DK1211S

service manual

Catalog

Chapter One About Maintenance

1.1 Safety precautions

1.1.1 Power supply

When maintenance personnel are repairing DVD players, he should pay special attention to the power board with 220V AC and 330V DC which will cause hurt and damage to persons!

1.1.2 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.

1.1.3 Precautions for laser head

1. Do not stare at laser head directly, for laser emission will occur when laser head is working, which will Hurt your eyes!

2. Do not use wiping water or alcohol to clean laser head, and you may use cotton swab.

1.1.4 About placement position

1. Never place DVD player in positions with high temperature and humidity.
2. Avoid placing near high magnetic fields, such as loudspeaker or magnet.
3. 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

- ◆ Digital oscillograph (≥100MHE)
- ◆ TV set
- ◆ SMD rework station
- ◆ Multimeter
- ◆ Soldering iron
- ◆ Pointed-month pincers
- ◆ Cutting nippers
- ◆ Forceps
- ◆ Electric screw driver
- ◆ Terminals connecting cord
- ◆ Microphone

Chapter Two

Functions and Operation Instructions

2.1 Features

Compatible Disc Types:

#Digital video playback DVD-Video, Super VCD, VCD compatibility.
#MPEG-4 standard support: compatibility with DivX3.11, DivX5, DivX pro, XviD compressed video filies.
#Digital audio playback: CD-DA and HDCD compatibility.
#Fully compatible with compressed audio files such as Mp3 and WMA
#Playback of DVD, VCD, CD+G karaoke discs.
#Digital graphic albums playback: Kodak picture CD, JPEG compatibility.

Audio:

#192KHz/24 bit Audio Digital/Analog converter.
#Coaxial and optical outputs for Dolby Digital/DTS/LPCM digital audio.
#Mixed audio output for amplifier of TV connection
#Stereo signal input for external signal connection.
#Built-in Dolby Pro Logic II decoder makes available to convert stereo signal into multi-channel.
#Dual-channel MIC inputs for karaoke function

Video:

#108MHz/12 bit Video Digital/Analog converter
#Progressive Scan Output(Y Pb Pr) producing flicker-free and stable images
#Composite, component(Y Cb Cr), S-Video and RGB/SCART outputs for various types of connections
#NTSC/PAL transcoder
#Multiple dubbings, angles, subtitles support.
#Sharpness, gamma, brightness, contrast, hue , saturation adjustment.

Others:

#Compatible disc types: CD-R/CD-RW, DVD+R/DVD+RW
#Built-in digital FM/AM tuner with 30 radio stations memory
#Karaoke function
#Russia, CIS and Baltic States adaptation interface and filenames, ID3-tags and CD-Text support simplifies device operation.
#"Last Memory" function enables to save the last point after stop playback.
#:Q-Play" function provides direct playback and allows to skip commercial that is not possible to rewind.
#"Virtual keyboard" function provides more convenient DVD playback control.
#"Browser" function provides manually operation to AM/FM radio channel.
#Automatic screensaver function
#Parental control function to protect children from watching inappropriate discs.

Chapter Three Principle and Servicing

Section One Principle of the Player

3.1.1 Features of the player

◆ Progressive scanning output to produce steadier and clearer pictures

◆ Composite video, S-video and component video output. 5.1CH output

◆ Digital picture adjustment to the sharpness, brightness, contrast, chroma and saturation of pictures, gamma correction

◆ Karaoke function. Built-in Dolby digital decoder

◆ Hi-Fi stereo headphone output

◆ FM/AM digital tuning function, capable of storing (memorizing) 30 FM/AM radio stations each

◆ Power amplifier adopts high-performance large-power IC, with complete protection function and perfect sound quality

◆ Compatible with DIVX, MPEG4 format movie

◆ Subwoofer adopts large-diameter bass unit with large-capacity body, with deep and dynamic bass effect

3.1.2 Block diagram of the player

This player is composed of decode & servo board, power amplifier board, input/output board, panel, headphone board, tuner, power board and loader. Block diagram of the player is shown in the figure 3.1.2.1. Except that power board is not shown, other signal flow is shown in the figure basically. Main function of loader is to read disc information and transmit to MT1389D, MT1389D fulfils servo function through AM5888 on decode board and other subsidiary circuit; and ensures normal working of loader through other circuits. FLASH on decode board is to save system program, SDRAM is to save program when the player is working and read sound and picture information from disc to ensure smooth output. The main function of power amplifier board is to perform DA conversion and amplification of analog signals to output 5.1CH and ensure normal working of external speaker. The main function of AV board is to output various audio and video signals. This player is also with headphone and microphone to meet client's requirements. In addition, there is external sound input , power amplifier board of this player may be used to amplify power to facilitate to output to speaker. Tuner in this player also makes it have tuning function.

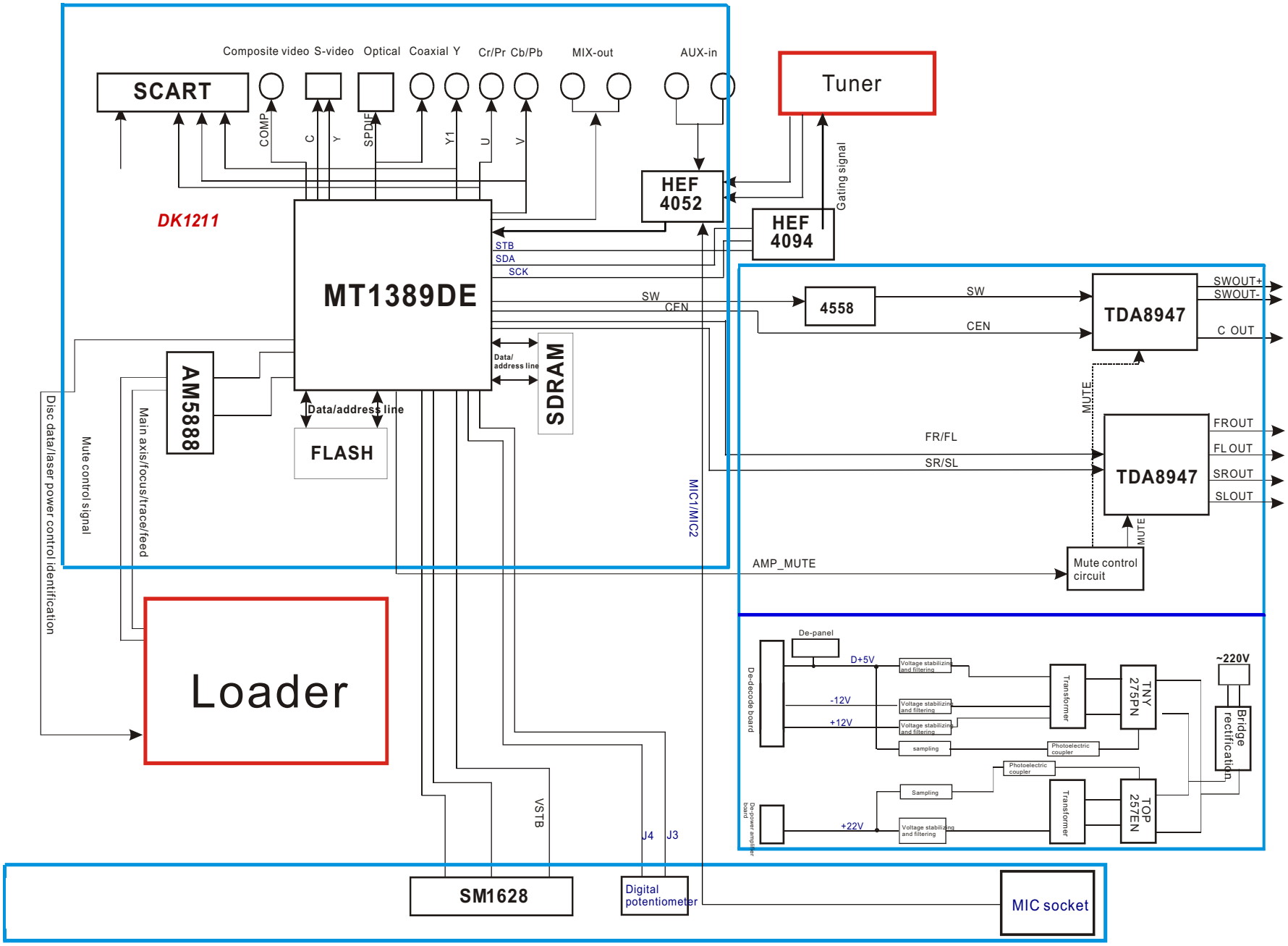


Figure 3.1.2.1 Block diagram of the player

3.1.3 PCB board composition diagram of the player

PCB board composition diagram of the player is shown in the figure 3.1.3.1:

