

DJ-396

Service Manual

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SPECIFICATIONS

1) GENERAL

Frequency coverage	DJ-396KR : TX 368.5 ~ 399.5MHz RX 368.5 ~ 399.5MHz TA : TX 330 ~ 399.995MHz RX 330 ~ 399.995MHz
Mode	F3E (FM)
Channel steps	5,10,12.5,15,20,25, & 30kHz
Memory channels	160 channels+1 CALL channel
Antenna connector	TNC (50Ω unbalanced)
Frequency stability	±3 ppm
Microphone input impedance	2kΩ nominal
Power supply requirement	6.0 ~ 16.0V DC (negative ground)
Current drain (at 13.8 V DC)	1.3A (typical) Transmit high at 4.8W 200mA (typical) Receive at 500mW 50mA (typical) standby 20mA (typical) Battery save on
Usable temperature range	-10 ~ +60°C (14 ~ 140°F)
Dimensions	56 (W) × 124 (H) × 37 (D) mm (with EBP-50N)
(Projections not included)	2.2"(W) × 4.88"(H) × 1.45"(D) inches (with EBP-50N)
Weight	Approx. 310g (10.9oz) (with EBP-50N)
DTMF (DJ-496)	16 Buttons Keypad
Sub audible Tone(CTCSS)	encoder/decoder installed (39tones)
Sub audible Tone (DCS)	encoder/decoder installed (104codes)

2) TRANSMITTER

Output power	Approx. 4W EBP-50N installed Approx. 4.8W 13.8V DC Approx. 0.8W (LOW)
Modulation system	Variable reactance frequency modulation
Spurious emissions	Less than -60dB
Max. frequency deviation	±5kHz

3) RECEIVER

Receive system	Double conversion superheterodyne
Intermediate frequencies	1st 30.85MHz / 2nd 455kHz
Sensitivity(12dB SINAD)	Less than -12.0dBμ (0.25V) (368.5 ~ 399.5MHz)
Selectivity	-6dB : 12kHz or more -60dB : 26kHz or less
Audio output power	500mW (typical with an 8Ω load) 450mW (8Ω 10% THD)

CIRCUIT DESCRIPTION

1) Receiver System

The receiver system is a double superheterodyne system with a 30.85MHz first IF and a 455kHz second IF.

1. Front End

The received signal at any frequency in the 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 30.85MHz by the mixer (Q10). The tuning circuit, which consists of L15, 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 30.85MHz 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 30.395MHz, 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 of 5 or 6.25kHz.

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 the resulting frequency is 5kHz, channel steps of 5, 10, 15, 20, 25, 30, and 50kHz are used. When it is 6.25kHz, the 12.5kHz channel step is used.

3. Phase Comparator Circuit

The PLL (IC2) uses the reference frequency, 5 or 6.25kHz. The phase comparator in the IC2 compares the phase of the frequency from the VCO with that of the comparison frequency, 5 or 6.25kHz, 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, D29). 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 from pin 42 of CPU (IC9) to the bases of Q19, Q24 and Q25.

3. Reset and Backup

When the power from 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. The reset signal, however, waits at 100, and does not enter the CPU until the CPU clock (X3) has stabilized.

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. DTMF Encoder

The CPU (IC9) is equipped with an internal DTMF encoder. The DTMF signal is output from pin 10, through R179 and R180 (for level adjustment), and then through the microphone amplifier (IC8), 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. 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.

7. DCS Encoder

The CPU (IC9) is equipped with an internal DCS code encoder. The code (023 to 754) is output from pin 9 of the CPU to the varicap (D16) of the PLL reference oscillator. When DCS is ON, DCS MUTE circuit (Q12-ON, Q18-ON, Q15-OFF) works. The modulation activates in X1 side only.

8. CTCSS, DCS 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.

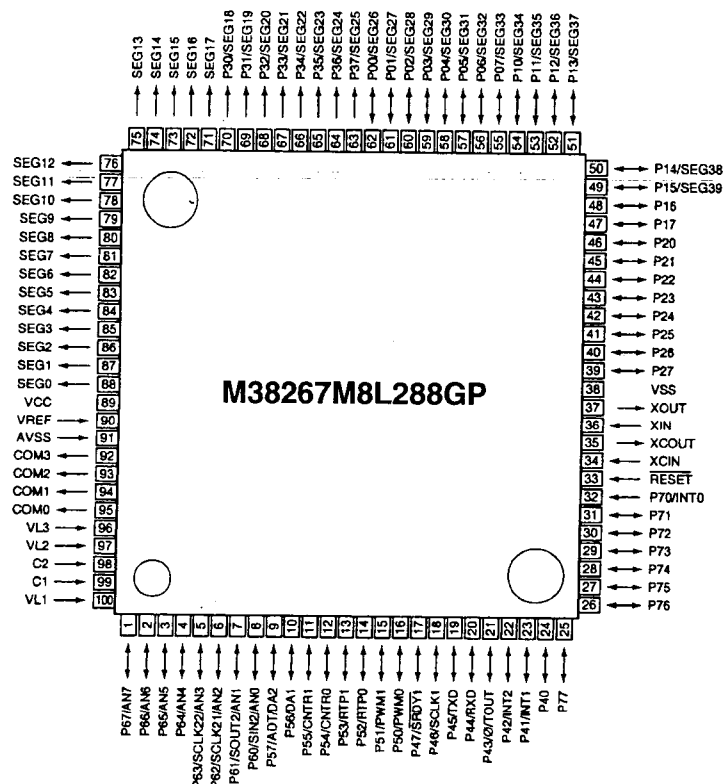
9. Clock Shift

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) M38267M8L288GP (XA0932)

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/DSC code 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	O	-	Activ high	DCS signal mute
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/DCS tone output/Tuning voltage out
10	P56/DA1	DTOUT	O	-	D/A	DTMF output/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	-	Activ low/Pulse	Trunking board detection (when PSW is on)/Trunking board reset
18	P46/SCLK1	STBP	O	-	Pulse	Strobe for PLL IC
19	P45/TXD	UTX	O	-	Pulse	UART data transmission output
20	P44/RXD	URX	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	P42/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	CLNSW	O	-	Activ high	CLONING ON / OFF output
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/INTO	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	KI0	I	*	Aktiv low	Key matrix input
44	P22	KI1	I	*	Aktiv low	
45	P21	KI2	I	*	Aktiv low	
46	P20	KI3	I	*	Aktiv low	
47	P17	KO3	O	-	Aktiv low	Key matrix output
48	P16	KO2	O	-	Aktiv low	
49	P15/SEG39	KO1	O	-	Aktiv low	
50	P14/SEG38	KO0	O	-	Aktiv low	
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

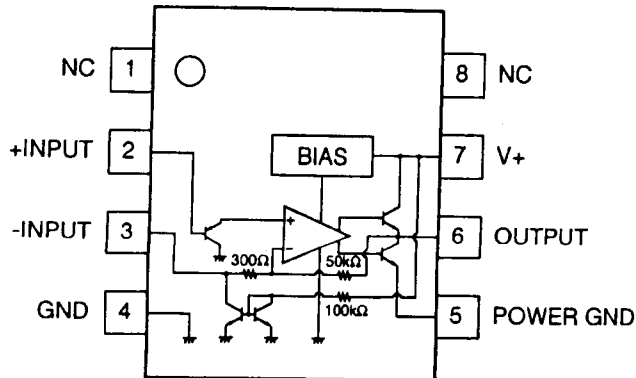
No.	Pin Name	Function	I/O	PU	Logic	Description
56	P06/SEG32	AFC	O	-	Activ high	AF tone control
57	P05/SEG31	S31	O	-	-	LCD segment signal
58	P04/SEG30	S30	O	-	-	
59	P03/SEG29	S29	O	-	-	
60	P02/SEG28	S28	O	-	-	
61	P01/SEG27	S27	O	-	-	
62	P00/SEG26	S26	O	-	-	
63	P37/SEG25	S25	O	-	-	
64	P36/SEG24	S24	O	-	-	
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	-	-	-	CPU power terminal
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

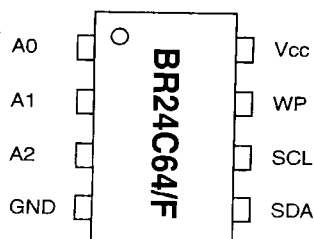


$V_+ = 6V$, $T_a = 25 \pm 2^\circ C$

Parameter	Condition	Symbol	Min.	Typ.	Max.	Unit
Supply voltage		V_+	1.8	-	15	V
Idle current	$R_L =$	I_q	-	4	7	mA
Output voltage		V_o	-	2.7	-	V
Input bias current		I_b	-	200	-	nA
Output power	THD=10%, $f=1kHz$	$V_+ = 6V, R_L = 4$	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) BR24C64F (XA0669)

