TOMAHAWK 245

Service Manual DR-245A

CONTENTS

ALINCO,INC.

SPECIFICATIONS

1) GENERAL

Frequency range		CH1(245.000MHz) ~ CH80(245.9875MHz)
Operating mode		8K50F3E
Frequency resolution		12.5 kHz
Memory channel		100 channels + 1 call channel
Antenna impedance		50Ω unbalanced
Microphone impedance		2 kΩ
Rated voltage		13.8V DC ±15% (11.7 to 15.8V)
Ground		Negative ground
Current	Receive	0.6A(Max.) 0.4A(Squelched) or less
	Transmit	5.0A or less
Operating temperature		- 10°C ~ 60°C(+14°F ~ +140°F)
Frequency stability		±5 ppm
Dimensions		142(W) × 40(H) × 174(D) mm
		5.58”(W) × 1.57”(H) × 6.83”(D)
Weight		Approx. 1.0kg (35.3oz)

2) TRANSMITTER

Output power	High:10W
	Mid: 5W Low: 2.5W
Modulation system	Variable reactance frequency modulation
Maximum frequency deviation	±2.5KHz
Spurious emission	-60dB or less

3) RECEIVER

Sensitivity	0.2 uV for 12dB SINAD 0.4 uV for 20dBNQL
Receiver circuitry	Double conversion superheterodyne
Intermediate frequency	1st 30.85MHz 2nd 455kHz
Squelch sensitivity	-16dBu
Adjacent channel selectivity	-60dB
Spurious and image rejection ratio	70dB
Audio output power	2.0W (8Ω,10%THD)

! Note: All spesifications are subject to change without notice or obligation.

CIRCUIT DESCRIPTION TOMAHAWK 245

1) Receiver System

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

1. Front End

The received signal at any frequency in the 245.00MHz to 245.9875MHz range is passed through the low-pass filter (L116, L115, L114, L113, C204, C203, C202, C216 and C215) and tuning circuit (L105, L104 and D105, D104), and amplified by the RF amplifier (Q107). The signal from Q107 is then passed through the tuning circuit (L103, L107, L102, and varicaps D103, D107 and D102) and converted into 30.85 MHz by the mixer (Q106). The tuning circuit, which consists of L105, L104, varicaps D105 and D104, L103, L107, L102, varicaps D103, D107 and D102, is controlled by the tracking voltage form the VCO. The local signal from the VCO is passed through the buffer (Q112), 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 (XF102, XF101) selects 30.85 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 24 of the demodulator IC (IC108). The second local signal of 30.395 MHz, which is oscillated by the internal oscillation circuit in IC108 and crystal (X104), is input through pin 1 of IC108. Then, these two signals are mixed by the internal mixer in IC108 and the result is converted into the second IF signal with a frequency of 455 kHz. The second IF signal is output from pin 3 of IC108 to the ceramic filter (FL102), where the unwanted frequency band of that signal is eliminated, and the resulting signal is sent back to the IC108 through pins 5.

The second IF signal input via pin 5 is demodulated by the internal limiter amplifier and quadrature detection circuit in IC108, and output as an audio signal through pin 12.

4. Audio Circuit

The audio signal from pin 12 of IC108 is amplified by the audio amplifier (IC104:A),and switched by the signal switch IC (IC111) and then input it to the de-emphasis circuit.

and is compensated to the audio frequency characteristics in the de-emphasis circuit (R203, R207, R213, R209, C191, C218, C217) and amplified by the AF amplifier (IC104:D). The signal is then input to volume (VR1) . The adjusted signal is sent to the audio power amplifier (IC117) through pin 1 to drive the speaker.

5. Squelch Circuit

The detected output which is outputted from the pin 12 of IC108 is inputted to pin 19 of IC108 after it was been amplified by IC104:A and it is outputted from pin 20 after the noise component was been eliminated from the composed band pass filter in the built in amplifier of the IC, then the signal is rectified by D106 to convert into DC component. The adjusted voltage level at VR101 is delivered to the comparator of the CPU.
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. During open squelch, pin 30 (SQC) of the CPU becomes “L” level, AF control signal is being controlled and sounds is outputted from the speaker.)

2) Transmitter System

1. Modulator Circuit

The audio signal is converted to an electrical signal by the microphone, and input it to the microphone amplifier (Q6). Amplified signal which passes through mic-mute control IC109 is adjusted to an appropriate mic-volume by means of mic-gain adjust VR106.
IC114:AandB 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 VR107. 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 drive amplifier (IC112) and younger amplifier (Q115), and input to the final power module (IC110). The signal is then amplified by the final power module (IC110) and led to the antenna switch (D110) and low-pass filter (L113, L114, L115, L116, C215, C216, C202, C203 and C204), 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 D111 and D112, converted to DC. The detection voltage is passed through the APC circuit (Q118, Q117, Q116), then it controls the APC voltage supplied to the younger amplifier Q115 and the final power module IC110 to fix the transmission power.

3) PLL Synthesizer Circuit

1. PLL

The dividing ratio is obtained by sending data from the CPU (IC1) to pin 2 and sending clock pulses to pin 3 of the PLL IC (IC501). The oscillated signal from the VCO is amplified by the buffer (Q504 and Q501) and input to pin 15 of IC501. Each programmable divider in IC501 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 12.8 MHz reference oscillation (X103) by 2048, according to the data from the CPU (IC1). When the resulting frequency is 6.25 kHz, channel steps of 12.5 kHz are used.

3. Phase Comparator Circuit

The PLL (IC501) uses the reference frequency, 6.25kHz. The phase comparator in the IC501 compares the phase of the frequency from the VCO with that of the comparison frequency, 6.25 kHz, which is obtained by the internal divider in IC501.

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 13) of IC501 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 Q503 directly oscillates the desired frequency. The frequency control voltage determined in the CPU (IC1) and PLL circuit is input to the varicaps (D503 and D504). This change the oscillation frequency, which is amplified by the VCO buffer (Q504) and output from the VCO area.

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 1/3 the bias, at the frame frequency is 64Hz.

2. Dimmer Circuit

The dimmer circuit makes the output of pin 13 of CPU (IC1) into “H” level at set mode, so that Q9 and Q3 will turn ON to make the lamp control resistor R84 short and make its illumination bright. But on the other hand, if the dimmer circuit makes pin 13 into “L” level, Q9 and Q3 will turn OFF, R84’s illumination will become dimmer as its hang on voltage falls down in the working LED (D11, D2, D5, D3 and D6).

3. Reset and Backup

When the power form the DC cable increases from Circuits 0 V to 2.5 or more, “H” level reset signal is output form the reset IC (IC4) to pin 33 of the CPU (IC1), causing the CPU to reset. The reset signal, however, waits at 100, and does not enter the CPU until the CPU clock (X1) has stabilized.

4. S(Signal) Meter Circuit

The DC potential of pin 16 of IC106 is input to pin 1 of the CPU (IC1), converted from an analog to a digital signal, and displayed as the S-meter signal on the LCD.

5. DTMF Encoder

The CPU (IC1) is equipped with an internal DTMF encoder. The DTMF signal is output from pin 10, through R35, R34 and R261 (for level adjustment), and then through the microphone amplifier (IC114:A), 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 form the speaker.

6. Tone Encoder

The CPU (IC1) 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 (D503 and D504) of the VCO for modulation.

7. DCS Encoder

The CPU (IC1) is equipped with an internal DCS code encoder. The code (023 to 754) is output from pin 9 of the CPU to the varicap (D124) of the PLL reference oscillator. When DCS is ON, DCS MUTE circuit (Q126-ON, Q133-ON, Q132-OFF)works. The modulation activates in X103 side only.

8. CTCSS, DCS Decoder

The voice band of the AF output signal from pin 1 of IC104:A is cut by sharp active filter IC104:B and C (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. During DCS, Q108 is ON, C156 is working and cut off frequency is lowered.

5) Power Supply Circuit

When power supply is ON, there is a “L” signal being inputted to pin 39 (PSW) of CPU which enables the CPU to work.

Then, “H” signal is outputted from the pin 41 (C5C) of CPU and drives ON the power supply switch control Q8 and Q7 which turns the 5VS ON.

5VS turns ON the PLL IC501, main power supply switch Q127 and Q122, AF POWER IC117 and the 8 V of AVR (IC115).

During reception, pin 29 (R5) of CPU outputs “H” level, Q124 is ON, and the reception circuits supplied by 8 V.

While during transmission, pin 28 (T5) of CPU outputs “L” level which is reverse by Q11 so that the output in Q128 will be “H” level, Q123 is ON, and the transmission circuit is supplied by 8 V.

Or, in the case when the condition of PLL is UNLOCK, “H” level is outputted from pin 14 of IC501, UNLOCK switch Q129 is ON, transmission switch Q128 is OFF which makes the transmission to stop.

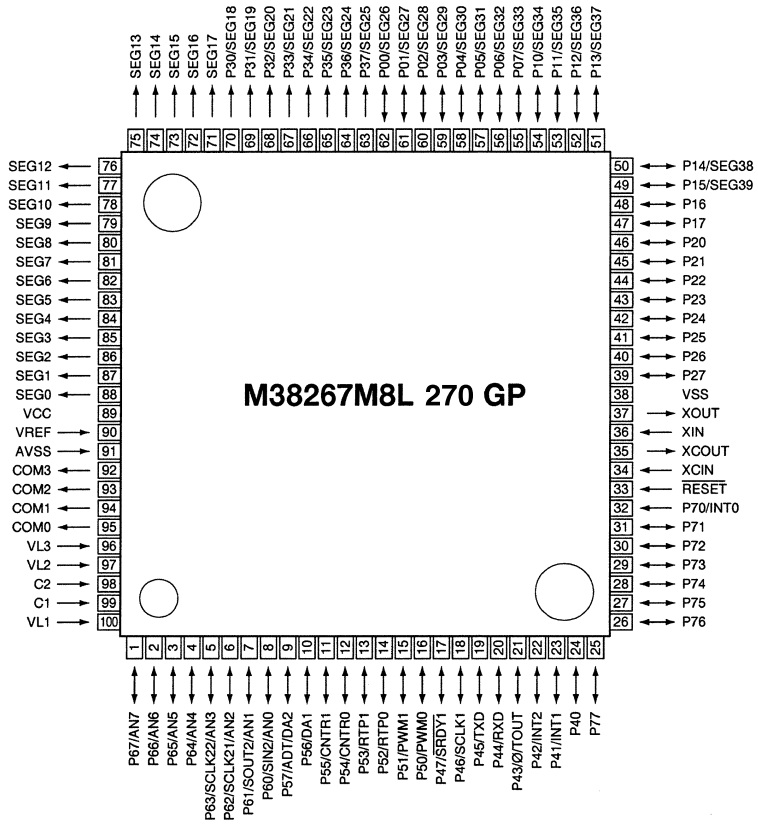
1. ACC External Power Supply Terminal

When optional power supply cord DEC-37 etc. is connected to the external power supply terminal JK101, with ACC power supply ON, switch Q101 will turn ON, 5 V of AVR IC101 pin 2 (STB) becomes “L” which makes C5V to turn ON. With this, it can turn the power supply of the radio ON.

6) M3826M8L270GP (XA0819)

CPU

Terminal Connection
(TOP VIEW)



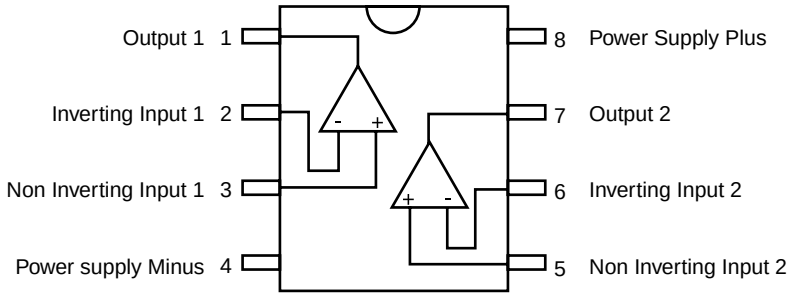
No.	Pin Name	Function	I/O	PU	Logic	Description
1	P67/AN7	SMT	I	-	A/D	S-meter input
2	P66/AN6	SQL	I	-	A/D	Noise level input for squelch
3	P65/AN5	BAT	I	-	A/D	Battery voltage input
4	P64/AN4	TIN	I	-	A/D	CTCSS tone input/DCS code input
5	P63/SCLK22/AN3	BP1	I	-	A/D	-
6	P62/SCLK21/AN2	BP2	I	-	A/D	-
7	P61/SOUT2/AN1	DCSW	O	-	Activ high	DCS signal mute (DCS:H)
8	P60/SIN2/AN0	RE2	I	-	Activ low	Rotary encoder input
9	P57/ADT/DA2	TOUT	O	-	D/A	CTCSS tone output/DCS tone output
10	P56/DA1	DOUT	O	-	D/A	DTMF output
11	P55/CNTR1	SCL	O	-	Pulse	Serial clock for EEPROM
12	P54/CNTR0	TBST	O	-	Pulse	-
13	P53/RTP1	BP4	I/O	-	Activ low	Lamp dimmer HI/LOW switch
14	P52/RTP0	MUTE	I/O	-	Activ low	Microphone mute (TX:H) / Security alarm SW (SCR:H)
15	P51/PWM3	CLK	O	-	Pulse	Serial clock output for PLL-IC
16	P50/PWM0	DATA	I/O	-	Pulse	Serial data output for PLL-IC/PLL unlock signal input (H:UL)
17	P47/SROY1	TSTB	I/O	-	Activ low/Pulse	-
18	P46/SCLK1	STB	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 output
22	P42I/NT2	SEC	I	-	Activ high	Sscurity voltage input (H:SCR on)
23	P41/INT1	RE1	I	*	Activ low	Rotary encoder input
24	P40	DSQ	I	-	Activ high	Digital squelch input (H:AF out)
25	P77	PTT	I	-	Activ low	PTT input
26	P76	SSTB	O	-	Pulse	SCR alarm control out (SCR:)
27	P75	W/N	O	-	Activ low	-
28	P74	T5	O	-	Activ low	TX power ON/OFF output
29	P73	R5	O	-	Activ high	RX power ON/OFF output
30	P72	SQC	O	-	Activ low	SQL ON/OFF (AF out:L)
31	P71	C/S	O	-	Activ low	-
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	-	Activ low	Power switch input
40	P26	SDA	O	-	Pulse	Serial data for EEPROM
41	P25	C5C	O	-	Activ high	C5V power ON/OFF output (C5V:H)
42	P24	AIR	O	-	Activ high	Tx middle power (MID:H)
43	P23	LOW	O	-	Activ high	Tx low power (LOW:H)
44	P22	EXP	O	-	Activ low	-
45	P21	SW6	I	*	Activ low	Key sw6 (SQL)
46	P20	SW5	I	*	Activ low	Key sw5 (CALL)
47	P17	SW4	I	*	Activ low	Key sw4 (TS/DCS)
48	P16	SW3	I	*	Activ low	Key sw3 (MONI)
49	P15/SEG39	SW2	I	*	Activ low	Key sw2 (V/M)
50	P14/SEG38	SW1	I	*	Activ low	Key sw1 (FUNC)
51	P13/SEG37	DOWN	I	*	Activ low	Mic down input
52	P12/SEG36	DUD	I	*	Activ low	-

No.	Pin Name	Function	I/O	PU	Logic	Description
53	P11/SEG35	SCR	I	*	-	-
54	P10/SEG34	UP	I	*	Activ low	Mic up input
55	P07/SEG33	S33	O	-	-	LCD segment signal
56	P06/SEG32	S32	O	-	-	
57	P05/SEG31	S31	O	-	-	
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) M5218FP (XA0068)

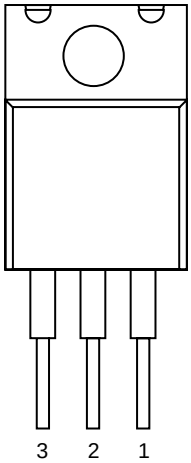
Dual Low Noise
Operational Amplifiers



2) NJM7808FA (XA0102)

8V Voltage Regulator

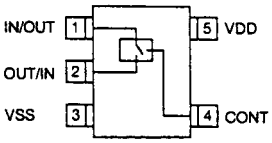
Pin Assignment

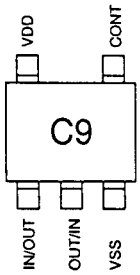


1. OUTPUT
2. COMMON
3. INPUT

3) TC4S66F (XA0115)

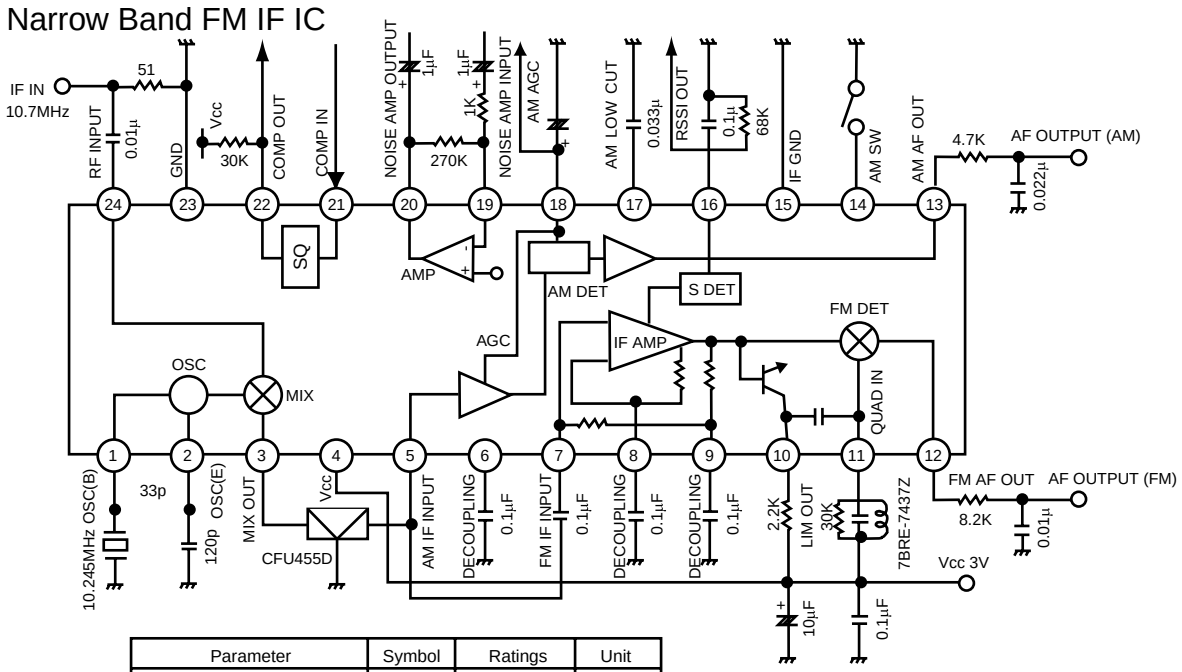
Bilateral Switch





4) TK10930VTL (XA0223)

