Mini Speaker

Service
Service
Service

Service Manual

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Version 1.0

PCB Board Locations

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Board in used	Service Policy	/12	FX15	
MAIN BOARD		M		
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IN BOARD		M		
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*Tips:	C -- Component Lever Repair M -- Module Lever Repair			

WOOX INNOVATIONS

Reference: WX-B-009-01	Title: Product Performance Specification	Rev./Status: 0.1 / Draft
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1. Introduction

1.1 Purpose and Scope of Document

TheProduct Performance Specificationis the leading specification and is the response of development. Whenever the specification cannot be met, Product Management is to be informed as early as possible in order to make sure the marketing can respond in time.

This Product Performance Specificationdoes not cover software specifications. Software is described in the URS documents and in the version matrix owned by Product Management. Product Management is responsible for maintaining, distributing and updating the version matrix.

 All changes to Product Performance Specificationhave to be submitted via Change Proposals. Changes have to be marked in bold and/ or colours in the document for easy recognition in at least the update right after the change. Deletion of text is done by strike through in order to make changes obvious in at least the update after the change took place.

Note:
The Product Performance Specificationis a only a document to list out key-parameters / specification points. It also describes product specific / unique parameters.For product performance, not mentioned or specified in this document, such as: Electrical/ Mechanical / safety/Sound/ Quality Performance /reliability requirement. Please refer to the PQR (Performance Quality Reliability) and product sound specification.

This Product Performance Specificationdoes not cover software specifications. Software is described in the URS documents and in the version matrix owned by Product Management. Product Management is responsible for maintaining, distributing and updating the version matrix.

In case there are conflicting requirements between the Product Performance Specification (Set specification) and the PQR document, then the Product Performance Specificationis the leading requirement / dictates the valid parameters.

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2. General Information and Requirement

2.1 Product Family Features

2.1.1 Identity and Key Features

FX15 FX25 FX55 is a MiniAudio Systemthat incorporates CD player with USB and Tuner FM/AM, and Blue Tooth support.

Elements to include as generic requirements:

1. Safety certification (cUL/FCC and CB/EMC/CE)

Following is a list of key features:
1. BT module:BM830
2. MCU: STM8S005C6T6 LQFP48
3. CD disc /USB/MP3 MPEG (Sunplus SPH8104)
4. FM/AM tuner Module:KST-MW004MV1-R78W2 IC : RN5B800
5. Audio DSP:STA311B
6. AMP:FX15STA518*2; FX25STA518*2; FX55STA516B*2
7. Rated output power
   FX15180W - 30% (4 x 45W)
   FX25300W - 30% (4 x 75W)
   FX55600W - 30% (3 x 200W),200W x 2 + 200W

2.1.2 Styling, Forms and Functions

FX15 FX25FX55can be placed on a tabletop which should have a form factor and footprint that can be easily be located in a 2nd room such as in thebedroom or small study room.

Features	Products	FX15 FX25FX55
	Stroke versions	All
	Design	Refer to MUS[3] for details
Front	Optical Drive Loading	Tray
	Tray Location	below
	Tray Orientation	HORIZONTAL
	VFD	UP
Dimension	Height of feet	3mm
	Apparatus tray closed W x D x H (mm)	mm (include rear connectors)
Weight	Main set	kg
	speaker	kg
Cosmetics	Color	Black
	Buttons	Black

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2.1.3   ACCESSORIES

Model	FX15 FX25FX55			
Stroke Version	12			
Region	EU			
Power Cord				
Audio cable (3.5mm audio)	NA			
Tuner Antenna				
Speaker cable				
USB cable	NA			
Remote Control	21keys			
Battery	1xAAA			

2.1.4   Controls, Local Display and LED Indications

Control keys on the set are:
1. Standby-On
2. Eject
3. Play/Pause
4. Next
5. Pre
6. FF
7. FB
8. Source (Disc, USB, FM, AM,Aux, BT)
9. Stop
10. Volume Knob

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2.2 **Mechanical General Information**

The productappearances and functions are defined in their respective MUS. Product management approves the MUS and it is a leading document where product appearance is applicable.

Please refer to Sh560 for mechanical information.

2.3 **Safety Standards**

Where applicable:

/12, /05 – EN-60065:2002 (Edition 7.0) +A1 +A11 +C11 +C12, UL-6500:2006 (Edition 2), other strokes IEC-60065:2005 (Edition 7.1), or

/12, /05 – EN-60950:2006 +A1, /37 – UL-60950 (Edition 2), /55 /79 /97 (other strokes than /12, /05, /37) – IEC-60950 +A1 (Edition 2)

2.4 **EMC Requirements**

Where applicable:

/12 – Audio functions: EN55013:2001; +A1:2003, +A2:2006, EN55020:2007
    IT-functions: EN55022:2006,+A1:2007, EN55024:1998, +A1:2001, +A2:2003
    WiFi-function: ETSI EN 300 328 (V1.7.1.), ETSI EN 301 489-1 (V1.8.1.) & -17 (V1.3.2), EN 62311:2008
    Generic functions: EN 61000-3-2:2006, EN 61000-3-3:1995; +A1:2001; +A2:2005 or alternatively EN61000-3-3:2008
/97 (/55) – Audio functions: CISPR-13:2006 (or alternatively CISPR-13:2009), CISPR-20:2005;
    IT-functions: CISPR-22;2008, CISPR-24:1997; +A1:2001, +A2:2002; IEC 62311:2007
    Generic functions: IEC 61000-3-2:2005,+A1:2008,+A2:2009 or alternatively IEC 61000-3-2:2009, IEC 61000-3-3:2008
/37 – FCC-15.247 (Part B, C), OET Bulletin 65, Edition 97-01 Table 1; RSS-210 Issue 7

Where applicable:

For /12(EU), /05(UK), /51(Russia)	EN/IEC 60065 7th Edition
For /37 (US, Canada)	UL 60065
For /55 (LATAM), /78 (Brazil)	IEC 60065 7th Edition
For /98 (AP), /69 (Singapore), /75 (Australia)	IEC 60065 7th Edition
For /93 (China)	GB 8898 (IEC 60065 7th Edition)
For /61 (Korea)	K 60065 6th Edition
For /96 (Taiwan)	CNS 14408 (IEC 60065 7th Edition)

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2.5 **ESD Requirements**

The product shall withstand electro static discharges on all user accessible parts of the product.
Reference: IEC61000-4-2.

For contact discharges:

Level	General (kV)	USA (kV)	Requirement
1	0-2	0-3	No deviations allowed.
2	>2-4	>3-4	Short perceptible deviations allowed.
3	>4-5	>4-5	~~Normal recallable functions function changes allowed.~~
4	>5-7	>5-7	~~Control recallable functions function changes allowed.~~
5	8	8	Components damage not allowed.

For air discharge:

Level	General (kV)	USA (kV)	Requirement
1	0-4	0-6	No deviations allowed.
2	>4-8	>6-8	Short perceptible deviations allowed.
3	>8-10	>8-10	~~Normal recallable functions function changes allowed.~~
4	>10-15	>10-15	~~Control recallable functions function changes allowed.~~
5	15-18	>15-18	Components damage not allowed.

General requirement:
1. 10 arcs for positive and negative polarity for unit "on" and "off" for 1kV incremental steps.
2. Component or mechanical damage is not allowed. No loss of fixed stored data (stored in EEPROMs).
3. Hang-ups and malfunctions are allowed, as long as the customer can "recover" from the hang-up by pressing theStandby or ON/OFF button of the set.
4. Failures that disappear only by unplugging the AC mains cord and/orpower sources are not acceptable.

2.6 **Environmental Condition**

The environmental condition requirements and test method is according to UAN-D1590.

Ambient temperature : max. 40 ° C - all climates
Apparatus acc. to spec. : +5 to + 35 ° C

Vibration test (acc. IEC 60 068/2/6) : operational vibration test to be proceeded in operating position of the set.

2.7 **Quality**

PQR-class: class Ⅲ according toBLC A&MA PQR handbook V2.1 (2006-10-02)

Lifetime: 7 years

Tested According to: General Test Instruction UAN-D 1591
Measured According to: UAN_L 1059 unless otherwise stated

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3. Technical Specifications

3.1 Power Supply

3.1.1 Type and versions
3.1.1.1 Main set

Build-inSMPS will be used for all models and stroke versions.

Versions	Region/Country	SMPS	Detachable mains cords
10	EUROPE / UK	230~240Vac nom. Frequency: 50Hz.	EU (/12) round 2-pin & UK (/05) 3-pin
37	NAFTA	90~132Vac limit. Frequency: 60Hz.	UL flat pin (polarized)
55	LATAM	90~132Vac & 220-240Vac selectable Frequency: 50/60Hz.	INMETRO certified round 2-pin
98	APAC	90~132Vac & 220-240Vac selectable Frequency: 50/60Hz.	EU round 2-pin
94	India	2) 100 ~310Vac limit (India compatible with up cost) used only for India. Frequency: 47~63Hz.	EU (/12) round 2-pin

All requirements per defined for each country should be met with sufficient testing.

3.1.2 Surge Immunity (Lightning Test)

The product shall withstand mains interference's of:

Differential mode:
- 2kV/2 ohm criteria C for Europe.
- 6kV/12 ohm criteria C for NAFTA.
Parameters:
- Bi-wave
- Open circuit voltage: 2/50us
- Short circuit current: 8/20us
- From +/1kV to +/-2kV (for Europe) or +/-6kV (for Nafta) in steps of 1kV.
- 10 shots per combination.
- One shot per minute.
- Serial impedance: 2 Ohm for Europe, 12Ohm for Nafta.

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- Polarity and phase: Positive (phase 90º) & Negative (phase 270º)

Common mode:
- 6kV/2 ohm criteria C for Europe.
- 6kV/12 ohm criteria C for Nafta.
  Parameters:
- Ring-wave (100kHz)
- From +/3kV to +/-6kV in steps of 1 kV.
- 10 shots per combination.
- One shot per minute.
- Serial impedance: 2 Ohm for Europe, 12Ohm for Nafta
- Polarity and phase: Positive (phase 90º) & Negative (phase 270º)

Reference: IEC61000-4-5 and for USA: 3135 019 8029 Reliability evaluation.

