

DR-130T/E/EZ/EA/TA/TE1/TE2

Service Manual

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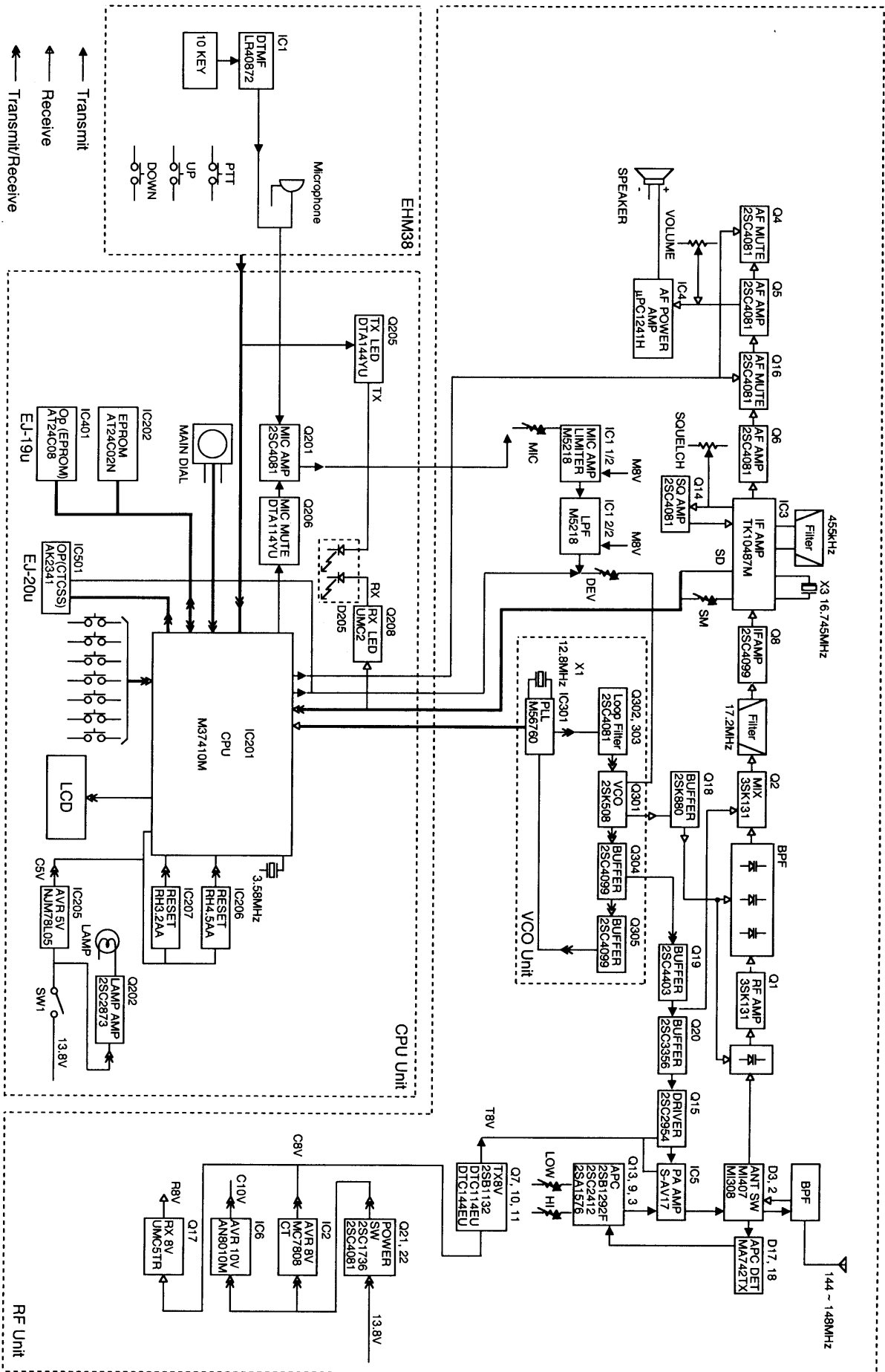
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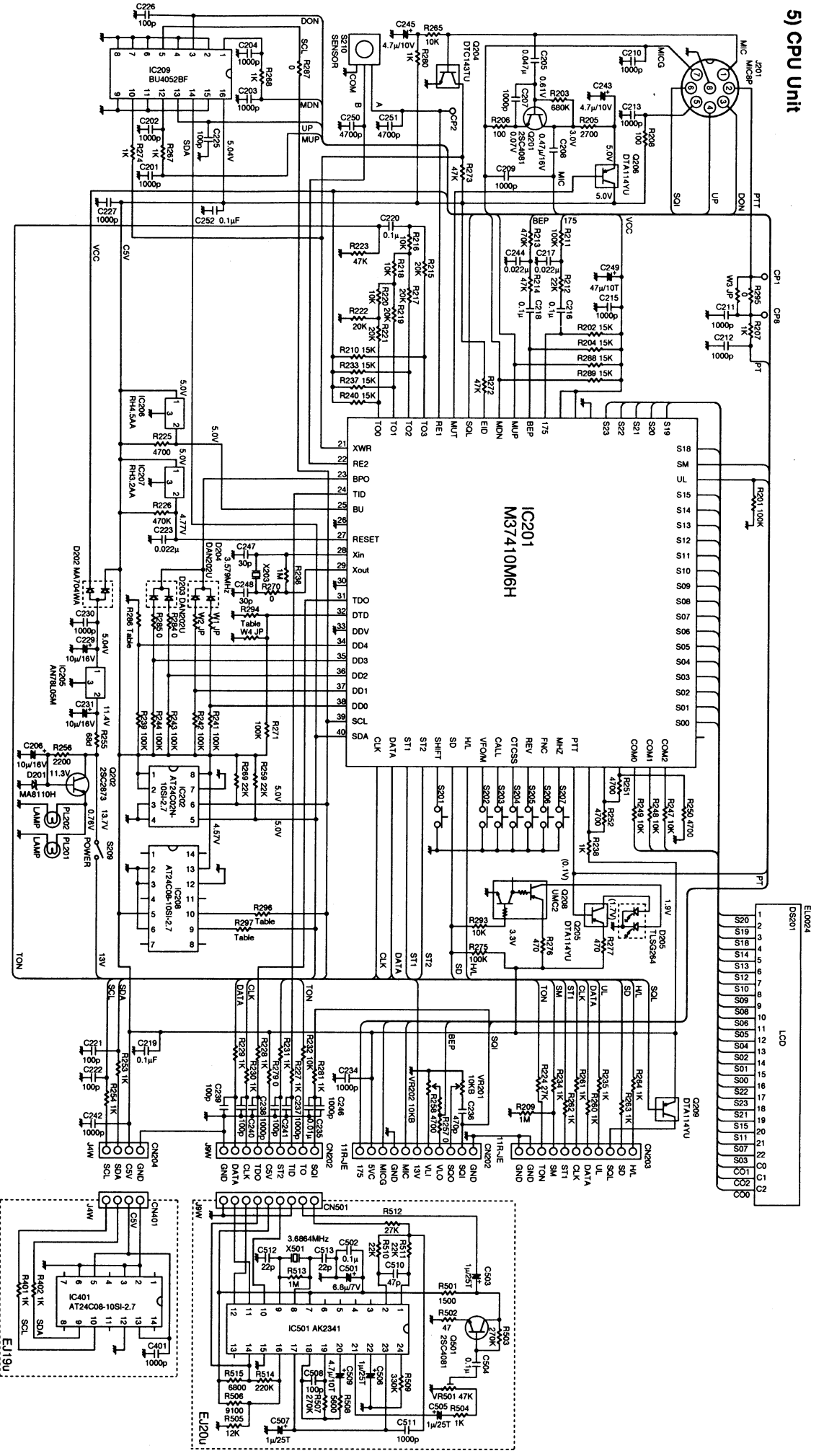
● BLOCK DIAGRAM39

ALINGO, INC.