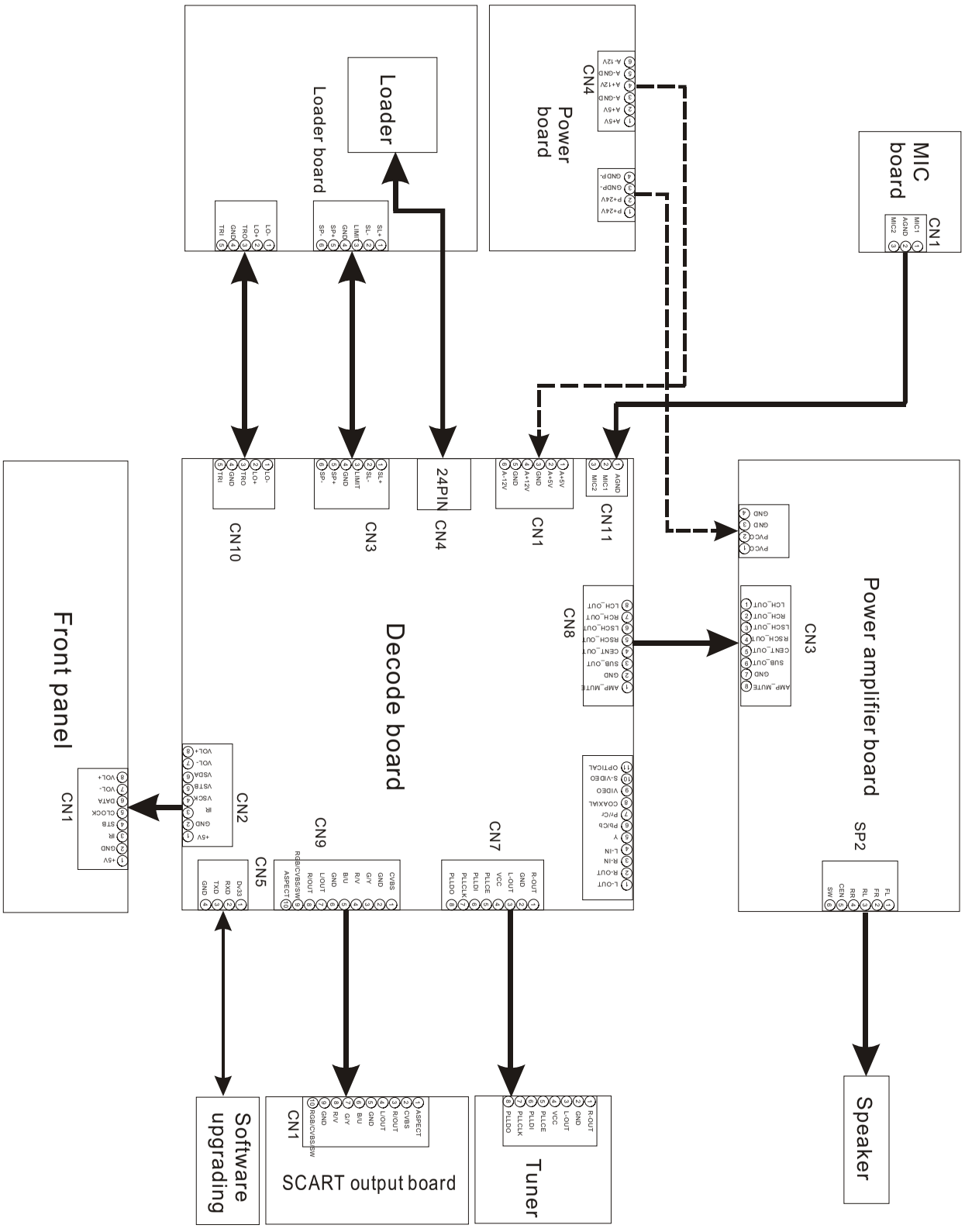


Figure3.1.2.1PC Bboard block diagram of the player

3.1.4 Introduction to IC used in this player

Introduction to IC used in DK1211S is shown in the following table:

PCB semi-finished product	IC model	Location	Function
Decode board	MT1389DE	U1	Decode chip
	4558	U7,U8,U10	Audio amplifying
	HEF4052	U12	Audio switch IC
	S8550	Q7,Q8,Q9,Q10	voltage stabilizer
	EON-F16-100HIP	U6	16M FLASH
	HY57V641620FTP-6	U5	64M SDRAM
	HEF4094	U2	Serial and parallel connection conversion
	AM5888	U3	Servo drive
Power amplifier board	TDA8947J	U7,U8	Digital power amplifier
	TL431	U3,U6	Precision voltage stabilizer
	PC817	U2,U5	Photoelectric coupler
	TOP257EN	U1	Power switch IC
	TNY275PN	U4	Power switch IC
	4558	U9	Audio amplifying
Mainpanel	SM1628	U1	Panel control IC

Section Two Unit Circuit Principle

3.2.1 Loader signal explanation

Loader signals explanation is shown in the following table:

Pin	Name	Signal flow direction	DVD disc	CD disc	No disc	Function description
1	F-	Input loader	2.52	2.34	0.46	Focus error signal is added to two sides of pick-up focus coil
2	F+	Input loader	2.49	2.49	0.93	
3	T+	Input loader	2.53	2.51	0.94	Trace error signal is added to two sides of pick-up trace coil
4	T-	Input loader	2.58	2.51	0.93	
5	C	Input MT1389	2.2	2.25	2.04	Disc data signal
6	D	Input MT1389	2.2	3.2	2.04	Disc data signal
7	IOA	Input MT1389	0.01	3.2	3.21	Disc identification signal, CD is 3.3V, DVD is 0V
8	RF	Input MT1389	2.21	2.53	1.28	The sum of disc data signal
9	A	Input MT1389	2.17	2.22	2.04	Disc data signal
10	B	Input MT1389	2.19	2.27	2.04	Disc data signal
11	F	Input MT1389	2.07	2.44	2.03	Supplementary signal used in trace
12	GND	Ground	0.01	0.01	0	Grounding
13	V20	Input loader	2.04	2.06	2.03	Reference voltage
14	Vcc	Input loader	5.04	5.04	5.02	Supply voltage for loader
15	E	Input MT1389	2.06	2.45	2.03	Disc data signal
16	Blanking	haning in air	0.01	0	0	unused
17	VR-CD	Input loader	0.21	0.01	0	Through the handling inside loader, make sure MD11 is 180mV when reading CD
18	VR-DVD	Input loader	0.01	0.2	0	Through the handling inside loader, make sure MD11 is 180mV when reading DVD
19	LD-CD	Input loader	0.09	2.1	0	CD laser power control signal
20	MDII	Input MT1389	0.21	0.2	0	CD and DVD laser power monitoring signal
21	HFM	Input loader	5.04	5.04	5.02	High frequency overlapping signal produces laser with different wave length inside loader

22	Blanking	unused	0.01	0.1	0	
23	LD-DVD	Input loader	2.21	0.1	0	DVD laser power control signal
24	GND	unused	0.01	0.01	0	Grounding

Note: 1. When reading DVD, there are only A, B, C, D signals

2. When reading CD, there are A, B, C, D, E, F signals.

3. RFO=A+B+C+D.

4. Focus error signal=(A+C)-(B+D) Trace error signal=E-F.

3.2.2 Servo circuit

1. DK1211S adopts SANYO HD850 loader and MTK decode solution (MT1389D+FLASH (16M)+SDRAM (64M)). Its servo circuit is mainly composed of front signal processing and digital servo processing, digital signal processing IC MT1389D and drive circuit AM5888, in which MT1389D is also the main part of decode circuit, shown in the figure 3.2.2.1:

