

Service  
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# Service Manual



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### Version 1.1



## TECHNICAL SPECIFICATION

<b>General description:</b>										1
<b>LIFETIME : 5 YEARS (ACC. TO UAN-D1611)</b>										2
<b>PERFORMANCE CLASSES :</b>										
	TUNER	SUPPLY, AMPLIFIER	SPEAKER BOXES	RECORDER	CLOCK	CD	DCC	TELEPHONE	REC. PLAYER	
I	X	X								3
II						X				4
III										5
<b>SAFETY REQUIREMENTS:</b> EN 60065 (IEC 65) CE										6
<b>RADIATION, IMMUNITY REQUIREMENTS: (EMC)</b> Pre-scan for EN55013, .										7
<b>CLIMATIC REQUIREMENTS: (acc. to UAN-D1590)</b>										
All climates: -10 °C till +50 °C (Functional); Set has to be pre-conditioned for 2 hour, except CD function										8
For all measurements: 25 °C										9
<b>POWER SUPPLY:</b>										
<b>MAINS (AC) operation</b>					<b>DC (int. or ext.) operation / Backup Buffer</b>					
Voltage selection:		See table below			Battery type: R14, UM2, C-cell x 6; nom.: 9V minimum operating voltage : 6.3V for CD / Tape 5.2V for TU					10
Selection:		See table below			Lifetime: CD ≥ 10 hours, TU ≥ <b>20</b> hours, (400mW, R14 金霸王 alkaline batteries)					11
Frequency:		See table below			External DC: No					12
<b>POWER CONSUMPTION:</b>										
Standby: ≤ 0.5W (power off mode)					Standby: ≪=0. 5nW (power off mode)					13
Maximum: 15 w					Maximum:					14
<b>General:</b> Q and R according to production division rules : Q ≤ 1% (Major), Q ≤ 4% (Minor) Measured according to: R ≤ 3% (CE52)										
<b>DERIVED VERSIONS:</b>								<b>APPROBATION</b>		
Version	AC Voltage/ Frequency on typeplate		Safety Tolerance	Tuner						
/05	230VAC/ 50HZ		+/-10%	FM,						15
/12/	220V—240VAC/ 50HZ		+/-10%	FM,						
79	230VAC/ 50HZ		+/-10%	FM,						
37	120VAC/ 60HZ		+/-10%	FM,						
<b>REMARKS:</b> For operation and thermal stability test : 220/230/240Vac setting : 198Vac to 264Vac 120Vac setting : 99Vac to 140Vac dual voltage ac setting (120Vac / 230Vac) : 99Vac to 140Vac and 196Vac to 264Vac										16

# TECHNICAL SPECIFICATION

<b>TUNER PART</b>													
<b>TECHNICAL description:</b>													
	AM (circuitry)				FM/AM (active components)				FM				
RF					Si4831-B30				Si4831-B30				1
IF					Si4831-B30				Si4831-B30				2
Detector													3
Decoder													4
<b>GENERAL part:</b>													
WAVE RANGE					TOLERANCES				TUNING STEP				
													5
FM (05/79 version)	87.5 –108MHZ				N.C				50K				6
FM (12 version)	87.5----108MHZ				N.C				50K				7
<b>AERIAL:</b>													
					FM telescope : 430 mm								11
FM wire :	N/A				Execution - N/A								12
<b>INDICATORS:</b>													
Pointer stroke:					Execution pointer:								13
Knob indication over:					Field Strength:								14
<b>ELECTRICAL DATA:</b>													
AM:		Nom.	limit	FM:		nom.	limit						
				AM Suppression		30	25 dB					15	
				-3dB limiting point		12	18 dBuV					16	
Amplification reserve				Amplification reserve		2	+/- 2 dB					17	
AGC figure of merit				B/AFC holding range (average)		300	+/- 150					18	
Distortion (RF 74 to 94 dBuV/m, m=80%)				Distortion (RF 32 to 72 dBuV, mono Δf 100kHz, Stereo : 90% + 9%)		5	7 %					19	
				Stereo -46dB quieting		40	44 dBuV					20	
				Cross-talk (RF 1mV, Δf 40kHz, 400Hz /1kHz / 5kHz)		21/25/18	18/20/15 dB					21	
Strong S/N radio RF 94dBuV/m, m=80%				S/N radio (A-Weighted, RF 4mV)		53	50 dBA					22	
Channel difference				Channel unbalance (250Hz to 6300Hz)		0	3 dB					23	
Modulation hum (30% mod)				Modulation hum (22.5kHz dev)		44	40 dB					24	
2, 3th IF harmonics rejection (RF 64 to 94dBuV/m)				8, 9, 10 <sup>th</sup> harmonics whistle		35	30 dB					25	
Overall frequency response (-3dB)				Overall frequency response (+/- 3dB, 1kHz ref) - 50us		70 9k	80 Hz 10k Hz					26	
Oscillator stop voltage 120V setting				Oscillator stop voltage 120V setting		90	96 Vac					27	
230V setting				230V setting		190	192 Vac						
Search tuning sensitivity		/	N/A	Search tuning sensitivity		/	N/A					28	
Search tuning stop accuracy RF ≥ α26 to 1mV		/	N/A	Search tuning stop accuracy - 20uV ~ 20mV		/	N/A					29	
RF ≥ 1V/m		/		- 20mV ~ 500mV with step size = 50kH		/							
		/		- 20mV ~ 500mV with step size > 50kHz		/							
Search time of total tuning range		/	N/A	Search time of total tuning range			N/A					30	
IF				IF								31	
Dial calibration				Dial calibration								33	
				Stereo On point (Pilot deviation : 6kHz)								34	
												35	
wave range		Sensitivity for 50mW			noise limited sensitivity (26dB)		Image rejection	IF rejection	large signal	Selectivity S9/300kHz	bandwidthB+3 dB		
FM	nom.				13		21	55	126dBf	21		36	
	lim.				15		19	50	125dBf	19		37	
	nom.												
	lim.												
	unit	μV/m	μV	dBf	dBμV/m	dBuV	dB	dB	dB	mV/m	dB	kHz	

## TECHNICAL SPECIFICATION

### SUPPLY, AF-AMPLIFIER & LOUDSPEAKER PART:

<b>TECHNICAL description:</b>						
		Power supply	Tone Control	AF-Amplifier	Loudspeaker	
Active components				PT2337		1
Passive components					2 X 1 W, 8ohm	2
						3
<b>GENERAL part:</b>						
Headphone type		None				4
Loudspeaker filter, high pass		None				5
Loudspeaker filter, low pass		None				6
Power stage protection		AC – NO; DC - NO; Temperature – YES; Short circuit – NO				7
Public address		No				8
<b>INDICATORS:</b>						
Output power or VU-meter		No			: digits:	9
Frequency response		No			: digits:	10
Low power (battery)		No				11
<b>ELECTRICAL DATA:</b>						
<b>TONE/EQUALIZER/DBB</b>						
		Balance control		No		12
		Mechanical noise (ISO 1996)				13
		Noise overall (ISO)				14
		Channel difference at 50mW				15
		Hum (vol.max.-20dB to vol.min.)		Limit: 250	nW	16
		Residual noise (volume minimum)		Limit: 80	nW	17
Input sens.: Nom.		500mV		mV		
for 50mW Limit:				mV		
Line outp.: Nom.				mV		
voltage Limit:				mV		
<b>OUTPUT POWER:</b>						
Mains operation:		D=10%	2 X 1W	Limit: - 1dB		18
Battery operation:		D=10%	2 X 1W	Limit: - 1dB		19
Music power (MPO) / Peak-MPO (PMPO):				(acc. to DIN45324)		20
Short term maximum output power:		-2*1.2W		(acc. to IEC 60268-15)		21
Long term maximum output power:		-		(acc. to IEC 60268-15)		22
Headphone output voltage/power:						23
Bandwidth FTC – 1dB at:		n.a.		(acc. to FTC/16/1/D/432)		24
Bandwidth DIN – 3dB at:		-		(acc. to IEC 60268-15)		25
Frequency response at Vol. max – 20dB:		typ. 60Hz to 16kHz (±3dB)				26
DBB raise level		10db at 125hz vol max-20db		Disc SBC429 Track 12		
<b>LOUDSPEAKER (output):</b>						
Low pass crossover frequency:		-	kHz	tolerance:	Hz	27
High pass crossover frequency:		-	kHz	tolerance:	Hz	28
Short term maximum output power:		-	W (acc. to IEC 60268-15)			29
Long term maximum output power:		-	W (acc. to IEC 60268-15)			30
Frequency response at:		-	Hz	kHz		31
<b>REMARKS:</b>						32
27 : Measured in Tuner mode; 28: CD or Tape mode.						