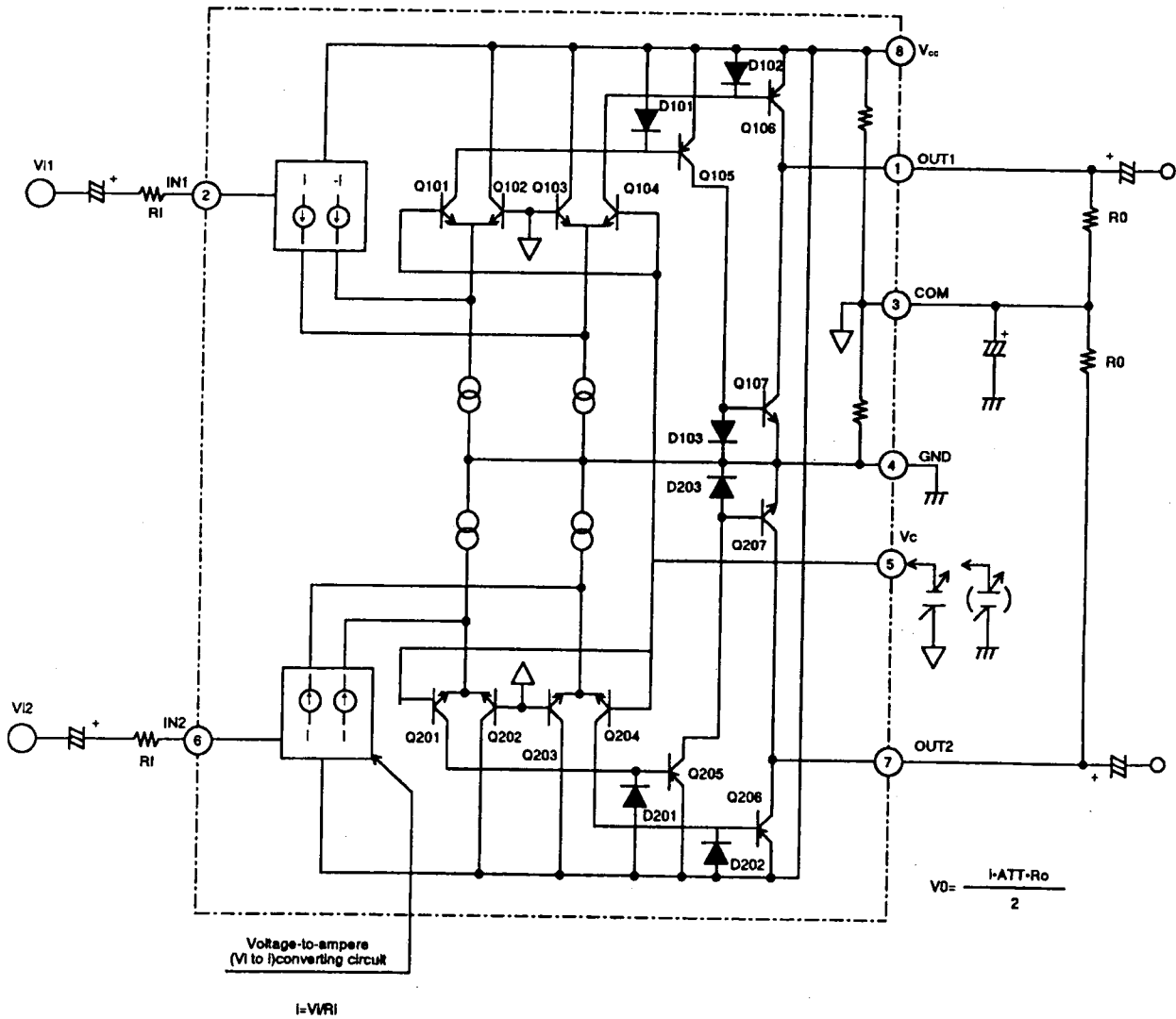
64K bits CMOS Serial EEPROM



Symbol	I/O	DESCRIPTION
V_{cc}	-	Connect power source
GND	-	Reference of all I/O voltage, OV
A0, A1, A2	I	Slave address parameter terminal
SCL	I	Serial clock input
SDA	I/O	Slave & word address serial data input / output
WP	I	Write-protect terminal

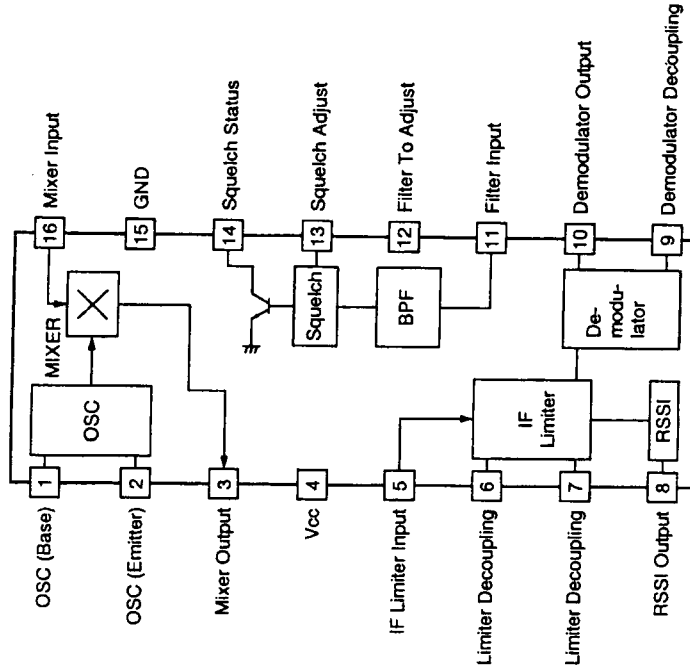
3) M5222FP-600C (XA0385)

Electronic Volume



4) TK14521MTL (XA0515)

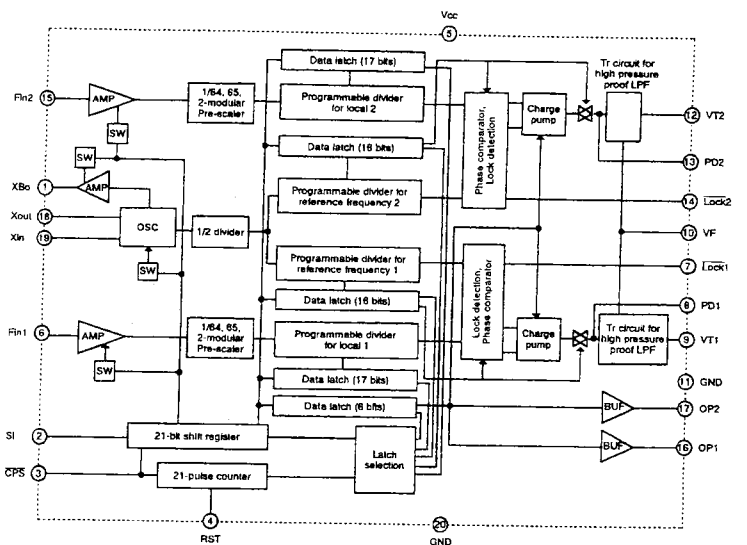
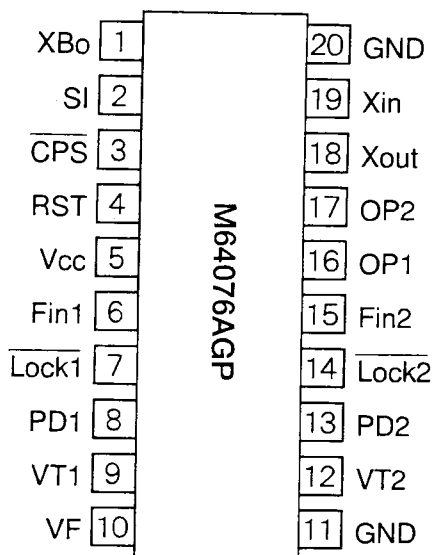
IF System



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

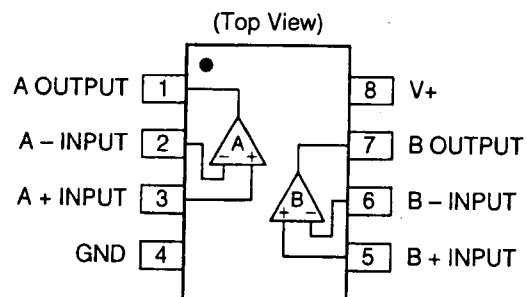
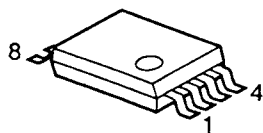
Parameter	Symbol	Ratings			Unit	Condition
		Min	Typical	Max		
Supply Current	Icc	4.3	7.0	9.8	mA	No signal
Mixer + IF part						
Limiting Sensitivity	Limit	-94	-100	-106	dBm	-3.0dB point
Output Voltage	Vo	200	300	400	mVrms	
Distortion	THD		0.8	2.8	%	
S/N	S/N	40	46	52	dB	
AM Rejection Ratio	AMRR	30	40		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)



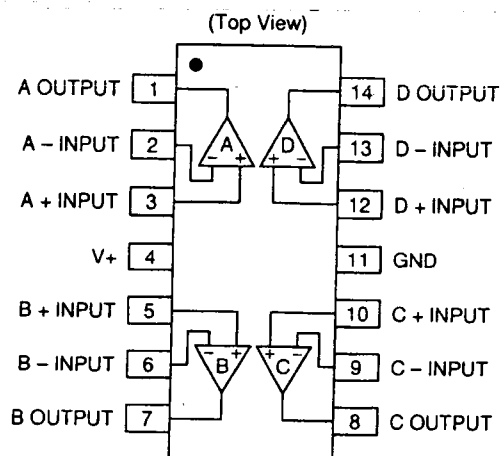
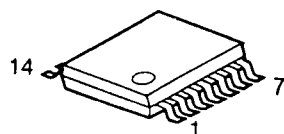
6) NJM2904V-TE1 (XA0573)

Dual Single Supply Operational Amplifier



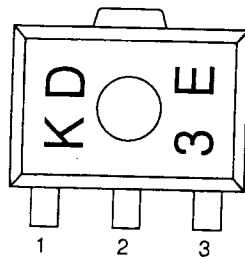
7) NJM2902V-TE1 (XA0596)