Narrow Band FM IF IC



Parameter	Symbol	Ratings	Unit
Supply voltage	Vcc max	10.0	V
Power dissipation	Pd	400	mV
Storage temperature	Tstg	-55~+150	℃
Operating temperature	Top	-30~+75	℃
Operating voltage	Vop	2.5~8.5	V
Operating frequency	fop	~60	MHz

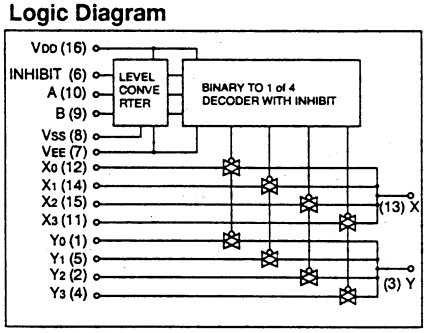
Ta=25℃ Vcc=3V

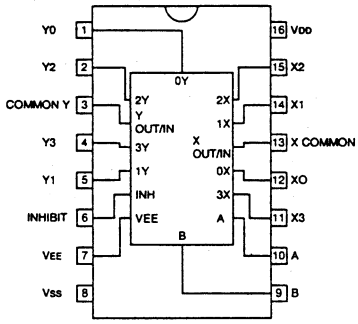
Parameter	Symbol	Ratings			Unit	Condition
		Min	Typical	Max		
Supply Current 1	Icc1		6.8	8.9	mA	No signal, AM ON
Supply Current 2	Icc2		3.9	5.3	mA	No signal, AM OFF
Mixer Coversion Gain	Mg		20		dB	
Mixer Input Impedance	Mz		3.6		KΩ	DC Test
FM						
Limiting Sensitivity	Limit		2.0	8.0	μV	-3.0dB
Output Voltage	Vo1	85	150	230	mVrms	10mVin +/-3kHz DEV
Distortion	THD1		1.0	2.0	%	10mVin +/-3kHz DEV
Output Impedance	Zo		800		Ω	10mVin
Filter Gain	Gf	30	38		dB	Fin=30kHz, Vo=100mV
Scan Control Hi Voltage	SH	2.3			V	Squelch input=2.5V
Scan Control Low Voltage	SL			0.3	V	Squelch input=0V
Squelch Hysteresis	Hys		30		mV	
S meter Output Voltage	S0		0.05	0.5	V	Vin=0mV, RS=68kΩ
S meter Output Voltage	S1	0.05	0.5	0.9	V	Vin=0.01mV, RS=68kΩ
S meter Output Voltage	S2	0.7	1.2	1.7	V	Vin=0.1mV, RS=68kΩ
S meter Output Voltage	S3	1.2	1.8	2.5	V	Vin=1mV, RS=68kΩ
S meter Output Voltage	S4	1.6	2.3	2.9	V	Vin=10mV, RS=68kΩ
S meter Output Voltage	S5	1.8	2.4	2.9	V	Vin=100mV, RS=68kΩ
AM						
Sensitivity	US	20	15		μV	required input level to get 20mV rms output
Output Voltage	Vo2	60	120	160	mVrms	1kHz, 30%, Vin=1mV
Distortion-1	THD2		1.0	2.0	%	1kHz, 30%, Vin=1mV
Distortion-2	THD3		2.0	4.0	%	1kHz, 30%, Vin=1mV
S/N	S/N	40	48		dB	1kHz, 30%, Vin=1mV
AM OFF	Vo	-0.3		0.3	%	

5) BU4052BF (XA0236)

Analog Multiplexer/Demultiplexer

Logic Diagram





Truth Table

INHIBIT	A	B	ON SWITCH
L	L	L	X0 Y0
L	H	L	X1 Y1
L	L	H	X2 Y2
L	H	H	X3 Y3
H	X	X	NONE

X: Don't Care

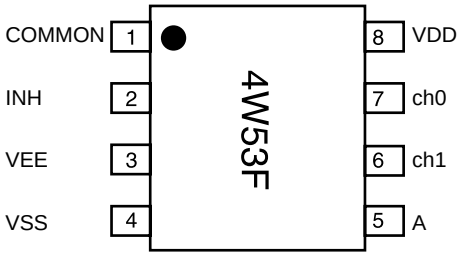
6) TC4W53FU (XA0348)

Multiplexer/Demultiplexer

Function Table

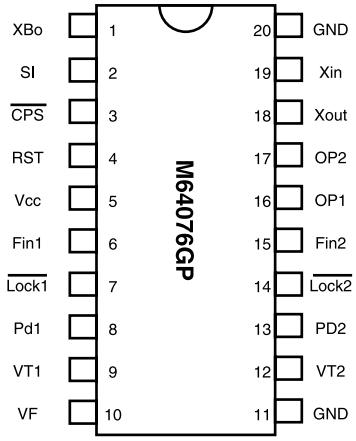
Control input		ON channel
INH	A	
L	L	ch0
L	H	ch1
H	*	NONE

* Don't Care



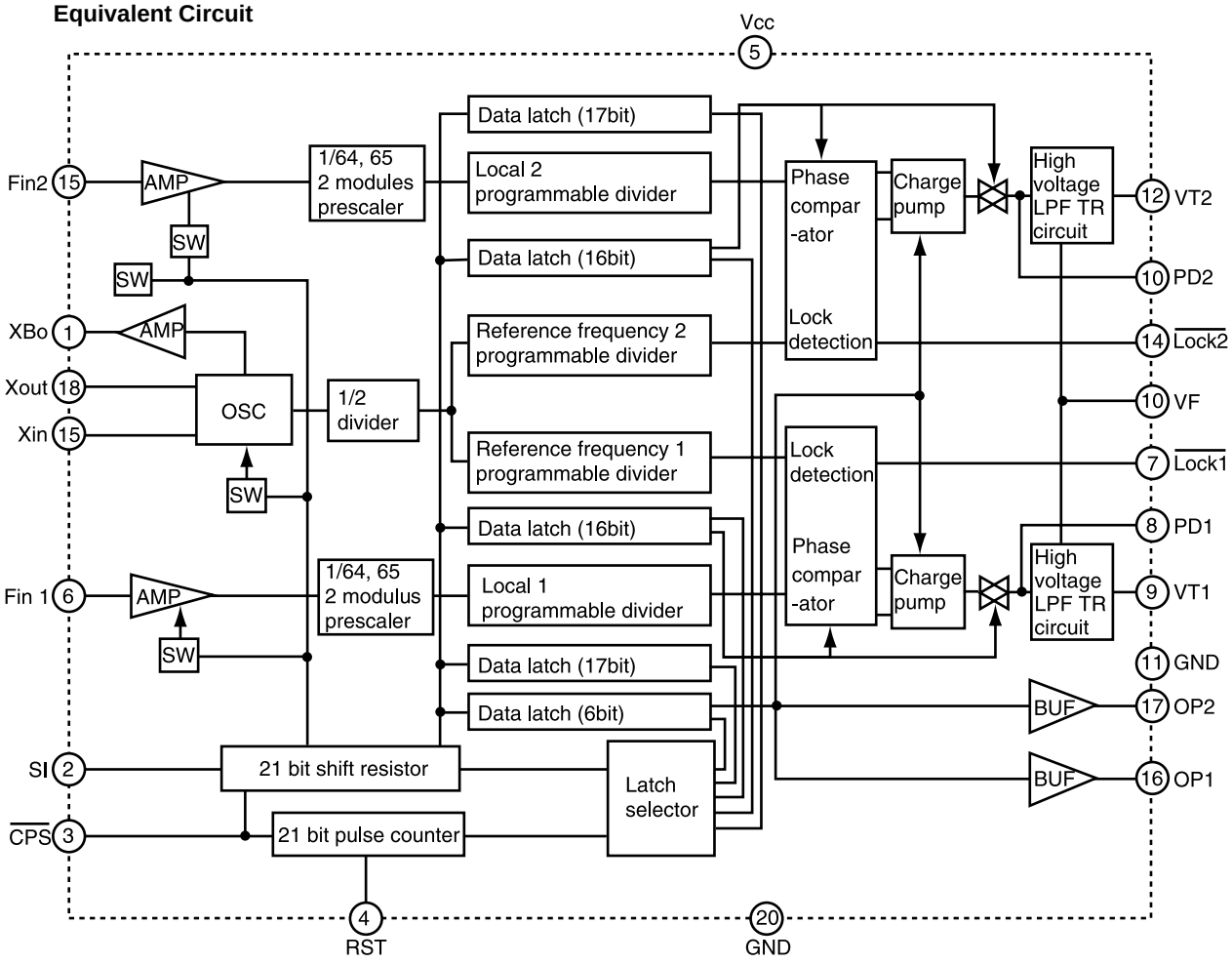
7) M64076GP (XA0352)

Dual PLL Synthesizer



Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Power supply voltage	Vcc	Fin=80~520MHz Vin=-10dBm	2.7	-	5.5	V
LPF supply voltage	VF		-	9	12	V
Local oscillator input level	Vin	Fin=80~520MHz	-20	-	-4	dBm
Local oscillator input frequency	Fin	Vin=-20~-4dBm Vcc=2.7~5.5V	80	-	520	MHz
Xin input level	Vxin	**Vcc=2.7~5.5V** Fxin=10~25MHz Sine wave	0.4	-	1.4	Vp-p
Xin input frequency	Fxin	Vcc=2.7~5.5V Vxin=0.4~1.4Vp-p	10	-	25	MHz

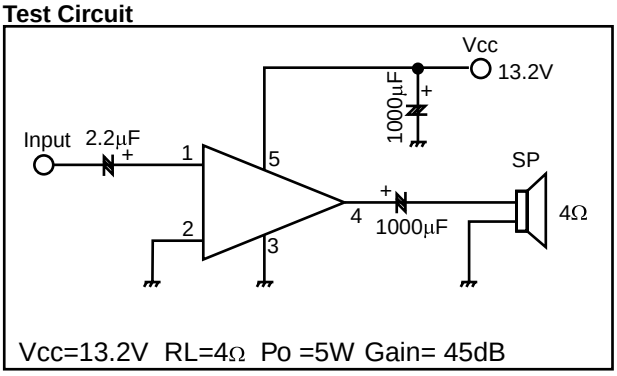
Equivalent Circuit

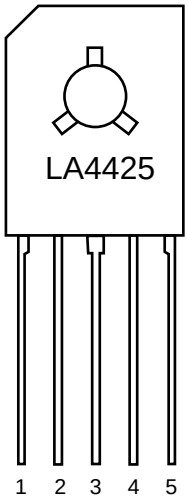


8) LA4425A (XA0410)

5W Audio Power Amplifiers

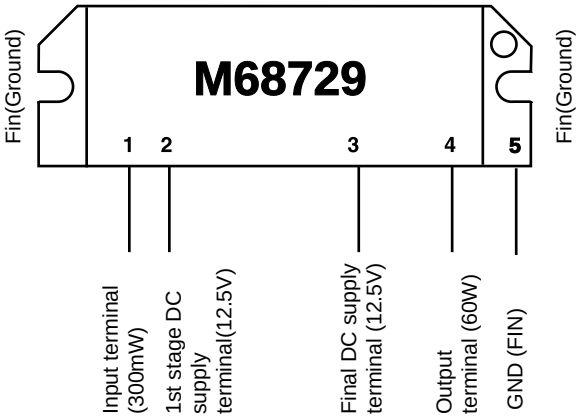
Test Circuit





9) M68729 (XA0591)

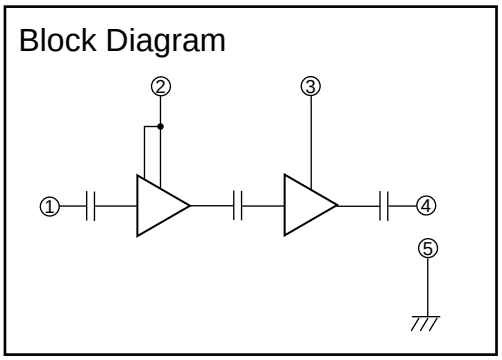
220 ~ 246MHz 30W
RF Power Module



ABSOLUTE MAXIMUM RATING(TC = 25˚C)

Rating	Symbol	Ratings	Unit
Supply voltage	Vcc	17	V
Total current	Icc	10	A
Input power	Pin(max)	600	mW
Output Power	Po(max)	40	W
Operation case temperature	Tc(op)	-30 to + 110	℃
Strage temperature	Tstg	-40 to + 110	℃

Zg=Zl=50Ω



PIN :
① Pin : RF INPUT
② V_{CC1} : 1st. DC SUPPLY
③ V_{CC2} : 2nd. DC SUPPLY
④ PO : RF OUTPUT
⑤ GND : FIN

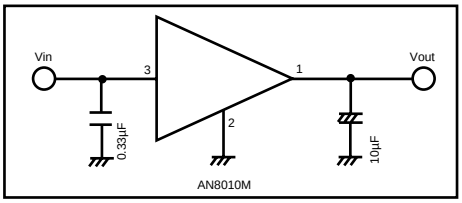
ELECTRICAL CHARACTERISTICS

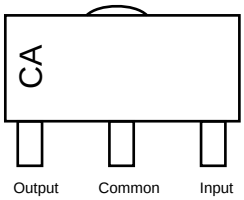
Symbol	Parameter	Test conditions	Limits		Unit
			Min	Max	
f	Frequency range	$V_{CC1,2}$ = 12.5V Pin = 300mV $Z_G = Z_L$ = 50Ω	220	246	MHz
Po	Output power		30		W
h_T	Total efficiency		40		%
2fo	2nd. harmonic			-30	dBc
3fo	3rd. harmonic			-30	dBc
rin	Input VSWR			3	-
-	Load VSWR tolerance	$V_{CC1,2}$ = 15.2V Po = 30W(Pin = Controlled) Load VSWR = 20:1 (All phase), Z_G = 50Ω	No degradation or destroy		-

10) AN8010M(XA0119)

Voltage Regulator

Test Circuit



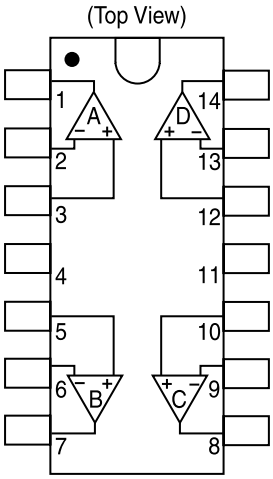


AN8010M

11) NJM2902 (XA0596)

Quad Operational Amplifiers

Pin Assignment

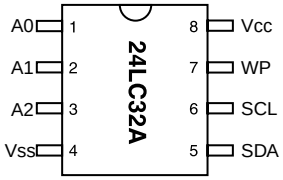


1. A OUTPUT	8. C OUTPUT
2. A - INPUT	9. C - INPUT
3. A+INPUT	10. C+INPUT
4. V^+	11. GND
5. B+INPUT	12. D+INPUT
6. B - INPUT	13. D - INPUT
7. B OUTPUT	14. D OUTPUT

12) 24LC32A (XA0604)

CMOS Serial EEPROM

PDIP



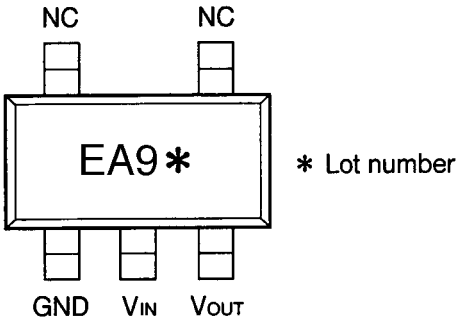
Name	Function
A0..A2	User Configurable Chip Selects
Vss	Ground
SDA	Serial Address/Data I/O
SCL	Serial Clock
WP	Write Protect Input
Vcc	+2.5V~6.0V Power Supply

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

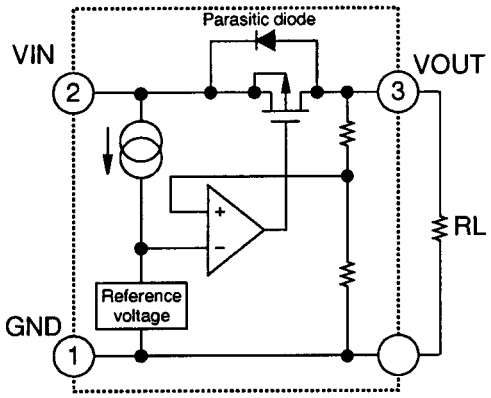
Voltage Detector

Vin=18V

Iout=100mA



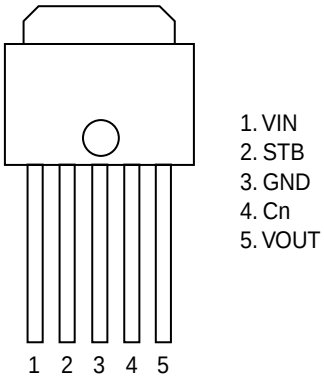
* Lot number



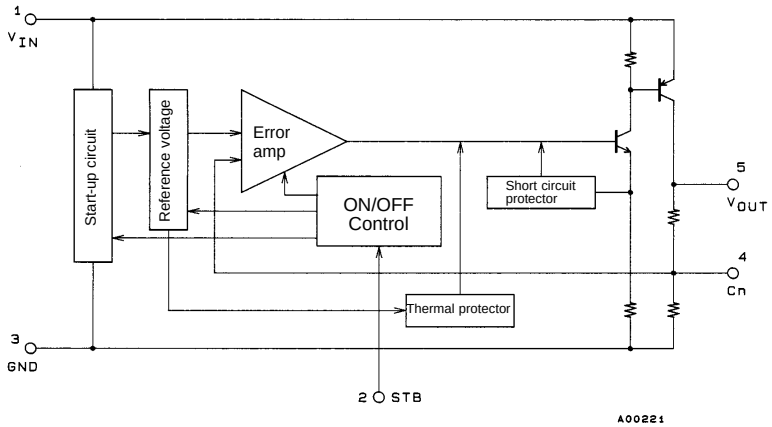
14) L88MS05TLL (XA0675)

