BBK

X19(RU)

service manual

Catalog

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-scaleintegrated 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 de 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 (≥100MHE)
- ◆ 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 FUNCTIONS AND FEATURES

Philips PNX0102audio decode chip

Adopt famous Plilips PNX0102 audio decode chip, special for Hi-Fi MP3 player, forcefully making up audio signal loss when compressing MP3 to revert audio signal better.

Support 3D surround stereo sound effect, 9 EQ modes

You may taste heartquaking bass and vivid surround stereo sound effect.

Play MP3/WMA/WAV files

Support 32kbps～320kbps MP3 file and 8kbps～192kbps WMA file.

Mobile storage function

Capable of downloading files from Windows resource manager.

FM tuning/FM recording function

Auto scanning and auto/manual saving function may listen to FM radio station program more easily. You may record FM program into Mp3 file directly.

Voice recording function

May be used to record in class, meeting and interview.

USB 2.0 transmission (high speed)

USB2.0 high speed data transmission.

Support firmware upgrading function

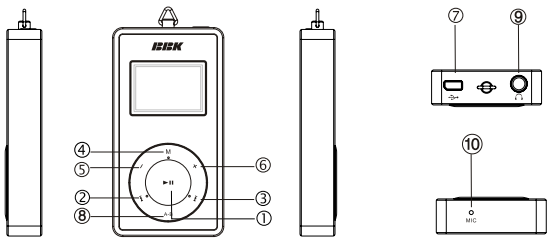
Support upgrading function. You may add new function to the built-in program of this player Conveniently.

Support multi-level directory

Support 11-level 256 folders and 3000 flies at most.

2.2 USAGE INTRODUCTION

2.2.1 BUTTONS AND JACKS ILLUSTRATION



① 

Press for long in power-off mode → power on
press for long in power-on mode → power off
Press in playback interface → switch in pause/play
Press when recording → pause recording
Press when tuning → mute

	# Press when operating menu	enter the selected item or confirm setup
	# Press in stopwatch timing	Pause
②、③	# Press in playback interface	previous/next track
	# Press for long in playback interface	fast backward/forward
	# Press in tuning PRESET mode	select channel
	# Press for long in tuning PRESET mode	full auto scanning
	# Press in tuning SCAN mode	manual scanning
	# Press for long in tuning SCAN mode	automanual scanning
	# When operating menu	move cursor or set item
	# Press or for long in “My EQ”	select the frequency point you want to set
	# Press or for long when browsing E-books	turn pages
	# Press when browsing pictures	switch pictures
④ M	# Press for long in any mode	Enter main menu
	(except recording)	switch in PRESET and SCAN mode
	# Press when tuning	not save the setup and return to the previous
	# Press when operating menu	menu
⑤ ⑥	# Press or for long in playback interface or when tuning	adjust volume adjust dB value
	# Press in “My EQ” setup	
	# Press or for long when setting screen saver or timing power off	adjust screen saver/timing power off time set time
	# Press when setting clock	adjust subwoofer
	# Press when setting 3D	
⑦	USB jack, power adapter, LINE IN jack	
⑧ A-B	# Press in playback mode	A-B reread
	# Press for long in any time	record/generate recording file
	# Press long when listening radio set	enter FM recording/generate recoding file
	# Press in file browsing interface	cancel file
	# Press when in antomanual/manual scanning	save radio station
	# Press when browsing E-books	adjust page number
⑨	Headphone jack	
⑩	MIC: microphone	

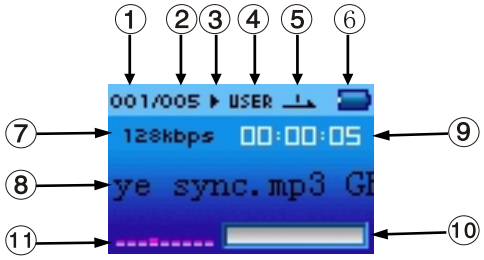
2.2.2 MAIN MENU ILLUSTRATION

My Music
save music file/FM recording file/LINEIN recording file
My Movie
save movie file

My Photo
Save picture file
My Ebook
Save text file
FM Radio
Select “FM Radio” to enter its mode
My Voice
Save microphone recording file, such as meeting, classroom and interview

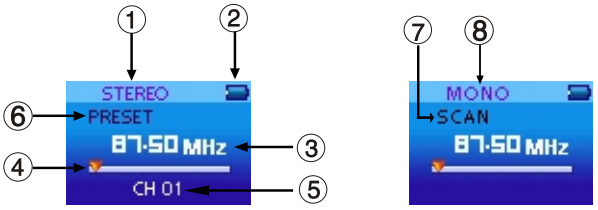
Calendar
Select “Calendar” to enter its mode
Stopwatch
Select “Stopwatch” to enter timing mode
SYS Setup
Select “SYS Setup” to set system items

2.2.3 PLAYING INTERFACE ILLUSTRATION



① Current track sequence number
② Total track number
③ Playback status
④ Sound effect mode
⑤ Playback mode
⑥ Battery capacity
⑦ Bit rate
⑧ Song name/singer/lyrics display
⑨ Current playback time
⑩ Playback progress bar
⑪ Music spectrum display

2.2.4 TUNING INTERFACE ILLUSTRATION



① Dual channel
② Battery capacity
③ Frequency of currently-listening radio station
④ Scanning progress bar
⑤ PRESET channel display
⑥ PRESET mode (normal listening)
⑦ SCAN mode (scanning)
⑧ Mono channel

2.2.5 RECORDING INTERFACE ILLUSTRATION

① Battery capacity
② Time that has been recorded
③ Record file name
④ Recording/pause
⑤ The left recordable time

As for the name of recorded file "V001.WAV": 001 is serial number of the current recorded track and arranged according to sequence; WAV is file format after recording.

2.3 BASIC OPERATION

2.3.1 INSTALL USB DRIVE PROGRAM

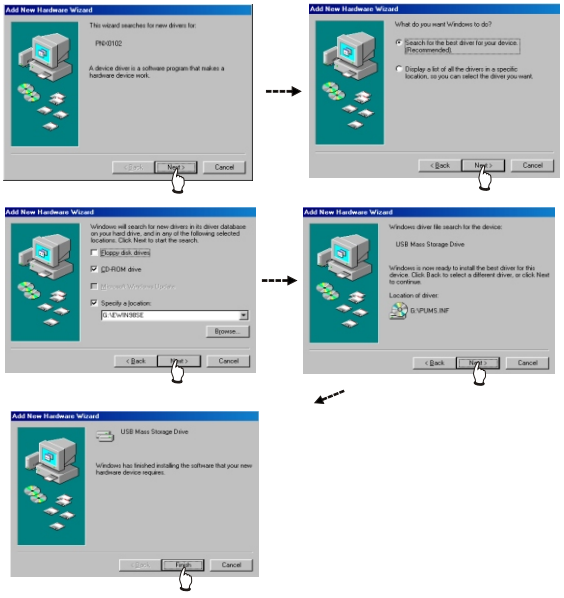
If your computer is Windows 98, you must install drive program if you want to use the mobile storage function of MP3 player in computer.

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

2. Connect Mp3 player to computer, and the computer will automatically indicate that new firmware device has been found, and run the installation guide, shown as the following figure. You only need to find the drive information file on disc according to prompt information to finish the installation of drive program.

3. After installation finishes, restart the computer and you may use the mobile storage function normally.

Shown as the following figure:



2.3.2 USE MOBILE STORAGE FUNCTION

This player can be used as mobile storage in Windows ME/2000/XP operating system. In Windows 98SE and Mac operating system, random drive program must be installed firstly and then used as mobile storage.

Connect MP3 PLAYER and computer with USB transmission line. After the bottom right corner of desktop appears " " symbol, the mobile storage function of Mp3 PLAYER

NOTE:

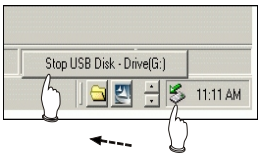
To avoid abnormality of the player appears, you are suggested to power off firstly before connecting MP3 PLAYER with computer, and then use USB

transmission line to connect MP3 PLAYER, then connect computer.

In Windows 98 system, there is no " "symbol.

2.3.3 DISCONNECT USB SAFELY

After operation finishes, click " " symbol on bottom right corner of Windows desktop with right button of mouse, and disconnect USB safely according to the computer prompt.



2.3.4 OMV VIDEO CONVERSION TOOL

1. General description

Before using, please install DirectX 9.0 and upgrade Windows Media Player to 9.0 or version above this. Usage platform: Windows2000, Windows XP

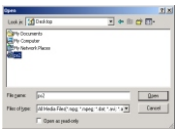
2. Explanation of help

Basic operation:

The interface after program running:

1.Click "File" menu and select " OpenFile".

2. Select a file to open in "Open" dialogue box.



3.Now set to save file path and file name, with steps the same as above..

1. After the setup of saving file path is successful, click icon to begin conversing.

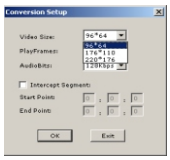
After conversion finishes, the hint of “Conversion Succeed”will appear.

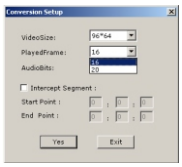
Conversion setup:

Before conversion, you may perform the setup of parameter conversion. Click icon to pop up dialogue box and perform parameter setup of VideSize, PlaydFrame, AudioBits, Intercept Segment.

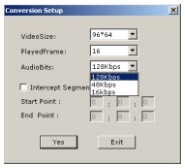
1.VideoSize:may be set according to the screen size of MP3.As the following figure, screen size is 96(length)*64(width)and unit is pixel spot.

2.PlaydFrame:the played frame rate of each second during file conversion maybe set.



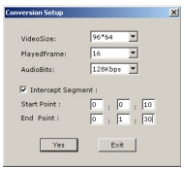


3.AudioBits:bit rate of music during file conversion may be set.



4.Intercept Segmen:a segment may be intercepted in video to conduct conversion. As in the following figure, input starting time

Point and finish time point, for instance, intercept the segment between 10 seconds and 1minutes plus 30 seconds; if you do not Select, it means the whole segment is intercepted(note:for some ASF, WMA file, the starting point of intercepted segment is from 0).



Note:

1.If DirectX 9.0 still can not run after installation finishes, Open 'Display Properties' in the Control Panel of PC, Click the 'Settings' tab, Click on the 'Advanced' button at the bottom of the page, Click on the 'Troubleshooting' tab in the window that appears, Verify that the 'Hardware Acceleration' slider is at the rightmost position.

2.If the playback of video file after conversion appears halt, you may turn off other application programs to run conversion program again.

2.3.5 MAKE PICTURE

Install MakePic, download MakePic from SOKEN website or copy the installation program file of MakePic from the attached present disc. Click “Setup exe” twice and then finish the installation according to prompt.

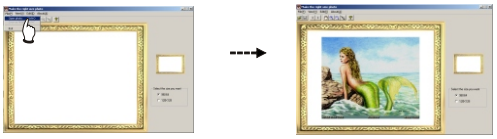
How to make picture:

1. MakePic running

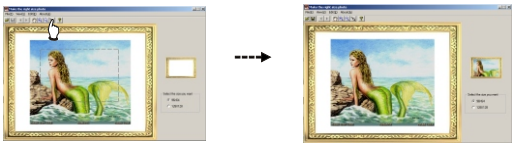
Click “Start” → Program → MakePic runs the tool of making picture.

2. After opening the program of making picture, click “File” → “Open photo”,

shown as the following figure:



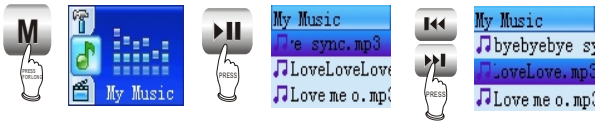
3. Click “Zooming zone” button to select your desired picture zone. Click “Save” icon to generate BMP format picture.



2.3.6 BROWSE/CANCEL FILE

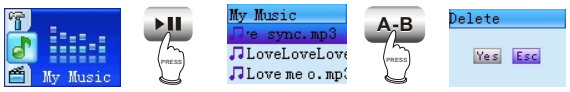
BROWSE FILE

In any case, press button for long to enter “Main Menu”. Musical file and recording file are separately saved in the two items of main menu “My Music” and “My Voice”. Press / button to select upward or downward to browse files.



#CANCEL FILE

When browsing files, press A-B button and the cancel dialogue box will pop up. Press ⏮/⏭ button to select “Yes” and press ⏯ button to cancel the file. Select “Esc” or M button to exit.



Note: File data cannot be cancelled when playing musical and recording files.

2.3.7 PLAY MUSIC

#PLAY MUSIC

Press ⏮/⏭ button to select song in “My Music”. Press ⏯ button to begin playing music, and meanwhile the playback interface displays.

#PAUSE MUSIC

When playing, press ⏯ button to switch to pause state. Press ⏯ button again to continue playing.

#NEXT and PREV

When playing, pressing ⏭ button may skip to the next track to play; and pressing ⏮ button may skip to the previous track to play.

#FF and FB

When playing, Pressing ⏭ button for long without losing may realize fast forward.

#FF and FB

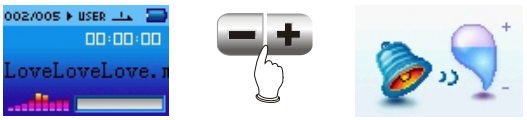
When playing, Pressing ⏮ button for long without losing may realize fast backward.

NOTE:

When in FB/FF operation, if you press ⏮/⏭ button for long without losing, the state is still FB/FB after entering the next track.

#ADJUST VOLUME

When playing or tuning, pressing -/+ button or for long may both adjust volume. The display of adjusting volume in music playback interface is shown as follows:



NOTE:

#In some operating system (such as complex font Windows), the operation of copying lyrics/song file and changing song's name may probably lead to incorrect display.

When playing WMA songs of VBR , pressing buttons may probably has slow response or has no lyrics display. When playing some non standard songs or songs with special format, noise may probably occur.

2.3.8 A-B REPEAT FUNCTION

When playing, if you want to listen to a certain segment repeatedly, please use A-B repeat function. Press M button for the first time to select the beginning point that you desire to repeat play and screen displays “A”;press it for the second time to select the ending point that you desire to repeat play and screen displays "A-B”, and system begins to repeat play between A-B segment. Press this button for the third time to cancel repeat and continue to play.

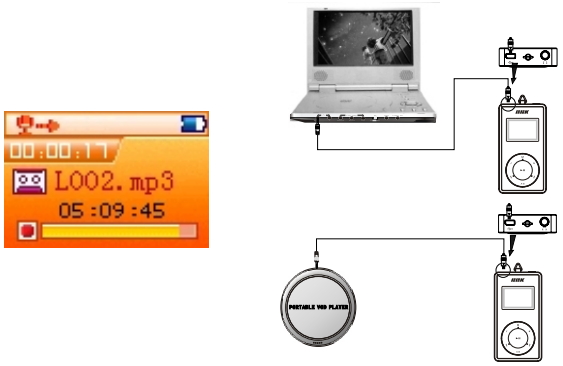
2.3.9 RECORDING

In any cases, press M button for long to enter recording mode; pressing ⏯ button may pause recording and pressing M button for long may generate recording file and then exit.

NOTE:

#To avoid sudden power-off when recording, you cannot record when in low battery and when disc is fully written. If you are recording, it indicates "FULL DISC" and exits recording.

When recording with microphone, if you press buttons and the sound of pressing may probably be recorded.
Select recording format “MIC”/“LINEIN” when recording.
LINEIN RE RECORDING
Firstly select LINEIN in “SYS Setup”--- “REC Set” --- “REC Source”, and then connect LINEIN input jack of MP3 PLAYER to the headphone output jack of DVD or CD player with LINEIN cord, and then enter recording according to above operation steps. The output audio signal of DVD or CD player can be re recorded into MP3 file (The output signal of any device with headphone output can be re recorded into MP3 file through this player.).



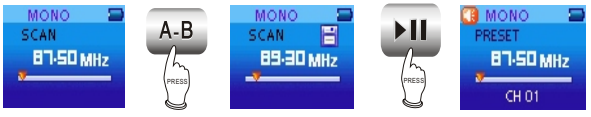
NOTE:
When in LINEIN recording, if external sound source input extent is too large, the playback of files after being re recorded will have distortion and noise. Please adjust
the external sound source to proper volume.

2.3.10 TUNING
ENTER TUNING MODE
Select "FM Radio" in main menu and press ⏯ button to listen to radio.
QUIT TUNING MODE
When listening to radio, press M button for long to return to main menu.
PRESET/SCAN MODE SWITCH
When listening to radio, press M button to switch between PRESET and SCAN mode.

1. PRESET MODE
#ADJUST CHANNEL
Press ⏭ button to enter the next channel, and press ⏮ button to enter the previous channel.
#FULL AUTO SCANNING
In PRESET mode, press ⏭ or ⏮ button for long to begin full auto scanning. All scanned radio stations will be saved automatically.

2. SCAN mode
#MANUAL/AUTOMANUAL SCANNING
Press ⏭ button to increase 0.1MHz each time; and press ⏮ button to decrease 0.1 MHz each time.
Press A-B button to save radio station and switch to PRESET mode.
Press ⏭ button for long to increase frequency continuously and stop until radio station has been searched. Press A-B button to save radio station.
Press ⏮ button for long to decrease frequency continuously and stop until radio station has been searched. Press A-B button to save radio station.

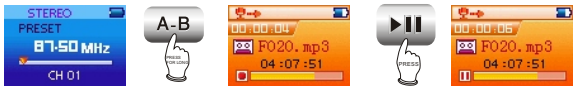
#SAVE RADIO STATION
In manual scanning mode, pressing A-B button may save the current radio station; in automanual scanning mode, pressing A-B button after radio station is searched may also save the ratio station. Press ⏯ button to mute.



NOTE:
In the course of full auto/automanual scanning, press M or ⏮/⏭ button will stop searching.

#FM RECORDING

When listening to radio set, press A-B button for long to enter FM recording; press ▶II button to pause recording; press A-B button for long to generate recording file and then exit to tuning mode. The file generated by FM recording is MP3 format.



NOTE:

When using FM, please pull up LINEIN cord to avoid the sound mixing of LINEIN and FM.

2.3.11 UPGRADE

UPGRADE

Download the latest firmware updating file from BBK website firstly, such as "BBK_X19RU.ebn" and "X19RU_Resource.bin", copy the two files into root directory of Mp3 PLAYER at the same time, and then power on again. Find "Upgrade" item in "SETTINGS", and pressing ▶II button may start updating. After updating finishes, MP3 PLAYER will power on again.

NOTE:

Make sure MP3 PLAYER has enough quantity of electric charge before updating.

To ensure successful firmware updating, do not power off during the course of updating.

Updating will last for about one minute, please try your best not to operate other buttons during this course.

After updating finishes, the player will power on automatically and meanwhile cancel the used updating file at the same time.

After firmware updating finishes, some function or interface may probably be different from user manual, so please take real object as standard.

After updating finishes, blank screen may probably appear for about 30 seconds, which means MP3 is updating resources.

2.4 ADDITIONAL INFORMATION

The longest playback time

In the state of proper volume , "NORMAL" sound effect and screen saver, play MP3 music file with 128kbps, and 44.1kHz, the longest playback time of this player is about 8 hours. In other cases, playback times will be different.

