

DJ-191

Service Manual

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ALINCO, INC.

SPECIFICATIONS

Frequency Coverage	TX	RX
DJ-191T (U.S. Amateur version)	144.000 ~ 147.995MHz	135.000 ~ 173.995MHz
DJ-191E (European Amateur version)	144.000 ~ 145.995MHz	144.000 ~ 145.995MHz
DJ-191TA1 (Commercial version VHFL)	135.000 ~ 155.000MHz	135.000 ~ 173.995MHz
DJ-191TA2 (Commercial version VHFH)	150.000 ~ 173.995MHz	135.000 ~ 173.995MHz
Channel Step:	5, 10, 12.5, 15, 20, 25, 30kHz steps	
Memory Channels:	40 Channels + 1 Call Channel Memory	
Antenna Impedance:	50Ω unbalanced	
Frequency Stability:	± 5 ppm	
Microphone Input Impedance:	2kΩ nominal.	
Signal Type:	F3E (FM)	
Offset Range:	0 ~ 99.995MHz	
Deviation:	± 5kHz max.	
TX Output (supply voltage):	1.5W (4.8V) / 3.5W (7.2V) / 5W (9.6 ~ 13.8V)	
RX Sensitivity:	12dB SINAD better than – 16dB μ	
RX Selectivity:	– 6dB / ± 12kHz	
I.F.:	(1st) 21.25MHz / (2nd) 450kHz	
Power Supply Requirements:	4.8 ~ 13.8V DC (4.8V DC standard)	
Current Consumption at 13.8V DC:	Transmitting: Approx. 1.2 Amp. in High Power Setting	
Operating Temperature:	Receiving: Squelched Approx. 24mA (BS on) – 10 ~ + 60°C, 14 ~ 140°F	
Dimensions: (with EBP-37N without projections)	57(W) × 151(H) × 28(D) mm 2 $\frac{1}{4}$ (W) × 6(H) × 1 $\frac{1}{16}$ (D) inches	
Weight:	Approx. 300g	
DTMF:	16 Button Keypad, encoder/decoder installed	
Subaudible Tones (CTCSS):	Encoder installed (50 tones)	

CIRCUIT DESCRIPTION

1) Receiver System

The receiver system is a double superheterodyne system with a 21.7 MHz first IF and a 450 kHz second IF.

1. Front End

The received signal at any frequency in the 130.00- to 173.995-MHz range is passed through the low-pass filter (L102, L103, L104, C113, C107, C116, and C114) and tuning circuit (L112 and D107), and amplified by the RF amplifier (Q107). The signal from Q107 is then passed through the tuning circuit (L109, L110, L111, and varicaps D104, D105 and D106) and converted into 21.7 MHz by the mixer (Q106). The tuning circuit, which consists of L112, L109, varicaps D107 and D104, L110, L111, varicaps D105 and D106, is controlled by the tracking voltage from the CPU so that it is optimized for the reception frequency. The local signal from the VCO is passed through the buffer (Q108), and supplied to the source of the mixer (Q106). The radio uses the lower side of the superheterodyne system.

2. IF Circuit

The mixer mixes the received signal with the local signal to obtain the sum of and difference between them. The crystal filter (XF101, XF102) selects 21.7 MHz frequency from the results and eliminates the signals of the unwanted frequencies. The first IF amplifier (Q105) then amplifies the signal of the selected frequency.

3. Demodulator Circuit

After the signal is amplified by the first IF amplifier (Q105), it is input to pin 16 of the demodulator IC (IC104). The second local signal of 21.25 MHz (shared with PLL IC reference oscillation), which is oscillated by the internal oscillation circuit in IC102 and crystal (X101), is input through pin 1 of IC104. Then, these two signals are mixed by the internal mixer in IC104 and the result is converted into the second IF signal with a frequency of 450 kHz. The second IF signal is output from pin 3 of IC104 to the ceramic filter (FL101), where the unwanted frequency band of that signal is eliminated, and the resulting signal is sent back to the IC104 through pins 5 and 7.

The second IF signal input via pin 7 is demodulated by the internal limiter amplifier and quadrature detection circuit in IC104, and output as an audio signal through pin 9.

4. Audio Circuit

The audio signal from pin 9 of IC104 is compensated to the audio frequency characteristics in the de-emphasis circuit (R162, R161, C172, C173) and amplified by the AF amplifier (Q109). The signal is then input to pin 2 of the electronic volume (IC103) for volume adjustment, and output from pin 1. The adjusted signal is sent to the audio power amplifier (IC105) through pin 2 to drive the speaker.

5. Squelch Circuit

Part of the audio signal from pin 9 of IC104 is amplified by the noise filter amplifier consisting of R176, R186, R177, C179, C183, C191, and C194, and the internal noise amplifier in IC104. The desired noise of the signal is output through pin 11 of IC104, to be further amplified by the noise amplifier (Q115). The amplified noise signal is rectified by voltage doubler D109 and input to pin 4 of CPU (IC5).

2) Transmitter System

1. Modulator Circuit

The audio signal is converted to an electric signal in either the internal or external microphone, and input to the microphone amplifier (IC6). IC6 consists of two operational amplifiers; one amplifier (pins 1, 2, and 3) is composed of pre-emphasis and IDC circuits and the other (pins 5, 6, and 7) is composed of a splatter filter. The maximum frequency deviation is obtained by VR2 and input to the cathode of the varicap of the VCO, to change the electric capacity in the oscillation circuit. This produces the frequency modulation.

2. Power Amplifier Circuit

The transmitted signal is oscillated by the VCO, amplified by the pre-drive amplifier (Q102) and drive amplifier (Q101), and input to the power module (IC101). The signal is then amplified by the power module (IC101) and led to the antenna switch (D101) and low-pass filter (L102, L103, L104, C113, C107, C116, and C114), where unwanted high harmonic waves are reduced as needed, and the resulting signal is supplied to the antenna.

3. APC Circuit

Part of the transmission power from the low-pass filter is detected by D103, converted to DC, and then amplified by a differential amplifier. The output voltage controls the bias voltage from pin 2 of the power module (IC101) to maintain the transmission power constant.

3) PLL Synthesizer Circuit

1. PLL

The dividing ratio is obtained by sending data from the CPU (IC5) to pin 2 and sending clock pulses to pin 3 of the PLL IC (IC102). The oscillated signal from the VCO is amplified by the buffer (Q117) and input to pin 6 of IC102. Each programmable divider in IC102 divides the frequency of the input signal by N according to the frequency data, to generate a comparison frequency of 5 or 6.25 kHz.

2. Reference Frequency Circuit

The reference frequency appropriate for the channel steps is obtained by dividing the 21.25 MHz reference oscillation (X101) by 4250 or 3400, according to the data from the CPU (IC5). When the resulting frequency is 5 kHz, channel steps of 5, 10, 15, 20, 25, 30, and 50 kHz are used. When it is 6.25 kHz, the 12.5 kHz channel step is used.

3. Phase Comparator Circuit

The PLL (IC102) uses the reference frequency, 5 or 6.25 kHz. The phase comparator in the IC102 compares the phase of the frequency from the VCO with that of the comparison frequency, 5 or 6.25 kHz, which is obtained by the internal divider in IC102.

4. PLL Loop Filter Circuit

If a phase difference is found in the phase comparison between the reference frequency and VCO output frequency, the charge pump output (pin 8) of IC102 generates a pulse signal, which is converted to DC voltage by the PLL loop filter and input to the varicap of the VCO unit for oscillation frequency control.

5. VCO Circuit

A Colpitts oscillation circuit driven by Q301 directly oscillates the desired frequency. The frequency control voltage determined in the CPU (IC5) and PLL circuit is input to the varicaps (D301 and D304). This changes the oscillation frequency, which is amplified by the VCO buffer (Q302) and output from the VCO unit.

Note

The oscillation frequency is determined by turning Q301 ON and OFF.

Displayed frequencies	Q301
TX: 130.00 - 139.995 MHz RX: 130.00 - 161.695 MHz	OFF
TX: 140.00 - 173.995 MHz RX: 161.70 - 173.995 MHz	ON

4) CPU and Peripheral Circuits

1. LCD Display Circuit

The CPU turns ON the LCD via segment and common terminals with 1/3 the duty and 1/3 the bias, at the frame frequency is 85Hz.

2. Display Lamp Circuit

When the LAMP key is pressed, "H" is output from pin 45 of CPU (IC5) to the bases of Q1 and Q12. Q1 and Q12 then turn ON and the LEDs (D1, D3, D14, D15, D16, and D17) light.

3. Reset and Backup Circuits

When the power from the DC jack or external battery increases from 0 V to 2.5 or more, "H" level reset signal is output from the reset IC (IC2) to pin 35 of the CPU (IC5), causing the CPU to reset. The reset signal, however, waits at C6 and R1010, and does not enter the CPU until the CPU clock (X1) has stabilized. When the external power drops to 3.2 V or below, the output signal from the backup IC (IC3), which has been input to pin 34 of the CPU, changes from "H" to "L" level. The CPU will then be in the backup state.

4. S(Signal)Meter Circuit

The DC potential of pin 13 of IC104 is input to pin 3 of the CPU (IC5), converted from an analog to a digital signal, and displayed as the S-meter signal on the LCD.

5. DTMF Encoder

The CPU (IC5) is equipped with an internal DTMF encoder. The DTMF signal is output from pin 12, through R90 and R91 (for level adjustment), and then through the microphone amplifier (IC6), and is sent to the varicap of the VCO for modulation. At the same time, the monitoring tone passes through the AF circuit and is output from the speaker.

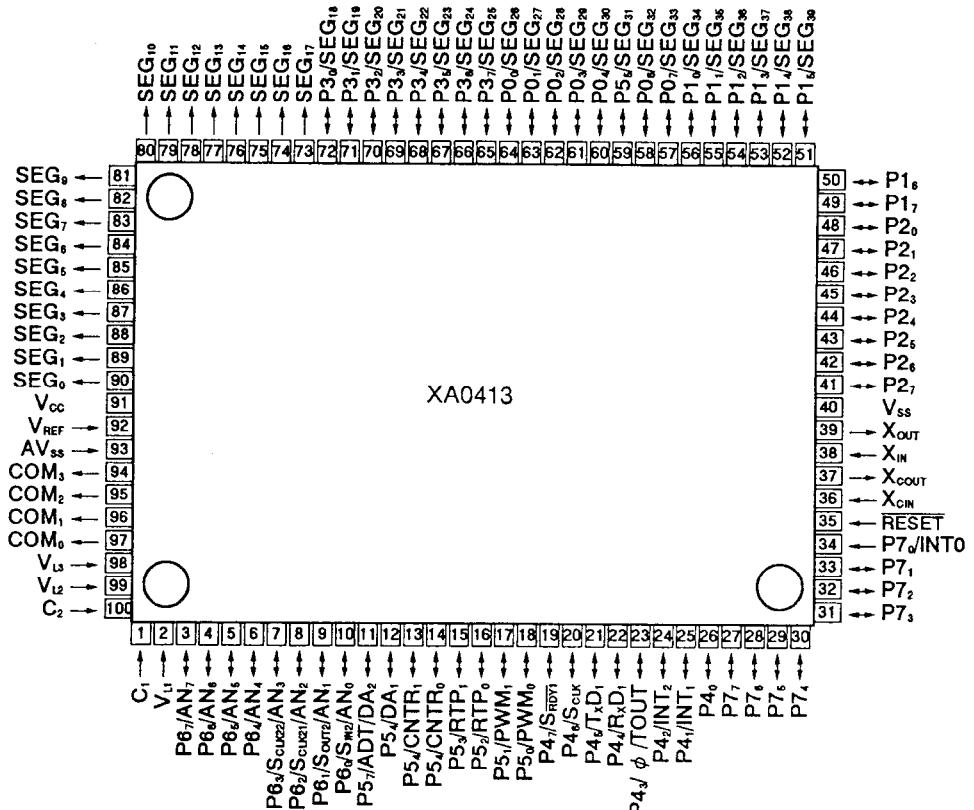
6. DTMF Decoder

Part of the audio signal demodulated by IC104 is input to pin 1 of DTMF IC (IC8). The internal signal judging circuit in IC 8 then checks if the signal is valid or invalid. The judged signal is converted into a 4-bit code and sent to pin 29 of IC5.

7. Tone Encoder

The CPU (IC5) is equipped with an internal tone encoder. The tone signal (67.0 to 254.1 Hz) is output from pin 11 of the CPU to the varicap of the VCO for modulation.

5) CPU Terminal Functions: M38267M8L (XA0413)



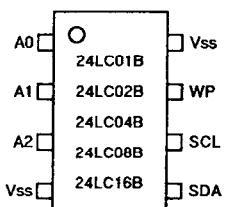
No.	Pin Name	Signal	I/O	Logic	Description
1	C1	C1	-	-	-
2	VL1	VL1	I	A/D	LCD power supply
3	P67/AN7	SMT	I	A/D	S-meter input
4	P66/AN6	SQL	I	A/D	Noise level input for squelch
5	P65/AN5	BAT	I	A/D	Low battery detection input
6	P64/AN4	BP5	I	A/D	Band plan 5
7	P63/CLK22/AN3	BP4	I	-	Band plan 4
8	P62/CLK21/AN2	UL	I	Active high	PLL unlock signal input
9	P61/SOUT2/AN1	BP1,2	I	A/D	Band plans 1 and 2
10	P60/SIN2/AN0	MONI	I	Active low	Monitor key input
11	P57/ADT/DA2	CTOUT	O	D/A	CTCSS tone output
12	P56/AD1	DTOUT	O	D/A	DTMF output
13	P55/CNTR1	TSQD	I	Active low	CTCSS tone detection input/Trunking board detection
14	P54/CNTR0	BEP	O	Pulse	Beep tone output/Band plan 3
15	P53/RTP1	STB2	I/O	Active low/pulse	CTCSS unit detection/Strobe signal to CTCSS unit/Strobe signal to trunking board/Audio line control
16	P52/RTP0	MUTE	I/O	Active high	Microphone mute/Bank change input while trunking
17	P51/PWM1	CLK	O	Pulse	Serial clock output for PLL, CTCSS, and trunking board
18	P50/PWM0	DATA	O	Pulse	Serial data output for PLL, CTCSS, and trunking board
19	P47/SRDY1	ACK	I/O	Pulse	Clock output for DTMF shift out/Band plan 6
20	P46/SCLK1	STB1	O	Pulse	Strobe for PLL IC
21	P45/TXD1	UTX	O	Pulse	UART data transmission output
22	P44/RXD1	URX	I	Pulse	UART data reception input
23	P43/φ/TOUT	TBST	O	Pulse	Tone burst (1750Hz) output (European version)
24	P42/INT2	RE2	I	Active low	Rotary encoder input
25	P41/INT1	RE1	I	Active low	
26	P40	PTT	I	Active high	PTT input
27	P77	DSW	O	Active low	DTMF IC ON/OFF
28	P76	STD	I/O	Active high	DTMF signal detection input during reception/Deviation adjustment during transmission
29	P75	DSD	I	Pulse	Decoded DTMF serial data input during reception/Deviation adjustment during transmission
30	P74	T3C	O	Active low	TX power ON/OFF output
31	P73	P3C	O	Active low	PLL power ON/OFF output
32	P72	AFP	O	Active low	AFAMP power ON/OFF output
33	P71	R3C	O	Active low	RX power ON/OFF output
34	P70/INTO	BU	I	Active low	Backup signal detection input
35	RESET	RST	I	Active low	Reset input
36	XCIN	XCIN	-	-	-
37	XCOUNT	XCOUNT	-	-	-
38	XIN	XIN	-	-	Main clock input
39	XOUT	XOUT	-	-	Main clock output
40	VSS	GND	-	-	CPU ground
41	P27	PSW	I	Active low	Power switch input
42	P26	SCL	O	Pulse	Serial clock for EEPROM
43	P25	C3C	O	Active high	C3 power ON/OFF output
44	P24	SDA	O	Pulse	Serial data for EEPROM
45	P23	LMP	O	Active high	Lamp ON/OFF
46	P22	T/KEY	I	Active low	Tone burst/LPTT input
47	P21	K00	I/O	-	Key matrix output/Band plan BP7 input
48	P20	K01	O	-	Key matrix output
49	P17	K02	O	-	
50	P16	K03	O	-	

No.	Pin Name	Signal	I/O	Logic	Description
51	P15/SEG39	F/KEY	I	Active low	Function key input Key matrix input
52	P14/SEG38	K10	I	-	
53	P13/SEG37	K11	I	-	
54	P12/SEG36	K12	I	-	
55	P11/SEG35	K13	I	-	
56	P10/SEG34	K14	I	-	
57	P07/SEG33	SFT	O	-	VCO frequency range change
58	P06/SEG32	SD	O	Active low	Signal detection output
59	P05/SEG31	AFC	O	Active high	AF tone control output
60	P04/SEG30	DA4	O	-	DA converter for electronic volume and output power
61	P03/SEG29	DA3	O	-	
62	P02/SEG28	DA2	O	-	
63	P01/SEG27	DA1	O	-	
64	P00/SEG26	DA0	O	-	
65	P37/SEG25	S25	O	-	
66	P36/SEG24	S24	O	-	LCD segment signal
67	P35/SEG23	S23	O	-	
68	P34/SEG22	S22	O	-	
69	P33/SEG21	S21	O	-	
70	P32/SEG20	S20	O	-	
71	P31/SEG19	S19	O	-	
72	P30/SEG18	S18	O	-	
73	SEG17	S17	O	-	
74	SEG16	S16	O	-	
75	SEG15	S15	O	-	
76	SEG14	S14	O	-	
77	SEG13	S13	O	-	
78	SEG12	S12	O	-	
79	SEG11	S11	O	-	
80	SEG10	S10	O	-	
81	SEG9	S9	O	-	
82	SEG8	S8	O	-	
83	SEG7	S7	O	-	
84	SEG6	S6	O	-	
85	SEG5	S5	O	-	
86	SEG4	S4	O	-	
87	SEG3	S3	O	-	
88	SEG2	S2	O	-	
89	SEG1	S1	O	-	
90	SEG0	S0	O	-	
91	VCC	VDD	-	-	CPU power terminal
92	VREF	VREF	-	-	AD converter power supply
93	AVSS	AVSS	-	-	AD converter ground
94	COM3	COM3	-	-	-
95	COM2	COM2	O	-	LCD COM2 output
96	COM1	COM1	O	-	LCD COM1 output
97	COM0	COM0	O	-	LCD COM0 output
98	VL3	VL3	I	-	LCD power supply
99	VL2	VL2	I	-	LCD power supply
100	C2		I	-	-

