

DR-130

Service Manual

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SPECIFICATIONS

1) General

Frequency Coverage:

RX: 136.000 ~ 174.000MHz	(T version)
TX: 144.000 ~ 148.000MHz	(T version)
RX: 144.000 ~ 146.000MHz	(E/EZ version)
TX: 144.000 ~ 146.000MHz	(E/EZ version)
RX: 130.000 ~ 174.000MHz	(EA/TA version)
TX: 130.000 ~ 174.000MHz	(EA/TA version)
RX: 136.000 ~ 155.000MHz	(TE1 version)
TX: 136.000 ~ 155.000MHz	(TE1 version)
RX: 150.000 ~ 174.000MHz	(TE2 version)
TX: 150.000 ~ 174.000MHz	(TE2 version)

Frequency Resolution: 5, 10, 12.5, 15, 20, 25kHz steps

Antenna Impedance: 50 ohm unbalanced

Power Supply Requirements: DC 13.8 +/-10% Volts DC

Current Drain at 13.8V

Receiving: Squelched less than 800mA

Transmitting: High/10.0A (approx.)

Low/3.5A (approx.)

Dimensions:

140mm(W) x 40mm(H) x 154mm(D)

Weight:

0.86kg (approx.)

2) Transmitter

Output Power:

High: 50Watts (DR-130T/E)

High: 35Watts (DR-130TE1/2)

High: 10Watts (DR-130EZ)

Low: 5Watts (Approx.)

F3E(FM)

Emission Mode:

Modulation System: Variable Reactance Frequency Modulation

Max. Frequency Deviation:

+/- 5kHz (Wide Version)

+/- 2.5kHz (Narrow Version)

Spurious Emission:

-60dB or below carrier

Microphone:

Electret Condenser Microphone

Operating Mode:

Simplex/Semi-Duplex

Offset :

Offset from 0 to 15.995MHz

3) Receiver

Receiving System:

Superheterodyne Dual Conversion

Intermediate Frequency:

1st IF: 17.2MHz

2nd IF: 455kHz

12dB SINAD less than -16dBu (144.000MHz ~ 147.995MHz)

Sensitivity: More than +/-6kHz at -6dB (Wide Version)

Selectivity: Less than +/-15kHz at -60dB (Wide Version)

Audio Power Output:

More than 2.5W 10% Distortion

Speaker Impedance:

8 ohm

CIRCUIT DESCRTPTION

1) Receiver System

1. Front End

The signal from the antenna is passed through a low-pass filter and input to the voltage step up circuit consisting Of L14. The signal from L14 is led to the gate of Q1. D19 is the diode limiter circuit against the excessive input power of more than 20dBm. Q1 is the FETwhich has two gates. The voltage of the gate 2 is set higher to get the high gain and sensitivity. The signal from Q1 is led to the triple band pass filter (L4, L5, L6), and gets the high image rejection ratio.

2. Mixer Circuit

The signal from the triple band pass filter is converted into the first IF signal of 17.2MHz. The receiving signal is led to the gate 1 of Q2, and the first local oscillator signal is led to the gate 2 of Q2. To get the high conversion gain, the local oscillator signal voltage is set to about 1V. To reduce the high adjacent channel interference, the band width of the FL2 is set to 20kHz. The signal from FL2 is amplified by Q8, and input to FM IF system IC3 of TK10487.

3. IF Circuit

The TK10487 has the second local oscilltor circuit, mixer circuit, detector circuit, squelch circuit, and so on. Pin1 and 2 are the terminals of the crystal oscillator circuit. Pin2 (emitter) is connected to the ground via the resister R3 to prevent the oscillator from decreasing the power at the low temperature. Pin4 of IC3 is connected to FL1 directly because the matching resistor for ceramic filter is built-in. The quadrature circuit (pin10 of IC3) is connected to the ceramic resonator X2 for the temperature stability and good quality. The signal from pin11 of IC3 is connected to the LPF. The detected AF signal, which has flat frequency characteristics, is led to the control unit and used as both squelch signal and tone squelch signal. De-emphasis circuit consists of R31, R32, C26 and C27. The LPF amplifier consisting of Q5 and Q6 is located far away from the VR in the control unit, so it outputs the high voltage signal to prevent S/N from the deterioration. The squelch switch circuit consists of Q4 and Q16, and switches on/off at the point where there is no voltage to prevent from the switching noise. The S meter signal from pin12 of IC3 is led to the CPU in the control unit after adjusting the level at D20 and VR5. The S meter signal is thermal compensated by TH1 and stabilized. The noise amplifier consists of pin13 and 14, the built-in OP amplifier in IC3. The output signal of noise amplifier is amplified by Q14, rectified by D5, and then led to the pin15 (hysteresis comparator input) of IC3.

4. AF Circuit

IC4 is about 5W audio power amplifier IC. When the capacity of pin1 in C16 is increased more, the output incidental noise becomes smaller. The high-pitched tone becomes smaller at the same time, This radio's capacity of C16 is determined considering the high-pitched tone.

2) Transmitter System

1. Modulation Circuit

3) PLL Circuit

The microphone amplifier IC1 (IDC, LPF) consists of two operational amplifiers. The signal from the microphone is led to pre-emphasis circuit consisting of C36 and R47 and then to the limiter circuit. The limiter circuit uses the saturation of the OP amplifier. The amplified signal is input to the low-pass filter IC1A. The output signal from the microphone amplifier is passed through variable resistors VR2 for modulation adjustment and input to the VCO unit. Sub tone deviation is determined by R24, R25 and VR2. The radio does not have the adjustment variable resistor for sub tone deviation.

2. TX Amp. Circuit

The signal from VCO is amplified by TX, RX wide band LO amplifier Q19. The signal from Q19 is passed through the transmission/reception selector, and amplified by Q20 and Q15. The PA unit is driven at 200mW driving power.

3. PA Circuit

IC5 is 50W powered amplifier module. The output power is controlled by the voltage of V1. The RF signal amplified 50W in PA is passed through D3 and three-stage transmission/reception low-pass filter, and input to the antenna connector.

4. ALC Circuit

The power detection circuit consisting of D17 and D18 rectifies the output signal voltage. The detected DC voltage is led to the VR1 (power adjust trimmer), and amplified by Q3, Q9 and Q13. Output power is controlled by voltage of V1 in IC5 and collector voltage of Q15. When the temperature goes up unusually, the power down circuit consisting of R101 and TH2 works to prevent the device from the destruction.

The VCO unit is designed for the PLL circuit, putting the VCO on one side, and PLL circuit on the other side.

Q301 in the VCO is grounded using the gate oscillator, and its frequency covers 134MHz to 174MHz without transmission/reception shift circuit.

IC301 is pulse swallow system based PLL IC with the built-in prescaler, which synthesizes 150MHz band signal.

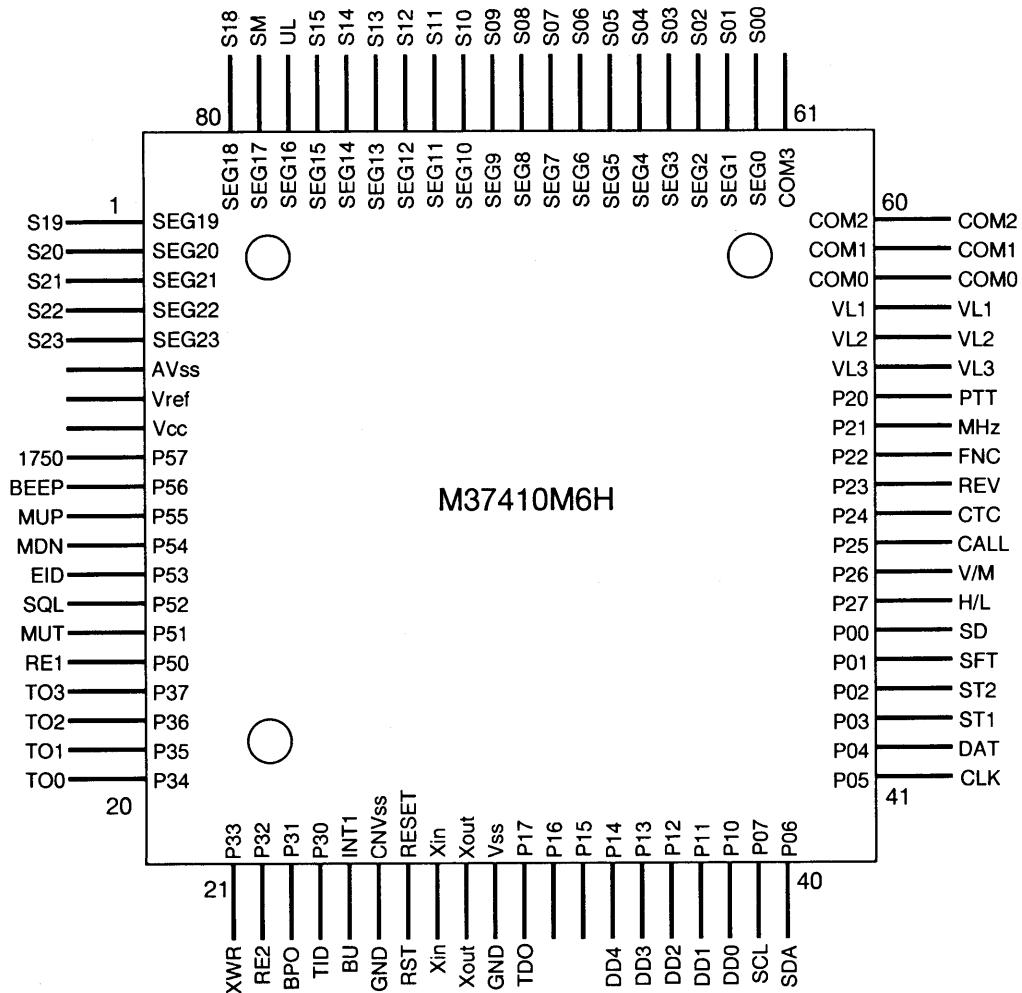
The loop filter consisting of Q302 and Q303 is the active type.

4) Terminal Function of Microprocessor

Port No.	I/O	Logic	PinName	Description
1	O		SEG19	LCDSegment19 Output
2	O		SEG20	LCDSegment20 Output
3	O		SEG21	LCDSegment21 Output
4	O		SEG22	LCDSegment22 Output
5	O		SEG23	LCDSegment23 Output
6	I		GND	AnalogGround 0V
7	I		Vref	Reference Voltage Input 5V
8	I		Vcc	CPU Power Supply hnpout 5V
9	O		1750	ToneBurstOutput
10	O	Clock	BEEP	BeepToneOutput
11	I	Active Low	MUP	Channel Up Input (Microphone Control)
12	I	Active Low	MDN	Channel Down Input (Microphone Control)
13	I	NoUse	EID	
14	O	Active Low	SQL	Squelch Control (L: Audio is off.)
15	O	ActiveHigh	MUT	Microphone Mute (H: Mic Amp is off.)
16	I	Active Low	REI	RotaryEncoder Input
17	O	Clock	TO3	ToneOutput
18	O	Clock	TO2	ToneOutput
19	O	Clock	TO1	ToneOutput
20	O	Clock	TO0	ToneOutput
21	I	ActiveHigh	XWR	EEPROM Write Status External Input
22	I	Active Low	RE2	RotaryEncoder Input
23	O	Active Low	BPO	Band Plan Detection Input (Common)
24	I	Active Low	TID	Tone Unit Detection Input
25	I	Active Low	BU	Back Up Signal Detection input
26	I		GND	Ground
27	I	Active Low	RST	ResetInput
28	I		Xin	Crystal Oscillator Terminal (3.58MHz)
29	O		Xout	Crystal Oscillator Terminal (3.58MHz)
30	I		GND	Ground
31	I	Active Low	TDO	CTCSS Tone Detection Output
32	O	Active High	DTD	For Trunking
33	O	NoUse		
34	I	Active Low	DD4	Band Plan 4 (V/U Selection)
35	I	Active Low	DD3	Band Plan 3 (445/435 Selection)
36	I	Active Low	DD2	Band Plan 2 (5k/12.5k Selection)
37	I	Active Low	DD1	Band Plan 1
38	I	Active Low	DD0	Band Plan 0
39	O	Clock	SCL	Clock Output for EEPROM

Port No.	I/O	Logic	PinName	Description
40	I/O	Clock	SDA	Data Output for EEPROM
41	O	Clock	CLK	Clock Output
42	O	Clock	DAT	DataOutput
43	O	Clock	ST1	Strobe Output for PLL IC
44	O	Clock	ST2	Strobe Output for CTCSS IC
45	I	Active Low	SFT	Shift Key Input
46	I	Active High	SD	Signal Detection Input
47	O	Active High	H/L	Transmission Power (H: Low Power)
48	I	Active Low	V/M	VFO/Memory Key Input
49	I	Active Low	CAL	Call Key Input
50	I	Active Low	CTC	CTCSS Mode Set Input
51	I	Active Low	REV	Reverse Key Input
52	I	Active Low	FNC	Function Key Input
53	I	Active Low	MHz	MHzKeyInput
54	I	Active Low	PTT	PTTKeyInput
55	I		LV3	Power Supply Input for LCD
56	I		LV2	Power Supply Input for LCD
57	I		LV1	Power Supply Input for LCD
58	I		COM0	LCD Common 0 Output
59	I		COM1	LCD Common 1 Output
60	I		COM2	LCD Common 2 Output
61	I	No Use		
62	O		SEG00	LCD Segment 00 Output
63	O		SEG01	LCD Segment 01 Output
64	O		SEG02	LCD Segment 02 Output
65	O		SEG03	LCD Segment 03 Output
66	O		SEG04	LCD Segment 04 Output
67	O		SEG05	LCD Segment 05 Output
68	O		SEG06	LCD Segment 06 Output
69	O		SEG07	LCD Segment 07 Output
70	O		SEG08	LCD Segment 08 Output
71	O		SEG09	LCD Segment 09 Output
72	O		SEG10	LCD Segment 10 Output
73	O		SEG11	LCD Segment 11 Output
74	O		SEG12	LCD Segment 12 Output
75	O		SEG13	LCD Segment 13 Output
76	O		SEG14	LCD Segment 14 Output
77	O		SEG15	LCD Segment 15 Output
78	I	ActiveHigh	UL	UnlockInput
79	I	Analog	SM	SignalMeterInput
80	O		SEG18	LCD Segment 18 Output

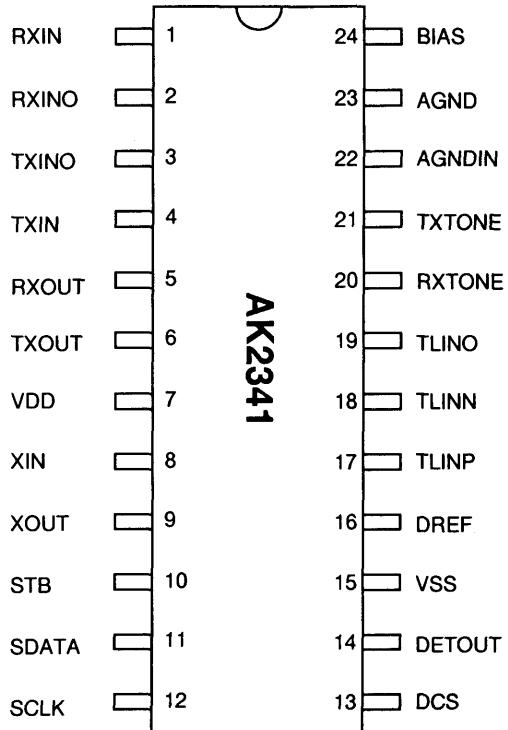
5) Terminal Connection of Microprocessor



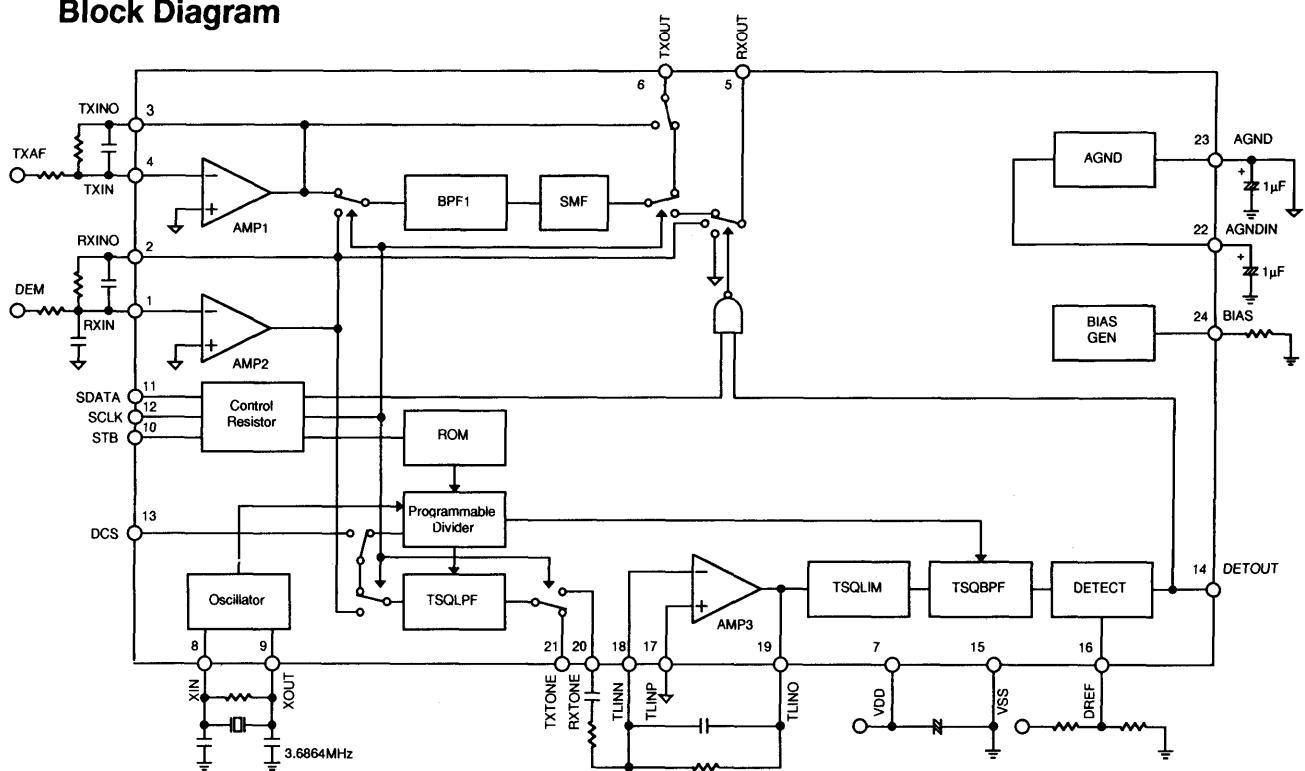
SEMICONDUCTOR DATA

1) AK2341 (XA0239) CTCSS Encoder/Decoder

Pin No.	Pin Name	I/O	Function
1	RXIN	I	RX Signal Input
2	RXINO	O	AMP2 Output
3	TXINO	O	AMP1 Output
4	TXIN	I	TX Audio Input
5	RXOUT	O	RX Audio Output
6	TXOUT	O	TX Audio Output
7	VDD	-	Power Supply (1.8 ~ 5.5V)
8	XIN	I	Crystal Terminal (3.6864MHz)
9	XOUT	O	Crystal Terminal (3.6864MHz)
10	STB	I	Strobe for Serial Data
11	SDATA	I	Serial Data
12	SCLK	I	Serial Clock
13	DCS	I	DCS Input
14	DETOUT	O	Tone Detection Output (Detect: Low)
15	VSS	-	Ground
16	DREF	I	Tone Detection Level Adjust Input
17	TLINP	I	RX Tone Signal Reference Input
18	TLINN	I	RX Tone Signal Input
19	TLINO	O	AMP3 Output
20	RXTONE	O	RX Tone Signal Output
21	TXTONE	O	TX Tone Signal Output
22	AGNDIN	I	Analog Ground Input
23	AGND	O	Analog Ground Output
24	BIAS	I	Bias Input

