

# ***Service Manual***

## **ATS-909X**

### **FM / MW / LW / SW PLL SYNTHESIZED RECEIVER**

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# Specification

## FM. ELECTRICAL PERFORMANCE

Mod : ATS-909X(CE)	Brand : SANGEAN	Temp : 25° C	R.H. : 75%	Date : 2010/12/21	Ver. : A	Page : 1/5			
Test Item	Condition			Value		Test No.			Unit
	Input	Output	freq	Nom.	Lim.	1.	2.	3.	
Tuning Range		S/N=6dB	Min	87.5	±0.05				MHz
			Max	108.0	±0.05				
Intermediate freq.		S/N=6dB		10.7	±0.05				MHz
Max. Sensitivity		S/N=6dB	90MHz		16				dB $\mu$
			98MHz		16				
			106MHz		16				
Usable Sensitivity		S/N=30dB	88MHz	16	22				dB $\mu$
			98MHz	16	22				
			106MHz	16	22				
RDS Sensitivity			98MHz		28				dB $\mu$
Image Rejection									dB
I.F. Rejection									dB
3dB Limiting(1mV)	80dB $\mu$			20	26				dB $\mu$
Min. output	60dB $\mu$			0.6	3				mv
Tuning Ind. Sens. (4 nd.dot)				13	18				dB $\mu$
Auto. Scan. Stop. Sens.				18	24				
Stereo indicator Sens.				18	24				
Stereo separation (1KHz)				25	20				dB
Spurious rejection	60dB $\mu$		98MHz		50				dB
S/N Ratio				50	44				dB
Alter. Channel Select.	40 dB $\mu$	R.O.			25				dB
Am. suppression	60dB $\mu$	.EMF			30				dB
Output Power	400kHz	10%T.H.D		1	0.8				W
T.H.D.(75KHz dev.)	400/1kHz			2	4				%
Over load capacity		10%T.H.D			106				dB $\mu$
Calibration									
*Lowest Batt. volt.	60dB $\mu$		98MHz	3.9	4.2				V
Audio Fidelity. -3dB (W/Pre-emphasis)	60dB $\mu$	TONE. NORMAL	98MHz		150 8K				Hz
TONE action 10kHz/1kHz VOLUME AT CENTER POSITION	60dB $\mu$	MUSIC	98MHz	+7.5	+3				dB
	60dB $\mu$	MENS	98MHz	-22	-16				
Supply Voltage: AC 9 V	R. O. : 50 mW	Load: 8 Ohm	Modulation:400Hz/22.5 Dev.						
Remark :				Approved by			Released/Tested by		
				蔡宇曙 2010/12/21			黃澍寰 2010/12/21		

# Specification

## MW ELECTRICAL PERFORMANCE

Model ;ATS-909X(CE )	Brand : SANGEAN	Temp : 25° C	R.H. : 75%	Date : 2010/12/21	Ver. : A	Page : 2/5				
Test Item	Condition			Value		Test No.			Unit	
	Input	Output	Freq.	Nom.	Lim.	1.	2.	3.		
Tuning Range			Min.	520	±1				KHz	
			Max.	1710	±1					
Intermediate freq.		S/N=6 dB	1st IF 2nd IF	55845 450	±1				KHz	
Max. Sensitivity		S/N=6 dB	603KHz		58				dB μ/m	
			999KHz		56					
			1404KHz		56					
Usable Sensitivity		S/N=20dB	603KHz	58	64				dB μ/m	
			999KHz	56	62					
			1404KHz	56	62					
Image Rejection		S/N=6 dB	1404KHz	36	30				dB	
I. F. Rejection(450KHz)		S/N=6 dB			50				dB	
Selectivity(±10KHz)		S/N=6 dB			40				dB	
Bandwidth (WIDE)6 dB		S/N=6 dB			7	4-8			KHz	
Bandwidth (NARROW)6 dB		S/N=6 dB			4.5	2.5-6			KHz	
T. H. D.(5mV)	74 dB μ/m				2	4			%	
Lowest Batt. Volt.	74 dB μ/m				3.9	4.2			V	
Hum Modulation.	100 dB μ/m								dB	
Tuning Ind. Sens.(4nd.dot)				999KHz	48	54			dB μ/m	
Auto. Scan. Stop. Sens.					56	62			dB μ/m	
S/N Ratio	74 dB μ/m					32			dB	
Current Consumption	74 dB μ/m								mA	
TONE ACTION(3KHz)	74 dB μ/m	NORMAL /NEWS			10	6			dB	
Audio fidelity(-6dB) WIDE	74 dB μ/m						150			Hz
							2100			
Output power	74 dB μ/m 400Hz	MAX 10%T.H.D				1	0.8			W
Over Load Capacity	30%Mod	10%T.H.D					100			dB μ/m
A. G. C. F. O. M.	100dB μ/m						50			dB
A. C.A.(. ±10KHz)						28			dB	
Whistle Modulation(5mV/M)	74 dB μ/m		2IF/3IF			15			%	
Supply Voltage: AC9 V	R. O. : 50 mW	Load: 8 Ohm	Modulation:400Hz/30%							
Remark :				Approved by			Released/Tested by			
				蔡宇曙 2010/12/21			黃澍寰 2010/12/21			

# Specification

## SW ELECTRICAL PERFORMANCE

Mode : ATS-909X(CE)	Brand : SANGEAN	Temp : 25° C	R.H. : 75%	Date : 2010/12/21	Ver. : A	Page : 3/5			
Test Item	Condition			Value		Test No.			Unit
	Input	Output	Freq.	Nom.	Lim.	1.	2.	3.	
Tuning Range			Min.	1711	±1K				KHz
			Max.	29999	±1K				
Intermediate freq.		S/N=6Db	1 <sup>st</sup> . IF 2 <sup>nd</sup> . IF	55845 450	±1				KHz
Max. Sensitivity		S/N=6Db	3900KHz		22				dB μ
			15100KHz		18				
			25600KHz		18				
Usable Sensitivity		S/N=20Db	3900KHz	22	28				dB μ
			15100KHz	18	24				
			25600KHz	18	24				
Calibration		S/N=6Db	3900KHz 15100KHz 25600KHz		±1				KHz
Audio fidelity(-6 Db)					150				Hz
					2200				Hz
Selectivity(±10KHz)		S/N=6Db			50				Db
Bandwidth (WIDE)6Db		S/N=6Db		6	4-8				KHz
Bandwidth (NARROW)6Db		S/N=6Db		4.5	3-7				KHz
T. H. D. ( 60 emf dB μ )				2	4				%
A. G. C. F. O. M.( 86 dB μ )					60				Db
Image Rejection				42	36				Db
I. F. Rejection (450KHz)				76	60				Db
Lowest Batt. Volt.				3.9	4.2				V
Hum Modulation (5Mv)									Db
Tuning Ind. Sens.(4 <sup>nd</sup> .dot)					18				dB μ
Auto. Scan. Stop. Sens.					10				dB μ
S/N Ratio ( 60 dB μ )					40				Db
Output power		MAX 10%T.H.D		1	0.8				W
Over Load Capacity	30%mod.	10%T.H.D		86	80				dB μ
RF Gain Control				28	±6				Db
SSB/CW sens.(S/N=10Db)				-3	+3				dB μ
Freq.Rewponse(-6Db)									Hz
A.C.A.( ±10KHz)					28				Db
Whistle Modulation			2IF/3IF						%
Supply Voltage:AC 9 V	R. O. : 50 Mw	Load: 8 Ohm	Modulation:400Hz/30% Mod						
Remark :				Approved by			Released/Tested by		
				蔡宇曙 2010/12/21			黃澍寰 2010/12/21		

# Specification

## LW ELECTRICAL PERFORMANCE

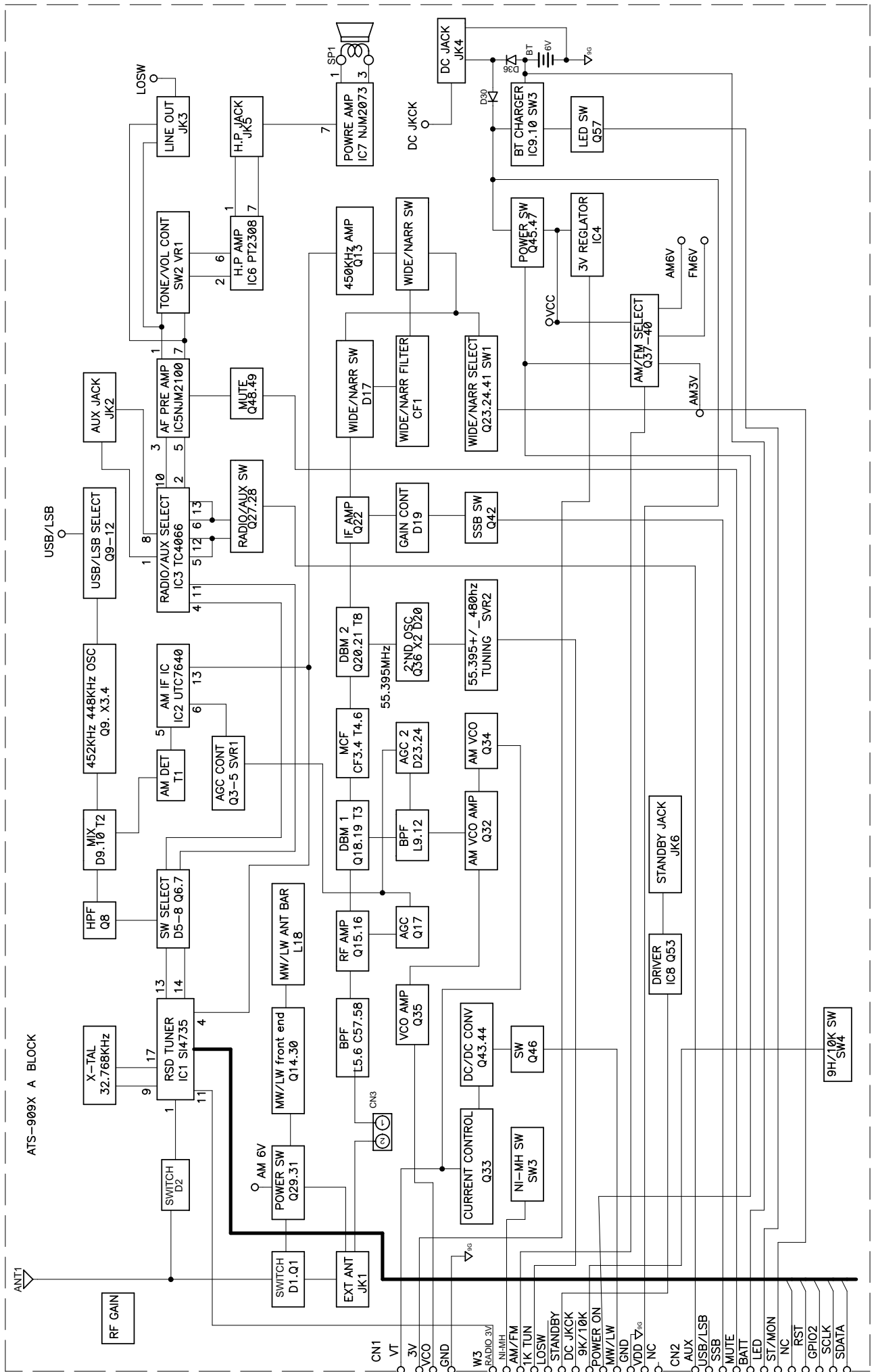
Model ATS-909X(CE)	Brand: SANGEAN	Temp : 25° C	R.H. : 75%	Date : 2010/12/21	Ver. : A	Page : 4/5			
Test Item	Condition			Value		Test No.			Unit
	Input	Output	Freq.	Nom.	Lim.	1.	2.	3.	
Tuning Range			Min.	100	±1				KHz
			Max.	519	±1				
Intermediate freq.		S/N=6dB	1st. IF 2nd. IF	55845 450	±1				KHz
Max. Sensitivity		S/N=6dB	180KHz		68				dB μ/m
			216KHz		66				
			279KHz		64				
Usable Sensitivity		S/N=20dB	180KHz	68	74				dB μ/m
			216KHz	66	72				
			279KHz	64	70				
Image Rejection			279KHz	30	24				dB
I.F. Rejection	450KHz	S/N=6dB	225KHz		50				dB
Selectivity(±10KHz)		S/N=6dB	216KHz		40				dB
Bandwidth -6dB		S/N=6dB							KHz
T. H. D. ( 5mV )	74dB μ/m			2	5				%
Lowest Batt. Volt.	74dB μ/m			3.9	4.2				V
Hum Modulation									dB
Tuning Ind. Sens.(4nd.dot)						68			dB μ/m
Auto. Scan. Stop. Sens.						72			dB μ/m
S/N Ratio ( 5mV )	74dB μ/m					20			dB
Current Consumption	74dB μ/m								mA
Tone action(3KHz)	74dB μ/m	NORMAL /NEWS							dB
Freq.Rewponse(-6dB)	74dB μ/m				150				Hz
					2.1				KHz
Output power	74dB μ/m 1KHz	MAX 10%T.H.D		1	0.8				W
Over Load Capacity	30%mod.	10%T.H.D			106				dB μ/m
A. G. C. F. O. M.	100dB μ/m								dB
Calibration		S/N=6dB	180KHz 225KHz 279KHz		±1				KHz
Whistle Modulation			2IF/3IF						%
Supply Voltage: AC 9 V	R. O. : 50 mW	Load: 8 Ohm	Modulation:400Hz/30% Mod						
Remark :				Approved by 蔡宇曙 2010/12/21			Released/Tested by 黃澍寰 2010/12/21		

# Specification

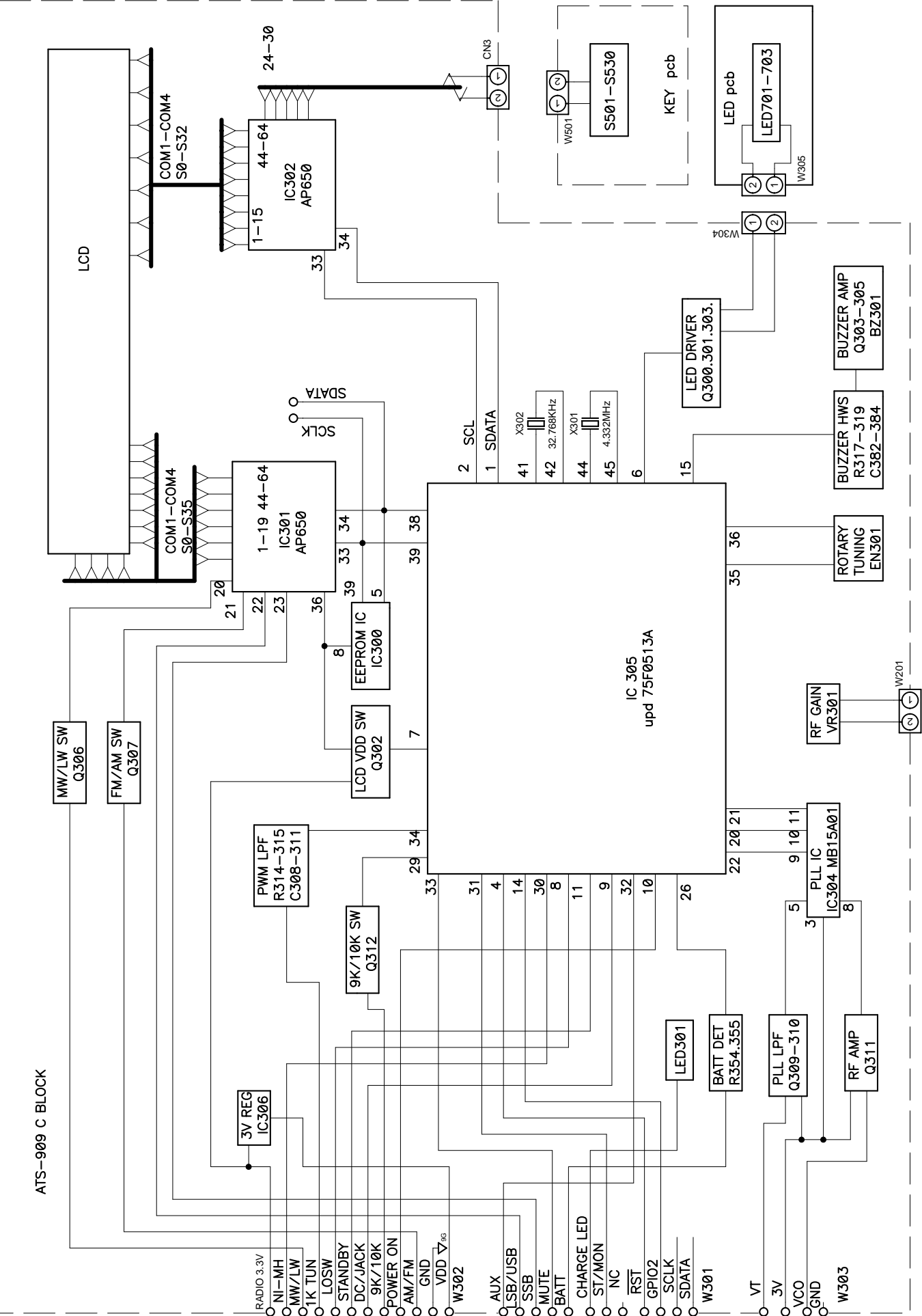
## AUX-IN ELECTRICAL PERFORMANCE

Mode ATS-909X(FCC)	Brand: SANGEAN	Temp : 25° C	R.H. : 75%	Date : 2010/12/21	Ver. : A	Page : 5/5			
Test Item	Condition			Value		Test No.			Unit
	Input	Output	Freq.	Nom.	Lim.	1.	2.	3.	
Output Power	AUX IN=0.5V/400Hz THD=10%			1500	1000				mW
AUX IN Dynamic Range	Output=R.0 THD=3% AUX IN=400Hz			1.5	1				V
I/S (Input Sensitivity)	AUX IN=400Hz OUT= 0.5W Volume=MAX			150	±50				mV
DISTORTION	AUX IN =I/S 400Hz OUT=R.O			0.5	1				%
MIN OUTPUT	AUX IN =I/S 400Hz Volume=MIN			1	3				mV
S/N RATIO	AUX IN =I/S 400Hz&GND OUT=R.O			56	50				dB
Frequency Response	AUX IN=0.15V/1KHz OUT=50mW=0dB	100Hz	0	±2				dB	
		10KHz	0	±3					
LINE OUT LEVEL (REC OUT IMPD=10K)	AUX IN =I/S 400Hz			150	±80				mV
Supply Voltage: Adaptor AC 9V	R.O.: 50mW			Load: 8 Ohm					
Remark :			Approved by 蔡宇曙 2010/12/21		Released/Tested by 黃澍寰 2010/12/21				

# MAIN PCB BLOCK DIAGRAM



# CONTROL PCB BLOCK DIAGRAM





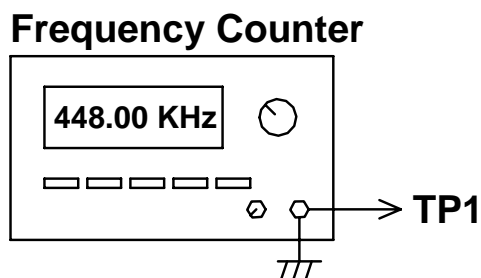
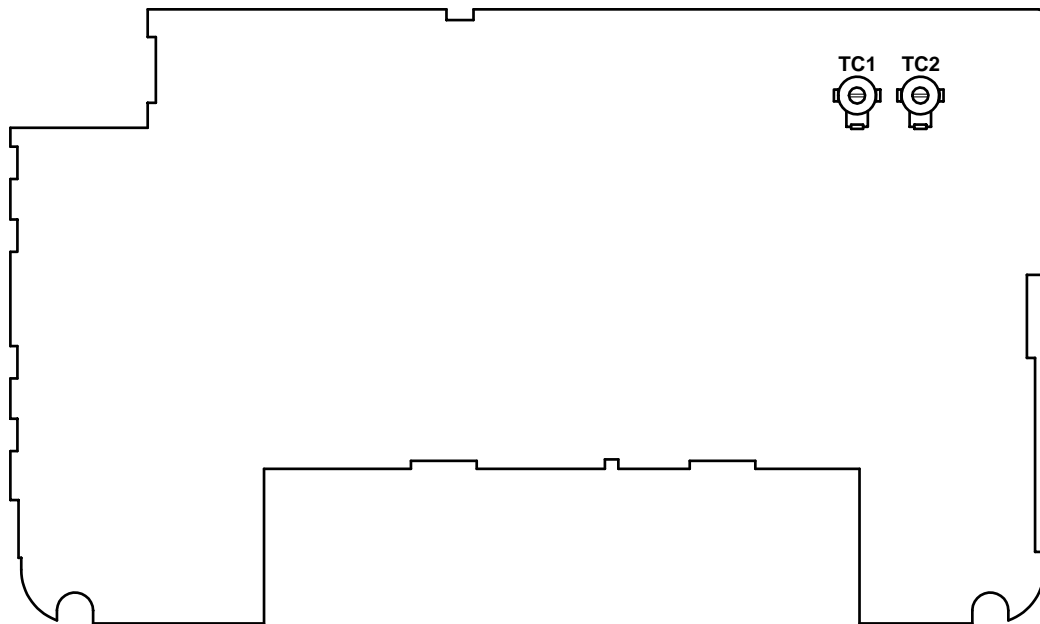
# ALIGNMENT INSTRUCTIONS

## (1) ALIGNMENT FOR 452KHZ / 448KHZ OSCILLATOR

- a. Required Instrument  
Frequency Counter
  
- b. Alignment Procedure

Setting		Procedure
RECEIVING FREQUENCY	15.1 MHz	(1) Connect a frequency counter to TP1. (2) Turn the radio to ON and set AM mode to "USB". (3) Adjust TC1 to have a reading specification frequency 452KHz $\pm$ 30Hz. (4) Set AM mode to "LSB" condition. (5) Adjust TC2 to have a reading specification frequency 448KHz $\pm$ 30Hz.
BAND	SW	
AM MODE	USB/LSB	
TONE	NORM	
RF GAIN	MAX.	
ADJUSTMENT	TC1, TC2	