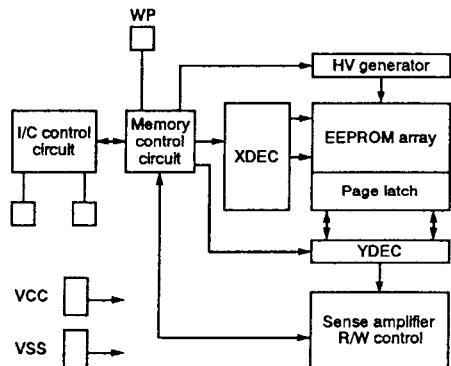
SEMICONDUCTOR DATA

1) 24LC16BT-I/SN (XA0351) EEPROM

Pin Assignment



Block Diagram

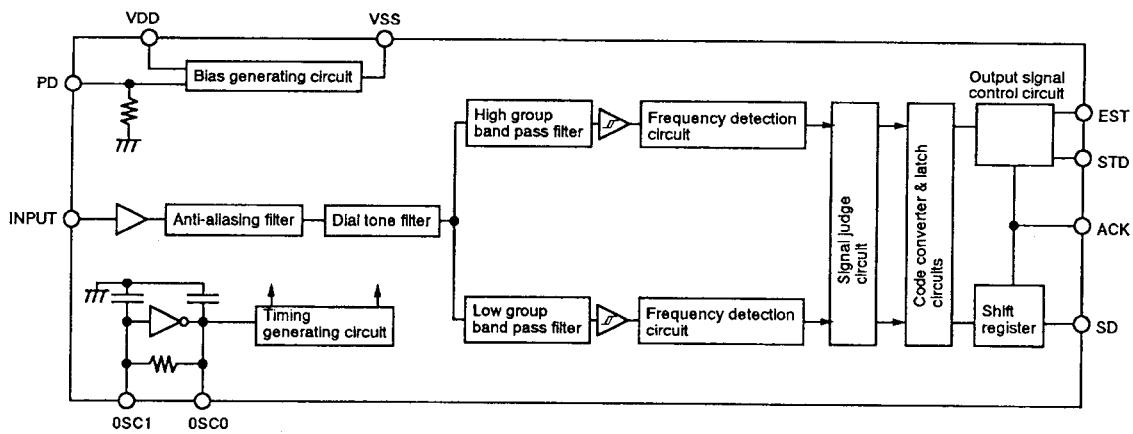


2) LC73881M-TLM (XA0344) DTMF Receiver

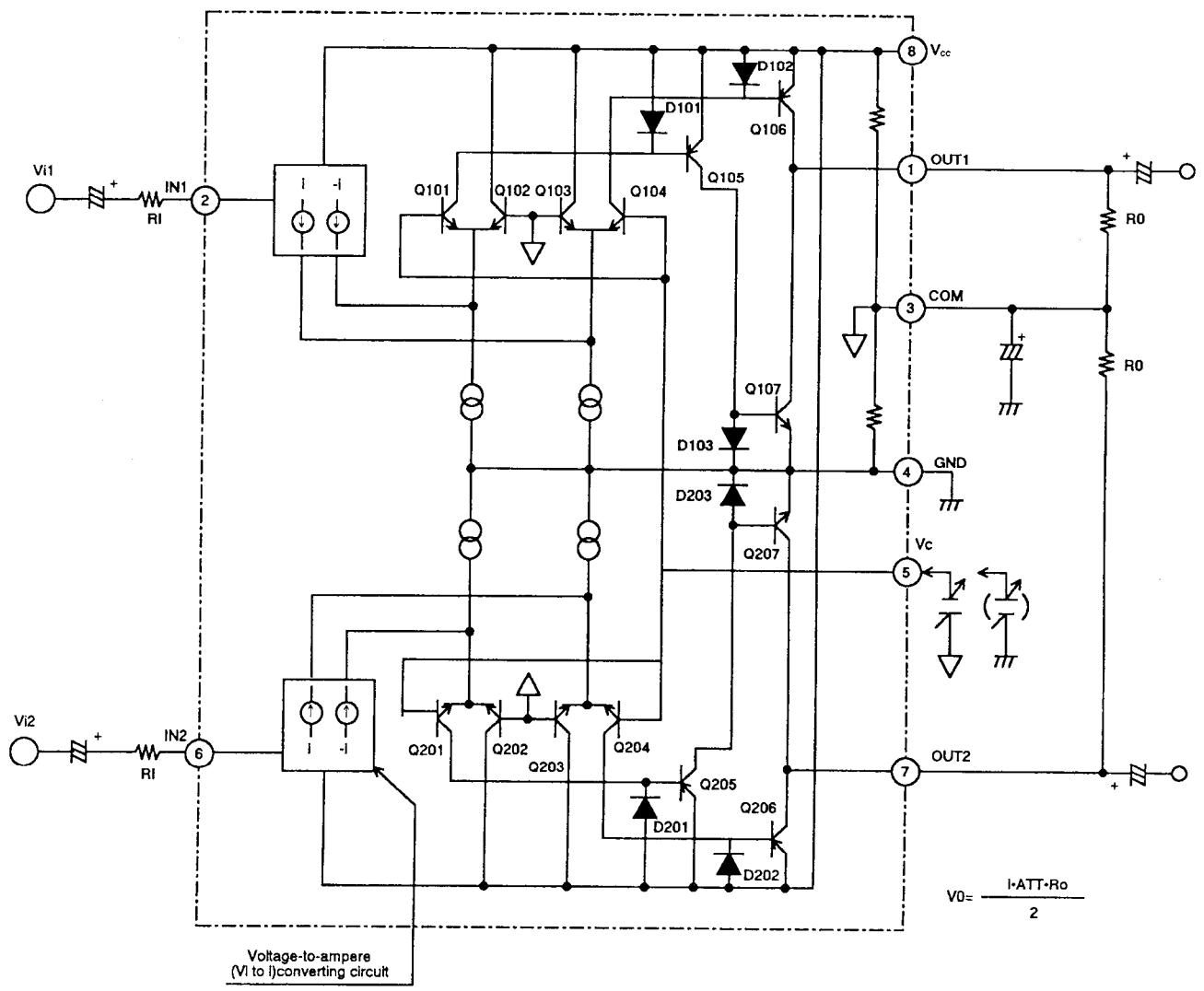
Pin Functions

Pin nos.	Signal	I/O	Description
1	INPUT	I	An input coupling capacitor is required. This input signal is internally biased by the V DD/2.
2	PD	I	When this signal goes HIGH, the system enters the power-down mode.
3	OSCO	O	These lines are connected to a crystal oscillator or a ceramic resonator of 194,304 MHz to form the oscillation circuit.
4	OSCI	I	
5	VSS	-	Power terminal (usually 0V).
6	SD	O	The decoded DTMF data is output as serial 4-bit data, starting with the LSB.
7	ACK	I	The ACK signal is used to shift out the data to pin 2 (PD). Four pulses are required to shift out a four-bit DTMF code. The leading edge of the first pulse latches the data into the shift register before shifting out.
8	STD	O	This signal goes HIGH when a DTMF code is sent. This signal changes LOW to HIGH slower than the EST signal, however the burst frequency for this signal uses a dead band.
9	EST	O	This signal goes HIGH when a DTMF code is sent. This line is externally monitored to determine an appropriate time, and then four pulses are input to the ACK terminal to allow the SD terminal to output the DTMF data.
10	VDD	-	Power terminal (usually, 2.7 V to 5.5 V)

Block Diagram



3) M5222FP-600C (XA0385) Electronic Volume

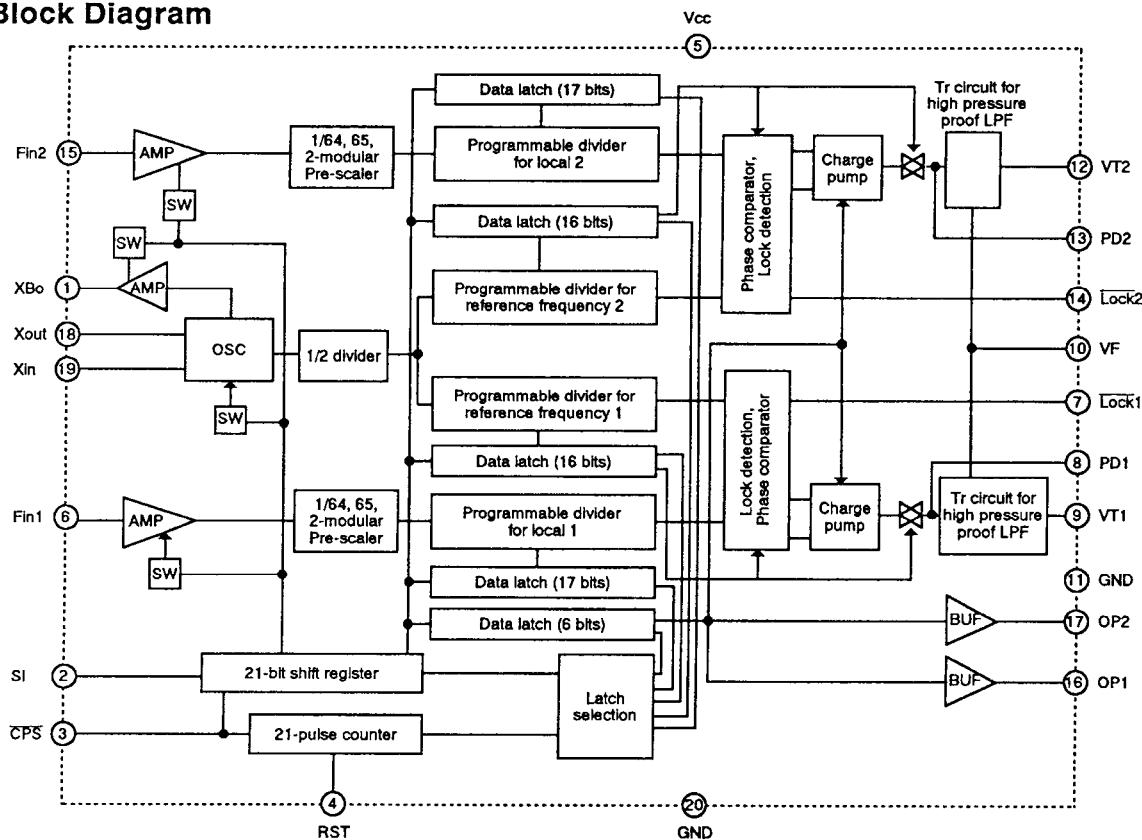


4) M64076GP (XA0352) PLL

Pin Assignment

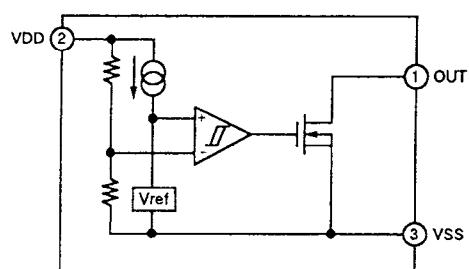
XBo	1	20	GND
SI	2	19	XIn
CPS	3	18	Xout
RST	4	17	OP2
Vcc	5	16	OP1
Fin1	6	15	Fin2
Lock1	7	14	Lock2
PD1	8	13	PD2
VT1	9	12	VT2
VF	10	11	GND

Block Diagram



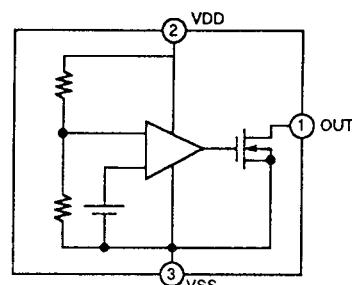
5) RH5VL25AA-T1 (XA0309) C-MOS Voltage Detector

Block Diagram



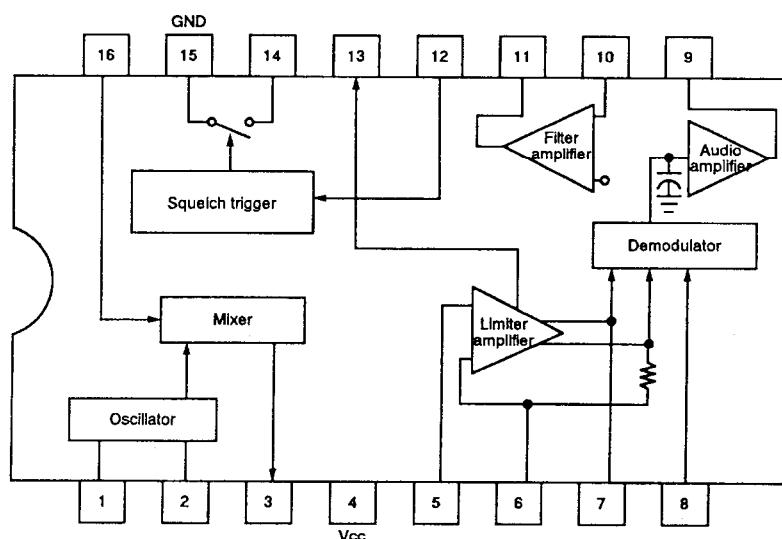
6) RH5VA32AA-T1 (XA0198) C-MOS Voltage Detector

Block Diagram

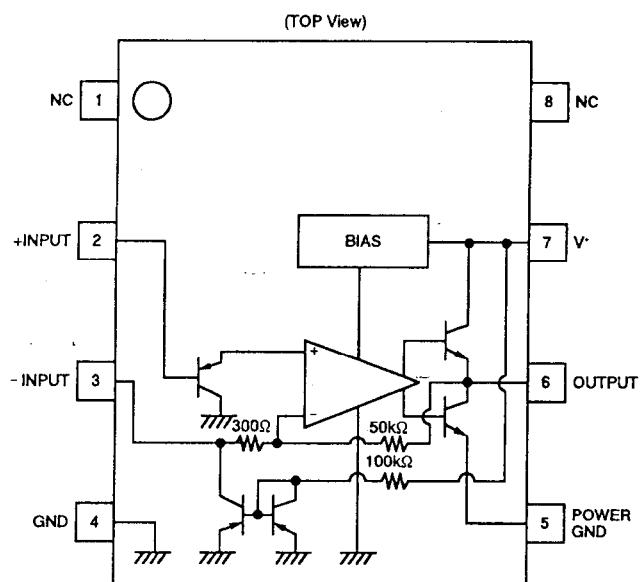


7) MC3372VM-EL (XA0343)
Narrow Band FM IF IC

Block Diagram



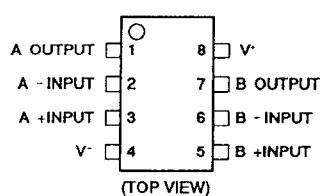
8) NJM2070M T1 (XA0210)
Audio Power Amplifier



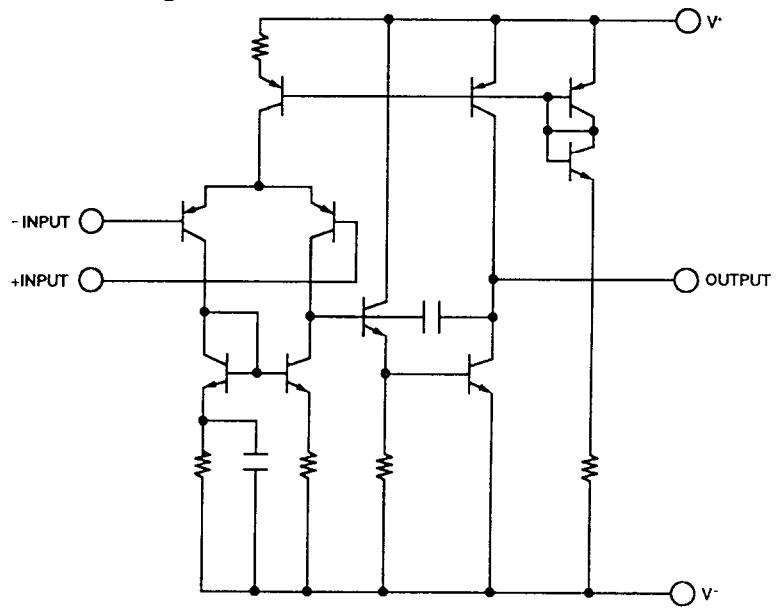
9) NJM2100M T1 (XA0209)

Operational Amplifier

Pin Assignment



Block Diagram



10) Transistor, Diode, and LED Outline Drawings

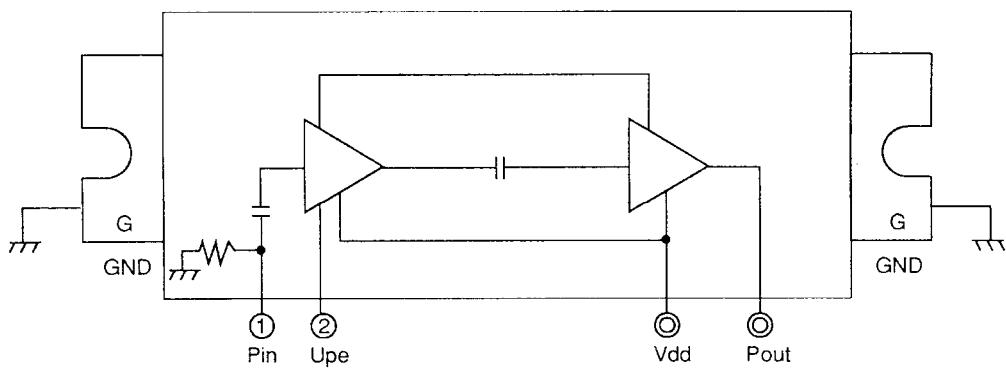
Top View

DA204U T106 XD0130	FMA7XT 148 XU0027	MA716 TW XD0118	MA741WA TX XD0251	MA742 TX XD0250
UN211H TX XU0040	UN2214 TX XU0038	UN9111 TX XU0062	XP1501 TX XU0172	
6 P	8 D	6 A	C1 C2 B1 E B2 5 R	

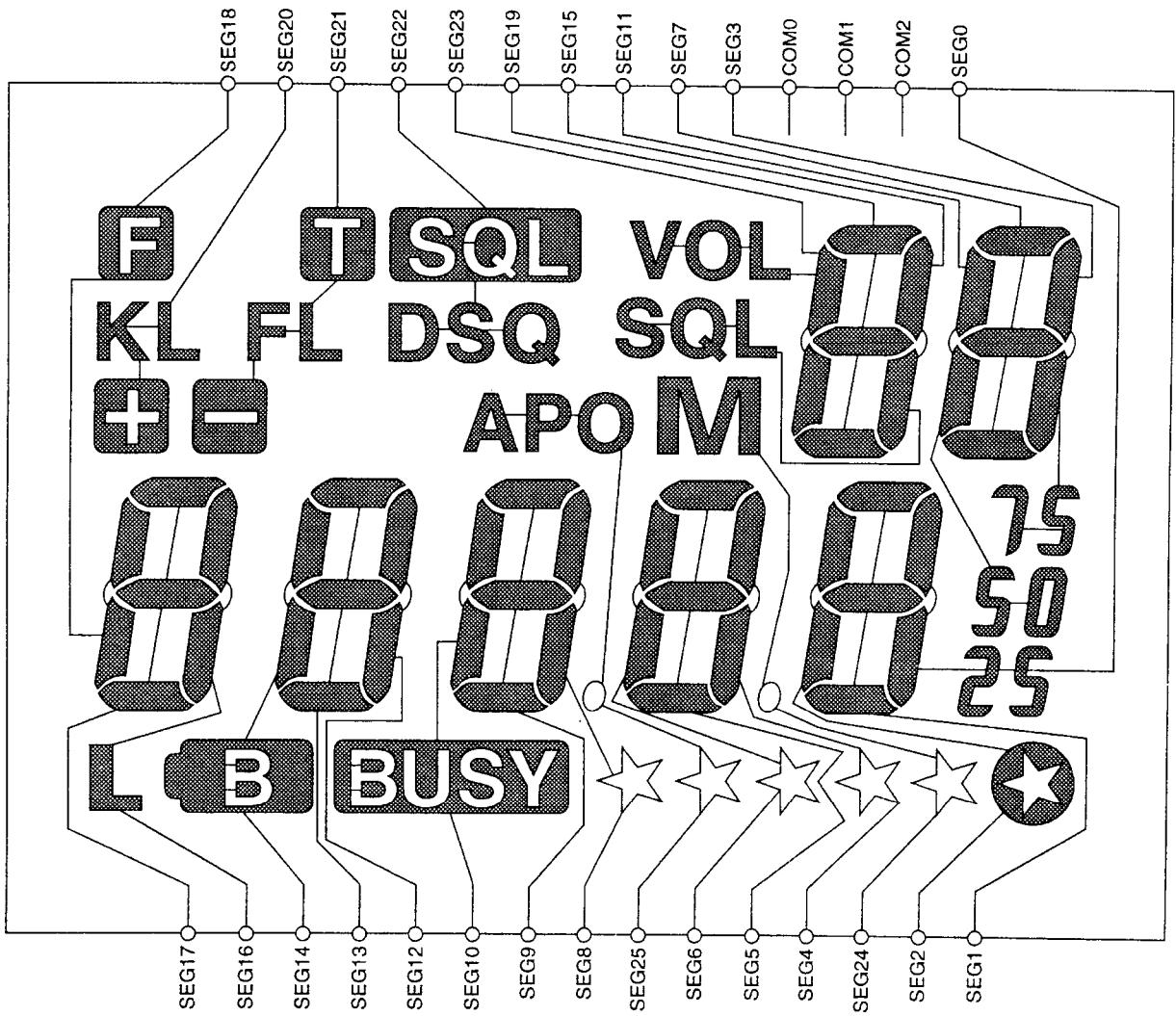
11) P. A. Module (IC101)