Requirements:
- Apparatus should fulfil the leakage current requirements of IEC60065 point 9.1.1 (UAN-D1631)
- Defects or permanent deviations are not allowed.

3.1.3   Mains Drop-out Immunity

The product shall withstand mains failures of:
- Variation 0%(=100% dip) at T-event = 50 mSec. Performance criterion B
- Variation 40%(=60% dip) at T-event = 100 mSec. Performance criterion B
- Variation 0%(=100% dip) at T-event = 5 Sec. Performance criterion C

Additional for USA apparatus: See 3135 019 8029 Reliability evaluation.
- Variation 0%(=100% dip) at T-event = 100 mSec in standby mode. Performancecriterion B

Requirement:

No misoperation and no interference of user in order to guarantee continuation of performed function.
Reference: IEC61000-4-11 For measuring method refer to UAN-D1724, as far as applicable.
Performance criterions according to IEC61000-4-4 Amendment 1
Performance Requirement
Criterion A - No any degradation of specification.
Criterion B - Temporary degradation / self recoverable.
Criterion C - No damage, resolvable hang-up.
Criterion D - Not recoverable loss of function.

3.1.4   Power Consumption

Power consumption at nominal AC input:
1. Docking mode at 1/8 P-rated output power   :   ≤   W
2. Low Power Standby Mode   :   ≤   0.5   W

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3.2 **Audio**

3.2.1 **Analog Audio Input/Outputs**

Gerneral Part

Output Stage Protection:	NA	Temperature :	Yes	Short Circuit:	Yes

Indicators

Standby Mode Indicator: Clock Display Active

Power Standby Mode: LED Turns Off

Electrical Data

DSC:	NA	Channel Difference:	$\pm$3dB
DBB:	NA	Hum (Vol$_{min}$ --- Vol$_{max}$-20dB	200nW
Bass:	Y	Residual Noise(Volume Minimum)	60nW
Treble:	Y	Channel Seperation: 1kHz/10kHz	40dB/35dB
Loudness:	Y	THD,Maximal	<1%
		SNR @standard output(A-weighted)$^{(*1)}$:	≥70dBA
		SNR @standard output(Un-weighted):	≥60dBA
		Crostalk:	≥45dB
		Amplification Reserve	1dB

Audio Inputputs

Audio Input Sensitivity($\pm$3dB) rated output power at 1kHz		Audio Output(*1)	
Tuner	FM 67.5kHz, Modulation (Limit:-6dB)	Line Out(Left/Right)	NA
CD/MP3	0dB track (Audio Disc 1, Track 1)	Headphone	NA
USB	0dB 1KHz sinewave(2.0HS)		
AUX1(back)	1V$\pm$100mV; Rin≥22kΩ		
MP3_link(front)	600mV$\pm$100mV; Rin≥22kΩ		

Output Power(*1)   At THD=10%, 1kHz sinewave

Main Operation for FX series/ all version (rms)	FX15 180W - 30% (4 x 45W) FX25 300W - 30% (4 x 75W) FX55 600W - 30% (3 x 200W),200W x 2 + 200W	(At Cold Condition with 10% THD,)
Frequency Response	FX55 40Hz-20kHz +0 dB /-3dB FX25 50Hz-20kHz +0 dB /-3dB FX15 60Hz-20kHz +0 dB /-3dB	

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Speaker driver Impedance:	Right/Left:	FX15/FX25 8Ω FX55 4Ω	
	Subwoofer:		

REMARKS:
Electrical Parameters are to be measured at Speaker Terminals across rated impedance Loadwith Rated Input Signalin CD Mode setting in DBB/Loudness Off and Pre-eq at Flat unless specified otherwise.

3.3 Bluetooth

Gerneral Part

Bluetooth module	Sunitec_BM153			

BT Specification

Operating Frequency Band	2.4GHz ~ 2.48GHz unlicensed ISM band			
Operating Voltage	1.8V / 3.3V			
RF Output Power	3dBm		0dBm	
Sensitivity at 0.1% BER	-90dBm		-70dBm	
Bluetooth version	Ver2.1 + EDR			
Receive A2DP:	NA			
Transmit A2DP:	NA			
Receive HSP	NA			
Bluetooth Flashing Display				

BT Audio

Description	Normal	Limited	unit	remark
Frequency Response 80 Hz ~16kHz	+ / -3dB		dB	
S/N (Unweighted)				
S/N (A-weighted)	≥75		dB	
Channel Separation	45	35	dB	
THD + Noise (0dB, 1Khz)	<1%			
Bluetooth at Set Level				
30%THD OUTPUT POWER(EQ:FLAT)	FX15 180W - 30% FX25 300W - 30% FX55 600W - 30%		W	
Connected distance	10	8	meter	

NFC

Connected distance	2.5cm	2CM	CM	

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3.4 TUNER

FM/AM tuner Module: KST-MW004MV1-R78W2 IC : RN5B800

GENARAL PART

WAVE RANGE	VERSION	TOLERANCE	TUNING GRID	
FM 87.5 – 108.00 MHz	/05/12	QUARTZ PRECISION	50kHz	
AM 530 -1700kHz	/55/37	QUARTZ PRECISION	10 kHz	

AERIAL
FM   : PIGTAILTYPE ANT WIRE 75Ω

FRAME ANT. 18.1 uH with shielding

ELECTRICAL DATA

A.M	Nom	Limit	Unit	FM	Nom	Limit	Unit
				- 3 dB Limiting Point	20	26	dBf
				Search Tuning Sensitivity(at stereo mode)	35	41	
Amplification Reverse	- 2	-4	dB	Search time digital tuning system.	-	60	S
AGC Figure of Merit	30	25	dB				
Distortion (RF 50mV, M 80%)	3	5	%	IF	10.7		MHz
IF	450	± 3	kHz	Stereo - 46 dB Quieting	48	51	dB
				Modulation Hum	50	45	
Search Tuning Sensitivity	α26	+/-10	dB	S/N Ratio	50	45	
S/N Ratio	45	40	dB	Amplification Reverse	0	-4	dB
				Distortion (RF 1mV, Frq Dev.75 kHz)	2	3	%
				Overall Frequency Response: 63Hz – 12.5KHz	-	±3	dB
				Channel separation:400 / 1000 / 5000 Hz. RF input: 68 dBf	26/30/20	20/26/18	dB

FM Frequency (MHz)		Noise Limited Sensitivity 26 dB	Image Rejection	IF Rejection	Large Signal Handling			
FM	Nom.	18			116 dBf			
88.0	Lim.	22			108 dBf			
FM	Nom.	18			116 dBf			
98.0	Lim.	22			108 dBf			
FM	Nom.	18			116 dBf			
107.0	Lim.	22			108 dBf			
	Units	dBf	dB	dB	dBf			

AM Frequency (KHz)		Noise Limited Sensitivity 26 dB	Image Rejection	IF Rejection	Large Signal Handling			
MW	Nom.	70			1000			
610KHz	Lim.	75			500			
MW	Nom.	65			1000			
1000KHz	Lim.	73			500			
MW	Nom.	65			1000			
1440 kHz	Lim.	73			500			
	Units	dBuV	dB	dB	mV/m			

Susceptibility to unwanted signals(CPU,SMPS,AMP,DSP …):	Limited(dB)	Normal (dB)	Remark
	-15dB	-20dB	Refer to selfpollution curve

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3.3 **Infra Red Receiver**

Parameters	Requirement	
	Receiver sensitivity	Max Distance
Receiver Sensitivity	• $E(0°) = 0.70$ mW/m^2	10m
	• $E(30°,h) = 1.12$ mW/m^2, γ= ± 30° off horizontal or vertical axis	7.92m
	• $E(45°,h) = 2.19$ mW/m^2, γ= ± 45° off horizontal axis	5.65m
Short Operating Distance	≤ 0.1 m	
Minimum Optical Viewing Angle	Horizontal (γ) ≥ ± 60° Vertical (δ) ≥ ± 30°	
Electromagnetic Interference	Field-strength: E_q≤ 100 V/m at nominal 36KHz carrier frequency.	

Refer to Appendix A for the remote control code.

3.4 **clock SPECIFICATION**

TECHNIAL DESCRIPTION		
SOFTWARE IMPLEMENTED CLOCK / TIMER FUNCTION WITH 32.768kHz QUARTZ OSCILLATOR.		
GENERAL PART		
Timer Setting	:	Clock and Timer
Timer Wakeup Mode	:	CD/USB/Tuner
Remarks Time Setting	:	/12 version for 24hrs /37 version for 12hrs
Volume at Wakeup	:	12 level Volume
No of Alarm Timer Settings	:	1 Alarm timer,
Clock Accuracy	:	Nom : 1 sec/day Limit : 2 sec/day
INDICATORS		
Display Type	:	

REMARKS:

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3.5 **MECHANICAL**

3.5.1 Shock Sensitivity
Refer to Quality plan for the details of the test discs and testing method.

Requirement:
No muting, plop sounds, picture freeze/jerk or audible/visible interference when impacting with force of -

- **In the ±X and ±Y directions:** $F \geq 6g$ / 3ms, $\Delta V = 0.06ms$
- **In the ± Z direction:** $F \geq 4g$ / 3ms, $\Delta V = 0.04ms$

Where g = acceleration due to gravity.

3.5.2 Thermal Performance
Refer to Quality plan for the details of the testing method.
Requirements:
1. Set should function normally
2. Temperature rise of accessible parts such as metallic enclosures (casing) shall not exceed 40°C above the ambient temperature.
3. Temperature rise of PCB prints shall not exceed 85°C
4. Temperature readings of all mechanical / electrical components and modules shall not exceed their specification limits. The calculated junction temperature of semiconductors shall also not exceed spec limits.

3.5.3 Noise Specifications
Test Conditions:
Measurements are to be made inside an Anechoic Chamber (echo-free environment) with ambient noise of less than 16dBA.
Measurements are to be taken at the following positions: -
    (a) Top-Surface and at center of Front-Cabinet
    (b) Front-Surface and at center of Front-Cabinet.

The microphone is to be positioned **10cm** from abovementioned surfaces.

