY)	
16	2A	*	E23-1123-04	GROUND TERMINAL(CONT-RF)	
17	2B	*	E37-0681-05	FLAT CABLE	
20	-	*	E30-3374-05	CABLE WITH 2.5D PLUG	
18	2A	*	F10-2251-04	SHIELDING COVER(P MODULE)	
19	2A	*	F10-2266-03	SHIELDING COVER(RF)	
21	1B	*	G01-0891-04	COIL SPRING (RELEASE)	
22	2B	*	G11-2569-04	SHEET (PTT)	
23	2A	*	G13-1460-04	CUSHION (VOL/ENC)	
24	2B	*	G13-1664-04	CUSHION (RF SHIELD)	
25	3A	*	G53-0843-02	PACKING (CABINET)	
26	2A	*	G53-0844-03	PACKING (SP/MIC)	
27	-	*	H12-3038-01	PACKING FIXTURE	
28	-	*	H25-0085-04	PROTECTION BAG (100/200/0.07)	
29	-	*	H52-1199-02	ITEM CARTON CASE	K
29	-	*	H52-1264-02	ITEM CARTON CASE	E
31	2B	*	J19-1599-03	HOLDER (BATT TERMINAL)	
32	1B	*	J19-5302-04	HOLDER (RELEASE)	
33	2B	*	J21-8362-04	HARDWARE FIXTURE(PTT)	
34	1B	*	J21-8363-04	HARDWARE FIXTURE(BOTTOM)	
35	-	*	J29-0631-13	HOOK ACSY	
36	-	*	J69-0342-05	HANDSTRAP ACSY	
37	1B	*	K29-5165-03	LEVER KNOB (RELEASE)	
38	1A	*	K29-5256-02	BUTTON KNOB(PTT)	
39	1A	*	K29-5257-03	KNOB (VOL)	
40	1B	*	K29-5258-01	KEY TOP	
41	1A	*	K29-5259-03	KNOB (ENC)	
A	2A	*	N09-1492-05	PAN HEAD SCREW (SMA)	
B	1A	*	N14-0573-04	CIRCULAR NUT(SMA)	
C	2A	*	N30-2605-46	PAN HEAD MACHINE SCREW(P MODUL)	
D	3B	*	N80-2012-45	PAN HEAD TAPTITE SCREW(CABINET)	
E	2B	*	N83-2005-46	PAN HEAD TAPTITE SCREW	
SP	1A	*	T07-0266-05	SPEAKER	
ANT	-	*	T90-0634-05	WHIP ANTENNA ACSY	
42	-	*	W08-0437-05	CHARGER(120V 13.5V) ACSY	K
42	-	*	W08-0440-05	CHARGER(230V 13.5V) ACSY	E
BATT	-	*	W09-0909-05	BATTERY ASSY(6V 650mAh) ACSY	E

Ref. No.	Address	New parts	Parts No.	Description	Destination
BATT	-	*	W09-0911-05	BATTERY ASSY(9.6V 600mAh) ACSY	K
<b>TX-RX UNIT (X57-570X-XX) 0-11:K, 2-71:E</b>					
C1		*	CK73HB1H471K	CHIP C 470PF	K
C2		*	CK73GB1H471K	CHIP C 470PF	K
C3 -5		*	CK73HB1H471K	CHIP C 470PF	K
C6		*	CK73GB1H471K	CHIP C 470PF	K
C7 ,8		*	CK73HB1H471K	CHIP C 470PF	K
C9		*	CK73GB1H102K	CHIP C 1000PF	K
C10 ,11		*	CK73HB1H471K	CHIP C 470PF	K
C12		*	CK73GB1H102K	CHIP C 1000PF	K
C13		*	CK73GB1C104K	CHIP C 0.10UF	K
C14		*	CK73HB1H102K	CHIP C 1000PF	K
C15		*	CK73GB1C104K	CHIP C 0.10UF	K
C16		*	CK73GB1H102K	CHIP C 1000PF	K
C17		*	CK73GB1H471K	CHIP C 470PF	K
C18		*	CK73GB1H102K	CHIP C 1000PF	K
C19		*	CK73GB1E103K	CHIP C 0.010UF	K
C20		*	CK73GB1H102K	CHIP C 1000PF	K
C21		*	CK73HB1H102K	CHIP C 1000PF	K
C22		*	CK73HB1H471K	CHIP C 470PF	K
C23		*	CK73GB1H102K	CHIP C 1000PF	K
C24		*	CK73HB1H471K	CHIP C 470PF	K
C25		*	CK73GB1H102K	CHIP C 1000PF	K
C26 -28		*	C92-0565-05	CHIP-TAN 6.8UF 10WV	
C29		*	CK73GB1H471K	CHIP C 470PF	K
C30		*	C92-0565-05	CHIP-TAN 6.8UF 10WV	
C31		*	CK73HB1H102K	CHIP C 1000PF	K
C32		*	CK73HB1H471K	CHIP C 470PF	K
C33 -35		*	CK73FB1A105K	CHIP C 1.0UF	K
C36 ,37		*	CK73GB1C104K	CHIP C 0.10UF	K
C38 -41		*	CK73HB1H471K	CHIP C 470PF	K
C42		*	CK73GB1C104K	CHIP C 0.10UF	K
C43		*	CK73GB1H471K	CHIP C 470PF	K
C44 ,45		*	CK73HB1H471K	CHIP C 470PF	K
C46		*	CK73GB1H471K	CHIP C 470PF	K
C47		*	CK73GB1C104K	CHIP C 0.10UF	K
C48		*	CK73HB1A104K	CHIP C 0.10UF	K
C49		*	CK73FB1A105K	CHIP C 1.0UF	K
C50		*	CC73HCH1E181J	CHIP C 180PF	J
C51		*	CK73GB1H471K	CHIP C 470PF	K
C52		*	CK73HB1H102K	CHIP C 1000PF	K
C53		*	CC73HCH1H070D	CHIP C 7.0PF	D
C54		*	CC73HCH1H390J	CHIP C 39PF	J
C55		*	CC73HCH1H220J	CHIP C 22PF	J
C56 ,57		*	CK73HB1H102K	CHIP C 1000PF	K
C58		*	C92-0507-05	CHIP-TAN 4.7UF 6.3WV	
C59 ,60		*	CK73HB1H471K	CHIP C 470PF	K
C65		*	C92-0518-05	CHIP-TAN 0.22UF 20WV	
C66		*	CK73HB1H471K	CHIP C 470PF	K
C67		*	C92-0694-05	TAN C 10UF 16WV	
C68		*	C92-0560-05	CHIP-TAN 10UF 6.3WV	
C69		*	C92-0715-05	TAN C 0.33UF 20WV	
C70		*	CK73HB1H471K	CHIP C 470PF	K
C71		*	CC73HCH1H020C	CHIP C 2.0PF	C
C72 ,73		*	CK73HB1H471K	CHIP C 470PF	K

## PARTS LIST

TX-RX UNIT (X57-570X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C74			CC73HCH1H060D	CHIP C 6.0PF D		C160			CC73HCH1H390J	CHIP C 39PF J	
C75			CC73HCH1H080D	CHIP C 8.0PF D		C163-165		*	CK73HB1A104K	CHIP C 0.10UF K	
C76			CK73HB1H471K	CHIP C 470PF K		C166			CK73HB1H102K	CHIP C 1000PF K	
C78			CK73HB1H471K	CHIP C 470PF K		C167			CK73GB1C104K	CHIP C 0.10UF K	
C79			CC73HCH1H060D	CHIP C 6.0PF D		C168		*	CK73HB1A104K	CHIP C 0.10UF K	
C80			CC73HCH1H100D	CHIP C 10PF D		C169			CK73GB1C104K	CHIP C 0.10UF K	
C81			CC73HCH1H060D	CHIP C 6.0PF D		C170			CK73HB1H102K	CHIP C 1000PF K	
C82			C92-0507-05	CHIP-TAN 4.7UF 6.3WV		C171			CK73HB1C103K	CHIP C 0.010UF K	
C83,84			CK73HB1H102K	CHIP C 1000PF K		C172			CK73FB1A105K	CHIP C 1.0UF K	
C89			C92-0518-05	CHIP-TAN 0.22UF 20WV		C173			CK73GB1C104K	CHIP C 0.10UF K	
C90			CK73HB1H102K	CHIP C 1000PF K		C174			CK73HB1H471K	CHIP C 470PF K	
C91			C92-0694-05	TAN C 10UF 16WV		C175			CC73HCH1H180J	CHIP C 18PF J	
C92			C92-0592-05	CHIP-TAN 4.7UF 6.3WV		C177			CK73HB1H471K	CHIP C 470PF K	
C93			C92-0715-05	TAN C 10UF 16WV		C179			CK73HB1H471K	CHIP C 470PF K	
C94-96			CK73HB1H102K	CHIP C 1000PF K		C180			CC73HCH1H040C	CHIP C 4.0PF C	
C98			CK73HB1H102K	CHIP C 1000PF K		C181,182			CK73HB1H471K	CHIP C 470PF K	
C99			CC73HCH1H080D	CHIP C 8.0PF D		C184			C92-0565-05	CHIP-TAN 6.8UF 10WV	
C100			CK73HB1H102K	CHIP C 1000PF K		C185			CK73HB1H471K	CHIP C 470PF K	
C102			CK73HB1H102K	CHIP C 1000PF K		C186			CC73HCH1H070D	CHIP C 7.0PF D	
C104			CC73HCH1H100D	CHIP C 10PF D		C187			CK73HB1C103K	CHIP C 0.010UF K	
C106			CC73HCH1H050C	CHIP C 5.0PF C		C188,189			CK73HB1H471K	CHIP C 470PF K	
C108			C92-0623-05	CHIP TAN 22UF 4WV		C190			CK73GB1H471K	CHIP C 470PF K	
C109			CC73HCH1H100D	CHIP C 10PF D		C192			CK73FB1C474K	CHIP C 0.47UF K	
C110			CK73GB1C104K	CHIP C 0.10UF K		C193			CK73HB1C103K	CHIP C 0.010UF K	
C112			CK73GB1C104K	CHIP C 0.10UF K		C194			CK73HB1H471K	CHIP C 470PF K	
C113			CK73HB1C103K	CHIP C 0.010UF K		C197			CK73GB1H471K	CHIP C 470PF K	
C114			CC73HCH1H101J	CHIP C 100PF J		C198			CC73GCH1H060D	CHIP C 6.0PF D	
C115			CK73GB1C104K	CHIP C 0.10UF K		C199			CC73GCH1H040C	CHIP C 4.0PF C	
C116,117			CC73HCH1H121J	CHIP C 120PF J		C200			CC73GCH1H010C	CHIP C 1.0PF C	
C118			CC73HCH1E221J	CHIP C 220PF J		C201			CC73GCH1H050C	CHIP C 5.0PF C	
C119			CK73GB1H472K	CHIP C 4700PF K		C202			CC73GCH1H100D	CHIP C 10PF D	
C120			CC73HCH1H150J	CHIP C 15PF J		C203			CC73GCH1H030C	CHIP C 3.0PF C	
C121			CC73HCH1H100D	CHIP C 10PF D		C204			CK73GB1H471K	CHIP C 470PF K	
C122			CK73GB1E103K	CHIP C 0.010UF K		C206			CC73GCH1H390J	CHIP C 39PF J	
C123			CK73HB1H471K	CHIP C 470PF K		C207			CC73GCH1H220J	CHIP C 22PF J	
C125			CC73GCH1H030C	CHIP C 3.0PF C		C208			CC73GCH1H040C	CHIP C 4.0PF C	
C126			CC73GCH1H060D	CHIP C 6.0PF D		C210			CC73HCH1H070D	CHIP C 7.0PF D	
C127			CK73GB1H102K	CHIP C 1000PF K		C211			CK73GB1H102K	CHIP C 1000PF K	
C129			CK73HB1H471K	CHIP C 470PF K		C212			CK73HB1H471K	CHIP C 470PF K	
C131			CK73GB1E103K	CHIP C 0.010UF K		C213			CC73HCH1H180J	CHIP C 18PF J	
C132			CK73HB1H102K	CHIP C 1000PF K		C214			CK73HB1H471K	CHIP C 470PF K	
C133			CC73HCH1H220J	CHIP C 22PF J		C215			CC73HCH1H040C	CHIP C 4.0PF C	
C134			CK73HB1C103K	CHIP C 0.010UF K		C216			CK73HB1C103K	CHIP C 0.010UF K	
C135			CC73HCH1H050C	CHIP C 5.0PF C		C217			CK73GB1H471K	CHIP C 470PF K	
C136			CK73HB1H102K	CHIP C 1000PF K		C218			CK73HB1H471K	CHIP C 470PF K	
C137			CC73HCH1H270J	CHIP C 27PF J		C219			CC73HCH1H030C	CHIP C 3.0PF C	
C138			C92-0623-05	CHIP TAN 22UF 4WV		C220			CK73HB1H471K	CHIP C 470PF K	
C139,140			CK73GB1C104K	CHIP C 0.10UF K		C221			CK73GB1C104K	CHIP C 0.10UF K	
C142			CK73HB1C103K	CHIP C 0.010UF K		C222,223			CK73HB1H471K	CHIP C 470PF K	
C143			CC73HCH1H101J	CHIP C 100PF J		C224			CC73HCH1H060D	CHIP C 6.0PF D	
C144			CK73GB1C104K	CHIP C 0.10UF K		C225			CC73HCH1H030C	CHIP C 3.0PF C	
C145,146			CC73HCH1H121J	CHIP C 120PF J		C226,227			CK73HB1H471K	CHIP C 470PF K	
C147			CC73HCH1E221J	CHIP C 220PF J		C228			CC73HCH1H220J	CHIP C 22PF J	
C148			CK73HB1E472K	CHIP C 4700PF K		C229			CC73HCH1H0R5B	CHIP C 0.5PF B	
C149			CC73HCH1H150J	CHIP C 15PF J		C230			CC73HCH1H220J	CHIP C 22PF J	
C151			CK73GB1E103K	CHIP C 0.010UF K		C231			CK73HB1H471K	CHIP C 470PF K	
C152			CK73HB1H102K	CHIP C 1000PF K		C232			CC73HCH1H070D	CHIP C 7.0PF D	
C153			CK73GB1E103K	CHIP C 0.010UF K		C233			CK73HB1H471K	CHIP C 470PF K	
C155			CK73HB1H102K	CHIP C 1000PF K		C234			CC73HCH1H090D	CHIP C 9.0PF D	
C159			CK73HB1H102K	CHIP C 1000PF K		C235			CK73HB1H471K	CHIP C 470PF K	

# PARTS LIST

TX-RX UNIT (X57-570X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C236			CK73GB1C104K	CHIP C 0.10UF K		C343			CC73GCH1H040C	CHIP C 4.0PF C	
C238			CK73HB1H471K	CHIP C 470PF K		C345			CK73GB1C104K	CHIP C 0.10UF K	
C239			CK73HB1H471K	CHIP C 470PF K E		C347			CK73HB1C103K	CHIP C 0.010UF K	
C262			CK73HB1H102K	CHIP C 1000PF K		C348,349			CK73HB1H102K	CHIP C 1000PF K	
C263			CC73HCH1H330J	CHIP C 33PF J		C353			CC73GCH1H101J	CHIP C 100PF J	
C264			CK73HB1H102K	CHIP C 1000PF K		C354			CC73GCH1H060D	CHIP C 6.0PF D	
C265			CC73HCH1H080D	CHIP C 8.0PF D		C355			CC73GCH1H120J	CHIP C 12PF J	
C266			CK73HB1H102K	CHIP C 1000PF K		C356			CC73GCH1H330J	CHIP C 33PF J	
C267			C92-0565-05	CHIP-TAN 6.8UF 10WV		C357			CC73GCH1H050C	CHIP C 5.0PF C	
C268			CK73HB1H102K	CHIP C 1000PF K		C358			CC73GCH1H010C	CHIP C 1.0PF C	
C269			CK73HB1C103K	CHIP C 0.010UF K		C359			CC73GCH1H220J	CHIP C 22PF J	
C270			CK73HB1H102K	CHIP C 1000PF K		C360			CC73GCH1H090D	CHIP C 9.0PF D	
C271,272			CC73HCH1H330J	CHIP C 33PF J		C361			CC73GCH1H040C	CHIP C 4.0PF C	
C274			CK73HB1H102K	CHIP C 1000PF K		C362			CC73GCH1H030C	CHIP C 3.0PF C	
C275			CK73FB1C474K	CHIP C 0.47UF K		C363			CC73GCH1H220J	CHIP C 22PF J	
C276			CK73HB1C103K	CHIP C 0.010UF K		C364			CC73GCH1H020C	CHIP C 2.0PF C	
C277			CK73HB1H102K	CHIP C 1000PF K		C365			CC73GCH1H120J	CHIP C 12PF J	
C278			CC73HCH1H120J	CHIP C 12PF J		C366			CC73HCH1H010C	CHIP C 1.0PF C	
C279			CK73HB1H102K	CHIP C 1000PF K		C367			CC73HCH1H0R5B	CHIP C 0.5PF B	
C281			CC73GCH1H090D	CHIP C 9.0PF D		C368			CK73HB1H102K	CHIP C 1000PF K	
C282			CC73GCH1H160J	CHIP C 16PF J		C369			CK73GB1C104K	CHIP C 0.10UF K	
C283			CC73GCH1H060D	CHIP C 6.0PF D		C370,371			CK73HB1H102K	CHIP C 1000PF K	
C284			CC73GCH1H270J	CHIP C 27PF J		C372			CC73HCH1H100D	CHIP C 10PF D	
C285			CK73GB1C104K	CHIP C 0.10UF K		C373			CC73HCH1H090D	CHIP C 9.0PF D	
C286			CK73HB1H102K	CHIP C 1000PF K		C374			CC73HCH1H0R5B	CHIP C 0.5PF B	
C288			CK73HB1H102K	CHIP C 1000PF K		C375			CK73HB1C103K	CHIP C 0.010UF K	
C290			CK73HB1H102K	CHIP C 1000PF K		C376-378			CK73HB1H102K	CHIP C 1000PF K	
C292			CK73HB1H102K	CHIP C 1000PF K		C379			CK73HB1A104K	CHIP C 0.10UF K	
C293			CC73HCH1H050C	CHIP C 5.0PF C		C380			CK73GB1C104K	CHIP C 0.10UF K	
C294			CK73HB1H102K	CHIP C 1000PF K		C381			CC73HCH1H100D	CHIP C 10PF D	
C295			CK73HB1C103K	CHIP C 0.010UF K		C382			CK73HB1H471K	CHIP C 470PF K	
C296			CC73HCH1H030C	CHIP C 3.0PF C		C384			CC73HCH1H030C	CHIP C 3.0PF C	
C300,301			C92-0592-05	CHIP-TAN 4.7UF 6.3WV		C385			CK73HB1C103K	CHIP C 0.010UF K	
C302			CC73HCH1H090D	CHIP C 9.0PF D		C392			CK73HB1H471K	CHIP C 470PF K	
C303			CK73HB1H102K	CHIP C 1000PF K		C393			CK73HB1A104K	CHIP C 0.10UF K	
C304			CC73HCH1H090D	CHIP C 9.0PF D		C396			CK73HB1H471K	CHIP C 470PF K	
C306-309			CK73HB1H102K	CHIP C 1000PF K		C397			CK73HB1C103K	CHIP C 0.010UF K	
C310			CK73HB1C103K	CHIP C 0.010UF K		C398			CC73HCH1H680J	CHIP C 68PF J	
C311			CC73HCH1H050C	CHIP C 5.0PF C		C500			CK73HB1H471K	CHIP C 470PF K	
C313			CK73HB1H102K	CHIP C 1000PF K		C503,504			CK73HB1H471K	CHIP C 470PF K	
C315		*	CC73HCH1H240J	CHIP C 24PF J		C510			C92-0665-05	TANTAL 100UF 6.3WV	
C316			CK73HB1H102K	CHIP C 1000PF K		C511-513			CK73HB1C103K	CHIP C 0.010UF K	
C317			CK73GB1C104K	CHIP C 0.10UF K		C516			CK73HB1H471K	CHIP C 470PF K	
C319,320			CK73HB1H102K	CHIP C 1000PF K		C519			C92-0565-05	CHIP-TAN 6.8UF 10WV	
C321			CC73HCH1H150J	CHIP C 15PF J		C520			CK73FB1A105K	CHIP C 1.0UF K	
C322,323			CK73HB1H102K	CHIP C 1000PF K		C521		*	CK73HB1A473K	CHIP C 0.047UF K	
C324			CK73GB1C104K	CHIP C 1000PF K		C522			C92-0628-05	CHIP-TAN 10UF 10WV	
C325			CC73HCH1H270J	CHIP C 27PF J		C523			CK73GB1C104K	CHIP C 0.10UF K	
C328			CC73HCH1H470J	CHIP C 47PF J		C524			CC73HCH1H101J	CHIP C 100PF J	
C329			CC73HCH1H060D	CHIP C 6.0PF D		C525		*	CK73HB1A473K	CHIP C 0.047UF K	
C330			CC73HCH1H330J	CHIP C 33PF J		C526			CK73HB1H102K	CHIP C 1000PF K	
C331			CC73HCH1H390J	CHIP C 39PF J		C527		*	CK73HB1A473K	CHIP C 0.047UF K	
C332			CC73HCH1H330J	CHIP C 33PF J		C528,529			CK73HB1C103K	CHIP C 0.010UF K	
C333			CC73HCH1H390J	CHIP C 39PF J		C530,531			CK73HB1H471K	CHIP C 470PF K	
C335			CC73HCH1H050C	CHIP C 5.0PF C		C532,533			CK73HB1C103K	CHIP C 0.010UF K	
C336			CK73FB1A105K	CHIP C 1.0UF K		C534			CK73FB1A105K	CHIP C 1.0UF K	
C337,338			CK73GB1C104K	CHIP C 0.10UF K		C535			CK73HB1H471K	CHIP C 470PF K	
C339			CK73FB1A105K	CHIP C 1.0UF K		C536			CK73GB1C104K	CHIP C 0.10UF K	
C340			CK73GB1C104K	CHIP C 0.10UF K		C537-541			CK73HB1H471K	CHIP C 470PF K	
C342			CK73HB1H471K	CHIP C 470PF K		C542		*	CK73HB1A104K	CHIP C 0.10UF K	