Accessories

.Headphone
.Hanging necklace
.USB drive disc
.User manual
.USB transmission line
.Warranty card
.LINE-IN cord
.Protection case

The lowest computer configuration requirements

.Above Windows98SE/2000/XP/ME,Mac8.5
.Pentium 200MHz centre processor or above
.CD-ROM drive
.40MB spare hard disc space
.32MB EMS memory
.USB jack

2.5 SPECIFICATION

Model	X19 Color
Audio decode chip	Philips PNX0102
Lithium battery	3.7V 320mAh
Continuous playback time	The longest continuous playback time is 8 hours.
Dimensions/weight	62mm X 33mm X 10.5mm about 33g
Audio SNR	⩾ 90dB
Headphone output	9mW+9mW 32 ohm (18mW+18mW headphone impedance 16 ohm)
Frequency range	18Hz~20kHz
FM tuning range	87.5MHz~108MHz
Working temperature	0 C°~ 40 C°
Files supported	MPEG 1/2 Layer 3 (32kbps~320kbps), WMA (8kbps~192kbps), WAV

Chapter Three Servicing and Principle

Section One Principle of the Player

3.1.1 Function introduction

1. Mp3 main decode chip, which adopts professional MP3 decode chip PNX0102 of Philips company, with integrated ARM and DSP core inside. Sound quality is good and power consumption is low.

2. USB jack circuit: USB jack, data exchange.

3. Flash circuit: data storage of the player.

4. OLED circuit: 1' colorful screen, display of working state of the player.

5. MIC circuit: external audio input, record function finishes.

3.1.2 Block diagram of the player

Block diagram of the player is shown in the figure 3.1.2.1:

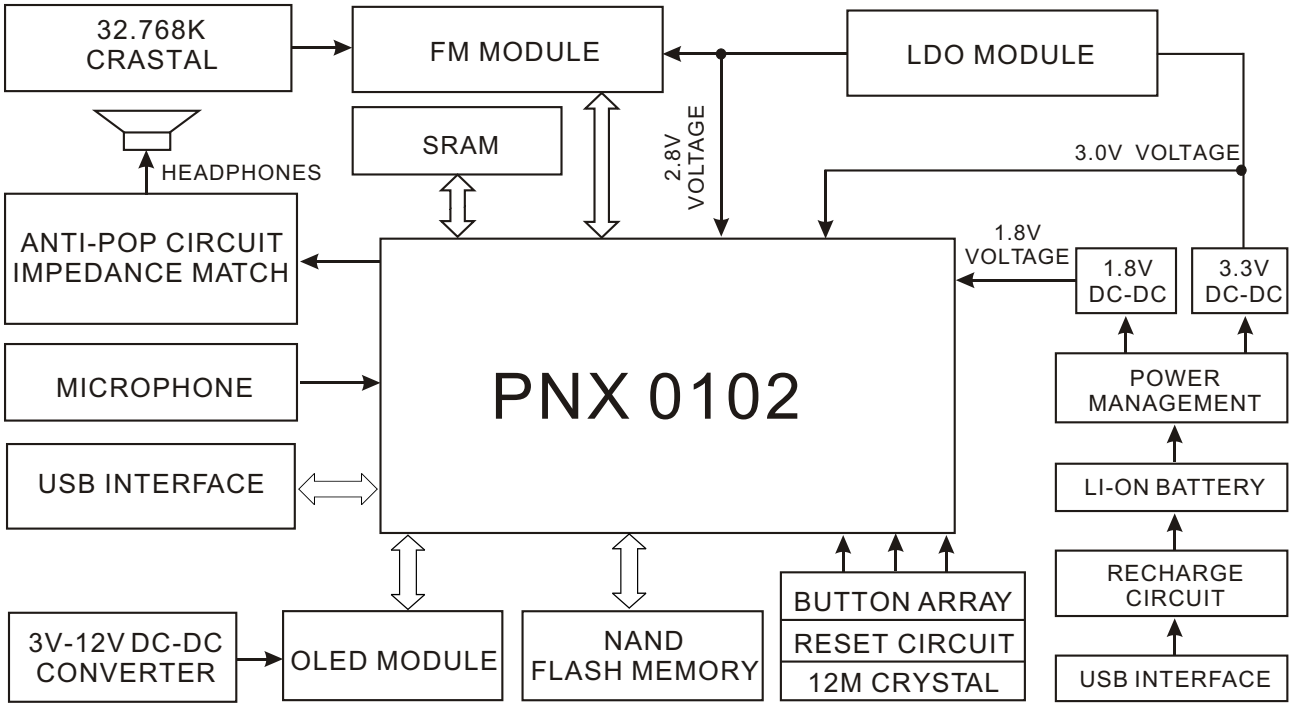


Figure 3.1.2.1 block diagram

3.1.3 Introduction to IC of the player

Introduction to IC of the player is shown as in the following table:

IC model	Location	Function
ISL6294IRZ DFN	U1	Charge management
PNX0102AET	U2	MP3 decode
TPS79301	U3	Precision voltage stabilizer
TPS62200	U4	Precision voltage stabilizer
PQ1X281M2ZP	U5	Precision voltage stabilizer
PIC10F200T-I	U6	Voltage detect
M41T62	U7	RTC chip
G690L263T71	U8	Reset IC
HY27UG088G5M	U9	Flash
LM2703	U10	12V boost
CS26LV16163HI	U11	SDRAM
TEA5767HN	U12	TuningIC
RCLAMP0504F	U13	ESD protection

Section Two Unit Circuit Principle

3.2.1 FLASH circuit

1. FLASH circuit schematic diagram is shown in the figure 3.2.1.1:

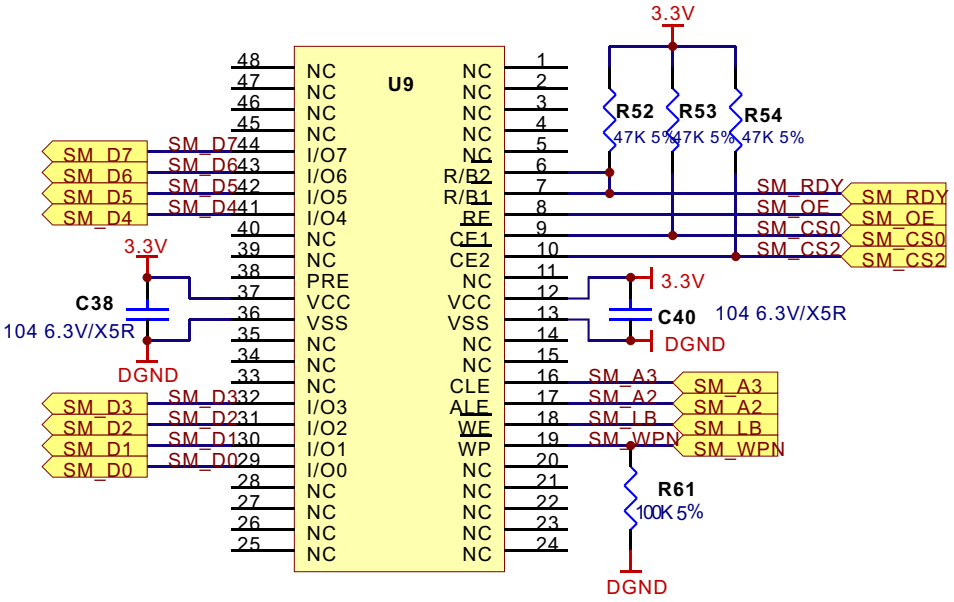


Figure 3.2.1.1 Flash circuit schematic diagram

2. Working principle: Flash Memory is the storage unit of the player, all MP3 and waveform files should be stored in FLASH. Flash module is composed of FLASH chip TC58512FT and peripheral circuit to finish internal files's working of read, write and delete. 3.3V voltage circuit provides 3.3V voltage for Flash working. R53 and R54 is pull up resistor of /CE1 and CE2, R52 is pull up resistor of R/B1, R61 is the pull down resistor of /WP,Vcc is power supply pin of FLASH, /CE is chip selection signal, high level is effective, VCC33 provides 3.3V voltage and FLASH begins to work. /RE, /WE are read effective and write effective signal end respectively to control read and write function of FLASH. I/O1 - I/O8 are 8 data lines to complete the exchange of FLASH and external data to realize functions of write, delete and edit of MP3.

When MP3 is powered on, 3.3V voltage supplies power for Flash through Vcc, /CE inputs 3.3V high level signal and Flash begins to work effectively. When MP3 is playing musical and recording files, /RE is high level, Flash performs read operation. When writing files in through data line o recording through microphone, /WE is high level, Flash performs write in operation. Working of read out and write in are performed through I/O1～I/O8 8 data/address lines. When playing video, data in Flash is processed by PNX0102 and then the continuous video output is realized through SDRAM U11 cache.

3.2.2 FM tuning circuit

1. FM tuning circuit diagram is shown in the figure 3.2.2.1;

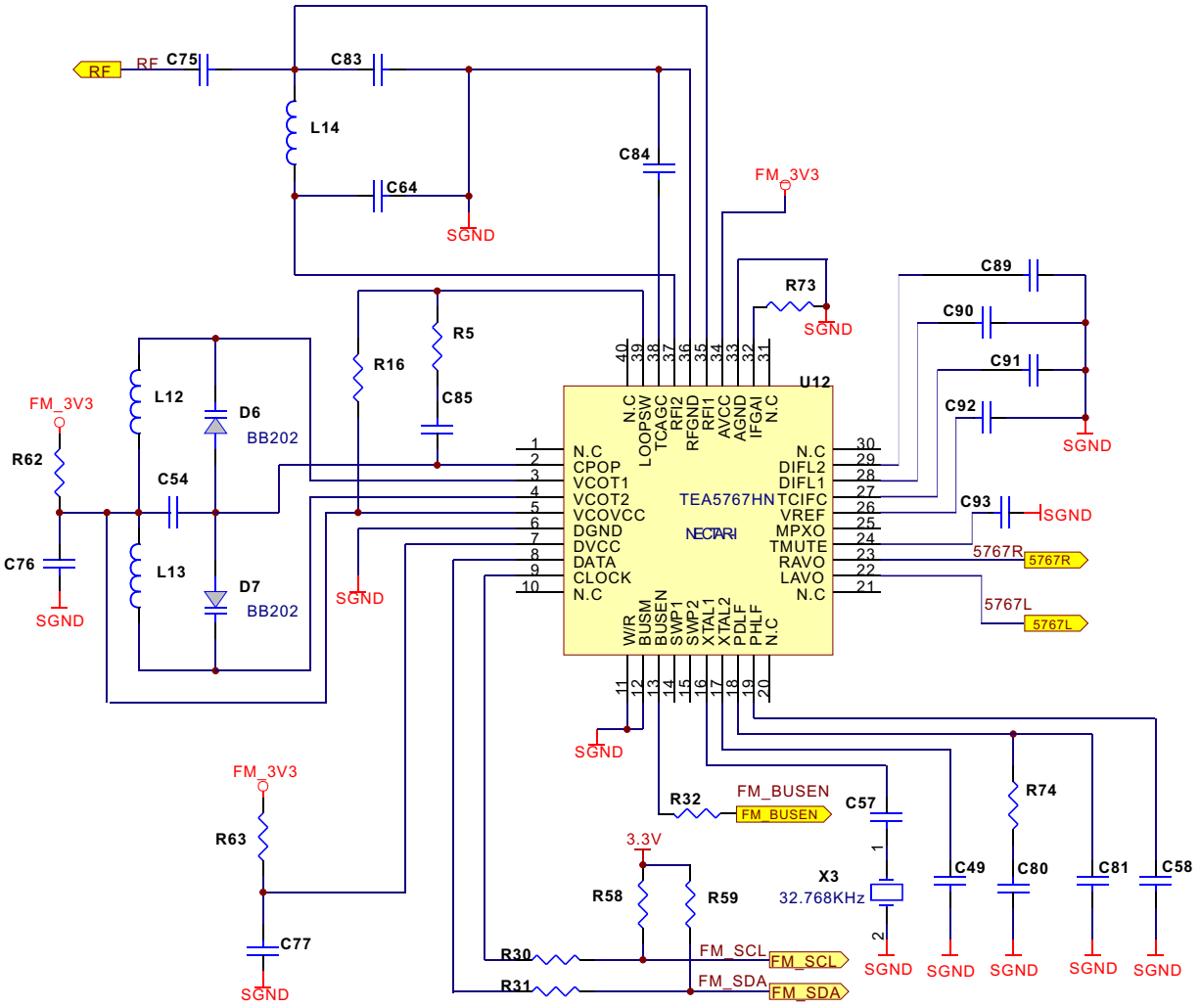


Figure 3.2.2.1 FM tuning circuit diagram

2. Working principle: tuning circuit is composed of micro digital tuning IC TEA5767HN of Philips company and peripheral circuit. Power supply voltage is supplied by PQ1X28 to provide pure voltage with value 2.8V for IC. C75, C83, C64, C84, L14 are antenna input match circuit of FM module; variable diode D6, D7 and winding inductor L12, L13 are selection tuning circuit in FM module. Control means of FM adopts IIC bus control means, 8, 9 of TEA5767 are data line and control line.

When MP3 player switches to FM tuning state, pin 13 BUSEN of TEA5767HN receives high level signal, bus control mode is gated, IC begins to work. As antenna, headphone receives FM signals from nature, through antenna input matching circuit, input TEA5767HN, PNX0101 via RFI1 and RFI2 to control TEA5767HN to perform intermediate frequency and selected frequency control through IIC_SCL and IIC_SDA to transform FM signals to sound simulating signals and then is outputted by FM_OUTR and FM_OUTL to ADC circuit of PNX0102 and then output through headphone after DAC processing.

3.2.3 OLED module circuit

1. OLED module circuit is shown in the figure 3.2.3.1:

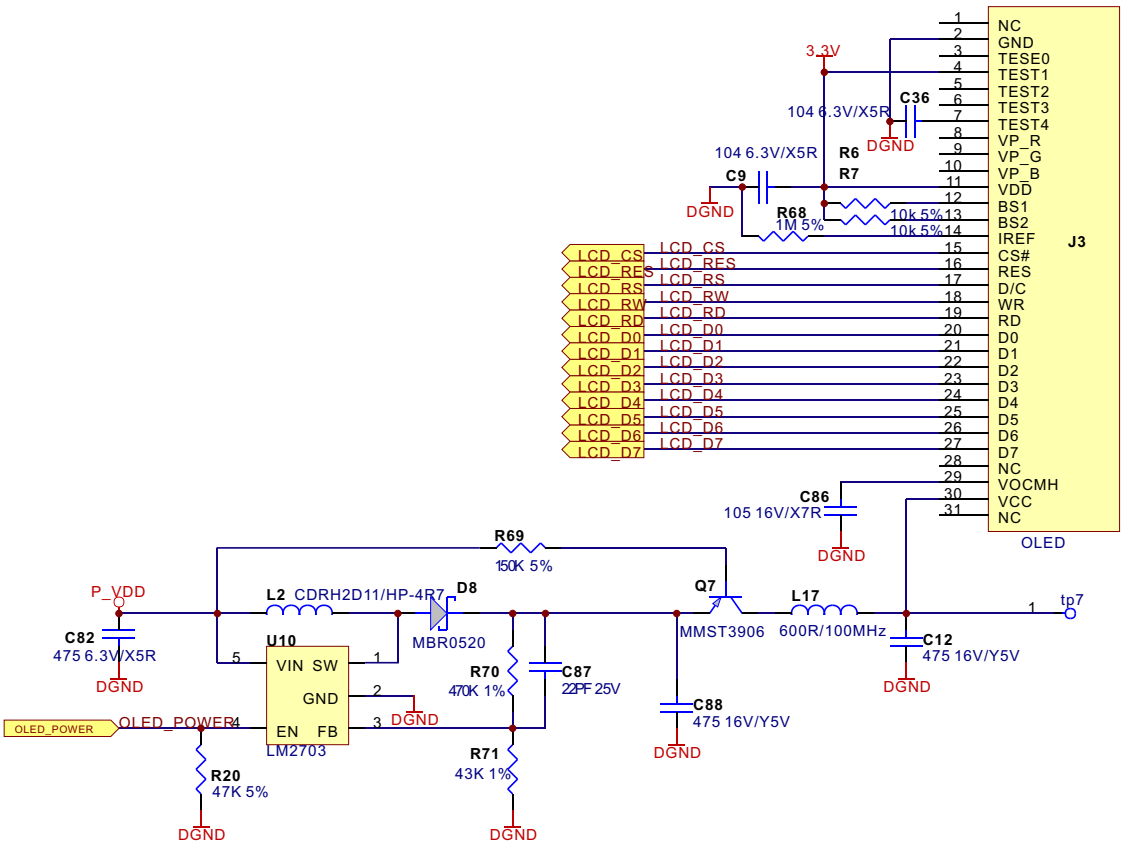


Figure 3.2.3.1 OLED circuit schematic diagram

2. Working principle: 12V high voltage is required to lighten OLED and matching circuit must be matched to finish. The circuit includes two parts: boosted circuit and OLED jack circuit, in which boosted circuit is constituted by boosted DC-DC LM2703 and peripheral circuit, VIN is power input, EN is Lm2703 enable end, high level is effective, SW is high voltage output pin, FB is feedback pin, voltageValue VOLED outputted by high voltage is achieved through selecting two voltage partial resistor on two ends of FB, and the following relation is met:

$$\frac{R_1}{R_2} = \frac{VOLED}{1.237} - 1$$

From the above, VOLED is about 12.2V and L2 in the circuit is IES of boost circuit.

3.3V voltage inputs to LM2703 through Vin, EN receives high level to make LM2703 effective, 3.3V voltage is outputted by SW pin through LM2703 boost and inputs to C electrode of triode Q7, Q7 is connected, 12V voltage outputs to power supply pin 30 of OLED to provide OLED with lightening voltage, diode D8 is used to prevent reverse current damaging IC. During the process of working, FB feedback to LM2703 through detecting capacitor C87 to control the output voltage through adjusting resistor R70 and R71.

OLED jack circuit is connected with OLED of PNX0101 directly, through data exchange of LED_DB0~LED_DB7 and PNX0102, character display is controlled by internal program of PNX0102.

Pin 16 of OLED is reset signal and controlled by one MPMC jack of PNX0102. When power on, high level outputs and OLED resets.

3.2.4 Buttons circuit

1. Buttons circuit is shown in the figure 3.2.4.1:

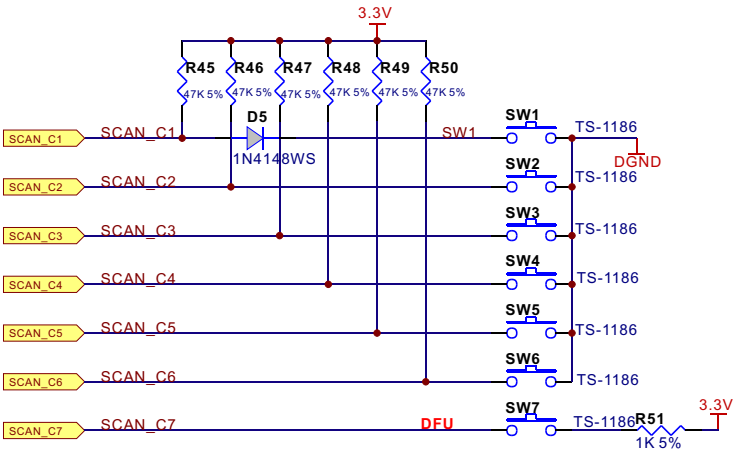


Figure 3.2.4.1 Buttons circuit schematic diagram

2. Working principle: buttons of X19 (RU) are composed of 7 single buttons (one is DFU button). Button detecting is to use voltage detecting mode to decide which button functions through utilizing PNX0102 to scan the voltage variation of SCAN_C1~SCAN_C7. When the relevant button is pressed, voltage of the corresponding preset point of this button will pull down to ground through the corresponding resistor in R45~R50. Low voltage is inputted to the corresponding detect circuit input jack of PNX0102 and the internal program makes the corresponding response to realize button function.

