DJ-191

Service Manual

CONTENTS

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 −16dBμ	
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	
	Receiving: Squelched Approx. 24mA (BS on)	
Operating Temperature:	−10 ~ +60°C, 14 ~ 140°F	
Dimensions: (with EBP-37N without projections)	57(W) × 151(H) × 28(D) mm $2^{1}/_{4}$(W) × 6(H) × $1^{1}/_{16}$(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 stablized. 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.

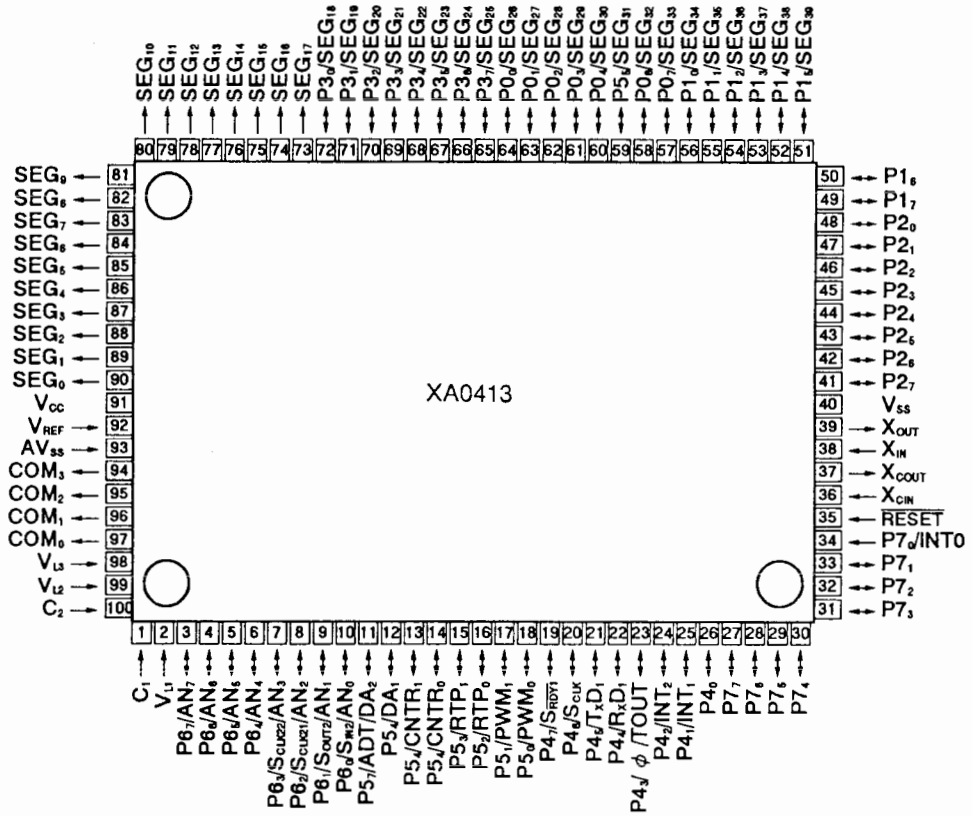
4. S(Signal)Meter Circuit The DC potential of pin 13 of IC104 is input to pin 3 of the CPU (IC5), converted from an analog to a digital signal, and displayed as the S-meter signal on the LCD.

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)



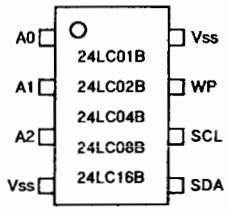
No.	Pin Name	Signal	I/O	Logic	Description
1	C1	C1	-	-	-
2	VL1	VL1	I	A/D	LCD power supply
3	P67/AN7	SMT	I	A/D	S-meter input
4	P66/AN6	SQL	I	A/D	Noise level input for squelch
5	P65/AN5	BAT	I	A/D	Low battery detection input
6	P64/AN4	BP5	I	A/D	Band plan 5
7	P63/CLK22/AN3	BP4	I	-	Band plan 4
8	P62/CLK21/AN2	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	XCOUT	-	-	-
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	KO0	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
52	P14/SEG38	K10	I	-	Key matrix input
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	-	LCD segment signal
66	P36/SEG24	S24	O	-	
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



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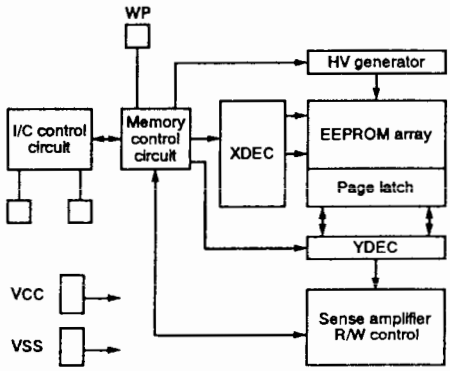
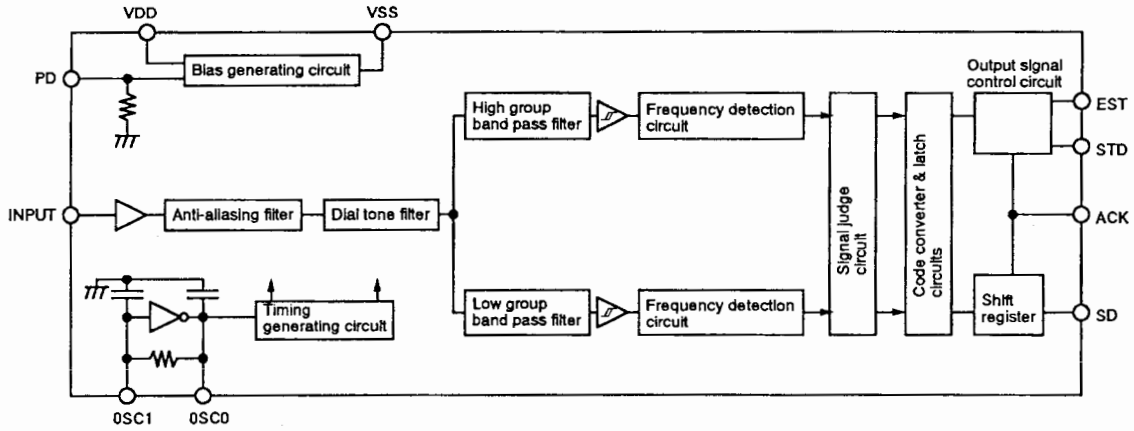


2) LC73881M-TLM (XA0344)
DTMF Receiver

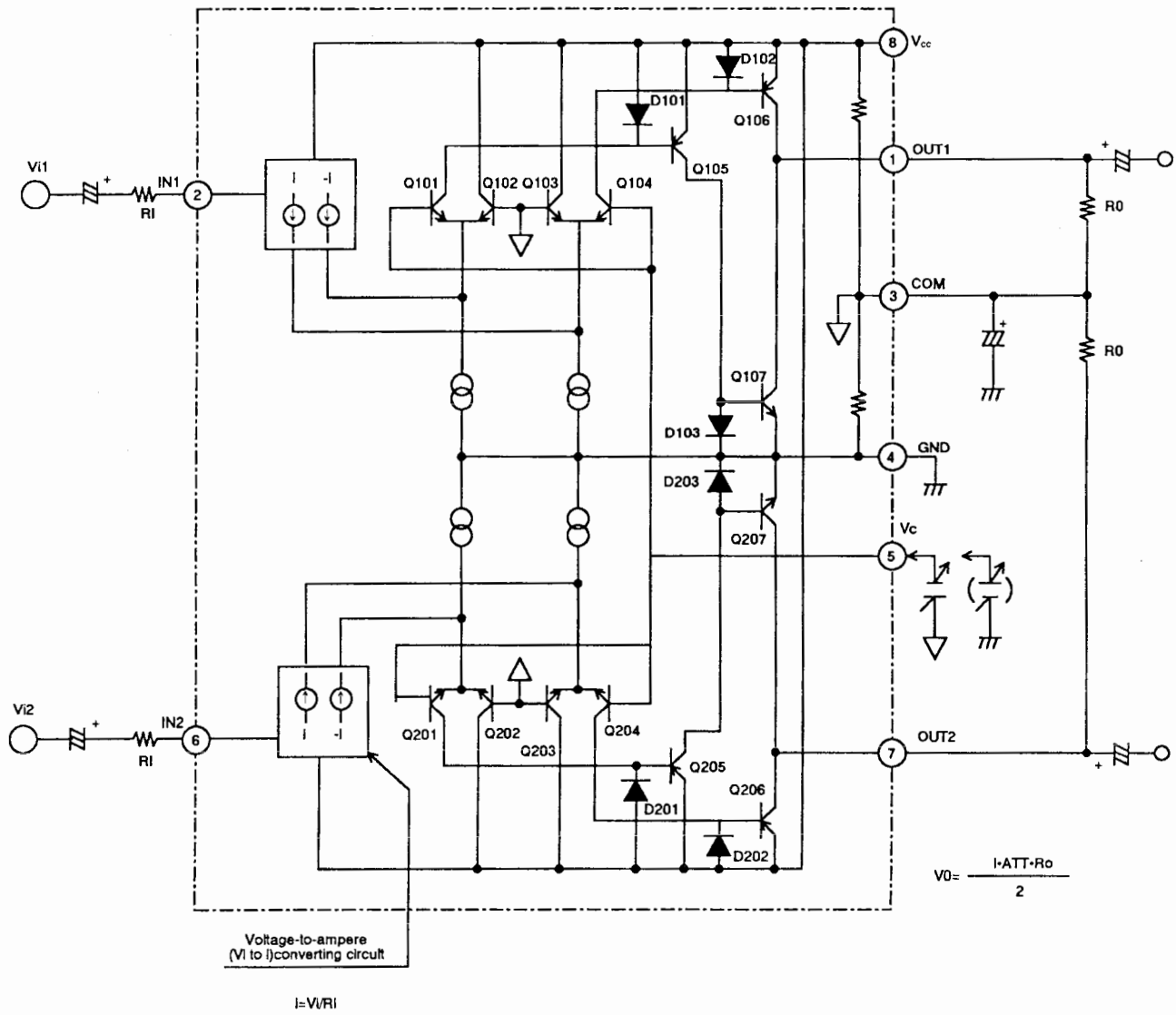
Pin Functions

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

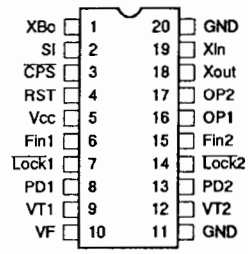


3) M5222FP-600C (XA0385) Electronic Volume



4) M64076GP (XA0352) PLL

Pin Assignment



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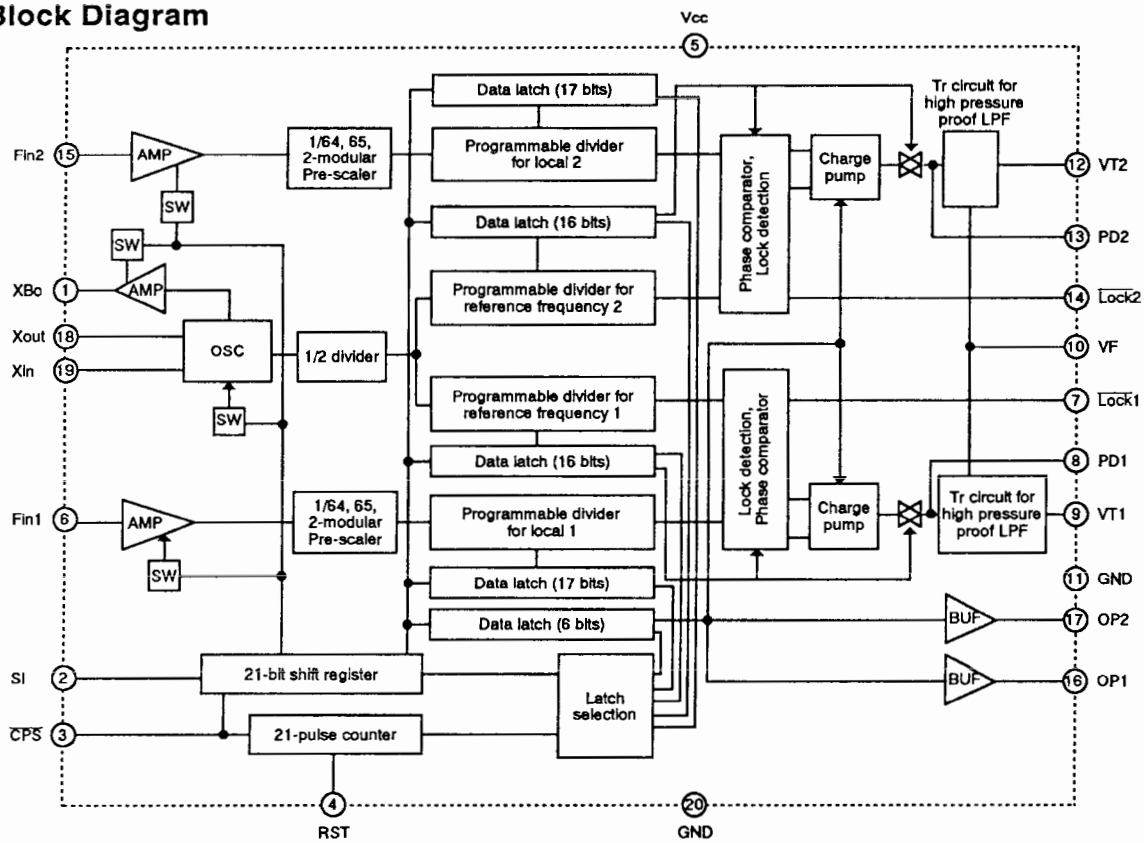
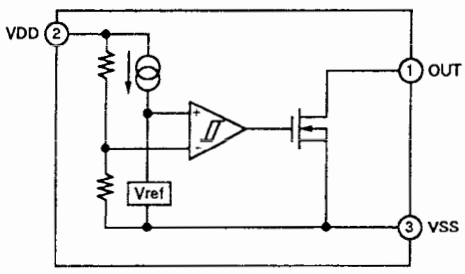


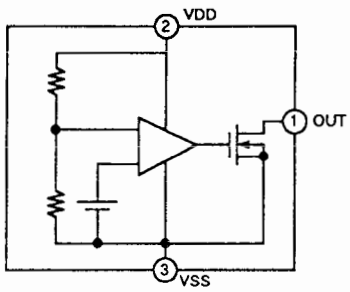
5) RH5VL25AA-T1 (XA0309) C-MOS Voltage Detector

Block Diagram



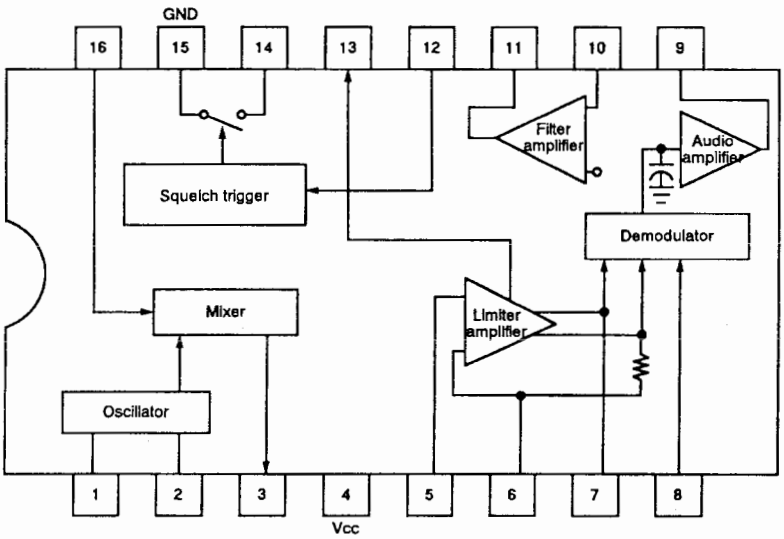
6) RH5VA32AA-T1 (XA0198) C-MOS Voltage Detector