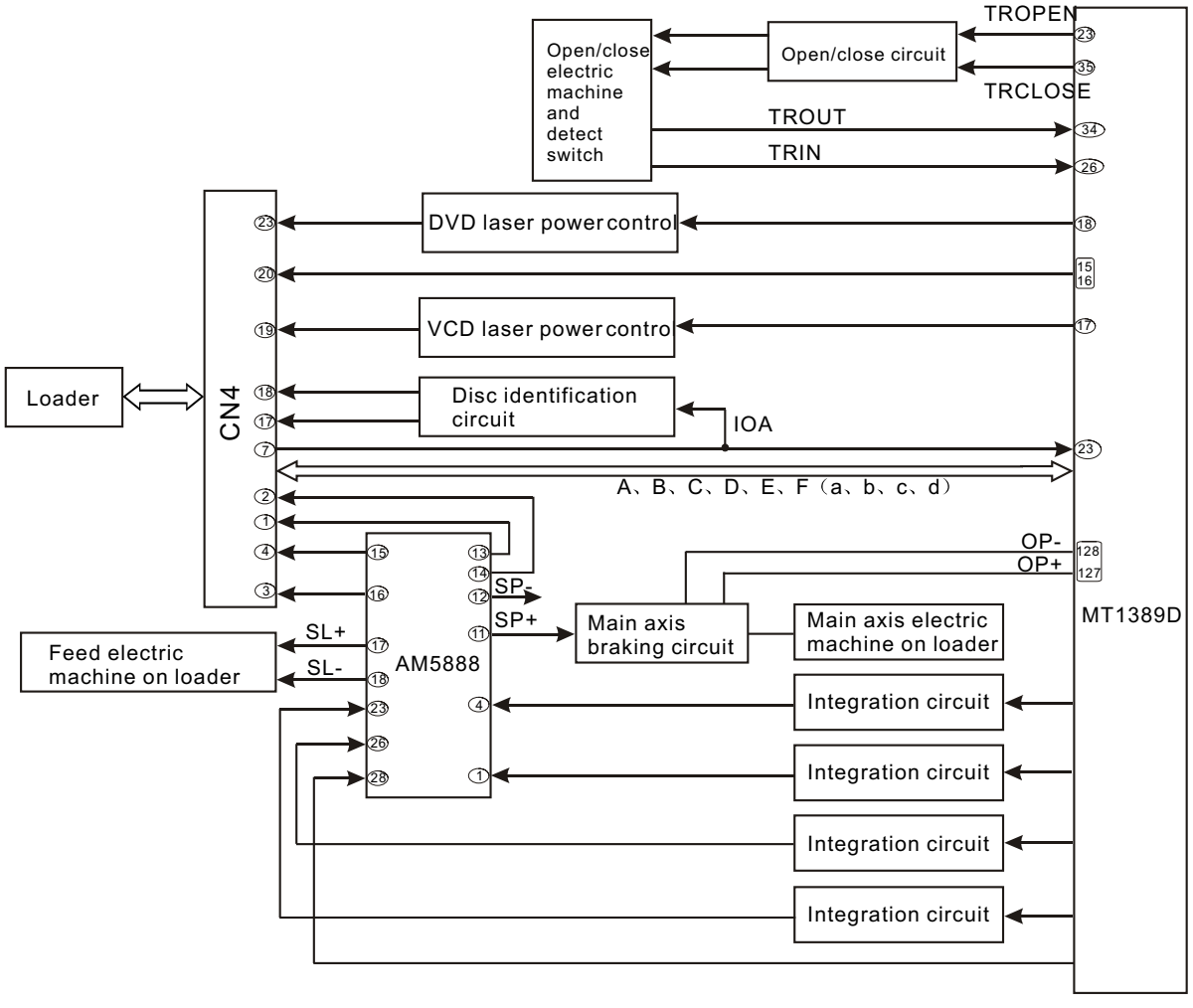


Figure 3.2.2.1 Servo circuit block diagram

2. Working principle: after powering on or disc in, according to IOA signal, disc identification circuit decides through which path of variable resistor the laser detecting diode gets path to the ground, meanwhile MT1389D decides whether DVD laser or VCD laser is emitted according to IOA signal, which can be fulfilled through laser power control circuit. When IOA is high level (3.3V), Mt1389D pulls LOD1 of Q6 base electrode in laser tube power control connected to VCD down to about 2.2V to make Q6 on and to make VCD laser tube emit beam; then decides whether to pull up or pull down LOD1 according to voltage after the feedback from MDI1 to control the power of light emission diode. Similarly, when IOA is low level (0V), MT1389D pulls LOD2 of Q5 base electrode in laser tube power control connected to DVD down to about 2.2V to make Q5 on and to make DVD laser tube emit beam; then decides whether to pull up or down LOD2 according to the voltage after the feedback from MDI1.

After loader reading disc information, A, B, C, D, E, F signals are sent out to Mt1389D (DVD only has A, B, C, D signals), and then inputted from pin 1~6 of MT1389D. After being amplified and processed by the pre-amplifier inside MT1389D, now signals are separated to two part s for processing inside Mt1389D.

After being processed by digital servo signal circuit inside MT1389D, one part of signal form corresponding servo control signals and output FOO, TRO, DMO, FMO digital servo control signals from pin 25, pin 24, pin 20, pin 21 of MT1389D respectively, then change into analog servo control signal FOSO, TRSO, DMSO, FMSO through integration circuit composed by resistor capacitor, and send to driver circuit AM5888 for amplification to bring along focus winding, trace winding, main axis electric machine and feed electric machine after drive amplification. Among these, focus and trace servo are used to correct objective position accurately; feed servo is used to bring along laser head to make radial large-scale move which belongs to the preliminary adjustment to pick-up position; and main axis servo is used to control main axis electric machine to make it read signals in means of constant linear velocity and bring along disc to rotate.

After processing of amplification by VGA voltage control amplifier and equalization frequency compensation inside MT1389D, another part of signals are changed into digital signals through internal A/D converter. When loader is reading CD/VCD signals, these signals are conducted EFM demodulation inside MT1389D, and then outputted to latter stage for AV decoding after finishing CIRC (Cross-Interleaved Reed-Solomon Code) error correction inside. When loader is reading DVD signals, these signals are conducted ESM demodulation inside MT1389D, and then sent to latter stage for decoding after finishing RSPC error correction inside.

The other part of servo is open/close disc tray circuit. After panel or remote controller emits open/close disc tray signal to MT1389D, in usual conditions, TROPEN and TRCLOSE sent out by pin 23, 35 of Mt1389D are both low level, when signal of “open” comes, after Mt1389D makes disc stop rotating through main axis braking circuit, TRCLOSE is set high to make open/close electric machine on loader frame run to bring along dist tray to eject. After disc tray ejecting to proper signal of opening to proper position (TR_OUT) is set high level (0V) through the detecting switch on loader frame, MT1389D pulls

down TRCLOSE and open/close electric machine stop running. When MT1389D receiving "close" signal, TROPEN is set high level by MT1389D, open/clode electric machine tuns conversely to bring along disc Tray to close. After disc tray closing to proper position, signal of closing to proper position (TR_IN) is set low level through the detecting switch on loader frame, MT1389D pulls down TROPEN and electric machine stops running to finish "close" process.

3. Explanation to servo terms

(1) FOO: for disc make differences, and when rotating disc may probably move upwards or downwards slightly to make the focus of laser emitted by laser head cannot justly fall on data pit of disc, now focus point of objective lens is required to adjust to make focus aim at data pit exactly. The acts are mainly to make objective lens move upwards and downwards.

(2) TRO: data information is saved in disc in form of tracks. When disc is rotating, disc deviation will produce, now laser head is required to adjust. In this process, objective lens makes forward and backward movement with small moving range.

(3) FMO: similar to acts of trace, the acts of feed are larger than those of trace. Feed conducts a large scale movement firstly, and then trace moves slightly in this range. Feed moves for a while, and does not move for another while; but trace moves all the time. Feed is rough adjustment and trace is fine. And acts are obvious when power on and selecting track.

(4) DMO: it is the top that holds up disc. Its rotation speed decides that of disc. Its rotation is generated by an individual DC electric machine, in which rotation speed of DVD is twice over that of CD.

4. Key point voltage (unit: V) is shown in the following table:

Name	when reading disc normaly	when opening door	when closing door	when no disc in
TROPEN	0	There is about 3.3V pulse with 1S at the moment of opening door	0	0
TRCLOSE	0	0V	There is about 3.3V pulse with 1S at the moment of opening door	0
TROUT	3.41V	3.3V→0V	0V→3.3V	3.3V
TRIN	0	0V→3.3V	3.3V→0V	0
OP+	1.66V	1.81V	1.27V	1.81V
OP-	1.85V	2.12V	1.47V	2.04V

3.2.3 Mute circuit

DK1211S mute control circuit includes power-on mute control, power-off mute control and usual mute function.

1. Power-on mute is shown in the figure 3.2.3.1. When voltage of pin 5, 10 of power IC TDA8947 is lower than power supply voltage 3.5V of this IC, this IC enters MUTE mode, from 0 to 0.8V, it is STANBY mode.

When power on, due to the function of c41 charge, Q2 cuts off at the beginning, Q1 is on, HERDM is low level, shown in the figure 3.2.3.2. Seen from the figure, when HARDM is low, SCM, LRSWM are pulled down to fulfil power-on mute.

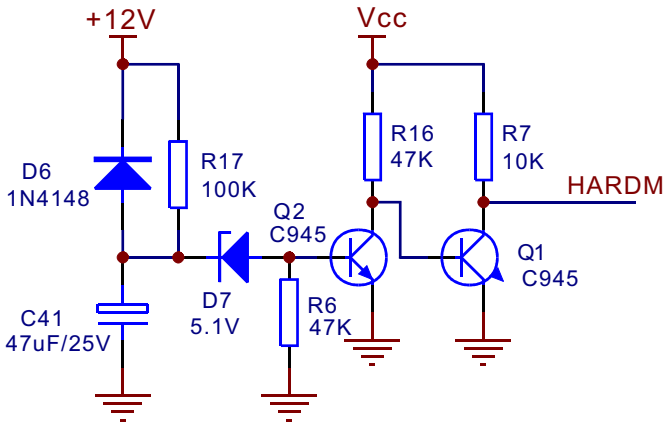


Figure 3.2.3.1 Power-on mute circuit

2. Usual mute: 1389 sends out control signal MUTE to control the on of triode Q5, to make STBY_A, STBY_B be low level to fulfill mute function.

3. Power-off mute: Q7 realizes power-off mute function. When +12V power failure, C61 still keeps high level, now base electrode of Q7 is low, Q7 is on, base electrode of Q5 gets high level and they are on to realize power-off mute function.

