

DJ-446

Service Manual

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ALINCO, INC.

SPECIFICATIONS

1) GENERAL

Frequency coverage

DJ-446 E/EUK		DJ-446EF	
Channel	Frequency MHz	Channel	Frequency MHz
1	446. 00625	---	---
2	446. 01875	---	---
3	446. 03125	1	446. 03125
4	446. 04375	2	446. 04375
5	446. 05625	3	446. 05625
6	446. 06875	4	446. 06875
7	446. 08125	5	446. 08125
8	446. 09375	6	446. 09375

Mode

F3E (FM)

Channel steps

12.5kHz

Memory channels

30 channels+1 CALL channel

Antenna

50Ω unbalanced

Frequency stability

±5 ppm

Microphone input impedance

2kΩ nominal

Power supply requirement

7.0 ~ 16.0V DC (negative ground)

Current drain (at 13.8 V DC)

0.5A (typical) Transmit high at 0.5W

200mA (typical) Receive at 280mW

50mA (typical) standby

20mA (typical) Battery save on

Usable temperature range

-10 ~ +60°C (14 ~ 140°F)

Dimensions

56 (W) × 124 (H) × 37.5 (D) mm (with EBP-50N)

(Projections not included)

2.2"(W) × 4.88"(H) × 1.48"(D) inches (with EBP-50N)

Weight

Approx. 300g (10.56oz) (with EBP-50N)

Sub audible Tone(CTCSS)

encoder/decoder installed (39tones)

2) TRANSMITTER

Output power

Approx. 0.5W EBP-50N installed

Approx. 0.5W 13.8V DC

Approx. 0.1W (LOW)

Modulation system

Variable reactance frequency modulation

Spurious emissions

Less than -60dB

Max. frequency deviation

±2.5kHz

3) RECEIVER

Receive system

Double conversion superheterodyne

Intermediate frequencies

1st 45.1MHz / 2nd 455kHz

Sensitivity(12dB SINAD)

Less than -12.0dBμ (0.25V)

Selectivity

-6dB : 6kHz or more

-60dB : 12kHz or less

Audio output power

280mW (typical with an 8Ω load)

200mW (8Ω 10% THD)

CIRCUIT DESCRIPTION

1) Receiver System

The receiver system is a double superheterodyne system with a 45.1MHz first IF and a 455kHz second IF.

1. Front End

The received signal at any frequency in the 446MHz range is passed through the low-pass filter (L2, L3, L8, C2, C9, C10, C11, and C62) and high-pass filter (C56, C57, C61, L25 and D15), and amplified by the RF amplifier (Q9). The signal from Q9 is then passed through the tuning circuit (L19, L20, L21 and varicaps D12, D13 and D14) and converted into 45.1MHz by the mixer (Q10). The tuning circuit, which consists of L25, L19, L20, L21, D15, D12, D13 and D14 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 (Q11), and supplied to the source of the mixer (Q10). 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 (XF1) selects 45.1MHz frequency from the results and eliminates the signals of the unwanted frequencies. The first IF amplifier (Q8) then amplifies the signal of the selected frequency.

3. Demodulator Circuit

After the signal is amplified by the first IF amplifier (Q8), it is input to pin 16 of the demodulator IC (IC4). The second local signal of 45.555MHz, which is oscillated by the internal oscillation circuit in IC4 and crystal (X2). Then, these two signals are mixed by the internal mixer in IC4 and the result is converted into the second IF signal with a frequency of 455kHz. The second IF signal is output from pin 3 of IC4 to the ceramic filter (FL1), where the unwanted frequency band of that signal is eliminated, and the resulting signal is sent back to the IC4 through pin 5.

The second IF signal input via pin 5 is demodulated by the internal limiter amplifier and quadrature detection circuit in IC4, and output as an audio signal through pin 10.

4. Audio Circuit

The audio signal from pin 10 of IC4 is compensated to the audio frequency characteristics in the de-emphasis circuit (R106, R107, C128, C127) and amplified by the AF amplifier (Q27). The signal is then input to pin 2 of the electronic volume (IC6) for volume adjustment, and output from pin 1. The adjusted signal is sent to the audio power amplifier (IC5) through pin 2 to drive the speaker.

5. Squelch Circuit

The signal except for the noise component in AF signal of IC4 is cut by the active filter inside IC. The noise component is amplified and rectified, then converted to the DC voltage to output from pin13 of IC4. The voltage is led to pin 2 of CPU and compared with the setting voltage. The squelch will open if the input voltage is lower than the setting voltage.

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 (IC8). IC8 consists of two operational amplifiers; one amplifier (pins 5, 6, and 7) is composed of pre-emphasis and IDC circuits and the other (pins 1, 2, and 3) is composed of a splatter filter. The maximum frequency deviation is obtained by VR1 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 IC (IC1) and drive amplifier (Q4), and input to the final amplifier (Q2). The signal is then amplified by the final amplifier (Q2) and led to the antenna switch (D2) and low-pass filter (L5, L3, L2, C24, C11, C10, and C9), 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 D7, converted to DC, and then amplified by a differential amplifier. The output voltage controls the bias voltage from the source of Q2 and Q4 to maintain the transmission power constant.

3) PLL Synthesizer Circuit

1. PLL

The dividing ratio is obtained by sending data from the CPU (IC9) to pin 2 and sending clock pulses to pin 3 of the PLL IC (IC2). The oscillated signal from the VCO is amplified by the buffer (Q5, Q37) and input to pin 6 of IC2. Each programmable divider in IC2 divides the frequency of the input signal by N according to the frequency data, to generate a comparison frequency.

2. Reference Frequency Circuit

The reference frequency appropriate for the channel steps is obtained by dividing the 21.25MHz reference oscillation (X1) by 4250 or 3400, according to the data from the CPU (IC9). When it is 6.25kHz, the 12.5kHz channel step is used.

3. Phase Comparator Circuit

The PLL (IC2) uses the reference frequency. The phase comparator in the IC2 compares the phase of the frequency from the VCO with that of the comparison frequency. Which is obtained by the internal divider in IC2.

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 IC2 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 Q3 directly oscillates the desired frequency. The frequency control voltage determined in the CPU (IC9) and PLL circuit is input to the varicaps (D3). This change the oscillation frequency, which is amplified by the VCO buffer (Q5) and output from the VCO unit.

4) CPU and Peripheral Circuits

1. LCD Display Circuit

The CPU turns ON the LCD via segment and common terminals with 1/4 the duty and 1/4 the bias, at the frame frequency is 112.5Hz.

2. Display Lamp Circuit

When the LAMP key is pressed, "H" is output form pin 42 of CPU (IC9) to the bases of Q19, Q24 and Q25.

3. Reset and Backup

When the power form the DC jack or external battery increases from Circuits 0 V to 2.5V or more, "H" level reset signal is output from the reset IC (IC11) to pin 33 of the CPU (IC9), causing the CPU to reset.

4. S(Signal) Meter Circuit

The DC potential of pin 8 of IC4 is input to pin 1 of the CPU (IC9), converted from an analog to a digital signal, and displayed as the S-meter signal on the LCD.

5. CTCSS Encoder

The CPU (IC9) is equipped with an internal tone encoder. The tone signal (67.0 to 250.3 Hz) is output from pin 9 of the CPU to the varicap (D4) of the VCO for modulation.

6. CTCSS Decoder

The voice band of the AF output signal from pin 10 of IC4 is cut by sharp active filter IC7 (VCVS) and amplified, then led to pin 4 of CPU. The input signal is compared with the programmed tone frequency code in the CPU. The squelch will open when they match.

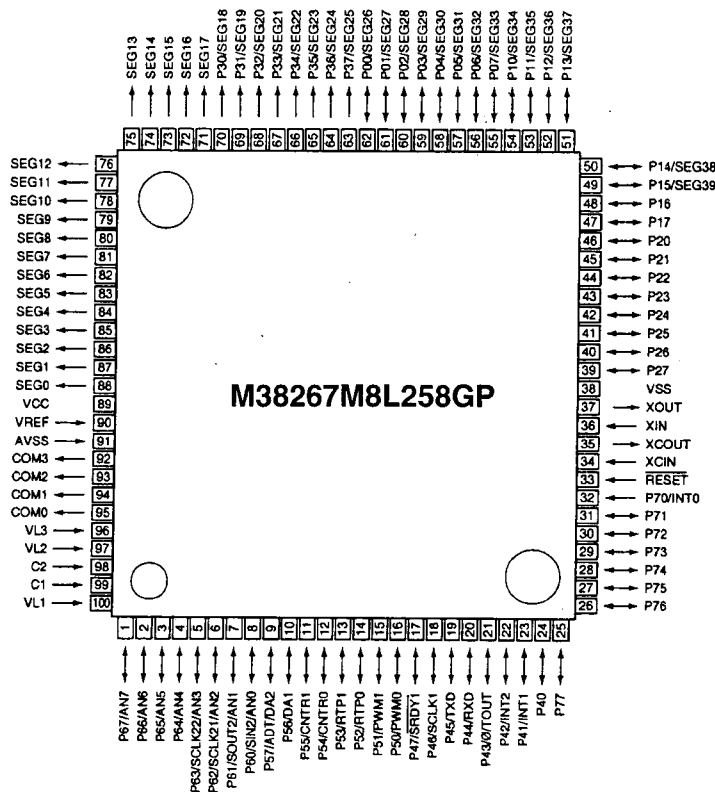
7. Clock Shift

In the unlikely event that CPU clock noise is present on a particular operating frequency programmed into the radio, you can shift the CPU clock frequency to avoid the CPU clock-noise. The output signal from pin 31 of the CPU turns on Q35. Then the oscillation frequency of X3 will be shifted about 300 ppm.