### c. Instrument Connection



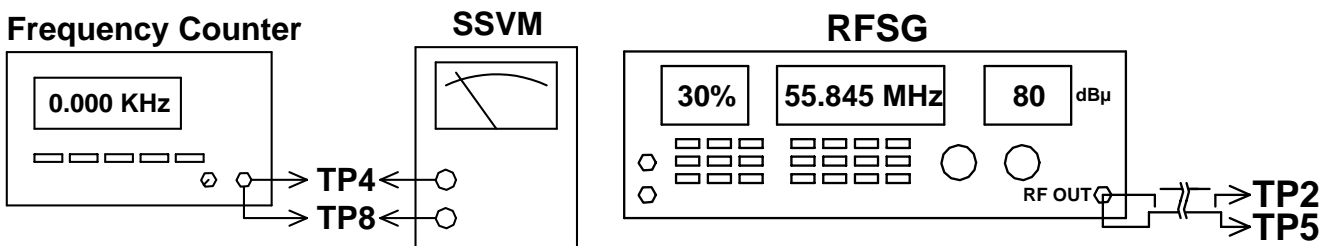
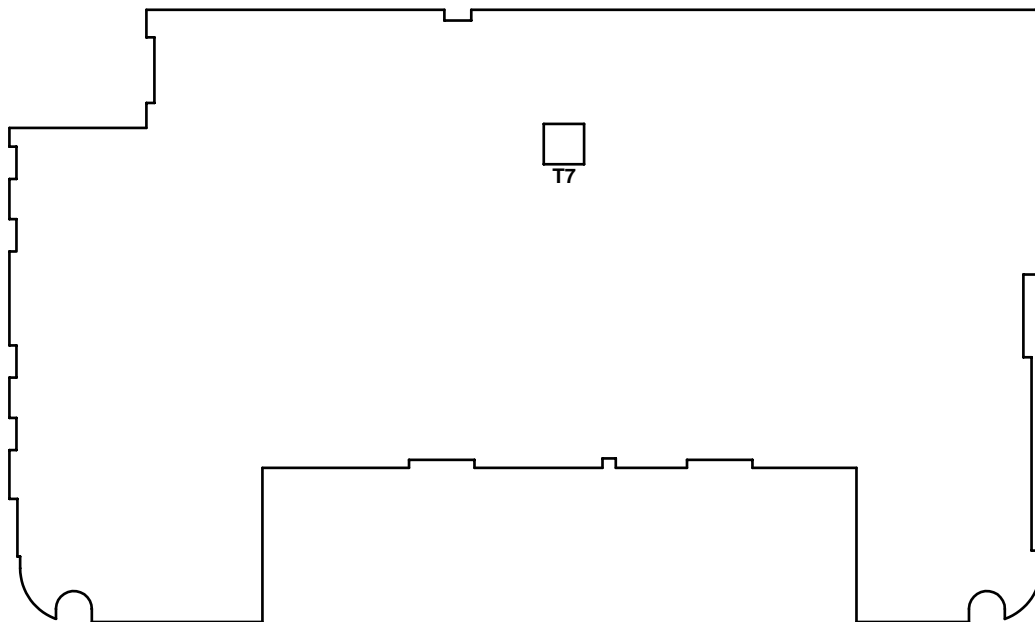
**(2) ALIGNMENT FOR AM 2ND LOCAL OSCILLATOR**

- a. Required Instrument
  - RF Signal Generator (RFSG)
  - Frequency Counter
  - DVM

b. Alignment Procedure

Setting		Procedure
<b>RECEIVING FREQUENCY</b>	<b>15.1 MHz</b>	(1) Set RFSG output level to 80 emf/dBμ and frequency to 55.845MHz with modulation 1KHz 30%.
<b>BAND</b>	<b>SW</b>	(2) Turn the radio to ON and set AM mode to "AM".
<b>AM MODE</b>	<b>LSB</b>	(3) Turn the radio receiving frequency to 15.1MHz.
<b>TONE</b>	<b>NORM</b>	(4) Connect RFSG output to ANT IN (TP2).
<b>WIDE / NARR. MONO</b>	<b>WIDE</b>	(5) Adjust T7 to get 1KHz maximum level output of the speaker.
<b>RF GAIN</b>	<b>MAX.</b>	(6) Change RFSG output frequency to 55.843MHz.
<b>ADJUSTMENT</b>	<b>T7</b>	(7) Change AM mode to "LSB" mode.
		(8) Check TP3 to have a reading on DVM 1.5V ± 0.05.
		(9) Set key lock function to ON.
		(10) Adjust T7 to get the speaker output tone beat below 50Hz.

c. Instrument Connection

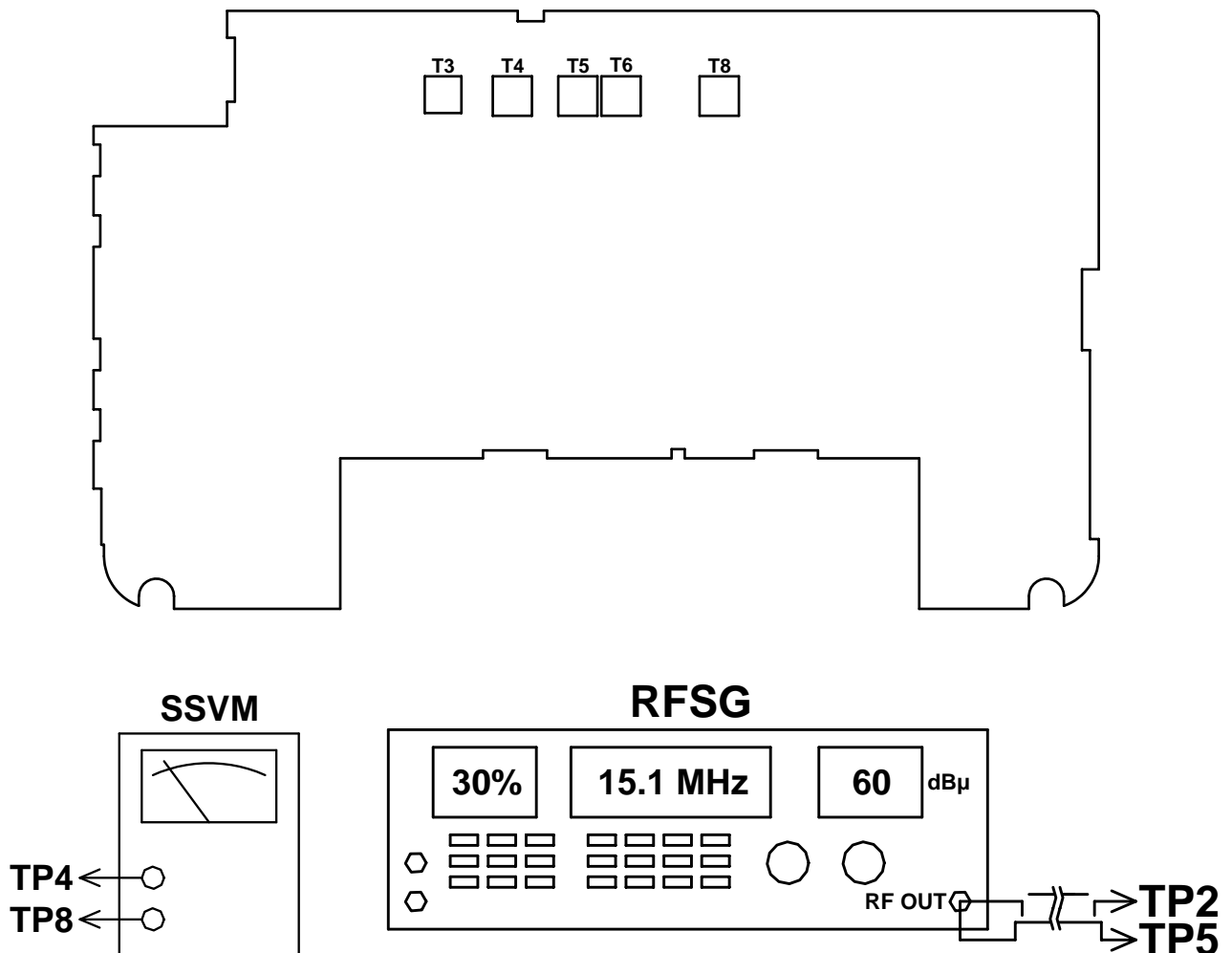


**(3) ALIGNMENT FOR AM SENSITIVITY**

- a. Required Instrument  
RF Signal Generator (RFSG)  
SSVM
- b. Alignment Procedure

Setting		Procedure
RECEIVING FREQUENCY	15.1 MHz	(1) Turn the radio to ON and tune receiving frequency to 15.1MHz. (2) Set RF Gain VR301 to Max. and slide Wide/Narr. switch to WIDE. (3) Feed a signal with 1KHz 30% modulation from RFSG into ANT IN (TP2). (4) Adjust T3, T4, T5, T6, T8 to have maximum 1KHz output level on SSVM.
BAND	SW	
AM MODE	AM	
TONE	NORM	
WIDE / NARR. MONO	WIDE	
RF GAIN	MAX.	
ADJUSTMENT	T3, T4, T5, T6, T8	

c. Instrument Connection

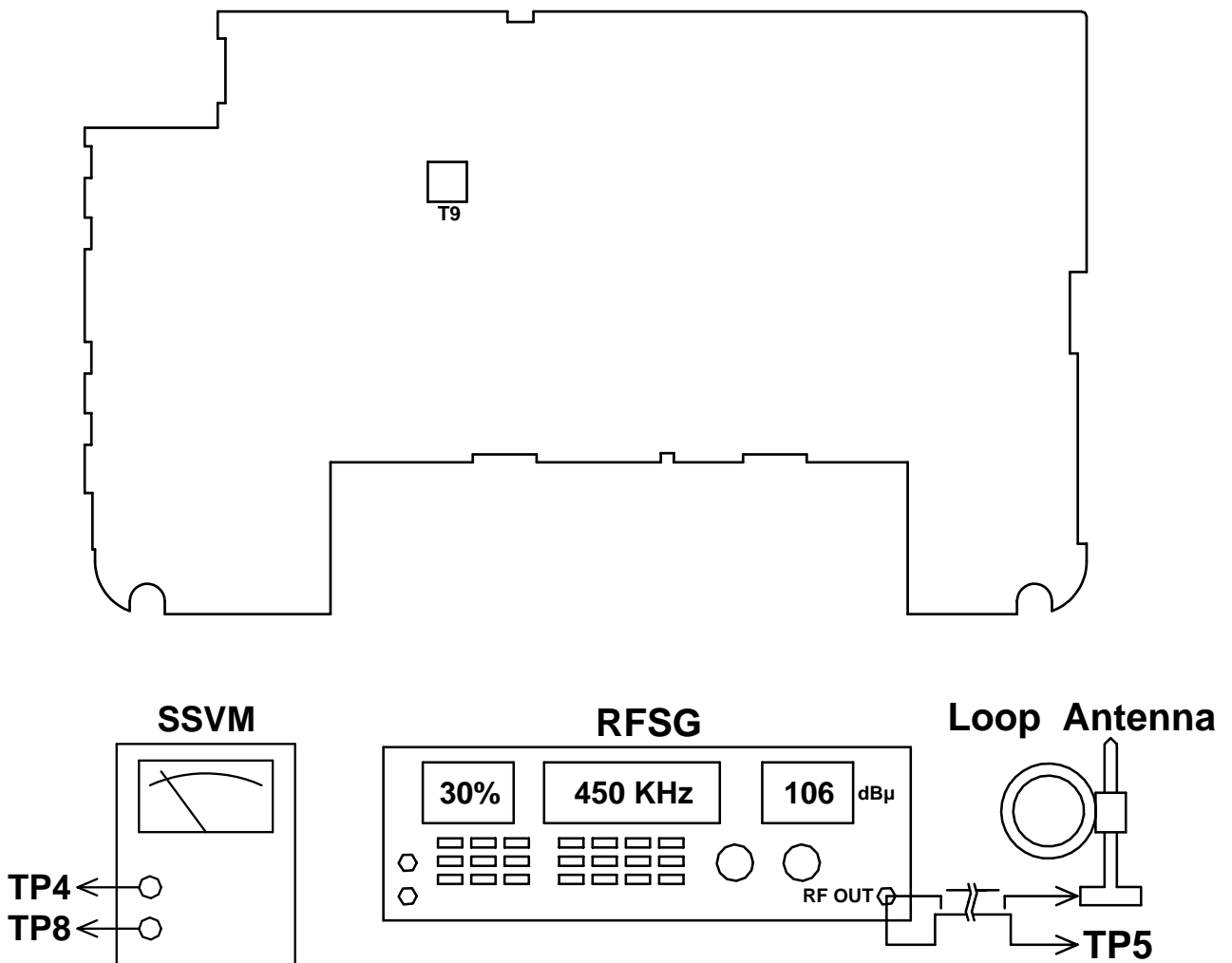


**(4) ALIGNMENT FOR 450KHz TRAP**

- a. Required Instrument  
RF Signal Generator (RFSG) With Loop Antenna  
SSVM
- b. Alignment Procedure

Setting		Procedure
RECEIVING FREQUENCY	450KHz	(1) Turn the radio to ON and tune receiving frequency to LW 450KHz. (2) Feed a 450KHz signal with 1KHz 30% modulation to loop antenna. (3) Connect a SSVM to speaker output (TP4). (4) Adjust T9 to get minimum reading of SSVM.
BAND	LW	
AM MODE	AM	
TONE	NORM	
WIDE / NARR. MONO	WIDE	
RF GAIN	MAX.	
ADJUSTMENT	T9	

c. Instrument Connection

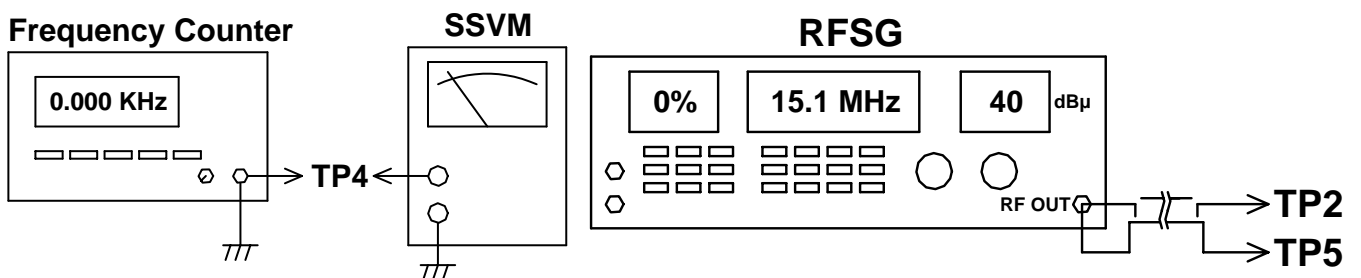
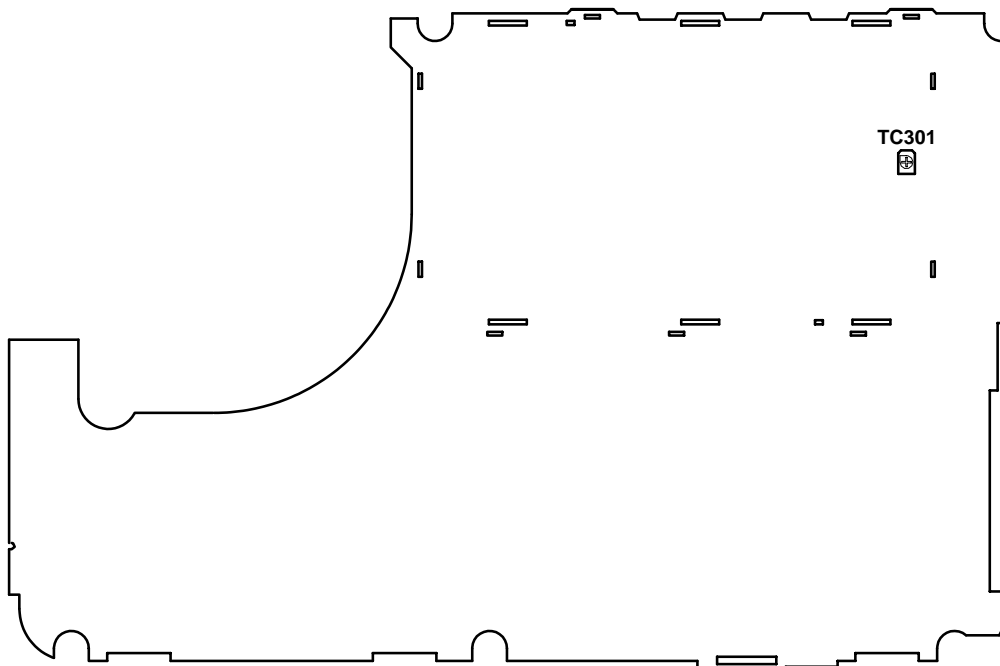


**(5) ALIGNMENT FOR TIME BASE OF FREQUENCY**

- a. Required Instrument  
 RF Signal Generator (RFSG)  
 Frequency Counter
- b. Alignment Procedure

Setting		Procedure
RECEIVING FREQUENCY	15.1 MHz	(1) Connect a RFSG to ANT IN (TP2) and set frequency to 15.1MHz and output to 40 emf/dB $\mu$ without modulation. (2) Set AM mode to LSB mode and volume turn to maximum. (3) Tune the radio receiving frequency to 15.1MHz by 10 key or tuning up/down and set key lock to ON. (4) Adjust TC301 to get the speaker output tone beat below 50Hz.
BAND	SW	
AM MODE	LSB	
TONE	NORM	
WIDE / NARR. MONO	NARR.	
RF GAIN	MAX.	
ADJUSTMENT	TC301	

c. Instrument Connection

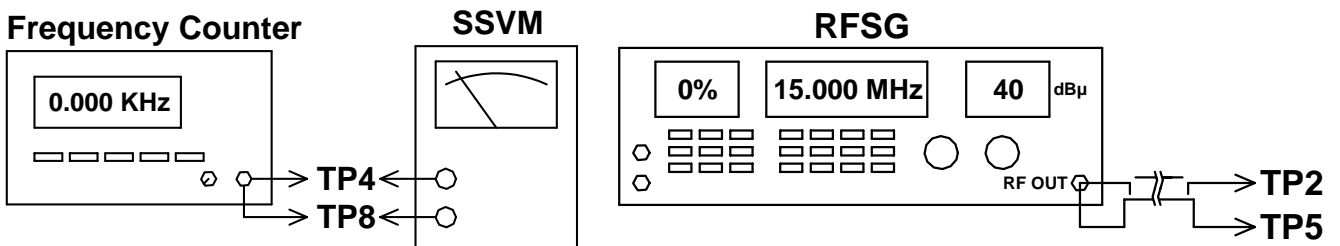
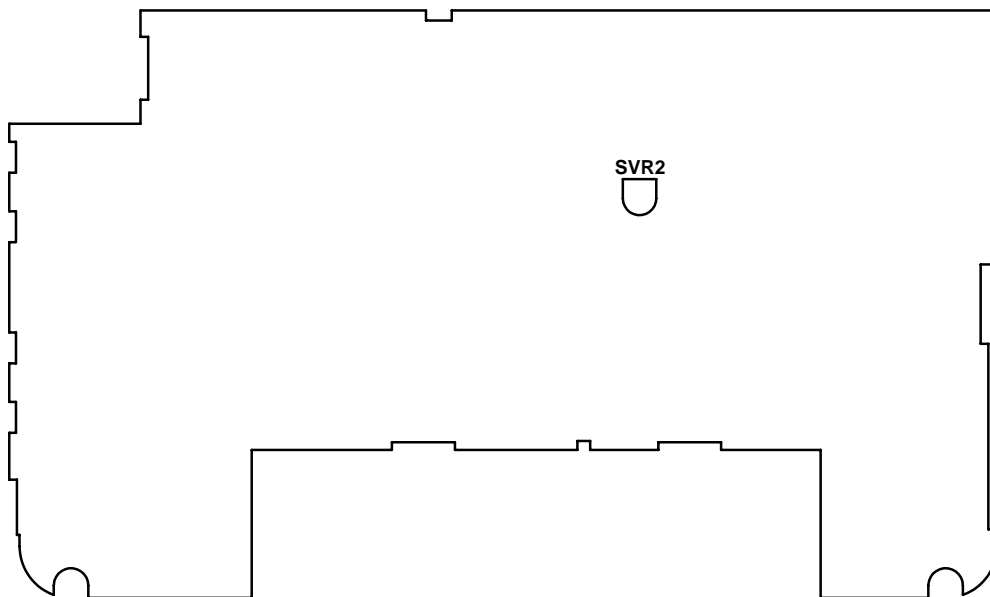


**(6) ALIGNMENT FOR USB/LSB FINE TUNING**

- a. Required Instrument  
 RF Signal Generator (RFSG)  
 Frequency Counter
- b. Alignment Procedure

Setting		Procedure
RECEIVING FREQUENCY	15.1 MHz	(1) Turn the radio to on and tune the receiving frequency to 15.1MHz. (2) Set the AM mode to "USB" mode. (3) Set the tuning step to "SLOW". (4) Connect RFSG to ANT IN (TP2) and set RF output to 15.1MHz 40 emf/dBμ without modulation. (5) Connect a frequency counter to speaker output (TP4). (6) Adjust SVR2 to have a reading of 40Hz ± 10Hz increment while Rotary tuning change the receiving frequency from 15.1MHz to 15.101MHz.
BAND	SW	
AM MODE	LSB	
TONE	NORM	
WIDE / NARR. MONO	NARR.	
RF GAIN	MAX	
TUNING STEP	SLOW	
VOLUME	CENTER POSITION	
ADJUSTMENT	SVR2	

- c. Instrument Connection

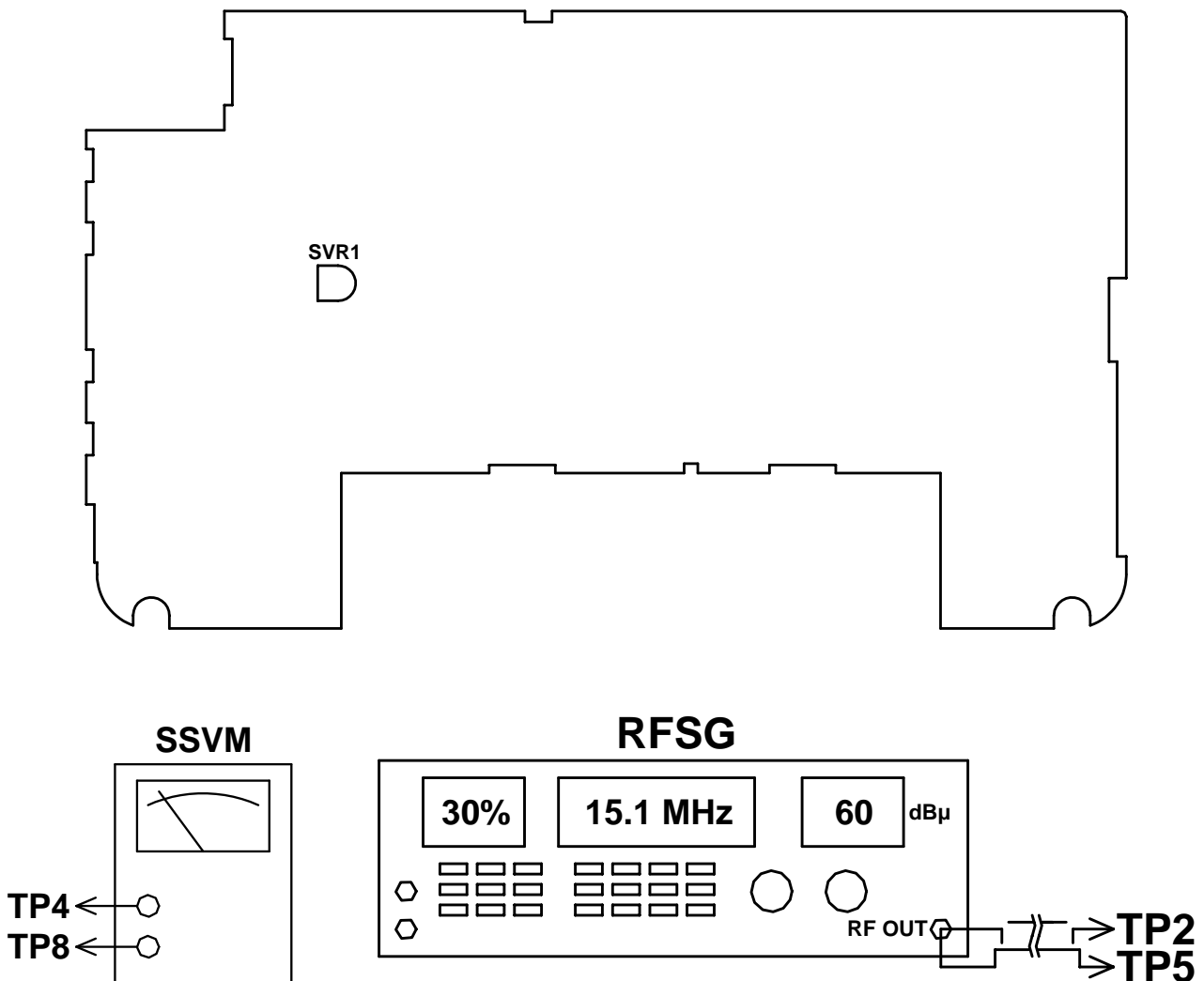


**(7) ALIGNMENT FOR TIME BASE OF FREQUENCY**

- a. Required Instrument  
 RF Signal Generator (RFSG)  
 DVM
- b. Alignment Procedure