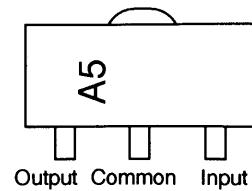
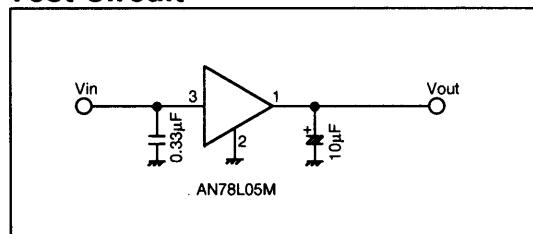


Block Diagram



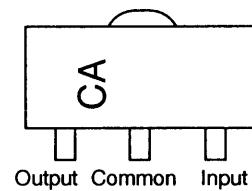
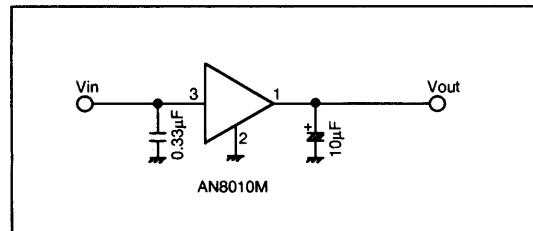
2) AN78L05M (XA0238) 5V Voltage Regulator

Test Circuit



3) AN8010M (XA0119) Voltage Regulator

Test Circuit

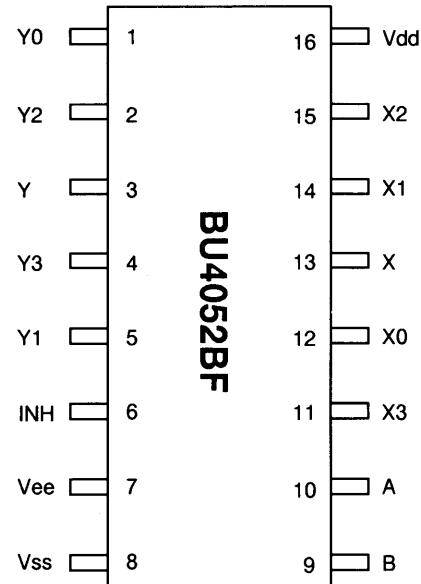
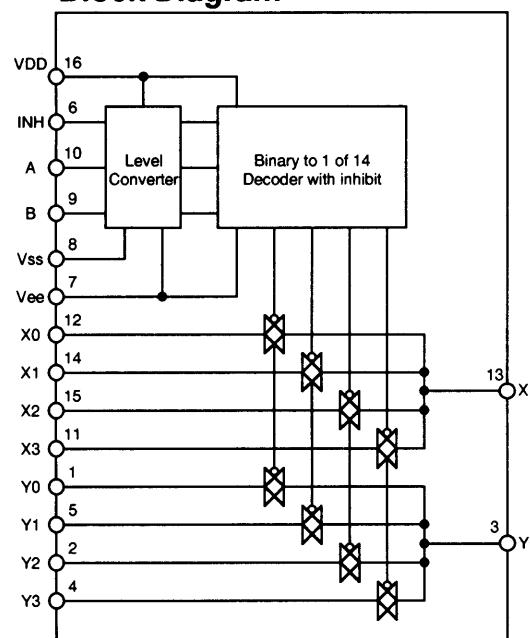


4) BU4052BF (XA0236) Analog Multiplexers/Demultiplexers

Function Table

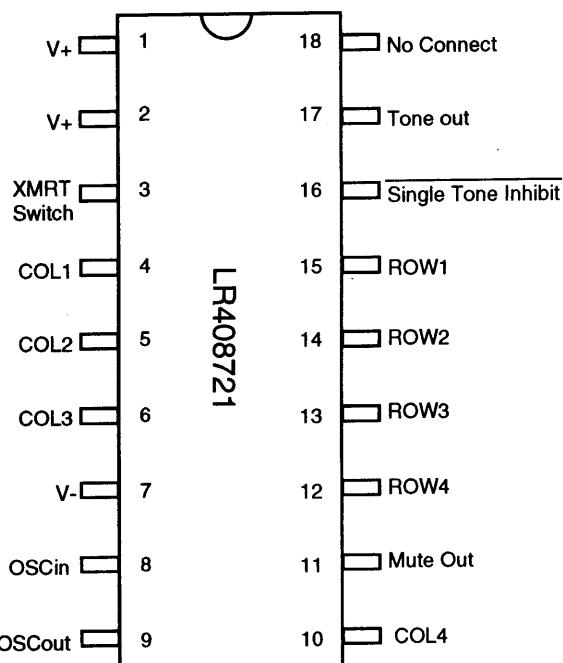
INHIBIT	A	B	ON Switch
Low	Low	Low	X0 Y0
Low	High	Low	X1 Y1
Low	Low	High	X2 Y2
Low	High	High	X3 Y3
High	Don't Care	Don't Care	None

Block Diagram

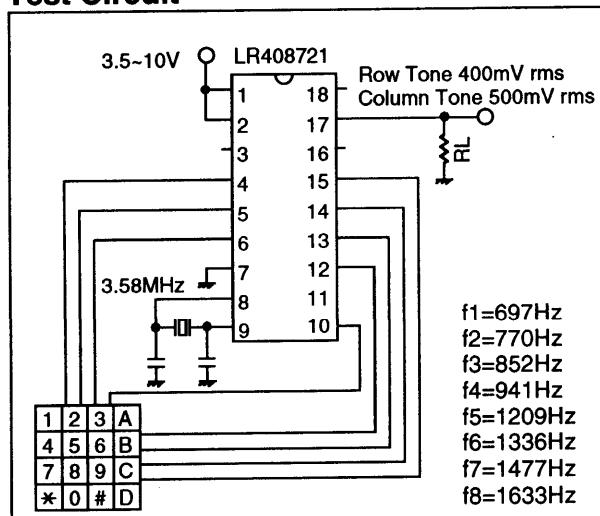


5) LR408721 (XA0042)

Tone Dialer



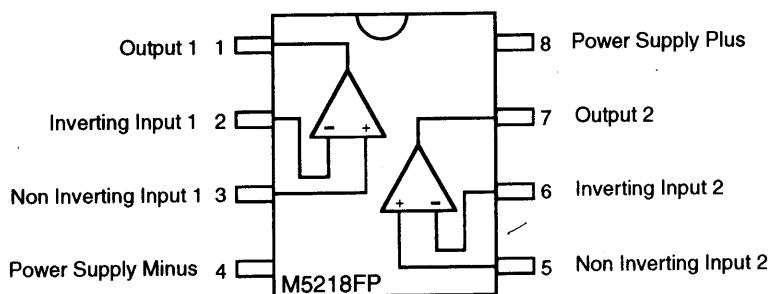
Test Circuit



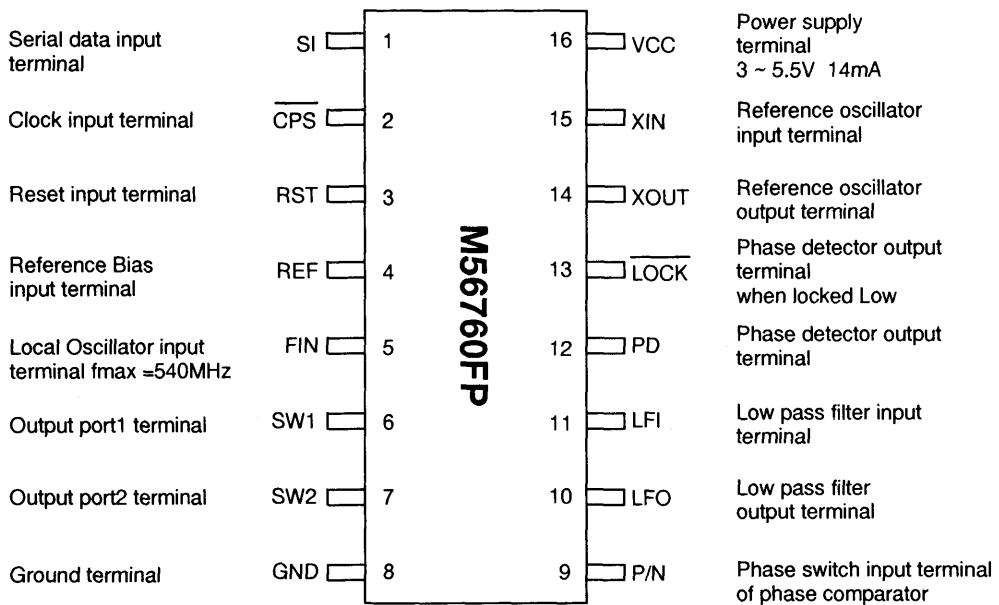
6) M5218FP (XA0068)

Dual Low Noise

Operational Amplifiers



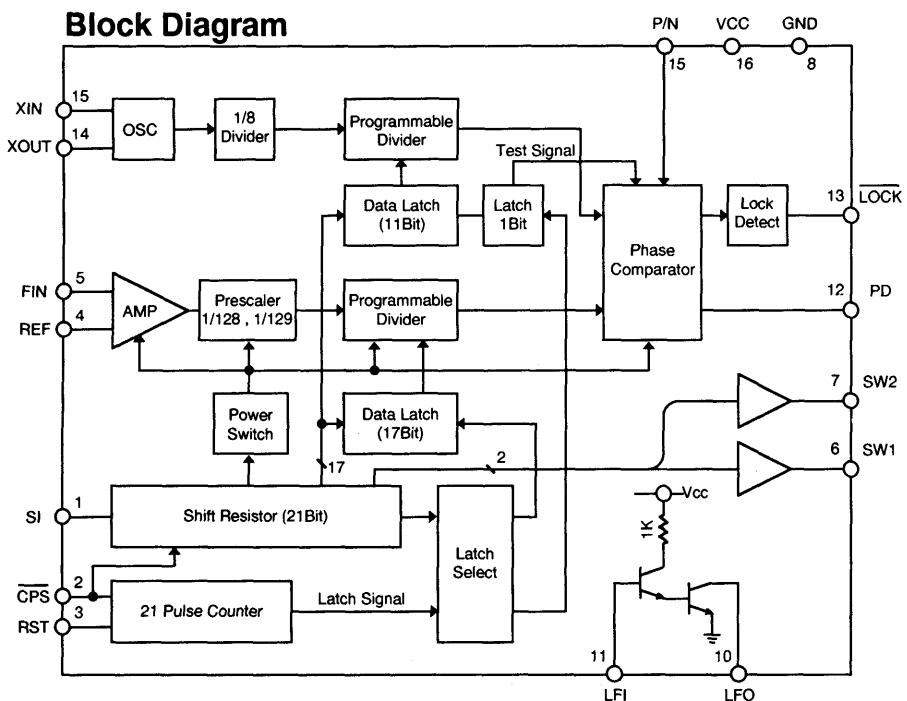
7) M56760FP (XA0235) 540MHz Frequency Synthesizer



Function Table

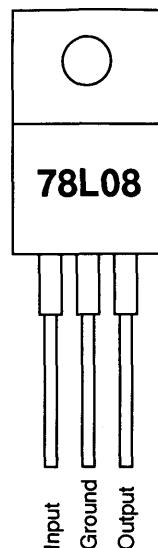
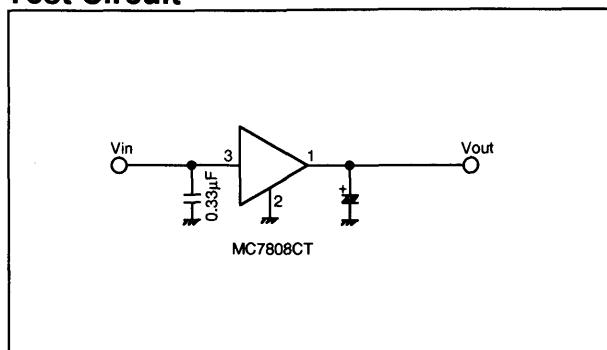
P/N input	Phase	PD output
High or Low	Locked	Hi-Z
High	Lead	High
High	Lag	Low
Low	Lead	Low
Low	Lag	High

Block Diagram



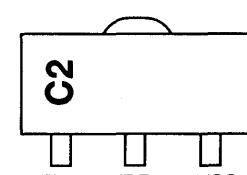
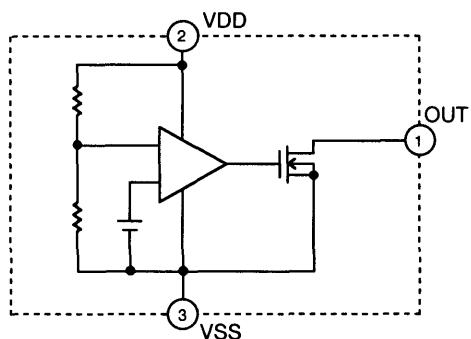
8) MC7808CT (XA0082)
8V Voltage Regulator

Test Circuit



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

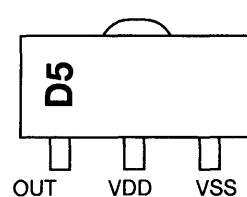
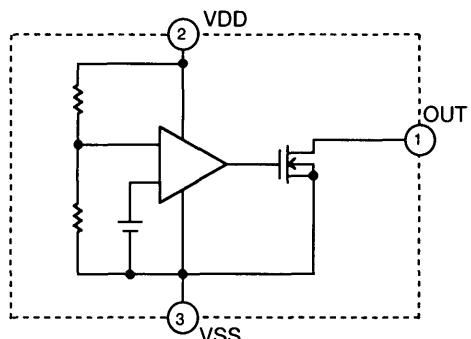
Equivalent Circuit



RH5VA32AA

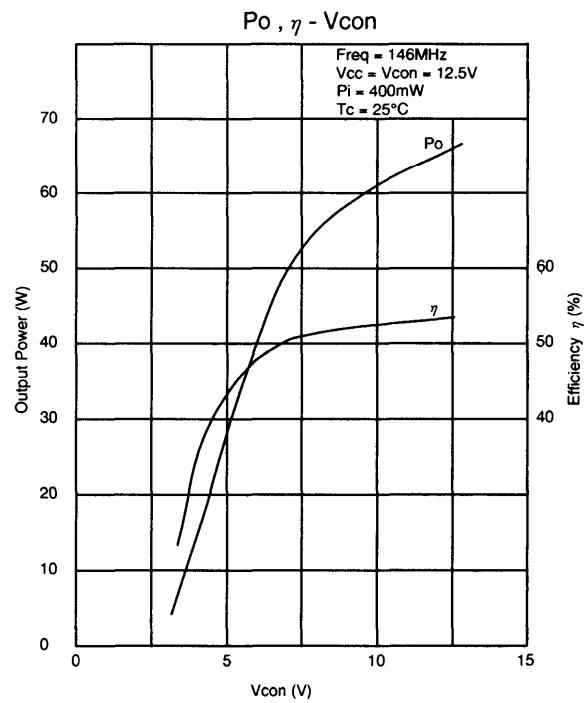
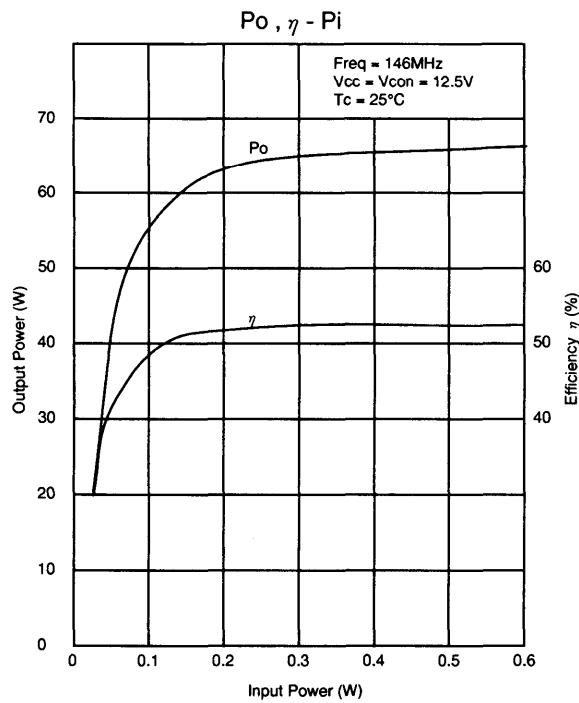
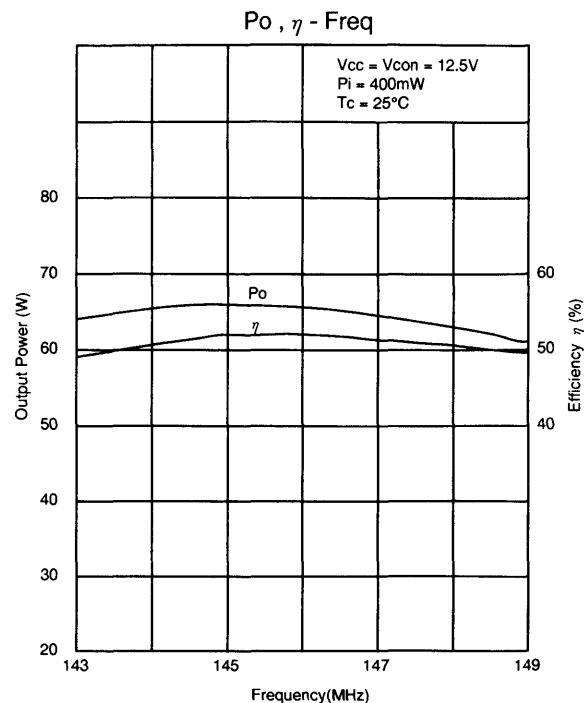
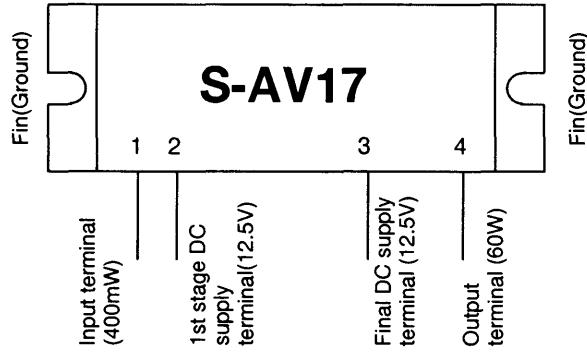
10) RH5VA45AA-T1 (XA0208)
C-MOS Voltage Detector