Quad Single Supply Operational Amplifier

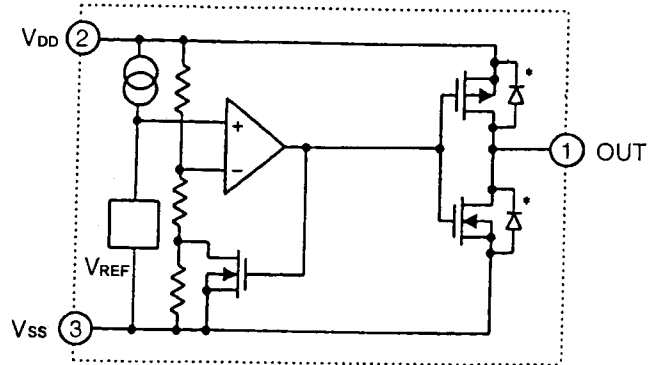


8) S-81350HG-KD-T1 (XA0724)

Top View



1 Vout
2 GND
3 Vin

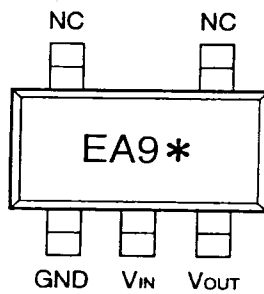


9) S-80845ALMP-EA9-T2 (XA0620)

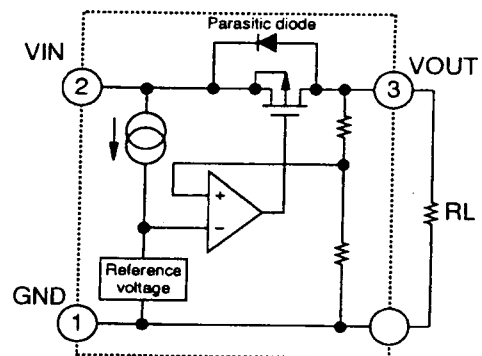
Voltage Regulator

Vin=18V

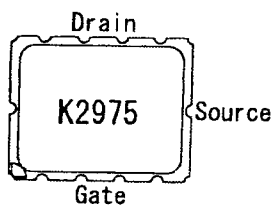
Iout=100mA



* 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

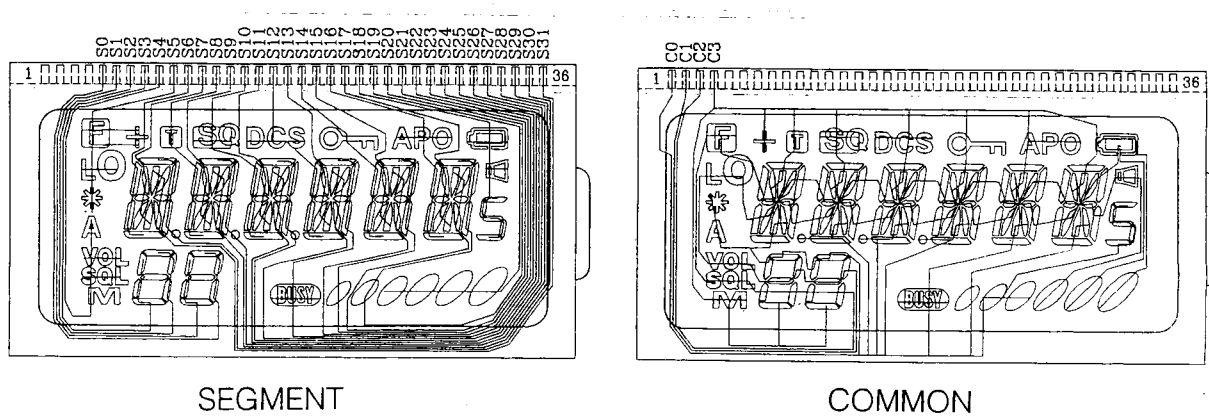
Ratings	Symbol	Min	Max	Unit
Drain-Source Breakdown Voltage Vds=17, Vgs=0V	Idss	-	10	uA
Zero Gate Voltage Drain Current Vgs=10, Vds=0V	Igss	-	1	uA
Gate Threshold Voltage Vds=9.6, Ids=1mA	Vth	1.0	1.7	V
Out Put Power f=450MHz Pin=1W Vds=9.6V	Po	7.0	-	W
Drain Efficiency f=450MHz Pin=1W Vds=9.7V	ηD	50	-	%

11) Transistor, Diode, and LED Ontline Drawings

Top View

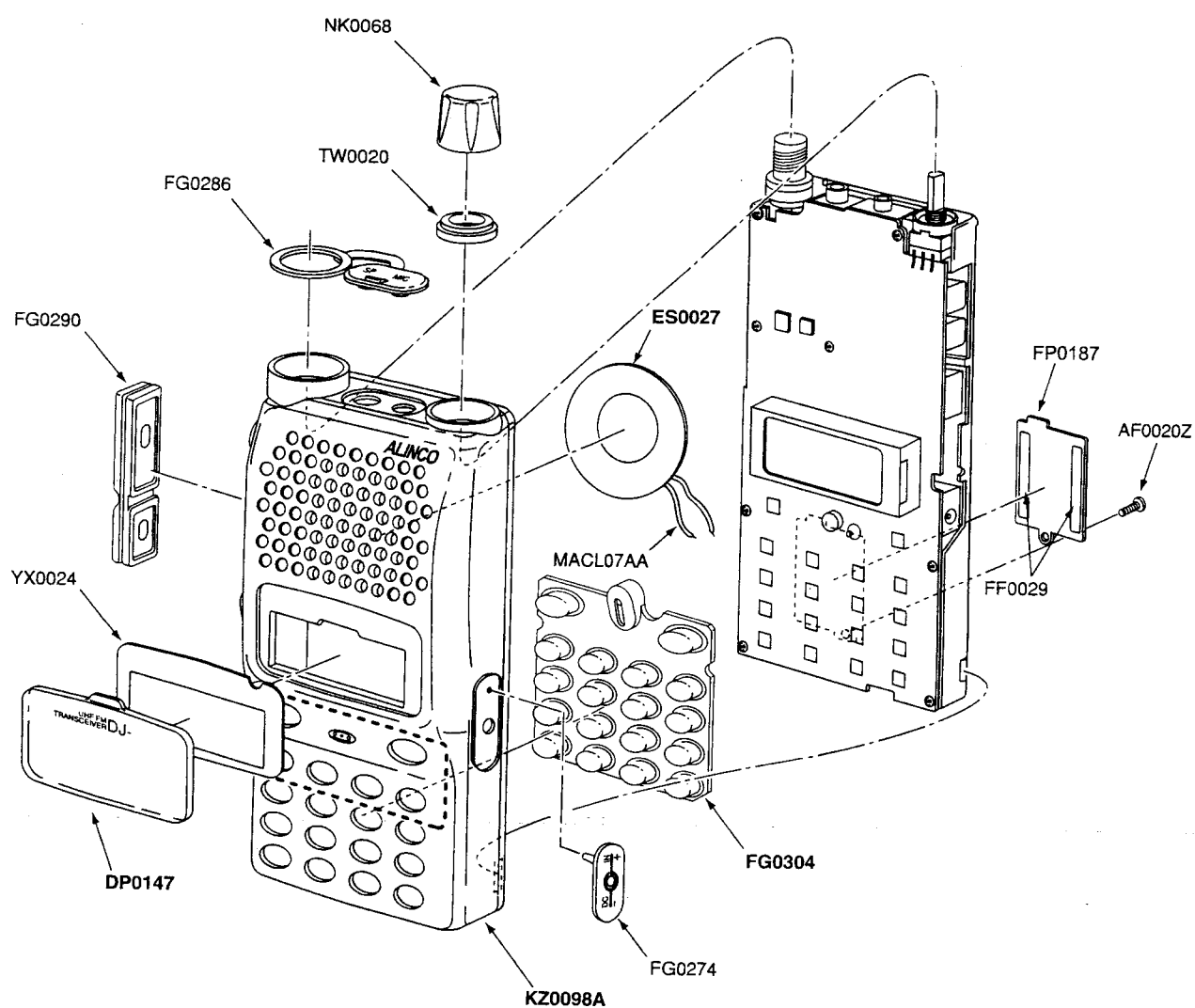
DA204U T106 XD0130	1SV214 TPH4 XD0131	MA741WA TX XD0251	S3DG7 XD0261	MA729-TX XD0291	U2FWJ44N (TE12R) XD0294	MA2S111-TX XD0323
MA2S30400L XD0312	HSU277TRF XD0331	MA2S30400L XD0312	MRF9745T1 XE0034	BRPG1201W TR XL0028	SML-310MTT86 XL0036	2SC4081 T106R XT0095
2SA1036K T146Q XT0110	2SD2216R-TX XT0135	2SB766A-TX 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	MA2S376 XD0316				

12) LCD Connection (EL0044)