BLOCK DIAGRAM

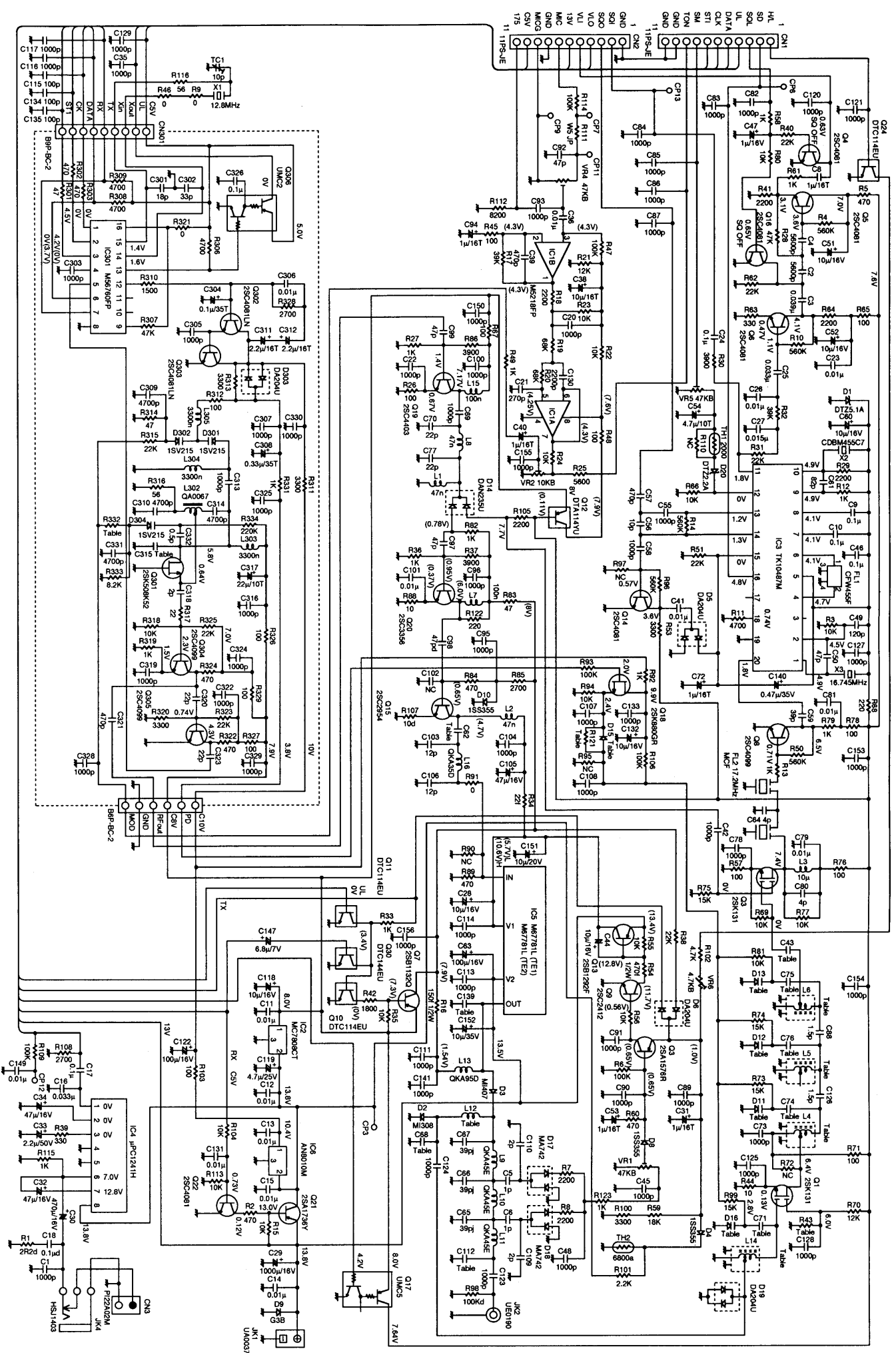


5) CPU Unit



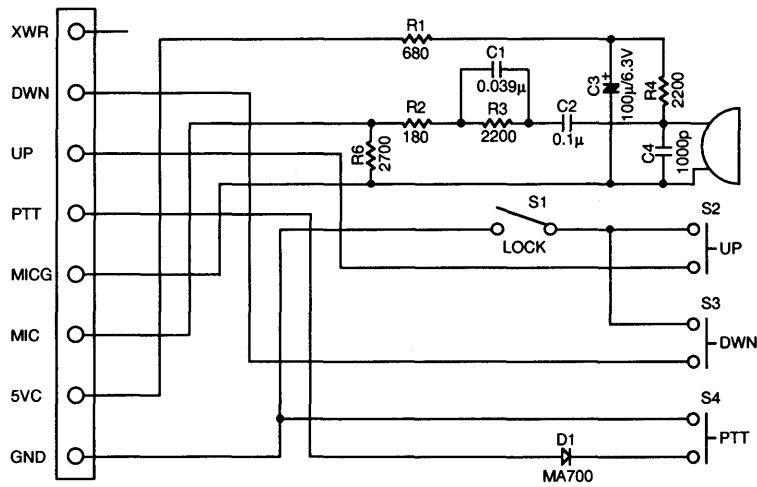
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JP	JP	JP	JP	0	0	0	0	0	0	0
EA	JP	JP	JP	0	0	0	1K	1K	0	AT24C08-10SH-2.7
TA	JP	JP	JP	0	0	0	0	0	0	0
TE1	JP	JP	JP	0	0	0	0	0	0	0
TE2	JP	JP	JP	0	0	0	0	0	0	0

4) Main Unit (TE1/TE2)

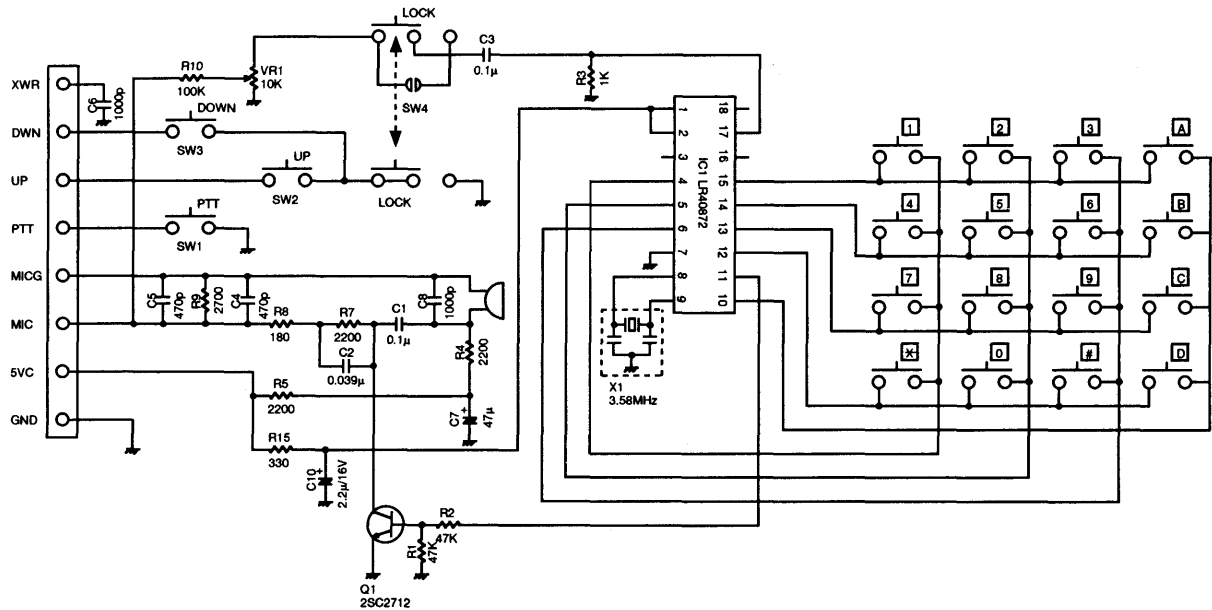


SCHEMATIC DIAGRAM

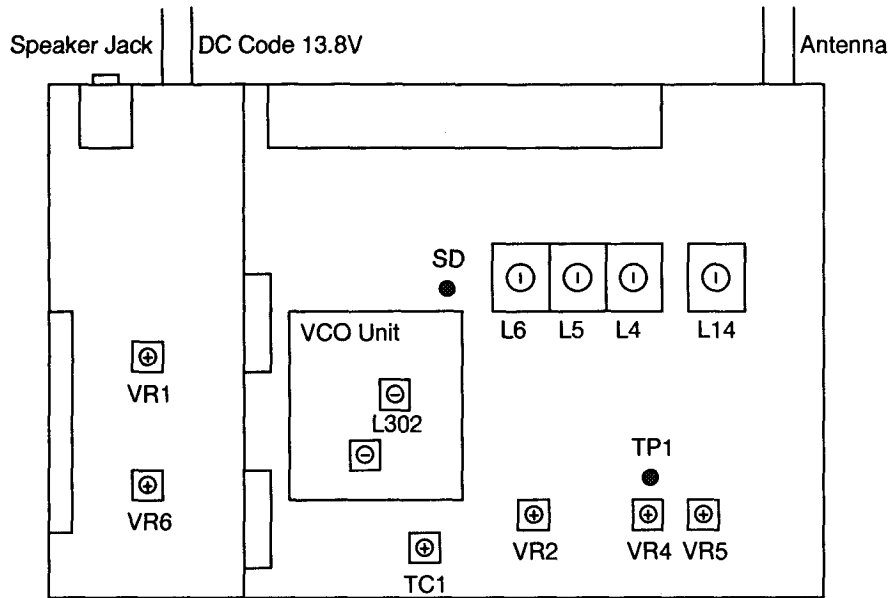
1) EHM35 CIRCUIT DIAGRAM



2) EHM38 CIRCUIT DIAGRAM



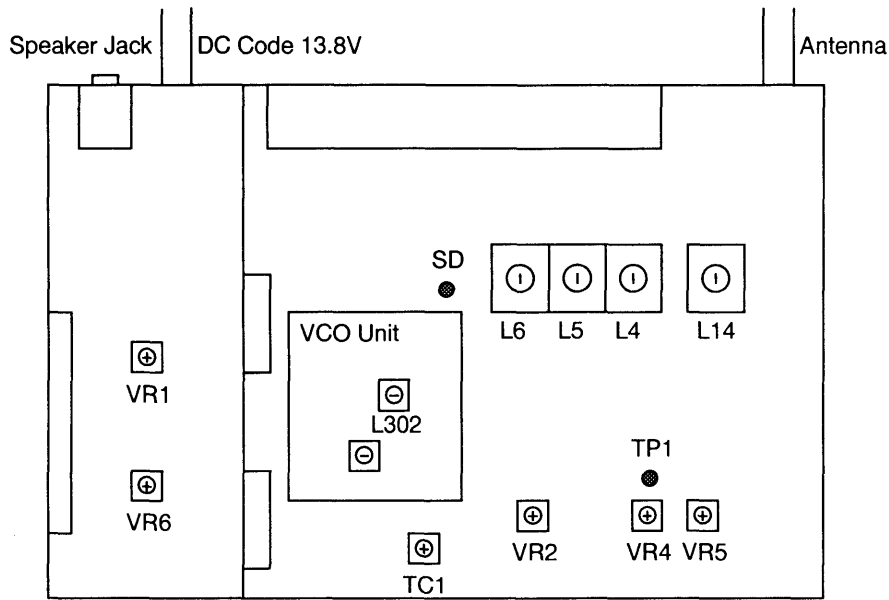
3) Adjustment Points



4) Adjustment Quick Reference

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

3) Adjustment Points



4) Adjustment Quick Reference

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

ADJUSTMENT

1) Required Test Equipment

1. Digital Multimeter

Voltage range: FS = 18V or so
Input resistance: 1M Ω 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 Ω
Dissipation: 5W or more

7. SSG

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

8. Frequency Counter

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

9. Power Meter

Measurable frequency: Up to 500MHz
Impedance: 50 Ω , 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 Ω , unbalanced