TA1 : XA0439
TA2 : XA0421

T : XA0381

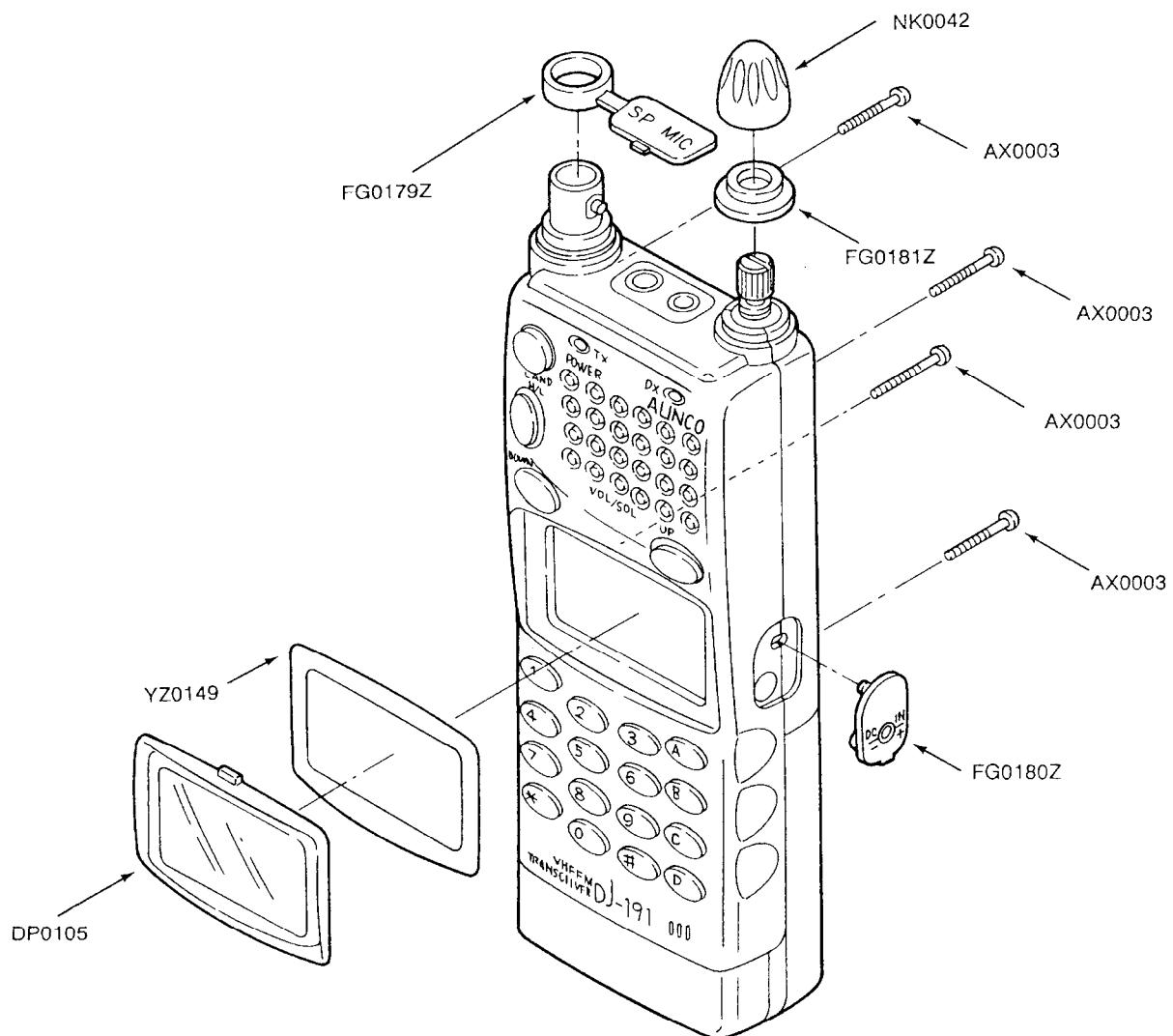


12) LCD Connection

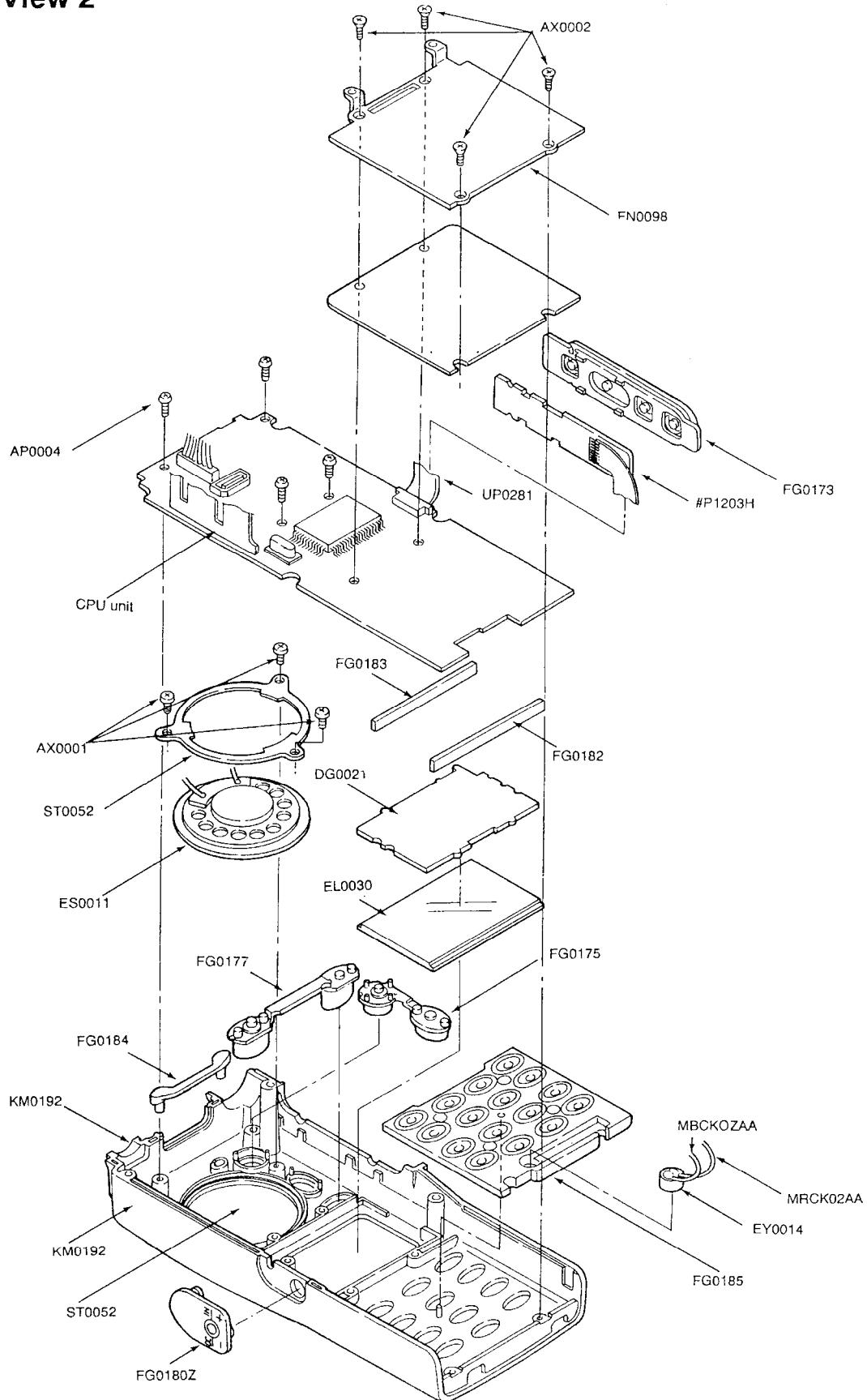


EXPLODED VIEW

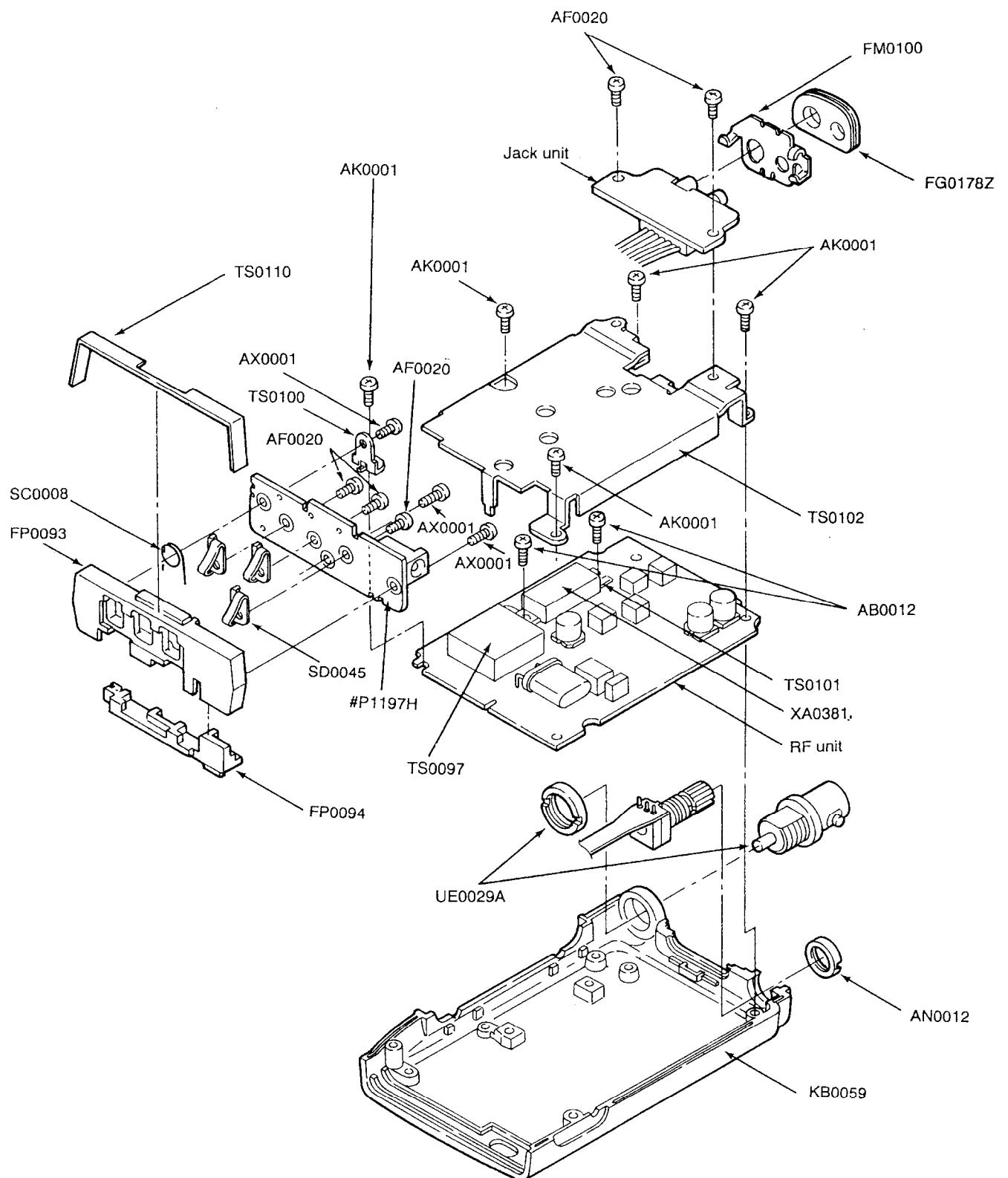
1) Front View 1



2) Front View 2



3) Rear View



PARTS LIST

Ref. No.	Parts No.	Description	Parts Name	Ver.
CPU Unit				
C1	CU3035	Chip C.	CL608.JB1H10ZKTA	
C2	CU3035	Chip C.	CL608.JB1H10ZKTA	
C3	CS0378	Chip C.	TMCAC001J07MTR	
C4	CS0317	Chip C.	CL608.CH1133Q1TA	
C5	CS0201	Chip C.	TMCAC06475MTR	
C6	CS0335	Chip C.	CL608.JB1H10ZKTA	
C7	CS0359	Chip C.	CL608.JB1H10ZKTA	
C8	CS0355	Chip C.	CL608.JB1H10ZKTA	
C9	CS0373	Chip Tantal	TMCAC1476MTR	
C10	CS0378	Chip Tantal	TMCAC0G10MTR	
C11	CS0359	Chip C.	CL608.JF1E10Q1ZTA	
C12	CS0063	Chip C.	TMCAC1V10MTR	
C13	CS0347	Chip C.	CL608.JB1H10ZKTA	
C14	CS0049	Chip Tantal	TMCAC1G05MTR	
C15	CS0057	Chip Tantal	TMCAC0A225MTR	
C16	CS0349	Chip C.	TMCAC1G05MTR	
C17	CS0321	Chip C.	CL608.CH1168Q1TA	
C18	CS0335	Chip C.	CL608.JB1H10ZKTA	
C19	CS0356	Chip C.	CL608.JF1E10ZKTA	
C20	CS0355	Chip C.	CL608.JB1H10ZKTA	
C21	CS0356	Chip C.	CL608.JF1E10ZKTA	
C22	CS0335	Chip C.	CL608.JB1H10ZKTA	
C23	CS0335	Chip C.	CL608.JB1H10ZKTA	
C24	CS0351	Chip C.	CL608.JR1E22ZKTA	
C25	CS0351	Chip C.	CL608.JR1E22ZKTA	
C26	CS0327	Chip C.	CL608.JR1E22ZKTA	
C27	CS0335	Chip C.	CL608.JB1H10ZKTA	
C28	CS0326	Chip C.	CL608.CH1181J7TA	
C29	CS0327	Chip C.	CL608.CH1182J7TA	
C30	CS0359	Chip C.	CL608.JF1E10ZKTA	
C31	CS0063	Chip C.	TMCAC1V10MTR	
C32	CS0359	Chip C.	CL608.JF1E10Q1ZTA	
C33	CS0335	Chip C.	CL608.JF1E10ZKTA	
C34	CS0359	Chip C.	CL608.JF1E10Q1ZTA	
C35	CS0349	Chip C.	TMCAC1G05MTR	
C36	CS0359	Chip C.	CL608.JF1E10Q1ZTA	
C37	CS0049	Chip C.	TMCAC1G05MTR	
C38	CS0359	Chip C.	CL608.JF1E10Q1ZTA	
C39	CS0306	Chip C.	CL608.CH1105QCTA	
C40	CS0359	Chip C.	CL608.JF1E10Q1ZTA	
C41	CS0359	Chip C.	CL608.JF1E10Q1ZTA	
C42	CS0335	Chip C.	CL608.JB1H10ZKTA	
C43	CS0335	Chip C.	CL608.JB1H10ZKTA	
C44	CS0335	Chip C.	CL608.JB1H10ZKTA	
C45	CS0335	Chip C.	CL608.JB1H10ZKTA	
C46	CS0256	Wire	JACK-CPU Wire	
C47	CS0335	Chip C.	CL608.JB1H10ZKTA	
C48	CS0335	Chip C.	CL608.JB1H10ZKTA	
C49	CS0335	Chip C.	CL608.JB1H10ZKTA	
C50	CS0359	Chip C.	CL608.JF1E10Q1ZTA	
C51	UE0270	Wire	CP0508-0201	
C52	UE0256	Diode	DS25 Flexible PCB	
C53	UE0282	Diode	ANW20C233OP	
C54	UE0267	LED	PG101F-TR	
D1	XU0045	LED	PG101F-TR	
D3	XU0047	LED	PG101W-TR	
D5	XU0047	LED	PG101W-TR	
D6	XU0048	LED	BR101W-TR	
D7	XU0291	Diode	W1729-TX	
D9	XU0291	Diode	W1729-TX	
D11	XU0250	Diode	W1712-TX	
D12	XU0291	Diode	W1729-TX	
D13	XU0291	Diode	W1729-TX	
D14	XU0036	LED	SML-310MTT86	
D15	XU0036	LED	SML-310MTT86	
D16	XU0036	LED	SML-310MTT86	
D17	XU0036	LED	SML-310MTT86	

Ref. No.	Parts No.	Description	Parts Name	Ver.
CPU Unit/CHARGE Unit/Mechanical Parts				
R1022	RK3035	EEP ROM	ZULC16QT-1/5N	
R1023	RK3035	IC	RU5WL256A-T1	
R1024	RK3035	IC	RU5WL256A-T1	
R1025	RK3035	IC	S-81235SG-01-T2	
R1026	RK3038	IC	#82627ML-0TP	
R1027	RK3038	IC	NU21200M-T1	
R1028	RK3038	IC	LC73881W-TLM	
R1029	RK3038	IC	#30AH1-025-H1	
R1030	RK3058	IC	MACLJ2G	
R1031	RK3046	Chip R.	TTA	
R1032	RK3066	Chip R.	TTA	
R1033	RK3039	Chip R.	SW1	
R1034	U0018	Switch	SOP-112RST	
R1035	U0018	Switch	SMD-49	
R1036	U0074	Crystal	4.19MHz	
R1037	U02938	P.C.B	DJ191 CPU PCB	
CHARGE Unit				
R1038	C801	CHARGE	C1608.RB1U471KTA	
R1039	D801	CHARGE A	U2F1J44NT(TEL2R)	
R1040	D802	CHARGE A	U2F1J44NT(TEL2R)	
R1041	D803	CHARGE A	MA111-TX	
R1042	D804	CHARGE A	X00261	
R1043	D805	CHARGE A	X00130	
R1044	D806	CHARGE A	HEC2781070510	
R1045	D807	CHARGE A	ZSA213Y TEJ2L	
R1046	D808	CHARGE A	ER16GEYJ150V	
R1047	D809	CHARGE A	ER16GSUJ472V	
Mechanical Parts				
A0020	AF0020	Screw	0# 2+3P Ni	
A0021	AF0020	Screw	0# 2+4P Be	
F0093	FP0093	Terminal frame	Terminal frame	
F0094	FP0094	Latch knob	Latch knob	
F0095	SC0008	Latch spring	Latch spring	
F0096	SD0045	Batt. terminal	Batt. terminal	
F0097	TS0100	earth terminals	earth terminals	
F0098	TS0110	Charge earth	Charge earth	
F0099	EY0014	EW1-123A	EW1-123A	
F0100	DS0352A	Spec.-Card	Spec.-Card	
F0101	DS0365	Spec.-Card	Spec.-Card	
F0102	EA0057Z	Antenna	Antenna	
F0103	EW0012	EDC-64	EDC-64	
F0104	FCC Part15 Seal	FCC Part15 Seal	FCC Part15 Seal	
F0105	PS0038	Ni-Cd Battery Pack	Ni-Cd Battery Pack	
F0106	PS0038	Fixture DJ5	Fixture DJ5	
F0107	PS0038	Fixture DJ65	Fixture DJ65	
F0108	PS0026	Registration Card	Registration Card	
F0109	PS0006	Lot Number Seal	Lot Number Seal	
F0110	PT0004A	Protection 165x280	Protection 165x280	
F0111	HK30392	Item Carton DJ191	Item Carton DJ191	
F0112	HP0031	Projection(Radio)	Projection(Radio)	
F0113	EG0025	Fixture DJ5	Fixture DJ5	
F0114	EG0026	Ni-Cd Battery Pack	Ni-Cd Battery Pack	
F0115	EW0012	Charger (FDCG3 12V)	Charger (FDCG3 12V)	
F0116	EW0012	Item Carton DJ191	Item Carton DJ191	
F0117	F0223	Power Key D1G5	Power Key D1G5	
F0118	F0223	Power Key D1G5	Power Key D1G5	
F0119	F0223	Power Key D1G5	Power Key D1G5	
F0120	F0223	Power Key D1G5	Power Key D1G5	
F0121	F0223	Power Key D1G5	Power Key D1G5	
F0122	F0223	Power Key D1G5	Power Key D1G5	
F0123	F0223	Power Key D1G5	Power Key D1G5	
F0124	F0223	Power Key D1G5	Power Key D1G5	
F0125	F0223	Power Key D1G5	Power Key D1G5	
F0126	F0223	Power Key D1G5	Power Key D1G5	
F0127	F0223	Power Key D1G5	Power Key D1G5	
F0128	F0223	Power Key D1G5	Power Key D1G5	
F0129	F0223	Power Key D1G5	Power Key D1G5	
F0130	F0223	Power Key D1G5	Power Key D1G5	
F0131	F0223	Power Key D1G5	Power Key D1G5	
F0132	F0223	Power Key D1G5	Power Key D1G5	
F0133	F0223	Power Key D1G5	Power Key D1G5	
F0134	F0223	Power Key D1G5	Power Key D1G5	
F0135	F0223	Power Key D1G5	Power Key D1G5	
F0136	F0223	Power Key D1G5	Power Key D1G5	
F0137	F0223	Power Key D1G5	Power Key D1G5	
F0138	F0223	Power Key D1G5	Power Key D1G5	
F0139	F0223	Power Key D1G5	Power Key D1G5	
F0140	F0223	Power Key D1G5	Power Key D1G5	
F0141	F0223	Power Key D1G5	Power Key D1G5	
F0142	F0223	Power Key D1G5	Power Key D1G5	
F0143	F0223	Power Key D1G5	Power Key D1G5	
F0144	F0223	Power Key D1G5	Power Key D1G5	
F0145	F0223	Power Key D1G5	Power Key D1G5	
F0146	F0223	Power Key D1G5	Power Key D1G5	
F0147	F0223	Power Key D1G5	Power Key D1G5	
F0148	F0223	Power Key D1G5	Power Key D1G5	
F0149	F0223	Power Key D1G5	Power Key D1G5	
F0150	F0223	Power Key D1G5	Power Key D1G5	
F0151	F0223	Power Key D1G5	Power Key D1G5	
F0152	F0223	Power Key D1G5	Power Key D1G5	
F0153	F0223	Power Key D1G5	Power Key D1G5	
F0154	F0223	Power Key D1G5	Power Key D1G5	
F0155	F0223	Power Key D1G5	Power Key D1G5	
F0156	F0223	Power Key D1G5	Power Key D1G5	
F0157	F0223	Power Key D1G5	Power Key D1G5	
F0158	F0223	Power Key D1G5	Power Key D1G5	
F0159	F0223	Power Key D1G5	Power Key D1G5	
F0160	F0223	Power Key D1G5	Power Key D1G5	
F0161	F0223	Power Key D1G5	Power Key D1G5	
F0162	F0223	Power Key D1G5	Power Key D1G5	
F0163	F0223	Power Key D1G5	Power Key D1G5	
F0164	F0223	Power Key D1G5	Power Key D1G5	
F0165	F0223	Power Key D1G5	Power Key D1G5	
F0166	F0223	Power Key D1G5	Power Key D1G5	
F0167	F0223	Power Key D1G5	Power Key D1G5	
F0168	F0223	Power Key D1G5	Power Key D1G5	
F0169	F0223	Power Key D1G5	Power Key D1G5	
F0170	F0223	Power Key D1G5	Power Key D1G5	
F0171	F0223	Power Key D1G5	Power Key D1G5	
F0172	F0223	Power Key D1G5	Power Key D1G5	
F0173	F0223	Power Key D1G5	Power Key D1G5	
F0174	F0223	Power Key D1G5	Power Key D1G5	
F0175	F0223	Power Key D1G5	Power Key D1G5	
F0176	F0223	Power Key D1G5	Power Key D1G5	
F0177	F0223	Power Key D1G5	Power Key D1G5	
F0178	F0223	Power Key D1G5	Power Key D1G5	
F0179	F0223	Power Key D1G5	Power Key D1G5	
F0180	F0223	Power Key D1G5	Power Key D1G5	
F0181	F0223	Power Key D1G5	Power Key D1G5	
F0182	F0223	Power Key D1G5	Power Key D1G5	
F0183	F0223	Power Key D1G5	Power Key D1G5	
F0184	F0223	Power Key D1G5	Power Key D1G5	
F0185	F0223	Power Key D1G5	Power Key D1G5	
F0186	F0223	Power Key D1G5	Power Key D1G5	
F0187	F0223	Power Key D1G5	Power Key D1G5	
F0188	F0223	Power Key D1G5	Power Key D1G5	
F0189	F0223	Power Key D1G5	Power Key D1G5	
F0190	F0223	Power Key D1G5	Power Key D1G5	
F0191	F0223	Power Key D1G5	Power Key D1G5	
F0192	F0223	Power Key D1G5	Power Key D1G5	
F0193	F0223	Power Key D1G5	Power Key D1G5	
F0194	F0223	Power Key D1G5	Power Key D1G5	
F0195	F0223	Power Key D1G5	Power Key D1G5	
F0196	F0223	Power Key D1G5	Power Key D1G5	
F0197	F0223	Power Key D1G5	Power Key D1G5	
F0198	F0223	Power Key D1G5	Power Key D1G5	
F0199	F0223	Power Key D1G5	Power Key D1G5	
F0200	F0223	Power Key D1G5	Power Key D1G5	
F0201	F0223	Power Key D1G5	Power Key D1G5	
F0202	F0223	Power Key D1G5	Power Key D1G5	
F0203	F0223	Power Key D1G5	Power Key D1G5	
F0204	F0223	Power Key D1G5	Power Key D1G5	
F0205	F0223	Power Key D1G5	Power Key D1G5	
F0206	F0223	Power Key D1G5	Power Key D1G5	
F0207	F0223	Power Key D1G5	Power Key D1G5	
F0208	F0223	Power Key D1G5	Power Key D1G5	
F0209	F0223	Power Key D1G5	Power Key D1G5	
F0210	F0223	Power Key D1G5	Power Key D1G5	
F0211	F0223	Power Key D1G5	Power Key D1G5	
F0212	F0223	Power Key D1G5	Power Key D1G5	
F0213	F0223	Power Key D1G5	Power Key D1G5	
F0214	F0223	Power Key D1G5	Power Key D1G5	
F0215	F0223	Power Key D1G5	Power Key D1G5	