Set Functional State		Requirement
		Normal
Idle State	Standby Mode	< 20 dBA
	Set On and "No Disc" mode	< 20 dBA
Tray Open/Close	Start/End peak noise	< 65 dBA
	Tray running noise (RMS)	< 50 dBA
CDDA & SACD **(Stereo & Multichannel)**		< 35 dBA
	Play (first & last tracks)	<30dBA
	Search Forward & Backward (all speeds)	<33dBA
	Pause (first & last tracks)	< 28dBA
	Jump Forward (first to last track)	< 38 dBA
	Jump Backwards (last to first track)	< 38dBA

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Service Hints

CAUTION

CHARGED CAPACITORS ON THE SERVO BOARD MAY DAMAGE THE DRIVE
ELECTRONICS WHEN CONNECTING A NEW DRIVE.THAT'S WHY, BESIDES THE SAFETY
MEASURES LIKE
- SWITCH OFF POWER SUPPLY
- ESD PROTECTION
ADDITIONAL ACTIONS MUST BE TAKEN BY THE REPAIR TECHNICIAN.

The following steps have to be done when replacing the defective loader :

1. Dismantling of the loader to access the ESD protection point if necessary.
2. **Solder the ESD protection point*.**
3. Disconnect flexfoil cable from the defective loader.
4. Put a paper clip on the flexfoil to short-circuit the contacts (fig.1)
5. Replace the defective loader with a new loader.
6. Remove paperclip from the flexfoil and connect it to the new loader.
7. Remove solder joint on the ESD protection point.

FIG. 1
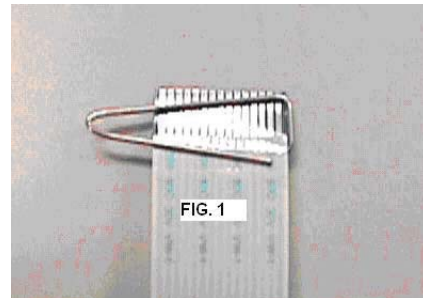
ATTENTION: The laser diode of this loader is protected against ESD by a solder joint which shortcircuits the laserdiode to ground.
For proper functionality of the loader this solder joint must be remove **after** connection loader to the set.

Solder Joint
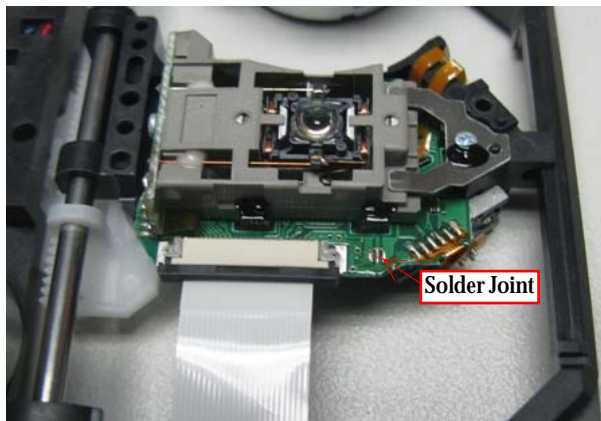
(ESD protection point is accessible from top of loader)

Only applicable for defective loader needed to be sent back to supplier for failure analysis and to support backcharging evidence.
This is also applicable for all partnership workshops.

The Guide of Software Operation for Philips Mini FX Series

The Software Upgrade way (Update software via USB):

1.> Download the Software into the root directory of a USB storage device.

2.>Rename the download software file, such as rename the "PCM_MCU_V12.bin"to"PCM_MCU.bin".

3.>Turn on the unit and switch to the USB source. -->"NO USB" is displayed.

4.>Connect the USB storage device to the USB socket on the unit. -->"MCU UPD"(MCU update) is displayed.

5.>Press " ▶II " key to start upgrade. -->"UPGING"(upgrading) is displayed during upgrade. At completion of upgrade, the unit reboots automatically.

6.> Delete the "PCM_MCU.bin" in the USB storage device, and repeat step 1.>/2.>/3.>/4.>/5.> to upgrade MPEG S/W, Rename software file, such as rename "PCM_MPEG_FX20_55_V13.bin"to"PCM_MPEG.bin". -->"MPEG UPD" is display.

Caution:

Do not turn off the power or remove the USB storage device when the software update is in progress because you might damage the unit.

The Software Version to view:

1.>Turn on the unit and switch to the DISC source. -->"NO DISC" is displayed.

2.>Press "EJECT" key to open the door. -->"OPEN" is displayed.

3.>Press the key STOP (■) ->PROG->NEXT (►►I) in turn on RC. -->the VFD will show such as "M1220P13".

Note: When view software version type, VFD can be show below information, eg:
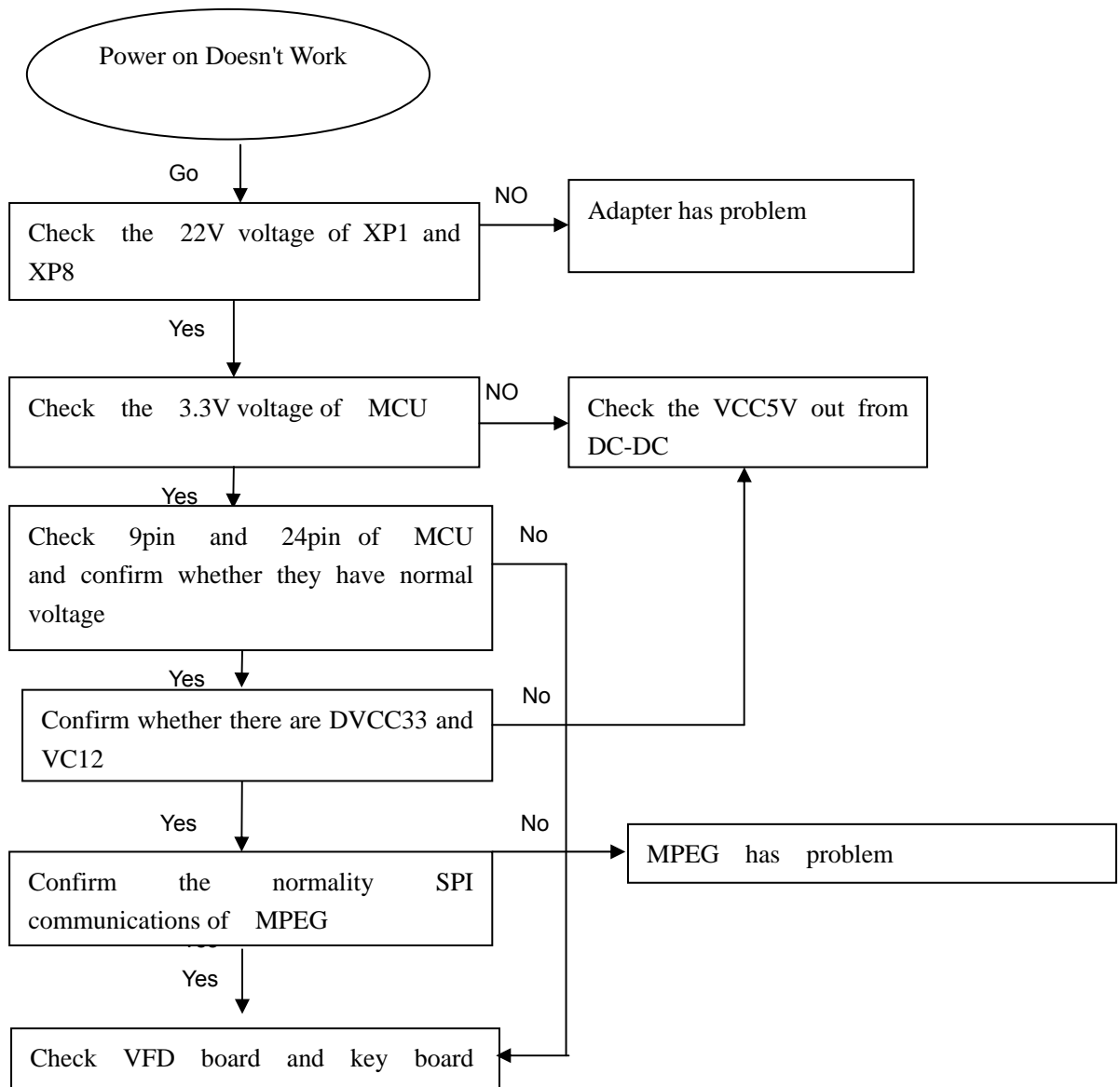
M0820P16