Equivalent Circuit



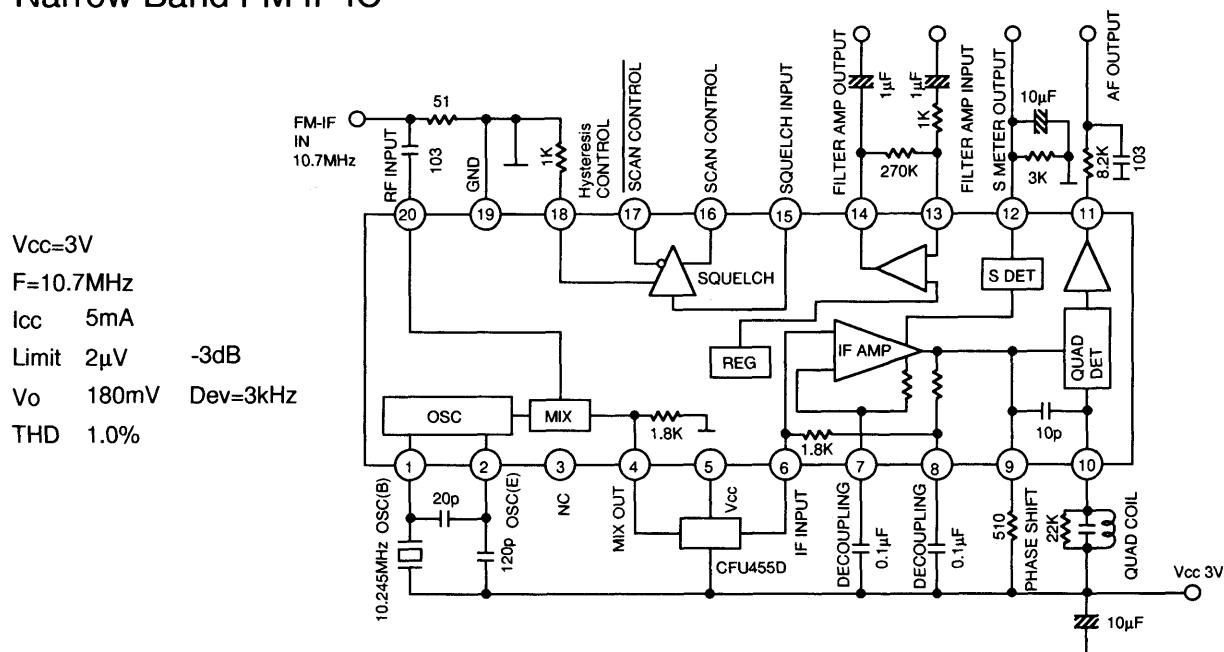
RH5VA45AA

11) S-AV17 (XA0185)
144 ~ 148MHz 60W
RF Power Module



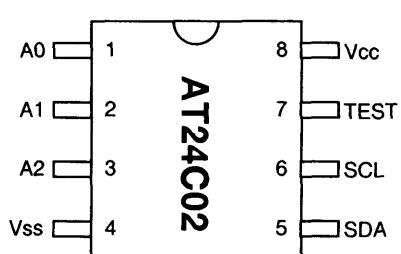
12) TK10487MTR (XA0144)

Narrow Band FM IF IC



13) AT24C02N-10SI-2.7 (XA0364)

EEPROM 256 x 8Bit

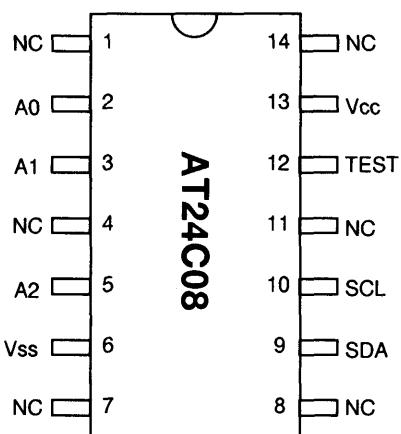


Pin Names

A0 ~ A2	Address inputs
SDA	Serial Data
SCL	Serial Clock
TEST	Write Control
Vss	Ground
Vcc	+5V

14) AT24C08-10SI-2.7 (XA0367)

EEPROM 1024 x 8Bit

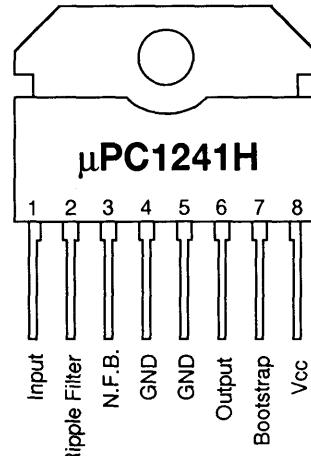
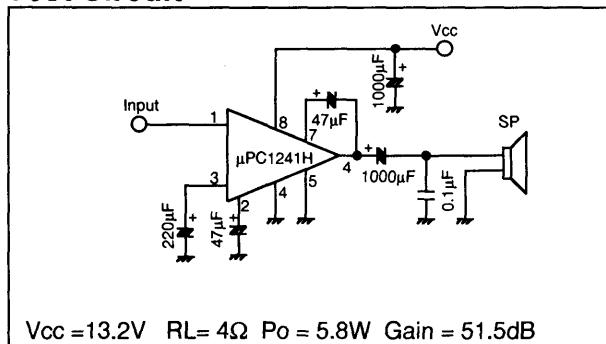


Pin Names

A0 ~ A2	Address inputs
SDA	Serial Data
SCL	Serial Clock
TEST	Hold at Vss
Vss	Ground
Vcc	+5V

15) μPC1241H (XA0079) Audio Power Amplifiers

Test Circuit

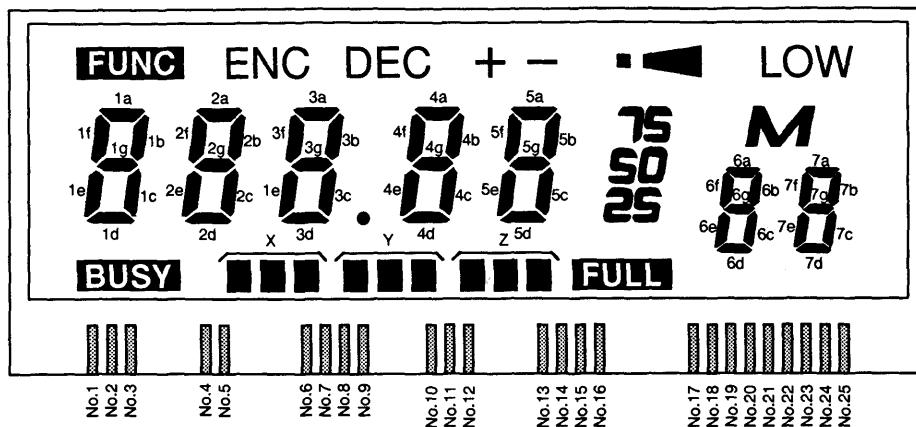


16) Transistor, Diode and LED Outline Drawings

Top View

1SS355 XD0254	1SV215 XD0132	DA204U XD0130	DAN202U XD0230	DAN235U XD0246	DTZ2.2A XD0145	DTZ5.1A XD0136	G3B XD0107
MA704WA XD0127	MA742 XD0250	MA8110H XD0255	MI308 XD0014	MI407 XD0013	2SK508 XE0010	2SK880 XE0021	3SK131 XE0012
M2P	M1U				K52	XY	V1
TLSG264 XL0029	2SA1576 XT0094	2SA1736 XT0099	2SB1132 XT0061	2SB1292 XT0112	2SC2412K XT0037	2SC2873 XT0099	2SC2954 XT0084
A(R) K A(G)	FR	LD	BA	B1192	BR	MO	QK
2SC3356 XT0030	2SC4081LN XT0111	2SC4081 XT0095	2SC4099 XT0096	2SC4403 XT0114	UMC2 XU0060	UMC5 XU0152	
R24	LS	BR	JP	LY			
DTA114YU XU0112	DTC114EU XU0131	DTC114YU XU0029	DTC124EU XU0140	DTC143TU XU0145	C1/B2	C2	C1/B2
54	24	64	25	03	E1 B1 E2		C5
DTC144EU XU0148	26						

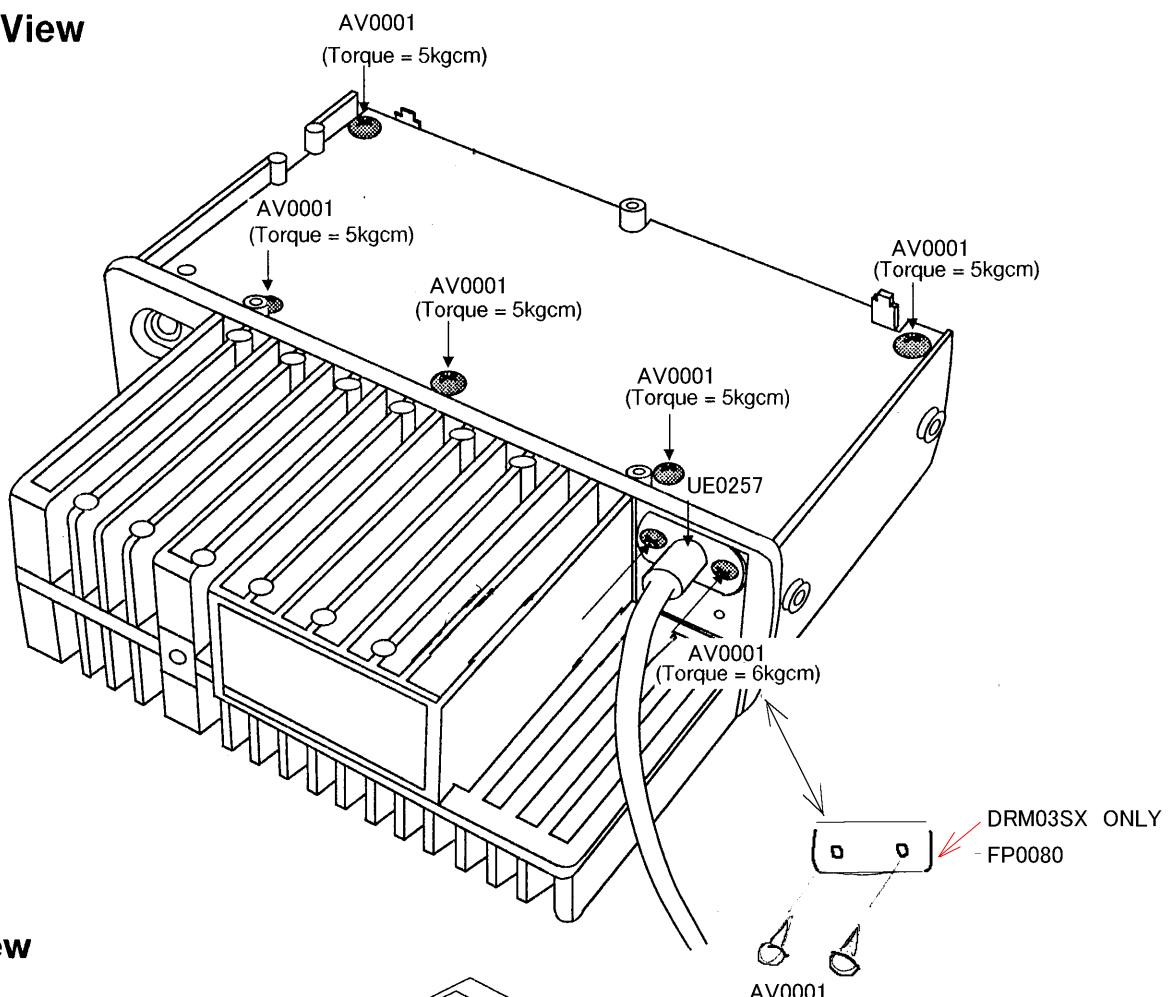
17) LCD Connection (EL0024)



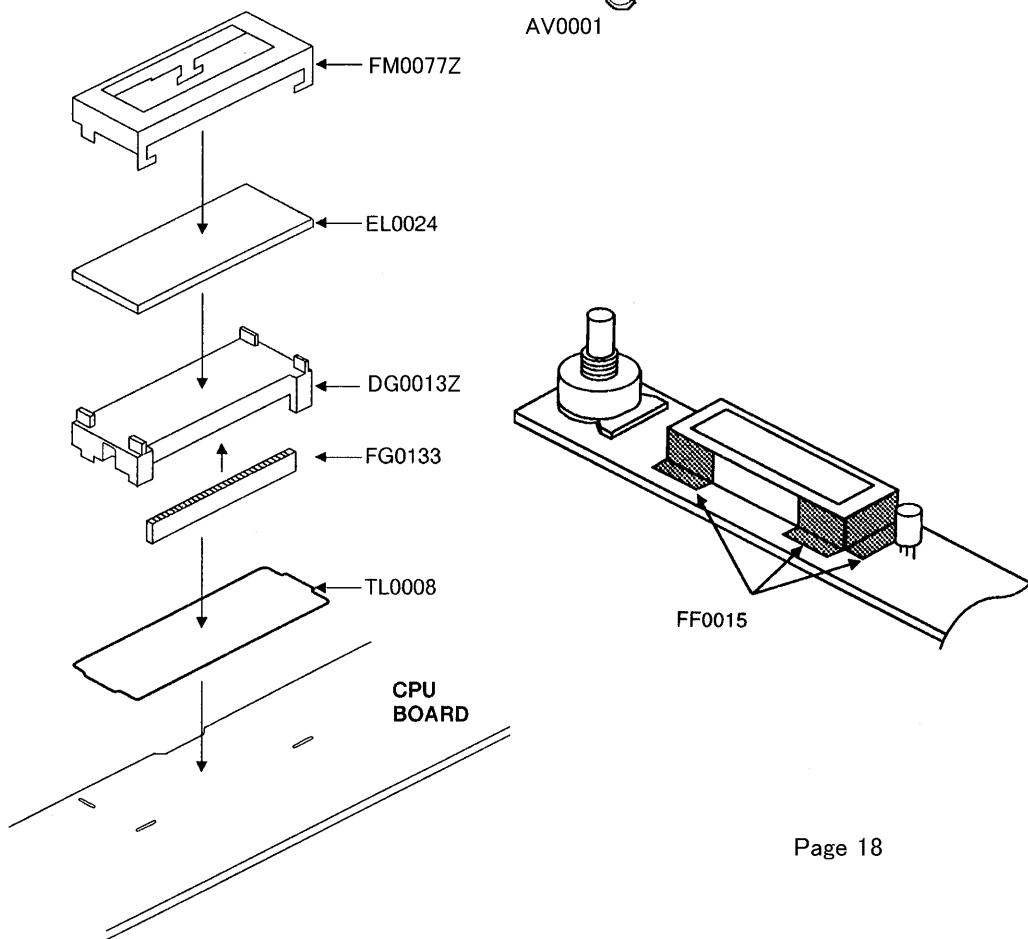
Pin No.	COMMON1	COMMON2	COMMON3
1	FUNC	1e	1f
2	1d	1g	1a
3	BUSY	1c	1b
4	ENC	2e	2f
5	2d	2g	2a
6	X	2c	2b
7	DEC	3e	3f
8	3d	3g	3a
9	●	3c	3b
10	Y	4e	4f
11	4d	4g	4a
12	+	4c	4b
13	Z	5e	5f
14	5d	5g	5a
15	—	5c	5b
16	FULL	25	50
17	75	6e	6f
18	6d	6g	6a
19	■	6c	6b
20	M	7e	7f
21	7d	7g	7a
22	LOW	7c	7b
23		COM.1	
24			COM.2
25	COM.0		