## PARTS LIST

TX-RX UNIT (X57-570X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C543			CK73HB1H102K	CHIP C 1000PF K		C614-616			CK73HB1H471K	CHIP C 470PF K	
C544,545			CK73HB1H471K	CHIP C 470PF K		C617,618			CK73GB1C104K	CHIP C 0.10UF K	
C546			CK73HB1C103K	CHIP C 0.010UF K		C619			CK73FB1A105K	CHIP C 1.0UF K	
C547			CC73HCH1H101J	CHIP C 100PF J		C620,621			CK73GB1C104K	CHIP C 0.10UF K	
C548		*	C92-0756-05	ELECTRO C 330UF 6.3VV		C622-625			CK73FB1A105K	CHIP C 1.0UF K	
C549			CK73FB1A105K	CHIP C 1.0UF K		C626,627			CK73HB1C103K	CHIP C 0.010UF K	
C550			CK73HB1C103K	CHIP C 0.010UF K		C628-630			CK73HB1H471K	CHIP C 470PF K	
C551			C92-0619-05	CHIP TAN 47UF 4VV		C631			CK73GB1C104K	CHIP C 0.10UF K	
C552			CK73HB1C103K	CHIP C 0.010UF K		C632			CK73HB1C223K	CHIP C 0.022UF K	
C553			CK73HB1H471K	CHIP C 470PF K		C640-644			CK73GB1C104K	CHIP C 0.10UF K	
C554			CK73GB1C104K	CHIP C 0.10UF K		C647,648	*		CK73HB1A104K	CHIP C 0.10UF K	
C555			C92-0507-05	CHIP-TAN 4.7UF 6.3VV		C651,652	*		CK73HB1A104K	CHIP C 0.10UF K	
C556,557			CK73HB1H471K	CHIP C 470PF K		C659			CK73EF1A106Z	CHIP C 10UF Z	
C558			CK73GB1C104K	CHIP C 0.10UF K		C660	*		CK73HB1A104K	CHIP C 0.10UF K	
C559			CK73GB1E123K	CHIP C 0.012UF K		C661			CC73HCH1H030C	CHIP C 3.0PF C	
C560			CK73HB1H471K	CHIP C 470PF K		C662	*		CC73HCH1H160J	CHIP C 16PF J	
C561			CK73HB1C103K	CHIP C 0.010UF K		C663,664	*		CK73HB1A104K	CHIP C 0.10UF K	
C562			CK73HB1H102K	CHIP C 1000PF K		C665			C92-0619-05	CHIP TAN 47UF 4VV	
C563			CK73HB1H471K	CHIP C 470PF K		C666	*		CK73HB1A104K	CHIP C 0.10UF K	
C564			CK73HB1H102K	CHIP C 1000PF K		C667			CK73FB1E224K	CHIP C 0.22UF K	
C565			CC73HCH1H560JY	CHIP C 56PF J		C668			CK73HB1H102K	CHIP C 1000PF K	
C566			CK73HB1H222K	CHIP C 2200PF K		C669	*		CK73HB1A473K	CHIP C 0.047UF K	
C567			CK73HB1H471K	CHIP C 470PF K		C670			CK73HB1C103K	CHIP C 0.010UF K	
C568			C92-0507-05	CHIP-TAN 4.7UF 6.3VV		C671			CC73HCH1H020C	CHIP C 2.0PF C	
C569-571			CK73HB1H471K	CHIP C 470PF K		C672			C92-0619-05	CHIP TAN 47UF 4VV	
C572			C92-0507-05	CHIP-TAN 4.7UF 6.3VV		C673			CK73EF1A106Z	CHIP C 10UF Z	
C573		*	CK73HB1A473K	CHIP C 0.047UF K		C674			CK73FB1A105K	CHIP C 1.0UF K	
C574		*	CK73HB1A104K	CHIP C 0.10UF K		C675			CC73HCH1H470J	CHIP C 47PF J	
C575,576		*	CK73HB1A104K	CHIP C 0.10UF K	K	TC1			C05-0384-05	CERAMIC TRIMMER CAP(10PF)	
C575,576		*	CK73HB1C223K	CHIP C 0.022UF K	E	CN1			E40-5902-05	FLAT CABLE CONNECTOR(36P)	
C577-579			CK73FB1A105K	CHIP C 1.0UF K		CN500			E40-5630-05	PIN ASSY SOCKET (6P:PTT)	
C580			CK73HB1H222K	CHIP C 2200PF K		CN501			E40-5629-05	PIN ASSY (6P:PTT)	
C581			CK73FB1A105K	CHIP C 1.0UF K		CN502			E40-5409-05	PIN ASSY (5P:VOL)	
C582,583			CK73GB1C104K	CHIP C 0.10UF K		CN504			E40-5902-05	FLAT CABLE CONNECTOR(36P)	
C584,585			CK73HB1H471K	CHIP C 470PF K		CN505	*		E40-5972-05	FLAT CABLE CONNECTOR(30P)	
C586			CK73FB1A105K	CHIP C 1.0UF K		CN506			E40-5392-05	PIN ASSY (VOL)	
C587,588			CK73HB1C103K	CHIP C 0.010UF K		J1			E03-0170-05	DC JACK	
C589			CK73GB1C104K	CHIP C 0.10UF K		J500			E11-0457-05	PHONE JACK (2.5/3.5)	
C590			CK73HB1C223K	CHIP C 0.022UF K		J501,502			E11-0439-05	2.5D PHONE JACK(5P)	
C591			CK73HB1C103K	CHIP C 0.010UF K		W500			E37-0697-05	PROCESSED LEAD WIRE	
C592,593			CK73HB1H471K	CHIP C 470PF K		706	*		F10-2275-04	SHIELDING CASE (VHF VCO)	
C594			CK73HB1C223K	CHIP C 0.022UF K		F1			F53-0128-05	FUSE (0.5A)	
C595			CK73HB1C682K	CHIP C 6800PF K		CO1			L79-1072-05	TUNING COIL	
C596			CK73HB1C103K	CHIP C 0.010UF K		CO2			L79-1474-05	TUNING COIL (450KHZ)	
C597			CK73FB1A105K	CHIP C 1.0UF K		CF1			L72-0916-05	CERAMIC FILTER(455KHZ)	
C598			CK73HB1E472K	CHIP C 4700PF K		CF2			L72-0945-05	CERAMIC FILTER(450KHZ)	
C599			CK73HB1C223K	CHIP C 0.022UF K		L1			L92-0137-05	FERRITE CHIP	
C600			CK73HB1C682K	CHIP C 6800PF K		L2			L92-0140-05	FERRITE CHIP	
C601		*	CK73HB1A473K	CHIP C 0.047UF K		L3 , 4			L40-2275-77	SMALL FIXED INDUCTOR(22NH)	
C602			CK73HB1C682K	CHIP C 6800PF K		L5			L92-0140-05	FERRITE CHIP	
C603			CK73HB1H222K	CHIP C 2200PF K		L6			L40-1875-77	SMALL FIXED INDUCTOR(18NH)	
C604			CK73HB1H391K	CHIP C 390PF K		L7			L40-1085-77	SMALL FIXED INDUCTOR(100NH)	
C605			CC73HCH1E221J	CHIP C 220PF J		L9	*		L40-3381-86	SMALL FIXED INDUCTOR(0.33UH)	
C606			CK73HB1C103K	CHIP C 0.010UF K		L10 , 11	*		L40-5681-86	SMALL FIXED INDUCTOR(0.56UH)	
C607			CK73FB1A105K	CHIP C 1.0UF K		L12	*		L40-3381-86	SMALL FIXED INDUCTOR(0.33UH)	
C608			CK73HB1C103K	CHIP C 0.010UF K		L13			L40-2275-77	SMALL FIXED INDUCTOR(22NH)	
C609			CK73HB1H102K	CHIP C 1000PF K		L15			L92-0140-05	FERRITE CHIP	
C610			CK73HB1H471K	CHIP C 470PF K		L16			L40-2275-77	SMALL FIXED INDUCTOR(22N)	
C611			CC73HCH1H101J	CHIP C 100PF J		L17			L40-1095-68	SMALL FIXED INDUCTOR(1UH)	
C612,613			CK73GB1C104K	CHIP C 0.10UF K		L18			L34-4513-05	AIR-CORE COIL(2.5T)	

# PARTS LIST

TX-RX UNIT (X57-570X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
L19			L34-4515-05	AIR-CORE COIL(3.5T)		CP2			R90-0741-05	MULTIPLE R (1K X2)	
L20			L40-1275-54	SMALL FIXED INDUCTOR(12NH)		CP3		*	RK75HA1J332J	MULTIPLE R (3.3K X2)	
L23			L40-2775-54	SMALL FIXED INDUCTOR(27NH)		CP4			R90-0741-05	MULTIPLE R (1K X2)	
L24			L34-4513-05	AIR-CORE COIL(2.5T)		CP5		*	RK75HA1J332J	MULTIPLE R (3.3K X2)	
L25			L40-1092-81	SMALL FIXED INDUCTOR		CP501,502			R90-0741-05	MULTIPLE R (1K X2)	
L26			L40-1085-77	SMALL FIXED INDUCTOR(100NH)		CP504-508			R90-0741-05	MULTIPLE R (1K X2)	
L27			L40-5675-77	SMALL FIXED INDUCTOR(56NH)		CP509			R90-0740-05	MULTIPLE R (100K X2)	
L28			L40-2275-77	SMALL FIXED INDUCTOR(22NH)		CP510-513			R90-0741-05	MULTIPLE R (1K X2)	
L29			L40-2275-54	SMALL FIXED INDUCTOR(22NH)		CP514-521			R90-0749-05	MULTIPLE R (330 X2)	
L30			L79-1492-05	FILTER MODULE(435MHZ)	E	CP522			R90-0741-05	MULTIPLE R (1K X2)	
L30			L79-1493-05	FILTER MODULE(445MHZ)	K	CP528			R90-0740-05	MULTIPLE R (100K X2)	
L30		*	L79-1574-05	FILTER MODULE(435MHZ)	E	CP529			R90-0741-05	MULTIPLE R (1K X2)	
L30		*	L79-1575-05	FILTER MODULE(444MHZ)	K	R1			RK73HB1J101J	CHIP R 100 J 1/16W	
L31			L40-1575-77	SMALL FIXED INDUCTOR(15NH)		R2			RK73HB1J102J	CHIP R 1.0K J 1/16W	
L32			L40-6875-54	SMALL FIXED INDUCTOR(68NH)		R3			RK73HB1J474J	CHIP R 470K J 1/16W	
L33			L40-5675-54	SMALL FIXED INDUCTOR(56NH)		R4			RK73HB1J273J	CHIP R 27K J 1/16W	
L34			L40-2775-77	SMALL FIXED INDUCTOR(27NH)		R5			R92-1368-05	CHIP R 0 OHM	
L35_36			L40-2275-54	SMALL FIXED INDUCTOR(22NH)		R6			RK73HB1J224J	CHIP R 220K J 1/16W	
L37			L40-2275-77	SMALL FIXED INDUCTOR(22NH)		R7			RK73HB1J471J	CHIP R 470 J 1/16W	
L39			L40-2275-77	SMALL FIXED INDUCTOR(22NH)		R8_9			RK73HB1J103J	CHIP R 10K J 1/16W	
L51			L40-1875-77	SMALL FIXED INDUCTOR(18NH)		R10_11			RK73EB2ER39K	CHIP R 0.39 K 1/4W	
L53			L40-6875-77	SMALL FIXED INDUCTOR(68NH)		R12			RK73GB1J120J	CHIP R 12 J 1/16W	
L54			L40-1095-68	SMALL FIXED INDUCTOR(1UH)		R13			RK73EB2ER39K	CHIP R 0.39 K 1/4W	
L55			L34-1374-05	AIR-CORE COIL(6.5T)		R14			RK73GB1J103J	CHIP R 10K J 1/16W	
L56			L34-1333-05	AIR-CORE COIL(8.5T)		R15			RK73HB1J101J	CHIP R 100 J 1/16W	
L58		*	L40-1281-86	SMALL FIXED INDUCTOR(0.12UH)		R16_17			RK73HB1J103J	CHIP R 10K J 1/16W	
L59			L40-1085-54	SMALL FIXED INDUCTOR(100NH)		R18			R92-1368-05	CHIP R 0 OHM	
L62			L40-8285-34	SMALL FIXED INDUCTOR(820NH)		R19			RK73HB1J182J	CHIP R 1.8K J 1/16W	
L63			L40-1085-54	SMALL FIXED INDUCTOR(100NH)		R20			RK73HB1J103J	CHIP R 10K J 1/16W	
L65_66			L40-1585-54	SMALL FIXED INDUCTOR(150NH)		R21			RK73HB1J222J	CHIP R 2.2K J 1/16W	
L68		*	L40-1281-86	SMALL FIXED INDUCTOR(0.12UH)		R22			RK73HB1J472J	CHIP R 4.7K J 1/16W	
L69			L34-4506-05	COIL		R23			RK73HB1J102J	CHIP R 1.0K J 1/16W	
L70			L40-1095-68	SMALL FIXED INDUCTOR(1UH)		R24_25			RK73HB1J472J	CHIP R 4.7K J 1/16W	
L71			L34-4506-05	COIL		R26			RK73HB1J102J	CHIP R 1.0K J 1/16W	
L72			L34-4507-05	COIL		R27			RK73HB1J332J	CHIP R 3.3K J 1/16W	
L73			L40-3375-54	SMALL FIXED INDUCTOR(33NH)		R28			RK73HB1J102J	CHIP R 1.0K J 1/16W	
L74			L40-3975-54	SMALL FIXED INDUCTOR(39NH)		R29			RK73HB1J472J	CHIP R 4.7K J 1/16W	
L75			L40-1085-54	SMALL FIXED INDUCTOR(100NH)		R30			RK73HB1J103J	CHIP R 10K J 1/16W	
L78			L40-5675-54	SMALL FIXED INDUCTOR(56NH)		R31			RK73HB1J101J	CHIP R 100 J 1/16W	
L79_80			L92-0149-05	FERRITE CHIP		R32			RK73HB1J332J	CHIP R 3.3K J 1/16W	
L83		*	L34-4580-05	AIR-CORE COIL(4.5T)		R33			RK73HB1J474J	CHIP R 470K J 1/16W	
L84			L34-1331-05	AIR-CORE COIL(5.5T)		R34			RK73HB1J222J	CHIP R 2.2K J 1/16W	
L85		*	L34-4579-05	AIR-CORE COIL(8.5T)		R35_36			RK73HB1J331J	CHIP R 330 J 1/16W	
L86			L34-4515-05	AIR-CORE COIL(3.5T)		R37			RK73HB1J102J	CHIP R 1.0K J 1/16W	
L87_88		*	L34-4389-05	AIR-CORE COIL(9.5T)		R38			R92-1252-05	CHIP R 0 OHM	
L89			L40-1085-77	SMALL FIXED INDUCTOR(100NH)		R39			RK73HB1J123J	CHIP R 12K J 1/16W	
L90_91			L40-3391-86	SMALL FIXED INDUCTOR(3.3UH)		R40			RK73HB1J223J	CHIP R 22K J 1/16W	
L92			L40-2275-54	SMALL FIXED INDUCTOR(22NH)		R41			RK73HB1J472J	CHIP R 4.7K J 1/16W	
L93			L40-3375-54	SMALL FIXED INDUCTOR(33NH)		R42			RK73HB1J103J	CHIP R 10K J 1/16W	
L94			L92-0140-05	FERRITE CHIP		R43			RK73HB1J474J	CHIP R 470K J 1/16W	
L500,501			L92-0140-05	FERRITE CHIP		R44			RK73HB1J471J	CHIP R 470 J 1/16W	
L502,503		*	L33-1358-05	SMALL FIXED INDUCTOR(330UH)		R45_46			RK73HB1J332J	CHIP R 3.3K J 1/16W	
L504-511			L92-0140-05	FERRITE CHIP		R47			RK73HB1J102J	CHIP R 1.0K J 1/16W	
X1		*	L77-1783-05	CRYSTAL RESONATOR(12.8MHZ)		R48			RK73HB1J821J	CHIP R 820 J 1/16W	
X2		*	L77-1769-05	CRYSTAL RESONATOR(45.505MHZ)		R49			RK73HB1J332J	CHIP R 3.3K J 1/16W	
X500		*	L78-0459-05	RESONATOR (4.19MHZ/12)		R51			R92-1252-05	CHIP R 0 OHM	
X501		*	L77-1780-05	CRYSTAL RESONATOR(7.9872MHZ)		R52			RK73HB1J104J	CHIP R 100K J 1/16W	
XF1		*	L71-0482-05	MCF (45SC158B)		R53			RK73HB1J470J	CHIP R 47 J 1/16W	
XF2		*	L71-0535-05	MCF (38.85MHZ)		R54			R92-1368-05	CHIP R 0 OHM	
CP1		*	RK75HA1J332J	MULTIPLE R (3.3K X2)		R55			RK73HB1J154J	CHIP R 150K J 1/16W	