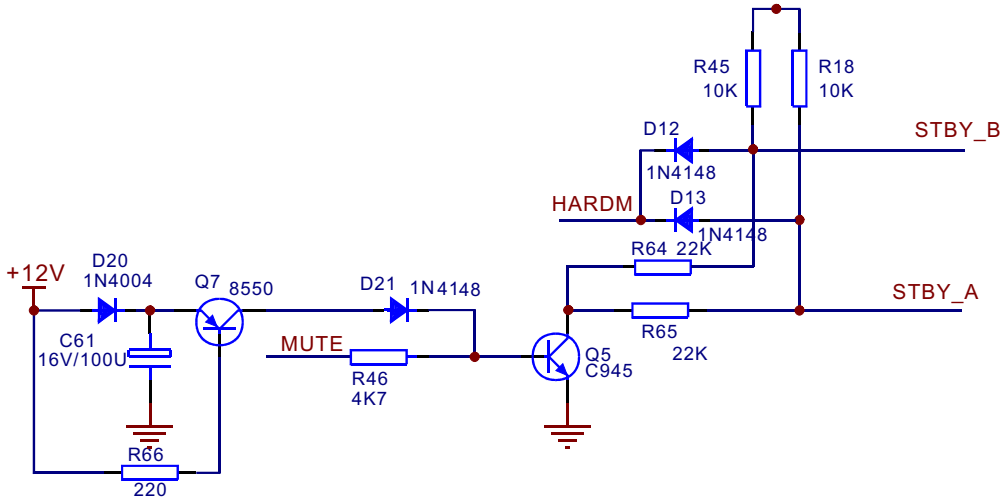


Figure 3.2.3.2 Mute circuit

3.2.4 Open/close door circuit

1. Open/close door circuit diagram is shown in the figure 3.2.4.1:

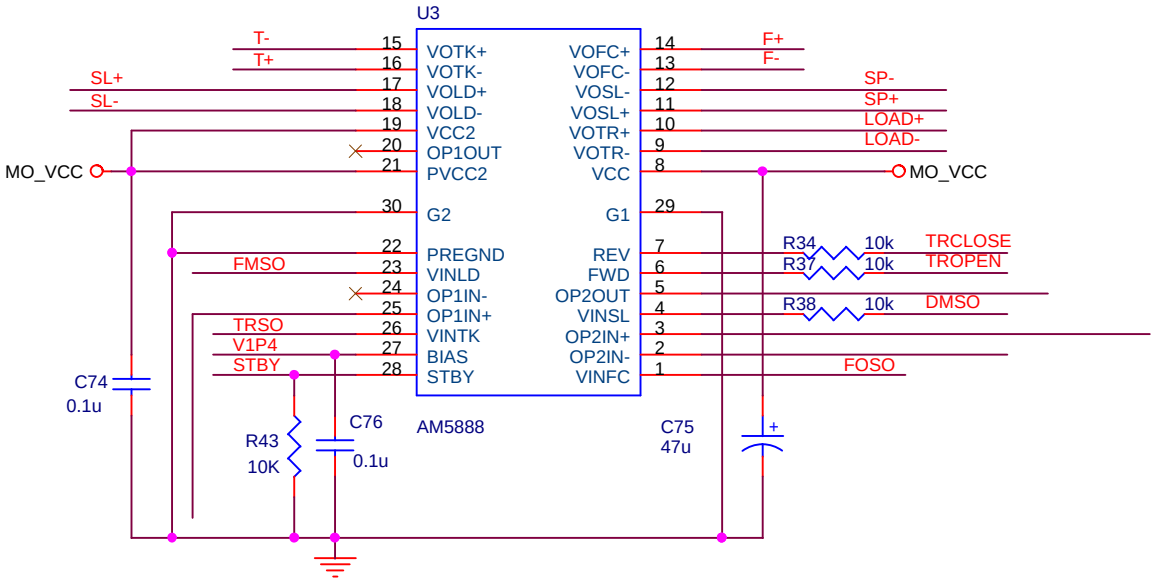


Figure 3.2.4.1 Open/close door circuit diagram

2. Working principle:

Open door, VCC→ AM5888 → LOAD+ → electric machine → LOAD- → AM5888 → ground

When action of opening door is not performed, pin 35 and 23 of MT1389D are low level. When opening door, pin 35 of MT1389D send out a high level, AM5888 is on, LOAD- changes to low level and LOAD+ changes to high level.

Close door: VCC→ AM5888 → LOAD- → electric machine→ LOAD+ → AM5888 →ground

When closing door, pin 23 of Mt1389 sends out a high level, AM5888 is on, LOAD+ is low level and LOAD- changes to high level.

3.2.5 Reset circuit

1. Reset circuit is shown in the figure 3.2.5.1:

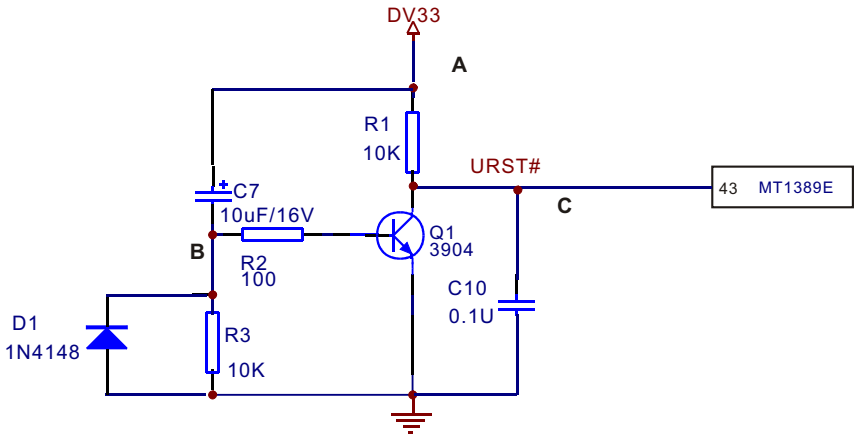


Figure 3.2.5.1 Reset circuit diagram

2. Working principle: when power on, voltage on two ends of capacitor C7 cannot change suddenly, cathode of capacitor begins charging from 3.3V, now triode Q1 is on, Q1 of collector output end is low level and performs reset to chip MT1389D; when capacitor charge is close to 3.3V, triode Q1 cuts off, outputs high level from Q1 and system reset finishes.

3. Key point voltage (unit: V) is shown in the following table:

Key point	Position	Voltage	Remark
DV33 (point A)	capacitor C7 anode	3.3V	After power off, C7 discharge current from this point
point B	Diode D1 cathode	After reset finishes, 0V	After reset finishes, voltage increases to 3.3V from 0V
URST# (point C)	Q1 collector	After reset finishes, 3.3V	After reset finishes, voltage increases to 0V from 3.3V

3.2.6 Main axis braking control circuit

1. Main axis braking control circuit is shown in the figure 3.2.6.1:

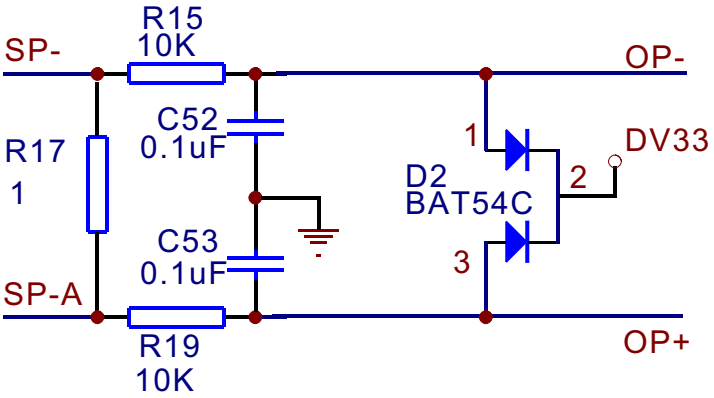


Figure 3.2.6.1 Mai axis braking control circuit

Equivalent circuit is shown in the figure 3.2.6.2:

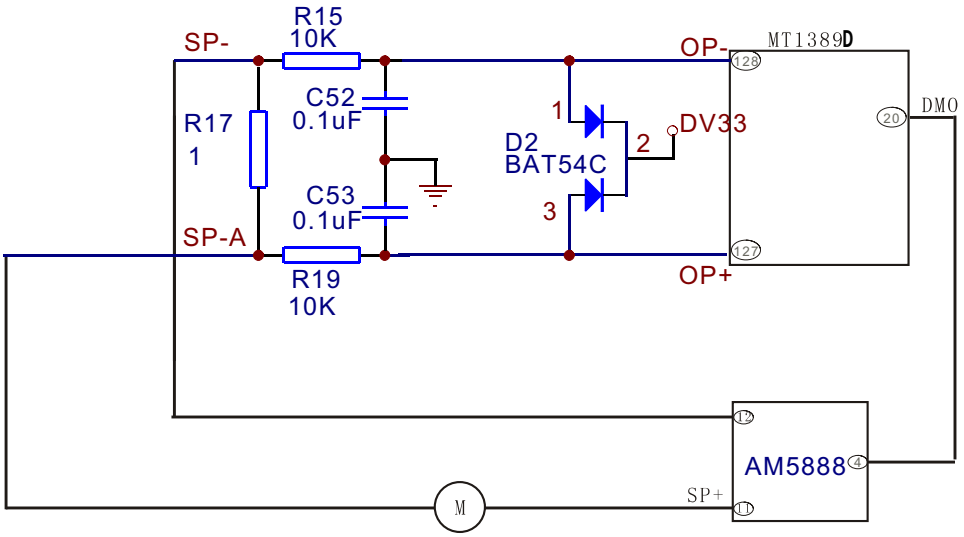


Figure 3.2.6.2 Main axis braking control equivalent circuit diagram

2. In order to prolong the usage life of electric machine and increase the influence of start-up current to electric machine, when disc is in, R&D personnel design main axis electric machine into running state all the time, even though STOP button is pressed. Thus, when pressing OPEN button, a braking signal is required to make main axis electric machine stop rotating immediately to fulfill door opening in short period.

During the course of playing, if OPEN button is pressed, main axis braking signal disappears, but main axis electric machine is still in rotating state due to the function of inertia, now the inductive electromotive force that produces from the rotation of electric machine achieves inductive voltage on

sampling resistor R17, through resistor R15, R19 with pin 127, 128 of MT1389D, after being processed and amplified inside send to MT1389D, through MT1389D internal D/A conversion and relevant processing, pin 20 of MT1389D outputs an instant electric machine reverse braking signal to make main axis electric machine speed down, when MT1389D detects that disc stops rotating, disc tray will be out to ensure that disc will not rotate when door opens.