## TECHNICAL SPECIFICATION

### SUPPLY, AF-AMPLIFIER & LOUDSPEAKER PART:

<b>TECHNICAL description:</b>						
	Power supply	Tone Control	AF-Amplifier	Loudspeaker		
Active components			PT2337			1
Passive components				2 X 1 W, 8ohm		2
						3
<b>GENERAL part:</b>						
Headphone type	None					4
Loudspeaker filter, high pass	None					5
Loudspeaker filter, low pass	None					6
Power stage protection	AC – NO; DC - NO; Temperature – YES; Short circuit – NO					7
Public address	No					8
<b>INDICATORS:</b>						
Output power or VU-meter	No				: digits:	9
Frequency response	No				: digits:	10
Low power (battery)	No					11
<b>ELECTRICAL DATA:</b>						
<b>TONE/EQUALIZER/DBB</b>						
			Balance control	No		12
			Mechanical noise (ISO 1996)			13
			Noise overall (ISO)			14
			Channel difference at 50mW			15
			Hum (vol.max.-20dB to vol.min.)	Limit: 250	nW	16
			Residual noise (volume minimum)	Limit: 80	nW	17
Input sens.: Nom.			500mV		mV	
for 50mW Limit:					mV	
Line outp.: Nom.					mV	
voltage Limit:					mV	
<b>OUTPUT POWER:</b>						
Mains operation:	D=10%	2 X 1W		Limit: - 1dB		18
Battery operation:	D=10%	2 X 1W		Limit: - 1dB		19
Music power (MPO) / Peak-MPO (PMPO):				(acc. to DIN45324)		20
Short term maximum output power:	-2*1.2W			(acc. to IEC 60268-15)		21
Long term maximum output power:	-			(acc. to IEC 60268-15)		22
Headphone output voltage/power:						23
Bandwidth FTC – 1dB at:	n.a.			(acc. to FTC/16/1/D/432)		24
Bandwidth DIN – 3dB at:	-			(acc. to IEC 60268-15)		25
Frequency response at Vol. max – 20dB:	typ. 60Hz to 16kHz (±3dB)					26
DBB raise level	10db at 125hz vol max-20db			Disc SBC429 Track 12		
<b>LOUDSPEAKER (output):</b>						
Low pass crossover frequency:	-	kHz	tolerance:		Hz	27
High pass crossover frequency:	-	kHz	tolerance:		Hz	28
Short term maximum output power:	-	W (acc. to IEC 60268-15)				29
Long term maximum output power:	-	W (acc. to IEC 60268-15)				30
Frequency response at:	-	Hz			kHz	31
<b>REMARKS:</b>						
27 : Measured in Tuner mode; 28: CD or Tape mode.						32

## TECHNICAL SPECIFICATION

### **CD-PART: (SANYO DA11VF CD MECHANISM) (BALL type)**

<b>Technical description:</b>					
	Input	Output	Motor/control	Logic control	1
Active components			TA2157F	TC94A29FAG-018	2
Passive components					3
	Signal processing	D/A converter	HF-preamplifier	Servo processor	4
Active components	CD: TC94A29FAG-018	CD: TC94A29FAG-018	D9258		5
Passive components					6
<b>Indicators/Display/Keys:</b>					
Display: LED Indicators					7
Keys: Slide switches & tact switches					8
<b>Playability:</b> (acc. to AHR-82-Gbu-00-4201)					
	Limit	Typical	Testdisc		9
Wedge	600 µm	900 µm	TNO 7,9 of SBC 444A (7104 099 24990)		10
Eccentric	150 µm	200 µm	TNO 1,24 of 200µm disc (7104 099 24960)		11
Fingerprint	No audible defect		TNO 11 of Subchassis 8A		12
Black dot	500 µm	600 µm	TNO 13, 14 of SBC 444A (7104 099 24990)		13
Double black dot	No failure		TNO 9 of Subchassis 8A		14
Skew 0.6 deg, 8cm	No audible defect		TNO 1,6 of 0.6deg C, 8cm skew disc		15
Bad HF track	No audible defect		TNO 8 of Subchassis 8A		16
Heavy fingerprint	No track jumps/plops		TNO 10 of Subchassis 8A		17
Maximum diameter	No audio effect		Last TNO of Subchassis 8A		18
Thick disc	No failure		Thick test disc		19
Thin disc	No failure		Thin test disc		20
Vertical deviation disc	No failure		TNO 1,16 of ABEX TCD-732RA (VDD +/- 0.5mm)		21
Playback position	Horizontal, Normal position (Set is located on a flat surface, floor)				22
- Playback of above mentioned tracks possible without track loss or audible defects.					23
- This unit can playback CD-R or CD-RW discs.					
<b>Shock resistance:</b> (acc. to AR 13-A6-CD-068)					
± Z axis	3 G				24
± X or Y axis	5 G				25
<b>Acoustical noise:</b>					
Mode: Play/Pause	35 dBA max. (45 dbA in Search mode)				26
Mode: Jump (Next)	45 dBA max.				27
<b>Acoustic feedback:</b>	Acoustical feedback is not allowed.	Test disc TNO 2,6,11,18,19,20 of SBC444 , 10% THD o/p , DBB on			
<b>AUDIO part:</b> (Measured with Audio Signals Disc-1, 7104 078 04911 on Speakers or Headphone socket with nom. load)					
	Typ.	Limit			
Output level (TNO1)	2. 8V	+/-1db			28
SNR unwt'd.	60 dB	50 dB			29
SNR wtd. dBA	62 dBA	57 dBA			30
Crosstalk (1kHz) TNO 67, 71	35 dB	30 dB			31
Crosstalk (other range) TNO 66 – 73 (16 TO 16kHz)	40 dB	40 dB			32
Frequency response Vol.max.-20dB (DBB on)	-1.5dB -1dB	±2dB at 100Hz ±2dB at 10kHz			33
Frequency response at DBB off (+/- 3dB)	100 10k	80 Hz 12.5 kHz			34
THD (1kHz, 0 dB)	1%	1.5 %			35
THD (overall frequency response range, 0dB)	2 %	3 %			36
Channel difference	0.5 dB	2 dB			37
Frequency accuracy	-	+/-0.5 %			38
De-emphasis	15µs / 50µs Switchable via Subcode information				39
<b>REMARKS:</b>					
- Amplification reserve for CD = +2dB (±2dB); Ref. Level for CD is a 1kHz, -6dB (Audio signal disc 1, track 35)					40

**VERSION VARIATION**

Type /Versions:		AZD102/AZD102W							
Service policy		/61/93/96	/79	/12(APMEA)					
Board in used:		M+C	M+C	M+C					
Main BOARD		M+C	M+C	M+C					
Key BOARD		M+C	M+C	M+C					
LED BOARD		M+C	M+C	M+C					
AMP BOARD		M+C	M+C	M+C					
Power BOARD		M+C	M+C	M+C					
IPOD BOARD		M	M	M					
Type /Versions:		AZD102							
Feature difference		/61/93/79/96							
Features									
RDS									
VOLTAGE SELECTOR									
ECO STANDBY - DARK		√							
<p>* TIPS : C -- Component Lever Repair.  M -- Module Lever Repair  √ -- Used</p>									

## 2.0 SAFETY INSTRUCTIONS

**(GB)** WARNING

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically. When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance. Keep components and tools also at this potential.

**ESD****(NL)** WAARSCHUWING

Alle IC's en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD). Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen. Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat. Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

**(F)** ATTENTION

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD). Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation. Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfilez le bracelet serti d'une résistance de sécurité. Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

**(D)** WARNUNG

Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD). Unsorgfältige Behandlung im Reparaturfall kann die Lebensdauer drastisch reduzieren. Veranlassen Sie, dass Sie im Reparaturfall über ein Pulsarmband mit Widerstand verbunden sind mit dem gleichen Potential wie die Masse des Gerätes. Bauteile und Hilfsmittel auch auf dieses gleiche Potential halten.

**(I)** AVVERTIMENTO

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD). La loro longevità potrebbe essere fortemente ridotta in caso di non osservazione della più grande cauzione alla loro manipolazione. Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza. Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

**(GB)**

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified, be used.

"Pour votre sécurité, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne".

**(NL)**

Veiligheidsbepalingen vereisen, dat het apparaat bij reparatie in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.

**(F)**

Les normes de sécurité exigent que l'appareil soit remis à l'état d'origine et que soient utilisés les pièces de rechange identiques à celles spécifiées.

**(GB)** Warning !

Invisible laser radiation when open. Avoid direct exposure to beam.

**(D)**

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Originalzustand des Geräts darf nicht verändert werden; für Reparaturen sind Original-Ersatzteile zu verwenden.

**(S)** Varning !

Osynlig laserstrålning när apparaten är öppnad och spårren är urkopplad. Beträkta ej strålen.

**(I)**

Le norme di sicurezza esigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambio identici a quelli specificati.

**(SF)** Varoitus !

Avatussa laitteessa ja suojalukituksen ohitettaessa olet alltiina näkymättömälle laserisäteilylle. Älä katso säteeseen!

"After servicing and before returning set to customer perform a leakage current measurement test from all exposed metal parts to earth ground to assure no shock hazard exist. The leakage current must not exceed 0.5mA."