EXPLODED VIEW

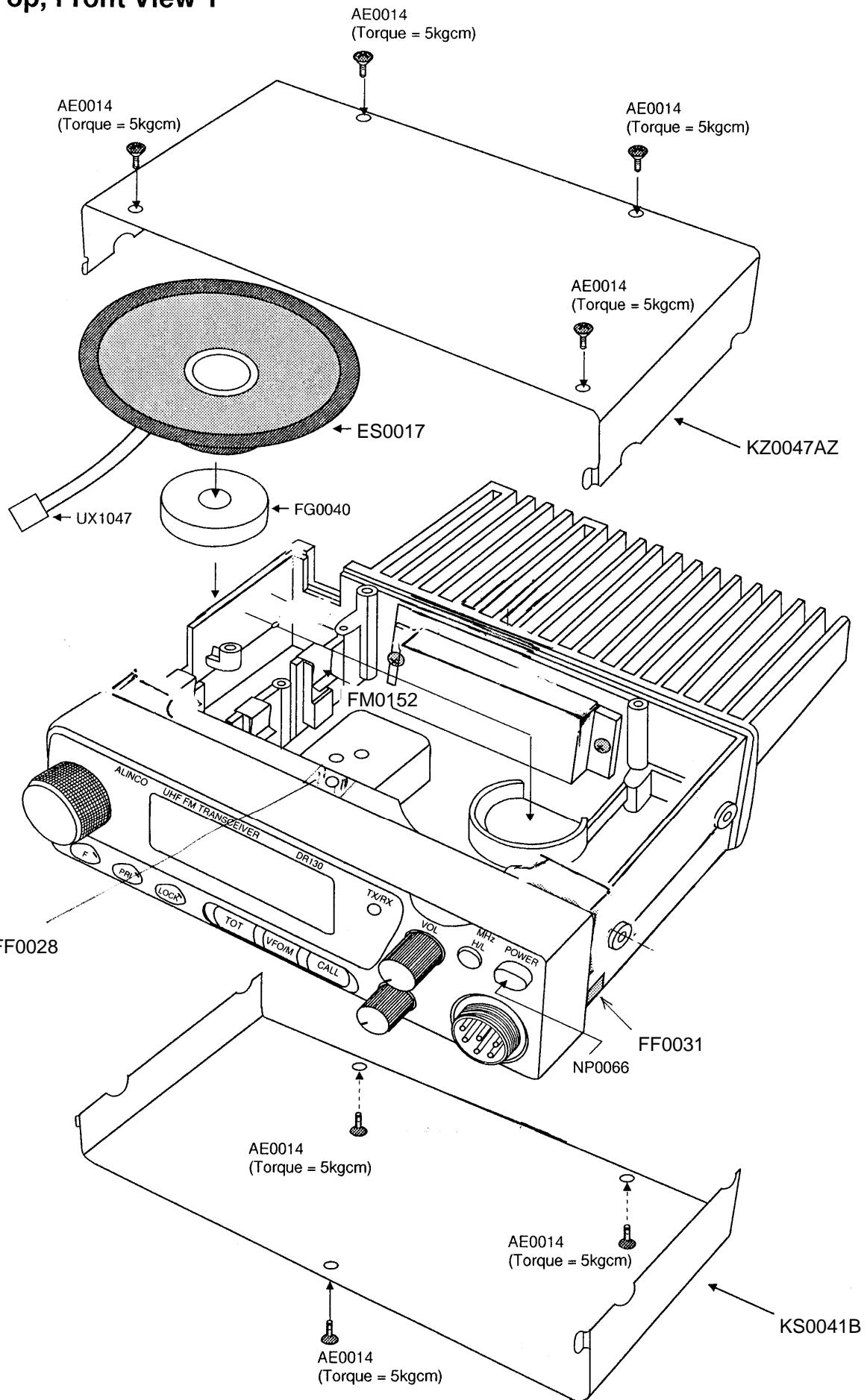
1) Bottom View



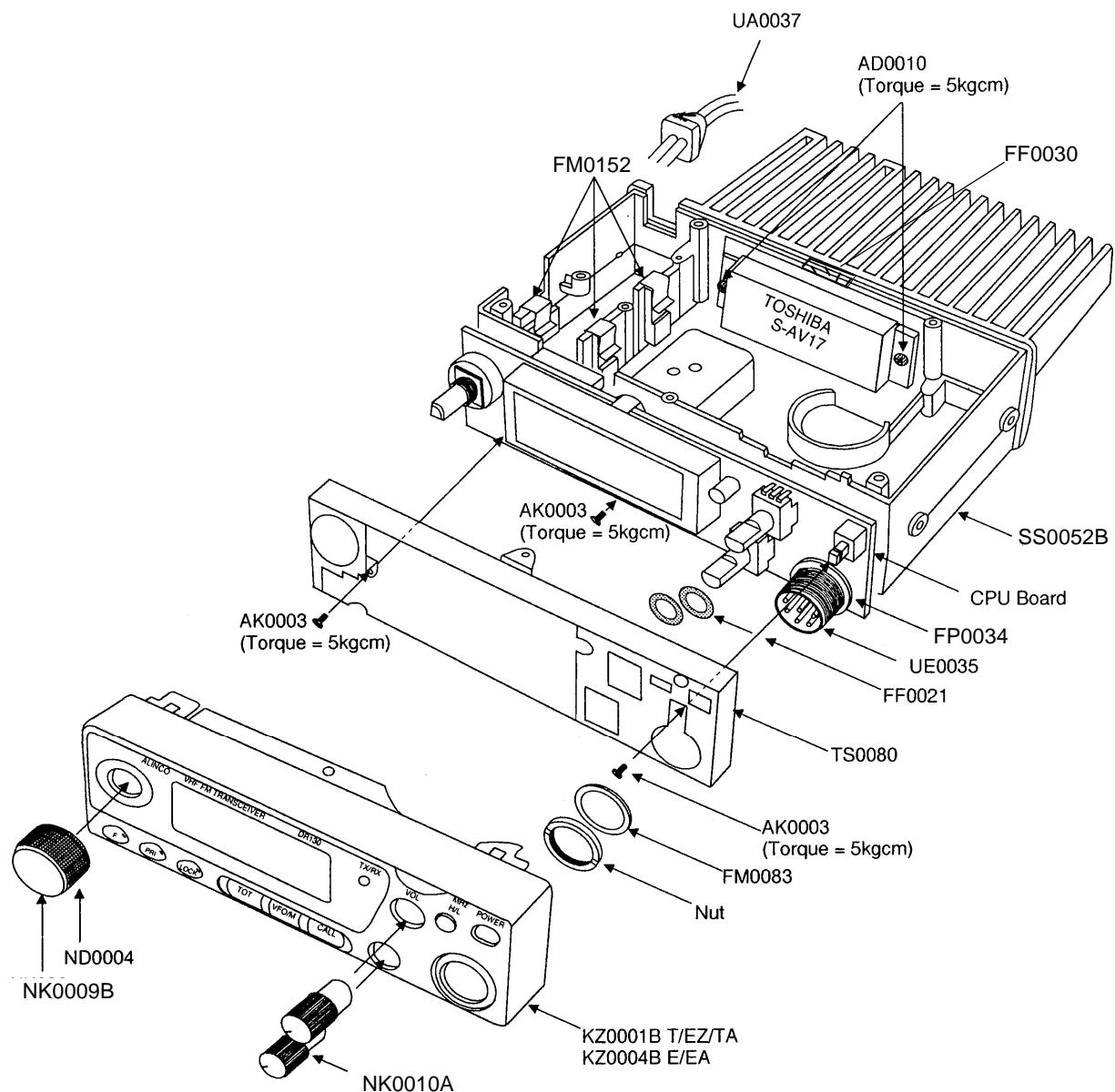
2) LCD View



3) Top, Front View 1



4) Top, Front View 2



VERSION TABLE

1) CPU UNIT

	W1	W2	W3/W4	R284	R294/R295	R286		R296	R297	CN204	IC208
T	JP	-	-	-	0	-		-	-	UE0165	-
E	JP	JP	-		0	0	-	-	-	UE0165	-
EZ	JP	JP	-	-		0	-	IK	1K	-	AT24CO8-10SI
EA	-	-	-		0	0	-	-	-	UE0165	-
TA	-	-	-	-		0	-	-	-	UE0165	-
TE1	-	-	JP	-	-	-		-	-	UE0165	-
TE2	-	-	JP	-	-	-		-	-	UE0165	-

TX Free RX Free Tranking 12.5k/5k Tranking V/U

2) MAIN UNIT

	C7	C43	C62	C63	C68	C71,7 4,75,7	C112	C139	C149
T/E/EZ/EA/TA	1000p	33p	47p	10u/16V	15p	47p	22p	22p	-
TE1	-	33p	100p	100u/16V	22p	56p	22p	12p	0.01uF
TE2	-	47p	33p	100u/16V	10p	1000p	18p	10p	0.01uF

	C150 153 154 155 156	C151	C152	D4	D11 12 13 16	D15	IC5	L4,5,6,14
T/E/EZ/EA/TA	-	-	-	-	1SV215	ISS355	S-AV7	QA0084
TE1	1000p	10u/20V	10u/35V	ISS355	1SV215	ISS355	M67781L	QA0084
TE2	1000p	10u/20V	10u/35V	ISS355	1SV214	-	M67781H	QA0100

	L12	P3	R43	R57	R101	R102	R111	R121	R122	R130	W5
T/E/EZ/EA/TA	QKA35D	-	47k	22	15k	1k	0	-	-	47k	-
TE1	QKA35D	0	47k	100	2.2k	4.7k	-	-	220	-	JP
TE2	QKA45D	0	27k	100	2.2k	4.7k	-	0	220	-	JP

3) VCO UNIT

	C315	C331	C332	D304	R315	R316	R332	R333	R334
T/E/EZ/EA/TA	3p	-	-	-	10k	100	-	-	-
TE1	3p	4700p	0.5p	1SV215	22k	56	8.2k	8.2k	220k
TE2	1p	4700p	0.5p	1SV215	22k	56	10k	8.2k	220k

PARTS LIST

NAIN Unit					
Ref No	Parts No.	Description	Parts Name	Ver	
C1	CU3035	NAIN Unit			
C2	CU3044	Chip C.	C1608JB1H102KTA		
C3	CU3100	Chip C.	C1608JB1H562KTA		
C4	CU3044	Chip C.	C1608JB1H562KTA		
C5	CU3002	Chip C.	C1608CH1H010CTA		
C6	CU3002	Chip C.	C1608CH1H010CTA		
C7	CU3035	Chip C.	C1608JB1H102KTA	0	
C8	CS0049	Chip Tantal	TMCMSA1C105MTR	1,2	
C9	CU3059	Chip C.	C1608JF1E10427A		
C10	CU3059	Chip C.	C1608JB1H103KTA		
C11	CU3047	Chip C.	C1608JB1H103KTA		
C12	CU3047	Chip C.	C1608JB1H103KTA		
C13	CU3047	Chip C.	C1608JB1H103KTA		
C14	CU3047	Chip C.	C1608JB1H103KTA		
C15	CU3047	Chip C.	C1608JB1H103KTA		
C16	CU3102	Chip C.	C1608JB1C333KTA		
C17	CU3059	Chip C.	C1608JF1E10427A		
C18	CU8042	Chip C.	C2012JB1C104KTA		
C20	CU3035	Chip C.	C1608JB1H102KTA		
C21	CU3028	Chip C.	C1608CH1H271KTA		
C22	CU3035	Chip C.	C1608JB1H102KTA		
C23	CU3047	Chip C.	C1608JB1H103KTA		
C24	CU3059	Chip C.	C1608JF1E10427A		
C25	CU3102	Chip C.	C1608JB1C333KTA		
C26	CU3047	Chip C.	C1608JB1H103KTA		
C27	CU3049	Chip C.	C1608JB1H153KTA		
C28	CE0339	Electrolytic C.	C16MV 10HW+TS		
C29	CE0343	Electrolytic C.	C16MV 1000HC+TS		
C30	CE0342	Electrolytic C.	C16MV 470HC+TS		
C31	CS0049	Chip Tantal	TMCMSA1C105MTR		
C32	CE0340	Electrolytic C.	C16MV 47HC+TS		
C33	CE0337	Electrolytic C.	C16MV 2R2SW+TS		
C34	CE0340	Electrolytic C.	C16MV 47HC+TS		
C35	CU3035	Chip C.	C1608JB1H102KTA		
C36	CU3047	Chip C.	C1608JB1H103KTA		
C38	CE0339	Electrolytic C.	C16MV 10HW+TS		
C39	CU3031	Chip C.	C1608JB1H471KTA	0,1	
C40	CS0049	Chip Tantal	TMCMSA1C105MTR		
C41	CU3047	Chip C.	C1608JB1H102KTA		
C42	CU3035	Chip C.	C1608JB1H102KTA		
C43	CU3017	Chip C.	C1608CH1H350JTA	2	
C44	CE0339	Electrolytic C.	C16MV 10HW+TS		
C45	CU3035	Chip C.	C1608JB1H102KTA		
C46	CU3059	Chip C.	C1608JF1E10427A		
C47	CS0049	Chip Tantal	TMCXSA1C105MTR		
C48	CU3035	Chip C.	C1608JB1H102KTA		
C49	CU3024	Chip C.	C1608CH1H121KTA		
C50	CU3019	Chip C.	C1808CH1H470JTA		
C51	CE0339	Electrolytic C.	C16MV 10HW+TS		
C52	CE0339	Electrolytic C.	C16MV 10HW+TS		
C53	CS0049	Chip Tantal	TMCMSA1C105MTR		
C54	CS0237	Chip Tantal	TMCMA1A475MTR		
C55	CU3035	Chip C.	C1608JB1H02KTA		
C56	CU3011	Chip C.	C1608CH1H100CTA		
C57	CU3031	Chip C.	C1608JB1H1471KTA		
C58	CU3035	Chip C.	C1608JB1H102KTA		
C59	CU3018	Chip C.	C1608CH1H390QTA		
C60	CE0339	Electrolytic C.	C16MV 10HW+TS		
C61	CU3022	Chip C.	C1608CH1H820QTA		
C62	CU3023	Chip C.	C1608CH1H101JTA	1	
C63	CE0339	Electrolytic C.	C16MV 10HW+TS	0	
C64	CU3005	Chip C.	C1608CH1H040CTA		
C65	CC5088	Ceramic C.	RCC06SI-390-L46AU		
C66	CC5088	Ceramic C.	RCC06SI-390-L46AU		
C67	CC5088	Ceramic C.	RCC06SI-390-L46AU		
C68	CU3013	Chip C.	C1608CH1H101JTA	0	
C69	CU3011	Chip C.	C1608CH1H100CTA	2	
C70	CU3015	Chip C.	C1608CH1H220QTA		
C71	CU3019	Chip C.	C1608CH1H102QTA	0	
C72	CS0049	Chip Tantal	TMCMSA1C105MTR		
C73	CU3035	Chip C.	C1608CH1H271KTA		
C74	CU3020	Chip C.	C1608CH1H156QTA	1	
C75	CU3019	Chip C.	C1608JB1H102KTA	2	
C76	CE0339	Electrolytic C.	C16MV 10HW+TS		
C77	CU3015	Chip C.	C1608CH1H220QTA		
C78	CU3035	Chip C.	C1608CH1H470JTA	0	
C79	CU3019	Chip C.	C1608CH1H103KTA		
C80	CU3045	Chip C.	C1608CH1H040CTA		
C81	CU3035	Chip C.	C1608JB1H102KTA	2	
C82	CU3035	Chip C.	C1608CH1H102KTA		
C83	CU3035	Chip C.	C1608JB1H102KTA		
C84	CU3035	Chip C.	C1608JB1H102KTA		
C85	CU3035	Chip C.	C1608JB1H102KTA		
C86	CU3035	Chip C.	C1608JB1H102KTA		
C87	CU3035	Chip C.	C1608JB1H102KTA		
C88	CU3035	Chip C.	C1608JB1H102KTA		
C89	CU3035	Chip C.	C1608JB1H102KTA		
C90	CU3035	Chip C.	C1608JB1H102KTA		
C91	CU3035	Chip C.	C1608JB1H102KTA		
C92	CU3019	Chip C.	C1608CH1H470JTA		
C93	CU3035	Chip C.	C1608JB1H102KTA		
C94	CS0049	Chip Tantal	TMCMSA1C105MTR		
C95	CU3035	Chip C.	C1608JB1H02KTA		
C96	CU3035	Chip C.	C1608CH1H470JTA		
C97	CU3019	Chip C.	C2012CH1H470K		
C98	CU0027	Chip C.	C1608CH1H470JTA		
C99	CU3019	Chip C.	C1608CH1H470JTA		
C100	CU3035	Chip C.	C1608JB1H102KTA		
C101	CU3047	Chip C.	C1608JB1H103KTA		
C102	CU3012	Chip C.	C1608CH1H20DSTA		
C103	CU3035	Chip C.	C1608JB1H102KTA		
C104	CU3035	Chip C.	C1608CH1H470C		
C105	CE0340	Electrolytic C.	C16MV 47HC+TS		
C106	CU3012	Chip C.	C1608CH1H120DSTA		
C107	CU3035	Chip C.	C1608JB1H102KTA		
C108	CU3003	Chip C.	C1608CH1H102QTA		
C109	CU3003	Chip C.	C1608CH1H102QTA		
C110	CU3035	Chip C.	C1608CH1H102QTA		
C111	CU3035	Chip C.	C1608JB1H102KTA		
C112	CC5064	Ceramic C.	RCC057S L220U-146AE	0,1	
C113	CU3035	Chip C.	C1608CH1H180J500	2	
C114	CU3035	Chip C.	C1608JB1H102KTA		
C115	CU3023	Chip C.	C1608CH1H101JTA		
C116	CU3035	Chip C.	C1608CH1H220QTA		
C117	CU3035	Chip C.	C1608CH1H102QTA		
C118	CE0338	Electrolytic C.	C16MV10HW+TS		
C119	CU3035	Chip C.	C1608CH1H470K		
C120	CU3035	Chip C.	C1608CH1H220QTA		
C121	CU3035	Chip C.	C1608CH1H102KTA		
C122	CE0341	Electrolytic C.	C16MV10HW+TS		
C123	CU7003	Chip C.	C16K31NAR102K		
C124	CU3035	Chip C.	C1608JB1H102KTA	2	
C125	CU3035	Chip C.	C1608CH1H101JTA		
C126	CU3064	Chip C.	C1608CH1H156QTA	1	
C127	CU3035	Chip C.	C1608CH1H102KTA	2	
C128	CU3035	Chip C.	C1608CH1H470JTA	0	
C129	CU3035	Chip C.	C1608CH1H156QTA	1	
C130	CU3039	Chip C.	C1608JB1H102KTA	2	
C131	CU3036	Chip C.	C1608CH1H102KTA	1	
C132	CE0339	Electrolytic C.	C16MV10HW+TS		
C133	CU3035	Chip C.	C1608CH1H103KTA		
C134	CU3023	Chip C.	C1608CH1H102QTA		
C135	CU3023	Chip C.	C1608CH1H101JTA		
C136	CU3036	Chip C.	C1608CH1H102KTA		
C137	CU3035	Chip C.	C1608CH1H102KTA		
C138	CU3035	Chip C.	C1608JB1H102KTA		
C139	CU3035	Chip C.	C1608CH1H102KTA		
C140	CS0232	Chip Tantal	TMCMA1V47400MTR		
C141	CU3035	Chip C.	C1608JB1H102KTA		
C142	CU3047	Chip C.	C1608JB1H103KTA		
C143	CU3017	Chip C.	C1608CH1H350JTA		
C144	CE0339	Electrolytic C.	C16MV 10HW+TS		
C145	CU3047	Chip C.	C1608JB1H102KTA		
C146	CU3035	Chip C.	C1608JB1H102KTA		
C147	CU3035	Chip C.	C1608JB1H102KTA		
C148	-	-	-		
C149	-	-	-		
C150	-	-	-		
C151	CS0227	Chip Tantal	TMCMSA1C105MTR		
C152	CS0236	Chip C.	C1608JB1H103KTA	1,2	
C153	CU3035	Chip C.	C1608JB1H102KTA	0	
C154	CU3035	Chip C.	C1608CH1H102QTA	0	
C155	-	-	-		
C156	-	-	-		
C157	CU3035	Chip C.	C1608JB1H102KTA		
C158	CU0191	Connector	11PSJ-E		
C159	CU3035	Chip C.	C1608CH1H102QTA		
C160	CU3035	Chip C.	C1608CH1H102QTA		
C161	CU3035	Chip C.	C1608CH1H102QTA		
C162	CU3035	Chip C.	C1608CH1H102QTA		
C163	CU3035	Chip C.	C1608CH1H102QTA		
C164	CU3035	Chip C.	C1608CH1H102QTA		
C165	CU3035	Chip C.	C1608CH1H102QTA		
C166	CU3035	Chip C.	C1608CH1H102QTA		
C167	CU3035	Chip C.	C1608CH1H102QTA		
C168	CU3035	Chip C.	C1608CH1H102QTA		
C169	CU3035	Chip C.	C1608CH1H102QTA		
C170	CU3035	Chip C.	C1608CH1H102QTA		
C171	CU3035	Chip C.	C1608CH1H102QTA		
C172	CU3035	Chip C.	C1608CH1H102QTA		
C173	CU3035	Chip C.	C1608CH1H102QTA		
C174	CU3035	Chip C.	C1608CH1H102QTA		
C175	CU3035	Chip C.	C1608CH1H102QTA		
C176	CU3035	Chip C.	C1608CH1H102QTA		
C177	CU3035	Chip C.	C1608CH1H102QTA		
C178	CU3035	Chip C.	C1608CH1H102QTA		
C179	CU3035	Chip C.	C1608CH1H102QTA		
C180	CU3035	Chip C.	C1608CH1H102QTA		
C181	CU3035	Chip C.	C1608CH1H102QTA		
C182	CU3035	Chip C.	C1608CH1H102QTA		
C183	CU3035	Chip C.	C1608CH1H102QTA		
C184	CU3035	Chip C.	C1608CH1H102QTA		
C185	CU3035	Chip C.	C1608CH1H102QTA		
C186	CU3035	Chip C.	C1608CH1H102QTA		
C187	CU3035	Chip C.	C1608CH1H102QTA		
C188	CU3035	Chip C.	C1608CH1H102QTA		
C189	CU3035	Chip C.	C1608CH1H102QTA		
C190	CU3035	Chip C.	C1608CH1H102QTA		
C191	CU3035	Chip C.	C1608CH1H102QTA		
C192	CU3035	Chip C.	C1608CH1H102QTA		
C193	CU3035	Chip C.	C1608CH1H102QTA		
C194	CS0049	Chip Tantal	TMCMSA1C105MTR		
C195	CU3035	Chip C.	C1608JB1H102KTA		
C196	CU3035	Chip C.	C1608CH1H102QTA		
C197	CU3035	Chip C.	C1608CH1H102QTA		
C198	CU3035	Chip C.	C1608CH1H102QTA		
C199	CU3035	Chip C.	C1608CH1H102QTA		
C200	CU3035	Chip C.	C1608CH1H102QTA		
C201	CU3035	Chip C.	C1608CH1H102QTA		
C202	CU3035	Chip C.	C1608CH1H102QTA		
C203	CU3035	Chip C.	C1608CH1H102QTA		
C204	CU3035	Chip C.	C1608CH1H102QTA		
C205	CU3035				