Mechanical Parts/PTT Unit/JACK Unit/VCO Unit/SW Unit

Ref. No.	Parts No.	Description	Parts Name	Ver.	Ref. No.	Parts No.	Description	Parts Name	Ver.	Ref. No.	Parts No.	Description	Parts Name	Ver.
VCO Unit					RF Unit					RF Unit				
C301	CU3035	Chip C	C1608JB1H102KTA		C101	CU3035	Chip C	C1608JB1H102KTA		C165	CU3021	Chip C	C1608CH1H02KTA	
C302	CS0377	Chip Tantal	TMCB10G476MTR		C102	CU3035	Chip C	C1608JB1H102KTA		C166	CU3059	Chip C	C1608IF1E104ZTA	
C303	CS0347	Chip C	C1608JB1H103KTA		C103	CU3035	Chip C	C1608JB1H102KTA		C167	CU3016	Chip C	C1608CH1H2201TA	
C304	CS0347	Chip C	C1608JB1H103KTA		C104	CU3035	Chip C	C1608JB1H102KTA		C168	CU3049	Chip Tantal	TMC8A1C105MTR	
C305	CU3031	Chip C	C1608CH1H747KTA		C105	CU3035	Chip C	C1608JB1H102KTA		C169	CU3056	Chip C	C1608IF1E4732TA	
C306	CU3006	Chip C	C1608CH1H505CTA		C106	CU3017	Chip C	C1608CH1H301TA		C170	CU3059	Chip C	C1608IF1E104ZTA	
C307	CU3035	Chip C	C1608JB1H102KTA		C107	CU3010	Chip C	C1608CH1H690CTA		C171	CU3051	Chip C	C1608BF1E223KTA	
C308	CU3006	Chip C	C1608CH1H1050CTA		C108	CU3007	Chip C	C1608CH1H690CTA		C172	CU3053	Chip C	C1608BF1E333KTA	
C309	CU3003	Chip C	C1608CH1H1020CTA		C110	CU3017	Chip C	C1608JB1H103KTA		C173	CU3047	Chip C	C1608BF1E102KTA	
C310	CU3031	Chip C	C1608JB1H1477KTA		C110	CU3017	Chip C	C1608CH1H600CTA		C174	CU3049	Chip Tantal	TMC8A1C105MTR	
C311	CU3035	Chip C	C1608JB1H102KTA		C112	CU3011	Chip C	C1608CH1H301TA		C175	CU3082	Chip C	C1608IF1E104ZTA	
C312	CU3035	Chip C	C1608JB1H102KTA		C113	CU3013	Chip C	C1608CH1H501TA		C176	CU3059	Chip C	C1608IF1E104ZTA	
C313	CU3035	Chip C	C1608JB1H102KTA		C114	CU3019	Chip C	C1608CH1H707TA		C177	CU3020	Chip Tantal	TMC8A1C105MTR	
C314	CU3026	Chip C	C1608CH1H181JTA		C115	CU3013	Chip C	C1608CH1H501TA		C178	CU3035	Chip C	C1608BF1E102KTA	
D301	XD0299	Diode	MA304-1X		C116	CU3019	Chip C	C1608CH1H501TA		C179	CU3027	Chip C	C1608BF1E102KTA	
D302	XD0293	Diode	LSV257-TP(TH3)		C117	CU3017	Chip C	C1608CH1H701TA		C180	CU3035	Chip C	C1608BF1E103KTA	
D303	XD0299	Diode	MA304-1X		C118	CU3035	Chip C	C1608CH1H102KTA		C181	CU3059	Chip C	C1608IF1E104ZTA	
D304	XD0299	Diode	MA304-1X		C119	CU3035	Chip C	C1608JB1H102KTA		C182	CU3035	Chip C	C1608BF1E102KTA	
L301	QA0077A	Coil	MF1608A1ROKA00		C120	CU3009	Chip C	C1608CH1H701TA		C183	CU3035	Chip C	C1608BF1E102KTA	
L301	QA0049	Coil	MF1608A1ROKA00		C121	CU3012	Chip C	C1608CH1H201TA		C184	CU3035	Chip C	C1608BF1E102KTA	
L301	QA0049	Coil	MF1608A1ROKA00		C122	CU3004	Chip C	TMC8A1C105MTR		C185	CU3047	Chip C	C1608BF1E104ZTA	
L301	QA0042	Coil	MF1608A1ROKA00		C123	CU3015	Chip C	C1608CH1H201TA		C186	CU3038	Chip C	6.3CV 100BS	
L303	QK065A	Coil	MF1608A1ROKA00		C124	CU3035	Chip C	C1608JB1H102KTA		C187	CU3035	Chip C	C1608IF1E104ZTA	
L304	QC0954	Coil	MF1608A1ROKA00		C125	CU3002	Chip C	C1608CH1H301TA		C188	CU3049	Chip C	C1608BF1E102KTA	
L305	QC0954	Coil	MF1608A1ROKA00		C126	CU3009	Chip C	C1608CH1H201TA		C189	CU3047	Chip C	C1608BF1E102KTA	
L305	XT0137	Transistor	ZSC5065-01(TP85L)		C127	CU3009	Chip C	TMC8A1C105MTR		C190	CU3039	Chip C	C1608BF1E104ZTA	
Q302	XU0137	Transistor	ZSC5065-01(TP85L)		C128	CU3035	Chip C	C1608CH1H201TA		C191	CU3035	Chip C	C1608BF1E103KTA	
Q303	XU0131	Transistor	DTCL14EU1T068		C129	CU3003	Chip C	C1608CH1H2201TA		C192	CU3047	Chip C	C1608BF1E103KTA	
R301	RK3026	Chip R	ERJ36GSY1J01W		C130	CU3026	Chip C	C1608JB1H102KTA		C193	CU3047	Chip C	C1608IF1E103KTA	
R302	RK3050	Chip R	ERJ36GSY1J221V		C131	CU3051	Chip C	C1608CH1H301TA		C194	CU3049	Chip C	C1608IF1E104ZTA	
R303	RK3050	Chip R	ERJ36GSY1J03V		C132	CU3047	Chip C	C1608CH1H103KTA		C195	CU3047	Chip C	C1608BF1E103KTA	
R304	RK3062	Chip R	ERJ36GSY1J03V		C133	CU3047	Chip C	TMC8A1C105MTR		C196	CU3032	Chip C	C1608BF1E103KTA	
R305	RK3062	Chip R	ERJ36GSY1J04V		C134	CU3035	Chip C	C1608CH1H102KTA		C197	CU3047	Chip C	C1608BF1E104ZTA	
R306	RK3062	Chip R	ERJ36GSY1J04V		C135	CU3009	Chip C	C1608CH1H201TA		C198	CU3038	Chip C	6.3CV 100BS	
R307	RK3055	Chip R	ERJ36GSY1J153V		C136	CU3027	Chip C	C1608JB1H102KTA		C199	CU3038	Chip C	C1608IF1E104ZTA	
R308	RK3042	Chip R	ERJ36GSY1J222V		C137	CU3051	Chip C	TMC8A1C25MTR		C200	CU3035	Chip C	C1608IF1E104ZTA	
R309	RK3050	Chip R	ERJ36GSY1J303V		C138	CU3047	Chip C	C1608CH1H102KTA		C201	CU3035	Chip C	C1608BF1E103KTA	
R310	RK3037	Chip R	ERJ36GSY1J303V		C139	CU3035	Chip C	C1608CH1H102KTA		C202	CU3047	Chip C	C1608BF1E104ZTA	
R311	RK3042	Chip R	ERJ36GSY1J303V		C140	CU3035	Chip C	C1608CH1H102KTA		C203	CU3035	Chip C	C1608BF1E103KTA	
R311	TS0097	Case	VCO Case		C141	CU3035	Chip C	C1608CH1H102KTA		C204	CU3059	Chip C	C1608IF1E104ZTA	
PTT Unit					SW Unit					Electrolytic C				
CM401	CP0261	BJDG5 Flexible PCB			CN501	UE0255	Connector	6007B-037003		C205	CU3073	Electrolytic C	16V 100uF	
SM401	UW0018	Switch	SOP-112LST		SK501	UW0018	Switch	SOP-112LST		C206	CU3085	Chip Tantal	TMC8A1C105MTR	
SM402	UW0026	Switch	TACISW		SW502	UW0018	Switch	SOP-112LST		C207	CU3035	Chip C	C1608IF1E104ZTA	
SM403	UW0018	Switch	SOP-1-12LST		Switch Space					C208	CU3035	Chip C	C1608IF1E104ZTA	
SM404	UW0018	Switch	Tape W=12		Switch Space					C209	CU3035	Chip C	C1608IF1E104ZTA	
JACK Unit					C142	CU3002	Chip C	C1608CH1H102KTA		C210	CU3019	Chip C	C1608IF1E104ZTA	
C501	CU3035	Chip C	C1608JB1H102KTA		C143	CU3003	Chip C	C1608CH1H102KTA		C211	CU3035	Chip C	C1608IF1E104ZTA	
C502	CU3035	Chip C	C1608JB1H102KTA		C144	CU3003	Chip C	C1608CH1H102KTA		C212	CU3035	Chip C	C1608IF1E104ZTA	
C503	CU3035	Chip C	C1608JB1H102KTA		C145	CU3006	Chip C	C1608CH1H102KTA		C213	CU3035	Chip C	C1608IF1E104ZTA	
C504	CU3035	Chip C	C1608JB1H102KTA		C146	CU3017	Chip C	C1608CH1H102KTA		C214	CU3035	Chip C	C1608IF1E104ZTA	
C505	CU3035	Chip C	C1608JB1H102KTA		C147	CU3018	Chip C	C1608CH1H102KTA		C215	CU3035	Chip C	C1608IF1E104ZTA	
C506	CU3035	Chip C	C1608JB1H102KTA		C148	CU3016	Chip C	C1608CH1H102KTA		C216	CU3035	Chip C	C1608IF1E104ZTA	
C507	CU3035	Chip C	C1608JB1H102KTA		C149	CU3011	Chip C	C1608CH1H102KTA		C217	CU3035	Chip C	C1608IF1E104ZTA	
C508	CU3035	Chip C	C1608JB1H102KTA		C150	CU3004	Chip C	C1608CH1H102KTA		C218	CU3035	Chip C	C1608IF1E104ZTA	
C509	CU3035	Chip C	C1608JB1H102KTA		C151	CU3015	Chip C	C1608CH1H102KTA		C219	CU3035	Chip C	C1608IF1E104ZTA	
C510	CU3035	Chip C	C1608JB1H102KTA		C152	CU3015	Chip C	C1608CH1H102KTA		C220	CU3035	Chip C	C1608IF1E104ZTA	
C511	CU3035	Chip C	C1608JB1H102KTA		C153	CU3059	Chip C	C1608CH1H102KTA		C221	CU3035	Chip C	C1608IF1E104ZTA	
C512	CU3035	Chip C	C1608JB1H102KTA		C154	CU3017	Chip C	C1608CH1H102KTA		C222	CU3035	Chip C	C1608IF1E104ZTA	
C513	CU3035	Chip C	C1608JB1H102KTA		C155	CU3018	Chip C	C1608CH1H102KTA		C223	CU3035	Chip C	C1608IF1E104ZTA	
C514	CU3035	Chip C	C1608JB1H102KTA		C156	CU3035	Chip C	C1608CH1H102KTA		C224	CU3035	Chip C	C1608IF1E104ZTA	
C515	CU3035	Chip C	C1608JB1H102KTA		C157	CU3007	Chip C	C1608CH1H102KTA		C225	CU3035	Chip C	C1608IF1E104ZTA	
C516	CU3035	Chip C	C1608JB1H102KTA		C158	CU3035	Chip C	C1608CH1H102KTA		C226	CU3035	Chip C	C1608IF1E104ZTA	
C517	CU3035	Chip C	C1608JB1H102KTA		C159	CU3059	Chip C	C1608CH1H102KTA		C227	CU3035	Chip C	C1608IF1E104ZTA	
C518	CU3035	Chip C	C1608JB1H102KTA		C160	CU3017	Chip C	C1608CH1H102KTA		C228	CU3035	Chip C	C1608IF1E104ZTA	
C519	CU3035	Chip C	C1608JB1H102KTA		C161	CU3047	Chip C	C1608CH1H102KTA		C229	CU3035	Chip C	C1608IF1E104ZTA	
C520	CU3035	Chip C	C1608JB1H102KTA		C162	CU3017	Chip C	C1608CH1H102KTA		C230	CU3035	Chip C	C1608IF1E104ZTA	
C521	CU3035	Chip C	C1608JB1H102KTA		C163	CU3037	Chip C	C1608CH1H102KTA		C231	CU3035	Diode	RS135 IE 11	
C522	CU3035	Chip C	C1608JB1H102KTA		C164	CU3049	Chip C	C1608CH1H102KTA		C232	CU3035	Diode	RS135 IE 11	
C523	CU3035	Chip C	C1608JB1H102KTA		C165	CU3017	Chip C	C1608CH1H102KTA		C233	CU3035	Diode	RS135 IE 11	
C524	CU3035	Chip C	C1608JB1H102KTA		C166	CU3039	Chip C	C1608CH1H102KTA		C234	CU3035	Diode	RS135 IE 11	
C525	CU3035	Chip C	C1608JB1H102KTA		C167	CU3039	Chip C	C1608CH1H102KTA		C235	CU3035	Diode	RS135 IE 11	
C526	CU3035	Chip C	C1608JB1H102KTA		C168	CU3039	Chip C	C1608CH1H102KTA		C236	CU3035	Diode	RS135 IE 11	
C527	CU3035	Chip C	C1608JB1H102KTA		C169	CU3039	Chip C	C1608CH1H102KTA		C237	CU3035	Diode	RS135 IE 11	
C528	CU3035	Chip C	C1608JB1H102KTA		C170	CU3039	Chip C	C1608CH1H102KTA		C238	CU3035</td			