Setting		Procedure
RECEIVING FREQUENCY	15.1 MHz	(1) Tune the radio to ON. (2) Connect the RFSG to ANT IN (TP2) and set frequency to 15.1MHz with 1KHz modulation. (3) Connect a DVM to TP6. (4) Set RFSG output level to 60 emf/dBμ. (5) Adjust SVR1 to have reading of 1.50V ~ 1.55V on DVM.
BAND	SW	
AM MODE	AM	
TONE	NORM	
WIDE / NARR. MONO	WIDE	
RF GAIN	MAX.	
ADJUSTMENT	SVR1	

c. Instrument Connection

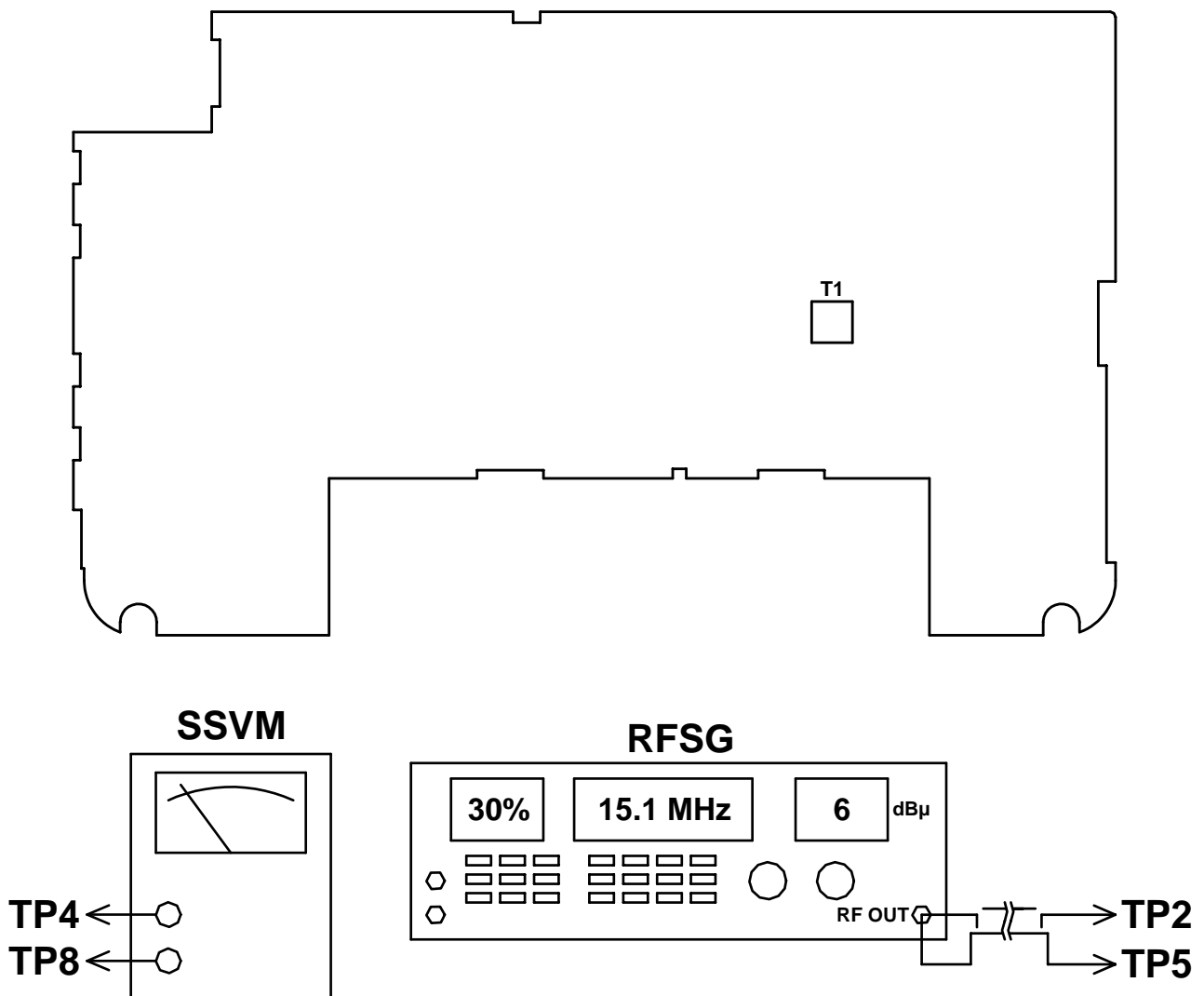


**(8) ALIGNMENT FOR AM SSB. IF SENSITIVITY**

- a. Required Instrument  
RF Signal Generator (RFSG)  
SSVM
- b. Alignment Procedure

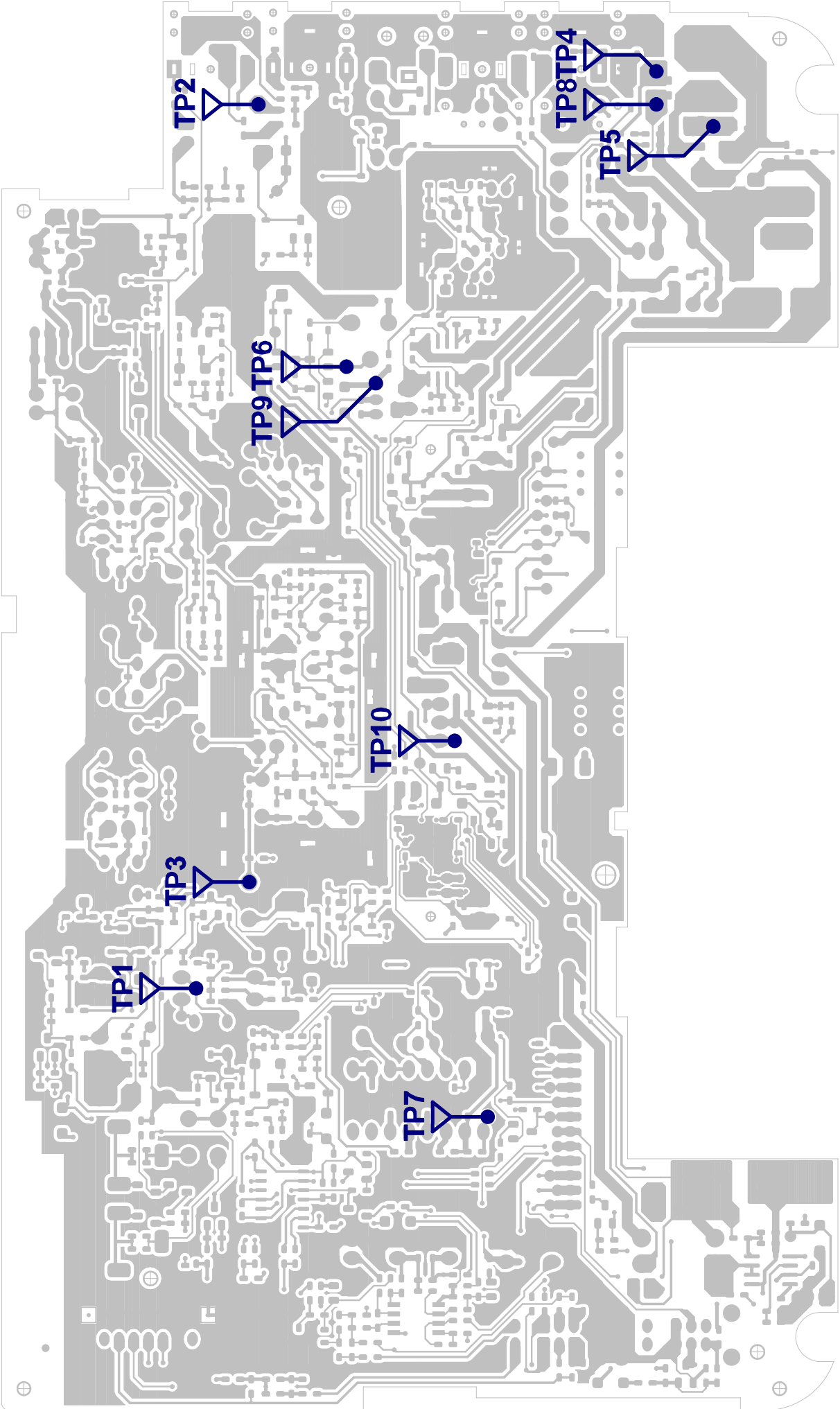
Setting		Procedure
RECEIVING FREQUENCY	15.1 MHz	(1) Turn the radio to ON and tune receiving frequency to 15.1MHz. (2) Set RF Gain VR301 to Max. and slide Wide/Narr. switch to WIDE. (3) Feed a signal with 1KHz 30% modulation from RFSG into ANT IN (TP2). (4) Adjust T1 to have maximum 1KHz output level on SSVM.
BAND	SW	
AM MODE	AM	
TONE	NORM	
WIDE / NARR. MONO	WIDE	
RF GAIN	MAX	
ADJUSTMENT	T1	

