

IBBK

X25L(RU)

service manual

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Chapter One About Maintenance

1.1 Safety precautions

1.1.1 Precautions for antistatic

Movement and friction will both bring static electricity which causes serious damages to integrated IC. Though static charge is little, when a limited quantity of electric charge is added to large-scale integrated IC, as the capacitance is very small in the meantime, now the integrated IC is very much easy to be struck through by static electricity or the performance will decrease. Thus static electricity prevention is of extraordinary importance. The following are several measures to prevent static electricity:

1. Use a piece of electric conduction metal with the length of about 2 metres to insert into the earth, and Fetch the lead wire from the top of the surplus metal and connect to the required static electricity device. The length and depth of the metal embedded under the earth should be determined according to the wettability of the local soil. For humid places, it may be shorter, and longer and deeper for dry places. If possible, it can be distributed and layed in terms of “#” shape.
2. On operating table-board, the antistatic table cushion should be covered and grounded.
3. All devices and equipments should be placed on the antistatic table cushion and grounded.
4. Maintenance personnel should wear antistatic wrist ring which should be grounded.
5. Places around the operating position should also be covered with electric conduction cushion or Painted with antistatic paint.

1.1.2 About placement position

1. Audio power amplifier cannot be installed in places with high temperature and humidity.
2. Positions for placement should be stable and secure.

1.2 Maintenance method

1.2.1 Visualized method

Directly view whether abnormalities of collision, lack of element, joint welding, shedding welding, rosin joint, copper foil turning up, lead wire disconnection and elements burning up among pins of

Elements appear. Check power supply of the machine and then use hands to touch the casing of part of elements and check whether they are hot to judge the trouble spot. You should pay more attention when using this method to check in high voltage parts.

1.2.2 Electric resistance method

Set the multimeter in resistance position and test whether the numerical value of resistance of each point in the circuit has difference from the normal value to judge the trouble spot. But in the circuit the tested numerical value of resistance is not accurate, and the tested numerical value of integrated IC's pins can only be used for reference, so the elements should be broken down for test.

1.2.3 Voltage method

Voltage method is relatively convenient, quick and accurate. Set the multimeter in voltage position and test power supply voltage of the player and voltage of a certain point to judge the trouble spot according to the tested voltage variation.

1.2.4 Current method

Set the multimeter in current position and test current of the player of a certain point to judge the trouble spot. But when testing in current method, the multimeter should be series connected in the circuit, which makes this method too trivial and troublesome, so it is less frequently used in reality.

1.2.5 Cutting method

Cutting method should be combined with electric resistance method and voltage method to use. This method is mainly used in phenomena of short circuit and current leakage of the circuit. When cutting the input terminal voltage of a certain level, if voltage of the player rises again, it means that the trouble lies in this level.

1.2.6 Element substitution method

When some elements cannot be judged good or bad, substitution method may be adopted directly.

1.2.7 Comparison method

A same good PC board is usually used to test the correct voltage and waveform. Compared these data with those tested through fault PC board, the cause of troubles may be found.

Through the above maintenance method, theoretical knowledge and maintenance experience, all difficulties and troubles will be readily solved.

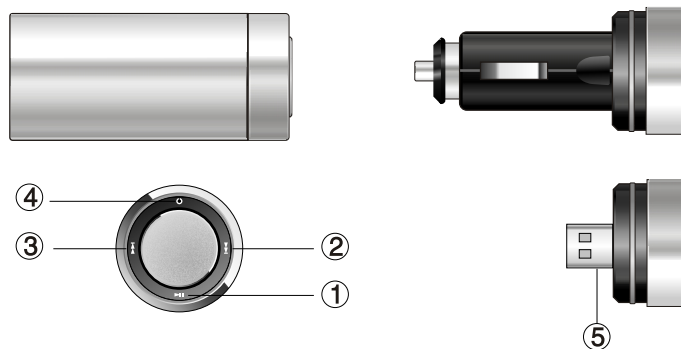
1.3 Required device for maintenance

- ◆ Audio Generator
- ◆ Digital oscillograph ($\geq 100\text{MHE}$)
- ◆ SMD rework station
- ◆ Multimeter
- ◆ Soldering iron
- ◆ Pointed-month pincers
- ◆ Cutting nippers
- ◆ Forceps
- ◆ Electric screw driver
- ◆ Terminals connecting cord
- ◆ Headphone
- ◆ Microphone

Chapter Two

Functions and Operation Instructions

2.1 ILLUSTRATION OF BUTTONS



- ① : #Press in power-off state → power on
#Press for long in power-on state → power off
#Press in playing state → pause playing
- ② ③ : #Press in playing state → previous/next track
#Press for long in playing state → fast forward/backward
- ④ : #Press or press for long In playing state → change transmitting frequency
- ⑤ USB jack

CAUTION: Please change frequency again until light flickering finishes.

2.2 POWER ON/OFF

#POWER ON



In power-off state, press button to power on, light flickers, playing starts automatically and transmits in default frequency.

#POWER OFF



Press button for long to power off.

CAUTION:

- # If playing function is not used during a specified period, MP3 player will power off automatically.
- # We suggest you power off before the car engine stops, otherwise the playing resume point may probably not be saved.
- #When inserting machine, please do not press buttons, otherwise functions will be in disorder.

2.3 PLAY MUSIC

#PLAY/PAUSE



When playing music, press this button to switch between "Play" and "Pause".

SELECT FREQUENCY



Press this button and the frequency transmits according to the sequence of 89MHz, 90MHz, 91MHz and 89MHz circularly, so please adjust the radio set to the corresponding frequency and then listen;

#NEXT and PREV



When playing music, press this button to enter the previous or the next track.

FF and FB



When playing music, press this button for long to enter fast forward or fast backward.

#PLAY MUSIC

Connect with this player and music playing starts automatically, or press button to play in stop and pause state.

#NEXT/PREV

When playing, press button to skip to the next track to play and then press button. If playing time of the current track is less than 5 seconds, the player will skip to the previous track to play; if playing time is more than 5 seconds, the player will play this track again.

#SELECT FREQUENCY

You may press button to change frequency. Each time when you press the button, the light flickers once. Circular sequence is 89MHz → 90MHz → 91MHz → 89MHz and adjust your radio set to the corresponding frequency at the same time.

2.4 INSTALL USB DRIVE PROGRAM

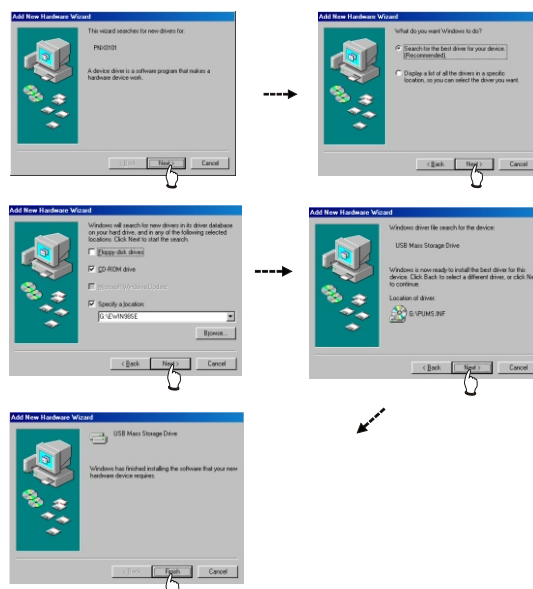
If your computer is Windows 98, use mobile storage function of MP3 player on the computer and you need install drive program.

1. Place USB drive disk into CD-ROM driver of computer.

2. Connect MP3 player with computer, the computer will give a prompt that new firmware device is found automatically and then run installation guide, shown in the following figure. You only need find drive information file on disk according to the prompt and installation of drive program finishes.

3. After installation finishes, start up computer again and then you may use mobile storage function normally.

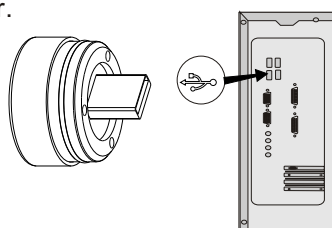
See the following figure:



2.5 CONNECT USB LINE

#CONNECT USB LINE

Pay attention to safe operation. When connecting USB transmission line, please do not press buttons, otherwise functions will be in disorder. You'd better not connect USB line when using normally. Before unplugging USB line, please stop using USB storage function firstly; and unplugging directly may probably damage the player.



2.6 USE MOBILE STORAGE FUNCTION

This player may be used as mobile storage under Windows ME/2000/XP operating system. Under Windows 98SE and Mac operating system, the player may not be used as mobile storage until the drive program is installed.

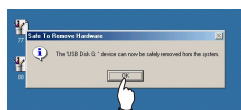
Use USB transmitting line to connect MP3 player and computer. After “” icon appears at bottom right corner on desktop of computer, mobile storage function of MP3 player may be used normally.

CAUTION:

Under Windows 98 system, there is no “” icon.

2.7 DISCONNECT USB SAFELY

After operating finishes, click “” icon at bottom right corner of Windows desktop with right button of mouse, and disconnect USB safely according to relevant computer prompt.



2.8 FIRMWARE UPGRADING

Download the latest firmware upgrading file from BBK website and then copy the file into MP3 player. Power on or connect USB again and system will upgrade automatically. After upgrading finishes, MP3 player will start up again.

After connecting USB, you may open X25_VER.txt file in disk to check the firmware version number.

CAUTIONS:

- #To ensure the success of firmware upgrading, you cannot power off or cut off power during the course of upgrading.
- #The upgrading process will cost a period, during which you'd better not operate other buttons.
- #After upgrading finishes, the player will delete the upgrading files used before.
- #After upgrading finishes, some functions may have difference from those described in user manual, so please take the actual function as standard.

#When upgrading firmware, data in original machine will be lost, so please pay attention to backup data.

2.9 SPECIFICATION

Model	X25 Auto
Size/weight	Size: $\Phi 34.5\text{mm} \times 76\text{mm}$ Weight: about 100g
Transmitting audio SNR	$\geq 60\text{dB}$
Frequency range	20Hz~15kHz
FM transmitting frequency	89MHz, 90MHz, 91MHz
Working temperature	0°C~40°C
Supportable files	MPEG 1/2/2.5 Layer 3(16kbps~320kbps), WMA(8kbps~192kbps), WAV

Chapter Three Principle and Servicing

Section One Principle of the Player

3.1.1 Principle of the player

X25 car portable MP3 player is mainly composed of the following function modules:

1. Decode part: decode part of the player is mainly composed of main decode chip PNX0101 and its peripheral circuit. Main decode chip PNX0101 is professional MP3 and WMA decode chip from Philips company. With its integrated ARM and DSP core, it possesses outstanding advantages of good timbre and low power consumption, and is widely used in MP3 and other portable audio facilities.

2. Power management module: power management module is composed of car power jack and variable voltage circuit. Variable voltage circuit is composed of TPS79301, TPS62200, TPS79333 and peripheral circuits and mainly charges of changing car 12V/24V power into voltages needed by player working.

3. Flash memory: data storage centre of player, all MP3, WMA and waveform files are saved in NAND FLASH MEMORY.

4. FM emission module: FM emission module is composed of chip BH1418 and peripheral circuit to realize adjustment and emission work of output audio signal of the player and sends audio signal outputted by player via FM. The audio signal is received by speaker system in car and restores Hi-Fi effect music.

4. USB jack: USB finishes data exchange between interior of player and the external world.

5. Reset circuit: it provides reset level signal for the player.

3.1.2 Block diagram of the player

Block diagram of the player is shown in figure 3.1.2.1:

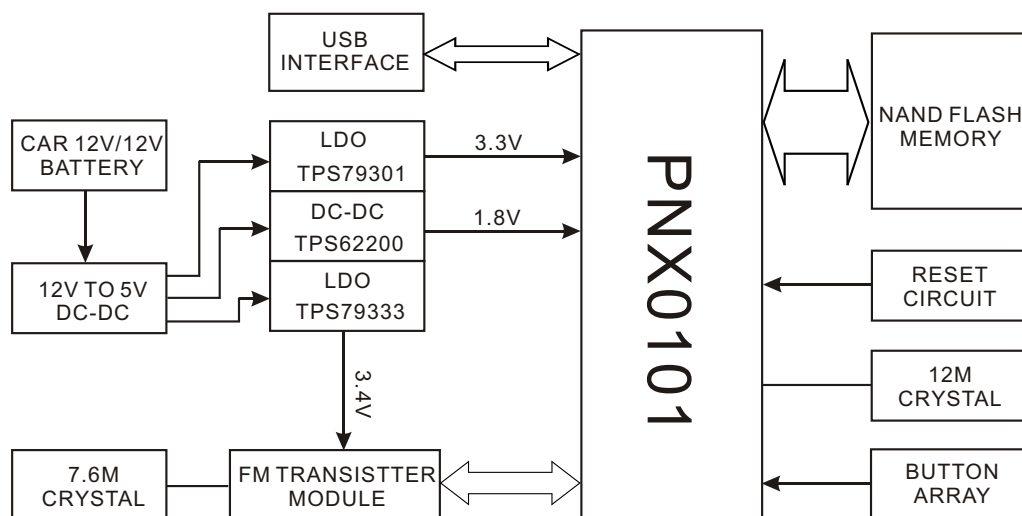


Figure 3.1.2.1 block diagram of X25 player module

3.1.3 Summary for IC used by player

IC used by X25 is shown in following block:

Main Board		
Location Number	Specification	Function
U1	PNX0101ET	MP3 Decoding
U2	K9K8G08U0M	Flash Memory
U3	TPS79301	3.3V LDO
U4	TCM809	System Reset
U5	TPS79333DBVR	3.4V LDO
U6	TPS62200	1.8V DC-DC Switch
Power Board		
U1	NCP3063B	12V/24V-5V DC-DC Switch
FM Emission Board		
FU1	BH1418KN	Demodulation and Emission of FM Signal

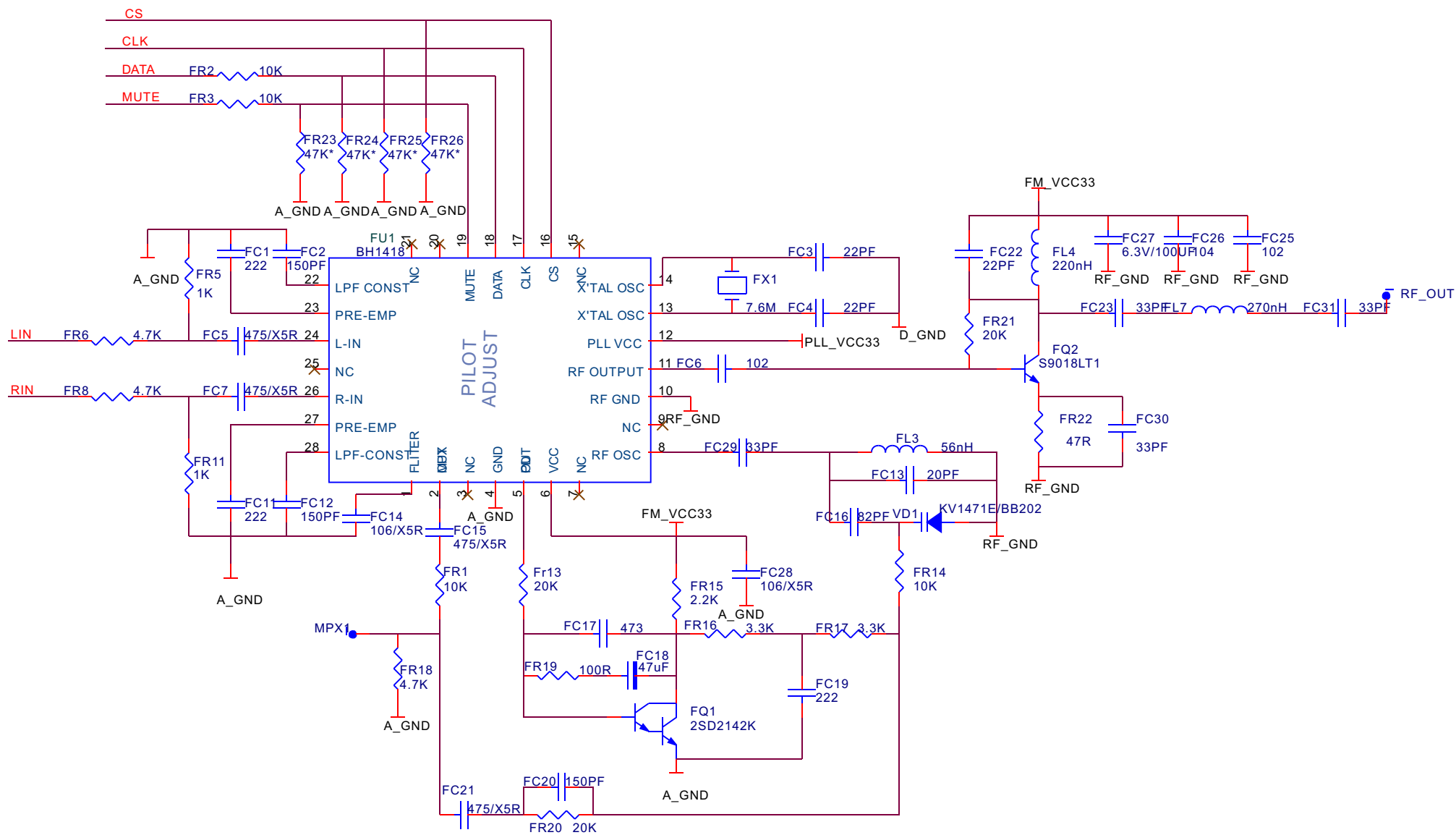


Figure 3.2.2.1 Principle block diagram of FM emission module circuit

2. FM emission circuit is mainly composed of FM modulation IC BH1418 and peripheral circuit. Audio signals LIN and RIN after decoded by PN0101 input to pin 24 and pin26 of BH1418. Firstly, they need to be pre-processed by built-in pre-emphasis circuit and limiting circuit. After low-pass filtered, pin2 outputs mix audio signals, which input to pin 8 of BH1418 after modulation with local signal. After RF oscillation, RF signal outputs from pin 11 of BH1418 and emits through FM emission antenna. Speaker system in car receives RF signal and restore music signal. Emission frequency is controlled by pin 5 PLL phase demodulation of BH1415 and peripheral circuit. CS, CLK and MUTE in circuit are control signal input to realize mute and other control operation to output signal.