Block Diagram

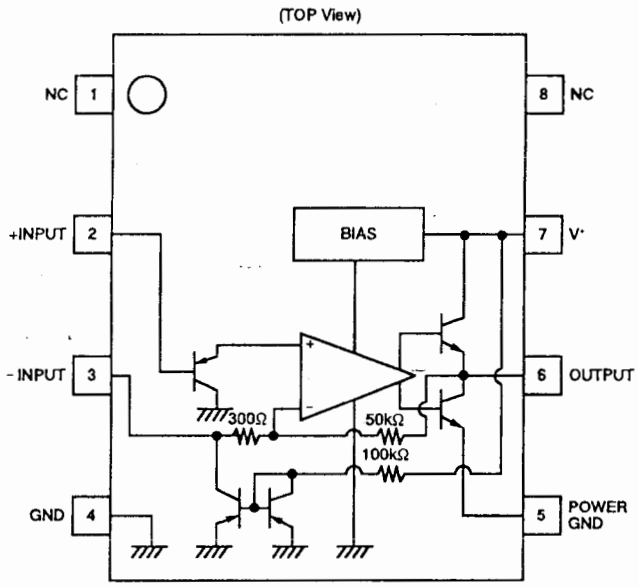


7) MC3372VM-EL (XA0343)
Narrow Band FM IF IC

Block Diagram

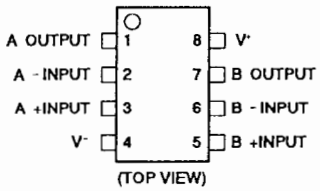


8) NJM2070M T1 (XA0210)
Audio Power Amplifier



9) NJM2100M T1 (XA0209)
Operational Amplifier

Pin Assignment



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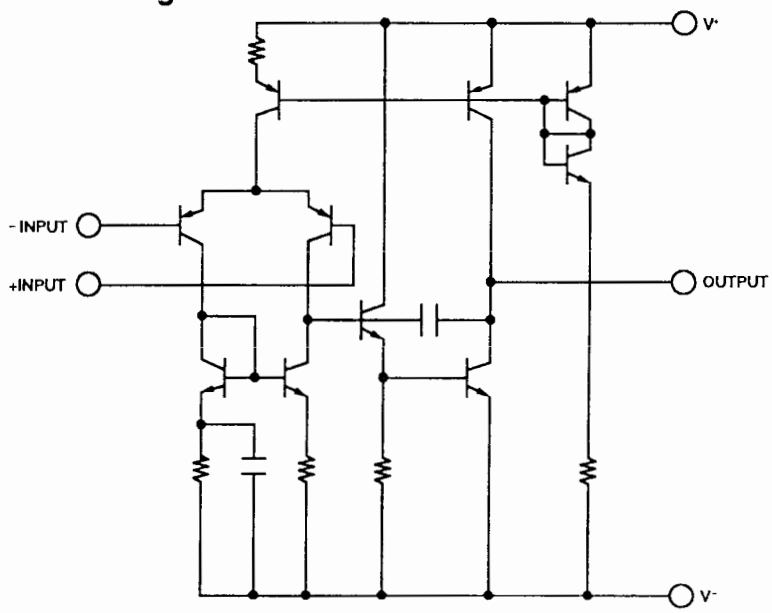
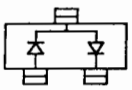
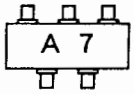
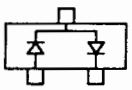
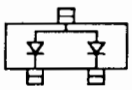
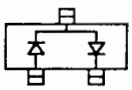
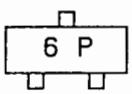
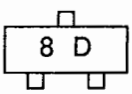
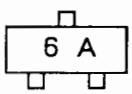
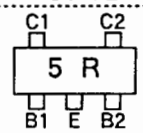


10) Transistor, Diode, and LED Ontline Drawings

Top View

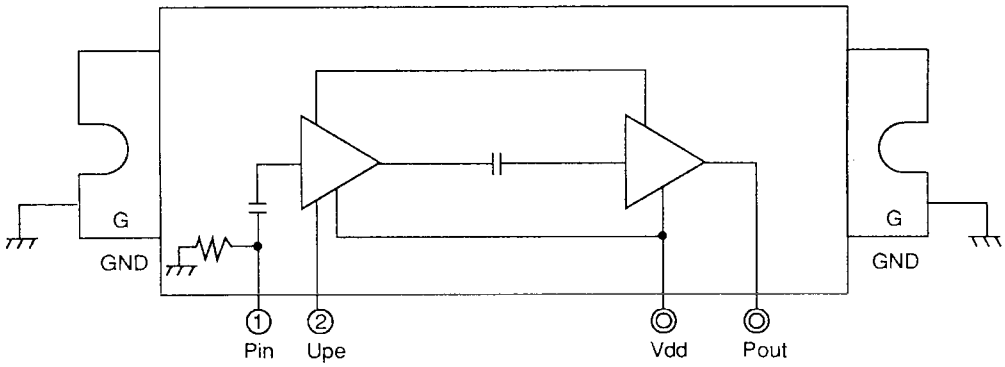
DA204U T106	FMA7XT 148	MA716 TW	MA741WA TX	MA742 TX
XD0130	XU0027	XD0118	XD0251	XD0250
				

UN211H TX	UN2214 TX	UN9111 TX	XP1501 TX
XU0040	XU0038	XU0062	XU0172
			

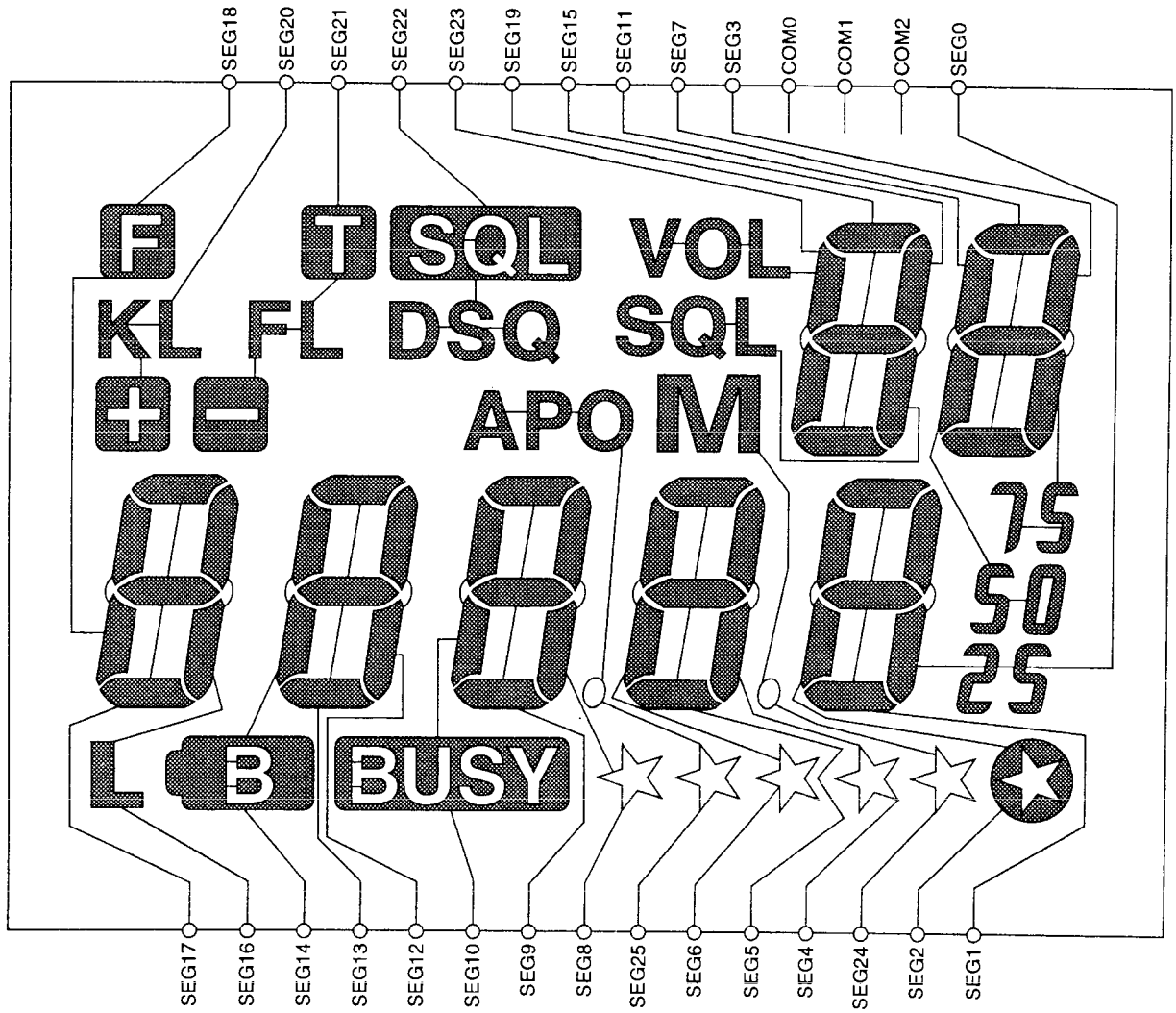
11) P. A. Module (IC101)