## PARTS LIST

TX-RX UNIT (X57-570X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R56			RK73HB1J470J	CHIP R 47 J 1/16W		R121			RK73HB1J182J	CHIP R 1.8K J 1/16W	
R58			RK73HB1J332J	CHIP R 3.3K J 1/16W		R122			RK73HB1J473J	CHIP R 47K J 1/16W	
R59			RK73HB1J102J	CHIP R 1.0K J 1/16W		R123			RK73HB1J103J	CHIP R 10K J 1/16W	
R60			R92-1252-05	CHIP R 0 OHM		R124			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R61			RK73HB1J393J	CHIP R 39K J 1/16W		R125,126			RK73HB1J104J	CHIP R 100K J 1/16W	
R62			RK73HB1J273J	CHIP R 27K J 1/16W		R127			RK73HB1J333J	CHIP R 33K J 1/16W	
R63, 64			RK73HB1J103J	CHIP R 10K J 1/16W		R128			RK73HB1J561J	CHIP R 560 J 1/16W	
R65			RK73HB1J474J	CHIP R 470K J 1/16W		R129			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R66			RK73HB1J471J	CHIP R 470 J 1/16W		R130			RK73HB1J563J	CHIP R 56K J 1/16W	
R67, 68			RK73HB1J332J	CHIP R 3.3K J 1/16W		R131			RK73HB1J220J	CHIP R 22 J 1/16W	
R69			RK73HB1J102J	CHIP R 1.0K J 1/16W		R132			RK73HB1J470J	CHIP R 47 J 1/16W	
R70			RK73HB1J821J	CHIP R 820 J 1/16W		R133			RK73HB1J151J	CHIP R 150 J 1/16W	
R71			RK73HB1J332J	CHIP R 3.3K J 1/16W		R134			RK73HB1J182J	CHIP R 1.8K J 1/16W	
R72, 73			R92-1252-05	CHIP R 0 OHM		R135			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R74			RK73HB1J154J	CHIP R 150K J 1/16W		R136			RK73HB1J220J	CHIP R 22 J 1/16W	
R75			R92-1252-05	CHIP R 0 OHM		R137			RK73HB1J561J	CHIP R 560 J 1/16W	
R76			RK73HB1J470J	CHIP R 47 J 1/16W		R138			RK73HB1J180J	CHIP R 18 J 1/16W	
R77			RK73HB1J154J	CHIP R 150K J 1/16W		R140			R92-1368-05	CHIP R 0 OHM	
R78			RK73HB1J470J	CHIP R 47 J 1/16W		R142			RK73HB1J680J	CHIP R 68 J 1/16W	
R80			RK73HB1J103J	CHIP R 10K J 1/16W		R143			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R81			RK73HB1J100J	CHIP R 10 J 1/16W		R144			RK73HB1J271J	CHIP R 270 J 1/16W	
R82			RK73HB1J103J	CHIP R 10K J 1/16W		R145			RK73HB1J222J	CHIP R 2.2K J 1/16W	
R83			R92-1368-05	CHIP R 0 OHM		R146			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R84			RK73HB1J154J	CHIP R 150K J 1/16W		R147			R92-1368-05	CHIP R 0 OHM	
R85			RK73HB1J152J	CHIP R 1.5K J 1/16W		R148,149			RK73HB1J104J	CHIP R 100K J 1/16W	
R86			RK73HB1J474J	CHIP R 470K J 1/16W		R150			RK73HB1J561J	CHIP R 560 J 1/16W	
R87			RK73HB1J222J	CHIP R 2.2K J 1/16W		R151			RK73HB1J224J	CHIP R 220K J 1/16W	
R88			RK73HB1J224J	CHIP R 220K J 1/16W		R152			RK73HB1J104J	CHIP R 100K J 1/16W	
R89			RK73HB1J272J	CHIP R 2.7K J 1/16W		R153			RK73HB1J470J	CHIP R 47 J 1/16W	
R90			RK73HB1J152J	CHIP R 1.5K J 1/16W		R154			RK73HB1J222J	CHIP R 2.2K J 1/16W	
R91			RK73HB1J104J	CHIP R 100K J 1/16W		R155			RK73HB1J101J	CHIP R 100 J 1/16W	
R92			RK73HB1J561J	CHIP R 560 J 1/16W		R156			RK73HB1J222J	CHIP R 2.2K J 1/16W	
R93			RK73HB1J470J	CHIP R 47 J 1/16W		R158			RK73HB1J222J	CHIP R 2.2K J 1/16W	
R94			R92-1252-05	CHIP R 0 OHM		R159			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R95			RK73HB1J272J	CHIP R 2.7K J 1/16W		R160,161			RK73HB1J104J	CHIP R 100K J 1/16W	
R96			RK73HB1J474J	CHIP R 470K J 1/16W		R162			RK73HB1J222J	CHIP R 2.2K J 1/16W	
R97			RK73HB1J100J	CHIP R 10 J 1/16W		R163			R92-1252-05	CHIP R 0 OHM	
R98			RK73HB1J101J	CHIP R 100 J 1/16W		R164			RK73GB1J221J	CHIP R 220 J 1/16W	
R99			RK73HB1J102J	CHIP R 1.0K J 1/16W		R165			RK73HB1J104J	CHIP R 100K J 1/16W	
R100			RK73HB1J154J	CHIP R 150K J 1/16W		R167			RK73HB1J222J	CHIP R 2.2K J 1/16W	
R101			RK73HB1J152J	CHIP R 1.5K J 1/16W		R168			R92-1252-05	CHIP R 0 OHM	
R102			RK73HB1J474J	CHIP R 470K J 1/16W		R174			R92-1252-05	CHIP R 0 OHM	
R103			RK73HB1J222J	CHIP R 2.2K J 1/16W		R175			RK73HB1J474J	CHIP R 470K J 1/16W	
R104			RK73HB1J224J	CHIP R 220K J 1/16W		R176			RK73HB1J333J	CHIP R 33K J 1/16W	
R105			RK73HB1J272J	CHIP R 2.7K J 1/16W		R177			R92-1368-05	CHIP R 0 OHM	
R106			RK73HB1J152J	CHIP R 1.5K J 1/16W		R178			RK73HB1J222J	CHIP R 2.2K J 1/16W	
R107			RK73HB1J333J	CHIP R 33K J 1/16W		R179			RK73HB1J224J	CHIP R 220K J 1/16W	
R108			RK73HB1J821J	CHIP R 820 J 1/16W		R181			RK73HB1J103J	CHIP R 10K J 1/16W	
R109			RK73HB1J470J	CHIP R 47 J 1/16W		R182			RK73HB1J151J	CHIP R 150 J 1/16W	
R110			R92-1252-05	CHIP R 0 OHM		R183			RK73HB1J182J	CHIP R 1.8K J 1/16W	
R111			RK73HB1J102J	CHIP R 1.0K J 1/16W		R184			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R112			RK73HB1J153J	CHIP R 15K J 1/16W		R185			RK73HB1J270J	CHIP R 27 J 1/16W	
R113			RK73HB1J474J	CHIP R 470K J 1/16W		R186			RK73HB1J561J	CHIP R 560 J 1/16W	
R114			RK73HB1J222J	CHIP R 2.2K J 1/16W		R187			RK73HB1J180J	CHIP R 18 J 1/16W	
R115			RK73HB1J474J	CHIP R 470K J 1/16W		R189			R92-1368-05	CHIP R 0 OHM	
R116			RK73HB1J222J	CHIP R 2.2K J 1/16W		R191			RK73HB1J680J	CHIP R 68 J 1/16W	
R117			RK73HB1J564J	CHIP R 560K J 1/16W		R192			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R118			RK73HB1J152J	CHIP R 1.5K J 1/16W		R195			RK73HB1J271J	CHIP R 270 J 1/16W	
R119			RK73HB1J102J	CHIP R 1.0K J 1/16W		R196			RK73HB1J101J	CHIP R 100 J 1/16W	
R120			RK73HB1J332J	CHIP R 3.3K J 1/16W		R197			RK73HB1J222J	CHIP R 2.2K J 1/16W	

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Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R198			RK73HB1J122J	CHIP R 1.2K J 1/16W		R541			RK73HB1J223J	CHIP R 22K J 1/16W	
R199			RK73HB1J103J	CHIP R 10K J 1/16W		R542			RK73HB1J100J	CHIP R 10 J 1/16W	
R200			RK73HB1J271J	CHIP R 270 J 1/16W		R543			RK73HB1J471J	CHIP R 470 J 1/16W	
R201			R92-1252-05	CHIP R 0 OHM		R544			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R202			RK73HB1J104J	CHIP R 100K J 1/16W		R545-548			RK73HB1J473J	CHIP R 47K J 1/16W	
R203			RK73HB1J220J	CHIP R 22 J 1/16W		R550			RK73HB1J103J	CHIP R 10K J 1/16W	
R204			RK73HB1J223J	CHIP R 22K J 1/16W		R551			RK73HB1J393J	CHIP R 39K J 1/16W	
R205			RK73HB1J222J	CHIP R 2.2K J 1/16W		R552			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R206			RK73HB1J104J	CHIP R 100K J 1/16W		R553			RK73HB1J564J	CHIP R 560K J 1/16W	
R207			RK73HB1J122J	CHIP R 1.2K J 1/16W		R554			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R208			R92-1252-05	CHIP R 0 OHM		R555			RK73HB1J103J	CHIP R 10K J 1/16W	
R209			RK73HB1J224J	CHIP R 220K J 1/16W		R557			RK73HB1J334J	CHIP R 330K J 1/16W	
R210			RK73HB1J104J	CHIP R 100K J 1/16W		R559			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R211			R92-1368-05	CHIP R 0 OHM		R560			RK73HB1J331J	CHIP R 330 J 1/16W	
R212			RK73HB1J470J	CHIP R 47 J 1/16W		R561			RK73HB1J474J	CHIP R 470K J 1/16W	
R213			R92-1368-05	CHIP R 0 OHM		R562-564			R92-1368-05	CHIP R 0 OHM	
R214			RK73HB1J823J	CHIP R 82K J 1/16W		R566			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R215			RK73HB1J104J	CHIP R 100K J 1/16W		R567			RK73HB1J124J	CHIP R 120K J 1/16W	
R216			RK73HB1J103J	CHIP R 10K J 1/16W		R568			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R217			RK73HB1J104J	CHIP R 100K J 1/16W		R569,570			RK73HB1J153J	CHIP R 15K J 1/16W	
R218,219			RK73HB1J103J	CHIP R 10K J 1/16W		R571			RK73HB1J104J	CHIP R 100K J 1/16W	
R220			RK73HB1J823J	CHIP R 82K J 1/16W		R572			RK73HB1J563J	CHIP R 56K J 1/16W	
R221			RK73HB1J103J	CHIP R 10K J 1/16W		R573			RK73HB1J105J	CHIP R 1.0M J 1/16W	
R222			RK73HB1J104J	CHIP R 100K J 1/16W		R574			RK73HB1J473J	CHIP R 47K J 1/16W	
R223			RK73HB1J473J	CHIP R 47K J 1/16W		R575			RK73HB1J471J	CHIP R 470 J 1/16W	
R224,225			RK73HB1J104J	CHIP R 100K J 1/16W		R576			RK73HB1J182J	CHIP R 1.8K J 1/16W	
R226			R92-1368-05	CHIP R 0 OHM		R577			RK73HB1J153J	CHIP R 15K J 1/16W	
R227			R92-1252-05	CHIP R 0 OHM		R578			R92-1368-05	CHIP R 0 OHM	
R228,229			RK73HB1J104J	CHIP R 100K J 1/16W		R579			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R231			R92-1252-05	CHIP R 0 OHM		R580			RK73HB1J223J	CHIP R 22K J 1/16W	
R232-234			RK73HB1J104J	CHIP R 100K J 1/16W		R581			RK73HB1J152J	CHIP R 1.5K J 1/16W	
R235			RK73HB1J470J	CHIP R 47 J 1/16W		R582			RK73HB1J153J	CHIP R 15K J 1/16W	
R236			RK73HB1J221J	CHIP R 220 J 1/16W		R583,584			RK73HB1J104J	CHIP R 100K J 1/16W	
R237			RK73HB1J220J	CHIP R 22 J 1/16W		R585			RK73HB1J474J	CHIP R 470K J 1/16W	
R238			RK73HB1J223J	CHIP R 22K J 1/16W		R586			RK73HB1J471J	CHIP R 470 J 1/16W	
R239			RK73HB1J473J	CHIP R 47K J 1/16W		R587			RK73HB1J474J	CHIP R 470K J 1/16W	
R240			RK73HB1J821J	CHIP R 820 J 1/16W		R588			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R241,242			RK73HB1J222J	CHIP R 2.2K J 1/16W		R589			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R243			RK73HB1J103J	CHIP R 10K J 1/16W		R590			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R244			RK73HB1J102J	CHIP R 1.0K J 1/16W		R591			RK73HB1J104J	CHIP R 100K J 1/16W	
R245			RK73GB1J102J	CHIP R 1.0K J 1/16W		R592			RK73HB1J154J	CHIP R 150K J 1/16W	
R247,248			RK73HB1J104J	CHIP R 100K J 1/16W		R593			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R249			RK73HB1J224J	CHIP R 220K J 1/16W		R594			RK73HB1J104J	CHIP R 100K J 1/16W	
R501-505			RK73HB1J221J	CHIP R 220 J 1/16W		R595			RK73HB1J152J	CHIP R 1.5K J 1/16W	
R506			RK73HB1J683J	CHIP R 68K J 1/16W		R596			RK73HB1J104J	CHIP R 100K J 1/16W	
R509			RK73HB1J222J	CHIP R 2.2K J 1/16W		R597			RK73HB1J473J	CHIP R 47K J 1/16W	
R512			RK73HB1J101J	CHIP R 100 J 1/16W		R598			RK73HB1J563J	CHIP R 56K J 1/16W	
R514			RK73HB1J103J	CHIP R 10K J 1/16W		R599,600			RK73HB1J224J	CHIP R 220K J 1/16W	
R522			RK73HB1J472J	CHIP R 4.7K J 1/16W		R601			RK73HB1J682J	CHIP R 6.8K J 1/16W	
R523			RK73HB1J103J	CHIP R 10K J 1/16W		R602			RK73HB1J123J	CHIP R 12K J 1/16W	
R525			RK73HB1J105J	CHIP R 1.0M J 1/16W		R603			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R526			RK73HB1J473J	CHIP R 47K J 1/16W		R604			RK73HB1J822J	CHIP R 8.2K J 1/16W	
R530			RK73HB1J184J	CHIP R 180K J 1/16W		R606			RK73HB1J223J	CHIP R 22K J 1/16W	
R531			RK73HB1J474J	CHIP R 470K J 1/16W		R607			RK73HB1J393J	CHIP R 39K J 1/16W	
R533			RK73HB1J101J	CHIP R 100 J 1/16W		R608			RK73HB1J104J	CHIP R 100K J 1/16W	
R534			RK73HB1J470J	CHIP R 47 J 1/16W		R609			RK73HB1J154J	CHIP R 150K J 1/16W	
R535			RK73HB1J474J	CHIP R 470K J 1/16W		R610			RK73HB1J563J	CHIP R 56K J 1/16W	
R536			RK73HB1J103J	CHIP R 10K J 1/16W		R611			RK73HB1J331J	CHIP R 330 J 1/16W	
R537,538			RK73HB1J104J	CHIP R 100K J 1/16W		R612			RK73HB1J332J	CHIP R 3.3K J 1/16W	
R540			RK73HB1J104J	CHIP R 100K J 1/16W		R613			RK73HB1J563J	CHIP R 56K J 1/16W	

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Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
R614			RK73HB1J102J	CHIP R 1.0K J 1/16W		R698			RK73HB1J221J	CHIP R 220 J 1/16W	
R616-619			RK73HB1J102J	CHIP R 1.0K J 1/16W		R699			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R620			RK73HB1J103J	CHIP R 10K J 1/16W		R706			RK73HB1J221J	CHIP R 220 J 1/16W	
R621			RK73HB1J102J	CHIP R 1.0K J 1/16W		R707,708			R92-1252-05	CHIP R 0 OHM	
R622,623			R92-1368-05	CHIP R 0 OHM		R714			R92-1368-05	CHIP R 0 OHM	
R624			RK73HB1J123J	CHIP R 12K J 1/16W		R715			RK73HB1J474J	CHIP R 470K J 1/16W	
R625,626			RK73HB1J104J	CHIP R 100K J 1/16W		R716			RK73HB1J102J	CHIP R 1.0K J 1/16W	
R627			RK73HB1J102J	CHIP R 1.0K J 1/16W		R718			RK73HB1J473J	CHIP R 47K J 1/16W	
R628			RK73HB1J123J	CHIP R 12K J 1/16W		R719			RK73HB1J474J	CHIP R 470K J 1/16W	
R629,630			RK73HB1J472J	CHIP R 4.7K J 1/16W		R720,721			R92-1252-05	CHIP R 0 OHM	
R631			RK73HB1J103J	CHIP R 10K J 1/16W		R722,723			RK73HB1J221J	CHIP R 220 J 1/16W	
R632			RK73HB1J123J	CHIP R 12K J 1/16W		R725			R92-1252-05	CHIP R 0 OHM	
R633			RK73HB1J472J	CHIP R 4.7K J 1/16W		R726			R92-1368-05	CHIP R 0 OHM	
R634			RK73HB1J103J	CHIP R 10K J 1/16W		R727			RK73HB1J222J	CHIP R 2.2K J 1/16W	
R635-637			RK73HB1J222J	CHIP R 2.2K J 1/16W		R728			RK73HB1J104J	CHIP R 100K J 1/16W	
R638			RK73HB1J103J	CHIP R 10K J 1/16W		VR1.2			R12-7490-05	TRIMMING POT.(47K/8)	
R641			RK73HB1J103J	CHIP R 10K J 1/16W	K	VR3			R12-7490-05	TRIMMING POT.(47K/8)	E
R641			RK73HB1J822J	CHIP R 8.2K J 1/16W	E	VR500			R12-7494-05	TRIMMING POT.(220K/8)	
R642			RK73HB1J103J	CHIP R 10K J 1/16W		VR501			R39-0602-05	VARIABLE RESISTOR(10K A)	
R643			RK73HB1J123J	CHIP R 12K J 1/16W		S500			S70-0424-05	TACT SWITCH	
R644			RK73HB1J102J	CHIP R 1.0K J 1/16W		MIC500	2B		T91-0580-05	MIC ELEMENT	
R645			RK73HB1J104J	CHIP R 100K J 1/16W		D1			RB751V-40	DIODE	
R646			RK73HB1J103J	CHIP R 10K J 1/16W		D2			DTZ3.9(B)	ZENER DIODE	
R647-649			RK73HB1J102J	CHIP R 1.0K J 1/16W		D3			SFPB-72VL	DIODE	
R650			RK73HB1J123J	CHIP R 12K J 1/16W		D4			1SS357	DIODE	
R651			RK73HB1J103J	CHIP R 10K J 1/16W		D5			DA221	DIODE	
R652-654			RK73HB1J332J	CHIP R 3.3K J 1/16W		D6			RB751V-40	DIODE	
R655			RK73HB1J102J	CHIP R 1.0K J 1/16W		D8			DA221	DIODE	
R656			RK73HB1J473J	CHIP R 47K J 1/16W		D9			MA2S111	DIODE	
R657,658			RK73HB1J223J	CHIP R 22K J 1/16W		D10-12			HSC277	DIODE	
R659			RK73HB1J103J	CHIP R 10K J 1/16W		D13			DA221	DIODE	
R660			RK73HB1J102J	CHIP R 1.0K J 1/16W		D14			MA2S111	DIODE	
R661			RK73HB1J563J	CHIP R 56K J 1/16W		D15			HSC277	DIODE	
R662			RK73HB1J103J	CHIP R 10K J 1/16W		D17			HSC277	DIODE	
R663			RK73HB1J393J	CHIP R 39K J 1/16W		D18			RB706F-40	DIODE	
R664			RK73HB1J103J	CHIP R 10K J 1/16W		D19			DA221	DIODE	
R665			RK73HB1J823J	CHIP R 82K J 1/16W		D20			HVU131	DIODE	
R666			RK73HB1J154J	CHIP R 150K J 1/16W		D21,22			HSC277	DIODE	
R667			RK73HB1J473J	CHIP R 47K J 1/16W		D23			DAN222	DIODE	
R668,669			RK73HB1J331J	CHIP R 330 J 1/16W		D24			DAN235	DIODE	
R670			R92-1368-05	CHIP R 0 OHM		D25			HSC277	DIODE	
R671			RK73HB1J331J	CHIP R 330 J 1/16W		D26			DAN235E	DIODE	
R673			RK73HB1J224J	CHIP R 220K J 1/16W		D27,28			HVC350B	VARIABLE CAPACITANCE DIODE	
R674			RK73HB1J105J	CHIP R 1.0M J 1/16W		D29			DA221	DIODE	
R675,676			RK73HB1J473J	CHIP R 47K J 1/16W		D30			HVU131	DIODE	
R677			RK73HB1J102J	CHIP R 1.0K J 1/16W		D31			HSC277	DIODE	
R678			RK73HB1J221J	CHIP R 220 J 1/16W		D32-34			HVC350B	VARIABLE CAPACITANCE DIODE	
R679,680			RK73HB1J472J	CHIP R 4.7K J 1/16W		D36			HVC350B	VARIABLE CAPACITANCE DIODE	
R682			RK73HB1J104J	CHIP R 100K J 1/16W		D37,38			MA2S304	VARIABLE CAPACITANCE DIODE	
R684			RK73HB1J224J	CHIP R 220K J 1/16W		D40			DAN222	DIODE	
R685			RK73HB1J473J	CHIP R 47K J 1/16W		D42-44			HSC277	DIODE	
R686			R92-1368-05	CHIP R 0 OHM		D500			MA2S111	DIODE	
R688			RK73HB1J102J	CHIP R 1.0K J 1/16W		D501			DA227	DIODE	
R689,690			RK73HB1J104J	CHIP R 100K J 1/16W		D502,503			MA2S111	DIODE	
R692			RK73HB1J104J	CHIP R 100K J 1/16W		D506			DA227	DIODE	
R693			RK73HB1J563J	CHIP R 56K J 1/16W		D507			MA2S111	DIODE	
R694			RK73HB1J102J	CHIP R 1.0K J 1/16W		D508			MA2S111	DIODE	K
R695			RK73HB1J223J	CHIP R 22K J 1/16W		D509,510			B30-2157-05	LED(YELLOW/8)	
R696			R92-1368-05	CHIP R 0 OHM		D511			B30-2143-05	LED(YG/8)	
R697			RK73HB1J473J	CHIP R 47K J 1/16W		D512,513			B30-2131-05	LED	