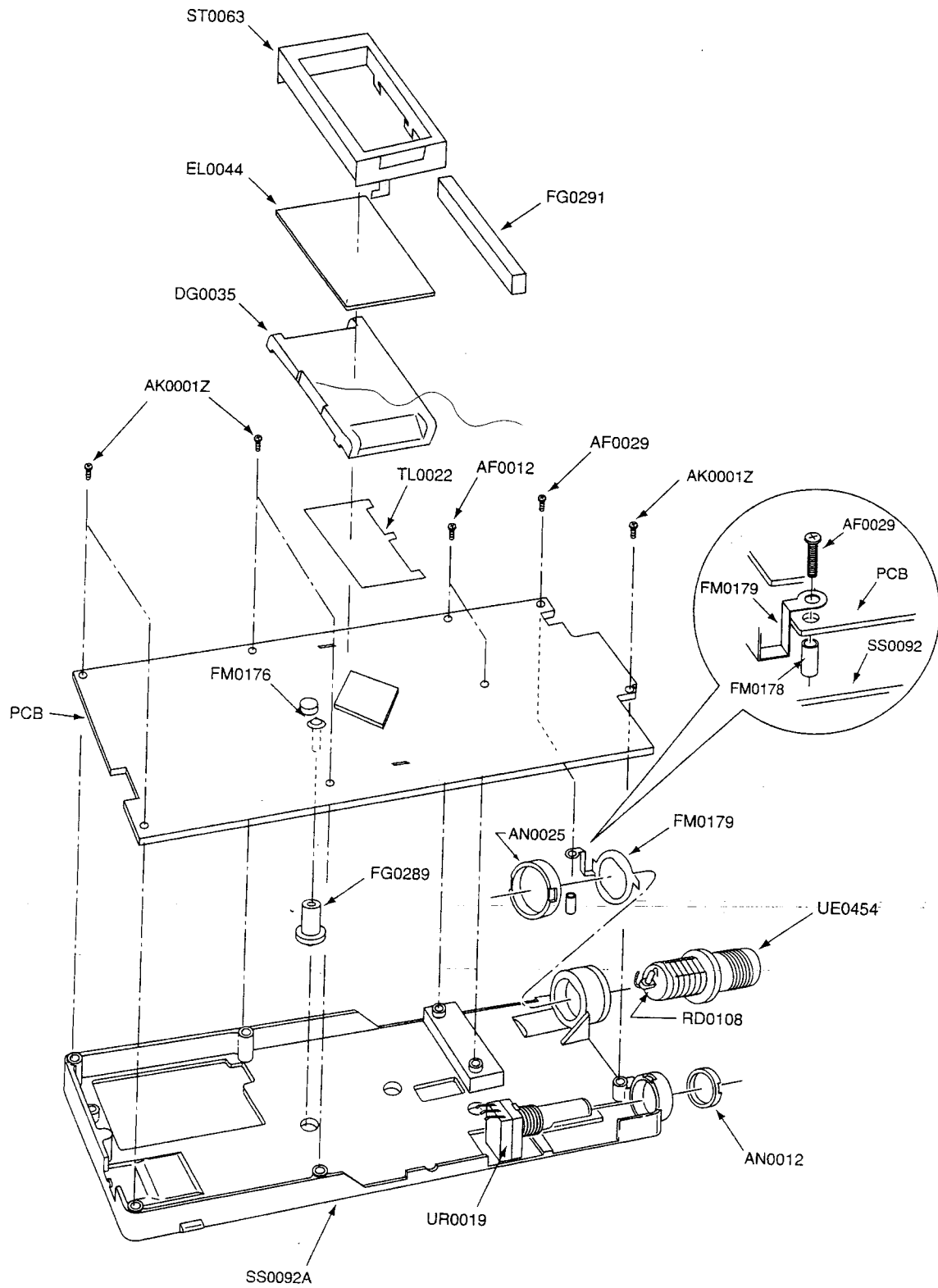


EXPLODED VIEW

1) Front View



2) Rear View



PARTS LIST (DJ-396)

Main Unit

Ref No.	Parts No.	Parts Name	Ver.
C1	CU3031	C1608JB1H471KT-AS	
C10	CU3009	C1608CH1H080CT-A	
C100	CS0408	6MCM156MATER	
C101	CU3047	C1608JB1H103KT-N	
C102	CU3035	C1608JB1H102KT-AS	
C103	CU0108	LMK212BJ105KG	
C104	CU3035	C1608JB1H102KT-AS	
C105	CS0404	6MCM106MATER	
C106	CU3007	C1608CH1H060CT-A	
C107	CS0408	6MCM156MATER	
C108	CU3035	C1608JB1H102KT-AS	
C109	CE0350	16MV100HC	
C11	CU3009	C1608CH1H080CT-A	
C110	CU3035	C1608JB1H102KT-AS	
C111	CE0397	MVS16VC47MF46	
C112	CU0108	LMK212BJ105KG	
C113	CU3047	C1608JB1H103KT-N	
C114	CU3035	C1608JB1H102KT-AS	
C115	CE0392	6MV47UW	
C116	CU3111	C1608JB1C104KT-N	
C117	CU3047	C1608JB1H103KT-N	
C118	CS0408	6MCM156MATER	
C119	CU3047	C1608JB1H103KT-N	
C12	CU3001	C1608CH1H0R5CT-AS	
C120	CU3035	C1608JB1H102KT-AS	
C121	CS0408	6MCM156MATER	
C122	CU3111	C1608JB1C104KT-N	
C123	CU3111	C1608JB1C104KT-N	
C124	CU3035	C1608JB1H102KT-AS	
C125	CU3051	C1608JB1E223KT-NS	
C126	CU3051	C1608JB1E223KT-NS	
C127	CU3051	C1608JB1E223KT-NS	
C128	CU3111	C1608JB1C104KT-N	
C129	CU3111	C1608JB1C104KT-N	
C13	CU3031	C1608JB1H471KT-AS	
C130	CU0108	LMK212BJ105KG	
C131	CU3111	C1608JB1C104KT-N	
C132	CE0396	MVS6.3VC100MF46	
C133	CS0408	6MCM156MATER	
C134	CU3111	C1608JB1C104KT-N	
C135	CU3035	C1608JB1H102KT-AS	
C136	CU3035	C1608JB1H102KT-AS	
C137	CU3101	C1608JB1C473KT-NS	
C138	CU3111	C1608JB1C104KT-N	
C139	CU0108	LMK212BJ105KG	
C14	CU3001	C1608CH1H0R5CT-AS	
C140	CU3035	C1608JB1H102KT-AS	
C141	CU3035	C1608JB1H102KT-AS	
C142	CU3047	C1608JB1H103KT-N	
C143	CU3035	C1608JB1H102KT-AS	
C144	CU3111	C1608JB1C104KT-N	
C145	CU3025	C1608CH1H151JT-AS	
C146	CU3035	C1608JB1H102KT-AS	
C147	CU3035	C1608JB1H102KT-AS	
C148	CU3111	C1608JB1C104KT-N	

Ref No.	Parts No.	Parts Name	Ver.
C149	CU3041	C1608JB1H332KT-NS	
C15	CU3031	C1608JB1H471KT-AS	
C150	CU3111	C1608JB1C104KT-N	
C151	CU3111	C1608JB1C104KT-N	
C152	CU3035	C1608JB1H102KT-AS	
C153	CU3035	C1608JB1H102KT-AS	
C154	CU3038	C1608JB1H182KT-AS	
C155	CU3111	C1608JB1C104KT-N	
C156	CU3035	C1608JB1H102KT-AS	
C157	CU3050	C1608JB1E183KT-NS	
C158	CU0108	LMK212BJ105KG	
C159	CU3051	C1608JB1E223KT-NS	
C16	CU3031	C1608JB1H471KT-AS	
C160	CU0108	LMK212BJ105KG	
C161	CS0408	6MCM156MATER	
C162	CU3023	C1608CH1H101JT-AS	
C163	CU3044	C1608JB1H562KT-NS	
C164	CU3040	C1608JB1H272KT-NS	
C165	CU3111	C1608JB1C104KT-N	
C166	CU3047	C1608JB1H103KT-N	
C167	CU3101	C1608JB1C473KT-NS	
C168	CU3047	C1608JB1H103KT-N	
C169	CU3047	C1608JB1H103KT-N	
C17	CS0408	6MCM156MATER	
C170	CU3047	C1608JB1H103KT-N	
C171	CU3046	C1608JB1H822KT-NS	
C172	CU3035	C1608JB1H102KT-AS	
C173	CU0108	LMK212BJ105KG	
C174	CS0408	6MCM156MATER	
C175	CU3111	C1608JB1C104KT-N	
C176	CU3014	C1608CH1H180JT-AS	
C177	CU3013	C1608CH1H150JT-AS	
C178	CU0108	LMK212BJ105KG	
C179	CU3035	C1608JB1H102KT-AS	
C18	CU3011	C1608CH1H100DT-AS	
C180	CU3111	C1608JB1C104KT-N	
C181	CU3049	C1608JB1E153KT-NS	
C182	CU3031	C1608JB1H471KT-AS	
C183	CU3031	C1608JB1H471KT-AS	
C185	CU3111	C1608JB1C104KT-N	
C186	CU3003	C1608CH1H020CT-AS	
C187	CU3111	C1608JB1C104KT-N	
C188	CS0398	TMCP0J225MTR	
C189	CU0108	LMK212BJ105KG	
C19	CU3035	C1608JB1H102KT-AS	
C190	CU3047	C1608JB1H103KT-N	
C192	CU3035	C1608JB1H102KT-AS	
C193	CU3031	C1608JB1H471KT-AS	
C2	CU3031	C1608JB1H471KT-AS	
C20	CU3016	C1608CH1H270JT-AS	
C21	CU3010	C1608CH1H090CT-A	
C23	CU3001	C1608CH1H0R5CT-AS	
C24	CU3013	C1608CH1H150JT-AS	
C25	CU3031	C1608JB1H471KT-AS	
C26	CU3031	C1608JB1H471KT-AS	