5) M38267M8L258GP (XA0733)

CPU

Terminal Connection
(TOP VIEW)



No.	Pin Name	Function	I/O	PU	Logic	Description
1	P67/AN7	SMT	I	-	A/D	S-meter input
2	P66/AN6	SQL	I	-	A/D	Noise level input for squelch
3	P65/AN5	BAT	I	-	A/D	Low battery detection input
4	P64/AN4	TIN	I	-	A/D	CTCSS tone input
5	P63/SCLK22/AN3	BP1	I	-	A/D	Band plan 1
6	P62/SCLK21/AN2	BP2	I	-	A/D	Band plan 2
7	P61/SOUT2/AN1	DCSW	I	-	A/D	-
8	P60/SIN2/AN0	F/M/KEY	I	-	A/D	Function/Monitor key input
9	P57/ADT/DA2	CTOUT	O	-	D/A	CTCSS tone output/Tuning voltage out
10	P56/DA1	DTOUT	O	-	D/A	EVR control output
11	P55/CNTR1	SCL	O	-	Pulse	Serial clock for EEPROM
12	P54/CNTR0	TBST	I/O	*	Pulse/Activ low	Tone burst output
13	P53/RTP1	BP4	I	-	-	Band plan 4
14	P52/RTP0	MUTE	I/O	-	Activ high	Microphone mute
15	P51/PWM3	CLK	O	-	Pulse	Serial clock output for PLL,CTCSS
16	P50/PWM0	DATA	I/O	-	Pulse	Serial data output for PLL,CTCSS,PLL unlock signal input
17	P47/SROY1	TRESET	I/O	-	-	-
18	P46/SCLK1	STBP	O	-	Pulse	Strobe for PLL IC
19	P45/TXD	UTX	O	-	Pulse	UART data transmission output
20	P44/RXD	RTX	I	-	Pulse	UART data reception output
21	P43/ Φ /TOUT	BEEP	I/O	-	Pulse/Activ low	Beep tone/Band plan 3(when PSW is on)
22	P42I/NT2	RE2	I	*	Aktiv low	Rotary encoder input
23	P41/INT1	RE1	I	*	Aktiv low	
24	P40	SD	O	-	Aktiv low	Signal detection output
25	P77	PTT	I	-	Activ high	PTT input
26	P76	BP6	I	*	-	-
27	P75	P5C	O	-	Activ low	PLL power ON/OFF output
28	P74	T5C	O	-	Activ low	TX power ON/OFF output
29	P73	R5C	O	-	Activ low	RX power ON/OFF output
30	P72	AFP	O	-	Activ low	AF AMP power ON/OFF output
31	P71	CLSFT	O	-	Activ high	CLOCK frequency shift
32	P70/INT0	BU	I	-	Activ low	Backup signal detection input
33	RESET	RESET	I	-	Activ low	Reset input
34	Xcin	Xcin	-	-	-	-
35	Xcout	Xcout	-	-	-	-
36	Xin	Xin	-	-	-	Main clock input
37	Xout	Xout	-	-	-	Main clock output
38	Vss	GND	-	-	-	CPU GND
39	P27	PSW	I	-	Aktiv low	Power switch input
40	P26	SDA	O	-	Pulse	Serial data for EEPROM
41	P25	C5C	O	-	Activ high	C5V power ON/OFF output
42	P24	LAMP	O	-	Activ high	Lamp ON/OFF
43	P23	BP5	I	*	Aktiv low	Band plan 5
44	P22	BP6	I	*	Aktiv low	Band plan 6
45	P21	KI2	I	*	Aktiv low	Key matrix input
46	P20	KI3	I	*	Aktiv low	
47	P17	KO3	O	-	Aktiv low	
48	P16	KO2	O	-	Aktiv low	
49	P15/SEG39	KO1	O	-	Aktiv low	
50	P14/SEG38	KO0	O	-	Aktiv low	Key matrix output
51	P13/SEG37	H/L	O	-	-	Tx power H/L
52	P12/SEG36	DA2	O	-	-	DA converter for output power
53	P11/SEG35	DA1	O	-	-	DA converter for output power
54	P10/SEG34	DA0	O	-	-	DA converter for output power
55	P07/SEG33	EXP	I	*	-	UART line SW/External control port

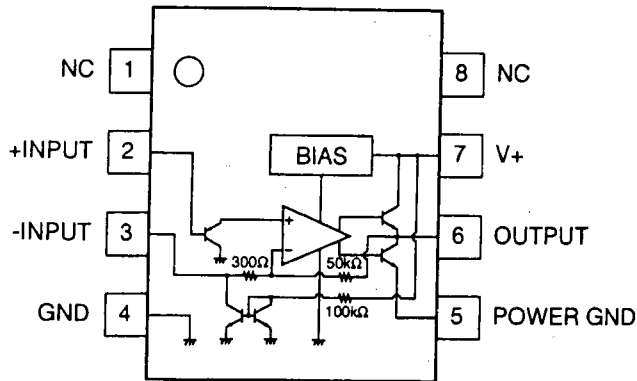
No.	Pin Name	Function	I/O	PU	Logic	Description
56	P06/SEG32	AFC	O	-	Activ high	AF tone control
57	P05/SEG31	S31	O	-	-	LCD segment signal
58	P04/SEG30	S30	O	-	-	
59	P03/SEG29	S29	O	-	-	
60	P02/SEG28	S28	O	-	-	
61	P01/SEG27	S27	O	-	-	
62	P00/SEG26	S26	O	-	-	
63	P37/SEG25	S25	O	-	-	
64	P36/SEG24	S24	O	-	-	
65	P35/SEG23	S23	O	-	-	
66	P34/SEG22	S22	O	-	-	
67	P33/SEG21	S21	O	-	-	
68	P32/SEG20	S20	O	-	-	
69	P31/SEG19	S19	O	-	-	
70	P30/SEG18	S18	O	-	-	
71	SEG17	S17	O	-	-	
72	SEG16	S16	O	-	-	
73	SEG15	S15	O	-	-	
74	SEG14	S14	O	-	-	
75	SEG13	S13	O	-	-	
76	SEG12	S12	O	-	-	
77	SEG11	S11	O	-	-	
78	SEG10	S10	O	-	-	
79	SEG9	S9	O	-	-	
80	SEG8	S8	O	-	-	
81	SEG7	S7	O	-	-	
82	SEG6	S6	O	-	-	
83	SEG5	S5	O	-	-	
84	SEG4	S4	O	-	-	
85	SEG3	S3	O	-	-	
86	SEG2	S2	O	-	-	
87	SEG1	S1	O	-	-	
88	SEG0	S0	O	-	-	
89	Vcc	VDD	-	-	-	
90	Vref	Vref	-	-	-	AD converter power supply
91	Avss	Avss	-	-	-	AD converter GND
92	COM3	COM3	O	-	-	LCD COM3 output
93	COM2	COM2	O	-	-	LCD COM2 output
94	COM1	COM1	O	-	-	LCD COM1 output
95	COM0	COM0	O	-	-	LCD COM0 output
96	VL3	VL3	-	-	-	LCD power supply
97	VL2	VL2	-	-	-	
98	C2	I	-	-	-	-
99	C1	C1	-	-	-	-
100	VL1	VL1	I	-	A/D	LCD power supply

SEMICONDUCTOR DATA

1) NMJ2070M T1 (XA0210)

Low Voltage Power Amplifier

Equivalent Circuit

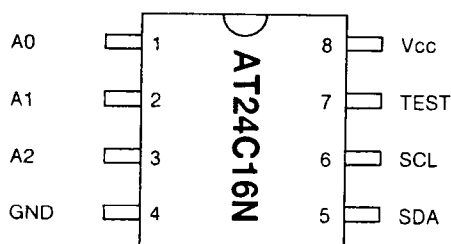


$V_+ = 6V, T_a = 25 \pm 2^\circ C$

Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit	
Supply voltage		V_+	1.8	-	15	V	
Idle current	$R_L = \infty$	I_Q	-	4	7	mA	
Output voltage		V_o	-	2.7	-	V	
Input bias current		I_b	-	200	-	nA	
Output power	THD=10%, $f=1kHz$	P_o	$V_+ = 6V, R_L = 4$	0.5	0.6	-	W
			$V_+ = 4.5V, R_L = 4$	-	0.32	-	W
			$V_+ = 3V, R_L = 4$	-	120	-	mW
			$V_+ = 2V, R_L = 4$	-	30	-	mW
	THD=10%, $f=1kHz$	$V_+ = 6V, R_L = 4$	-	500	-	mW	
		$V_+ = 4.5V, R_L = 4$	-	250	-	mW	
Distortion	$P_o = 0.4W, R_L = 4, f = 1kHz$	THD	-	0.25	-	%	
Voltage gain	$f = 1kHz$	A_v	41	44	47	dB	
Input impedance	$f = 1kHz$	Z_{IN}	100	-	-	k	
Equivalent input noise voltage	$R_s = 10k$	A curve	V_{n1}	-	2.5	-	μV
		B=22Hz to 22kHz	V_{n2}	-	3	-	μV
Power supply voltage rejection ratio	$f = 100Hz, C_x = 100\mu F$	SVR	24	30	-	dB	
Power gain band width (-3dB)	$R_L = 8, P_o = 250mW$	P.B	-	200	-	kHz	

2) AT24C16N-10SI-2.7TER (XA0368)

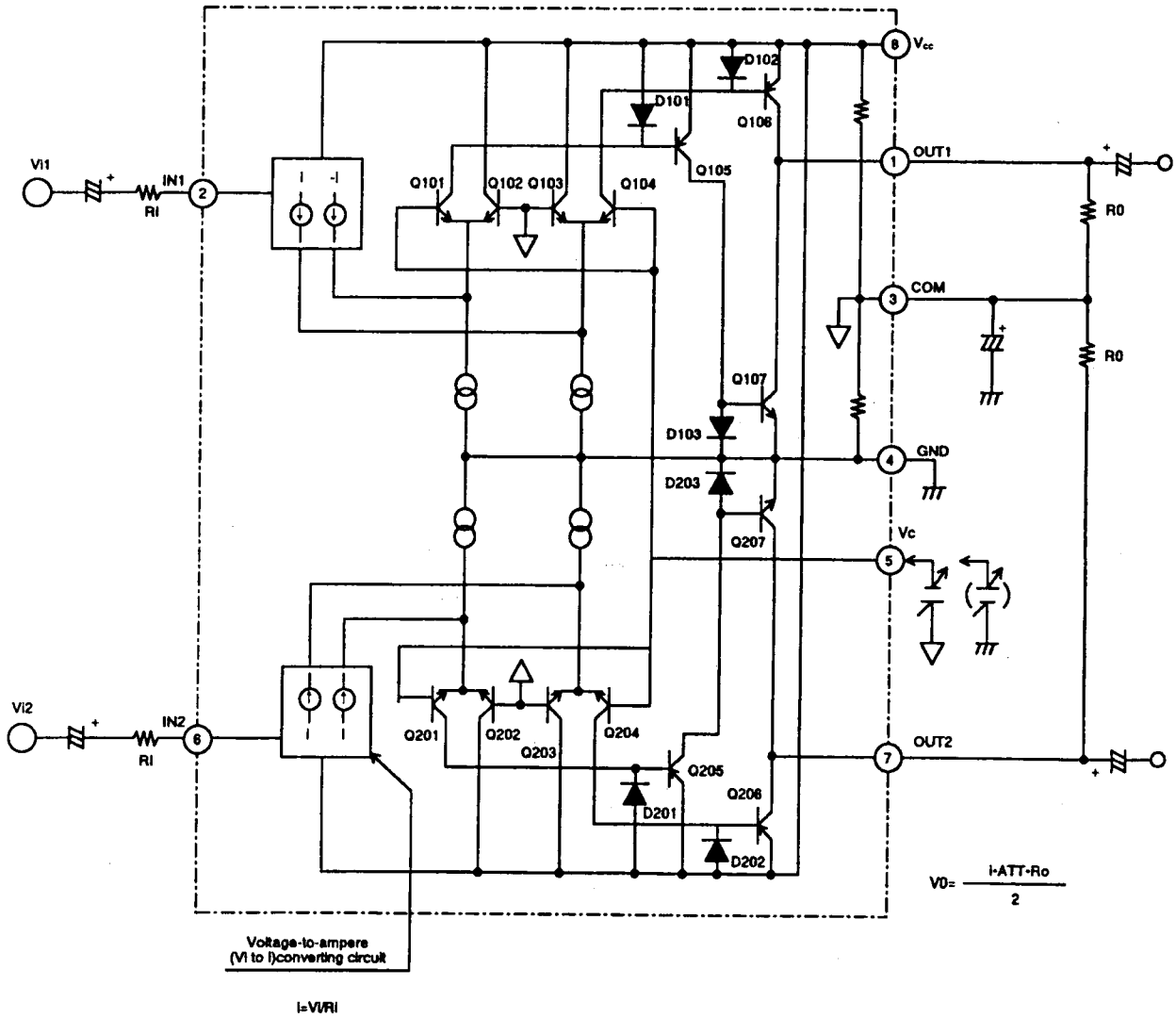
16K bits CMOS Serial EEPROM



Pin Name	Function
A0 to A2	Address inputs
SDA	Serial Data
SCL	Serial Clock
Test	Test Input (GND or Vcc)
NC	No connection