TA1 : XA0439
TA2 : XA0421

T : XA0381

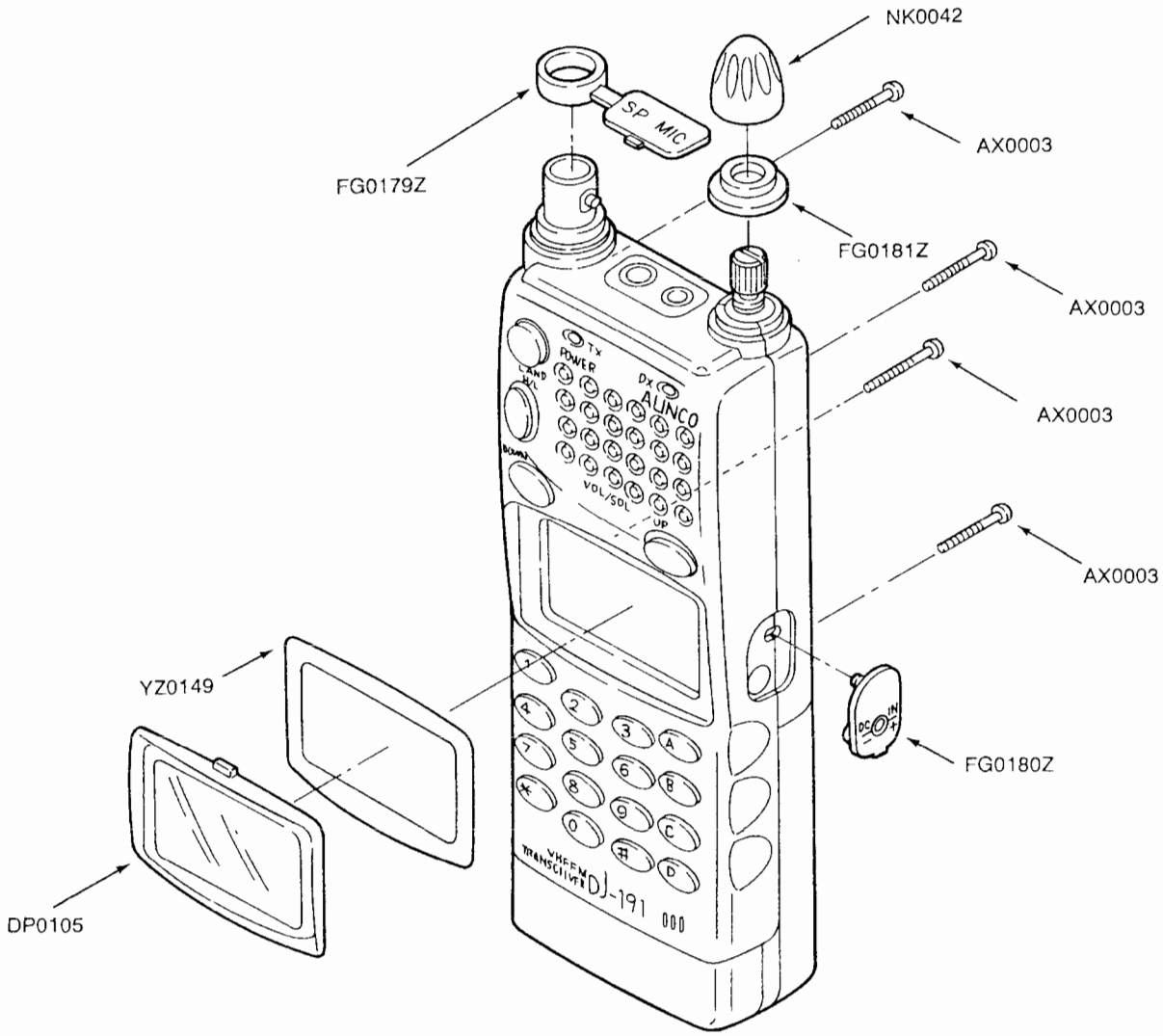


12) LCD Connection

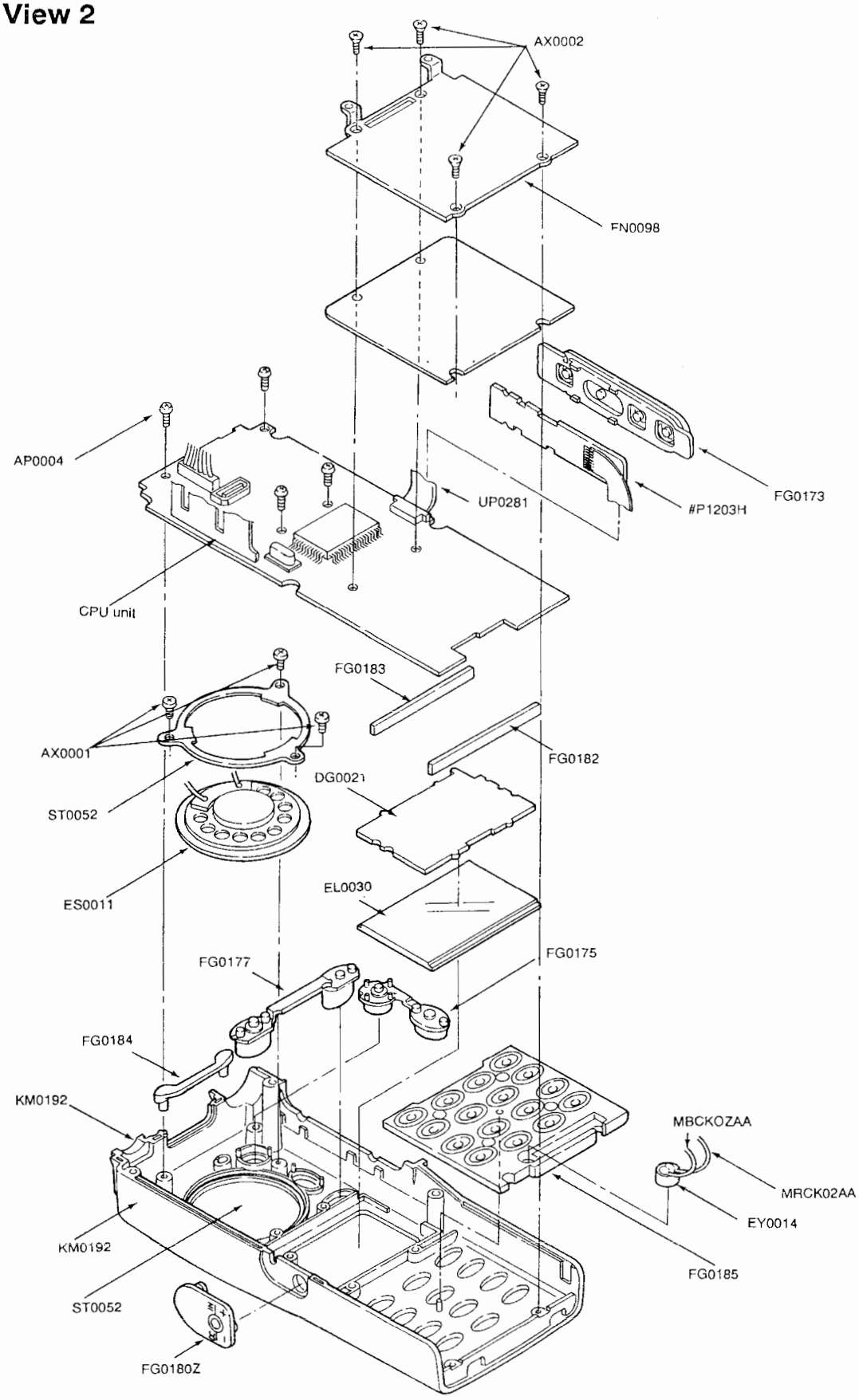


EXPLODED VIEW

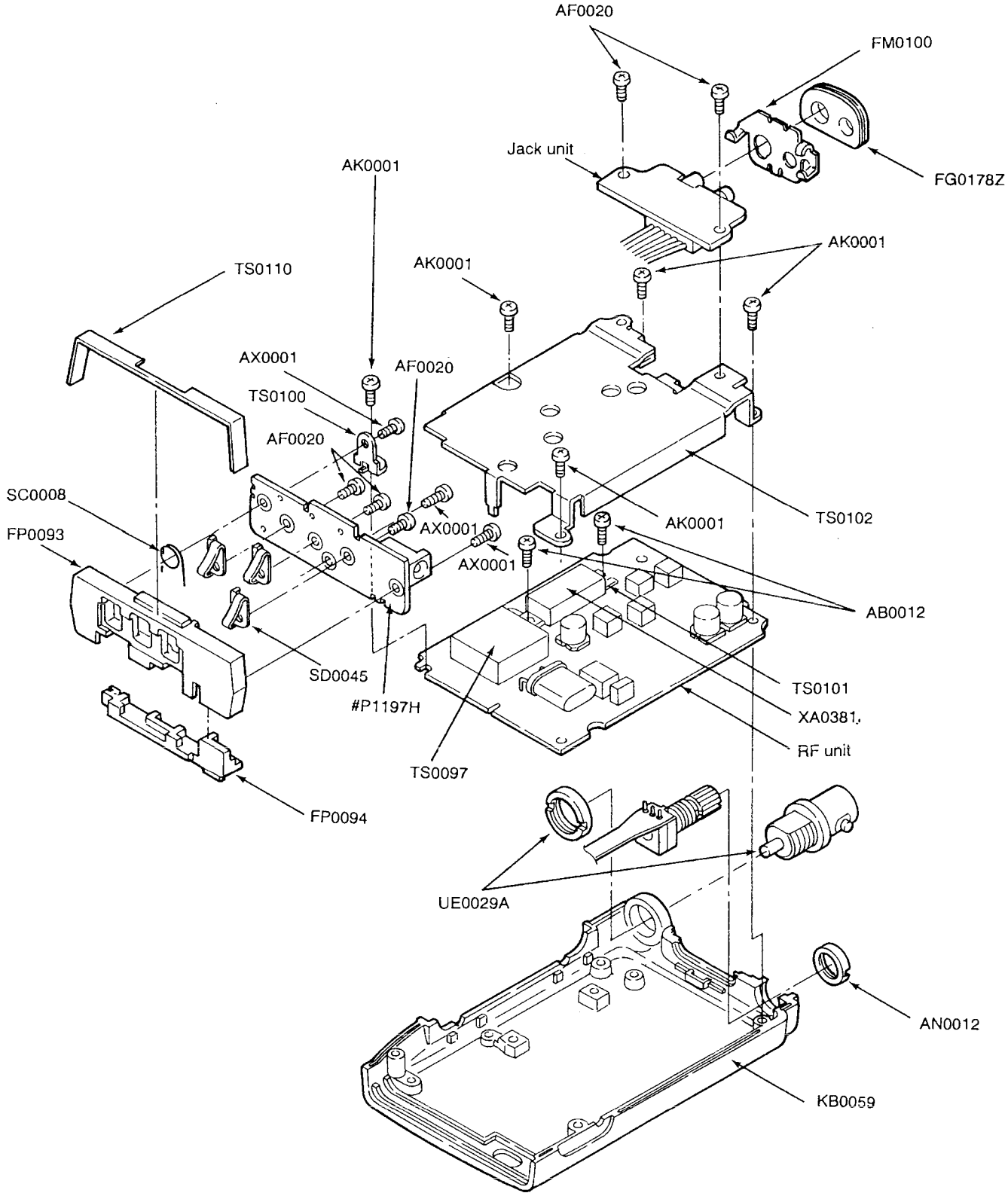
1) Front View 1



2) Front View 2



3) Rear View


AF0020
FM0100
Jack unit
AK0001
FG0178Z
AK0001
AK0001
TS0110
AX0001
AF0020
TS0100
AF0020
SC0008
FP0093
AX0001
AK0001
TS0102
AX0001
AB0012
SD0045
#P1197H
TS0101
XA0381
RF unit
TS0097
FP0094
UE0029A
AN0012
KB0059

PARTS LIST

CPU Unit

Ref. No.	Parts No.	Description	Parts Name	Ver.
CPU Unit				
C1	CU3035	Chip C.	C1608JB1H102KTA	
C2	CU3035	Chip C.	C1608JB1H102KTA	
C3	CS0378	Chip Tantal	TMCMC0G107MTR	
C4	CU3017	Chip C.	C1608CH1H330JTA	
C5	CU3017	Chip C.	C1608CH1H330JTA	
C6	CS0201	Chip Tantal	TMCMA0G475MTR	
C7	CU3035	Chip C.	C1608JB1H102KTA	
C8	CU3035	Chip C.	C1608JB1H102KTA	
C9	CS0378	Chip Tantal	TMCMC0G107MTR	
C10	CS0373	Chip Tantal	TMCMD1C476MTR	
C11	CS0378	Chip Tantal	TMCMC0G107MTR	
C12	CU3059	Chip C.	C1608JF1E104ZTA	
C13	CS0063	Chip Tantal	TMCSA1V104MTR	
C14	CU3047	Chip C.	C1608JB1H103KTA	
C15	CS0049	Chip Tantal	TMCSA1C105MTR	
C16	CS0057	Chip Tantal	TMCSA0J225MTR	
C18	CS0049	Chip Tantal	TMCSA1C105MTR	
C19	CU3021	Chip C.	C1608CH1H680JTA	
C20	CU3035	Chip C.	C1608JB1H102KTA	
C21	CU3056	Chip C.	C1608JF1E473ZTA	
C22	CU3035	Chip C.	C1608JB1H102KTA	
C23	CU3035	Chip C.	C1608JB1H102KTA	
C24	CU3051	Chip C.	C1608JB1E223KTA	
C25	CU3051	Chip C.	C1608JB1E223KTA	
C26	CU3027	Chip C.	C1608CH1H221JTA	
C27	CU3035	Chip C.	C1608JB1H102KTA	
C28	CU3026	Chip C.	C1608CH1H181JTA	
C29	CU3027	Chip C.	C1608CH1H221JTA	
C30	CU3059	Chip C.	C1608JF1E104ZTA	
C31	CS0063	Chip Tantal	TMCSA1V104MTR	
C32	CU3059	Chip C.	C1608JF1E104ZTA	
C33	CU3035	Chip C.	C1608JB1H102KTA	
C35	CU3059	Chip C.	C1608JF1E104ZTA	
C37	CS0049	Chip Tantal	TMCSA1C105MTR	
C39	CU3059	Chip C.	C1608JF1E104ZTA	
C40	CU3006	Chip C.	C1608CH1H050CTA	
C41	CU3059	Chip C.	C1608JF1E104ZTA	
C42	CU3035	Chip C.	C1608JB1H102KTA	
C43	CU3035	Chip C.	C1608JB1H102KTA	
C44	CU3035	Chip C.	C1608JB1H102KTA	
C45	CU3035	Chip C.	C1608JB1H102KTA	
C46	CU3035	Chip C.	C1608JB1H102KTA	
C47	CU3035	Chip C.	C1608JB1H102KTA	
C48	CU3035	Chip C.	C1608JB1H102KTA	
C49	CU3035	Chip C.	C1608JB1H102KTA	
C52	CU3059	Chip C.	C1608JF1E104ZTA	
CN1	UE0270	Wire	JACK-CPU Wire	
CN2	UE0256		CFP0508-0201	
CN3	UP0282		DJG5 Flexible PCB	
CN7	UE0267		AXN420C330P	
D1	XL0045	LED	PG1101F-TR	
D3	XL0045	LED	PG1101F-TR	
D5	XL0047	LED	PG1101W-TR	
D6	XL0048	LED	BR1101W-TR	
D7	XD0291	Diode	MA729-TX	
D9	XD0291	Diode	MA729-TX	
D11	XD0250	Diode	MA742 TX	
D12	XD0291	Diode	MA729-TX	
D13	XD0291	Diode	MA729-TX	
D14	XL0036	LED	SML-310MTT86	
D15	XL0036	LED	SML-310MTT86	
D16	XL0036	LED	SML-310MTT86	
D17	XL0036	LED	SML-310MTT86	

Ref. No.	Parts No.	Description	Parts Name	Ver.
IC1	XA0351	EEP ROM	24LC16BT-I/SN	
IC2	XA0309	IC	RH5VL25AA-T1	
IC3	XA0198	IC	RH5VA32AA T1	
IC4	XA0383	IC	S-81235SG-QI-T2	
IC5	XA0413	IC	M38267ML-OTP	
IC6	XA0209	IC	NJM2100M T1	
IC8	XA0344	IC	LC73881M-TLM	
J1	MACLH2GG	Wire	#30AH1-025-H1	T.TA. TAH.TA2
L1	QC0442	Chip L.	MLF1608A1ROKTA00	
L2	QC0442	Chip L.	MLF1608A1ROKTA00	
L3	QC0442	Chip L.	MLF1608A1ROKTA00	
L4	QC0442	Chip L.	MLF1608A1ROKTA00	
L5	QC0442	Chip L.	MLF1608A1ROKTA00	
Q1	XU0145	Transistor	DTC143TU T106	
Q3	XU0040	Transistor	UN211H TX	
Q5	XU0040	Transistor	UN211H TX	
Q7	XU0014	Transistor	DTC144EK T146	
Q9	XU0064	Transistor	UN5210 TX	
Q10	XU0064	Transistor	UN5210 TX	
Q11	XT0095	Transistor	2SC4081 T106R	
Q12	XU0145	Transistor	DTC143TU T106	
Q13	XU0148	Transistor	DTC144EU T106	
Q14	XU0148	Transistor	DTC144EU T106	
R1	RK3035	Chip R.	ERJ3GSYJ561V	
R2	RK3062	Chip R.	ERJ3GSYJ104V	
R3	RK3035	Chip R.	ERJ3GSYJ561V	
R4	RK3001	Chip R.	ERJ3GSY0R00V	
R5	RK3001	Chip R.	ERJ3GSY0R00V	
R9	RK3062	Chip R.	ERJ3GSYJ104V	
R10	RA0009	Chip R.	EXBV8V102JV	
R11	RA0010	Chip R.	EXBV8V472JV	
R12	RA0010	Chip R.	EXBV8V472JV	
R13	RK3038	Chip R.	ERJ3GSYJ102V	
R14	RK3038	Chip R.	ERJ3GSYJ102V	
R15	RK3028	Chip R.	ERJ3GSYJ151V	
R16	RK3030	Chip R.	ERJ3GSYJ221V	
R18	RK3036	Chip R.	ERJ3GSYJ681V	
R19	RK3074	Chip R.	ERJ3GSYJ105V	
R20	RK3038	Chip R.	ERJ3GSYJ102V	
R21	RK3038	Chip R.	ERJ3GSYJ102V	
R22	RK3074	Chip R.	ERJ3GSYJ105V	
R23	RK3031	Chip R.	ERJ3GSYJ271V	
R26	RK3038	Chip R.	ERJ3GSYJ102V	
R27	RK3050	Chip R.	ERJ3GSYJ103V	
R28	RK3058	Chip R.	ERJ3GSYJ473V	
R30	RK3038	Chip R.	ERJ3GSYJ102V	
R31	RK3053	Chip R.	ERJ3GSYJ183V	
R32	RK3058	Chip R.	ERJ3GSYJ473V	
R33	RK3058	Chip R.	ERJ3GSYJ473V	
R34	RK3055	Chip R.	ERJ3GSYJ273V	
R35	RK3058	Chip R.	ERJ3GSYJ473V	
R37	RK3038	Chip R.	ERJ3GSYJ102V	
R38	RK3041	Chip R.	ERJ3GSYJ182V	
R39	RK3038	Chip R.	ERJ3GSYJ102V	
R40	RK3068	Chip R.	ERJ3GSYJ334V	
R41	RK3065	Chip R.	ERJ3GSYJ184V	
R42	RK3061	Chip R.	ERJ3GSYJ823V	
R43	RK3058	Chip R.	ERJ3GSYJ473V	
R44	RK3054	Chip R.	ERJ3GSYJ223V	
R45	RK3001	Chip R.	ERJ3GSY0R00V	
R46	RK3046	Chip R.	ERJ3GSYJ472V	
R47	RK3052	Chip R.	ERJ3GSYJ153V	
R48	RK3062	Chip R.	ERJ3GSYJ104V	

Ref. No.	Parts No.	Description	Parts Name	Ver.
R49	RK3048	Chip R.	ERJ3GSYJ682V	
R50	RK3050	Chip R.	ERJ3GSYJ103V	
R51	RK3048	Chip R.	ERJ3GSYJ682V	
R52	RK3041	Chip R.	ERJ3GSYJ182V	
R53	RK3046	Chip R.	ERJ3GSYJ472V	
R54	RK3062	Chip R.	ERJ3GSYJ104V	
R55	RK3050	Chip R.	ERJ3GSYJ103V	
R56	RK3066	Chip R.	ERJ3GSYJ224V	
R57	RK3039	Chip R.	ERJ3GSYJ122V	
R58	RK3069	Chip R.	ERJ3GSYJ394V	
R59	RK3051	Chip R.	ERJ3GSYJ123V	
R60	RK3058	Chip R.	ERJ3GSYJ473V	
R61	RK3054	Chip R.	ERJ3GSYJ223V	
R62	RK3065	Chip R.	ERJ3GSYJ184V	
R63	RK3056	Chip R.	ERJ3GSYJ333V	
R64	RK3058	Chip R.	ERJ3GSYJ473V	
R65	RK3058	Chip R.	ERJ3GSYJ473V	
R66	RK3055	Chip R.	ERJ3GSYJ273V	
R67	RK3062	Chip R.	ERJ3GSYJ104V	
R68	RK3061	Chip R.	ERJ3GSYJ823V	
R69	RK3050	Chip R.	ERJ3GSYJ103V	
R70	RK3058	Chip R.	ERJ3GSYJ473V	
R71	RK3034	Chip R.	ERJ3GSYJ471V	
R72	RK3056	Chip R.	ERJ3GSYJ333V	
R73	RK3051	Chip R.	ERJ3GSYJ123V	
R75	RK3058	Chip R.	ERJ3GSYJ473V	
R76	RK3038	Chip R.	ERJ3GSYJ102V	
R79	RK3038	Chip R.	ERJ3GSYJ102V	E
R80	RK3046	Chip R.	ERJ3GSYJ472V	
R82	RK3058	Chip R.	ERJ3GSYJ473V	
R83	RK3058	Chip R.	ERJ3GSYJ473V	
R84	RK3038	Chip R.	ERJ3GSYJ102V	E
R86	RK3058	Chip R.	ERJ3GSYJ473V	
R88	RK3038	Chip R.	ERJ3GSYJ102V	
R89	RK3046	Chip R.	ERJ3GSYJ472V	
R90	RK3056	Chip R.	ERJ3GSYJ333V	
R91	RK3038	Chip R.	ERJ3GSYJ102V	
R92	RK3001	Chip R.	ERJ3GSY0R00V	
R93	RK3042	Chip R.	ERJ3GSYJ222V	
R94	RK3031	Chip R.	ERJ3GSYJ271V	
R96	RK3038	Chip R.	ERJ3GSYJ102V	
R97	RK3038	Chip R.	ERJ3GSYJ102V	
R98	RA0009	Chip R.	EXBV8V102JV	
R99	RK1018	Chip R.	ERJ8GEYJ101V	
R1001	RK3038	Chip R.	ERJ3GSYJ102V	
R1002	RK3038	Chip R.	ERJ3GSYJ102V	
R1004	RK3058	Chip R.	ERJ3GSYJ473V	
R1005	RK3058	Chip R.	ERJ3GSYJ473V	
R1006	RK3058	Chip R.	ERJ3GSYJ473V	
R1007	RK3038	Chip R.	ERJ3GSYJ102V	
R1008	RK3001	Chip R.	ERJ3GSY0R00V	E
R1009	RK3038	Chip R.	ERJ3GSYJ102V	
R1010	RK3050	Chip R.	ERJ3GSYJ103V	
R1011	RK3046	Chip R.	ERJ3GSYJ472V	
R1012	RK3050	Chip R.	ERJ3GSYJ103V	
R1013	RK3050	Chip R.	ERJ3GSYJ103V	
R1014	RK3038	Chip R.	ERJ3GSYJ102V	
R1015	RK3038	Chip R.	ERJ3GSYJ102V	
R1016	RK3062	Chip R.	ERJ3GSYJ104V	
R1017	RK3050	Chip R.	ERJ3GSYJ103V	
R1018	RK3050	Chip R.	ERJ3GSYJ103V	
R1019	RK3050	Chip R.	ERJ3GSYJ103V	
R1020	RK3035	Chip R.	ERJ3GSYJ561V	
R1021	RK3035	Chip R.	ERJ3GSYJ561V	