MAIN Unit

Ref No	Parts No	Description	Parts Name	Ver	Ref No	Parts No.	Description	Parts Name	Ver	
JK2	UE0190	Connector	SJ403.DD1010	R1	RK0108	Chip R.	ERJ6GEYJ2R2V	ERJ3GSYJ103V	R55	
JK4	UJ0024	Connector	NL322522TJ047M	R2	RK2024	Chip R.	MCR50UZH-1471	ERJ3GSYJ103V	R56	
L1	QC0063	Coil	NL322522TJ347M	R3	RK3050	Chip R.	ERJ3GSYJ103V	ERJ3GSYJ220V	R57	
L2	QC0063	Coil	NL322522TJ347M	R4	RK3071	Chip R.	ERJ3GSYJ564V	ERJ3GSYJ101V	R57	
L3	QC0048	Coil	NL322522T-100K	R5	RK3034	Chip R.	ERJ3GSYJ471V	ERJ3GSYJ102V	R68	
L4	QA0084	Coil	0.1	R6	RK3062	Chip R.	ERJ3GSYJ104V	ERJ3GSYJ183V	R59	
L5	QA0100	Coil	0.1	R7	RK3042	Chip R.	ERJ3GSYJ222V	ERJ3GSYJ471V	R60	
L6	QA0084	Coil	0.1	R8	RK3032	Chip R.	ERJ3GSYJ222V	ERJ3GSYJ102V	R61	
L7	QC0067	Coil	NL322522T-R10M	R9	RK3001	Chip R.	ERJ3GSYJ000V	ERJ3GSYJ223V	R62	
L8	QC0063	Coil	NL322522T-047M	R10	RK3071	Chip R.	ERJ3GSYJ564V	ERJ3GSYJ103V	R63	
L9	QKA45E	Coil	MR 3.0 4.5 T 0.8	R11	RK3046	Chip R.	ERJ3GSYJ472V	ERJ3GSYJ222V	R64	
L10	QKA45E	Coil	MR 3.0 4.5 T 0.8	R12	RK3048	Chip R.	ERJ3GSYJ102V	ERJ3GSYJ103V	R65	
L11	QKA45E	Coil	MR 3.0 4.5 T 0.8	R13	RK3038	Chip R.	ERJ3GSYJ102V	ERJ3GSYJ003V	R66	
L12	QKA35D	Coil	MR 3.0 4.5 T 0.8	R14	RK3071	Chip R.	ERJ3GSYJ564V	ERJ3GSYJ101V	R67	
L13	QKA35D	Coil	MR 3.0 4.5 T 0.6	R15	RK3050	Chip R.	ERJ3GSYJ103V	ERJ3GSYJ103V	R68	
L14	QA0084	Coil	0.1	R16	RK4028	Chip R.	ERJ-12YJ151	ERJ3GSYJ103V	R69	
L15	QC0067	Coil	NL322522T-R10M	R17	RK3057	Chip R.	ERJ3GSYJ393V	ERJ3GSYJ123V	R70	
L16	QKA35D	Coil	MR3.03.5T0.6	R18	RK3032	Chip R.	ERJ3GSYJ222V	ERJ3GSYJ101V	R71	
M106	SD0034	Earth Spdrg DR	3SK131V1.1.12T	R19	RK3060	Chip R.	ERJ3GSYJ683V	ERJ3GSYJ153V	R73	
Q1	XE0012	FEET	3SK131V1.1.12T	R20	RK3050	Chip R.	ERJ3GSYJ683V	ERJ3GSYJ153V	R74	
Q2	XE0012	FEET	2SA1576 T106R	R21	RK3051	Chip R.	ERJ3GSYJ123V	ERJ3GSYJ153V	R75	
Q3	XT0094	Transistor	2SA1576 T106R	R22	RK3050	Chip R.	ERJ3GSYJ103V	ERJ3GSYJ103V	R76	
Q4	XT0095	Transistor	2SC4081 T106R	R23	RK3050	Chip R.	ERJ3GSYJ222V	ERJ3GSYJ101V	R77	
Q5	XT0095	Transistor	2SC4081 T106R	R24	RK3050	Chip R.	ERJ3GSYJ103V	ERJ3GSYJ103V	R78	
Q6	XT0095	Transistor	2SC4081 T106R	R25	RK3047	Chip R.	ERJ3GSYJ562V	ERJ3GSYJ102V	R79	
Q7	XT0061	Transistor	DTA1132 T100Q	R26	RK3046	Chip R.	ERJ3GSYJ472V	ERJ3GSYJ103V	R80	
Q8	XT0096	Transistor	2SC4099 T106R	R27	RK3026	Chip R.	ERJ3GSYJ101V	ERJ3GSYJ103V	R81	
Q9	XT0037	Transistor	2SC2412K T146R	R28	RK3058	Chip R.	ERJ3GSYJ473V	ERJ3GSYJ1222V	R82	
Q10	XU0131	Transistor	DT114EU T106	R29	RK3042	Chip R.	ERJ3GSYJ1222V	ERJ3GSYJ103V	R83	
Q11	XU0148	Transistor	DT1C144EU T106	R30	RK3045	Chip R.	ERJ3GSYJ103V	ERJ3GSYJ222V	R84	
Q12	XU0112	Transistor	DTA114Y T106	R31	RK3034	Chip R.	ERJ3GSYJ1223V	ERJ3GSYJ103V	R85	
Q13	XU0112	Transistor	DTB1292F	R32	RK3077	Chip R.	ERJ3GSYJ101V	ERJ3GSYJ102V	R86	
Q14	XU0095	Transistor	2SC4081 T106R	R33	RK3038	Chip R.	ERJ3GSYJ1393V	ERJ3GSYJ1393V	R88	
Q15	XU0084	Transistor	2SC2412K T146R	R34	RK3038	Chip R.	ERJ3GSYJ102V	ERJ3GSYJ102V	R89	
Q16	XU0095	Transistor	2SC4081 T106R	R35	RK3050	Chip R.	ERJ3GSYJ103V	ERJ3GSYJ102V	R91	
Q17	XU0152	Transistor	UMC5TR	R36	RK3038	Chip R.	ERJ3GSYJ102V	ERJ3GSYJ102V	R92	
Q18	XE0001	Transistor	2SC4081 T106R	R37	RK3045	Chip R.	ERJ3GSYJ1392V	ERJ3GSYJ103V	R93	
Q19	XU0114	Transistor	2SC4403	R38	RK3041	Chip R.	ERJ3GSYJ1392V	ERJ3GSYJ103V	R94	
Q20	XU0030	Transistor	2SCXBB6-T1	R39	RK3052	Chip R.	ERJ3GSYJ331V	ERJ3GSYJ103V	R96	
Q21	XU0099	Transistor	2SA1736Y TE2L	R40	RK3044	Chip R.	ERJ3GSYJ223V	ERJ3GSYJ100V	R98	
Q22	XU0095	Transistor	2SC4081 T106R	R41	RK3022	Chip R.	ERJ3GSYJ222V	ERJ3GSYJ100V	R99	
Q24	XU0131	Transistor	DTCl144EU T06	R42	RK3041	Chip R.	ERJ3GSYJ101V	ERJ3GSYJ101V	R100	
Q30	XU0148	Transistor	DTCl144EU	R43	RK3052	Chip R.	EFU3GSYJ000V	ERJ3GSYJ103V	R101	
Q47	RK3062	Chip R.	ERJ3GSYJ104V	R44	RK3058	Chip R.	ERJ3GSYJ104V	ERJ3GSYJ222V	R105	
Q48	RK3026	Chip R.	ERJ3GSYJ104V	R49	RK3055	Chip R.	ERJ3GSYJ102V	ERJ3GSYJ102V	R106	
Q50	RK3071	Chip R.	ERJ3GSYJ564V	R51	RK3044	Chip R.	ERJ3GSYJ472V	ERJ3GSYJ103V	R107	
Q53	RK3044	Chip R.	ERJ3GSYJ223V	R54	RK4034	Chip R.	ERJ3GSYJ104V	ERJ3GSYJ000V	R108	
Q54	RK4034	Chip R.	ERJ-12YJ471		R111	RK3001	Chip R.	ERJ3GSYJ000V	0	R111

0 : TE/EZ/EA/T/A
1: TE1
2: TE2
None: all models

CPU Unit

Ref No	Parts No.	Description	Parts Name	Ver	Ref No	Parts No.	Description	Parts Name	Ver			
C201	CU3035	CPU Unit			R224	RK3055	Chip.R	ERJ3GSY/J273V				
C202	CU3035	Chip C.	C1608JB/H102KTA	D201	XD0255	Diode	MA8110H	ERJ3GSY/J153V	R288			
C203	CU3035	Chip C.	C1608JB/H102KTA	D202	XD0177	Diode	MA704WA TX	ERJ3GSY/J472V	R289			
C204	CU3035	Chip C.	C1608JB/H102KTA	D203	XD0230	Diode	DAN202UT106	ERJ3GSY/J474V	R225			
C205	CU3101	Chip C.	C1608JB/H102KTA	D204	XD0230	Diode	DAN202UT106	ERJ3GSY/J102V	R226			
C206	CE0312	Electrolytic.Q	EEC/EVICA100R	D205	XL0029	LED	TLSG264	ERJ3GSY/J103V	R227			
C207	CU3035	Chip C.	C1608JB/H102KTA	I201	XA0289	IC	M37410M6H	ERJ3GSY/J102V	R228			
C208	CS0232	Chip Tantal	TMCM4A V474MTR	I202	XA0364	IC	AT24C02N-10SI-27	ERJ3GSY/J102V	R229			
C209	CU3035	Chip C.	C1608JB/H102KTA	I205	XA0238	IC	AN78L05M	ERJ3GSY/J103V	R230			
C210	CU3035	Chip C.	C1608JB/H102KTA	I206	XA0208	IC	RH5VVA45AA-T1	ERJ3GSY/J102V	R231			
C211	CU3035	Chip C.	C1608JB/H102KTA	I207	XA0198	IC	RH5VVA32AA-T1	ERJ3GSY/J102V	R232			
C212	CU3035	Chip C.	C1608JB/H102KTA	I208	-	IC	AT24C08-10SI-27 EZ	ERJ3GSY/J102V	R233			
C213	CU3035	Chip C.	C1608JB/H102KTA	I209	XA0236	IC	BU4052BF	ERJ3GSY/J104V	R234			
C215	CU3035	Chip C.	C1608JB/H102KTA	J201	UE0025	Connector	FM214-8SMPY	ERJ3GSY/J104V	R235			
C216	CU3059	Chip C.	C1608JB/H104ZTA	ELO0024	-	EL0003	LCDDRW1	ERJ3GSY/J104V	R236			
C217	CU3051	Chip C.	C1608JB/E223KTA	PL201	EP0003	Lamp	BQO31-30403A	ERJ3GSY/J105V	R237			
C218	CU3059	Chip C.	C1608JB/H102ZTA	PL202	EP0003	Lamp	BQO31-30403A	ERJ3GSY/J102V	R238			
C219	CU3059	Chip C.	C1608JB/H102ZTA	Q201	XT0095	Transistor	2SC4081-TI06R	ERJ3GSY/J104V	R239			
C220	CU3059	Chip C.	C1608JB/H102ZTA	Q202	XT0113	Transistor	2SC2873Y TE12L	ERJ3GSY/J104V	R240			
C221	CU3023	Chip C.	C1608CH1H010JTA	Q203	XU0029	Transistor	DTC114YU/T106	ERJ3GSY/J104V	R241			
C222	CU3023	Chip C.	C1608CH1H010JTA	Q204	XU0145	Transistor	DTC143TU/T106	ERJ3GSY/J104V	R242			
C223	CU3051	Chip C.	C1608JB/E223KTA	Q205	XU0112	Transistor	DTA114YU/T106	ERJ3GSY/J104V	R243			
C225	CU3023	Chip C.	C1608JF/E104ZTA	Q206	XU0112	Transistor	DTA114YU/T106	ERJ3GSY/J104V	R244			
C226	CU3023	Chip C.	C1608JF/E104ZTA	Q208	XU0060	Transistor	UMC2CTR	ERJ3GSY/J103V	R245			
C227	CU3035	Chip C.	C1608JB/H102KTA	Q209	XU0129	Transistor	DTA114YU/T106	ERJ3GSY/J103V	R246			
C229	CS0209	Chip Tantal	TMCM010 106MTR	R201	TK0302	Chip.R	ERJ3GSY/J104V	ERJ3GSY/J472V	R247			
C230	CU3035	Chip C.	C1608JB/H102KTA	R202	RK3052	Chip.R	Q205	TK0112	Transistor	DTA114YU/T106	ERJ3GSY/J104V	R248
C231	CE0312	Electrolytic.Q	EEC/EVICA100R	R203	RK3072	Chip.R	Q206	TK0112	Transistor	DTA114YU/T106	ERJ3GSY/J104V	R249
C234	CU3035	Chip C.	C1608JB/H102KTA	R204	RK3052	Chip.R	Q208	TK0060	Transistor	DTA114YU/T106	ERJ3GSY/J104V	R250
C235	CU3047	Chip C.	C1608JB/H103KTA	R205	RK3053	Chip.R	Q209	TK0129	Transistor	DTA114YU/T106	ERJ3GSY/J104V	R251
C236	CU3031	Chip C.	C1608JB/H1471KTA	R206	RK3056	Chip.R	Q201	TK0302	Chip.R	ERJ3GSY/J104V	ERJ3GSY/J472V	R252
C237	CU3035	Chip C.	C1608JB/H102KTA	R207	RK3058	Chip.R	Q207	TK0302	Chip.R	ERJ3GSY/J102V	ERJ3GSY/J472V	R253
C238	CU3035	Chip C.	C1608JB/H102KTA	R208	RK3056	Chip.R	Q208	TK0302	Chip.R	ERJ3GSY/J102V	ERJ3GSY/J472V	R254
C239	CU3023	Chip C.	C1608CH1H010JTA	R209	RK3074	Chip.R	Q209	TK0303	Chip.R	ERJ3GSY/J223V	ERJ3GSY/J102V	R255
C240	CU3023	Chip C.	C1608CH1H010JTA	R210	RK3052	Chip.R	Q210	TK0302	Chip.R	ERJ3GSY/J102V	ERJ3GSY/J102V	R256
C241	CU3023	Chip C.	C1608CH1H010JTA	R211	RK3052	Chip.R	Q211	TK0302	Chip.R	ERJ3GSY/J102V	ERJ3GSY/J102V	R257
C242	CU3035	Chip C.	C1608JB/H102KTA	R212	RK3054	Chip.R	Q212	TK0302	Chip.R	ERJ3GSY/J102V	ERJ3GSY/J102V	R258
C243	CS0237	Chip Tanta1	TMCM4A 4/5MTR	R213	RK3056	Chip.R	Q213	TK0302	Chip.R	ERJ3GSY/J102V	ERJ3GSY/J102V	R259
C244	CU3051	Chip C.	C1608JB/H103KTA	R214	RK3058	Chip.R	Q214	TK0302	Chip.R	ERJ3GSY/J105V	ERJ3GSY/J105V	R260
C245	CS0237	Chip Tanta1	TMCM4A 4/76MTR	R215	RK3102	Chip.R	Q215	TK0302	Chip.R	ERJ3GSY/J153V	ERJ3GSY/J102V	R261
C246	CU3035	Chip C.	C1608JB/H1472KTA	R216	RK3056	Chip.R	Q216	TK0302	Chip.R	ERJ3GSY/J104V	ERJ3GSY/J104V	R262
C247	CU3085	Chip C.	C1608JB/H102KTA	R217	RK3102	Chip.R	Q217	TK0302	Chip.R	ERJ3GSY/J1223V	ERJ3GSY/J102V	R263
C248	CU3085	Chip C.	C1608CH1H300JTA	R218	RK3070	Chip.R	Q218	TK0302	Chip.R	ERJ3GSY/J474V	ERJ3GSY/J102V	R264
C249	CS0218	Chip Tanta1	TMCM4DI A4/76MTR	R219	RK3102	Chip.R	Q219	TK0302	Chip.R	ERJ3GSY/J473V	ERJ3GSY/J102V	R265
C250	CU3043	Chip C.	C1608JB/H472KTA	R220	RK3050	Chip.R	Q220	TK0302	Chip.R	ERJ3GSY/J203V	ERJ3GSY/J102V	R266
C251	CU3043	Chip C.	C1608JB/H472KTA	R221	RK3102	Chip.R	Q221	TK0302	Chip.R	ERJ3GSY/J103Y	ERJ3GSY/J104V	R267
C252	CU3059	Chip C.	C1608JF/E104ZTA	R222	RK3102	Chip.R	Q222	TK0302	Chip.R	ERJ3GSY/J203V	ERJ3GSY/J102V	R268
CN201	UE0170	Connector	B9B-ZR	R223	RK3058	Chip.R	Q223	TK0302	Chip.R	ERJ3GSY/J473V	ERJ3GSY/J102V	R269
CN2	UE0192	Connector	11R-JE	R224	-	-	Q224	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R270
CN2	UE0192	Connector	11R-JE	R225	-	-	Q225	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R271
CN2	UE0165	Connector	B4B-ZR	R226	-	-	Q226	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R272
CN2	UE0165	Connector	EZ	R227	RK3001	Chip.R	Q227	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R273
CN2	UE0165	Connector	EZ	R228	RK3001	Chip.R	Q228	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R274
CN2	UE0165	Connector	EZ	R229	RK3001	Chip.R	Q229	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R275
CN2	UE0165	Connector	EZ	R230	RK3001	Chip.R	Q230	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R276
CN2	UE0165	Connector	EZ	R231	RK3001	Chip.R	Q231	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R277
CN2	UE0165	Connector	EZ	R232	RK3001	Chip.R	Q232	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R278
CN2	UE0165	Connector	EZ	R233	RK3001	Chip.R	Q233	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R279
CN2	UE0165	Connector	EZ	R234	RK3001	Chip.R	Q234	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R280
CN2	UE0165	Connector	EZ	R235	RK3001	Chip.R	Q235	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R281
CN2	UE0165	Connector	EZ	R236	RK3001	Chip.R	Q236	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R282
CN2	UE0165	Connector	EZ	R237	RK3001	Chip.R	Q237	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R283
CN2	UE0165	Connector	EZ	R238	RK3001	Chip.R	Q238	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R284
CN2	UE0165	Connector	EZ	R239	RK3001	Chip.R	Q239	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R285
CN2	UE0165	Connector	EZ	R240	RK3001	Chip.R	Q240	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R286
CN2	UE0165	Connector	EZ	R241	RK3001	Chip.R	Q241	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R287
CN2	UE0165	Connector	EZ	R242	RK3001	Chip.R	Q242	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R288
CN2	UE0165	Connector	EZ	R243	RK3001	Chip.R	Q243	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R289
CN2	UE0165	Connector	EZ	R244	RK3001	Chip.R	Q244	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R290
CN2	UE0165	Connector	EZ	R245	RK3001	Chip.R	Q245	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R291
CN2	UE0165	Connector	EZ	R246	RK3001	Chip.R	Q246	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R292
CN2	UE0165	Connector	EZ	R247	RK3001	Chip.R	Q247	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R293
CN2	UE0165	Connector	EZ	R248	RK3001	Chip.R	Q248	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R294
CN2	UE0165	Connector	EZ	R249	RK3001	Chip.R	Q249	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R295
CN2	UE0165	Connector	EZ	R250	RK3001	Chip.R	Q250	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R296
CN2	UE0165	Connector	EZ	R251	RK3001	Chip.R	Q251	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R297
CN2	UE0165	Connector	EZ	R252	RK3001	Chip.R	Q252	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R298
CN2	UE0165	Connector	EZ	R253	RK3001	Chip.R	Q253	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R299
CN2	UE0165	Connector	EZ	R254	RK3001	Chip.R	Q254	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R300
CN2	UE0165	Connector	EZ	R255	RK3001	Chip.R	Q255	TK0302	Chip.R	ERJ3GSY/J471V	ERJ3GSY/J102V	R301
CN2	UE0165	Connector	EZ	R256	RK3042	Chip.R	Q256	TK0302	Chip.R	ERJ3GSY/J472V	ERJ3GSY/J102V	R302
CN2	UE0165	Connector	EZ	R257	RK3001	Chip.R	Q257	TK0302	Chip.R	ERJ3GSY/J472V	ERJ3GSY/J102V	R303
CN2	UE0165	Connector	EZ	R258	RK3046	Chip.R	Q258	TK0302	Chip.R	ERJ3GSY/J472V	ERJ3GSY/J102V	R304
CN2	UE0165	Connector	EZ	R259	RK3054	Chip.R	Q259	TK0302	Chip.R	ERJ3GSY/J223V	ERJ3GSY/J102V	R305
CN2	UE0165	Connector	EZ	R260	RK3038	Chip.R	Q260	TK0302	Chip.R	ERJ3GSY/J102V	ERJ3GSY/J102V	R306
CN2	UE0165	Connector	EZ	R261	RK3038	Chip.R	Q261	TK0302	Chip.R	ERJ3GSY/J102V	ERJ3GSY/J102V	R307
CN2	UE0165	Connector	EZ	R262	RK3038	Chip.R	Q262	TK0302	Chip.R	ERJ3GSY/J102V	ERJ3GSY/J102V	R308
CN2	UE0165	Connector	EZ	R263	RK3038	Chip.R	Q263	TK0302	Chip.R	ERJ3GSY/J102V	ERJ3GSY/J102V	R309
CN2	UE0165	Connector	EZ	R264	RK3038	Chip.R	Q264	TK0302	Chip.R	ERJ3GSY/J102V	ERJ3GSY/J102V	R310
CN2	UE0165	Connector	EZ	R265	RK3050	Chip.R	Q265	TK0302	Chip.R			