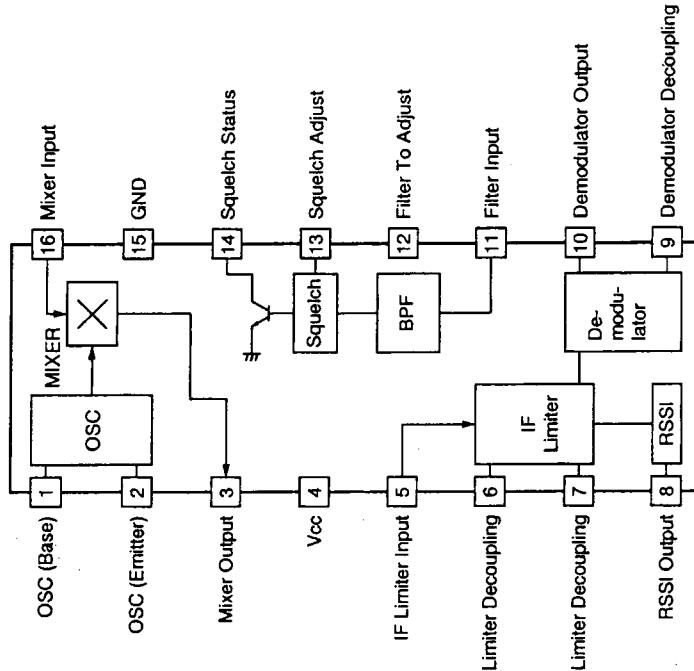
3) M5222FP-600C (XA0385)

Electronic Volume



4) TK14521MTL (XA0515)

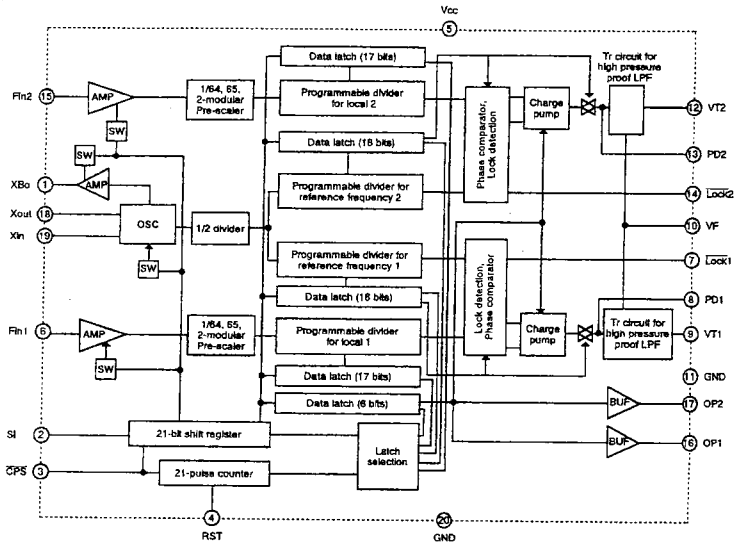
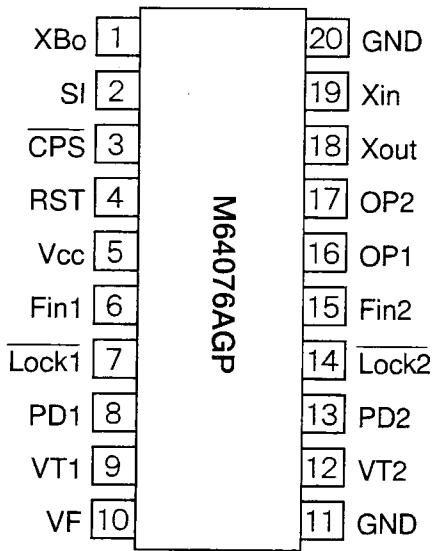
IF System



Ta = 25°C, Vcc = 3V, fin = 10.7MHz, fm = 1kHz, Mod = ±3kHz

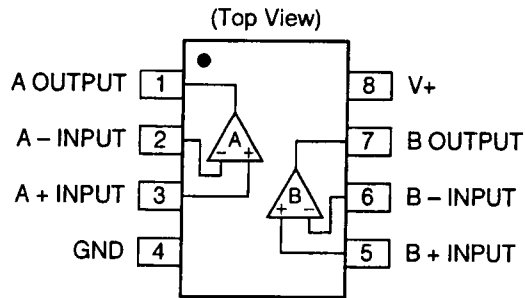
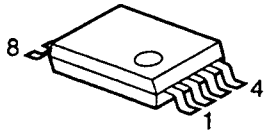
Parameter	Symbol	Ratings			Unit	Condition
		Min	Typical	Max		
Supply Current	Icc	4.3	7.0	9.8	mA	No signal
Mixer + IF part						
Limiting Sensitivity	Limit	-94	-100	-106	dBm	-3.0dB point
Output Voltage	Vo	200	300	400	mVrms	
Distortion	THD		0.8	2.8	%	
S/N	S/N	40	46	52	dB	
AM Rejection Ratio	AMRR	30	40		dB	AM 30% mod
Mixer Conversion Gain	GM	20	26	32	dB	
Mixer 3rd Intercept point	ICP	-10	-3		dBm	
Mixer Input Impedance	RIM	2.8	3.6	4.4	KΩ	DC Test
Mixer Output Impedance	ROM	1.2	1.5	1.9	KΩ	DC Test
Limiter input Impedance	RIFIN	1.2	1.5	1.9	KΩ	DC Test
RSSI part						
RSSI Output Current 1	IRSSI 1	41	60	88	μA	-30dBm is input.
RSSI Output Current 2	IRSSI 2	22	40	59	μA	-60dBm is input.
RSSI Output Current 3	IRSSI 3	10	17	25	μA	-100dBm is input.
Squelch BPF part						
Center Frequency 1	fct 1	10.5	15.0	21.0	kHz	Center frequency setting R=∞
Center Frequency 2	fct 2	21.0	30.0	39.0	kHz	Center frequency setting R=36kΩ
Center Frequency 3	fct 3	38.5	55.0	71.5	kHz	Center frequency setting R=6.8kΩ
Squelch Output Current	Isq	6	10	18	μA	Center frequency setting R=36kΩ 25mVrms is input (Pin11)
Squelch ON Voltage	Vsq(ON)	0.40	0.47	0.54	V	DC voltage is input to pin13.
Squelch OFF Voltage	Vsq(OFF)	0.50	0.57	0.64	V	DC voltage is input to pin13.

5) M64076AGP (XA0352)



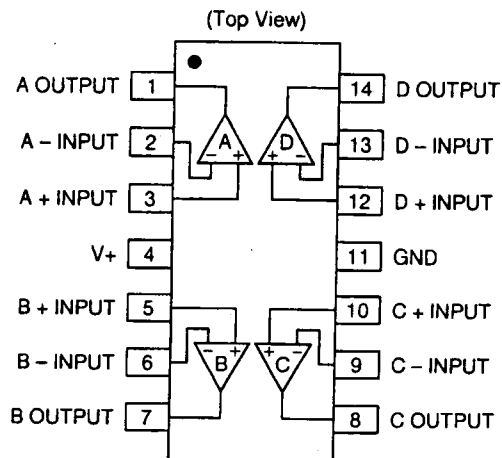
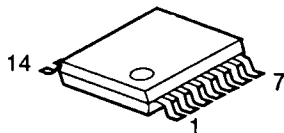
6) NJM2904V-TE1 (XA0573)

Dual Single Supply Operational Amplifier



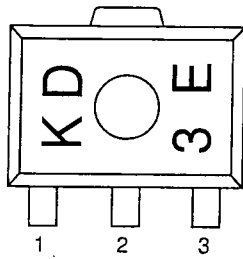
7) NJM2902V-TE1 (XA0596)

Quad Single Supply Operational Amplifier

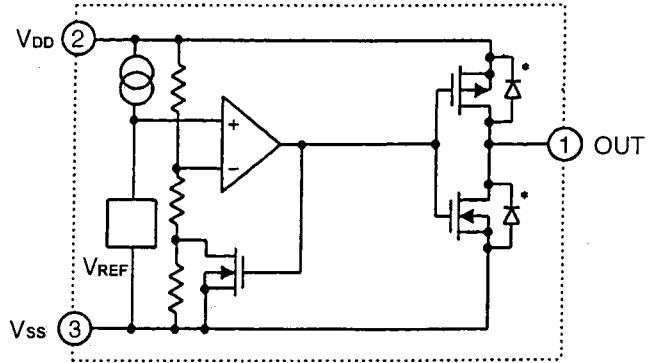


8) S-81350HG-KD-T1 (XA0724)

Top View



1 Vout
2 GND
3 Vin

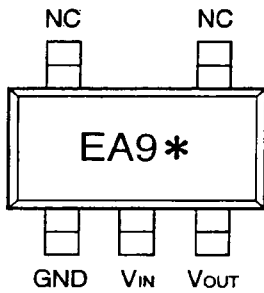


9) S-80845ALMP-EA9-T2 (XA0620)

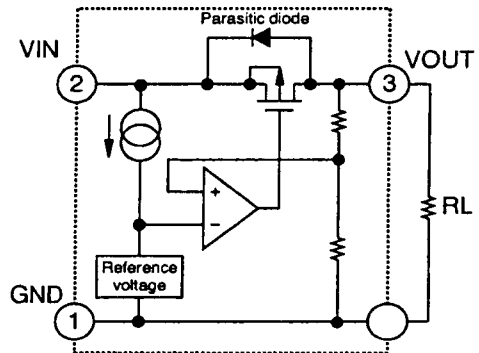
Voltage Regulator

Vin=18V

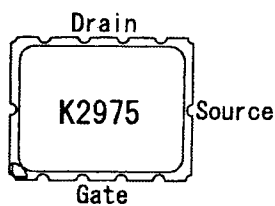
Iout=100mA



* Lot number



10) 2SK2975 (XE0038)



Maximum ratings

Ratings	Symbol	Value	Unit
Drain-Source Voltage	Vdss	30	V
Total Device Dissipation @Tc=20°C	Pd	10	W
Gate-Source Voltage	Vgss	±20	V
Storage Temperature Range	Tstg	-40~+110	°C
Operating Junction Temperature	Tj	175	°C