13. Linear Detector

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

Ref. No.	Parts No.	Description	Parts Name	Ver.
EJ20U				
CS01	CS0236	Chip Tantal	TMQMA0J8695MTR	
CS02	CU3059	Chip C.	C1608JF1E104ZTA	
CS03	CS0230	Chip Tantal	TMQMA1E105MTR	
CS04	CU3059	Chip C.	C1608JF1E104ZTA	
CS05	CS0230	Chip Tantal	TMQMA1E105MTR	
CS06	CS0230	Chip Tantal	TMQMA1E105MTR	
CS07	CS0230	Chip Tantal	TMQMA1E105MTR	
CS08	CU3023	Chip C.	C1608CH1H101JTA	
CS09	CS0237	Chip Tantal	TMQMA1A475MTR	
CS10	CU3019	Chip C.	C1608CH1H470JTA	
CS11	CU3035	Chip C.	C1608JB1H1102KTA	
CS12	CU3015	Chip C.	C1608CH1H220KTA	
CS13	CU3015	Chip C.	C1608CH1H220KTA	
CS501	UX1050	Wire	EJ20U	
IC501	XA0239	IC	AK2341	
QS01	XT0095	Tanistor	2SC4081 T106R	
RS01	RK3040	Chip R.	ERJ3GSVJ152V	
RS02	RK3022	Chip R.	ERJ3GSVJ470V	
RS03	RK3067	Chip R.	ERJ3GSVJ274V	
RS04	RK3038	Chip R.	ERJ3GSVJ102V	
RS05	RK3051	Chip R.	ERJ3GSVJ123V	
RS06	RK3089	Chip R.	ERJ3GSVJ912V	
RS07	RK3067	Chip R.	ERJ3GSVJ274V	
RS08	RK3047	Chip R.	ERJ3GSVJ662V	
RS09	RK3068	Chip R.	ERJ3GSVJ334V	
RS10	RK3054	Chip R.	ERJ3GSVJ223V	
RS11	RK3055	Chip R.	ERJ3GSVJ223V	
RS12	RK3065	Chip R.	ERJ3GSVJ273V	
RS13	RK3074	Chip R.	ERJ3GSVJ105V	
RS14	RK3066	Chip R.	ERJ3GSVJ224V	
RS15	RK3048	Chip R.	ERJ3GSVJ662V	
VR501	RH0106	Trim. Pot	EVN1YSX50B04	
XS01	XC0057	Crystal	DS-MAT 3.6864MHz	
	HK0305	Carton		
	HP0029	Protection Bag		
	PG0057	Rubber Cushion		
	UP0243	P.C.B.		
	YZ0042	Bond G17		
		Adhesion		
EHM35B				
C1	CC5029	Ceramic C.	XTE993KVA	
C2	CK0011	Ceramic C.	SC45-F1C104Z-A	
C3	CE0037	Electrolytic C	MS5 6.3V 100JF	
C4	CK0003	Ceramic C.	50V 102	
D1	XD0067	Diode	MA700	
R1	RDD0031	Resistor	R20 1/4W 680Ω	
R2	RDD0021	Resistor	R20 1/4W 180Ω	
R3	RDD0039	Resistor	R20 1/4W 2.2KΩ	
R4	RDD0039	Resistor	R20 1/4W 2.2KΩ	
R6	RDD0040	Resistor	R20 1/4W 2.7KΩ	
S1	US0015	Switch	HSW0890-01-210	
S2	UU0009	Switch	EVO-QHJ04G	
S3	UU0009	Switch	EVO-QHJ04G	
S4	UM0002	Switch	Micro Switch SS-5	
AS0142	DE0006	Microphone	Screw Set	
EY0006	FG0045	Stopper	WM-60AT	
HP0036	KB0033	Mic Rubber Cushion		
KM0071A	NP0041	Front Case		
NP0042	NP0042	PTT Button		
NS0003	NS0003	Up Button		
SC0004	SC0004	Down Knob		
UE0051A	UP0193	Slide Spring		
UX0133	UX0133	P.C.B.		
		Wire	EMS-5	
EMH38A				
C1	CU8003	Chip C.	CC2012JF1E104Z	
C2	CU8035	Chip C.	C2012B1E393K	
C3	CU8003	Chip C.	C2012JF1E104Z	
C4	CU8012	Chip C.	C2012JB1H471KTA	
C5	CU8012	Chip C.	C2012JB1H471KTA	
C6	CU8016	Chip C.	C2012JB1H102K	
C7	CE0315	Electrolytic C	ECEV1CA47P	
C8	CK0004	Ceramic C.	CK45-F1H102ZTA	
C10	CS0066	Chip Tantal	TMCSB1D25MTR	
FAR1	XB0001	Crystal	FARCA4C039000K01R	
IC1	XA0042	IC	LFA0872	
Q1	XT0031	Transistor	2SC2712Y TE85L	
R1	RK0062	Chip R.	ERJ6GEVJ473V	
R2	RK0062	Chip R.	ERJ6GEVJ473V	
R3	RK0035	Chip R.	ERJ6GEVJ102V	
R4	RK0039	Chip R.	ERJ6GEVJ222V	
R5	RK0039	Chip R.	ERJ6GEVJ222V	
R7	RK0039	Chip R.	ERJ6GEVJ222V	
R8	RK0021	Chip R.	ERJ6GEVJ222V	
R9	RK0040	Chip R.	ERJ6GEVJ181V	
R10	RK0069	Chip R.	ERJ6GEVJ104V	
R15	RK0025	Chip R.	ERJ6GEVJ331V	
R16	RK3001	Chip R.	ERJ3J5VJ000V	
R17	RK3001	Chip R.	ERJ3J5VJ000V	
SW1	UM0002	Switch	Micro Switch SS-5	
SW2	UU0009	Switch	EVO-QHJ04G	
SW3	UU0009	Switch	EVO-QHJ04G	
SW4	US0015	Switch	HSW0890-01-210	
VR1	RH0031	Trim. Pot	CVR-42A-103AW1D	
W1	MACK02AA	Wire	#28A02-020-02	
W2	MYCK02AA	Wire	#28V02-020-02	
EMH38A				
AJ0013	AJ0025	Screw	1M2 3+12FeCr	
AP0004	AP0004	Screw	1M3.5+10FeN	
AP0008	AP0008	Screw	PM2+5FeCr	
DE0007	DE0007	Screw	PM3+8FeBC	
EY0006	EY0006	Microphone	Stopper	
FG0045	FG0045	Stopper	WM-60AT	
HP0036	HP0036	Mic Rubber Cushion		
KB0033	KB0033	Rubber Switch		
KM0153	KM0153	Protection Bag		
NP0041	NP0041	Rear Case		
NP0042	NP0042	Front Case		
NP0043	NP0043	PTT Button		
NS0003	NS0003	Up Button		
SC0004	SC0004	Down Button		
TT1002	TT1002	Slide Switch		
UE0125A	UE0125A	PTT Spring		
UP0183B	UP0183B	1.0x11mm		
		Tube	Curt Code EMS3	
			P.C.B.	

The version is indicated as follows:
 0: TE/EZ/EJ/TA
 1: TE
 2: TEZ
 None: all models

VCO Unit

Ref. No.	Parts No.	Description	Parts Name	Ver.
C301	CU	Chip C.	C1608CH1H JTA	
C302	CU	Chip C.	C1608CH1H JTA	
C303	CU3035	Chip C.	C1608JB1H102KTA	
C304	CU3063	Chip Tantal	TMCSA1V104MTR	
C305	CU3035	Chip C.	C1608JB1H102KTA	
C306	CU3047	Chip C.	C1608JB1H103KTA	
C307	CU3045	Chip C.	C1608JB1H102KTA	
C308	CU30235	Chip Tantal	TMCSA1V334MTR	
C309	CU3043	Chip C.	C1608JB1H472KTA	
C310	CU3043	Chip C.	C1608JB1H472KTA	
C311	CU30220	Chip Tantal	TMOMA1C225MTR	
C312	CU30220	Chip Tantal	TMOMA1C225MTR	
C313	CU3035	Chip C.	C1608JB1H102KTA	
C314	CU3043	Chip C.	C1608JB1H472KTA	
C315	CU3004	Chip C.	C1608CH1H030CTA	0, 1
C316	CU3002	Chip C.	C1608CH1H010CTA	2
C317	CU3035	Chip C.	C1608JB1H102KTA	
C318	CU3003	Chip Tantal	TMOMC1A226MTR	
C319	CU3035	Chip C.	C1608JB1H102KTA	
C320	CU3015	Chip C.	C1608CH1H220LTA	
C321	CU3031	Chip C.	C1608JB1H471KTA	
C322	CU3035	Chip C.	C1608JB1H102KTA	
C323	CU3015	Chip C.	C1608CH1H220LTA	
C324	CU3035	Chip C.	C1608JB1H102KTA	
C325	CU3035	Chip C.	C1608JB1H102KTA	
C326	CU3059	Chip C.	C1608JF1E104ZTA	
C328	CU3035	Chip C.	C1608JB1H102KTA	
C329	CU3035	Chip C.	C1608JB1H102KTA	
C330	CU3035	Chip C.	C1608JB1H102KTA	
C331	CU3043	Chip C.	C1608JB1H472KTA	0
C332	CU3001	Chip C.	C1608CH1H030CTA	1, 2
CN301	UE0188	Connector	B9P-BC-2	
CN302	UE0185	Connector	B9P-BC-2	
D301	XD0132	Diode	1SV215 7PH4	
D302	XD0132	Diode	1SV215 7PH4	
D303	XD0130	Diode	DA204U T106	
D304	XD0132	Diode	1SV215 7PH4	0
IC301	XAD235	IC	M56760FP	1, 2
L302	QA0067	Coil	QA0067	
L303	QC000	Coil	NL322522T-	
L304	QC000	Coil	NL322522T-3R3M	
L305	QC0045	Coil	NL322522T-3R3M	
Q301	XE0010	FET	2SK508K52-72B	
Q302	XT0111	Transistor	2SC4081LN T106S	

SP Unit / E119u / Mechanical Parts / Others / Packing

Ref. No.	Parts No.	Description	Parts Name	Ver.
C303	XT0111	Transistor	2SC4081LN T106S	
Q304	XT0096	Transistor	2SC4099T 106N	
Q305	XT0096	Transistor	2SC4099T 106N	
Q306	XU0060	Transistor	UMC2TR	
R301	RK3022	Chip R.	ERJ3GSYJ470V	
R302	RK3034	Chip R.	ERJ3GSYJ471V	
R303	RK3034	Chip R.	ERJ3GSYJ471V	
R306	RK3046	Chip R.	ERJ3GSYJ472V	
R307	RK3058	Chip R.	ERJ3GSYJ473V	
R308	RK3046	Chip R.	ERJ3GSYJ472V	
R309	RK3046	Chip R.	ERJ3GSYJ472V	
R310	RK3040	Chip R.	ERJ3GSYJ152V	
R311	RK3044	Chip R.	ERJ3GSYJ322V	
R312	RK3026	Chip R.	ERJ3GSYJ101V	
R313	RK3044	Chip R.	ERJ3GSYJ322V	
R314	RK3022	Chip R.	ERJ3GSYJ103V	0
R315	RK3054	Chip R.	ERJ3GSYJ223V	1, 2
R316	RK3026	Chip R.	ERJ3GSYJ101V	0
R317	RK3023	Chip R.	ERJ3GSYJ560V	1, 2
R318	RK3018	Chip R.	ERJ3GSYJ220V	0
R319	RK3058	Chip R.	ERJ3GSYJ103V	1, 2
R320	RK3044	Chip R.	ERJ3GSYJ102V	
R321	RK3004	Chip R.	ERJ3GSYJ000V	
R322	RK3034	Chip R.	ERJ3GSYJ471V	
R323	RK3054	Chip R.	ERJ3GSYJ223V	
R324	RK3034	Chip R.	ERJ3GSYJ471V	
R325	RK3054	Chip R.	ERJ3GSYJ223V	
R326	RK3026	Chip R.	ERJ3GSYJ101V	
R327	RK3026	Chip R.	ERJ3GSYJ101V	
R328	RK3043	Chip R.	ERJ3GSYJ272V	
R329	RK3026	Chip R.	ERJ3GSYJ101V	
R331	RK3038	Chip R.	ERJ3GSYJ102V	
R332	RK3049	Chip R.	ERJ3GSYJ821V	0
R333	RK3050	Chip R.	ERJ3GSYJ103V	1
R334	RK3056	Chip R.	ERJ3GSYJ224V	2
	TS0081	Case	VCO Case	0

Ref. No.	Parts No.	Description	Parts Name	Ver.
AD0010	AE0014	Screw	D3+8FENI	
AD0017	AK0003	Screw	B2.6+8F8BG	
AE0003	AK0003	Screw	2.6+8F8N1	
FF0015	FF0021	Light Shield Cloth	082.6+6FEN1	
FF0021	FF0028	Volume Tape	Volume Tape	
FF0030	FF0031	Cloth	Cloth	
FF0031	FF0031	Cloth	Cloth	
F50138	F50138	Rubber Cushion	DR130	
FM0083	ND0004	Spring Washer	Spring Washer	
ND0004	NK0008B	Dial Knob	Dial Knob	
NK0008B	NK0010	Dial Knob	Dial Knob	
NK0010	NP0006	Volume Knob	Volume Knob	
NP0006	K50041B	Power Switch Knob	Power Switch Knob	
K50041B	K20001B	Bottom Case	Bottom Case	
K20001B	K20004B	Front Panel	DR130T	
K20004B	K20009A	Front Panel	DR130T	
SS0052B	SS0052B	Chassis	Chassis	
TS0080	TS0080	Front Shield Case	Front Shield Case	