# PARTS LIST

TX-RX UNIT (X57-570X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
D516,517			MA2S111	DIODE		Q25			2SC4617(R)	TRANSISTOR	
D518			B30-2143-05	LED(YG/B)		Q26			2SC4617(S)	TRANSISTOR	
D526			MA2S111	DIODE		Q27,28			2SC5108(Y)	TRANSISTOR	
D527			DTZ3.9(B)	ZENER DIODE		Q29-31			*2SC4649(N,P)	TRANSISTOR	
D528		*	DTZ4.3(A)	ZENER DIODE		Q32-35			2SC4617(R)	TRANSISTOR	
D529			1SS388	DIODE		Q36			2SC5108(Y)	TRANSISTOR	
D530		*	DTZ4.3(A)	ZENER DIODE		Q37			2SC3356	TRANSISTOR	
D531			MA2S111	DIODE		Q38			2SK1824	FET	
D532			B30-2143-05	LED(YG/B)		Q39,40			3SK309	FET	
D533,534			MA2S111	DIODE		Q45			2SK1824	FET	
D535			B30-2143-05	LED(YG/B)		Q46			2SC3356	TRANSISTOR	
D536-539			B30-2157-05	LED(YELLOW/B)		Q47			DTC144EE	DIGITAL TRANSISTOR	
IC1,2			LMC7101BIM5	IC(OP AMP)		Q48			3SK309	FET	
IC3			TC7660S0EA	IC		Q49			3SK239A	FET	
IC4			BU2090FS	IC(SHIFT/STORE REGISTER)		Q50			3SK309	FET	
IC6		*	MB15E03L	IC(PLL SYNTHESIZER)		Q51			DTC144EE	DIGITAL TRANSISTOR	
IC7			TC7S66FU	IC(ANALOG SWITCH)		Q52			2SC4617(R)	TRANSISTOR	
IC9		*	MB15E03L	IC(PLL SYNTHESIZER)		Q53			3SK239A	FET	
IC10			TC7S66FU	IC(ANALOG SWITCH)		Q54			2SC5108(Y)	TRANSISTOR	
IC12,13			TA31136FN	IC(FM IF DETECTOR)		Q55			2SK1875(V)	FET	
IC14			TC4W53FU	IC(2 INPUT NAND GATE)		Q56			DTC114YE	DIGITAL TRANSISTOR	
IC15	3A		M67799MA	IC(POWER MODULE:UHF)		Q57			UPA672T	FET	
IC16	3A		M67798LRA	IC(POWER MODULE)VHF)		Q58,59			2SJ243	FET	
IC17		*	UPB1509GV	IC		Q60			2SC4617(R)	TRANSISTOR	
IC18			TA75W01FU	IC(OP AMP X2)		Q61			2SK1824	FET	E
IC500			KIA6278F	IC		Q62,63			2SK1824	FET	
IC501			X25650S8I-2.5	IC(EEPROM)		Q504			2SK1588	FET	
IC503		*	RN5VT32C	IC(CONVERTER)		Q510,511			2SC4617(R)	TRANSISTOR	
IC504		*	RN5VT25A	IC(REGULATOR)		Q512,513			2SB1188(O)	TRANSISTOR	
IC505		*	78F42166CJUKB	IC(CPU)		Q514			UPA672T	FET	
IC506			TA75W01FU	IC(OP AMP X2)		Q515,516			2SJ243	FET	
IC507,508			S-81335HG-KI	IC		Q517			2SK1824	FET	
IC509			AK2343	IC(CTCSS ENCODER/DECODER)		Q518			2SJ243	FET	
IC510		*	TGT0120Q	IC		Q519			2SK1824	FET	
IC511		*	TMT0110Q	IC		Q520			2SC4617(R)	TRANSISTOR	
IC512		*	TA75W393FU	IC		Q521			IMD16A	TRANSISTOR	
IC513		*	BU4053BCFV	IC		Q522,523			2SK1824	FET	
IC514			TA75W01FU	IC(OP AMP X2)		Q524		*	2SA1774(R)	TRANSISTOR	
IC515			TA75S393F	IC		Q525,526			2SK1824	FET	
IC516		*	X25097V1-1.8	IC(EEPROM)		Q527-529			2SC4617(R)	TRANSISTOR	
IC517			TA75W01FU	IC(OP AMP X2)		Q530			UPA672T	FET	
IC518		*	ADM3202ARU	IC		Q531-533			2SK1824	FET	
Q1			2SC4617(R)	TRANSISTOR		Q534,535			2SJ243	FET	
Q2			2SK1824	FET		Q536			2SC4997	TRANSISTOR	
Q3			UMG1	TRANSISTOR		Q537			2SJ243	FET	
Q4			UMA11N	TRANSISTOR		Q538			DTC144EE	DIGITAL TRANSISTOR	
Q5			UPA672T	FET		Q539			2SK1824	FET	
Q6			2SD1483	TRANSISTOR		TH1			157-104-65001	THERMISTOR(100K)	
Q7			2SB1188(O)	TRANSISTOR		TH501			157-153-65001	THERMISTOR(15K)	
Q8,9			UMW1	TRANSISTOR		A1		*	X58-4600-11	SUB UNIT (UHF VCO)	K
Q10			*2SB1184(Q,R)	TRANSISTOR		A1		*	X58-4602-71	SUB UNIT (UHF VCO)	E
Q11,12			IMD16A	TRANSISTOR		<b>SUB UNIT (UHF VCO) (X58-460X-XX) 0-11:K, 2-71:E</b>					
Q13-15			UMA11N	TRANSISTOR		C1			CK73HB1H471K	CHIP C	470PF K
Q16,17			UMA10N	TRANSISTOR		C3			CK73GB1C104K	CHIP C	0.10UF K
Q18			2SC4617(R)	TRANSISTOR		C4			CK73HB1H471K	CHIP C	470PF K
Q19		*	2SA1774(R)	TRANSISTOR		C6			CK73HB1H471K	CHIP C	470PF K
Q20			2SC4617(R)	TRANSISTOR		C7			CC73HC11H0R5B	CHIP C	0.5PF B
Q21			2SC4617(S)	TRANSISTOR		C8		*	CC73HC11H070C	CHIP C	7.0PF C
Q22,23			2SC5108(Y)	TRANSISTOR		C9			CC73HC11H0R5B	CHIP C	0.5PF B
Q24		*	2SA1774(R)	TRANSISTOR							

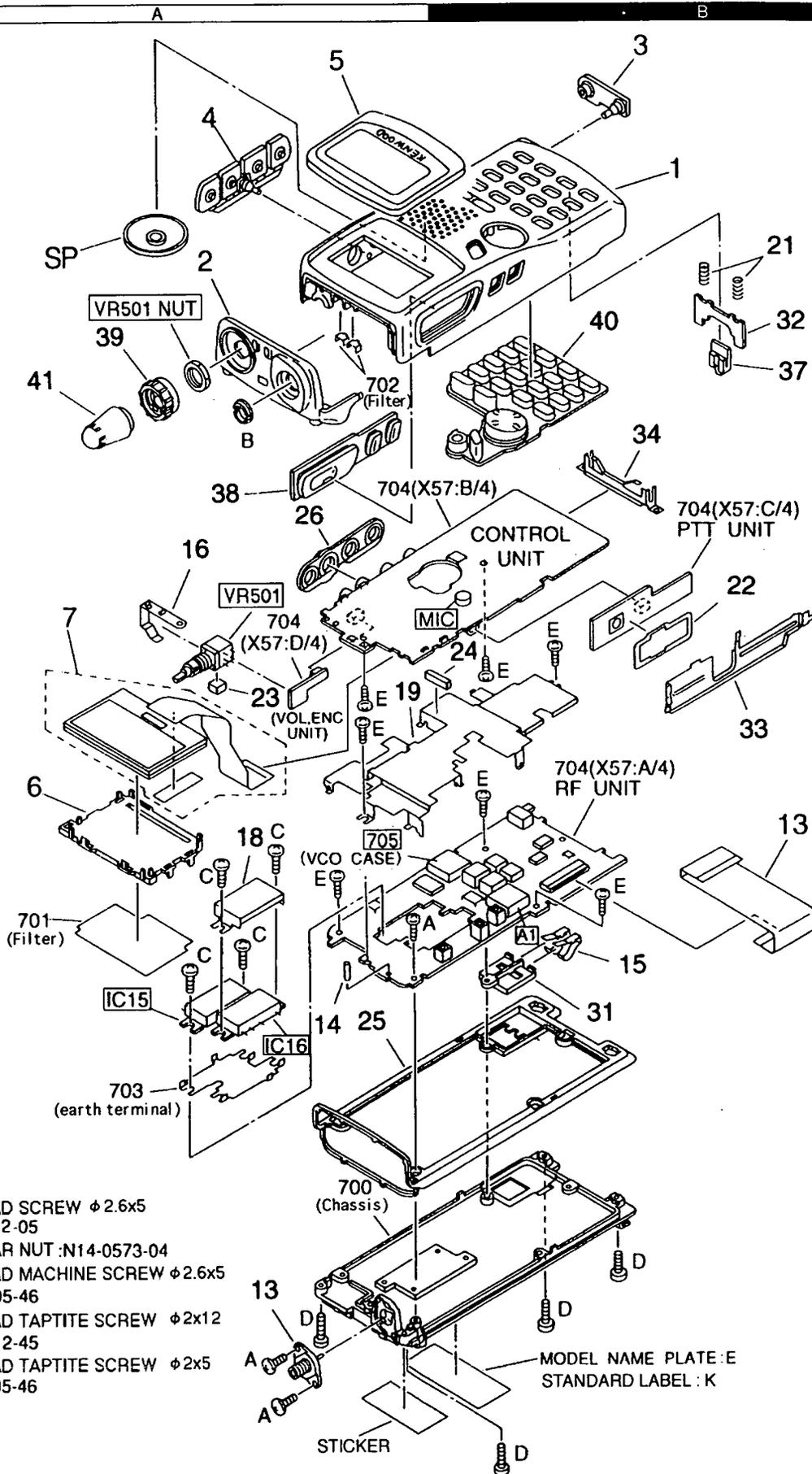
## PARTS LIST

TX-RX UNIT (X57-570X-XX)

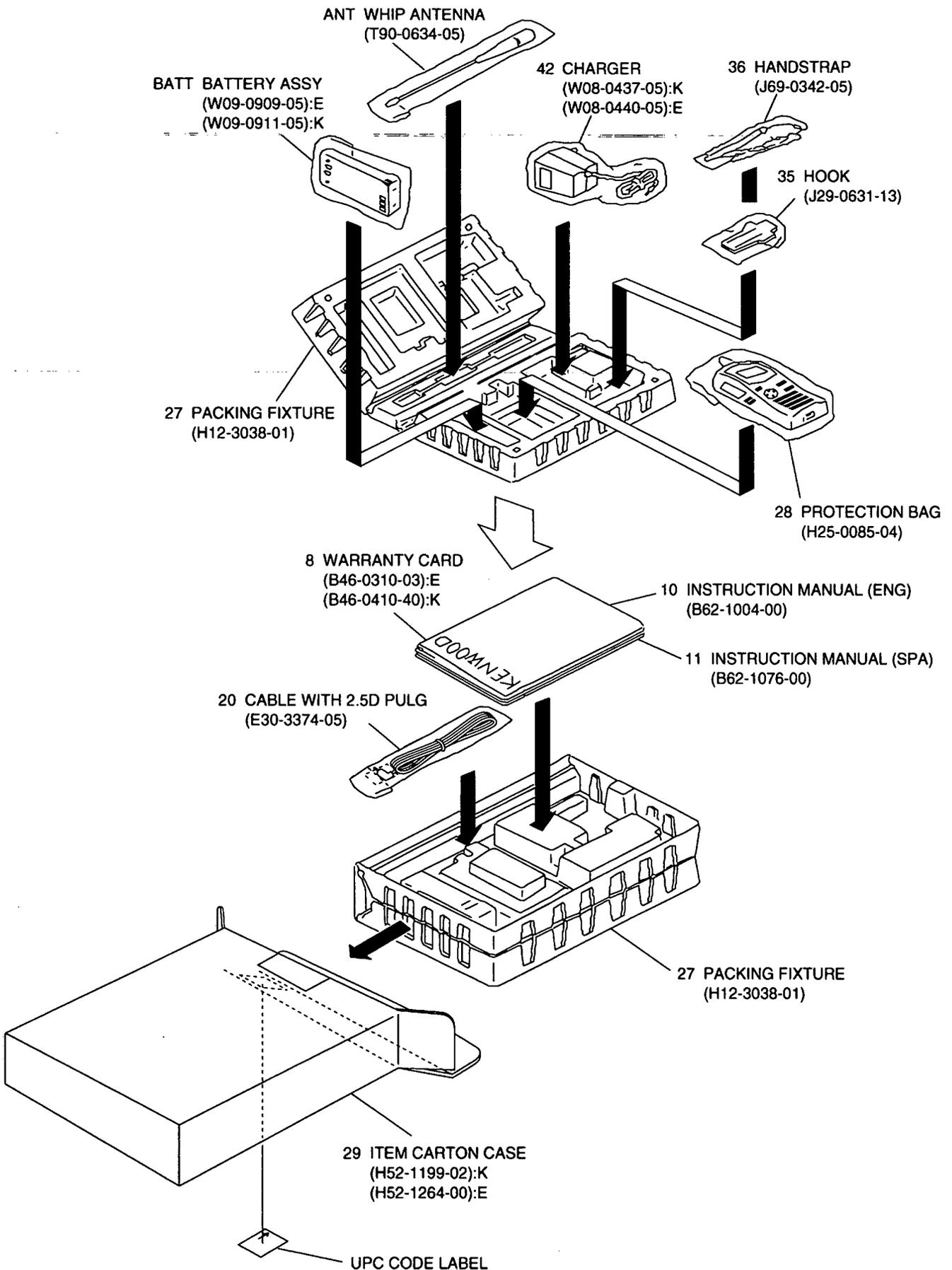
SUB UNIT(UHF VCO) (X58-460X-XX)

Ref. No.	Address	New parts	Parts No.	Description	Destination	Ref. No.	Address	New parts	Parts No.	Description	Destination
C10			CK73HB1H471K	CHIP C 470PF K							
C11			CC73HCH1H0R5B	CHIP C 0.5PF B							
C12			CC73HCH1H150J	CHIP C 15PF J							
C13			CK73GB1C104K	CHIP C 0.10UF K							
C14, 15			CK73HB1H471K	CHIP C 470PF K							
C17			CK73HB1H471K	CHIP C 470PF K							
50			F10-2276-04	SHIELDING CASE							
L1			L40-3391-86	SMALL FIXED INDUCTOR(3.3UH)							
L2			L40-2275-77	SMALL FIXED INDUCTOR(22NH)							
L3			L40-2778-53	SMALL FIXED INDUCTOR(27NH)							
L4			L40-3391-86	SMALL FIXED INDUCTOR(3.3UH)							
L5			L40-1078-53	SMALL FIXED INDUCTOR(10NH)							
R1, 2			RK73HB1J470J	CHIP R 47 J 1/16W							
R3, 4			RK73HB1J473J	CHIP R 47K J 1/16W							
R5			RK73HB1J471J	CHIP R 470 J 1/16W							
R6			RK73HB1J222J	CHIP R 2.2K J 1/16W							
R7			RK73HB1J103J	CHIP R 10K J 1/16W							
R8			RK73HB1J104J	CHIP R 100K J 1/16W							
R10			RK73HB1J823J	CHIP R 82K J 1/16W							
R11			RK73HB1J103J	CHIP R 10K J 1/16W							
R12			RK73HB1J682J	CHIP R 6.8K J 1/16W							
R13			RK73HB1J181J	CHIP R 180 J 1/16W							
R14			RK73HB1J103J	CHIP R 10K J 1/16W							
D1			HSC277	DIODE							
D2, 3			1SV273	VARIABLE CAPACITANCE DIODE							
Q1			2SC5108(Y)	TRANSISTOR							
Q2			2SC5006	TRANSISTOR							
Q3			2SC4997	TRANSISTOR							

EXPLODED VIEW



## PACKING



# ADJUSTMENT

## REQUIRED TEST EQUIPMENT

### 1. Stabilized Power Supply

- ① The supply voltage can be changed between 3V and 16V and the current is 1A or more.
- ② The standard voltage is 13.8V.

### 2. DC Ammeter (DC.A)

- ① Class 1 ammeter (17 ranges and other features)
- ② The full scale can be switched between 300mA and 3A.
- ③ A cable with low internal loss must be used.

### 3. Frequency Counter (f. counter)

- ① Frequencies of up to 1 GHz or so can be measured.
- ② The sensitivity can be changed to 250 MHz or below and measurements are highly stable and accurate (about 0.2 ppm).

### 4. Power Meter (terminal type)

- ① Measurable frequency: Up to 500 MHz
- ② Impedance: 50Ω, unbalanced
- ③ Measuring range: Full scale of 10W
- ④ The specified special connection cable must be used.

### 5. RF VTVM (RF V.M)

- ① Measurable frequency: Up to 500 MHz or so

### 6. Linear Detector

- ① Measurable frequency: Up to 500 MHz
- ② Characteristic is flat and CN is 60 dB or more.

### 7. Digital Voltmeter

- ① Voltage range: FS = 18V or so
- ② Input resistance: 1MΩ or more

### 8. Oscilloscope

- ① Measuring range: DC to 30 MHz
- ② Provides highly accurate measurements for 5 to 25 MHz

### 9. AF Voltmeter (AF V.M)

- ① Measurable frequency: 50 Hz to 1 MHz
- ② Maximum sensitivity: 1mV or more

### 10. Spectrum Analyzer

- ① Measuring range: DC to 1GHz or more

### 11. Standard Signal Generator (SSG)

- ① Maximum frequency: 500MHz or more
- ② Output: -133 dBm (0.05 μV) to -13 dBm (50mV)
- ③ Output impedance: 50Ω

### 12. Tracking Generator

- ① Center frequency: 50 kHz to 200 MHz
- ② Frequency deviation: ±35 MHz
- ③ Output voltage: 100 mV or more

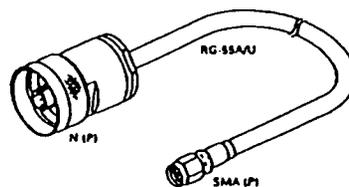
### 13. Dummy Load

- ① 8Ω, 3W or more

## Preparations

- Use a no-conductive rod such as a Bakelite rod for adjustment (especially of trimmers and coils).
- To protect the SSG, do not send out signals while adjusting the receiving unit.
- The SSG output levels give the values are for maximum output. Also, unless otherwise specified, use the standard modulation (modulation: 1 kHz, deviation: ± 3 kHz).

## Adjustment service jig



Antenna cable (length 1m)  
(E30-3226-05)

## Using the "SET mode"

The SET mode is used to adjust the TH-D7A/E. In this mode, the following items can be set:

1. Squelch critical point in each band
2. First segment ON/all segments ON of the S meter in each band
3. Hi/Lo transmission output in each band
4. Reference voltage for overvoltage warning (13.8 V)

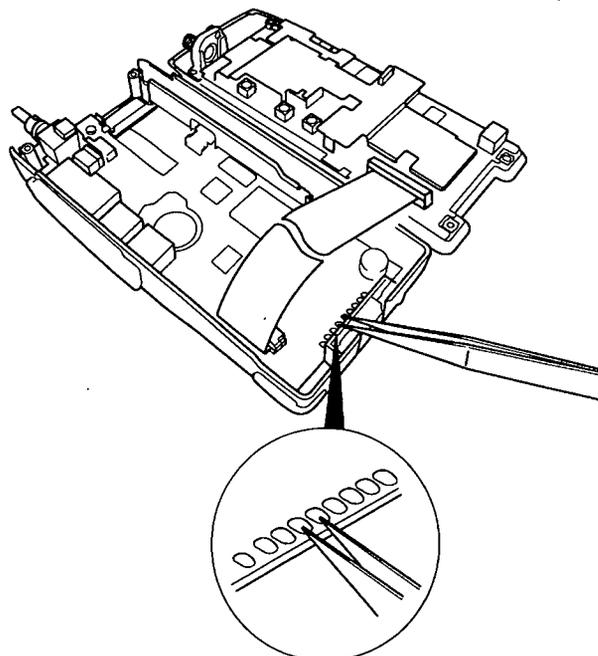
The levels set in the SET mode are written into the EEPROM.