3.2.3 Press button and Power on/off circuit

1.Principle of control circuit of power on/off and button circuit are separately shown in figure 3.2.3.1, 3.2.3.2

2. Detection of X25 button uses dividing voltage mode, use U5 pin of ADC of PN0101 to detect preset voltage value of button to confirm which button is functional. Then, internal programme makes corresponding response to realize functions of all buttons . Details of functions are as follows: in power off state, press S1 to power on, power on automatically when power in on; in power on state, pressing S1 for short is to play or pause, pressing for long is to power off . When long press is detected by PN0101 save the current frequency point; when loose S1,PN0101 send order to power off. Press S4 to realize skip forward and fast forward functions; press S2 to realize skip backward and fast backward functions. Press S3 for short once, frequency skip once. The amount of frequency point is setup by software. Long press is switch changing of background. When insert USB, press skipping backward button to enter DFU mode.

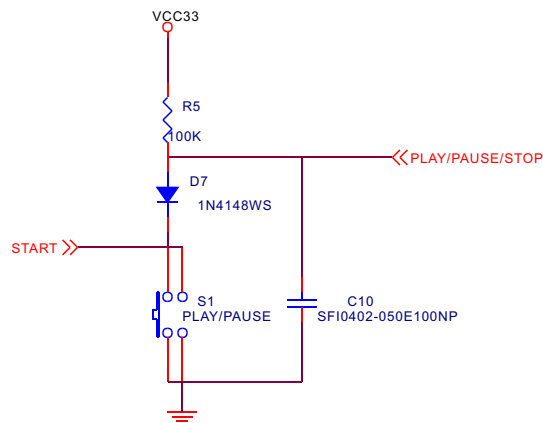


Figure 3.2.3.1 Principle of power on/off control circuit

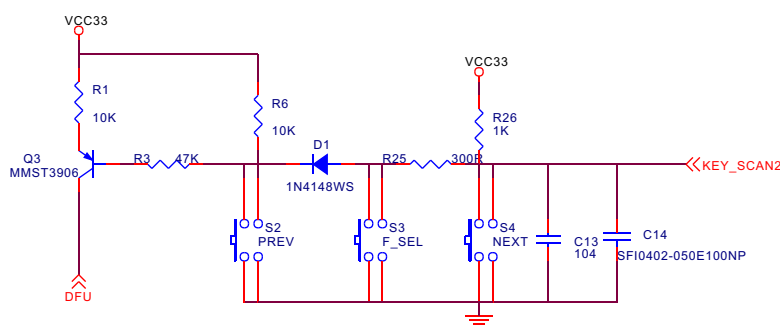


Figure 3.2.3.2 Principle of press button circuit

3.2.4 Power management mode

1. Car 12V/24V power changes into 5V voltage through DC-DC switch of NCP3063 to provide power for Mp3. Function of power management mode is to change 5V power into 3.3V, 1.8V and 3.8V voltages needed by player working, which are separately shown in figure 3.2.4.1, 3.2.4.2, 3.2.4.3

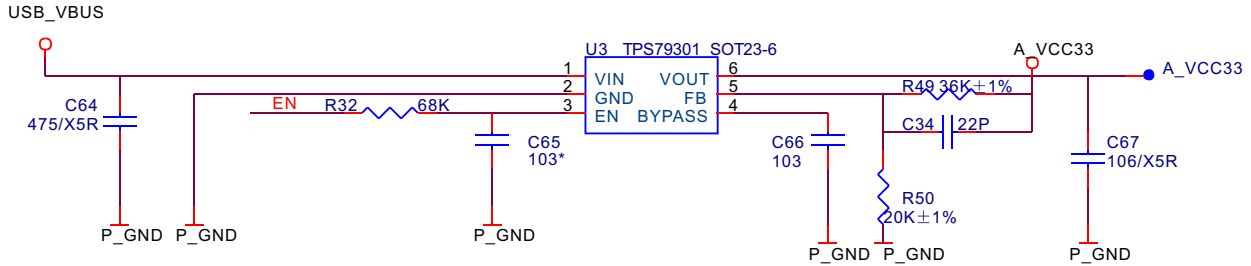


Figure3.2.4.1 Principle of 3.3Vpower circuit

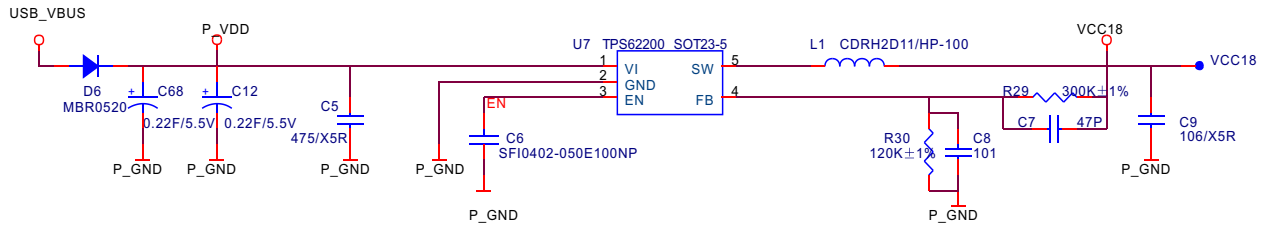


Figure 3.2.4.2 Principle of 1.8V power circuit

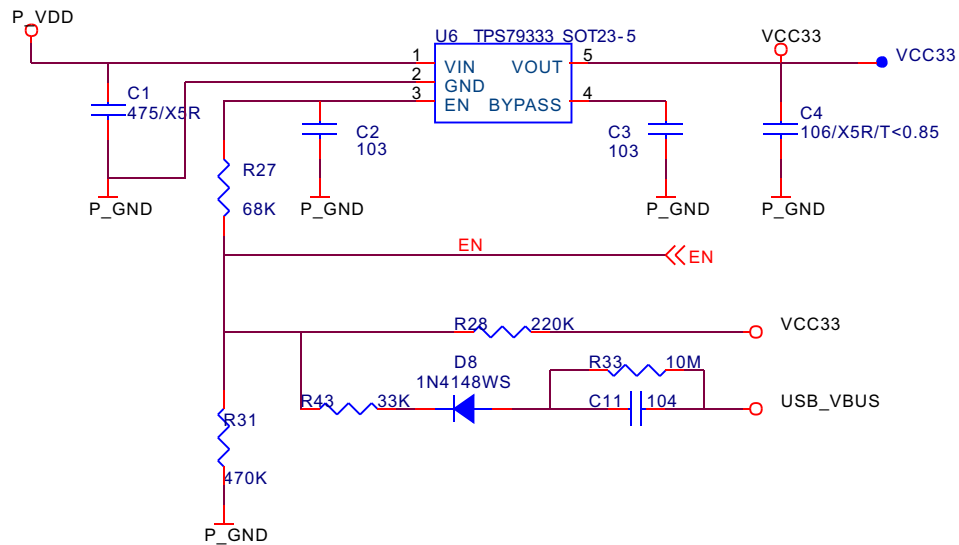


Figure 3.2.4.3 Principle of 3.8V power circuit

2. From circuit diagram, it is found that 3.3V voltage is provided by IC TPS79301 and peripheral circuit. TPS79301 is linear voltage stabilization mode(also called LDO), and its EN pin is enable pin of control normal working, high level is effective. There is a resistor inside BYPASS pin, which can comprise a low-pass filter with external 103 capacitor C66 to decrease output noise. Setting of output voltage of TPS79301 is decided by value of two external connected resistors with its relationship shown as follows:

$$V_{OUT}=1.2246\times\left(1+\frac{R_{49}}{R_{50}}\right)$$

From above, V_{OUT} is about 3.43V

1.8V voltage for player's working is supplied by IC TPS62200 and its peripheral circuit. TPS62200 is high efficient voltage-decreasing DC-DC convertor . EN pin is enable pin, high level is effective; relationship of output voltage of TPS62200 and feedback resistor of FB pin is shown as follows :

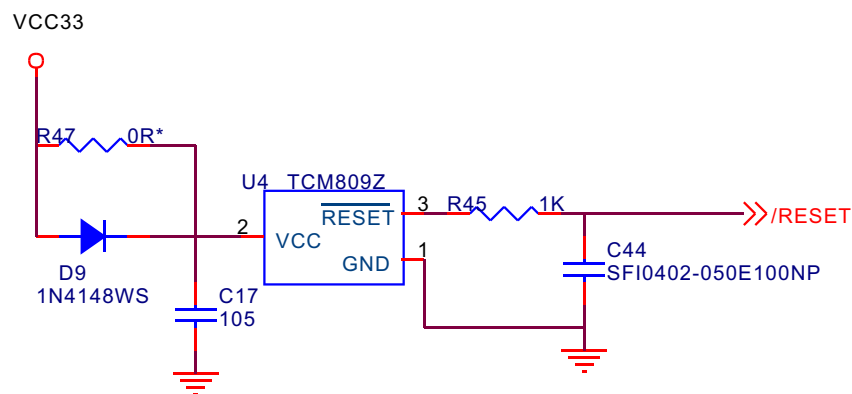
$$V_{OUT}=0.5\times\left(1+\frac{R_{29}}{R_{30}}\right)$$

From above, output voltage is about 1.75V .

To enhance and improve FM emission effect, LDO TPS79333 outputs pure 3.8V voltage, power is very clean with lower ripple voltage. After filtered again, it provide power for FM modulation circuit.