CPU Unit/CHARGE Unit/Mechanical Parts

Ref. No.	Parts No.	Description	Parts Name	Ver.
R1022	RK3035	Chip R.	ERJ3GSYJ561V	
R1023	RK3035	Chip R.	ERJ3GSYJ561V	
R1025	RK3001	Chip R.	ERJ3GSY0R00V	
R1027	RK3038	Chip R.	ERJ3GSYJ102V	
R1028	RK3038	Chip R.	ERJ3GSYJ102V	
R1029	RK3038	Chip R.	ERJ3GSYJ102V	
R1030	RK3058	Chip R.	ERJ3GSYJ473V	
R1031	RK3046	Chip R.	ERJ3GSYJ472V	
SW1	UU0018	Switch	SOP-112HST	
SW11	UU0018	Switch	SOP-112HST	
X1	XQ0074	Crystal	SMD-49 4.19MHZ	
	UP0293B	P.C.B	DJ191 CPU PCB	
CHARGE Unit				
C801	CHARGE A	CU3031	C1608JB1H471KTA	
D801	CHARGE A	XD0294	U2FWJ44N(TE12R)	
D802	CHARGE A	XD0294	U2FWJ44N(TE12R)	
D803	CHARGE A	XD0290	MA111-TX	
D804	CHARGE A	XD0261	S3DG9	
D805	CHARGE A	XD0130	DA204U T106	
JK801	CHARGE H	UJ0018	HEC2781010510	
Q801	CHARGE A	XT0088	2SA1213Y TE12L	
R801	CHARGE A	RK0003	ERJ6GEYJ150V	
R802	CHARGE A	RK3046	ERJ3GSYJ472V	
Mechanical Parts				
	AF0020	Screw	0# 2+3Fe Ni	
	AX0001	Screw	0# 2+4Fe Bc	
	FP0093		Terminal frame	
	FP0094		latch knob	
	SC0008		latch spring	
	SD0045		Batt terminal	
	TS0100		earth terminal	
	TS0110		Charge earth	
	EY0014		EM-123A	
	DS0352A		Spec.Card	E.TA. TAH.TA2
	DS0365		Spec.Card	T
	EA0057Z		Antenna	
	EW0012		EDC-64	E.TA. TAH.TA2
	PR0237		FCC Part15 Seal	T
	EG0025		Ni-Cd Battery Pack	TAH.TA2
	EG0026		Ni-Cd Battery Pack	T.E.TA
	EW0011		Charger(EDC63 120V)	T
	HK0392		Item Carton DJ191	
	HP0031		Protection(Radio)	
	HU0077		Fixture	
	HU0085		Fixture DJG5	
	HU0086		Fixture DJG5	
	PH0009		Registration Card	
	PT0004A		Lot Number Seal	
	HP0028		Protection 165x280	
	PS0028	Screw	Instruction Card	
	PK0058	Screw	Schematic Diagram	
	AP0004	Screw	P2+5FeZn	
	AX0001		0# P2+4Fe B/C1	
	AX0002		0# p2+5FeNi1	
	DG0021		LCD Lamp DJ190	
	DP0105		LCD panel DJ190	
	EL0030		LCD XH618	
	ES0011		SU-36W0824	
	FG0175		POWER Key DJG5	

Ref. No.	Parts No.	Description	Parts Name	Ver.
	FG0177		V/U Key DJG5	
	FG0182		LCD Rubber(A) DJG5	
	FG0183		LCD Rubber(B) DJG5	
	FG0184		ON AIR Rubber DJG5	
	FG0185B		16-Key Rubber DJ191	
	FG0218		Cushion DJG5	
	FM0098		Rear Panel DJG5	
	MNCK03AA	Wire	Lead #28N02-030-02	
	ST0052		SP Freme DJG5	
	TG0023		SP Cloth tape DJG5	
	TZ0064		Panel sheet DJG5	
	YZ0149		LCD tape DJG5	
	AX0003	Screw	O# P2+16Fe B/C3	
	FG0173		Rubber PTT	
	FG0179Z		Jack Cap DJG5	
	FG0180Z		DC Cap DJG5	
	FG0181Z		Diar Cap DJG5	
	KZ0070Y		Front Case	
	NK0042		Dial Knob	
	AB0012	Screw	S2.5+5FeNil	
	AF0020	Screw	O#2+3FeNil	
	AK0001	Screw	O#B2+4FeNi	
	AN0012		Dial Nut	
	FG0178Z		Jack Rubber DJG5	
	FM0100		Jack metal DJG5	
	KB0059		Rear Case DJ191	
	TS0102		RF Shield DJ191	
	UE0029A		BNC Receptacle	
PTT Unit				
CN401	LP0281		DJG5 Flexble PCB	
SW401	UU0018	Switch	SOP-112HST	
SW402	UU0026	Switch	TACTSW	
SW403	UU0018	Switch	SOP-112HST	
SW404	UU0018	Switch	SOP-112HST	
	YZ0082		Tape W=12	
JACK Unit				
C901	CU3035	Chip C	C1608JB1H102KTA	
C902	CU3035	Chip C	C1608JB1H102KTA	
C904	CU3035	Chip C	C1608JB1H102KTA	
C905	CU3035	Chip C	C1608JB1H102KTA	
C906	CU3035	Chip C	C1608JB1H102KTA	
JK901	UJ0019	Connector	HSJ1493-01-010	
JK902	UJ0022	Connector	HSJ1102-01-540	
L901	QC0003	Coil	MLF3216A1R0M	
L902	QC0003	Coil	MLF3216A1R0M	
L904	QC0003	Coil	MLF3216A1R0M	
L905	QC0003	Coil	MLF3216A1R0M	

Ref. No.	Parts No.	Description	Parts Name	Ver.
VCO Unit				
C301	CU3035	Chip C	C1608JB1H102KTA	
C302	CS0377	Chip Tantal	TMCMB0G476MTR	
C303	CU3047	Chip C	C1608JB1H103KTA	
C304	CU3047	Chip C	C1608JB1H103KTA	
C305	CU3031	Chip C	C1608JB1H471KTA	
C306	CU3006	Chip C	C1608CH1H050CTA	
C307	CU3035	Chip C	C1608JB1H102KTA	
C308	CU3006	Chip C	C1608CH1H050CTA	
C309	CU3003	Chip C	C1608CH1H020CTA	
C310	CU3031	Chip C	C1608JB1H471KTA	
C311	CU3035	Chip C	C1608JB1H102KTA	
C312	CU3035	Chip C	C1608JB1H102KTA	
C313	CU3035	Chip C	C1608JB1H102KTA	
C314	CU3026	Chip C	C1608CH1H181JTA	
D301	XD0299	Diode	MA304-TX	
D302	XD0293	Diode	1SV257(TPH3)	
D303	XD0129	Diode	1SS318 TT11	
D304	XD0299	Diode	MA304-TX	
L301	QA0120	Coil	657BN-1126GHR=P3	T,E,TA
L301	QA0077A	Coil		TA2,TFH
L302	QC0442	Coil	MLF1608A1R0KTA00	
L303	QKA65A	Coil	MR1.5 3.5T 0.4	
L304	QC0454	Coil	MLF1608K100KTA00	
L305	QC0454	Coil	MLF1608K100KTA00	
Q301	XT0137	Transistor	2SC5065-O(TE85L)	
Q302	XT0137	Transistor	2SC5065-O(TE85L)	
Q303	XU0131	Transistor	DTC114EU T106	
R301	RK3026	Chip R	ERJ3GSYJ101V	
R302	RK3030	Chip R	ERJ3GSYJ221V	
R303	RK3050	Chip R	ERJ3GSYJ103V	
R304	RK3062	Chip R	ERJ3GSYJ104V	
R305	RK3062	Chip R	ERJ3GSYJ104V	
R306	RK3062	Chip R	ERJ3GSYJ104V	
R307	RK3052	Chip R	ERJ3GSYJ153V	
R308	RK3042	Chip R	ERJ3GSYJ222V	
R309	RK3050	Chip R	ERJ3GSYJ103V	
R310	RK3037	Chip R	ERJ3GSYJ821V	
R311	RK3042	Chip R	ERJ3GSYJ222V	
	TS0097	Case	VCO Case	
	UT0030	Terminal	0.6 Pin	
SW Unit				
CN501	UE0255	Connector	6027B-03Z003	
SW501	UU0018	Switch	SOP-112HST	
SW502	UU0018	Switch	SOP-112HST	
	FP0098		Switch space	

RF Unit

Ref. No.	Parts No.	Description	Parts Name	Ver.
RF Unit				
C101	CU3035	Chip C	C1608JB1H102KTA	
C102	CU3035	Chip C	C1608JB1H102KTA	
C103	CU3035	Chip C	C1608JB1H102KTA	
C104	CU3035	Chip C	C1608JB1H102KTA	
C105	CU3035	Chip C	C1608JB1H102KTA	
C106	CU3017	Chip C	C1608CH1H330JTA	
C107	CU3010	Chip C	C1608CH1H090CTA	T,E,TA
C107	CU3007	Chip C	C1608CH1H060CTA	TA2,TFH
C108	CU3007	Chip C	C1608CH1H060CTA	TA2,TFH
C110	CU3017	Chip C	C1608CH1H330JTA	
C112	CU3011	Chip C	C1608CH1H100CTA	
C113	CU3017	Chip C	C1608CH1H330JTA	T,E,TA
C113	CU3013	Chip C	C1608CH1H150JTA	TA2,TFH
C114	CU3019	Chip C	C1608CH1H470JTA	T,E,TA
C114	CU3013	Chip C	C1608CH1H150JTA	TA2,TFH
C115	CU3013	Chip C	C1608CH1H150JTA	
C116	CU3019	Chip C	C1608CH1H470JTA	T,E,TA
C116	CU3012	Chip C	C1608CH1H120JTA	TA2,TFH
C117	CS0049	Chip Tantal	TMCSA1C105MTR	
C118	CU3035	Chip C	C1608JB1H102KTA	
C119	CU3035	Chip C	C1608JB1H102KTA	
C121	CU3004	Chip C	C1608CH1H030CTA	T,E,TA
C121	CU3003	Chip C	C1608CH1H020CTA	TA2,TFH
C122	CU3004	Chip C	C1608CH1H030CTA	T,E,TA
C122	CU3003	Chip C	C1608CH1H020CTA	TA2,TFH
C123	CU3015	Chip C	C1608CH1H220JTA	
C124	CU3035	Chip C	C1608JB1H102KTA	
C125	CU3002	Chip C	C1608CH1H010CTA	
C126	CU3002	Chip C	C1608CH1H010CTA	
C127	CS0049	Chip Tantal	TMCSA1C105MTR	
C128	CU3035	Chip C	C1608JB1H102KTA	
C129	CU3035	Chip C	C1608JB1H102KTA	
C130	CS0220	Chip Tantal	TMCMA1C225MTR	
C131	CU3051	Chip C	C1608JB1E223KTA	
C132	CU3047	Chip C	C1608JB1H103KTA	
C133	CU3047	Chip C	C1608JB1H103KTA	
C134	CU3035	Chip C	C1608JB1H102KTA	
C135	CU3009	Chip C	C1608CH1H080CTA	
C136	CU3047	Chip C	C1608JB1H103KTA	
C137	CS0220	Chip Tantal	TMCMA1C225MTR	
C141	CU3035	Chip C	C1608JB1H102KTA	
C142	CU3003	Chip C	C1608CH1H020CTA	T,E,TA
C142	CU3002	Chip C	C1608CH1H010CTA	TA2,TFH
C143	CU3003	Chip C	C1608CH1H020CTA	
C144	CU3003	Chip C	C1608CH1H020CTA	
C146	CU3007	Chip C	C1608CH1H060CTA	
C148	CU3006	Chip C	C1608CH1H050CTA	
C149	CU3011	Chip C	C1608CH1H100CTA	
C150	CU3011	Chip C	C1608CH1H100CTA	
C151	CU3004	Chip C	C1608CH1H030CTA	
C152	CU3015	Chip C	C1608CH1H220JTA	
C153	CU3017	Chip C	C1608CH1H330JTA	
C154	CU3018	Chip C	C1608CH1H390JTA	
C155	CU3017	Chip C	C1608CH1H330JTA	
C156	CU3035	Chip C	C1608JB1H102KTA	
C157	CU3007	Chip C	C1608CH1H060CTA	
C158	CU3035	Chip C	C1608JB1H102KTA	
C159	CU3059	Chip C	C1608JF1E104ZTA	
C160	CU3047	Chip C	C1608JB1H103KTA	
C161	CU3047	Chip C	C1608JB1H103KTA	
C163	CS0377	Chip Tantal	TMCMB0G476MTR	
C164	CS0049	Chip Tantal	TMCSA1C105MTR	

Ref. No.	Parts No.	Description	Parts Name	Ver.
C165	CU3021	Chip C	C1608CH1H680JTA	
C166	CU3059	Chip C	C1608JF1E104ZTA	
C167	CU3016	Chip C	C1608CH1H270JTA	
C168	CU3015	Chip C	C1608CH1H220JTA	
C169	CS0049	Chip Tantal	TMCSA1C105MTR	
C170	CU3056	Chip C	C1608JF1E473ZTA	
C171	CU3059	Chip C	C1608JF1E104ZTA	
C172	CU3051	Chip C	C1608JB1E223KTA	
C173	CU3053	Chip C	C1608JF1E333ZTA	
C174	CU3047	Chip C	C1608JB1H103KTA	
C175	CS0382	Chip Tantal	TMCMB1A226MTR	
C176	CU3059	Chip C	C1608JF1E104ZTA	
C177	CS0220	Chip Tantal	TMCMA1C225MTR	
C178	CU3035	Chip C	C1608JB1H102KTA	
C179	CU3027	Chip C	C1608CH1H221JTA	
C180	CU3035	Chip C	C1608JB1H102KTA	
C181	CU3059	Chip C	C1608JF1E104ZTA	
C182	CU3035	Chip C	C1608JB1H102KTA	
C183	CU3035	Chip C	C1608JB1H102KTA	
C184	CU3035	Chip C	C1608JB1H102KTA	
C185	CU3047	Chip C	C1608JB1H103KTA	
C186	CE0308	Electrolytic C	6.3CV 100BS	
C187	CU3035	Chip C	C1608JB1H102KTA	
C188	CS0049	Chip Tantal	TMCSA1C105MTR	
C189	CU3047	Chip C	C1608JB1H103KTA	
C190	CU3059	Chip C	C1608JF1E104ZTA	
C191	CU3035	Chip C	C1608JB1H102KTA	
C192	CU3047	Chip C	C1608JB1H103KTA	
C193	CU3047	Chip C	C1608JB1H103KTA	
C194	CU3019	Chip C	C1608CH1H470JTA	
C195	CU3047	Chip C	C1608JB1H103KTA	
C196	CS0232	Chip Tantal	TMCMA1V474MTR	
C197	CU3035	Chip C	C1608JB1H102KTA	
C198	CE0308	Electrolytic C	6.3CV 100BS	
C199	CE0308	Electrolytic C	6.3CV 100BS	
C200	CU3035	Chip C	C1608JB1H102KTA	
C201	CU3035	Chip C	C1608JB1H102KTA	
C202	CU3047	Chip C	C1608JB1H103KTA	
C203	CU3051	Chip C	C1608JB1E223KTA	
C204	CU3059	Chip C	C1608JF1E104ZTA	
C205	CE0373	Electrolytic C	16MV 100UW	
C206	CS0366	Chip Tantal	TMCMA0G106MTR	
C215	CU3035	Chip C	C1608JB1H102KTA	
C216	CU3035	Chip C	C1608JB1H102KTA	
C217	CU3019	Chip C	C1608CH1H470JTA	
C218	CU3035	Chip C	C1608JB1H102KTA	
C219	CS0366	Chip Tantal	TMCMA0G106MTR	
C220	CS0063	Chip Tantal	TMCSA1V104MTR	
C223	CU3035	Chip C	C1608JB1H102KTA	
C224	CU3015	Chip C	C1608CH1H220JTA	
C225	CU3035	Chip C	C1608JB1H102KTA	
C226	CS0049	Chip Tantal	TMCSA1C105MTR	
C228	CS0377	Chip Tantal	TMCMB0G476MTR	
C229	CS0237	Chip Tantal	TMCMA1A475MTR	
C230	CS0366	Chip Tantal	TMCMA0G106MTR	
D101	XD0066	Diode	RLS135 TE 11	
D102	XD0066	Diode	RLS135 TE 11	
D103	XD0251	Diode	MA741WA TX	
D104	XD0299	Diode	MA304-TX	
D105	XD0299	Diode	MA304-TX	
D106	XD0299	Diode	MA304-TX	
D107	XD0299	Diode	MA304-TX	
D108	XD0129	Diode	1SS318 TT11	
D109	XD0118	Diode	MA716 TW	