Therefore, the data stored in the EEPROM is retained after the power is shut down or reset.

If the EEPROM is replaced, all items must be written (set) into the new EEPROM.

## Setting procedure

Open the main unit, turn the power on, and momentarily short the SET point on the component side of the TX-RX unit (B/4) (with tweezers, etc.). (See the figure below.)



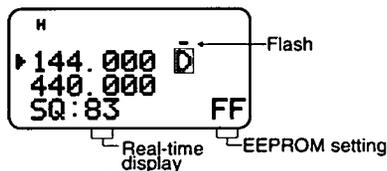
The beeper sounds and the **■** mark on the display flashes to indicate that the SET mode is effective.

## ADJUSTMENT

### Operation

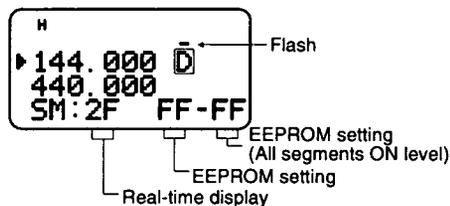
#### 1. Setting the squelch critical point

- Set the squelch adjustment screen on which 'SQ' is shown at the bottom of the display with the  $\uparrow/\downarrow$  key, and select the band and frequency with the **(BAND)** key and encoder.
- Send a prescribed signal to the ANT terminal from the SSG.
- Press the  $\rightarrow$  key to set the squelch critical point.
- Set the squelch critical point in all the receive bands in the same way.



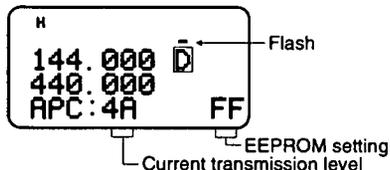
#### 2. S meter setting

- Set the S meter adjustment screen on which 'SM' is shown at the bottom of the display with the  $\uparrow/\downarrow$  key, and select the band and frequency with the **(BAND)** key and encoder.
- Send a prescribed signal to the ANT terminal from the SSG.
- Set the first segment ON level with the  $\leftarrow$  key and set the all segments ON level with the  $\rightarrow$  key.
- Set the levels in all the receive bands in the same way.



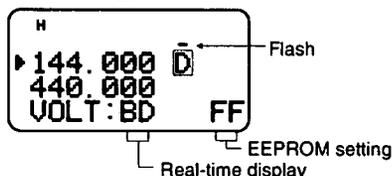
#### 3. APC (RF power) setting

- Set the RF power adjustment screen on which 'APC' is shown at the bottom of the display with the  $\uparrow/\downarrow$  key, and select the band and frequency with the **(BAND)** key and encoder.
- Connect the power meter to the ANT terminal, select HI/LO power with the **(F)** and **(LOW)** keys and press the **(PTT)** key.
- Adjust the transmission power to the prescribed output using the  $\uparrow/\downarrow$  key and encoder.
- Press the  $\rightarrow$  key to set the selected value as the power.



#### 4. Overvoltage warning reference voltage setting

- Set the overvoltage warning reference voltage adjustment screen on which 'VOLT' is shown at the bottom of the display with the  $\uparrow/\downarrow$  key.
- Apply terminal voltage 13.8 V  $\pm$  0.05 V to the external power terminal (DC IN) from the stabilized power supply.
- Press the  $\rightarrow$  key to set 13.8 V.



### Prescribed input values

Enter the SSG level for each band from the ANT terminal and press the appropriate key. (See the table below.)

	SQ level	S1 level (First segment ON)	S9 level (All segments ON)
Key to press (CURSOR key)	$\rightarrow$	$\leftarrow$	$\rightarrow$
Band (SSG frequency)			
VHF :145.820MHz	-126.0dBm	-120.0dBm	-105.0dBm
UHF 435.900MHz:E 444.000MHz:K	-126.0dBm	-120.0dBm	-105.0dBm
SUB-VHF:145.820MHz	-126.0dBm	-120.0dBm	-105.0dBm

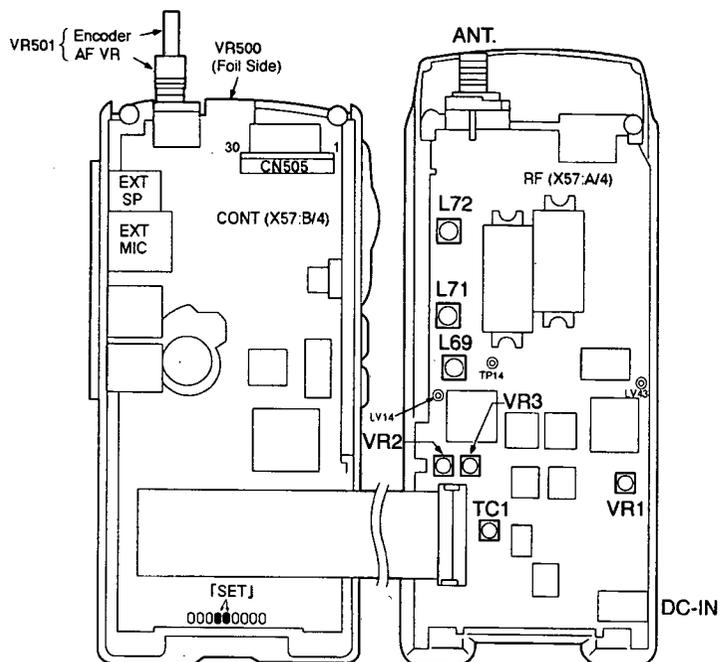
Note: SSG uses standard modulation.

### Other information

- The settings are overwritten on previous data, so they can be entered in any order and independently of each other.
- The real-time display is updated every about 200 ms.
- If an item is not set, "FF" is displayed on the EEPROM setting display.
- In the SET mode, the expanded band can be recalled with the **(BAND)** key even if the receiver is not modified to extend the bands. However, the receiver extension is turned off when the SET mode is canceled.
- Only the 118MHz band can be switched between FM and AM using the **(MENU)** key.  
(When AM is selected, the 'MHz dot' becomes a widened point.)
- The SET mode is canceled when the power is turned off.
- Finally, perform "VFO reset".

## ADJUSTMENT

### Adjustment Points



CONT UNIT (X57:B/4)  
 [SET] : SET mode test points.  
 VR500 : LCD Contrast  
 (Adjust only when replacing the LCD.)

RF UNIT (X57:A/4)  
 L69, 71, 72 : VHF Helical  
 TC1 : UHF transmit frequency  
 VR1 : UHF DEV  
 VR2 : VHF DEV (Wide):K  
 VR3 : VHF DEV (Narrow):E  
 TP14 : Helical alignment spectrum analyzer point  
 LV14 : VHF Lock voltage point  
 LV43 : UHF Lock voltage point

### Section common to transmission and reception

Item	Conditions	Measurement			Adjustment			Specifications/Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. Setting and reset	1) External power supply connection DC-IN terminal voltage: 13.8V	<p>LCD all-lit display</p>						
	2) All-lit display check While pressing the F key, switch the POWER switch ON.							
	3) RESET Use Partial (VFO) Reset to initialize all settings except the memory channels, the Call channel, the DTMF channels, and Memory Channel Lockout. Use Full Reset to initialize all settings that you have customized.							
	3-1) Press [F]+ POWER ON. • "RESET?" appears. • You can also use Menu 1-5-7 (TH-D7A) or Menu 1-5-9 (TH-D7E).							
	3-2) Press [UP]/ [DWN] to select Partial (VFO) Reset or Full Reset.							
3-3) Press [OK]. • A confirmation message appears.								
3-4) Press [UP]/ [DWN] to select Yes (or No).								
3-5) Press [OK].	<p>Default setting display after all reset</p>							

## ADJUSTMENT

Item	Conditions	Measurement			Adjustment			Specifications/Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method	
2. Lock voltage check	1) Frequency:144.050MHz During transmit and receive	Digital Voltmeter	RF	LV14			Check the voltage	0.7V or more
	2) Frequency:145.950MHz:E :147.950MHz:K During transmit and receive			LV43				5.8V or more
	3) Frequency:430.050MHz:E :438.050MHz:K During transmit and receive							0.7V or more
	4) Frequency:439.975MHz:E :449.975MHz:K During transmit and receive							6.0V or less
3. Adjust the LCD contrast	Only during LCD replacement Normally use Menu Mode 1-1-2.	Digital Voltmeter	CONT	CN505 (4 pin)	CONT	VR500 (Foil Side)	Alignment Method 1. Set for a maximum voltage (display gets darker). Set the voltage at that time as V max (V). 2. Temporarily return to the minimum voltage (display gets lighter) and then align V max to -0.001(V).	

### VHF reception section

Item	Conditions	Measurement			Adjustment			Specifications/Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. Helical Adjust (BPF)	1) Tracking generating output: -35dBm Center: 145.050 MHz  Span:20MHz	Tracking generator Spectrum analyzer	RF	ANT TP	RF	L69 L71 L72	Repeat 2-3 times for maximum level	See Figure 1.
2. Large input S/N check	1) Frequency:145.020 MHz:E 146.020 MHz:K SSG:-53dBm	SSG Oscilloscope AFVM		ANT SP			S/N check (AF-VR:0.63V/8Ω)	35 dB or more.
3. Sensitivity Check	1) Frequency:144.020MHz SSG:-121dBm AF - VR:0.63V/8 Ω 2) Frequency:145.020MHz:E 146.020MHz:K 3) Sub-VHF Frequency:145.05MHz:E Frequency:146.05MHz:K SSG :-117dBm	Distortion meter Ammeter Dummy load					Check	12dB SINAD or more.
4. S meter Check	1) Frequency:144.020MHz SSG:-120dBm±6dBm	SSG Oscilloscope		ANT SP		LCD	Check	<p>At least one lit</p>
	2) SSG:-105dBm±6dBm							<p>All lit</p>
5. Squelch Check	1) Frequency:144.020MHz SSG:OFF						Check	Squelch must be closed.
	2) SSG:-122.5dBm							Squelch must be opened.

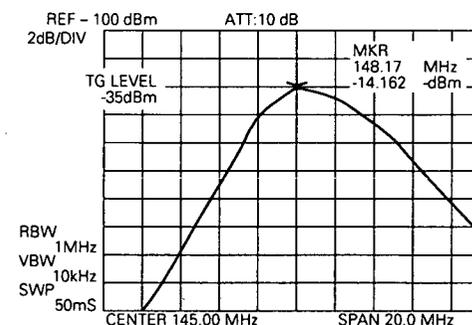
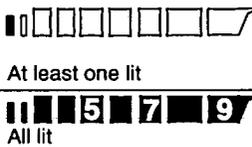


Figure 1 Helical (BPF) Adjust waveform

## ADJUSTMENT

### UHF reception section

Item	Conditions	Measurement			Adjustment			Specifications/Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. Large input S/N check	1) Frequency:430.025MHz:E :440.025MHz:K SSG:-53dBm AF*VR:0.63V/8 Ω	SSG Oscilloscope AFVM Distortion meter	RF	ANT SP			Check	40dB or more.
2. Sensitivity Check	1) Frequency:430.025MHz:E :440.025MHz:K SSG:-121dBm 2) Frequency:435.025MHz:E :445.025MHz:K	Ammeter Dummy load					Check	12dB SINAD or more.
3. S meter Check	1) Frequency:430.025MHz:E :440.025MHz:K SSG:-121dBm±6dBm 2) SSG:-105dBm±6dBm	SSG Oscilloscope		ANT SP		LCD	Check	 At least one lit All lit
4. Squelch Check	1) Frequency:435.025MHz:E :445.025MHz:K SSG:OFF 2) SSG:-122.5dBm						Check	Squelch must be closed.  Squelch must be closed.

### UHF transmission section

Item	Conditions	Measurement			Adjustment			Specifications/Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. Transmission frequency Adjust	1) Frequency:434.980MHz:E :449.980MHz:K PTT:ON	Power meter F counter	RF	ANT	RF	TC1	Set to display frequency	±200Hz
2. Transmission output Adjust	1) DC-IN:13.8V Frequency:435.050MHz:E :445.050MHz:K Set to SET MODE 2) Transmission output switching:HI PTT transmission Press the set key. Return to PTT. 3) Transmission output switching : LO Same method as 2) 4) Transmission output switching: EL Same method as 2)	Power meter DC-A		ANT	Panel	Display encoder	Turn the encoder and adjust the power meter reading to 4.8 W.  Adjust to 0.5W Adjust to 50mW	±0.1W  (Less than:2.1A)  ±0.1W (Less than 0.8A) ±10mW (Less than 0.5A)
3.DEV Adjust	1) Frequency:434.975MHz:E :444.000MHz:K AG:1kHz/70mV PTT:ON 2) AG:20dBm down:1 kHz/7 mV PTT:ON	Power meter Linear detector Oscilloscope AG AFVM		ANT MIC	RF	VR1	Adjust to 4.2 kHz with larger ±.  Check (mic sensitivity)	±100Hz  ±1.8~2.6kHz

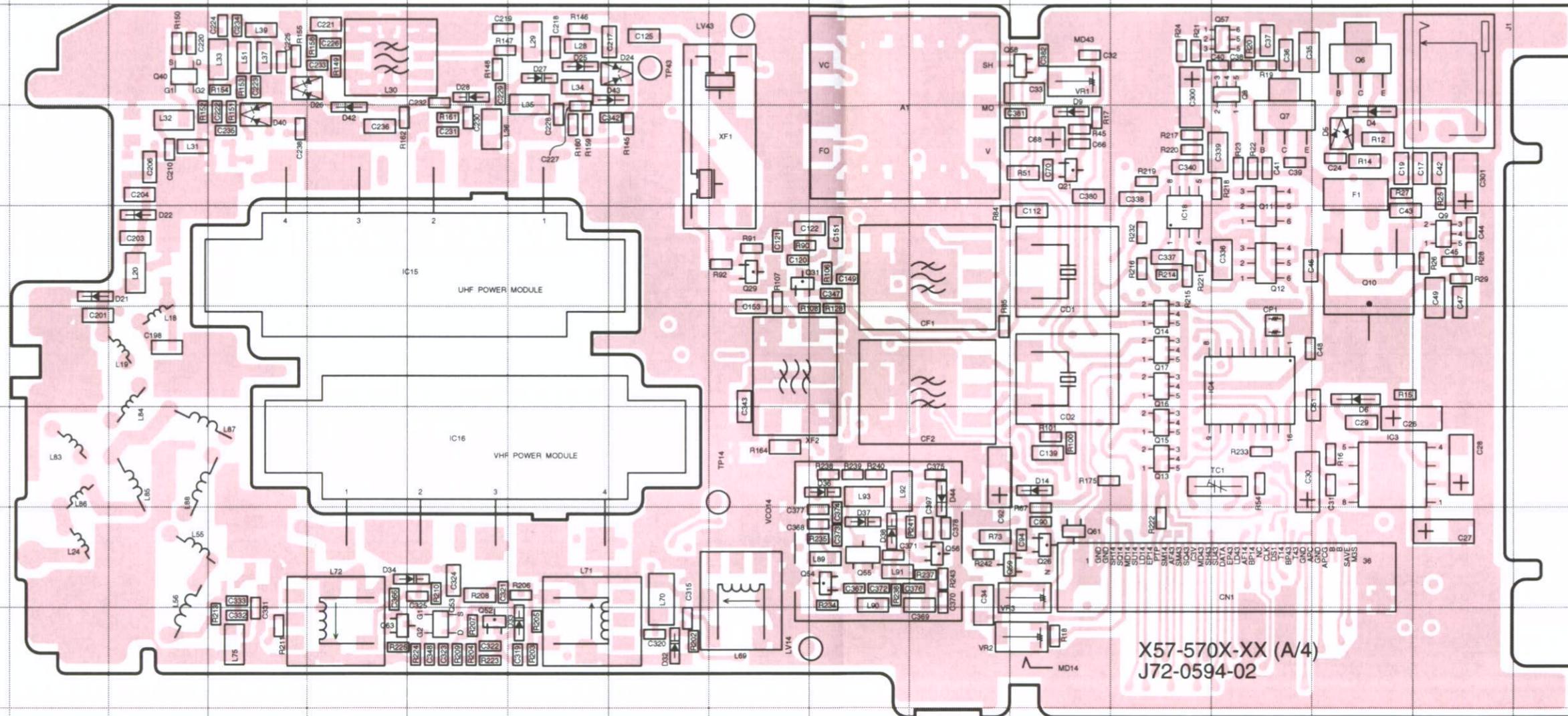
## ADJUSTMENT

### VHF transmission section

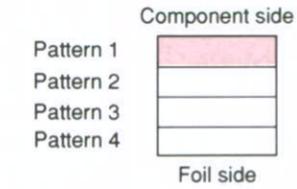
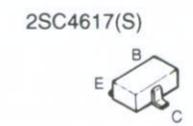
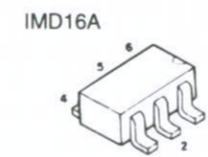
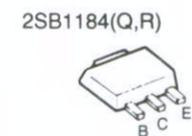
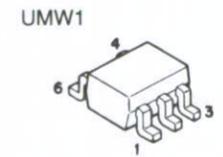
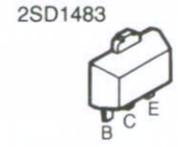
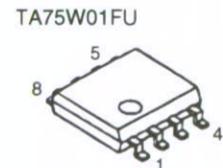
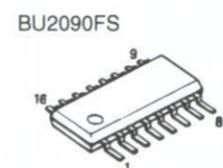
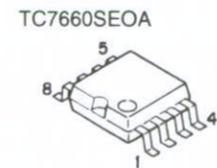
Item	Conditions	Measurement			Adjustment			Specifications/Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method	
1. Transmission output Adjust	1) DC-IN:13.8V Frequency:145.060MHz:E :146.060MHz:K Set to Set mode. 2) Transmission output switching: HI PTT transmission Press the set key. Return to PTT. 3) Transmission output switching: LO Same method as 2) 4) Transmission output switching: EL Same method as 2)	Power meter DC-A	RF	ANT	Panel	Display encoder	Turn the encoder and adjust the power meter reading to 4.8W.  Adjust to 0.5W Adjust to 50mW	±0.1W  (Less than 1.8A)  ±50mW (Less than 0.8A) ±10mW (Less than 0.5A)
2.DEV Adjust	1) Frequency:145.060MHz:E :146.060MHz:K AG:1kHz/70mV PTT:ON 2) AG: 20dB down: (1 kHz/7 mV) PTT:ON	Power meter Linear detector Oscilloscope AG AFVM		ANT MIC	RF	VR2 VR3	K: Adjust to 4.2 kHz with larger ±. E: Adjust to 2.1 kHz Check (mic sensitivity)	±100Hz  ±2.6~3.5kHz:K ±1.3~1.7kHz:E
3. DTMF DEV check	1) Frequency:145.975MHz:E :147.950MHz:K In transmitted state, press the D key.						DTMF DEV Check	±2.2~4.2kHz
4. TONE DEV check	1) Frequency:144.800MHz TONE Frequency:88.5Hz PTT:ON						TONE DEV Check	±0.4~1.2kHz

RF UNIT (X57-570X-XX) (A/4) Component Side View

RF UNIT (A/4) (Component side)



Ref. No.	Address
IC3	70
IC4	6N
IC15	5F
IC16	7F
IC18	5M
Q6	3O
Q7	4N
Q8	3N
Q9	5P
Q10	5O
Q11	4N
Q12	5N
Q13	7M
Q14	6M
Q15	7M
Q16	6M
Q17	6M
Q21	4L
Q26	8L
Q29	5I
Q31	5I
Q40	3C
Q52	9F
Q53	9F
Q54	8J
Q55	8J
Q56	8K
Q57	3N
Q58	3L
Q59	8K
Q61	8L
Q63	9E
D4	4O
D5	4O
D6	6O
D9	4L
D14	7L
D21	5B
D22	5C
D24	3H
D25	3G
D26	3E
D27	3G
D28	3F
D32	9H
D33	9G
D34	8F
D36	7J
D37	8J
D38	8J
D40	4D
D42	4E
D43	3H
D44	7K