5V Voltage Regulator With On/Off Function

Pin Assignment

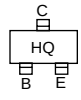
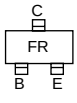
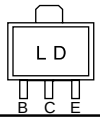
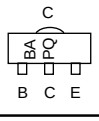
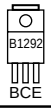
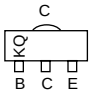
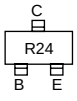
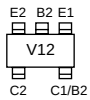


1. VIN
2. STB
3. GND
4. Cn
5. VOUT



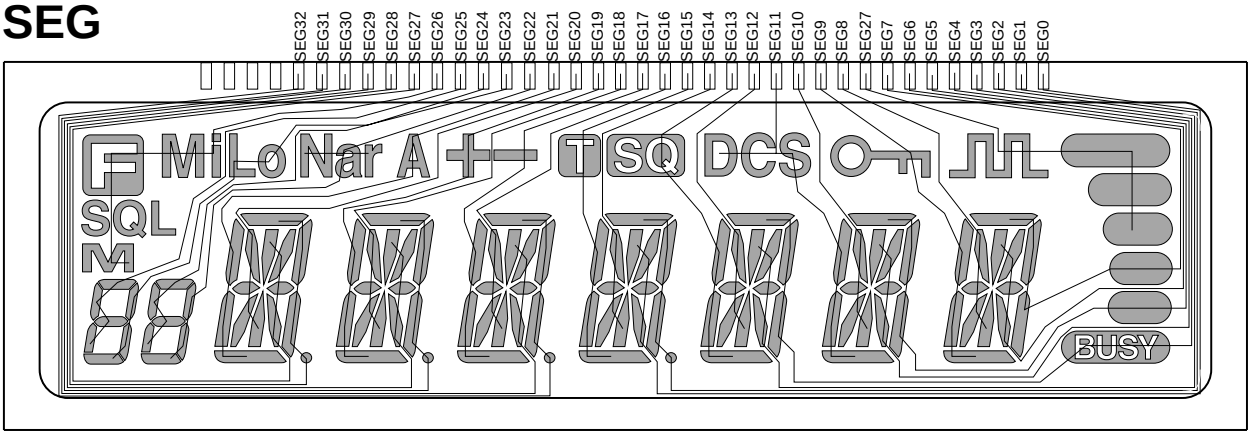
15) Transistor, Diode, and LED Outline Drawings

Top View

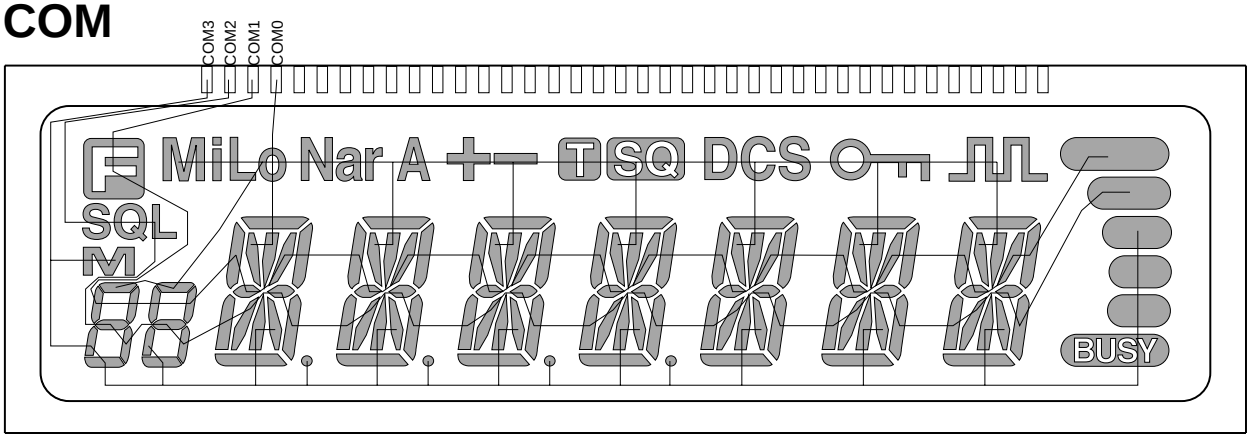
RLS-73 XD0363	1SS355 XD0254	1SV214 XD0131	1SV262 XD0300	1SV268 XD0301	DA204U XD0130	DAN235U XD0246
						
DTZ5. 1B XD 0165	DSA3AI XD0131	MA729 XD0300	MA742 XD0250	MI407 XD0013	2SK508 XE0010	2SK880GR XE0021
						
2SA1036K XT0110	2SA1576 XT0094	2SA1736 XT0099	2SB1132 XT0061	2SB1292F XT0112	2SC2954 XT0084	2SC3356 XT0030
						
2SC4081 XT0095	2SC4099 XT0096	2SC4215 XT0124	2SC4245 XT0125	3SK184S XE0013	DTA114YU XU0112	DTC114EU XU0131
						
DTC144EUA XU0148	DTC114YU XU0029	FA1111C XL0069	FA1111C XL0077	UMC3TR XU0047	XP215 XU0178	
						

16) LCD Connection (TTR3626UPFDHN)