Main Unit

Ref No.	Parts No.	Parts Name	Ver.
C27	CU3009	C1608CH1H080CT-A	
C28	CU3002	C1608CH1H010CT-AS	
C3	CU3015	C1608CH1H220JT-AS	
C30	CU3013	C1608CH1H150JT-AS	
C31	CU3006	C1608CH1H050CT-AS	
C32	CU3002	C1608CH1H010CT-AS	
C33	CU3031	C1608JB1H471KT-AS	
C34	CU3047	C1608JB1H103KT-N	
C35	CU3031	C1608JB1H471KT-AS	
C36	CU3031	C1608JB1H471KT-AS	
C38	CU3001	C1608CH1H0R5CT-AS	
C4	CU3015	C1608CH1H220JT-AS	
C40	CU3015	C1608CH1H220JT-AS	
C41	CU3031	C1608JB1H471KT-AS	
C42	CU3031	C1608JB1H471KT-AS	
C43	CU3023	C1608CH1H101JT-AS	
C44	CU3031	C1608JB1H471KT-AS	
C45	CU3031	C1608JB1H471KT-AS	
C46	CU3031	C1608JB1H471KT-AS	
C47	CU0108	LMK212BJ105KG	
C48	CU3031	C1608JB1H471KT-AS	
C49	CU3005	C1608CH1H040CT-AS	
C5	CU3031	C1608JB1H471KT-AS	
C53	CU3031	C1608JB1H471KT-AS	
C54	CU3047	C1608JB1H103KT-N	
C55	CS0408	6MCM156MATER	
C56	CU3015	C1608CH1H220JT-AS	
C57	CU3006	C1608CH1H050CT-AS	
C58	CU3011	C1608CH1H100DT-AS	
C59	CU3014	C1608CH1H180JT-AS	
C6	CU3031	C1608JB1H471KT-AS	
C60	CU3109	C1608CH1H110JT-A	
C61	CU3008	C1608CH1H070CT-A	
C62	CU3004	C1608CH1H030CT-AS	
C64	CU3047	C1608JB1H103KT-N	
C65	CU3006	C1608CH1H050CT-AS	
C66	CU3006	C1608CH1H050CT-AS	
C67	CU3006	C1608CH1H050CT-AS	
C68	CU3023	C1608CH1H101JT-AS	
C69	CU3047	C1608JB1H103KT-N	
C7	CU3008	C1608CH1H070CT-A	
C70	CS0063	TMCSA1V104MTR	
C71	CU3001	C1608CH1H0R5CT-AS	
C72	CU3035	C1608JB1H102KT-AS	
C73	CU3047	C1608JB1H103KT-N	
C74	CU3031	C1608JB1H471KT-AS	
C76	CU3019	C1608CH1H470JT-AS	
C77	CU3009	C1608CH1H080CT-A	
C78	CU3015	C1608CH1H220JT-AS	
C79	CU3001	C1608CH1H0R5CT-AS	
C8	CU3031	C1608JB1H471KT-AS	
C80	CS0213	TMCMA1A225MTR	
C83	CU3031	C1608JB1H471KT-AS	
C84	CU3031	C1608JB1H471KT-AS	
C85	CU0108	LMK212BJ105KG	

Ref No.	Parts No.	Parts Name	Ver.
C87	CU3035	C1608JB1H102KT-AS	
C88	CS0213	TMCMA1A225MTR	
C9	CU3007	C1608CH1H060CT-A	
C90	CU0108	LMK212BJ105KG	
C91	CU3035	C1608JB1H102KT-AS	
C92	CU3035	C1608JB1H102KT-AS	
C93	CE0392	6MV47UW	
C94	CU3035	C1608JB1H102KT-AS	
C95	CS0408	6MCM156MATER	
C96	CU3111	C1608JB1C104KT-N	
C97	CU0108	LMK212BJ105KG	
C98	CU3047	C1608JB1H103KT-N	
C99	CS0408	6MCM156MATER	
CN2	UE0369	AXN49301616	
D1	XD0323	MA2S111-TX	
D10	XD0130	DA204U T106	
D11	XD0294	U2FWJ44N(TE12R)	
D12	XD0344	1SV311 (TPL3)	
D13	XD0344	1SV311 (TPL3)	
D14	XD0344	1SV311 (TPL3)	
D15	XD0344	1SV311 (TPL3)	
D17	XL0036	SML-310MTT86	
D18	XL0036	SML-310MTT86	
D19	XL0028	BRPG1201W TR	
D2	XD0331	HSU277TRF	
D20	XL0036	SML-310MTT86	
D21	XL0036	SML-310MTT86	
D22	XL0036	SML-310MTT86	
D23	XL0036	SML-310MTT86	
D25	XD0332	RB706F-40-T106	
D26	XD0291	MA729-TX	
D27	XD0342	1SS390 TE61	
D28	XD0377	MAZS0270HL	
D29	XD0316	MA2S376-TX	
D3	XD0316	MA2S376-TX	
D4	XD0331	HSU277TRF	
D5	XD0331	HSU277TRF	
D7	XD0251	MA741WA TX	
D8	XD0261	S3DG7	
D9	XD0323	MA2S111-TX	
FL1	XC0072	ALFCM455F=K	
IC1	XA0449	UPC2710T-E3	
IC10	XA0669	BR24C64F-E2	
IC11	XA0620	S80845CLMC-B66-T2	
IC2	XA0352	M64076GP	
IC3	XA0888	XC6202P502PR	
IC4	XA0515	TK14521MTL	
IC5	XA0210	NJM2070M T1	
IC6	XA0385	M5222FP-600C	
IC7	XA0596	NJM2902V-TE1	
IC8	XA0573	NJM2904V-TE1	
IC9	XA0932	M38267M8L288GP	
JK1	UJ0046	MJ82-1	
JK2	UJ0019	HSJ1493-01-010	
JK3	UJ0022	HSJ1102-01-540	

Main Unit

Ref No.	Parts No.	Parts Name	Ver.
L1	QC0507	LK16081R0K-T	
L10	QC0627	LL1608-FSR10J	
L11	QC0620	LL1608-FS27NJ	KR
L11	QC0622	LL1608-FS39NJ	TA
L12	QC0529	LQN21A18NJ04	
L13	QC0560	LL1608-FH8N2J	
L14	QC0618	LL1608-FS18NJ	
L18	QC0507	LK16081R0K-T	
L19	QC0616	LL1608-FS12NJ	
L2	QKA65A	MR1.5 6.5T 0.4	
L20	QC0531	LQN21A27NJ04	
L21	QC0531	LQN21A27NJ04	
L22	QC0619	LL1608-FS22NJ	
L23	QC0617	LL1608-FS15NJ	
L24	QC0623	LL1608-FS47NJ	
L25	QC0535	LQN21A56NJ04	
L26	QC0089	NL322522T-181JA	
L27	QC0507	LK16081R0K-T	
L3	QKA65A	MR1.5 6.5T 0.4	
L4	QC0507	LK16081R0K-T	
L5	QKA25A	MR1.5 2.5T 0.4	
L6	QKA35A	MR1.5 3.5T 0.4	
L7	QC0559	LL1608-FH6N8J	
L8	QC0530	LQN21A22NJ04	
L9	QKA75A	MR1.5 7.5T 0.4	
LCD1	EL0044	HT-3404	
MIC1	EY0017	OB-27P44	
Q1	XT0135	2SD2216R-TX	
Q10	XT0171	2SC4808-TX.AR	
Q11	XT0171	2SC4808-TX.AR	
Q12	XU0193	RN1107 TE85L	
Q13	XT0170	2SB766A-TX	
Q14	XT0170	2SB766A-TX	
Q15	XU0193	RN1107 TE85L	
Q16	XU0172	XP1501-TX	
Q17	XT0110	2SA1036K T146Q	
Q18	XU0193	RN1107 TE85L	
Q19	XU0197	RN1111 (TE85L)	
Q2	XE0038	2SK2975-T11-A	
Q20	XU0172	XP1501-TX	
Q21	XU0161	XP1114(TX)	
Q22	XU0192	RN2107 TE85L	
Q23	XT0135	2SD2216R-TX	
Q24	XU0197	RN1111 (TE85L)	
Q25	XU0197	RN1111 (TE85L)	
Q26	XU0193	RN1107 TE85L	
Q27	XT0095	2SC4081 T106R	
Q28	XU0192	RN2107 TE85L	
Q29	XU0192	RN2107 TE85L	
Q3	XT0138	2SC5066-O(TE85L)	
Q30	XU0195	RN1104 TE85L	
Q31	XT0135	2SD2216R-TX	
Q32	XE0029	2SK1580-T1	
Q33	XT0135	2SD2216R-TX	
Q34	XE0029	2SK1580-T1	