Ref. No.	Parts No.	Description	Parts Name	Ver.
D113 X00130	Diode	D204C 1106	R123 RK3026	T.E. T
PL101 XC0018	Filter	CPW450F	R124 RK3022	S.A.28
JK101 RD0108		JPA01R_01	R126 RK3050	
IC101 XA0381	IC		R128 RK3052	
IC101 XA0421	IC	P10311	R130 RK3050	142.1MHz
IC102 XA0352	IC	H61076GP	R132 RK3050	
IC103 XA0385	IC	H5222PFP-600C	R133 RK3058	
IC104 XA0393	IC	H61372PW-EL	R135 RK3063	
IC105 XA0210	IC	H412070M_11	R137 RK3066	
L101 Q00016	Cell	MJF321GA2024W	R138 RK3047	
L102 QKA654	Cell	MRI_1.5_3.5T 0.4	R140 RK3052	
L103 QKA654	Cell	MRI_1.5_3.5T 0.4	R142 RK3030	
L104 QKA654	Cell	MRI_1.5_3.5T 0.4	R143 RK3042	
L105 QCA030	Cell	MJF16080R10KTA00	R144 RK3050	
L106 QCA030	Cell	QWA75A	R145 RK3074	
L107 QCA030	Cell	MJF321GA4R74	R146 RK3074	
L108 QCO080	FET	Q0009	R147 RK3074	
L109 QAO071	Coil	QAO071	R148 RK3060	
L110 QAO071	Coil	QAO071	R149 RK3074	
L111 QAO071	Coil	QAO071	R150 RK3034	
L112 QAO071	Coil	QAO071	R153 RK3059	
L113 QCO009	FET	MJF3216BR10M	R154 RK3042	
L114 QCO040	Coil	MJF16080R10KTA00	R155 RK3058	
Q101 XT0110	Transistor	2SC3356-TIBR24	R156 RK3041	
Q102 XT0110	Transistor	2SC3356-TIBN24	R157 RK3041	
Q103 XT0172	Transistor	YF1501-TX	R158 RK3059	
Q105 XT0095	Transistor	2SC4099_105N	R159 RK3047	
Q106 XE0020	FET	2SK3601GE TL	R160 RK3054	
Q106 XE0009	FET	2SK3602GR	R161 RK3052	
Q107 XT0137	Transistor	2SC5065_0(TE85L)	R162 RK3052	
Q108 XT0036	Transistor	2SC4099_105N	R163 RK3030	
Q109 XT0095	Transistor	2SC4081_T10GR	R164 RK3058	
Q110 XT0098	Transistor	2SK2121AY_105N	R165 RK3058	
Q111 XT0088	Transistor	2SK2123Y_102L	R166 RK3046	
Q112 XT0027	Transistor	FAK77_148	R167 RK3038	
Q113 XT0172	Transistor	YF1501-TX	R168 RK105	
Q114 XT0088	Transistor	2SA1213Y_1E12L	R169 RK3032	
Q115 XT0052	Transistor	2SC4081_105R	R170 RK3038	
Q116 XT0052	Transistor	XP1501-TX	R171 RK3058	
Q117 XT0137	Transistor	2SC5065_0(TE85L)	R172 RK3054	
Q118 XT0125	Transistor	DT114AEUT106	R173 RK3071	
Q119 XT0038	Transistor	DU2214_TX	R174 RK3071	
Q120 XT0052	Transistor	UH9111_TX	R175 RK3054	
R101 RK3028	Chip R	ERJ36SY1423V	R176 RK3046	
R102 RK3026	Chip R	ERJ36SY1415V	R177 RK3077	
R103 RK3026	Chip R	ERJ36SY1401V	R178 RK3054	
R104 RK3034	Chip R	ERJ36SY1401V	R179 RK3055	
R105 RK3026	Chip R	ERJ36SY1401V	R180 RK3042	
R113 RK3050	Chip R	ERJ36SY1427V	R181 RK3054	
R106 RK3050	Chip R	ERJ36SY1403V	R182 RK3058	
R107 RK3046	Chip R	ERJ36SY1423V	R183 RK3042	
R114 RK3050	Chip R	ERJ36SY1403V	R184 RK3050	
R115 RK3026	Chip R	ERJ36SY1401V	R185 RK3050	
R116 RK3050	Chip R	ERJ36SY103V	R186 RK3052	
R117 RK3034	Chip R	ERJ36SY1471V	R187 RK3058	
R118 RK3050	Chip R	ERJ36SY1403V	R188 RK3050	
R119 RK3051	Chip R	ERJ36SY1123V	R189 RK3042	
R120 RK3051	Chip R	ERJ36SY1402V	R190 RK3050	
R121 RK3050	Chip R	ERJ36SY103V	R191 RK3050	
R122 RK3050	Chip R	ERJ36SY1221V	R192 RK3014	
R123 RK3050	Chip R	ERJ36SY103V	R193 RK3038	
R124 RK3050	Chip R	ERJ36SY103V	R194 RK3056	
R125 RK3050	Chip R	ERJ36SY103V	R195 RK3052	
R126 RK3050	Chip R	ERJ36SY103V	R196 RK3052	
R127 RK3050	Chip R	ERJ36SY103V	R197 RK3038	
R128 RK3050	Chip R	ERJ36SY103V	R198 RK3030	

Ref. No.	Parts No.	Description	Parts Name	Ver.
D123 X00130	Diode	D204C 1106	R205 RK3030	
PL101 XC0018	Filter	CPW450F	R206 RK3059	
JK101 RD0108		JPA01R_01	R207 RK3026	
IC101 XA0381	IC	S.A.28	R208 RK3050	
IC101 XA0421	IC	P10311	R209 RK3026	
IC102 XA0352	IC	H61076GP	R210 RK3052	
IC103 XA0385	IC	H5222PFP-600C	R211 RK3062	
IC104 XA0393	IC	H61372PW-EL	R212 RK3001	
IC105 XA0210	IC	H412070M_11	R213 RK3050	
L101 Q00016	Cell	MJF321GA2024W	R214 RK3050	
L102 QKA654	Cell	MRI_1.5_3.5T 0.4	R215 RK3059	
L103 QKA654	Cell	MRI_1.5_3.5T 0.4	R216 RK3058	
L104 QKA654	Cell	MRI_1.5_3.5T 0.4	R217 RK3058	
L105 QCA030	Cell	MJF16080R10KTA00	R218 RK3026	
L106 QCA030	Cell	QWA75A	R219 RK3026	
L107 QCA030	Cell	MJF321GA4R74	R220 RK3026	
L108 QCO080	FET	Q0009	R221 RK3038	
L109 QAO071	Coil	QAO071	R222 TC101	
L110 QAO071	Coil	QAO071	R223 TC012	
L111 QAO071	Coil	QAO071	R224 TC012	
L112 QAO071	Coil	QAO071	R225 TC012	
L113 QCO009	FET	XE0009	R226 TC012	
L114 QCO040	Coil	XE0009	R227 TC012	
Q101 XT0110	Transistor	XT0110	R228 TC012	
Q102 XT0110	Transistor	XT0110	R229 TC012	
Q103 XT0172	Transistor	XT0172	R230 TC012	
Q105 XT0095	Transistor	XT0095	R231 TC012	
Q106 XT0098	Transistor	XT0098	R232 TC012	
Q111 XT0088	Transistor	XT0088	R233 TC012	
Q112 XT0027	Transistor	XT0027	R234 TC012	
Q113 XT0172	Transistor	XT0172	R235 TC012	
Q114 XT0088	Transistor	XT0088	R236 TC012	
Q115 XT0052	Transistor	XT0052	R237 TC012	
Q116 XT0052	Transistor	XT0052	R238 TC012	
Q117 XT0137	Transistor	XT0137	R239 TC012	
Q118 XT0125	Transistor	XT0125	R240 TC012	
Q119 XT0038	Transistor	XT0038	R241 TC012	
Q120 XT0052	Transistor	XT0052	R242 TC012	
R101 RK3028	Chip R	ERJ36SY1423V	R243 TC012	
R102 RK3026	Chip R	ERJ36SY1401V	R244 TC012	
R103 RK3026	Chip R	ERJ36SY1401V	R245 TC012	
R104 RK3034	Chip R	ERJ36SY1401V	R246 TC012	
R105 RK3026	Chip R	ERJ36SY1401V	R247 TC012	
R113 RK3050	Chip R	ERJ36SY1403V	R248 TC012	
R106 RK3050	Chip R	ERJ36SY1403V	R249 TC012	
R107 RK3046	Chip R	ERJ36SY1423V	R250 TC012	
R114 RK3050	Chip R	ERJ36SY1403V	R251 TC012	
R115 RK3026	Chip R	ERJ36SY1401V	R252 TC012	
R116 RK3050	Chip R	ERJ36SY103V	R253 TC012	
R117 RK3034	Chip R	ERJ36SY1471V	R254 TC012	
R118 RK3050	Chip R	ERJ36SY1403V	R255 TC012	
R119 RK3051	Chip R	ERJ36SY1123V	R256 TC012	
R120 RK3051	Chip R	ERJ36SY1402V	R257 TC012	
R121 RK3050	Chip R	ERJ36SY103V	R258 TC012	
R122 RK3050	Chip R	ERJ36SY1221V	R259 TC012	
R123 RK3050	Chip R	ERJ36SY103V	R260 TC012	
R124 RK3050	Chip R	ERJ36SY103V	R261 TC012	
R125 RK3050	Chip R	ERJ36SY103V	R262 TC012	
R126 RK3050	Chip R	ERJ36SY103V	R263 TC012	
R127 RK3050	Chip R	ERJ36SY103V	R264 TC012	
R128 RK3050	Chip R	ERJ36SY103V	R265 TC012	
R129 RK3050	Chip R	ERJ36SY103V	R266 TC012	
R130 RK3050	Chip R	ERJ36SY103V	R267 TC012	
R131 RK3050	Chip R	ERJ36SY103V	R268 TC012	
R132 RK3050	Chip R	ERJ36SY103V	R269 TC012	
R133 RK3050	Chip R	ERJ36SY103V	R270 TC012	
R134 RK3050	Chip R	ERJ36SY103V	R271 TC012	
R135 RK3050	Chip R	ERJ36SY103V	R272 TC012	
R136 RK3050	Chip R	ERJ36SY103V	R273 TC012	
R137 RK3050	Chip R	ERJ36SY103V	R274 TC012	
R138 RK3050	Chip R	ERJ36SY103V	R275 TC012	
R139 RK3050	Chip R	ERJ36SY103V	R276 TC012	
R140 RK3050	Chip R	ERJ36SY103V	R277 TC012	
R141 RK3050	Chip R	ERJ36SY103V	R278 TC012	
R142 RK3050	Chip R	ERJ36SY103V	R279 TC012	
R143 RK3050	Chip R	ERJ36SY103V	R280 TC012	
R144 RK3050	Chip R	ERJ36SY103V	R281 TC012	
R145 RK3050	Chip R	ERJ36SY103V	R282 TC012	
R146 RK3050	Chip R	ERJ36SY103V	R283 TC012	
R147 RK3050	Chip R	ERJ36SY103V	R284 TC012	
R148 RK3050	Chip R	ERJ36SY103V	R285 TC012	
R149 RK3050	Chip R	ERJ36SY103V	R286 TC012	
R150 RK3050	Chip R	ERJ36SY103V	R287 TC012	
R151 RK3050	Chip R	ERJ36SY103V	R288 TC012	
R152 RK3050	Chip R	ERJ36SY103V	R289 TC012	
R153 RK3050	Chip R	ERJ36SY103V	R290 TC012	
R154 RK3050	Chip R	ERJ36SY103V	R291 TC012	
R155 RK3050	Chip R	ERJ36SY103V	R292 TC012	
R156 RK3050	Chip R	ERJ36SY103V	R293 TC012	
R157 RK3050	Chip R	ERJ36SY103V	R294 TC012	
R158 RK3050	Chip R	ERJ36SY103V	R295 TC012	
R159 RK3050	Chip R	ERJ36SY103V	R296 TC012	
R160 RK3050	Chip R	ERJ36SY103V	R297 TC012	
R161 RK3050	Chip R	ERJ36SY103V	R298 TC012	
R162 RK3050	Chip R	ERJ36SY103V	R299 TC012	
R163 RK3050	Chip R	ERJ36SY103V	R300 TC012	
R164 RK3050	Chip R	ERJ36SY103V	R301 TC012	
R165 RK3050	Chip R	ERJ36SY103V	R302 TC012	
R166 RK3050	Chip R	ERJ36SY103V	R303 TC012	
R167 RK3050	Chip R	ERJ36SY103V	R304 TC012	
R168 RK3050	Chip R	ERJ36SY103V	R305 TC012	
R169 RK3050	Chip R	ERJ36SY103V	R306 TC012	
R170 RK3050	Chip R	ERJ36SY103V	R307 TC012	
R171 RK3050	Chip R	ERJ36SY103V	R308 TC012	
R172 RK3050	Chip R	ERJ36SY103V	R309 TC012	
R173 RK3050	Chip R	ERJ36SY103V	R310 TC012	
R174 RK3050	Chip R	ERJ36SY103V	R311 TC012	
R175 RK3050	Chip R	ERJ36SY103V	R312 TC012	
R176 RK3050	Chip R	ERJ36SY103V	R313 TC012	
R177 RK3050	Chip R	ERJ36SY103V	R314 TC012	
R178 RK3050	Chip R	ERJ36SY103V	R315 TC012	
R179 RK3050	Chip R	ERJ36SY103V	R316 TC012	
R180 RK3050	Chip R	ERJ36SY103V	R317 TC012	
R181 RK3050	Chip R	ERJ36SY103V	R318 TC012	
R182 RK3050	Chip R	ERJ36SY103V	R319 TC012	
R183 RK3050	Chip R	ERJ36SY103V	R320 TC012	
R184 RK3050	Chip R	ERJ36SY103V	R321 TC012	
R185 RK3050	Chip R	ERJ36SY103V	R322 TC012	
R186 RK3050	Chip R	ERJ36SY103V	R323 TC012	
R187 RK3050	Chip R	ERJ36SY103V	R324 TC012	
R188 RK3050	Chip R	ERJ36SY103V	R325 TC012	
R189 RK3050	Chip R	ERJ36SY103V	R326 TC012	
R190 RK3050	Chip R	ERJ36SY103V	R327 TC012	
R191 RK3050	Chip R	ERJ36SY103V	R328 TC012	
R192 RK3050	Chip R	ERJ36SY103V	R329 TC012	
R193 RK3050	Chip R	ERJ36SY103V	R330 TC012	
R194 RK3050	Chip R	ERJ36SY103V	R331 TC012	
R195 RK3050	Chip R	ERJ36SY103V	R332 TC012	
R196 RK3050	Chip R	ERJ36SY103V		

ADJUSTMENT

1) Required Test Equipment

The following items are required to adjust radio parameters:

1. Regulated power supply	Supply voltage: Current:	5 - 14 VDC 3 A or more
2. Digital multimeter	Voltage range: Current: Input resistance:	FS = Approx. 20 V 10A or more High impedance
3. Oscilloscope	Measurable frequency:	Audio frequency
4. Audio dummy load	Impedance: Dissipation: Jack:	8 Ω 1 W or more 3.5 mm φ
5. SSG	Output frequency: Output level: Modulation:	200 MHz or more -20 dB/0.1 μV - 120dB/1V AM/FM
6. Spectrum Analyzer	Measuring range:	Up to 2 GHz or more
7. Power meter	Measurable frequency: Impedance: Measuring range:	Up to 200 MHz 50 Ω , unbalanced 0.1 W - 10 W
8. Audio volmeter	Measurable frequency: Sensitivity:	Up to 100 kHz 1 mV to 10 V
9. Audio generator	Output frequency: Output impedance:	67 Hz to 10 kHz 600 Ω , unbalanced
10. Distortion meter /SINAD meter	Measurable frequency: Input level: Distortion level:	1 kHz Up to 40 dB 1 % - 100 %
11. Frequency counter	Measurable frequency: Measurable stability:	Up to 200 MHz Approx. +/-0.1 ppm
12. Linear detector	Measurable frequency: Characteristics: CN:	Up to 200 MHz Flat 60 dB or more

Note

- Standard modulation: 1 kHz +/-3.5 kHz/DEV
- Reference sensitivity: 12 dB SINAD
- Specified audio output level: 200 mW at 8 Ω
- Standard audio output level: 50 mW at 8 Ω
- Use an RF cable (3D2W: 1 m) for test equipment.
- Attach a fuse to the RF test equipment.
- All SSG outputs are indicated by EMF.
- Supply voltage for the transceiver: 13.8 VDC

2) Adjustment Mode

The DJ-191 does not require a serviceperson to manipulate the components on the printed - circuit board, except the trimmer when adjusting reference frequency and deviation. Most of the adjustments for the transceiver are made by using the keys on it while the unit is in the adjustment mode. Because the adjustment mode temporarily uses the channels, frequency must be set on each channel before adjustments can be made. For instructions on how to program the channels, see the "DJ-191 INSTRUCTION MANUAL" which came with the product. In consideration of the radio environment, the frequency on each channel must be near the value (+/- 1 MHz) listed in the table below. To enter the adjustment mode, turn the power off, hold down both the UP and DOWN keys, and press the POWER key. "chEc" appears on the LCD for about two seconds, and "C" appears indicating the unit is in the adjustment mode.

Channel frequencies used in the adjustment mode

Channel	Channel function	Frequency
1	Reference frequency adjustment	145 MHz
2	High power adjustment	145 MHz
3	Low power adjustment	145 MHz
4	Minimum frequency sensitivity adjustment	130 MHz
5	Medium frequency sensitivity adjustment	145 MHz
6	Maximum frequency sensitivity adjustment	173 MHz
7	S-meter (1) adjustment	145 MHz
8	S-meter (FULL) adjustment	145 MHz
9	Deviation	145 MHz
10	DTMF (1) test	145 MHz
11	DTMF (D) test	145 MHz
12	Tone 67 Hz test	145 MHz
13	Tone 88.5 Hz test	145 MHz
14	Tone 250.3 Hz test	145 MHz
15	Tone burst test	145 MHz
16	Aging (Not required to use)	145 MHz
20	VCO frequency shift change (Do not change).	-

Caution

- Do not press the **UP** or **DOWN** key while channel 20 is selected in the adjustment mode. Otherwise, the VCO switch frequency will change, causing a malfunction.

Reference Frequency Adjustment

1. In the adjustment mode, select channel 1 by rotating the main tuning dial.
2. Press the **(PTT)** key to start transmission.
3. Rotate TC101 on the RF circuit board until the value on the frequency counter matches the one displayed on the LCD.
4. On 145.05MHz measure TP near the VCO and adjust L301 to obtain $1.1V \pm 0.1V$ (If the second decimal point is flashing, the PLL is unlocked).

High Power Adjustment

1. In the adjustment mode, select channel 2 by rotating the main tuning dial.
2. Hold down the **(F)** key and press the **(H/L)** key to enter the high power mode ("L" at the lower-left of the display disappears).
3. Hold down the **(PTT)** key to start transmission.
4. While watching the reading of the TX power meter, set the output power to the value closest to 5 W by using the **(UP)** and **(DOWN)** keys.
5. When the **(PTT)** key is released, the output power at that time will be stored as the high power setting.

Low Power Adjustment

1. In the adjustment mode, select channel 3 by rotating the main tuning dial.
2. Hold down the **(F)** key and press the **(H/L)** key to enter the low power mode ("L" appears at the lower-left of the display).
3. Hold down the **(PTT)** key to start transmission.
4. While watching the reading of the TX power meter, set the output power to the value closest to 0.5 W by using the **(UP)** and **(DOWN)** keys.
5. When the **(PTT)** key is released, the output power at that time will be stored as the low power setting.

Minimum Frequency Sensitivity Adjustment

See "Note on Adjusting the Sensitivity" later in this section.

1. In the adjustment mode, select channel 4 by rotating the main tuning dial.
2. Using the **(UP)** and **(DOWN)** key, set the minimum frequency sensitivity.

Medium Frequency Sensitivity Adjustment

See "Note on Adjusting the Sensitivity" later in this section.

1. In the adjustment mode, select channel 5 by rotating the main tuning dial.
2. Using the **(UP)** and **(DOWN)** key, set the medium frequency sensitivity.

Maximum Frequency Sensitivity Adjustment

See "Note on Adjusting the Sensitivity" later in this section.

1. In the adjustment mode, select channel 6 by rotating the main tuning dial.
2. Using the **(UP)** and **(DOWN)** key, set the maximum frequency sensitivity.

S-meter (1) Adjustment

1. In the adjustment mode, select channel 7 by rotating the main tuning dial. The S-meter will show a single star (★).
2. Enter “0” dB μ (EMF) with the transceiver tester.
3. Press the **DOWN** key. The transceiver beeps indicating the new setting has been stored successfully.

**S-meter (FULL)
Adjustment**

1. In the adjustment mode, select channel 8 by rotating the main tuning dial. The S-meter will show all six stars (★ ★ ★ ★ ★ ○).
2. Enter “+20” dB μ (EMF) with the transceiver tester.
3. Press the **DOWN** key. The transceiver beeps indicating the new setting has been stored successfully.

Deviation

1. In the adjustment mode, select channel 9 by rotating the main tuning dial.
2. Input a 50 mVrms, 1 KMz signal with your transceiver tester through the external microphone jack.
3. With the tester, put the transceiver in the transmission mode.
4. Rotate the VR2 on the printed-circuit board of the transceiver until the deviation is set to 4.5 KHz.

DTMF (1) Test

This function is only for checking the DTMF code, not adjusting it.

1. In the adjustment mode, select channel 10 by rotating the main tuning dial.
2. Press the **PTT** key. DTMF code “1” is automatically sent and you will hear the monitoring tone from the speaker.
3. Check the deviation with the transceiver tester.

DTMF (D) Test

1. In the adjustment mode, select channel 11 by rotating the main tuning dial.
2. Press the **PTT** key. DTMF code “D” is automatically sent and you will hear the monitoring tone from the speaker.
3. Check the deviation with the transceiver tester.

Tone 67 Hz Test

This function is only for checking the tone encoder, not adjusting it.

1. In the adjustment mode, select channel 12 by rotating the main tuning dial.
2. Press the **PTT** key. A 67 Hz tone is automatically sent.
3. Check the deviation with the transceiver tester.