M08: MCU version

20 : FX20 model, if this unit is 15/25/30/50/55,mean is FX15/FX25/FX30/FX50/FX55 model.
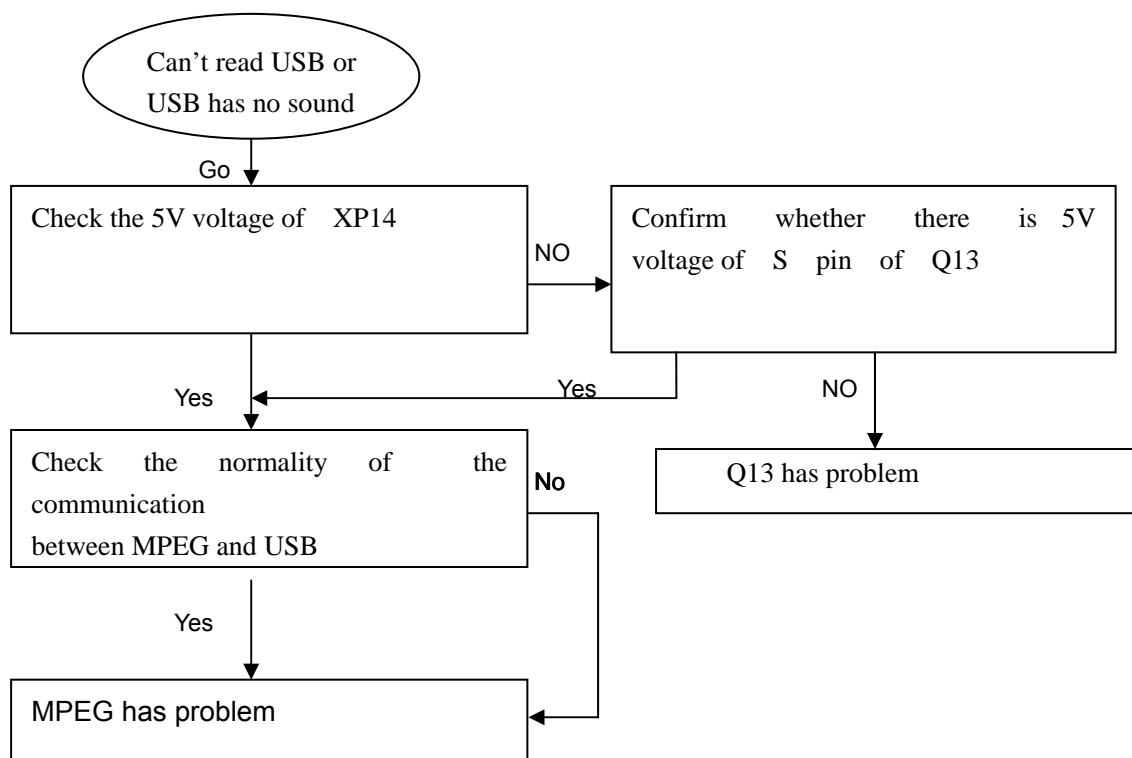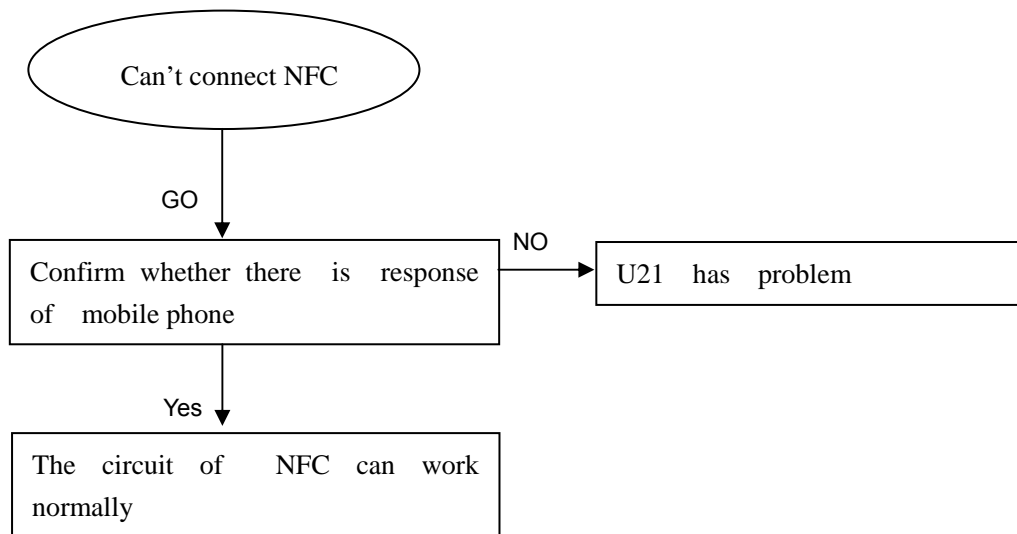
P16: Mpeg version.

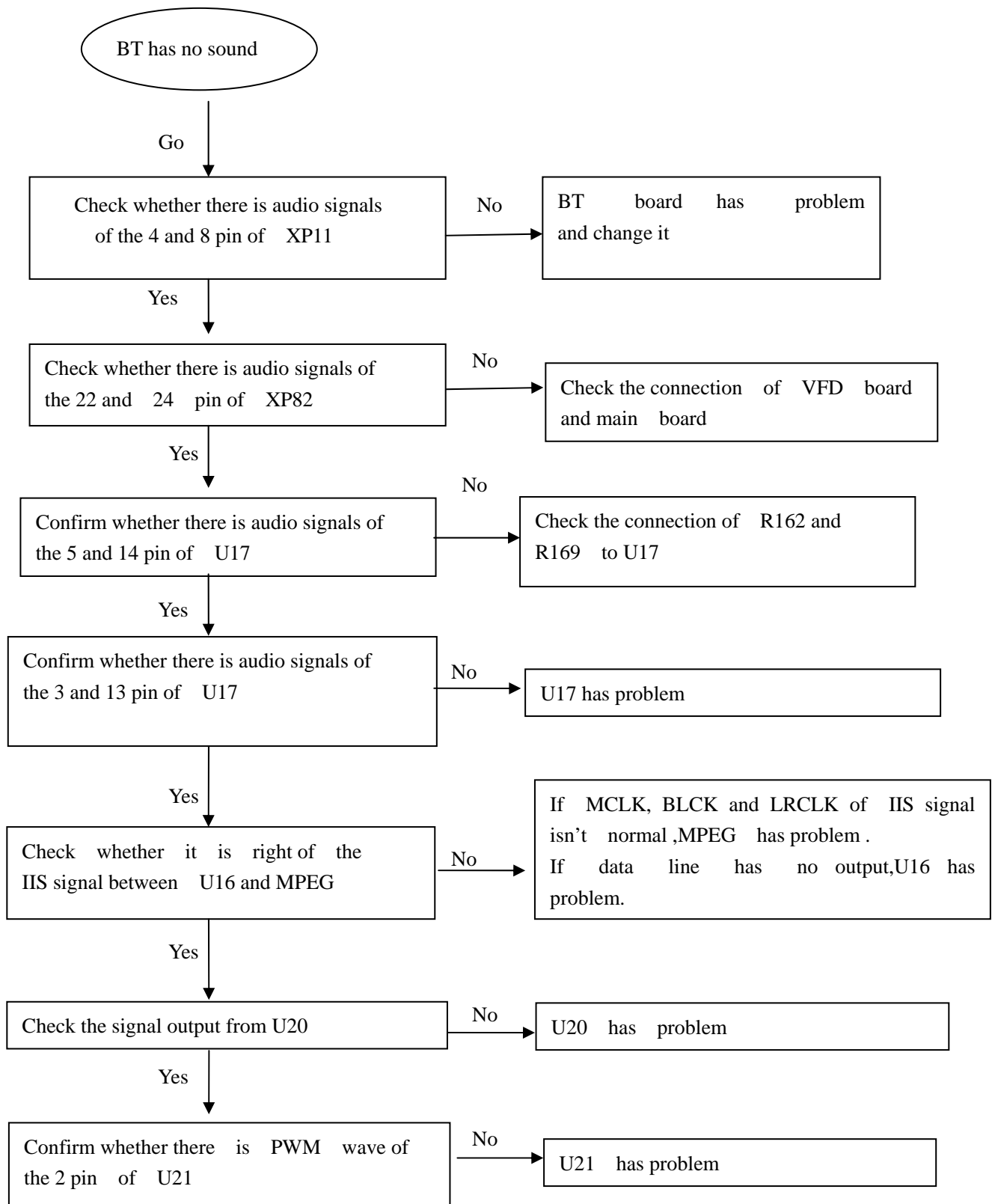## Restore default settings:

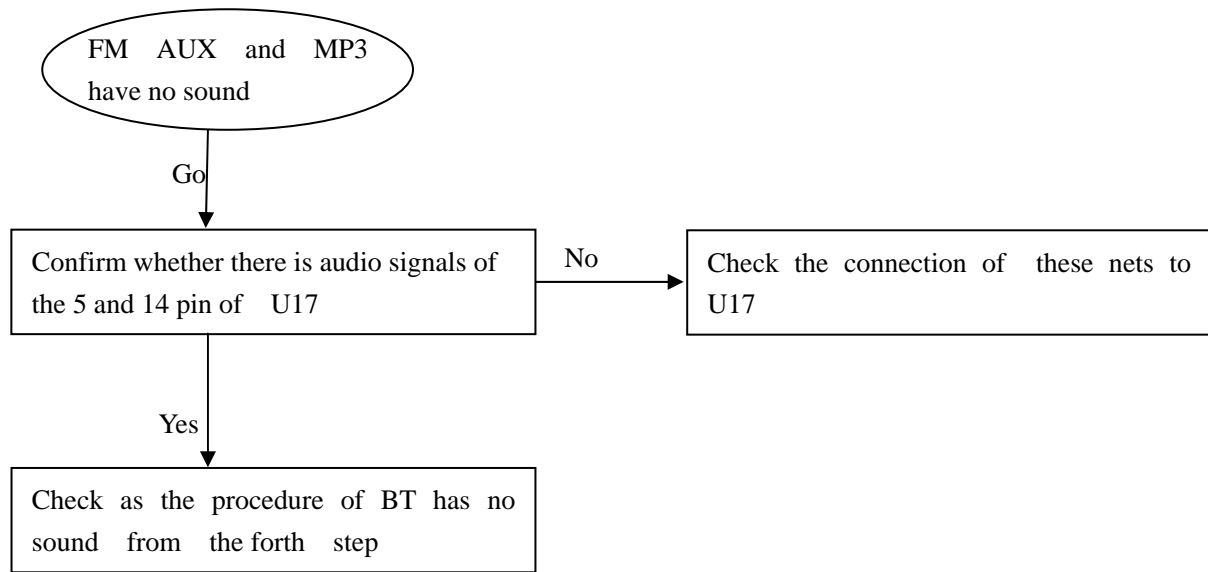You can also restore the default settings of the unit.