Ref. No.	Parts No.	Description	Parts Name	Ver.
D113	XD0130	Diode	DA204U T106	
FL101	XC0018	Filter	CFWM450E	
JK101	RD0108		JPW01R-01	
IC101	XA0381	IC	S-AV28	T, E, TE
IC101	XA0421	IC	PF00311	TA2,TFH
IC102	XA0352	IC	M64076GP	
IC103	XA0385	IC	M5222FP-600C	
IC104	XA0343	IC	MC3372VM-EL	
IC105	XA0210	IC	NJM2070M T1	
L101	QC0016	Coil	MLF3216A2R2M	
L102	QKA65A	Coil	MR1.5 3.5T 0.4	
L103	QKA65A	Coil	MR1.5 3.5T 0.4	
L104	QKA65A	Coil	MR1.5 3.5T 0.4	
L105	QC0430	Coil	MLF1608DR10KTA00	
L106	QC0430	Coil	MLF1608DR10KTA00	
L107	QKA75A	Coil	QKA75A	
L108	QC0090	Coil	MLF3216A4R7M	
L109	QA0071	Coil	L QA0071	
L110	QA0071	Coil	L QA0071	
L111	QA0071	Coil	L QA0071	
L112	QA0071	Coil	L QA0071	
L113	QC0009	Coil	MLF3216DR10M	
L114	QC0430	Coil	MLF1608DR10KTA00	
Q101	XT0119	Transistor	2SC3356-T1BR24	
Q102	XT0119	Transistor	2SC3356-T1BR24	
Q103	XU0172	Transistor	XP1501-TX	
Q105	XT0096	Transistor	2SC4099 T106N	
Q106	XE0020	FET	2SK3601GE TL	T, E, TE
Q106	XE0009	FET	2SK302GR	TA2,TFH
Q107	XT0137	Transistor	2SC5065-O(TE85L)	
Q108	XT0096	Transistor	2SC4099 T106N	
Q109	XT0095	Transistor	2SC4081 T106R	
Q110	XT0088	Transistor	2SA1213Y TE12L	
Q111	XT0088	Transistor	2SA1213Y TE12L	
Q112	XU0027	Transistor	FMA7XT 148	
Q113	XU0172	Transistor	XP1501-TX	
Q114	XT0088	Transistor	2SA1213Y TE12L	
Q115	XT0095	Transistor	2SC4081 T106R	
Q116	XU0172	Transistor	XP1501-TX	
Q117	XT0137	Transistor	2SC5065-O(TE85L)	
Q118	XU0125	Transistor	DTA144EUT106	
Q119	XU0038	Transistor	UN2214 TX	
Q120	XU0062	Transistor	UN9111 TX	
R101	RK3028	Chip R	ERJ3GSYJ151V	
R102	RK3026	Chip R	ERJ3GSYJ101V	
R103	RK3026	Chip R	ERJ3GSYJ101V	
R104	RK3034	Chip R	ERJ3GSYJ471V	
R105	RK3046	Chip R	ERJ3GSYJ472V	
R106	RK3050	Chip R	ERJ3GSYJ103V	
R107	RK3046	Chip R	ERJ3GSYJ472V	
R108	RK3046	Chip R	ERJ3GSYJ472V	
R110	RK3026	Chip R	ERJ3GSYJ101V	
R111	RK3026	Chip R	ERJ3GSYJ101V	
R113	RK3050	Chip R	ERJ3GSYJ103V	T, E, TE
R113	RK3051	Chip R	ERJ3GYJ123V	TA2,TFH
R114	RK3050	Chip R	ERJ3GSYJ103V	
R115	RK3026	Chip R	ERJ3GSYJ101V	
R116	RK3050	Chip R	ERJ3GSYJ103V	
R117	RK3034	Chip R	ERJ3GSYJ471V	
R118	RK3050	Chip R	ERJ3GSYJ103V	T, E, TE
R118	RK3051	Chip R	ERJ3GYJ123V	TA2,TFH
R119	RK3038	Chip R	ERJ3GSYJ102V	
R121	RK3050	Chip R	ERJ3GSYJ103V	
R122	RK3030	Chip R	ERJ3GSYJ221V	
R123	RK3026	Chip R	ERJ3GSYJ101V	
R124	RK3022	Chip R	ERJ3GSYJ470V	
R126	RK3050	Chip R	ERJ3GSYJ103V	
R128	RK3052	Chip R	ERJ3GSYJ153V	
R130	RK3050	Chip R	ERJ3GSYJ103V	
R131	RK3038	Chip R	ERJ3GSYJ102V	
R133	RK3053	Chip R	ERJ3GSYJ183V	
R135	RK3066	Chip R	ERJ3GSYJ224V	
R137	RK3047	Chip R	ERJ3GSYJ562V	
R138	RK3038	Chip R	ERJ3GSYJ102V	
R140	RK3052	Chip R	ERJ3GSYJ153V	
R142	RK3030	Chip R	ERJ3GSYJ221V	
R143	RK3042	Chip R	ERJ3GSYJ222V	
R144	RK3050	Chip R	ERJ3GSYJ103V	
R145	RK3074	Chip R	ERJ3GSYJ105V	
R146	RK3074	Chip R	ERJ3GSYJ105V	
R147	RK3074	Chip R	ERJ3GSYJ105V	
R148	RK3060	Chip R	ERJ3GSYJ683V	
R149	RK3074	Chip R	ERJ3GSYJ105V	
R150	RK3034	Chip R	ERJ3GSYJ471V	
R153	RK3054	Chip R	ERJ3GSYJ223V	
R154	RK3042	Chip R	ERJ3GSYJ222V	
R155	RK3058	Chip R	ERJ3GSYJ473V	
R156	RK3041	Chip R	ERJ3GSYJ182V	
R157	RK3041	Chip R	ERJ3GSYJ182V	
R158	RK3059	Chip R	ERJ3GSYJ563V	
R159	RK3047	Chip R	ERJ3GSYJ562V	
R160	RK3054	Chip R	ERJ3GSYJ223V	
R161	RK3052	Chip R	ERJ3GSYJ153V	
R162	RK3052	Chip R	ERJ3GSYJ153V	
R163	RK3030	Chip R	ERJ3GSYJ221V	
R164	RK3058	Chip R	ERJ3GSYJ473V	
R166	RK3046	Chip R	ERJ3GSYJ472V	
R167	RK3038	Chip R	ERJ3GSYJ102V	
R168	RK0105	Chip R	ERJ6GEYJ2R2V	
R169	RK3032	Chip R	ERJ3GSYJ331V	
R170	RK3038	Chip R	ERJ3GSYJ102V	
R171	RK3058	Chip R	ERJ3GSYJ473V	
R172	RK3054	Chip R	ERJ3GSYJ223V	
R173	RK3044	Chip R	ERJ3GSYJ332V	
R174	RK3071	Chip R	ERJ3GSYJ564V	
R175	RK3054	Chip R	ERJ3GSYJ223V	
R176	RK3046	Chip R	ERJ3GSYJ472V	
R177	RK3070	Chip R	ERJ3GSYJ474V	
R178	RK3041	Chip R	ERJ3GSYJ182V	
R179	RK3056	Chip R	ERJ3GSYJ333V	
R180	RK3042	Chip R	ERJ3GSYJ222V	
R181	RK3046	Chip R	ERJ3GSYJ472V	
R182	RK3058	Chip R	ERJ3GSYJ473V	
R183	RK3042	Chip R	ERJ3GSYJ222V	
R184	RK3055	Chip R	ERJ3GSYJ273V	
R185	RK3062	Chip R	ERJ3GSYJ104V	
R186	RK3046	Chip R	ERJ3GSYJ472V	
R187	RK3058	Chip R	ERJ3GSYJ473V	
R188	RK3050	Chip R	ERJ3GSYJ103V	
R189	RK3050	Chip R	ERJ3GSYJ103V	
R191	RK3050	Chip R	ERJ3GSYJ103V	
R192	RK3014	Chip R	ERJ3GSYJ100V	
R193	RK3038	Chip R	ERJ3GSYJ102V	
R195	RK3056	Chip R	ERJ3GSYJ333V	
R196	RK3052	Chip R	ERJ3GSYJ153V	
R198	RK3043	Chip R	ERJ3GSYJ272V	
R203	RK3038	Chip R	ERJ3GSYJ102V	
R204	RK3030	Chip R	ERJ3GSYJ221V	
R205	RK3030	Chip R	ERJ3GSYJ221V	
R208	RK3059	Chip R	ERJ3GSYJ563V	
R209	RK3026	Chip R	ERJ3GSYJ101V	
R210	RK3001	Chip R	ERJ3GSY0R00V	
R211	RK3062	Chip R	ERJ3GSYJ104V	
R212	RK3001	Chip R	ERJ3GSY0R00V	
R213	RK3050	Chip R	ERJ3GSYJ103V	
R214	RK3050	Chip R	ERJ3GSYJ103V	
R215	RK3059	Chip R	ERJ3GSYJ563V	
R216	RK3062	Chip R	ERJ3GSYJ104V	
R219	RK3058	Chip R	ERJ3GSYJ473V	
R220	RK3026	Chip R	ERJ3GSYJ101V	
R221	RK3038	Chip R	ERJ3GSYJ102V	
TC101	CT0012	Trimmer	CTZ10AW	
X101	XQ0076	Crystal	HC49U 21.5MHz	
X102	XK0003	Ceramic Discriminator	CDBM450C7	
XF101	XF0022	Cristal Filter	UM-1 21.7MHz	
XF102	XF0022	Cristal Filter	UN-1 21.7MHz	
	FG0212		Cushion DJ190	
	FG215		Cushion DJ191	
	TS0101		PM Shield	

Ref. No.	Parts No.	Description	Parts Name	Ver.
		EJ-28U		
C701	CU3015		C1608CH1H220JTA	
C702	CU3015		C1608CH1H470JTA	
C703	CU3015		C1608CH1H101JTA	
C705	CS0237		TMCMA1A475MTR	
C709	CS0049		TMCSA1C105MTR	
C710	CU3015		C1608JF1E104ZTA	
C711	CS0236		TMCMA0J685MTR	
C712	CU3015		C1608JB1H102KTA	
C714	CS0049		TMCSA1C105MTR	
C715	CS0049		TMCSA1C105MTR	
R701	RK3048		ERJ3GSYJ682V	
R702	RK3089		ERJ3GSYJ912V	
R703	RK3066		ERJ3GSYJ224V	
R704	RK3074		ERJ3GSYJ105V	
R705	RK3051		ERJ3GSYJ123V	
R707	RK3067		ERJ3GSYJ274V	
R710	RK3047		ERJ3GSYJ562V	
R715	RK3060		ERJ3GSYJ683V	
R716	RK3054		ERJ3GSYJ223V	
R717	RK3055		ERJ3GSYJ273V	
R718	RK3062		ERJ3GSYJ104V	
CN701	UE0274		AXN320C038P	
CN701	UP0295A		EJ28U PCB	
IC701	XA0239		AK2341	
	TZ0069		Insulation Seet	
X701	XQ0077		38C 3.686400MHz	

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 μ V - 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 ± 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.

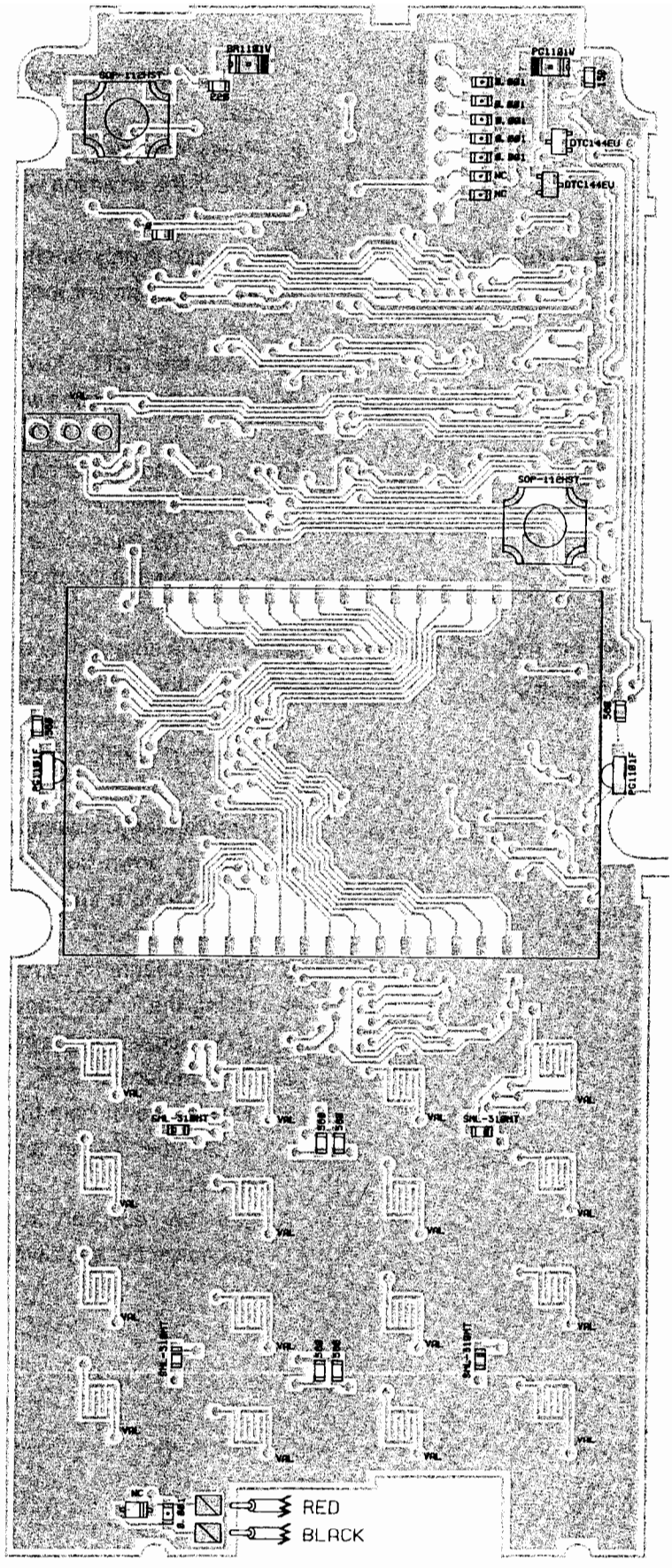
Note on Adjusting Sensitivity

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.

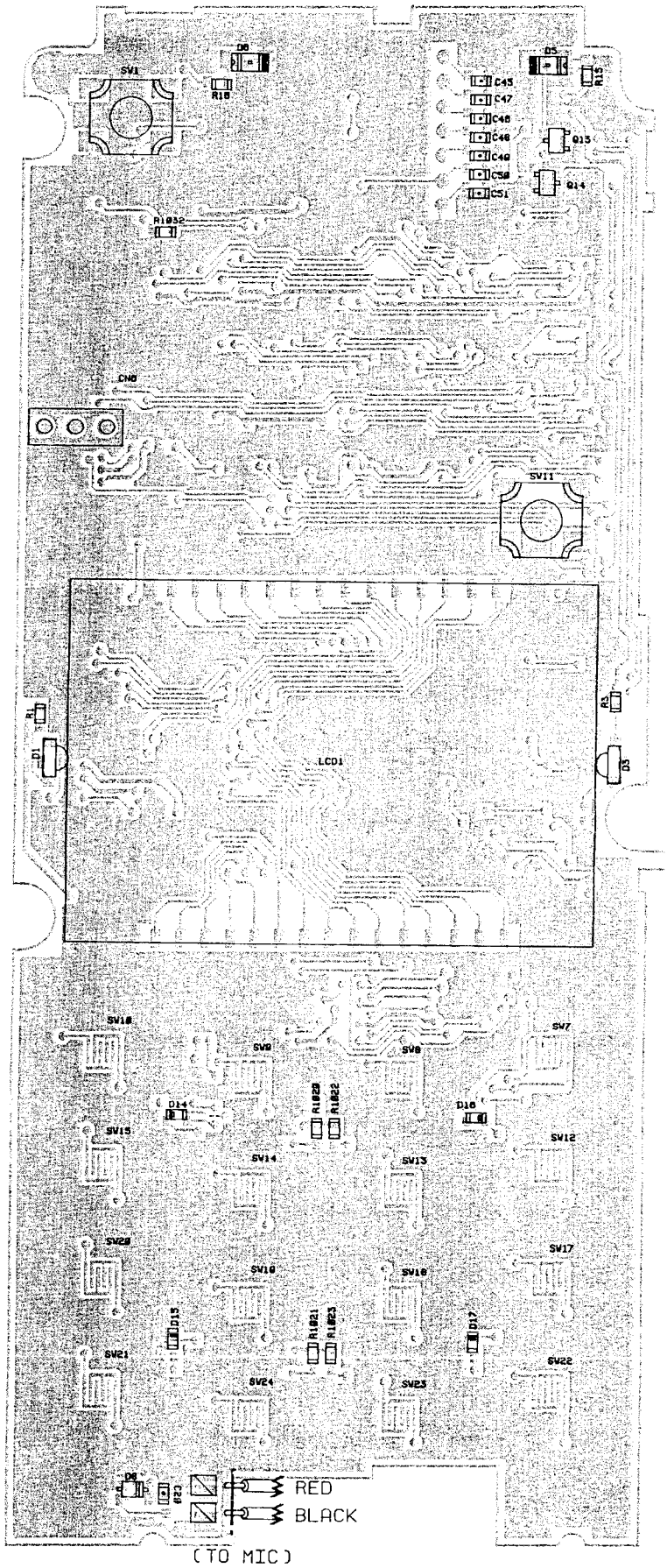
1. Program any frequency within 145 MHz +/-1 on memory channel 5.
2. Holding down both the (UP) and (DOWN) key, press the POWER switch to turn the power ON. "chEc" will appears on the LCD for two seconds, and "C" appears.
3. Select channel 5 by rotating the main tuning dial.
4. Using the (UP) and (DOWN) 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