Ref. No.	Parts No.	Description	Parts Name	Ver.
EA0013	AE0012	Screw	M5-20F-eCr	
AE0012	AN0002	Nut	F33PMx8BC	
AN0002	AZ0009	Screw	M4 M-5F-eCr	
AZ0009	EF0005	Washer	M5-20F-eCr	
EF0005	AZ0010	Fuse	Spring SW-5F-eCr	
AZ0010	FM0078	Bracket	W-5F-eCr	
FM0078	FM0079	Bracket	FG8015A	
FM0079	HM0042	Spanner	FG8015A	
HM0042	HK0306	Cushion	DR130	
HK0306	HM0398	Item Carton	DR130	
HM0398	HM0419	Item Carton	DR130	
HM0419	HP0006	Protection Bag	E/EA/EZ	
HP0006	HP0009	Protection Bag	Protection Bag	
HP0009	HP0016	Protection Bag	Protection Bag	
HP0016	HP0028	Protection Bag	Protection Bag	
HP0028	HP0037	Protection Bag	Protection Bag	
HP0037	HP0035	Protection Bag	Protection Bag	
HP0035	HU00	Fixture (A)	DR130	
HU00	KZ0003	Fixture (B)	DR130	
KZ0003	PK0047	Button Cover	Button Cover	
PK0047	PR0215	Schematic Diagram	Schematic Diagram	
PR0215	PS0181	Seal EZ	Seal EZ	
PS0181	PT0004A	Instruction Card	Instruction Card	
PT0004A	UA0038	Instruction Card	(T/A/T/E)/T/E/EZ	
UA0038	YZ0118	Lot Number Seal	Lot Number Seal	
YZ0118	YZ0121	R-52.0x3W Resistor 15A	R-52.0x3W Resistor 15A	
YZ0121	YZ0121	Tape 50mm	Tape 50mm	
YZ0121	YZ0121	Tape 10mm	Tape 10mm	

The version is indicated as follows:
 1: TE1
 2: TE2
 None: all models

VERSION TABLE

1) CPU UNIT

	W1	W2	W3	W4	R284	R294	R295	R296	R297	CN204	IC208
T	JP	-	-	-	-	0	0	-	-	-	-
E	JP	JP	-	-	0	0	0	-	-	-	-
EZ	JP	JP	-	-	-	0	0	1K	1K	0	AT24C08-10SI-2.7
EA	-	-	-	-	0	0	0	-	-	-	-
TA	-	-	-	-	-	0	0	-	-	-	-
TE1	-	-	JP	JP	-	-	-	-	-	-	-
TE2	-	-	JP	JP	-	-	-	-	-	-	-

2) MAIN UNIT

	C7	C43	C62	C63	C68	C71, 74, 75, 76	C112	C139	C149
T/E/EZ/EA/TA	1000p	33p	47p	10 μ /16V	15p	47p	22p	22p	-
TE1	-	33p	100p	100 μ /16V	22p	56p	22p	12p	0.01 μ F
TE2	-	47p	33p	100 μ /16V	10p	1000p	18p	10p	0.01 μ F

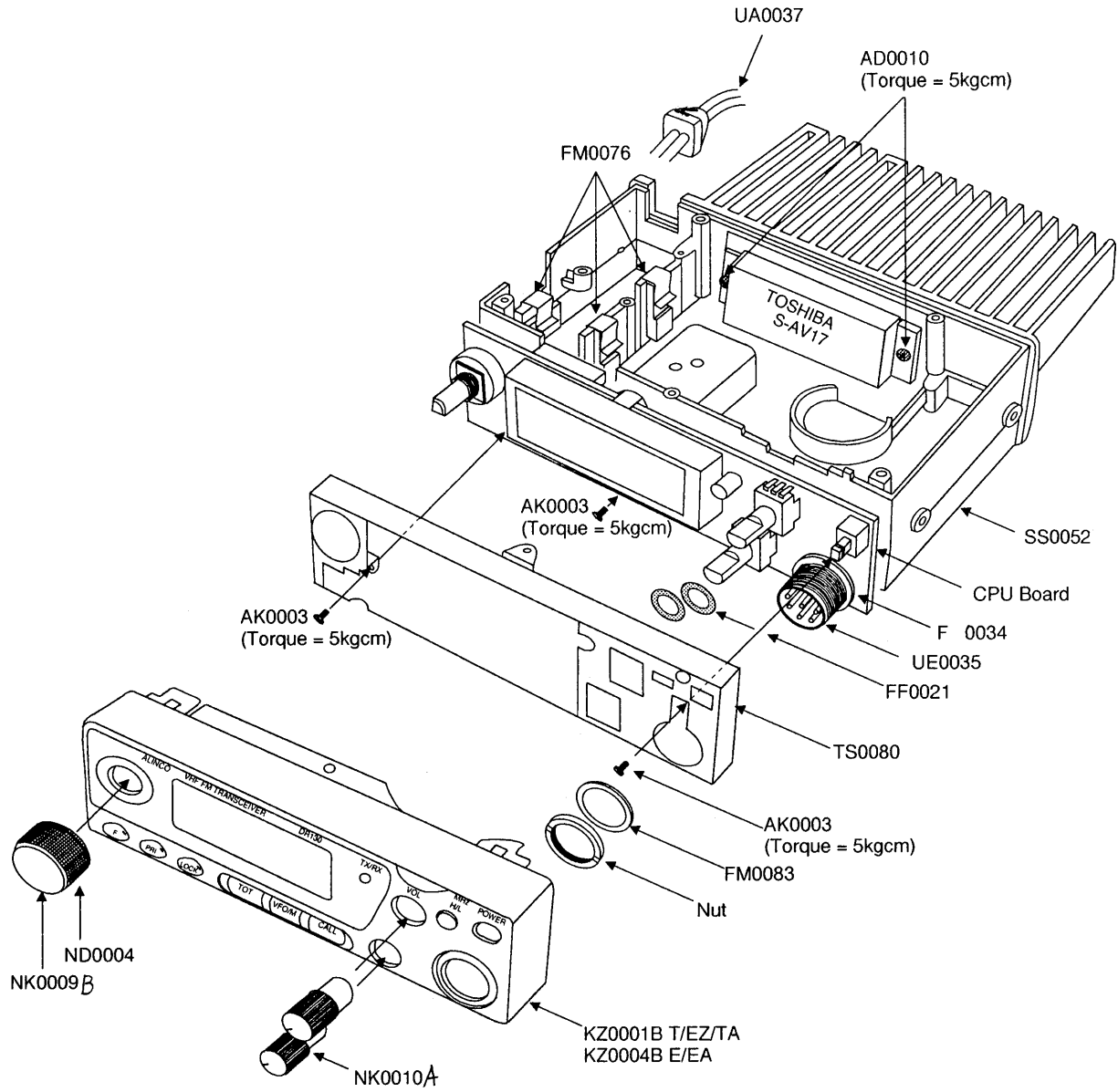
	C150, 153, 154, 155, 156	C151	C152	D4	D11, 12, 13, 16	D15	IC5	L4, 5, 6, 14
T/E/EZ/EA/TA	-	-	-	-	1SV215	1SS355	S-AV7	QA0084
TE1	1000p	10 μ /20V	10 μ /35V	1SS355	1SV215	1SS355	M67781L	QA0084
TE2	1000p	10 μ /20V	10 μ /35V	1SS355	1SV214	-	M67781H	QA0100