Turn on the unit, in any source, press and hold both the key ▶II and PRESET- on the front panel for more than three seconds. -->After a while, "RESET OK" is displayed. Then, the unit reboots automatically.

```
                    ┌─────────────────────────────┐
                    │    Power on Doesn't Work     │
                    └─────────────────────────────┘
                                  │ Go
                                  ▼
   ┌──────────────────────────────────┐   NO   ┌───────────────────────────┐
   │ Check   the   22V voltage of XP1  │───────▶│  Adapter has problem      │
   │ and XP8                           │        │                           │
   └──────────────────────────────────┘        └───────────────────────────┘
                    │ Yes
                    ▼
   ┌──────────────────────────────────┐   NO   ┌───────────────────────────┐
   │ Check  the  3.3V voltage of  MCU  │───────▶│  Check the VCC5V out from │
   │                                   │        │  DC-DC                    │
   └──────────────────────────────────┘        └───────────────────────────┘
                    │ Yes                                    ▲
                    ▼                                        │
   ┌──────────────────────────────────┐   No               │
   │ Check  9pin  and  24pin of  MCU   │──────┐             │
   │ and confirm whether they have     │      │             │
   │ normal voltage                    │      │             │
   └──────────────────────────────────┘      │             │
                    │ Yes                     │             │
                    ▼                         │             │
   ┌──────────────────────────────────┐  No  │             │
   │ Confirm whether there are DVCC33  │──────┴─────────────┘
   │ and VC12                          │
   └──────────────────────────────────┘
                    │ Yes                No
                    ▼                    ┌──────────────────────────────┐
   ┌──────────────────────────────────┐ │  MPEG   has   problem        │
   │ Confirm    the    normality  SPI  │─┘                              │
   │ communications of   MPEG          │ └──────────────────────────────┘
   └──────────────────────────────────┘
                    │ Yes
                    ▼
   ┌──────────────────────────────────┐
   │ Check  VFD  board  and  key board │◀──────
   └──────────────────────────────────┘
```

```
                    ┌─────────────────────┐
                    │  Can't read USB or  │
                    │  USB has no sound   │
                    └─────────────────────┘
                          Go │
                             ▼
┌───────────────────────────────────┐   NO    ┌───────────────────────────────────┐
│ Check the 5V voltage of  XP14      │────────▶│ Confirm    whether    there   is  5V│
│                                    │         │ voltage of  S  pin  of  Q13        │
│                                    │         │                                    │
└───────────────────────────────────┘         └───────────────────────────────────┘
              │                    Yes                    │ NO
        Yes   │        ◀──────────────────────           ▼
              ▼                              ┌───────────────────────────────────┐
┌───────────────────────────────────┐       │        Q13 has problem            │
│ Check   the   normality   of   the │ No    └───────────────────────────────────┘
│ communication                      │
│ between MPEG and USB               │
└───────────────────────────────────┘
        Yes   │
              ▼
┌───────────────────────────────────┐
│ MPEG has problem                   │
│                                    │
└───────────────────────────────────┘
```

Can't connect NFC

GO

Confirm whether there is response of mobile phone

NO → U21 has problem

Yes

The circuit of NFC can work normally

BT has no sound

Go

Check whether there is audio signals of the 4 and 8 pin of XP11

No → BT board has problem and change it

Yes

Check whether there is audio signals of the 22 and 24 pin of XP82

No → Check the connection of VFD board and main board

Yes

Confirm whether there is audio signals of the 5 and 14 pin of U17

No → Check the connection of R162 and R169 to U17

Yes

Confirm whether there is audio signals of the 3 and 13 pin of U17

No → U17 has problem

Yes

Check whether it is right of the IIS signal between U16 and MPEG

No → If MCLK, BLCK and LRCLK of IIS signal isn't normal ,MPEG has problem . If data line has no output,U16 has problem.

Yes

Check the signal output from U20

No → U20 has problem

Yes

Confirm whether there is PWM wave of the 2 pin of U21

No → U21 has problem

\

FM   AUX   and   MP3
have no sound

Go

Confirm whether there is audio signals of the 5 and 14 pin of   U17

No →   Check the connection of   these nets to U17

Yes

Check as the procedure of BT has no sound   from   the forth   step

Mechanical and Dismantling Instructions

Dismantling Instruction   Detailed information please refer to the model set.

The following guidelines show how to dismantle the player.

Step 1:Open the top cover.Remove 5 screws on the back panel and 2 screw on the left and right sides,
then open the cover from the back panel side.(Figure 1)

(Figure 1)

Step 2:Dismantle the loader.Disconnect the connectors on main board.Remove 2 screws besides the
loader.Pull up the loader from the back panel side,the CD door will be separated at the same
time.(Figure 2)

(Figure 2)

Mechanical and Dismantling Instructions

Dismantling Instruction   Detailed information please refer to the model set.

The following guidelines show how to dismantle the player.

Step 3:Dismantle the loader bracket.Remove 1 screw on the bracket then remove the bracket directly.
        (Figure 3)

(Figure 3)

Step 4:Dismantle the front panel.Disconnect the connectors on the main and power board. Release 2
        buckles under the bottom plate and 2 screws on the left and right sides.(Figure 4)

(Figure 4)

Step 5:Dismantle the USB board.Remove 2 screws on the board.(Figure 5)

Step 6:Dismantle the IN board.Remove 2 screws on the board.(Figure 5)

Step 7:Dismantle the support board.Remove 2 screws on the board.(Figure 5)

Step 8:Dismantle the key board.Remove 2 screws on the board and disconnect the connector.(Figure 5)
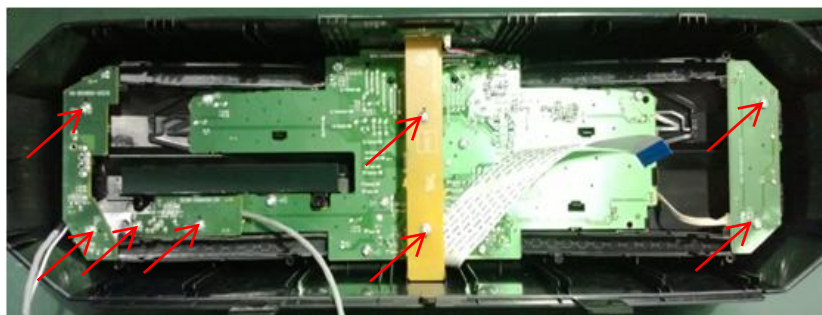
(Figure 5)

Mechanical and Dismantling Instructions

Dismantling Instruction Detailed information please refer to the model set.

The following guidelines show how to dismantle the player.

Step 9:Dismantle the front control board.pull out the volume knob. Remove 9 screws on the board.
Release the buckles on the board.Then pull out the board.(Figure 6)

(Figure 6)

Step 10:Dismantle the power board. Remove 4 screws on the board.(Figure 7)

(Figure 7)

Step 11:Dismantle the main board. Remove 4 screws on the back panel and 2 screws on the board.
(Figure 8)
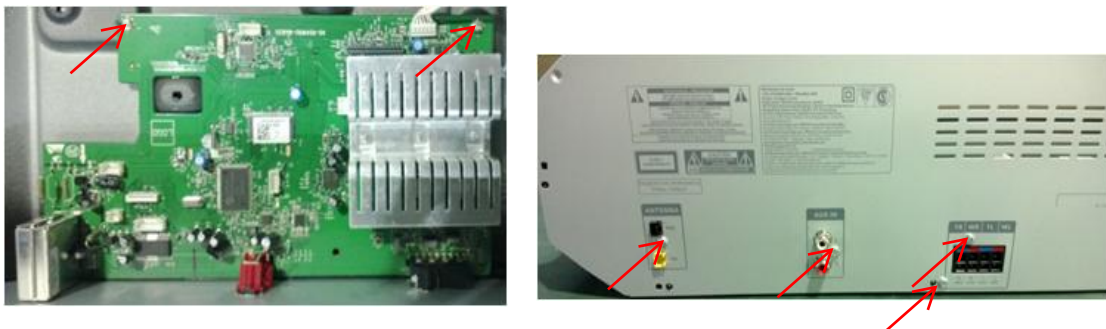
(Figure 8)