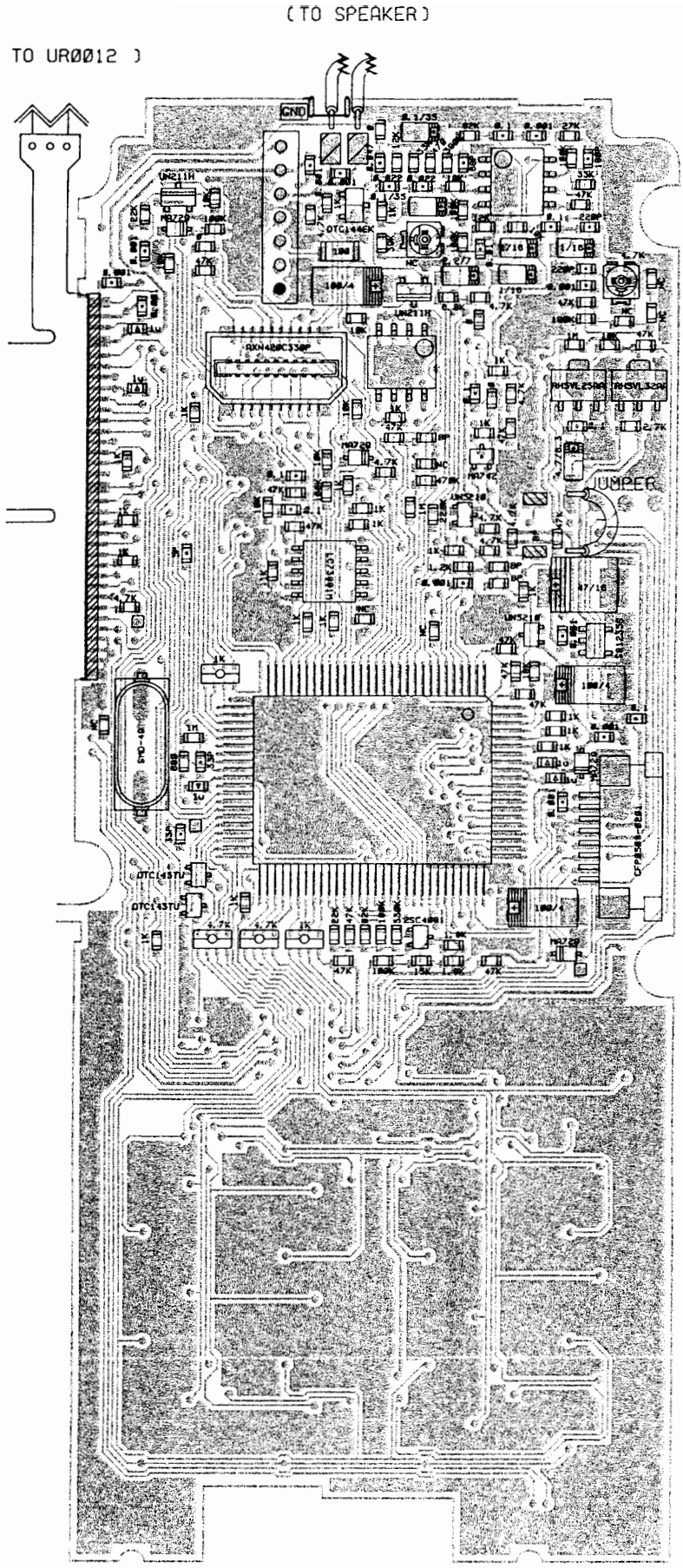
CPU Unit Side A (VALUE)



CPU Unit Side A（REFERENCE）

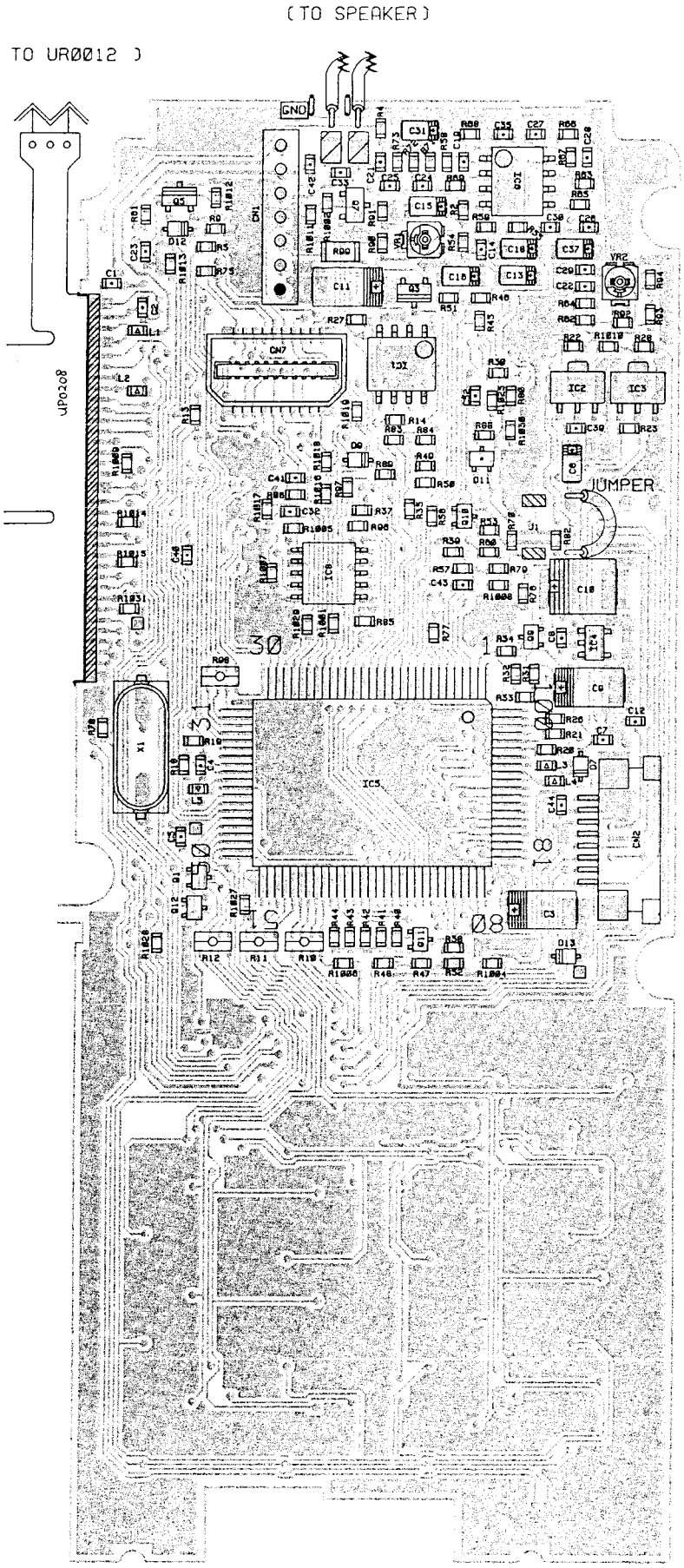


CPU Unit Side B
(VALUE)



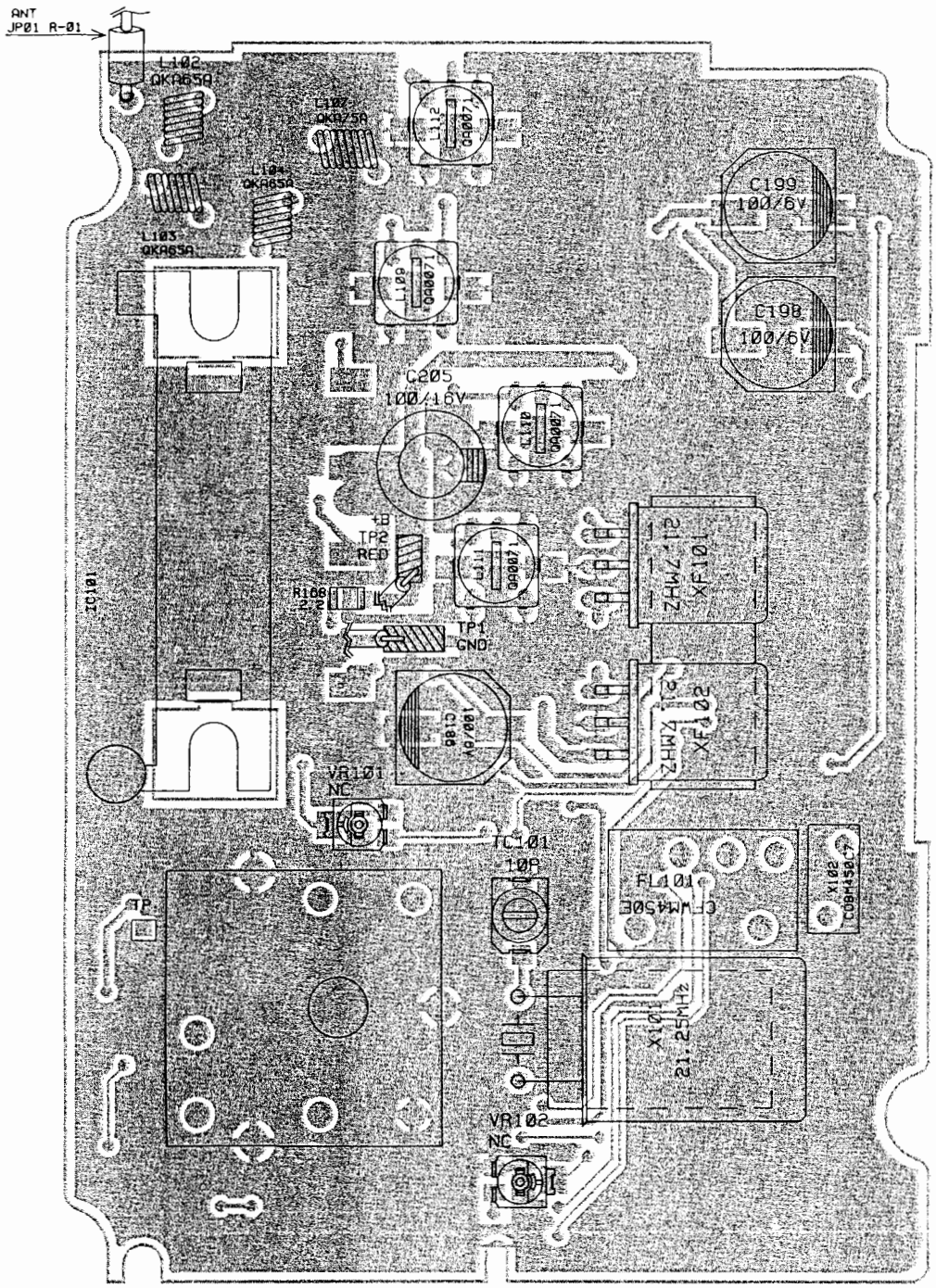
	R79	R84	R1008	J1
T	——	——	——	JAMPER
TA	——	——	——	——
E	1K	1K	0	——

CPU Unit Side B
(REFERENCE)

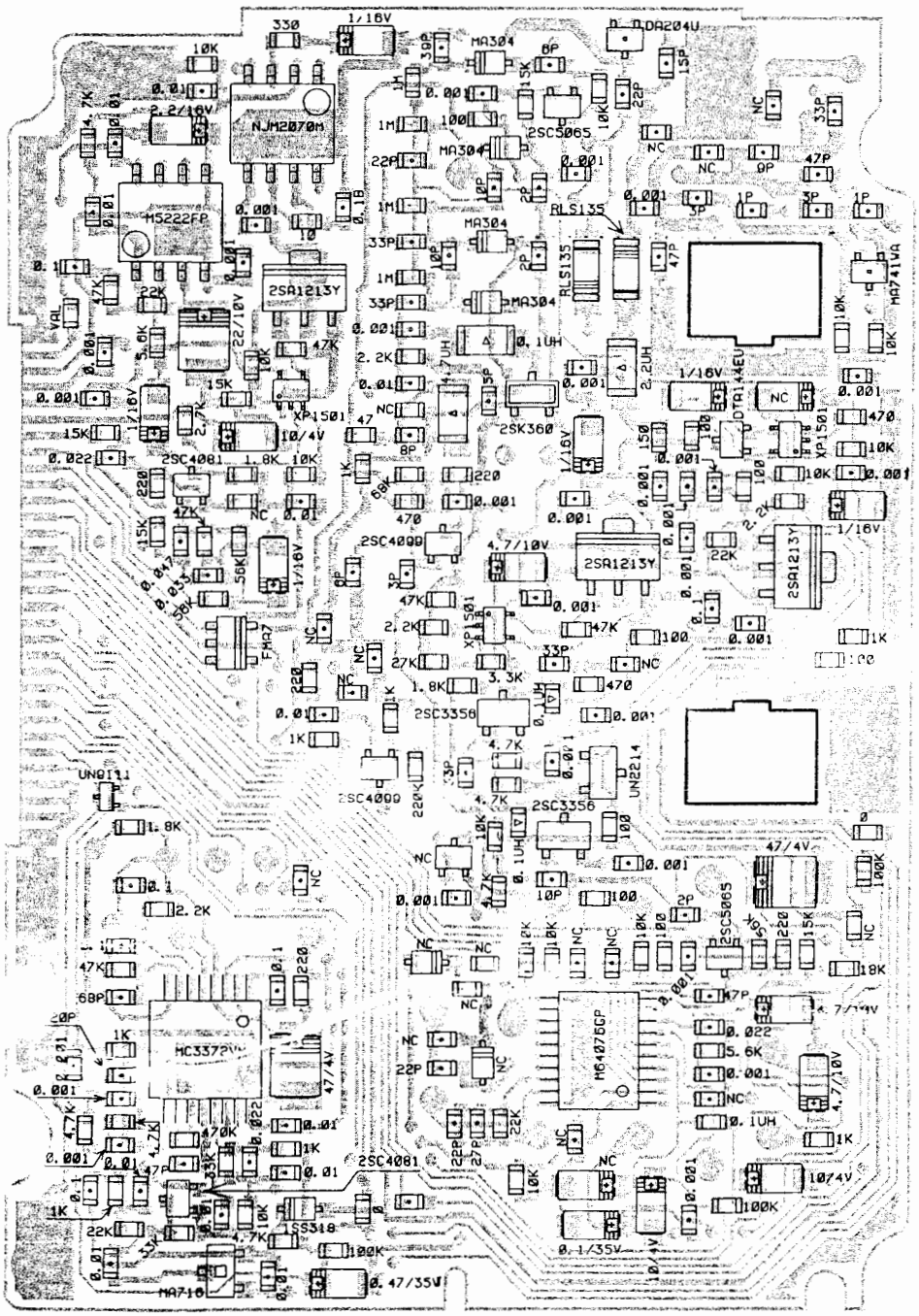


	R79	R84	R1008	J1
T	——	——	——	JAMPER
TA	——	——	——	——
E	1K	1K	Ø	——

RF Unit Side A
(VALUE / REFERENCE)



RF Unit Side B
(VALUE)