Characteristic

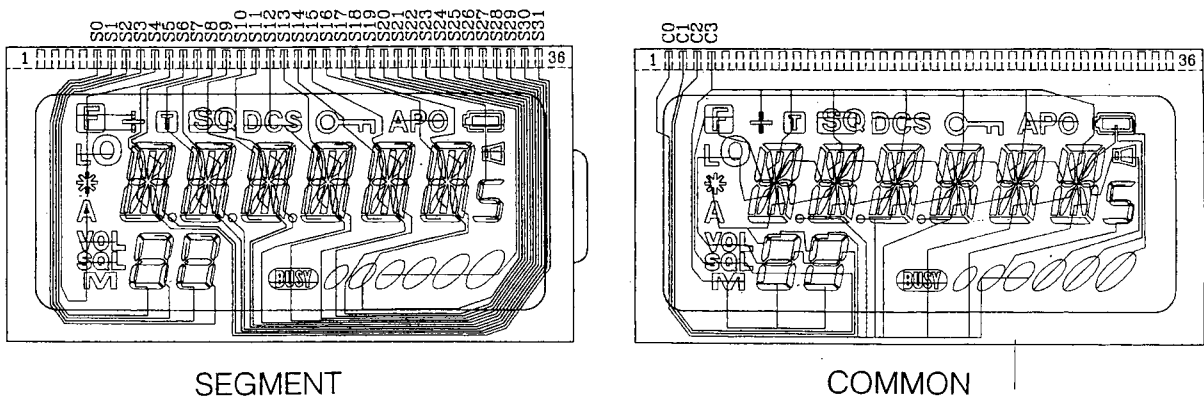
Ratings	Symbol	Min	Max	Unit
Drain-Source Breakdown Voltage Vds=17, Vgs=0V	Idss	-	10	uA
Zero Gate Voltage Drain Current Vgs=10, Vds=0V	Igss	-	1	uA
Gate Threshold Voltage Vds=9.6, Ids=1mA	Vth	1.0	1.7	V
Out Put Power f=450MHz Pin=1W Vds=9.6V	Po	7.0	-	W
Drain Efficiency f=450MHz Pin=1W Vds=9.7V	ηD	50	-	%

11) Transistor, Diode, and LED Outline Drawings

Top View

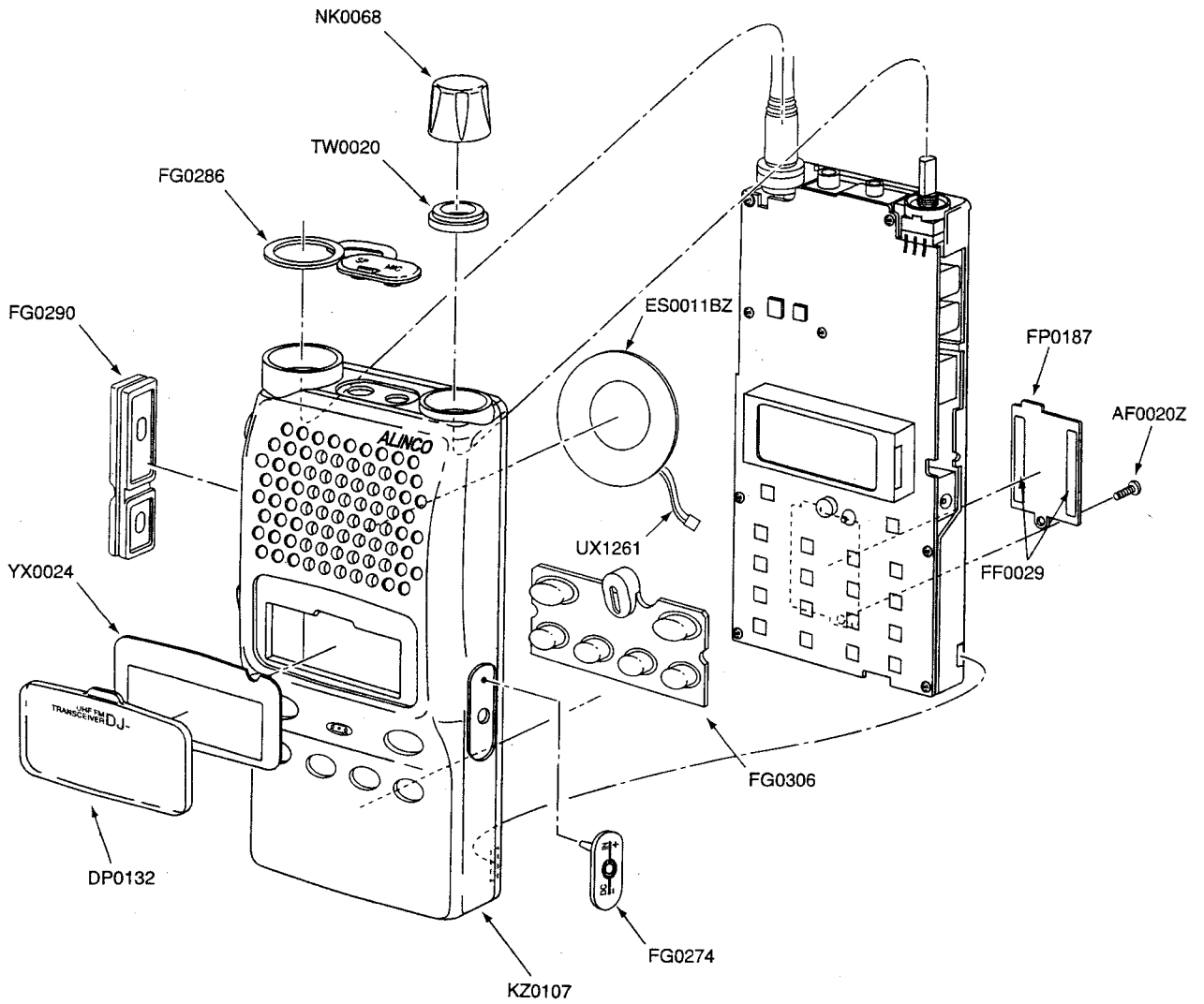
DA204U T106 XD0130	1SV214 TPH4 XD0131	MA741WA TX XD0251	S3DG7 XD0261	MA729-TX XD0291	U2FWJ44N (TE12R) XD0294	MA2S111-TX XD0323
MA2S30400L XD0312	HSU277TRF XD0331	MA2S30400L XD0312	MRF9745T1 XE0034	BRPG1201W TR XL0028	SML-310MTT86 XL0036	2SC4081 T106R XT0095
2SA1036K T146Q XT0110	2SD2216R-TX XT0135	2SB766A-TX XT0170	2SC4808-TX. AR XT0171	2SC4618 XT0172	RN2107 TE85L XU0192	RN1107 TE85L XU0193
RN2111 TE85L XU0194	XP1114 (TX) XU0161	XP1501-TX XU0172	RN1104 TE85L XU0195	RN1104 TE85L XU0195	RN1104 TE85L XU0195	RN1104 TE85L XU0195
1SV311 TPL3 XD0344	1SV307 TPH3 XD0326					

12) LCD Connection (EL0044)