	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

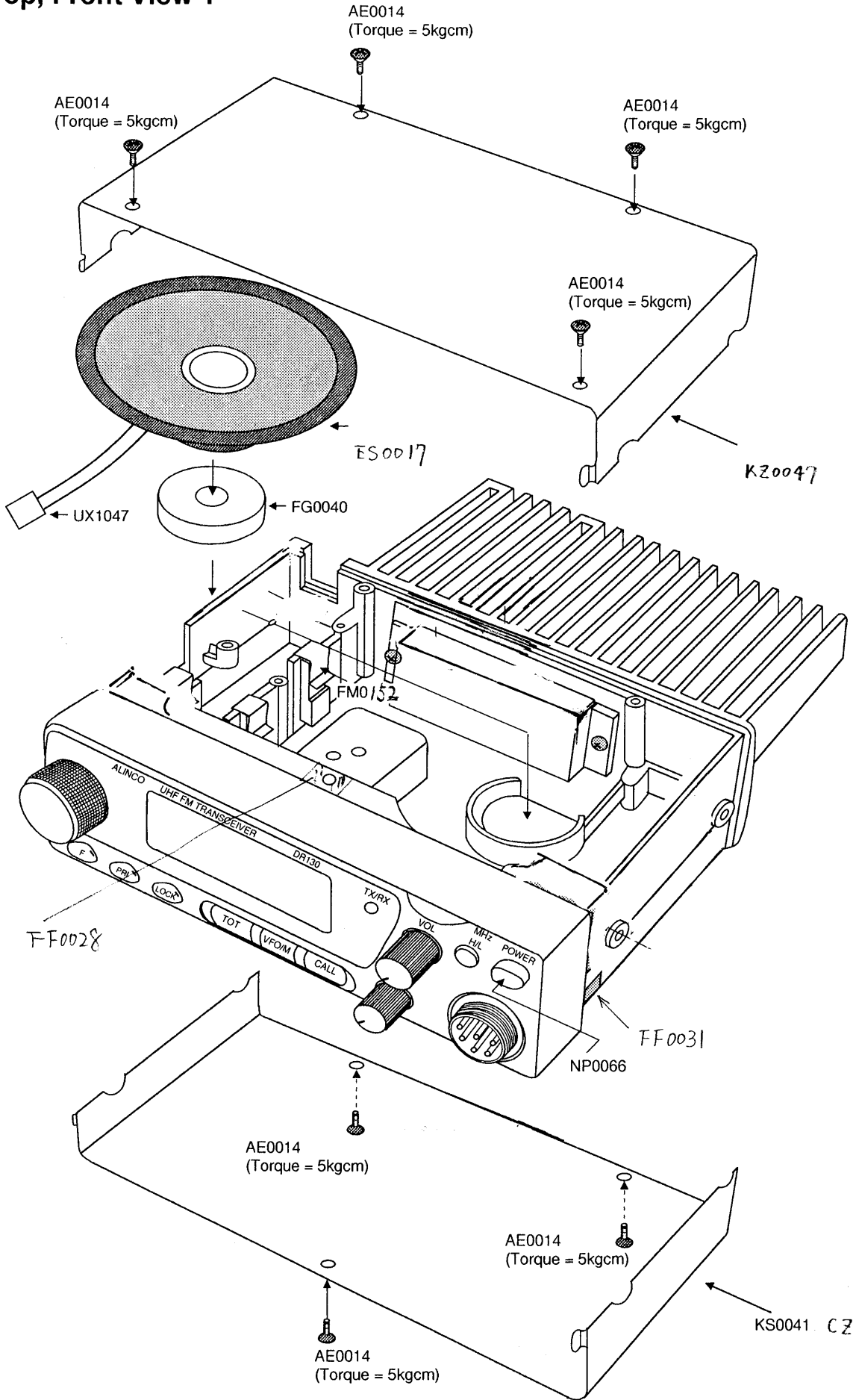
3) VCO UNIT

	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

4) Top, Front View 2

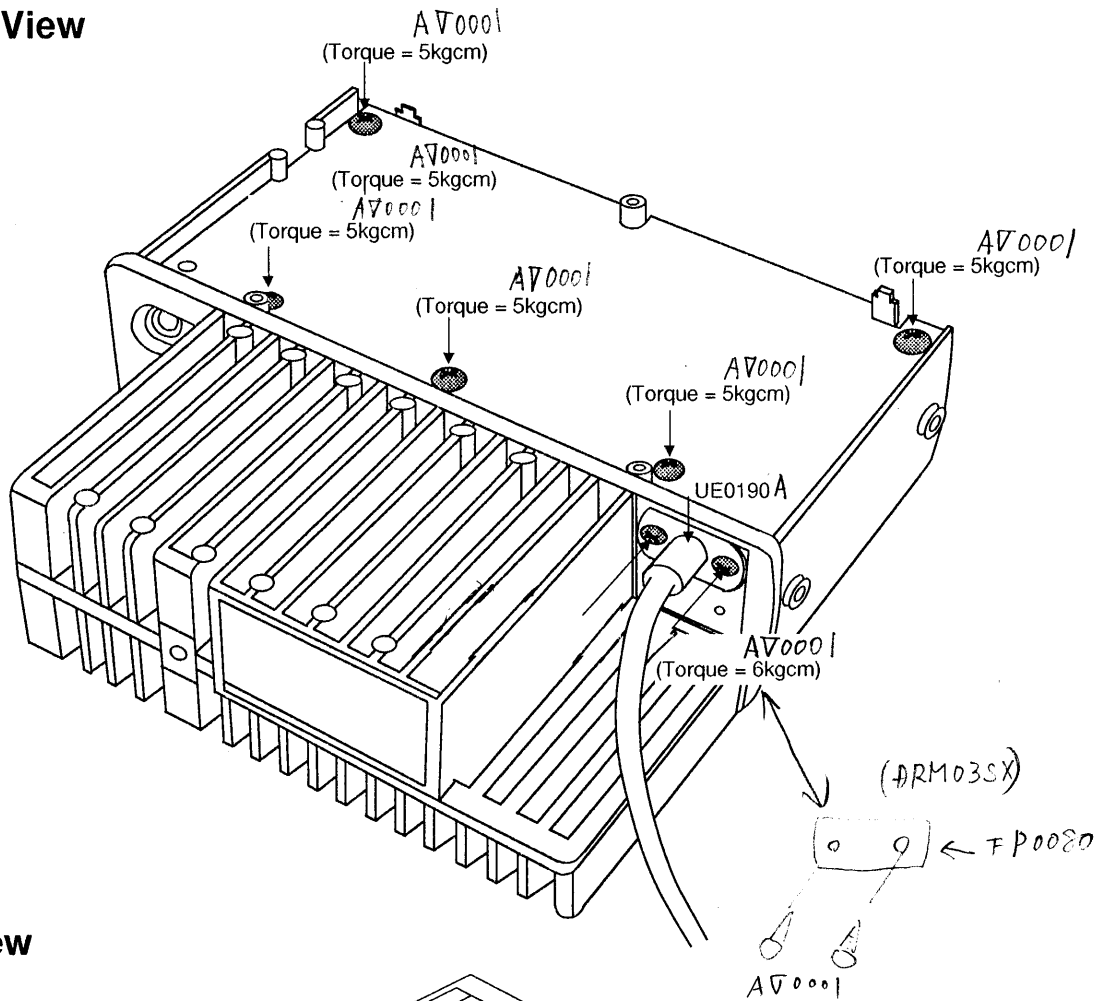


3) Top, Front View 1

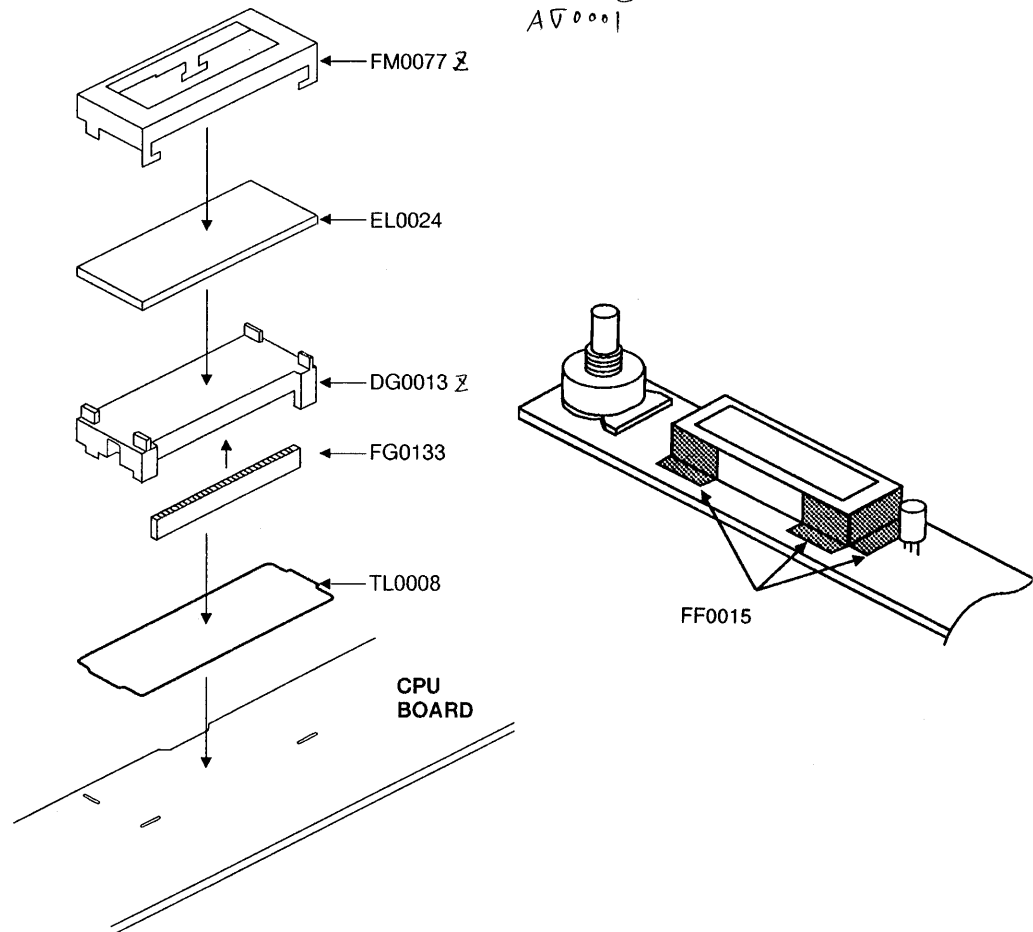


EXPLODED VIEW

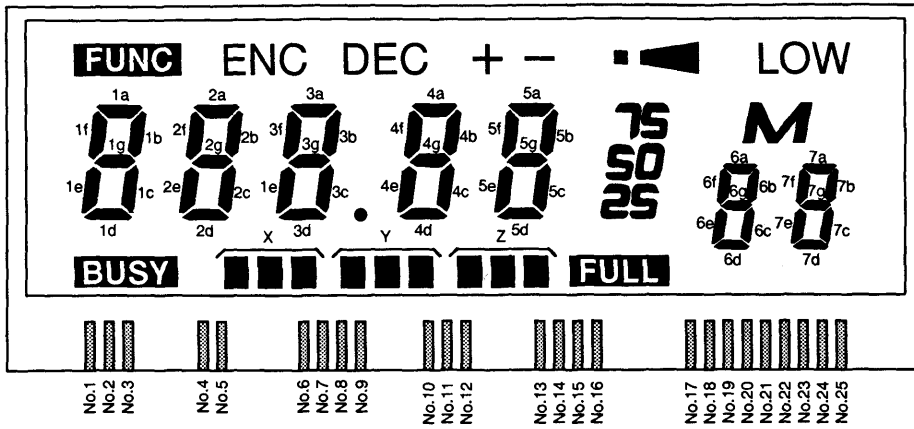
1) Bottom View



2) LCD View



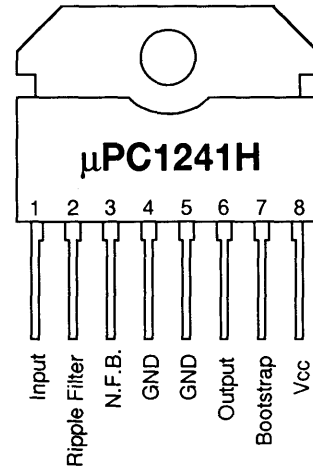
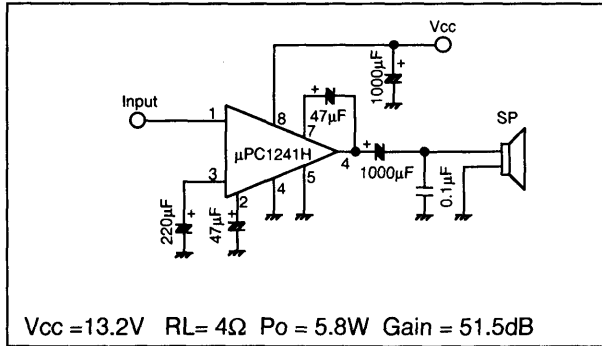
17) LCD Connection (EL0024)



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		

15) μ PC1241H (XA0079) Audio Power Amplifiers

Test Circuit



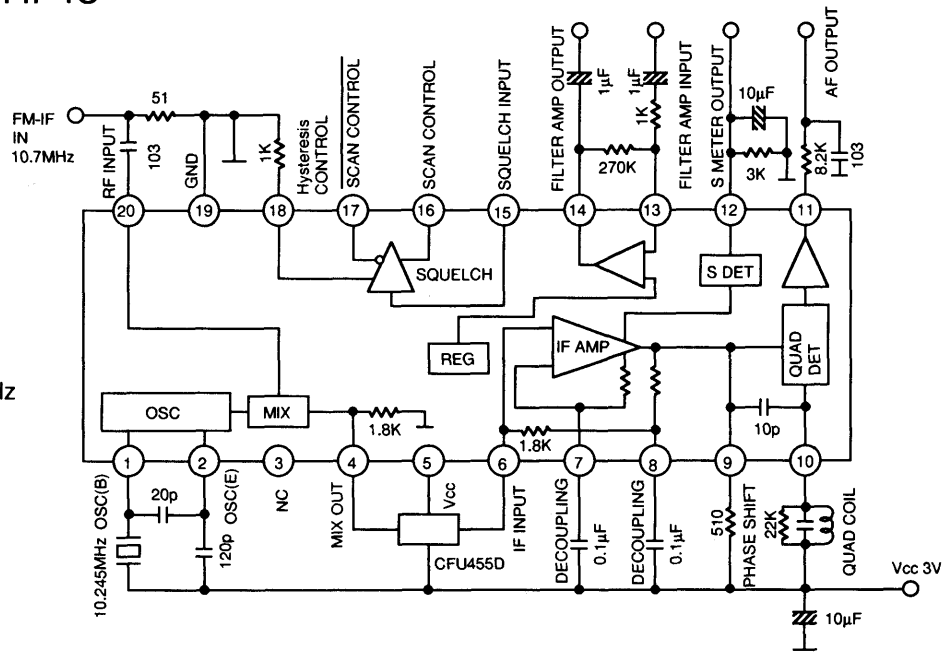
16) Transistor, Diode and LED Outline Drawings