Ref No.	Parts No.	Parts Name	Ver.
Q35	XU0194	RN2111 TE85L	
Q36	XU0197	RN1111 (TE85L)	
Q37	XT0171	2SC4808-TX.AR	
Q38	XE0029	2SK1580-T1	
Q4	XE0044	2SK3074 TE12L	
Q5	XT0138	2SC5066-O(TE85L)	
Q6	XU0172	XP1501-TX	
Q7	XT0170	2SB766A-TX	
Q8	XT0172	2SC4618TLP	
Q9	XT0138	2SC5066-O(TE85L)	
R1	RK3030	MCR03EZJ221	
R10	RK3018	MCR03EZJ220	
R101	RK3036	MCR03EZJ681	
R102	RK3062	MCR03EZJ104	
R103	RK3050	MCR03EZJ103	
R104	RK3050	MCR03EZJ103	
R105	RK3041	MCR03EZJ182	
R106	RK3052	MCR03EZJ153	
R107	RK3048	MCR03EZJ682	
R108	RK3052	MCR03EZJ153	
R109	RK3050	MCR03EZJ103	
R11	RK3050	MCR03EZJ103	
R110	RK3050	MCR03EZJ103	
R111	RK3066	MCR03EZJ224	
R112	RK3054	MCR03EZJ223	
R113	RK3050	MCR03EZJ103	
R114	RK3038	MCR03EZJ102	
R115	RK3062	MCR03EZJ104	
R116	RK3066	MCR03EZJ224	
R117	RK3074	MCR03EZJ105	
R118	RK3014	MCR03EZJ100	
R119	RK3051	MCR03EZJ123	
R12	RK3063	MCR03EZJ124	KR
R12	RK3062	MCR03EZJ104	TA
R120	RK3042	MCR03EZJ222	
R122	RK3032	MCR03EZJ331	
R123	RK3062	MCR03EZJ104	
R124	RK3070	MCR03EZJ474	
R125	RK1018	ERJ8GEYJ101V	
R126	RK3058	MCR03EZJ473	
R127	RK3062	MCR03EZJ104	
R128	RK3062	MCR03EZJ104	
R129	RK3055	MCR03EZJ273	
R13	RK3030	MCR03EZJ221	
R130	RK3062	MCR03EZJ104	
R131	RK3055	MCR03EZJ273	
R132	RK3046	MCR03EZJ472	
R133	RK3046	MCR03EZJ472	
R134	RK3046	MCR03EZJ472	
R135	RK3046	MCR03EZJ472	
R136	RK3074	MCR03EZJ105	
R138	RK3022	MCR03EZJ470	
R139	RK3057	MCR03EZJ393	
R14	RK3026	MCR03EZJ101	
R140	RK3058	MCR03EZJ473	

Main Unit

Ref No.	Parts No.	Parts Name	Ver.
R141	RK3054	MCR03EZHJ223	
R142	RK3042	MCR03EZHJ222	
R143	RK3058	MCR03EZHJ473	
R144	RK3061	MCR03EZHJ823	
R145	RK3050	MCR03EZHJ103	
R146	RK3058	MCR03EZHJ473	
R147	RK3045	MCR03EZHJ392	
R148	RK3063	MCR03EZHJ124	
R149	RK3040	MCR03EZHJ152	
R150	RK3038	MCR03EZHJ102	
R151	RK3038	MCR03EZHJ102	
R152	RK3062	MCR03EZHJ104	
R153	RK3065	MCR03EZHJ184	
R154	RK3061	MCR03EZHJ823	
R155	RK3057	MCR03EZHJ393	
R156	RK3050	MCR03EZHJ103	
R157	RK3059	MCR03EZHJ563	
R158	RK3063	MCR03EZHJ124	
R159	RK3052	MCR03EZHJ153	
R16	RK3062	MCR03EZHJ104	
R160	RK3068	MCR03EZHJ334	
R161	RK3046	MCR03EZHJ472	
R162	RK3062	MCR03EZHJ104	
R163	RK3048	MCR03EZHJ682	
R164	RK3038	MCR03EZHJ102	
R165	RK3050	MCR03EZHJ103	
R166	RK3074	MCR03EZHJ105	
R167	RK3038	MCR03EZHJ102	
R168	RK3046	MCR03EZHJ472	
R169	RK3066	MCR03EZHJ224	
R170	RK3069	MCR03EZHJ394	
R171	RK3072	MCR03EZHJ684	
R172	RK3050	MCR03EZHJ103	
R173	RK3050	MCR03EZHJ103	
R174	RK3050	MCR03EZHJ103	
R175	RK3038	MCR03EZHJ102	
R176	RK3060	MCR03EZHJ683	
R177	RK3067	MCR03EZHJ274	
R178	RK3050	MCR03EZHJ103	
R179	RK3061	MCR03EZHJ823	
R18	RK3050	MCR03EZHJ103	
R180	RK3055	MCR03EZHJ273	
R181	RK3062	MCR03EZHJ104	
R182	RK3050	MCR03EZHJ103	
R183	RK3051	MCR03EZHJ123	
R184	RK3062	MCR03EZHJ104	
R185	RK3048	MCR03EZHJ682	
R186	RK3038	MCR03EZHJ102	
R187	RK3046	MCR03EZHJ472	
R188	RK3038	MCR03EZHJ102	
R189	RK3046	MCR03EZHJ472	
R19	RK3058	MCR03EZHJ473	
R190	RK3050	MCR03EZHJ103	
R191	RK3050	MCR03EZHJ103	
R192	RK3066	MCR03EZHJ224	

Ref No.	Parts No.	Parts Name	Ver.
R193	RK3066	MCR03EZHJ224	
R194	RK3074	MCR03EZHJ105	
R195	RK3062	MCR03EZHJ104	
R196	RK3062	MCR03EZHJ104	
R197	RK3062	MCR03EZHJ104	
R198	RK3001	MCR03EZHJ000	
R199	RK3066	MCR03EZHJ224	
R2	RK3022	MCR03EZHJ470	KR
R2	RK3030	MCR03EZHJ221	TA
R20	RK3062	MCR03EZHJ104	
R200	RK3066	MCR03EZHJ224	
R201	RK3074	MCR03EZHJ105	
R202	RK3062	MCR03EZHJ104	
R203	RK3062	MCR03EZHJ104	
R204	RK3062	MCR03EZHJ104	TA
R205	RK3066	MCR03EZHJ224	
R206	RK3074	MCR03EZHJ105	
R207	RK3074	MCR03EZHJ105	
R208	RK3058	MCR03EZHJ473	
R209	RK3058	MCR03EZHJ473	
R21	RK3059	MCR03EZHJ563	
R210	RK3062	MCR03EZHJ104	KR
R214	RK3046	MCR03EZHJ472	
R216	RK3065	MCR03EZHJ184	
R217	RK3043	MCR03EZHJ272	
R218	RK0107	ERJ6GEY0R00V	
R219	RK3063	MCR03EZHJ124	
R22	RK3062	MCR03EZHJ104	
R220	RK3063	MCR03EZHJ124	
R221	RK3030	MCR03EZHJ221	
R222	RK3030	MCR03EZHJ221	
R226	RK3001	MCR03EZHJ000	
R227	RK3039	MCR03EZHJ122	
R228	RK3062	MCR03EZHJ104	
R23	RK3039	MCR03EZHJ122	
R231	RK3001	MCR03EZHJ000	
R232	RK3050	MCR03EZHJ103	
R233	RK3074	MCR03EZHJ105	
R234	RK3032	MCR03EZHJ331	
R236	RK3062	MCR03EZHJ104	
R24	RK3058	MCR03EZHJ473	
R25	RK0002	ERJ6GEYJ120V	
R26	RK3050	MCR03EZHJ103	
R27	RK3034	MCR03EZHJ471	
R28	RK3042	MCR03EZHJ222	
R29	RK3053	MCR03EZHJ183	
R3	RK3046	MCR03EZHJ472	
R31	RK3023	MCR03EZHJ560	
R33	RK3050	MCR03EZHJ103	
R34	RK3062	MCR03EZHJ104	
R35	RK3034	MCR03EZHJ471	
R36	RK3066	MCR03EZHJ224	
R37	RK3050	MCR03EZHJ103	
R38	RK3046	MCR03EZHJ472	
R39	RK3062	MCR03EZHJ104	

Main Unit

Ref No.	Parts No.	Parts Name	Ver.
R4	RK3050	MCR03EZHJ103	
R40	RK3063	MCR03EZHJ124	
R41	RK3036	MCR03EZHJ681	
R42	RK3038	MCR03EZHJ102	
R43	RK3050	MCR03EZHJ103	
R44	RK3048	MCR03EZHJ682	
R46	RK3032	MCR03EZHJ331	
R47	RK3030	MCR03EZHJ221	
R48	RK3049	MCR03EZHJ822	
R49	RK3058	MCR03EZHJ473	
R5	RK3030	MCR03EZHJ221	
R50	RK3038	MCR03EZHJ102	
R51	RK3026	MCR03EZHJ101	
R52	RK3074	MCR03EZHJ105	
R53	RK3074	MCR03EZHJ105	
R54	RK3074	MCR03EZHJ105	
R55	RK3074	MCR03EZHJ105	
R57	RK3030	MCR03EZHJ221	
R58	RK3074	MCR03EZHJ105	
R59	RK3066	MCR03EZHJ224	
R6	RK3066	MCR03EZHJ224	
R62	RK3058	MCR03EZHJ473	
R63	RK3058	MCR03EZHJ473	
R64	RK3050	MCR03EZHJ103	
R66	RK3054	MCR03EZHJ223	
R69	RK3058	MCR03EZHJ473	
R7	RK3018	MCR03EZHJ220	
R71	RK3046	MCR03EZHJ472	
R72	RK3058	MCR03EZHJ473	
R73	RK3036	MCR03EZHJ681	
R74	RK3050	MCR03EZHJ103	
R75	RK3058	MCR03EZHJ473	
R76	RK3050	MCR03EZHJ103	
R77	RK3050	MCR03EZHJ103	
R78	RK3054	MCR03EZHJ223	
R79	RK3022	MCR03EZHJ470	
R8	RK3050	MCR03EZHJ103	
R80	RK3062	MCR03EZHJ104	
R81	RK3042	MCR03EZHJ222	
R82	RK3046	MCR03EZHJ472	
R83	RK3050	MCR03EZHJ103	
R84	RK3036	MCR03EZHJ681	
R85	RK3050	MCR03EZHJ103	
R86	RK3038	MCR03EZHJ102	
R87	RK3050	MCR03EZHJ103	
R89	RK3001	MCR03EZHJ000	
R90	RK3032	MCR03EZHJ331	
R91	RK3062	MCR03EZHJ104	
R92	RK3058	MCR03EZHJ473	
R93	RK3050	MCR03EZHJ103	
R94	RK3050	MCR03EZHJ103	
R95	RK3036	MCR03EZHJ681	
R96	RK3034	MCR03EZHJ471	
R97	RK3058	MCR03EZHJ473	
R98	RK3044	MCR03EZHJ332	