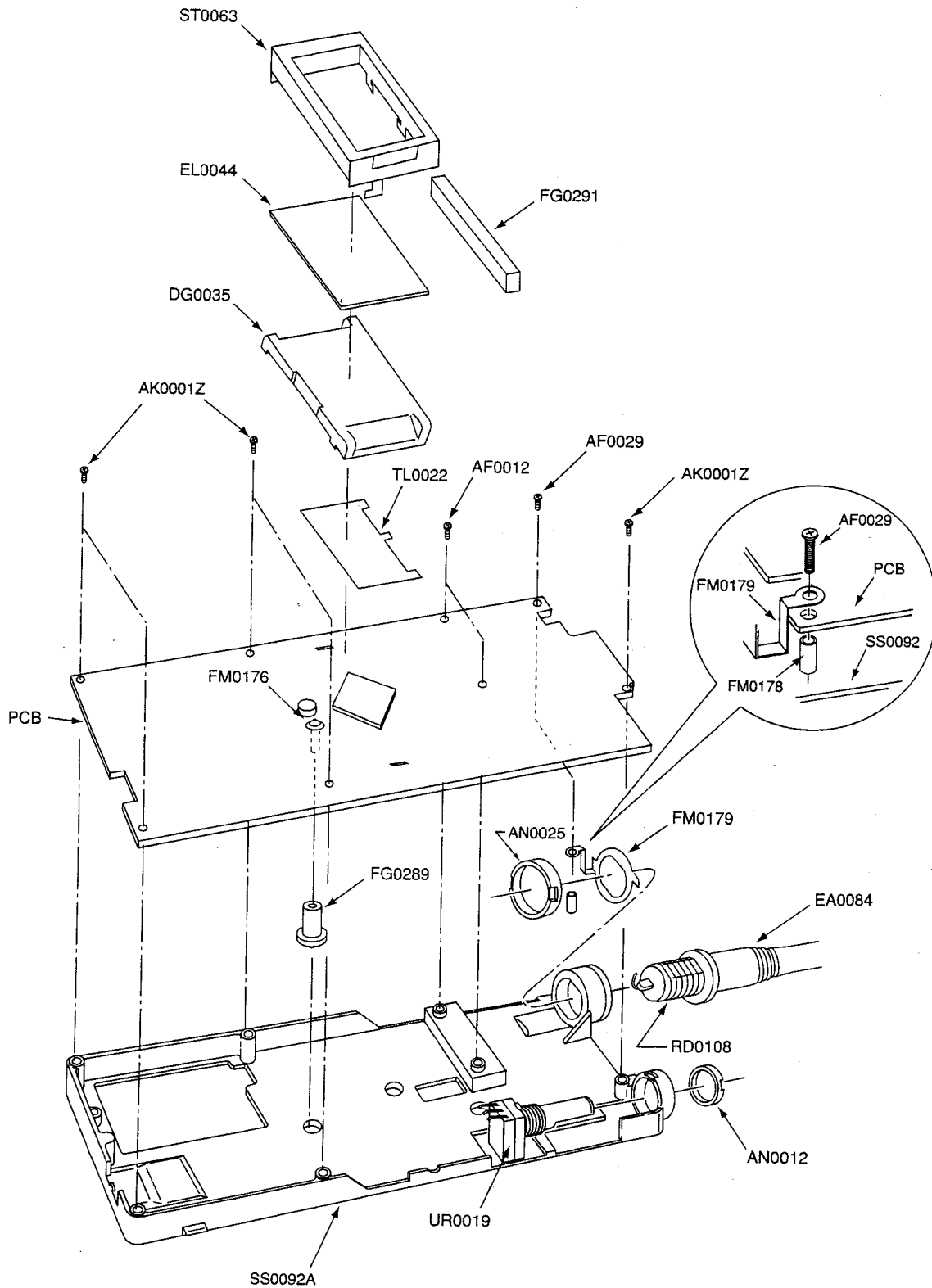


EXPLODED VIEW

1) Front View



2) Rear View



PARTS LIST

Ref. No.	Parts No.	Parts Name	Ver.	Ref. No.	Parts No.	Parts Name	Ver.
C1	CU3031	C1608JB1H471KT-AS		C60	CU3088	C1608CH1H200JT-AS	
C2	CU3031	C1608JB1H471KT-AS		C61	CU3005	C1608CH1H040CT-AS	
C3	CU3057	C1608CH1H130JT-A		C62	CU3006	C1608CH1H050CT-AS	
C4	CU3013	C1608CH1H150JT-AS		C63	NC		
C5	CU3031	C1608JB1H471KT-AS		C64	CU3047	C1608JB1H103KT-N	
C6	CU3031	C1608JB1H471KT-AS		C65	CU3004	C1608CH1H030CT-AS	
C7	CU3007	C1608CH1H060CT-A		C66	CU3004	C1608CH1H030CT-AS	
C8	CU3031	C1608JB1H471KT-AS		C67	CU3006	C1608CH1H050CT-AS	
C9	CU3005	C1608CH1H040CT-AS		C68	CU3023	C1608CH1H101JT-AS	
C10	CU3009	C1608CH1H080CT-A		C69	CU3047	C1608JB1H103KT-N	
C11	CU3009	C1608CH1H080CT-A		C70	CS0407	35MC104MATER	
C12	CU3001	C1608CH1H0R5CT-AS		C71	CU3001	C1608CH1H0R5CT-AS	
C13	CU3031	C1608JB1H471KT-AS		C72	CU3035	C1608JB1H102KT-AS	
C14	CU3001	C1608CH1H0R5CT-AS		C73	CU3047	C1608JB1H103KT-N	
C15	CU3031	C1608JB1H471KT-AS		C74	CU3031	C1608JB1H471KT-AS	
C16	CU3031	C1608JB1H471KT-AS		C75	CU3057	C1608CH1H130JT-A	
C17	CS0408	6MCM156MATER		C76	CU3015	C1608CH1H220JT-AS	
C18	CU3007	C1608CH1H060CT-A		C77	CU3012	C1608CH1H120JT-AS	
C19	CU3035	C1608JB1H102KT-AS		C78	CU3014	C1608CH1H180JT-AS	
C20	CU3014	C1608CH1H180JT-AS		C79	CU3002	C1608CH1H010CT-AS	
C21	CU3011	C1608CH1H100DT-AS		C80	CS0213	TMCMA1A225MTR	
C22	NC			C81	CU3011	C1608CH1H100DT-AS	
C23	CU3001	C1608CH1H0R5CT-AS		C82	CU0108	LMK212BJ105KG	
C24	CU3012	C1608CH1H120JT-AS		C83	CU3031	C1608JB1H471KT-AS	
C25	CU3031	C1608JB1H471KT-AS		C84	CU3031	C1608JB1H471KT-AS	
C26	CU3031	C1608JB1H471KT-AS		C85	CU0108	LMK212BJ105KG	
C27	CU3009	C1608CH1H080CT-A		C86	CU3016	C1608CH1H270JT-AS	
C28	CU3002	C1608CH1H010CT-AS		C87	CU3035	C1608JB1H102KT-AS	
C29	NC			C88	CS0213	TMCMA1A225MTR	
C30	CU3012	C1608CH1H120JT-AS		C89	CU3016	C1608CH1H270JT-AS	
C31	CU3006	C1608CH1H050CT-AS		C90	CU0108	LMK212BJ105KG	
C32	CU3002	C1608CH1H010CT-AS		C91	CU3035	C1608JB1H102KT-AS	
C33	CU3031	C1608JB1H471KT-AS		C92	CU3035	C1608JB1H102KT-AS	
C34	CU3047	C1608JB1H103KT-N		C93	CE0392	6MV47UW	
C35	CU3031	C1608JB1H471KT-AS		C94	CU3035	C1608JB1H102KT-AS	
C36	CU3031	C1608JB1H471KT-AS		C95	CS0408	6MCM156MATER	
C37	CU3016	C1608CH1H270JT-AS		C96	CU3111	C1608JB1C104KT-N	
C38	CU3001	C1608CH1H0R5CT-AS		C97	CU0108	LMK212BJ105KG	
C39	NC			C98	CU3047	C1608JB1H103KT-N	
C40	CU3011	C1608CH1H100DT-AS		C99	CS0408	6MCM156MATER	
C41	CU3031	C1608JB1H471KT-AS		C100	CS0408	6MCM156MATER	
C42	CU3031	C1608JB1H471KT-AS		C101	CU3047	C1608JB1H103KT-N	
C43	CU3023	C1608CH1H101JT-AS		C102	CU3035	C1608JB1H102KT-AS	
C44	CU3031	C1608JB1H471KT-AS		C103	CU0108	LMK212BJ105KG	
C45	CU3031	C1608JB1H471KT-AS		C104	CU3035	C1608JB1H102KT-AS	
C46	CU3031	C1608JB1H471KT-AS		C105	CS0404	6MCM106MATER	
C47	CU0108	LMK212BJ105KG		C106	CU3015	C1608CH1H220JT-AS	
C48	CU3031	C1608JB1H471KT-AS		C107	CS0408	6MCM156MATER	
C49	CU3013	C1608CH1H150JT-AS		C108	CU3035	C1608JB1H102KT-AS	
C50	NC			C109	CE0350	16MV100HC	
C51	NC			C110	CU3035	C1608JB1H102KT-AS	
C52	NC			C111	CE0397	MVS16VC47MF46	
C53	CU3031	C1608JB1H471KT-AS		C112	CU0108	LMK212BJ105KG	
C54	CU3047	C1608JB1H103KT-N		C113	CU3047	C1608JB1H103KT-N	
C55	CS0408	6MCM156MATER		C114	CU3035	C1608JB1H102KT-AS	
C56	CU3015	C1608CH1H220JT-AS		C115	CE0392	6MV47UW	
C57	CU3004	C1608CH1H030CT-AS		C116	CU3111	C1608JB1C104KT-N	
C58	CU3009	C1608CH1H080CT-A		C117	CU3047	C1608JB1H103KT-N	
C59	CU3015	C1608CH1H220JT-AS		C118	CS0408	6MCM156MATER	

Ref. No.	Parts No.	Parts Name	Ver.	Ref. No.	Parts No.	Parts Name	Ver.
C119	CU3047	C1608JB1H103KT-N		C178	CU0108	LMK212BJ105KG	
C120	CU3035	C1608JB1H102KT-AS		C179	CU3035	C1608JB1H102KT-AS	
C121	CS0408	6MCM156MATER		C180	CU3111	C1608JB1C104KT-N	
C122	CU3111	C1608JB1C104KT-N		C181	CU3049	C1608JB1E153KT-NS	
C123	CU3111	C1608JB1C104KT-N		C182	CU3031	C1608JB1H471KT-AS	
C124	CU3035	C1608JB1H102KT-AS		C183	CU3031	C1608JB1H471KT-AS	
C125	CU3051	C1608JB1E223KT-NS		C184	NC		
C126	CU3051	C1608JB1E223KT-NS		C185	CU3111	C1608JB1C104KT-N	
C127	CU3051	C1608JB1E223KT-NS		C186	CU3003	C1608CH1H020CT-AS	
C128	CU3111	C1608JB1C104KT-N		C187	CU3111	C1608JB1C104KT-N	
C129	CU3111	C1608JB1C104KT-N		CN1	UE0410	9210B-1-02-GF	
C130	CU0108	LMK212BJ105KG		CN2	NC		
C131	CU3111	C1608JB1C104KT-N		CN3	UE0320	PI28E02M	
C132	CE0396	MVS6.3VC100MF46		D1	XD0323	MA2S111-TX	
C133	CS0408	6MCM156MATER		D2	XD0326	1SV307(TPH3)	
C134	CU3111	C1608JB1C104KT-N		D3	XD0344	1SV311 (TPL3)	
C135	CU3035	C1608JB1H102KT-AS		D4	XD0331	HSU277TRF	
C136	CU3035	C1608JB1H102KT-AS		D5	XD0331	HSU277TRF	
C137	CU3101	C1608JB1C473KT-NS		D7	XD0251	MA741WA TX	
C138	CU3111	C1608JB1C104KT-N		D8	XD0261	S3DG7	
C139	CU0108	LMK212BJ105KG		D9	XD0323	MA2S111-TX	
C140	CU3035	C1608JB1H102KT-AS		D10	XD0130	DA204U T106	
C141	CU3035	C1608JB1H102KT-AS		D11	XD0294	U2FWJ44N(TE12R)	
C142	CU3047	C1608JB1H103KT-N		D12	XD0344	1SV311 (TPL3)	
C143	CU3035	C1608JB1H102KT-AS		D13	XD0344	1SV311 (TPL3)	
C144	CU3111	C1608JB1C104KT-N		D14	XD0344	1SV311 (TPL3)	
C145	CU3025	C1608CH1H151JT-AS		D15	XD0344	1SV311 (TPL3)	
C146	CU3035	C1608JB1H102KT-AS		D16	XD0131	1SV214 TPH4	
C147	CU3035	C1608JB1H102KT-AS		D17	XL0036	SML-310MTT86	
C148	CU3111	C1608JB1C104KT-N		D18	XL0036	SML-310MTT86	
C149	CU3041	C1608JB1H332KT-NS		D19	XL0028	BRPG1201W TR	
C150	CU3111	C1608JB1C104KT-N		D20	NC		
C151	CU3111	C1608JB1C104KT-N		D21	NC		
C152	CU3035	C1608JB1H102KT-AS		D22	NC		
C153	CU3035	C1608JB1H102KT-AS		D23	NC		
C154	CU3038	C1608JB1H182KT-AS		D24	NC		
C155	CU3111	C1608JB1C104KT-N		D25	XD0332	RB706F-40-T106	
C156	CU3035	C1608JB1H102KT-AS		D26	XD0291	MA729-TX	
C157	CU3050	C1608JB1E183KT-NS		D27	XD0342	1SS390 TE61	
C158	CU0108	LMK212BJ105KG		FL1	XC0073	ALFCM455G=K	
C159	CU3051	C1608JB1E223KT-NS		IC1	XA0449	UPC2710T-E3	
C160	CU0108	LMK212BJ105KG		IC2	XA0352	M64076GP	
C161	CS0408	6MCM156MATER		IC3	XA0724	S81350HG-KD-T1	
C162	CU3023	C1608CH1H101JT-AS		IC4	XA0515	TK14521MTL	
C163	CU3044	C1608JB1H562KT-NS		IC5	XA0210	NJM2070M T1	
C164	CU3040	C1608JB1H272KT-NS		IC6	XA0385	M5222FP-600C	
C165	CU3111	C1608JB1C104KT-N		IC7	XA0596	NJM2902V-TE1	
C166	CU3047	C1608JB1H103KT-N		IC8	XA0573	NJM2904V-TE1	
C167	CU3101	C1608JB1C473KT-NS		IC9	XA0733	M38267M8L-258GP	
C168	CU3047	C1608JB1H103KT-N		IC10	XA0368	AT24C16N-10SI-2.7TER	
C169	CU3047	C1608JB1H103KT-N		IC11	XA0620	S-80845ALMP-EA9-T2	
C170	CU3047	C1608JB1H103KT-N		JK1	UJ0046	MJ82-1	
C171	CU3046	C1608JB1H822KT-NS		JK2	UJ0019	HSJ1493-01-010	
C172	CU3035	C1608JB1H102KT-AS		JK3	UJ0022	HSJ1102-01-540	
C173	CU0108	LMK212BJ105KG		L1	QC0507	LK16081R0K-T	
C174	CS0408	6MCM156MATER		L2	QKA45A	MR1.5 4.5T 0.4	
C175	CU3111	C1608JB1C104KT-N		L3	QKA45A	MR1.5 4.5T 0.4	
C176	CU3014	C1608CH1H180JT-AS		L4	QC0507	LK16081R0K-T	
C177	CU3013	C1608CH1H150JT-AS		L5	QKA25A	MR1.5 2.5T 0.4	