3.2.5 Headphone jack circuit

1. Headphone jack circuit is shown in the figure 3.2.5.1:

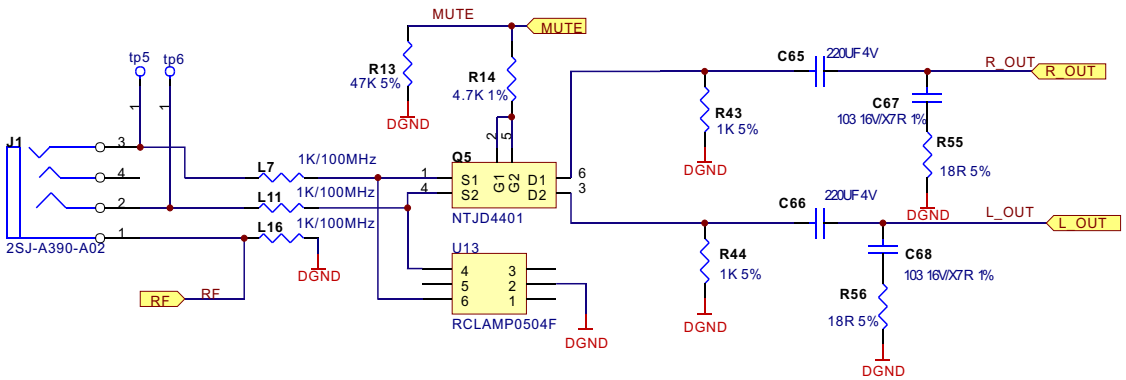


Figure 3.2.5.1 Headphone jack circuit schematic diagram

2. Working principle: left and right channels audio signals outputted from PNX0102 , through 220uF C65 C66 capacitor coupling output, are sent to headphone jack circuit. Headphone jack circuit is composed of the dual MOS tube NT JD4401 and headphone socket J1 that control sound output. Pin 2 and 5 of NTJD4401 are connected to mute circuit. When MUTE button is pressed, control dual MOS tube is disconnected to cut the output of left and right channels of headphone. RCLAMP0504F in circuit is TVS diode array, used to protect ESD to prevent external static from damaging internal circuit through headphone jack. Ground wire of headphone is also used as antenna input of FM tuning.

3.2.6 Charge control circuit

1. Charge control circuit fulfills the charge function to lithium-ion battery and circuit diagram is shown in the figure 3.2.6.1:

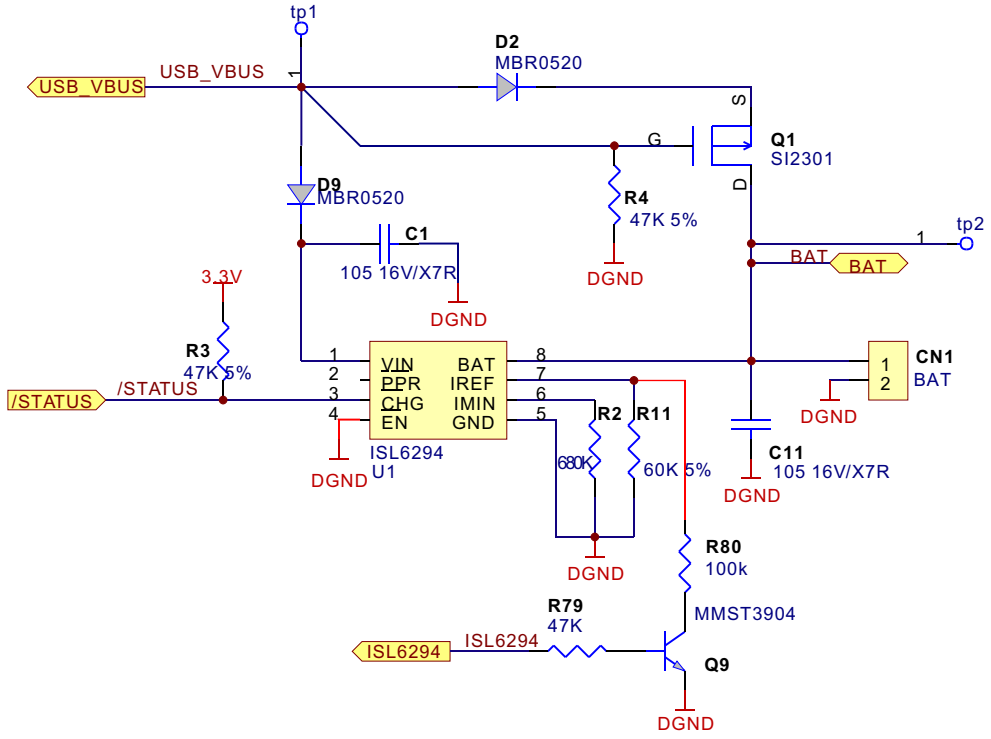


Figure 3.2.6.1 Charge control circuit diagram

2. Working principle: charge circuit is composed of charge control IC ISL6294 and peripheral circuit. Pin VIN is ISL6294 power input pin, that is input end of USB 5V power; BAT is output pin of ISL6294, that is input end of lithium-ion battery; /CHG is charge state indication end; when /CHG is low level, it means machine is in charge, or else it means the charge finishes; IMIN is min charge current setup end, that is, when charge current is lower than the current set by this end, charge is terminated. Setup of min charge current is realized through selecting external resistor R2. The relation between min charge current I_{MIN} and R2 is shown as follows:

$$I_{MIN} = \frac{11000}{R2} \text{ (mA)}$$

From the above, we know that min charge current is 20 mA.

IREF is charge current setup end and ISL6294 uses this reference current to charge lithium battery. Relation between charge current I_{REF} and external resistor is shown as follows:

$$I_{REF} = \frac{12089}{R}$$

Triode Q9 in circuit is used as charge current selection. When users use computer to charge battery, PNX0102 outputs SI6294, which is low level, Q9 cuts off and R11 is connected into circuit. From the above, IREF is about 100 mA; when users use charger to charge battery, PNX0102 outputs ISL6294, which is high level, Q9 is saturated on, R2 and R11 are connected parallel into circuit. From the above, IREF is about 200m A. The reason for this design is that USB jack of some computers (for instance, some PC) cannot provide large current to charge battery.

3.2.7 Battery protection circuit

1. Battery protection circuit board is installed on lithium battery and used to prevent lithium battery from damage of short-circuit, over discharge and over charge. Lithium battery and battery protection circuit board are together called lithium battery core components. Battery protection board circuit diagram is shown in the figure 3.2.7.1:

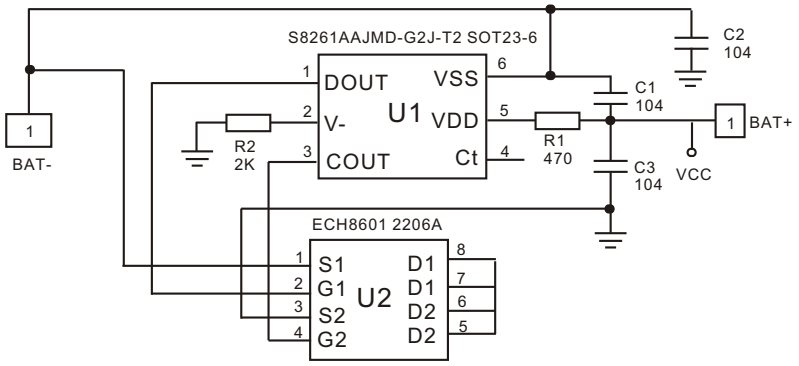


Figure 3.2.7.1 Battery protection circuit diagram

Equivalent circuit diagram of battery protection circuit is shown in the figure 3.2.7.2:

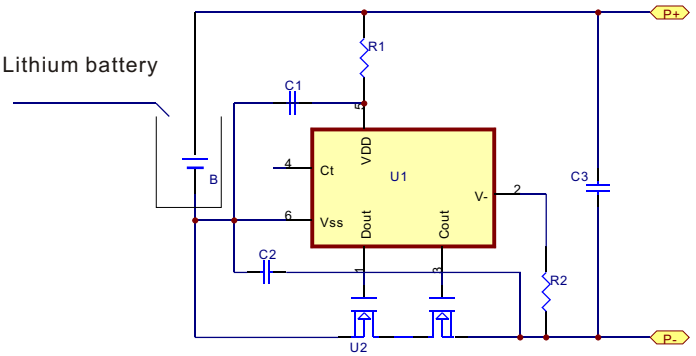


Figure 3.2.7.2 Battery protection circuit equivalent diagram

2. Working principle: battery protection circuit is mainly composed of battery protection IC S8261 and internal dual N groove MOSFET ECH8601. S8261 is the protection IC of the lithium-ion polymer chargeable battery of internal high precision voltage detect circuit and delay circuit. DOUT and COUT pin are over discharge (when lithium battery voltage is lower than 2.4V) protection output end and over charge (when lithium battery voltage is higher than 4.2V) protection output end. The two pins are high level when working normally; MOSFET is on and lithium battery voltage outputs to the player through protection board; when in protection, the two pins output low level to control MOSFET to cut off power. Over current detect (short-circuit protection) is fulfilled through the control of DOUT and COUT output by V- pin when detecting short-circuit state; when battery is in short-circuit, voltage on V- external resistor R1 will have a sudden change, V- detects that voltage on R2 increases immediately and then outputs to control DOUT and COUT and outputs low level at the same time to control MOS tube to cut off battery to protect battery.

3.2.8 Power circuit

1. 3.3V power circuit is shown in the figure 3.2.8.1:

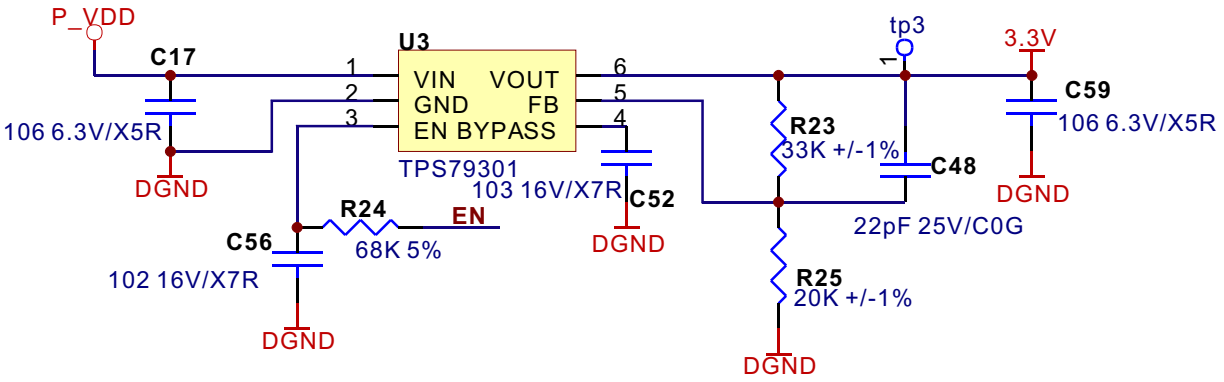


Figure 3.2.8.1 3.3V power circuit

3.3V power is supplied by IC TPS79301 and peripheral circuit. TPS79301 is linear voltage stabilizing module (also called LDO), EN pin is the enable pin that controls normal working and high level is effective; BYPASS has resistor onside and constitutes low-pass filter with external 103 capacitor C5 to decrease output noise; setup of TPS79301 output voltage is decided by two external resistors of FB pin and he relation is shown as follows:

$$VOUT = 1.2246 \times \left(1 + \frac{R_1}{R_2}\right)$$

From the above, we know that *VOUT* is 3.2V.

2. 2.8V power circuit is shown in the figure 3.2.8.2:

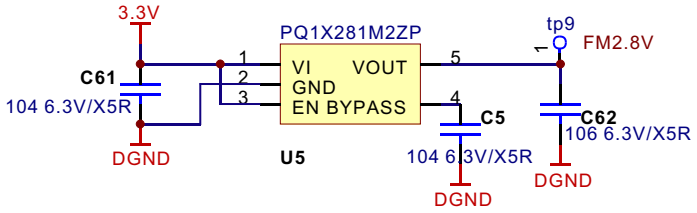


Figure 3.2.8.2 2.8V power circuit diagram

1.8V power is supplied by IC TPS62200 and peripheral circuit. TPS62200 is high efficiency reduce DC-DC converter; EN pin is enable pin and high level is effective; the relation between TPS62200 output voltage and FB pin feedback resistor is :

$$VOUT = 0.5 \times \left(1 + \frac{R_4}{R_5}\right)$$

From the above, we know that output voltage is about 1.75V.

3. 1.8V power circuit is shown in the figure 3.2.8.3:

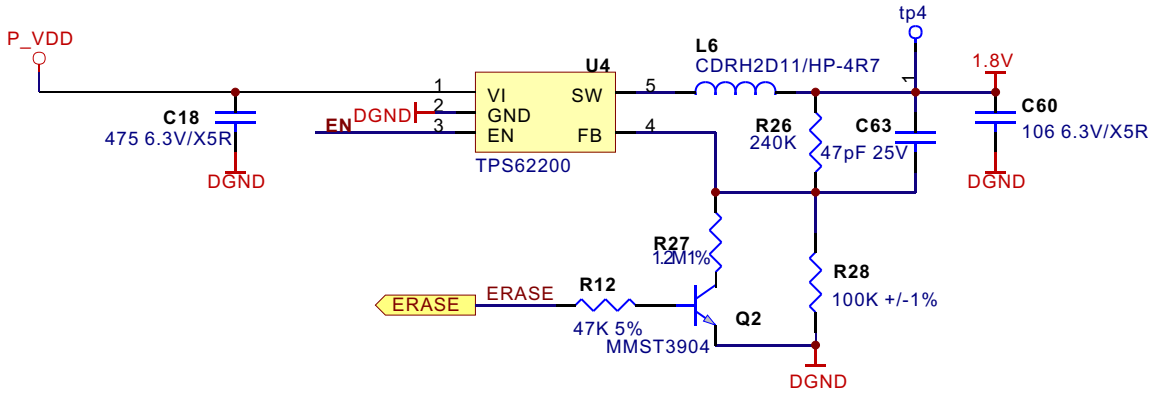


Figure 3.2.8.3 1.8V power circuit diagram

In order to enhance and better sound quality of Mp3, FM tuning and microphone effect, TPS62200 provides 2.8V power with low ripple interference. EN is enable end and high level working.

3.2.9 Reset circuit

1. Reset circuit is shown in the figure 3.2.9.1:

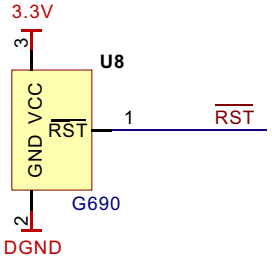


Figure 3.2.9.1 Reset circuit diagram

2. Working principle: reset circuit is composed of reset IC G690L263. When power on, pin 2 level of G690L263 changes from 0V to 3.3V, pin 3 outputs a low level reset pulse signal with pulse width140 millisecond which inputs to T14 pin of PNX0102 for the reset of the player.

3.2.10 Power on/off control circuit

1. Power on/off control circuit is shown in the figure 3.2.10.1:

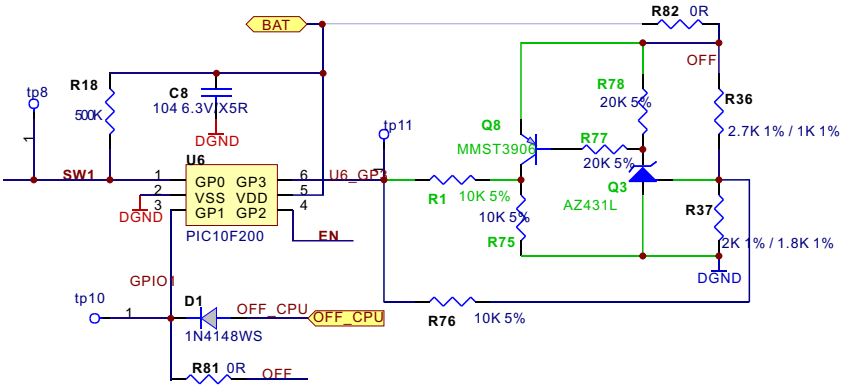


Figure 3.2.10.1 Power on/off control circuit diagram

2. Working principle: power on/off control is fulfilled by PIC10F200T-I and with battery low voltage protection function through software design.

Pin 1 of U6 is connected with OPEN button Sw1. When SW1 is pressed, voltage is pulled down, pin 4 GP2 of U6 outputs high level, EN high level inputs to U3 and U4, 3.3V and 1.8V power supply begins to output and system power on. When power off manually or voltage is too low, OFF or OFF_CPU output high level, GP2 outputs low level, EN changes to low level, power supply stops and system power off.

Meanwhile, pin 5 Vdd of U6 detects battery voltage. When battery voltage is lower than 2.8V, internal software controls EN to output low level, system is in power off state to protect battery.

3.2.11 Microphone circuit

1. Microphone circuit is shown in the figure 3.2.11.1:

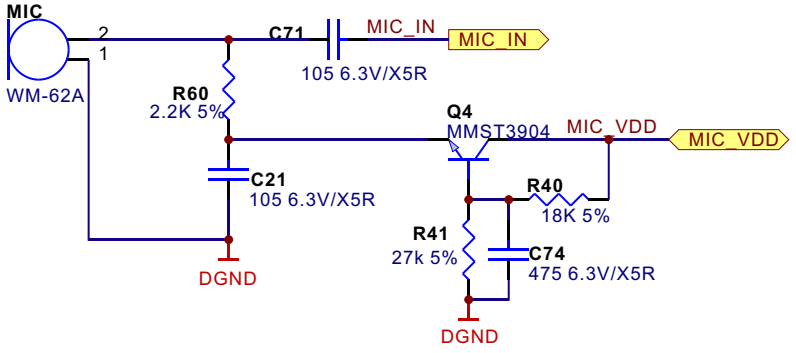


Figure 3.2.11.1 Microphone circuit diagram

2. Working principle: microphone circuit is composed of microphone and microphone power bias circuit. MIC1 switches the recorded external voice signals into electric signals, through C71 coupling, outputs to ADC circuit of PNX0102 to switch analog electric signals into digital signals and forms WAV files through software encoding and saves in FLASH. R40, R41, Q4 and C74 in circuit is triode voltage stabilizing system, which provides microphone with stable power bias, R60 is bias resistor of microphone.