3. Key point voltage (unit: V) is shown in the following table:

Key point	Position	Normal working voltage (V)	Voltage variation when opening door (V)
SP+	pin 11 of AM5888, pin 2 of CN3	3.79	3.79→0.70→1.80
SP-	pin 12 of AM5888, pin 1 of CN3	1.38	1.38→3.40→1.80
OP+	MT1389D pin 127	1.38	1.38→3.10→1.80
OP-	MT1389D pin 128	1.53	1.53→3.08→1.98
DMSO	AM5888 pin 4	1.42	1.42

3.2.7 Disc identification circuit

1. Disc identification circuit is shown in the figure 3.2.7.1:

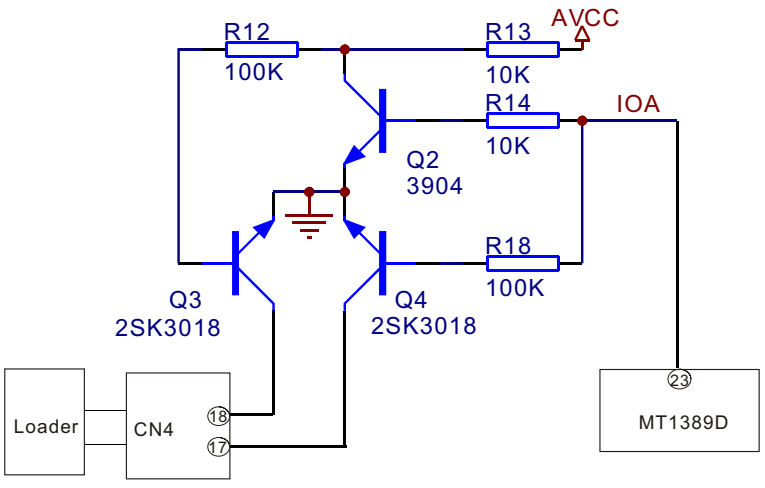


Figure 3.2.7.1 Disc identification circuit

2. Working principle: the function of disc identification circuit is to recognise the disc inserted into loader to judge whether the disc is VCD or DVD to make the relevant control action. When disc is inserted, decode servo control IC MT1389D defaults disc to be DVD, pin 23 of MT1389D sends out a low

Voltage signal, Q2 and Q4 cut off, Q3 is on, laser receiving tube inside loader selects DVD channel, now IOA is low level input loader to make loader in DVD reading state, MT1389D analyses whether initial judgment(DVD is the default disc) is correct through the detection of laser power feedback signal, when initial judgment is correct through detection, loader runs in DVD reading state; when initial judgment is incorrect through detection, MT1389D sends out a high voltage signal from pin 23, Q2 and Q4 are on, Q3 cuts off, laser receiving tube inside loader selects VCD channel, now IOA is high level input loader to make loader in VCD reading state. Whether default disc is VCD or DVD is set by internal software of MT1389D.

Note: Q3, Q4 are MOS tube.

3.2.8 Panel control components

1. Panel control components block diagram is shown in the figure 3.2.8.1:

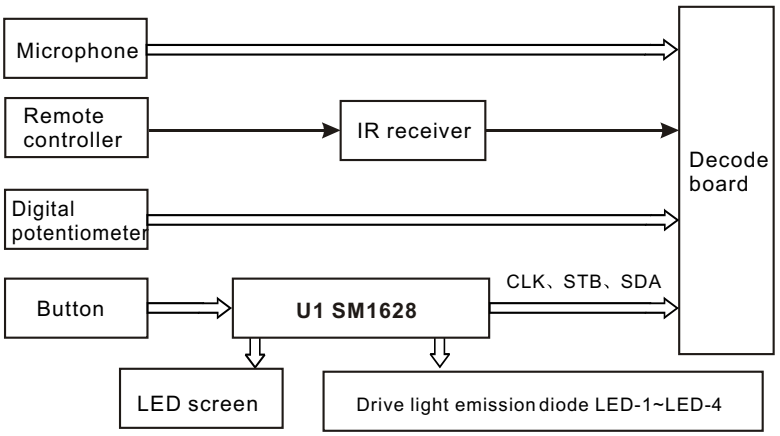


Figure 3.2.8.1 Panel control components block diagram

2. MIC board schematic diagram is shown in the figure 3.2.8.2:

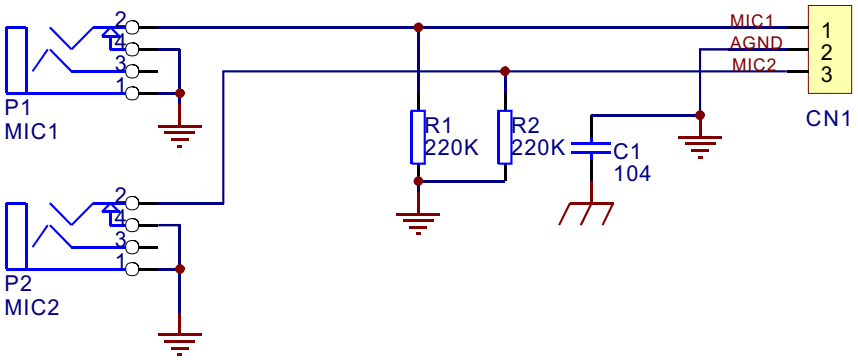


Figure 3.2.8.2 MIC board schematic diagram

4. Working principle: panel is mainly composed of LED screen, drive chip SM1628, remote control IR receiver, digital potentiometer, MIC jack, button .

The function of U1 (SM1628) is to process data signals sent from decode board to drive display screen to display relevant state, and scan panel button matrix at the same time, after processing button information, send to CPU in the means of digital signals to control the player and make it perform the relevant action.

Pin 3 of remote control IR receiver GPIUX50 is 5V power supply pin, pin 2 is grounded, pin 1 is output pin; remote control receiver processes button information of remote controller and then outputs from pin 1 to decode board directly.

Digital potentiometer VOL1 is used to adjust volume, which uses the phase difference of pulse sent from pin 1 and 3 to realize volume adjustment.

3.2.9 Video circuit

1. Video circuit block diagram is shown in the figure 3.2.9.1:

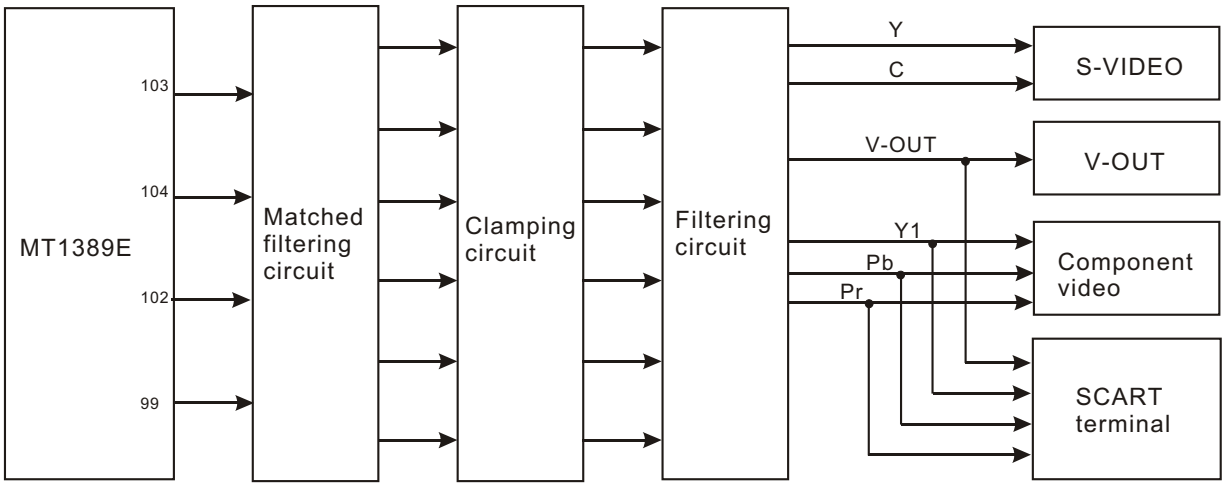


Figure 3.2.9.1 Video circuit block diagram

2. Working principle: brightness, chroma, CVBS and component video signals decoded by U1 (MT1389D), through low-pass filtering and clamping, are sent to the relevant terminal for output. Take Y signal as instance, we will introduce working principle of clamping circuit, shown in the figure 3.2.9.2:

This circuit is very simple. R105 is a matched resistor to make signals achieve max power on load, capacitor C106, C108 and inductor L106 compose a low-pass filter to filter high frequency interference signals except for useful signals; diode VD108 and VD109 compose a clamping circuit, we know from features of diode, the max range of chroma signal cannot exceed 5.7V, and cannot be lower than -0.7V in minimum, thus the high voltage signals from TV set can be prevented from burning down the player.

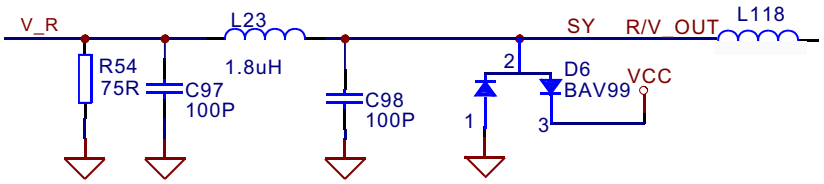


Figure 3.2.9.2 S-VIDEO output circuit diagram

3. Key point voltage (unit: V) is shown in the following table:

Signal	Function	Trouble	DC voltage without disc in
Y	S-VIDEO brightness	S-video no picture/ picture bright/picture dark	0.74
C	S-VIDEO chroma	S-video no color/color distortion	1.48
VIDEO	Component video composite signal	Composite video no picture/picture bright/picture dark	0.74
Y1	Component video brightness signal	Component video no picture/picture bright/picture dark	0.76
Pb	Component video chroma signal	Component video color distortion	1.46
Pr			1.75

Note: in actual measurement, voltage of the above signals Y, C, VEDIEO, Y1, Pb, Pr will have some change, thus the main troubleshooting method is to measure waveform of each signal during the course of playback.

3.2.10 Input/output circuit

Input/output circuit is often DECODE board. through coupling and filtering circuit and then outputs from the relevant terminal, externally-inputted audio signals are sent to decode board for processing DK1211S decode board video output (refer to 3.2.9 video Circuit) circuit includes composite

video output terminal, S-video and component video output terminal; audio circuit includes mixed left/right channel output terminal, digital optical output terminal, coaxial cable output terminal, SCART terminal and also one channel input terminal, that is left/right channel input terminal.