SEG

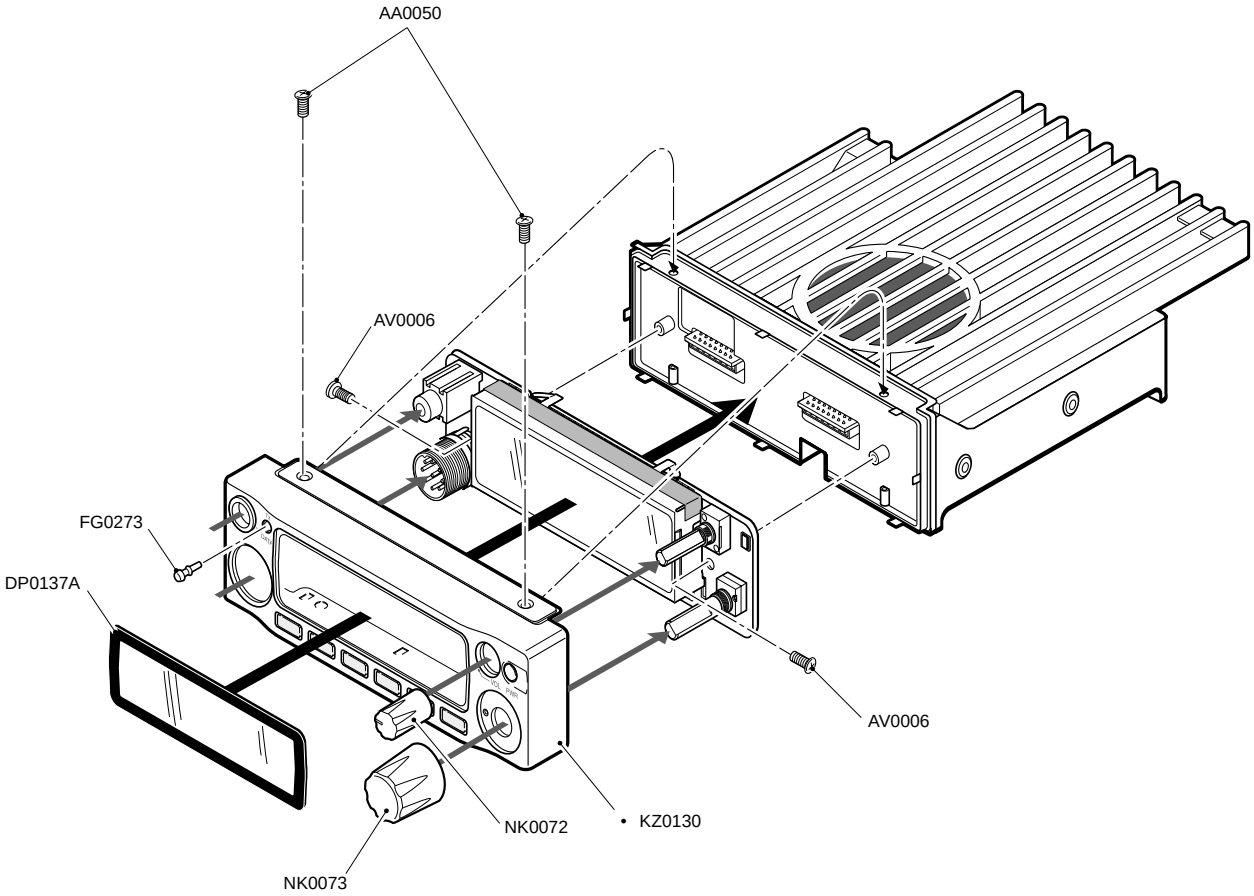


COM

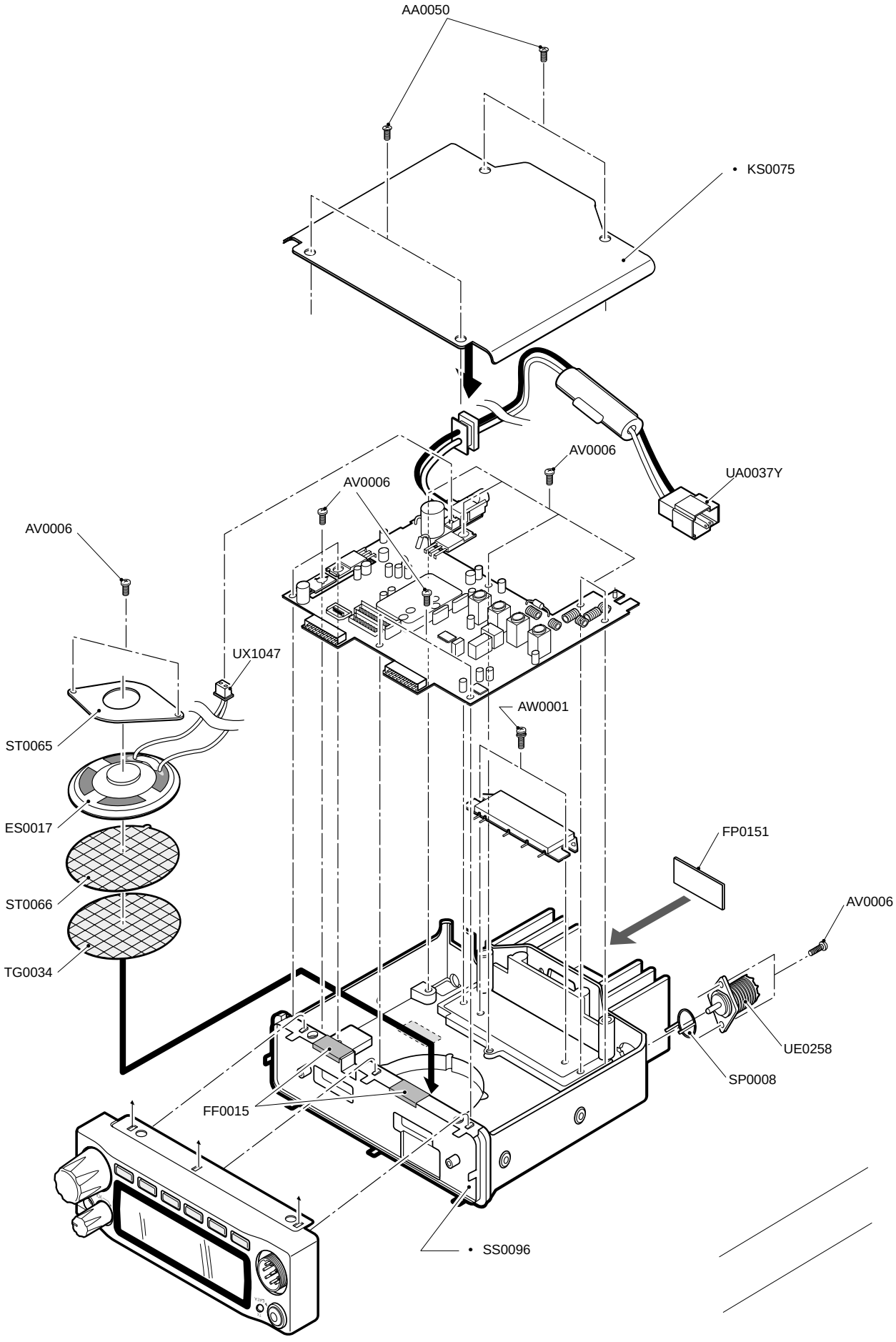


EXPLODED VIEW

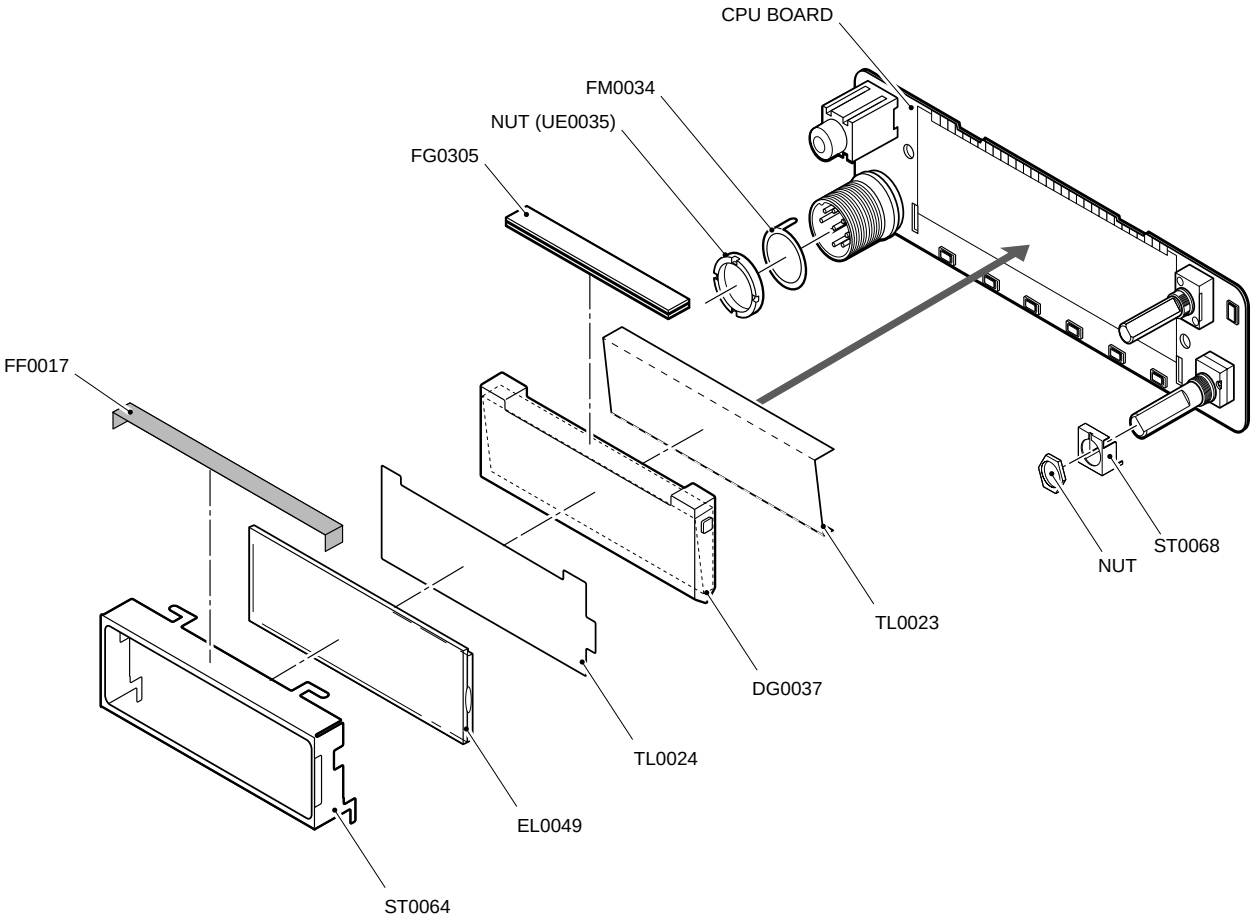
1) Top and Front View



2) Bottom View



3) LCD Assembly



PARTS LIST

CPU

Ref. No.	Parts No.	Description	Parts Name	Unit	Loc (side)	Qty
C1	CU3111	Chip C.	C1608JB1C104KT-N	CPU	B	1
C2	CU3111	Chip C.	C1608JB1C104KT-N	CPU	B	1
C3	CU3049	Chip C.	C1608JB1E153KT-NS	CPU	B	1
C4	CU3049	Chip C.	C1608JB1E153KT-NS	CPU	B	1
C5	CU3111	Chip C.	C1608JB1C104KT-N	CPU	B	1
C6	CU3023	Chip C.	C1608CH1H101JT-AS	CPU	B	1
C7	CU3023	Chip C.	C1608CH1H101JT-AS	CPU	B	1
C8	CU3043	Chip C.	C1608JB1H472KT-NS	CPU	B	1
C9	CU3111	Chip C.	C1608JB1C104KT-N	CPU	B	1
C10	CU3043	Chip C.	C1608JB1H472KT-NS	CPU	B	1
C11	CU3043	Chip C.	C1608JB1H472KT-NS	CPU	B	1
C12	CU3101	Chip C.	C1608JB1C473KT-NS	CPU	B	1
C13	CS0049	Chip tantalum	TMCSA1C105MTR	CPU	B	1
C14	CU3014	Chip C.	C1608CH1H180JT-AS	CPU	B	1
C15	CU3014	Chip C.	C1608CH1H180JT-AS	CPU	B	1
C16	CU3035	Chip C.	C1608JB1H102KT-AS	CPU	B	1
C17	CS0372	Chip tantalum	TMCMB1C106MTR	CPU	B	1
C18	CU3035	Chip C.	C1608JB1H102KT-AS	CPU	B	1
C19	CU3111	Chip C.	C1608JB1C104KT-N	CPU	B	1
C20	CU3101	Chip C.	C1608JB1C473KT-NS	CPU	B	1
C21	CU3047	Chip C.	C1608JB1H103KT-N	CPU	B	1
C22	CU3035	Chip C.	C1608JB1H102KT-AS	CPU	B	1
C23	CU3047	Chip C.	C1608JB1H103KT-N	CPU	A	1
C24	CU3035	Chip C.	C1608JB1H102KT-AS	CPU	B	1
C25	CU3035	Chip C.	C1608JB1H102KT-AS	CPU	B	1
C26	CU3035	Chip C.	C1608JB1H102KT-AS	CPU	B	1
C27	CU3035	Chip C.	C1608JB1H102KT-AS	CPU	B	1
CN1	UE0398	Connector	20-5082-3010-17-100	CPU	H	1
CN2	UE0398	Connector	20-5082-3010-17-100	CPU	H	1
CN3	UE0035	Connector	FM214-8SMPY	CPU	H	1
D1	XL0069	Chip LED	FA1111C-TR	CPU	A	1
D2	XL0077	Chip LED	FA1111C-TR CDE RANK	CPU	A	1
D3	XL0077	Chip LED	FA1111C-TR CDE RANK	CPU	A	1
D4	XL0069	Chip LED	FA1111C-TR	CPU	A	1
D5	XL0077	Chip LED	FA1111C-TR CDE RANK	CPU	A	1
D6	XL0077	Chip LED	FA1111C-TR CDE RANK	CPU	A	1
D8	XD0254	Chip Diode	1SS355 TE17	CPU	B	1
D11	XL0077	Chip LED	FA1111C-TR CDE RANK	CPU	A	1
D12	XD0165	Chip Diode	UDZSTE-17 5.1B	CPU	B	1
D14	XD0291	Chip Diode	MA729-TX	CPU	B	1
IC1	XA0819	CPU	M38267M8L270GP	CPU	B	1
IC2	XA0604	IC	24LC32AT-I/SN	CPU	A	1
IC4	XA0620	IC	S-80845ALMP-EA9-T2	CPU	B	1
JK1	UJ0047	Jack	HSJ2013-01-120	CPU	H	1
LCD1	EL0049	LCD	TTR3626 UPTDHN	CPU	H	1
Q1	XU0029	Chip Transistor	DTC114YUA T106	CPU	B	1
Q2	XU0131	Chip Transistor	DTC114EUA T106	CPU	B	1
Q3	XT0110	Chip Transistor	2SA1036K T146Q	CPU	B	1
Q4	XU0131	Chip Transistor	DTC114EUA T106	CPU	B	1
Q5	XU0131	Chip Transistor	DTC114EUA T106	CPU	B	1
Q6	XT0095	Chip Transistor	2SC4081 T106R	CPU	B	1
Q7	XT0061	Chip Transistor	2SB1132T 100Q	CPU	A	1
Q8	XU0029	Chip Transistor	DTC114YUA T106	CPU	A	1
Q9	XU0148	Chip Transistor	DTC144EUA T106	CPU	A	1
Q10	XU0131	Chip Transistor	DTC114EUA T106	CPU	B	1
Q11	XU0112	Chip Transistor	DTA114YUA T106	CPU	B	1
Q12	XU0112	Chip Transistor	DTA114YUA T106	CPU	B	1
R1	RK3054	Chip R.	MCR03EZHJ223	CPU	B	1
R2	RK3001	Chip R.	MCR03EZHJ000	CPU	B	1
R4	RK3054	Chip R.	MCR03EZHJ223	CPU	B	1
R5	RK3050	Chip R.	MCR03EZHJ103	CPU	B	1
R6	RK3050	Chip R.	MCR03EZHJ103	CPU	B	1
R7	RK3023	Chip R.	MCR03EZHJ560	CPU	A	1
R8	RK3023	Chip R.	MCR03EZHJ560	CPU	A	1
R9	RK3038	Chip R.	MCR03EZHJ102	CPU	B	1
R10	RK3032	Chip R.	MCR03EZHJ331	CPU	B	1
R11	RK3046	Chip R.	MCR03EZHJ472	CPU	B	1

Ref. No.	Parts No.	Description	Parts Name	Unit	Loc (side)	Qty
R14	RK3048	Chip R.	MCR03EZHJ682	CPU	B	1
R16	RK3001	Chip R.	MCR03EZHJ000	CPU	B	1
R17	RK3001	Chip R.	MCR03EZHJ000	CPU	B	1
R19	RK3062	Chip R.	MCR03EZHJ104	CPU	B	1
R20	RK3046	Chip R.	MCR03EZHJ472	CPU	B	1
R21	RK3030	Chip R.	MCR03EZHJ221	CPU	B	1
R22	RK3038	Chip R.	MCR03EZHJ102	CPU	B	1
R23	RK3064	Chip R.	MCR03EZHJ154	CPU	A	1
R24	RK3050	Chip R.	MCR03EZHJ103	CPU	B	1
R25	RK3050	Chip R.	MCR03EZHJ103	CPU	B	1
R26	RK3050	Chip R.	MCR03EZHJ103	CPU	B	1
R27	RK3050	Chip R.	MCR03EZHJ103	CPU	B	1
R28	RK3038	Chip R.	MCR03EZHJ102	CPU	B	1
R29	RK3038	Chip R.	MCR03EZHJ102	CPU	B	1
R30	RK3038	Chip R.	MCR03EZHJ102	CPU	B	1
R31	RK3038	Chip R.	MCR03EZHJ102	CPU	B	1
R32	RK3044	Chip R.	MCR03EZHJ332	CPU	B	1
R33	RK3034	Chip R.	MCR03EZHJ471	CPU	B	1
R34	RK3047	Chip R.	MCR03EZHJ562	CPU	B	1
R35	RK3052	Chip R.	MCR03EZHJ153	CPU	B	1
R36	RK3062	Chip R.	MCR03EZHJ104	CPU	B	1
R37	RK3049	Chip R.	MCR03EZHJ822	CPU	B	1
R38	RK3050	Chip R.	MCR03EZHJ103	CPU	B	1
R39	RK3058	Chip R.	MCR03EZHJ473	CPU	B	1
R40	RK3062	Chip R.	MCR03EZHJ104	CPU	B	1
R41	RK3026	Chip R.	MCR03EZHJ101	CPU	B	1
R42	RK3050	Chip R.	MCR03EZHJ103	CPU	B	1
R43	RK3050	Chip R.	MCR03EZHJ103	CPU	B	1
R44	RK3026	Chip R.	MCR03EZHJ101	CPU	B	1
R45	RK3050	Chip R.	MCR03EZHJ103	CPU	B	1
R47	RK3038	Chip R.	MCR03EZHJ102	CPU	B	1
R48	RK3038	Chip R.	MCR03EZHJ102	CPU	B	1
R49	RK3038	Chip R.	MCR03EZHJ102	CPU	B	1
R50	RK3070	Chip R.	MCR03EZHJ474	CPU	B	1
R51	RK3038	Chip R.	MCR03EZHJ102	CPU	A	1
R52	RK3038	Chip R.	MCR03EZHJ102	CPU	A	1
R53	RK3062	Chip R.	MCR03EZHJ104	CPU	B	1
R54	RK3050	Chip R.	MCR03EZHJ103	CPU	A	1
R55	RK3074	Chip R.	MCR03EZHJ105	CPU	B	1
R56	RK3050	Chip R.	MCR03EZHJ103	CPU	A	1
R57	RK3066	Chip R.	MCR03EZHJ224	CPU	B	1
R58	RK3034	Chip R.	MCR03EZHJ471	CPU	B	1
R59	RK3026	Chip R.	MCR03EZHJ101	CPU	B	1
R60	RK3034	Chip R.	MCR03EZHJ471	CPU	B	1
R61	RK3074	Chip R.	MCR03EZHJ105	CPU	B	1
R62	RK3050	Chip R.	MCR03EZHJ103	CPU	B	1
R63	RK3026	Chip R.	MCR03EZHJ101	CPU	B	1
R64	RK3046	Chip R.	MCR03EZHJ472	CPU	B	1
R65	RK3026	Chip R.	MCR03EZHJ101	CPU	B	1
R66	RK3050	Chip R.	MCR03EZHJ103	CPU	B	1
R67	RK3026	Chip R.	MCR03EZHJ101	CPU	B	1
R68	RK3050	Chip R.	MCR03EZHJ103	CPU	B	1
R69	RK3046	Chip R.	MCR03EZHJ472	CPU	B	1
R70	RK3062	Chip R.	MCR03EZHJ104	CPU	B	1
R71	RK3072	Chip R.	MCR03EZHJ684	CPU	B	1
R72	RK3050	Chip R.	MCR03EZHJ103	CPU	A	1
R73	RK3032	Chip R.	MCR03EZHJ331	CPU	A	1
R74	RK3026	Chip R.	MCR03EZHJ101	CPU	B	1
R75	RK3046	Chip R.	MCR03EZHJ472	CPU	B	1
R76	RK3034	Chip R.	MCR03EZHJ471	CPU	B	1
R77	RK3028	Chip R.	MCR03EZHJ151	CPU	A	1
R78	RK3001	Chip R.	MCR03EZHJ000	CPU	B	1
R79	RK3038	Chip R.	MCR03EZHJ102	CPU	B	1
R80	RK3038	Chip R.	MCR03EZHJ102	CPU	B	1
R82	RK3050	Chip R.	MCR03EZHJ103	CPU	A	1
R83	RK3038	Chip R.	MCR03EZHJ102	CPU	A	1
R84	RK0008	Chip R.	ERJ6GEYJ330V	CPU	B	1
R85	RK3046	Chip R.	MCR03EZHJ472	CPU	B	1

Ref. No.	Parts No.	Description	Parts Name	Unit	Loc (side)	Qty
R86	RK3050	Chip R.	MCR03EZHJ103	CPU	B	1
R87	RK3054	Chip R.	MCR03EZHJ223	CPU	B	1
R88	RK3050	Chip R.	MCR03EZHJ103	CPU	B	1
R89	RK3058	Chip R.	MCR03EZHJ473	CPU	B	1
R90	RK3058	Chip R.	MCR03EZHJ473	CPU	B	1
R91	RK3050	Chip R.	MCR03EZHJ103	CPU	B	1
R92	RK3032	Chip R.	MCR03EZHJ331	CPU	A	1
R94	RK3001	Chip R.	MCR03EZHJ000	CPU	B	1
RE1	UR0015	Dial	RH90N74E20-A90770	CPU	H	1
SW1	UU0015Z	Switch	EVQPPXA25	CPU	A	1
SW2	UU0015Z	Switch	EVQPPXA25	CPU	A	1
SW3	UU0015Z	Switch	EVQPPXA25	CPU	A	1
SW4	UU0015Z	Switch	EVQPPXA25	CPU	A	1
SW5	UU0015Z	Switch	EVQPPXA25	CPU	A	1
SW6	UU0015Z	Switch	EVQPPXA25	CPU	A	1
SW7	UU0015Z	Switch	EVQPPXA25	CPU	A	1
VR1	RV0035	Variable R.	EVUF2JFK4B14	CPU	H	1
X1	XQ0131	Xtal	CSA310/3.6864MHz	CPU	H	1
	DG0037		LCD LIGHT DR135	CPU	H	1
	FG0305		LCD RUB.CONNECT. 135	CPU	H	1
	FM0034		MIC GND PLATE	CPU	H	1
	FP0034		MIC SPACER DR110	CPU	H	1
	ST0064		LCD HOLDER DR135	CPU	H	1
	ST0068		DIAL FITTING DR135	CPU	H	1
	TL0023		REFLECTION DR135	CPU	H	1
	TL0024		DIFFUSION SHEET 135	CPU	H	1

Main Unit

Ref. No.	Parts No.	Description	Parts Name	Unit	Loc (side)	Qty
C101	CU3047	Chip C.	C1608JB1H103KT-N	MAIN	A	1
C102	CU3047	Chip C.	C1608JB1H103KT-N	MAIN	A	1
C103	CS0049	Chip tantalum	TMCSA1C105MTR	MAIN	A	1
C104	CU3047	Chip C.	C1608JB1H103KT-N	MAIN	A	1
C105	CS0394	Chip tantalum	TMCMB0J476MTR	MAIN	A	1
C106	CU3051	Chip C.	C1608JB1E223KT-NS	MAIN	A	1
C107	CU3111	Chip C.	C1608JB1C104KT-N	MAIN	A	1
C108	CU3047	Chip C.	C1608JB1H103KT-N	MAIN	A	1
C109	CS0216	Chip tantalum	TMCMB1A106MTR	MAIN	A	1
C110	CU3047	Chip C.	C1608JB1H103KT-N	MAIN	A	1
C113	CU3047	Chip C.	C1608JB1H103KT-N	MAIN	A	1
C114	CU3047	Chip C.	C1608JB1H103KT-N	MAIN	A	1
C115	CU3047	Chip C.	C1608JB1H103KT-N	MAIN	A	1
C117	CU3047	Chip C.	C1608JB1H103KT-N	MAIN	A	1
C118	CU3049	Chip C.	C1608JB1E153KT-NS	MAIN	A	1
C119	CU3051	Chip C.	C1608JB1E223KT-NS	MAIN	A	1
C120	CU3021	Chip C.	C1608CH1H680JT-AS	MAIN	A	1
C121	CU3003	Chip C.	C1608CH1H020CT-AS	MAIN	A	1
C122	CU3002	Chip C.	C1608CH1H010CT-AS	MAIN	A	1
C123	CU3013	Chip C.	C1608CH1H150JT-AS	MAIN	A	1
C124	CU3040	Chip C.	C1608JB1H272KT-NS	MAIN	A	1
C125	CU3044	Chip C.	C1608JB1H562KT-NS	MAIN	A	1
C126	CU3038	Chip C.	C1608JB1H182KT-AS	MAIN	A	1
C127	CU3041	Chip C.	C1608JB1H332KT-NS	MAIN	A	1
C129	CU3111	Chip C.	C1608JB1C104KT-N	MAIN	A	1
C130	CS0220	Chip tantalum	TMCMA1C225MTR	MAIN	A	1
C132	CU3027	Chip C.	C1608CH1H221JT-AS	MAIN	A	1
C133	CU3003	Chip C.	C1608CH1H020CT-AS	MAIN	A	1
C134	CU3042	Chip C.	C1608JB1H392KT-NS	MAIN	A	1
C135	CU3044	Chip C.	C1608JB1H562KT-NS	MAIN	A	1
C137	CU3015	Chip C.	C1608CH1H220JT-AS	MAIN	A	1
C138	CS0049	Chip tantalum	TMCSA1C105MTR	MAIN	A	1
C139	CU3014	Chip C.	C1608CH1H180JT-AS	MAIN	A	1
C140	CU3014	Chip C.	C1608CH1H180JT-AS	MAIN	A	1
C141	CU3111	Chip C.	C1608JB1C104KT-N	MAIN	A	1
C142	CU3111	Chip C.	C1608JB1C104KT-N	MAIN	A	1
C143	CU3111	Chip C.	C1608JB1C104KT-N	MAIN	A	1
C144	CU3009	Chip C.	C1608CH1H080CT-A	MAIN	A	1
C145	CU3003	Chip C.	C1608CH1H020CT-AS	MAIN	A	1
C146	CE0339	Electrolytic C.	16MV 10SWB+TS	MAIN	H	1
C148	CU3015	Chip C.	C1608CH1H220JT-AS	MAIN	A	1
C149	CU3019	Chip C.	C1608CH1H470JT-AS	MAIN	A	1
C150	CU3002	Chip C.	C1608CH1H010CT-AS	MAIN	A	1
C151	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C152	CE0339	Electrolytic C.	16MV 10SWB+TS	MAIN	H	1
C153	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C154	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C155	CU3012	Chip C.	C1608CH1H120JT-AS	MAIN	A	1
C156	CU3047	Chip C.	C1608JB1H103KT-N	MAIN	A	1
C157	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C158	CU3013	Chip C.	C1608CH1H150JT-AS	MAIN	A	1
C159	CU3018	Chip C.	C1608CH1H390JT-AS	MAIN	A	1
C160	CE0339	Electrolytic C.	16MV 10SWB+TS	MAIN	H	1
C161	CU3111	Chip C.	C1608JB1C104KT-N	MAIN	A	1
C162	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C165	CU3111	Chip C.	C1608JB1C104KT-N	MAIN	A	1
C168	CU3111	Chip C.	C1608JB1C104KT-N	MAIN	A	1
C169	CU3027	Chip C.	C1608CH1H221JT-AS	MAIN	A	1
C170	CU3002	Chip C.	C1608CH1H010CT-AS	MAIN	A	1
C171	CU3111	Chip C.	C1608JB1C104KT-N	MAIN	A	1
C173	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C174	CU3029	Chip C.	C1608JB1H331KT-AS	MAIN	A	1
C175	CU3111	Chip C.	C1608JB1C104KT-N	MAIN	A	1
C176	CU3002	Chip C.	C1608CH1H010CT-AS	MAIN	A	1
C177	CU3014	Chip C.	C1608CH1H180JT-AS	MAIN	A	1
C179	CU3111	Chip C.	C1608JB1C104KT-N	MAIN	A	1
C180	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C183	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C184	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C185	CS0061	Chip tantalum	TMCSA1V224MTR	MAIN	A	1
C186	CU3013	Chip C.	C1608CH1H150JT-AS	MAIN	A	1
C187	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C188	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C189	CU3011	Chip C.	C1608CH1H100DT-AS	MAIN	A	1
C191	CU3102	Chip C.	C1608JB1C333KT-NS	MAIN	A	1
C193	CU4033	Chip C.	GRM42-6X7R102K500PT	MAIN	A	1
C194	CU3011	Chip C.	C1608CH1H100DT-AS	MAIN	A	1
C195	CU3009	Chip C.	C1608CH1H080CT-A	MAIN	A	1
C196	CU3013	Chip C.	C1608CH1H150JT-AS	MAIN	A	1
C198	CE0339	Electrolytic C.	16MV 10SWB+TS	MAIN	H	1
C199	CE0339	Electrolytic C.	16MV 10SWB+TS	MAIN	H	1
C200	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C201	CU4011	Chip C.	GRM42-6CH100D500PT	MAIN	A	1
C202	CU4013	Chip C.	GRM42-6CH150J500PT	MAIN	A	1
C203	CU4013	Chip C.	GRM42-6CH150J500PT	MAIN	A	1
C204	CU4008	Chip C.	GRM42-6CH070D500PT	MAIN	A	1
C205	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C206	CE0339	Electrolytic C.	16MV 10SWB+TS	MAIN	H	1
C207	CU3002	Chip C.	C1608CH1H010CT-AS	MAIN	A	1
C208	CU3002	Chip C.	C1608CH1H010CT-AS	MAIN	A	1
C209	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C210	CU3003	Chip C.	C1608CH1H020CT-AS	MAIN	A	1
C211	CU3003	Chip C.	C1608CH1H020CT-AS	MAIN	A	1
C212	CE0364	Electrolytic C.	16MV 47SWB+TS	MAIN	H	1
C213	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C215	CU4013	Chip C.	GRM42-6CH150J500PT	MAIN	A	1
C216	CU4013	Chip C.	GRM42-6CH150J500PT	MAIN	A	1
C217	CU3051	Chip C.	C1608JB1E223KT-NS	MAIN	A	1
C218	CU3051	Chip C.	C1608JB1E223KT-NS	MAIN	A	1
C219	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C220	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C221	CU3047	Chip C.	C1608JB1H103KT-N	MAIN	A	1
C222	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C223	CE0100	Electrolytic C.	16MV 22UW	MAIN	H	1
C224	CU3023	Chip C.	C1608CH1H101JT-AS	MAIN	A	1
C225	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C226	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C227	CS0049	Chip tantalum	TMCSA1C105MTR	MAIN	A	1
C228	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C229	CU3101	Chip C.	C1608JB1C473KT-NS	MAIN	A	1
C230	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C231	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1