Ref No	Parts No.	Description	Parts Name	Ver	Ref No	Parts No.	Description	Parts Name	Ver
C301	CU3013	VCO Unit	Transistor	Q303	XTO111	Transistor	2SC4081 LN T106S	SP Unit	Others
C302	CU3016	Chip C.	C1608CHIH	Q304	XTO096	Transistor	2SCAO99T 106N	V\$57-O814-1.5W	Microphone (E/EZ/EA)
C303	CU3035	Chip C.	C1608JB1H102KTA	Q305	XTO096	Transistor	2SC4099T 106N	FG0040	Microphone
C304	CS0063	Chip Tantal	TMC8SA1V104MTR	Q306	XU0060	Transistor	UMC2TR	Speaker	Speaker Cushion
C305	CU3035	Chip C.	C1608JB1H102KTA	R301	RK3022	ChipR.	ERJ3GSYJ470V	E119U	Wire
C306	CU3047	Chip C.	C1608JB1H103KTA	R302	RK3034	Chip R.	ERJ3GSYJ471V	C401	Specifications Card
C307	CU3035	Chip C.	C1608JB1H102KTA	R303	RK3034	Chip R.	ERJ3GSYJ471V	IC	Specifications Card
C308	CS0235	Chip Tantal	TMC8A1V334MTR	R306	RK3046	Chip R.	ERJ3GSYJ472V	IC401	Registration Card
C309	CU3043	Chip C.	C1608JB1H472KTA	R307	RK3058	Chip R.	ERJ3GSYJ473V	R401	Seal TA
C310	CU3043	Chip C.	C1608JB1H472KTA	R308	RK3046	Chip R.	ERJ3GSYJ472V	R402	Packing
C311	CS0220	Chip Tantal	TMCMA1C225MTR	R309	RK3046	Chip R.	ERJ3GSYJ472V	RG0057	Seal EA
C312	CS0220	Chip Tantal	TMCMA1C225MTR	R310	RK3040	Chip R.	ERJ3GSYJ1152V	UX1049	Packing
C313	CU3035	Chip C.	C1608JB1H102KTA	R311	RK3044	Chip R.	ERJ3GSYJ332V	AA0013	Wire EJ19U
C314	CU3043	Chip C.	C1608JB1H472KTA	R312	RK3026	Chip R.	ERJ3GSYJ1101V	AE0012	Screw
C315	CU3004	Chip C.	C1608CH1H050CTA 0.1	R313	RK3044	Chip R.	ERJ3GSYJ332V	AN0002	Nut
	CU3002	Chip C.	C1608CH1H010CTA 21	R314	RK3022	Chip R.	ERJ3GSYJ470V	AJ0093	Screw
C316	CU3035	Chip C.	C1608JB1H102KTA	R315	RK3040	Chip R.	ERJ3GSYJ103V	AJ0017	Spring SW-5FeCr
C317	CS0217	Chip Tantal	TMC8C1A226MTR	R316	RK3044	Chip R.	ERJ3GSYJ472V	AJ0003	Washer
C318	CU3003	Chip C.	C1608CH1H020CTA	R317	RK3026	Chip R.	ERJ3GSYJ472V	AZ0010	V5FeCr
C319	CU3035	Chip C.	C1608JB1H102KTA	R318	RK3048	Chip R.	ERJ3GSYJ220V	EF0015	FGB015A
C320	CU3015	Chip C.	C1608CH1H220JTA	R319	RK3044	Chip R.	ERJ3GSYJ472V	FF0015	Light Shield Cloth
C321	CU3031	Chip C.	C1608JB1H102KTA	R320	RK3026	Chip R.	ERJ3GSYJ223V	FF0021	Volume Tape
C322	CU3035	Chip C.	C1608CH1H020CTA	R321	RK3023	Chip R.	ERJ3GSYJ1101V	FF0028	Bracket
C323	CU3015	Chip C.	C1608CH1H220JTA	R322	RK3044	Chip R.	ERJ3GSYJ1560V	FM0079	Spanner
C324	CU3035	Chip C.	C1608JB1H102KTA	R323	RK3048	Chip R.	ERJ3GSYJ220V	HH0042	Cushion DR130
C325	CU3035	Chip C.	C1608CH1H220JTA	R324	RK3044	Chip R.	ERJ3GSYJ103V	HK0306	Item Carton DR130
C326	CU3059	Chip C.	C1608JB1H471KTA	R325	RK3044	Chip R.	ERJ3GSYJ472V	HK0308	Rubber Cushin DR130
C327	CU3035	Chip C.	C1608JB1H102KTA	R326	RK3026	Chip R.	ERJ3GSYJ332V	IC Spring	E/EA/EZ
C328	CU3035	Chip C.	C1608CH1H220JTA	R327	RK3040	Chip R.	ERJ3GSYJ1000V	ND0004	Spring Washer
C329	CU3035	Chip C.	C1608JB1H102KTA	R328	RK3044	Chip R.	ERJ3GSYJ471V	ND0009B	Dial Cover
C330	CU3035	Chip C.	C1608JB1H102KTA	R329	RK3044	Chip R.	ERJ3GSYJ223V	NK0010	Dial Knob
C331	-	Chip C.	C1608JB1H104ZTA	R330	RK3044	Chip R.	ERJ3GSYJ471V	NK0011	Volurn3i Knob
C332	CU3043	Chip C.	C1608JB1H472KTA	R331	RK3048	Chip R.	ERJ3GSYJ472V	NP0066	Power Switch Knob
C333	-	Chip C.	C1608JB1H102KTA	R332	RK3054	Chip R.	ERJ3GSYJ472V	KZ0041B	Bottom Case
C334	-	Diode	C1608JB1H472KTA	R333	RK3026	Chip R.	ERJ3GSYJ101V	KZ0001B	Front Panel DR130T
C335	-	Diode	C1608JB1H102KTA	R334	RK3026	Chip R.	ERJ3GSYJ101V	PR0215	T/FZ
C336	-	Diode	C1608JB1H102KTA	R335	RK3043	Chip R.	ERJ3GSYJ222V	PS0181	/TA
C337	-	Diode	C1608JB1H472KTA	R336	RK3026	Chip R.	ERJ3GSYJ101V	PS0182	Institution Card
C338	-	Diode	C1608JB1H472KTA	R337	RK3043	Chip R.	ERJ3GSYJ222V	(/TA/TE1/TE2/EZ)	Instrument Card
C339	-	Diode	C1608JB1H472KTA	R338	RK3046	Chip R.	ERJ3GSYJ101V	PR0073	Lot Nurdber Sear
C340	-	Diode	C1608JB1H472KTA	R339	RK3046	Chip R.	ERJ3GSYJ224V	ADUA38	R.B2.x3M Receptacle 15A
C341	-	Diode	C1608JB1H472KTA	R340	RK3046	Chip R.	ERJ3GSYJ224V	YZ0118	Tape 50mm
C342	-	Diode	C1608JB1H472KTA	R341	RK3038	Chip R.	ERJ3GSYJ102V	YZ0121	Tape 10mm
CN301	CU3001	Chip C.	C1608CH1H05CTA 1.2	R342	-	Chip R.	SS0052C	KZ0003	Button Cover
CN302	CU3018	Connector	B9P-BC-2	R343	RK3049	Chip R.	ERJ3GSYJ821V	PK0047	Schematic Diagram
CN303	CU3018	Connector	B6P-BC-2	R344	RK3050	Chip R.	ERJ3GSYJ103V	PR0215	Seat EZ
D301	XD0132	Diode	1SV215TPH4	R345	-	Chip R.	ERJ3GSYJ821V	PS0080	Front Shield Case
D302	XD0132	Diode	1SV215TPH4	R346	RK3050	Chip R.	ERJ3GSYJ821V	0	Front Panel DR130T
D303	XD0130	Diode	DA2040UT106	R347	-	Chip R.	ERJ3GSYJ821V	TS0080	T/FZ
D304	-	Diode	0	R348	RK3066	Chip R.	ERJ3GSYJ224V	PR0215	/TA
I301	XAA235	IC	M6760FP	R349	-	Case	VCO Case	PS0181	Institution Card
L302	QA0067	Coil	QA0067	R350	-	Case	SS0052C	PS0182	Instrument Card
L303	QC0044	Coil	NL322522T-3R3M	R351	-	Case	SS0052C	PR0215	Instrument Card
L304	QC0043	Coil	NL322522T-2R2J-3	R352	-	Case	SS0052C	PS0181	Instrument Card
L305	QC0045	Coil	NL322522T-3R3M	R353	-	Case	SS0052C	PS0182	Instrument Card
Q301	XE0010	FET	2SK508K52-T2B	R354	-	Case	SS0052C	PR0215	Instrument Card
Q302	XT0111	Transistor	2SC4081 LN T106S	R355	-	Case	SS0052C	PS0181	Instrument Card

0 : T/E/EZ/EA/T/A
1: TE1
2: TE2

None: all models

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EJ20u / EMS-5A

Ref No	Parts No.	Description	Parts Name	Ver
EJ20u				
C501	CS0236	Chip Tantal	TMCMAOJ685MTR	
C502	CU3059	Chip C.	C1608JF1E104ZTA	
C503	CS0230	Chip Tantal	TMCMA1E105MTR	
C504	CU3059	Chip C.	C1608JF1E104ZTA	
C505	CS0230	Chip Tanta 1	TMCMA1E105MTR	
C506	CS0230	Chip Tantal	TMCMA1E105MTR	
C507	CS0230	Chip Tantal	TMCMA1E105MTR	
C508	CU3023	Chip C.	C1608CH1H10LUTA	
C509	CU3023	Chip C.	C1608CH1A475MTR	
C510	CU3019	Chip C.	C1608CH1H470JUTA	
C511	CU3035	Chip C.	C1608JB1H102KTA	
C512	CU3015	Chip C.	C1608CH1H220KTA	
C513	CU3015	Chip C.	C1608CH1H220KTA	
CN501	UX1050	Wire	EJ20u	
IC501	XAO239	IC	AK2341	
Q501	XTO095	Transistor	2SC4081 T106R	
R501	RK3040	Chip R.	ERJ3GSYJ152V	
R502	RK3022	Chip R.	ERJ3GSYJ470V	
R503	RK3067	Chip R.	ERJ3GSYJ274V	
R504	RK3038	Chip R.	ERJ3GSYJ102V	
R505	RK3051	Chip R.	ERJ3GSYJ123V	
R506	RK3089	Chip R.	ERJ3GSYJ912V	
R507	RK3067	Chip R.	ERJ3GSYJ1274V	
R508	RK3047	Chip R.	ERJ3GSYJ562V	
R509	RK3068	Chip R.	ERJ3GSYJ334V	
R510	RK3054	Chip R.	ERJ3GSYJ223V	
R511	RK3054	Chip R.	ERJ3GSYJ1223V	
R512	RK3055	Chip R.	ERJ3GSYJ1273V	
R513	RK3074	Chip R.	ERJ3GSYJ105V	
R514	RK3066	Chip R.	ERJ3GSYJ224V	
R515	RK3048	Chip R.	ERJ3GSYJ162V	
VR501	RH0106	Trim. Pot	EVM1YSX50BQ4	
X501	XQ0057	Crystal	DS-MAT3.6864MHz	
X502	XQ0056	Carton		
HP0029	PG0057	Protection Bag		
UP0243a	YZZ0042	Adhesion	P.C.B.	
YZZ0042	YZZ0042	Adhesion	Bond G17	

EMS-11

Ref No	Parts No.	Description	Parts Name	Ver
	EMS-5A			
C1	CC5029	Ceramic C.	X1E333KYA	
C2	CK0011	Ceramic C.	SC45J1C104Z-A	
C3	CE0037	Electrolytic C	QMS56.3V 100uF	
C4	CK0003	Ceramic C.	50V102	
DI	XD0067	Diode	MA700	
RD0031	Resistor	R20 1/4W 680		
RD0021	Resistor	R20 1/4W 180		
RD0039	Resistor	R20 1/4W 2.2K		
RD0039	Resistor	R20 1/4W 2.2K		
RD0040	Resistor	R20 1/4W 2.7K		
S1	US0015	Switch	HSW0880-01-210	
S2	UU0009	Switch	EVQ-QH04G	
S3	UU0009	Switch	EVQ-QH04G	
S4	UM002	Switch	MICn Switch SS-5	
AS0142			Screw Set	
			Stopper	
DE0006			Microphone	WM-60AT
EE0006			Microphone	WM-60AT
FG0045			PTT Button	
Q1	XTO031	Transistor	2SC2712Y TE85L	
R1	RK0062	Chip PR	CK45-F1H102ZTA	
R2	RK0062	Chip PR	TMCSB 1D225MTR	
R3	RK0035	Chip PR	FARC4CA0358000KO1R	
R4	RK0039	Chip PR	LR4087Z	
R5	RK0039	Chip PR	UE0125A	
R7	RK0039	Chip PR	UP0183B	
R8	RK0021	Chip PR	ERJ6GEYJ473V	
R9	RK0040	Chip PR	ERJ6GEYJ102V	
R10	RK0069	Chip PR	ERJ6GEYJ222V	
R15	RK0025	Chip PR	UE0125A	
R16	RK3001	Chip PR	ERJ3JSYJ000V	
R17	RK3001	Chip PR	ERJ3JSYJ000V	
SW1	UM0002	Switch	Micro Switch SS-5	
SW2	UL0009	Switch	EVQ-QHJ-04G	
SW3	UJ0009	Switch	EVCLQHJ04G	
SW4	US0015	Switch	HSW0880UD1-210	
VR1	RH0031	Trim. Pot	CVR42A-103AVID	
W1	MACK02A Wire		#28A02-020-02	
W2	NYCK02A Wire		#28Y02-020-02	

Ref No	Parts No.	Description	Parts Name	Ver
	EMS-11			
C1	CU8003	Chip C.	C2012,F1E104Z	
C2	CU8035	Chip C.	C2012,B1E393K	
C3	CU8003	Chip C.	C2012,F1E104Z	
C4	CU8012	Chip C.	C2012,B1H471KTA	
C5	CU8012	Chip C.	C2012,B1H471KTA	
C6	CU8016	Chip C.	C2012,B1H102K	
C7	CE0315	Electrolytic C	EC-EV1CA470P	
C8	CK0004	Ceramic C.	CK45-F1H102ZTA	
C10	CK0066	Chip Tantal	TMCSB 1D225MTR	
FAR1	XB0001	Crystal	FARC4CA0358000KO1R	
IC1	XA0042	IC	LR4087Z	
Q1	XTO031	Transistor	2SC2712Y TE85L	
R1	RK0062	Chip PR	ERJ6GEYJ473V	
R2	RK0062	Chip PR	ERJ6GEYJ473V	
R3	RK0035	Chip PR	ERJ6GEYJ102V	
R4	RK0039	Chip PR	ERJ6GEYJ222V	
R5	RK0039	Chip PR	ERJ6GEYJ222V	
R7	RK0039	Chip PR	ERJ6GEYJ222V	
R8	RK0021	Chip PR	ERJ6GEYJ181V	
R9	RK0040	Chip PR	ERJ6GEYJ272V	
R10	RK0069	Chip PR	ERJ6GEYJ4104V	
R15	RK0025	Chip PR	ERJ6GEYJ331V	
R16	RK3001	Chip PR	ERJ3JSYJ000V	
R17	RK3001	Chip PR	ERJ3JSYJ000V	
SW1	UM0002	Switch	Micro Switch SS-5	
SW2	UL0009	Switch	EVQ-QHJ-04G	
SW3	UJ0009	Switch	EVCLQHJ04G	
SW4	US0015	Switch	HSW0880UD1-210	
VR1	RH0031	Trim. Pot	CVR42A-103AVID	
W1	MACK02A Wire		#28A02-020-02	
W2	NYCK02A Wire		#28Y02-020-02	

ADJUSTMENT

1) Required Test Equipment

1. Digital Multimeter

Voltage range: FS= 18V or so
Input resistance: 1M ohm or more

2. Regulated Power Supply

Supply voltage: 13.80V
Current : 15A or more

3. Oscilloscope

Measurable frequency: DC to 30MHz

4. Spectrum Analyzer

Measuring range: Up to 2GHz or more

5. Tracking Generator

Output frequency: Up to 2GHz or more

6. Audio Dummy Load

Impedance: 8 ohm
Dissipation: 5W or more

7. SSG

Output frequency: 1GHz or more
Output level: -20dB/0.1uV to 120dB/1V
Modulation: FM

8. Frequency Counter

Measurable frequency.l Up to 500MHz
Measurements stability: 0.2ppm or so

9. Power Meter

Measurable frequency.l Up to 500MHz
Impedance: 50 ohm, unbalanced
Measuring range: Full scale of 60W or so

10. Audio Voltmeter

Measurable frequency: 50Hz to 10kHz
Sensitivity: 1mV ~ 10V

11. Distortion Meter

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

12. Audio Generator

Output frequency: 88.5Hz and 1kHz
Output impedance: 600 ohm, unbalanced

13. Linear Detector

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

2) Adjustment for DR130

SSG Mod:1KHz +/-3.5KHz/DEV

SP terminal is connected to 8ohm dummy load.