Top View

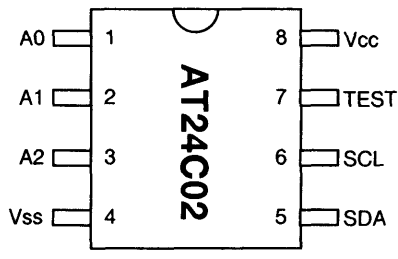
1SS355 XD0254	1SV215 XD0132	DA204U XD0130	DAN202U XD0230	DAN235U XD0246	DTZ2.2A XD0145	DTZ5.1A XD0136	G3B XD0107
MA704WA XD0127	MA742 XD0250	MA8110H XD0255	MI308 XD0014	MI407 XD0013	2SK508 XE0010	2SK880 XE0021	3SK131 XE0012
TLSG264 XL0029	2SA1576 XT0094	2SA1736 XT0099	2SB1132 XT0061	2SB1292 XT0112	2SC2412K XT0037	2SC2873 XT0099	2SC2954 XT0084
2SC3356 XT0030	2SC4081LN XT0111	2SC4081 XT0095	2SC4099 XT0096	2SC4403 XT0114	UMC2 XU0060	UMC5 XU0152	
DTA114YU XU0112	DTC114EU XU0131	DTC114YU XU0029	DTC124EU XU0140	DTC143TU XU0145	C2 E1 B1 E2		C5 E1 B1 E2
DTC144EU XU0148							

12) TK10487MTR (XA0144) Narrow Band FM IF IC

Vcc=3V
 F=10.7MHz
 Icc 5mA
 Limit 2μV -3dB
 Vo 180mV Dev=3kHz
 THD 1.0%



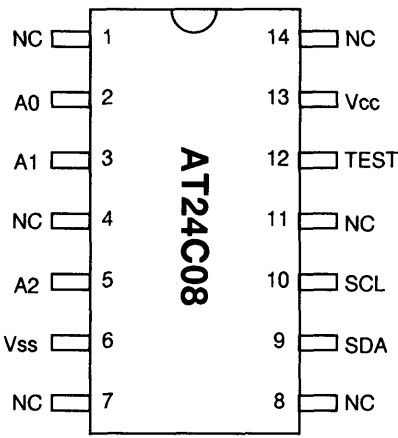
13) AT24C02N-10SI-2.7 (XA0364) EEPROM 256 x 8Bit



Pin Names

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

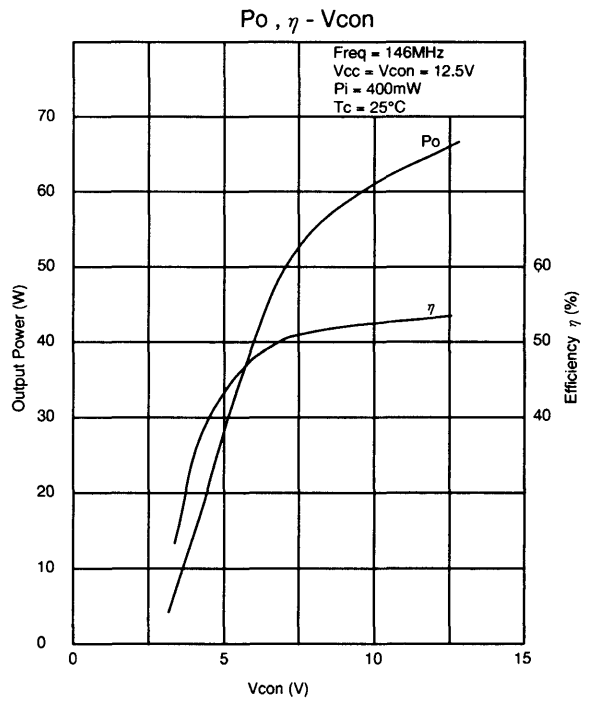
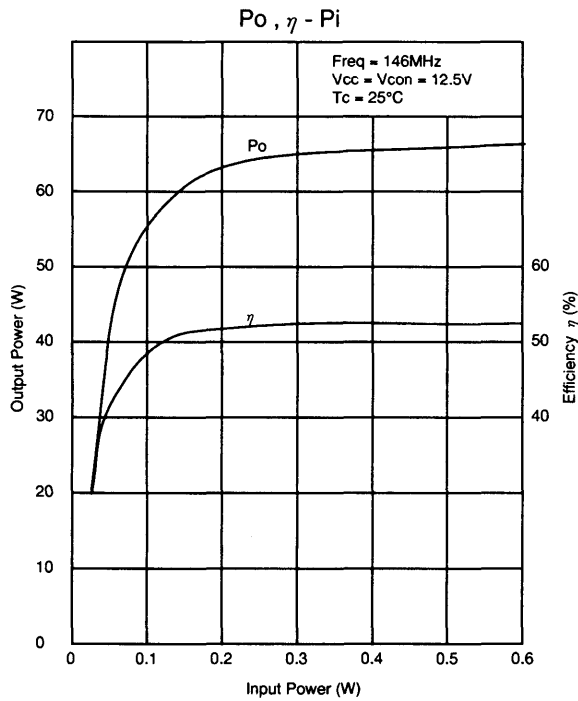
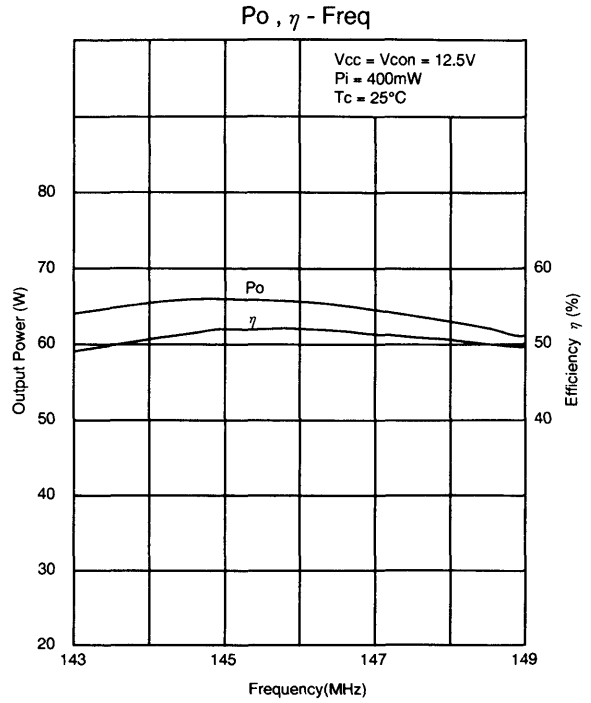
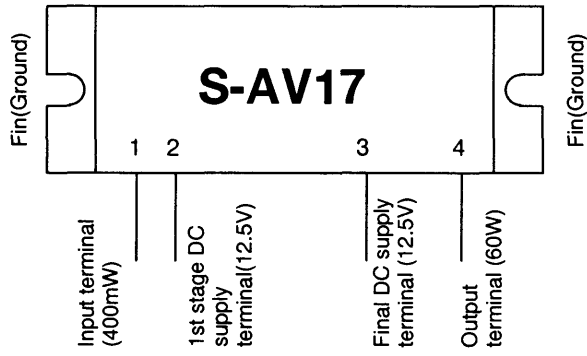
14) AT24C08-10SI-2.7 (XA0367) EEPROM 1024 x 8Bit



Pin Names

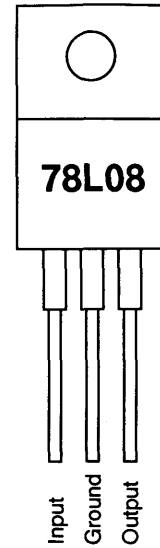
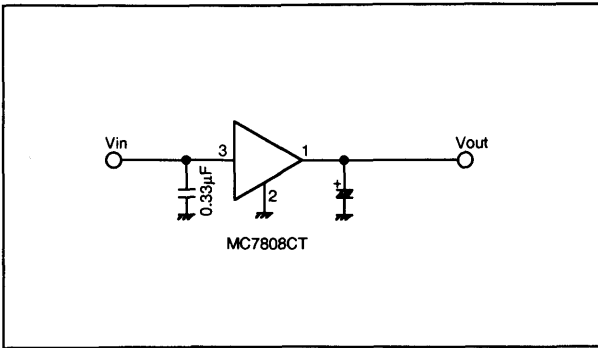
A0 ~ A2	Address inputs
SDA	Serial Data
SCL	Serial Clock
TEST	Hold at Vss
Vss	Ground
Vcc	+5V

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



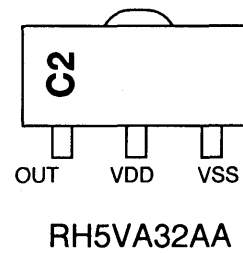
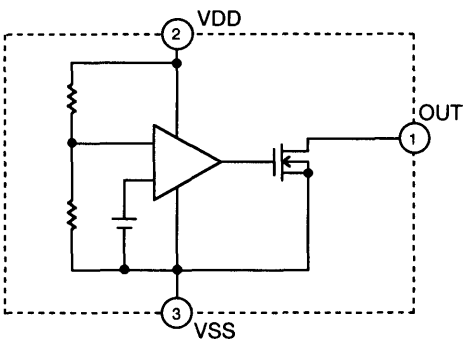
8) MC7808CT (XA0082)
8V Voltage Regulator

Test Circuit



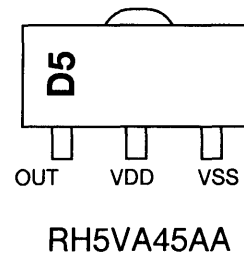
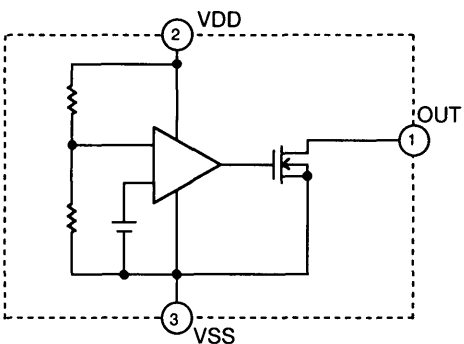
9) RH5VA32AA-T1 (XA0198)
C-MOS Voltage Detector