Ref. No.	Parts No.	Description	Parts Name	Unit	Loc (side)	Qty
C232	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C233	CU3011	Chip C.	C1608CH1H100DT-AS	MAIN	A	1
C234	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C235	CU3003	Chip C.	C1608CH1H020CT-AS	MAIN	A	1
C237	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C238	CS0049	Chip tantalum	TMCSA1C105MTR	MAIN	A	1
C239	CS0049	Chip tantalum	TMCSA1C105MTR	MAIN	A	1
C241	CU3022	Chip C.	C1608CH1H820JT-AS	MAIN	A	1
C242	CU3051	Chip C.	C1608JB1E223KT-NS	MAIN	A	1
C243	CE0339	Electrolytic C.	16MV 10SWB+TS	MAIN	H	1
C244	CE0339	Electrolytic C.	16MV 10SWB+TS	MAIN	H	1
C245	CS0049	Chip tantalum	TMCSA1C105MTR	MAIN	A	1
C246	CU3043	Chip C.	C1608JB1H472KT-NS	MAIN	A	1
C247	CU3111	Chip C.	C1608JB1C104KT-N	MAIN	A	1
C248	CU3047	Chip C.	C1608JB1H103KT-N	MAIN	A	1
C249	CU3038	Chip C.	C1608JB1H182KT-AS	MAIN	A	1
C250	CU3026	Chip C.	C1608CH1H181JT-AS	MAIN	A	1
C251	CE0339	Electrolytic C.	16MV 10SWB+TS	MAIN	H	1
C252	CU3008	Chip C.	C1608CH1H070CT-A	MAIN	A	1
C253	CU3111	Chip C.	C1608JB1C104KT-N	MAIN	A	1
C254	CU3111	Chip C.	C1608JB1C104KT-N	MAIN	A	1
C255	CE0364	Electrolytic C.	16MV 47SWB+TS	MAIN	H	1
C256	CU3111	Chip C.	C1608JB1C104KT-N	MAIN	A	1
C257	CE0339	Electrolytic C.	16MV 10SWB+TS	MAIN	H	1
C258	CS0049	Chip tantalum	TMCSA1C105MTR	MAIN	A	1
C259	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C260	CE0339	Electrolytic C.	16MV 10SWB+TS	MAIN	H	1
C261	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C262	CU3111	Chip C.	C1608JB1C104KT-N	MAIN	A	1
C263	CS0220	Chip tantalum	TMCMA1C225MTR	MAIN	A	1
C264	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C265	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C266	CU3007	Chip C.	C1608CH1H060CT-A	MAIN	A	1
C267	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C268	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C270	CU3047	Chip C.	C1608JB1H103KT-N	MAIN	A	1
C271	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C272	CE0339	Electrolytic C.	16MV 10SWB+TS	MAIN	H	1
C274	CU3018	Chip C.	C1608CH1H390JT-AS	MAIN	A	1
C276	CU3047	Chip C.	C1608JB1H103KT-N	MAIN	A	1
C277	CE0343	Electrolytic C.	16MV 1000HC+T	MAIN	H	1
C278	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C280	CU3019	Chip C.	C1608CH1H470JT-AS	MAIN	A	1
C286	CU3027	Chip C.	C1608CH1H221JT-AS	MAIN	A	1
C291	CU3011	Chip C.	C1608CH1H100DT-AS	MAIN	A	1
C294	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C297	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C298	CU3015	Chip C.	C1608CH1H220JT-AS	MAIN	A	1
C300	CU4011	Chip C.	GRM42-6CH100D500PT	MAIN	A	1
C301	CU3023	Chip C.	C1608CH1H101JT-AS	MAIN	A	1
C302	CU3023	Chip C.	C1608CH1H101JT-AS	MAIN	A	1
C303	CU3023	Chip C.	C1608CH1H101JT-AS	MAIN	A	1
C305	CU3047	Chip C.	C1608JB1H103KT-N	MAIN	A	1
C306	CU3111	Chip C.	C1608JB1C104KT-N	MAIN	A	1
C307	CU3047	Chip C.	C1608JB1H103KT-N	MAIN	A	1
C308	CE0342	Electrolytic C.	16MV 470HC+TS	MAIN	H	1
C309	CU3051	Chip C.	C1608JB1E223KT-NS	MAIN	A	1
C310	CU3023	Chip C.	C1608CH1H101JT-AS	MAIN	A	1
C318	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
C319	CS0237	Chip tantalum	TMCMA1A475MTR	MAIN	A	1
C320	CS0237	Chip tantalum	TMCMA1A475MTR	MAIN	A	1
C321	CS0220	Chip tantalum	TMCMA1C225MTR	MAIN	A	1
C322	CU3035	Chip C.	C1608JB1H102KT-AS	MAIN	A	1
CN102	UE0397	Connector	10-5082-3110-17-100	MAIN	H	1
CN103	UE0397	Connector	10-5082-3110-17-100	MAIN	H	1
CN104	UA0037Y	Cable	DC CABLE UA0037	MAIN	H	1
CN106	UE0043	Connector	PI22A02M	MAIN	H	1
D101	XD0112	Chip Diode	1SV128 TE85L	MAIN	A	1
D102	XD0131	Chip Diode	1SV214 TPH4	MAIN	A	1
D103	XD0131	Chip Diode	1SV214 TPH4	MAIN	A	1
D104	XD0131	Chip Diode	1SV214 TPH4	MAIN	A	1
D105	XD0131	Chip Diode	1SV214 TPH4	MAIN	A	1

Ref. No.	Parts No.	Description	Parts Name	Unit	Loc (side)	Qty
D106	XD0250	Chip Diode	MA742 TX	MAIN	A	1
D107	XD0131	Chip Diode	1SV214 TPH4	MAIN	A	1
D108	XD0130	Chip Diode	DA204U T106	MAIN	A	1
D109	XD0301	Chip Diode	1SV268-TD	MAIN	A	1
D110	XD0013	Diode	MI407	MAIN	H	1
D111	XD0250	Chip Diode	MA742 TX	MAIN	A	1
D112	XD0250	Chip Diode	MA742 TX	MAIN	A	1
D113	XD0254	Chip Diode	1SS355 TE17	MAIN	A	1
D114	XD0246	Chip Diode	DAN235UT 106	MAIN	A	1
D115	XD0254	Chip Diode	1SS355 TE17	MAIN	A	1
D117	XD0254	Chip Diode	1SS355 TE17	MAIN	A	1
D118	XD0130	Chip Diode	DA204U T106	MAIN	A	1
D119	XD0254	Chip Diode	1SS355 TE17	MAIN	A	1
D120	XD0254	Chip Diode	1SS355 TE17	MAIN	A	1
D121	XD0274	Diode	DSA3A1	MAIN	H	1
D124	XD0131	Chip Diode	1SV214 TPH4	MAIN	A	1
IC101	XC0036	Ceramic Filter	ALFYM455G	MAIN	H	1
IC104	XA0675	IC	L88MS05TLL-TL	MAIN	A	1
IC108	XA0596	IC	NJM2902V-TE1	MAIN	A	1
IC109	XA0223	IC	TK10930VTL	MAIN	A	1
IC110	XA0115	IC	TC4S66F TE85R	MAIN	A	1
IC111	XA0591	IC	M68729	MAIN	H	1
IC112	XA0236	IC	BU4052BCF-E2	MAIN	A	1
IC113	XA0119	IC	AN8010M E1	MAIN	A	1
IC114	XA0348	IC	TC4W53FU(TE12)	MAIN	A	1
IC115	XA0068	IC	M5218AFP/600E	MAIN	A	1
IC116	XA0102	IC	NJM7808FA	MAIN	H	1
IC117	XA0410	IC	LA4425A	MAIN	H	1
JK101	UJ0046	Jack	MJ82-1	MAIN	H	1
JK102	UJ0024Z	Jack	LGY6501-0600	MAIN	H	1
L101	QC0043	Chip inductor	NL322522T-2R2J-3	MAIN	A	1
L102	QA0155	Coil	E544ENAS-110251	MAIN	H	1
L103	QA0155	Coil	E544ENAS-110251	MAIN	H	1
L104	QA0155	Coil	E544ENAS-110251	MAIN	H	1
L105	QA0155	Coil	E544ENAS-110251	MAIN	H	1
L106	QC0061	Chip inductor	NL322522T-033JA	MAIN	A	1
L107	QA0155	Coil	E544ENAS-110251	MAIN	H	1
L111	QKA35E	Coil	MR3.0 3.5T 0.8	MAIN	H	1
L112	QKA25D	Coil	MR3.0 2.5T 0.6	MAIN	H	1
L113	QKA35E	Coil	MR3.0 3.5T 0.8	MAIN	H	1
L114	QKA35E	Coil	MR3.0 3.5T 0.8	MAIN	H	1
L115	QKA35E	Coil	MR3.0 3.5T 0.8	MAIN	H	1
L116	QKA35E	Coil	MR3.0 3.5T 0.8	MAIN	H	1
L117	QC0061	Chip inductor	NL322522T-033JA	MAIN	A	1
L118	QKA95D	Coil	MR3.0 9.5T 0.6	MAIN	H	1
L119	QC0061	Chip inductor	NL322522T-033JA	MAIN	A	1
Q101	XU0131	Chip Transistor	DTC114EUA T106	MAIN	A	1
Q102	XU0131	Chip Transistor	DTC114EUA T106	MAIN	A	1
Q105	XT0096	Chip Transistor	2SC4099 T106N	MAIN	A	1
Q106	XE0013	FET	3SK184 TX S	MAIN	A	1
Q107	XE0013	FET	3SK184 TX S	MAIN	A	1
Q108	XU0131	Chip Transistor	DTC114EUA T106	MAIN	A	1
Q112	XT0125	Chip Transistor	2SC4245-Y(TE85L)	MAIN	A	1
Q115	XT0084	Chip Transistor	2SC2954 T1	MAIN	A	1
Q116	XT0112	Transistor	2SB1292F	MAIN	H	1
Q117	XT0095	Chip Transistor	2SC4081 T106R	MAIN	A	1
Q118	XT0094	Chip Transistor	2SA1576A T106R	MAIN	A	1
Q121	XU0178	Chip Transistor	XP1215-TX	MAIN	A	1
Q122	XT0099	Chip Transistor	2SA1736 TE12R	MAIN	A	1
Q123	XT0061	Chip Transistor	2SB1132T 100Q	MAIN	A	1
Q124	XU0047	Chip Transistor	UMC3NTR	MAIN	A	1
Q125	XE0021	FET	2SK880GR TE85L	MAIN	A	1
Q126	XU0131	Chip Transistor	DTC114EUA T106	MAIN	A	1
Q127	XT0095	Chip Transistor	2SC4081 T106R	MAIN	A	1
Q128	XU0131	Chip Transistor	DTC114EUA T106	MAIN	A	1
Q129	XU0148	Chip Transistor	DTC144EUA T106	MAIN	A	1
Q131	XT0030	Chip Transistor	2SC3356T1BR24/25	MAIN	A	1
Q132	XU0131	Chip Transistor	DTC114EUA T106	MAIN	A	1
Q133	XU0131	Chip Transistor	DTC114EUA T106	MAIN	A	1
Q139	XT0095	Chip Transistor	2SC4081 T106R	MAIN	A	1
Q140	XT0095	Chip Transistor	2SC4081 T106R	MAIN	A	1
R101	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1

Ref. No.	Parts No.	Description	Parts Name	Unit	Loc (side)	Qty
R102	RK3091	Chip R.	MCR03EZPFX3902	MAIN	A	1
R103	RK3091	Chip R.	MCR03EZPFX3902	MAIN	A	1
R104	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R105	RK3028	Chip R.	MCR03EZHJ151	MAIN	A	1
R108	RK3023	Chip R.	MCR03EZHJ560	MAIN	A	1
R109	RK3026	Chip R.	MCR03EZHJ101	MAIN	A	1
R110	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R111	RK3001	Chip R.	MCR03EZHJ000	MAIN	A	1
R112	RK3026	Chip R.	MCR03EZHJ101	MAIN	A	1
R114	RK3041	Chip R.	MCR03EZHJ182	MAIN	A	1
R115	RK3043	Chip R.	MCR03EZHJ272	MAIN	A	1
R116	RK3038	Chip R.	MCR03EZHJ102	MAIN	A	1
R117	RK3071	Chip R.	MCR03EZHJ564	MAIN	A	1
R118	RK3026	Chip R.	MCR03EZHJ101	MAIN	A	1
R119	RK3052	Chip R.	MCR03EZHJ153	MAIN	A	1
R120	RK3045	Chip R.	MCR03EZHJ392	MAIN	A	1
R121	RK3063	Chip R.	MCR03EZHJ124	MAIN	A	1
R122	RK3059	Chip R.	MCR03EZHJ563	MAIN	A	1
R123	RK3061	Chip R.	MCR03EZHJ823	MAIN	A	1
R124	RK3057	Chip R.	MCR03EZHJ393	MAIN	A	1
R125	RK3036	Chip R.	MCR03EZHJ681	MAIN	A	1
R128	RK3060	Chip R.	MCR03EZHJ683	MAIN	A	1
R129	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R130	RK3060	Chip R.	MCR03EZHJ683	MAIN	A	1
R131	RK3061	Chip R.	MCR03EZHJ823	MAIN	A	1
R132	RK3046	Chip R.	MCR03EZHJ472	MAIN	A	1
R133	RK3037	Chip R.	MCR03EZHJ821	MAIN	A	1
R134	RK3055	Chip R.	MCR03EZHJ273	MAIN	A	1
R135	RK3052	Chip R.	MCR03EZHJ153	MAIN	A	1
R136	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R137	RK3067	Chip R.	MCR03EZHJ274	MAIN	A	1
R138	RK3059	Chip R.	MCR03EZHJ563	MAIN	A	1
R139	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R140	RK3072	Chip R.	MCR03EZHJ684	MAIN	A	1
R141	RK3064	Chip R.	MCR03EZHJ154	MAIN	A	1
R143	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R144	RK3042	Chip R.	MCR03EZHJ222	MAIN	A	1
R147	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R148	RK3062	Chip R.	MCR03EZHJ104	MAIN	A	1
R151	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R152	RK3001	Chip R.	MCR03EZHJ000	MAIN	A	1
R153	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R155	RK3052	Chip R.	MCR03EZHJ153	MAIN	A	1
R156	RK3034	Chip R.	MCR03EZHJ471	MAIN	A	1
R157	RK3062	Chip R.	MCR03EZHJ104	MAIN	A	1
R158	RK3026	Chip R.	MCR03EZHJ101	MAIN	A	1
R160	RK3062	Chip R.	MCR03EZHJ104	MAIN	A	1
R161	RK3062	Chip R.	MCR03EZHJ104	MAIN	A	1
R162	RK3023	Chip R.	MCR03EZHJ560	MAIN	A	1
R163	RK3014	Chip R.	MCR03EZHJ100	MAIN	A	1
R164	RK3014	Chip R.	MCR03EZHJ100	MAIN	A	1
R165	RK3074	Chip R.	MCR03EZHJ105	MAIN	A	1
R167	RK3052	Chip R.	MCR03EZHJ153	MAIN	A	1
R168	RK3054	Chip R.	MCR03EZHJ223	MAIN	A	1
R171	RK3062	Chip R.	MCR03EZHJ104	MAIN	A	1
R172	RK3062	Chip R.	MCR03EZHJ104	MAIN	A	1
R173	RK3026	Chip R.	MCR03EZHJ101	MAIN	A	1
R174	RK3034	Chip R.	MCR03EZHJ471	MAIN	A	1
R176	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R180	RK3001	Chip R.	MCR03EZHJ000	MAIN	A	1
R181	RK3042	Chip R.	MCR03EZHJ222	MAIN	A	1
R182	RK3062	Chip R.	MCR03EZHJ104	MAIN	A	1
R183	RK3074	Chip R.	MCR03EZHJ105	MAIN	A	1
R184	RK3059	Chip R.	MCR03EZHJ563	MAIN	A	1
R185	RK3070	Chip R.	MCR03EZHJ474	MAIN	A	1
R186	RK3026	Chip R.	MCR03EZHJ101	MAIN	A	1
R189	RK3038	Chip R.	MCR03EZHJ102	MAIN	A	1
R191	RK3038	Chip R.	MCR03EZHJ102	MAIN	A	1
R192	RK3054	Chip R.	MCR03EZHJ223	MAIN	A	1
R193	RK3043	Chip R.	MCR03EZHJ272	MAIN	A	1
R195	RK3070	Chip R.	MCR03EZHJ474	MAIN	A	1
R196	RK3038	Chip R.	MCR03EZHJ102	MAIN	A	1