**DK** Advarsel !

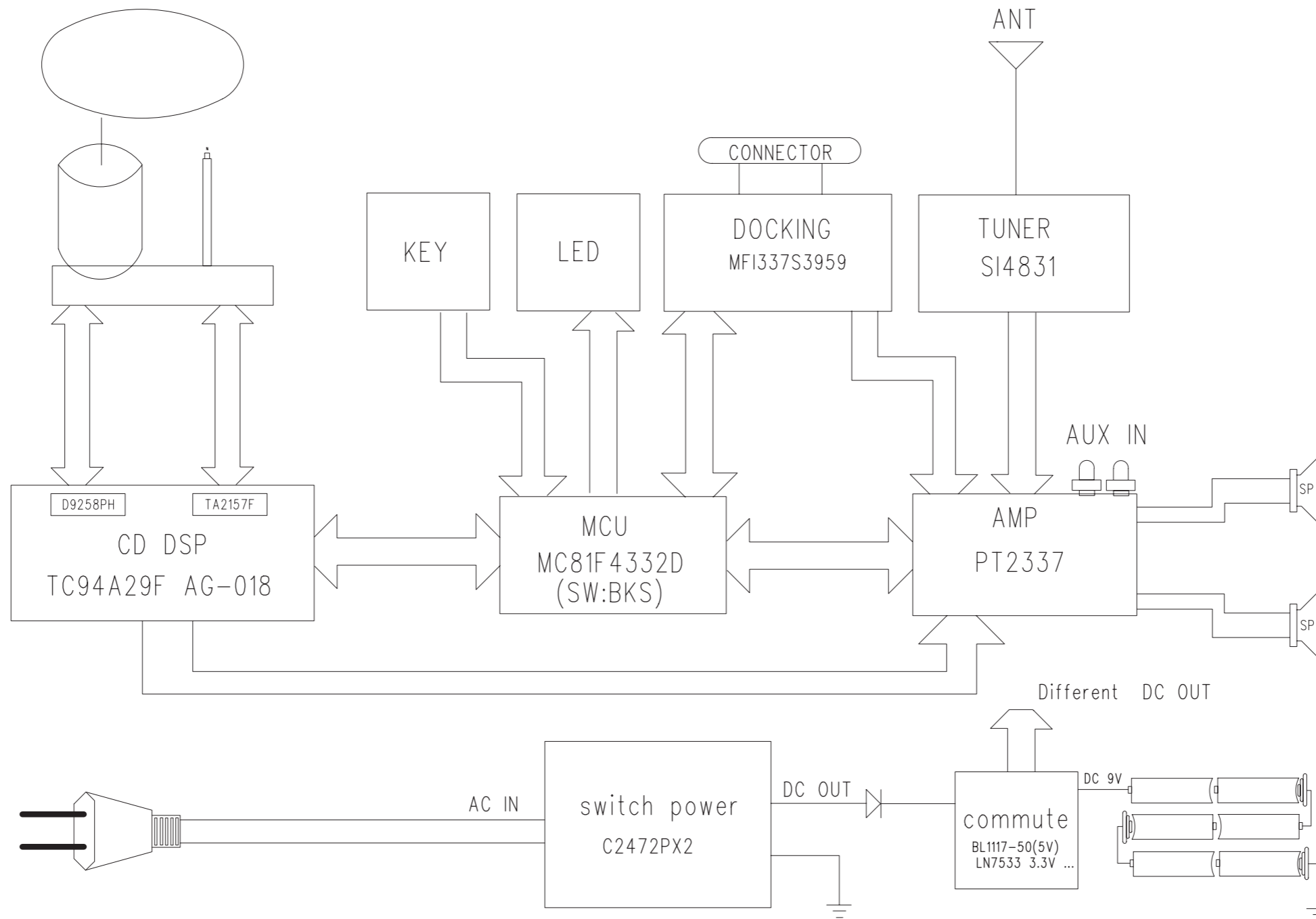
Usynlig laserstrålning ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsættelse for strålning.

Caution: These servicing instructions are for use by qualified service personnel only.

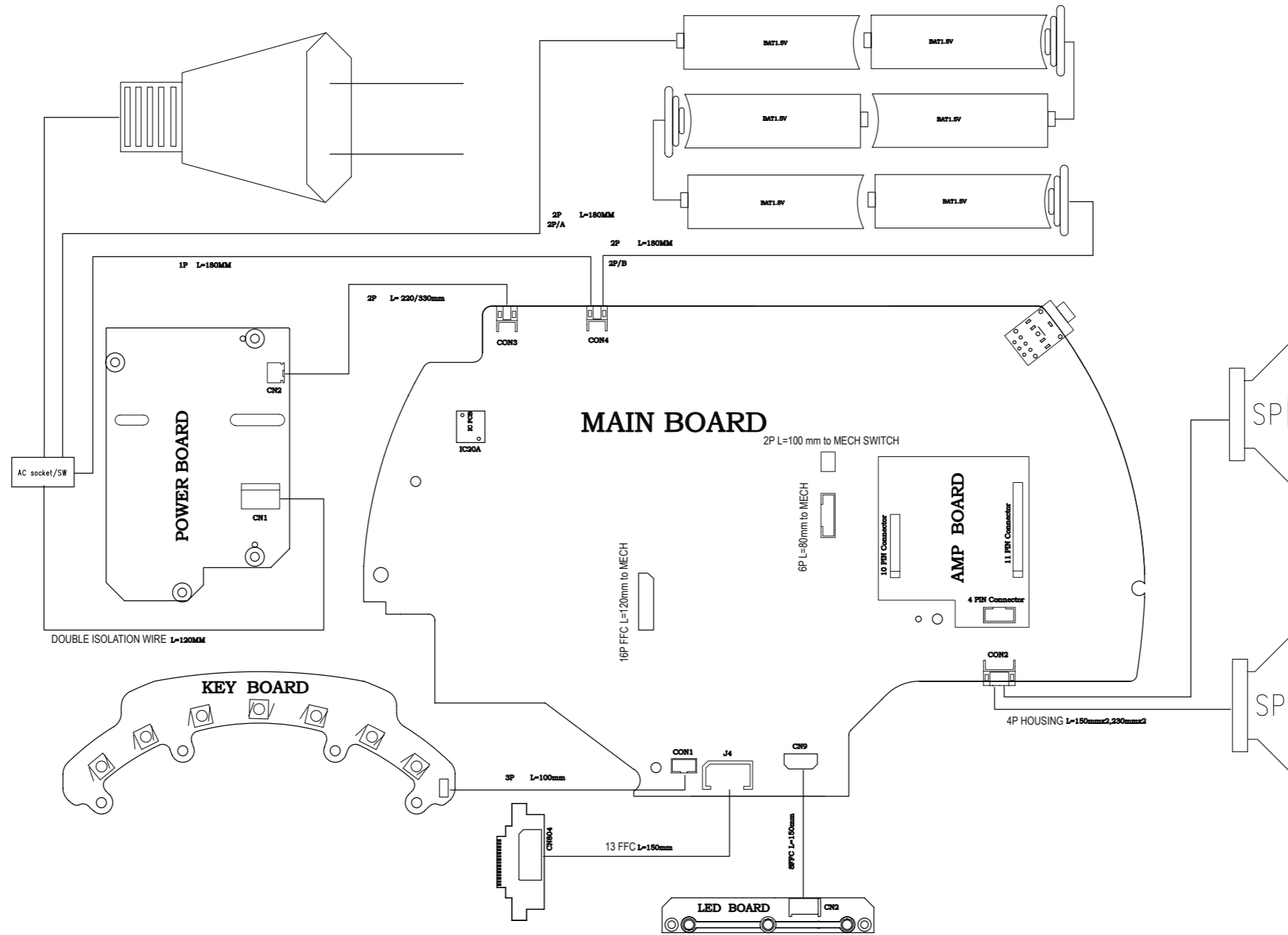
To reduce the risk of electric shock do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.