1. SCART terminal

SCART is a terminal that integrates video and audio transmission into one. It may transmit video and audio signals at the same time and it is very convenient for operation. It has 21 pins in all and locates in the centre at rear side of the player. Pin function is shown in the following table:

Pin	Name	Signal direction	Function description	Pin	Name	Signal direction	Function description
1	A(B)OUT	I	Audio right channel input	12	NC		Network cimmnication data line 2
2	A(B)IN	O	Audio right channel output	13	RETURN		Pr signal ground
3	A(A)OUT	I	Audio left channel input	14	RETURN		Blanking signal ground
4	A-COM		Audio signal ground	15	RED I/O	I/O	Pr signal I/O port
5	RETURN		Pb signal ground	16	BLK I/O	I/O	Blanking signal I/O port
6	A(A)IN	O	Audio left channel output	17	RETURN		Blanking signal ground
7	BLUE I/O	I/O	Pb signal I/O port	18	TRTURN		Composite video signal ground
8	FUNCSW	I	Function selection jack	19	V-OUT	I	Composite video signal input
9	RETURN		Y1 signal ground	20	V-IN	O	Composite video signal output
10	CONT	I/O	Network cimmnication data line 2	21	GND		Common ground
11	GREEN I/O	I/O	Y1 signal I/O port				

Note: pin 16 is blanking signal and used for the selection of RGB and CVBS mode. I means input, O means output and I/O means input and output.

2. SCART terminal function selection is shown in the following table:

FS1	FS2	FS0	pin 8 of SCART terminal	Function
0	_	0	10V	AV4:3
0	_	1	7.5V	AV16:9
1	_	0	0.90V	TV
1	_	1	0.85V	TV

_	0	_	_	CVBS MODE
_	1	_	_	RGB MODE

Note: 1. FS1 and FS0 are used to control the input voltage on pin 8 of SCART terminal. FS2 is used to control the voltage variation on pin 16 of SCART terminal. The voltage on pin 16 controls whether RGB mode or CVBS mode is selected by SCART.

2. 4:3 and 16:9 mean the display mode of screen and is controlled by voltage on pin 8.

3.2.11 Audio power amplifying circuit block diagram

1. Audio power amplifying circuit block diagram is shown in the figure 3.2.11.1:

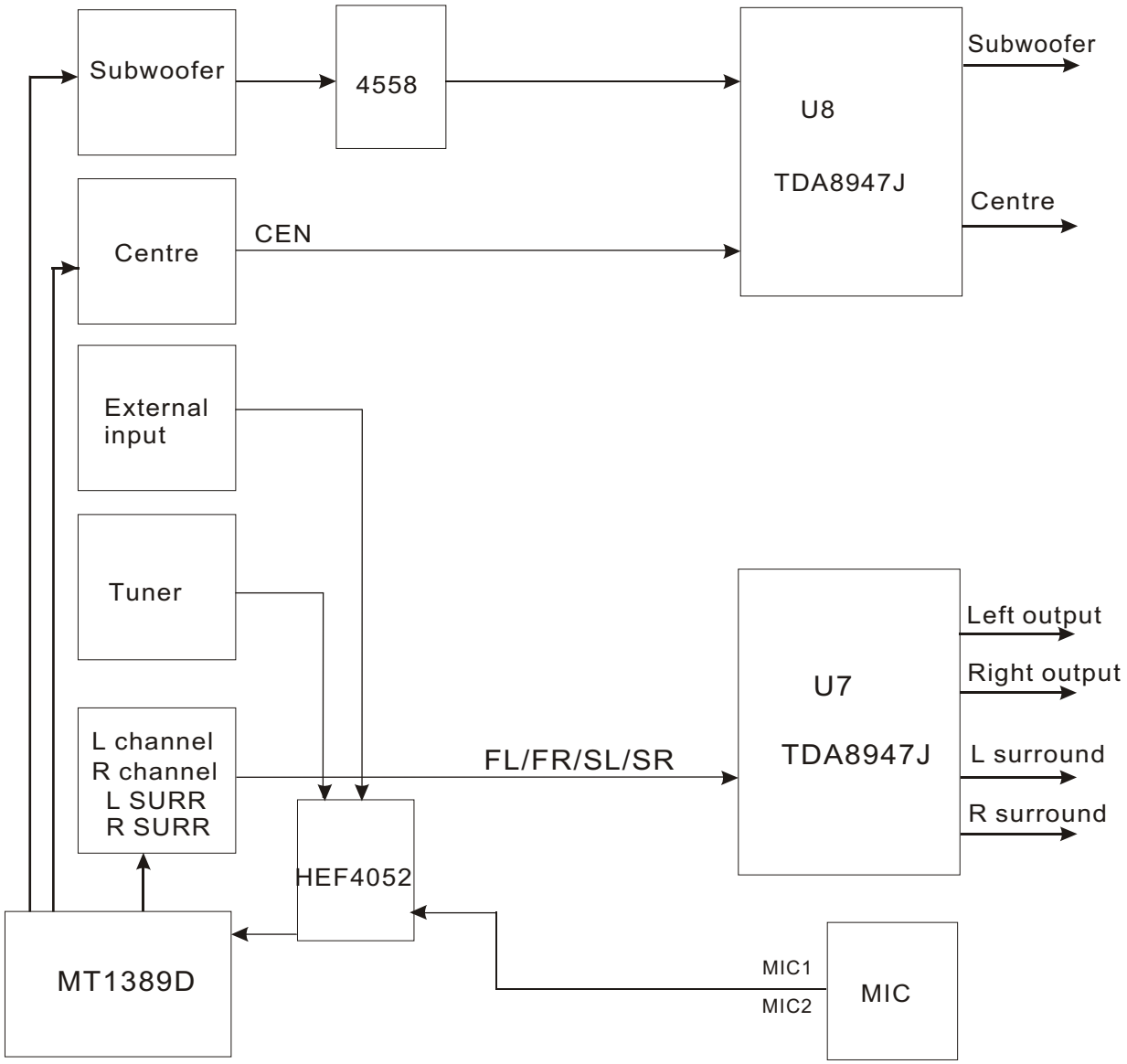


Figure 3.2.11.1 Audio power amplifying circuit diagram

2. Working principle

In power amplifier part, Karaoke processing circuit, external input circuit, power amplifying circuit and mute circuit can be divided. Mute circuit has been introduced in section 2, so here we will not say it again.

2-channel microphone input signals to 1389D, through 1389D internal processing, mix to left and tight channels output.

U12 (HEF4052) is a selection switch, which selects left/right channel information of disc signal, external input signal and tuning signals (external input and tuning only have left and right channels signals input). In special mode, there is special sound output. This player uses 3 of the channels, which are used as left/right channel information, tuning signal, selection of external input signal. Through being selected by HEF4052, signals of left/right channel to DECODE IC MT1389D

.

Power IC U8 (TDA8947) is a 4-channel power amplifying IC, if single channel outputs, output power range is from 1W to 25W; if all channels output, output power range is from 4W to 50W, in this player, take channel 1 and 2 of U8 as the all channels output of subwoofer, rated output power is 15W; take channel 3 and 4 as power output of lect and right channels, rated output power is 6W. The 3rd channel is reverse output, so right channel output is reversely connected, its pin 5, 10 are mode selection pin, this player uses them all together to make it as mute control pin.

Subwoofer output of this player is divided into one parts, the subwoofer signals of decode output to discs inside 1389D When in external input and tuning, without subwoofer signals outputted by 1389, Power output of subwoofer is fulfilled by the full connection of channel 1 and 2 of U8 (TDA8947).

Centre and subwoofer power output is fulfilled by U8 (TDA8947). 1389D outputs analog audio signals directly, after pre-amplifying and low-pass, outputted by U8 power amplifying. Similarly , the 3rd channel is reverse output, so centre is reversely connected to output. Its pin 5 and 10 are connected together, as mute control pin.