Ref. No.	Parts No.	Parts Name	Ver.	Ref. No.	Parts No.	Parts Name	Ver.
L6	QKA25A	MR1.5 2.5T 0.4		R1	RK3030	MCR03EZHJ221	
L7	QC0558	LL1608-FH5N6S		R2	RK3034	MCR03EZHJ471	
L8	QC0529	LQN21A18NJ04		R3	RK3046	MCR03EZHJ472	
L9	QKA75A	QKA75A		R4	RK3050	MCR03EZHJ103	
L10	QC0573	LL1608-FHR10J		R5	RK3030	MCR03EZHJ221	
L11	QC0565	LL1608-FH22NJ		R6	RK3066	MCR03EZHJ224	
L12	QS40124	0.40-1.20-4T-L		R7	RK3018	MCR03EZHJ220	
L13	QC0567	LL1608-FH33NJ		R8	RK3048	MCR03EZHJ682	
L14	QC0561	LL1608-FH10NJ		R9	RK3026	MCR03EZHJ101	
L15	QC0507	LK16081R0K-T		R10	RK3018	MCR03EZHJ220	
L18	QC0507	LK16081R0K-T		R11	RK3050	MCR03EZHJ103	
L19	QC0561	LL1608-FH10NJ		R12	RK3063	MCR03EZHJ124	
L20	QC0528	LQN21A15NJ04		R13	RK3034	MCR03EZHJ471	
L21	QC0528	LQN21A15NJ04		R14	RK3026	MCR03EZHJ101	
L22	QC0564	LL1608-FH18NJ		R16	RK3062	MCR03EZHJ104	
L23	QC0562	LL1608-FH12NJ		R18	RK3050	MCR03EZHJ103	
L24	QC0569	LL1608-FH47NJ		R19	RK3058	MCR03EZHJ473	
L25	QC0534	LQN21A47NJ04		R20	RK3062	MCR03EZHJ104	
L26	QC0089	NL322522T-181JA		R21	RK3053	MCR03EZHJ183	
L27	QC0507	LK16081R0K-T		R22	RK3054	MCR03EZHJ223	
LCD1	EL0044	HT-3404		R23	RK3039	MCR03EZHJ122	
MIC1	EY0017	OB-27P44		R24	RK3058	MCR03EZHJ473	
Q1	XT0135	2SD2216R-TX		R25	RK0002	ERJ6GEYJ120V	
Q2	XE0038	2SK2975-T11-A		R26	RK3045	MCR03EZHJ392	
Q3	XT0138	2SC5066-O(TE85L)		R27	RK3030	MCR03EZHJ221	
Q4	XE0034	MRF9745T1		R28	RK3040	MCR03EZHJ152	
Q5	XT0138	2SC5066-O(TE85L)		R29	RK3050	MCR03EZHJ103	
Q6	XU0172	XP1501-TX		R30	NC		
Q7	XT0170	2SB766A-TX		R31	RK3026	MCR03EZHJ101	
Q8	XT0172	2SC4618TLP		R33	RK3050	MCR03EZHJ103	
Q9	XT0138	2SC5066-O(TE85L)		R34	RK3062	MCR03EZHJ104	
Q10	XT0171	2SC4808-TX.AR		R35	RK3032	MCR03EZHJ331	
Q11	XT0171	2SC4808-TX.AR		R36	RK3066	MCR03EZHJ224	
Q12	XU0193	RN1107 TE85L		R37	RK3050	MCR03EZHJ103	
Q13	XT0170	2SB766A-TX		R38	RK3046	MCR03EZHJ472	
Q14	XT0170	2SB766A-TX		R39	RK3062	MCR03EZHJ104	
Q15	XU0193	RN1107 TE85L		R40	RK3063	MCR03EZHJ124	
Q16	XU0172	XP1501-TX		R41	RK3032	MCR03EZHJ331	
Q17	XT0110	2SA1036K T146Q		R42	RK3038	MCR03EZHJ102	
Q18	XU0193	RN1107 TE85L		R43	RK3050	MCR03EZHJ103	
Q19	XU0197	RN1111 (TE85L)		R44	RK3048	MCR03EZHJ682	
Q20	XU0172	XP1501-TX		R45	NC		
Q21	XU0161	XP1114(TX)		R46	RK3032	MCR03EZHJ331	
Q22	XU0192	RN2107 TE85L		R47	RK3030	MCR03EZHJ221	
Q23	XT0135	2SD2216R-TX		R48	RK3050	MCR03EZHJ103	
Q24	NC			R49	RK3058	MCR03EZHJ473	
Q25	NC			R50	RK3038	MCR03EZHJ102	
Q26	XU0193	RN1107 TE85L		R51	RK3026	MCR03EZHJ101	
Q27	XT0095	2SC4081 T106R		R52	RK3074	MCR03EZHJ105	
Q28	XU0192	RN2107 TE85L		R53	RK3074	MCR03EZHJ105	
Q29	XU0192	RN2107 TE85L		R54	RK3074	MCR03EZHJ105	
Q30	XU0195	RN1104 TE85L		R55	RK3074	MCR03EZHJ105	
Q31	XT0135	2SD2216R-TX		R57	RK3030	MCR03EZHJ221	
Q32	XE0029	2SK1580-T1		R58	RK3074	MCR03EZHJ105	
Q33	XT0135	2SD2216R-TX		R59	RK3066	MCR03EZHJ224	
Q34	XE0029	2SK1580-T1		R60	RK3064	MCR03EZHJ154	
Q35	XU0194	RN2111 TE85L		R61	RK3050	MCR03EZHJ103	
Q36	XU0197	RN1111 (TE85L)		R62	RK3058	MCR03EZHJ473	
Q37	XT0171	2SC4808-TX.AR		R63	RK3062	MCR03EZHJ104	

Ref. No.	Parts No.	Parts Name	Ver.	Ref. No.	Parts No.	Parts Name	Ver.
R64	RK3050	MCR03EZHZ103		R123	RK3062	MCR03EZHZ104	
R65	NC			R124	RK3070	MCR03EZHZ474	
R66	RK3054	MCR03EZHZ223		R125	RK1018	ERJ8GEYJ101V	
R67	RK3076	MCR03EZHZ155		R126	RK3058	MCR03EZHZ473	
R68	RK3076	MCR03EZHZ155		R127	RK3062	MCR03EZHZ104	
R69	RK3058	MCR03EZHZ473		R128	RK3062	MCR03EZHZ104	
R70	RK3054	MCR03EZHZ223		R129	RK3055	MCR03EZHZ273	
R71	RK3042	MCR03EZHZ222		R130	RK3062	MCR03EZHZ104	
R72	RK3058	MCR03EZHZ473		R131	RK3055	MCR03EZHZ273	
R73	RK3036	MCR03EZHZ681		R132	RK3046	MCR03EZHZ472	
R74	RK3050	MCR03EZHZ103		R133	RK3046	MCR03EZHZ472	
R75	RK3058	MCR03EZHZ473		R134	RK3046	MCR03EZHZ472	
R76	RK3054	MCR03EZHZ223		R135	RK3046	MCR03EZHZ472	
R77	RK3050	MCR03EZHZ103		R136	RK3074	MCR03EZHZ105	
R78	RK3054	MCR03EZHZ223		R137	NC		
R79	RK3022	MCR03EZHZ470		R138	RK3022	MCR03EZHZ470	
R80	RK3062	MCR03EZHZ104		R139	RK3057	MCR03EZHZ393	
R81	RK3042	MCR03EZHZ222		R140	RK3058	MCR03EZHZ473	
R82	RK3046	MCR03EZHZ472		R141	RK3054	MCR03EZHZ223	
R83	RK3050	MCR03EZHZ103		R142	RK3042	MCR03EZHZ222	
R84	RK3036	MCR03EZHZ681		R143	RK3058	MCR03EZHZ473	
R85	RK3050	MCR03EZHZ103		R144	RK3061	MCR03EZHZ823	
R86	RK3038	MCR03EZHZ102		R145	RK3050	MCR03EZHZ103	
R87	RK3050	MCR03EZHZ103		R146	RK3058	MCR03EZHZ473	
R88	RK3001	MCR03EZHZ000		R147	RK3045	MCR03EZHZ392	
R89	NC			R148	RK3063	MCR03EZHZ124	
R90	RK3032	MCR03EZHZ331		R149	RK3040	MCR03EZHZ152	
R91	RK3062	MCR03EZHZ104		R150	RK3062	MCR03EZHZ104	
R92	RK3058	MCR03EZHZ473		R151	RK3038	MCR03EZHZ102	
R93	RK3050	MCR03EZHZ103		R152	RK3062	MCR03EZHZ104	
R94	RK3050	MCR03EZHZ103		R153	RK3065	MCR03EZHZ184	
R95	NC			R154	RK3061	MCR03EZHZ823	
R96	RK3001	MCR03EZHZ000		R155	RK3057	MCR03EZHZ393	
R97	RK3058	MCR03EZHZ473		R156	RK3054	MCR03EZHZ223	
R98	RK3044	MCR03EZHZ332		R157	RK3059	MCR03EZHZ563	
R99	RK3050	MCR03EZHZ103		R158	RK3063	MCR03EZHZ124	
R100	NC			R159	RK3052	MCR03EZHZ153	
R101	NC			R160	RK3068	MCR03EZHZ334	
R102	RK3062	MCR03EZHZ104		R161	RK3045	MCR03EZHZ392	
R103	RK3050	MCR03EZHZ103		R162	RK3062	MCR03EZHZ104	
R104	RK3050	MCR03EZHZ103		R163	RK3048	MCR03EZHZ682	
R105	RK3041	MCR03EZHZ182		R164	RK3038	MCR03EZHZ102	
R106	RK3052	MCR03EZHZ153		R165	RK3050	MCR03EZHZ103	
R107	RK3048	MCR03EZHZ682		R166	RK3074	MCR03EZHZ105	
R108	RK3052	MCR03EZHZ153		R167	RK3038	MCR03EZHZ102	
R109	RK3050	MCR03EZHZ103		R168	RK3046	MCR03EZHZ472	
R110	RK3050	MCR03EZHZ103		R169	RK3066	MCR03EZHZ224	
R111	RK3066	MCR03EZHZ224		R170	RK3069	MCR03EZHZ394	
R112	RK3054	MCR03EZHZ223		R171	RK3072	MCR03EZHZ684	
R113	RK3050	MCR03EZHZ103		R172	RK3050	MCR03EZHZ103	
R114	RK3038	MCR03EZHZ102		R173	RK3050	MCR03EZHZ103	
R115	RK3062	MCR03EZHZ104		R174	RK3050	MCR03EZHZ103	
R116	RK3068	MCR03EZHZ334		R175	RK3038	MCR03EZHZ102	
R117	RK3074	MCR03EZHZ105		R176	RK3060	MCR03EZHZ683	
R118	RK3014	MCR03EZHZ100		R177	RK3067	MCR03EZHZ274	
R119	RK3051	MCR03EZHZ123		R178	RK3050	MCR03EZHZ103	
R120	RK3042	MCR03EZHZ222		R179	RK3061	MCR03EZHZ823	
R121	NC			R180	RK3055	MCR03EZHZ273	
R122	RK3032	MCR03EZHZ331		R181	RK3062	MCR03EZHZ104	