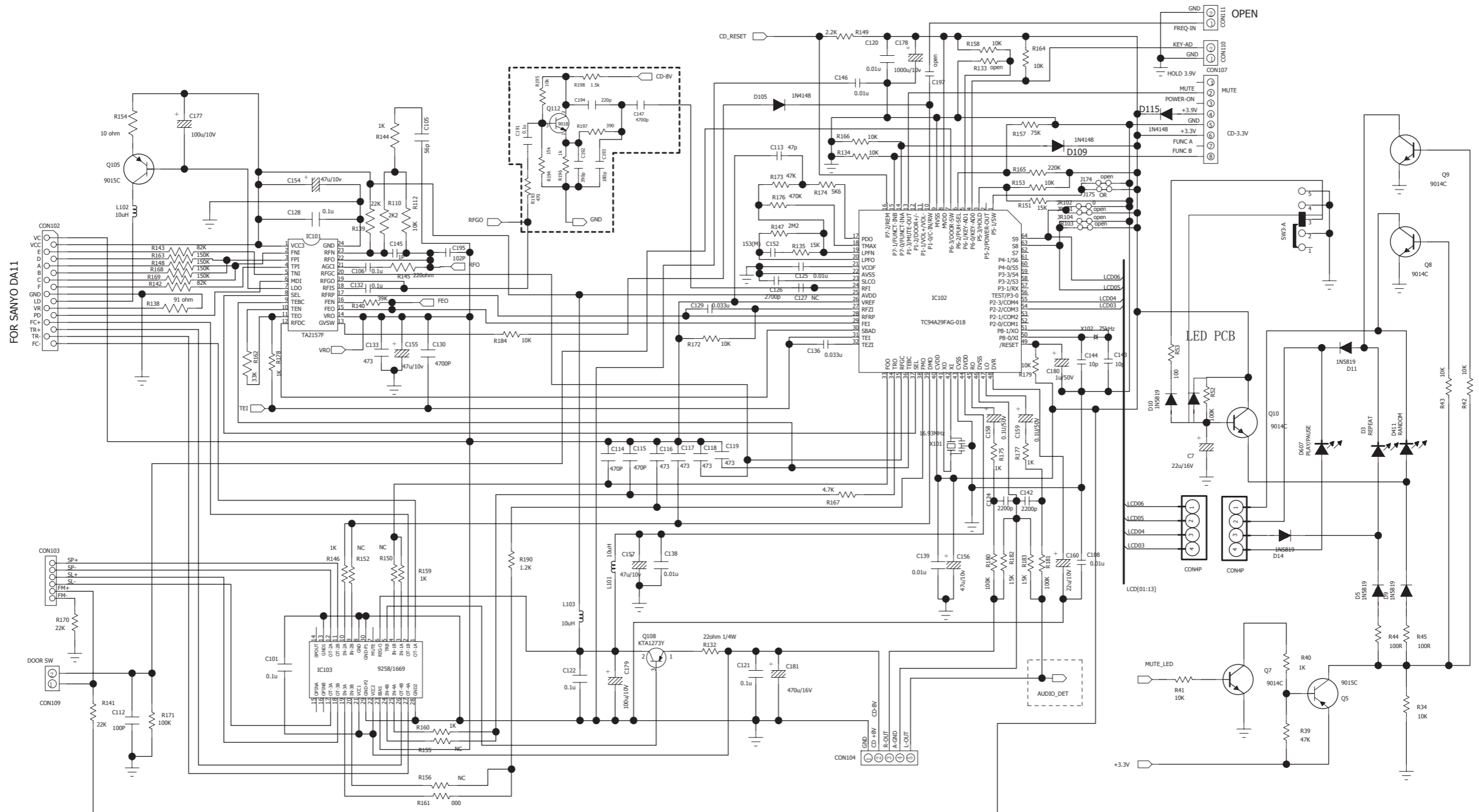
SET BLOCK DIAGRAM



# WIRE CONNECT DIAGRAM



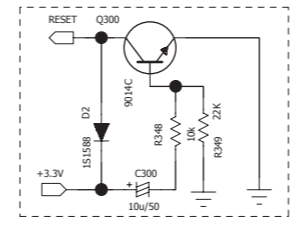
CIRCUIT DIAGRAM -MAIN + LED BOARD PART1



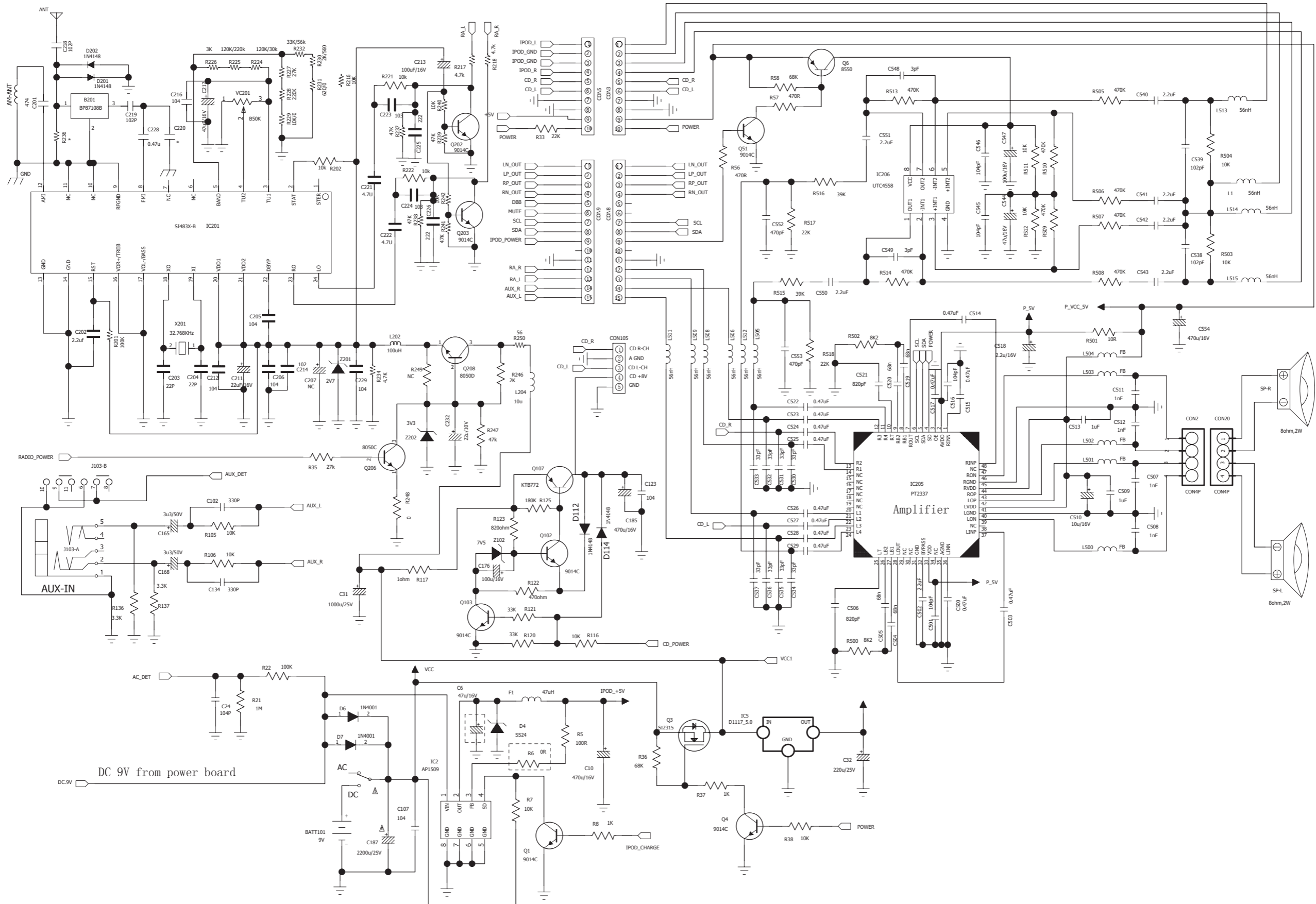
IC303	R7/8/9/10	R11/12/13/14