[illegible]

Mechanical Parts

[illegible]

Packing Parts

[illegible]

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: 8Ω
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: 50Ω , 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: 600Ω , 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. ± 0.1 ppm

12.Linear detector

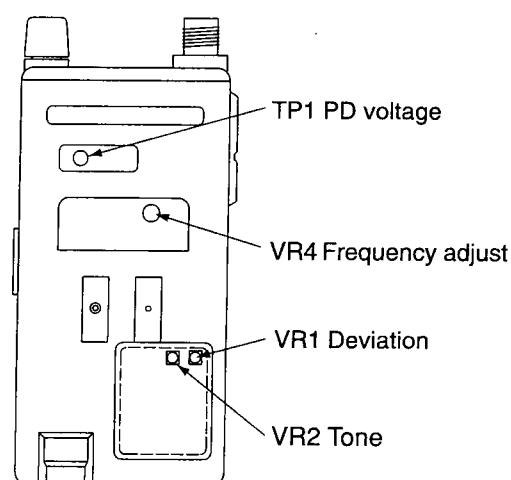
Measurable frequency: Up to 500MHz
Characteristics: Flat
CN: 60dB or more

Note

- Standard modulation: 1kHz +/-3.5kHz/DEV
- Reference sensitivity: 12dB SINAD
- Specified audio output level: 500mW at 8Ω
- Standard audio output level: 50mW at 8Ω
- Use an RF cable (3D2W: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-396 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-396 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 input 490217. 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
		KR, TA
1	Reference frequency adjustment	384.05 MHz
2	High power adjustment	384.05 MHz
3	Low power adjustment	384.05 MHz
4	Minimum frequency sensitivity adjustment	368.5 MHz
5	Medium frequency sensitivity adjustment	384.05 MHz
6	Maximum frequency sensitivity adjustment	399.5 MHz
7	S-meter (1) adjustment	384.05 MHz
8	S-meter (FULL) adjustment	384.05 MHz
9	Deviation	384.05 MHz
10	DTMF (1) test (DJ-496)	384.05 MHz
11	DTMF (D) test (DJ-496)	384.05 MHz
13	Tone 88.5 Hz test	384.05 MHz
15	DCS code 255 test	384.05 MHz
16	Tone burst test	384.05 MHz
17	Aging (Not required to use)	384.05 MHz

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 VR4 on the Main board until the value on the frequency counter matches the one displayed on the LCD.
4. (If the frequency display 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 **(FUNC)** key and press the H/L key to enter the high power mode. ("L" at the upper--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 4.8 W by rotating the main tuning dial.
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 **(FUNC)** key and press the H/L key to enter the high power mode. ("L" appears at the upper-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 0.8 W by rotating the main tuning dial.
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. Set the minimum frequency sensitivity rotating the main tuning dial, while F appears after the **(FUNC)** key is pressed.

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. Set the medium frequency sensitivity rotating the main tuning dial, while F appears after the **(FUNC)** key is pressed.

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. Set the maximum frequency sensitivity rotating the main tuning dial, while F appears after the **(FUNC)** key pressed.

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 F 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 **F** 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, 1KMz 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 4.5KHz.

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 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 0.9kHz (T) or 0.8kHz (E).

DCS Code 225 Test

1. In the adjustment mode, select channel 15 by rotating the main tuning dial.
2. Press the **PTT** key. An 255 DCS code 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 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.

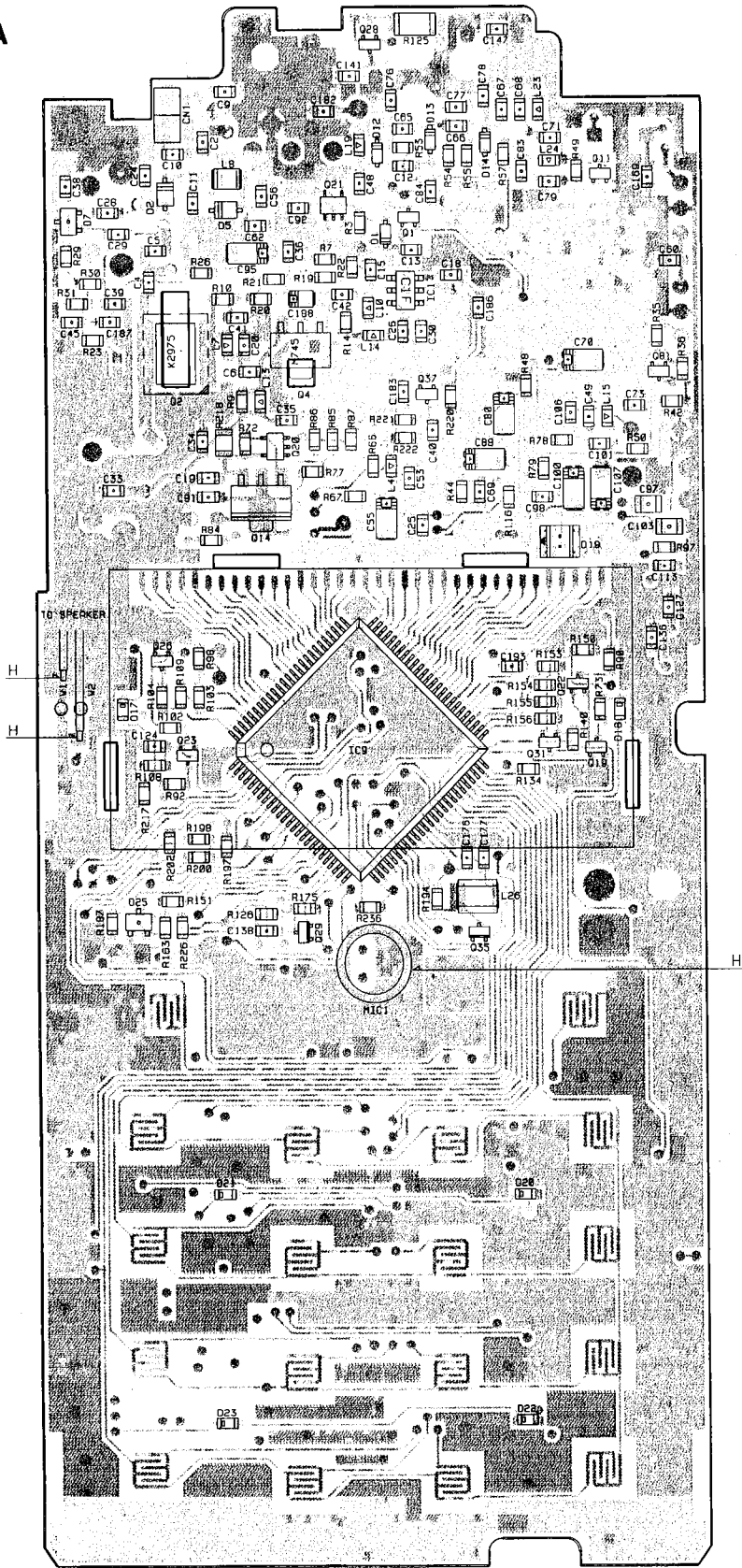
Aging

Perform this aging test only when necessary.

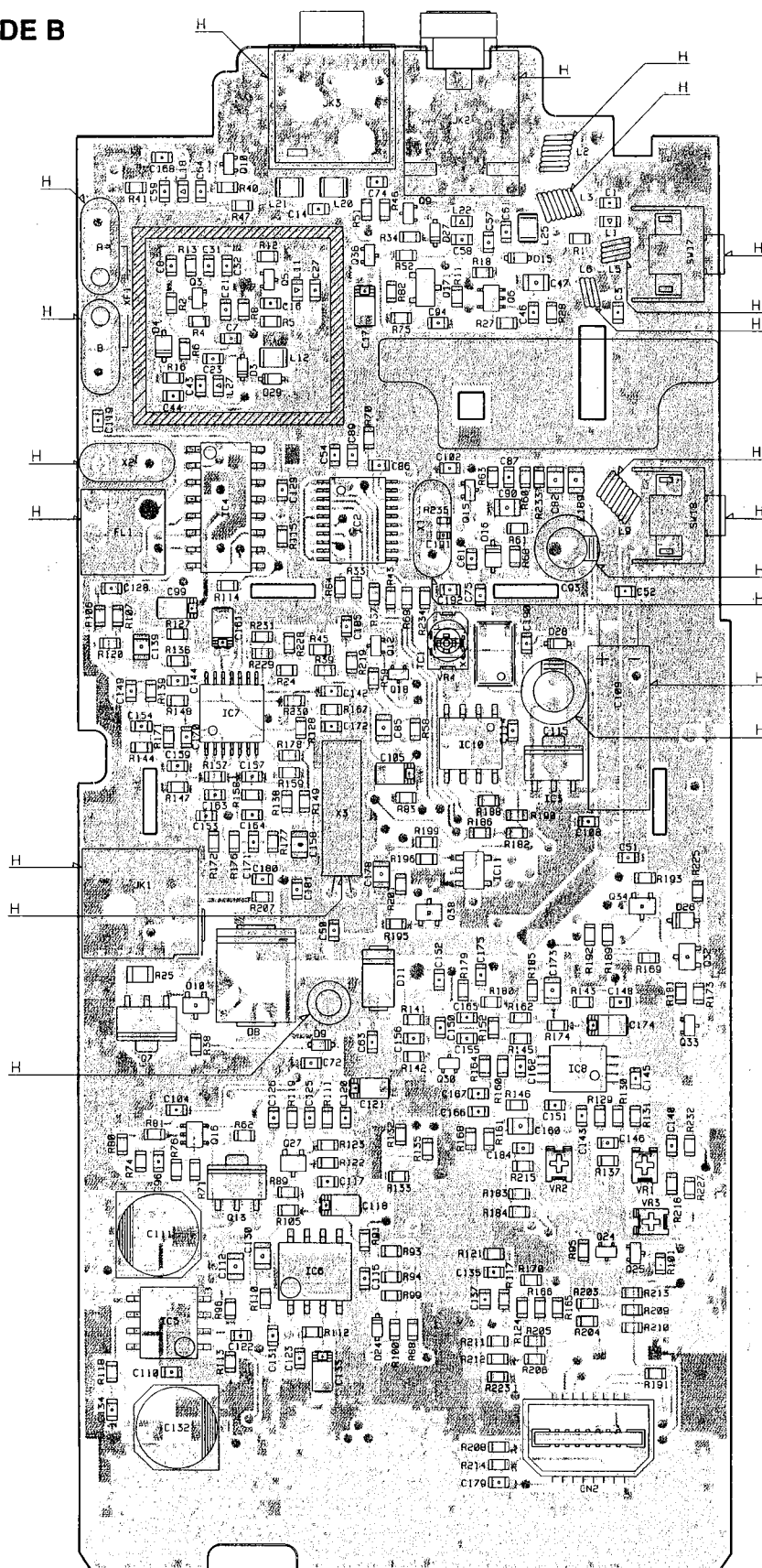
1. In the adjustment mode, select channel 17 by rotating the main tuning dial.
The transceiver automatically repeaters transmission for a minute and reception for another minute.