RF Unit Side B
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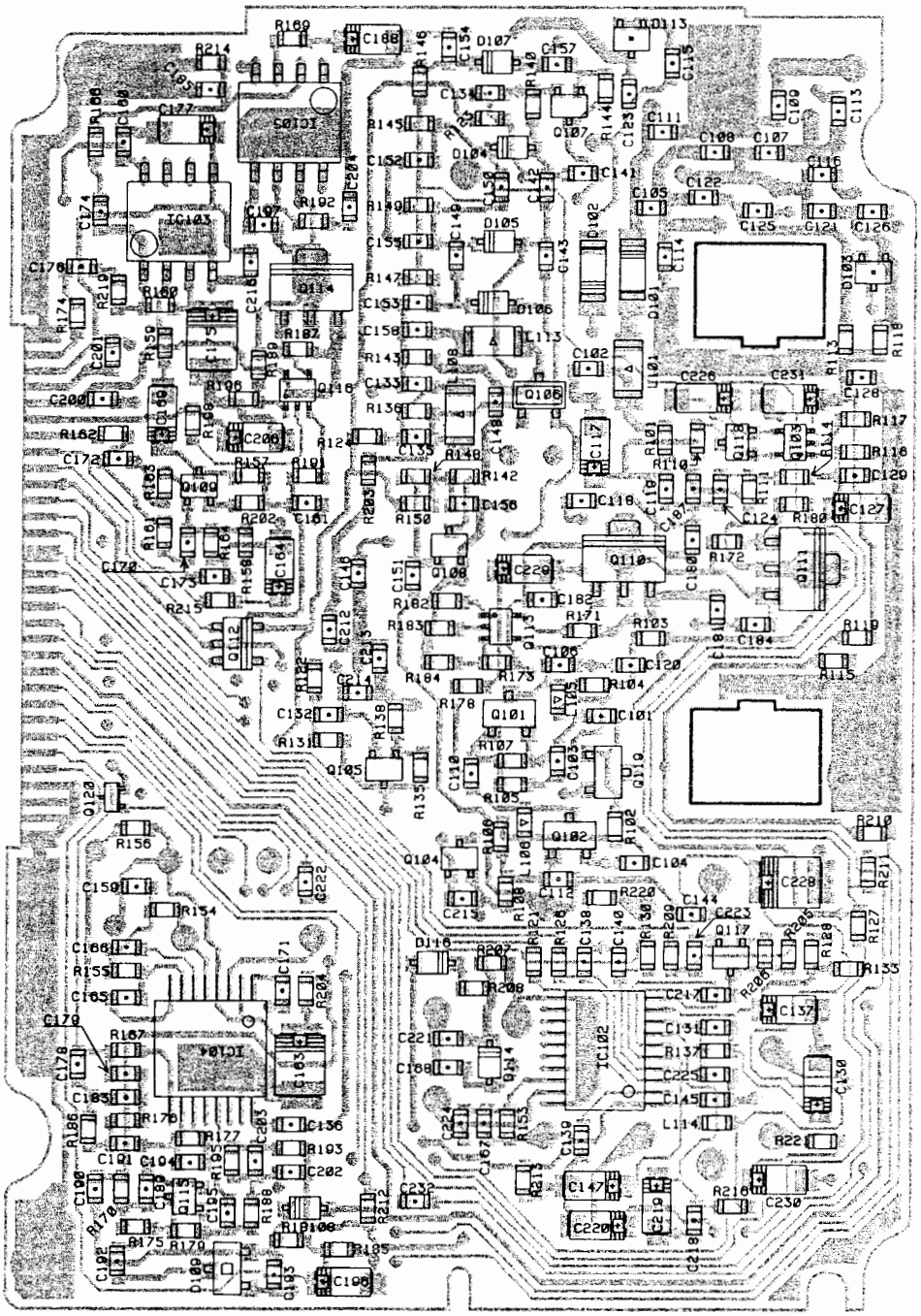
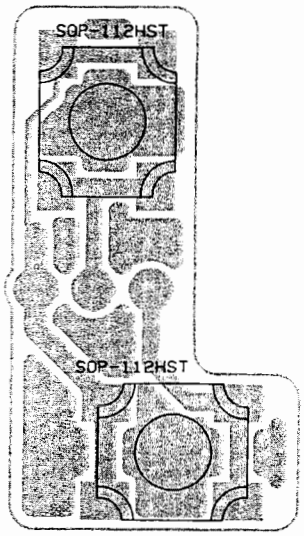


SW Unit Side A
(VALUE)



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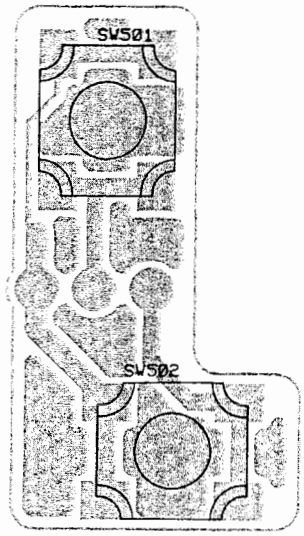
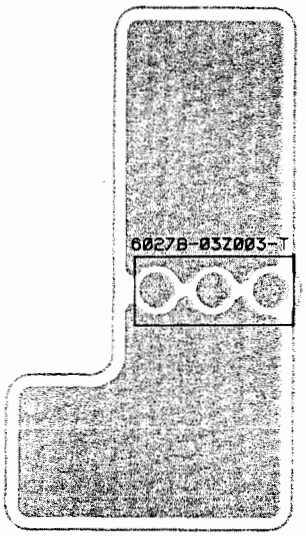


SW Unit Side B
(VALUE)



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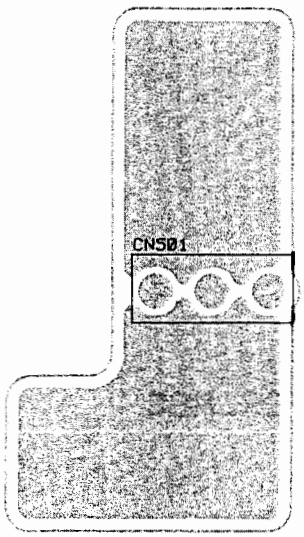

PTT Unit Side A
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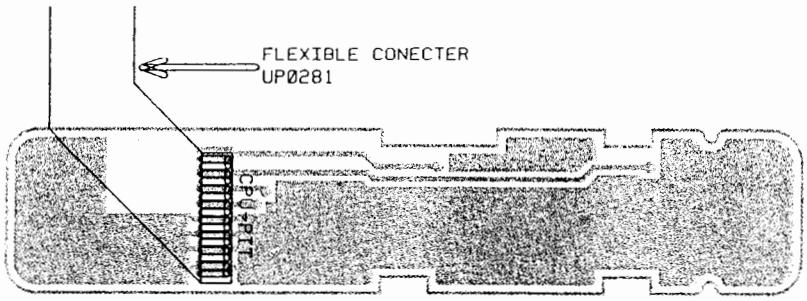
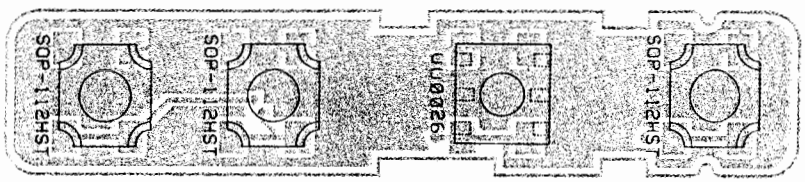


(REFERENCE)

PTT Unit Side B
(VALUE)



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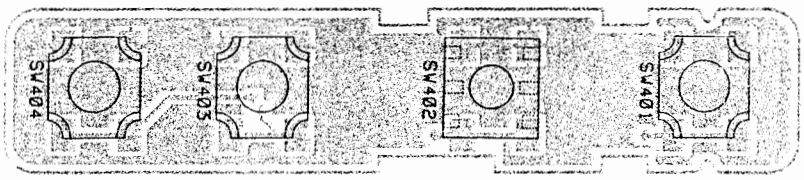
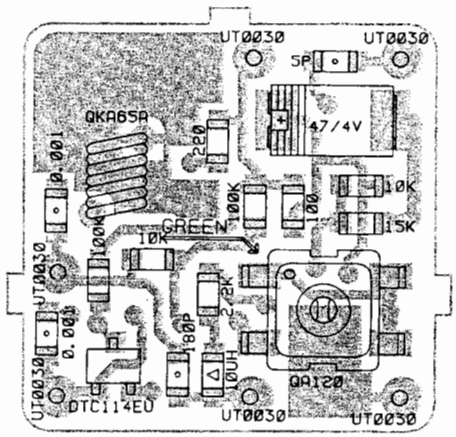


VCO Unit Side A
(VALUE)



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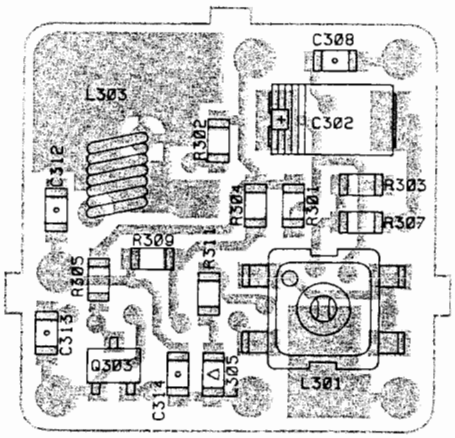
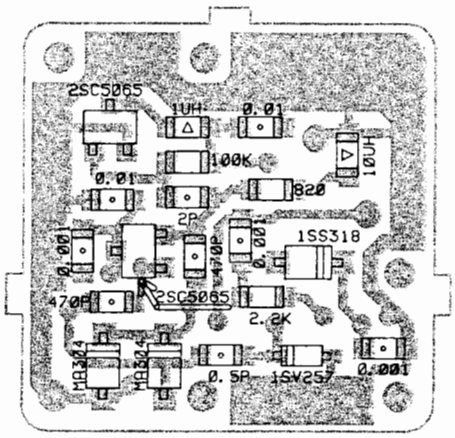


VCO Unit Side B
(VALUE)



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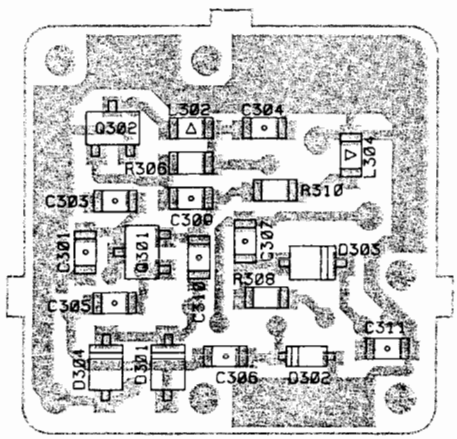
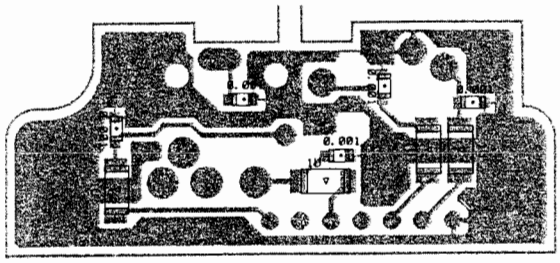


JACK Unit Side A
(VALUE)



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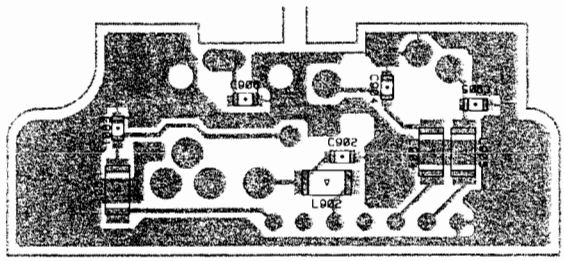

JACK Unit Side B
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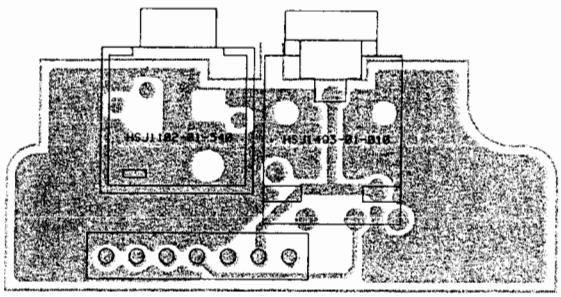

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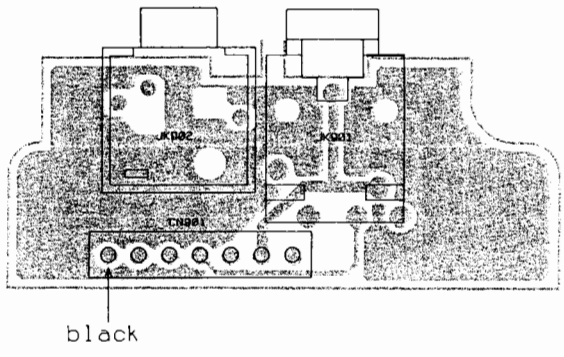
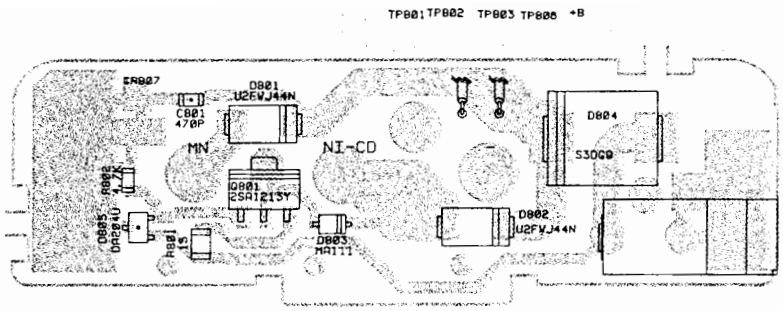
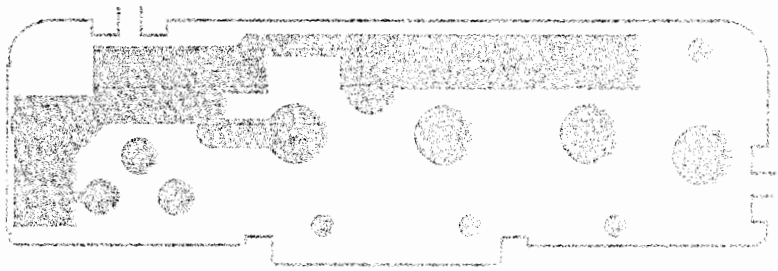


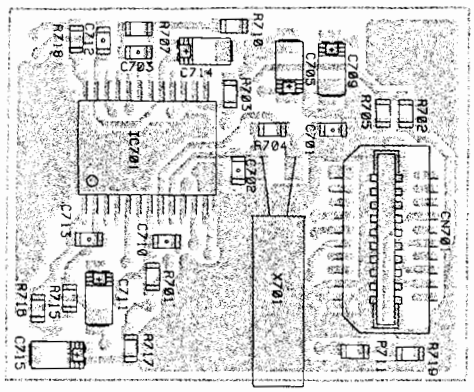
CHARGE Unit Side A
(VALUE / REFERENCE)



CHARGE Unit Side B
(VALUE / REFERENCE)



TSQ UNIT Side A
(VALUE)



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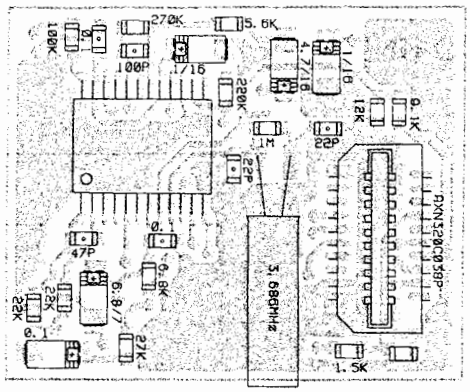
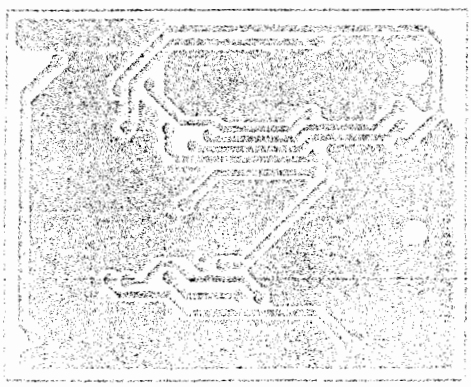
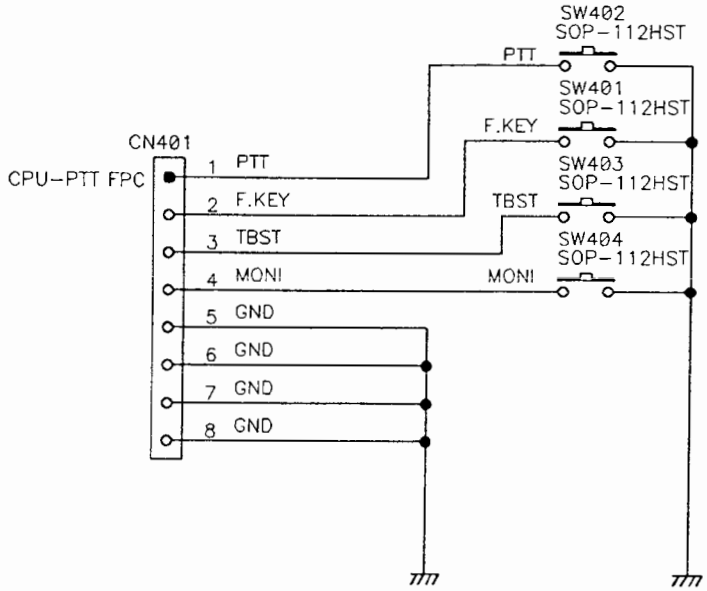


TSQ UNIT Side B
(VALUE/REFERENCE)