Equivalent Circuit

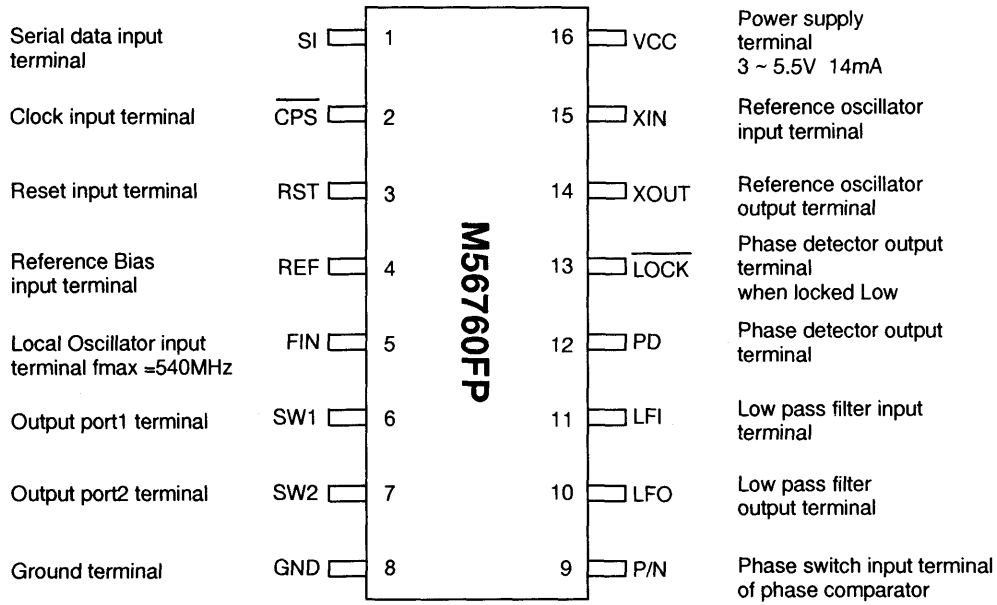


10) RH5VA45AA-T1 (XA0208)
C-MOS Voltage Detector

Equivalent Circuit

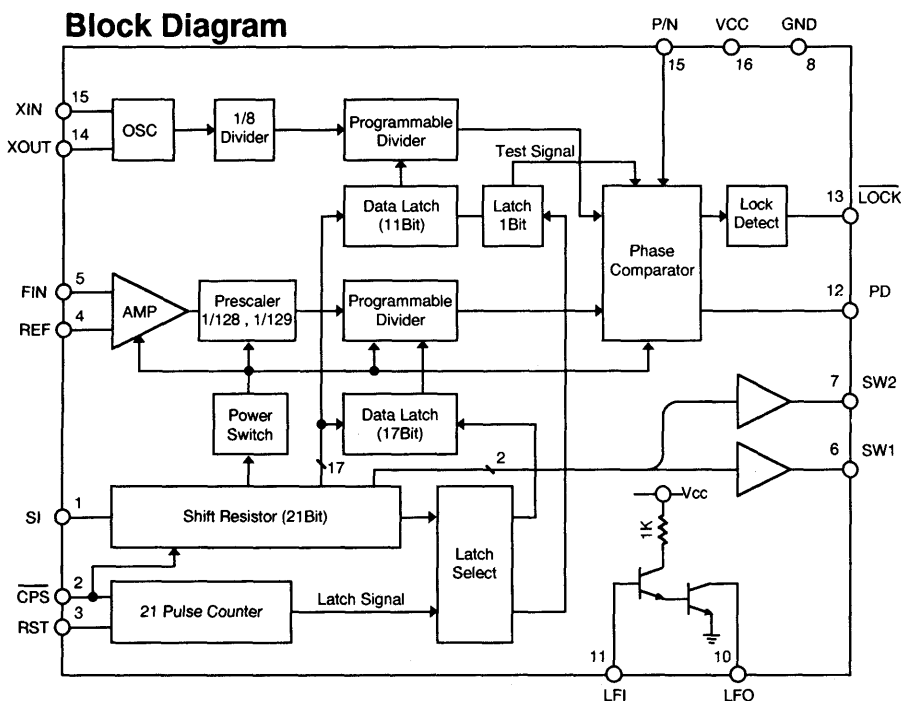


7) M56760FP (XA0235) 540MHz Frequency Synthesizer

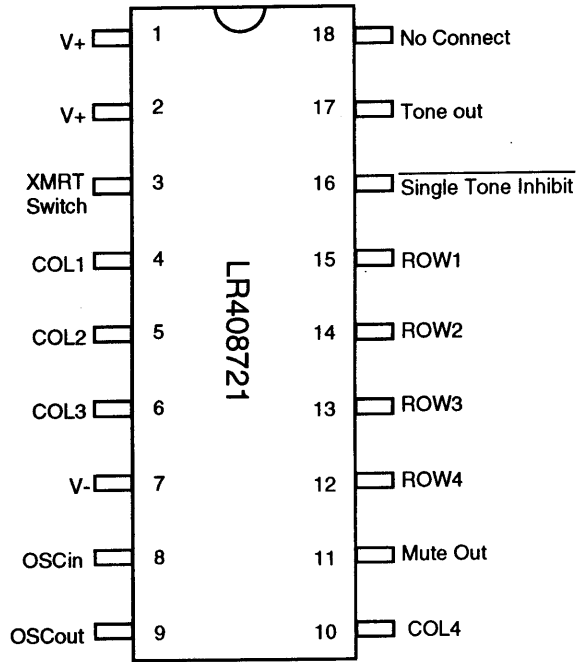


Function Table

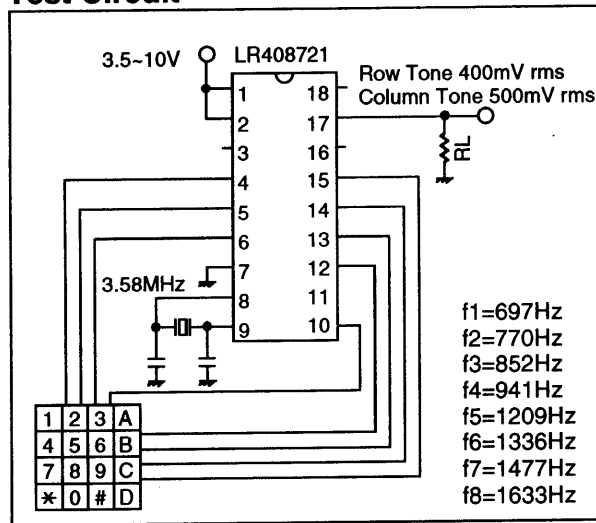
P/N input	Phase	PD output
High or Low	Locked	Hi-Z
High	Lead	High
High	Lag	Low
Low	Lead	Low
Low	Lag	High



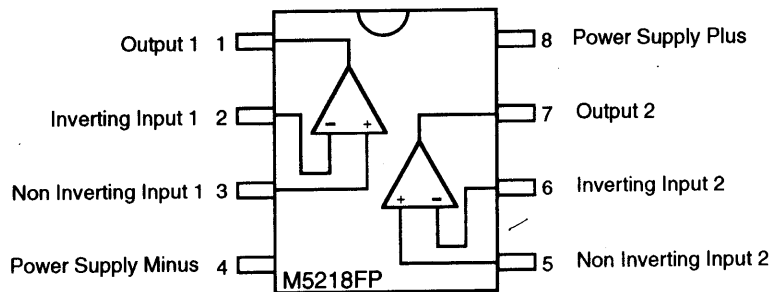
5) LR408721 (XA0042)
Tone Dialer



Test Circuit

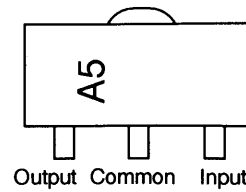
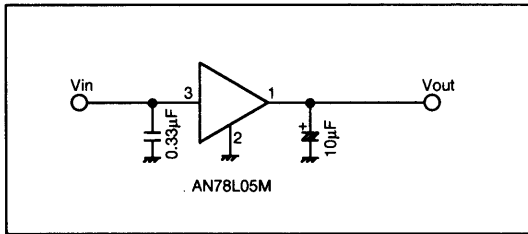


6) M5218FP (XA0068)
Dual Low Noise
Operational Amplifiers



2) AN78L05M (XA0238)
5V Voltage Regulator

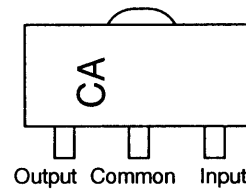
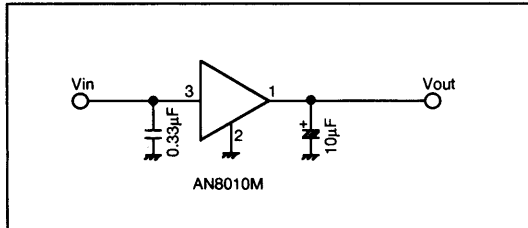
Test Circuit



AN78L05M

3) AN8010M (XA0119)
Voltage Regulator

Test Circuit

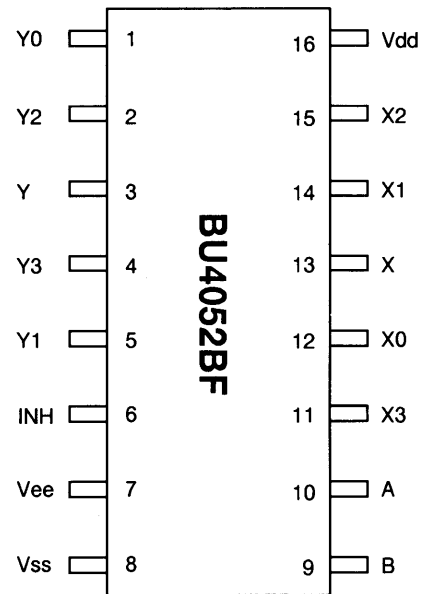


AN8010M

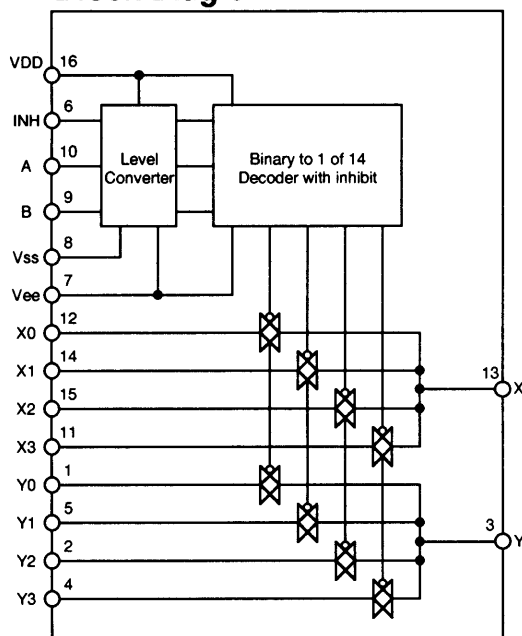
4) BU4052BF (XA0236)
Analog Multiplexers/Demultiplexers