3.2.5 Reset circuit

1. Reset circuit is to provide reset signal for PNX0101. Reset circuit is shown in figure 3.2.5.1

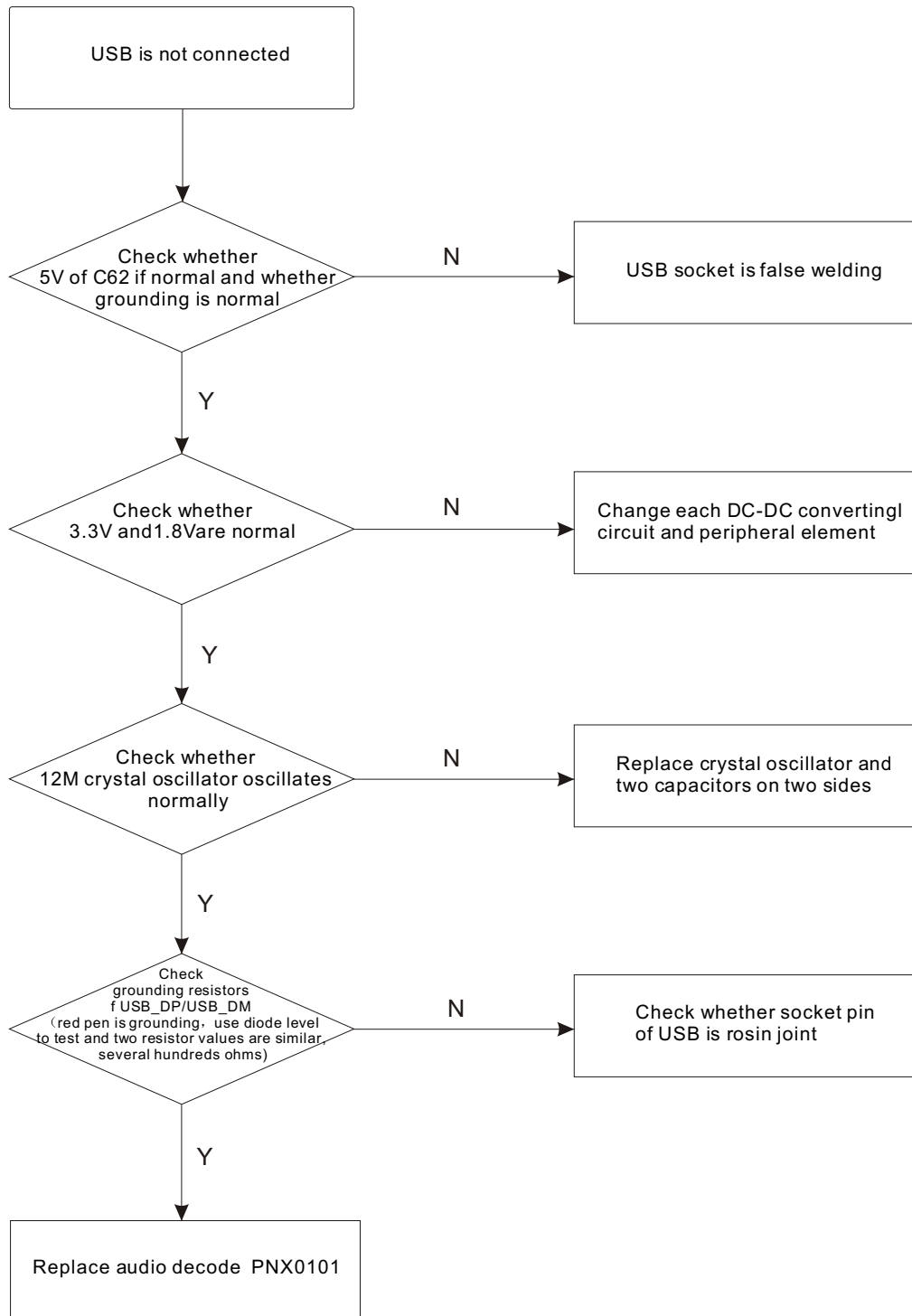


3.2.5.1 Principle of reset circuit

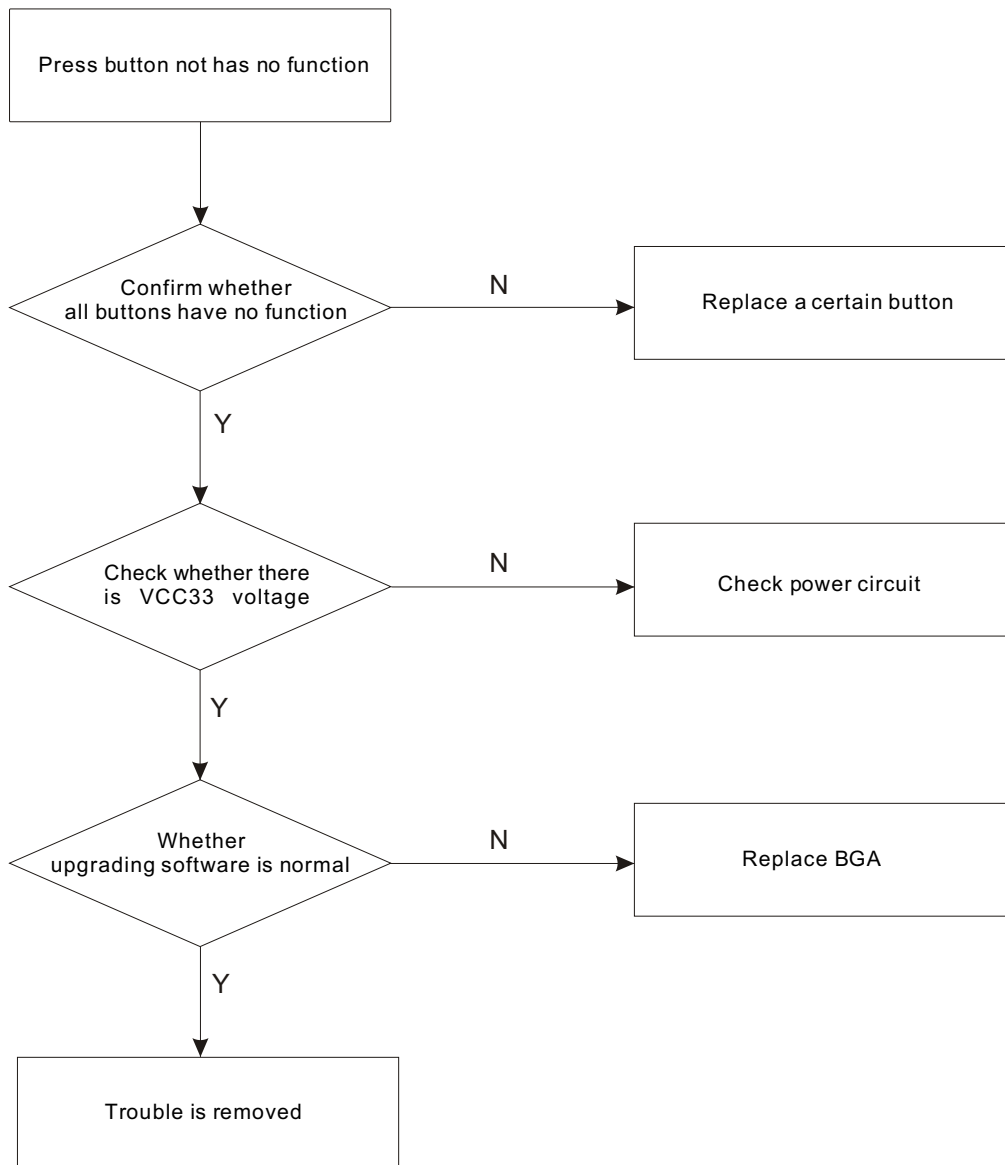
2. Reset adopts TVM809Z reset, when V_{cc} voltage of pin 2 is up to VCC33 voltage, pin 1 outputs reset signal to reset for PNX0101. Reset signal at least keeps 140ms. C44 in circuit is voltage dependant resistor to protect ESD.

Section Three Troubleshooting Flow

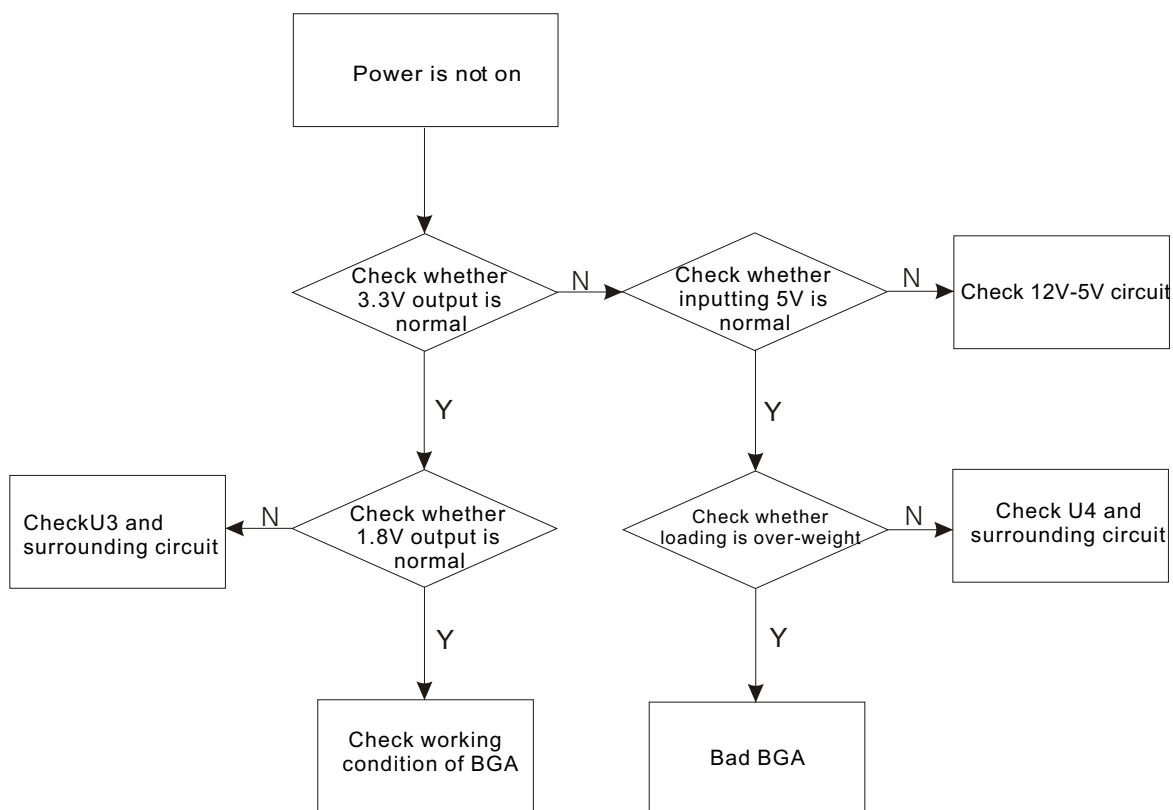
3.3.1 Troubleshooting flow of USB jack circuit



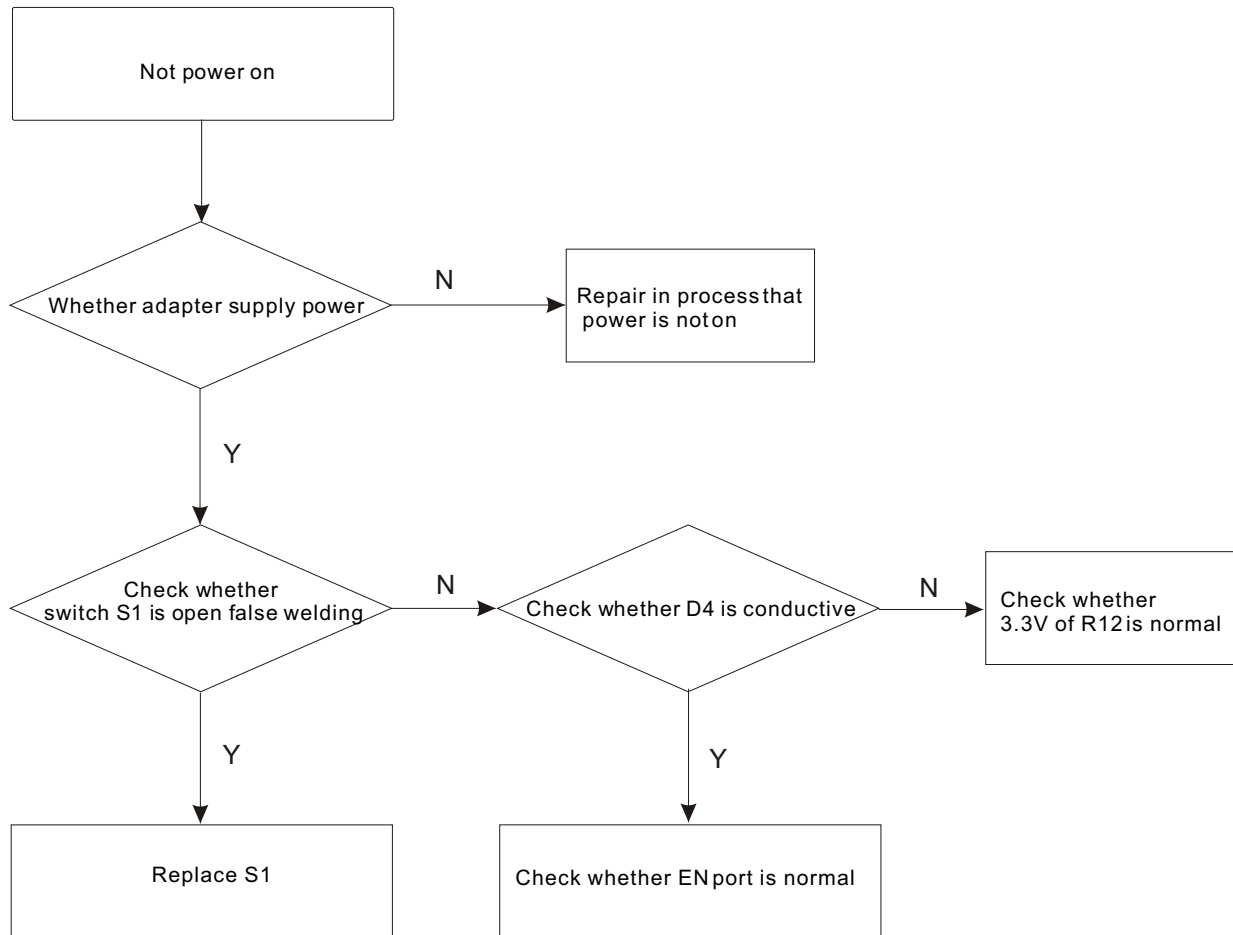
3.3.2 Troubleshooting flow of press button circuit



3.3.3 Troubleshooting flow of power management circuit



3.3.4 Troubleshooting flow of power on/off control circuit



Section Four Function Introduction to IC

3.4.1 Function introduction to PNX0101ET

1. Description

The PNX0101 (ARM-based Solid State Audio IC) is an IC based on an embedded RISC processor. The device is designed for hand-held Solid State Audio applications like portable MP3 players. The high level of integration, low power consumption and high processor performances make the PNX0101 very suitable for portable hand-held devices.

The PNX0101 is based on the powerful ARM7TDMI CPU core, which is a full 32-bit RISC processor with 8 kbyte dedicated cache.

2. Features

2.1 General Features

- ◆ One chip solution for compressed audio players using flash memory
- ◆ Programmable architecture enables flexible support of “up-coming” digital music formats
 - This hold for running the decoder on the ARM
 - The decoders on the low-power DSP, are running from mask ROM
- ◆ FM Radio input and control support
- ◆ Embedded program flash for easy upgrading and increased program security
- ◆ Support for Philips LifeVibes™ audio enhancement algorithms
- ◆ Small footprint package TBGA180 10x10mm 0.5pitch

2.2 Hardware Features

- ◆ ARM7TDMI + 8kByte cache
- ◆ Embedded 64kByte RAM and 32 kByte ROM
- ◆ Integrated embedded program Flash (4M bit)
- ◆ Ultra low power Audio DSP for support of Philips LifeVibes™ audio enhancement algorithms (storede in teh DSP's ROM).
- ◆ External memory support: Nand Flash/Compact flash/MMC/SMC/SRAM/ROM/SDRAM
- ◆ Integrated MCI interface
- ◆ Integrated USB 2.0 FS compliant slave interface (for firmware upgrade, data support from/to PC, streaming audio)
- ◆ Intelligent Configuration Power Management
- ◆ Single battery operated embedded DC/DC converter
- ◆ Integrated 6800/8080 compatible LCD interface
- ◆ General-Purpose IO pins (nearly all pins can be configured as GPIO pins)

- ◆ Integrated Master/Slave IIC interface
- ◆ Integrated ADC with line input and voice input (with recording possibility)
- ◆ Built-in ADC for level measurement & control (5-inputs)
- ◆ Integrated DAC with line output, headphone output with short-circuit protection
- ◆ Integrated IIS input and output interface
- ◆ Integrated SPDIF receiver
- ◆ Integrated UART + IRDA
- ◆ Integrated Real Time Clock with alarm
- ◆ Boundary scan

2.3 Possible software features

◆ MP3 encoding/decoding (*) => Support for MPEG 1 layer 3 and MPEG 2 layer 2.5 and layer 3 audio decoding (MP3)

- ◆ WMA decoding (*)
- ◆ AAC decoding (*)
- ◆ Ogg Vorbis decoding (*)
- ◆ Voice recording using ADPCM
- ◆ Intelligent power management software
- ◆ USB Mass Storage Class
- ◆ USB Device Firmware Upgrade
- ◆ Philips LifeVibes™ sound enhancement software including bass/treble/volume control.

(*) Audio decoders/encoders do need appropriate licenses.

3. PIN Description

SYMBOL	BGA BALL	DIGITAL I/O LEVEL	APPL. FUNC	PIN STATE AFTER RESET	CELL TYPE	DESCRIPTION
12 MHz oscillator (fixed: 4 pins)						
XTALH_IN	T10		A	input	apio (ZI)	12 MHz clock input
XTALH_OUT	V9		A	output	apio (IO)	12 MHz clock output
XTALH_VDDA18	U9				vddco	Analog supply Oscillator
XTALH_VSSA	T9				vssco	Analog ground Oscillators
32.768 kHz oscillator (fixed: 4 pins)						
XTALL_IN	V7		A	input	apio (ZI)	32.768 kHz clock input
XTALL_OUT	T8		A	output	apio (ZI)	32.768 kHz clock output
XTALL_VDDA18	U8				vddco	Analog supply Oscillators/PLL's
XTALL_GNDA	V8				vssco	Analog ground Oscillators/PLL's
bitslicer/SPDIF (fixed: 3pins)						

SPDIF_IN	T12		A	input	apio (IO)	SPDIF input
SPDIF_VDDA33	U11				vddco	Analog supply SPDIF input
SPDIF_GNDA	T11				vssco	Analog ground SPDIF input
10-bit ADC (fixed: 7 pins)						
ADC10B_GPA4	U5		A	input	apio (ZI)	Analog General Purpose pins
ADC10B_GPA3	T6		A	input	apio (ZI)	Analog General Purpose pins
ADC10B_GPA2	U6		A	input	apio (ZI)	Analog General Purpose pins
ADC10B_GPA1	T7		A	input	apio (ZI)	Analog General Purpose pins
ADC10B_GPA0	U7		A	input	apio (ZI)	Analog General Purpose pins
ADC10B_VDDA33	V10				vddco	Analog supply 10-bit ADC
ADC10B_GNDA	U10				vssco	Analog ground 10-bit ADC
DAC (fixed: 13 pins)						
DAC_VOUTR	M3		A	output	apio (IO)	SDAC Right Analog Output
DAC_VOUTL	M2		A	output	apio (IO)	SDAC Left Analog Output
DAC_VDDA33	L1				vddco	SDAC Positive Voltage
DAC_VREFP	L2		A	input	apio (IO)	SDAC Positive Reference Voltage
DAC_VREFN	M1		A	input	apio (IO)	SDAC Negative Reference Voltage
HP_OUTR	P3		A	output	apio (IO)	SDAC Right Headphone Output
HP_OUTL	N3		A	output	apio (IO)	SDAC Left Headphone Output
HP_OUTCA	N2		A	output	apio (IO)	Headphone common output reference
HP_OUTCB	N1		A	output	apio (IO)	Headphone common output reference
HP_VDDA33A	R1				vddco	Headphone analog supply
HP_VDDA33B	R2				vddco	Headphone analog supply
HP_GNDAA	P2				vssco	Headphone analog ground
HP_GNDAB	P1				vssco	Headphone analog ground
ADC (fixed: 11 pins)						
ADC_VCOM	T3		A	input	apio (IO)	ADC Common Reference Voltage
ADC_VREFP	U2		A	input	apio (IO)	ADC Positive Reference Voltage
ADC_VREFN	V1		A	input	apio (IO)	ADC Negative Reference Voltage
ADC_VDDA18	V3				vddco	Analog supply ADC
ADC_VDDA33	U3				vddco	Analog supply ADC
ADC_GNDA	V2				vssco	Analog ground ADC
ADC_VREF	U1		A	input	apio (IO)	ADC Reference Voltage
ADC_VINR	T1		A	input	apio (IO)	SADC Right Analog Input
ADC_VINL	T4		A	input	apio (IO)	SADC Left Analog Input