c. Instrument Connection

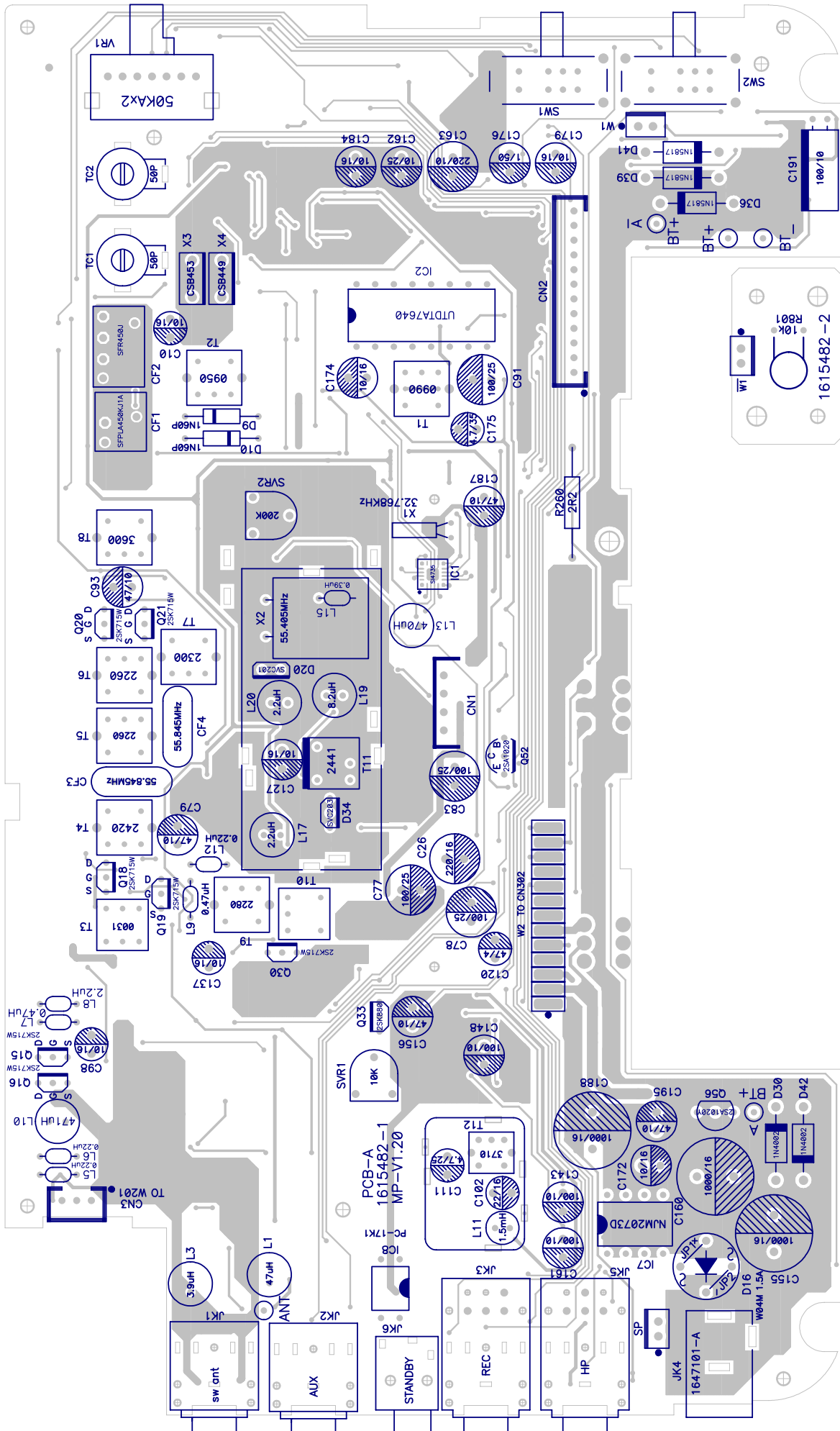




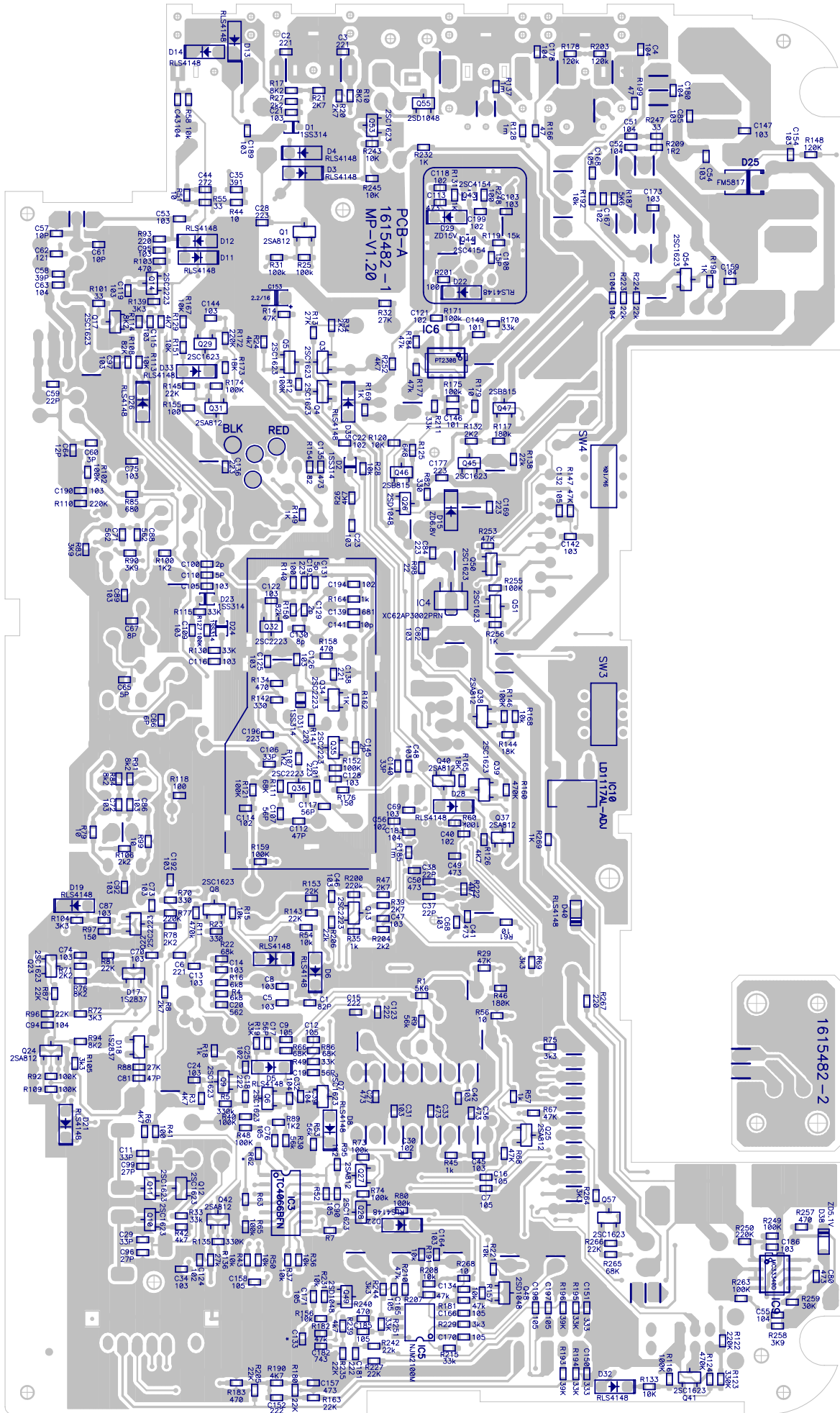
# TEST POINTS DIAGRAM



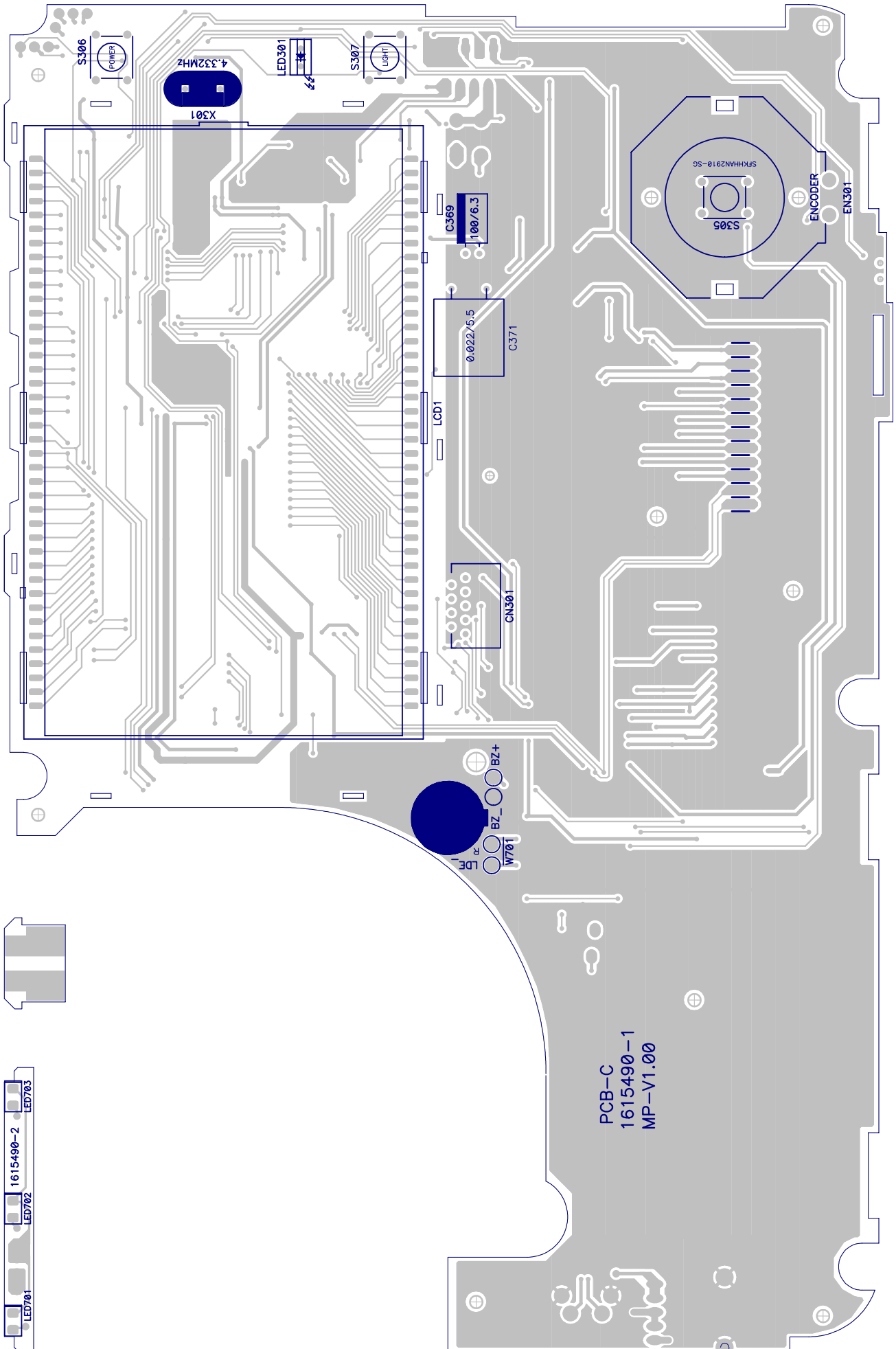
# MAIN PCB TOP VIEW



# MAIN PCB BOTTOM VIEW

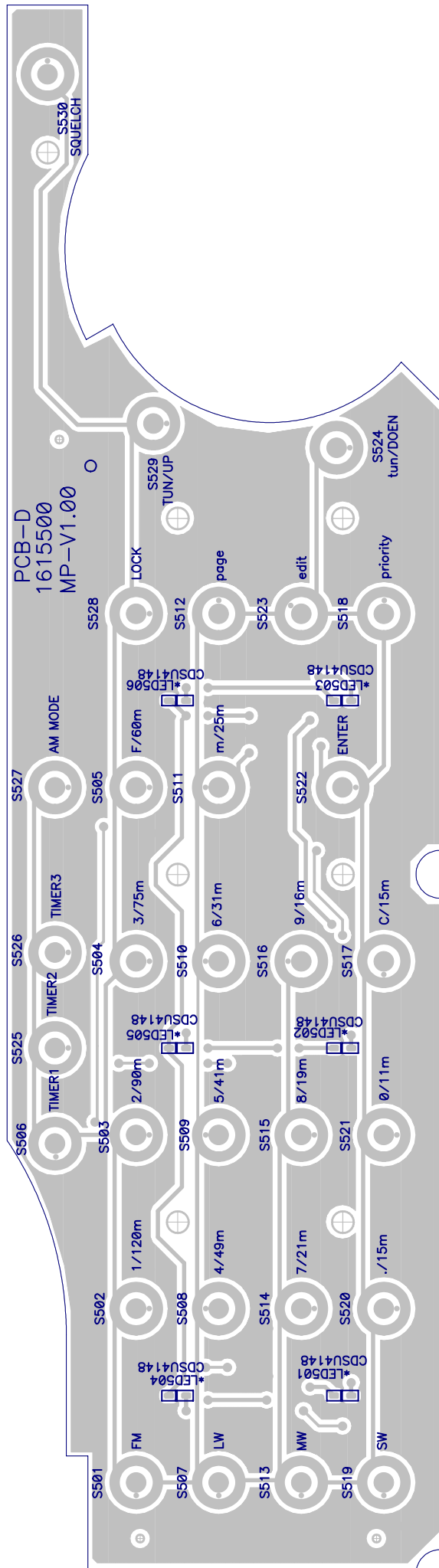


# CONTROL PCB TOP VIEW

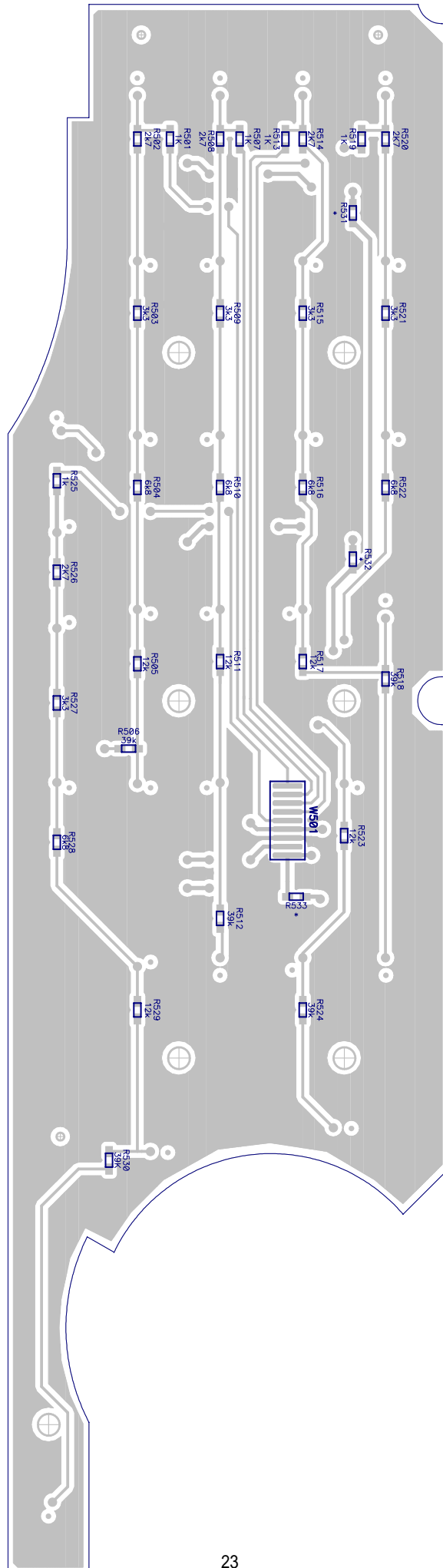




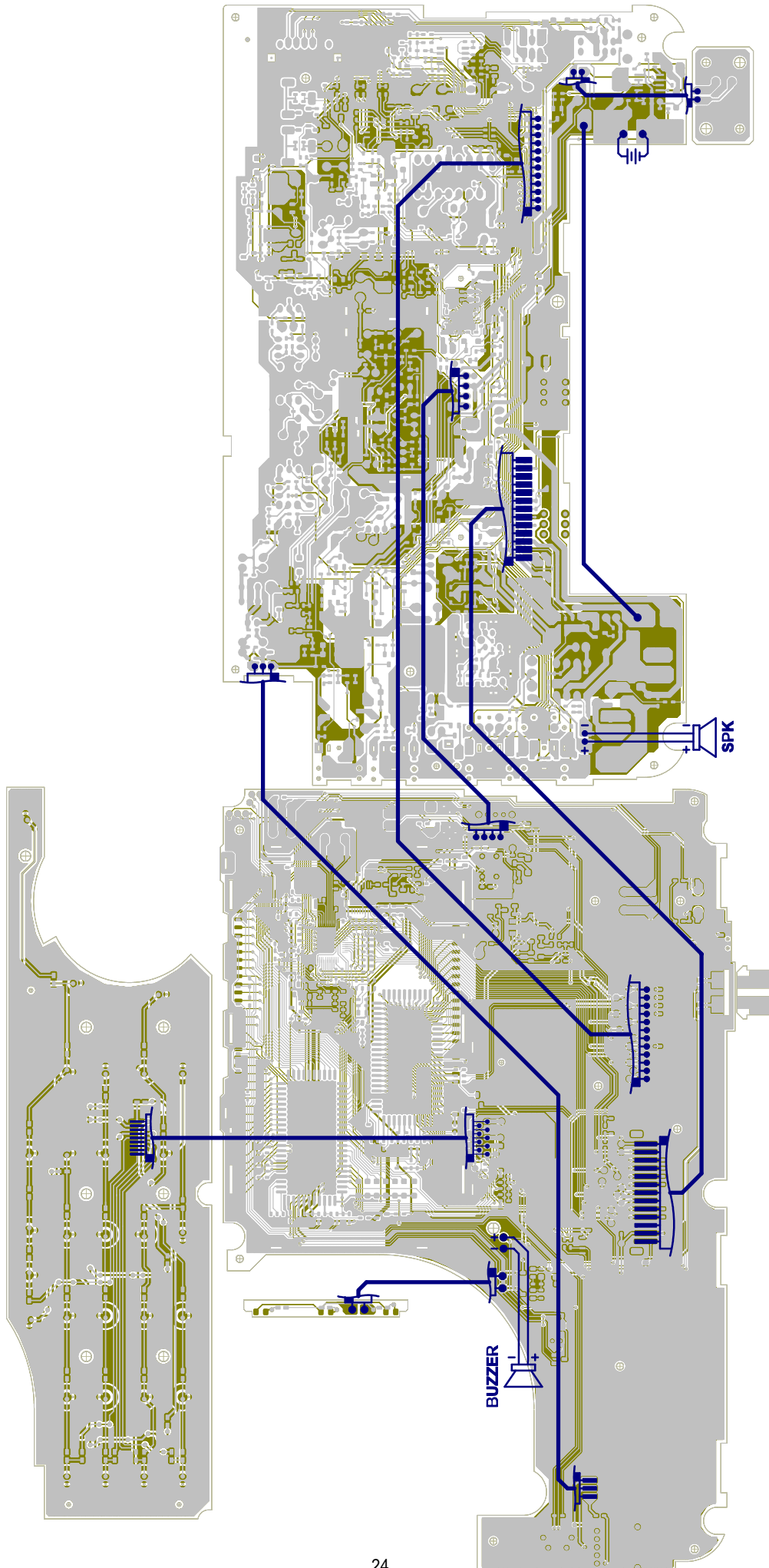
# KEY PCB TOP VIEW



# KEY PCB BOTTOM VIEW



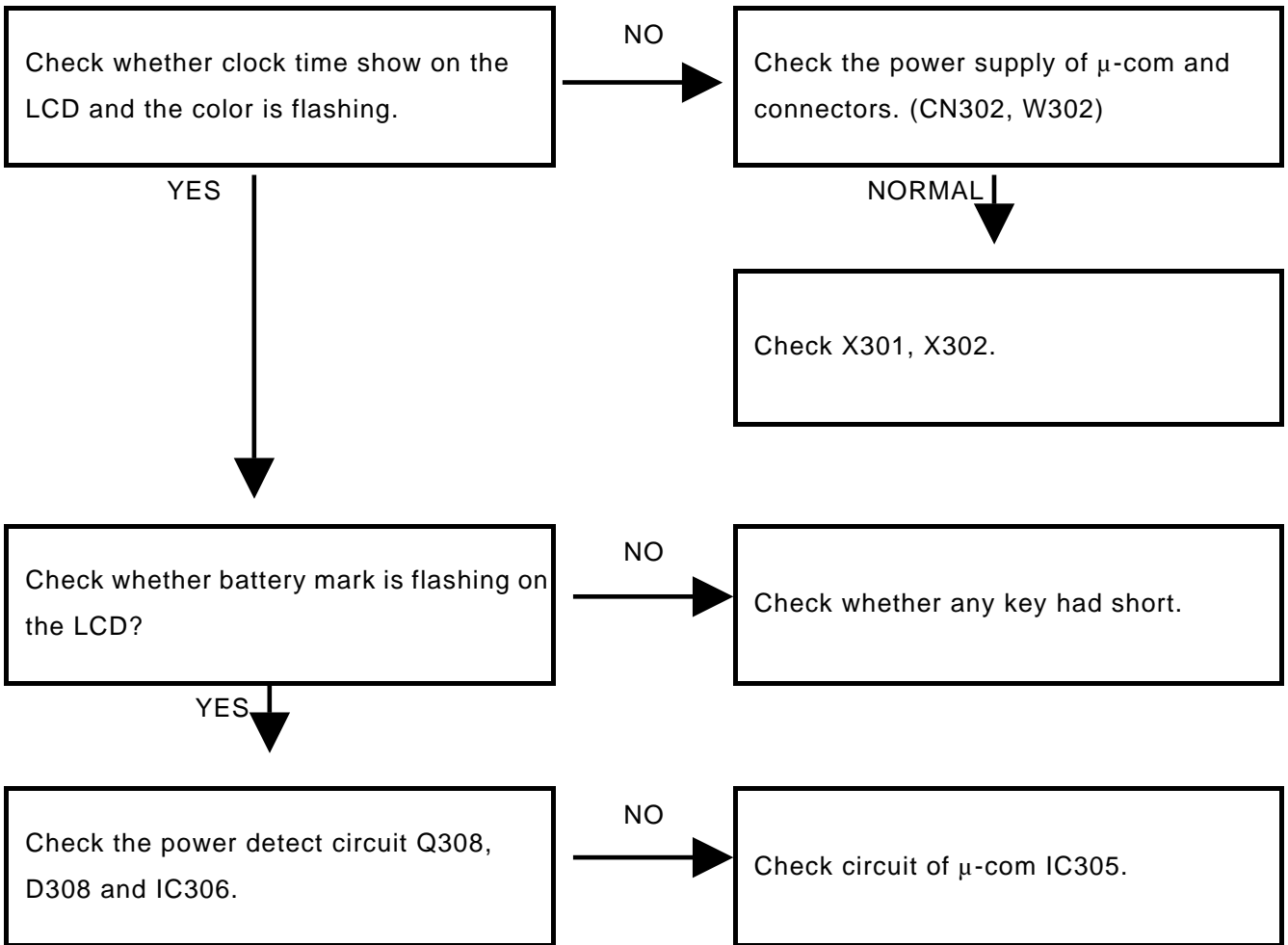
# WIRING DIAGRAM



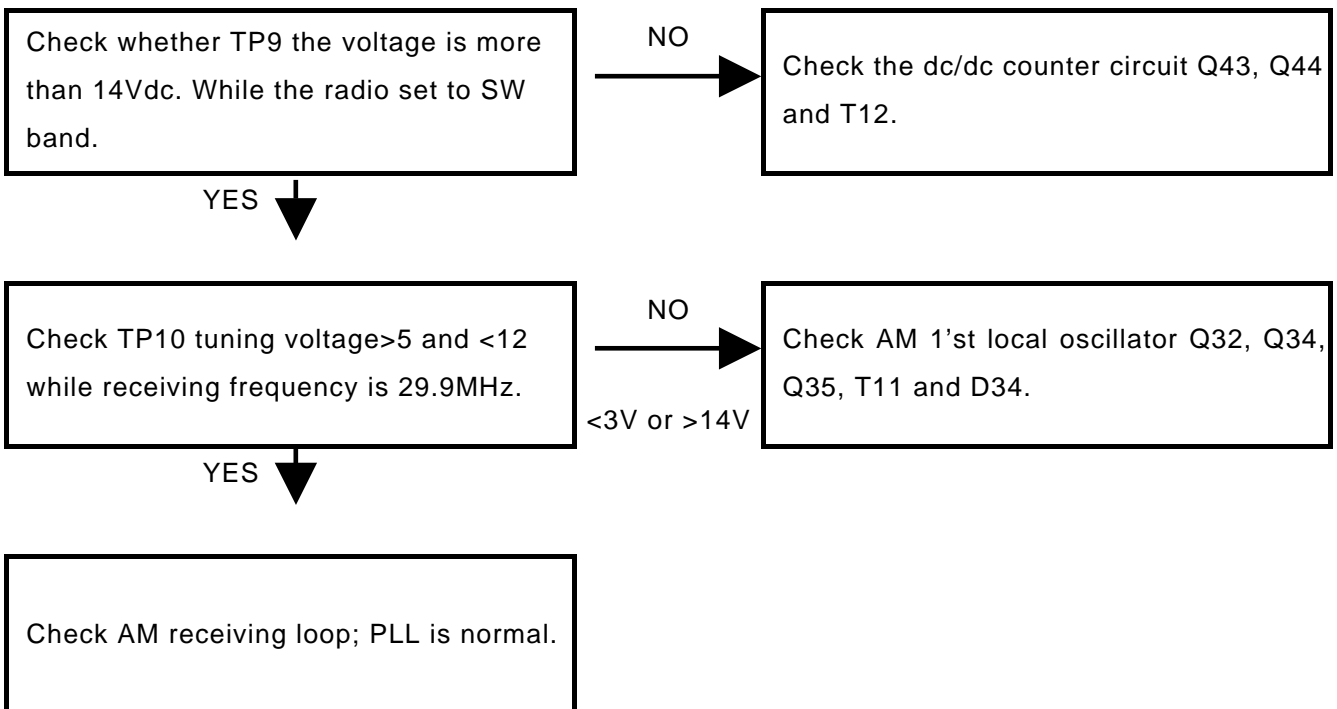


# TROUBLESHOOTING FLOW CHART

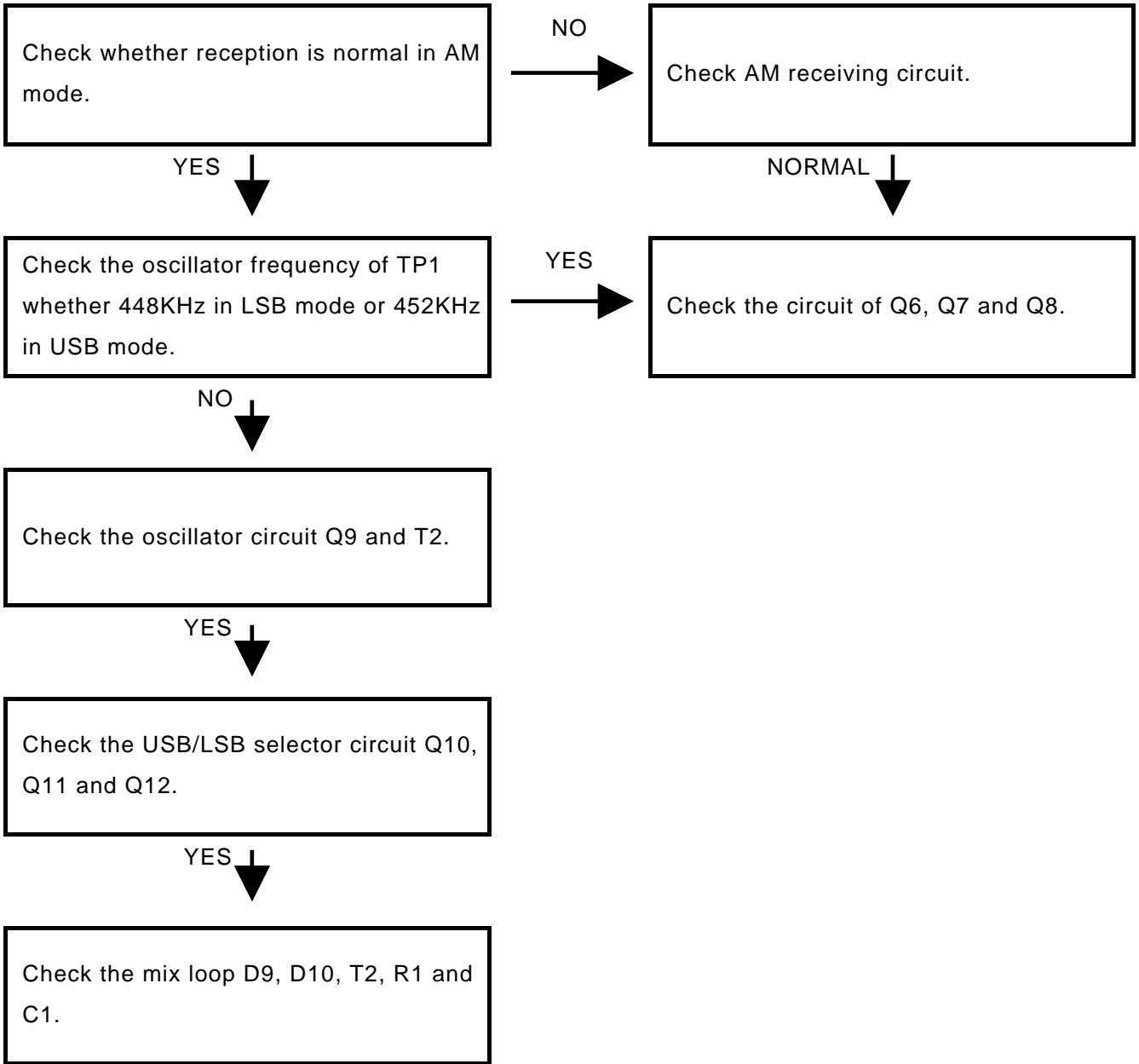
## (1) The radio power can not turn to ON