Ref. No.	Parts No.	Description	Parts Name	Unit	Loc (side)	Qty
R198	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R199	RK3058	Chip R.	MCR03EZHJ473	MAIN	A	1
R201	RK3001	Chip R.	MCR03EZHJ000	MAIN	A	1
R203	RK3056	Chip R.	MCR03EZHJ333	MAIN	A	1
R204	RK3062	Chip R.	MCR03EZHJ104	MAIN	A	1
R205	RK0069	Chip R.	ERJ6GEYJ104V	MAIN	A	1
R206	RK0001	Chip R.	ERJ6GEYJ100V	MAIN	A	1
R207	RK3052	Chip R.	MCR03EZHJ153	MAIN	A	1
R208	RK3028	Chip R.	MCR03EZHJ151	MAIN	A	1
R209	RK3061	Chip R.	MCR03EZHJ823	MAIN	A	1
R210	RK3038	Chip R.	MCR03EZHJ102	MAIN	A	1
R211	RK4018	Chip R.	ERJ12YJ220U	MAIN	A	1
R212	RK4026	Chip R.	ERJ12YJ101U	MAIN	A	1
R213	RK3049	Chip R.	MCR03EZHJ822	MAIN	A	1
R214	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R215	RK3041	Chip R.	MCR03EZHJ182	MAIN	A	1
R216	RK3042	Chip R.	MCR03EZHJ222	MAIN	A	1
R217	RK3042	Chip R.	MCR03EZHJ222	MAIN	A	1
R218	RK3056	Chip R.	MCR03EZHJ333	MAIN	A	1
R220	RK4034	Chip R.	ERJ12YJ471U	MAIN	A	1
R221	RK3052	Chip R.	MCR03EZHJ153	MAIN	A	1
R222	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R223	RK3026	Chip R.	MCR03EZHJ101	MAIN	A	1
R224	RK4026	Chip R.	ERJ12YJ101U	MAIN	A	1
R225	RK3001	Chip R.	MCR03EZHJ000	MAIN	A	1
R226	RK3026	Chip R.	MCR03EZHJ101	MAIN	A	1
R227	RK3030	Chip R.	MCR03EZHJ221	MAIN	A	1
R228	RK3062	Chip R.	MCR03EZHJ104	MAIN	A	1
R229	RK3048	Chip R.	MCR03EZHJ682	MAIN	A	1
R230	RK3054	Chip R.	MCR03EZHJ223	MAIN	A	1
R231	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R234	RK3054	Chip R.	MCR03EZHJ223	MAIN	A	1
R235	RK3049	Chip R.	MCR03EZHJ822	MAIN	A	1
R236	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R237	RK3026	Chip R.	MCR03EZHJ101	MAIN	A	1
R238	RK3062	Chip R.	MCR03EZHJ104	MAIN	A	1
R239	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R241	RK3051	Chip R.	MCR03EZHJ123	MAIN	A	1
R242	RK3044	Chip R.	MCR03EZHJ332	MAIN	A	1
R243	RK3054	Chip R.	MCR03EZHJ223	MAIN	A	1
R244	RK3068	Chip R.	MCR03EZHJ334	MAIN	A	1
R245	RK3038	Chip R.	MCR03EZHJ102	MAIN	A	1
R246	RK3046	Chip R.	MCR03EZHJ472	MAIN	A	1
R247	RK3038	Chip R.	MCR03EZHJ102	MAIN	A	1
R248	RK3070	Chip R.	MCR03EZHJ474	MAIN	A	1
R249	RK3042	Chip R.	MCR03EZHJ222	MAIN	A	1
R250	RK3070	Chip R.	MCR03EZHJ474	MAIN	A	1
R251	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R252	RK3070	Chip R.	MCR03EZHJ474	MAIN	A	1
R253	RK3057	Chip R.	MCR03EZHJ393	MAIN	A	1
R254	RK3057	Chip R.	MCR03EZHJ393	MAIN	A	1
R255	RK3046	Chip R.	MCR03EZHJ472	MAIN	A	1
R256	RK3026	Chip R.	MCR03EZHJ101	MAIN	A	1
R257	RK3046	Chip R.	MCR03EZHJ472	MAIN	A	1
R258	RK3057	Chip R.	MCR03EZHJ393	MAIN	A	1
R259	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R260	RK3043	Chip R.	MCR03EZHJ272	MAIN	A	1
R261	RK3054	Chip R.	MCR03EZHJ223	MAIN	A	1
R262	RK3069	Chip R.	MCR03EZHJ394	MAIN	A	1
R263	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R264	RK3038	Chip R.	MCR03EZHJ102	MAIN	A	1
R265	RK3047	Chip R.	MCR03EZHJ562	MAIN	A	1
R266	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R267	RK3030	Chip R.	MCR03EZHJ221	MAIN	A	1
R269	RK3062	Chip R.	MCR03EZHJ104	MAIN	A	1
R271	RK4034	Chip R.	ERJ12YJ471U	MAIN	A	1
R272	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R273	RK3062	Chip R.	MCR03EZHJ104	MAIN	A	1
R274	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R275	RK3022	Chip R.	MCR03EZHJ470	MAIN	A	1
R279	RK3046	Chip R.	MCR03EZHJ472	MAIN	A	1
R280	RK3058	Chip R.	MCR03EZHJ473	MAIN	A	1

Ref. No.	Parts No.	Description	Parts Name	Unit	Loc (side)	Qty
R281	RK3041	Chip R.	MCR03EZHJ182	MAIN	A	1
R282	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R283	RK3038	Chip R.	MCR03EZHJ102	MAIN	A	1
R284	RK3030	Chip R.	MCR03EZHJ221	MAIN	A	1
R285	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R286	RK3045	Chip R.	MCR03EZHJ392	MAIN	A	1
R287	RK3046	Chip R.	MCR03EZHJ472	MAIN	A	1
R288	RK3014	Chip R.	MCR03EZHJ100	MAIN	A	1
R290	RK3038	Chip R.	MCR03EZHJ102	MAIN	A	1
R291	RK3001	Chip R.	MCR03EZHJ000	MAIN	A	1
R297	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R304	RK3052	Chip R.	MCR03EZHJ153	MAIN	A	1
R306	RK3076	Chip R.	MCR03EZHJ155	MAIN	A	1
R308	RK3076	Chip R.	MCR03EZHJ155	MAIN	A	1
R309	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R311	RK3038	Chip R.	MCR03EZHJ102	MAIN	A	1
R312	RK3038	Chip R.	MCR03EZHJ102	MAIN	A	1
R313	RK3038	Chip R.	MCR03EZHJ102	MAIN	A	1
R315	RK3042	Chip R.	MCR03EZHJ222	MAIN	A	1
R316	RK3051	Chip R.	MCR03EZHJ123	MAIN	A	1
R318	RK3050	Chip R.	MCR03EZHJ103	MAIN	A	1
R319	RK3062	Chip R.	MCR03EZHJ104	MAIN	A	1
R320	RK3062	Chip R.	MCR03EZHJ104	MAIN	A	1
R322	RD0108	Jumper	J1/6Z	MAIN	H	1
R323	RK3001	Chip R.	MCR03EZHJ000	MAIN	A	1
R327	RK3092	Chip R.	MCR03EZPFX7502	MAIN	A	1
R328	RD3013	Resistor	ERX1SJ100	MAIN	H	1
R334	RK3042	Chip R.	MCR03EZHJ222	MAIN	A	1
TC101	CT0012	Trimmer	CTZ3S-10A-W1-P	MAIN	A	1
TH101	XS0031	Thermistor	NTCCM16084BH682KCT	MAIN	A	1
VR101	RH0146	Trimmer Pot.	MVR22HXBRN473	MAIN	A	1
VR102	RH0148	Trimmer Pot.	MVR22HXBRN104	MAIN	A	1
VR103	RH0142	Trimmer Pot.	MVR22HXBRN103	MAIN	A	1
VR104	RH0144	Trimmer Pot.	MVR22HXBRN223	MAIN	A	1
VR106	RH0146	Trimmer Pot.	MVR22HXBRN473	MAIN	A	1
VR107	RH0140	Trimmer Pot.	MVR22HXBRN472	MAIN	A	1
VR108	RH0148	Trimmer Pot.	MVR22HXBRN104	MAIN	A	1
W101	MBAG02GG	Wire	#22BH1-020-H1	MAIN	H	1
X101	XK0002	Discriminator	CDBM455C7	MAIN	H	1
X103	XQ0096	Xtal	12.8MHZ 5PPM UM5	MAIN	H	1
X104	XQ0058A	Xtal	UM-530.395MHZ	MAIN	H	1
XF10	XF0031Z	Xtal Filter	UM1 30.85MHZ 30M7	MAIN	H	1
	SD0034		GND SPRING DR130	MAIN	H	1
	TS0164A		VCO CASE DR235	MAIN	H	1
	TZ0049		SILICON DUMPER	MAIN	H	1
	TZ0072		SHEET	MAIN	H	1
	UP0414	PCBoard	PCB DR245	MAIN	A	1

VCO Unit

Ref. No.	Parts No.	Description	Parts Name	Unit	Loc (side)	Qty
C503	CU3039	Chip C.	C1608JB1H222KT-AS	VCO	A	1
C504	CU3051	Chip C.	C1608JB1E223KT-NS	VCO	A	1
C505	CS0220	Chip tantalum	TMCMA1C225MTR	VCO	A	1
C506	CS0220	Chip tantalum	TMCMA1C225MTR	VCO	A	1
C507	CU3035	Chip C.	C1608JB1H102KT-AS	VCO	A	1
C508	CS0063	Chip tantalum	TMCSA1V104MTR	VCO	A	1
C511	CU3047	Chip C.	C1608JB1H103KT-N	VCO	A	1
C512	CU3047	Chip C.	C1608JB1H103KT-N	VCO	A	1
C513	CU3008	Chip C.	C1608CH1H070CT-A	VCO	A	1
C514	CU3035	Chip C.	C1608JB1H102KT-AS	VCO	A	1
C515	CU3006	Chip C.	C1608CH1H050CT-AS	VCO	A	1
C516	CU3035	Chip C.	C1608JB1H102KT-AS	VCO	A	1
C517	CU3035	Chip C.	C1608JB1H102KT-AS	VCO	A	1
C518	CU3003	Chip C.	C1608CH1H020CT-AS	VCO	A	1
C519	CU3035	Chip C.	C1608JB1H102KT-AS	VCO	A	1
C520	CS0382	Chip tantalum	TMCMB1A226MTR	VCO	A	1
C523	CU3004	Chip C.	C1608CH1H030CT-AS	VCO	A	1
C524	CU3027	Chip C.	C1608CH1H221JT-AS	VCO	A	1
C525	CU3007	Chip C.	C1608CH1H060CT-A	VCO	A	1
C526	CU3001	Chip C.	C1608CH1H0R5CT-AS	VCO	A	1
C527	CU3009	Chip C.	C1608CH1H080CT-A	VCO	A	1
C528	CU3003	Chip C.	C1608CH1H020CT-AS	VCO	A	1
C529	CU3035	Chip C.	C1608JB1H102KT-AS	VCO	A	1
C530	CU3035	Chip C.	C1608JB1H102KT-AS	VCO	A	1
C531	CU3011	Chip C.	C1608CH1H100DT-AS	VCO	A	1
CN501	UE0420	Connector	B8P-BC-2	VCO	H	1
CN502	UE0185	Connector	B6P-BC-2	VCO	H	1
D501	XD0131	Chip Diode	1SV214 TPH4	VCO	A	1
D503	XD0300	Chip Diode	1SV262TPH2	VCO	A	1
D504	XD0300	Chip Diode	1SV262TPH2	VCO	A	1
IC501	XA0352	IC	M64076GP	VCO	B	1
L501	QC0104	Chip inductor	LER015T1R5M	VCO	A	1
L503	QA0147	Coil	4VP-5.25T	VCO	A	1
L504	QC0104	Chip inductor	LER015T1R5M	VCO	A	1
L505	QC0104	Chip inductor	LER015T1R5M	VCO	A	1
L506	QC0544	Chip inductor	LER015TR47M	VCO	A	1
L507	QC0430	Chip inductor	MLF1608DR10K-T	VCO	A	1
Q501	XT0124	Chip Transistor	2SC4215-Y(TE85L)	VCO	A	1
Q503	XE0010	FET	2SK508K52 T2B	VCO	A	1
Q504	XT0124	Chip Transistor	2SC4215-Y(TE85L)	VCO	A	1
R502	RK3022	Chip R.	MCR03EZHJ470	VCO	A	1
R503	RK3030	Chip R.	MCR03EZHJ221	VCO	A	1
R504	RK3001	Chip R.	MCR03EZHJ000	VCO	A	1
R505	RK3048	Chip R.	MCR03EZHJ682	VCO	A	1
R506	RK3053	Chip R.	MCR03EZHJ183	VCO	A	1
R507	RK3042	Chip R.	MCR03EZHJ222	VCO	A	1
R508	RK3026	Chip R.	MCR03EZHJ101	VCO	A	1
R509	RK3034	Chip R.	MCR03EZHJ471	VCO	A	1
R510	RK3054	Chip R.	MCR03EZHJ223	VCO	A	1
R511	RK3044	Chip R.	MCR03EZHJ332	VCO	A	1
R512	RK3022	Chip R.	MCR03EZHJ470	VCO	A	1
R513	RK3050	Chip R.	MCR03EZHJ103	VCO	A	1
R514	RK3060	Chip R.	MCR03EZHJ683	VCO	A	1
R518	RK3030	Chip R.	MCR03EZHJ221	VCO	A	1
R519	RK3022	Chip R.	MCR03EZHJ470	VCO	A	1
R520	RK3045	Chip R.	MCR03EZHJ392	VCO	A	1
R521	RK3026	Chip R.	MCR03EZHJ101	VCO	A	1
R522	RK3034	Chip R.	MCR03EZHJ471	VCO	A	1
R523	RK3050	Chip R.	MCR03EZHJ103	VCO	A	1

Mechanical Patrs

Ref. No.	Parts No.	Description	Parts Name	Unit	Loc (side)	Qty
	AA0050	Screw	XSC26+6FZ	Mechanical	-	6
	AV0006	Screw	B2.6+8 Fe/Ni	Mechanical	-	16
	AW0001	Screw	XYN3+J8FN	Mechanical	-	2
	AZ0042	Washer	Washer	Mechanical	-	2
	DP0137		LCD panel DR235A	Mechanical	-	1
	FF0015		BLIND CLOTH DR110	Mechanical	-	2
	FF0017		BLIND CLOTH DR570	Mechanical	-	1
	FG0273		ON AIR KEY RUBBER	Mechanical	-	1
	FG0320		SP cushion	Mechanical	-	1
	FP0151		REAR PANEL DR135	Mechanical	-	1
	KS0075		BOTTOM CASE DR235A	Mechanical	-	1
	KZ0130		FRONT ASSY. DR235A	Mechanical	-	1
	NK0072		VOL KNOB DR135	Mechanical	-	1
	NK0073		DIAL KNOB DR135	Mechanical	-	1
	SP0008		GND TERM XM601	Mechanical	-	1
	SS0096		CHASSIS(R)	Mechanical	-	1
	ST0065		SP HOLDER DR135	Mechanical	-	1
	ST0066		SP FITTING DR135	Mechanical	-	1
	TG0034		SP HIMERON DR135	Mechanical	-	1
	UE0258	Connector	FM-M.D.R-(4)	Mechanical	-	1
	YZ0131	Tape	Tape #9110 12X1mm	Mechanical	-	15

Speaker

Ref. No.	Parts No.	Description	Parts Name	Unit	Loc (side)	Qty
	ES0017	Speaker	057M9017	Spesker	-	1
	UX1047	Wire	WIRE DR130	Spesker	-	1

Packing Parts

Ref. No.	Parts No.	Description	Parts Name	Unit	Loc (side)	Qty
	AE0012	Screw	HEXH/D M4+8 FE/B.ZN	Packing	-	4
	AJ0003T	Screw	T5x20mm	Packing	-	4
	AN0002	Nut	HEX5mm	Packing	-	4
	AZ0009	Washer	5x9.2mm	Packing	-	4
	AZ0010	Washer	5x12mm	Packing	-	4
	DS0388A		Model Name Plate	Packing	-	1
	EF0005	Fuse	FGBO 125V 15A	Packing	-	2
	EMS53		Microphone	Packing	-	1
	ADFM78		BRACKET DR130	Packing	-	1
	FM0079		SPANNER DR130	Packing	-	1
	HK0514		Item Carton DR245	Packing	-	1
	HM0203		5PCS	Packing	-	0.2
	HP0006		Protection Bag 5x90x170	Packing	-	1
	HP0009		Protection Bag 5x125x250	Packing	-	1
	HP0035		Protection Bag 5x200x250	Packing	-	1
	HU0099		FRONT DR605	Packing	-	1
	HU0159		Fixture	Packing	-	1
	HU0161		Fixture	Packing	-	0.4
	PH0009A		Registration Card	Packing	-	1
	PK0084		Schematic Diagram	Packing	-	1
	PR0454		Security Seal T	Packing	-	2
	PS0371		INSTRUCTION DR135TA	Packing	-	1
	PT0004A		SERIAL NO.FOR CARTON	Packing	-	2
	ADUA38	Power Cable	R-B2.0X3M RECEPT.15A	Packing	-	1
	UX1259		WIRE SCR1	Packing	-	1
	UX1260		WIRE SCR2	Packing	-	1
	YZ0121		Tape 10mm	Packing	-	2