3.2.12 USB jack circuit

1. USB jack circuit is shown in the figure 3.2.12.1:

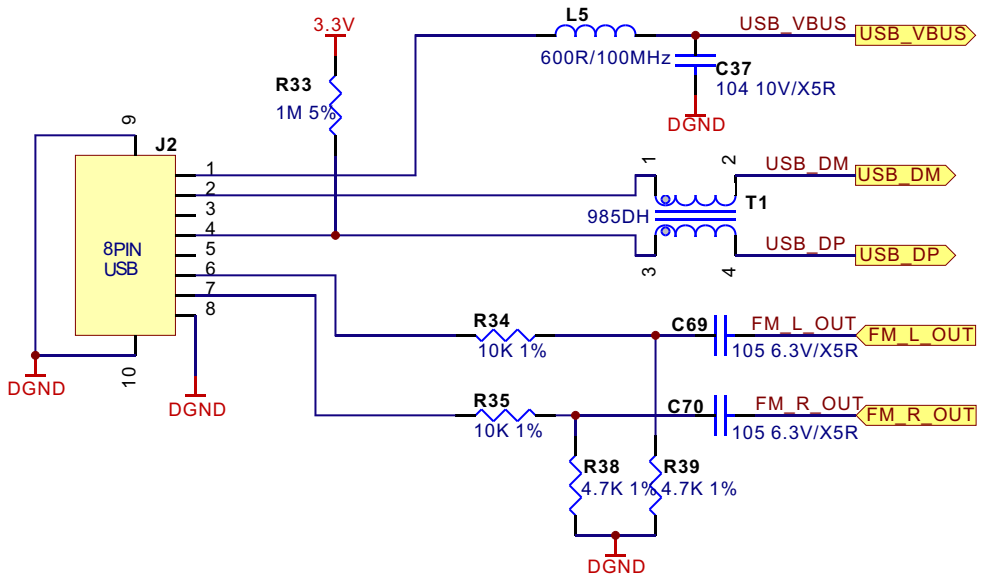


Figure 3.2.12.1 USB jack circuit diagram

2. Working principle: USB data jack network is composed of USB_VBS (USB 5V power), USB_DM (anode data line), USB_DP (cathode data line) and grounding surface casing (ground line). USB jack is directly connected with USB control module of PNX0102. After Mp3 is connected with computer, USB_VBS high level of computer USB jack inputs to USB_VUSB of PNX0102, USB jack is effective, USB jack is connected with PNX01021 through USB_DP and USB_DM and then connected with Flash through PNX0102 to realize the exchange of Flash internal data and computer internal data.

Meanwhile, USB jack of this player is also Line-In. When recording selects Line-In, external audio signals input through FM_R_OUT and FM_L_OUT, then directly inputs to ADC module of PNX0102 through C69 and C70 coupling to save musical or wave files into Flash after AD conversion.

3.2.13 RTC circuit

1. To maintain normal function of clock and auto power-on, this player is with RTC circuit, shown in the figure 3.2.13.1:

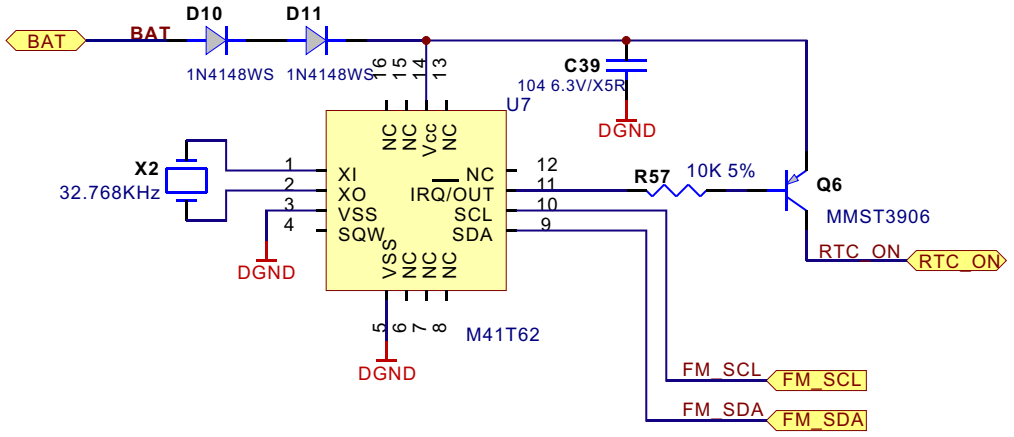


Figure 3.2.13.1 RTC circuit diagram

2. Working principle: in normal working and power off state, U7 supplies power through Vcc, 32.768kHz crystal oscillator maintains system clock function, meanwhile U7 intermit port/IRQ outputs high level, Q6 cuts off and RTC_ON outputs low level.

Through software design, this player may fulfill timing power-on function. When system clock reaches timing power-on time, /IRQ outputs low level intermit signal, Q6 is connected, RTC_ON changes to high level, meanwhile D3 is connected, EN changes to high level and system power on.

Section Three Servicing Cases

3.3.1 Servicing cases

[Example 1] Syntom: power not on

Description: no OSD and no output

Analysis and troubleshooting: connect with power adapter and check whether charge is available and whether screen has display and result is that there is no display; take down machine and check power supply 3.3V and 1.8V, we find that 3.3V decreases to 0.6V; use power adapter to suppl power, input 5V is normal, charge enable end is high level and it is also normal; observe carefully and find that pin 2 of U3 (TPS79301) has false welding; after weld again, trouble is removed.

[Example 2] Symptom: machine cannot be switched on

Description: press ON button, screen has no display and headphone has no output.

Analysis and troubleshooting: firstly make sure whether machine cannot be switched on or power not on; connect with power adapter or computer and check whether screen displays normally; connect with power adapter and charge can display, which means that power and rear stage circuit working is normal; power on/off circuit, through a light touch switch Sw1, forms loop after closing; signal produces and enters U6 (PIC10F200) pin 1 high level to make pin 4 produce a high level to give power an enable end signal to control whether the whole circuit works; test SW1 switch, press SHUT and check whether it is on; when testing, we find that Sw1 has false welding; after welding again, trouble is removed.

[Example 3] Symptom: cannot connect with computer

Description: no response and no OSD after connecting with computer

Analysis and troubleshooting: firstly make sure whether charge and power on are normal and the result is normal; use diode level of multimeter to test the resistance to ground of D+, D- data signals in USB terminal position and it should be close to several hundred ohm, but we find that D+ resistance value is normal, D- resistance value is infinite and USB terminal has false welding; after welding again, trouble is removed.

[Example 4] Symptom: noise appears when tuning

Description: noise appears when tuning.

Analysis and troubleshooting: firstly judge whether tuning components or common part has trouble, whether one side of headphone has sound when listening, and the result is normal; then switch to tuning

State, search radio station automatically, tuning is normal, which means power supply, data and clock are normal; we remote external interference, receive the nearest local radio station and check whether it is clear, and the result shows noise still exists; circuit that causes noise is high frequency tuning and mixed frequency part; carefully check and find that pin 37 of tuning U12(TEA5767HN)is false welding; weld again and trouble is removed.

[Example 5] Symptom: noise appear when playing

Description: headphone output noise when playing

Analysis and troubleshooting: if there is noise when playing, it is BGA that has trouble, for playback and other functions are all normal, only there is noise, so it is necessary to analyse whether decode [art or rear stage causes this trouble, when playing 1KHZ standard signal, there should be sine wave signals and not any noise; test P3, N3 waveform close to BGA, so we judge that it is BGA that has trouble; after changing it, trouble is removed.

[Example 6] Symptom: no OSD

Description: screen has no display

Analysis and troubleshooting: firstly confirm whether trouble lies in power or screen itself; power on and listen to the sound and sound s normal, so it is preliminarily judged that power supply 3.3V and 1.8V are both basically normal. Firstly test voltage on two ends of L2 and it is about 4.3V, which is basically normal; then test voltage on two ends of D8 and find that anode has no 13V voltage, take down display screen and there is still no; check input end voltage and enable voltage and they are basically normal, then check FB end voltage of feedback pin and it is obviously low, EN enable end has false welding, after welding again, trouble is removed.

[Example 7] Symptom: screen has mosaic

Description: display screen has mosaic and display has disorder

Analysis and troubleshooting: this troubleshooting is the same with that of no screen display, with the difference is that power supply is normal; firstly confirm whether the screen itself has trouble or circuit has trouble, change display screen and trouble still exists, then use oscillograph to test the 8-digit number of OLED screen and find that flat cable holder of display screen has false welding, after welding again, trouble is removed.

[Example 8] Symptom: Noise when playing recording files

Description: Noise when playing recording files

Analysis and troubleshooting: schematic diagram of record circuit is shown in the figure, it is mainly composed of microphone and microphone power bias circuit, MIC switches the external voice signals recorded into electric signals, through being coupled by C71, output to ADC circuit of PNX0102 and form

WMA files through software coding to save in Flash.When repairing this kind of machine, firstly play files and check whether there is noise and there is no; check recording circuit and power supply is normal; when recording, use oscillograph to test C71 and there is noise interference, after changing MIC, trouble is removed.

[Example 9] Symptom: cannot connect with computer

Description: no display after connecting with computer and disk cannot be found

Analysis and troubleshooting: if software program is incorrect or lost, machine may probably not be switched on or machine failure will happen; when this trouble appears, please fresh the software firstly; firstly check whether software upgrading is available and then down load software program; after upgrading software, trouble is removed.

[Example 10] Symptom: cannot charge

Description: charge mode can display but in fact charge function is not available

Analysis and troubleshooting: charge mode and charge can both display but the player cannot be fully charged; after 3 hours, unplug power adapter and power on, low battery charge displays and then power off automatically; you may enter charge mode and there is charge indication, which means there is power input, BAT and CHG are normal, so we should consider charge control pin, check IMIN current control end, when current of this pin is very small, charge stops; R11 has false welding; after welding again, trouble is removed.

3.3.2 Troubleshooting flow chart

1.Troubleshooting process for “No screen display” is shown in the figure 3.2.2.1:

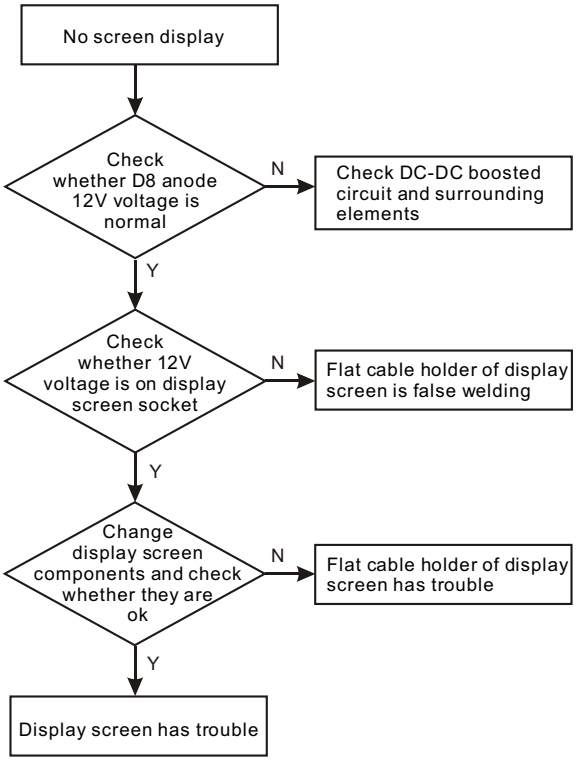


Figure 3.3.2.1 Trouble shooting flow chart for “No screen display”

2.Troubleshooting process for “USB not connected” is shown in the figure 3.2.2.2:

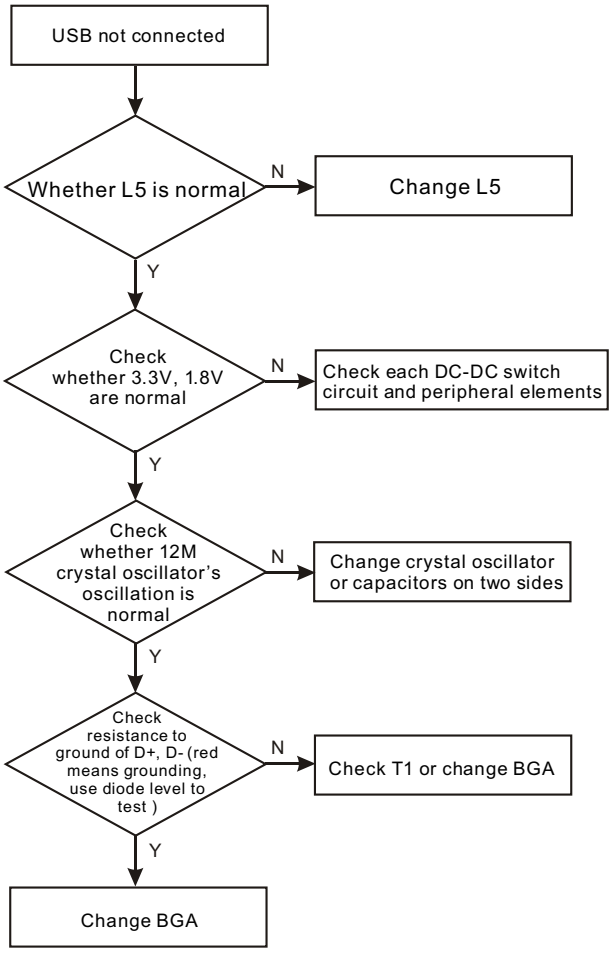


Figure 3.3.2.2 Troubleshooting plow chart for “USB not connected”

3.Troubleshooting process for “Buttons have no function” is shown in the figure 3.2.2.3:

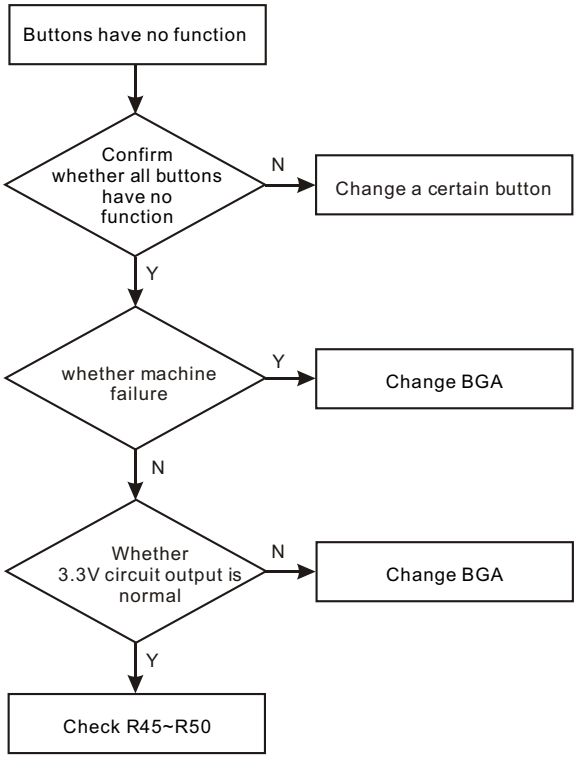


Figure 3.3.2.3 Troubleshooting flow chart for “Buttons have no function”

4.Troubleshooting process for “No tuning function” is shown in the figure 3.2.2.4:

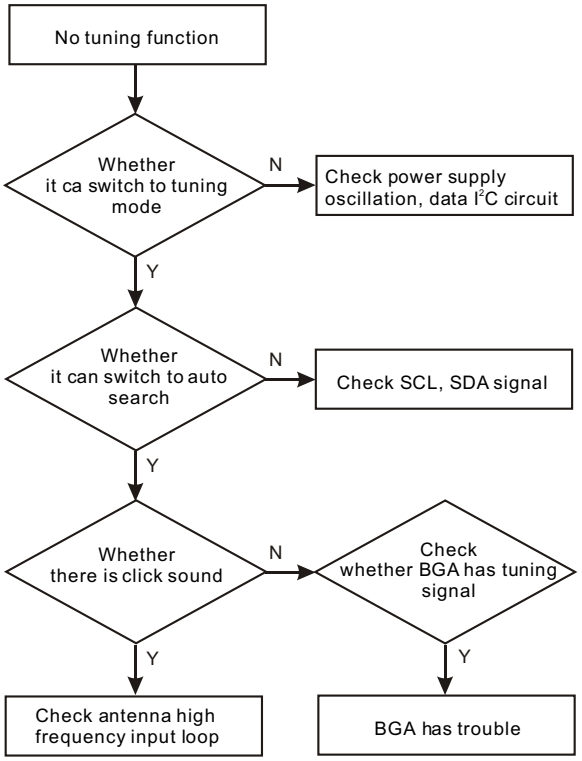


Figure 3.3.2.4 Troubleshooting flow chart for “No tuning function”

5 . Troubleshooting process for “Cannot charge” is shown in the figure 3.2.2.5:

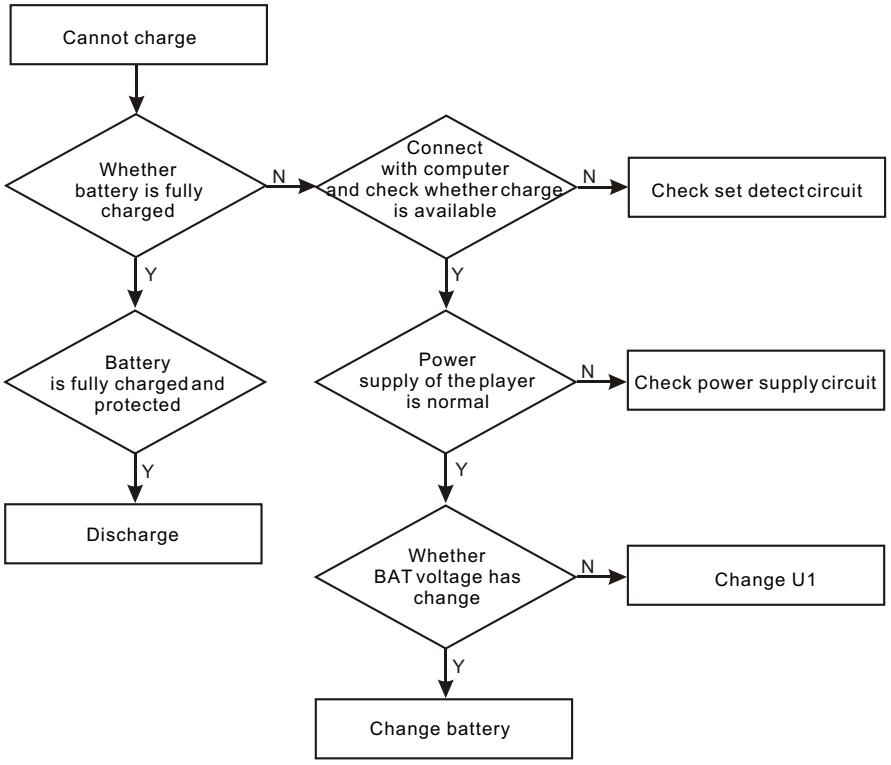
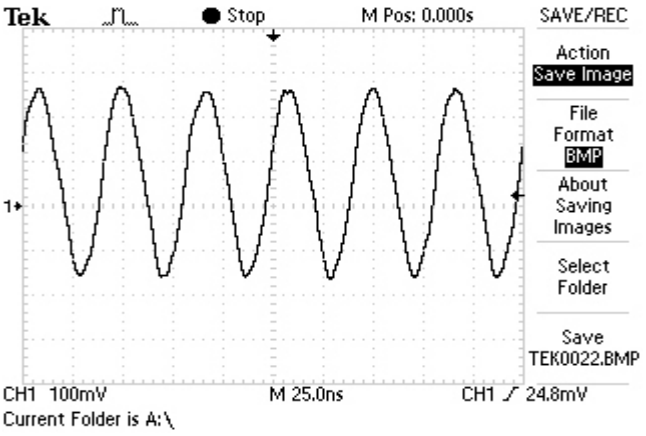


Figure 3.2.2.5 Troubleshooting flow chart for “Cannot charge”

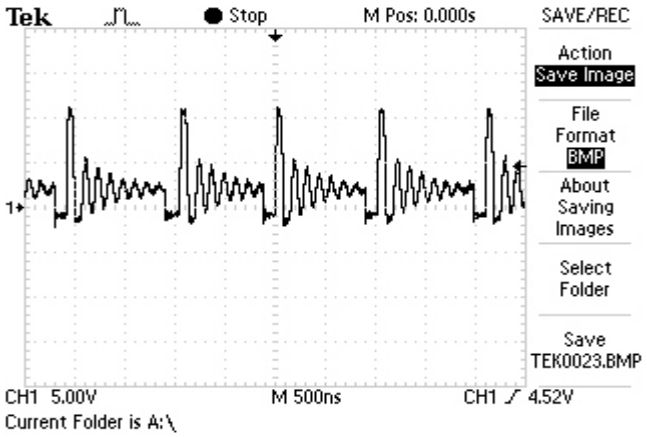
Section Four Waveform diagram

This section collects signal waveform diagram of audio, video and each unit circuit with the purpose to help servicing personnel to judge where trouble lies in accurately and quickly to improve servicing skills. For the difference of oscillograph's type, model and tuner, a certain difference may exist, so the servicing personnel are expected to pay more attention to check in daily operation.