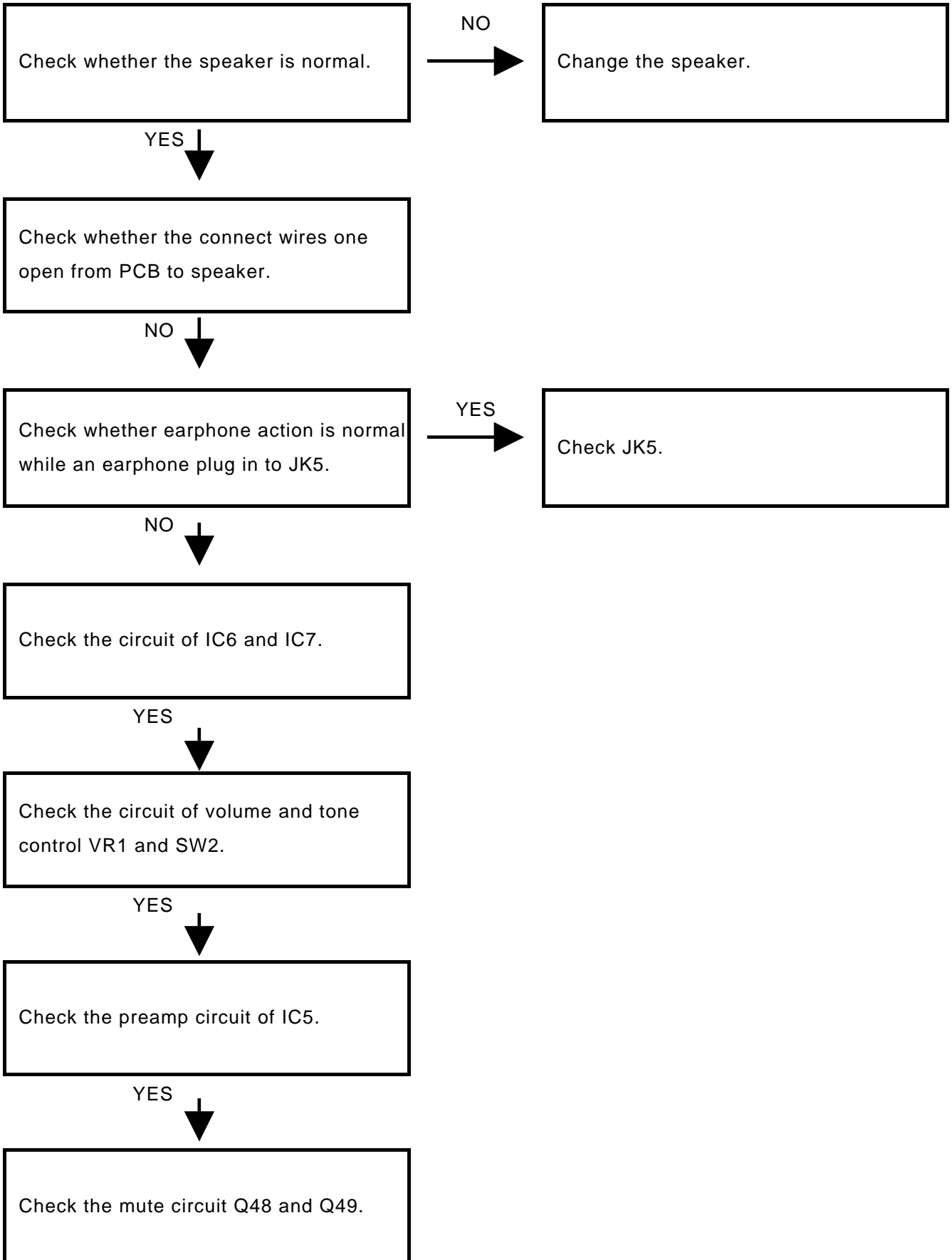
## (2) PLL do not work in AM band



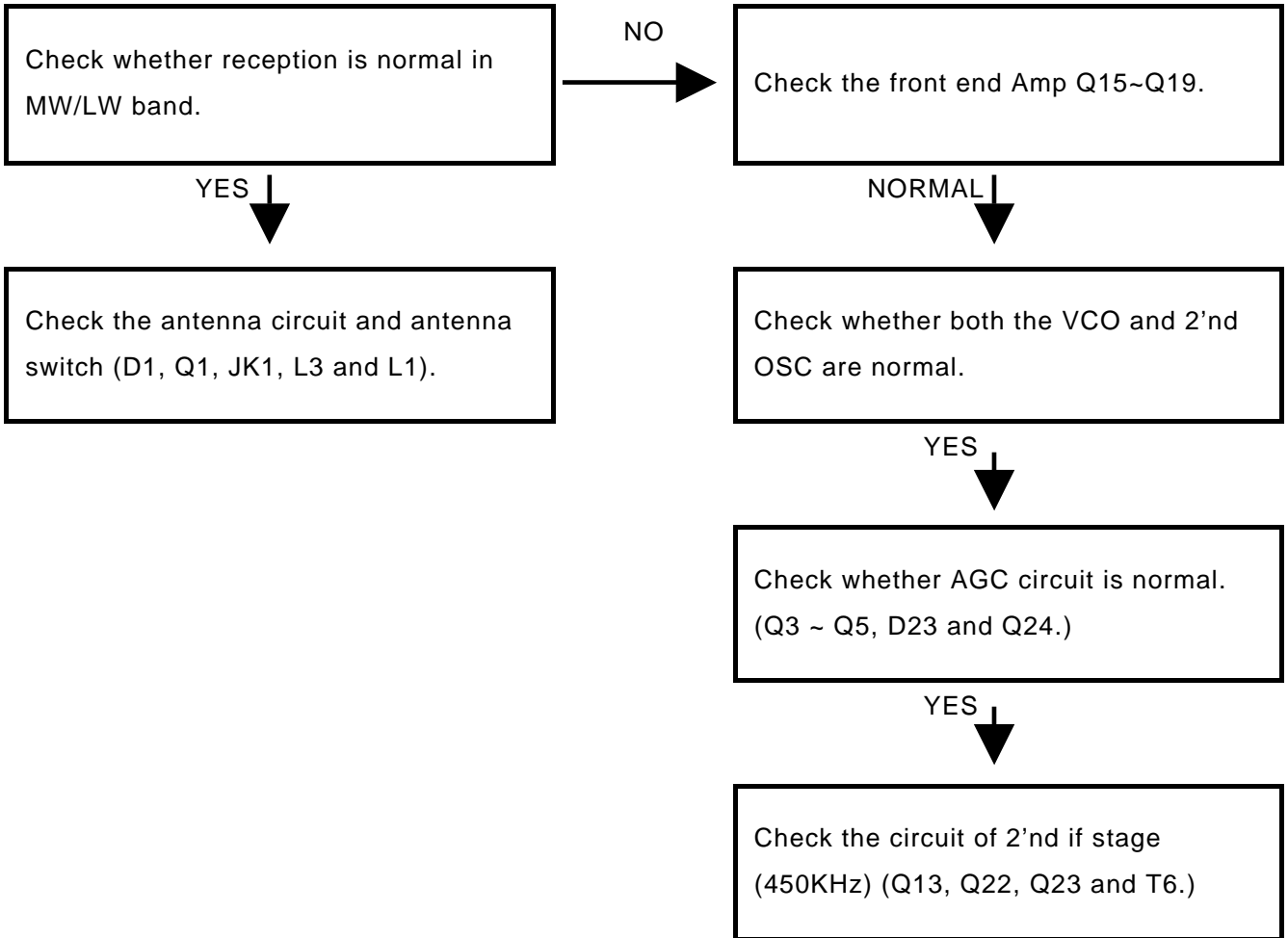
**(3) SSB function do not work**



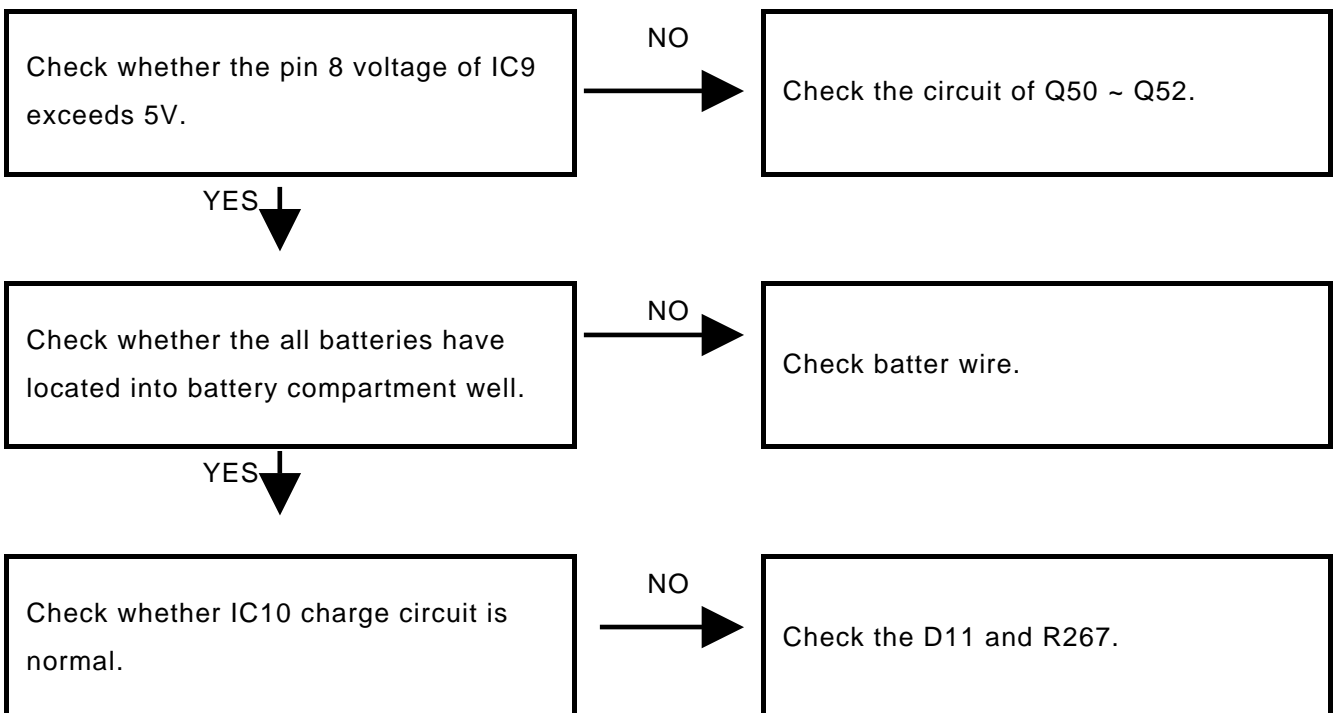
**(4) Speaker have not voice output**



**(5) Weak sensitivity in AM band**



**(6) Charge does not work**



# ELECTRICAL PARTS LIST

ATS-909X

PART NO.	DESCRIPTION	Q'TY	REMARK
1001170	CH LSI UPD78F0513A	1	IC 305,
1011362	CH IC XC62FP3002PRN	1	IC 4,
1012072	CH IC NJM2100M DMP8	1	IC 5,
1012410	CH IC MB15A01PFV1-G-BND	1	IC 304,
1012620	IC PHOTOCOUPLE PC-17K1	1	IC 8,
1013890	CH IC PT2308 8PIN SO-P	1	IC 6,
1014580	CH IC MC33340	1	IC 9,
1014780	CH IC LD1117AL-ADJ	1	IC 10,
1014820	CH IC TC4066BFN SOL14P	1	IC 3,
1016450	CH IC XC6202P302PRN	1	IC 306,
1016600	IC NJM2073D	1	IC 7,
1016970	IC UTC7640P DIP16	1	IC 2,
1016980	CH IC 24LC32A SOP8	1	IC 300,
1017550	CH IC Si4735-D60 GFN20	1	IC 1,
1020211	CH TR 2SB815 B7	2	Q 46,47,
1020230	CH TR 2SA812-T1B-A M6	13	Q 1,24,25,27,31,37,38, 40,42,302,303,308, 316,
1020240	CH TR 2SC1623-T1B-A L6	31	Q 3-12,17,23,28,29,39, 41,45,50,51,53,54,57 ,300,301,304-307,310 ,312,315,
1020250T	TR 2SA1020Y-T hFE=120	2	Q 52,56,
1020260	CH TR 2SC2223-T1B-A F13	8	Q 13,14,22,32,34-36,311,
1022272	CH TR 2SC4154-G hFE:400	2	Q 43,44,
1023010	CH TR 2SD1048 X6	4	Q 26,55,48,49,
1030081	FET 2SK715W	7	Q 15,16,18-21,30,
1030100	CH FET 2SK433B KB	1	Q 309,
1030190T	FET 2SK2880A-T	1	Q 33,
1040040T	DIODE 1N60P-T	2	D 9,10,
1041030T	DIODE IN4002T	2	D 30,42,
1041190T	DIODE 1N5817-T	3	D 36,39,41,
1041400	CH SCHOTTKY FM5817	1	D 25,
1041410	DIODE BRIDGE W04M 1.5A	1	D 16,
1042030	CH DIODE 1S2837-T1B-A	2	D 17,18,
1042270	CH DIODE 1SS394	2	D 308,309
1043030	VARICAP SVC201SPA	1	D 20,
1043061	VARICAP SVC203(AA3)	1	D 34,
1045020	CH DIODE 1SS314-F	5	D 1,2,23,24,31,
1045348	CH ZENER RD5.1EB-T	1	D 38,
104534B	CH ZENER 6V8	1	D 15,
1045460	CH ZENER ZMM5245B-15V	1	D 29,
1046010	CH DIODE RLS4148	23	D 3-8,11-14,19,21,22, 26-28,32,33,35,40, 300,310,311,
1050490	LED RED 3? 2034ADS-N	1	LED301,
1062490	CH LED WHT TS3020WSZ-048	3	LED701-703,
1110470	BAR ANT & COIL 0470	1	L 18,
1120950	ADJ. COIL 0950	1	T 2,
1120990	ADJ. COIL 0990	1	T 1,
1122260	ADJ. COIL 2260	2	T 5,6,
1122280	ADJ. COIL 2280	1	T 9,
1122300	ADJ. COIL 2300	1	T 7,

# ELECTRICAL PARTS LIST

ATS-909X

PART NO.	DESCRIPTION	Q'TY	REMARK
1122420	ADJ. COIL 2420	1	T 4,
1122441	ADJ. COIL 2441	1	T 11,
1123600	ADJ. COIL 3600	1	T 8,
1123710	ADJ. COIL 3710	1	T 12,
1130810T	FIXED COIL 0.39 $\mu$ HK-T	1	L 15,
1130920T	FIXED COIL 0.47 $\mu$ HK-T	2	L 7,9,
1131710T	FIXED COIL 2.2 $\mu$ HK-T	1	L 8,
1136102	FIXED COIL 10mH	1	T 10,
1150033	TOROID COIL 107 $\mu$ H	1	T 3,
116155K2U17	WOUND-V 1.5mHK 6 $\phi$ x8	1	L 11,
116222K2U17	WOUND-V 2.2 $\mu$ HK 6 $\phi$ x8	2	L 17,20,
116392K2U17	WOUND-V 3.9 $\mu$ HK 6 $\phi$ x8	1	L 3,
116473K2U17	WOUND-V 47 $\mu$ HK 6 $\phi$ x8	1	L 1,
116474K2S17	WOUND-V 470 $\mu$ HK 6 $\phi$ x8-S	2	L 10,13,
116685J0S17	WOUND-V 6.8mHJ 5.5 $\phi$ x9-S	1	L 301,
116822K2U17	WOUND-V 8.2 $\mu$ HK 6 $\phi$ x8	1	L 19,
11705K1T-6	AXIAL INDUCTOR 0.22 $\mu$ HK-T	3	L 5,6,12,
1210411	CH TC 30P GRN 3mm	1	TC 301,
1210550	TC 50P 7mm GRN	2	TC 1,2,
1316315	R-VR 50KAx2 RD14K L=15	1	VR 1,
1319023	R-VR 10KB F-1001G	1	VR 301,
1320393	S.F-VR 10KB TB067A-0D	1	SVR1,
1320397	S.F-VR 200KB TB067A-0D	1	SVR2,
1601001	LCD 0121A-HTGT ATS-909X	1	
1615481	PCB A ATS-909X 1.2T/2	1	PCB A
1615490	PCB C ATS-909X 1.2T/2	1	PCB C
1615500	PCB D ATS-909X 1.2T/2	1	PCB D
1620880	SPK 3" 8 $\Omega$ 3W(MAX)	1	SPEAKER
1625090	BUZZER OBO-11250WA	1	BZ 301,
1630531	SW SLIDE 1P2C-12D01N	1	S 309,
1631330	TACT SW.1P1C	1	S 304,
1631600	TACT SW 100 $\pm$ 50gf 4.3mm	2	S 306,307,
1631750	SILD SW 2P2C	2	SW 3,4,
1631890	TACT SW 160+-50gf 7mm	1	S 305,
1632120	SW SLIDE 3P2C-SV65020F	2	SW 1,2,
1632140	CH TACT SW160+80/-30 3.5	4	S 301-303,308,
1632180	METAL DOME SW 30P ASS'Y	1	S501_530
1640010	JACK EP 3.5 $\phi$ N/SW BLK	1	JK 2,
1640030	JACK EP 3.5 $\phi$ W/SW BLK	2	JK 3,5,
1647101	JACK DC TK18-001 D=2.0	1	JK 4,
1649030	JACK EXT ANT	1	JK 1,
1649050	JACK REC STANDBY	1	JK 6,
1650020	X'TAL 55.405M $\pm$ 30Ppm	1	X 2,
1650042	X'TAL 55.845M 49T3	2	CF 3,4,
1650150	X'TAL 32.768KHZ	2	X 1,302,
1650290	X'TAL 4.332MHZ	1	X 301,
1660170	FILTER SFPLA450KJ1A-B0	1	CF 1,
1660360	FILTER SFR450J	1	CF 2,
1664102	RESONATOR ZTB453E200	1	X 3,
1664111	CSBLA449KE28-B0	1	X 4,
1701003	CNT BASE 2x3P	1	CN 3,
170100C	CNT BASE 2x12P	1	CN 2,
1701749	HOUSING 1x9P-R	1	CN 301,

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ATS-909X

PART NO.	DESCRIPTION	Q'TY	REMARK
1702050	CNT BASE 2.5x4P	1	CN 1,
1702A3D	CH HOUSING 2x13P-S	1	CN 302,
170310143010	CNT/W-A 100(2+3P)	1	W 201,
170312154010	CNT/W-A 120(2.5+4P)	1	W 303,
17035504C010	CNT/W-A 55(12P+12P)P=2	1	W 302,
17035504D010	CNT/W-A 55(2+13P)	1	W 2,
170357001020	CNT/W-A 57(ANT+1P)	1	ANT
170A15142050	W-A/2 150(6+6)	2	W 1,SP,
170A80012030	W-A/2 80(3+3)	1	W 701,
170E800M9010	W-FFC/9 80(2.5+4)P=1	1	W 501,
1730250	EN/SW JRS0000B1401 32P	1	EN 301,
1900850	Surgx ESD (0603ESDA-TR1)	1	ESD301,
1903050	IC AP650 ASS'Y	2	IC 301,302,
1A1610060M40	W-A/1 60(6+6)BLK	1	BT-
1A1611200M60	W-A/1 200(9+9)BRN	1	W A,
1A1612050M40	W-A/1 50(6+6)RED	1	BT+
22000000600	ROUND LABEL L.BRN/TWN	1	
4110482C	CC 104K 50V R20X7R2L	1	C 362,
4410564T2H	EL 105M 50V 5x11-T 105	1	C 176,
4447542T2H	EL 475M 25V 4x7-T 105	1	C 111,
4447551T2H	EL 475M 35V 4x5-T 105	1	C 175,
4410632T0H	EL 106M 16V 4x7-T 105	1	C 320,
4410632T2H	EL 106M 16V 4x7-T 105	3	C 10,98,137,
4410644T2H	EL 106M 25V 5x11-T 105	6	C 127,172,174,179,184,162,
4422632T2H	EL 226M 16V 4x7-T 105	1	C 102,
4447602T2H	EL 476M 4V 4x7-T 105	1	C 120,
4447624T2H	EL 476M 10V 5x11-T 105	5	C 79,93,156,187,195,
4410712T0H	EL 107M 6.3V 5x7-T 105	1	C 369,
4410724T2H	EL 107M 10V 5x11-T 105	4	C 143,148,161,191,
4410744T0H	EL 107M 25V 6.3x11-T 105	4	C 77,78,83,91,
4422724T0H	EL 227M 10V 6.3x11-T 105	1	C 163,
4422734T0H	EL 227M 16V 6.3x11-T 105	1	C 26,
4410834T0H	EL 108M 16V 10x14-T 105	3	C 155,160,188,
4822472T0	MP/C 224J 63V-T P=5mm	1	C 359,
4922300T	SUP/C 223Z 5V5 11x12-V	1	C 371,
4B10612	CH TA 106M 6.3V 3.2x1.6	1	C 153,
5402001	CH CC 020C 50V NPO-C	3	C 100,129,145,
5403001	CH CC 030C 50V NPO-C	1	C 60,
5405001	CH CC 050C 50V NPO-C	3	C 110,131,65,
5406002	CH CC 060D 50V NPO-C	1	C 66,
5408002	CH CC 080D 50V NPO-C	2	C 67,130,
5410002	CH CC 100D 50V NPO-C	7	C 57,61,141,304,336,337,356,
5410101	CH CC 101J 50V NPO-C	3	C 146,149,306,
5410261	CH CC 102K 50V X7R-C	20	C 22,25,30,40,56,114, 118,121,124,167,194, 199,332,375,377-381,388,
5410367	CH CC 103K 25V X7R-C M	69	C 5,8,13,14,21,23,24, 31,34,42,45-47,48,53 ,54,68-70,72-75,82, 85-87,89,92,95,97, 192,103,105,109,115, 116,119,122,125,126, 128,142,144,147,164,

# ELECTRICAL PARTS LIST

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PART NO.	DESCRIPTION	Q'TY	REMARK
5410471	CH CC 104Z 25V Y5V-C	40	173,186,189,190,307, 341-343,346,349,350, -352,353,357,361,363 365,376,385-387,154, C 300,305,308-319,321, -322,325,327,328,366 368,374,382-384,32, 39,43,51,52,55,63,94 ,104,159,4,178,180,183,
5410557	CH CC 105Z 10V F-C	20	C 7,9,12,16,76,90,158, 165,166,168,170,171, 185,197,198,132,324, 326,330,373,
5412001	CH CC 120J 50V NPO-C	1	C 64,
5412101	CH CC 121J 50V NPO-C	1	C 62,
5415001	CH CC 150J 50V NPO-C	1	C 108,
5422001	CH CC 220J 50V NPO-C	6	C 37,38,59,302,303,355
5422101	CH CC 221J 50V NPO-C	8	C 2,3,6,138,323,333-335,
5422261	CH CC 222K 50V X7R-C	5	C 15,18,123,152,181,
5422367	CH CC 223K 25V X7R-C	9	C 28,84,136,193,389, 169,177,101,196,
5427001	CH CC 270J 50V NPO-C	3	C 96,99,301,
5427261	CH CC 272K 50V X7R-C	1	C 44,
5433001	CH CC 330J 50V NPO-C	4	C 11,29,106,140,
5433351	CH CC 333K 16V X7R-C	2	C 150,151,
5439001	CH CC 390J 50V NPO-C	1	C 58,
5439101	CH CC 391J 50V NPO-C	1	C 35,
5447001	CH CC 470J 50V NPO-C	6	C 81,112,370,372,390,391,
5447101	CH CC 471J 50V NPO-C	3	C 344,345,358,
5447365	CH CC 473Z 50V Y5V-C	11	C 27,33,36,41,49,50,80 ,113,135,157,182,
5447443	CH CC 474Z 25V Y5V-C	1	C 329,
5456001	CH CC 560J 50V NPO-C	3	C 17,19,107,
5456016	CH CC 560J 50V UJ-C	1	C 117,
5456261	CH CC 562K 50V X7R-C	3	C 20,71,88,
5468101	CH CC 681J 50V NPO-C	1	C 139,
5482001	CH CC 820J 50V NPO-C	1	C 1,
61301100	CH RD 10J-0603	15	R 44,51,56,61,79,99, 179,268,308,341,376, 390,701-703,
61301101	CH RD 100J-0603	8	R 41,140,155,201,248, 316,393,118,
61301102	CH RD 1KJ-0603	30	R 35,45,57,131,162,164 ,169,198,232,256,269 ,301,302,309,337,344 ,368,401,501,507,513 ,519,525,149,322,18, 336,398,400,402,
61301103	CH RD 10KJ-0603	42	R 15,28,36,37,43,50,54 ,58,113,120,133,151, 156,157,167,168,191, 208,221,231,243,245, 307,313-315,317-319,



# ELECTRICAL PARTS LIST

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PART NO.	DESCRIPTION	Q'TY	REMARK
61301104	CH RD 100KJ-0603	33	325,343,345,356,363, 364,372,375,409,410, 192,323,340, R 25,31,40,48,60,65,73 ,74,80,92,102,109, 116,121,127,146,311, 152,159,171,174,175, 249,255,263,351,352, 374,383,396,405,407,12,
61301105	CH RD 1MJ-0603	10	R 128,185,353,382,403, 404,406,408,137,413,
61301122	CH RD 1K2J-0603	4	R 89,100,107,95,
61301123	CH RD 12KJ-0603	12	R 349,365,371,377,386, 391,397,505,511,517, 523,529,
61301124	CH RD 120KJ-0603	4	R 148,178,203,379,
61301151	CH RD 150J-0603	2	R 97,176,
61301152	CH RD 1K5J-0603	1	R 389,
61301153	CH RD 15KJ-0603	1	R 119,
61301183	CH RD 18KJ-0603	3	R 144,165,173,
61301184	CH RD 180KJ-0603	2	R 117,46,
613011R2	CH RD 1R2J-0603	1	R 209,
61301220	CH RD 22J-0603	1	R 98,
61301221	CH RD 220J-0603	4	R 141,267,394,93,
61301222	CH RD 2K2J-0603	11	R 27,71,78,106,132,204 ,373,387,388,392,34, R 81,87,96,143,145,153 ,163,180,205,227,235 ,242,266,138,223,224 ,320,206,
61301223	CH RD 22KJ-0603	18	R 77,110,122,172,200, 250,306,367,369,
61301224	CH RD 220KJ-0603	9	R 8,20,21,305,346,502, 508,514,520,526,39,47,
61301272	CH RD 2K7J-0603	12	R 13,32,88,136, R 259,
61301273	CH RD 27KJ-0603	4	R 55,101,247,
61301303	CH RD 30KJ-0603	1	R 23,70,82,142,412,
61301330	CH RD 33J-0603	3	R 72,104,105,139,229, 244,347,503,509,515, 521,527,69,75,264,
61301331	CH RD 330J-0603	5	R 19,33,49,115,130,170 ,194,195,211,215,251
61301332	CH RD 3K3J-0603	15	R 5,123,135,335,385, R 83,90,258,
61301333	CH RD 33KJ-0603	11	R 193,196,350,378,506, 512,518,524,530,
61301334	CH RD 330KJ-0603	5	R 166,199,
61301392	CH RD 3K9J-0603	3	R 103,134,158,183,240, 257,395,
61301393	CH RD 39KJ-0603	9	R 6,24,26,42,126,129, 190,239,252,328-331, 381,399,3,
61301470	CH RD 47J-0603	2	
61301471	CH RD 470J-0603	7	
61301472	CH RD 4K7J-0603	16	

# ELECTRICAL PARTS LIST

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PART NO.	DESCRIPTION	Q'TY	REMARK
61301473	CH RD 47KJ-0603	26	R 29,14,67,68,147,177, 181,182,184,207,210, 253,303,304,326,327, 338,339,359-362,370, 384,411,414,
61301474	CH RD 470KJ-0603	6	R 11,124,160,310,357,358,
61301475	CH RD 4M7J-0603	1	R 222,
61301562	CH RD 5K6J-0603	2	R 1,187,
61301563	CH RD 56KJ-0603	6	R 9,30,53,380,312,321,
61301564	CH RD 560KJ-0603	2	R 354,355,
61301680	CH RD 68J-0603	1	R 324,
61301681	CH RD 680J-0603	1	R 85,
61301682	CH RD 6K8J-0603	9	R 4,16,125,348,504,510 ,516,522,528,
61301683	CH RD 68KJ-0603	7	R 22,66,86,111,265,332,333,
61301820	CH RD 82J-0603	1	R 154,
61301822	CH RD 8K2J-0603	7	R 10,17,76,91,94,114,84,
61301823	CH RD 82KJ-0603	4	R 108,150,342,366,
61301824	CH RD 820KJ-0603	1	R 334,
648082R20	RDF 2W 2R2J(MG)	1	R 260,
6999926	THERMISTOR 10K(9-11mm)	1	R 801,