ADJUSTMENT

1) Adjustment Spot

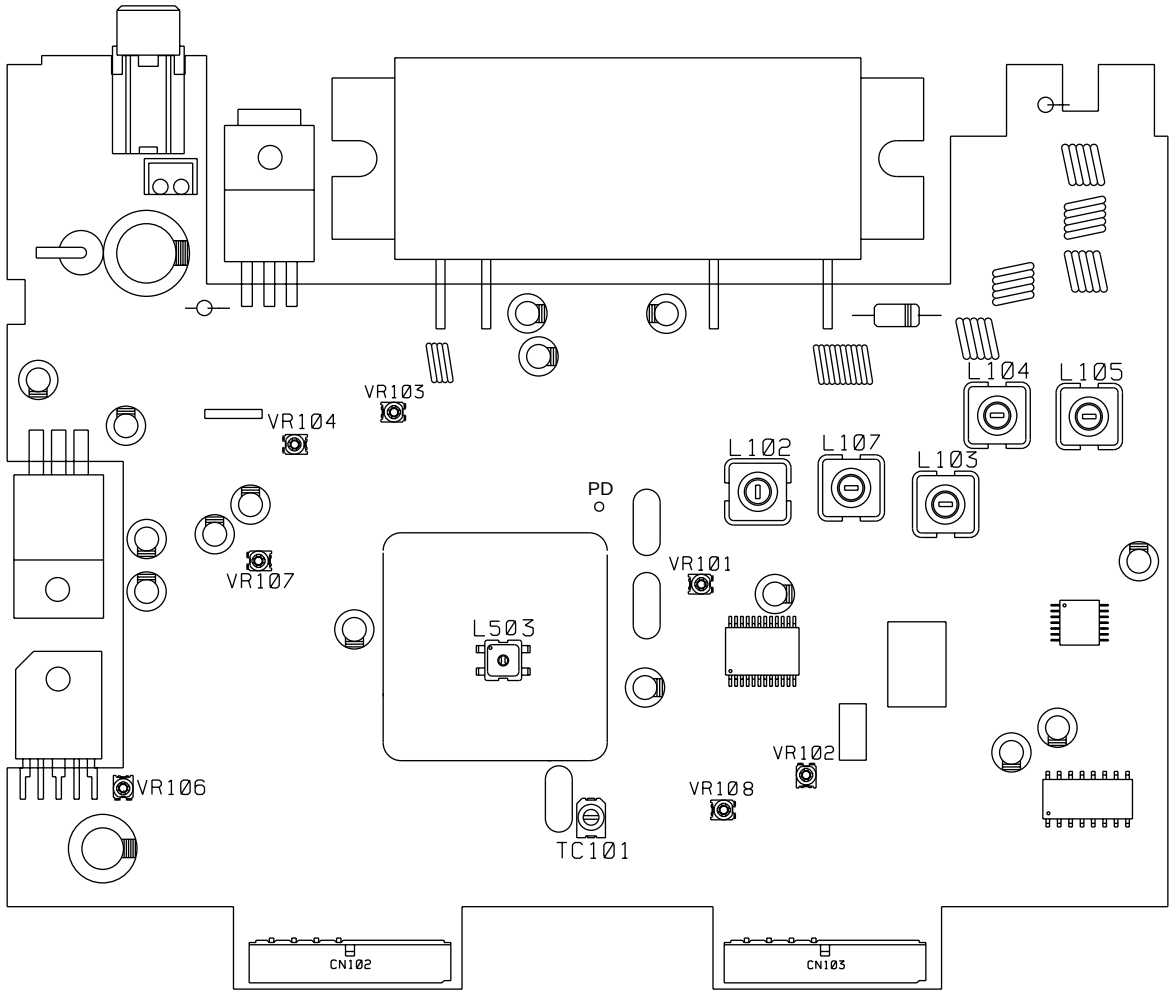
Power Supply Voltage 13.8 V

Output of SSG is all EMF indication

SSG output is MOD 1KHz 1.5KHz/DEV

Standard Modulation is also based above.

Speaker load is 8Ω and Output is 50~100 mV.



Attention: Don’t set the variable resistor into its open position.

2) VCO and RX Adjustment Specification

ITEM	CONDITION	UNIT	ADJ. SPOT	ADJUSTING METHOD
Adjustment Frequency	CH1 245.00MHz TX	MAIN	TC101	Adjust so that Tx Frequency becomes within 245.00MHz±100Hz
VCO Adjustment	CH1 245.00MHz RX	MAIN	L503	Adjust so that PD voltage becomes 3.1V
VCO Confirmation	CH1 245.00MHz RX	MAIN		Confirm if PD voltage becomes less than 7.2V
Rx Signal Sensitivity Adjustment	CH41 245.50MHz CH5 245.05MHz CH41 245.50MHz CH77 245.95MHz	MAIN	L105, L104 L103, L107 L102	Repeatedly adjust so that the Rx Sensitivity becomes in maximum. Confirm: At -8dBu SINAD more than 12dB At -8dBu SINAD more than 12dB At -8dBu SINAD more than 12dB
Squelch Adjustment	CH41 245.50MHz SSG OFF Indication 01	MAIN	VR 101	Adjust so that the squelch stops at perfectly close location
S Meter Adjustment	CH41 245.50MHz SSG20dBu 1KHz 1.5KHz/DEV	MAIN	VR102	Adjust so that all the indicator appears

3) Tx Adjustment Specification

ITEM	CONDITION	UNIT	ADJ. SPOT	ADJUSTING METHOD
HI POWER Adjustment	CH41 245.50MHz HI POWER	MAIN	VR103	Adjust to 10.0±1.0W
MID POWER Adjustment	CH41 245.50MHz MID POWER	MAIN	VR104	Adjust to 5.0±1.0W
LOW POWER Confirmation	CH41 245.50MHz LOW POWER	MAIN		Confirm if it becomes 2.5±1.0W
Maximum Deviation Adjustment	CH41 245.50MHz MOD 1KHz40mVemf	MAIN	VR107	2.3±0.1KHz/DEV
Mic Gain Adjustment	CH41 245.50MHz MOD 1KHz4mVemf WIDE	MAIN	VR 106	1.5±0.1KHz/DEV
CTCSS Modulation Level Confirmation	CH41 245.50MHz 88.5Hz	MAIN		500±200Hz/DEV 3KHz LPF ON
DCS Modulation Level Confirmation	CH41 245.50MHz 255 Code	MAIN	VR108	500±100Hz/DEV 3KHz LPF ON
DTMF Modulation Level Confirmation	CH41 245.50MHz DTMF① Press the V/M key during TX	MAIN		1.5±0.5KHz/DEV

4) Rx Test Specification

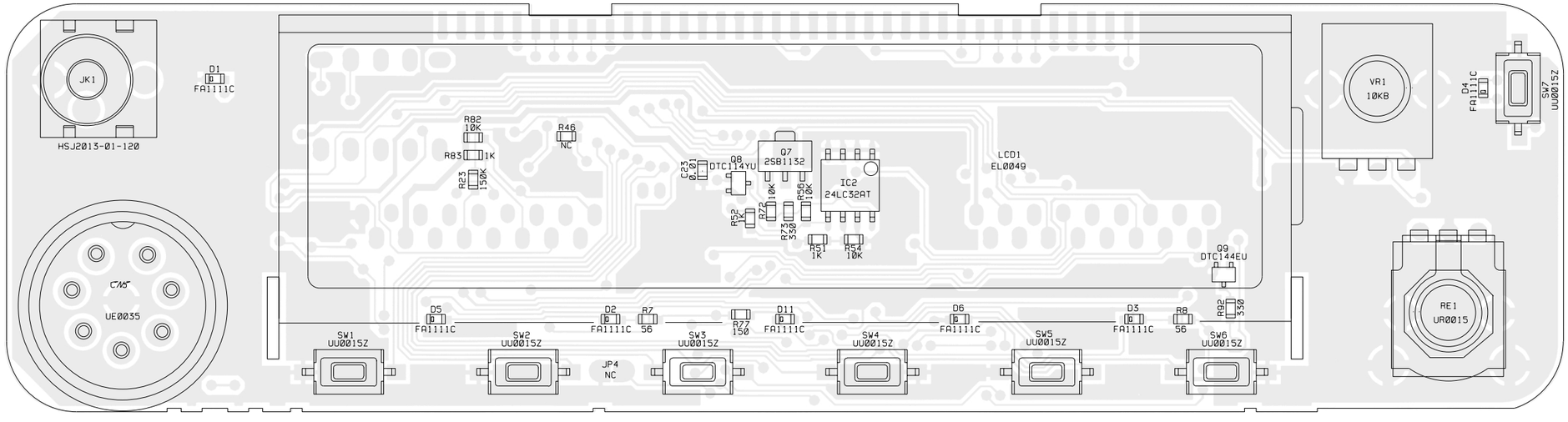
TEST ITEM	CONDITION	ADJ STANDARD	SPECIFICATION	NOTE
RX Sensitivity	CH5 245.05MHz CH41 245.50MHz CH77 245.95MHz	Less than -8dBu	Less than -7dBu	12dBSINAD
RX Distortion	CH41 245.50MHz	Less than 4%	Less than 5%	SSG Output 30dBu
RX S/N		More than 34dB	Less than 32dBu	SSG Output 30dBu 0.3~3KHzBPF OFF
Squelch Sensitivity	CH5 245.50MHz Indication 02	Squelch Open	Squelch Open	SSG Output -10dBu
		Squelch Close	Squelch Close	SSG Output OFF
S Meter	CH41 245.50MHz	All appears at 20dBu	All appears at 25dBu	Decrease SSG level and decrease S Meter level
AF Output	CH41 245.50MHz	More than 2W	More than 2W	SSG Output 30 dBu
CTCSS Sensitivity	CH41 245.50MHz tone 88.5Hz	Open at 250Hz/DEV	Open at 250Hz/DEV	SSG Output 0dBu 88.5Hz
DCS Sensitivity	CH41 245.50MHz tone 255	Opens when test Equipment is in Tx	Opens when test Equipment is in Tx	255 code
Drain Current	CH41 245.50MHz	Less than 0.65A	Less than 0.65A	MAX VR
Power Off Current	CH41 245.50MHz	Less than 10mA	Less than 10mA	Power Off
Howling	CH41 245.50MHz	Don't occur	Don't occur	SSG Output 60dBu MOD OFF MAX VR

5) Tx Test Specification

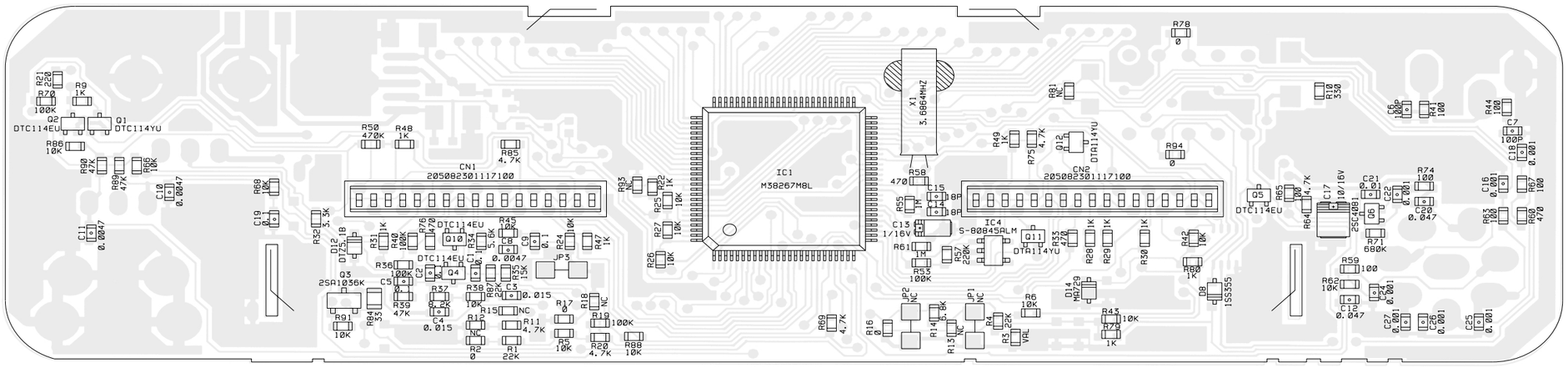
TEST ITEM	CONDITION	ADJ STANDARD	SPECIFICATION	NOTE
TX Output HI POWER	CH1 245.00MHz CH41 245.50MHz CH80 245.9875MHz	10±1W 10±1W 10±1W	10±2W 10±2W 10±2W	
TX Output MID POWER	CH41 245.50MHz	5±1W	5±2W	
TX Output Low Power	CH41 245.50MHz	2.5±1W	2 ~ 4W	
Drain Current	CH41 245.50MHz	Less than 5A	Less than 6A	
Frequency Deviation	CH41 245.00MHz	Within±0.3KHz	Within±0.5KHz	
Spurious	CH1 245.00MHz CH41 245.50MHz CH80 459.9875MHz	More than 65dB More than 65dB More than 65dB	More than 60dB More than 60dB More than 65dB	
Modulation Level	CH41 245.50MHz	1.5±0.1KHz/DEV 2.3±0.1KHz/DEV	1.5±0.2KHz/DEV 2.3±0.2KHz/DEV	MIC IN 4mVemf MIC IN 40mVemf
CTCSS Modulation level	CH41 245.50MHz	500±200Hz/DEV	500±300Hz/DEV	88.5Hz 3KHz LPF ON
DCS Modulation Level	CH41 245.50MHz	500±100Hz/DEV	500±200Hz/DEV	Code 255 3KHz LPF ON
DTMF Modulation Level	CH41 245.50MHz	1.5±0.5 KHz/DEV	1.5±0.5 KHz/DEV	Presss the V/M key during TX
Modulation Distortion		Less than 3%	Less than 4%	
TX S/N		More than 35dB	More than 33dB	0.3~3KHz BPF ON

PC BOARD VIEW

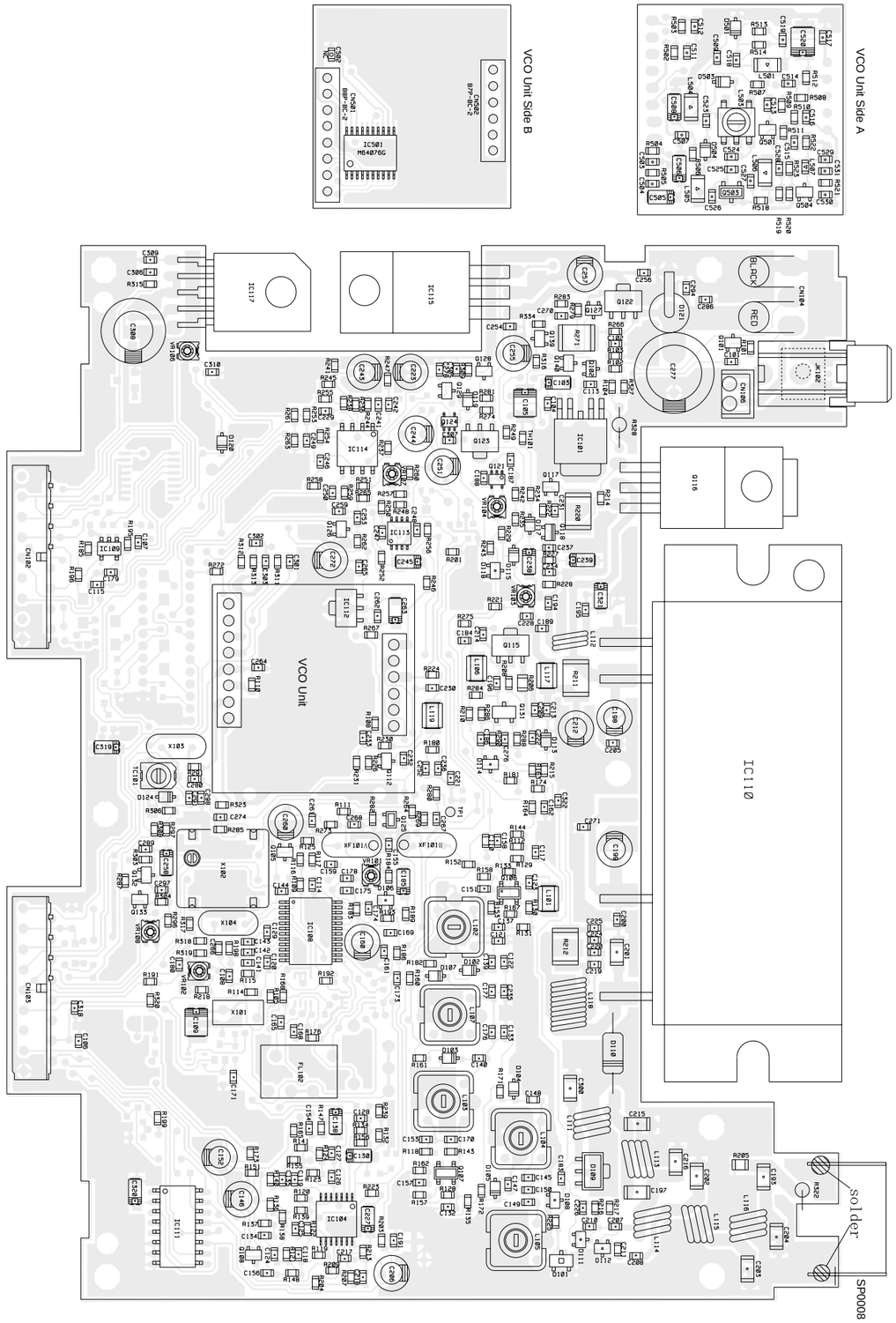
1) CPU Unit Side A (UP 0414)