ADC_MIC	R3		A	input	apio (IO)	Microphone input
ADC_MIC_LNA	T2		A	output	apio (IO)	Output of LNA of Microphone input
HP_VCOM				input		HP Common Reference Voltage
LCD Interface (fixed: 12 pins)						
LCD_RW_WR	G2	0-5 VDC tolerant	I/O	output	bpts10tht 5v	6800 read/write select 8080 active 'high' write enable
GPIO_LCD_11						General Purpose IO pin
LCD_E_RD	F2	0-5 VDC tolerant	I/O	output	bpts10tht 5v	6800 enable 8080 active 'high' read enable
GPIO_LCD_10						General Purpose IO pin
LCD_DB_7	E3	0-5 VDC tolerant	I/O	output	bpts10tht 5v	Data input 7/Data output 7/Serial data output/4-bit data 3
GPIO_LCD_9						General Purpos IO pin
LCD_DB_6	E2	0-5 VDC tolerant	I/O	output	bpts10tht 5v	Data input 6/Data output 6/Serial data input/4-bit data 2
GPIO_LCD_8						General Purpose IO pin
LCD_DB_5	D3	0-5 VDC tolerant	I/O	output	bpts10tht 5v	Data input 5/Data output 5/Serial clock output/4-bit data 1
GPIO_LCD_7						General Purpos IO pin
LCD_DB_4	D1	0-5 VDC tolerant	I/O	output	bpts10tht 5v	Data input 4/Data output 4/4-bit data 0
GPIO_LCD_6						General Purpose IO pin
LCD_DB_3	D2	0-5 VDC tolerant	I/O	output	bpts10tht 5v	Data input 3/Data output 3
GPIO_LCD_5						General Purpose IO pin
LCD_DB_2	C3	0-5 VDC tolerant	I/O	output	bpts10tht 5v	Data input 2/Data output 2
GPIO_LCD_4						General Purpose IO pin
LCD_DB_1	C1	0-5 VDC tolerant	I/O	output	bpts10tht 5v	Data input 1/Data output 1
GPIO_LCD_3						General Purpose IO pin
LCD_DB_0	C2	0-5 VDC tolerant	I/O	output	bpts10tht 5v	Data input 0/Data output 0
GPIO_LCD_2						General Purpose IO pin
LCD_CSB	B3	0-5 VDC tolerant	I/O	output	bpts10tht 5v	Chip Select
GPIO_LCD_1						General Purpose IO pin
LCD_RS	F3	0-5 VDC tolerant	I/O	output	bpts10tht 5v	'high' Data register select 'low' instruction register select
GPIO_LCD_0						General Purpose IO pin
Memory Card Interface (fixed: 6 pins)						
MCI_DAT_3	J3	0-5 VDC	I/O	input	bpts10tht	Data input/Data output

GPIO_MCI_5		tolerant			5v	General Purpose IO pin
MCI_DAT_2	J1	0-5 VDC	I/O	input	bpts10tht	Data input/Data output
GPIO_MCI_4		tolerant			5v	General Purpose IO pin
MCI_DAT_1	J2	0-5 VDC	I/O	input	bpts10tht	Data input/Data output
GPIO_MCI_3		tolerant			5v	General Purpose IO pin
MCI_DAT_0	H3	0-5 VDC	I/O	input	bpts10tht	Data input/Data output
GPIO_MCI_2		tolerant			5v	General Purpose IO pin
MCI_CLK	G3	0-5 VDC	I/O	output	bpts10tht	MCI clock output
GPIO_MCI_1		tolerant			5v	General Purpose IO pin
MCI_CMD	H2	0-5 VDC	I/O	input	bpts10tht	Command input/Command output
GPIO_MCI_0		tolerant			5v	General Purpose IO pin
USB Interface (fixed: 4 pins + (8 pins reserved for future use))						
USB_CONNECT_N	T15	0-5 VDC	I/O	output	bpts10tht	Soft connect output USB 2.0 FS
GPIO_USB_1		tolerant			5v	General Purpose IO pin
USB_RPU					A	apio (IO)
USB_DP	U17		A	input	usb11	Positive USB data line USB 2.0 FS
USB_DP					apio	Positive USB data line USB 2.0 HS
USB_DM	T17		A	input	usb11	Negative USB data line USB 2.0 FS
USB_DM					apio	Negative USB data line USB 2.0 HS
USB_VBUS	U14	0-5 VDC	I/O	input	bpts10tht	USB Supply detection line USB 2.0 FS & USB 2.0
GPIO_USB_0		tolerant			5v	HS
USB_RREF	P16		I/O		bpts10tht 5v	
USB_GNDA	R17				vssco	Reserved for USB 2.0 HS
USB_VSSA_REF	R16				vccso	Reserved for USB 2.0 HS
USB_VSSA_TERM	T16				vssco	Reserved for USB 2.0 HS
USB_VDDA18_PLL	U15				vddco	Reserved for USB 2.0 HS
USB_VDDA18_BG	U16				vddco	Reserved for USB 2.0 HS
USB_VDDA33	U18				vddco	Reserved for USB 2.0 HS
USB_VDDA33_DRV	V18				vddco	Reserved for USB 2.0 HS
DAI Interface (fixed: 3 pins)						
DAI_BCK	H17	0-5 VDC	I/O	input	bpts10tht	DAI Bitclock
GPIO_DAI_2		tolerant			5v	General Purpose IO pin
DAI_WS	G17	0-5 VDC	I/O	input	bpts10tht	DAI Wordselect

GPIO_DAI_1		tolerant			5v	General Purpose IO pin
DAI_DATA	G16	0-5 VDC	I/O	input	bpts10tht	DAI Serial data input
GPIO_DAI_0		tolerant			5v	General Purpose IO pin
DAO Interface (fixed: 4 pins)						
DAO_CLK	F16	0-5 VDC tolerant	I/O	output	bpts10tht 5v	256 fs clock output
DAO_BCK	G18	0-5 VDC	I/O	output	bpts10tht	DAO Bitclock
GPIO_DAO_2		tolerant			5v	General Purpose IO pin
DAO_WS	F18	0-5 VDC tolerant	I/O	output	bpts10tht 5v	DAO Wordselect
DAO_DATA	F17	0-5 VDC	I/O	output	bpts10tht	DAO Serial data output
GPIO_DAO_0		tolerant			5v	General Purpose IO pin
JTAG (fixed: 6 pins)						
JTAG_TRST_N	T13	0-5 VDC tolerant	I	input	ipthdt5v	JTAG Reset Input (pull-down)
JTAG_TCK	V4	0-5 VDC tolerant	I	input	ipthut5v	JTAG Clock Input (pull-up)
JTAG_TMS	U12	0-5 VDC tolerant	I	input	ipthut5v	JTAG Mode Select Input (external pull-up)
JTAG_TDI	T5	0-5 VDC tolerant	I	input	ipthut5v	JTAG Data Input (pull-up)
JTAG_TDO	U13	0-5 VDC tolerant	I/O	output	bpts10tht 5v	JTAG Data output
JTAG_SEL_ARM	U4	0-5 VDC tolerant	I	input	ipthdt5v	JTAG selection (pull-down)
IIC master/slave Interface (fixed: 2 pins)						
IIC_SCL	H16	0-5 VDC tolerant	I/O	input	iic400kt5 v	Serial clock IIC Slave
IIC_SDA	J17	0-5 VDC tolerant	I/O	input	iic400kt5 v	Serial data IIC Slave
MPMC (fixed: 52 pins)						
MPMC_D_15	B8		I/O	input	bpts10th	MPMC data input/output 15
GPIO_MPMC_50						General Purpose IO pin
MPMC_D_14	C8		I/O	input	bpts10th	MPMC data input/output 14
GPIO_MPMC_49						General Purpose IO pin
MPMC_D_13	B7		I/O	input	bpts10th	MPMC data input/output 13

GPIO_MPMC_48						General Purpose IO pin
MPMC_D_12	C7		I/O	input	bpts10th	MPMC data input/output 12
GPIO_MPMC_47						General Purpose IO pin
MPMC_D_11	B6		I/O	input	bpts10th	MPMC data input/output 11
GPIO_MPMC_46						General Purpose IO pin
MPMC_D_10	C6		I/O	input	bpts10th	MPMC data input/output 10
GPIO_MPMC_45						General Purpose IO pin
MPMC_D_9	C5		I/O	input	bpts10th	MPMC data input/output 9
GPIO_MPMC_44						General Purpose IO pin
MPMC_D_8	C4		I/O	input	bpts10th	MPMC data input/output 8
GPIO_MPMC_43						General Purpose IO pin
MPMC_D_7	B5		I/O	input	bpts10th	MPMC data input/output 7
GPIO_MPMC_42						General Purpose IO pin
MPMC_D_6	A5		I/O	input	bpts10th	MPMC data input/output 6
GPIO_MPMC_41						General Purpose IO pin
MPMC_D_5	B4		I/O	input	bpts10th	MPMC data input/output 5
GPIO_MPMC_40						General Purpose IO pin
MPMC_D_4	A4		I/O	input	bpts10th	MPMC data input/output 4
GPIO_MPMC_39						General Purpose IO pin
MPMC_D_3	A3		I/O	input	bpts10th	MPMC data input/output 3
GPIO_MPMC_38						General Purpose IO pin
MPMC_D_2	B2		I/O	input	bpts10th	MPMC data input/output 2
GPIO_MPMC_37						General Purpose IO pin
MPMC_D_1	A2		I/O	input	bpts10th	MPMC data input/output 1
GPIO_MPMC_36						General Purpose IO pin
MPMC_D_0	A1		I/O	input	bpts10th	MPMC data input/output 0
GPIO_MPMC_35						General Purpose IO pin
MPMC_A_20	C13		I/O	output	bpts10th	MPMC address 20
GPIO_MPMC_34						General Purpose IO pin
MPMC_A_19	B13		I/O	output	bpts10th	MPMC address 19
GPIO_MPMC_33						General Purpose IO pin
MPMC_A_18	A13		I/O	output	bpts10th	MPMC address 18
GPIO_MPMC_32						General Purpose IO pin
MPMC_A_17	C14		I/O	output	bpts10th	MPMC address 17
GPIO_MPMC_31						General Purpose IO pin
MPMC_A_16	B14		I/O	output	bpts10th	MPMC address 16

GPIO_MPMC_30						General Purpose IO pin
MPMC_A_15	A14		I/O	output	bpts10th	MPMC address 15
GPIO_MPMC_29						General Purpose IO pin
MPMC_A_14	C15		I/O	output	bpts10th	MPMC address 14
GPIO_MPMC_28						General Purpose IO pin
MPMC_A_13	B15		I/O	output	bpts10th	MPMC address 13
GPIO_MPMC_27						General Purpose IO pin
MPMC_A_12	C16		I/O	output	bpts10th	MPMC address 12
GPIO_MPMC_26						General Purpose IO pin
MPMC_A_11	B16		I/O	output	bpts10th	MPMC address 11
GPIO_MPMC_25						General Purpose IO pin
MPMC_A_10	C17		I/O	output	bpts10th	MPMC address 10
GPIO_MPMC_24						General Purpose IO pin
MPMC_A_9	B17		I/O	output	bpts10th	MPMC address 9
GPIO_MPMC_23						General Purpose IO pin
MPMC_A_8	C18		I/O	output	bpts10th	MPMC address 8
GPIO_MPMC_22						General Purpose IO pin
MPMC_A_7	B18		I/O	output	bpts10th	MPMC address 7
GPIO_MPMC_21						General Purpose IO pin
MPMC_A_6	A18		I/O	output	bpts10th	MPMC address 6
GPIO_MPMC_20						General Purpose IO pin
MPMC_A_5	D18		I/O	output	bpts10th	MPMC address 5
GPIO_MPMC_19						General Purpose IO pin
MPMC_A_4	D17		I/O	output	bpts10th	MPMC address 4
GPIO_MPMC_18						General Purpose IO pin
MPMC_A_3	D16		I/O	output	bpts10th	MPMC address 3
GPIO_MPMC_17						General Purpose IO pin
MPMC_A_2	E18		I/O	output	bpts10th	MPMC address 2
GPIO_MPMC_16						General Purpose IO pin
MPMC_A_1	E17		I/O	output	bpts10th	MPMC address 1
GPIO_MPMC_15						General Purpose IO pin
MPMC_A_0	E16		I/O	output	bpts10th	MPMC address 0
GPIO_MPMC_14						General Purpose IO pin
MPMC_NSTCS_2	B11		I/O	output	bpts10th	Static memory chip select 2. Default active LOW (reprogrammable).

GPIO_MPMC_13						General Purpose IO pin
MPMC_NSTCS_1	A8		I/O	output	bpts10th	Static memory chip select 1. Default active LOW (reprogrammable).
GPIO_MPMC_12						General Purpose IO pin
MPMC_NSTCS_0	C9		I/O	output	bpts10th	Static memory chip select 0. Default active LOW (reprogrammable).
GPIO_MPMC_11						General Purpose IO pin
MPMC_NDYCS	B9		I/O	output	bpts10th	SDRAM chip select. Active LOW.
GPIO_MPMC_10						General Purpose IO pin
MPMC_CLKOUT	A10		O	output	bpt4mt	Memory clock output. Connect to the clock input of SDRAM and SyncFlash devices.
MPMC_CKE	B10		I/O	output	bpts10th	SDRAM clock enable. Active HIGH.
GPIO_MPMC_9						General Purpose IO pin
MPMC_NWE	C11		I/O	output	bpts10th	Write enable for SDRAM. Active LOW.
GPIO_MPMC_8						General Purpose IO pin
MPMC_NRAS	A9		I/O	output	bpts10th	Row address strobe for SDRAM and SyncFlash devices. Active LOW.
GPIO_MPMC_7						General Purpose IO pin
MPMC_NCAS	C10		I/O	output	bpts10th	Column address strobe for SDRAM and SyncFlash devices. Active LOW.
GPIO_MPMC_6						General Purpose IO pin
MPMC_DQM_1	A11		I/O	output	bpts10th	Data mask output to SDRAM. Active HIGH. The signal MPMCDQMOUT[1] mask byte [15:8] on the data bus. Used for SDRAM devices.
GPIO_MPMC_5						General Purpose IO pin
MPMC_DQM_0	C12		I/O	output	bpts10th	Data mask output to SDRAM. Active HIGH. The signal MPMCDQMOUT[0] mask byte [7:0] on the data bus. Used for SDRAM devices.
GPIO_MPMC_4						General Purpose IO pin
MPMC_NOE	A17		I/O	output	bpts10th	Output enable for static memories. Active LOW. Used for static memory devices.
GPIO_MPMC_3						General Purpose IO pin
MPMC_BLOUT1	B12		I/O	output	bpts10th	The signal nMPMCBLSOUT[1] selects byte lane [15:8] on the data bus. Used for static memory devices.
GPIO_MPMC_2						General Purpose IO pin