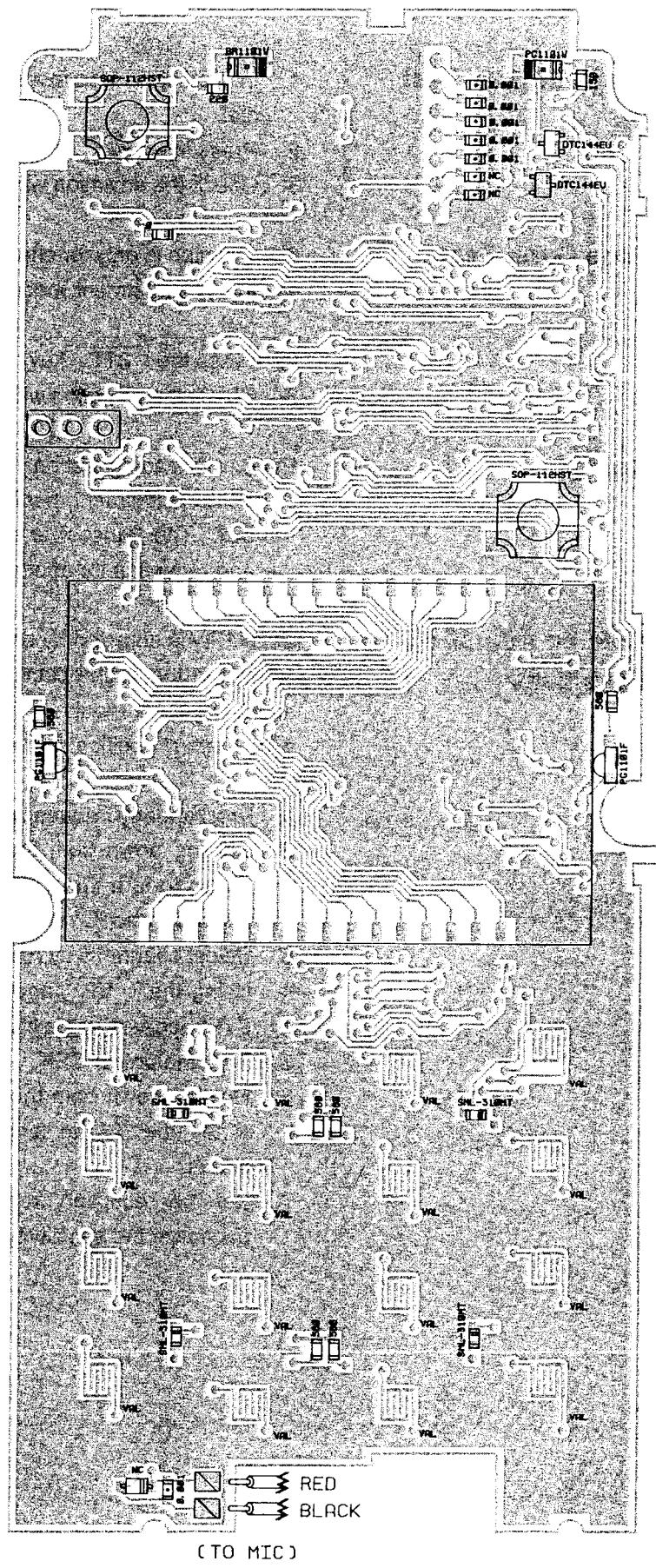
Tone 88.5 Hz Test

1. In the adjustment mode, select channel 13 by rotating the main tuning dial.
2. Press the **PTT** key. An 88.5 Hz tone is automatically sent.
3. Check the deviation with the transceiver tester.

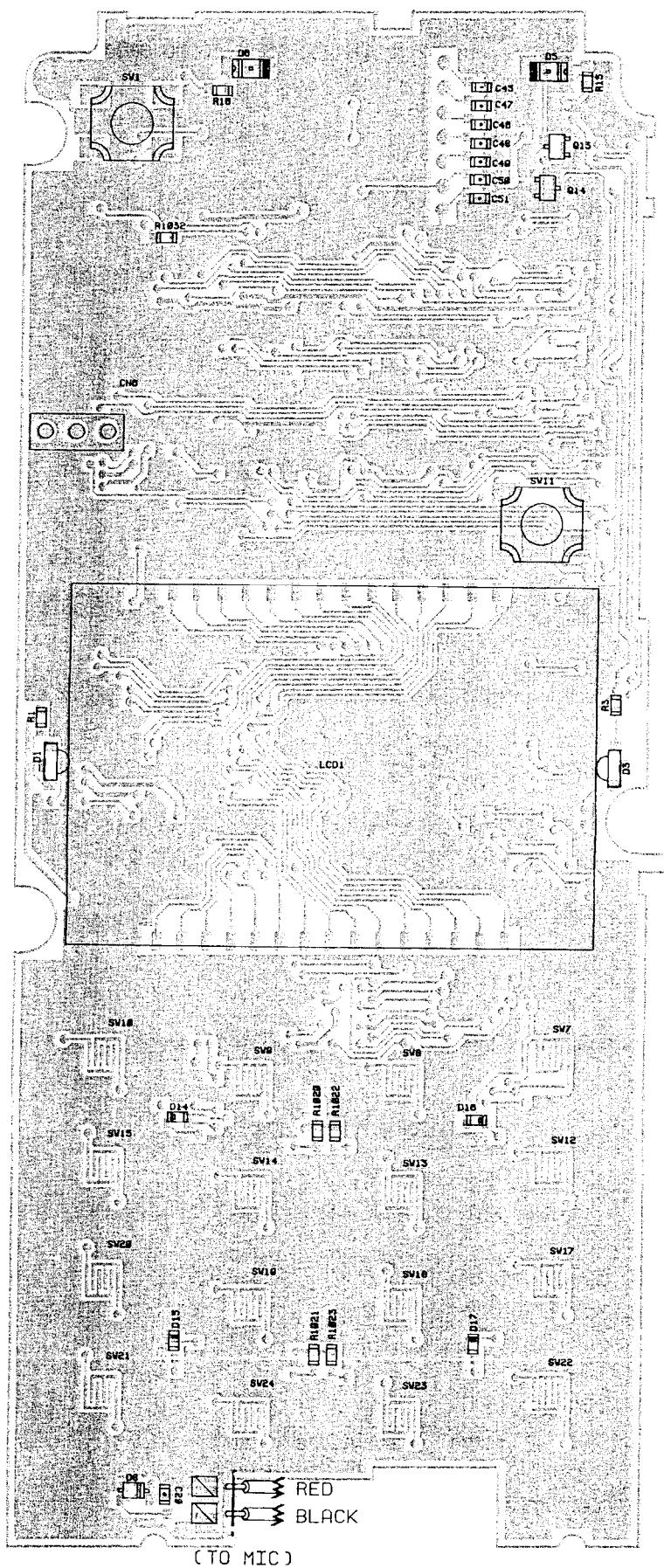
- Tone 250.3 Hz Test**
1. In the adjustment mode, select channel 14 by rotating the main tuning dial.
 2. Press the **PTT** key. A 250.3 Hz tone is automatically sent.
 3. Check the deviation with the transceiver tester.
- Tone Burst Test**
- This function is only for checking the tone burst, not adjusting it.
1. In the adjustment mode, select channel 15 by rotating the main tuning dial.
 2. Press the **PTT** key. A 1750 Hz tone burst is automatically sent.
 3. Check the deviation with the transceiver tester.
- Aging**
- Perform this aging test only when necessary.
1. In the adjustment mode, select channel 16 by rotating the main tuning dial. The transceiver automatically repeats transmission for a minute and reception for another minute.
- Note on Adjusting Sensitivity**
- Sensitivity is adjusted by applying the optimum voltage from the CPU to the varicap of the tuning circuit. The coil manipulation for L109, L110, L111, and L112 is not required. If any of the coils is accidentally rotated, return it to the default position as described below, before adjusting the sensitivity.
1. Program any frequency within 145 MHz +/-1 on memory channel 5.
 2. Holding down both the **UP** and **DOWN** key, press the POWER switch to turn the power ON. "chEc" will appear on the LCD for two seconds, and "C" appears.
 3. Select channel 5 by rotating the main tuning dial.
 4. Using the **UP** and **DOWN** keys, set the adjustment data to "7F" ("7F" appears in the channel number area on the LCD).
 5. Turn the power OFF.
 6. Holding down both the **UP** and **DOWN** key, turn the power ON. When the "C" no longer appears, the transceiver is in the normal status.
 7. Set the reception frequency to 145 MHz +/-1. Rotate the coil to maximize the sensitivity.

PC BOARD VIEW

CPU Unit Side A (VALUE)

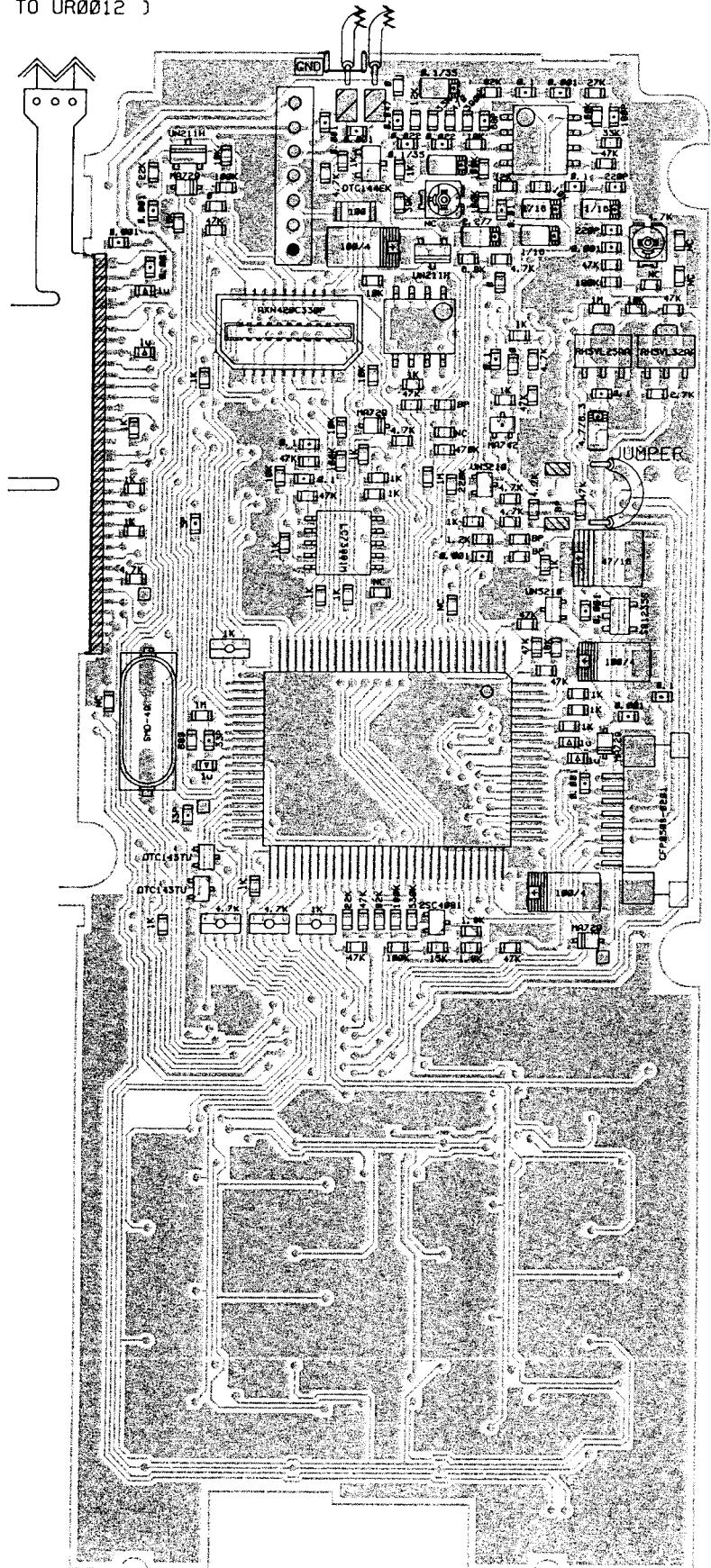


CPU Unit Side A (REFERENCE)



**CPU Unit Side B
(VALUE)**

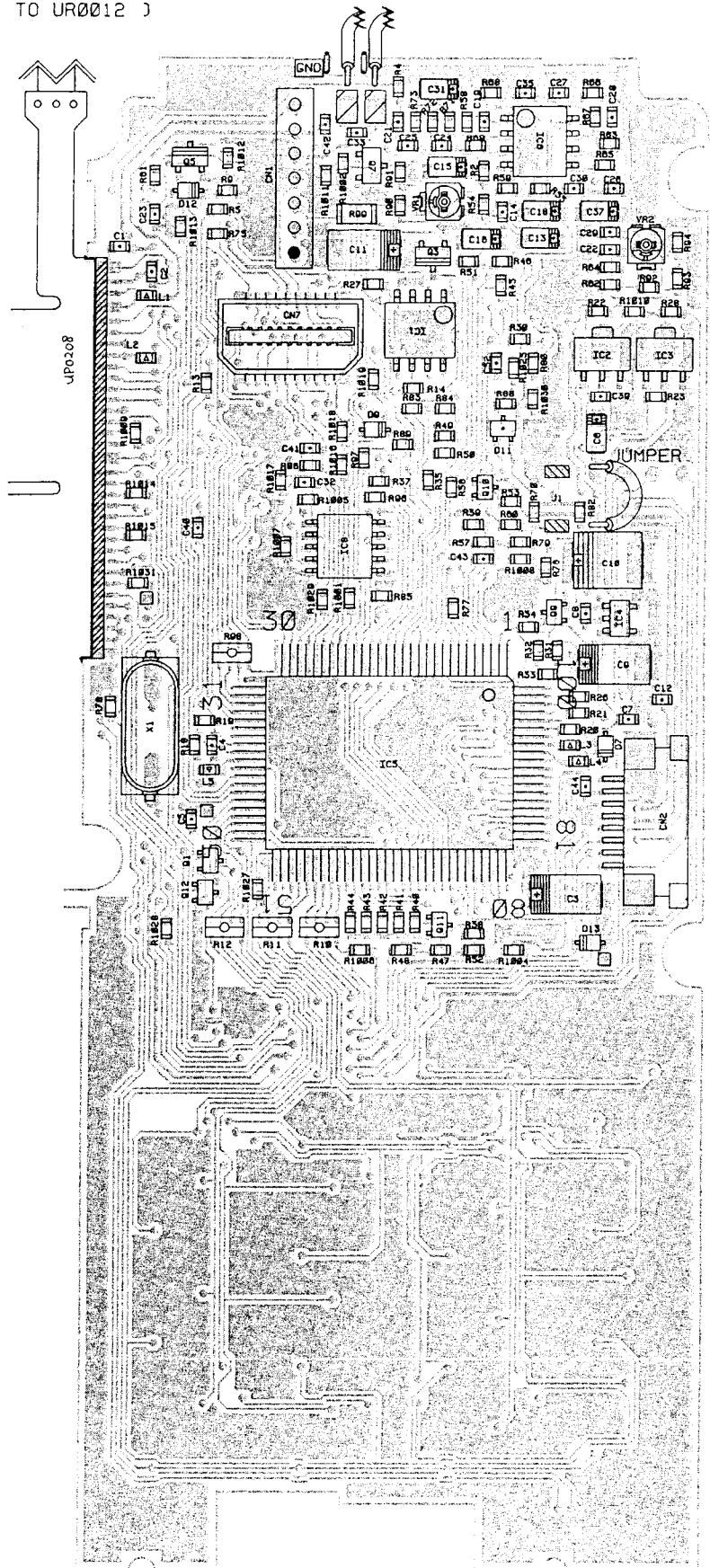
(TO SPEAKER)
(TO UR0012)



	R79	R84	R1008	J1
T	—	—	—	JAMPER
TA	—	—	—	—
E	1K	1K	Ø	—

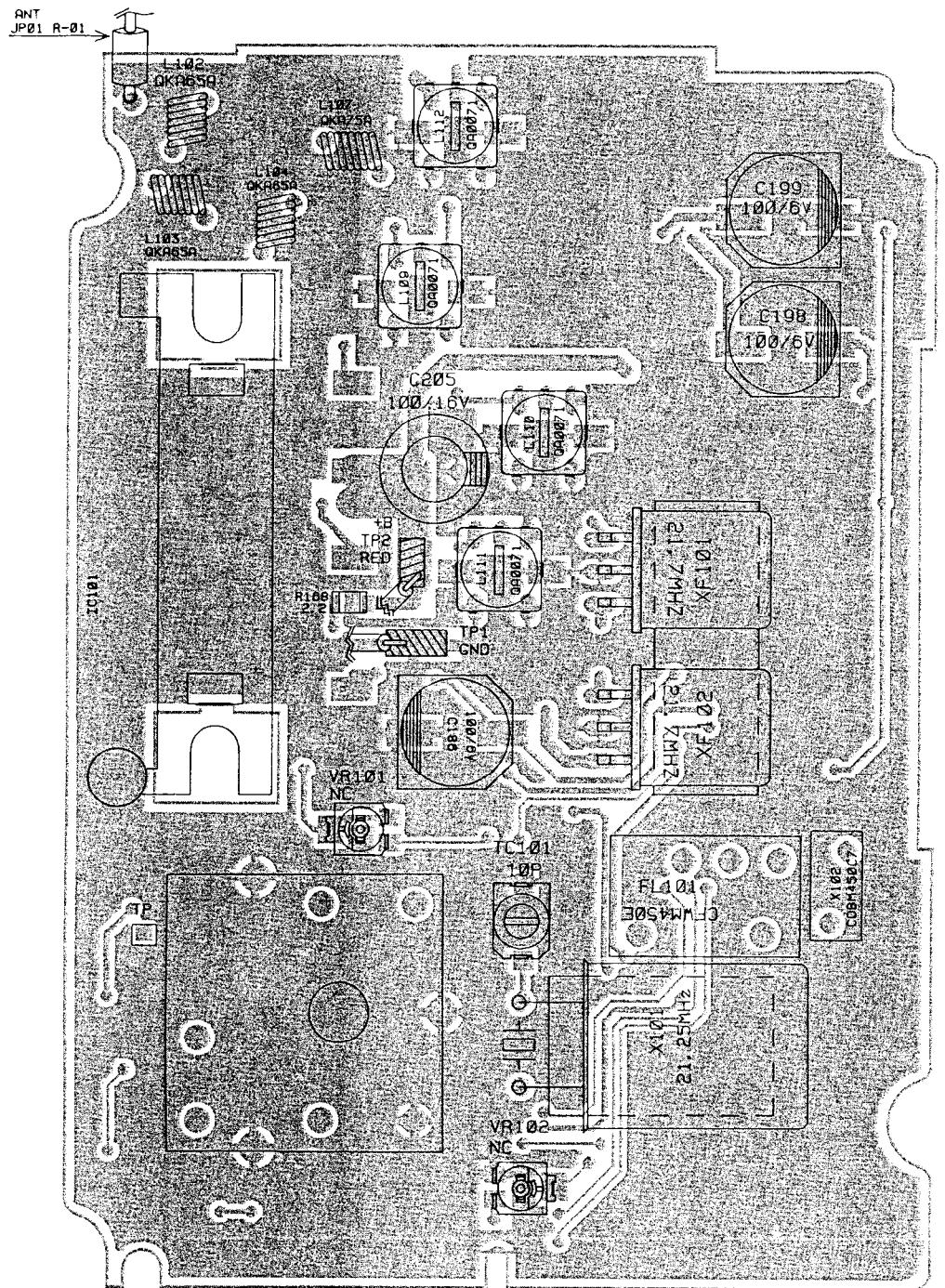
**CPU Unit Side B
(REFERENCE)**

(TO SPEAKER)
(TO UR0012)