# MECHANICAL PARTS LIST

ATS-909X

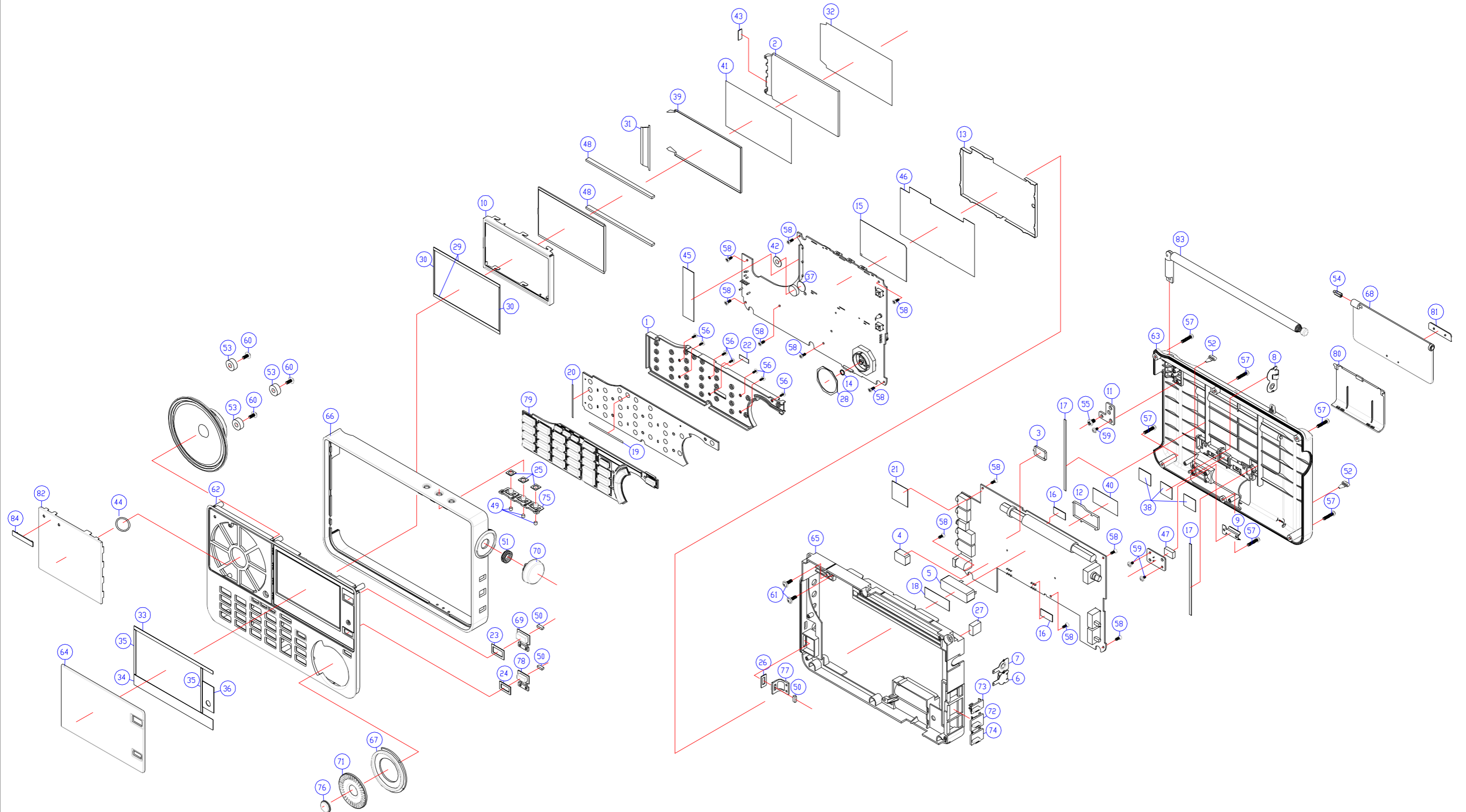
Ref no	PART NO.	DESCRIPTION	Q'TY	APP./DWG NO.	REMARK
1	2000TW00000	FUNCTION HOLDER	1	A3-TW-01	
2	2000TW00100	LCD LIGHT LENS	1	A3-TW-02	
3	21004100600	SHI DC/DC-DOWN	1	A4-202-1737	
4	21005900100	DC/DC SHIELD (UP)	1	A4-800-1217	
5	21008600700	VCO SHIELD (UP)	1	A4-909-2114	
6	2100M40060B	BATTERY CONTACT ASS'Y+	1	A4-SB-39A	
7	2100PJ00700	BATTERY CONTACT ASS'Y-?	1	A4-ISB-23	
8	2100PJ00800	BATTERY CONTACT ASS'Y-+	1	A4-ISB-24	
9	2100RA00200	HEAT CONDUCTION	1	A4-RA-09	
10	2100TW00000	LCD HOLDER	1	A3-TW-03	
11	2100TW00100	ROD ANT BRACKET	1	A4-TW-01	
12	2100TW00200	VCO SHIELD (DOWN)	1	A4-TW-02	
13	2100TW00300	SHIELD CASE	1	A3-TW-04	
14	2100TW00400	STEP KNOB SPRING	1	A4-TW-24	
15	2100TW00500	COPPER FOIL	1	A4-TW-31	
16	22005600000	P.C.B. HEMELON	2	A4-606-1313	
17	2200TW00000	HEMELON 85.0x3.0x0.2T	2	A4-TW-34	
18	2200TW00100	HEMELON 41.0x19.0x0.2T	1	A4-TW-37	
19	2200TW00200	HEMELON 50.0x7.0x0.2T	1	A4-TW-36	
20	2200TW00300	HEMELON 40.0x7.0x0.2T	1	A4-TW-36	
21	2300860020A	EVA SPACER(A)	1	A4-909-2209	
22	2300S601600	DOUBLE SIDE TAPE G	1	A4-S6-42	
23	2300TW00000	PU A t=0.5	1	A4-TW-03	POWER KEY
24	2300TW00100	PU B t=0.5	1	A4-TW-04	LIGHT KEY
25	2300TW00200	PU C t=0.5	3	A4-TW-05	TIME SET KEY
26	2300TW00300	PU D t=0.5	1	A4-TW-06	AUX IN KNOB
27	2300TW00400	EVA	1	A4-TW-07	BAR ANT
28	2300TW00500	PU F t=0.5	1	A4-TW-08	REVOLVE KNOB
29	2300TW00600	PU G t=0.5	2	A4-TW-09	LCD UP/DOWN
30	2300TW00700	PU H t=0.5	2	A4-TW-10	LCD RIGHT/LEFT
31	2300TW00800	LENS MYLAR UP	1	A4-TW-11	
32	2300TW00900	LENS MYLAR DOWN	1	A4-TW-12	
33	2300TW01000	DOUBLE TAPE A t=0.5	1	A4-TW-13	FRONT CABINET/DISPLAY WINDOW
34	2300TW01100	DOUBLE TAPE B t=0.5	1	A4-TW-14	FRONT CABINET/DISPLAY WINDOW
35	2300TW01200	DOUBLE TAPE C t=0.5	2	A4-TW-15	FRONT CABINET/DISPLAY WINDOW
36	2300TW01300	DOUBLE TAPE D t=0.5	1	A4-TW-16	FRONT CABINET/DISPLAY WINDOW
37	2300TW01400	TAPE φ 10.5x0.15t	1	A4-TW-17	BUZZER
38	2300TW01500	PC PLATE	3	A4-TW-23	REAR CABINET
39	2300TW01600	LENS MYLAR SIDE	1	A4-TW-25	
40	2300TW01700	EVA 41x19x1.0t	1	A3-TW-27	
41	2300TW01800	LENS MYLAR DIFFUSE	1	A4-TW-26	
42	2300TW02100	EVA φ 11x φ 4x0.5	1	A4-TW-29	MIC
43	2300TW02200	DOUBLE TAPE 10x4x0.15	1	A4-TW-30	LED PCB
44	2300TW02300	PU K φ 2.70x φ 22.0x0.5t	1	A4-TW-32	
45	2300TW02400	EVA 60.0x14x1.0t	1	A4-TW-33	
46	2300TW02500	PU L t=0.5	1	A4-TW-35	
47	2400S400600	THERMAL RUBBER	1	A4-S4-64A	
48	2400TW00000	LCD CONDUCT RUBBER	2	A4-TW-18	
49	2400TW00100	TIME SET KEY RUBBER	3	A4-TW-19	
50	2400TW00200	AUX IN KNOB RUBBER	3	A4-TW-20	
51	2400TW00300	RUBBER RING	1	A4-TW-21	
52	2400TW00400	FOOT PAD	2	A4-TW-22	
53	2500TW00110	SPACER SUPPORT	3	PG 405A	SPEAKER
54	2500TW00210	HINGE	1	H38AM-020R	
55	29S06305001	SCREW JMB 3x5(ZK)	1		ROD ANT
56	29S09990010	SCREW PTP 1.4x4(NI)	7		FUNCTION KEY
57	29S10212002	SCREW PTP 2.6x12(NI)	6		FRONT / REAR CABINET
58	29S11106001	SCREW PTF 2x6(ZK)	12		PCB C x7 / PCB A x5
59	29S15104002	SCREW PTPW 2x4(NI)	3		ROD ANT BRACKERx1 /PCB SENSORx2
60	29S15206001	SCREW PTPW 2.6x6(ZK)	3		SPEAKER
61	29S15208002	SCREW PTPW 2.6x8(NI)	2		ROD ANT BRACKER

# MECHANICAL PARTS LIST

ATS-909X

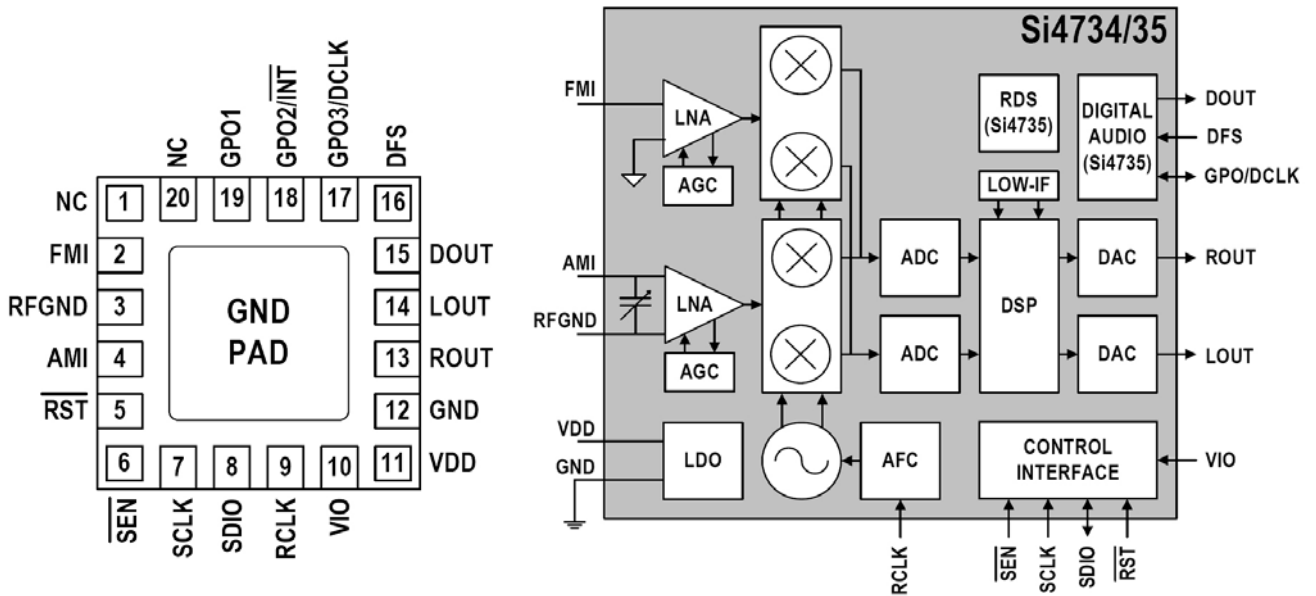
Ref no	PART NO.	DESCRIPTION	Q'TY	APP./DWG NO.	REMARK
62	3010TW0000010	FRONT CABINET	1	A3-TW-05	
63	3030TW0000050	REAR CABINET	1	A3-TW-07	
64	3050TW0000010	DISPLAY WINDOW	1	A3-TW-09	
65	3061TW0000010	MIDDLE CHASSIS	1	A3-TW-06	
66	3062TW0000010	FRONT CHASSIS	1	A3-TW-10	
67	3081TW0000010	REVOLVER KNOB PANEL	1	A3-TW-20	
68	3082TW0000010	REAR PANEL	1	A3-TW-23	
69	3101TW0000010	POWER KEY	1	A3-TW-11	
70	3102TW0000010	VOLUME KNOB	1	A3-TW-12	
71	3103TW0000010	REVOLVER KNOB	1	A3-TW-13	
72	3104TW0000010	STONE KNOB	1	A3-TW-14	
73	3105TW0000010	TIME KNOB	1	A3-TW-15	
74	3106TW0000010	ST KNOB	1	A3-TW-16	
75	3107TW0000010	TIME SET KEY	1	A3-TW-17	
76	3108TW0000010	STEP KNOB	1	A3-TW-18	
77	3109TW0000010	AUX IN KNOB	1	A3-TW-19	
78	310ATW0000010	LIGHT KEY	1	A3-TW-21	
79	310BTW0000010	FUNCTION KAY ASS'	1	A3-TW-22	
80	3120TW0000010	BATTERY COVER	1	A3-TW-08	
81	3150TW0000010	REAR PLATE	1	A3-TW-24	
82	3230TW0000010	SPK GRILL	1	A3-TW-26	
83	3270TW0000010	ROD ANT	1		
84	3A74TW0000100	SANGEAN BADGE	1		

# EXPLODE VIEWS

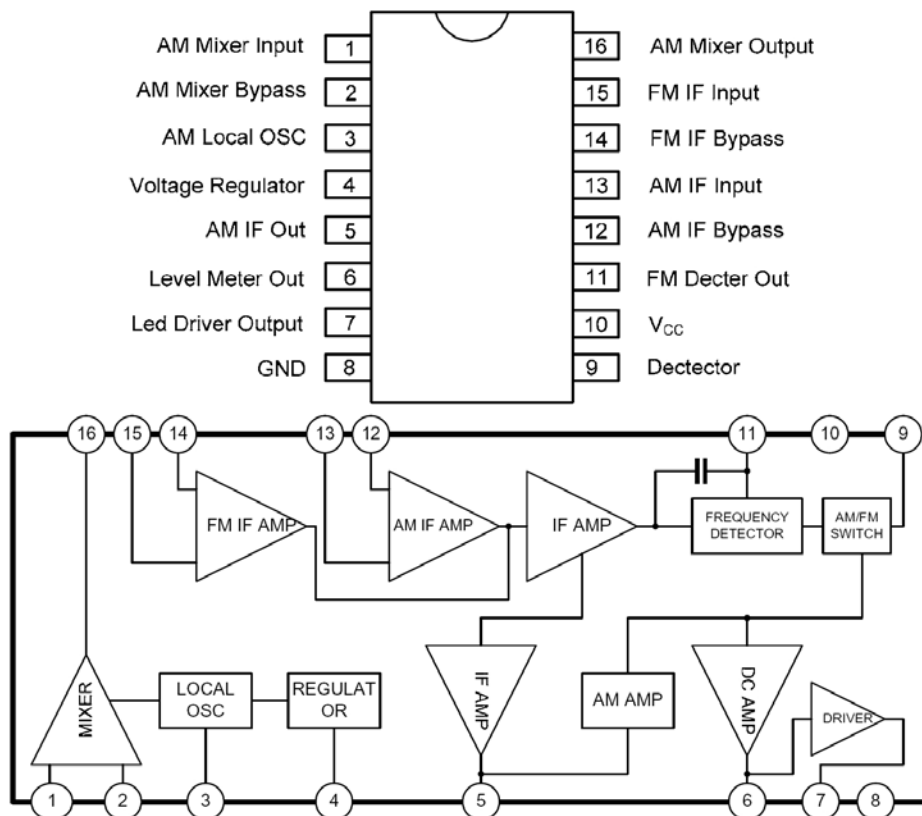


# IC CIRCUIT BLOCK DIAGRAM

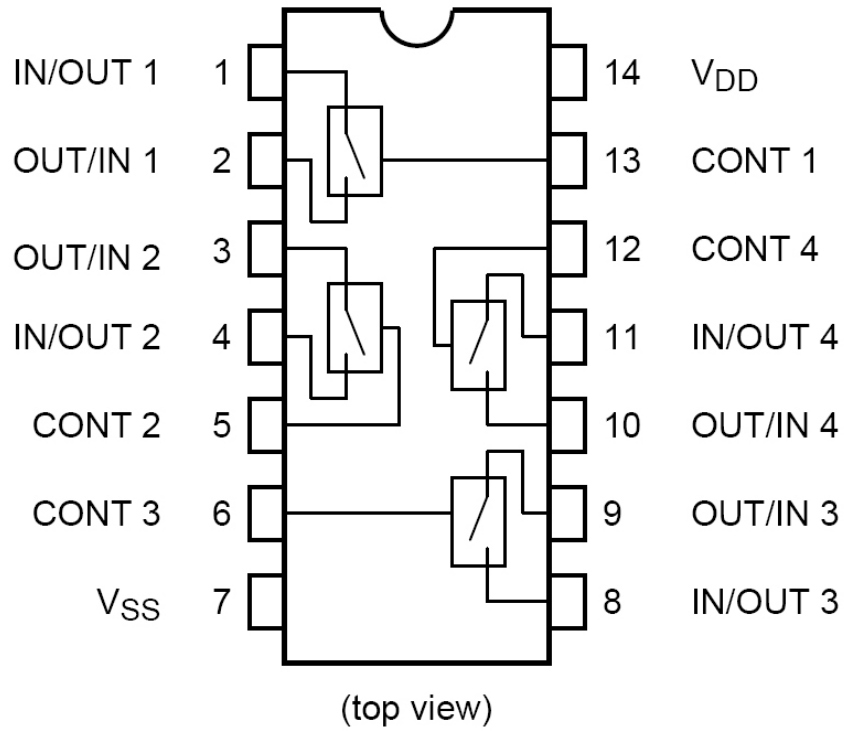
## 1. IC1 - Si4735-D60



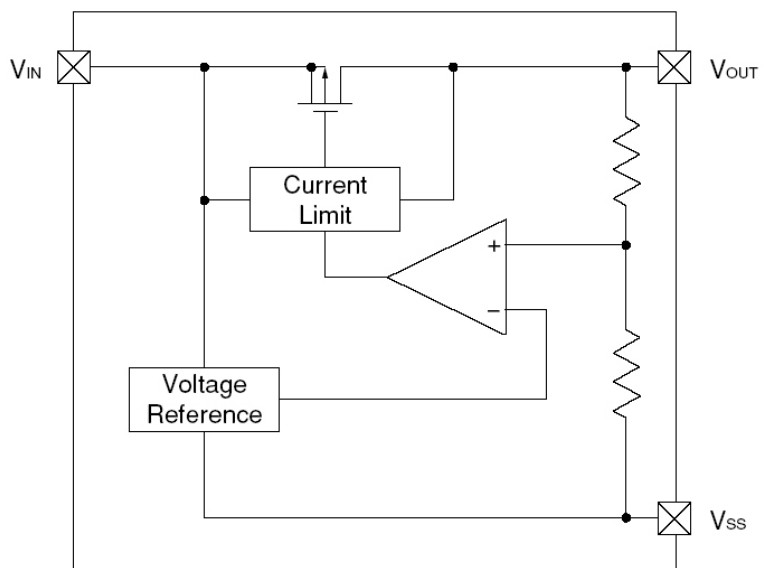
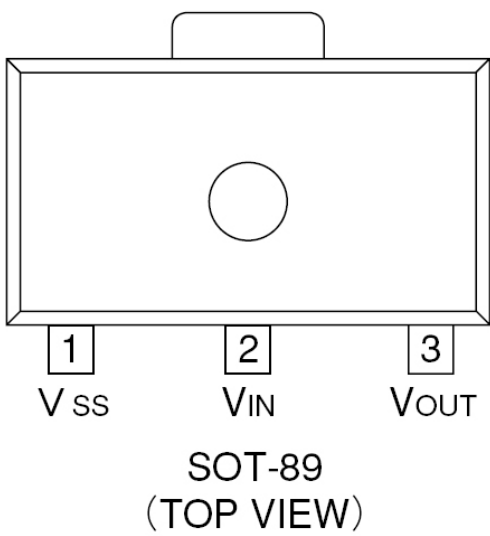
## 2. IC2 - UTC7640P



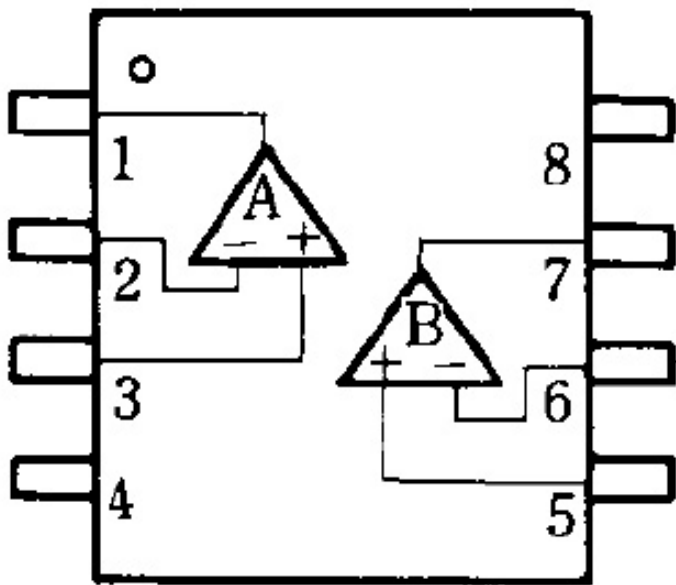
**3. IC3 - TC4066BFN**



**4. IC4 - XC62FP3002PRN**

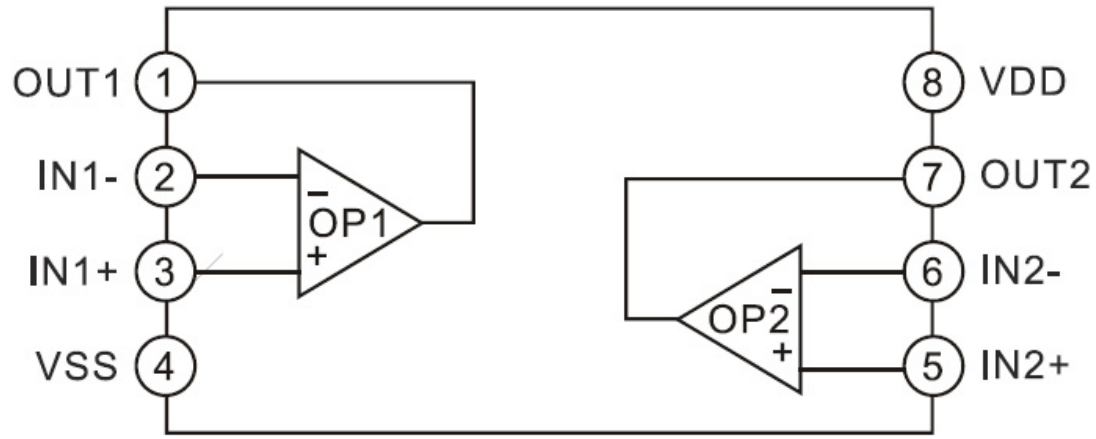


5. IC5 - NJM2100M



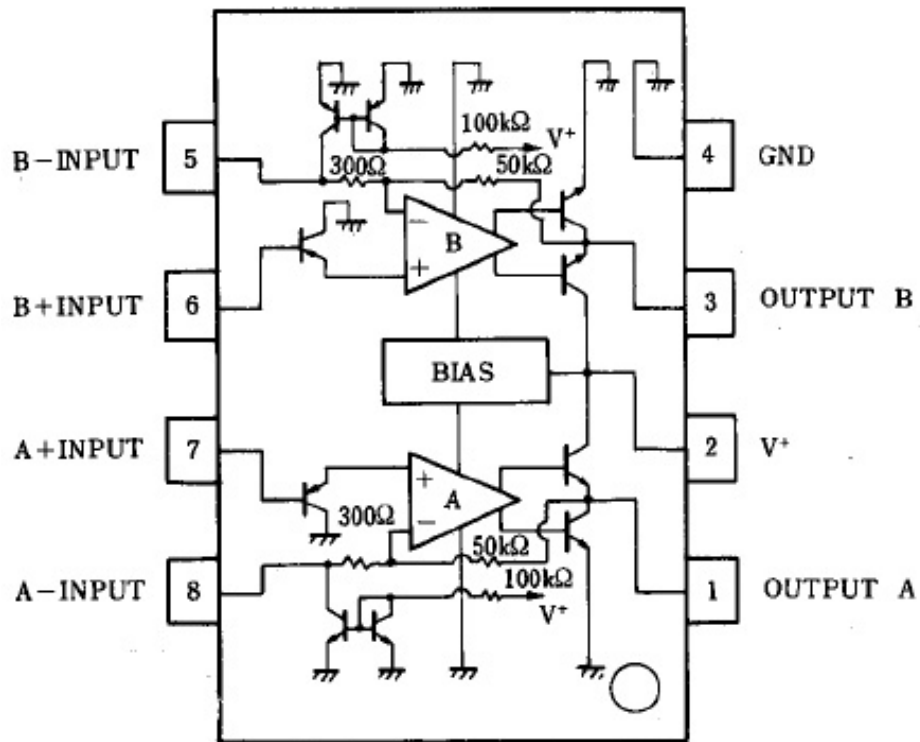
- 1. A OUTPUT
- 2. A -INPUT
- 3. A +INPUT
- 4. V<sup>-</sup>
- 5. B +INPUT
- 6. B -INPUT
- 7. B OUTPUT
- 8. V<sup>+</sup>