MPMC_BLOUT0	A12		I/O	output	bpts10th	The signal nMPMCBLSOUT[0] selects byte lane [7:0] on the data bus. Used for static memory devices.
GPIO_MPMC_1						General Purpose IO pin
MPMC_RPOUT	B1		I/O	output	bpts10th	Reset power down to SyncFlash memory. Active LOW. Used for static memory devices.
GPIO_MPMC_0						General Purpose IO pin
UART (fixed: 4 pins)						
UART_TXD	L3	0-5 VDC	I/O	output	bpts10tht	Serial output
GPIO_UART_3		tolerant			5v	General Purpose IO pin
UART_RXD	K3	0-5 VDC	I/O	input	bpts10tht	Serial input
GPIO_UART_2		tolerant			5v	General Purpose IO pin
UART_NCTS	K2	0-5 VDC	I/O	input	bpts10tht	Clear to send (active low)
GPIO_UART_1		tolerant			5v	General Purpose IO pin
UART_NRTS	K1	0-5 VDC	I/O	output	bpts10tht	Ready to send
GPIO_UART_0		tolerant			5v	General Purpose IO pin
Mode selection pins (fixed: 2 pins)						
GPIO_3	J16	0-5 VDC tolerant	I/O	input	bpts10th dt5v	Start up mode pin 2 (pull down) General Purpose IO pin
GPIO_2	K18	0-5 VDC tolerant	I/O	input	bpts10th dt5v	Start up mode pin 1 (pull down) General Purpose IO pin
GPIO (fixed: 2 pins)						
GPIO_1	K17	0-5 VDC tolerant	I/O	input output (Test Mode))	bpts10tht 5v	General Purpose IO pin Toggled (Test Mode)
GPIO_0	K16	0-5 VDC tolerant	I/O	input	bpts10tht 5v	General Purpose IO pin (stop)
Reset input pin (fixed: 1 pin)						
RSTIN_N	T14	0-5 VDC tolerant	I	input	ipthut5v	System Reset input (active low)
Flash pins (fixed: 1 pins)						
FLASH_VDD_HV	V15				vddco	
Digital supplies (fixed: 6 pins)						
VDDI1	H1				vddco	Core supply (Mem)
VDDI2	V11				vddco	Core supply (Core)

VDDI3	V16				vddi	Core supply (Flash)
VSSI1	G1				vssco	Core ground (Mem)
VSSI2	V12				vssco	Core ground (Core)
VSSI3	V17				vssis	Core ground (Flash)
Peripheral supplies (fixed: 12 pins)						
VDDE1	E1				vdde3v3	Peripheral (I/O) supply (3.3V)
VDDE2	V5				vdde3v3	Peripheral (I/O) supply (3.3V)
VDDE3	V14				vdde3v3	Peripheral (I/O) supply (3.3V)
VDDE4	J18				vdde3v3	Peripheral (I/O) supply (3.3V)
VSSE1	F1				vsse3v3	Peripheral (I/O) ground
VSSE2	V6				vsse3v3	Peripheral (I/O) ground
VSSE3	V13				vsse3v3	Peripheral (I/O) ground
VSSE4	H18				vsse3v3	Peripheral (I/O) ground
VDDE5	A16				vdde3v3	MPMC Peripheral (I/O) supply (1.8V .. 3.3V)
VDDE6	A7				vdde3v3	MPMC Peripheral (I/O) supply (1.8V .. 3.3V)
VSSE5	A15				vsse3v3	MPMC Peripheral (I/O) ground
VSSE6	A6				vsse3v3	MPMC Peripheral (I/O) ground
DC/DC pins (fixed: 13 pins)						
DCDC_PLAY	L17		A		apio	Play button input
DCDC_STOP	L18		A		apio	Stop signal input
DCDC_LX2	N17		A		apio	DC/DC connection to external coil 2
DCDC_LX1	P17		A		apio	DC/DC connection to external coil 1
DCDC_VUSB	T18		A		apio	USB supply voltage
DCDC_VBAT	M17				vddco	Battery supply voltage
DCDC_VOUT33A	R18				vddco	DC/DC 3.3V output voltage
DCDC_VOUT33B	M16				vddco	DC/DC 3.3V input voltage
DCDC_VOUT18	N18				vddco	DC/DC 1.8V output voltage
DCDC_VSS1	P18				vssco	DC/DC ground to N-switch 1
DCDC_VSS2	N16				vssco	DC/DC ground to N-switch 2
DCDC_GND	L16				vssco	Core ground and substrate
DCDC_CLEAN	M18				vssco	Reference circuit ground, not connected to substrate

3.4.2 Function introduction to HY27UG088G5M

1. Description

Offered in 512Mx8bit, the HY27UG088G5M is 4G bit with spare 128M bit capacity. Its NAND cell provides the most cost-effective solution for the solid state mass storage market. A program operation can be performed in typical 200 μ s on the 2112-byte page and an erase operation can be performed in typical 2ms on a 128K-byte block. Data in the data page can be read out at 30ns cycle time per byte. The I/O pins serve as the ports for address and data input/output as well as command input. The on-chip write controller automates all program and erase functions including pulse repetition, where required, and internal verification and margining of data. Even the write-intensive systems can take advantage of the HY27UG088G5M's extended reliability of 100K program/erase cycles by providing ECC(Error Correcting Code) with real time mapping-out algorithm. The K9K4G08U0M is an optimum solution for large nonvolatile storage applications such as solid state file storage and other portable applications requiring non-volatility. An ultra high density solution having two 4Gb stacked with two chip selects is also available in standard TSOP package.

2. Features

- ◆ Voltage Supply
 - 2.7 V ~3.6 V
- ◆ Organization
 - Memory Cell Array
 - (512M + 16,384K)bit x 8bit
 - Data Register
 - (2K + 64)bit x8bit
 - Cache Register
 - (2K + 64)bit x8bit
- ◆ Automatic Program and Erase
 - Page Program
 - (2K + 64)Byte
 - Block Erase
 - (128K + 4K)Byte
- ◆ Page Read Operation
 - Page Size
 - 2K-Byte
 - Random Read : 25 μ s(Max.)
 - Serial Access : 30ns(Min.)
- ◆ Fast Write Cycle Time
 - Program time : 200 μ s(Typ.)
 - Block Erase Time : 2ms(Typ.)
- ◆ Command/Address/Data Multiplexed I/O Port
- ◆ Hardware Data Protection
 - Program/Erase Lockout During Power Transitions

- ◆ Reliable CMOS Floating-Gate Technology
 - Endurance : 100K Program/Erase Cycles
 - Data Retention : 10 Years
- ◆ Command Register Operation
- ◆ Cache Program Operation for High Performance Program
- ◆ Power-On Auto-Read Operation
- ◆ Intelligent Copy-Back Operation
- ◆ Unique ID for Copyright Protection
- ◆ Package :
 - K9K4G08U0M-YCB0/YIB0
48-Pin TSOP I (12 x 20 / 0.5 mm pitch)
 - K9W8G08U1M-YCB0/YIB0 : Two K9K4G08U0M stacked.
48-Pin TSOP I (12 x 20 / 0.5 mm pitch)
 - K9K4G08U0M-PCB0/PIB0 : Pb-FREE PACKAGE
48-Pin TSOP I (12 x 20 / 0.5 mm pitch)
 - K9W8G08U1M-PCB0/PIB0 : Two K9K4G08U0M stacked.
48-Pin TSOP I (12 x 20 / 0.5 mm pitch)

3. PIN Description

PIN No.	Symbol	I/O	Description
29~32, 41~44	I/O0 ~ I/O7	I/O	DATA INPUTS/OUTPUTS
16	CLE	I	COMMAND LATCH ENABLE
17	ALE	I	ADDRESS LATCH ENABLE
9, 10	/CE1, /CE2	I	CHIP ENABLE
8	/RE	I	READ ENABLE
18	/WE	I	WRITE ENABLE
19	/WP	I	WRITE PROTECT
6, 7	R/B1, R/B2	I	READY/BUSY OUTPUT
38	PRE	I	POWER-ON READ ENABLE
37	Vcc	P	POWER
36	Vss	P	GROUND
1~5, 14, 15, 20~24, 25~28, 33~35, 39, 40, 45~48	N.C	N	NO CONNECTION

3.4.3 Function introduction to TPS79301

1. Description

The TPS793xx family of low-dropout (LDO) low-power linear voltage regulators features high power supply rejection ratio (PSRR), ultralow noise, fast start-up, and excellent line and load transient responses in NanoStar wafer chip scale and SOT23 packages. NanoStar packaging gives an ultrasmall footprint as well as an ultralow profile and package weight, making it ideal for portable applications such as handsets and PDAs. Each device in the family is stable, with a 2.2- μ F ceramic capacitor on the output. The TPS793xx family uses an advanced, proprietary BiCMOS fabrication process to yield extremely low dropout voltages (e.g., 112 mV at 200mA, TPS79330). Each device achieves fast start-up times (approximately 50 μ s with a 0.001- μ F capacitor) while consuming very low quiescent current (170 μ A typical). Moreover, when the device is placed in standby mode, the supply current is reduced to less than 1 μ A. The TPS79328 exhibits approximately 32 μ V_{RMS} of output voltage noise with a 0.1- μ F bypass capacitor. Applications with analog components that are noise sensitive, such as portable RF electronics, benefit from the high PSRR and low-noise features as well as the fast response time.

2. Features

- ◆ 200-mA RF Low-Dropout Regulator With Enable
- ◆ Available in 1.8-V, 2.5-V, 2.8-V, 2.85-V, 3-V, 3.3-V, 4.75-V, and Adj (1.22 V to 5.5 V)
- ◆ High PSRR (70 dB at 10 kHz)
- ◆ Ultralow Noise (32 μ V)
- ◆ Fast Start-Up Time (50 μ s)
- ◆ Stable With a 2.2- μ F Ceramic Capacitor
- ◆ Excellent Load/Line Transient Response
- ◆ Very Low Dropout Voltage (112 mV at Full exLoad, TPS79330)
- ◆ 5-Pin SOT23 (DBV) and NanoStar Wafer Chip Scale (YEQ) Packages

3. PIN Description

PIN No.	Symbol	I/O	Description
1	IN	I	Unregulated input to the device
2	GND	I	Regulator ground
3	EN	I	Enables or shuts down the device
4	BYPASS	O	further reduce regulator noise
5	FB	O	feedback input voltage for the adjustable device
6	OUT	O	Output of the regulator

3.4.4 Function introduction to TCM809

1. Description

The TCM809 and TCM810 are cost-effective system supervisor circuits designed to monitor VDD in

digital systems; providing a reset signal to the host processor, when necessary. No external components are required.

The RESET output is typically driven active within 65 μ sec of VDD falling through the reset voltage threshold. RESET is maintained active for a minimum of 140 m sec after VDD rises above the reset threshold.

The TCM810 has an active-high RESET output, while the TCM809 has an active-low /RESET output. The output of the TCM809/TCM810 is valid down to VDD = 1V. Both devices are available in 3-Pin SC-70 and SOT-23B packages.

The TCM809/TCM810 are optimized to reject fast transient glitches on the VDD line. A low supply current of 9 μ A (typ., VDD = 3.3V) make these devices suitable for battery-powered applications..

2. Features

- ◆ Precision VDD Monitor for 2.5V, 3.0V, 3.3V, 5.0V Nominal System Voltage Supplies
- ◆ 140 msec Minimum RESET Time-Out Period
- ◆ /RESET Output to VDD = 1.0V (**TCM809**)
- ◆ Low Supply Current, 9 μ A (typ.)
- ◆ VDD Transient Immunity
- ◆ Small 3-Pin SC-70 and SOT-23B Packages
- ◆ No External Components
- ◆ Push-Pull RESET Output
- ◆ Temperature Ranges:
 - Industrial: SC-70 (E): -40°C to +85°C
 - Extended: SOT-23, SC-70 (V): -40°C to +125°C

3. PIN Description

PIN No.	Symbol	I/O	Description
1	/RESET	O	RESET Signal Output
2	GND	I	Ground
3	VCC	P	Power

3.4.5 Function introduction to TPS62200

1. Description

The TPS6220x devices are a family of high-efficiency synchronous step-down converters ideally suited for portable systems powered by 1-cell Li-Ion or 3-cell NiMH/NiCd batteries. The devices are also suitable to operate from a standard 3.3-V or 5-V voltage rail.

With an output voltage range of 6.0 V down to 0.7 V and up to 300 mA output current, the devices are ideal to power low voltage DSPs and processors used in PDAs, pocket PCs, and smart phones. Under nominal load current, the devices operate with a fixed switching frequency of typically 1 MHz. At light load currents, the part enters the power save mode operation; the switching frequency is reduced and the

quiescent current is typically only 15 μ A; therefore it achieves the highest efficiency over the entire load current range. The TPS6220x needs only three small external components. Together with the tiny SOT23 package, a minimum system solution size can be achieved. An advanced fast response voltage mode control scheme achieves superior line and load regulation with small ceramic input and output capacitors.

2. Features

- ◆ High Efficiency Synchronous Step-Down Converter With up to 95% Efficiency
- ◆ 2.5 V to 6.0 V Input Voltage Range
- ◆ Adjustable Output Voltage Range From 0.7 V to V_I
- ◆ Fixed Output Voltage Options Available
- ◆ Up to 300 mA Output Current
- ◆ 1 MHz Fixed Frequency PWM Operation
- ◆ Highest Efficiency Over Wide Load Current Range Due to Power Save Mode
- ◆ 15- μ A Typical Quiescent Current
- ◆ Soft Start
- ◆ 100% Duty Cycle Low-Dropout Operation
- ◆ Dynamic Output-Voltage Positioning
- ◆ Available in a Tiny 5-Pin SOT23 Package

3. PIN Description

PIN No.	Symbol	I/O	Description
1	V_I	I	Supply voltage pin
2	GND		Ground
3	EN	I	The enable pin of the device
4	FB	I	The feedback pin of the device
5	SW	I/O	The switch pin

3.4.6 Function introduction to NCP3063

1. Description

The NCP3063 Series is a higher frequency upgrade to the popular MC34063A and MC33063A monolithic DC–DC converters. These devices consist of an internal temperature compensated reference, comparator, a controlled duty cycle oscillator with an active current limit circuit, a driver and a high current output switch. This series was specifically designed to be incorporated in Step-Down, Step-Up and

Voltage-Inverting applications with a minimum number of external components.

2. Features

- ◆ Operation from 3.0 V to 40 V Input
- ◆ Low Standby Current
- ◆ Output Switch Current to 1.5 A
- ◆ Output Voltage Adjustable
- ◆ Frequency Operation of 150 kHz
- ◆ Precision 1.5% Reference
- ◆ New Features: Internal Thermal Shutdown with Hysteresis Cycle-by-Cycle Current Limiting
- ◆ Pb-Free Packages are Available

3. PIN Description

Pin No.	Pin Name	Description
1	Switch Collector	Internal Darlington switch collector
2	Switch Emitter	Internal Darlington switch emitter
3	Timing Capacitor	Timing Capacitor to control the switching frequency
4	GND	Ground pin for all internal circuits
5	Comparator Inverting Input	Inverting input pin of intern
6	VCC	Voltage supply
7	Ipk Sense	Peak Current Sense Input to monitor the voltage drop across an external resistor to limit the peak current through the circuit
8	N.C.	Pin not connected

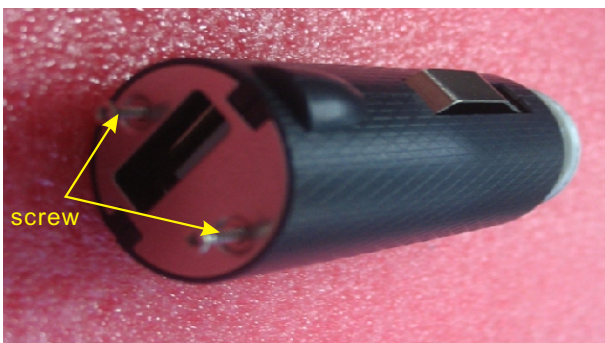
Chapter Four

Assembly and Disassembly Process

In order to know the structure of X25 more easily and directly, now we use pictures to present each key point of assembly and disassembly process before all users to prevent users from operating blindly to damage elements. So, we hope you can operate according to instructions strictly!