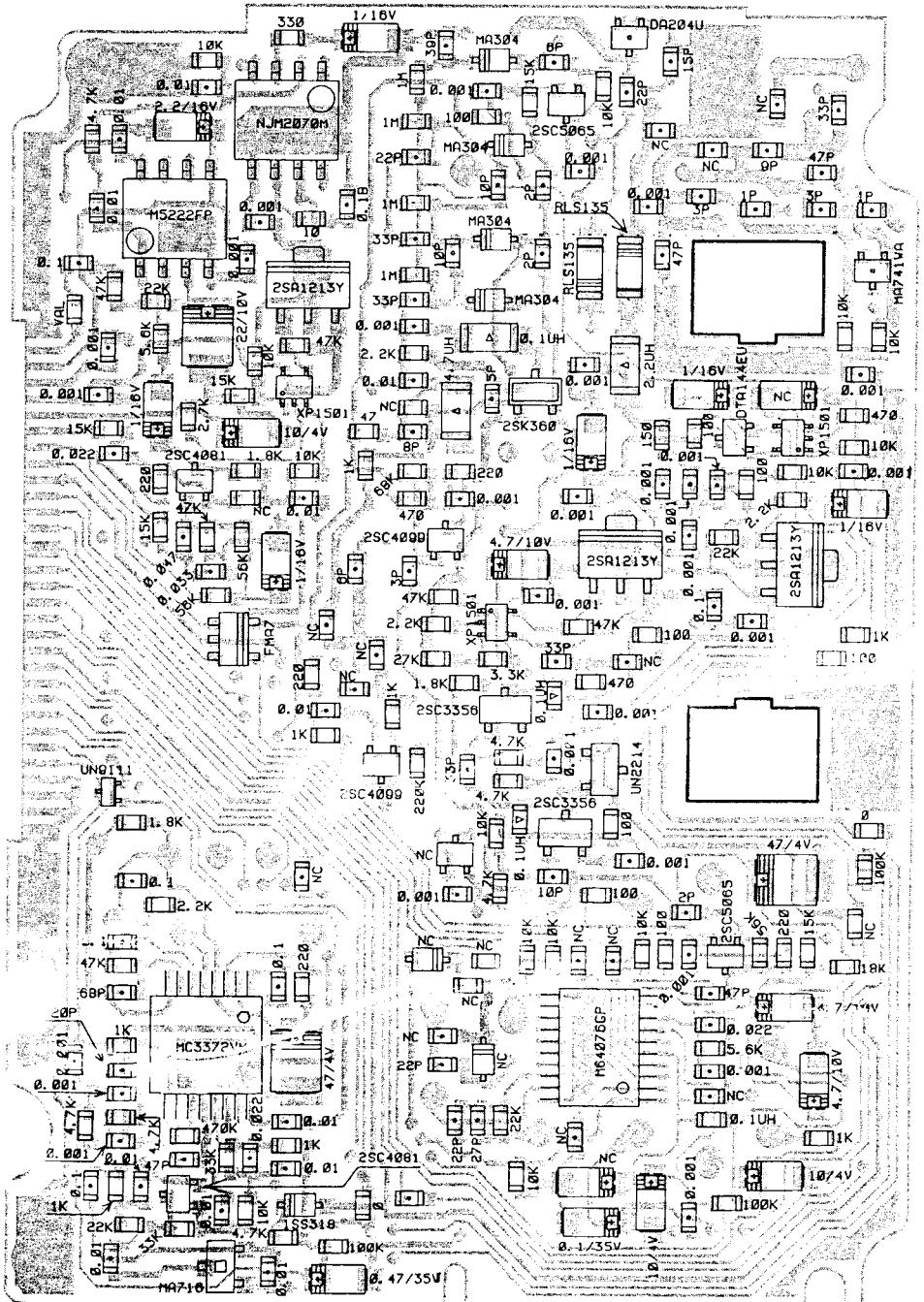


	R79	R84	R1008	J1
T	—	—	—	JAMPER
TA	—	—	—	—
E	1K	1K	Ø	—

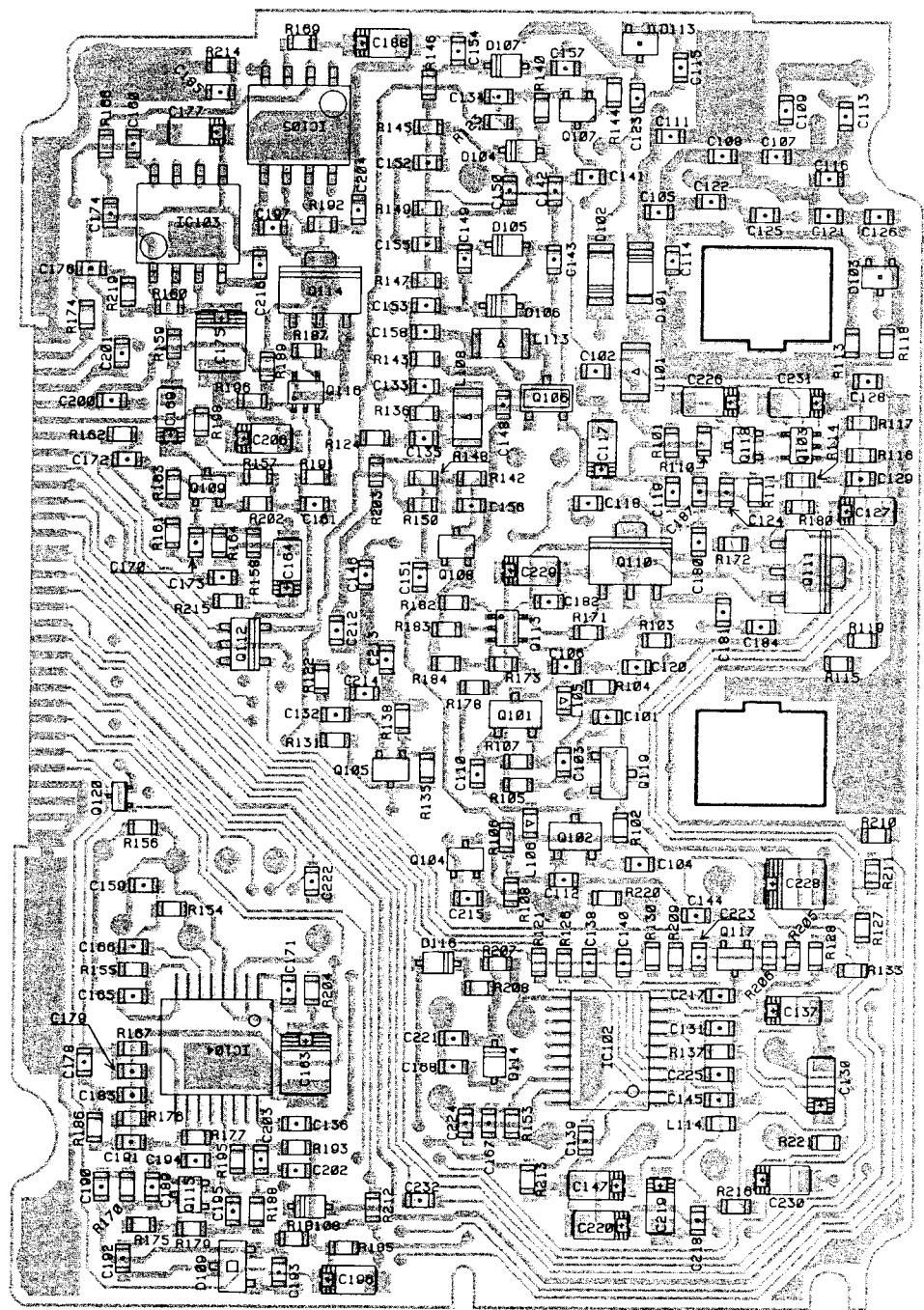
RF Unit Side A (VALUE / REFERENCE)



RF Unit Side B (VALUE)

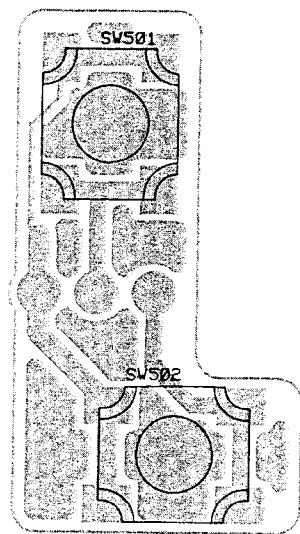
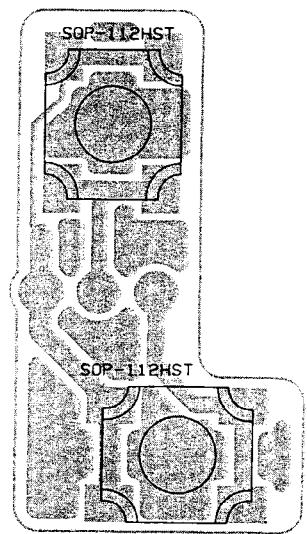


RF Unit Side B (REFERENCE)



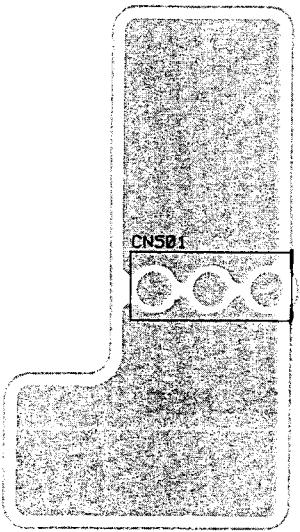
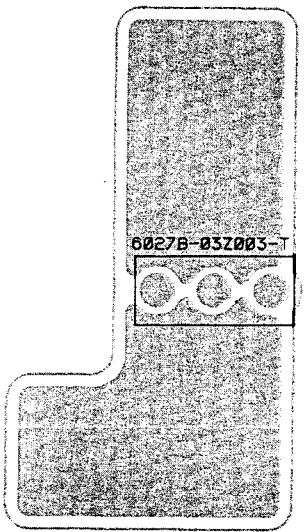
SW Unit Side A
(VALUE)

(REFERENCE)

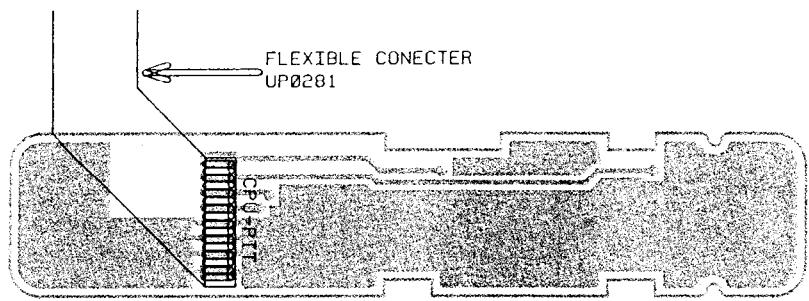


SW Unit Side B
(VALUE)

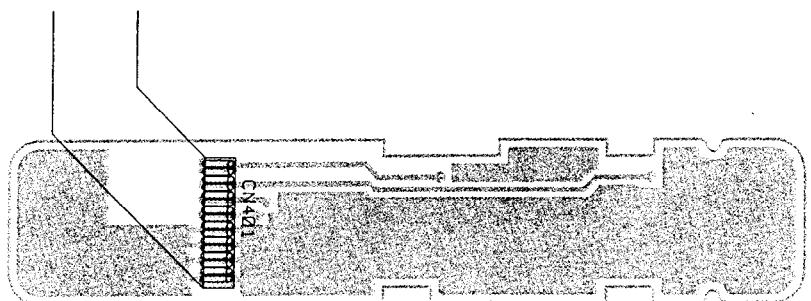
(REFERENCE)



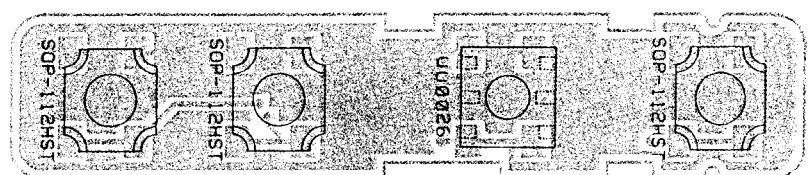
**PTT Unit Side A
(VALUE)**



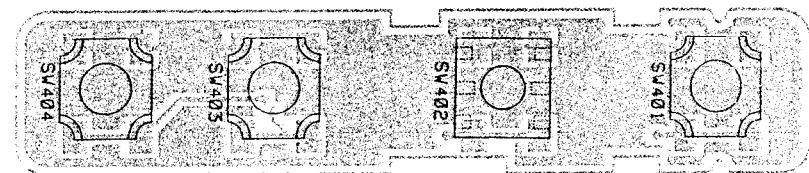
(REFERENCE)



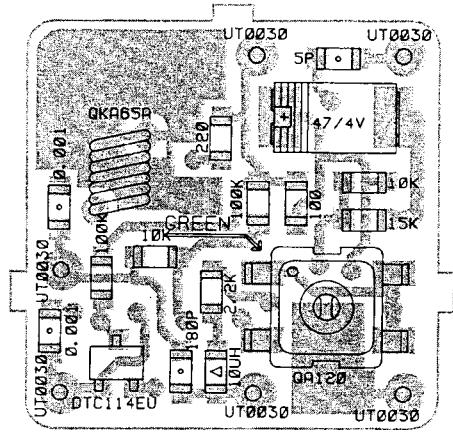
**PTT Unit Side B
(VALUE)**



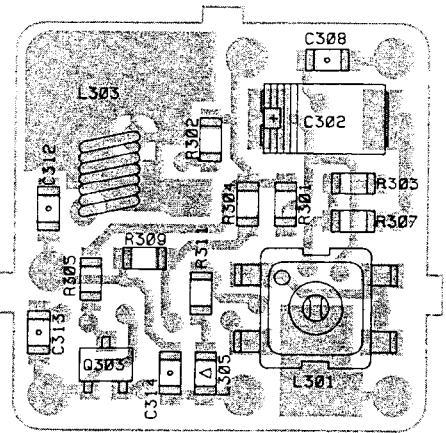
(REFERENCE)



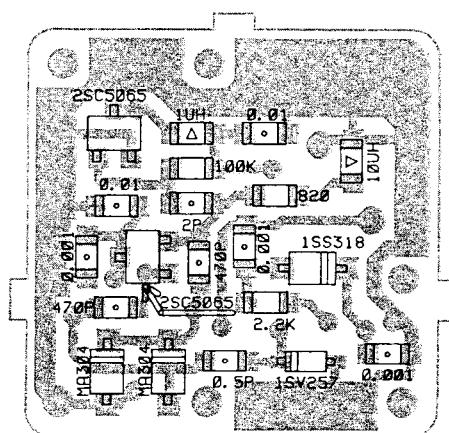
VCO Unit Side A (VALUE)



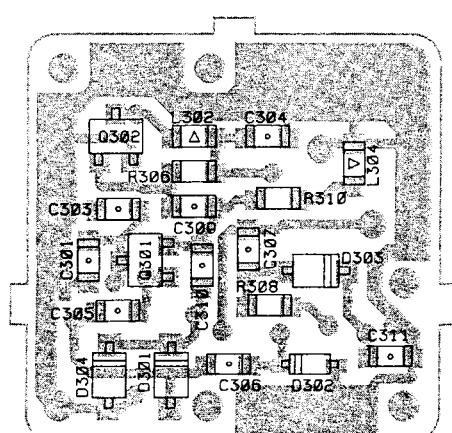
(REFERENCE)



VCO Unit Side B (VALUE)

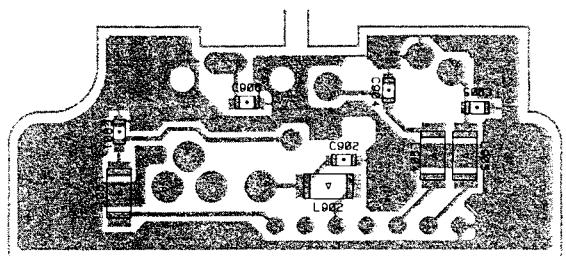
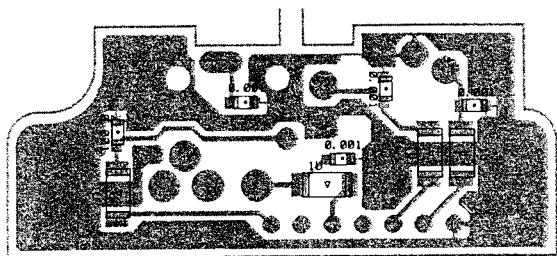


(REFERENCE)



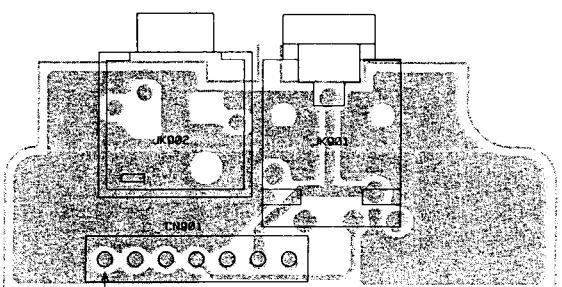
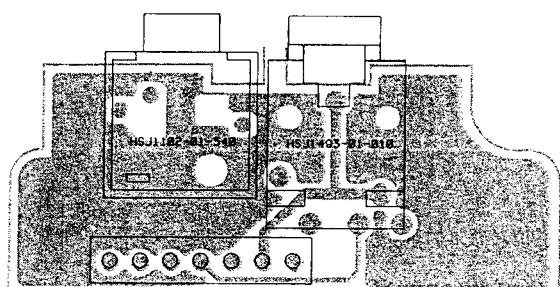
JACK Unit Side A
(VALUE)

(REFERENCE)



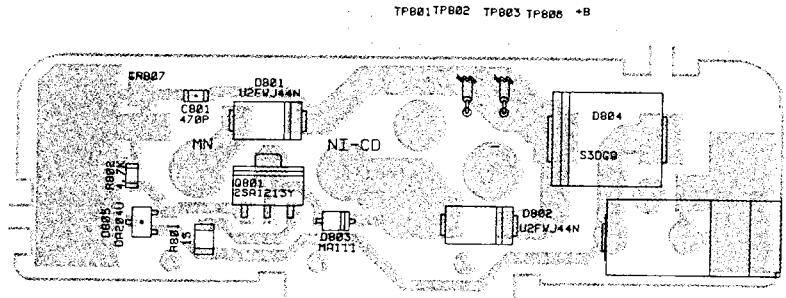
JACK Unit Side B
(VALUE)

(REFERENCE)



black

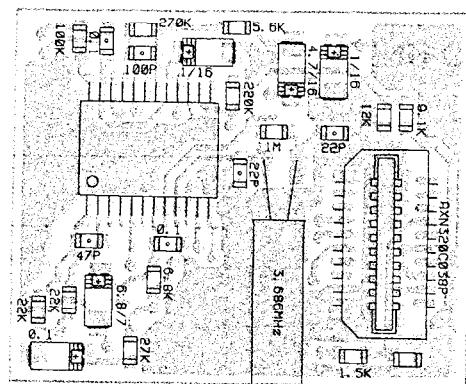
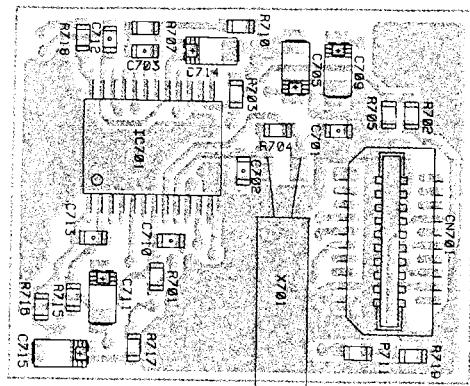
CHARGE Unit Side A (VALUE / REFERENCE)



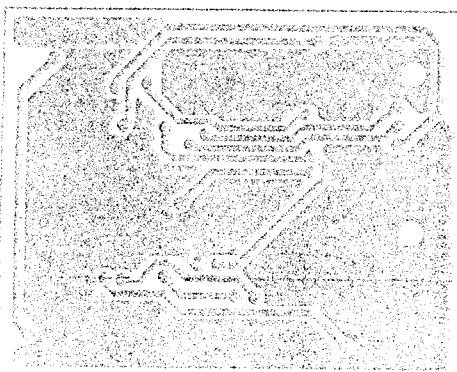
CHARGE Unit Side B (VALUE / REFERENCE)