6. IC6 - PT2308

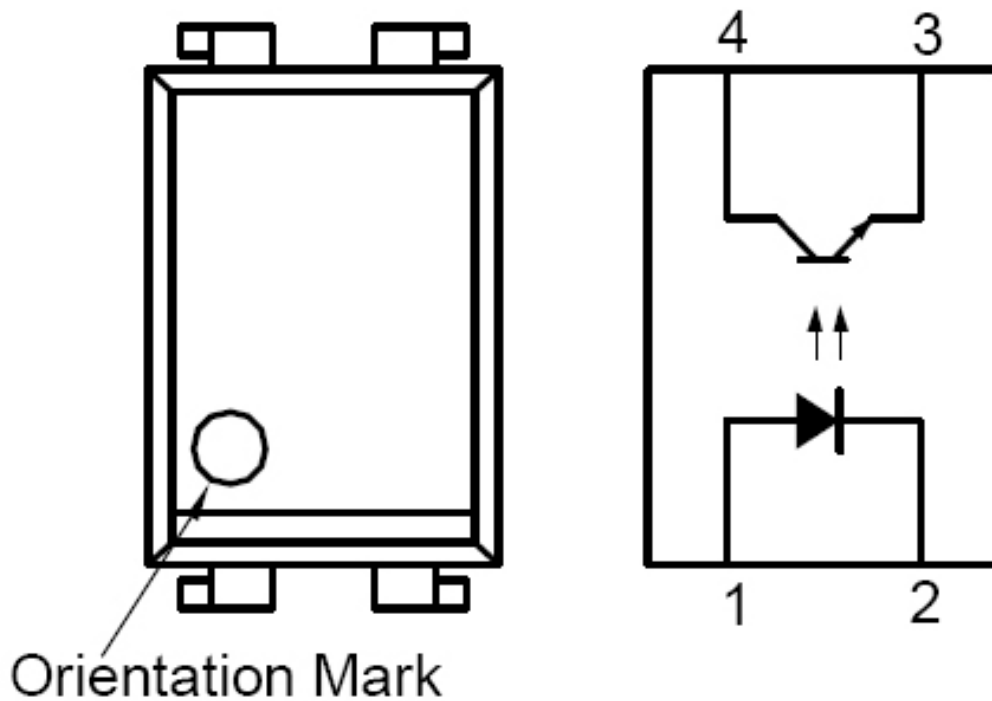




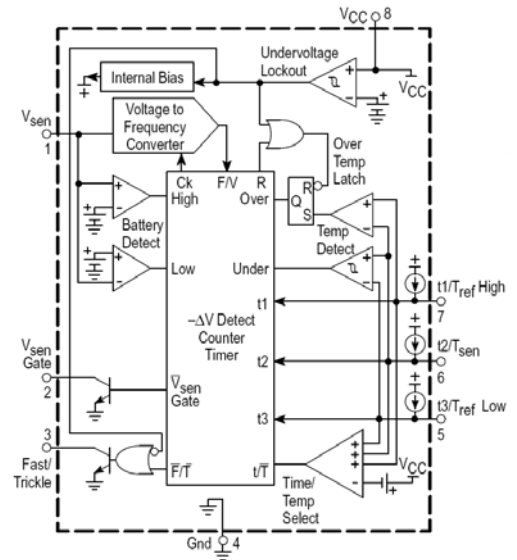
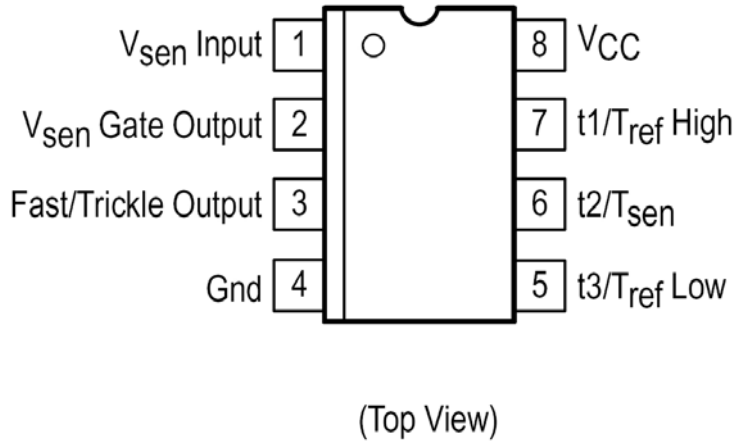
7. IC7 - NJM2073D



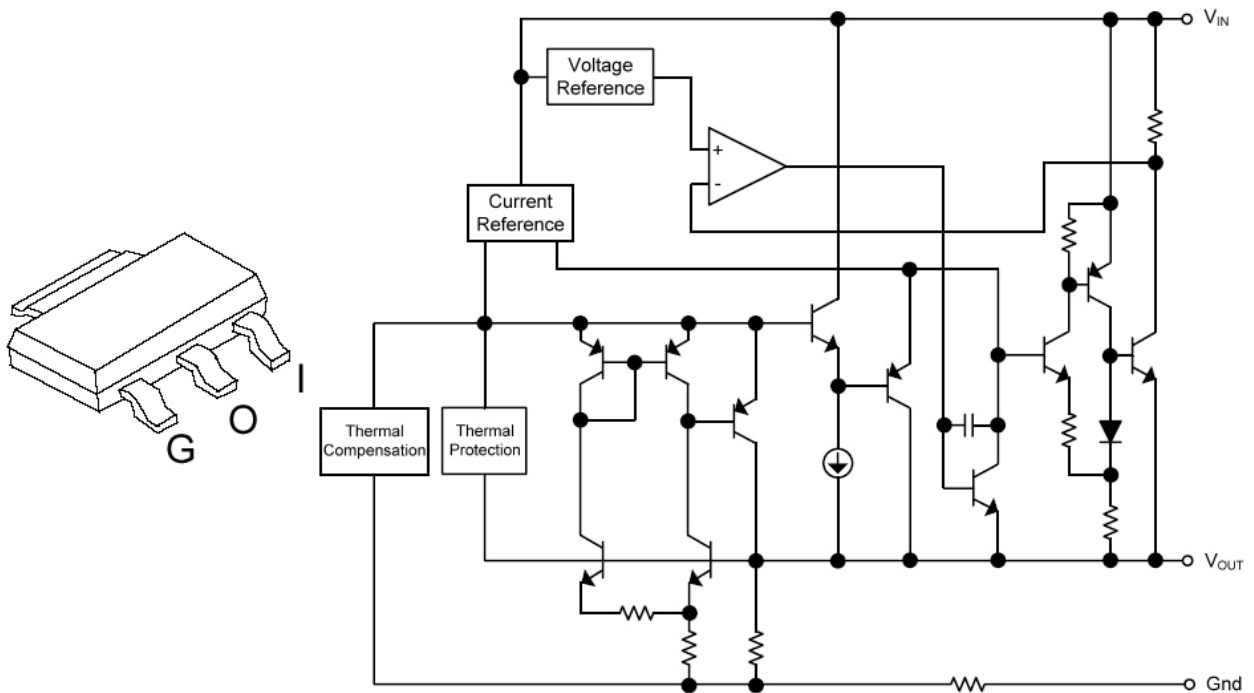
8. IC8 - PC-17K1



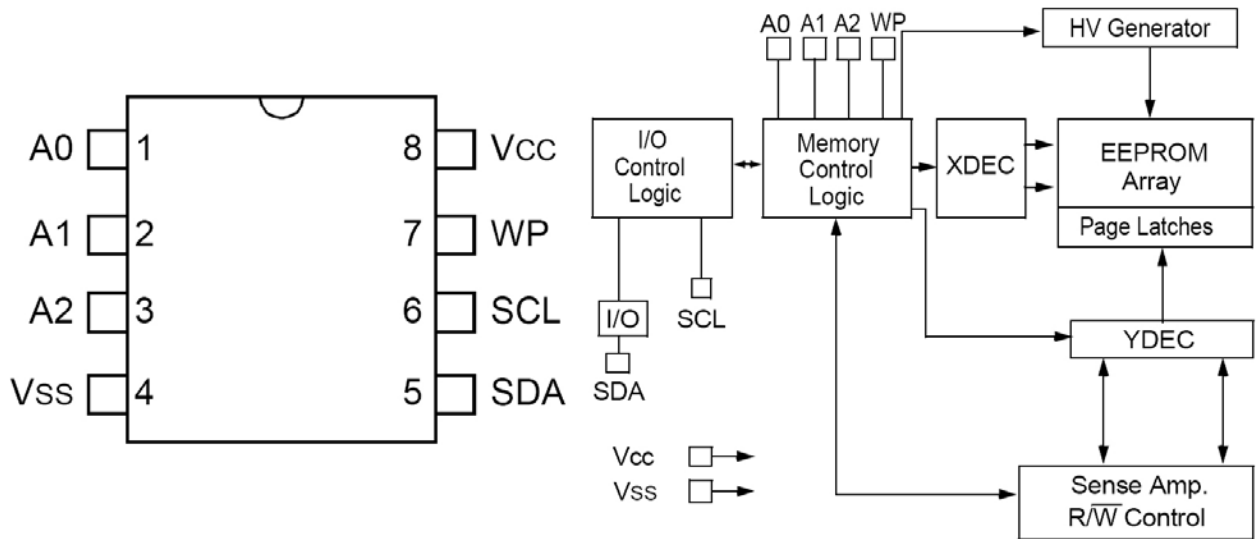
9. IC9 - MC33340



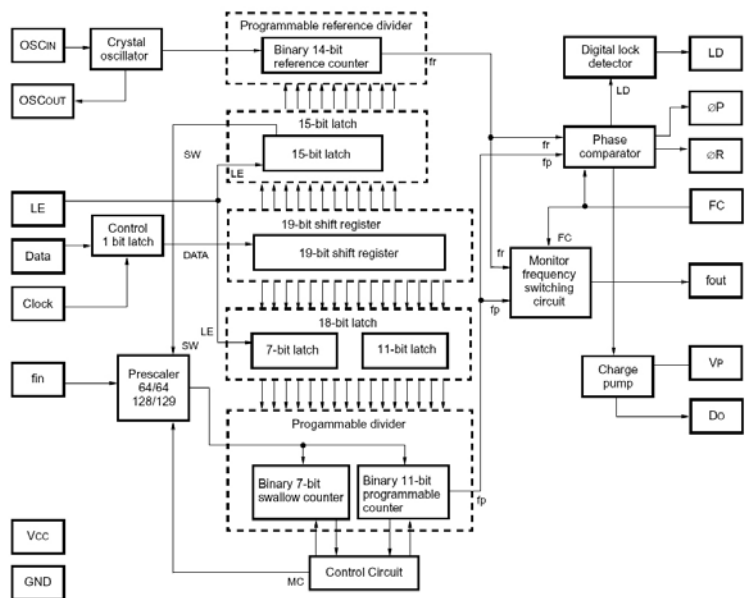
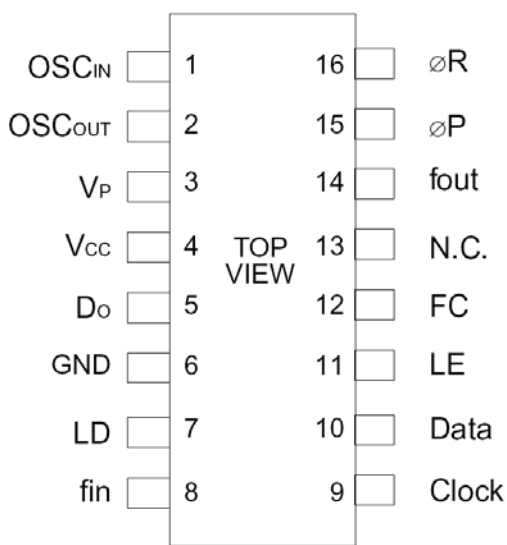
10. IC10 - LD1117AL-ADJ



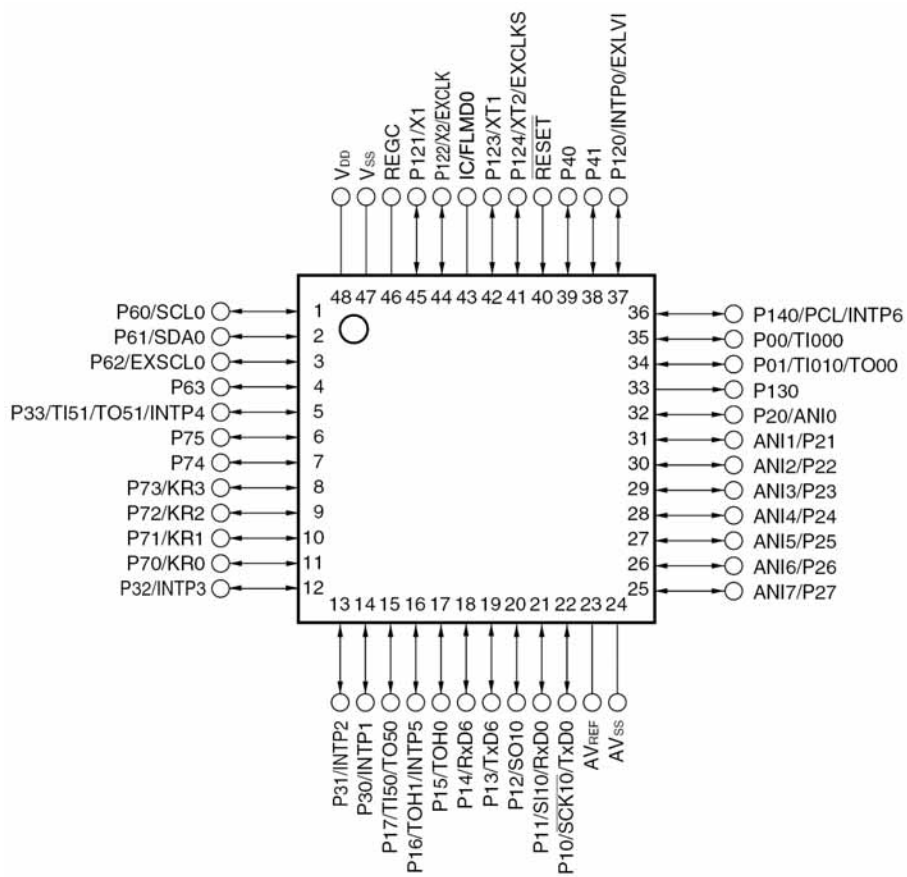
11. IC300 - 24LC32A



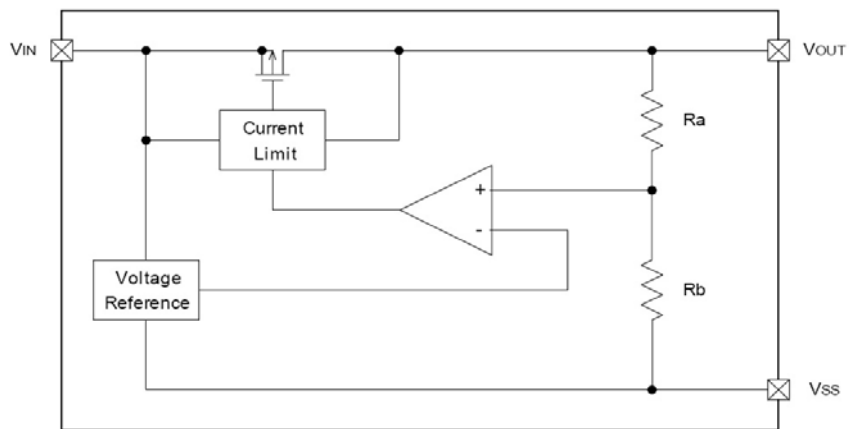
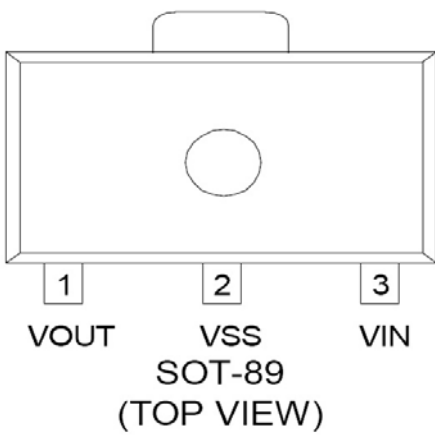
12. IC304 - MB15A01PFV1



13. IC305 - UPD78F0513A

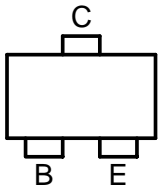


14. IC306 - XC6202P302PRN

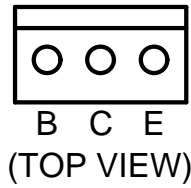


# SEMUCONDUCTOR LEAD IDENTIFICATIONS

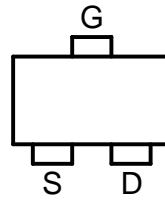
## Transistors



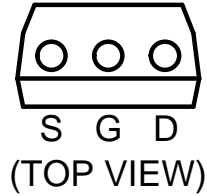
**2SA812**  
**2SB815**  
**2SC1623**  
**2SC2223**  
**2SC4154**  
**2SD1048**



**2SA1020**



**2SK433B**



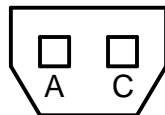
**2SK715W**  
**2SK2880A**

(E: Emitter C: Collector B: Base S: Source G: Gate D: Drain)

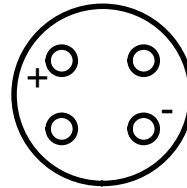
## Diodes



**1N4002**  
**1N5817**  
**1N60P**



**SVC201SPA**



**W04M 1.5A**



**ZENER 3V**  
**ZENER RD5V1**  
**ZENER 6V8**  
**ZENER RD15**



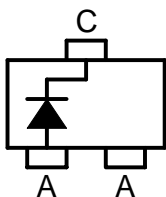
**RLS4148**



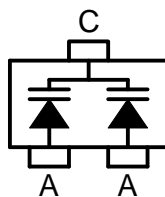
**1SS314**



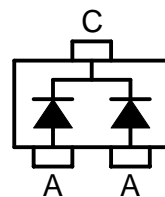
**FM5817**



**1SS394**



**SVC203**



**1S2837**

(A: Anode C: Cathode)

# IC AND TRANSISTOR VOLTAGE CHART

**IC1 - Si4735-D60**

PIN	FM	MW	LW	SW	AUX
1	0.56	0.54	0.54	0.54	0.54
2	0	0	0	0	0
3	0	0	0	0	0
4	0	0.46	0.44	0.44	0
5	2.77	2.84	2.84	2.84	3
6	0	0	0	0	0
7	2.78	2.78	2.78	2.78	2.78
8	2.76	2.8	2.79	2.79	2.79
9	0.72	0.73	0.73	0.73	0
10	2.8	2.86	2.87	2.87	3
11	2.8	2.86	2.87	2.87	3
12	0	0	0	0	0
13	0.74	0.74	0.74	0.74	0
14	0.74	0.74	0.74	0.74	0
15	0	0	0	0	0
16	0	0	0	0	0
17	0.4	0.4	0.4	0.4	0
18	2.8	2.8	2.87	2.87	0
19	2.62	2.62	2.62	2.62	0
20	0.54	0.54	0.54	0.54	0

**IC2 - UTC7640P**

PIN	FM	MW	LW	SW	AUX
1	1.52	1.48	1.5	1.5	1.5
2	1.51	1.48	1.5	1.5	1.5
3	2.24	2.2	2.2	2.2	2.2
4	2.24	2.2	2.2	2.2	2.2
5	0	1.59	1.54	1.54	1.54
6	0	1.74	1.74	1.74	1.74
7	3	0.2	0.2	0.2	0.2
8	0	0	0	0	0
9	1.28	1.22	1.21	1.21	1.21
10	6.16	6.12	6.1	6.1	6.1
11	6.16	6.12	6.1	6.1	6.1
12	1.35	1.43	1.43	1.43	1.43
13	1.34	1.43	1.43	1.43	1.43
14	1.34	1.43	1.43	1.43	1.43
15	1.34	1.43	1.43	1.43	1.43
16	1.36	1.36	1.36	1.36	1.36

**IC3 - TC4066BFN**

PIN	FM	MW	LW	SW	AUX
1	0	0	0	0	0
2	0.3	0.26	0.15	0.06	0.08
3	0.3	0.22	0.13	0.05	0.07
4	0.3	0.19	0.11	0.05	0.1
5	0.3	6.09	6.1	6.09	0.02
6	6.12	6.21	6.22	6.21	6.25
7	0	0	0	0	0
8	0	0	0	0	0
9	0	0	0	0	0
10	0.35	0.21	0.12	0.04	0.09
11	0.3	0.18	0.1	0.04	0.06
12	6.13	6.1	6.1	6.1	0.02
13	0	6.22	6.22	6.21	6.25
14	6.24	6.22	6.22	6.22	6.25

**IC4 - XC62FP3002PRN**

PIN	FM	MW	LW	SW	AUX
G	0	0	0	0	0
O	3	3	3	3	3
I	6.01	6.01	6.01	6.01	6.01

**IC5 - NJM2100M**

PIN	FM	MW	LW	SW	AUX
1	2.74	2.74	2.74	2.74	2.74
2	2.74	2.74	2.74	2.74	2.74
3	2.74	2.74	2.74	2.74	2.74
4	0	0	0	0	0
5	2.74	2.74	2.74	2.74	2.74
6	2.74	2.74	2.74	2.74	2.74
7	2.74	2.74	2.74	2.74	2.74
8	5.51	5.51	5.51	5.51	5.51

**IC6 - PT2308**

PIN	FM	MW	LW	SW	AUX
1	3.06	3.06	3.06	3.06	3.06
2	3.06	3.06	3.06	3.06	3.06
3	3.06	3.06	3.06	3.06	3.06
4	0	0	0	0	0
5	3.06	3.06	3.06	3.06	3.06
6	3.06	3.06	3.06	3.06	3.06
7	3.06	3.06	3.06	3.06	3.06
8	6.18	6.18	6.18	6.18	6.18

**IC7 - NJM2073D**

PIN	FM	MW	LW	SW	AUX
1	4.5	4.5	4.5	4.5	4.5
2	9.6	9.6	9.6	9.6	9.6
3	4.5	4.5	4.5	4.5	4.5
4	0	0	0	0	0
5	0.5	0.5	0.5	0.5	0.5
6	0	0	0	0	0
7	0	0	0	0	0
8	0.5	0.5	0.5	0.5	0.5

**IC8 - PC-17K1**

PIN	FM	MW	LW	SW	AUX
1	9.6	9.6	9.6	9.6	9.6
2	8.85	8.85	8.85	8.85	8.85
3	0	0	0	0	0
4	0	0	0	0	0

**IC9 - MC33340**

PIN	FM	MW	LW	SW	AUX
1	0	0	0	0	0
2	0	0	0	0	0
3	0	0	0	0	0
4	0	0	0	0	0
5	0	0	0	0	0
6	0	0	0	0	0
7	0	0	0	0	0
8	0	0	0	0	0

**IC300 - 24LC32A**

PIN	FM	MW	LW	SW	AUX
1	0	0	0	0	0
2	0	0	0	0	0
3	0	0	0	0	0
4	0	0	0	0	0
5	2.77	2.77	2.77	2.77	2.77
6	2.77	2.77	2.77	2.77	2.77
7	0	0	0	0	0
8	2.73	2.73	2.73	2.73	2.73