Note: all operations must be with strict anti-static measures. Operators must wear anti-static gloves or wrist ring; electric screwdriver must be grounded effectively and articles, such as nippers must be removed static before using!

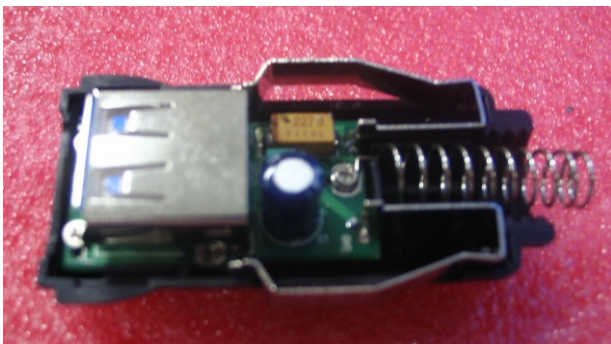
4.1 Disassembly flow of player



1. Take out power connector of vehicle from metal case, use electric screwdriver or "+" shaped screwdriver to remove two panel fixing screws shown in the figure;



2. Revolve plastic nut and anode nut out from casing, and remove stainless steel durance ring;



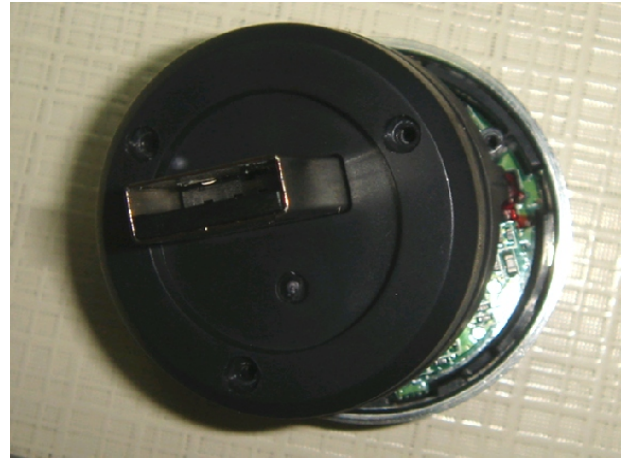
3. Use force from centre of casing to disassemble casing;



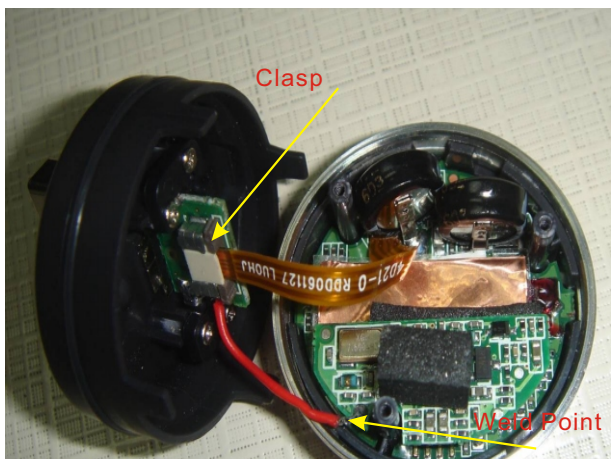
4. Use iron to take out two metal spring sheet, use electric screwdriver to take out spring;



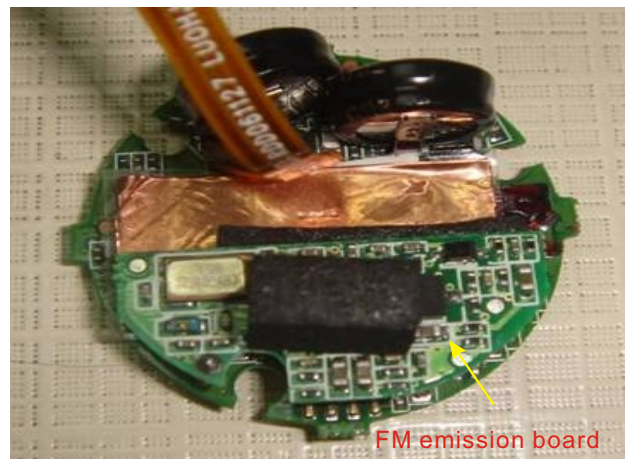
5. Use electric screwdriver or "+" shaped screwdriver to take out three screws of rear casing;



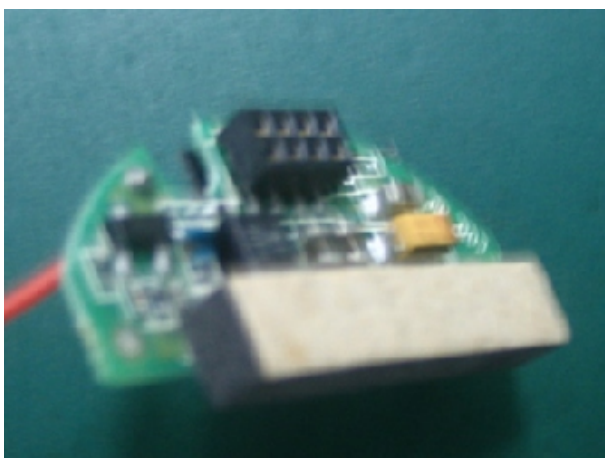
6. Use force by nail from centre to separate bottom casing and front casing;



7. Use nipper to unplug USB board clasp, use iron to weld and open weld point on FM board to remove bottom casing and USB board;



8. Use nipper by force from edge of FM emission board to unplug FM emission board from main board;

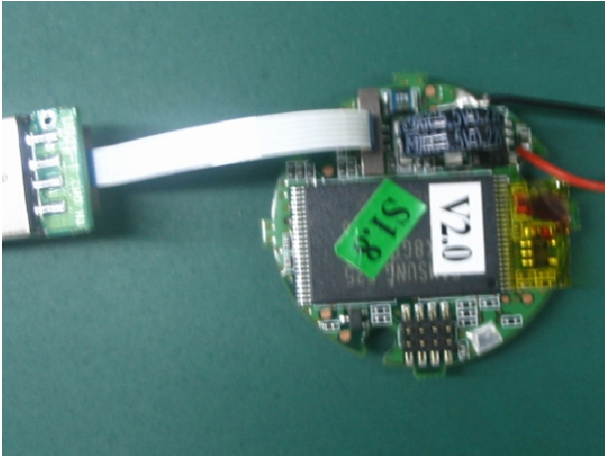


9. FM emission board unplugged from main board;

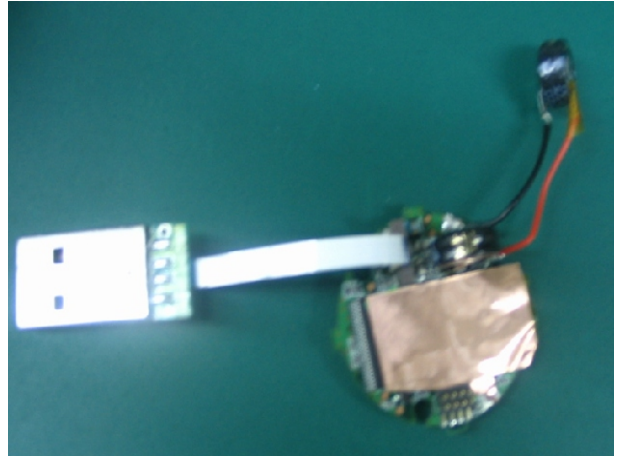


10. Use electric screwdriver or "+" shaped screwdriver to take out four screws and USB board shown in the figure;

4.2 Assembly process of the player



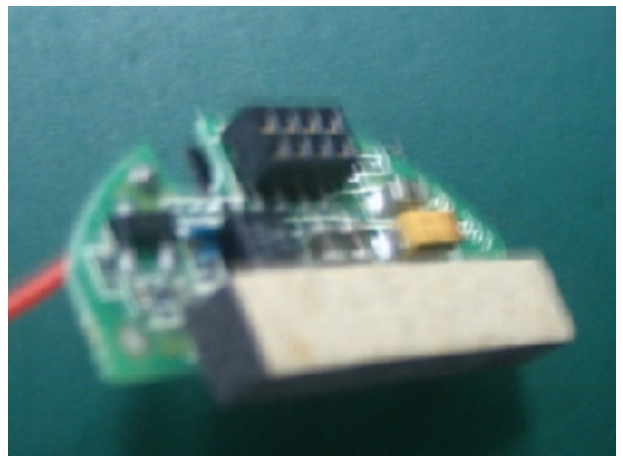
1. Insert two sides of USB flat cable separately onto main board and USB board, clasp the clasp well;



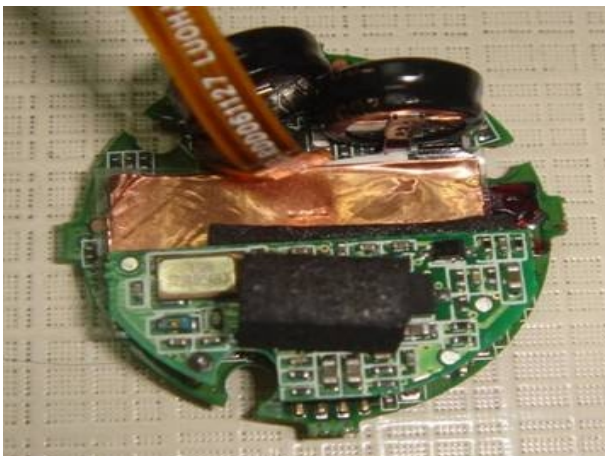
2. Stick the copper foil label with glue in rear side stuck onto main board FLASH, copper foil label should not be stuck onto PCB board and FLASH weld leg to prevent from short circuit;



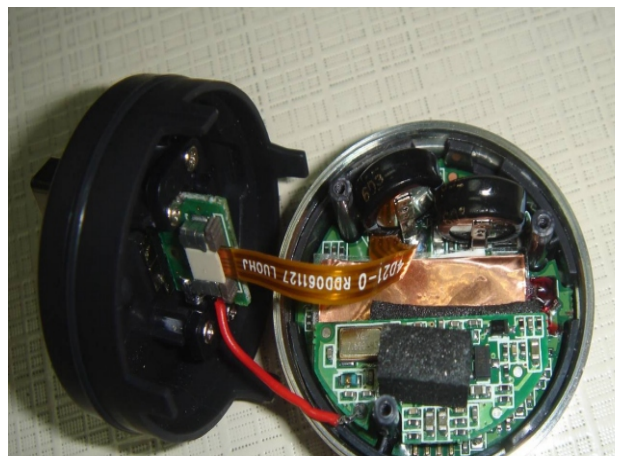
3. Use four screws to fix USB board onto bottom casing;



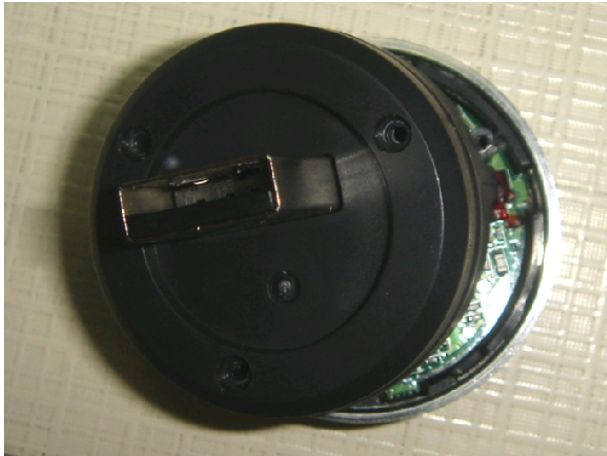
4. Stick one 18×4×3 dual-faced hard sponge soft spacer onto one side of FM emission board socket shown in the figure;



5. Remove protection film of sponge soft spacer of emission board and install it into main board, each pin should be ordered and compressed;



6. Array three holes of main board and orientation pole of front casing tidily and install it into front casing to designated position;



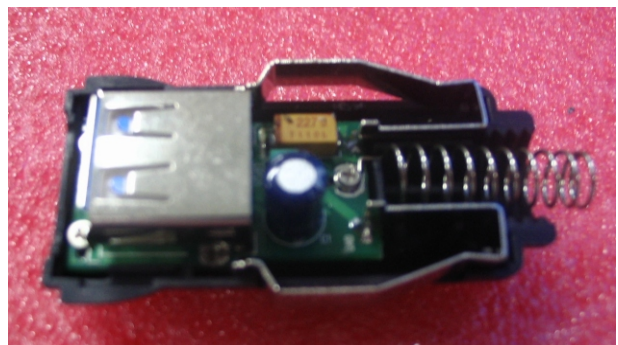
7. Put rear casing to front casing and compress it to designed position;



8. Use three screws which is shown in figure to fix rear casing;



9. Install processed power board into corresponding bottom casing, and use two screws in position shown in corresponding picture to fix power board;



10. Install anode spring into corresponding position, use one screw to fix spring, PCB and bottom casing. Install two elastic sheets separately onto two sides of bottom casing, add stannum to weld elastic sheet onto power board;



11. Install stainless steel durable ring into front position of component and install anode head into plastic nut and revolve it into corresponding position;



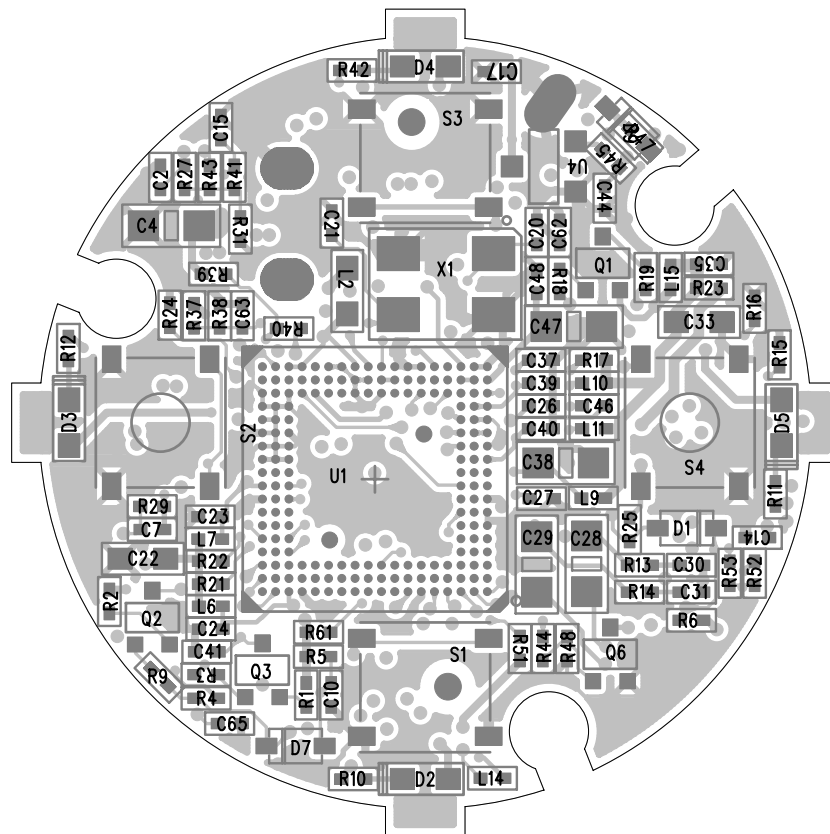
12. Use two screws to fix surface casing component, and install power connector of vehicle into metal casing, player assembling is finished;