MM1669AH	NC	YES
9258D	YES	NC

PUH SEL(6pin)	R165	R157
SANYO DA11	MW 9K	100K
	AM 10K	22K

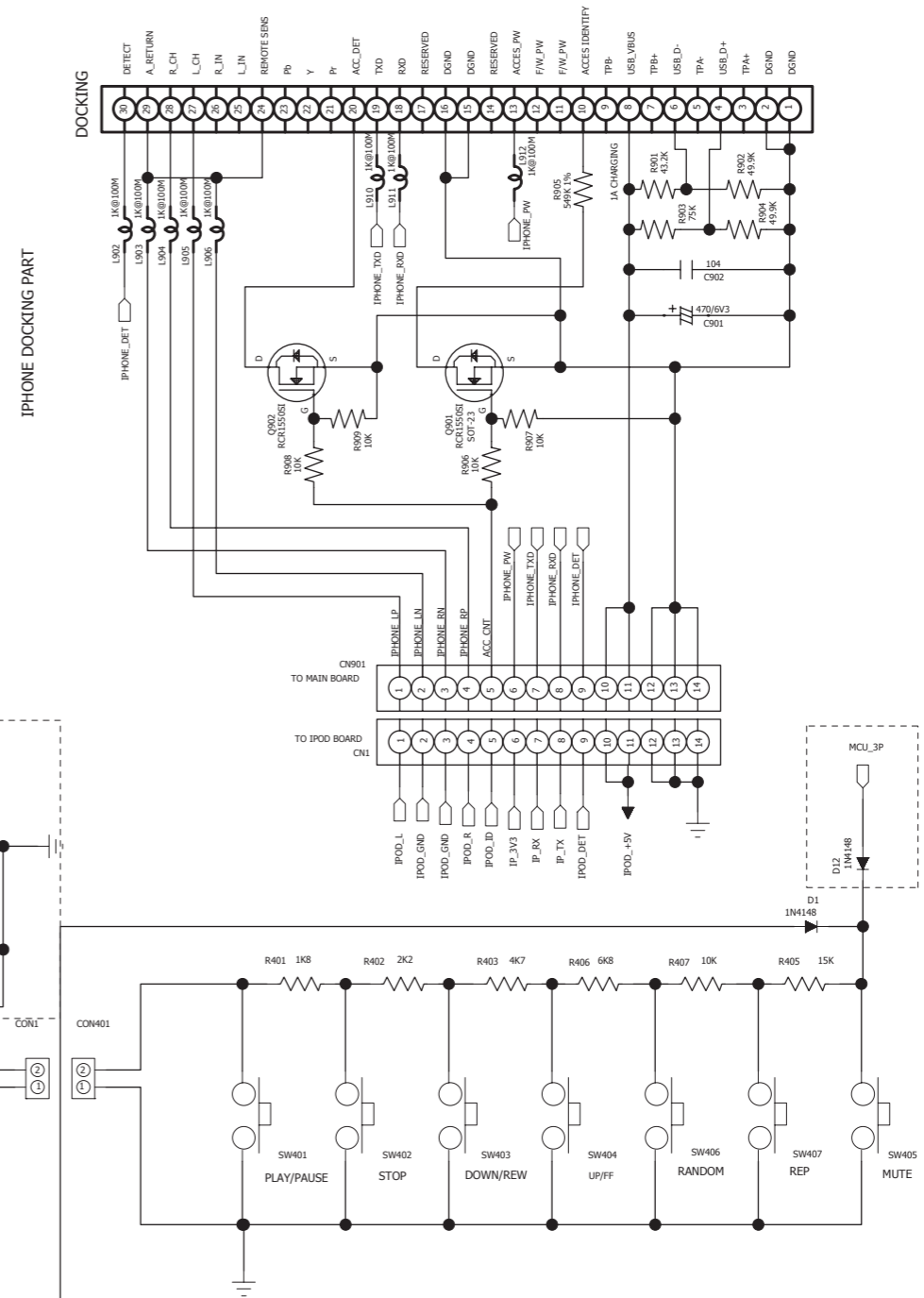
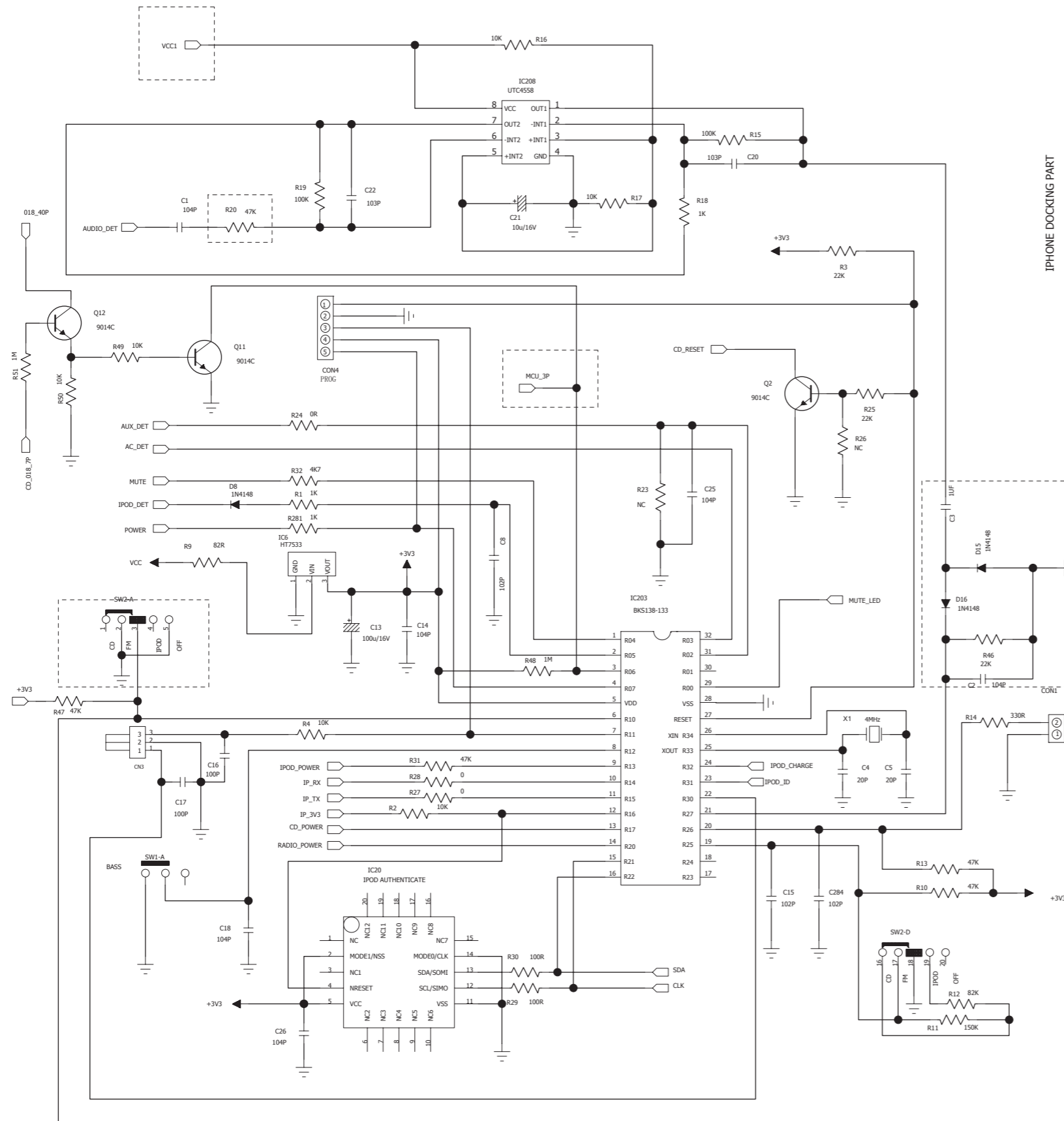
Fucntion	FUNCT-A	FUNCT-B
AUX	H	H
CD	H	L
TUNER	L	H