**IC10 - LD1117AL-ADJ**

PIN	FM	MW	LW	SW	AUX
I	0	0	0	0	0
G	0	0	0	0	0
O	0	0	0	0	0

**IC301 - AP650**

PIN	FM	MW	LW	SW	AUX	PIN	FM	MW	LW	SW	AUX	PIN	FM	MW	LW	SW	AUX
1	1.52	0	0	0	1.52	22	0	0	0	0	0	43	0	0	0	1.52	0
2	1.52	0	0	0	0	23	2.73	2.75	2.75	2.75	2.75	44	1.52	1.52	1.52	1.52	1.52
3	1.52	0	0	0	1.52	24	0	0	0	0	0	45	1.52	1.52	1.52	1.52	1.52
4	1.52	1.52	1.52	1.52	1.54	25	0	0	0	0	0	46	1.52	0	0	1.52	1.52
5	1.52	0	0	0	1.53	26	0	0	0	0	0	47	1.52	1.52	1.52	1.52	1.52
6	1.52	0	0	0	1.52	27	0	0	0	0	0	48	1.52	1.52	1.52	1.52	1.52
7	1.52	1.52	1.52	0	1.52	28	0	0	0	0	0	49	1.52	1.52	1.52	1.52	1.52
8	1.52	1.52	1.52	0	1.52	29	0	0	0	0	0	50	1.52	0	0	1.52	1.52
9	1.52	1.52	1.52	0	1.52	30	0	0	0	0	0	51	1.52	1.52	1.52	1.52	1.52
10	1.52	1.52	1.52	0	1.52	31	0	0	0	0	0	52	1.52	1.52	1.52	1.52	1.52
11	1.52	0	0	0	1.52	32	0	1.46	1.46	1.47	1.47	53	1.52	1.52	1.52	1.52	1.52
12	1.52	1.52	1.52	0	1.52	33	2.76	0	0	2.8	2.79	54	1.52	1.52	1.52	1.52	1.52
13	1.52	0	0	0	1.52	34	2.78	2.78	2.78	2.78	2.78	55	1.52	1.52	1.52	1.52	1.52
14	1.52	1.52	1.52	1.52	1.52	35	2.72	2.74	2.74	2.74	2.74	56	1.52	1.52	1.52	0	1.52
15	1.52	1.52	1.52	1.52	1.52	36	2.73	2.75	2.75	2.75	2.75	57	1.52	0	0	1.52	1.52
16	1.52	1.52	1.52	1.52	1.52	37	1.57	1.52	1.52	1.52	1.52	58	1.52	1.52	1.52	0	1.52
17	1.52	1.52	1.52	1.52	1.52	38	2.33	0	0	2.32	0	59	1.52	1.52	1.52	0	1.52
18	1.52	1.52	1.52	1.52	1.52	39	0.78	0.79	0.79	0.78	0.78	60	1.52	1.52	1.52	0	1.52
19	1.52	1.52	1.52	1.52	1.52	40	3.1	3.14	3.14	3.1	3.12	61	1.52	1.52	1.52	0	1.52
20	2.73	0	0	2.75	0	41	2.01	0	0	2	2	62	1.52	1.52	1.52	0	1.52
21	0	2.75	2.75	2.75	2.75	42	1.02	1.05	1.05	1.01	1.03	63	1.52	1.52	1.52	0	1.52
												64	1.52	1.52	1.52	0	1.52

IC302 - AP650

PIN	FM	MW	LW	SW	AUX	PIN	FM	MW	LW	SW	AUX	PIN	FM	MW	LW	SW	AUX
1	1.37	1.37	1.37	1.37	1.37	22	0	0	0	0	0	43	0	0	0	0	0
2	1.39	1.37	1.37	1.37	1.37	23	3	3	3	0	0	44	1.35	1.35	1.35	1.35	1.35
3	1.39	1.37	1.37	1.37	1.37	24	3	3	3	3	3	45	1.35	1.35	1.35	1.35	1.35
4	1.37	1.37	1.37	1.37	1.37	25	3	3	3	3	3	46	1.35	1.35	1.35	1.35	1.35
5	1.37	1.37	1.37	1.37	1.37	26	3	3	3	3	3	47	1.35	1.35	1.35	1.35	1.35
6	1.37	1.37	1.37	1.37	1.37	27	3	3	3	3	3	48	1.35	1.35	1.35	1.35	1.35
7	1.37	0	0	1.37	1.37	28	3	3	3	3	3	49	1.35	1.35	1.35	1.35	1.35
8	1.37	1.37	1.37	1.37	1.37	29	2.8	2.8	2.8	2.8	2.8	50	1.35	1.35	1.35	1.35	1.35
9	1.37	1.37	1.37	1.37	1.37	30	0	0	0	0	0	51	1.35	1.35	1.35	1.35	1.35
10	1.37	1.37	1.37	1.37	1.37	31	0	0	0	0	0	52	1.35	1.35	1.35	1.35	1.35
11	1.37	1.37	1.37	1.37	1.37	32	1.44	1.44	1.44	0	1.44	53	1.35	1.35	1.35	1.35	1.35
12	1.37	1.37	1.37	1.37	1.37	33	2.75	2.75	2.75	2.75	2.75	54	1.35	1.35	1.35	1.35	1.35
13	1.37	1.37	1.37	1.37	1.37	34	2.76	2.76	2.76	0	2.76	55	1.35	1.35	1.35	1.35	1.35
14	1.37	1.37	1.37	1.37	1.37	35	2.78	2.78	2.78	2.78	2.78	56	1.35	1.35	1.35	1.35	1.35
15	1.37	0	0	1.37	1.37	36	2.79	2.79	2.79	0	2.79	57	1.35	1.35	1.35	1.35	1.35
16	0	0	0	0	0	37	0	1.59	1.59	1.56	1.57	58	1.35	1.35	1.35	1.35	1.35
17	0	0	0	0	0	38	0	2.23	2.23	2.2	2.22	59	1.35	1.35	1.35	1.35	1.35
18	0	0	0	0	0	39	0.77	0	0	0.77	0.77	60	1.35	1.35	1.35	1.35	1.35
19	0	0	0	0	0	40	2.82	2.82	2.82	2.82	2.82	61	1.35	1.35	1.35	1.35	1.35
20	0	0	0	0	0	41	1.78	1.78	1.78	1.78	1.78	62	1.35	1.35	1.35	1.35	1.35
21	0	0	0	0	0	42	0.89	0.89	0.89	0.89	0.89	63	1.35	1.35	1.35	1.35	1.35
												64	1.35	1.35	1.35	1.35	1.35

IC304 - MB15A01PFV1

PIN	FM	MW	LW	SW	AUX	PIN	FM	MW	LW	SW	AUX
1	1.22	1.21	1.21	1.22	1.21	9	0	0	0	0	0
2	2.92	1.43	1.43	1.41	1.43	10	0	0	0	0	0
3	2.92	2.94	2.94	2.94	2.94	11	0.74	0.74	0.74	0.73	0.73
4	2.92	2.94	2.94	2.94	2.94	12	0	0	0	0	0
5	2.9	0.78	0.78	0.76	0.78	13	0	0	0	0	0
6	0	0	0	0	0	14	0	0	0	0	0
7	0	2.94	2.94	2.94	2.94	15	0	0	0	0	0
8	1.9	1.9	1.9	1.9	1.9	16	0	0	0	0	0

IC306 - XC6202P302PRN

PIN	FM	MW	LW	SW	AUX
I	9.54	9.54	9.54	9.54	9.54
G	0	0	0	0	0
O	3	3	3	3	3



IC305 - UPD78F0513A

PIN	FM	MW	LW	SW	AUX	PIN	FM	MW	LW	SW	AUX	PIN	FM	MW	LW	SW	AUX
1	0	2.78	2.78	2.78	2.78	17	0	0	0	0	0	33	0	0	0	0	0
2	2.77	2.78	2.78	2.78	2.78	18	0	0	0	0	0	34	1.4	1.4	1.4	1.4	1.4
3	2.77	0.2	0.2	0.2	0.2	19	0	0	0	0	0	35	0	2.6	2.6	2.6	2.6
4	2.77	2.84	2.84	2.84	3	20	0	0	0	0	0	36	0	2.6	2.6	2.6	2.6
5	0	0	0	0	0	21	0	0	0	0	0	37	3.16	3.18	3.18	3.18	3.18
6	2.79	2.8	2.8	0	2.8	22	2.37	0	0	0	0	38	2.77	2.8	2.8	2.8	2.8
7	0	0	0	0	0	23	2.37	2.8	2.8	2.8	2.8	39	2.79	2.8	2.8	2.8	2.8
8	0	0	0	2.62	0	24	0	0	0	0	0	40	2.77	2.8	2.8	2.8	2.8
9	2.42	2.56	2.56	0	2.6	25	0	0	0	0	0	41	1.48	1.61	1.61	1.61	1.61
10	2.72	2.79	2.79	0	2.8	26	0.24	0.24	0.24	0.35	0.32	42	0.76	0.77	0.77	0.77	0.77
11	0	0	0	0	0	27	0	0	0	0	0	43	0	0	0	0	0
12	0	0	0	0	0	28	0	3	3	3	3	44	1.32	1.33	1.33	1.33	1.33
13	0	0	0	0	0	29	0	0	0	0	0	45	1.11	1.12	1.12	1.11	1.12
14	0	2.87	2.87	2.86	0	30	0	2.03	2.03	2.75	2.75	46	1.11	2.52	2.52	1.11	2.52
15	2.73	2.8	2.8	2.8	2.8	31	0	0	0	0	0	47	2.5	0	0	0	0
16	0	3	3	3	3	32	0	0	0	0	2.79	48	2.8	2.8	2.8	2.8	2.8

Transistor

	PIN	FM	MW	LW	SW	AUX		PIN	FM	MW	LW	SW	AUX
Q1	B	0	5.42	5.42	5.42	0	Q9	B	0	0	0	0.06	0
	E	0	6.1	6.1	6.1	0		E	0	0	0	0	0
	C	0	6	6	0.25	0		C	1.33	0	0	1.33	1.33
Q3	B	1.48	1.48	1.48	1.48	1.48	Q10	B	0	0	0	0	0
	E	0.39	0.88	0.88	0.89	0.39		E	0	0	0	0	0
	C	3.03	3	3	3	3.03		C	0	0	0	0	0
Q4	B	0.72	1.38	1.38	1.3	0.72	Q11	B	0	0	0	0	0
	E	0.89	0.88	0.88	0.89	0.89		E	0	0	0	0	0
	C	2.82	1.97	1.97	2.78	2.82		C	0	0	0	0	0
Q5	B	2.7	1.97	1.97	2.68	2.7	Q12	B	0	0	0	0	0
	E	2.1	1.31	1.31	2.1	2.1		E	0	0	0	0	0
	C	3	3	3	3	3		C	0	0	0	0	0
Q6	B	0	0	0	0.07	0	Q13	B	0.23	0.91	0.91	0.91	0.23
	E	0	0	0	0	0		E	0	0.2	0.2	0.2	0
	C	0	1.34	1.34	0	0		C	0.23	1.57	1.57	1.57	0.23
Q7	B	0	0	0	0	0	Q14	B	0	2.0	2.0	0	0
	E	0	0	0	0	0		E	0	1.29	1.29	0	0
	C	1.34	1.33	1.33	1.35	1.34		C	0	5.28	5.28	0	0
Q8	B	0	0	0	0.07	0	Q15	G	0	0	0	0	0
	E	0	0	0	0	0		S	0	0.69	0.69	0.43	0
	C	0	0	0	0	0		D	0	6.13	6.13	6.11	0

Transistor

	PIN	FM	MW	LW	SW	AUX
Q16	G	0	0	0	0	0
	S	0	0.69	0.69	0.43	0
	D	0	6.13	6.13	6.11	0
Q17	B	0.61	0.58	0.58	0.69	0.61
	E	0	0	0	0	0
	C	0	0.68	0.68	0.13	0
Q18	G	0	0.47	0.47	0.28	0
	S	0	1.23	1.23	1.29	0
	D	0	5.32	5.32	5.25	0
Q19	G	0	0.47	0.47	0.28	0
	S	0	1.23	1.23	1.21	0
	D	0	5.32	5.32	5.25	0
Q20	G	0	0	0	0	0
	S	0	0.78	0.78	0.74	0
	D	0	5.68	5.68	5.7	0
Q21	G	0	0	0	0	0
	S	0	0.71	0.71	0.76	0
	D	0	5.7	5.7	5.7	0
Q22	B	0.23	0.85	0.85	0.85	0.23
	E	0	0.11	0.11	0.11	0
	C	0.23	1.03	1.03	1	0.23
Q23	B	0	0	0	0.67	0
	E	0	0	0	0	0
	C	0.23	2.62	2.62	0	0.23
Q24	B	0	6.08	6.08	5.49	0
	E	0	6.14	6.14	6.14	0
	C	0	6.08	6.08	0	0
Q25	B	2.42	2.42	2.42	2.44	2.42
	E	3	3	3	3	3
	C	3	0	0	3	3
Q26	B	6.85	6.85	6.85	6.85	6.85
	E	6.22	6.22	6.22	6.22	6.22
	C	9.17	9.17	9.17	9.17	9.17
Q27	B	6.16	6.16	6.16	6.16	6.16
	E	6.22	6.22	6.22	6.22	6.22
	C	0	0	0	0	0
Q28	B	0	0	0	0	0.6
	E	0	0	0	0	0
	C	6.1	6.1	6.1	6.1	0
Q29	B	0	0.62	0.62	0	0
	E	0	0	0	0	0
	C	0	0	0	6.07	0

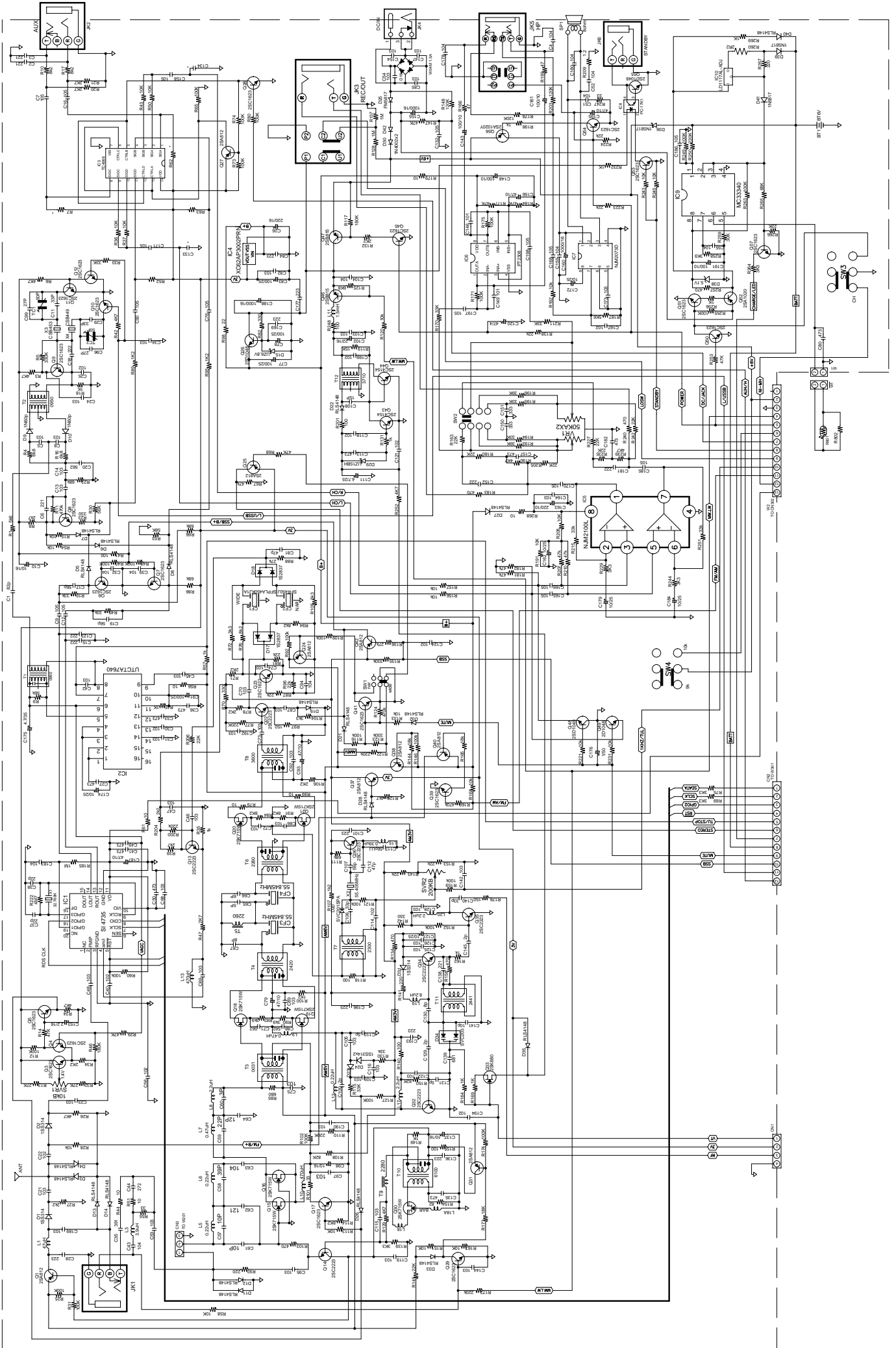
	PIN	FM	MW	LW	SW	AUX
Q30	G	0	0	0	0	0
	S	0	5.19	5.19	0	0
	D	0	0.36	0.36	0	0
Q31	B	0	5.4	5.4	6.08	0
	E	0	6.12	6.12	6.14	0
	C	0	6.04	6.04	0	0
Q32	B	0.22	0.73	0.73	0.56	0.22
	E	0	0	0	0	0
	C	0.22	2.72	2.72	2.74	0.22
Q33	G	0	2.41	2.41	4.69	0
	S	0	1.41	1.41	13.81	0
	D	0	1.62	1.62	4.33	0
Q34	B	0	1.52	1.52	1.44	0
	E	0	0.77	0.77	0.84	0
	C	0	2.12	2.12	2.1	0
Q35	B	0	0.72	0.72	0.74	0
	E	0	0	0	0	0
	C	0	2.43	2.43	2.44	0
Q36	B	0	0.7	0.7	0.67	0
	E	0	0	0	0	0
	C	0.22	1.56	1.56	1.56	0.22
Q37	B	5.6	2.28	2.28	2.31	5.6
	E	3	3	3	3	3
	C	0.22	2.96	2.96	2.94	0.22
Q38	B	6.13	5.5	5.5	5.52	6.13
	E	6.23	6.22	6.22	6.25	6.23
	C	0	6.13	6.13	6.14	0
Q39	B	0.59	0	0	0	0.59
	E	0	0	0	0	0
	C	0	5.62	5.62	5.65	0
Q40	B	5.57	5.63	5.63	5.66	5.57
	E	6.23	6.22	6.22	6.24	6.23
	C	6.2	0.27	0.27	0	6.2
Q41	B	0	0	0	0.55	0
	E	0	0	0	0	0
	C	0	6.01	6.01	6.03	0
Q42	B	2.32	2.76	2.76	2.76	2.32
	E	0.22	2.94	2.94	2.96	0.22
	C	0	0	0	0	0
Q43	B	0.56	0	0	0.57	0.56
	E	0	0	0	0	0
	C	0.46	0	0	0	0.46

Transistor

	PIN	FM	MW	LW	SW	AUX
Q44	B	0.46	0	0	0.47	0.46
	E	0	0	0	0	0
	C	7.76	0	0	7.78	7.76
Q45	B	0.65	0.65	0.65	0.65	0.65
	E	0	0	0	0	0
	C	0	0	0	0	0
Q46	B	8.47	9.21	9.21	8.42	8.47
	E	9.17	9.46	9.46	9.13	9.17
	C	9.13	0	0	9.1	9.13
Q47	B	8.46	8.8	8.8	8.42	8.46
	E	9.21	9.53	9.53	9.17	9.21
	C	9.18	9.5	9.5	9.14	9.18
Q48	B	0	0	0	0	0
	E	0	0	0	0	0
	C	0	0	0	0	0
Q49	B	0	0	0	0	0
	E	0	0	0	0	0
	C	0	0	0	0	0
Q50	B	0.57	0.55	0.55	0.57	0.57
	E	0	0	0	0	0
	C	0	0	0	0	0
Q51	B	0	0	0	0	0
	E	0	0	0		0
	C	10.2	10.56	10.56	10.2	10.2
Q52	B	10.19	11.1	11.1	10.2	10.19
	E	10.72	10.596	10.596	10.72	10.72
	C	0.6	0	0	0	0.6
Q53	B	0	0	0	0	0
	E	0	0	0	0	0
	C	8.4	8.72	8.72	8.36	8.4
Q54	B	0	0.63	0.63	0.62	0
	E	0.62	0	0	0	0.62
	C	4.7	4.02	4.02	2.95	4.7
Q55	B	0	0	0	0	0
	E	0	0	0	0	0
	C	0	0	0	0	0
Q56	B	9.25	8.53	8.53	8.48	9.25
	E	9.26	9.24	9.24	9.18	9.26
	C	8.58	9.21	9.21	9.21	8.58
Q57	B	0	0	0	0	0
	E	0	0	0	0	0
	C	0	7.9	7.9	7.84	0
Q300	B	2.4	2.7	2.7	2.7	2.4
	E	1.8	2.13	2.13	2.13	1.8
	C	9.2	9.2	9.2	9.2	9.2

	PIN	FM	MW	LW	SW	AUX
Q301	B	0.8	0.92	0.92	0.92	0.8
	E	0.2	0.25	0.25	0.25	0.2
	C	6.3	6.3	6.3	6.3	6.3
Q302	B	2.63	0	0	0	2.63
	E	0	2.8	2.8	2.8	0
	C	2.58	2.76	2.76	2.76	2.58
Q303	B	9.27	9.2	9.2	9.2	9.27
	E	9.25	9.2	9.2	9.2	9.25
	C	0	0	0	0	0
Q304	B	0.2	0.22	0.22	0.22	0.2
	E	0	0	0	0	0
	C	9.2	9.23	9.23	9.23	9.2
Q305	B	0	0.82	0.82	0.82	0
	E	0	0.22	0.22	0.22	0
	C	0.2	0.22	0.22	0.22	0.2
Q306	B	0	0	0	0	0
	E	0	0	0	0	0
	C	0	8.56	8.56	8.56	0
Q307	B	0	0.63	0.63	0.63	0
	E	0	0	0	0	0
	C	6.1	0	0	0	6.1
Q308	B	3.0	3	3	3	3.0
	E	3.6	3.65	3.65	3.65	3.6
	C	3.6	3.65	3.65	3.65	3.6
Q309	B	2.54	1	1	1.01	2.54
	E	3	3	3	3	3
	C	2.94	0.7	0.7	6.79	2.94
Q310	B	0.7	0.6	0.6	0.6	0.7
	E	0	0	0	0	0
	C	0	0.4	0.4	3.46	0
Q311	B	0.7	0.75	0.75	0.7	0.7
	E	0	0	0	0	0
	C	0	2	2	2.1	0
Q312	B	0.55	0.55	0.55	0.55	0.55
	E	0	0	0	0	0
	C	0	0	0	0	0
Q315	B	0.6	0.6	0.6	0.6	0.6
	E	0	0	0	0	0
	C	0	0	0	0	0
Q316	B	0.2	0.2	0.2	0.2	0.2
	E	0	0	0	0	0
	C	0	0	0	0	0

# MAIN SCHEMATIC DIAGRAM



# CONTROL SCHEMATIC DIAGRAM