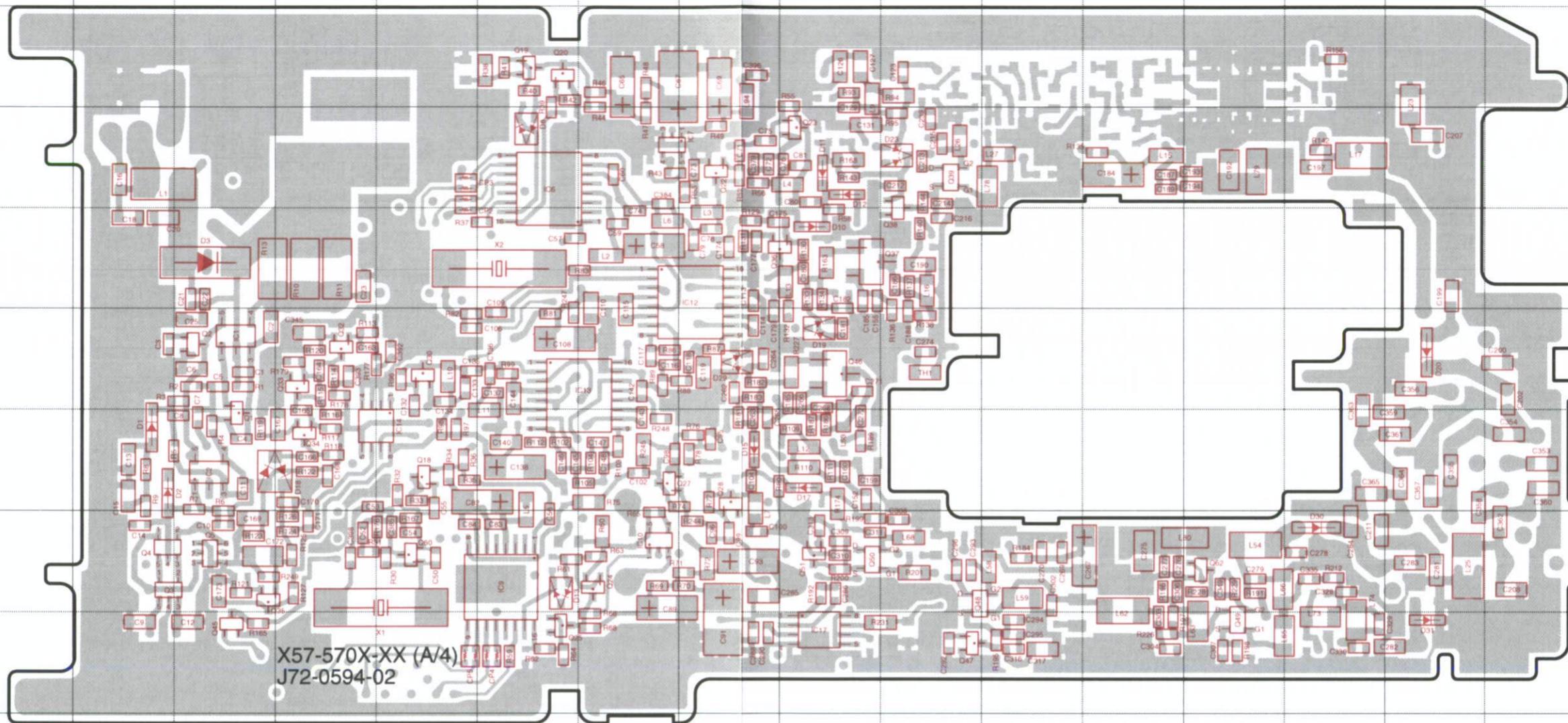


# TH-D7A/E PC BOARD VIEW

RF UNIT (A/4) (Foil side)

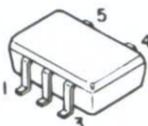
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IC14	7G
IC17	9K
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Q2	6E
Q3	8E
Q4	8D
Q5	8E
Q18	7G
Q19	3H
Q20	3H
Q22	4J
Q23	4K
Q24	8I
Q25	9H
Q27	7I
Q28	7J
Q30	6G
Q32	6F
Q33	6F
Q34	7F
Q35	8E
Q36	5J
Q37	5K
Q38	5L
Q39	4L
Q45	9E
Q46	6K
Q47	9L
Q48	8L
Q49	9O
Q50	8K
Q51	8K
Q60	8G
Q62	8O
D1	7D
D2	7E
D3	5E
D8	4H
D10	5K
D11	4K
D12	4K
D13	8H
D15	7J
D17	7K
D18	7F
D19	6K
D20	6Q
D23	4L
D29	6J
D30	8P
D31	9Q

RF UNIT (X57-570X-XX) (A/4) Foil Side View

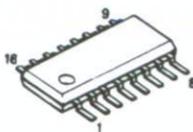


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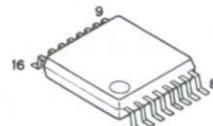
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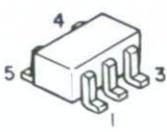
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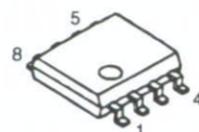
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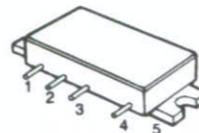
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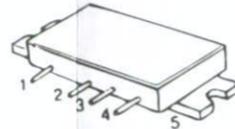
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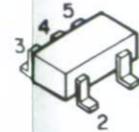
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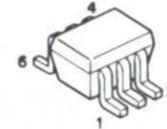
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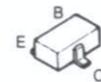
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2SC5108(Y)



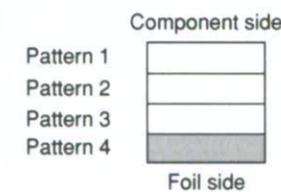
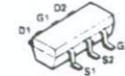
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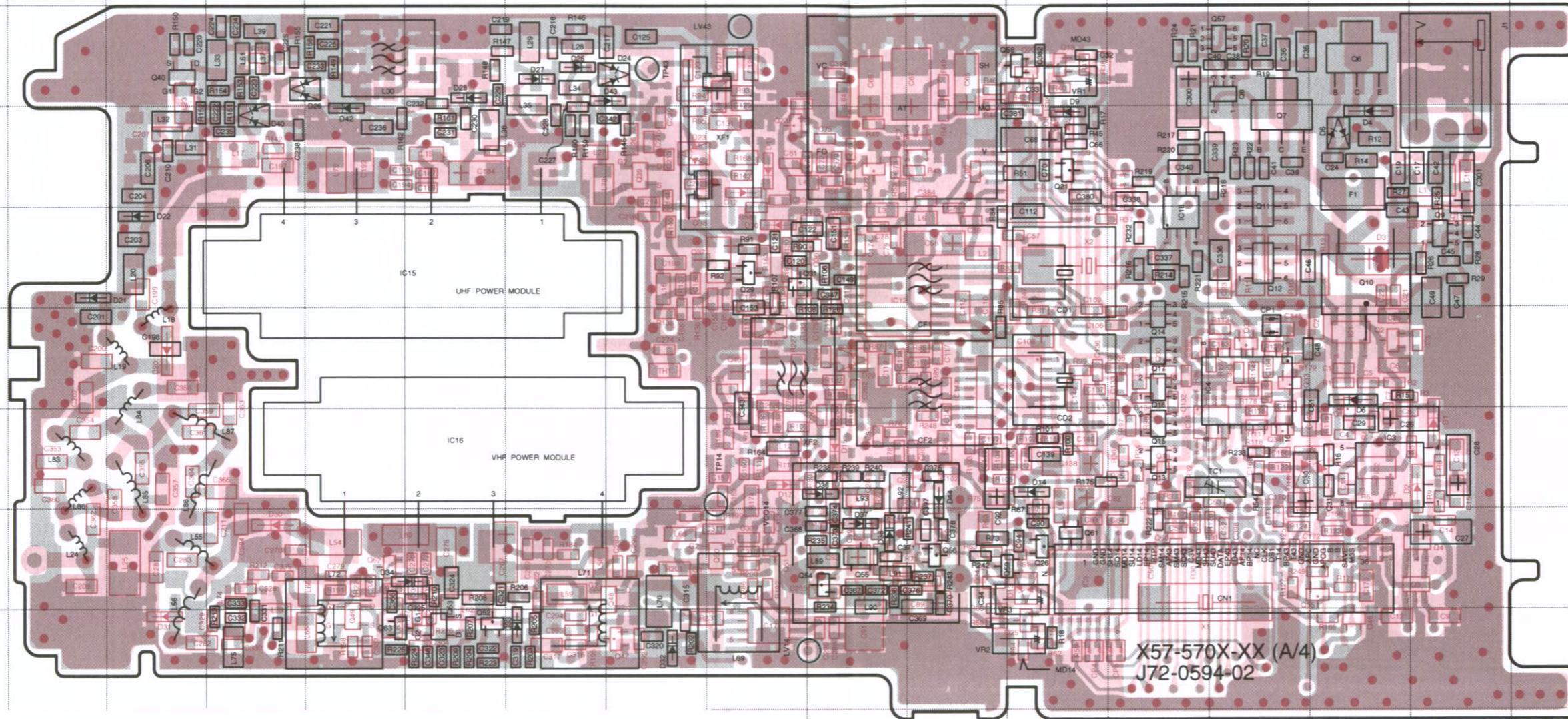
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# PC BOARD VIEW TH-D7A/E

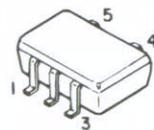
RF UNIT (X57-570X-XX) (A/4) Component Side View + Foil Side View

RF UNIT (A/4)  
(Component side) + (Foil side)

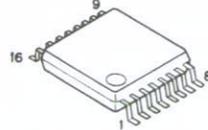


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IC3	7O	Q47	9H
IC4	6N	Q48	8H
IC6	4L	Q49	9E
IC7	4K	Q50	8I
IC9	8L	Q51	8I
IC10	8K	Q52	9F
IC12	5J	Q53	9F
IC13	6L	Q54	8J
IC14	7M	Q55	8J
IC15	5F	Q56	8K
IC16	7F	Q57	3N
IC17	9I	Q58	3L
IC18	5M	Q59	8K
Q1	7O	Q60	8M
Q2	6O	Q61	8L
Q3	8P	Q62	8E
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Q7	4N	D3	5O
Q8	3N	D4	4O
Q9	5P	D5	4O
Q10	5O	D6	6O
Q11	4N	D8	4L
Q12	5N	D9	4L
Q13	7M	D10	5I
Q14	6M	D11	4I
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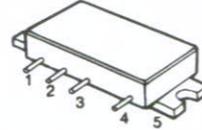
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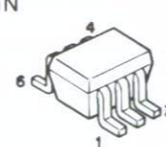
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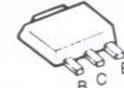
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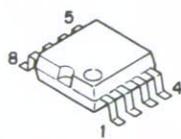
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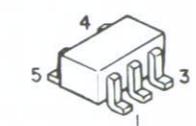
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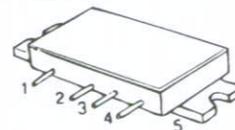
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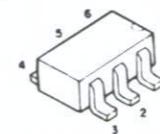
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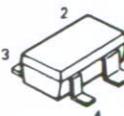
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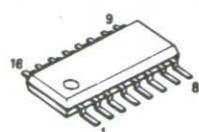
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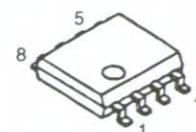
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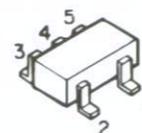
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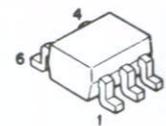
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UMG1



UMW1



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UPA672T



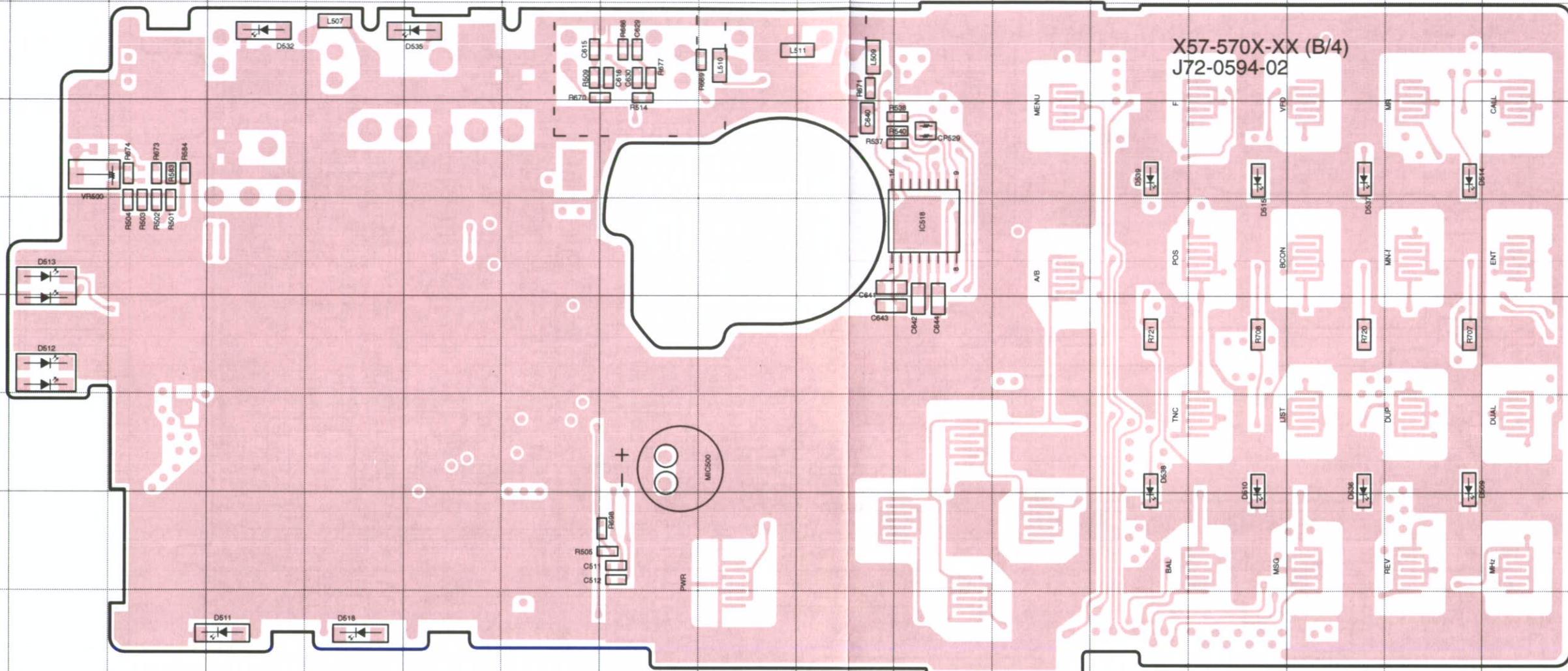
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Component side



# TH-D7A/E PC BOARD VIEW

## CONTROL UNIT (X57-570X-XX) (B/4) Component Side View

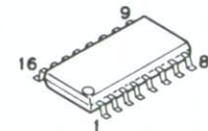


X57-570X-XX (B/4)  
J72-0594-02

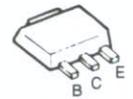
CONTROL UNIT (B/4)  
(Component side)

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D511	9D
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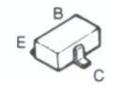
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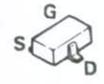
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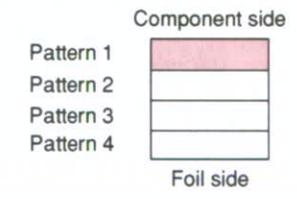
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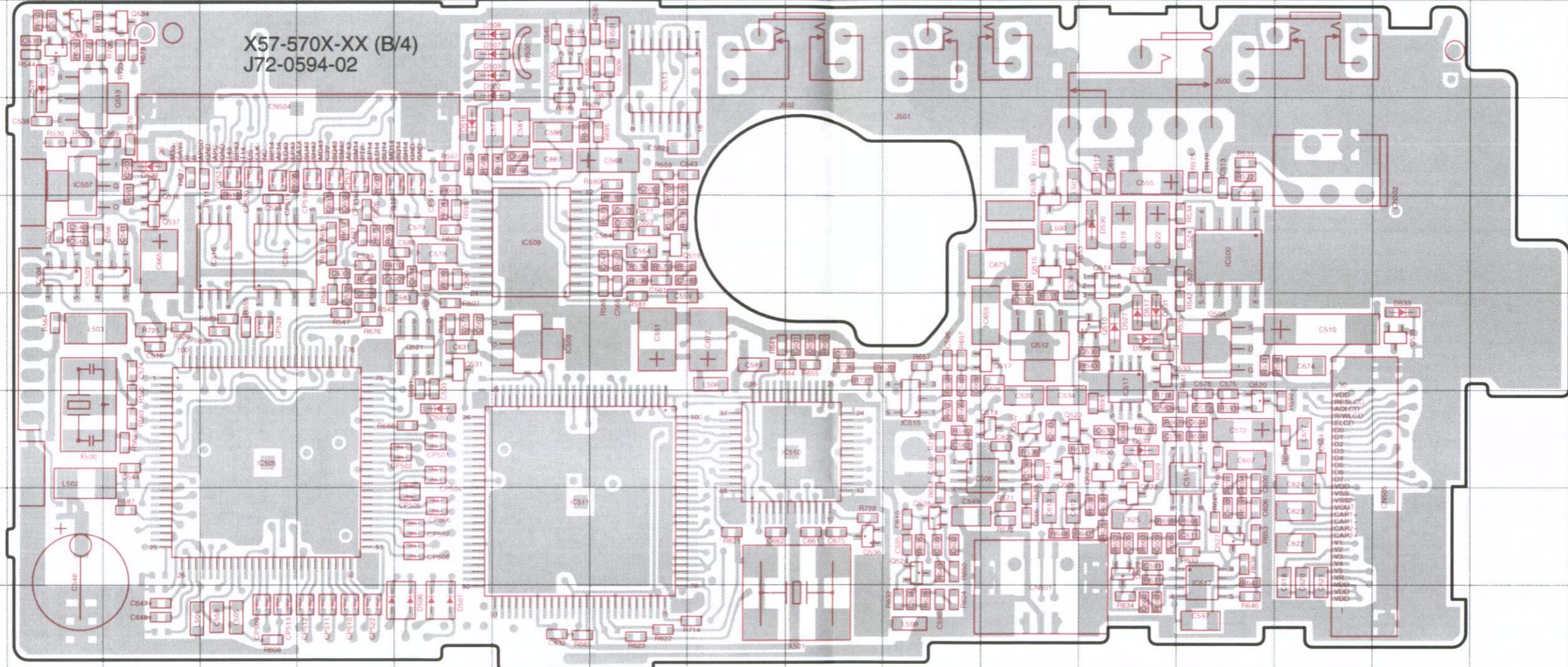


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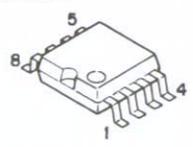
CONTROL UNIT (X57-570X-XX) (B/4) Foil Side View

CONTROL UNIT (B/4)  
(Foil side)

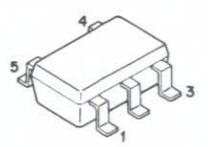


Ref. No.	Address
IC500	5N
IC501	5D
IC503	5B
IC504	5B
IC505	7D
IC506	7L
IC507	4B
IC508	6G
IC509	5G
IC510	7J
IC511	8G
IC512	8N
IC513	3H
IC514	7N
IC515	7K
IC516	5D
IC517	6M
Q504	6N
Q510	6M
Q511	3B
Q512	6L
Q513	4C
Q514	5M
Q515	5L
Q516	4C
Q517	6L
Q518	7L
Q519	5H
Q520	7N
Q521	6F
Q522	8M
Q523	7L
Q524	8K
Q525	7M
Q526	7L
Q527	8N
Q528	8K
Q529	8M
Q530	3G
Q531	6F
Q532	7L
Q533	6M
Q534	3C
Q535	4L
Q536	8J
Q537	5C
Q538	3B
Q539	6P
D500	7F
D501	9F
D502	3G
D503	3G
D506	9F
D507	3G
D508	3G
D516	4F
D517	6M
D526	6M
D527	6M
D528	3B
D529	4C
D530	5M
D531	6M
D533	6P
D534	7M

KIA6278F



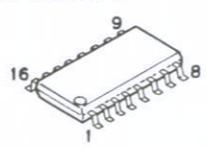
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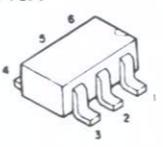
S-81335HG-KI