Circuit Diagram - Support board

A	B	C	D	E

R1 1K
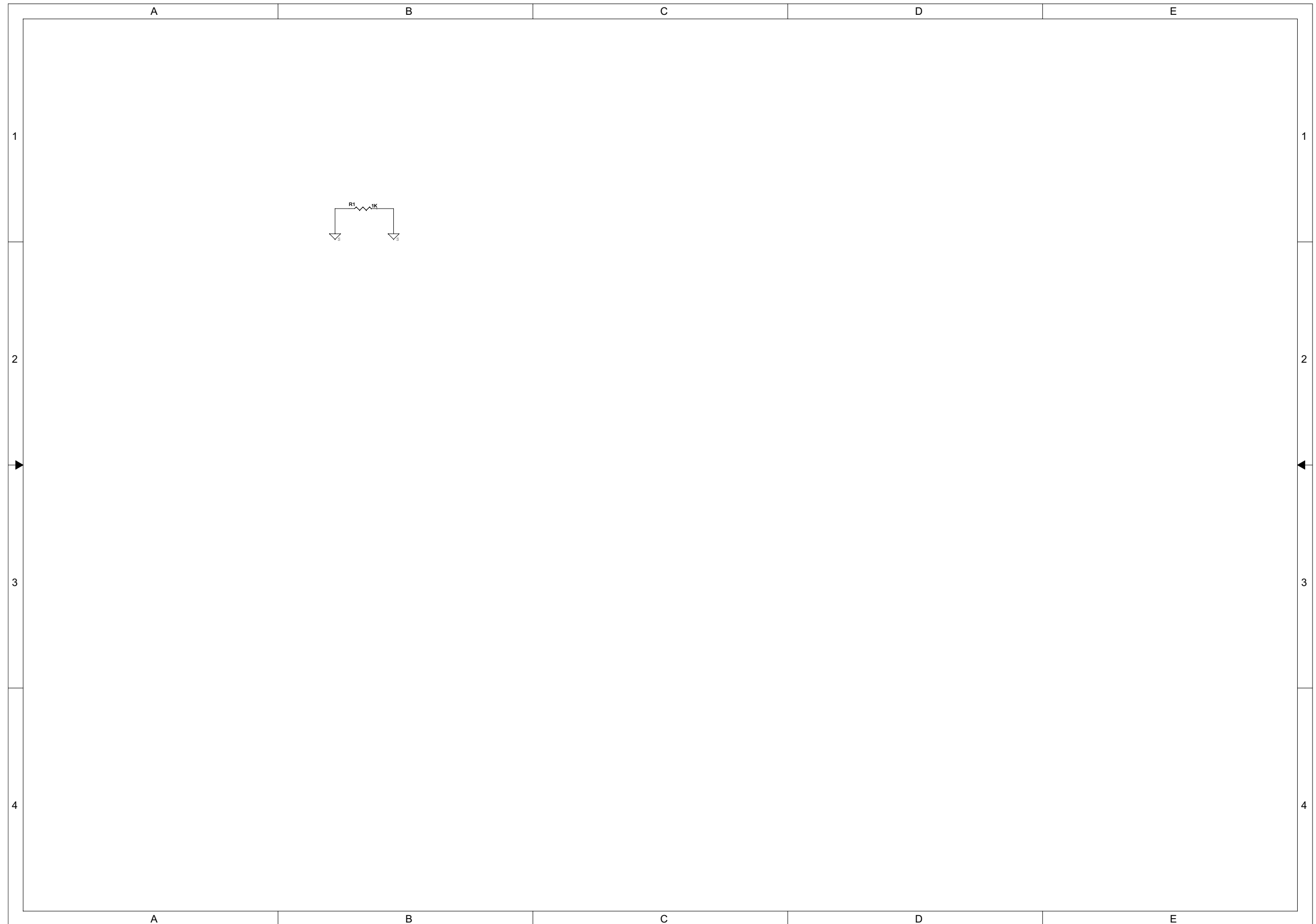
Circuit Diagram - Key board
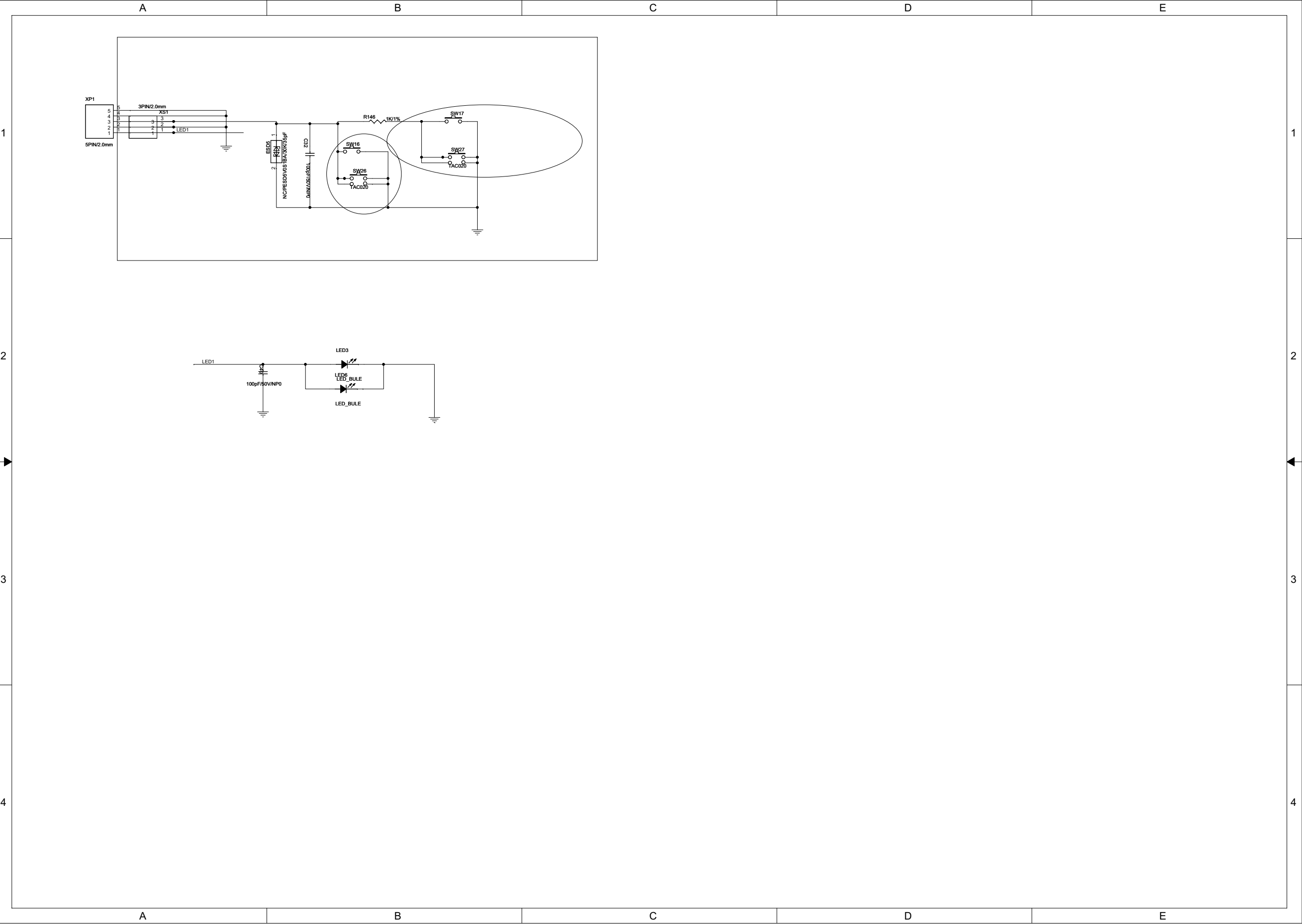
Circuit Diagram - USB board

Circuit Diagram - IN board

AUDIO IN

3PIN/2.0mm/260mm

XS2
1
2
3

AUDIO IN_R FB2 500/200mA
TP64

AUDIO IN_L
FB3
500/200mA
TP65

C34
3300pF/50V/X7R

C39
3300pF/50V/X7R

CON2
1
6
3
5
4
2

Audio in

XP2
AUDIO IN_R   1
AUDIO IN_L   2
              3
MIC   4
MIC_det   5
12V_D_A   6

6PIN/2.0mm

MIC

12V_D_A

R620 2.2K   12VA   R646   22K   REFM

CE608
220uF/16V

C772
0.1uF/50V/X7R

CE609
47uF/16V

R610
22K

R642
100K

JACK801
1
6
3
5
4
2

MIC JACK

R650   1K   MIC_det

FB611   1.2K

R612
680

CE610
2.2uF/25V

R648
10K

C607
1000pF/50V/X7R

C611 47pF/50V/NP0
R643   110K

AS4558M
U602A
2
3
1
4
8

REFM   12VA

C623
2.2UF

C610
100pF/50V/NP0

AS4558M
U602B
5
6
7
8
4

MIC

R649
20K

R645   100K

C626 47pF/50V/NP0

C625
2.2UF

J20 0

Circuit Diagram - Front Control board

Circuit Diagram - Power board

	A	B	C	D	E

BD501 KBP306

CE501 NC
CE502 150uF/450V *Alternative*
C502 0.01uF/400V *Alternative*

FB80@100MHz
FB503
CX502 0.1uF/250VAC

C503 0.0022uF(222)400V
R508 22
R509 22
R510 47K/2W

CY507 470pF/250VAC *Alternative*
CY506 NA *Alternative*
HV

C551 1000pF/1KV
T501 ER28
R551

SF20A300HPI/20A/300V
D551

CON502 4PIN/2.0mm/170mm
1:+33V
2:+33V
3:GND
4:GND

R503 2M
R504 2M
R505 2M

D501 FR207/2A/1000V

ZD501 P6KE160A

CE551 820uF/50V
C552 0.1uF/50V/X7R
CE552 820uF/50V
R557 47K/1%
LIF551 250uH
C553 0.1uF/50V/X7R

CON503 6PIN/2.0mm/100mm
1: 33V_Main
2: GND
3: P_CON
4: Fset_A
5: Fset_B
6: GND

R5013 1M   R5014 1M
CY503 470pF/250VAC   CY502 470pF/250VAC
LIF502_3   LIF502_4
LIF502   LIF502_1

R501 33K

RJ501 22   Vcc
FR107/1A/1000V
D502
CE504 47uF/35V

R511 0

R512 51K

R552 1K

D505 1N4148
Q506
Q505 PNP_MMBT3550CLT1
PNP_3CG3906M

L6566B
1 HVS   AC_OK 16
2 N.C.   VFF 15
3 GND   SS 14
4 GD   OCS 13 OCS
5 Vcc   MODE/SC 12
6 FMOD   ZCD 11
7 CS   VREF 10
8 DIS   COMP 9
U501

R502 33K
R506 470K
D506 BAS316/100V/0.5A
15K/1%
C521
2200pF/50V/X7R
C507
0.033uF/50V/X7R
R507

C513 47pF/50V/NP0
ZD502 NC
CPP option

R553 2.2K
U502 LTV-817S-B

C554 470pF/50V/NP0
R554 10K
C555 0.1uF/50V/X7R
R556 10K/1%
Q555 3DG3904M

D503 BAS316/100V/0.5A
R519 22
R518 47

Q501
12A/650V
C515 10pF/1KV

R555 6.2K/1%
C562
0.01uF/50V/X7R
R563 1K P_CON
R562 4.7K

U503 AS431

R513 20K/1%
R515 10K
R517 1K
R516 0.22/2W

ZD505
R536 1M   R537 2.2M   C537 0.47uF/63V
R535 1M
R5011 1M   R5012 1M   R521
CX501 0.33uF/275VAC
C511 1uF
20HSC

R520 7.5K
SC Option

C517 330pF/50V/X7R

C523 0.01uF/50V/X7R
C522
0.01uF/50V/X7R

VREF
RJ508 0
R534 100K
R533 56K/1%
3DG3904M
RJ504 0
Q507

RV501 VDR/470V

TR501 NTC/3ohm/5A
F501 FUSE_3.15AL/250V
CY501 NC

C518 0.01uF/50V/X7R
C516 0.01uF/50V/X7R
TR502 100K
CLOSE to MOSFET

CON501 2PIN/7.92mm

RJ502
RJ505
RJ506 0Ω
RJ507 0Ω
RJ510 0

R558 1K
R525 100K   Vcc
U504 LTV-817S-B
C556 0.1uF/50V/X7R
R559 4.7K *Alternative*

LIF501 Alternative
LIF501_1 FB502 LIF501_4
FB80@100MHz
FB501
LIF501_2 LIF501_3
FB80@100MHz