RX speaker output level is 50 to 100mW

1. Power supply voltage is 13.8V. Power switch is off.
2. Turn the squelch and volume knobs counterclockwise.
3. Press and hold the "F"key,then turn on the power switch.
The display shows that the frequency is 145.00MHz

PLL Adjustment

Item	Condition	Measurement			Adjustment			Specification/ Remarks
		Test equipmen	Unit	Terminal	Unit	Parts	Method	
Frequency	Frequency:145.00MHz power: Low *1 PTT: ON	Freq.Counter Power Meter	Back	ANT	MAIN	TC1	145.00 MHz	+/- 100Hz
PLL VCO	Frequency:145.00MHz PTT: OFF *1	Digital Multimeter	Main	SD	PLL VCO	L302	2.0V Check	1.8-2.2V 0.7-1.0V

RX Adjustment (ALL SSG out =EMF)

Item	Condition	Measurement			Adjustment			Specification/ Remarks	
		Test equipmen	Unit	Terminal	Unit	Parts	Method		
RX Sensitivity	Frequency:145.03MHz SSG out:0dBu *1	SSG Distortion Meter	Main	TP1	L4-L6 L14	SINAD: MAX	Turn the coil L14, L4,L5,L6,L4,L5 to the MAX in order		
	Frequency:145.03MHz SSG out:-10dBu *1					Check			
	Frequency:134.00MHz SSG out:-2.0dBu *2								
	Frequency:174.00MHz SSG out:-2.0dBu *3								
S Meter	Frequency:145.03MHz SSG out: 15dBu *1 Mod: OFF	LCD S Meter	Front Panel		Main	VR5	Full flashing		
	Frequency:145.03MHz SSG out:0dBu *1 Mod: OFF						Check	S Meter does not light.	
SQL	Frequency:145.03MHz SSG out:-10dBu *1 SQL VR:Threshold	LCD Busy	Front Panel		Main		Make sure that SQL is open	Busy ON	

*1 or bond-center of your radio version

*2 or bond lower limit of your radio version

*3 or bond upper limit of your radio version

TX Adjustment

Item	Condition	Measurement			Adjustment			Specification/ Remarks
		Test equipment	Unit	Terminal	Unit	Parts	Method	
High Power	VR1: max Power:High PTT: ON	Power Meter	Back	ANT	Main			
	Frequency:145.00MHz Power:High *1 PTT: ON					VR1	52w	+/- 1.0W Below 10.5A
	Frequency:130.00MHz Power:High *2 PTT: ON					Check	Above 5W (T.E.EZ)	
	Frequency:174.00MHz or 155MHz Power:Low *3 PTT: ON					Check	Above 5W (T.E.EZ)	
Low Power	Frequency:130.00MHz Power:Low *1 PTT: ON					VR5	5.0w	+/- 0.5W (T.E.EZ)
DEV	Frequency:145.00MHz Power: Low *1 AG:1KHz -30dBm PTT: ON	AG Linear Detector Power Meter	Back	ANT	Main	VR2	4.7kHz /Dev	4.7 +/-0.2kHz/Dev
MIC Gain	Frequency:145.00MHz Power: Low *1 AG:1KHz -47dBm PTT: ON						4.0kHz /Dev	4.0 +/-0.2kHz/Dev
CTCSS Ton DEV	Frequency:145.00MHz Power: Low *1 AG: OFF PTT: ON ToneSW(88.5Hz):ON					Check	0.60-0.85kHz/Dev	
Tone Burst DEV	Frequency:145.00MHz Power: Low *1 AG: OFF PTT: ON ToneSW:ON					Check	2.5-3.5kHz/Dev	

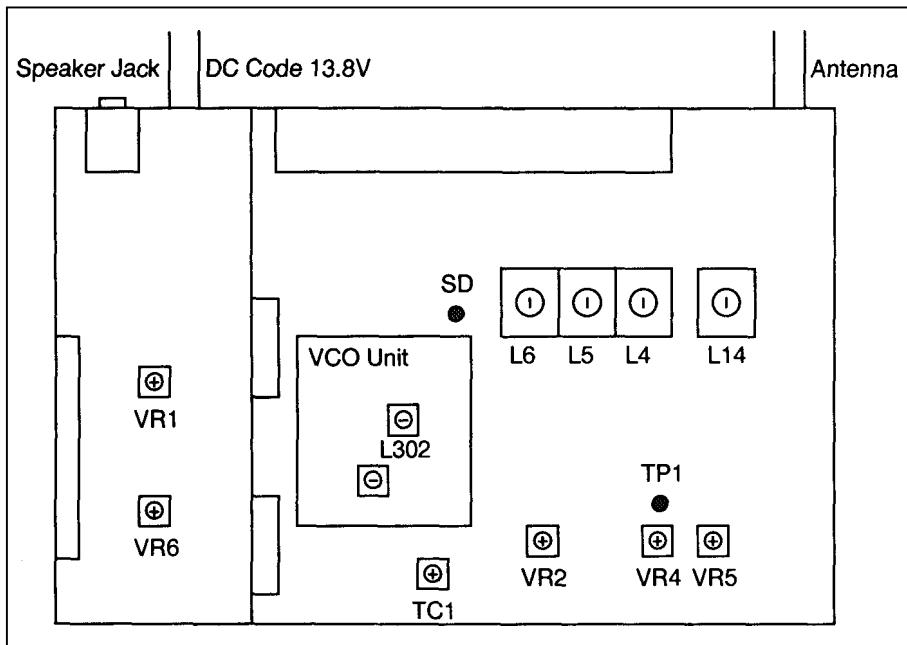
*1 or bond-center of your radio version

*2 or bond lower limit of your radio version

*3 or bond upper limit of your radio version

If the logic board EJ-21D or EJ21D exists ,first pull out the logic board
and re-connect W3,W4,W5, so that the radio comes back to conventional

3) Adjustment Points



4) Adjustment Quick Reference

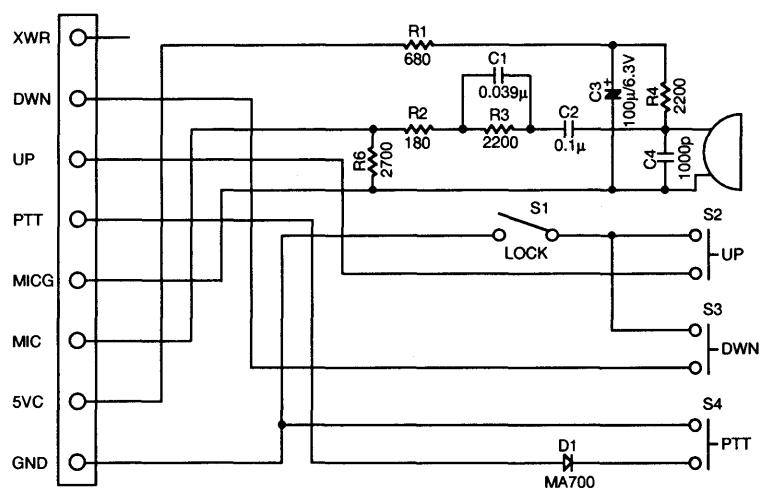
SSG Output = EMF

Parts	Item	Specifications	Specifications
L4	RX Sensitivity	-10dBpV (12dB SINAD)	-10dBpV (12dB SINAD)
L5	RX Sensitivity	-10dBpV (12dB SINAD)	-10dBpV (12dB SINAD)
L6	RX Sensitivity	-10dBpV (12dB SINAD)	-10dBpV (12dB SINAD)
L14	RX Sensitivity	-10dBpV (12dB SINAD)	-10dBpV (12dB SINAD)
L302	VCO Frequency	1.8V~2.2V	1.8V~2.2V
TC1	Reference Frequency	145.00MHz +/-100Hz	145.00MHz +/-100Hz
VR1	TX High Power	52W +/- 1.0W 10.5W +/- 0.5W (EZ)	52W +/- 1.0W 10.5W +/- 0.5W (EZ)
VR2	Deviation	4.7kHz +/-0.2kHz	2.4kHz +/-0.1kHz
VR4	Mic Gain	4.0kHz +/-0.2kHz	2.0kHz +/-0.1kHz
VR5	S Meter	15dBu "Full"	15dBu "Full"
VR6	TX LowPower	5W+/-0.5W	5W+/-0.5W

SCHEMATIC DIAGRAM

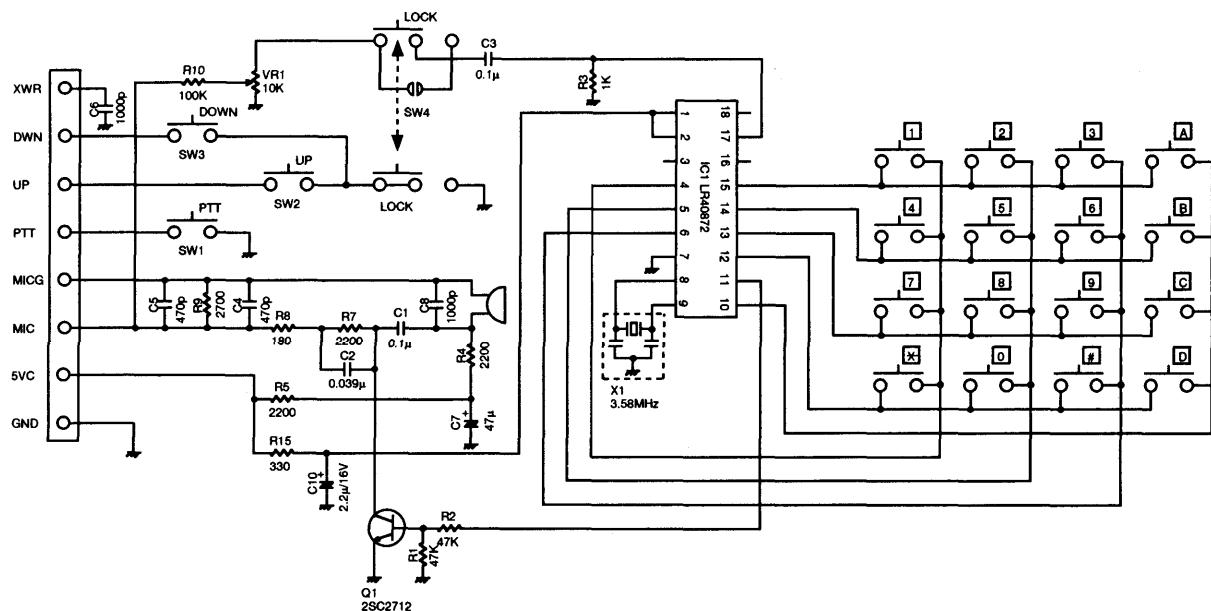
1)

CIRCUIT DIAGRAM

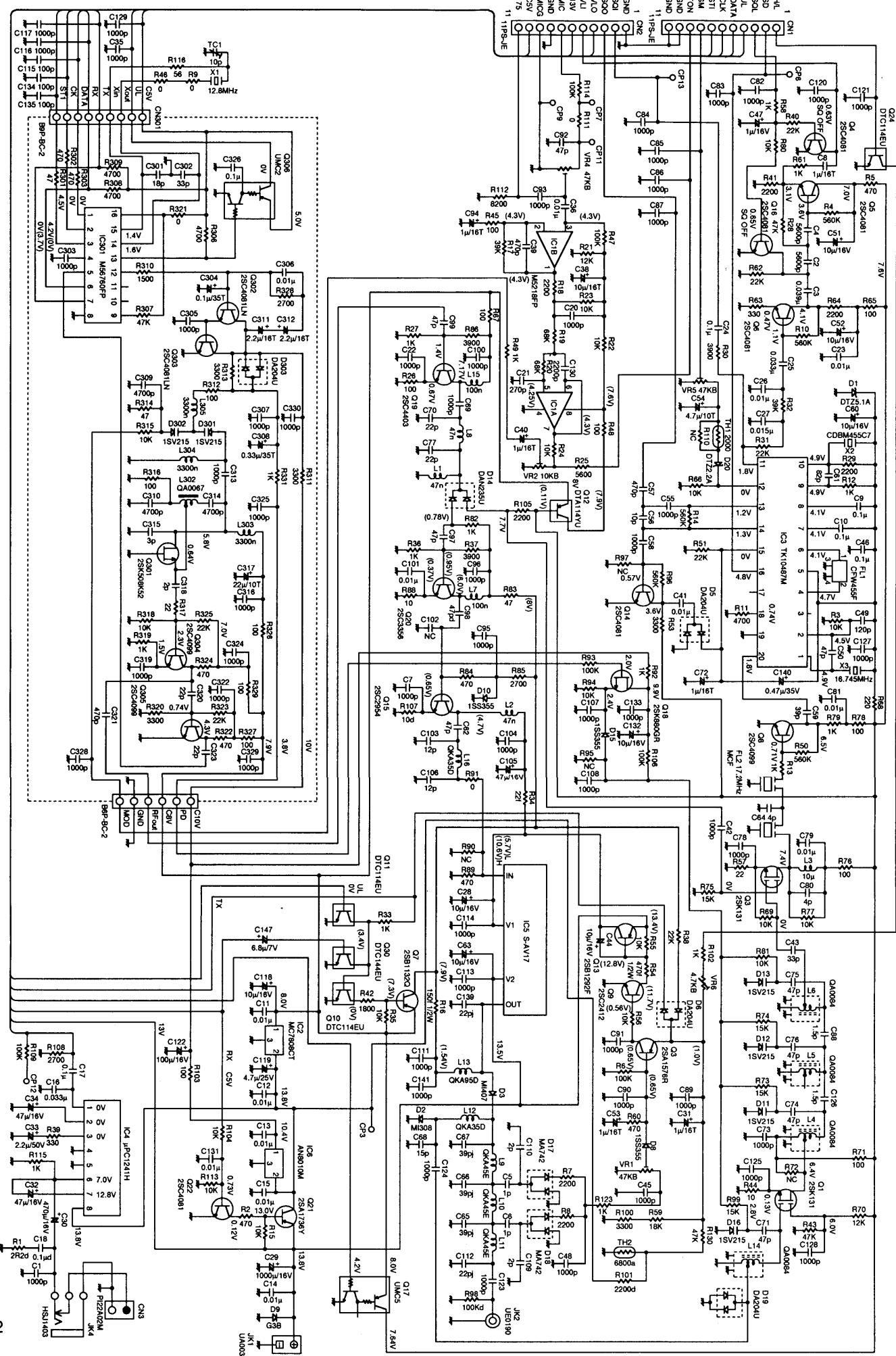


2)