3.2.12 Power circuit

1. Power circuit block diagram is shown in the figure 3.2.12.1:

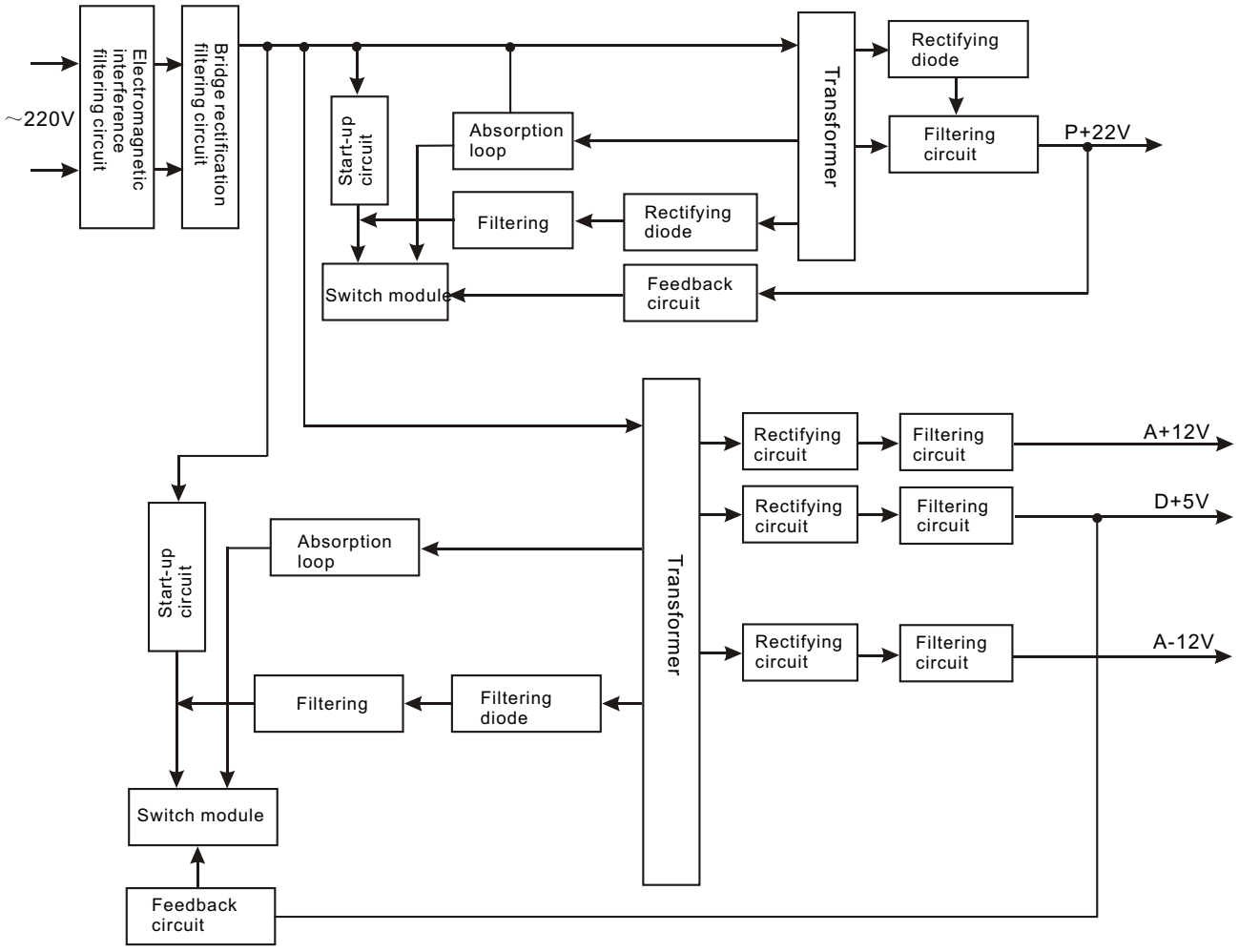


Figure 3.2.12.1 Power circuit block diagram

2. Working principle: this power circuit is composed of two parts, with electromagnetic interference filtering circuit and bridge rectification filtering circuit commonly used. The first part circuit produces P+22V DC power and uses in power supply of power amplifier circuit; the other part is responsible for power supply of other module circuit.

Working principle of each part is shown as follows:

(1)Electromagnetic interference filtering circuit: various electromagnetic radiation exits in surroundings, the input AC power will be disturbed. The function of electromagnetic interference filtering circuit is to filter these interference to make those that enters bridge rectification circuit is pure AC power.

(2) Bridge rectifying and filtering circuit: the function of this circuit is to produce a DC power about 310V to supply for rear stage.

(3) Start circuit: wen power on, transformer does not begin working, now start circuit provides switch module with a power supply voltage to make it work, after transformer begins to work, the voltage supplied by power supply circuit to switch module maintains the working of switch module.

(4) Absorption loop: switch module perform “on” and “off” action in very high frequency, so a strong self-inductive voltage will produce in transformer primary winding to cause damage to switch module. The function of absorption loop is to form loop for inductor to ensure normal working of circuit.

(5) Switch module: 310V DC power inputs from transformer. To make transformer work, AC shape voltage must be shown. Function of switch module is to control this 310V DC power to make it on for a whole and then off for a while to make a high/low level variation produce in input level of transformer, thus transformer can work.

(6) Power supply circuit: provides switch module with a power supply voltage.

(7) Rectifying diode: voltage that outputs from transformer is pulse DC, the function of rectifying diode is to change pulse DC into DC together with filtering circuit.

(8) Feedback loop: the time length of “on” of switch module is decided by feedback loop. Feedback loop samples output level. When output voltage is too high, voltage sampled is on high side, through feedback, to make the “on” time of switch module decrease, coupling of transformer reduces and output voltage decreased. When output voltage is too low, voltage sampled is on low side, through feedback loop, to make the “on” time of switch module increases, coupling of transformer increases and output voltage increases, thus through auto control function of feedback loop, power board may output stable voltage.

(9) Filtering circuit: the function is to produce a stable DC voltage with small ripple. “∏"-type filter is mostly adopted in filtering circuit. Features of capacitor filtering are that when load resistence is high and current is small, filtering is obvious; as for inductor filtering, when load resistence is small and current is large, filtering is obvious. Constitute capacitor to “∏"-type filter to get better filtering effect.

3. Main function of each voltage of power output board:

(1) +22V: output to power amplifier board and supply power for power amplifier circuit.

(3) D+5V: supply power for panel U1, servo drive chip U3 (AM5888) and open/close door circuit.

(4) A-12V, A+12V: supply power for audio power amplifying ship U7,U8,U10 (IC4558), U9(IC4558) on power amplifier board.

Section Three Servicing Cases

3.3.1 Servicing cases

[Example 1] Symptom: not read disc

Description: not read any disc

Analysis and troubleshooting: check laser, light emission, feed, main axis, trace and they are all normal, but there is no focus action; use multimeter to test pin 13, 14 of U3 (AM5888), voltage is normal (about 2.4V); test pin 1, 2 of CN4 and voltage is normal; check nerve flat cable and contact is good, so we judge that laser head focus winding is burnt down; after changing loader, trouble is removed.

[Example 2] Symptom: waveform is small

Description: left and right output waveform of mixed audio terminal are small

Analysis and troubleshooting: left and right output waveform of mixed left and right audio terminal are small, if this kind of case appears, the elements used by two terminals commonly are easier to have trouble. Firstly check whether the flat cable between decode board and power amplifier board has well contacted, after removing the above factors, then check power supply of IC with location number U8 on decode board and they are +12V, -12V, which are normal; check flat cable between power amplifier board and decode board and it is normal; check AD conversion voltage AADVDD of audio signals and find that it is 2.4V, which should be 3.3V in normal conditions; check and find that resistance on two ends of C32, C29 is infinite, so we can confirm that L13 has trouble, after changing is, trouble is removed.

[Example 3] Symptom: no MIC

Description: when inserting microphone and speaking, there is no audio output

Analysis and troubleshooting: insert microphone and speak, use oscillograph to test pin collector of decode board Q21 and there is signal output; test collector of Q21 there is no signal, so we can judge that Q21 has been damaged, after changing it, trouble is removed.

[Example 4] Symptom: panel indicator light is not on

Description: after power on, panel indicator light is not on

Analysis and troubleshooting: power on, use multimeter to test voltage of pin 1 of CN1 (panel board) and find that voltage is 0V; check whether the cable between decode board and panel board has well contacted, thus only cable has trouble, after changing it, trouble is removed.

[Example 5] Symptom: display screen flickers when reading disc

Description: when reading disc or opening door, display on screen is not stable, and panel indicator light flickers

Analysis and troubleshooting: when this kind of case appears, start from power supply. When checking display screen 5V power supply, after no disc in or disc reading is normal, voltage keeps in stable state, this voltage varies from 3.5 to 5.5V when reading discs, so the trouble should be caused by power, voltage also varies the same when checking 5V output voltage of power board, check 5V voltage filtering circuit elements and there is no abnormality, so we doubt that performance of the diode with location number D8 is not stable, after changing it, trouble is removed.

[Example 6] Symptom: speed of opening door is fast

Description: when opening and closing door, speed is fast, disc reading is normal, picture and sound output is normal.

Analysis and troubleshooting: when this trouble appears, trouble should lie in power circuit, check power supply voltage of open/close door drive circuit and it increases to 7.5V; check voltage of other circuit and it also increases, so trouble should lie in output voltage adjustment circuit; test voltage of IC with location number U6 of power board and it is 3.3V; it is known from working principle of U6, voltage of this pin is 2.5V when in normal conditions, change IC with location number U6, voltage resumes to be normal and trouble is removed.

[Example 7] Symptom: picture has mosaic when playing DVD

Description: when playing other discs, picture output is normal; only when playing DVD disc, two parallel interfering lines appear on picture

Analysis and troubleshooting: this trouble appears in video decode part always. After power off,

Picture output is normal; after playing for a period (about 5 minutes), picture has interference. To analyse this trouble, firstly play DVD disc normally after power on, use electric iron to heat chip 1389, picture has interference after heating; after changing chip 1389, trouble is remove.

[Example 8] Symptom: power amplifier has no sound output

Description: after playing any disc for one hour, MIX out sound output is normal, only power amplifier channel has no sound output with slight noise; power on again after power off for a period, the player resumes to be normal, after about 1 hour, there is no sound output again.

Analysis and troubleshooting: when this trouble appears, trouble lies in power amplifier output circuit. Test power supply voltage of power amplifier IC TDA9847 and it is 23V, which is normal; use oscillograph to test waveform of pin 6, 8, 9, 12 of TDA8947 and they are normal; it is known from symptom, when there is no sound output, IC should lie on over-heat or over-current protection state; test STBY A or ATBY B control signal and there is no abnormality, so it means that trouble should be caused by power amplifier IC itself; after changing TDA8947, trouble is removed.

[Example 9] Symptom: power amplifier has no sound output

Description: when playing disc, player has sound output, Tuner and Aux in have no sound output; when rotate volume knob, panel display variation is normal, power amplifier output end has noise or current sound, disc playing is normal.

Analysis and troubleshooting: it is known from circuit principle, Tuner,Aux in and power amplifier audio signal are the same signals , which are divided into three-channel signals through HEF4052, so trouble should lie in common channel. In addition, trouble should lie in surroundings of HEF4052. Use oscillograph to test C141 location capacitor and there is no audio signal output, then test C140,C145, C157,C156 location capacitor and waveform is normal, test U12 location IC power supply and pin 9, pin 10 signal and they are all normal; after changing HEF4052IC, trouble is removed.