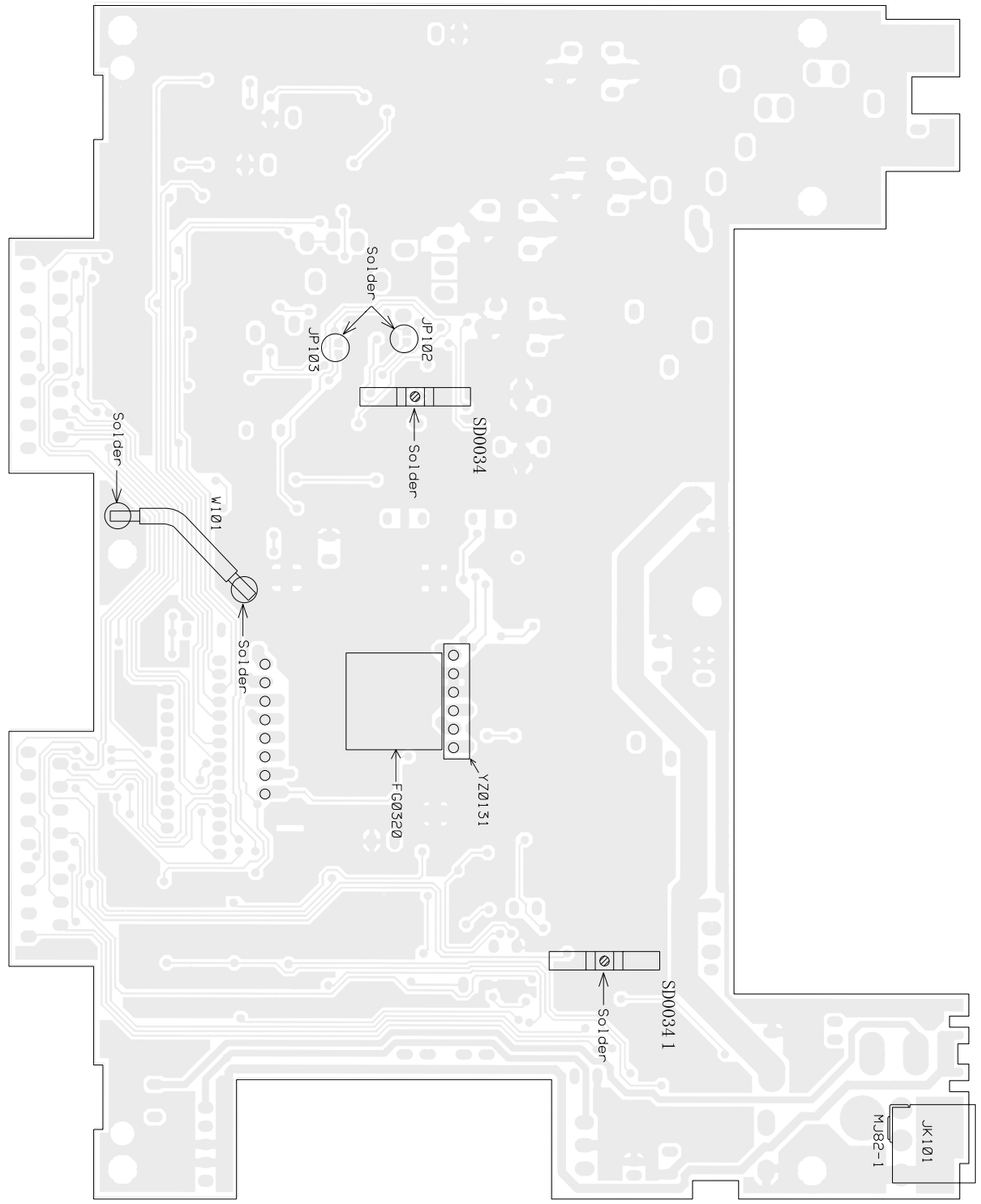
2) CPU Unit Side B (UP 0414)



3) MAIN Unit Side A (UP 0414)

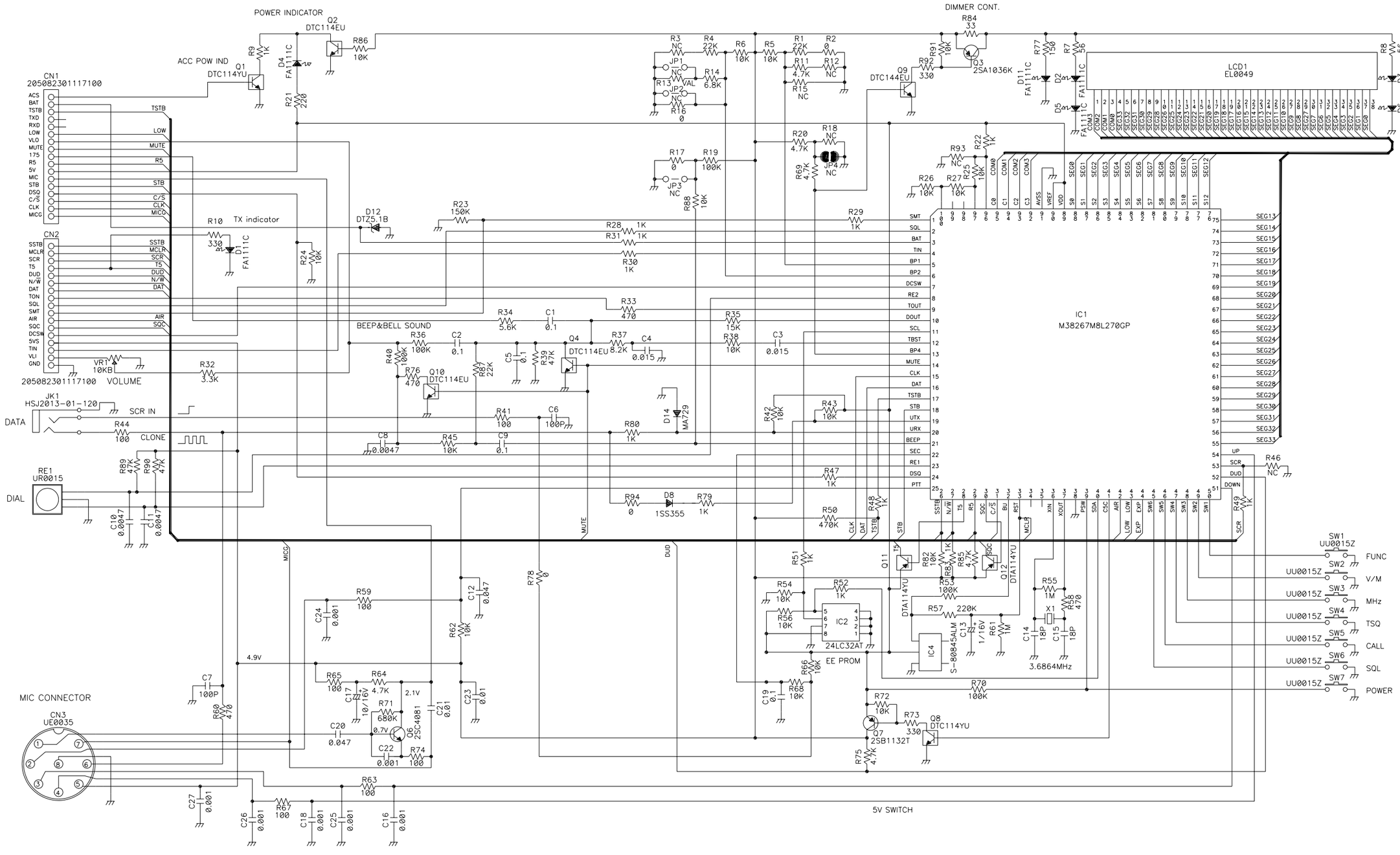


4) MAIN Unit Side B (UP 0414)

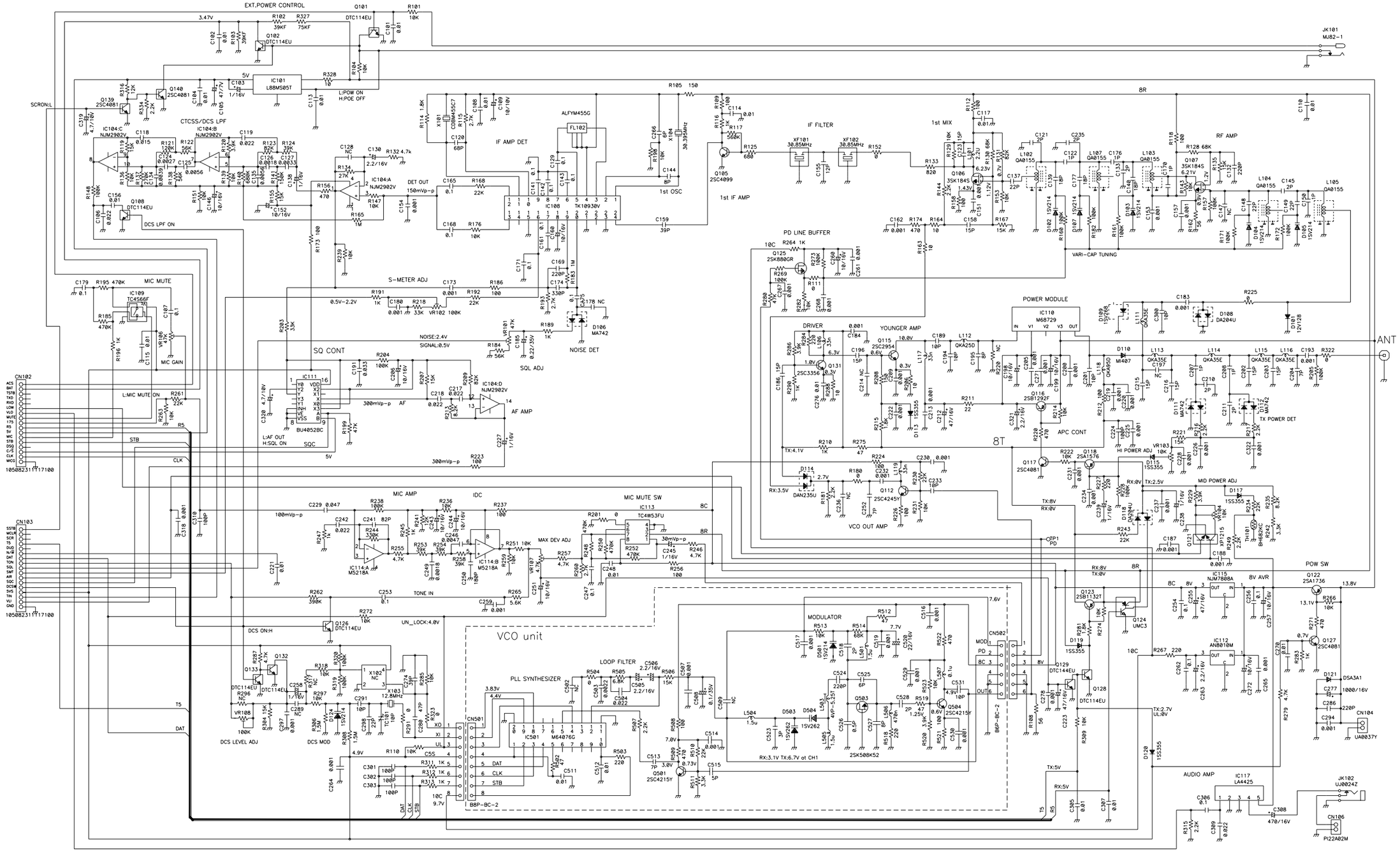


SCHMATIC DIAGRAM

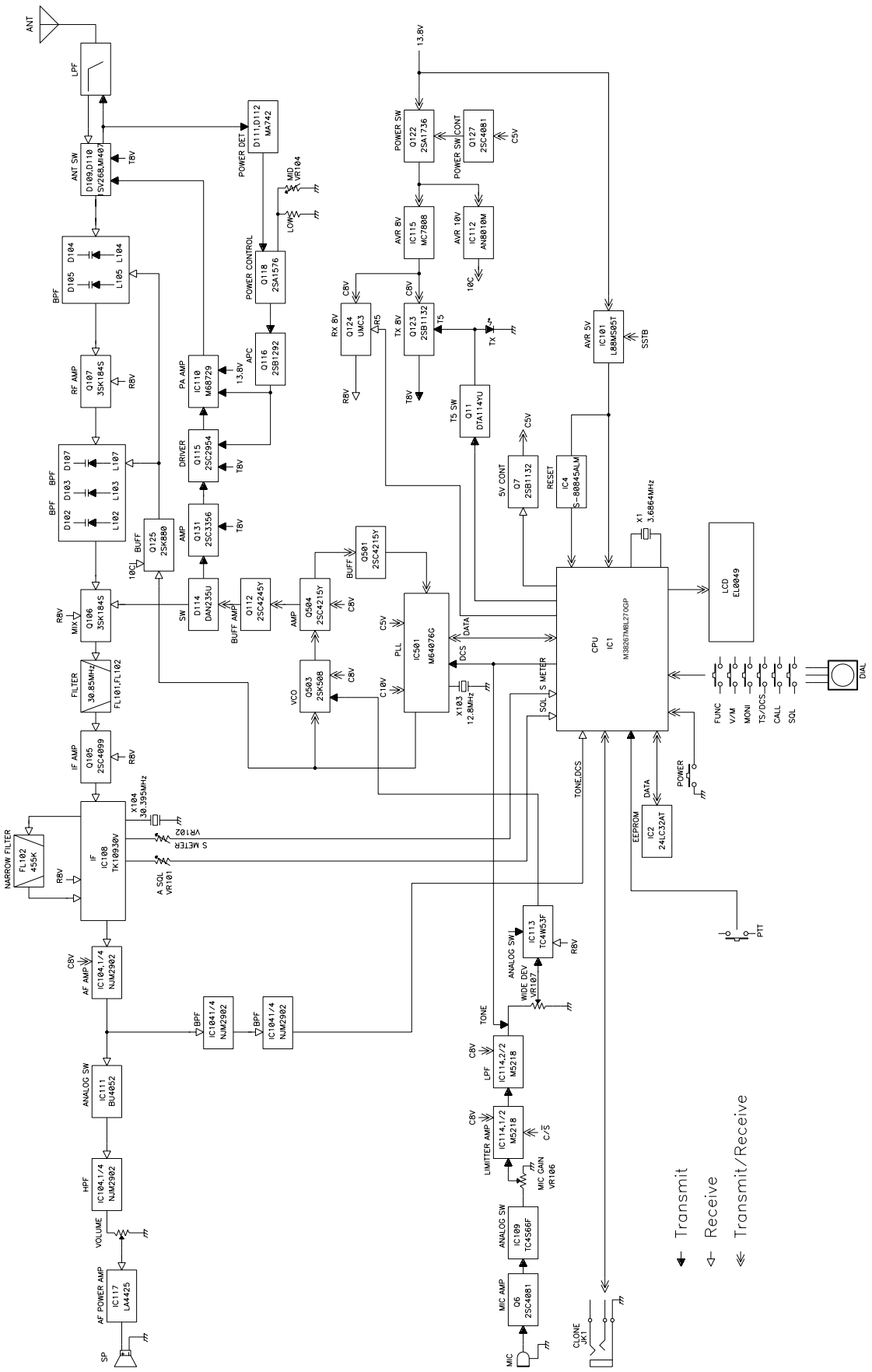
1) CPU Unit



2) MAIN Unit


EXT.POWER CONTROL
3.47V
Q101 DTC114EU
Q102 DTC114EU
IC101 L88MS05T
5V
L:POW ON
Hi:POE OFF
JK101 MJ82-1
ANT
SCRON:L
Q139 2SC4081
Q140 2SC4081
CTCSS/DCS LPF
IC104:C NJM2902V
IC104:B NJM2902V
IC104:A NJM2902V
DET OUT
150mVp-p
IF AMP DET
ALFYM455G
FL102
1st OSC
30.395MHz
1st IF AMP
Q105 2SC4099
IF FILTER
XF101 30.85MHz
XF102 30.85MHz
1st MIX
8R
RF AMP
Q106 3SK184S
Q107 3SK184S
VARI-CAP TUNING
DCS LPF ON
MIC MUTE
IC109 TC4S66F
MIC GAIN
L:MIC MUTE ON
S-METER ADJ
0.5V-2.2V
NOISE:2.4V
SIGNAL:0.5V
NOISE DET
D106 MA742
SQL ADJ
SQ CONT
IC111 BU4052BC
L:AF OUT
H:SQL ON
SQC
300mVp-p AF
AF AMP
IC104:D NJM2902V
PD LINE BUFFER
Q125 2SK880GR
DRIVER
Q115 2SC2954
Q131 2SC3356
YOUNGER AMP
POWER MODULE
IC110 M68729
D110 MI407
Q116 2SB1292F
APC CONT
8T
TX:4.1V
RX:3.5V
D114 DAN235U
Q112 2SC4245Y
VCO OUT AMP
HI POWER ADJ
MID POWER ADJ
TX POWER DET
D117 1SS355
D118 DA204U
Q117 2SC4081
Q118 2SA1576
TX:8V
RX:8V
TX:2.5V
RX:0V
TX:0V
MIC AMP
IDC
MIC MUTE SW
IC113 TC4W53FU
IC114:A M5218A
IC114:B M5218A
MAX DEV ADJ
TONE IN
UN_LOCK:4.0V
DCS ON:H
DCS LEVEL ADJ
DCS MOD
Q126 DTC114EU
Q132
Q133
VCO unit
PLL SYNTHESIZER
IC501 M64076G
LOOP FILTER
MODULATOR
Q501 2SC4215Y
Q503 2SK508K52
Q504 2SC4215Y
RX:3.1V TX:6.7V at CH1
B8P-BC-2
B6P-BC-2
CN502
MOD
PD
8C
OUT
POW SW
Q122 2SA1736
Q123 2SB1132T
Q124 UMC3
Q127 2SC4081
Q128 DTC114EU
Q129 DTC144EU
IC115 NJM7808A
8V AVR
IC112 AN8010M
IC117 LA4425
AUDIO AMP
JK102 UJ0024Z
CN106 PI22A02M
CN102
CN103
10508231T17100
STB
CLK
DAT
T5
RX:5V
TX:5V
TP1 PD

BLOCK DIAGRAM



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Printed in Japan PM0063