Chapter Cinque

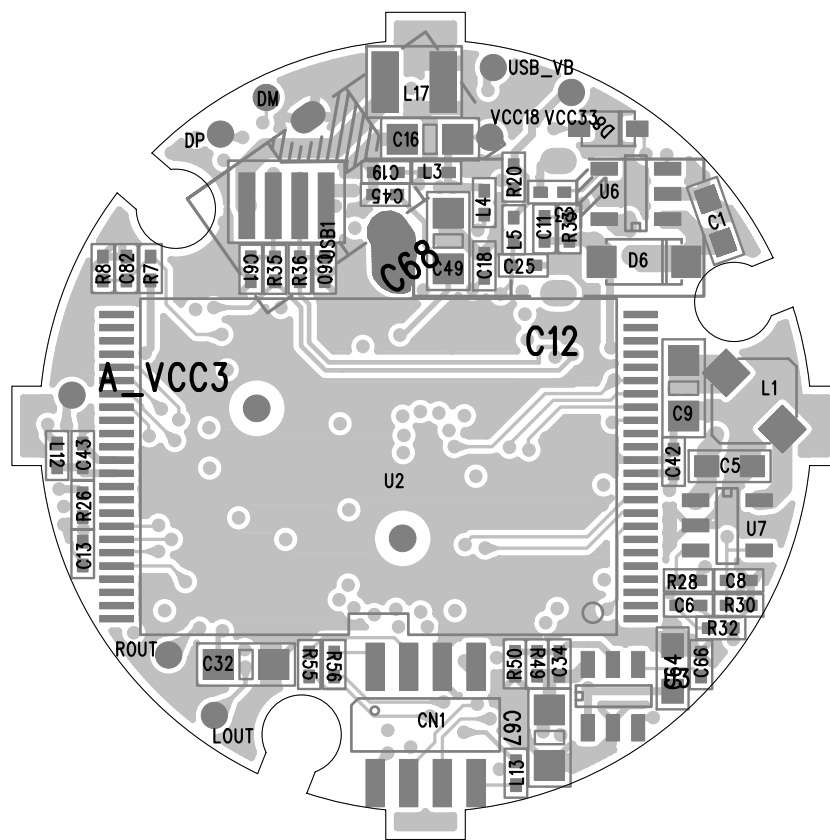
PCB board & Circuit diagram

Section One PCB board

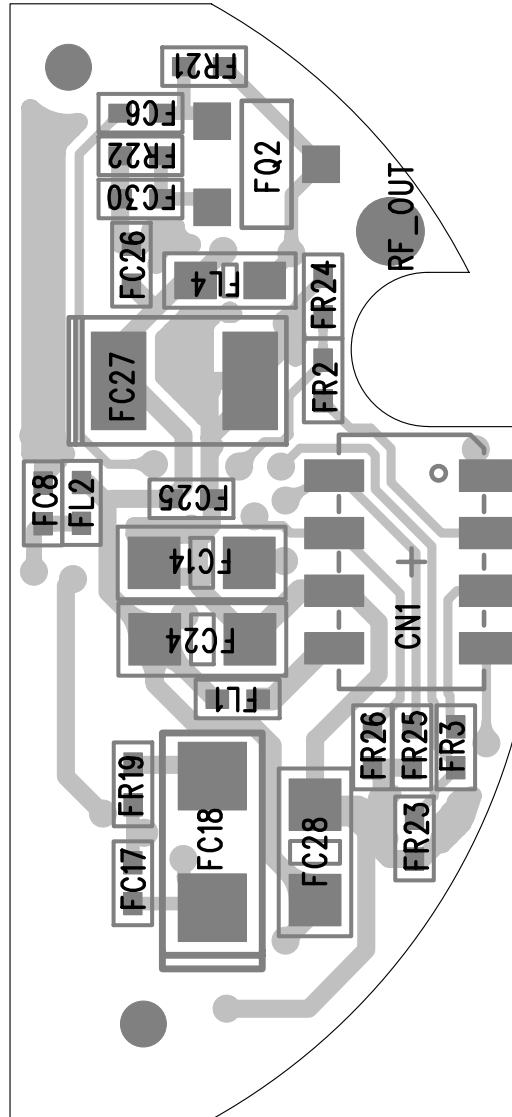
5.1.1 Surface layer of main Board



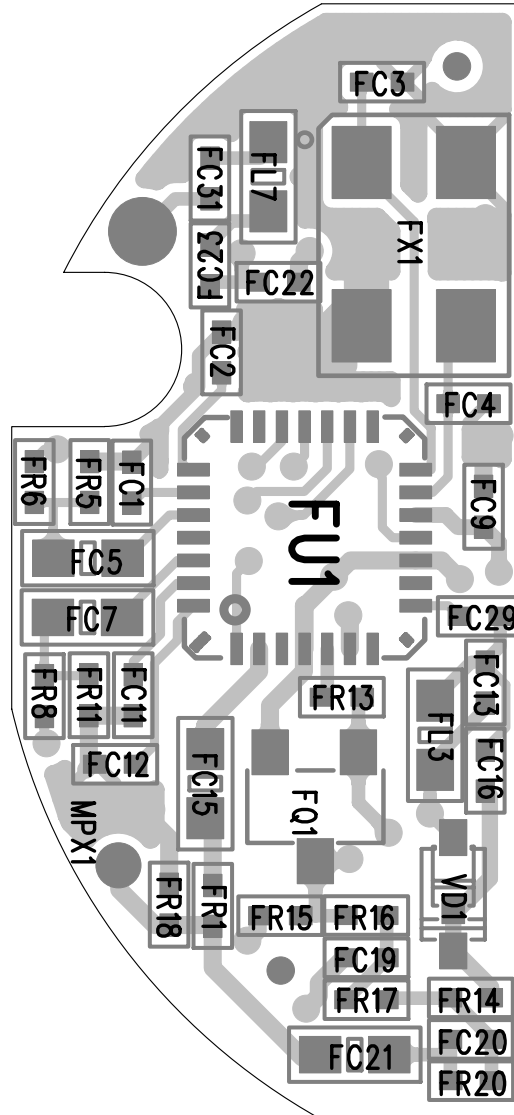
5.1.2 Bottom layer of main Board



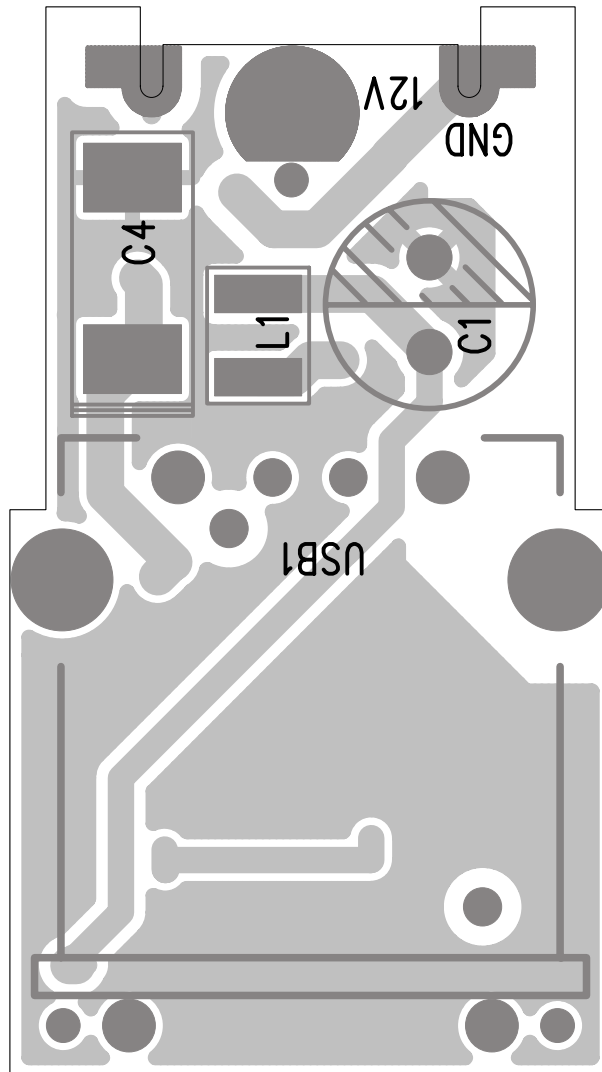
5.1.3 Bottom layer of FM emission Board



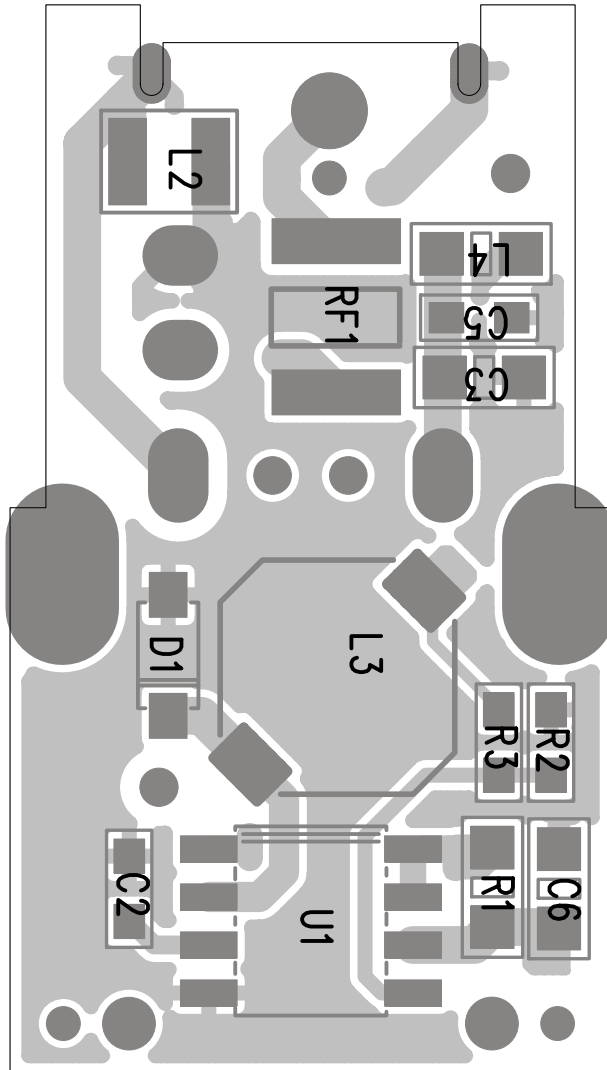
5.1.4 Bottom layer of FM emission Board



5.1.5 Bottom layer of USB Board

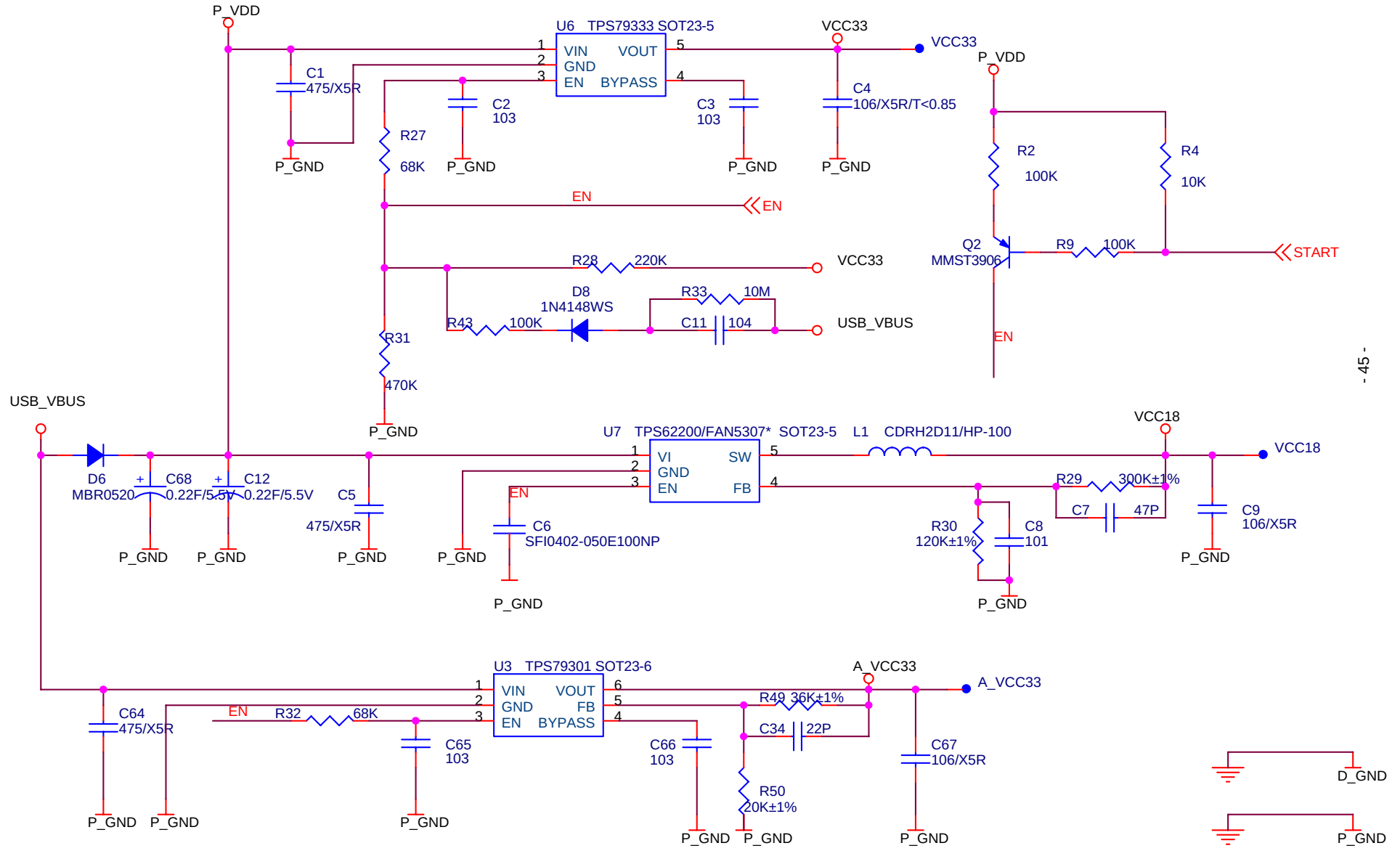


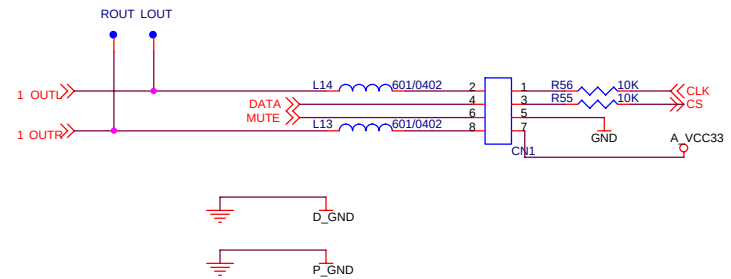
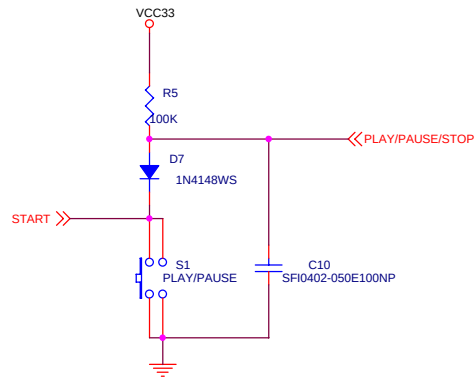
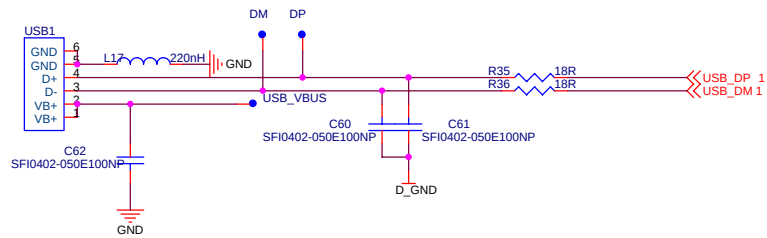
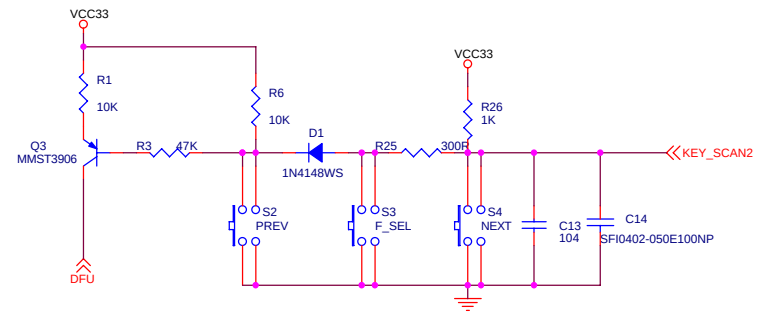
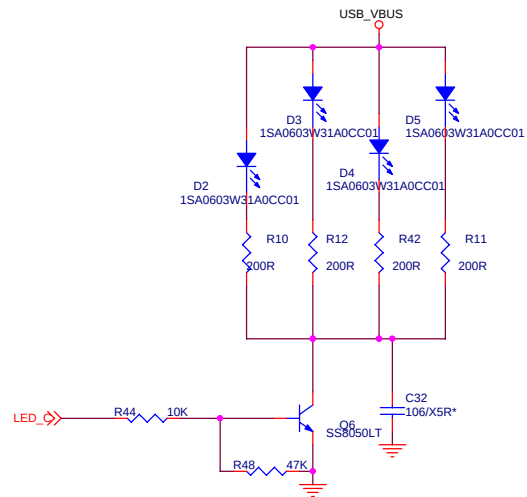
5.1.6 Bottom layer of USB Board