Ref. No.	Parts No.	Parts Name	Ver.	Ref. No.	Parts No.	Parts Name	Ver.
R182	RK3050	MCR03EZHJ103		X1	XQ0112	UM-5 21.250MHZ	
R183	RK3049	MCR03EZHJ822		X2	XQ0122	XA10818 UM5 45.555M	
R184	RK3063	MCR03EZHJ124		X3	XQ0131	CSA310 3.686400MHZ	
R185	RK3048	MCR03EZHJ682		XF1	XF0046	FA50017(45N08B4)45.1	
R186	RK3038	MCR03EZHJ102			UP0404A	DJ496 INTEGRATED	
R187	RK3046	MCR03EZHJ472				Mechanical Parts	
R188	RK3038	MCR03EZHJ102			AF0012	OPH M2+4 FE/ZN3	
R189	RK3046	MCR03EZHJ472			AF0020Z	1P 2X3 NIC	
R190	RK3050	MCR03EZHJ103			AF0029	XQN2+C9FN	
R191	RK3050	MCR03EZHJ103			AK0001Z	BT 3P 2X4 NIC	
R192	RK3066	MCR03EZHJ224			AN0012	RND N7X0.75 BR/B.ZN	
R193	RK3066	MCR03EZHJ224			AN0025	RND N3/8-32BR/N	
R194	RK3074	MCR03EZHJ105			DG0035	LCD LIGHT	
R195	RK3001	MCR03EZHJ000			DP0132	LCD PANEL DJ446	
R196	RK3062	MCR03EZHJ104			EA0084	ANTENNA DJ446	
R197	RK3062	MCR03EZHJ104			FF0029	CLOTH 4.0X22	
R198	RK3001	MCR03EZHJ000			FG0274	DC CAP	
R199	RK3066	MCR03EZHJ224			FG0289	TERMINAL RUBBER 195	
R200	RK3066	MCR03EZHJ224			FG0290	KL6767-PTT DJ195	
R201	RK3074	MCR03EZHJ105			FG0291	LCD RUBBER CONNECT.	
R202	RK3062	MCR03EZHJ104			FG0306	KL7022A-POWER RUBBER	
R203	RK3062	MCR03EZHJ104			FG0323	KL0693A-JACK CAP 446	
R204	RK3062	MCR03EZHJ104			FG0324	LCD CUSHION DJ496	
R205	RK3066	MCR03EZHJ224			FM0176	PLUS TERMINAL DJ195	
R206	RK3074	MCR03EZHJ105			FM0177	RADIATIVE PLATE 195	
R207	RK3074	MCR03EZHJ105			FM0178	PIN DJ195	
R208	RK3046	MCR03EZHJ472			FM0179	アンテナアース DJ195	
R209	RK3058	MCR03EZHJ473			FM0187	REAR PANEL DJ196	
R210	NC				KZ0107	FRONT PANEL DJ446	
R211	NC				NK0068	DIAL KNOB DJ195	
R212	NC		E.EUK		RD0108	J1/6Z	
R212	RK3038	MCR03EZHJ102	EF		SS0092A	CHASSIS DJ196	
R213	NC				ST0063	LCD HOLDER DJ195	
R214	RK3046	MCR03EZHJ472			TL0022	REFLECTIVE SHEET 195	
R215	NC				TS0142	VCOケース XH655	
R216	RK3062	MCR03EZHJ104			TS0148	VCOソールド DJP85	
R217	RK3043	MCR03EZHJ272			TW0020	W.PROOF A XH720	
R218	RK0107	ERJ6GEY0R00V			TZ0049	SILICON DUMPER	
R219	RK3063	MCR03EZHJ124			YX0024	LCD TAPE DJ195	
R220	RK3066	MCR03EZHJ224					
R221	RK3030	MCR03EZHJ221					
R222	RK3030	MCR03EZHJ221					
R223	NC						
R224	RK3062	MCR03EZHJ104					
R225	NC						
R226	RK3001	MCR03EZHJ000					
R227	RK3039	MCR03EZHJ122					
R228	RK3001	MCR03EZHJ000					
R231	RK3001	MCR03EZHJ000					
R232	RK3053	MCR03EZHJ183					
RE1	UR0019	RH70N00E20 (RY-6320)					
SP1	ES0011BZ	036M9014B					
SW17	UU0030	EVQPJ005Q					
SW18	UU0030	EVQPJ005Q					
TC1	CT0012						
VR1	RH0138	MVR22HXBRN222					
VR2	RH0146	MVR22HXBRN473					
VR3	NC						
W1	UX1261	WIRE DJ446 W1					

Ref. No.	Parts No.	Parts Name	Ver.				
Packing Parts							
	PR0309	CE label					
	EBP50N	Battery pack					
	EDC94	Wall charger 230V	E,EF				
	EDC96	Wall charger 230V	EUK				
	HK0499	Pacage					
	HU0150	Inner C					
	HM0204	Carton					
	HU0162	Inner 10					
	PR0433	A label					
	DS0388A	Spec.sheet					
	PS0361	Instruction Manual	E,EUK				
	PS0392		EF				
	HH0061	Air cap					
	HH0045	Air cap					
	PT0004A	Serial No. Carton					
	EDC17	Belt Clip					
	BB0009Y	Strap					

ADJUSTMENT

1) Required Test Equipment

The following items are required to adjust radio parameters:

1. Regulated power supply

Supply voltage: 5-14V DC
Current: 3A or more

2. Digital multimeter

Voltage range: FS = Approx. 20V
Current: 10A or more
Input resistance: High impedance

3. Oscilloscope

Measurable frequency: Audio frequency

4. Audio dummy load

Impedance: 8 Ω
Dissipation: 1W or more
Jack: 3.5mm ϕ

5. SSG

Output frequency: 500MHz or more
Output level: -20dBu/0.1uV -120dBu/1V
Modulation: AM/FM

6. Spectrum Analyzer

Measuring range: Up to 2GHz or more

7. Power meter

Measurable frequency: Up to 500MHz
Impedance: 50 Ω , unbalanced
Measuring range: 0.1W -10W

8. Audio voltmeter

Measurable frequency: Up to 100kHz
Sensitivity: 1mV to 10V

9. Audio generator

Output frequency: 67Hz to 10kHz
Output impedance: 600 Ω , unbalanced

10. Distortion meter/SINAD meter

Measurable frequency: 1kHz
Input level: Up to 40dB
Distortion: 1% - 100%

11. Frequency counter

Measurable frequency: Up to 500MHz
Measurable stability: Approx. +/-0.1ppm

12.Linear detector

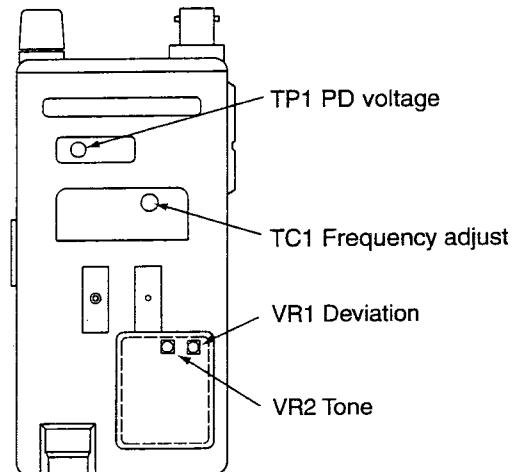
Measurable frequency: Up to 500MHz
Characteristics: Flat
CN: 60dB or more

Note

- Standard modulation: 1kHz +/-1.5kHz/DEV
- Reference sensitivity: 12dB SINAD
- Specified audio output level: 200mW at 8Ω
- Standard audio output level: 50mW at 8Ω
- Use an RF cable (3D2V:1m) for test equipment.
- Attach a fuse to the RF test equipment.
- All SSG outputs are indicated by EMF.
- Supply voltage for the transceiver: 13.8VDC

2) Adjustment Mode

The DJ-446 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-446 INSTRUCTION MANUAL" which came with the product. In consideration of the radio environment, the frequency on each channel must be near the value (+/-1MHz) listed in the table below. To enter the adjustment mode, set key lock and push FUNC key one time, VOL key one time, SCAN key two times, CALL key one time, VM key two times. Decimal point at 100MHz and 10MHz appears in LCD. (To release the mode, same manner to enter the adjustment mode.)



Channel frequencies used in the adjustment mode

Memory Channel	Channel function	Frequency
1	Reference frequency adjustment	4ch
2	High power adjustment	4ch
3	Low power adjustment	4ch
4	Minimum frequency sensitivity adjustment	1ch
5	Medium frequency sensitivity adjustment	4ch
6	Maximum frequency sensitivity adjustment	※
7	S-meter (1) adjustment	4ch
8	S-meter (FULL) adjustment	4ch
9	Deviation	4ch
10	—	—
11	—	—
12	Tone 67 Hz test	— (Not use)
13	Tone 88.5 Hz test	4ch
14	Tone 250.3Hz test	— (Not use)
15	—	—
16	Tone burst test	4ch
17	Aging (Not required to use)	4ch

※ ; 8ch/DJ-446E and EUK, 6ch/DJ-446EF

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 TC1 on the Main board until the value on the frequency counter matches the one displayed on the LCD.
4. On 4ch measure TP1 near the VCO and to obtain 0.8V~1.6V.

High Power Adjustment

1. In the adjustment mode, select channel 2 by rotating the main tuning dial.
2. Hold down the **(PTT)** key to start transmission.
3. While watching the reading of the TX power meter, set the output power to the value closest to 0.5 W by rotating the main tuning dial.
4. 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 **(PTT)** key to start transmission.
3. While watching the reading of the TX power meter, set the output power to the value closest to 0.25 W by rotating the main tuning dial.
4. When the **(PTT)** key is released, the output power at that time will be stored as the low power setting.

Minimum Frequency Sensitivity Adjustment

1. In the adjustment mode, select channel 4 by rotating the main tuning dial.
2. Press the **(FUNC)** key and, while the F appears, set the sensitivity to maximum position by rotating the main tuning dial. The position is decided by selecting next channel.

Medium Frequency Sensitivity Adjustment

1. In the adjustment mode, select channel 5 by rotating the main tuning dial.
2. Press the **(FUNC)** key and, while the F appears, set the sensitivity to maximum position by rotating the main tuning dial. The position is decided by selecting next channel.

Maximum Frequency Sensitivity Adjustment

1. In the adjustment mode, select channel 6 by rotating the main tuning dial.
2. Press the **(FUNC)** key and, while the F appears, set the sensitivity to maximum position by rotating the main tuning dial. The position is decided by selecting next channel.

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 circle (●)
2. Enter "0"dBu(EMF) with the transceiver tester (SSG).
3. Press the (FUNC) key. The transceiver beeps indicating the new setting has been stored successfully.

S-meter (FULL)

1. In the adjustment mode, select channel 8 by rotating the main tuning dial. The S-meter will show all six circles (●●●●●●)
2. Enter "+20"dBu (EMF) with the transceiver tester (SSG).
3. Press the (FUNC) 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 50mVrms, 1KHz signal with your transceiver tester through the external microphone jack.
3. With the tester, put the transceiver in the transmission mode.
4. Rotate the VR1 on the printed-circuit board of the transceiver until the deviation is set to 2.1KHz.