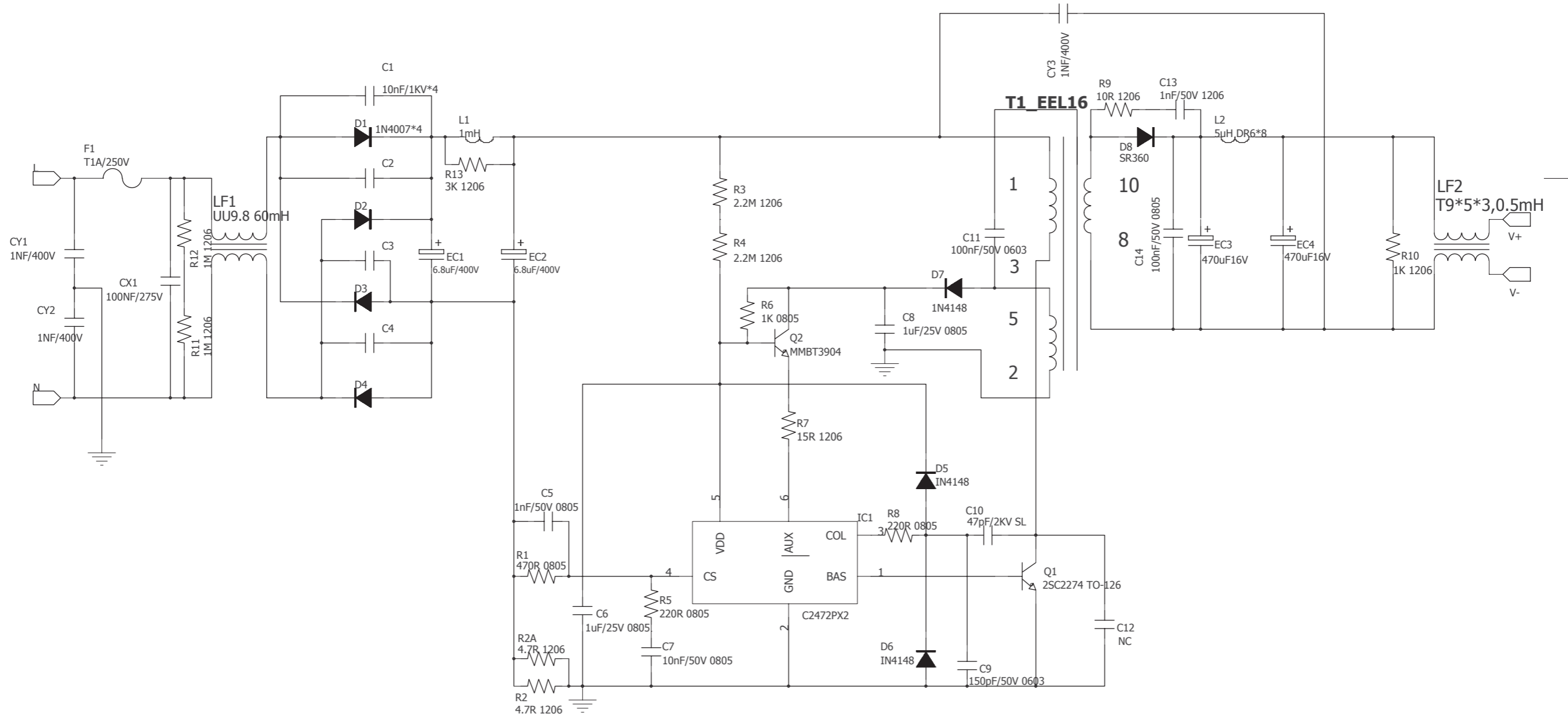
# CIRCUIT DIAGRAM -MAIN + AMP BOARD



# CIRCUIT DIAGRAM -MAIN + IPOD + KEY BOARD

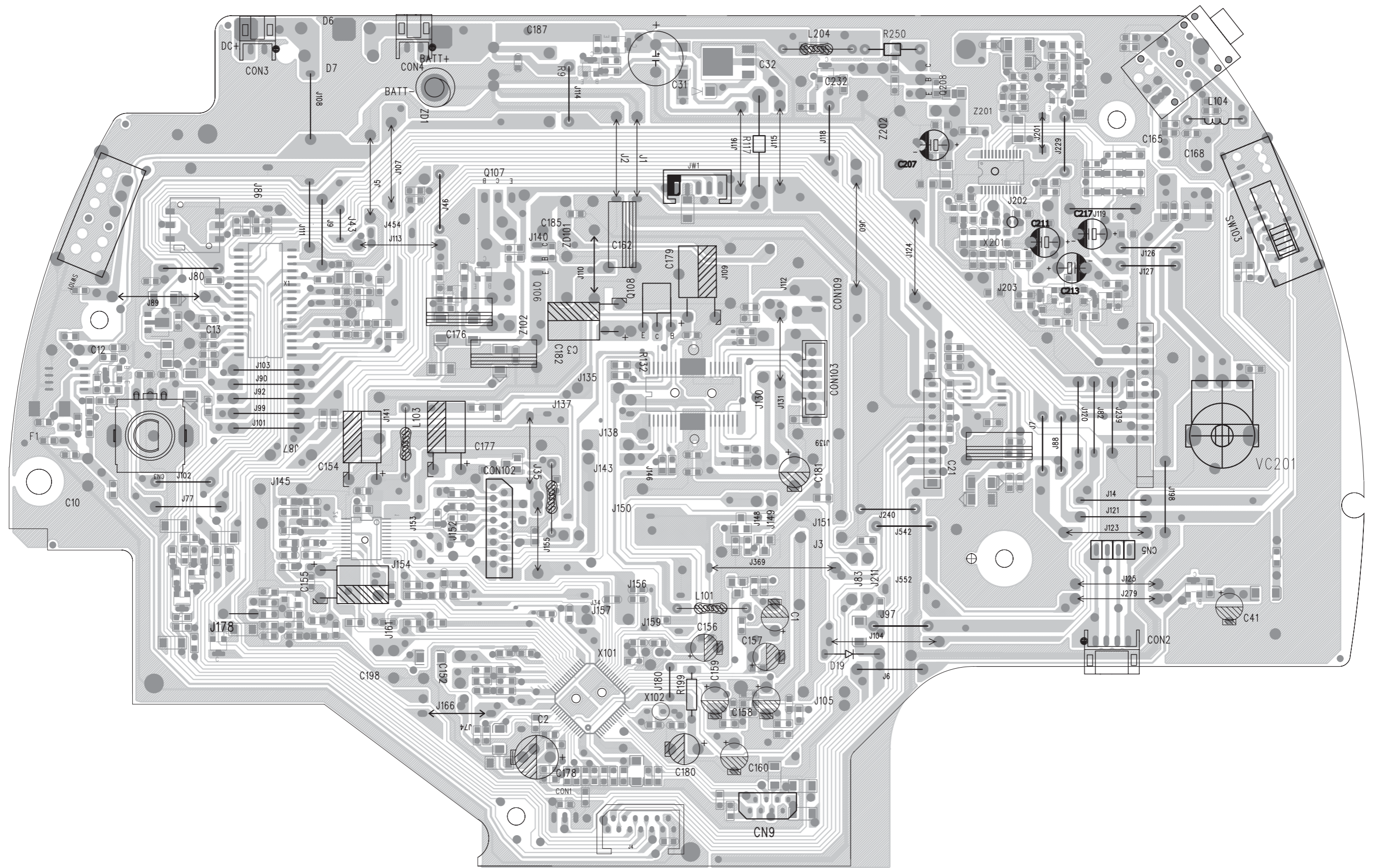


# CIRCUIT DIAGRAM - POWER BOARD



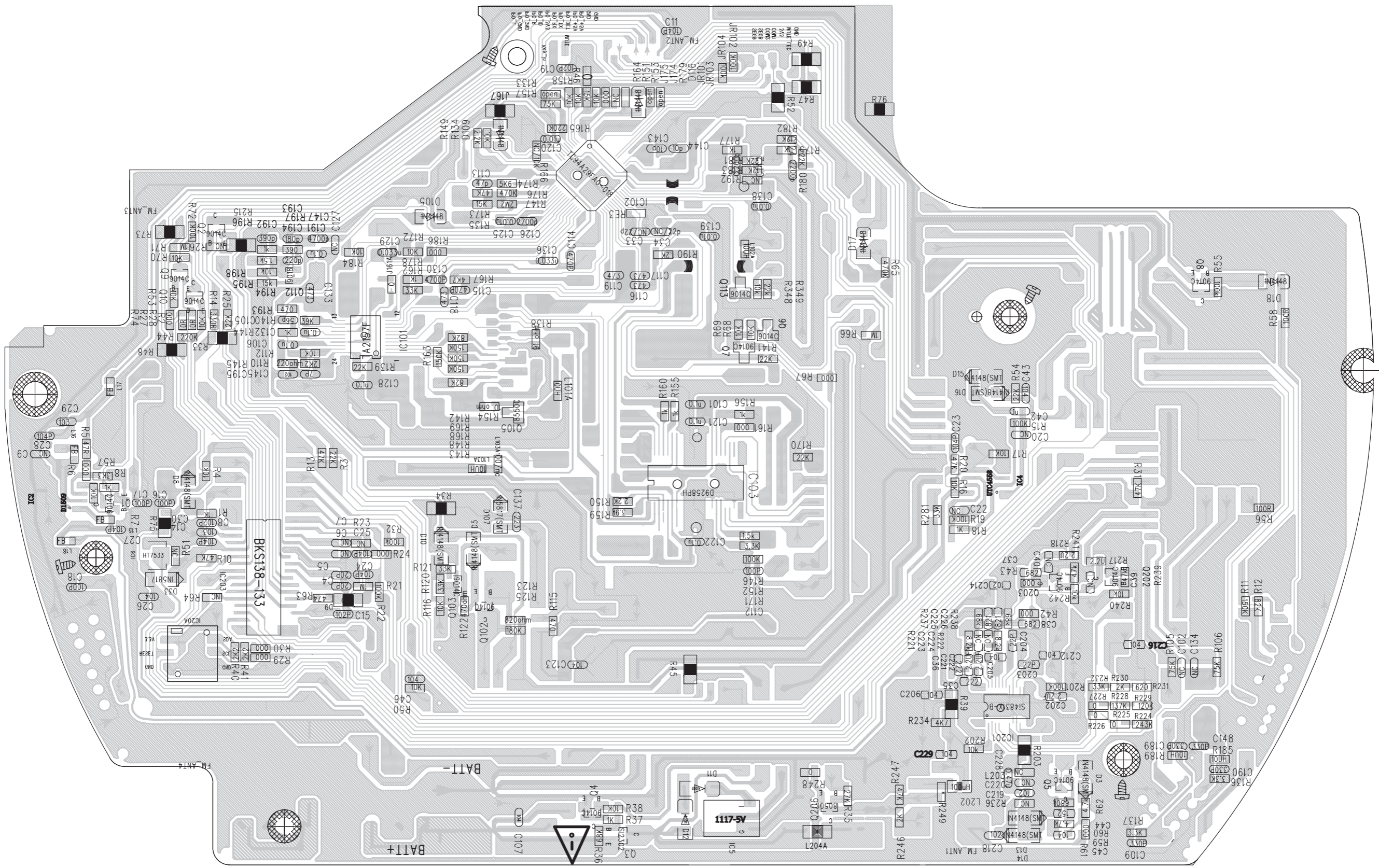


LAYOUT DIAGRAM -MAIN BOARD  
TOP SIDE VIEW