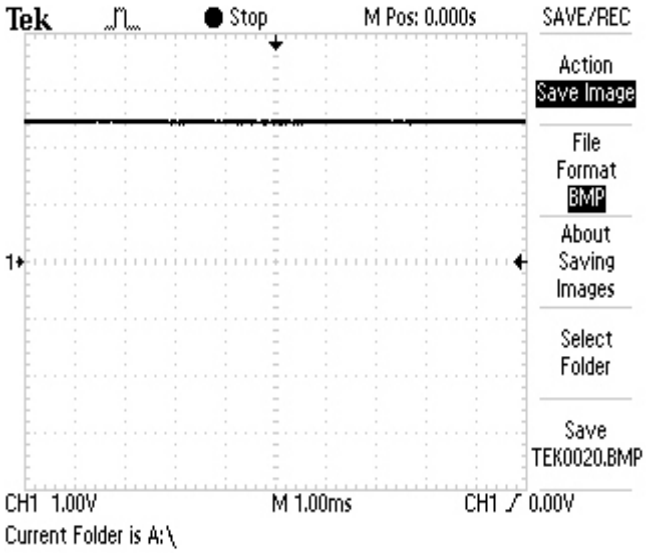
1. 12M crystal oscillator oscillation waveform diagram



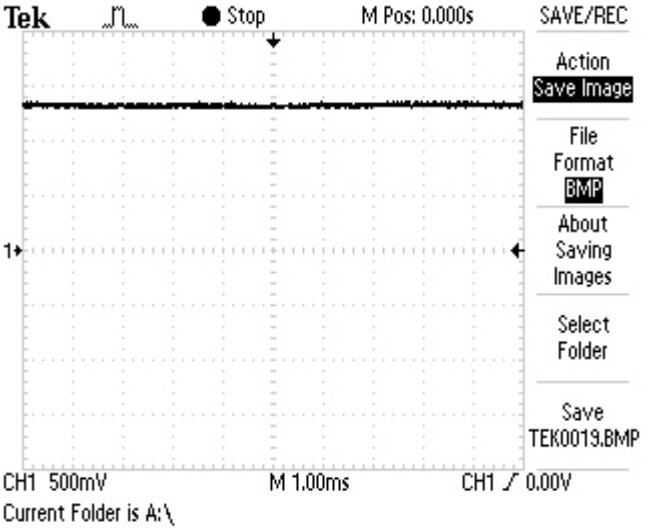
2. L2 boosted energy storage waveform diagram



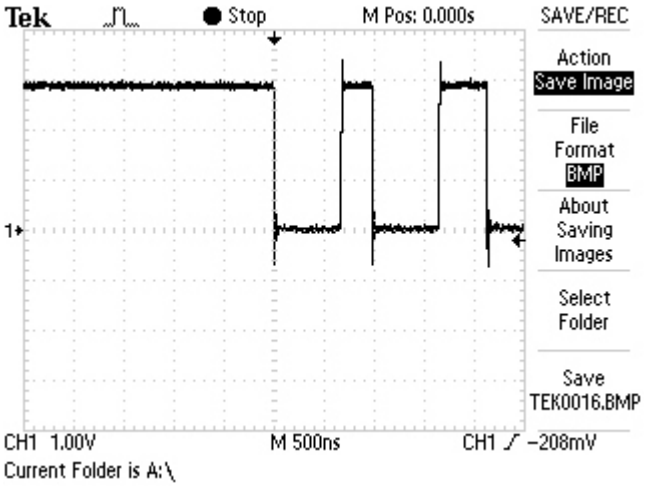
3. Software power supply 3V3 waveform diagram



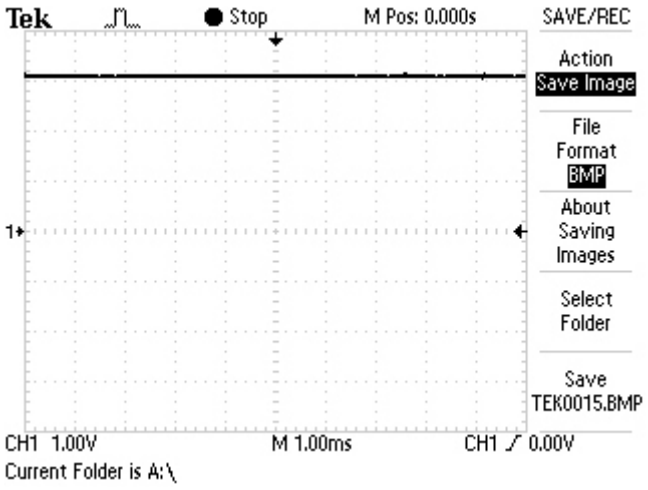
4. LCD_3V3 waveform diagram



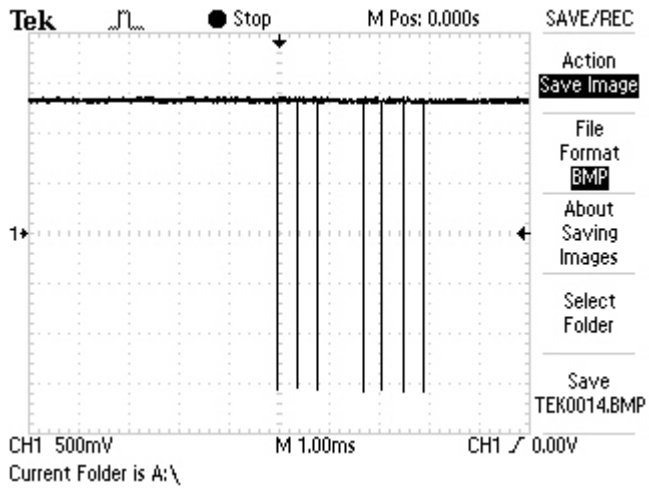
5. LCD_CS waveform diagram



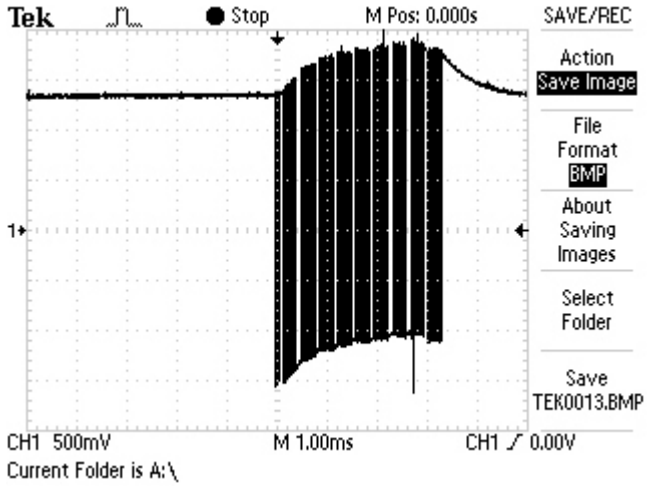
6. LCD_RESET waveform diagram



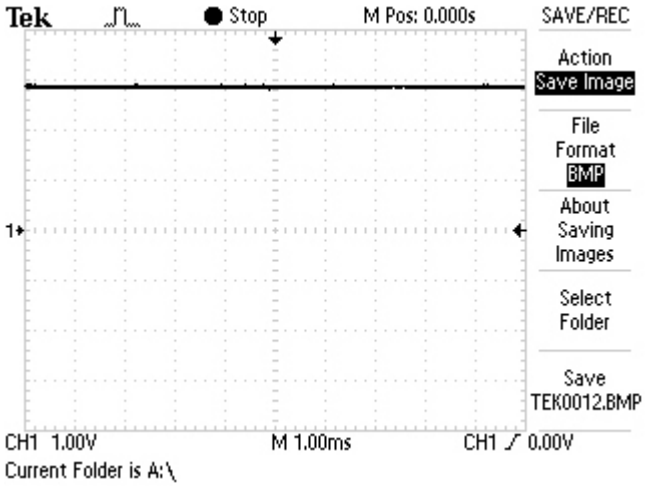
7. LCD_D/C waveform diagram



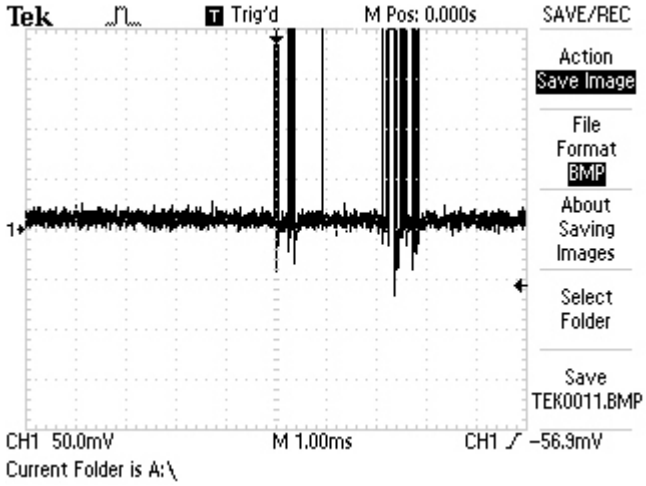
8. LCD_WR waveform diagram



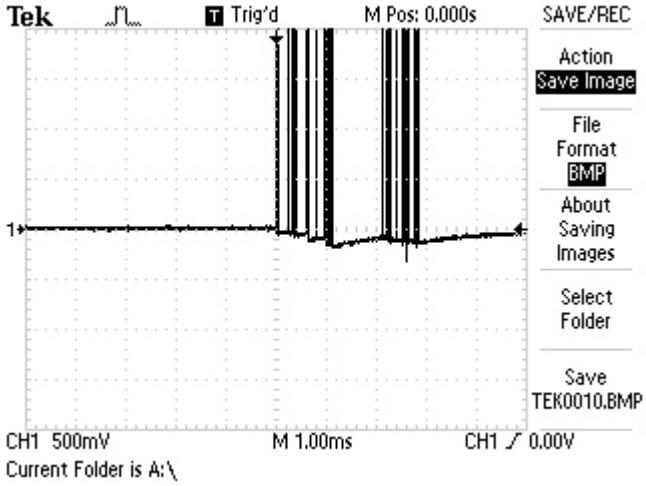
9. LCD_RD waveform diagram



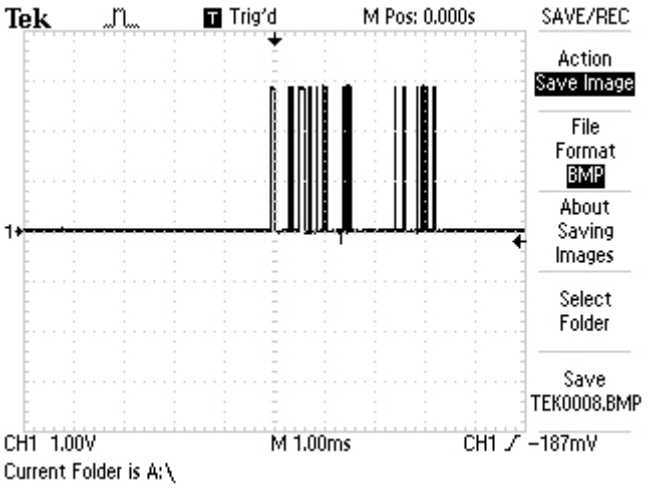
10. LCD_DB0 waveform diagram



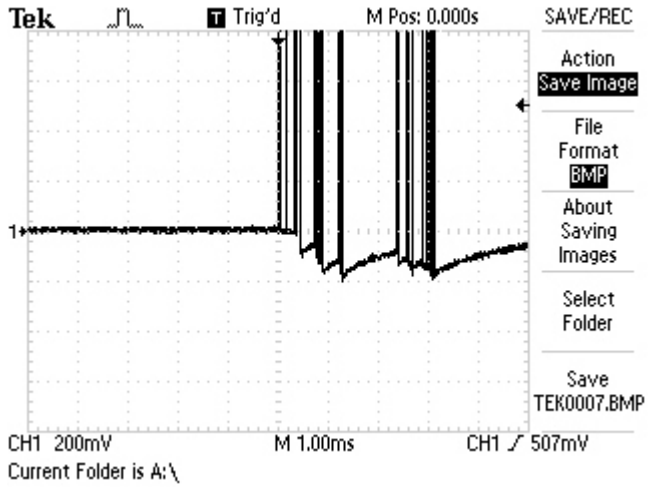
11. LCD_DB1 waveform diagram



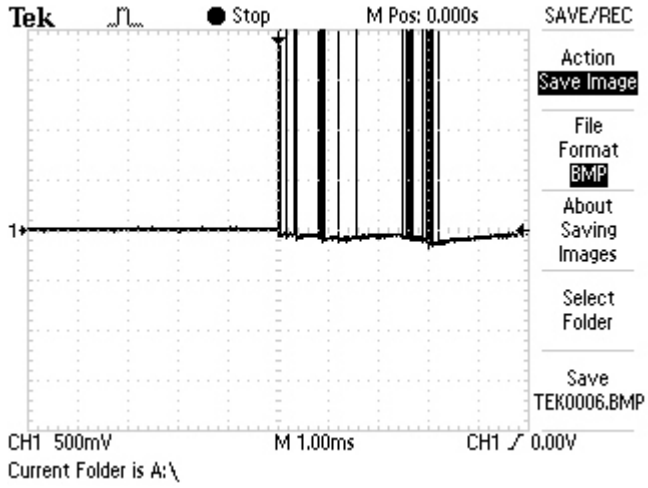
12. LCD_DB2 waveform diagram



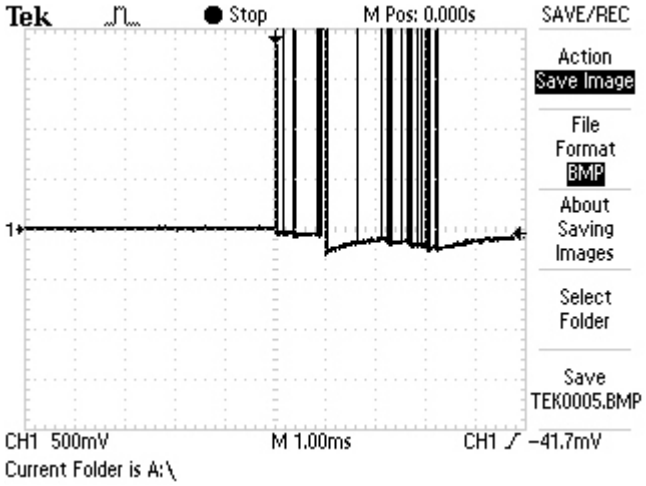
13. LCD_DB3 waveform diagram



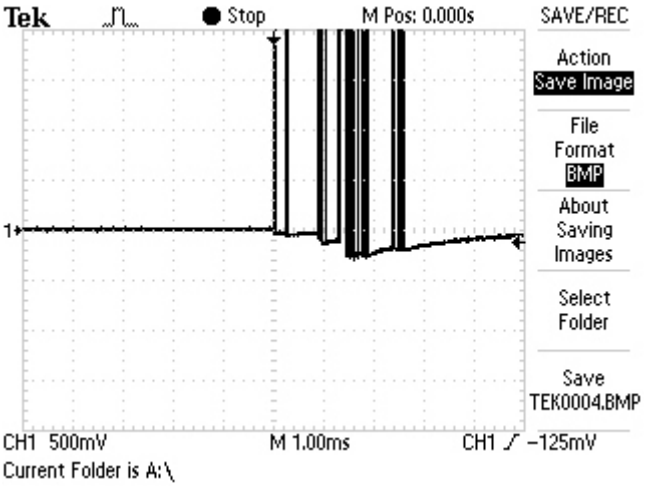
14. LCD_DB4 waveform diagram



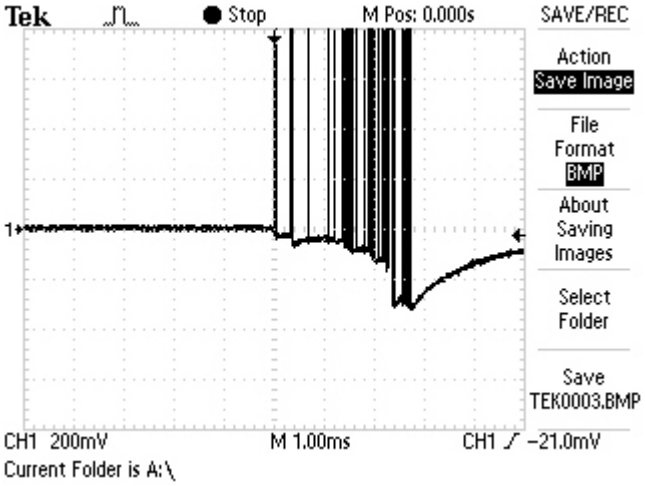
15. LCD_DB5 waveform diagram



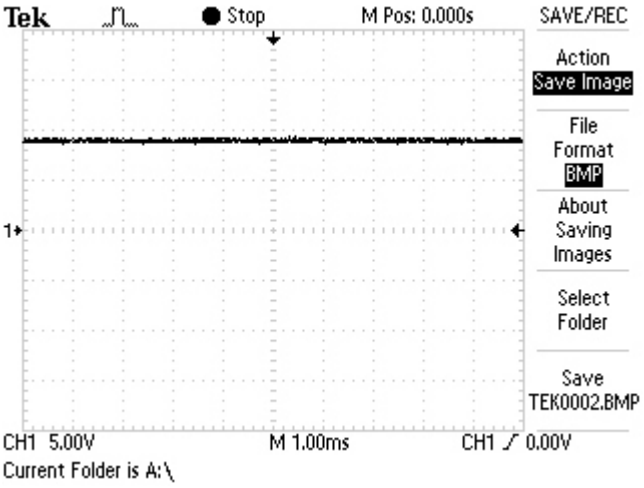
16. LCD_DB6 waveform diagram



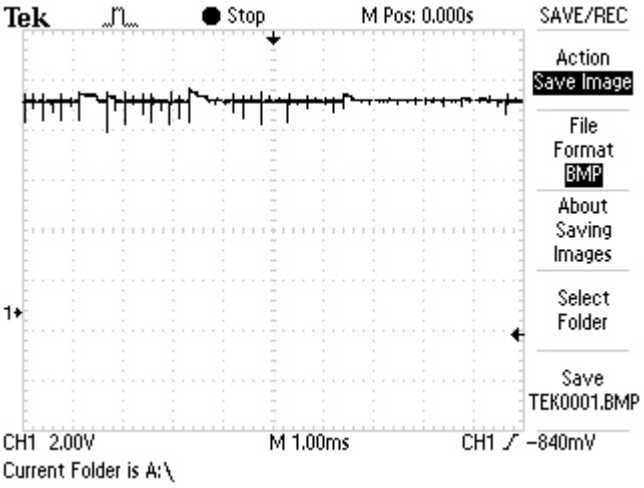
17. LCD_DB7 waveform diagram



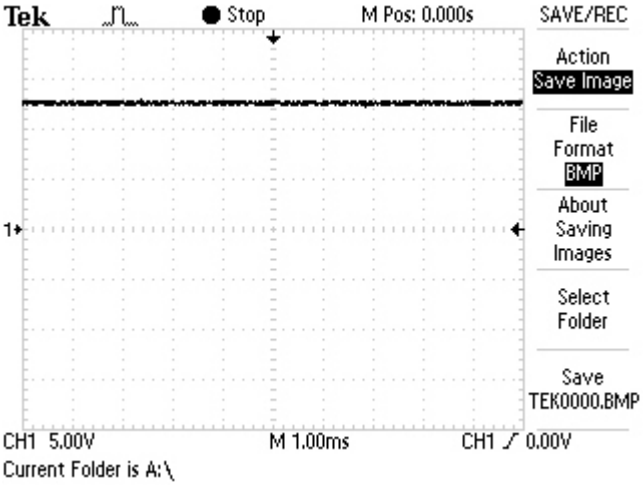
18. IREF waveform diagram



19. VCOMH waveform diagram



20. VOLED waveform diagram



Section Five Function Introduction to IC

3.5.1 Function introduction to PNX0102AET

1. Description

The PNX0102 (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 PNX0102 very suitable for portable hand-held devices.