BU4053BCFV



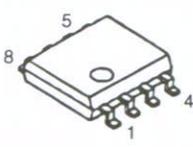
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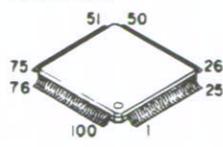
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2SJ243



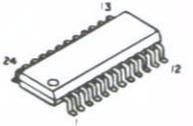
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X25650S8I-2.5  
TA75W393FU



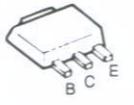
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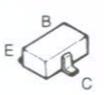
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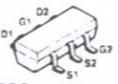
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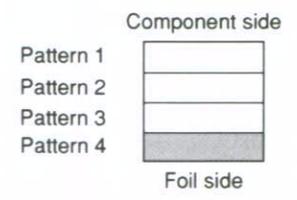
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2SC4997



UPA672T



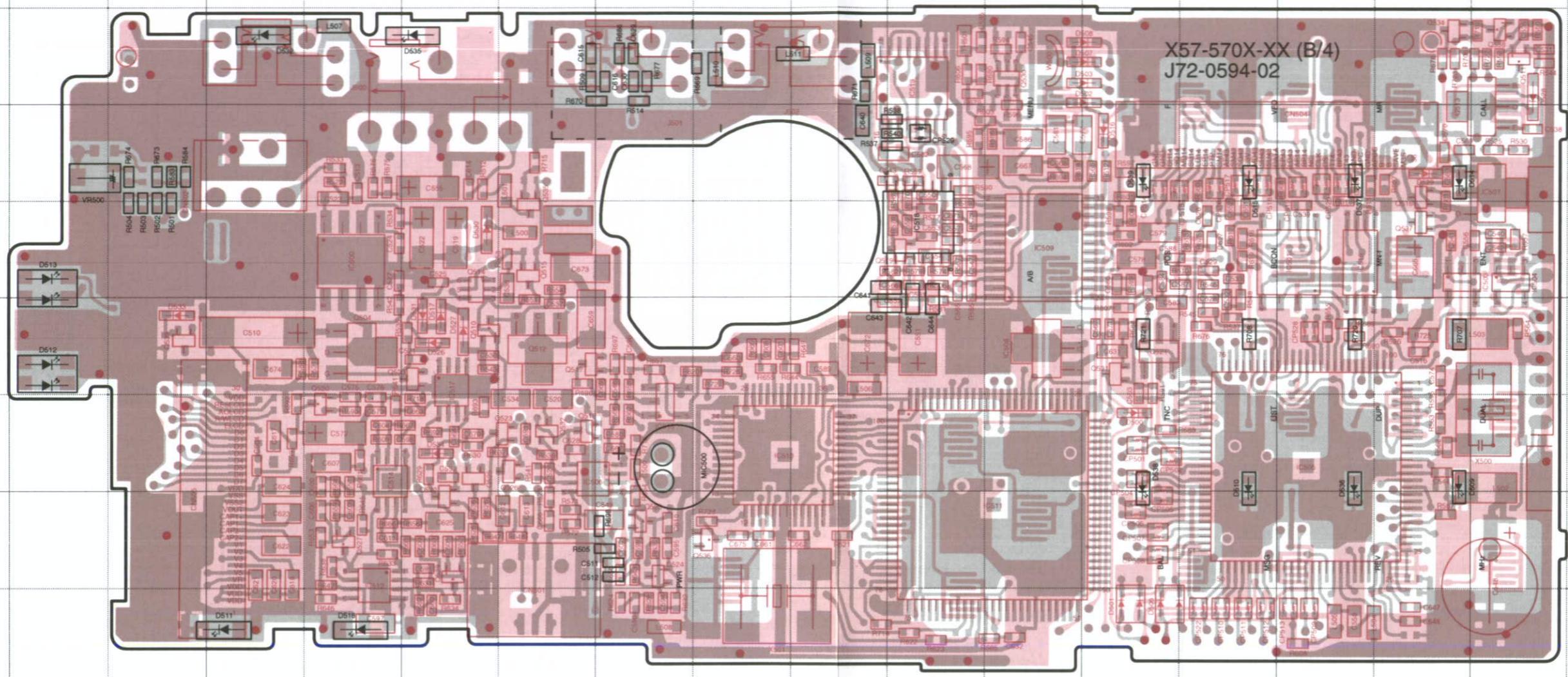
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# TH-D7A/E PC BOARD VIEW

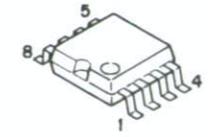
CONTROL UNIT (B/4)  
(Component side) + (Foil side)

CONTROL UNIT (X57-570X-XX) (B/4) Component Side View + Foil Side View

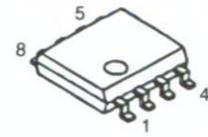


Ref. No.	Address
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IC501	5O
IC503	5Q
IC504	5Q
IC505	7O
IC506	8G
IC507	4Q
IC508	6L
IC509	5L
IC510	7I
IC511	8L
IC512	8E
IC513	3K
IC514	7E
IC515	7H
IC516	5O
IC517	6F
IC518	5K
Q504	6E
Q510	6F
Q511	3Q
Q512	6G
Q513	4P
Q514	5F
Q515	5G
Q516	4P
Q517	6G
Q518	7G
Q519	5K
Q520	7E
Q521	6M
Q522	8F
Q523	7G
Q524	8H
Q525	7F
Q526	7G
Q527	8E
Q528	8H
Q529	8F
Q530	3L
Q531	6M
Q532	7G
Q533	6F
Q534	3P
Q535	4G
Q536	8I
Q537	5P
Q538	3Q
Q539	6C
D500	7M
D501	9M
D502	3M
D503	3M
D506	9M
D507	3M
D508	3M
D509	7P
D510	7N
D511	9D
D512	6B
D513	5B
D514	4P
D515	4N
D516	4M
D517	6F
D518	9E
D526	6F
D527	6F
D528	3Q
D529	4P
D530	5F
D531	6F
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D535	3F
D536	7O
D537	4O
D538	7M
D539	4M

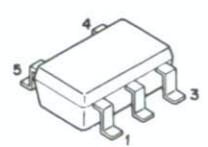
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KIA6278F



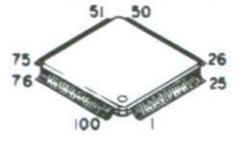
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X25650S8I-2.5  
TA75W393FU



RN5VT32C  
RN5VT25A  
TA75W01FU



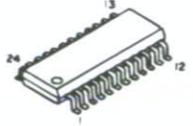
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TMT0110Q



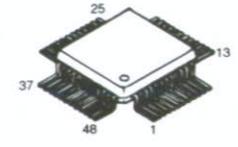
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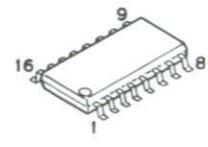
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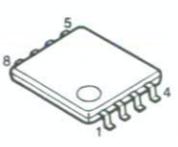
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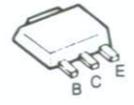
BU4053BCFV  
ADM3202ARU



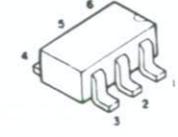
X25097VI-1.8



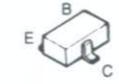
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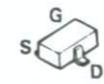
IMD16A



DTC144EE  
2SC4617(R)  
2SC4997



2SK1824  
2SJ243



UPA672T



2SK1588



● Connect 1 and 4.

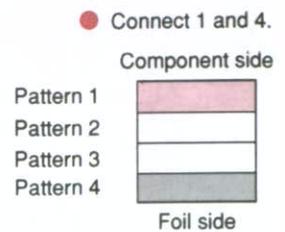
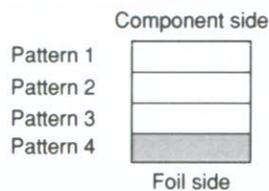
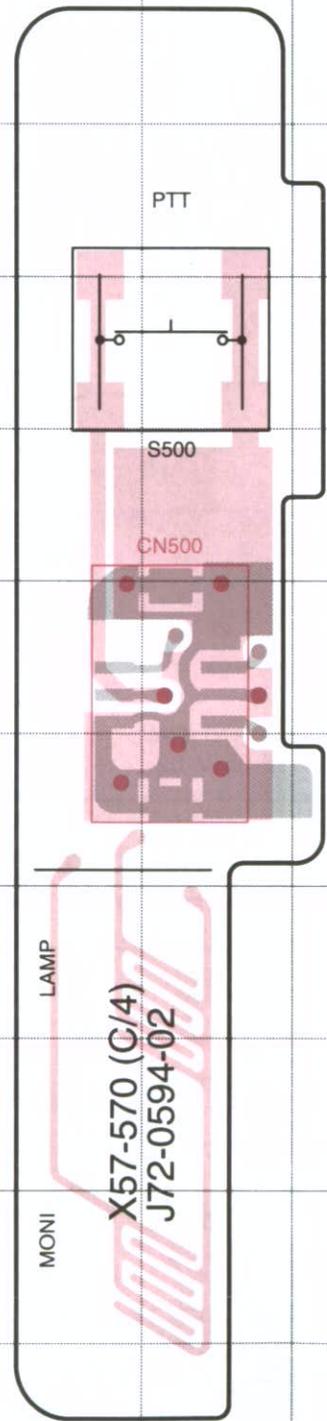
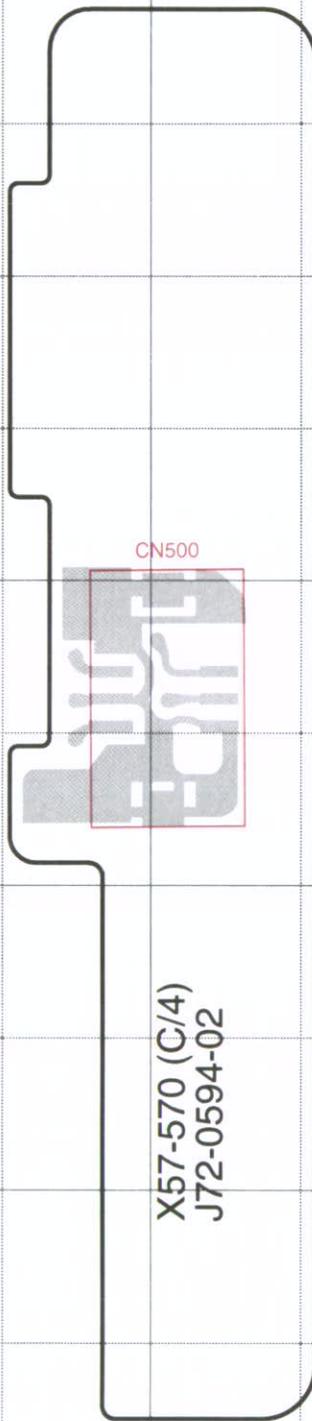
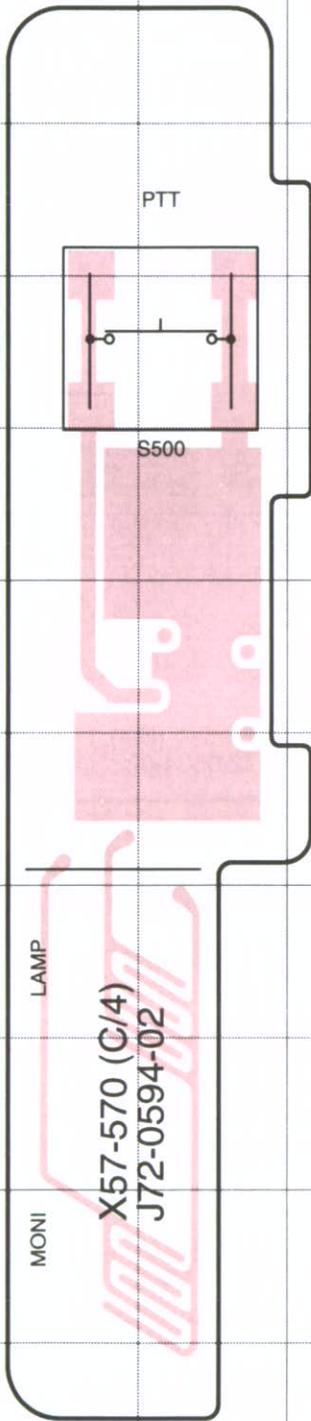


# PC BOARD VIEW TH-D7A/E

**PTT UNIT (X57-570X-XX) (C/4)**  
**Component Side View**

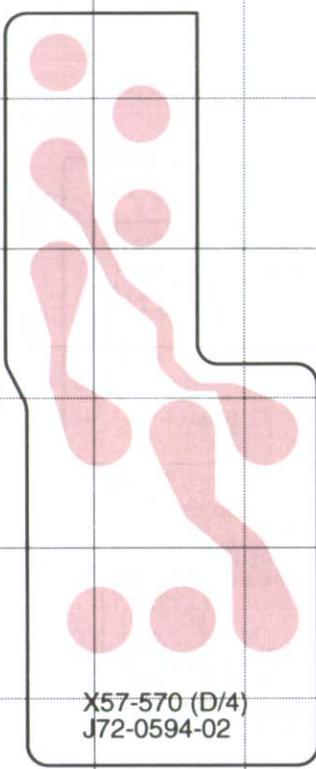
**PTT UNIT (X57-570X-XX) (C/4)**  
**Foil Side View**

**PTT UNIT (X57-570X-XX) (C/4)**  
**Component Side View +  
 Foil Side View**

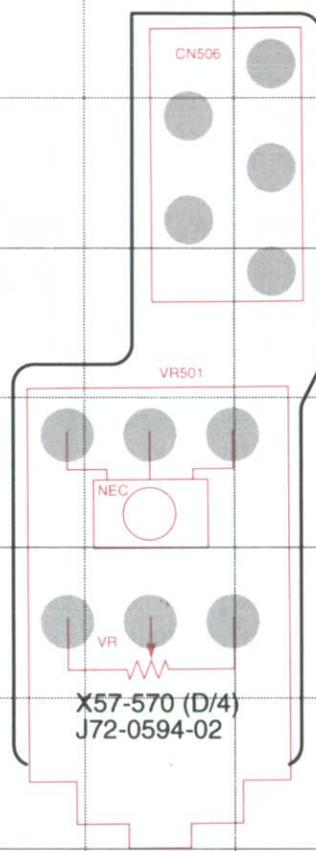


# TH-D7A/E PC BOARD VIEW

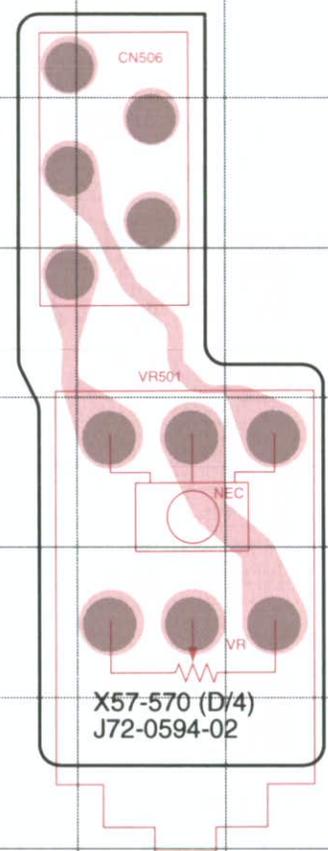
**VOL, ENC UNIT  
(X57-570X-XX) (D/4)  
Component Side View**



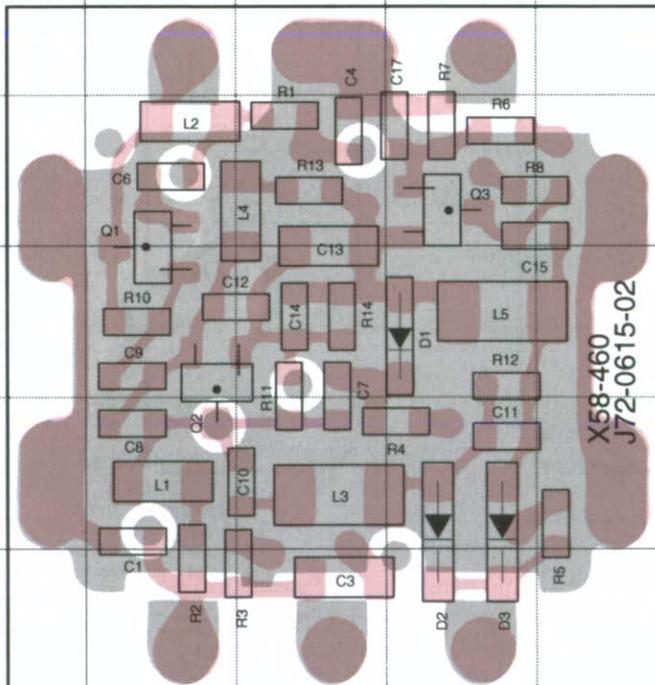
**VOL, ENC UNIT  
(X57-570X-XX) (D/4)  
Foil Side View**



**VOL, ENC UNIT  
(X57-570X-XX) (D/4)  
Component Side View +  
Foil Side View**



**SUB UNIT (X58-460X-XX)  
Component Side View**



RF UNIT (A/4) (Foil side)

Ref. No.	Address
Q1	10B
Q2	11B
Q3	10D
D1	11D
D2	12D
D3	12D

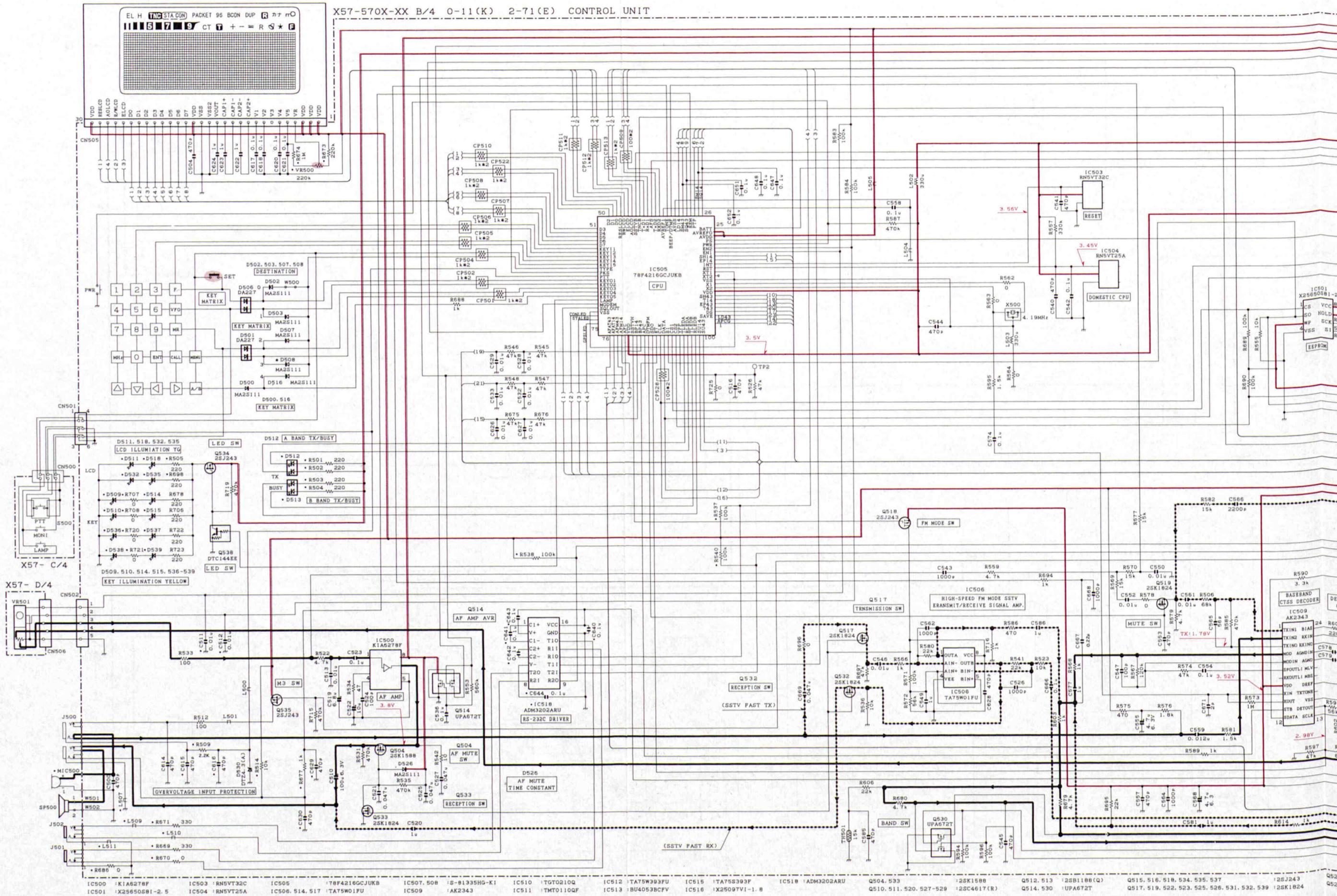
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2SC5006  
2SC4997