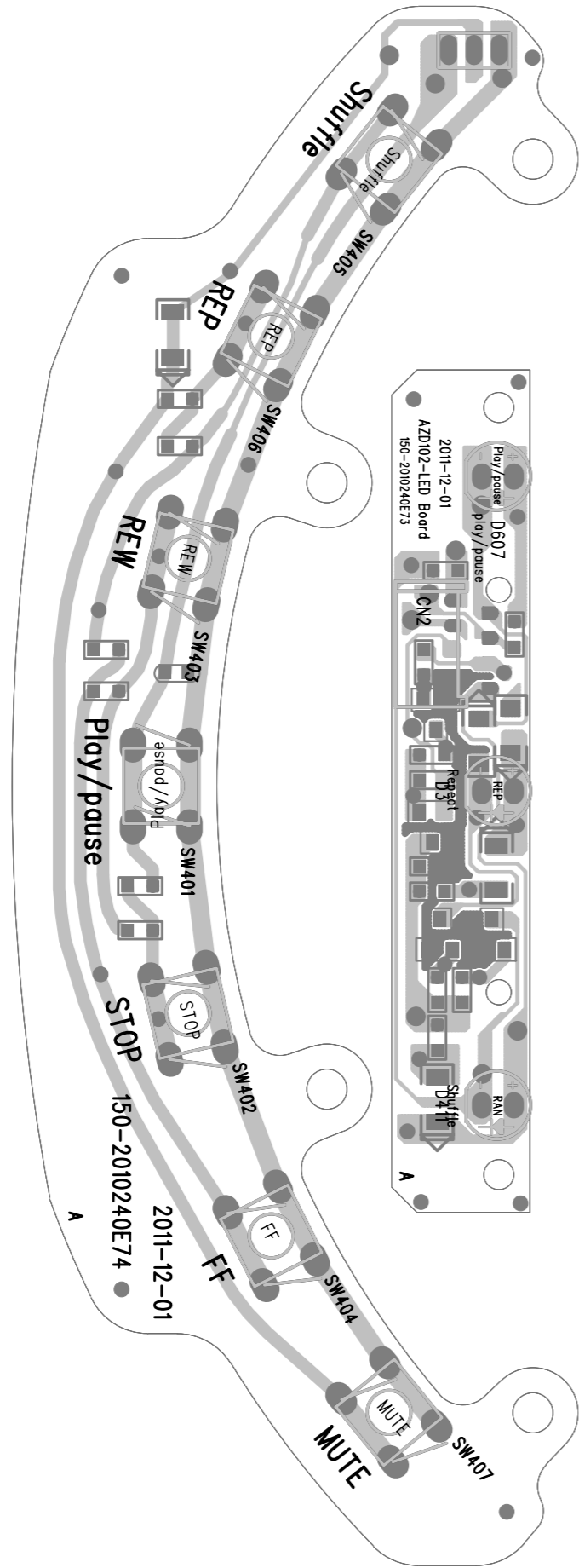


LAYOUT DIAGRAM - MAIN BOARD  
BOTTOM SIDE VIEW

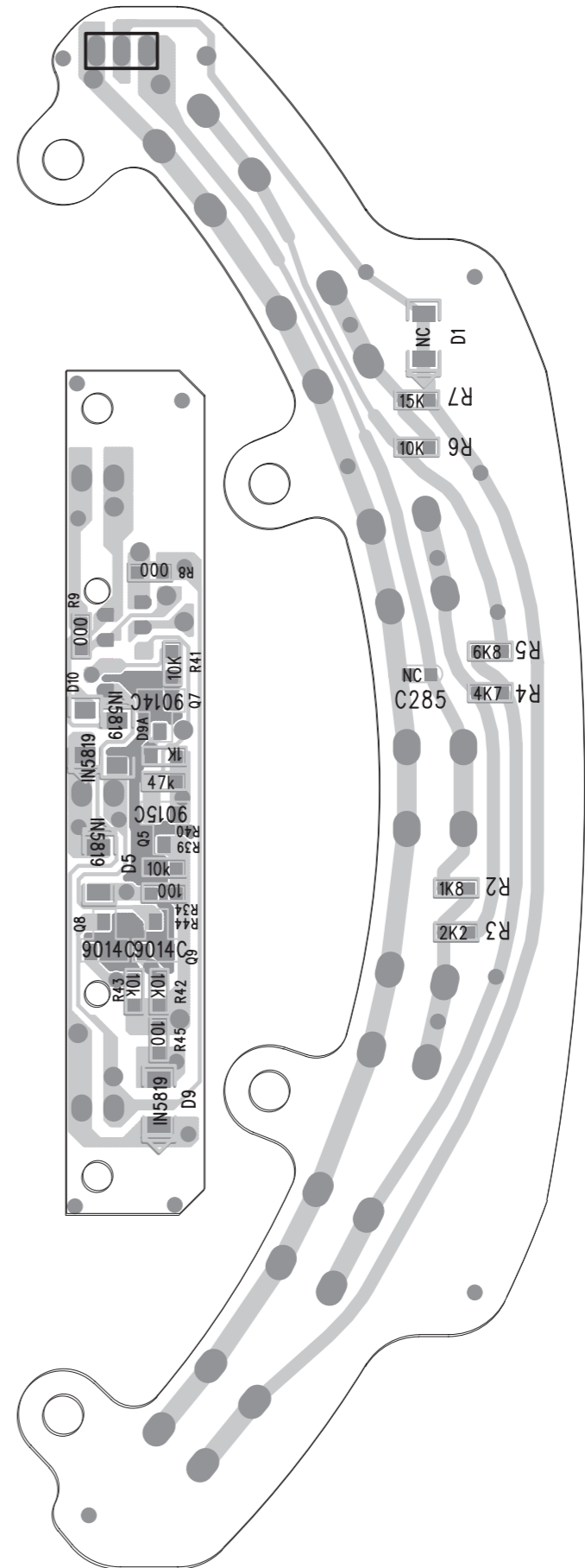




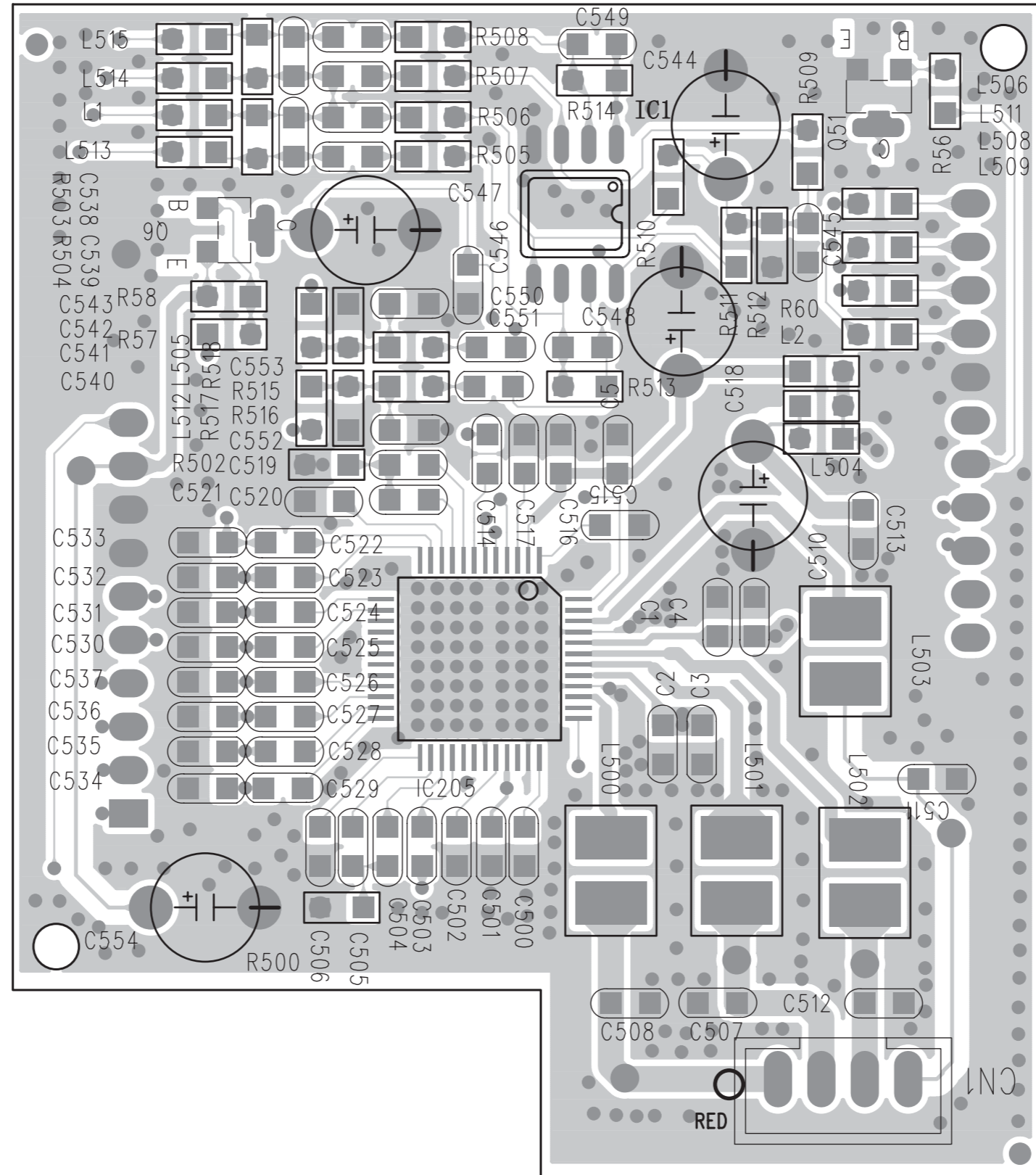
LAYOUT DIAGARM -KEY + LED BOARD  
TOP VIEW



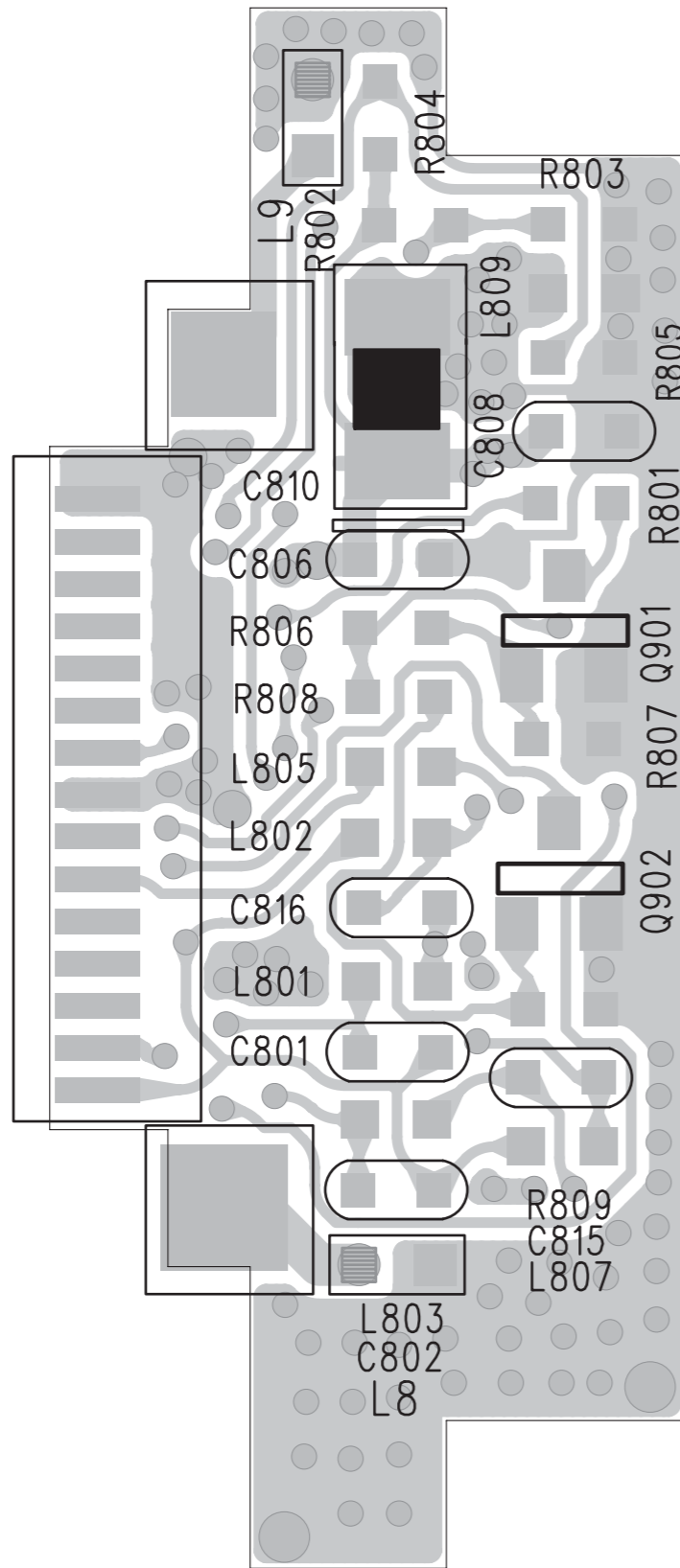
LAYOUT DIAGARM -KEY + LED BOARD  
BOTTOM VIEW