PC BOARD VIEW (DJ-396)

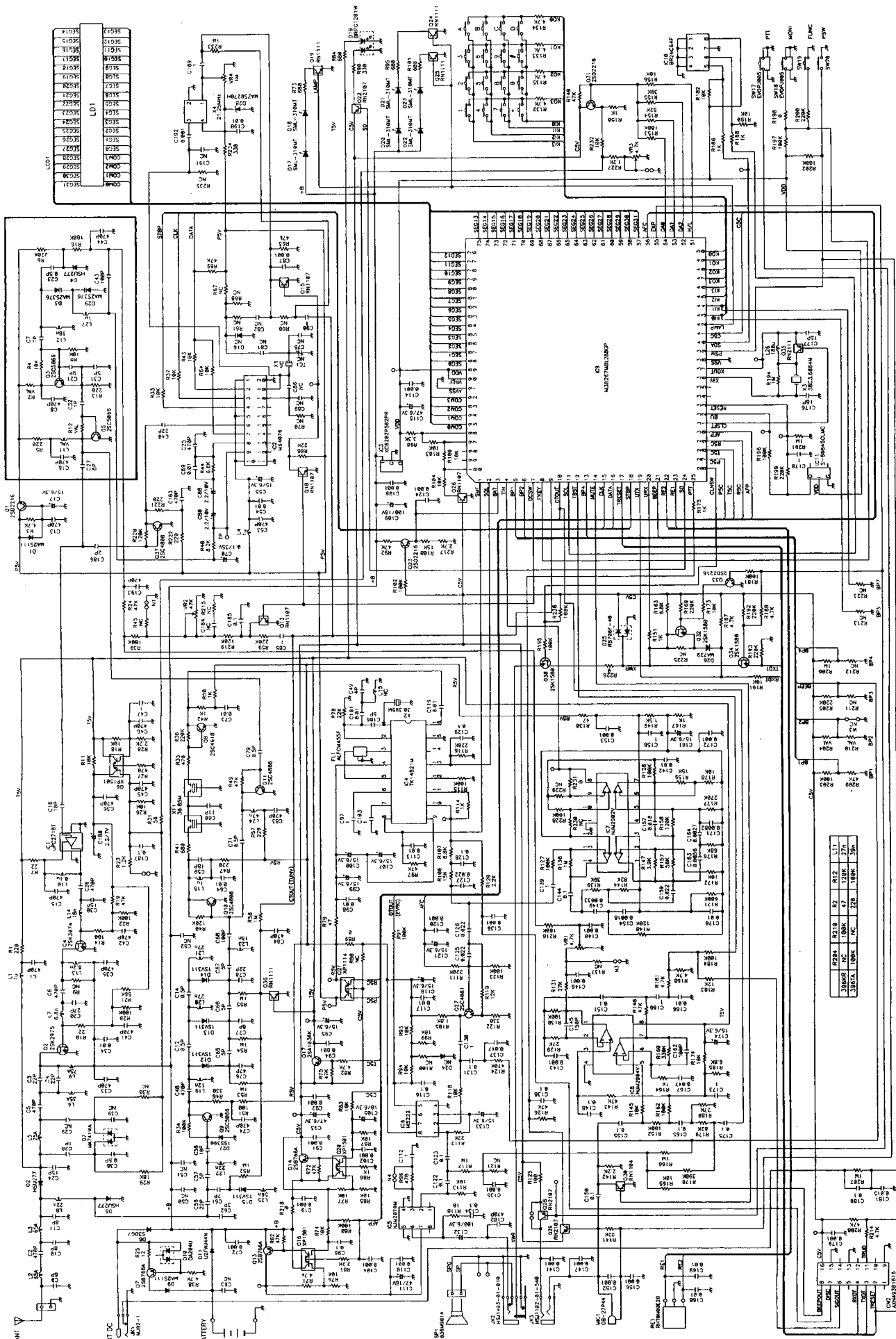
MAIN SIDE A



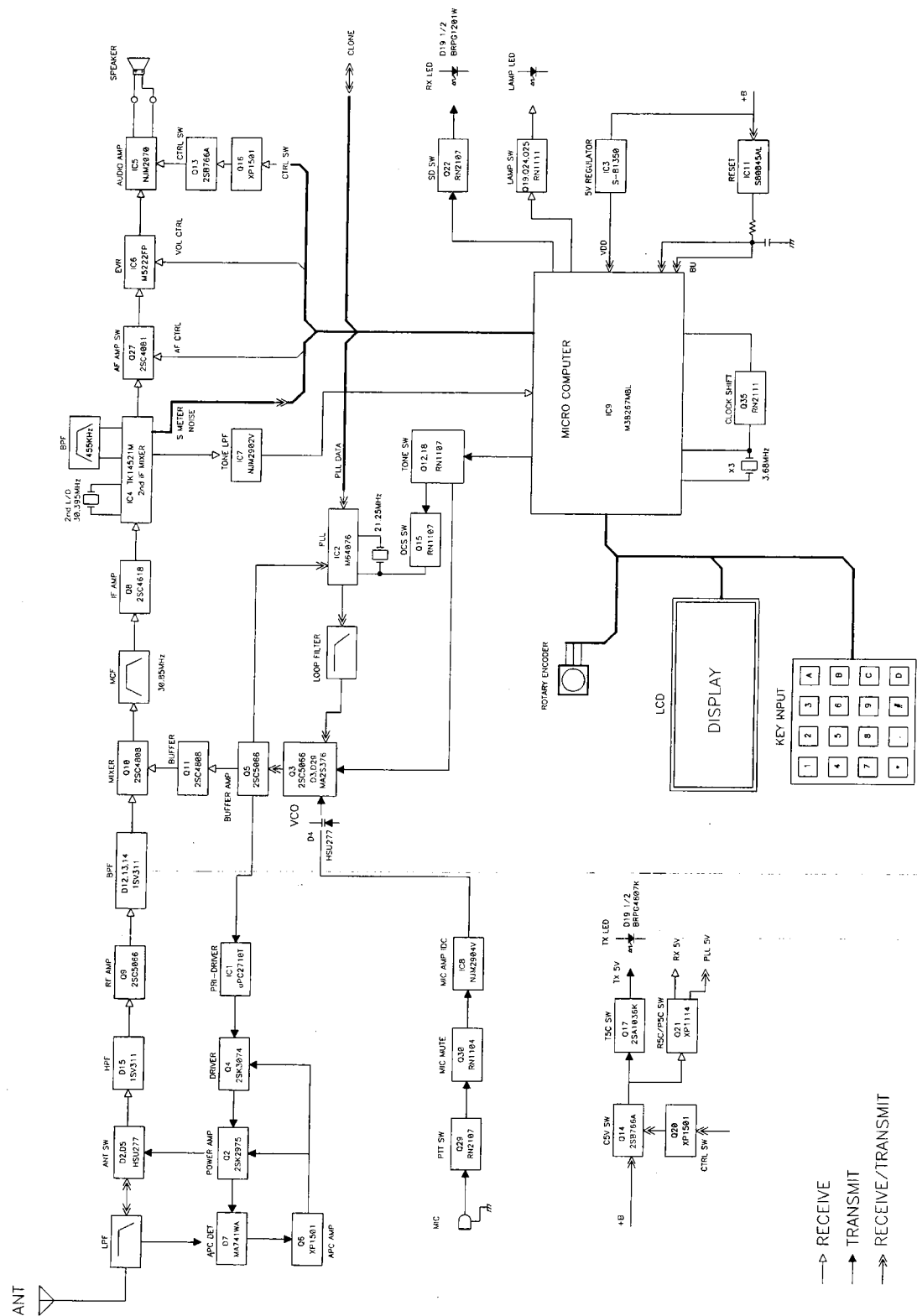
MAIN SIDE B



SCHEMATIC DIAGRAM (DJ-396)



BLOCK DIAGRAM (DJ-396)



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