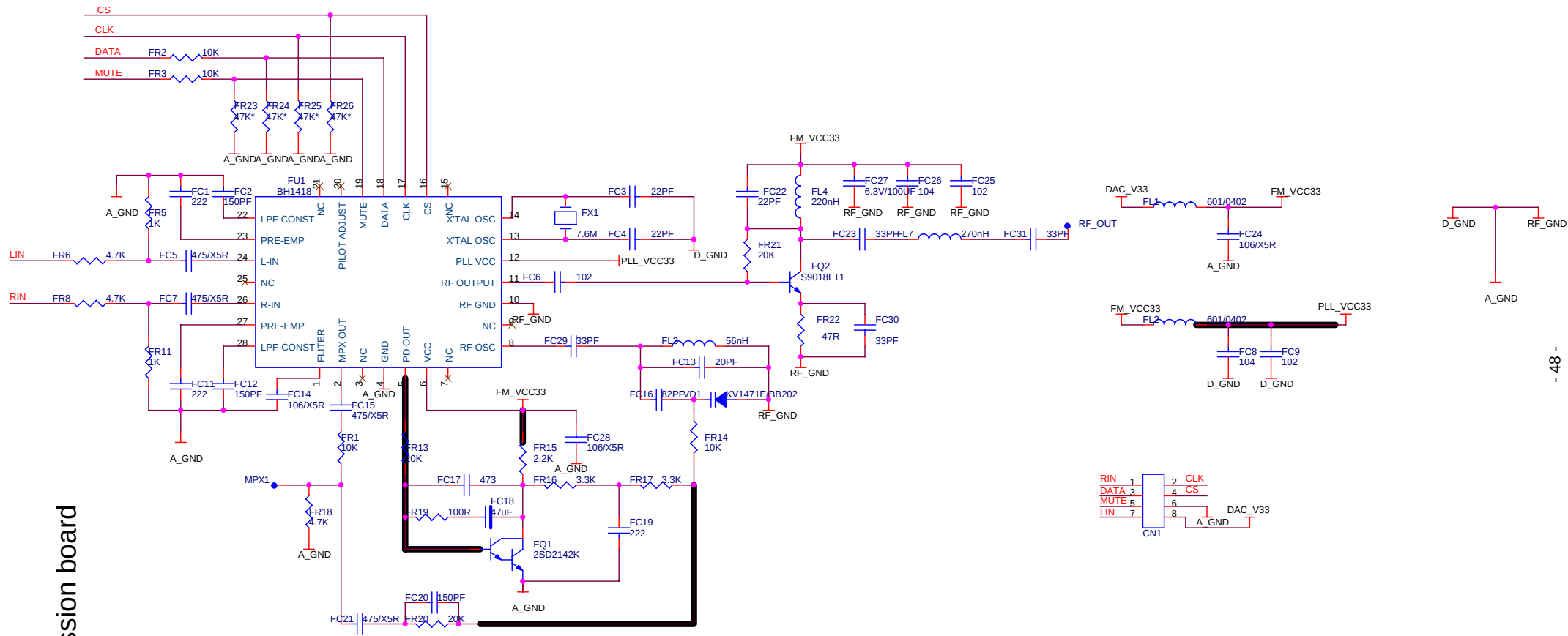
Section Two Circuit diagram

5.2.1 Main board

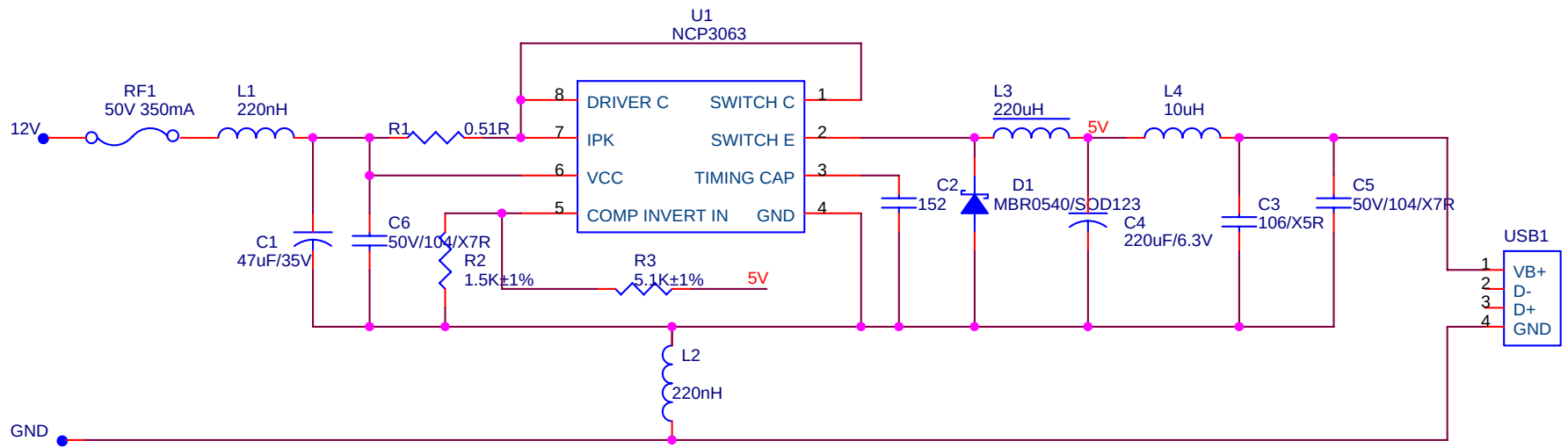




5.2.2. FM emission board



5.2.3 USB board



Chapter Six BOM List

X25L auto(RU)M GREY			
MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
MAINBOARD 4940132			
0090333	SMD RESISTOR	1/1647Ω±5% 0402	FR22
0090339	SMD RESISTOR	1/16W 100Ω±5% 0402	FR19
0090362	SMD RESISTOR	1/16W 1K±5% 0402	FR11,FR5
0090369	SMD RESISTOR	1/16W 2.2K±5% 0402	FR15
0090373	SMD RESISTOR	1/16W 3.3K±5% 0402	FR16,FR17
0090377	SMD RESISTOR	1/16W 4.7K±5% 0402	FR18,FR8,FR6
0090385	SMD RESISTOR	1/16W 10K±5% 0402	FR14,FR1,FR2,FR3
0090391	SMD RESISTOR	1/16W 20K±5% 0402	FR13,FR20,FR21
0310415	SMD CAPACITOR	50V 20P±5% NPO 0402	FC13
0310416	SMD CAPACITOR	50V 22P±5% NPO 0402	FC3,FC4,FC22
0310420	SMD CAPACITOR	50V 33P±5% NPO 0402	FC29 , FC30,FC31,FC23
0310426	SMD CAPACITOR	50V 82P±5% NPO 0402	FC16
0310433	SMD CAPACITOR	50V 151±5% NPO 0402	FC12,FC2,FC20
0310704	SMD CAPACITOR	25V 102±10% 7R 0402	FC6,FC9,FC25
0310394	SMD CAPACITOR	50V 222±10% 7R 0402	FC1,FC11,FC19
0310712	SMD CAPACITOR	10V 473±10% 5R 0402	FC17
0310480	SMD CAPACITOR	10V 104±10% 5R 0402	FC26,FC8
0310674	SMD CAPACITOR	6.3V 475±10% 5R 0603	FC5,FC7,FC15,FC21
0310486	SMD CAPACITOR	6.3V 106±20% 5R 0805	FC14,FC24,FC28
0310838	SMD TANTALUM CAPACITOR	6.3V 68UF±20% 3528 T≤2.1	FC27
0310845	SMD TANTALUM CAPACITOR	6.3V 47uF±12% 3216	FC18
0390388	SMD MAGNETIC BEADS	600Ω/100MHZ±25% 1005	FL1,FL2
0390501	SMD COIL THREAD INDUCTOR	56NH±5% 1608	FL3
0390502	SMD COIL THREAD INDUCTOR	220NH±5% 1608	FL4
0390516	SMD COIL THREAD INDUCTOR	270NH±10% 1608	FL7
0700179	SMD RANSFIGURATION DIODE	KV1471E	VD1
0780318	SMD TRIODE	22142K SO23	FQ1
0780346	SMD TRIODE	MMB9018 SO23	FQ2
1860088	FLAT FEMALE	4p 1.27mm DUAL RANK,SMD,MOLD HIGH 2.1mm	CN1
0960330	SMD CRYSTAL OSCILLATOR	7.6MHz±30PPM 5032/4 20P	FX1
0883252	IC	BH1418KN VQFN	FU1

1633681	PCB	F 21-2	
X25L auto(RU)M GREY			
MAINBOARD 4940129			
MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0090326	SMD RESISTOR	1/16W 10Ω±5% 0402	L10,L11,R13,R14,R17
0090644	SMD RESISTOR	1/16W 18Ω±5% 0402	L9,R35,R36
0090345	SMD RESISTOR	1/16W 200Ω±5% 0402	R10,R11,R12,R42
0090349	SMD RESISTOR	1/16W 300Ω±5% 0402	R25
0260750	FARAD CAPACITOR	GC 5.5V0.22F10×5 5	C12,C68
1633704	FPC	4 21-0	
0090362	SMD RESISTOR	1/16W 1K±5% 0402	R45,R26
0090385	SMD RESISTOR	1/16W 10K±5% 0402	R1,R4,R6,R18,R21,R22,R41,R55,R56, R44
0090324	SMD RESISTOR	1/16W 0Ω±5% 0402	R52
0090396	SMD RESISTOR	1/16W 33K±5% 0402	R40,R43
0090400	SMD RESISTOR	1/16W 47K±5% 0402	R48,R3
0090404	SMD RESISTOR	1/16W 68K±5% 0402	R27,R32
0090408	SMD RESISTOR	1/16W 100K±5% 0402	R2,R5,R9,R20,R24,R61
0090417	SMD RESISTOR	1/16W 220K±5% 0402	R28
0090425	SMD RESISTOR	1/16W 470K±5% 0402	R39,R31
0090433	SMD RESISTOR	1/16W 1MΩ±5% 0402	R16,R15
0090444	SMD RESISTOR	1/16W 10MΩ±5% 0402	R33
0090639	PRECISION SMD RESISTOR	1/16W 1.5K±1% 0402	R19
0090672	PRECISION SMD RESISTOR	1/16W 20K±1% 0402	R50
0090826	PRECISION SMD RESISTOR	1/1636K±1% 0402	R49
0090509	PRECISION SMD RESISTOR	1/16W 100K±1% 0402	R7,R37
0090681	PRECISION SMD RESISTOR	1/16W 120K±1% 0402	R30
0090645	PRECISION SMD RESISTOR	1/16W 180K±1% 0402	R8,R38
0090682	PRECISION SMD RESISTOR	1/16W 300K±1% 0402	R29
0310416	SMD CAPACITOR	50V 22P±5% NPO 0402	C21,C20,C34
0310424	SMD CAPACITOR	50V 47P±5% NPO 0402	C7
0310432	SMD CAPACITOR	50V 101±5% NPO 0402	C8
0310704	SMD CAPACITOR	25V 102±10% 7R 0402	C46
0310705	SMD CAPACITOR	25V 332±10% 7R 0402	C26,C27

0310453	SMD CAPACITOR	25V 103±10% 7R 0402	C2,C3,C66
0310480	SMD CAPACITOR	10V 104±10% 5R 0402	C13,C18,C19,C23,C24,C25,C30,C31,C35,C37,C39,C40,C42,C43,C45,C48,C63,C82,C11
0310674	SMD CAPACITOR	6.3V 475±10% 5R 0603	C1,C5,C22,C33,C64
0310662	SMD CAPACITOR	6.3V 105±10% 5R 0402	C17
0310486	SMD CAPACITOR	6.3V 106±20% 5R 0805	C9,C16,C28,C29,C38,C47,C49,C67
0310831	SMD CAPACITOR	6.3V106±10%5R 0805 T≤0.85	C4
1030029	SMD PRESS SENSITIVITY RESISTOR	SF10402-050E100NP	C6,C10,C14,C41,C44,C60,C61,C62
0390142	SMD MAGNETIC BEADS	FC1608-60102	L2
0390388	SMD MAGNETIC BEADS	600Ω/100MHZ±25% 1005	L3,L4,L5,L6,L7,L12,L13,L14,R23
0390511	SMD COIL THREAD INDUCTOR	220NH±5% 2520	L17
0390397	SMD CORES INDUCTOR	10uH±20% CDRH2D11/HP	L1
0700154	SMD TRIODE	14148WS SO323	D1,D7,D8,D9
0700098	SMD RADIATION DIODE	PEAK LIGHTING 0603 WHITE	D2,D3,D4,D5
0680077	SMD SCHOTTKY DIODE	MBR0520 SOD123	D6
0780293	SMD TRIODE	MMS3906 SO323	Q1,Q2,Q3
0780299	SMD TRIODE	SS8050LT SO323	Q6
1970099	SMD DUAL FLAT NEEDLE	4 4.5 1.27mm SMD MOLD HIGH 1mm	CN1
1340174	LIGHT TOUCH SWITCH	SS-1186-2(180 GRAM PUISSANCE)	S1,S2,S3,S4
0960284	SMD CRYSTAL OSCILLATOR	12MHz±30ppm 5032/4 20P	X1
0882403	IC	PNX0101ET/302 TFBGA	U1
0882875	IC	98G08U0PCB0 TSOP	U2 ①
0883145	IC	98G08U0PCB0 TSOP	U2 ①
0883141	IC	TC809ZVNB713 SO23B	U4
0882668	IC	79333DBVR SO23-5	U6
0882476	IC	TP62200 SO23-5	U7
0882475	IC	79301 SO23-6	U3
1633683	PCB	2 21-2	

X25L auto(RU)M GREY

MAINBOARD 4940130

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0090828	PRECISION SMD RESISTOR	1/100.51Ω±1% 0805	R1
0090634	PRECISION SMD RESISTOR	1/16W 1.5K±1% 0603	R2

0090825	PRECISION SMD RESISTOR	1/165.1K±1% 0603	R3
0310067	SMD CAPACITOR	50V 152±10% 7R 0603	C2
0310543	SMD CAPACITOR	50V 104±10% 7R 0603	C5,C6
0310486	SMD CAPACITOR	6.3V 106±20% 5R 0805	C3
0310702	SMD TANTALUMCAPACITOR	6.3V 220uF±20% 6032	C4
1050018	SMD HEAT SENSITIVITY RESISTOR	PTC FSMD035-1812	RF1
0390044	SMD INDUCTOR	10UH±10% 2012	L4
0390511	SMD COIL THREAD INDUCTOR	220NH±5% 2520	L2,L1
0390532	SMD CORES INDUCTOR	120uH ±20% 7E06NG	L3
0680097	SMD SCHOTTKY DIODE	MBR0540 SOD-123	D1
0883278	IC	NCP3063B SOIC	U1
1633580	PCB	5 21-0	

X25L auto(RU)M GREY

MAINBOARD 4940131

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
1940392	CABLE SOCKET	6P 0.5mm SMD SUBMIT MEET WITH CLASP	USB2
1633589	PCB	U 21-1	