FMOD
R524 150K/1%
OCS
RJ509 0Ω OCS1
R532 1K
Q504 3DG3904M
C524 1UF/16V/X7R
D504 BAT54C
R523 30K/1%

T502 PQ3230
T501_S3
T501_P1
T501_P2 GND
T501_P36

R526 120K/1%
Q502 3DG3904M
R544 4.7K
C527 0.1uF/50V/X7R
R527 20K
V_1

R528 100K   Vcc
U505 LTV-817S-B
C561 0.1uF/50V/X7R
R561 4.7K *Alternative*

R529 56K/1%
Q503 3DG3904M
R530 4.7K
C531 0.1uF/50V/X7R
R531 20K
V_2 *Alternative*

R560 1K

* CAUTION :
THE PARTS MARKED WITH ⚠ ARE IMPORTANT PARTS ON THE SAFETY.
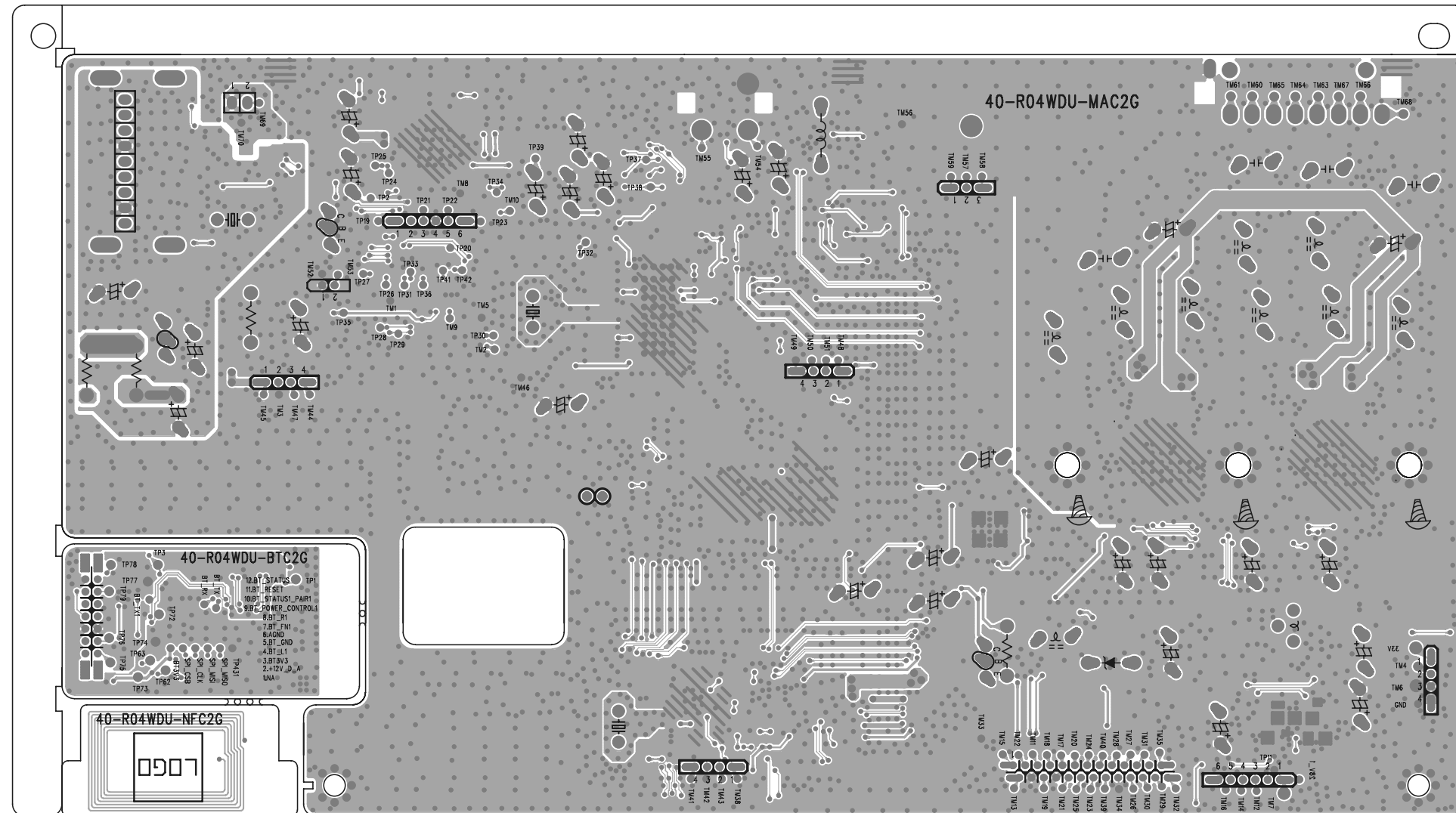PLEASE USE THE PARTS HAVING THE DESIGNATED PARTS NUMBER WITHOUT FAIL.

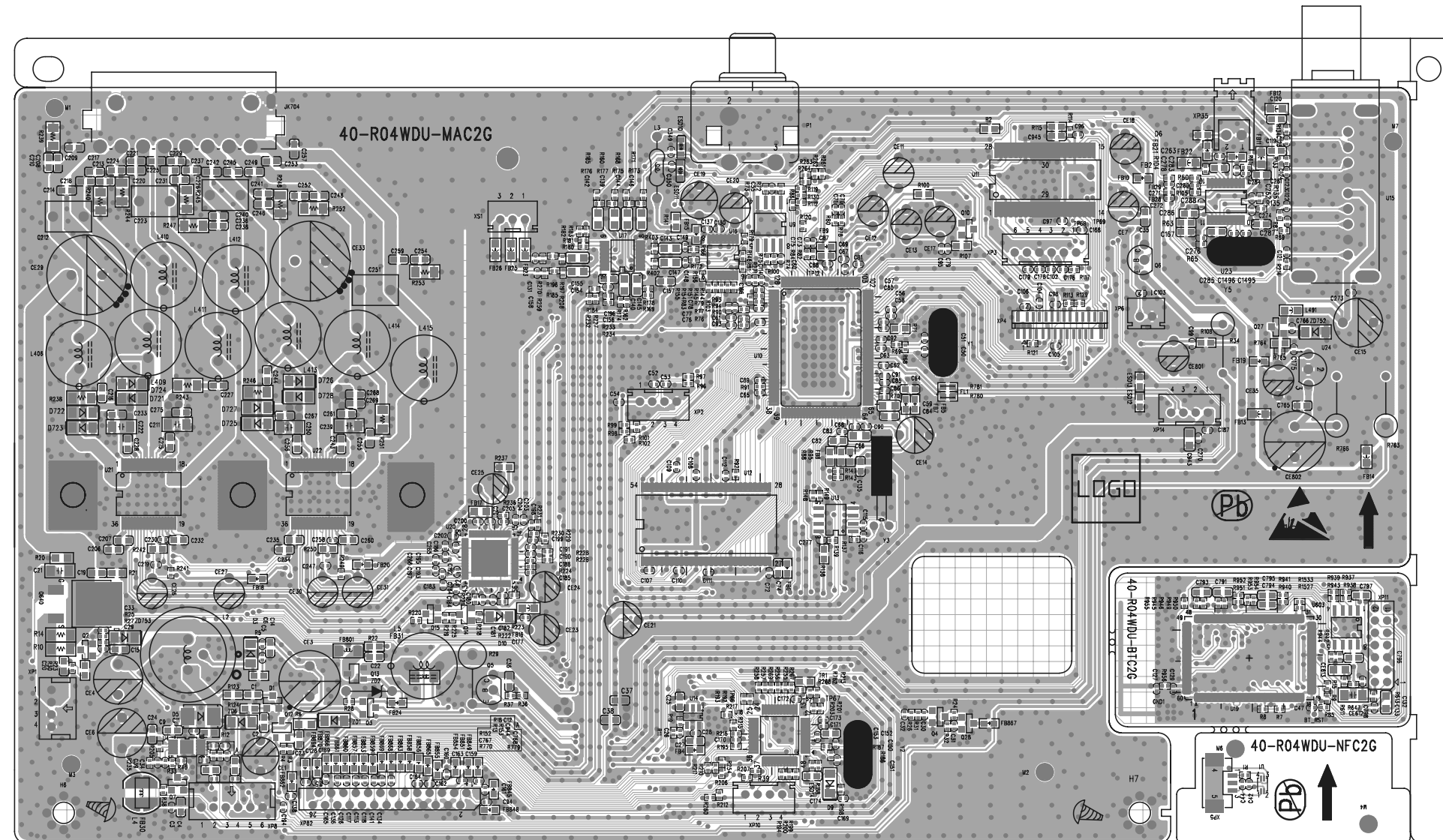Print layout -USB & Key & Support Board (top side)