**TSQ UNIT Side A
(VALUE)**

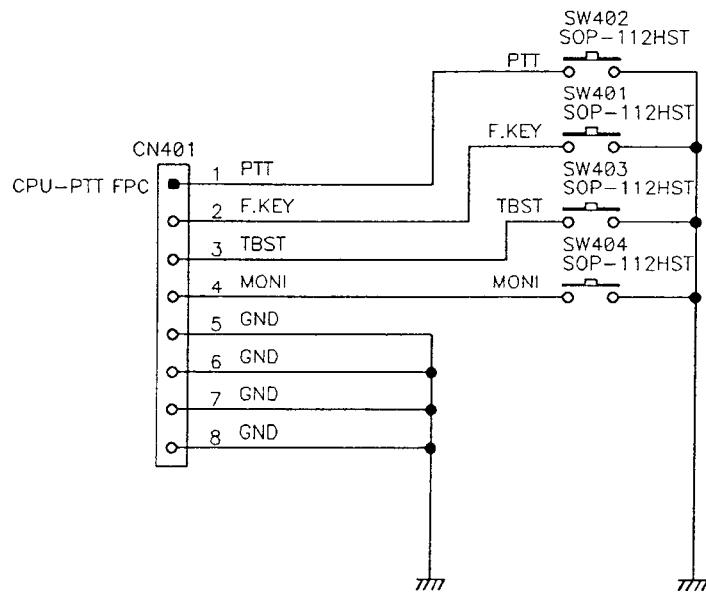


**TSQ UNIT Side B
(VALUE/REFERENCE)**

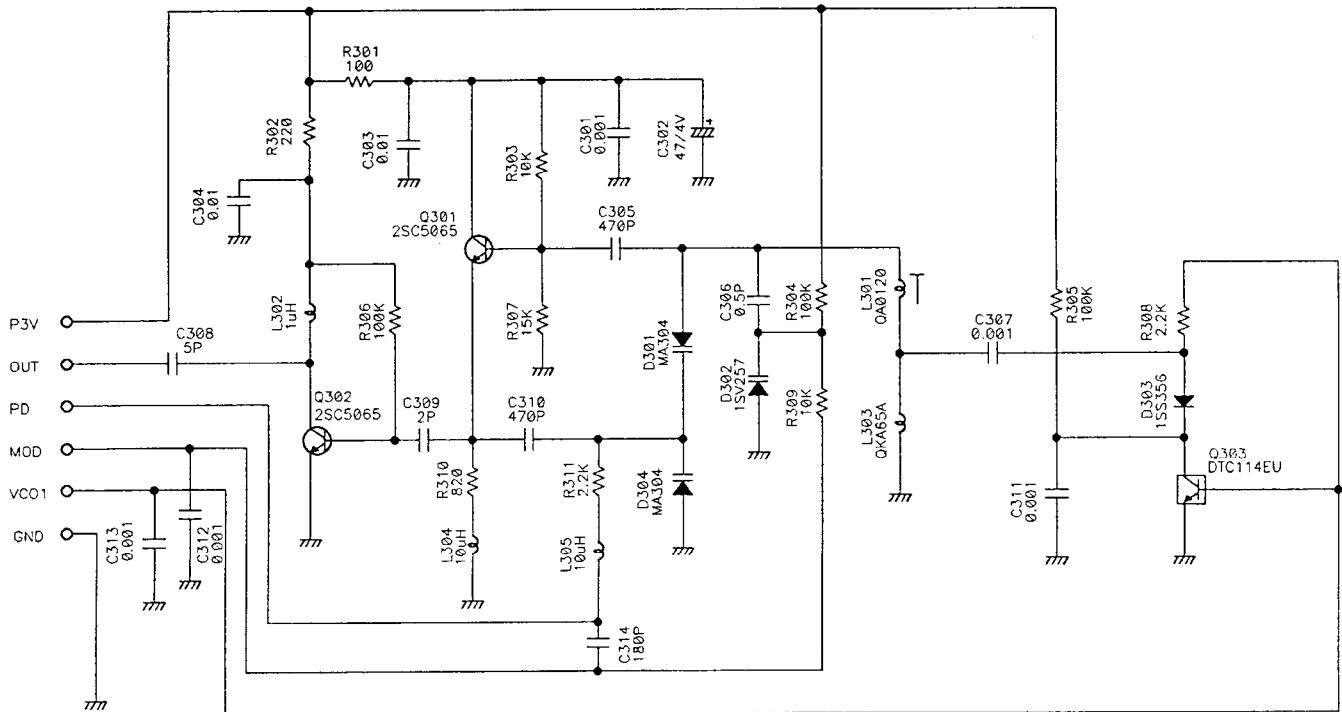


CIRCUIT DIAGRAM

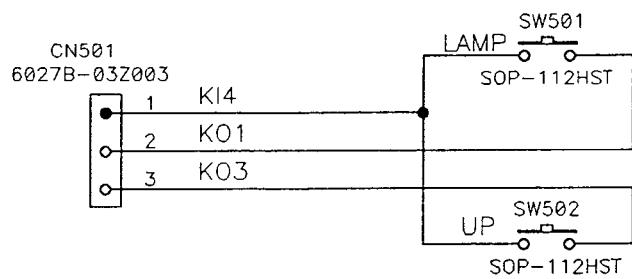
PTT UNIT



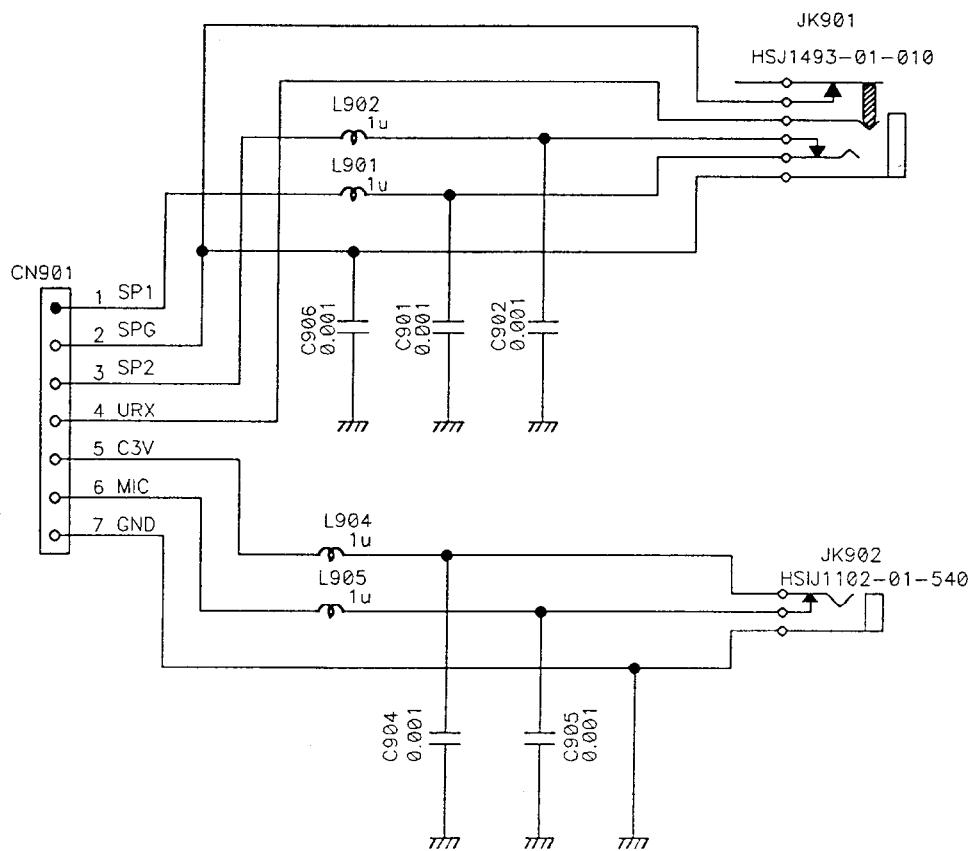
VCO UNIT



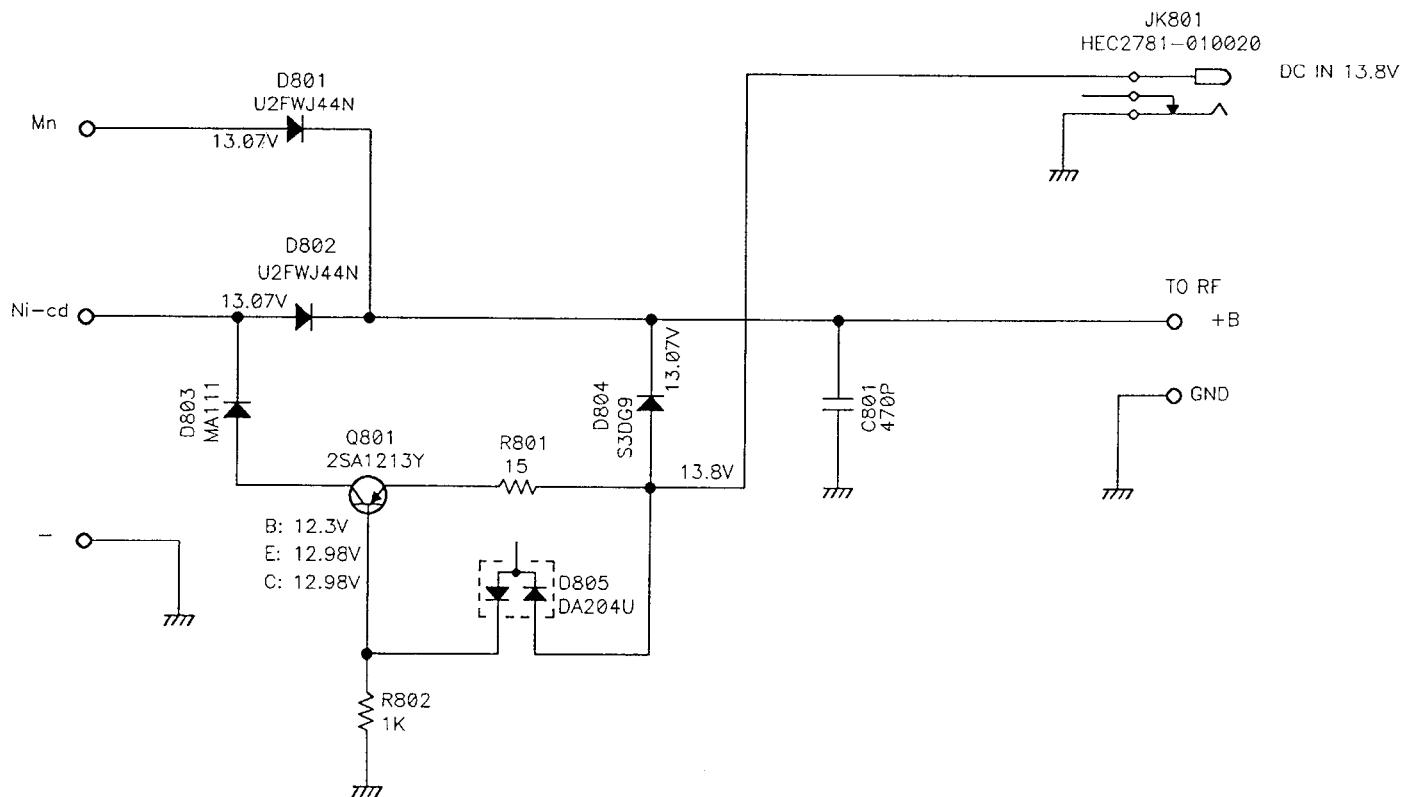
SW UNIT



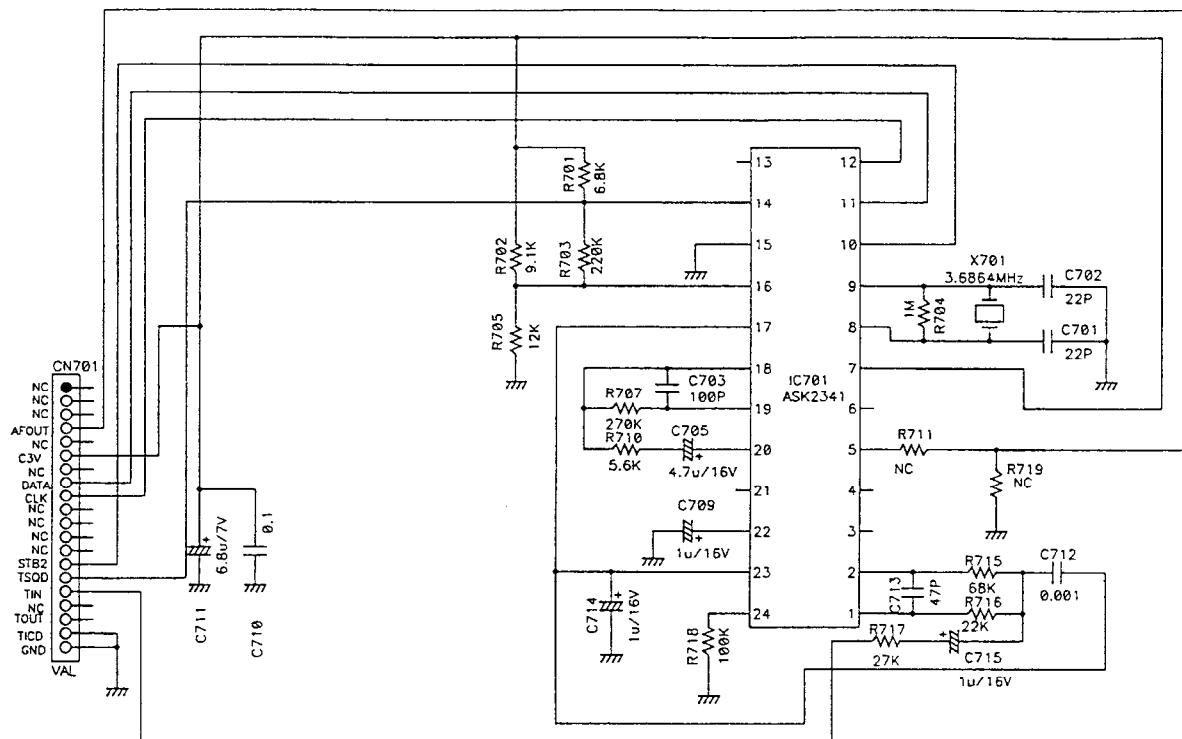
SP-JACK UNIT



CHARGE UNIT



TSQ UNIT

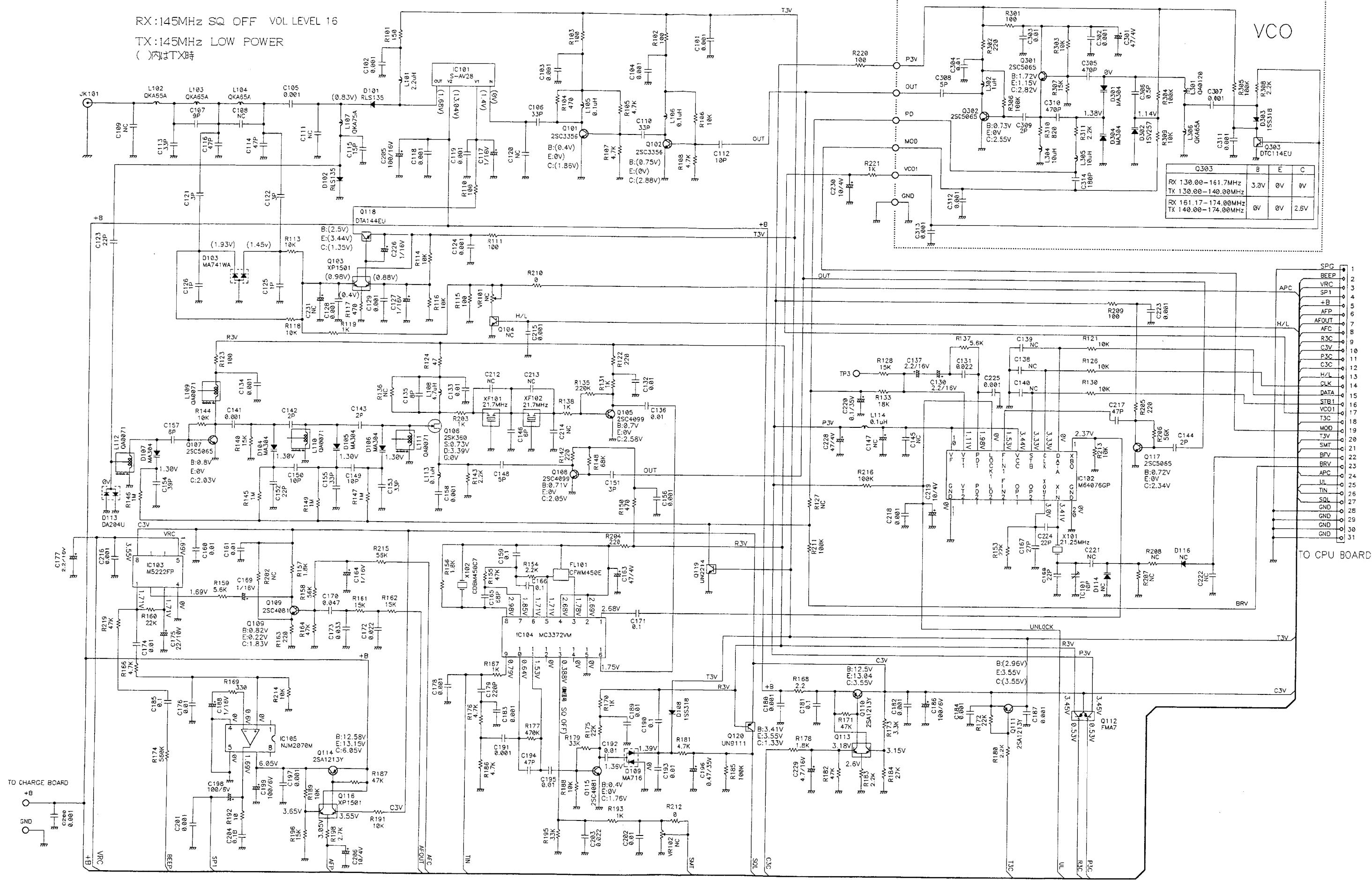


RF UNIT

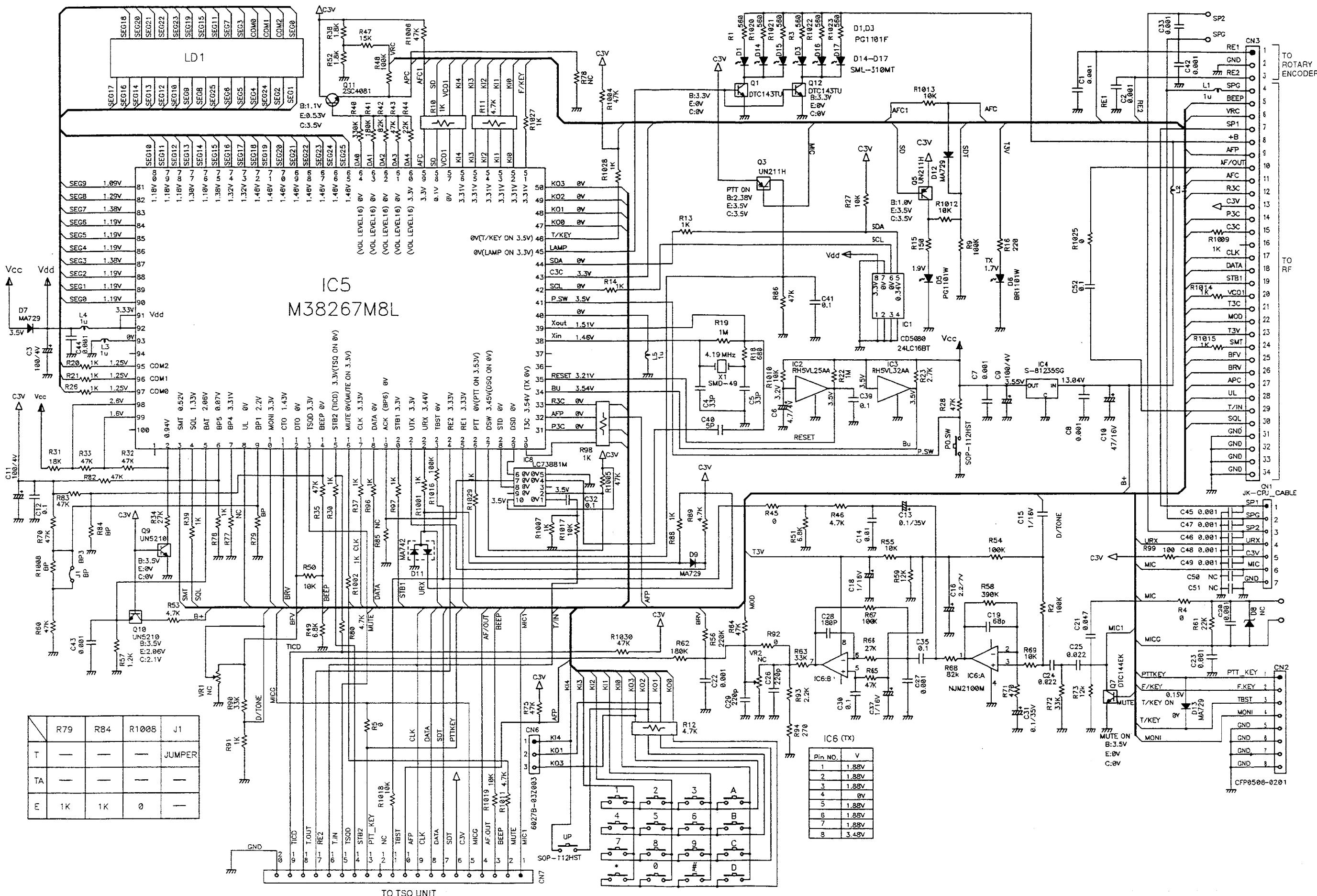
RX:145MHz SQ OFF VOL LEVEL 16

TX:145MHz LOW POWER

()内はTX時



CPU UNIT



TO TSQ UNIT

BLOCK DIAGRAM