The PNX0102 is based on the powerful ARM7TDMI CPU core, which is a full 32-bit RISC processor with 8 k byte 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

◆ FM Radio input and control support

◆ Embedded program flash for easy upgrading and increased program security

◆ Support for Philips Life Vibes ^{TM} audio enhancement algorithms

◆ Small footprint package TBGA180 10x10mm 0.5pitch

2.2 Hardware Features

◆ ARM7TDMI + 8kByte cache

◆ Embedded 64kByte RAM and 32 k Byte ROM

◆ Ultra low power Audio DSP for support of Philips Life Vibes ^{TM} audio enhancement algorithms

◆ Integrated embedded program Flash (8M bit)

◆ Maximum 4Mbyte of external static memory

◆ External memory support: Nand Flash/Compact flash/MMC/SMC/SRAM/ROM/SDRAM

◆ Integrated MCI interface

◆ Integrated USB 2.0 HS 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 Life Vibes ^{TM} 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	I/O	output	bpts10tht	Data input 0/Data output 0

GPIO_LCD_2		tolerant			5v	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 tolerant	I/O	input	bpts10tht 5v	Data input/Data output
GPIO_MCI_5						General Purpose IO pin
MCI_DAT_2	J1	0-5 VDC tolerant	I/O	input	bpts10tht 5v	Data input/Data output
GPIO_MCI_4						General Purpose IO pin
MCI_DAT_1	J2	0-5 VDC tolerant	I/O	input	bpts10tht 5v	Data input/Data output
GPIO_MCI_3						General Purpose IO pin
MCI_DAT_0	H3	0-5 VDC tolerant	I/O	input	bpts10tht 5v	Data input/Data output
GPIO_MCI_2						General Purpose IO pin
MCI_CLK	G3	0-5 VDC tolerant	I/O	output	bpts10tht 5v	MCI clock output
GPIO_MCI_1						General Purpose IO pin
MCI_CMD	H2	0-5 VDC tolerant	I/O	input	bpts10tht 5v	Command input/Command output
GPIO_MCI_0						General Purpose IO pin
USB Interface (fixed: 4 pins + (8 pins reserved for future use))						
USB_CONNECT_N	T15	0-5 VDC tolerant	I/O	output	bpts10tht 5v	Soft connect output USB 2.0 FS
GPIO_USB_1						General Purpose IO pin
USB_RPU			A		apio (IO)	Reserved for USB 2.0 HS
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 tolerant	I/O	input	bpts10tht 5v	USB Supply detection line USB 2.0 FS & USB 2.0 HS
GPIO_USB_0						General Purpose IO pin
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 tolerant	I/O	input	bpts10tht 5v	DAI Bitclock
GPIO_DAI_2						General Purpose IO pin
DAI_WS	G17	0-5 VDC tolerant	I/O	input	bpts10tht 5v	DAI Wordselect
GPIO_DAI_1						General Purpose IO pin
DAI_DATA	G16	0-5 VDC tolerant	I/O	input	bpts10tht 5v	DAI Serial data input
GPIO_DAI_0						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 tolerant	I/O	output	bpts10tht 5v	DAO Bitclock
GPIO_DAO_2						General Purpose IO pin
DAO_WS	F18	0-5 VDC tolerant	I/O	output	bpts10tht 5v	DAO Wordselect
DAO_DATA	F17	0-5 VDC tolerant	I/O	output	bpts10tht 5v	DAO Serial data output
GPIO_DAO_0						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	I/O	output	bpts10tht	JTAG Data output

		tolerant			5v	
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	iic400kt5v	Serial clock IIC Slave
IIC_SDA	J17	0-5 VDC tolerant	I/O	input	iic400kt5v	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 tolerant	I/O	input	bpts10tht 5v	Serial input
GPIO_UART_2						General Purpose IO pin
UART_NCTS	K2	0-5 VDC tolerant	I/O	input	bpts10tht 5v	Clear to send (active low)
GPIO_UART_1						General Purpose IO pin
UART_NRTS	K1	0-5 VDC tolerant	I/O	output	bpts10tht 5v	Ready to send
GPIO_UART_0						General Purpose IO pin
Mode selection pins (fixed: 2 pins)						
GPIO_3	J16	0-5 VDC tolerant	I/O	input	bpts10thd t5v	Start up mode pin 2 (pull down) General Purpose IO pin
GPIO_2	K18	0-5 VDC tolerant	I/O	input	bpts10thd t5v	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	Peripherel (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

3.5.2 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 200μs 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 TSOPI 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 : 25μs(Max.)
  - – Serial Access : 30ns(Min.)
- ◆ Fast Write Cycle Time
  - – Program time : 200μs(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

3.5.3 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-µF 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 star-up times (approximately 50µs with a 0.001-µF capacitor) while consuming very low quiescent current (170 µA typical). Moreover, when the device is placed in standby mode, the supply current is reduced to less than 1 µA. The TPS79328 exhibits approximately 32 µVRMS of output voltage noise with a 0.1-µF 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 µV)
- Fast Start-Up Time (50 µs)
- Stable With a 2.2-µF 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

3.5.4 Function introduction to G690L263T71

1. Description

The G690/G691 are microprocessor (µP) supervisory circuits used to monitor the power supplies in µP and digital systems. They provide excellent circuit reliability and low cost by eliminating external components and adjustments when used with +5V, +3.3V, +3.0V- powered circuits.

These circuits perform a single function: they assert a reset signal whenever the VCC supply voltage

declines below a preset threshold, keeping it asserted for at least 140ms after VCC has risen above the reset threshold. Reset thresholds suitable for operation with a variety of supply voltages are available.

The G691L has an open-drain output stage, while the G690 have push-pull outputs. The G691L's open-drain RESET output requires a pull-up resistor that can be connected to a voltage higher than VCC. The G690L have an active-low RESET output, while the G690H has an active-high RESET output. The reset comparator is designed to ignore fast transients on VCC, and the outputs are guaranteed to be in the correct logic state for VCC down to 1V.

Low supply current makes the G690/G691 ideal for use in portable equipment. The G690/G691 are available in 3-pin SOT-23 packages.

2. Features

- ◆ Precision Monitoring of +3V, +3.3V, and +5V Power-Supply Voltages
- ◆ Fully Specified Over Temperature
- ◆ Available in Three Output Configurations Push-Pull RESET Output (G690L)
- ◆ 140ms min Power-On Reset Pulse Width
- ◆ 10μA Supply Current
- ◆ Guaranteed Reset Valid to VCC = +1V
- ◆ Power Supply Transient Immunity
- ◆ No External Components
- ◆ 3-Pin SOT-23 Packages

3. PIN Description

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

3.5.5 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 µA; 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 VI
- ◆ 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-µA 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	VI	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

3.5.6 Function introduction to LM2703

1. Description

The LM2703 is a micropower step-up DC/DC in a small 5-lead SOT-23 package. A current limited, fixed off-time control scheme conserves operating current resulting in high efficiency over a wide range of load conditions. The 21V switch allows for output voltages as high as 20V. The low 400ns off-time permits the use

of tiny, low profile inductors and capacitors to minimize footprint and cost in space-conscious portable applications. The LM2703 is ideal for LCD panels requiring low current and high efficiency as well as white LED applications for cellular phone back-lighting. The LM2703 can drive up to 4 white LEDs from a single Li-Ion battery.

2. Features

- ◆ 350mA, 0.7W, internal switch
- ◆ Uses small surface mount components
- ◆ Adjustable output voltage up to 20V
- ◆ 2.2V to 7V input range
- ◆ Input undervoltage lockout
- ◆ 0.01μA shutdown current
- ◆ Small 5-Lead SOT-23 package

3. PIN Description

PIN No.	Symbol	I/O	Description
1	SW	P	Power Switch input.
2	GND		Ground.
3	FB	O	Output voltage feedback input.
4	SHDN	I	Shutdown control input, active low.
5	VIN	I	Analog and Power input.

3.5.7 Function introduction to TEA5767HN

1. Description

The TEA5767HN is a single-chip electronically tuned FM stereo radio for low-voltage application with fully integrated IF selectivity and demodulation. The radio is completely adjustment-free and only requires a minimum of small and low cost external components. The radio can be tuned to the European, US and Japanese FM bands.

2. Features

- ◆ High sensitivity due to integrated low-noise RF input amplifier
- ◆ FM mixer for conversion to IF of the US/Europe (87.5 to 108 MHz) and Japanese (76 to 91MHz) FM band
- ◆ Preset tuning to receive Japanese TV audio up to 108 MHz
- ◆ RF Automatic Gain Control (AGC) circuit

◆ LC tuner oscillator operating with low cost fixed chip inductors

◆ FM IF selectivity performed internally

◆ No external discriminator needed due to fully integrated FM demodulator

◆ Crystal reference frequency oscillator; the oscillator operates with a 32.768 kHz clock crystal or with a 13 MHz crystal and with an externally applied 6.5 MHz reference frequency

◆ PLL synthesizer tuning system

◆ I2C-bus and 3-wire bus, selectable via pin BUSMODE

◆ 7-bit IF counter output via the bus

◆ 4-bit level information output via the bus

◆ Soft mute

◆ Signal dependent mono to stereo blend [Stereo Noise Cancelling (SNC)]

◆ Signal dependent High Cut Control (HCC)

◆ Soft mute, SNC and HCC can be switched off via the bus

◆ Adjustment-free stereo decoder

◆ Autonomous search tuning function

◆ Standby mode

◆ Two software programmable ports

◆ Bus enable line to switch the bus input and output lines into 3-state mode

◆ Automotive temperature range (at VCCA, VCC(VCO) and VCCD = 5 V).

3. PIN Description

PIN No.	Symbol	I/O	Description
1	n.c.		not connected
2	CPOUT	O	charge pump output of synthesizer PLL
3	VCOTANK1	O	voltage controlled oscillator tuned circuit output 1
4	VCOTANK2	O	voltage controlled oscillator tuned circuit output 2
5	VCC(VCO)	P	voltage controlled oscillator supply voltage
6	DGND		digital ground
7	VCCD	P	digital supply voltage
8	DATA	I/O	bus data line input/output
9	CLOCK	I	bus clock line input
10	n.c.		not connected
11	WRITE/READ	I	write/read control input for the 3-wire bus
12	BUSMODE	I	bus mode select input
13	BUSENABLE	I	bus enable input

14	SWPORT1		software programmable port 1
15	SWPORT2		software programmable port 2
16	XTAL1	I	crystal oscillator input 1
17	XTAL2	I	crystal oscillator input 2
18	PHASEFIL		phase detector loop filter
19	PILFIL		pilot detector low-pass filter
20	n.c.		not connected
21	n.c.		not connected
22	VAFL	O	left audio frequency output voltage
23	VAFR	O	right audio frequency output voltage
24	TMUTE	I	time constant for soft mute
25	MPXO	O	FM demodulator MPX signal output
26	Vref	P	reference voltage
27	TIFC	I	time constant for IF centre adjust
28	LIMDEC1	I	decoupling IF limiter 1
29	LIMDEC2	I	decoupling IF limiter 2
30	n.c.		not connected
31	n.c.		not connected
32	Igain	I	gain control current for IF filter
33	AGND		analog ground
34	VCCA	P	analog supply voltage
35	RFI1	I	RF input 1
36	RFGND		RF ground
37	RFI2	I	RF input 2
38	TAGC		time constant RF AGC
39	LOOPSW		switch output of synthesizer PLL loop filter
40	n.c.		not connected

3.5.8 Function introduction to ISL6294IRZ

1. Description

The ISL6294 is a cost-effective, fully integrated high input voltage single-cell Li-ion battery charger. The charger uses a CC/CV charge profile required by Li-ion batteries. The charger accepts an input voltage up to 28V but is disabled when the input voltage exceeds the OVP threshold, typically 6.8V, to prevent excessive

power dissipation. The 28V rating eliminates the overvoltage protection circuit required in a low input voltage charger.

The charge current and the end-of-charge (EOC) current are programmable with external resistors. When the battery voltage is lower than typically 2.55V, the charger preconditions the battery with typically 20% of the programmed charge current. When the charge current reduces to the programmable EOC current level during the CV charge phase, an EOC indication is provided by the CHG pin, which is an open-drain output. An internal thermal foldback function protects the charger from any thermal failure.

Two indication pins (PPR and CHG) allow simple interface to a microprocessor or LEDs. When no adapter is attached or when disabled, the charger draws less than 1μA leakage current from the battery.

2. Features

- ◆ Complete Charger for Single-Cell Li-ion/Polymer Batteries
- ◆ Integrated Pass Element and Current Sensor
- ◆ No External Blocking Diode Required
- ◆ Low Component Count and Cost
- ◆ 1% Voltage Accuracy
- ◆ Programmable Charge Current
- ◆ Programmable End-of-Charge Current
- ◆ Charge Current Thermal Foldback for Thermal Protection
- ◆ Trickle Charge for Fully Discharged Batteries
- ◆ 28V Maximum Voltage for the Power Input
- ◆ Power Presence and Charge Indications
- ◆ Less Than 1μA Leakage Current off the Battery When No Input Power Attached or Charger Disabled
- ◆ Ambient Temperature Range: -40°C to 85°C

3. PIN Description

PIN No.	Symbol	I/O	Description
1	VIN	P	Power input
2	PPR	I	Open-drain power presence indication
3	CHG	I	Open-drain charge indication pin
4	EN	I	Enable input
5	BAT	O	Charger output pin
6	IREF	I	Charge-current program and monitoring pin
7	IMIN	I	End-of-charge (EOC) current program pin
8	GND		System ground

3.5.9 Function introduction to PIC10F200T

1. Description

The PIC10F200/202/204/206 devices from Microchip Technology are low-cost, high-performance, 8-bit, fullystatic, Flash-based CMOS microcontrollers. They employ a RISC architecture with only 33 single-word/ single-cycle instructions. All instructions are single cycle (1 μs) except for program branches, which take two cycles. The PIC10F200/202/204/206 devices deliver performance in an order of magnitude higher than their competitors in the same price category. The 12-bit wide instructions are highly symmetrical, resulting in a typical 2:1 code compression over other 8-bit microcontrollers in its class. The easy to use and easy to remember instruction set reduces development time significantly.

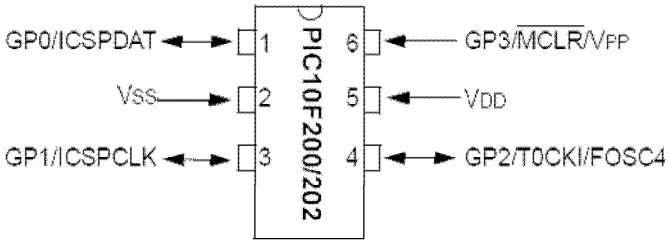
2. Features

- ◆ Only 33 single-word instructions to learn
- ◆ All single-cycle instructions except for program branches, which are two-cycle
- ◆ 12-bit wide instructions
- ◆ 2-level deep hardware stack
- ◆ Direct, Indirect and Relative Addressing modes for data and instructions
- ◆ 8-bit wide data path
- ◆ 8 Special Function Hardware registers
- ◆ Operating speed:
  - 4 MHz internal clock
  - 1? s instruction cycle
- ◆ Operating Current:
  - < 350 ? A @ 2V, 4 MHz
- ◆ Standby Current:
  - 100 nA @ 2V, typical
- ◆ Low-power, high-speed Flash technology:
  - 100,000 Flash endurance
  - > 40 year retention
- ◆ Fully static design
- ◆ Wide operating voltage range: 2.0V to 5.5V
- ◆ Wide temperature range:
  - Industrial: -40? C to +85? C
  - Extended: -40? C to +125? C
- ◆ 4 I/O pins:
  - 3 I/O pins with individual direction control
  - 1 input only pin
  - High current sink/source for direct LED drive

- Wake-on-change
- Weak pull-ups

◆ 8-bit real-time clock/counter (TMR0) with 8-bit programmable prescaler

3. PIN Description



3.5.10 Function introduction to PQ1X281M2ZP

1. Description

The PQ1Xxx1M2ZP Series are Low Output Current, Compact Surface Mount Type Low Power-Loss Voltage Regulators.

2. Features

◆ Compact surface mount package (2.9×1.6×1.1mm)
◆ Low power-loss (Dropout voltage: TYP. 0.11 V/MAX. 0.26V at IO=60mA)
◆ Also compatible ceramic capacitors because of suppressing oscillation level
◆ High ripple rejection (TYP. 70dB)
◆ Low dissipation current (Dissipation current at no load: TYP. 150μA)
◆ Built-in ON/OFF control function (Dissipation current at OFF-state: MAX. 1μA)
◆ Built-in overcurrent and overheat protection functions
◆ *It is available for every 0.1V of output voltage (1.3V to 5.0V)

3. PIN Description

PIN No.	Symbol	I/O	Description
1	Vin	I	DC input
2	GND		Ground
3	Vc	I	ON/OFF control terminal
4	Nr	I	Noise reduction
5	Vo	O	DC Output

3.5.11 Function introduction to SI1912

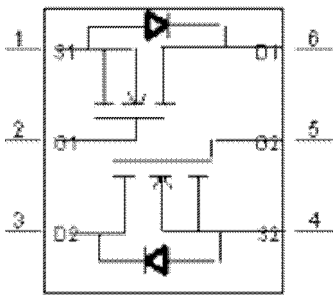
1. Description

The SI1912 is a Dual N-Channel 20-V (D-S) MOSFET.