Tone 88.5Hz

1. In the adjustment mode, select channel 13 by rotating the main tuning dial.
2. Press the (PTT) key. An 88.5Hz tone is automatically sent.
3. Rotate the VR2 on the printed-circuit board of the transceiver until the deviation is set to $0.55 \pm 0.05\text{kHz}$

Tone Burst Test

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

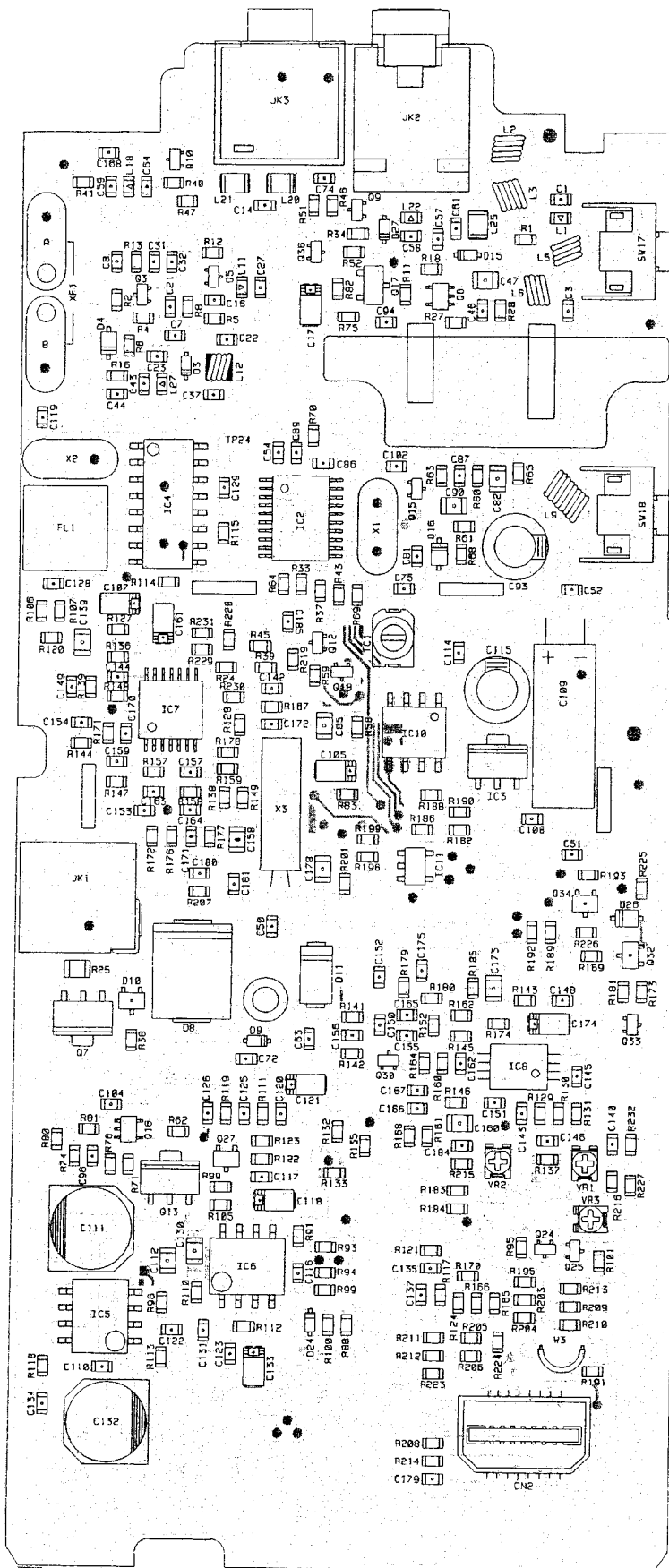
1. In the adjustment mode, select channel 16 by rotating the main tuning dial.
2. Press the (PTT) key. An 1750Hz tone burst is automatically sent.
3. Check the deviation with the transceiver tester.

Aging

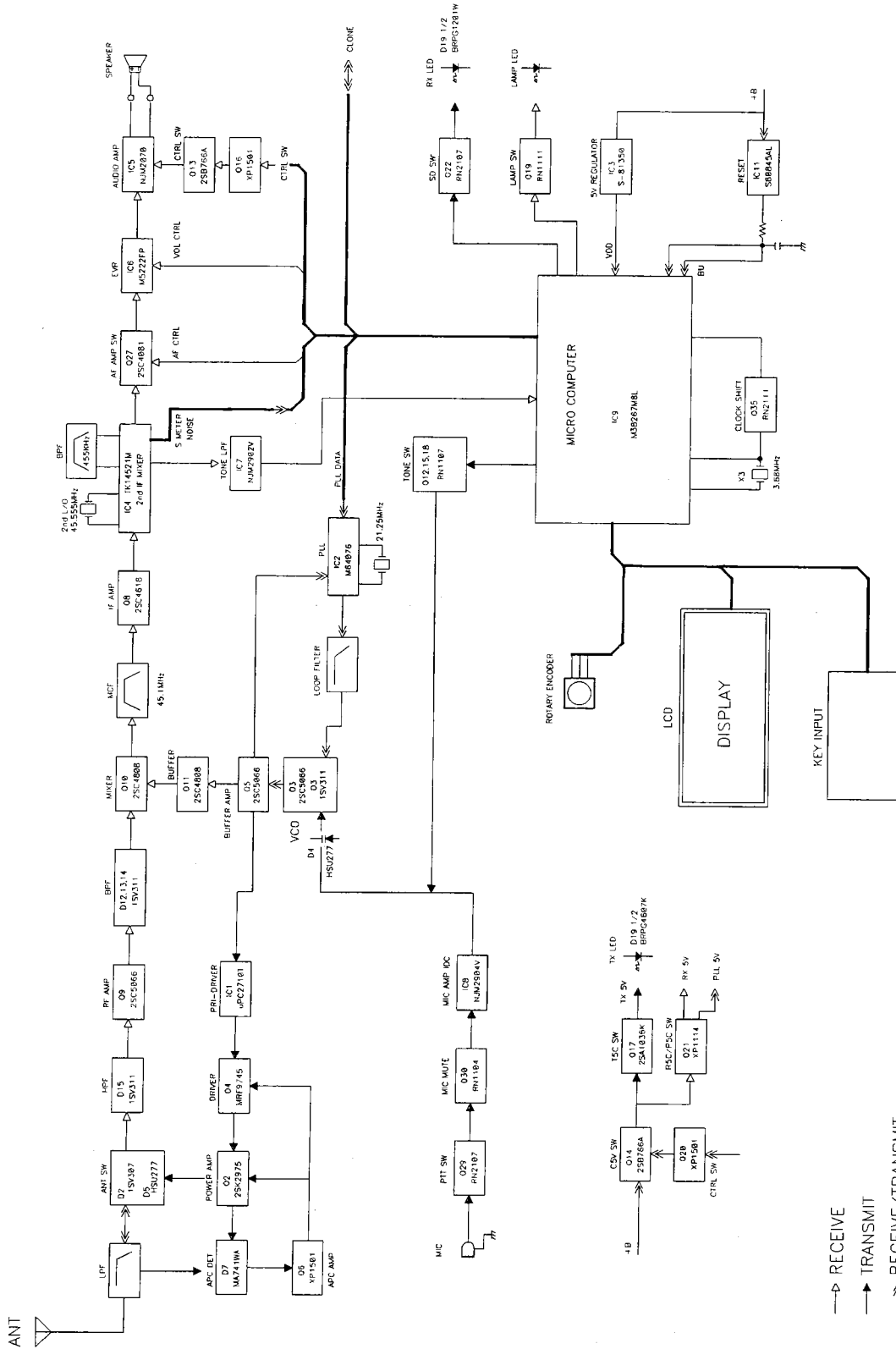
Perform this aging test only when necessary.

1. In the adjustment mode, select channel 17 by rotating the main tuning dial. The transceiver automatically repeats transmission for a minute and reception for another minute.

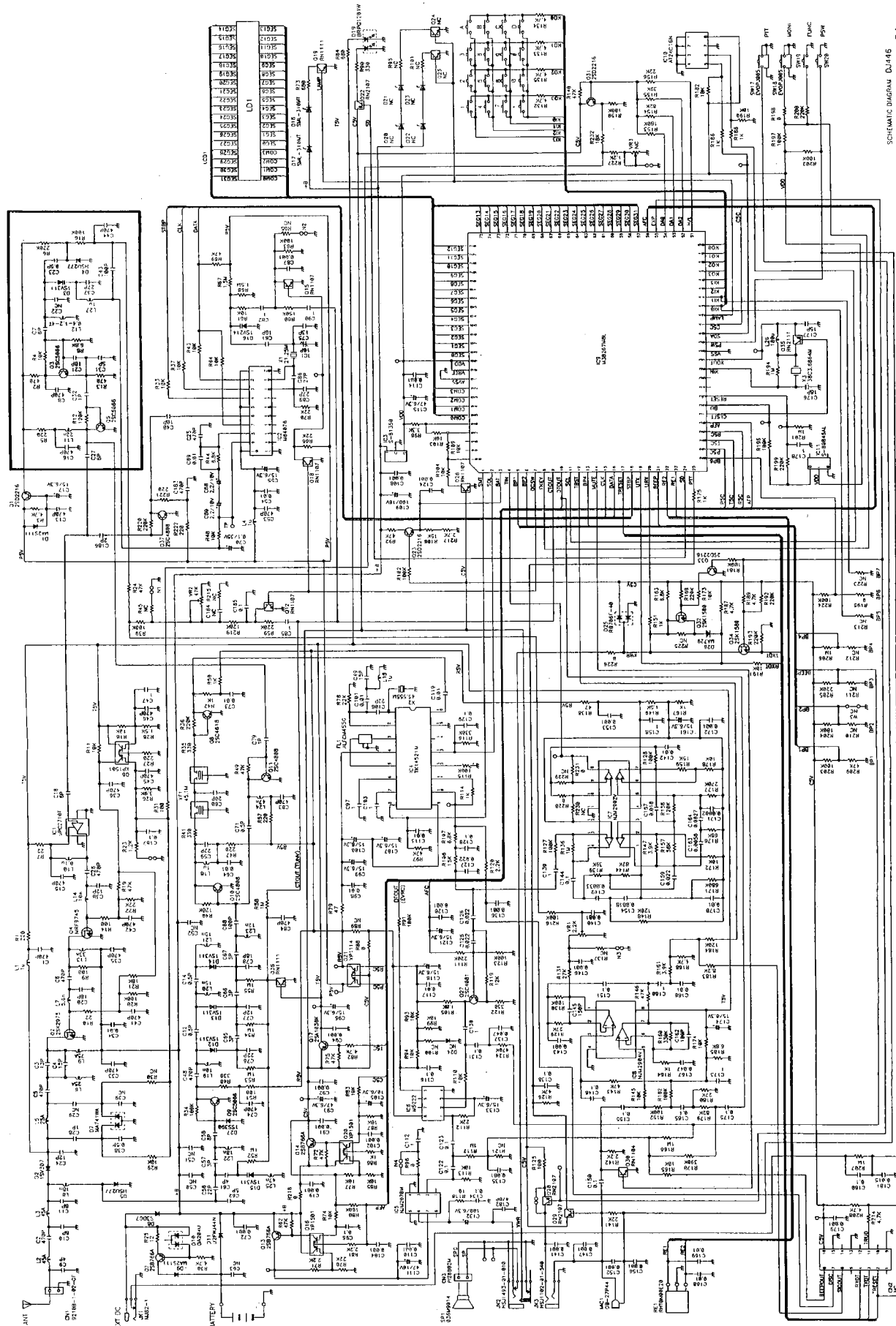
MAIN SIDE B



BLOCK DIAGRAM



SCHEMATIC DIAGRAM



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