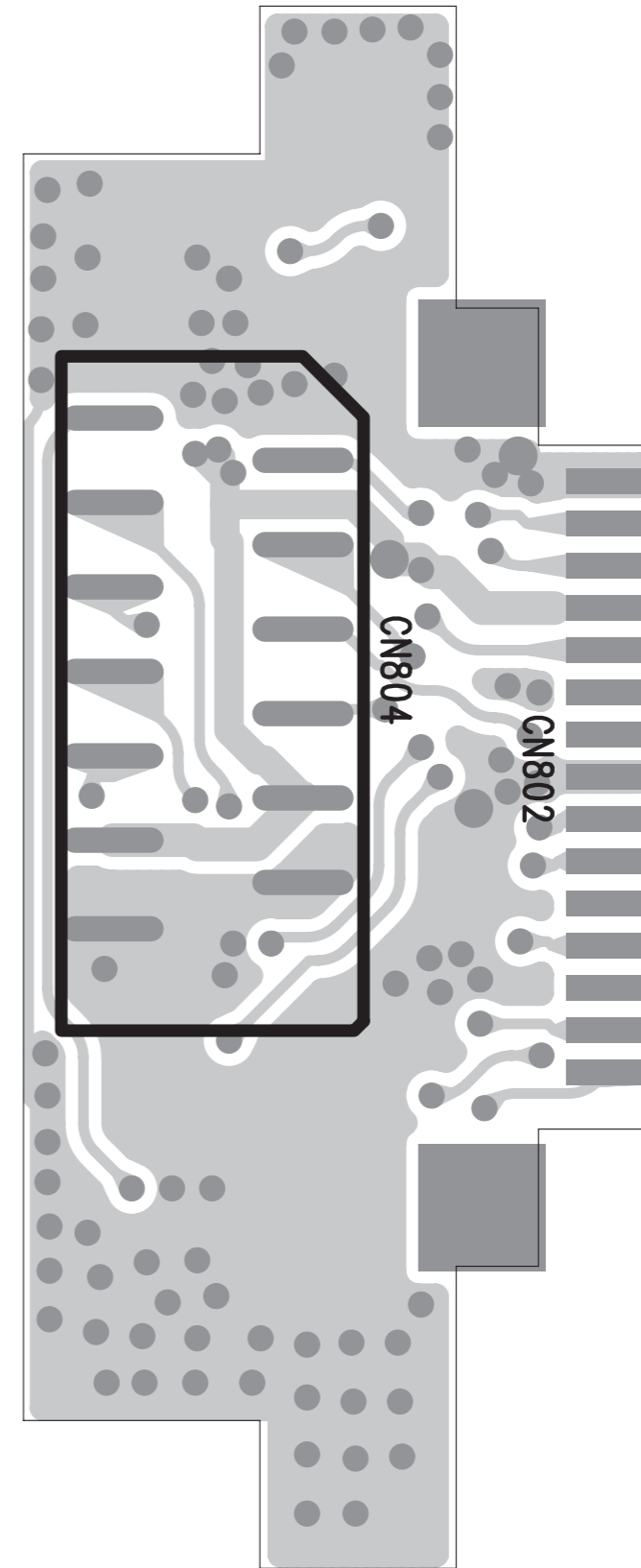
LAYOUT DIAGARM -AMP BOARD  
TOP SIDE VIEW



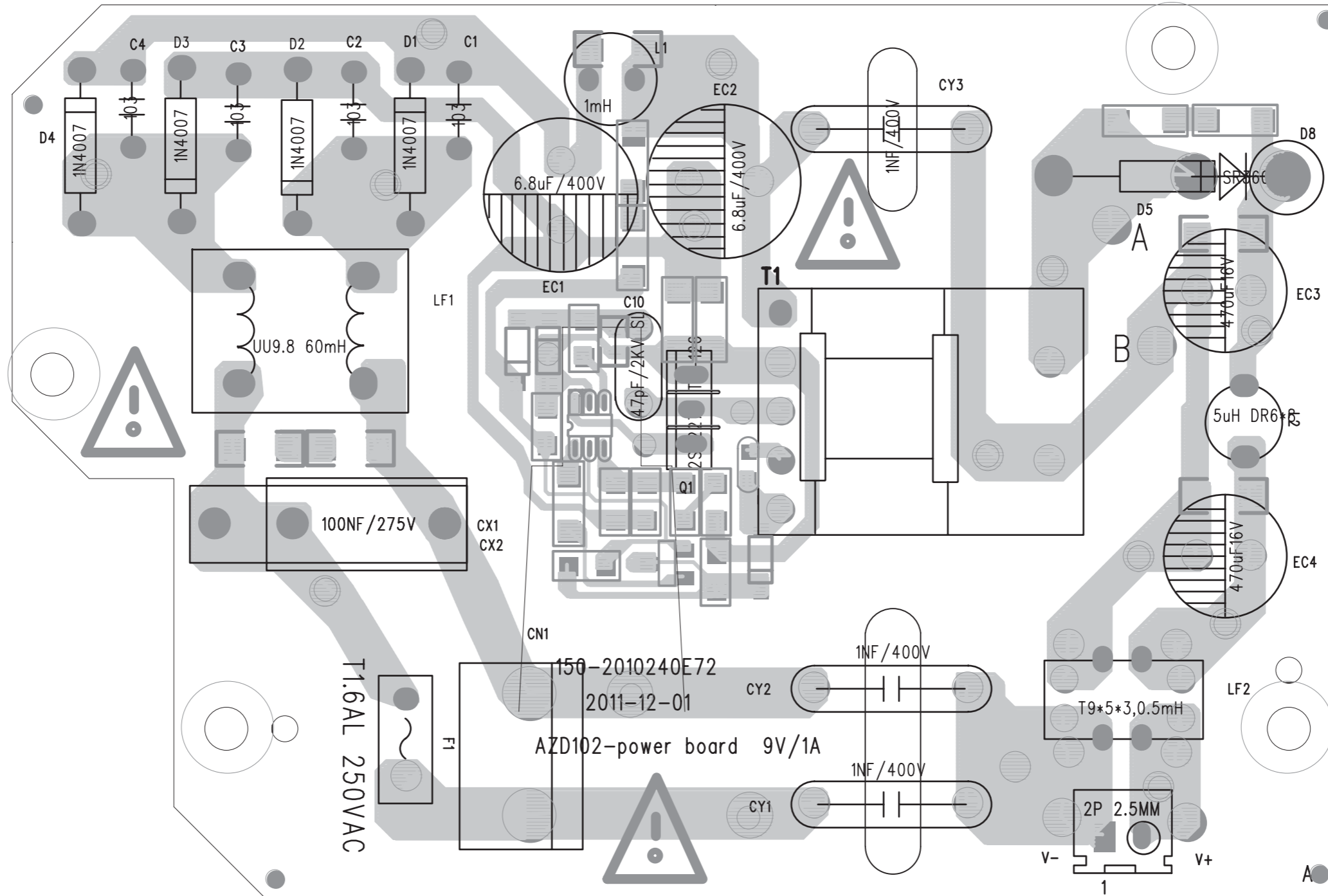
LAYOUT DIAGARM -IPOD BOARD  
TOP SIDE VIEW



LAYOUT DIAGARM -IPOD BOARD  
BOTTOM SIDE VIEW

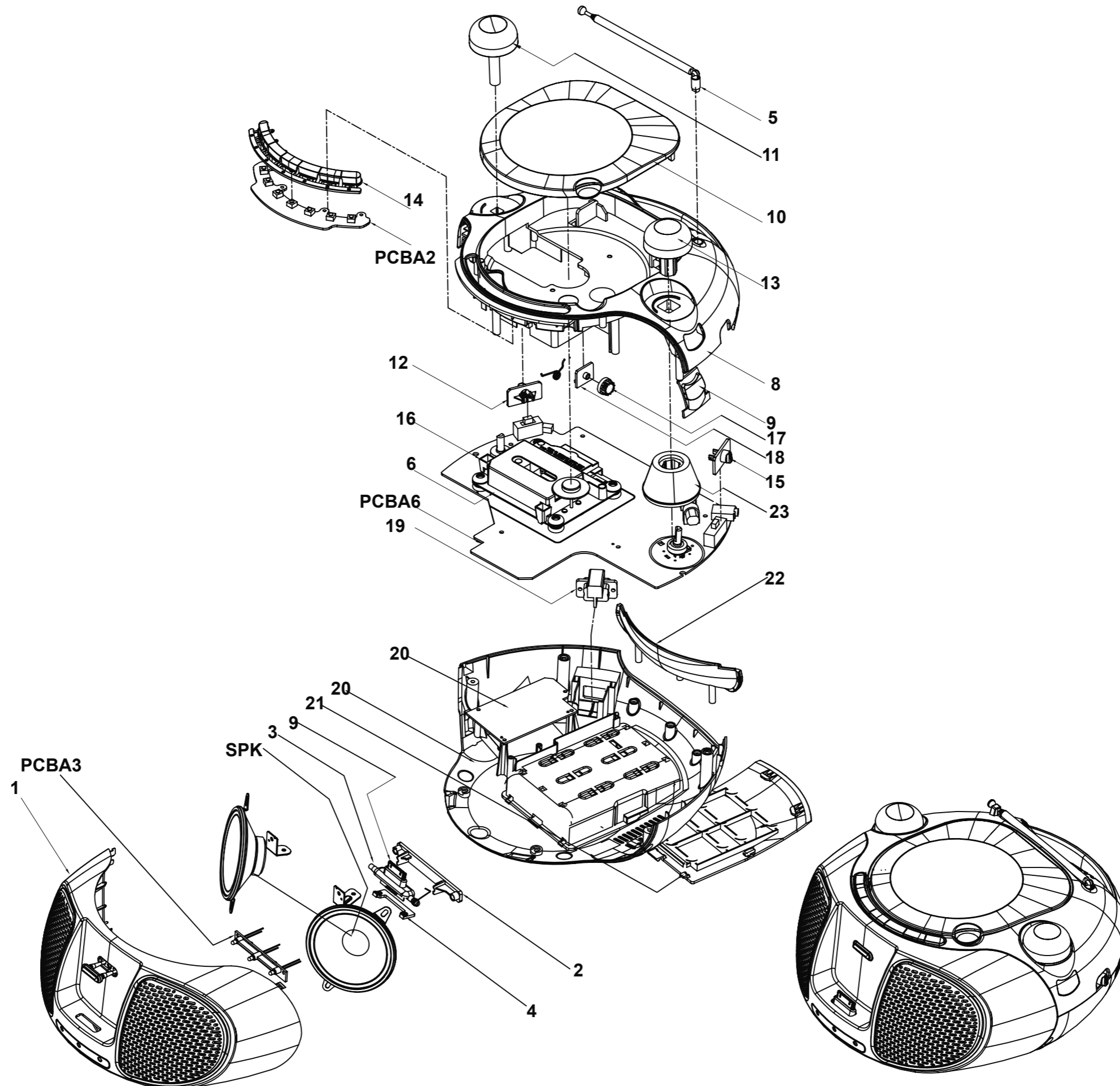


LAYOUT DIAGARM - POWER BOARD  
TOP SIDE VIEW





EXPLODED VIEW DIAGRAM



## **Version History**

V1.0: initial release

V1.1: Add /12(for APMEA) version