40-R04W9U-USF1G

40-R04W9U-KYF1G

40-R04W9U-DGF1G

Print layout - In & Front Control Board (top side)
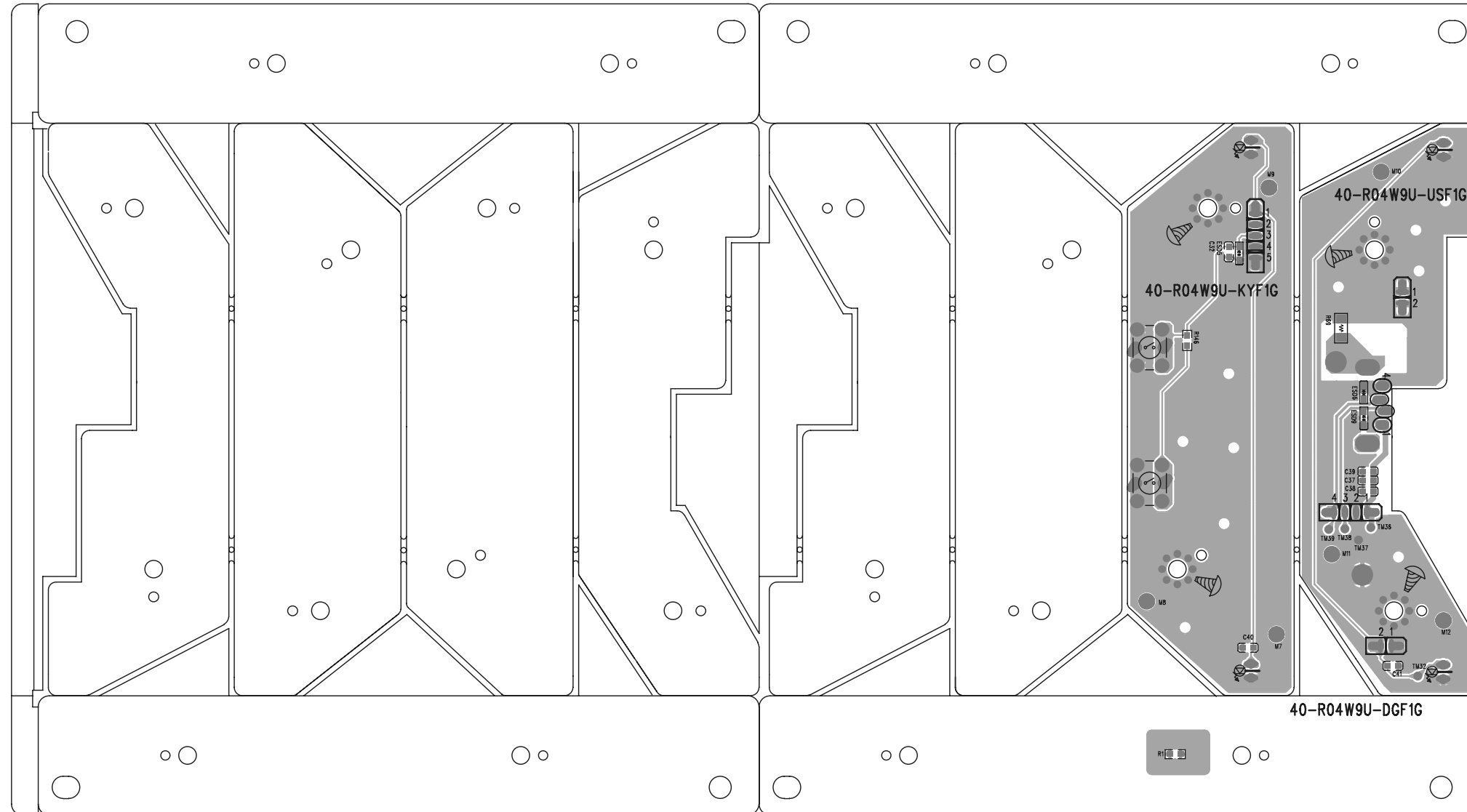
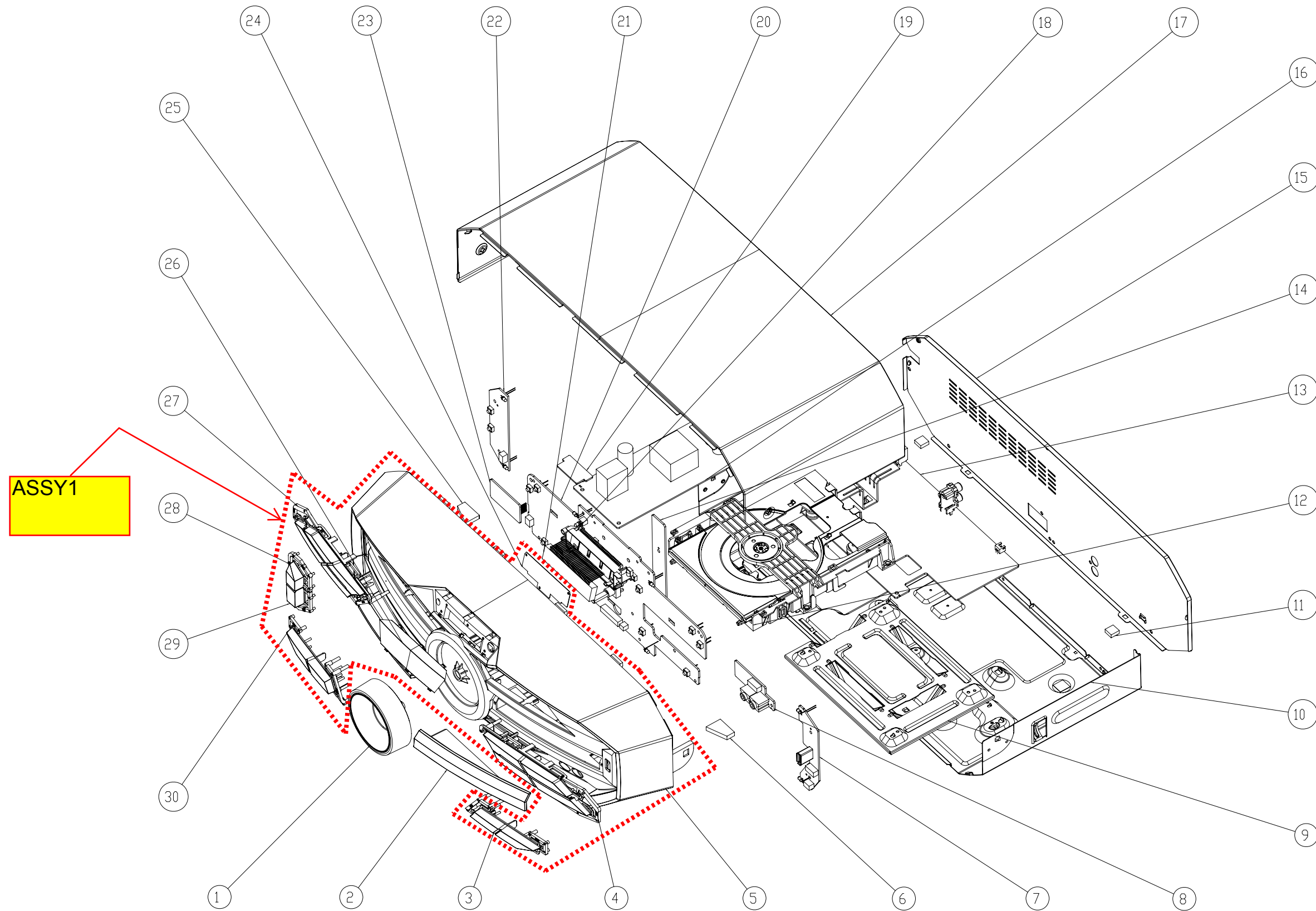# Print layout - Power Board (top side)
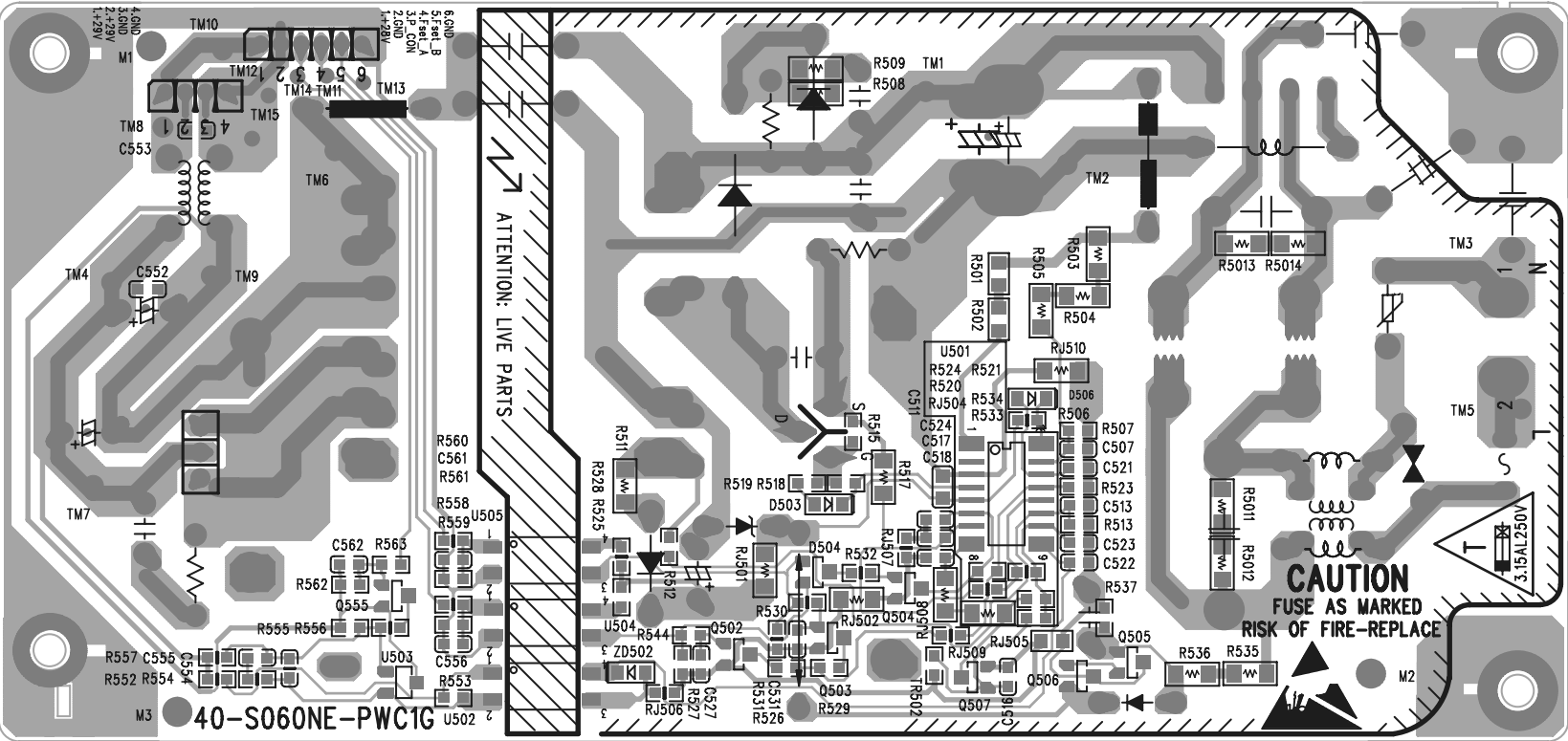
Print layout - Main Board (bottom side)

Print layout - Main Board (top side)

Exploded View for FX15:

ASSY1

Remarks: ASSY1 includes 3,4,5,24,26,27,28,29,30.

Partlist refer to a separated excel file on FYP

REVISION LIST

V 1.0 2014-5-23 Initial release for FX15/12.