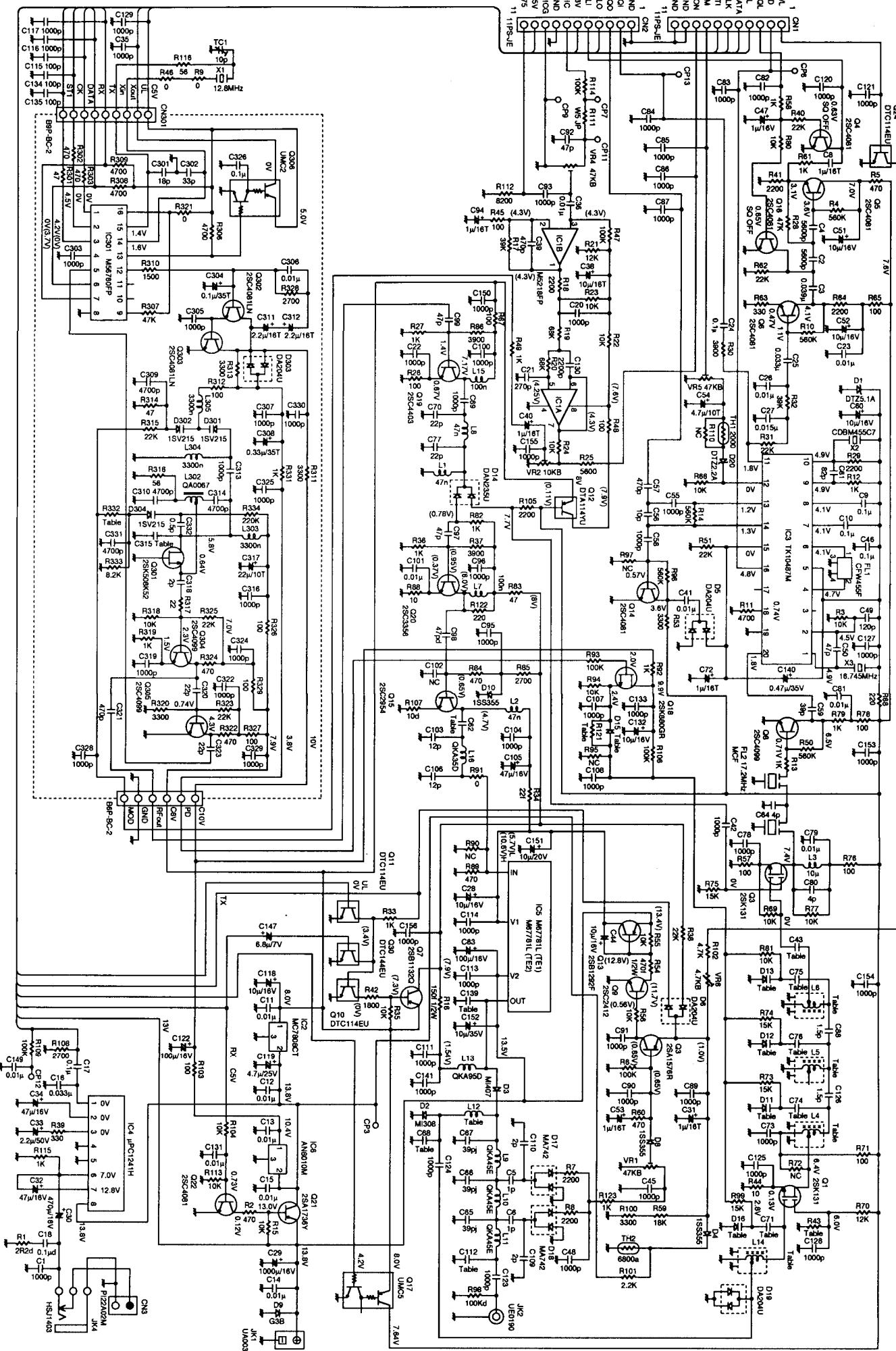
CIRCUIT DIAGRAM



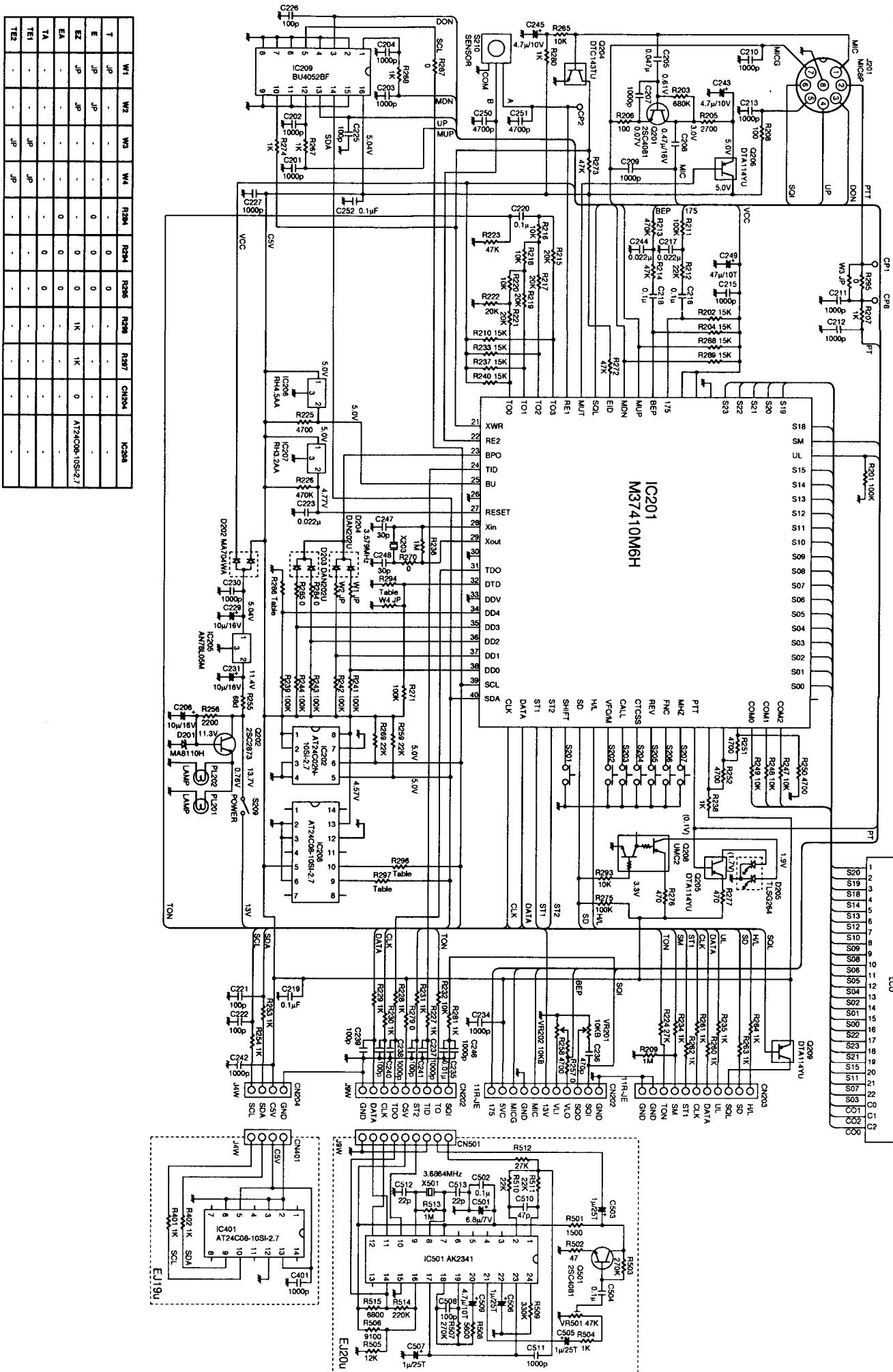
3) Main Unit (T/E/EZ/EA/TA)



4) Main Unit (TE1/TE2)

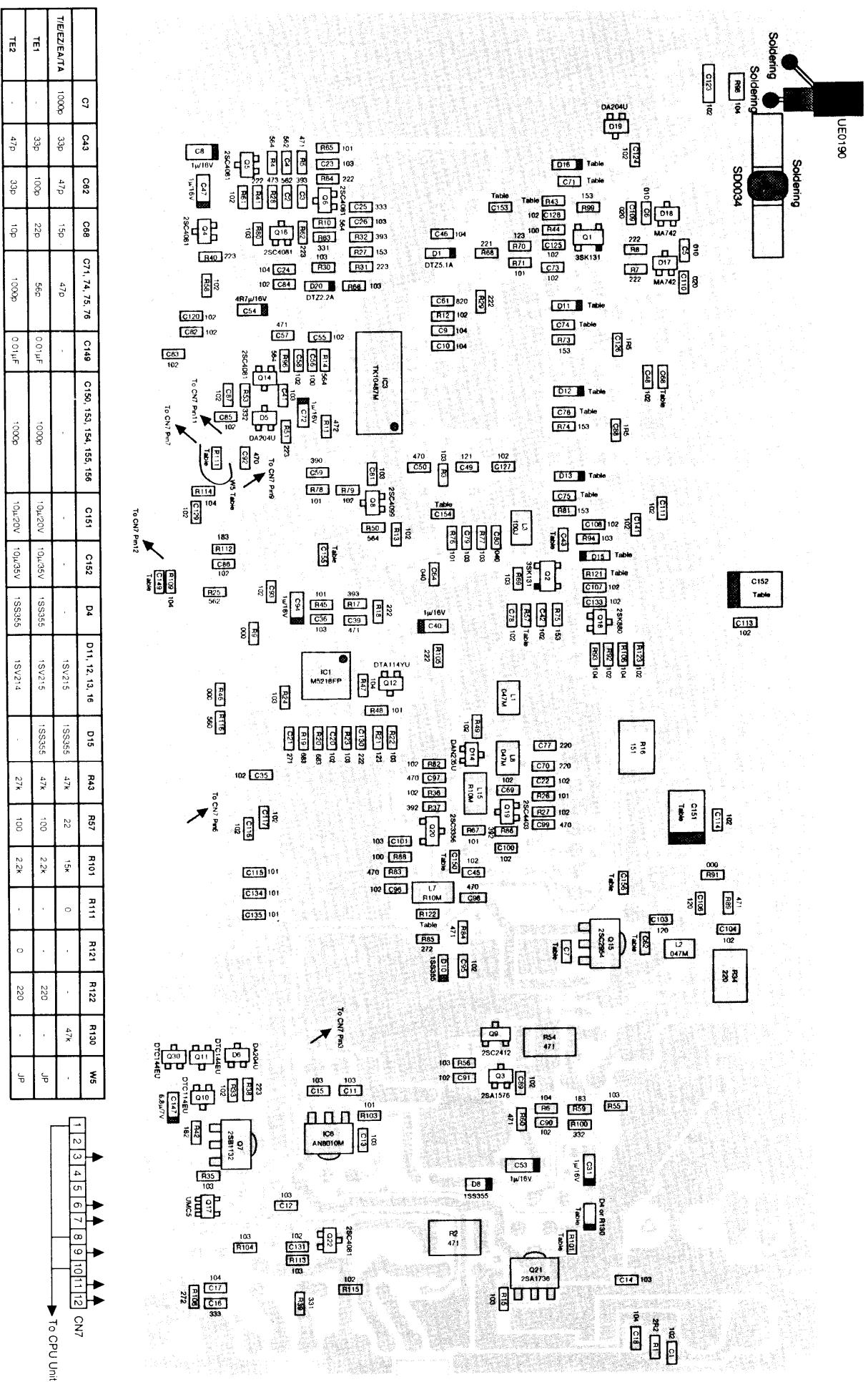


5) CPU Unit

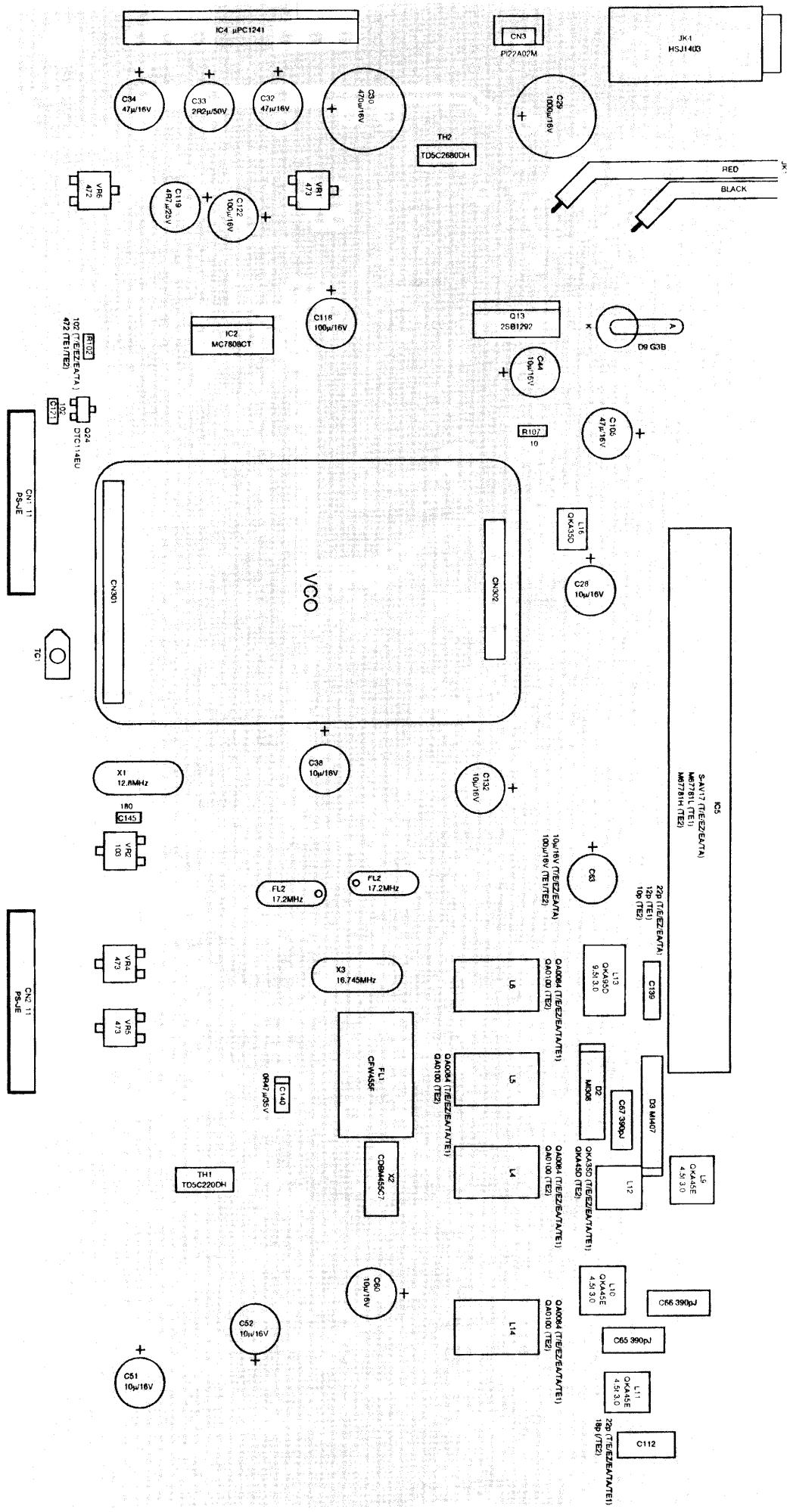


PC BOARD VIEW

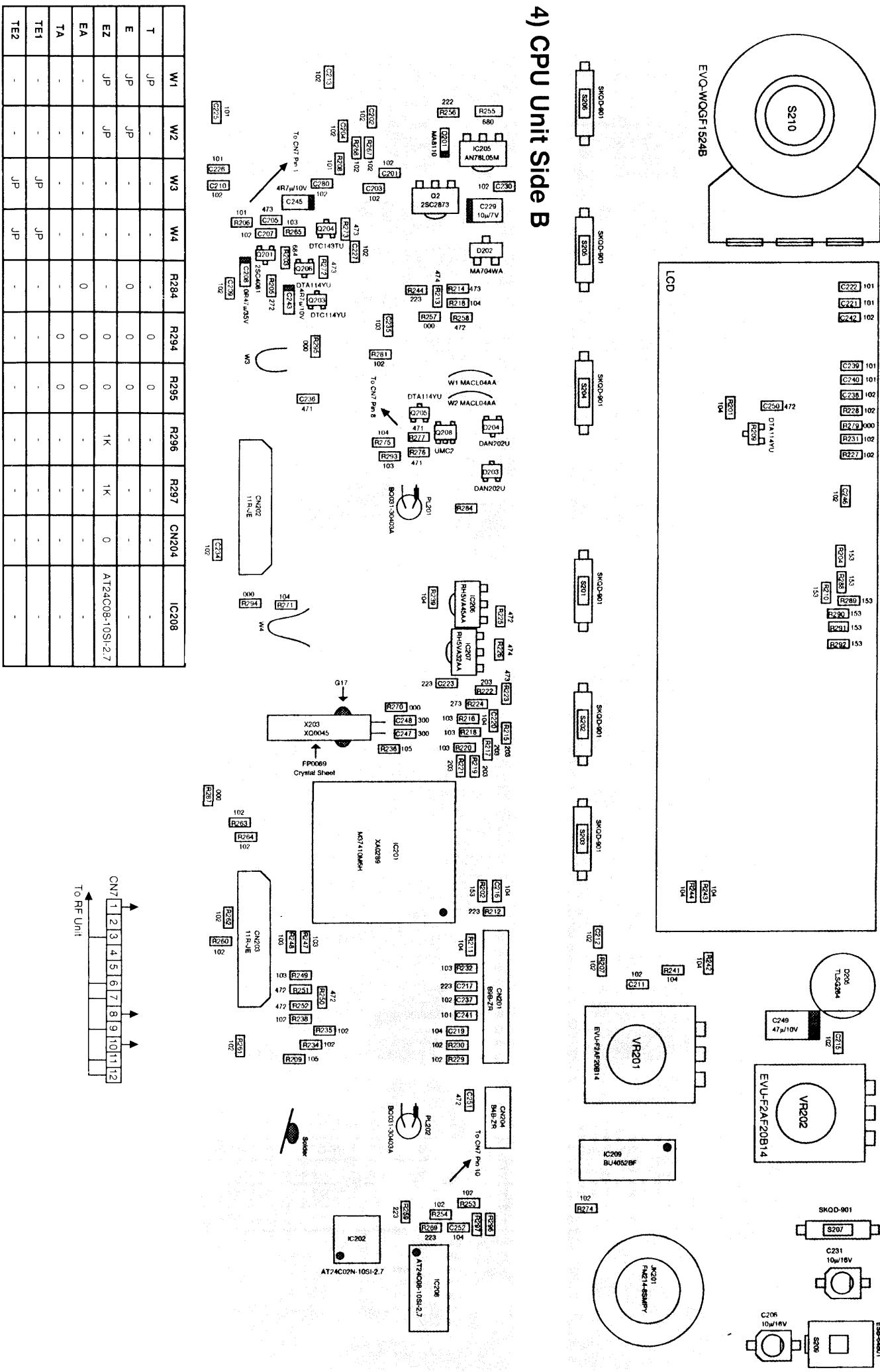
1) Main Unit Side A



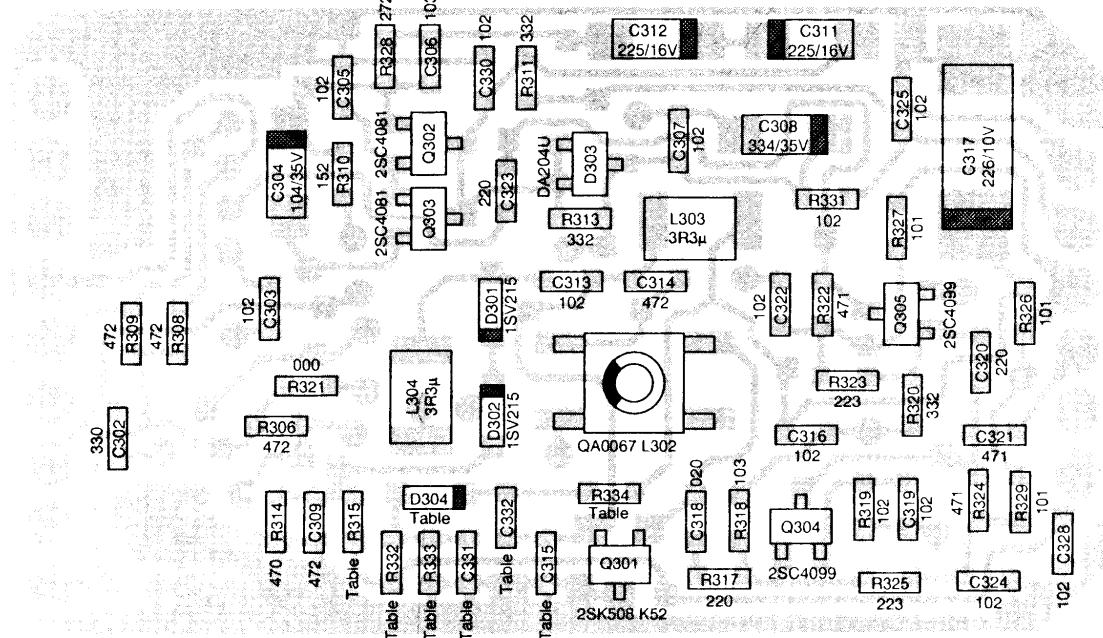
2) Main Unit Side B



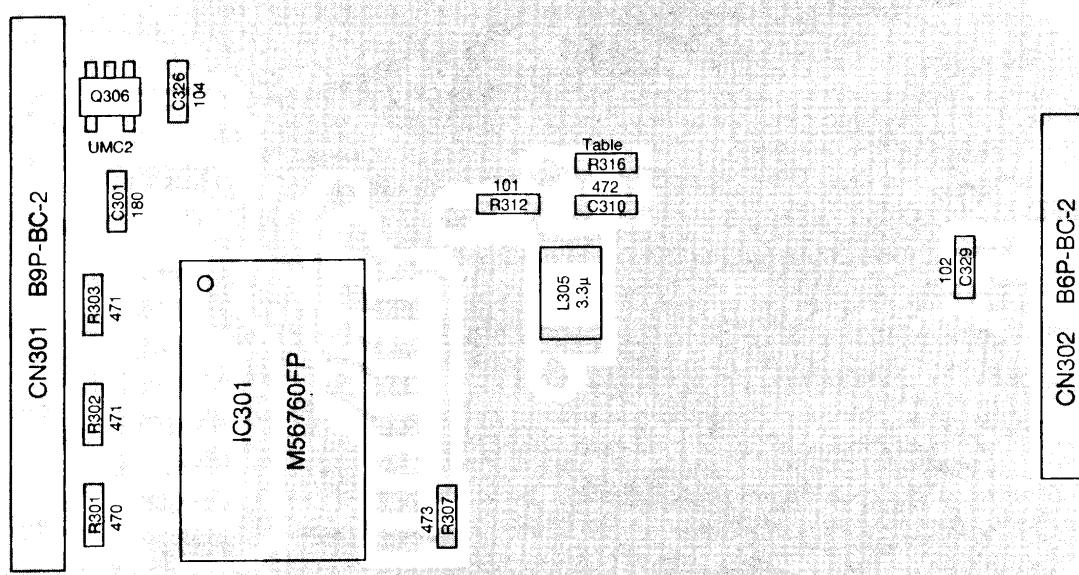
3) CPU Unit Side A



5) VCO Unit Side A



6) VCO Unit Side B



	C315	C331	C332	D304	R315	R316	R332	R333	R334
T/E/EZ/EA/TA	3p	-	-	-	10k	100	-	-	-
TE1	3p	4700p	0.5p	1SV215	22k	56	8.2k	8.2k	220k
TE2	1p	4700p	0.5p	1SV215	22k	56	10k	8.2k	220k

BLOCK DIAGRAM