2. Features

- ◆ TrenchFET Power MOSFETS: 1.8-V Rated
- ◆ ESD Protected: 2000 V
- ◆ Thermally Enhanced SC-70 Package

3. PIN Description



3.5.12 Function introduction to SI1912

1. Description

The M41T6X Serial Access TIMEKEEPER® is a low power Serial RTC with a built-in 32.768 KHz oscillator (external crystal controlled). Eight registers (see Table 3., page 13) are used for the clock/ calendar function and are configured in binary coded decimal (BCD) format. An additional 8 registers provide status/control of Alarm, 32KHz output, Calibration, and Watchdog functions. Addresses and data are transferred serially via a two line, bi-directional I2C interface. The built-in address register is incremented automatically after each WRITE or READ data byte.

2. Features

- ◆ TIMEKEEPING DOWN TO 1.0V
- ◆ 1.3V TO 3.6V I2C BUS OPERATING VOLTAGE
- ◆ COUNTERS FOR TENTHS/HUNDREDTHS OF SECONDS, SECONDS, MINUTES, HOURS, DAY, DATE, MONTH, YEAR, AND CENTURY
- ◆ SERIAL INTERFACE SUPPORTS I2C BUS (400KHz)
- ◆ PROGRAMMABLE ALARM WITH FLAG BIT ONLY (M41T63/64)
- ◆ PROGRAMMABLE ALARM WITH INTERRUPT FUNCTION (M41T62/65)
- ◆ LOW OPERATING CURRENT OF 350µA

- ◆ SOFTWARE CLOCK CALIBRATION
- ◆ OSCILLATOR STOP DETECTION
- ◆ 32KHz SQUARE WAVE ON POWER-UP (M41T62/63/64)
- ◆ WATCHDOG TIMER
- ◆ WATCHDOG OUTPUT (M41T63/65)
- ◆ AUTOMATIC LEAP YEAR COMPENSATION
- ◆ OPERATING TEMPERATURE OF –40 TO 85°C
- ◆ LEAD-FREE 16-PIN QFN PACKAGE

3. PIN Description

PIN No.	Symbol	I/O	Description
1	XI	I	Oscillator Input
2	XO		Oscillator Output
3, 5	VSS	I	Ground
4	SQW	I	Programmable Square Wave -Defaults to 32KHz on Power-up
9	SDA	O	Serial Data Input/Output
10	SCL	I	Serial Clock Input
11	/IRQ/OUT		Interrupt or OUT Output
14	VCC	I	Supply Voltage
6, 7, 8, 12, 13, 15, 16	NC		Not used

Chapter Four

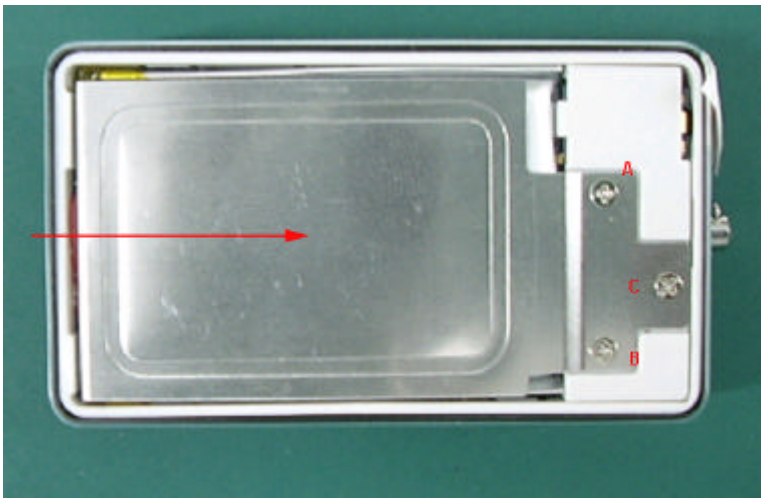
Assembly and Disassembly Process

In order to get to know the structure of X19 (RU) more easily and directly, now we use pictures to present each key point of disassembly and assembly process before all users to prevent users from operating blindly and to damage elements, so we hope you can operate according to the instructions strictly.

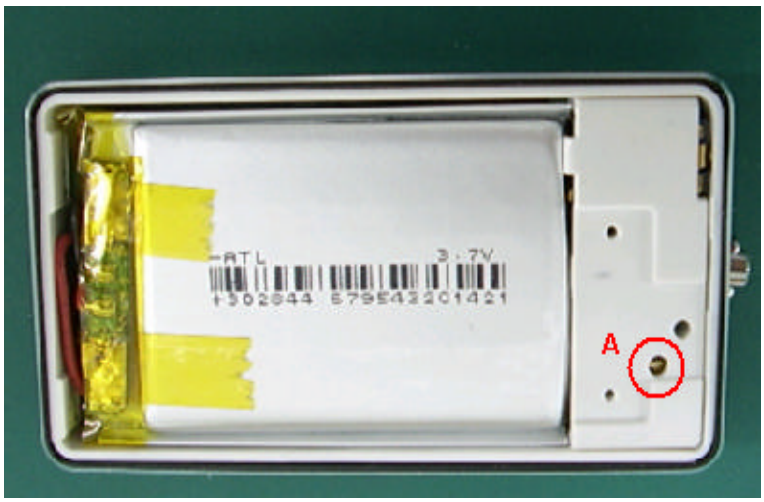
Note: all operations must be with strict anti-static measures. Operators must wear anti-static gloves or wrist ring; electric screwdriver must be grounded effectively and articles, such as nippers must be removed static before using!

4.1 Disassembly process for the player

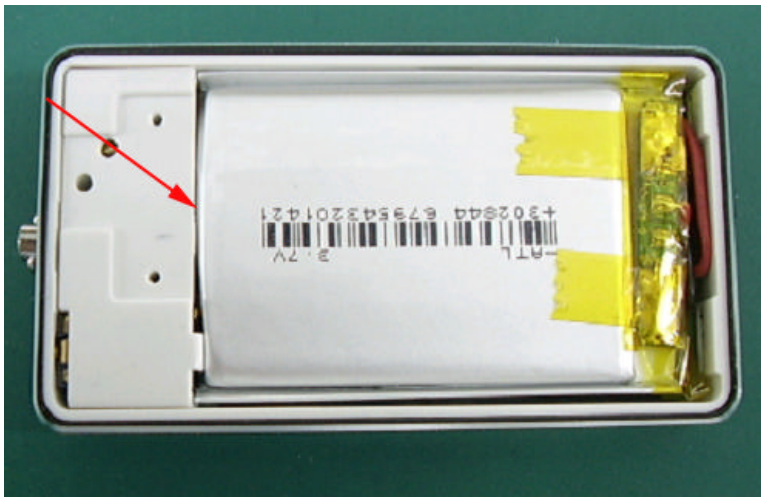
1. Remove the bottom casing by exerting strength in MIC hole (A in the figure) and pay attention not to damage the aluminum alloy surface casing.



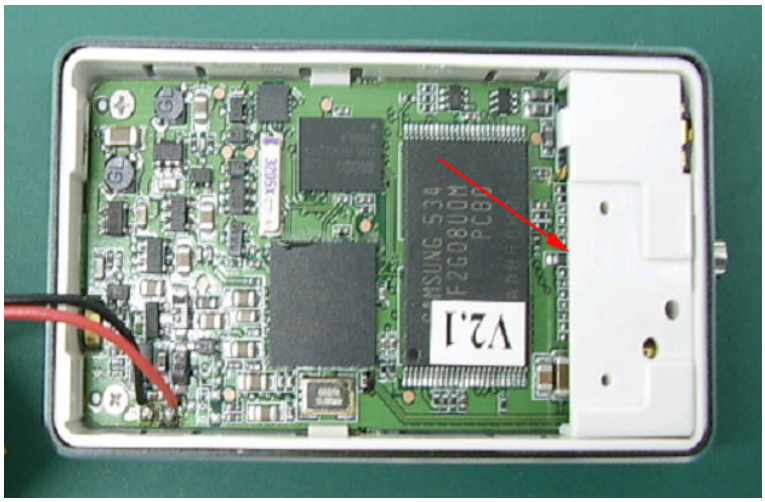
2. Use “+”-shaped screwdriver to remove screws A, B and C and then remove the stainless board according to the arrow direction.



3. Remove the grounding spring in position A.

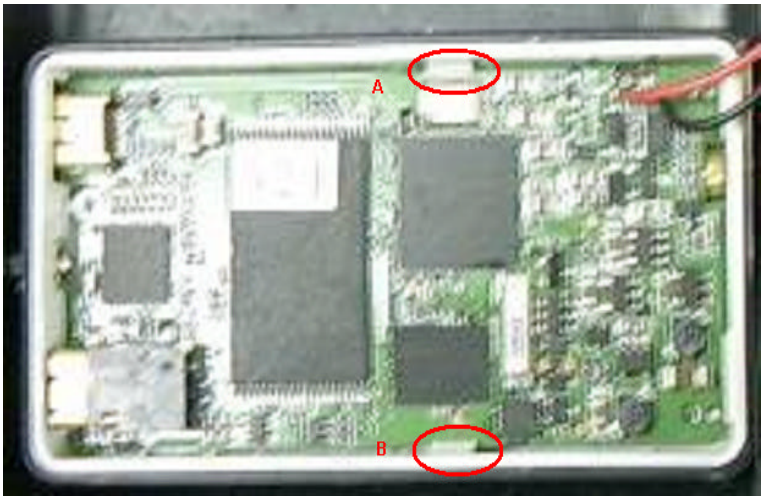


4. Remove battery according to the arrow direction in the figure.

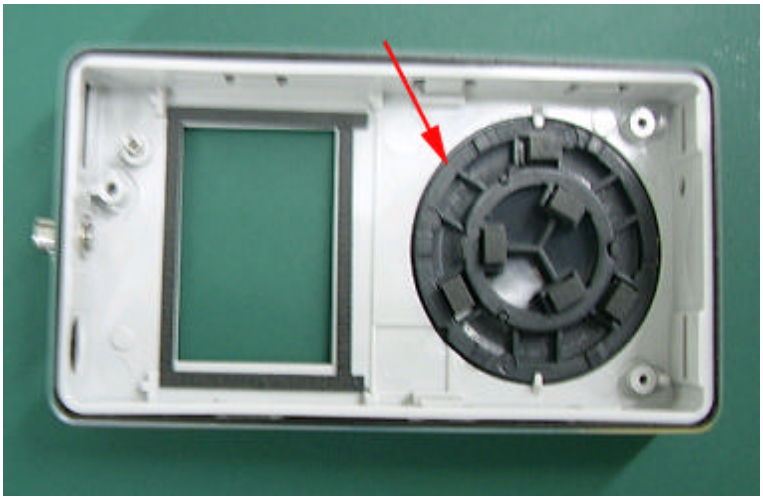


5. After removing battery, use hand to take out the stain board upwards from the indication position of arrow.

6. Use “+”-shaped screwdriver to remove two main board screws (A, B).

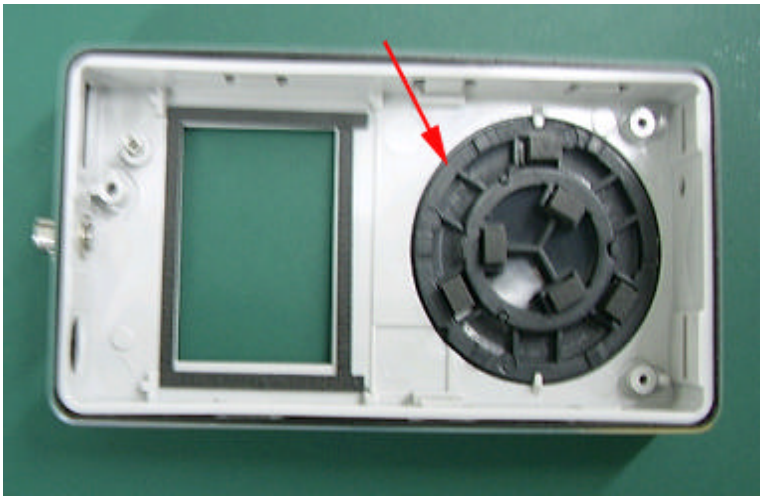


7. Open the buttons (A, B) on main board and use hand to press buttons on face side to take out the main board.

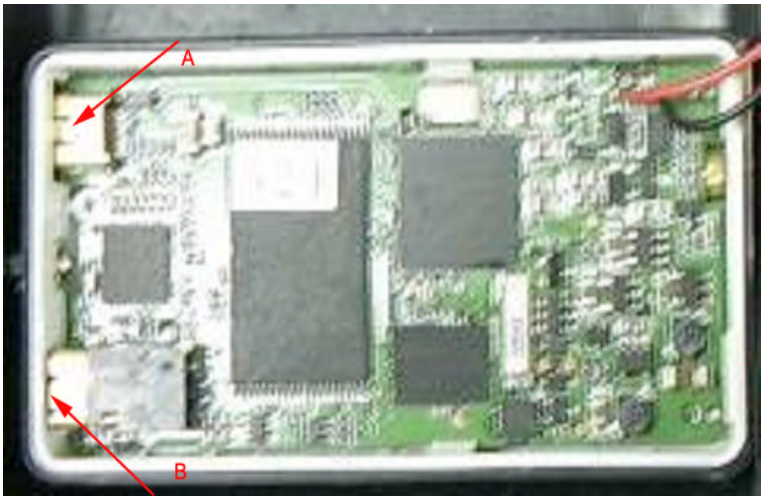


8. Remove button from the front surface casing.

4.2 Assembly process of the player

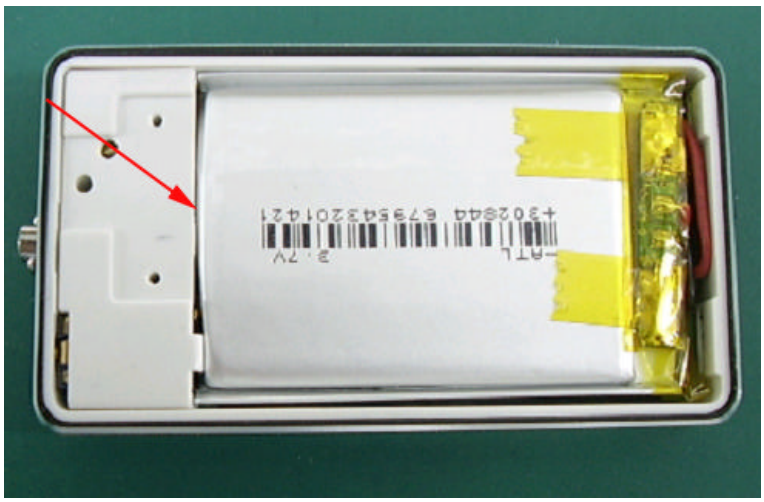


1. Install the button into the button hole.

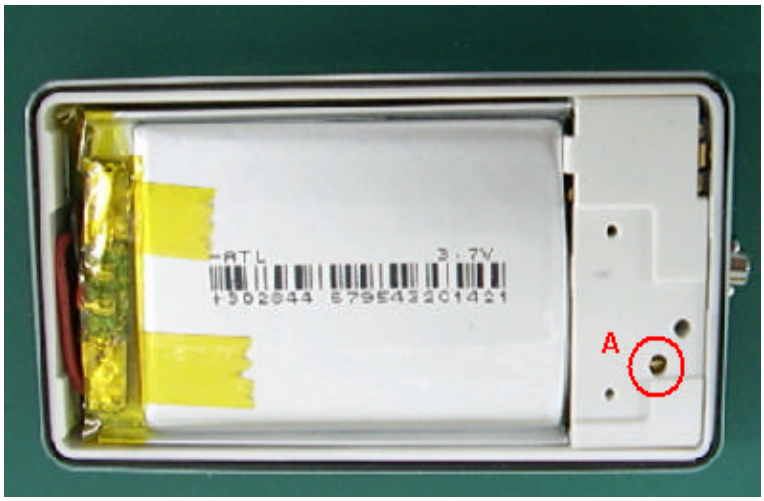


2. After installing headphone base (A) and USB base (B) into proper position, use hand to press down main board and the main board may be installed to proper position. When installing main board, please make sure you press down after screen is in proper position to avoid damaging the screen.

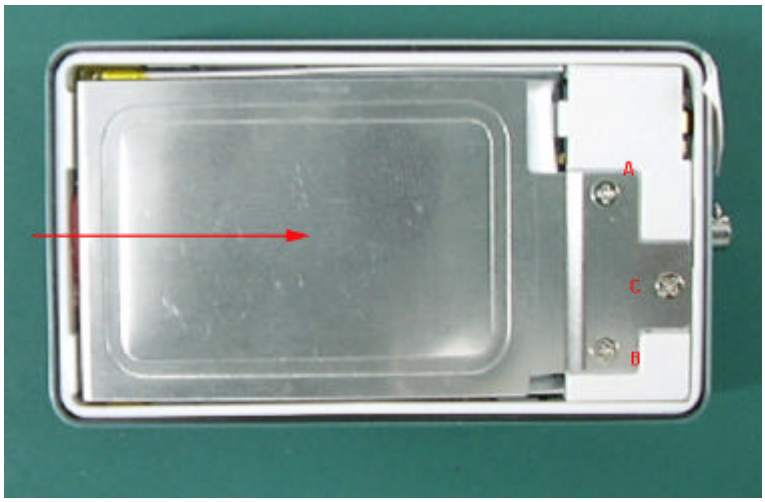
3. Use “+”-shaped screwdriver to fix 2 main board screws (A, B).