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



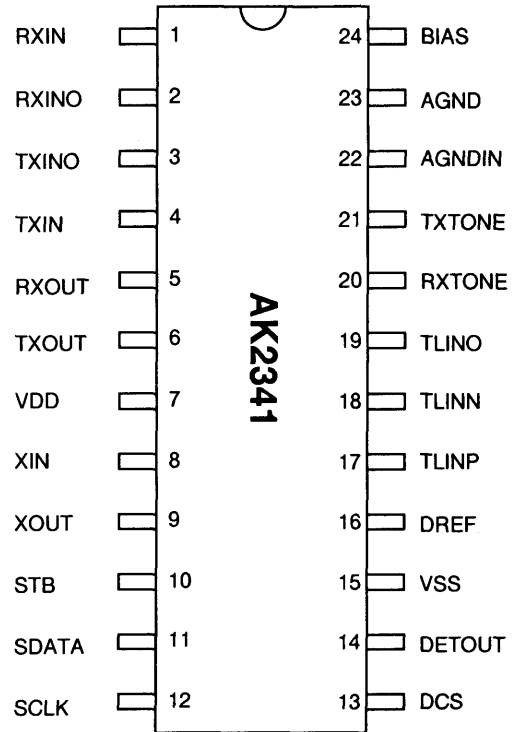
Block Diagram



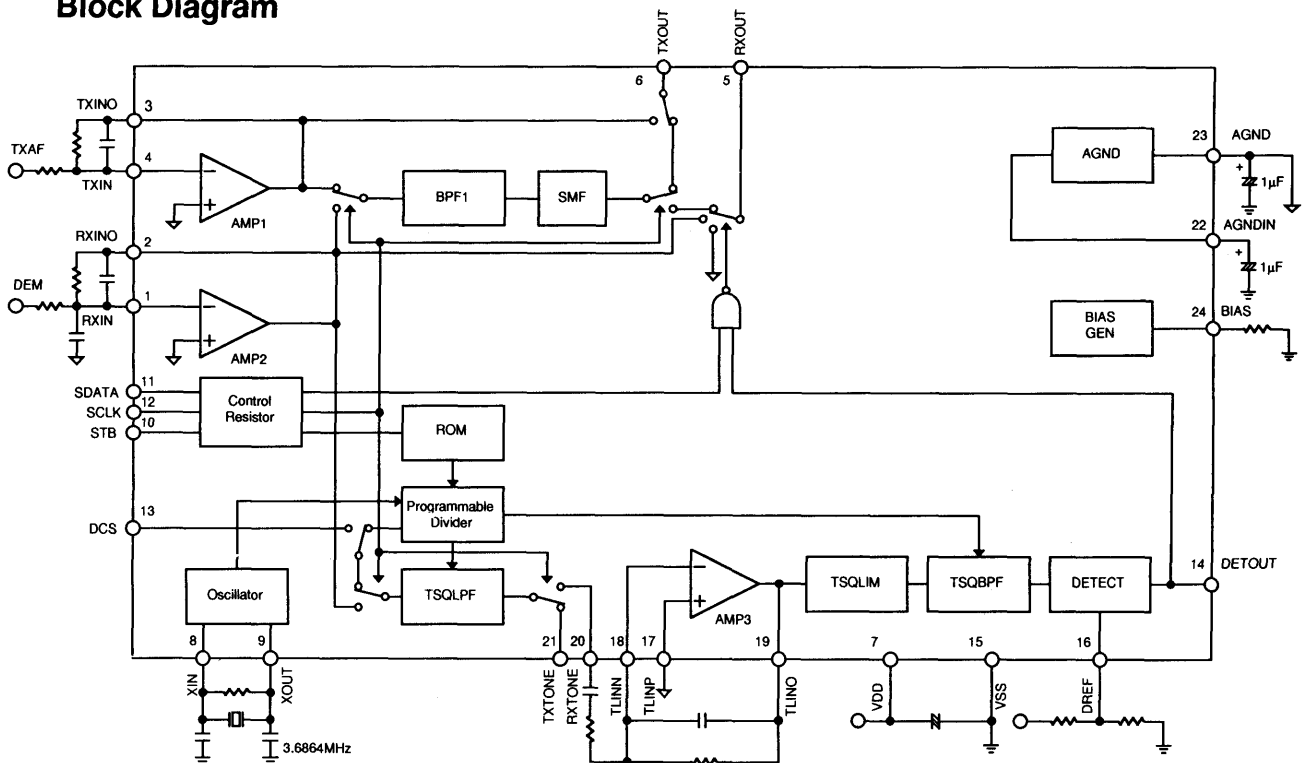
SEMICONDUCTOR DATA

1) AK2341 (XA0239) CTCSS Encoder/Decoder

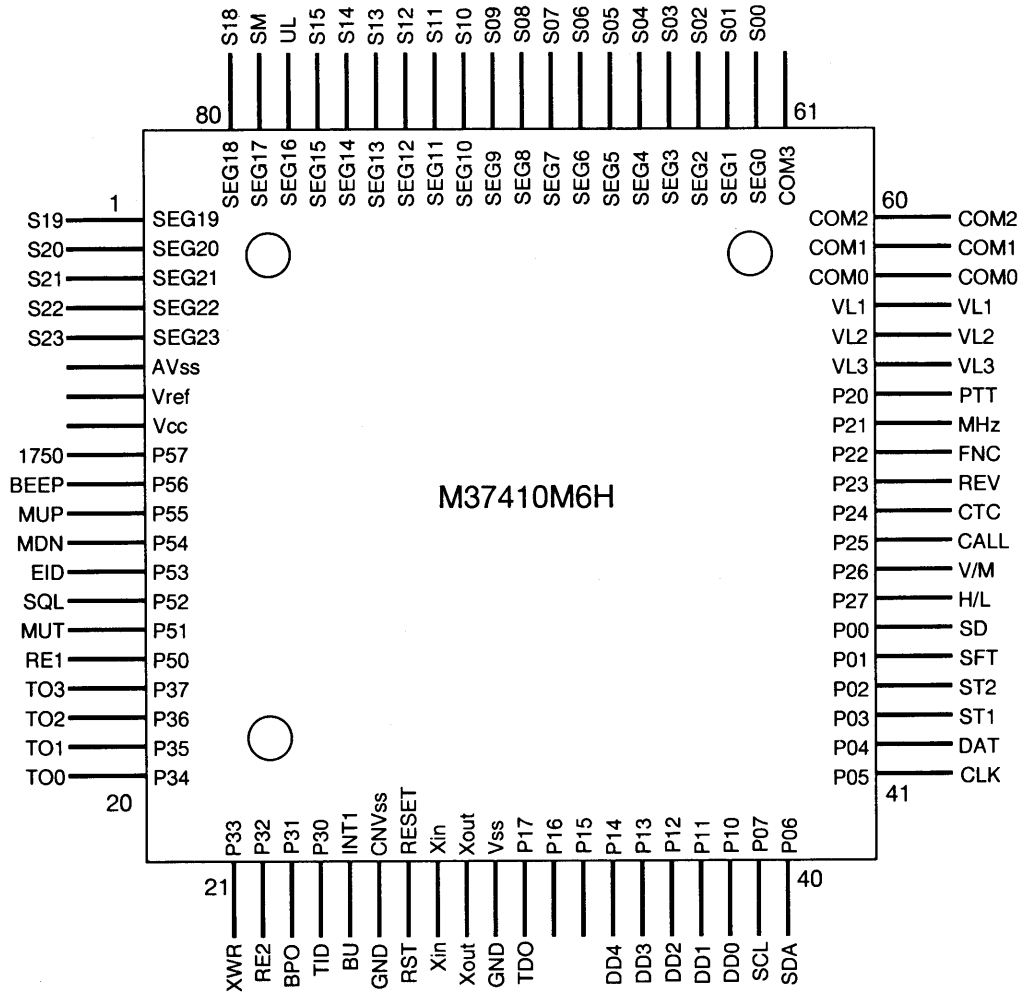
Pin No.	Pin Name	I/O	Function
1	RXIN	I	RX Signal Input
2	RXINO	O	AMP2 Output
3	TXINO	O	AMP1 Output
4	TXIN	I	TX Audio Input
5	RXOUT	O	RX Audio Output
6	TXOUT	O	TX Audio Output
7	VDD	-	Power Supply (1.8 ~ 5.5V)
8	XIN	I	Crystal Terminal (3.6864MHz)
9	XOUT	O	Crystal Terminal (3.6864MHz)
10	STB	I	Strobe for 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



5) Terminal Connection of Microprocessor



Port No.	I/O	Logic	Pin Name	Description
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	Active High	UL	Unlock Input
79	I	Analog	SM	Signal Meter Input
80	O	-	SEG18	LCD Segment 18 Output

Port No.	I/O	Logic	Pin Name	Description
32	O	No Use	-	
33	O	No Use	-	
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
40	I/O	Clock	SDA	Data Output for EEPROM
41	O	Clock	CLK	Clock Output
42	O	Clock	DAT	Data Output
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	MHz Key Input
54	I	Active Low	PTT	PTT Key Input
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

4) Terminal Function of Microprocessor

Port No.	I/O	Logic	Pin Name	Description
01	O	-	SEG19	LCD Segment 19 Output
02	O	-	SEG20	LCD Segment 20 Output
03	O	-	SEG21	LCD Segment 21 Output
04	O	-	SEG22	LCD Segment 22 Output
05	O	-	SEG23	LCD Segment 23 Output
06	I	-	GND	Analog Ground 0V
07	I	-	Vref	Reference Voltage Input 5V
08	I	-	Vcc	CPU Power Supply Input 5V
09	O	-	1750	Tone Burst Output
10	O	Clock	BEEP	Beep Tone Output
11	I	Active Low	MUP	Channel Up Input (Microphone Control)
12	I	Active Low	MDN	Channel Down Input (Microphone Control)
13	I	No Use	EID	
14	O	Active Low	SQL	Squelch Control (L: Audio is off.)
15	O	Active High	MUT	Microphone Mute (H: Mic Amp is off.)
16	I	Active Low	RE1	Rotary Encoder Input
17	O	Clock	T03	Tone Output
18	O	Clock	T02	Tone Output
19	O	Clock	T01	Tone Output
20	O	Clock	T00	Tone Output
21	I	Active High	XWR	EEPROM Write Status External Input
22	I	Active Low	RE2	Rotary Encoder 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	Reset Input
28	I	-	Xin	Crystal Oscillator Terminal (3.58MHz)
29	O	-	Xout	Crystal Oscillator Terminal (3.58MHz)
30	I	-	GND	Ground
31	O	Active Low	TDO	CTCSS Tone Detection Output

2) Transmitter System

1. Modulation 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.

3) PLL Circuit

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.

CIRCUIT DESCRIPTION

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 FET which 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 oscillator 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 resistor 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.

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:	50Ω 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.)
Emission Mode:	F3E(FM)
Modulation System:	Variable Reactance Frequency Modulation
Max. Frequency Deviation:	+/-5kHz
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
Sensitivity:	12dB SINAD less than -16dBμ (144.000MHz ~ 147.995MHz)
Selectivity:	More than +/-6kHz at -6dB Less than +/-15kHz at -60dB
Audio Power Output:	More than 2.5W 10% Distortion
Speaker Impedance:	8Ω