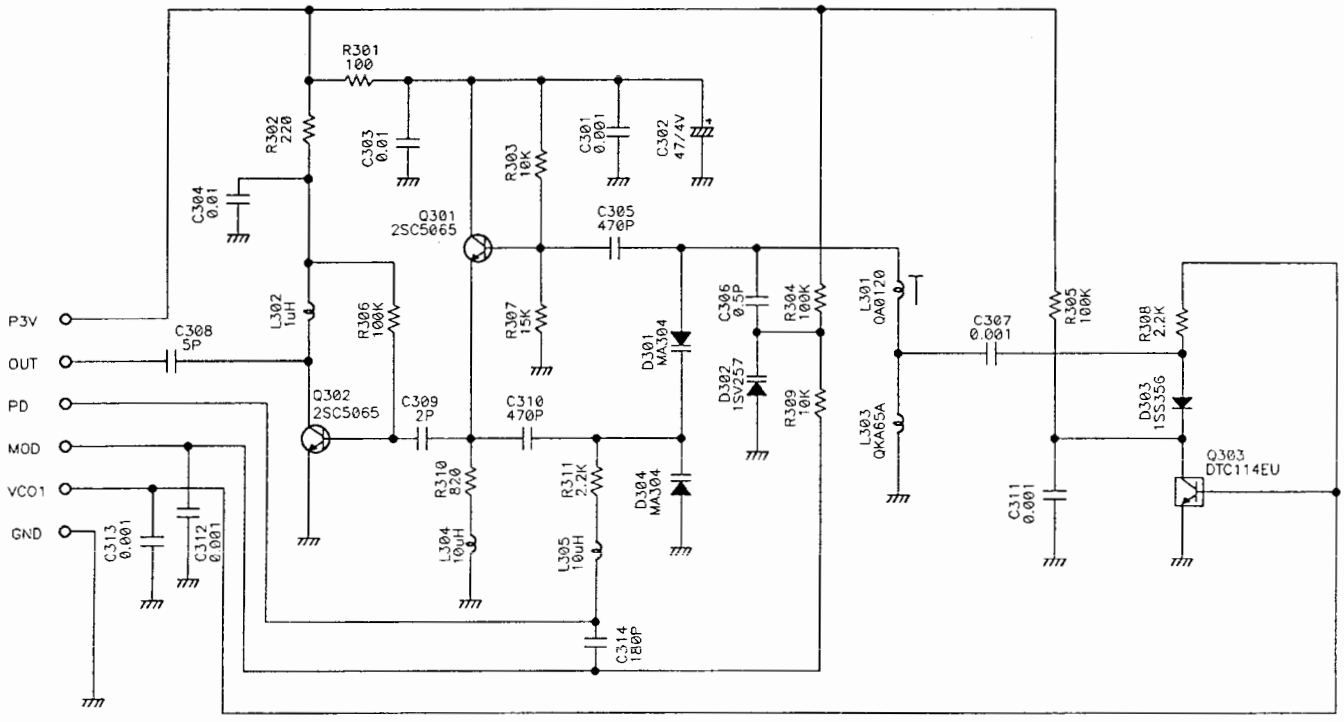


CIRCUIT DIAGRAM

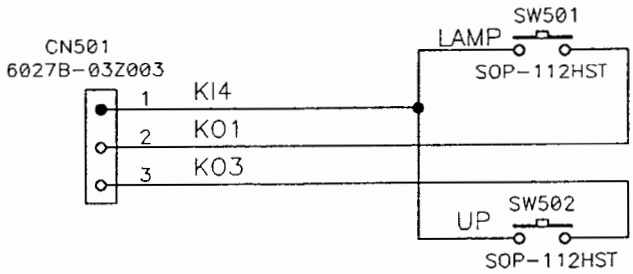
PTT UNIT



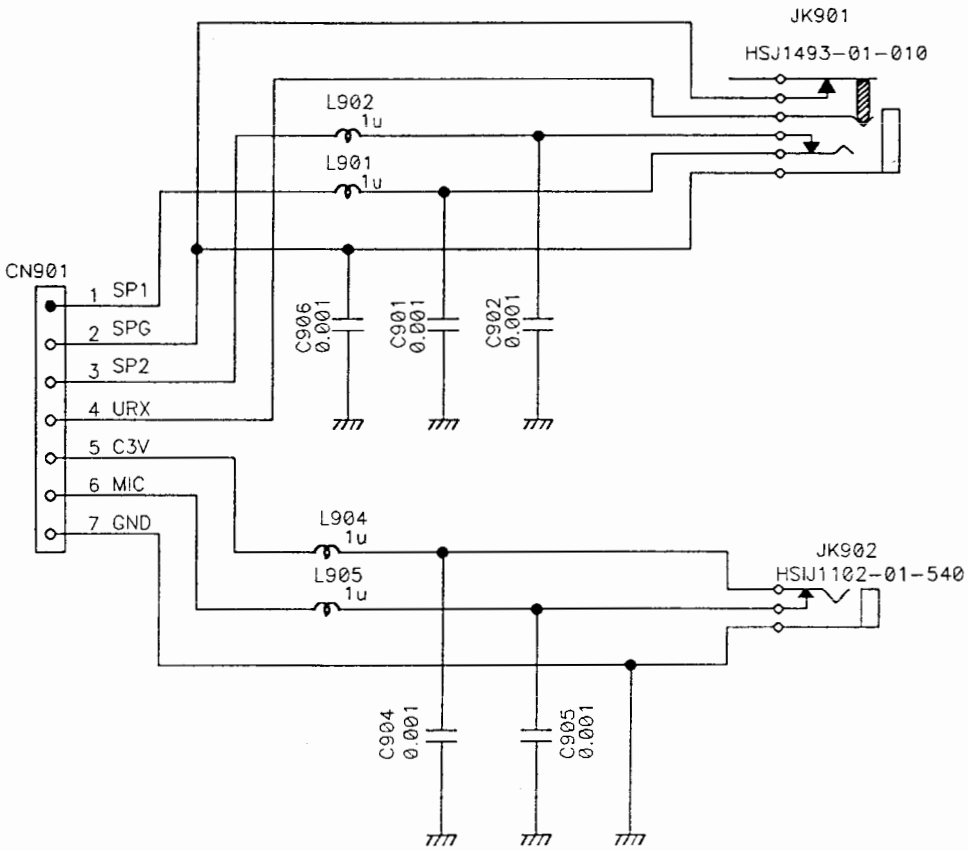
VCO UNIT



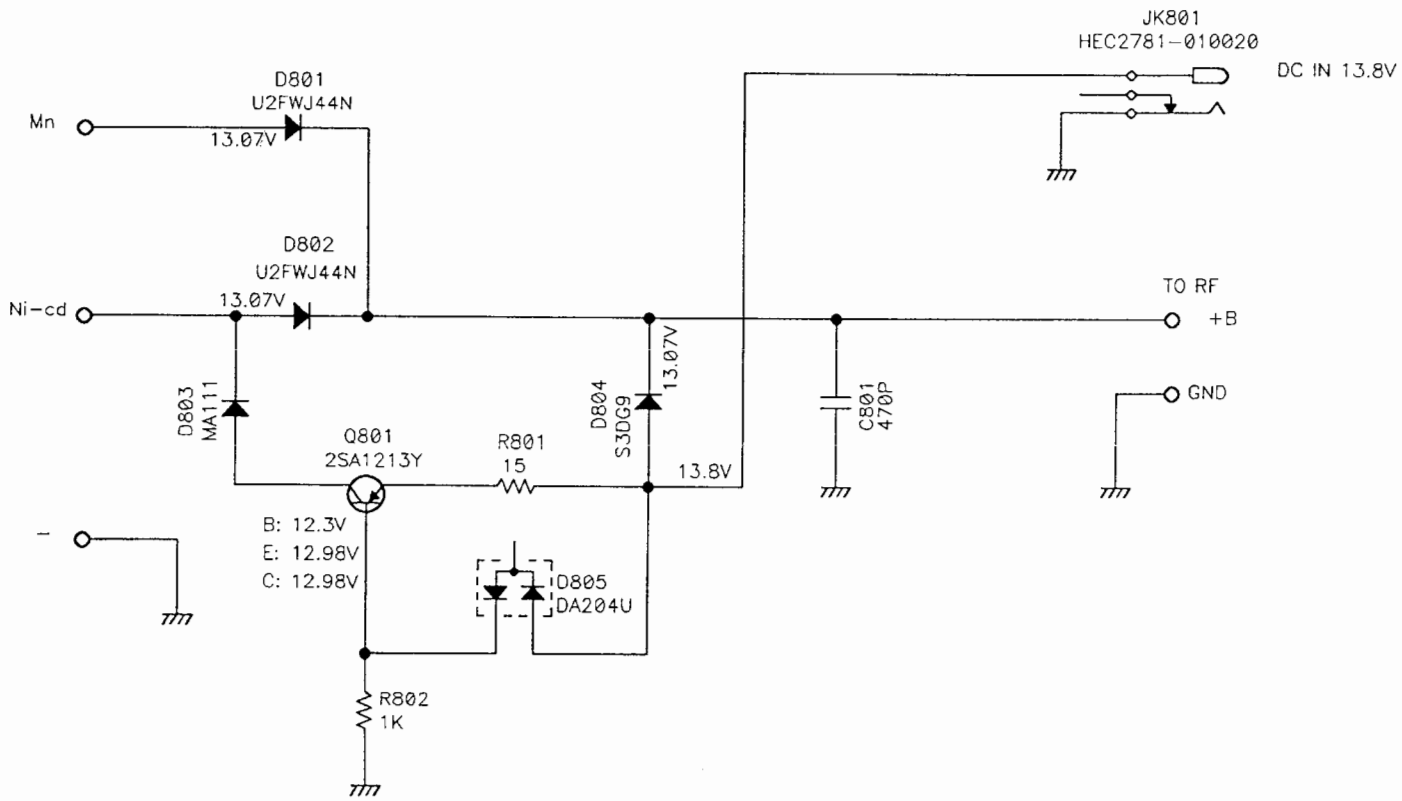
SW UNIT



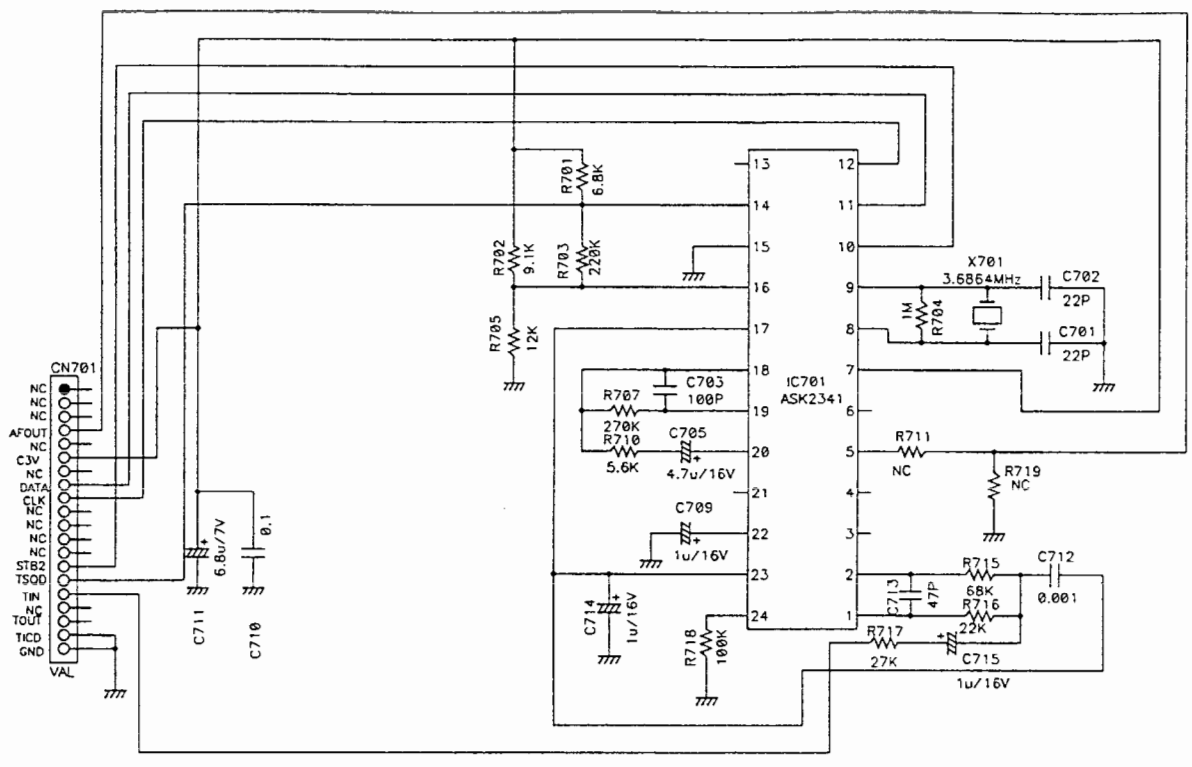
SP-JACK UNIT



CHARGE UNIT



TSQ UNIT



R718 WA BIAS DENNATU
IC701NO DOUSADENNATU WO

RF UNIT

RX:145MHz SQ OFF VOL LEVEL 16

TX:145MHz LOW POWER

( )内はTX時

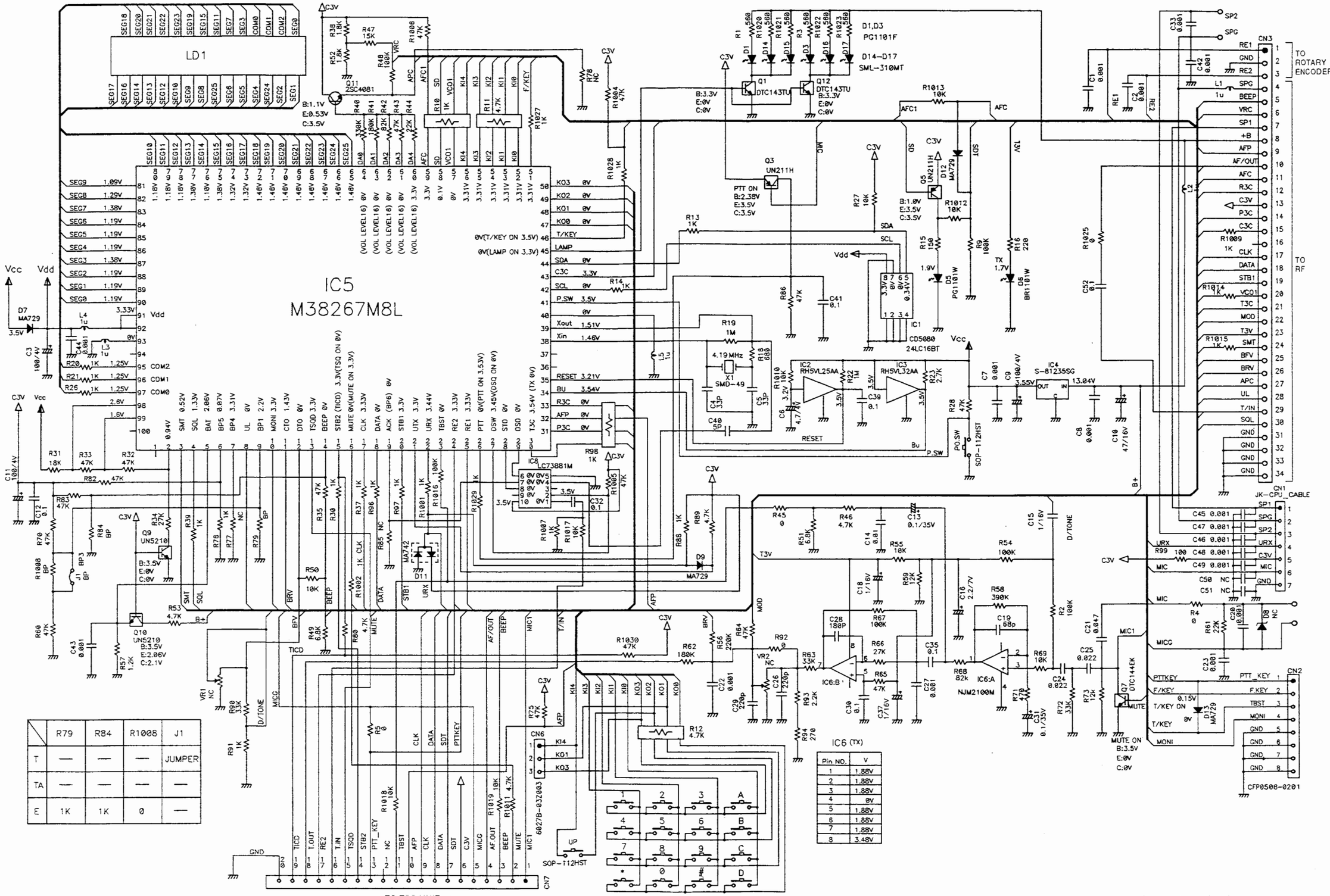
VCO

Q303	B	E	C
RX 130.00–161.7MHz TX 130.00–140.00MHz	3.0V	0V	0V
RX 161.17–174.00MHz TX 140.00–174.00MHz	0V	0V	2.6V

TO CPU BOARD

TO CHARGE BOARD

CPU UNIT



	R79	R84	R1008	J1
T	—	—	—	JUMPER
TA	—	—	—	—
R	1K	1K	0	—

BLOCK DIAGRAM