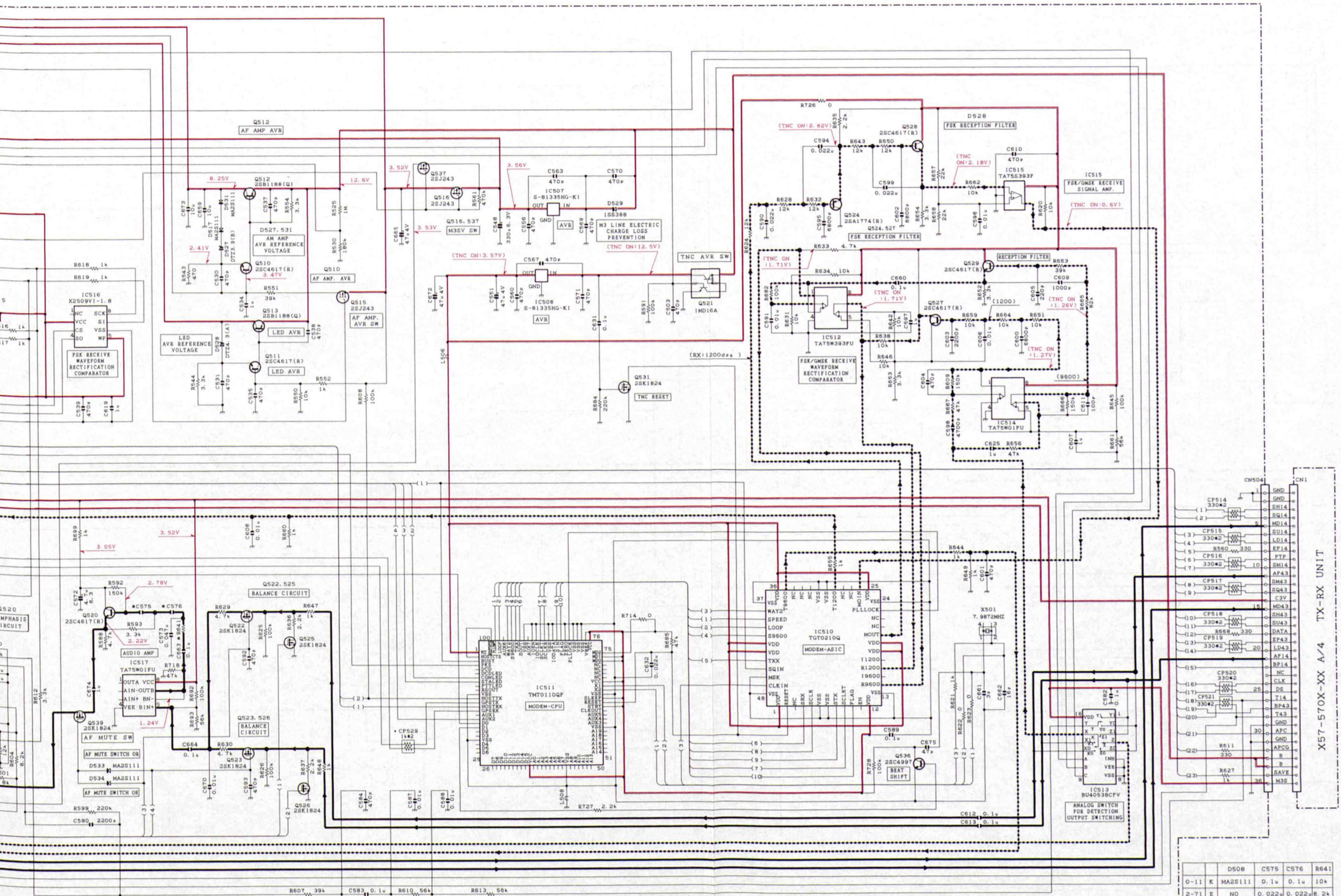
# TH-D7A/E

# SCHEMATIC DIAGRAM

X57-570X-XX B/4 0-11(K) 2-71(E) CONTROL UNIT



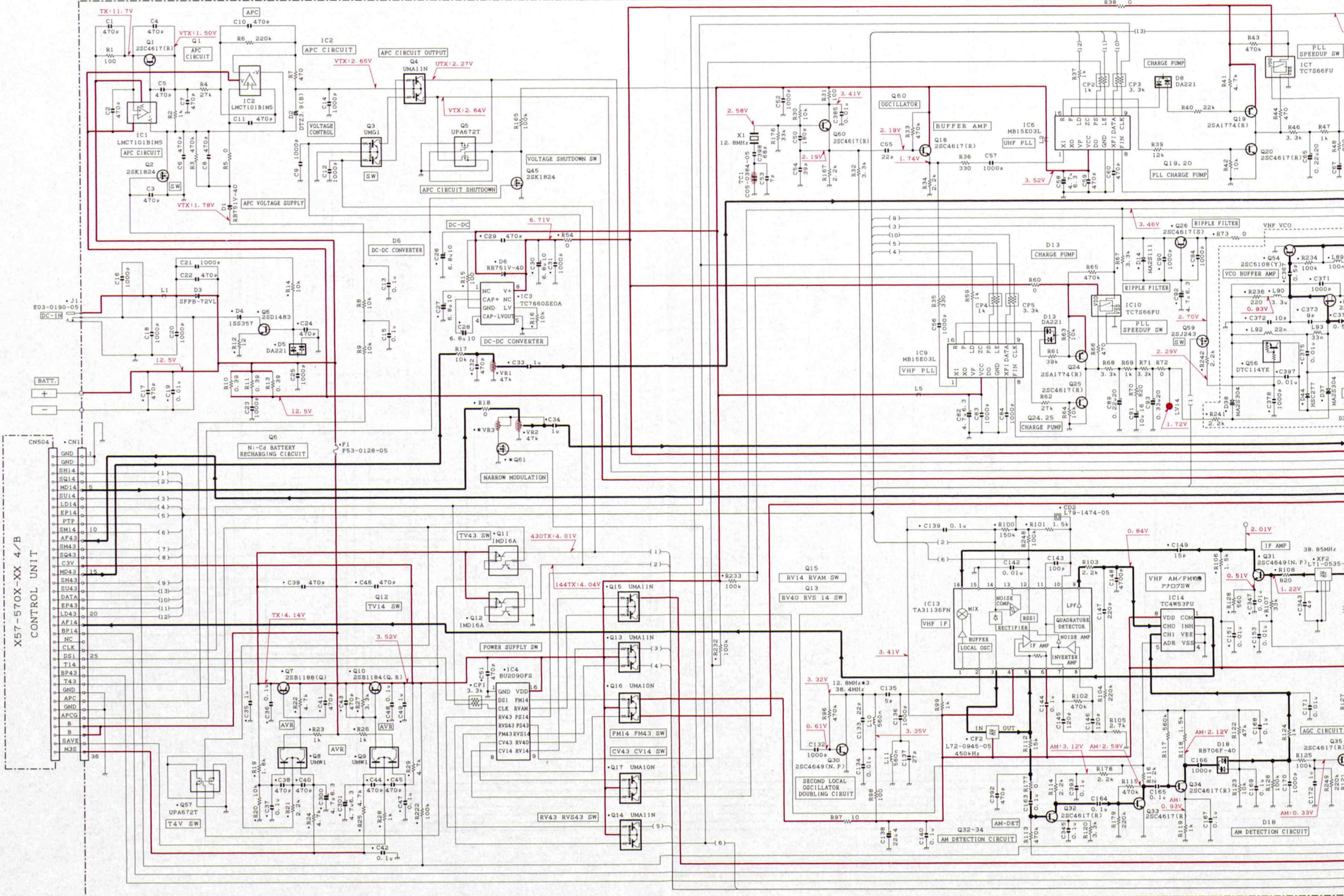
Note) ● Ref. No. : Parts of pattern 1.



X57-570X-XX A/4 TX-RX UNIT

	D508	C575	C576	R641
0-11	K	MARS111	0.1u	0.1u 10k
2-71	E	NO	0.022u	0.022u 8.2k

X57-570X-XX 4/A 0-11(K) 2-71(E) RF UNIT

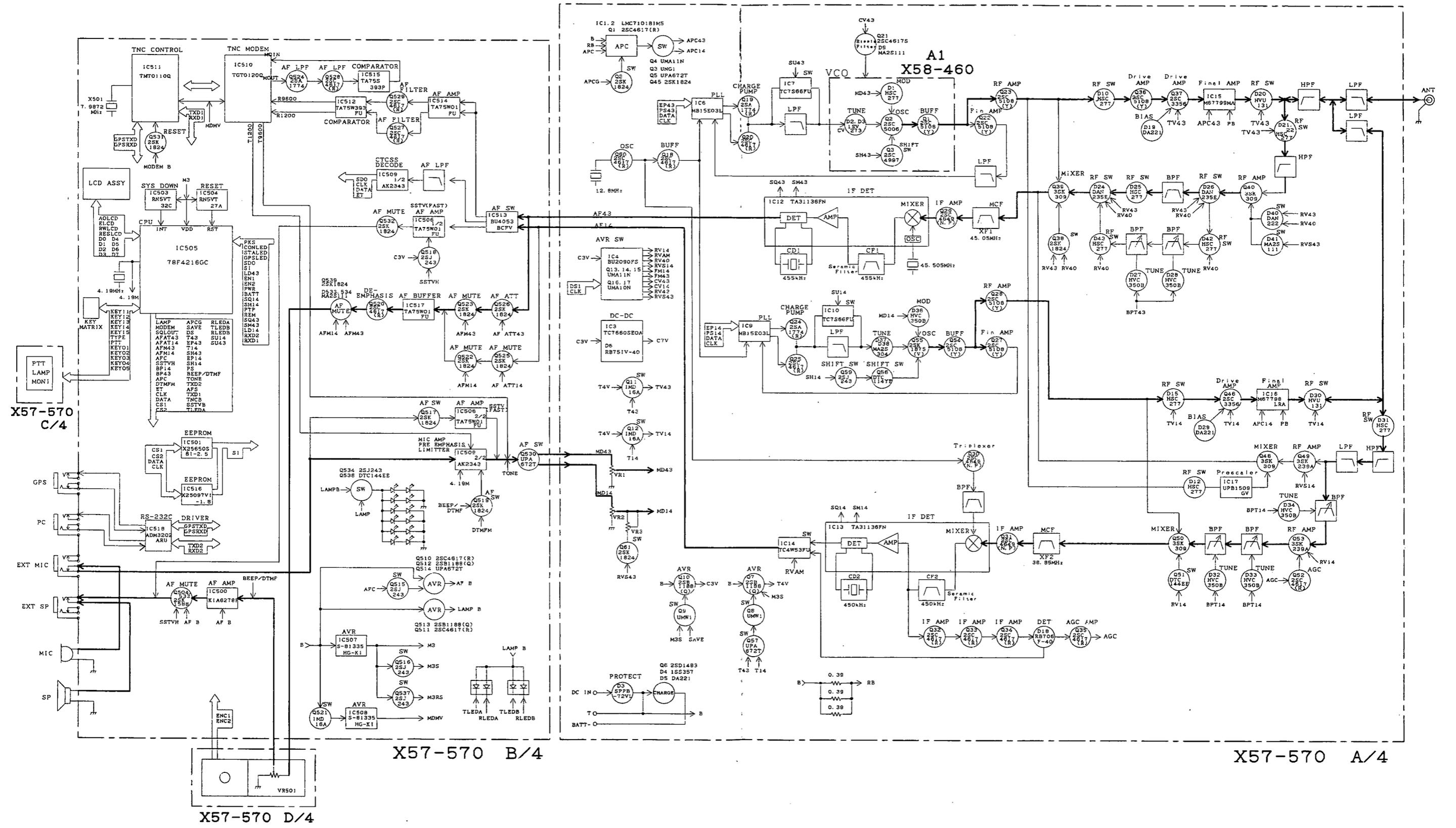


D1. 6 : RB751V-40    D3 : SFPB-72VL    D5. B. 13. 19. 29    : DA221    D9. 14 : MA2S111    D20. 30 : HVU131    D24. 26    : DAN235E    D37. 38 : MA2S304    Q1. 18. 20. 25. 32-35. 52. 60    : 2SC4617(R)    Q3    : UMG1    Q5. 57 : UPA672T    Q7    : 2SB1188(Q)    Q10    : 2SB1184(Q, R)    C  
D2 : DTZ3. 9(B)    D4 : 1SS357    D10-12. 15. 17. 21. 22. 25. 31. 42-44    : HSC277    D18 : RB706F-40    D23. 40 : DAN222    D27. 28. 32-34. 36    : HVC350B    Q2. 38. 45. 61-63    : 2SK1824    Q4. 13-15 : UMA11N    Q6    : 2SD1483    Q8. 9 : UMW1    Q11. 12 : IMD16A



# TH-D7A/E TH-D7A/E

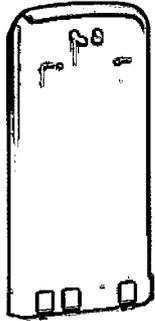
## BLOCK DIAGRAM



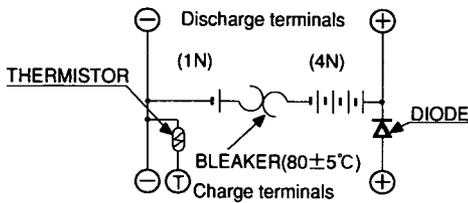


# BC-19 RAPID CHARGER / PB-38, PB-39 (BATTERY BACK) / BT-11 (BATTERY CASE) / PG-4V, PG-4W (CONNECTION CABLE)

**PB-38: External view (6.0V 650mAh)**



**Schematic diagram**



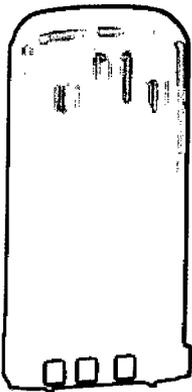
**Main external shape dimensions and weight**

Item	Unit	Main unit	
		A	B
Width (W)	mm	54	58
Depth (D)	mm	11.8	15.9
Height (H)	mm	112	112
Weight	g	About 145	

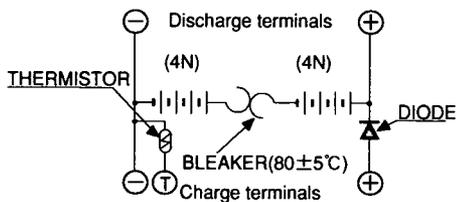
A: Dimensions not including projections

B: Dimensions including projections

**PB-39: External view (9.6V 600mAh)**



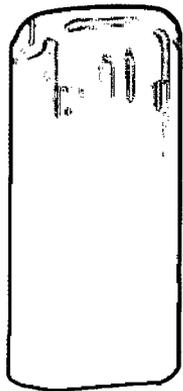
**Schematic diagram**



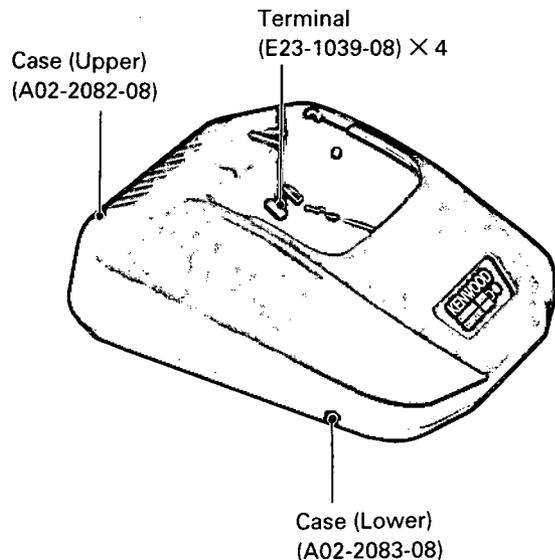
**Main external shape dimensions and weight**

Item	Unit	Main unit	
		A	B
Width (W)	mm	54	58
Depth (D)	mm	19.8	23.9
Height (H)	mm	112	112
Weight	g	About 183	

**BT-11: External view (For 4 AA batteries)**



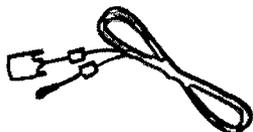
**BC-19: External view**



**PG-4V: Connection Cable to VC-H1**



**PG-4W: Connection Cable to Computer (With a memory store program <sup>1</sup> and a separate manual (document file) <sup>2</sup>)**



- <sup>1</sup> This software is mainly used to program memory channels via a personal computer.
- <sup>2</sup> This manual gives further detailed information on specialized communications including Packet and APRS.

## □ Specifications

Charging current	..... 700mA±70mA (PB-38), 450mA±45mA (PB-39)
Charging time (Minute)	.... 60±30% (PB-38), 90±30% (PB-39)
Source voltage	..... 15V±10% or more
Terminal voltage (Open)	.. 17.3V±0.8V
Ambient temperature	..... 5°C~40°C
Dimensions	..... 105 (W)×135 (D)×55 (H) (mm)
Weight	..... 0.16kg

## SPECIFICATIONS

General		VHF Band	UHF Band
Frequency range	TH-D7A TH-D7E	144 ~ 148 MHz 144 ~ 146 MHz	438 ~ 450 MHz 430 ~ 440 MHz
Mode		F3E (FM), F1D (GMSK), F2D (FSK)	
Usable temperature range		-20°C ~ +60°C (-4°F to +140°F)	
Rated voltage	External power supply (DC IN)	5.5 ~ 16.0 V (13.8 V)	
	Battery terminals	4.5 ~ 15.0 V (6.0 V)	
Current	Receive with no signals <sup>1</sup>	Approx. 90 mA	
	Battery Saver ON <sup>2</sup>	Average 25 mA	
	TNC ON	Approx. 115mA	
	Transmit with H, 13.8 V (DC IN)	Approx. 1.6 A	Approx. 1.7 A
	Transmit with H, 9.6 V (battery terminals)	Approx. 1.6 A	Approx. 1.7 A
	Transmit with H, 6.0 V (battery terminals)	Approx. 1.3 A	Approx. 1.4 A
	Transmit with L, 6.0 V (battery terminals)	Apporox. 500 mA	
	Transmit with EL, 6.0 V (battery terminals)	Apporox. 300 mA	
Ground method		Negative	
Dimensions (W × H × D) <sup>3</sup>	TH-D7A (With a PB-39 installed)	54.0 X 119.5 X 43.5 mm / 2.13" X 4.70" X 1.71"	
	TH-D7E (With a PB-38 installed)	54.0 X 119.5 X 35.5 mm	
Weight <sup>4</sup>	TH-D7A (With a PB-39 installed)	Approx. 380 g / 13.4 oz	
	TH-D7E (With a PB-38 installed)	Approx. 340 g / 12.0 oz	
Frequency stability	-10 ~ +50°C	Within ± 10 ppm	
	-20 ~ +60°C	Within ± 15 ppm	
Microphone impedance		2 kΩ	
Antenna impedance		50 Ω	
Transmitter			
Power output	H, 13.8 V	6 W	5.5 W
	H, 9.6 V	Approx. 5 W	
	H, 6.0 V	Approx. 2.5 W	Approx. 2.2 W
	L, 6.0 V	Approx. 0.5 W	
	EL, 6.0 V	Approx. 50 mW	
Modulation		Reactance	
Maximum frequency deviation		Within ±5 kHz	
Spurious emissions		-60 dB or less	
Receiver			
Circuitry		Double conversion superheterodyne	
1st intermediate frequency		38.85 MHz	45.05 MHz
2nd intermediate frequency		450 kHz	455 kHz
Sensitivity (12 dB SINAD) <sup>5</sup>		0.18 μV or less	
Squelch sensitivity		0.1 μV or less	
Selectivity (-6 dB)		12 kHz or more	
Selectivity (-40 dB)		28 kHz or less	
Audio output (10% distortion)	9.6 V (battery terminals)	450 mW or higher (8 Ω load)	
	6.0 V (battery terminals)	300 mW or higher (8 Ω load)	

1 With one band blanked (TNC OFF): Approx. 45 mA

2 With one band blanked (TNC OFF): Approx. 25 mA

3 Projections not included

4 Antenna, belt hook, and hand strap included

5 VHF sub-band: 0.28 μV or less

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