4. Install the battery.



5. Install the grounding spring in position A.



6. Install the cover board and use “+”-shaped screwdriver to fix 3 cover board screws (A, B, C).

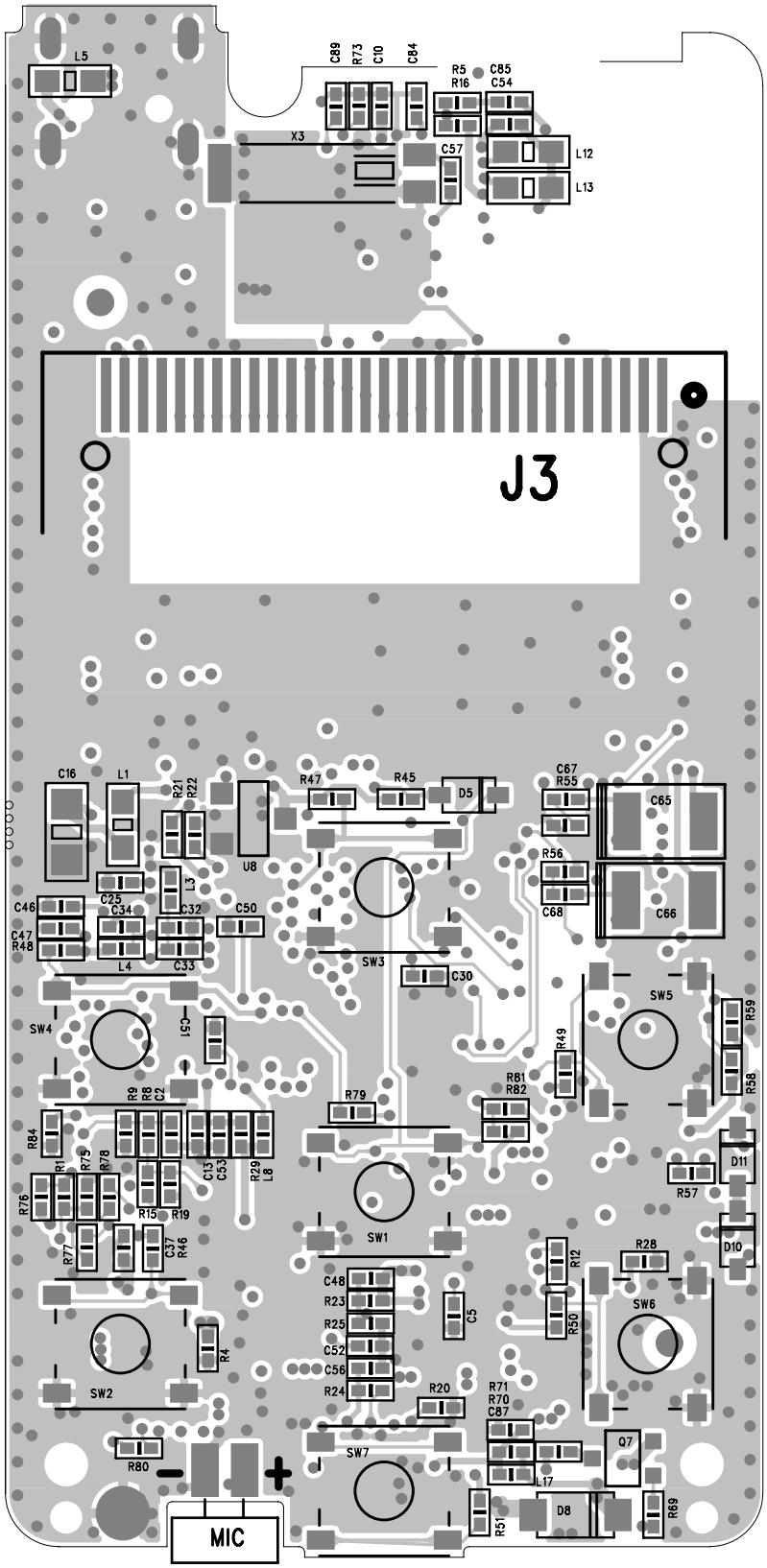
7. Install the bottom casing.

Chapter Cinque

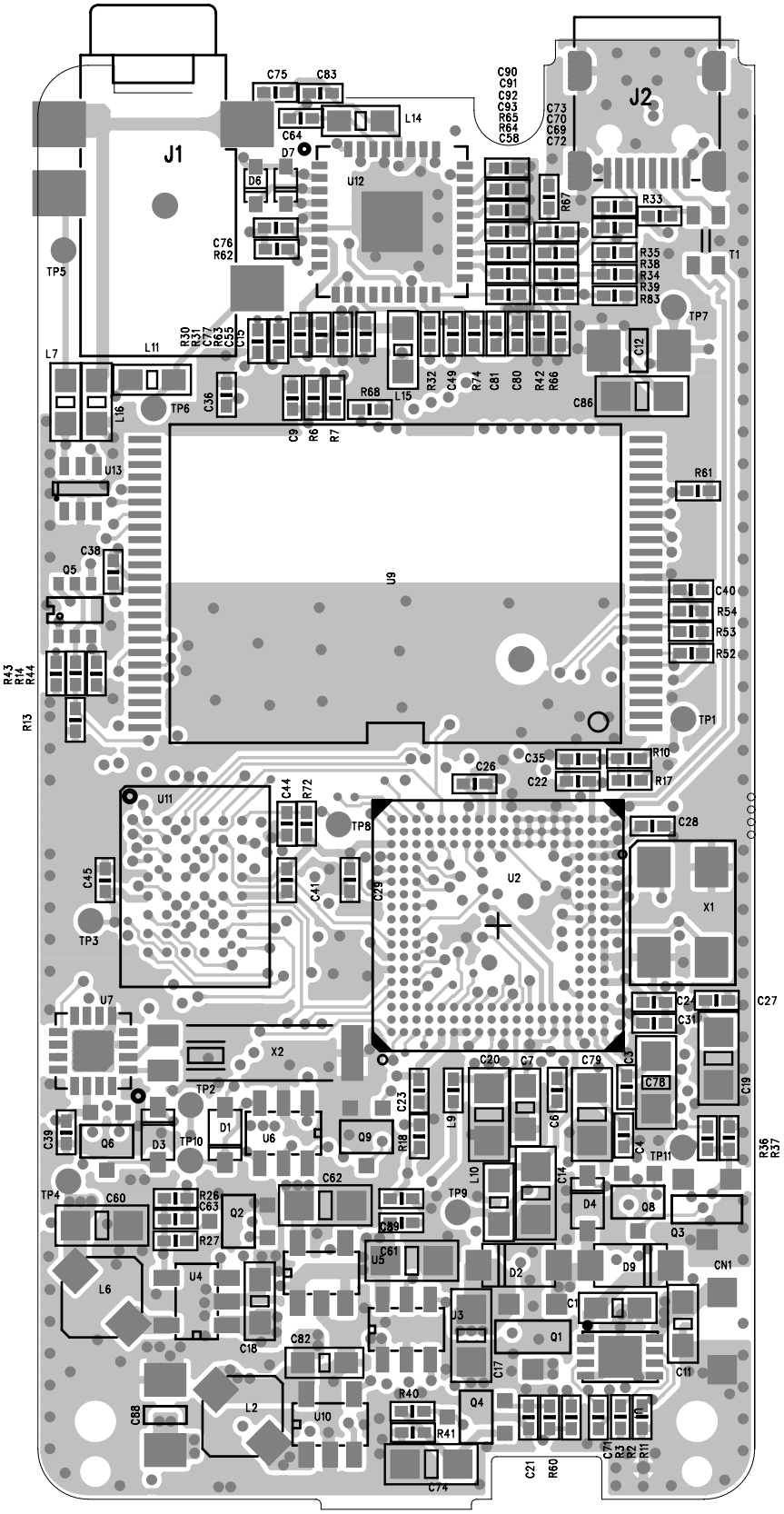
PCB board & Circuit diagram

Section One PCB board

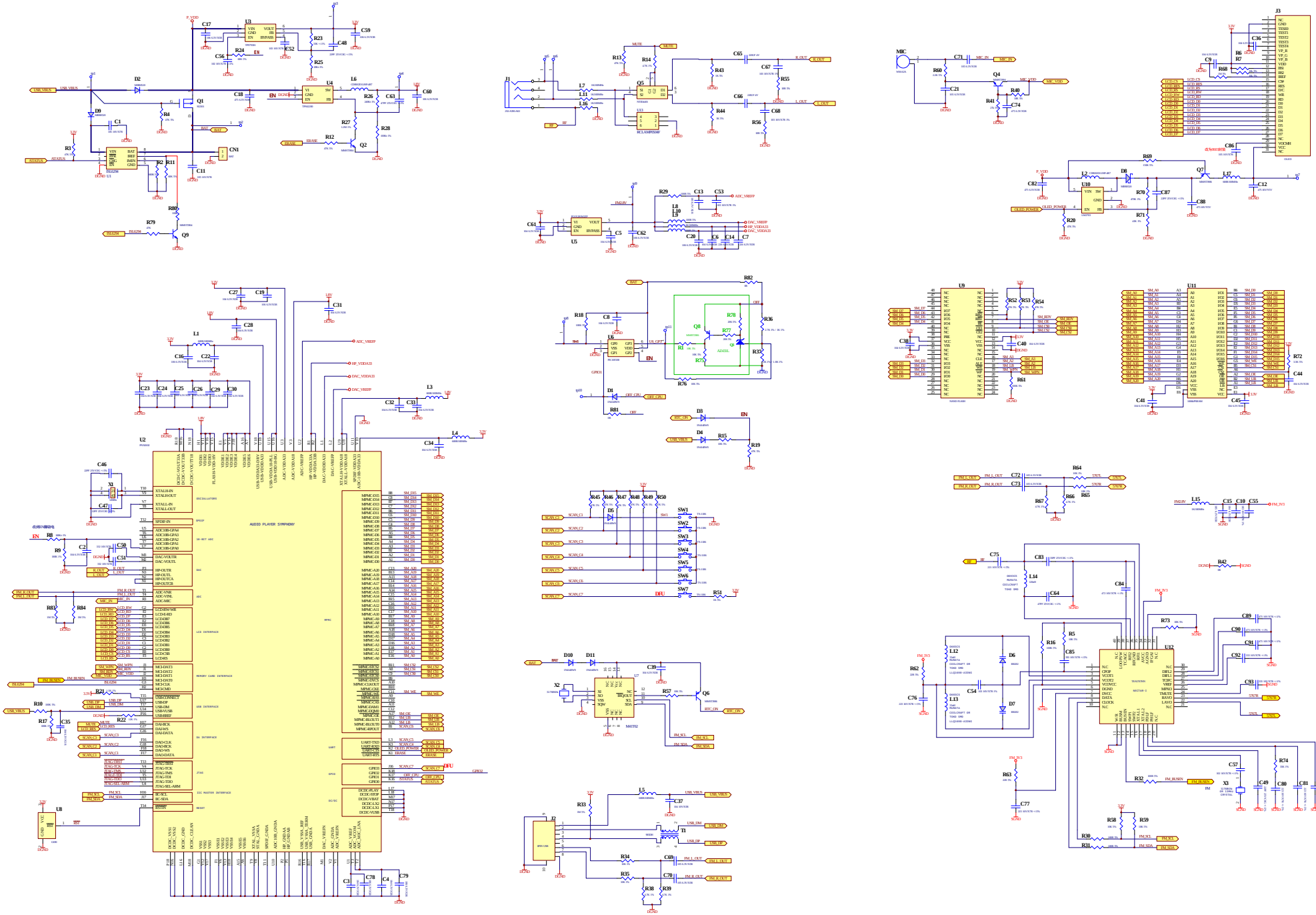
Surface layer of mainBoard



Bottom layer of mainBoard



Section Two circuit diagram



Chapter six BOM List

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
X19H (RU) (2G) BLACK WHITE			
BATTERY PROTECT BOARD 5446654			
0090223	SMD RESISTOR	1/16W 2K±5%	R2
0090011	SMD RESISTOR	1/16W 470O±5% 0603	R1
0310207	SMD CAPACITOR	50V 104 ±20% 7R 0603	C1,C2,C3 ①
0310543	SMD CAPACITOR	50V 104±10% 7R 0603	C1,C2,C3 ①
0882570	IC	S-8261AANMG22 SO23-6	U1
0790065	SMD FIELD EFFECT TRANSISTOR	ECH8601 TSSOP	U2 ②
0790090	SMD FIELD EFFECT TRANSISTOR	ECH8601R TSSOP	U2 ②
1632263	PCB	E9-0	
X19H (RU) (2G) BLACK WHITE			
MAINBOARD 5449854 1.0/Ver3.00			
0090377	SMD RESISTOR	1/16W 4.7K±5% 0402	R14
0090741	PRECISION SMD RESISTOR	1/16W 4.7K±1% 0402	R38,R39,R66,R67
0090369	SMD RESISTOR	1/16W 2.2K±5% 0402	R60
0090324	SMD RESISTOR	1/16W 0O±5% 0402	R42,R81,R24
0090639	PRECISION SMD RESISTOR	1/16W 1.5K±1% 0402	R21
0090740	PRECISION SMD RESISTOR	1/16W 1.8K±1% 0402	R36
0090652	PRECISION SMD RESISTOR	1/16W 1K±1% 0402	R37
0090362	SMD RESISTOR	1/16W 1K±5% 0402	R43,R44,R51
0390356	SMD MAGNETIC BEADS	1KO/100MHz±25% 1608	L1,L5,L7,L10,L11,L15,L16
0090433	SMD RESISTOR	1/16W 1MO±5% 0402	R33,R83,R84
0090748	SMD RESISTOR	1/16W1.3MO±5% 0402	R68
0700154	SMD TRIODE	14148WS SO323	D1,D3,D4,D5,D10,D11
0310776	SMD CAPACITOR	6.3V 105±20% 5R 0402 ? ?	C71,C13,C15,C21,C69,C70,C72,C73
1980074	SMDEARPHONE SOCKET	2S0386-001	J1
0090373	SMD RESISTOR	1/16W 3.3K±5% 0402	R72
0310717	SMD CAPACITOR	6.3V 475±20% 5R 0603	C82,C18,C74,C7
0090462	PRECISION SMD RESISTOR	1/16W 10K±1% 0402	R34,R35
0090651	PRECISION SMD RESISTOR	1/16W 200O±1% 0402	R64,R65

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0090385	SMD RESISTOR	1/16W 10K±5% 0402	R57,R58,R59,R5,R6,R7,R76
0090453	PRECISION SMD RESISTOR	1/16W 12K±1% 0402	R22
0960284	SMD CRYSTAL OSCILLATOR	12MHz±30ppm 5032/4 20P	X1
0090390	SMD RESISTOR	1/16W 18K±5% 0402	R73
0090387	SMD RESISTOR	1/1612K±5% 0402	R40
0090644	SMD RESISTOR	1/16W 18O±5% 0402	R56,R55
0090672	PRECISION SMD RESISTOR	1/16W 20K±1% 0402	R25
0310416	SMD CAPACITOR	50V 22P±5% NPO 0402	C49,C47,C48,C46,C87
0090447	SMD RESISTOR	1/16W 22O±5% 0402	R62,R63
0960279	SMD CRYSTAL OSCILLATOR	32.768KHz±20ppm SS6 12.5P	X2,X3
0090396	SMD RESISTOR	1/16W 33K±5% 0402	R74
0090671	PRECISION SMD RESISTOR	1/16W 33K±1% 0402	R23
0310420	SMD CAPACITOR	50V 33P±5% NPO 0402	C83
0390221	SMD COIL THREAD INDUCTOR	33nH±2% 1608	L12,L13
0090400	SMD RESISTOR	1/16W 47K±5% 0402	R45,R46,R47,R48,R49,R50,R52,R53,R54,R3,R4, R12,R13,R15,R19,R20,R79,R71
0310424	SMD CAPACITOR	50V 47P±5% NPO 0402	C64,C63
0090404	SMD RESISTOR	1/16W 68K±5% 0402	R41
0090408	SMD RESISTOR	1/16W 100K±5% 0402	R61,R10,R16,R18
0090509	PRECISION SMD RESISTOR	1/16W 100K±1% 0402	R8,R28
0090339	SMD RESISTOR	1/16W 100O±5% 0402	L8,R29,R30,R31,R32,L9
0390398	SMD COIL THREAD INDUCTOR	120nH±2% 1608	L14
0090412	SMD RESISTOR	1/16W 150K±5% 0402	R69
0090645	PRECISION SMD RESISTOR	1/16W 180K±1% 0402	R9,R17
0310736	SMD TANTALUMCAPACITOR	4V 220uF±20% 3528(B)	C65,C66
0090687	PRECISION SMD RESISTOR	1/16W 240K±1% 0402	R26
0090683	PRECISION SMD RESISTOR	1/16W 470K±1% 0402	R70
0390388	SMD MAGNETIC BEADS	600O/100MHZ±25% 1005	L3,L4,L17
0090738	PRECISION SMD RESISTOR	1/16W 1.2MO±1% 0402	R27
0310480	SMD CAPACITOR	10V 104±10% 5R 0402	C2,C3,C4,C5,C6,C8,C9,C10,C22,C23,C24,C25,C 26,C27,C28,C29,C30,C31,C32,C33,C34,C35,C36, C37,C38,C39,C40,C41,C44,C45,C61,C56 ③
0310790	SMD CAPACITOR	10V 104±20% 5R 0402	C2,C3,C4,C5,C6,C8,C9,C10,C22,C23,C24,C25,C 26,C27,C28,C29,C30,C31,C32,C33,C34,C35,C36, C37,C38,C39,C40,C41,C44,C45,C61,C56 ③

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0310486	SMD CAPACITOR	6.3V 106±20% 5R 0805	C20,C78,C79,C14,C16,C17,C19,C59,C60,C62
0310704	SMD CAPACITOR	25V 102±10% 7R 0402	C57,C58
0310453	SMD CAPACITOR	25V 103±10% 7R 0402	C52,C53,C67,C68,C54,C55
0310658	SMD CAPACITOR	25V 105±10% 7R 0805	C86
0310216	SMD CAPACITOR	10V 105 +80%-20% 0603	C1,C11
0310435	SMD CAPACITOR	50V 221±5% NPO 0402	C75
0310455	SMD CAPACITOR	16V 223±10% 7R 0402	C77,C80,C81,C76
0310705	SMD CAPACITOR	25V 332±10% 7R 0402	C50,C51
0310710	SMD CAPACITOR	16V 333±10% 5R 0402	C92,C93
0310711	SMD CAPACITOR	10V 393±10% 5R 0402	C85
0310706	SMD CAPACITOR	25V 472±10% 7R 0402	C84
0310712	SMD CAPACITOR	10V 473±10% 5R 0402	C89,C90,C91
0310752	SMD CAPACITOR	25V 106±10% 5R 1206	C12,C88
0700115	SMD TRANSFIGURATION DIODE	BB202	D6,D7
0390432	SMD CORES INDUCTOR	4.7uH±30% CDRH2D11/HP	L2,L6
0882951	IC	26LV16163HC-70 BGA	U11
0882481	IC	G690L26371 SO23-3	U8
0882851	IC	ISL6294IRZ DFN	U1
0882565	IC	L2703 SO23-5	U10 ④
0882999	IC	5331 SO23-5	U10 ④
0882850	IC	4162 QFN	U7
0680077	SMD SCHOTTKY DIODE	MBR0520 SOD123	D2,D8,D9
0780298	SMD TRIODE	MMS3904 SO323	Q2,Q4,Q9
0780293	SMD TRIODE	MMS3906 SO323	Q6,Q7
0883396	IC	HY27UH08AG5TPCB TSOP	U9
0790070	SMD FIELD EFFECT TRANSISTOR	NTJD4401N SO363	Q5
0882853	IC	PIC10200I/OTG SO23	U6
0882852	IC	PNX0102AET/102 TFBGA	U2
0882480	IC	PQ12812ZP SO23-5	U5
1090080	ESD ELEMENT	RCL0504 SC70-6L	U13
0790041	SMD FIELD EFFECT TRANSISTOR	SI2305DS SO23	Q1
0882388	IC	TE5767HN HVQFN	U12

MATERIAL CODE	MATERIAL NAME	SPECIFICATIONS	LOCATION
0882476	IC	TP62200 SO23-5	U4
0882475	IC	79301 SO23-6	U3
1340174	LIGHT TOUCH SWITCH	TS-1186-2(180 GRAM PUISSANCE)	SW1,SW2,SW3,SW4,SW5,SW6,SW7
1140082	MICROPHONE	44dB±3dB 4×1.2 WITH NEEDLE	MIC
0090429	SMD RESISTOR	1/16W 680K±5% 0402	R2,R11
1000053	COMMON MODE FILTER	SDCW2012-2-371T NT2012	T1
1860110	USB SOCKET	R-S13DG-03	J2
1632974	PCB	0002192	
0090402	SMD RESISTOR	1/16W 56K±5% 0402	R80