3.3.2 Troubleshooting flow chart

1. Troubleshooting process for “Player has no output” is shown in the figure 3.3.2.1:

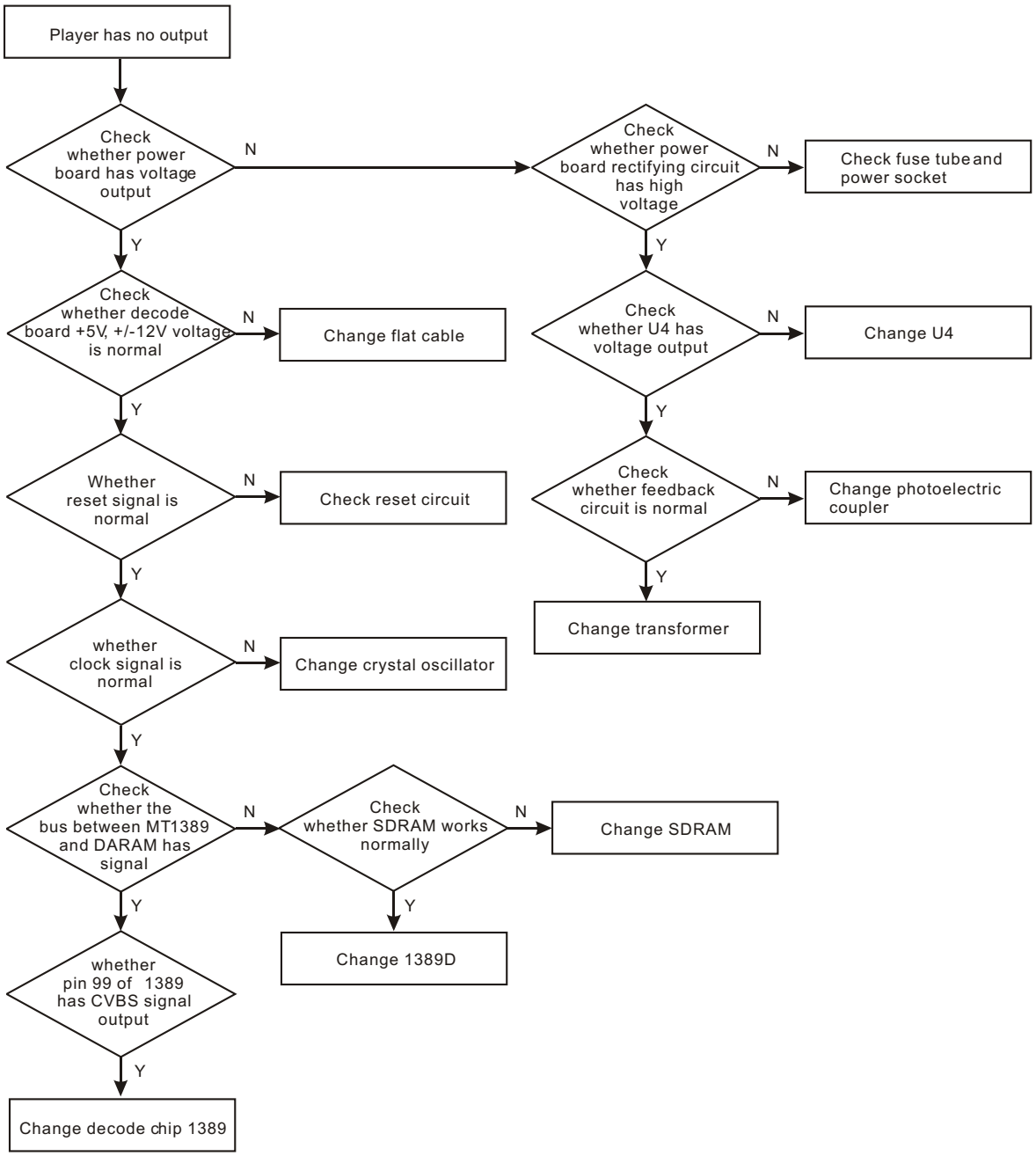


Figure 3.3.2.1 Troubleshooting flow chart for “Player has no output”

2. Troubleshooting process for “No sound output” is shown in the figure 3.3.2.2:

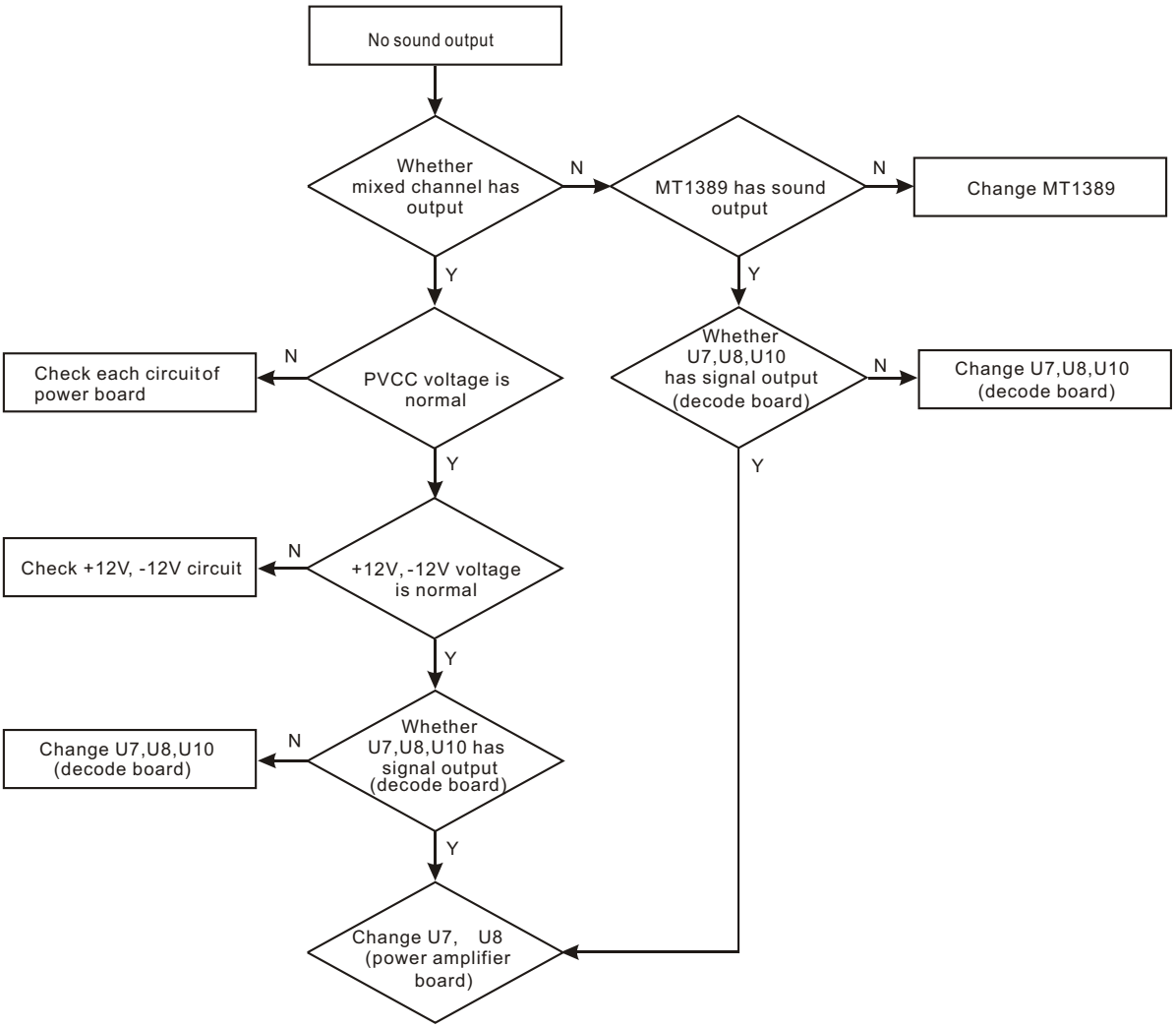


Figure 3.3.2.2 Troubleshooting flow chart for “No sound output”

3. Troubleshooting process for “Power amplifier volume invalid” is shown in the figure 3.3.2.3:

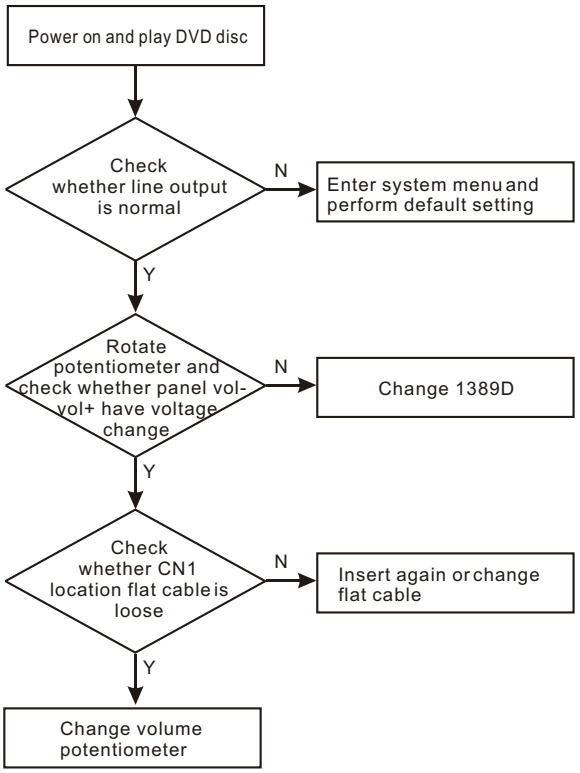


Figure 3.3.2.3 Troubleshooting flow chart for “Power amplifier volume is invalid”

5. Troubleshooting process for “Power not on” is shown in the figure 3.3.2.5:

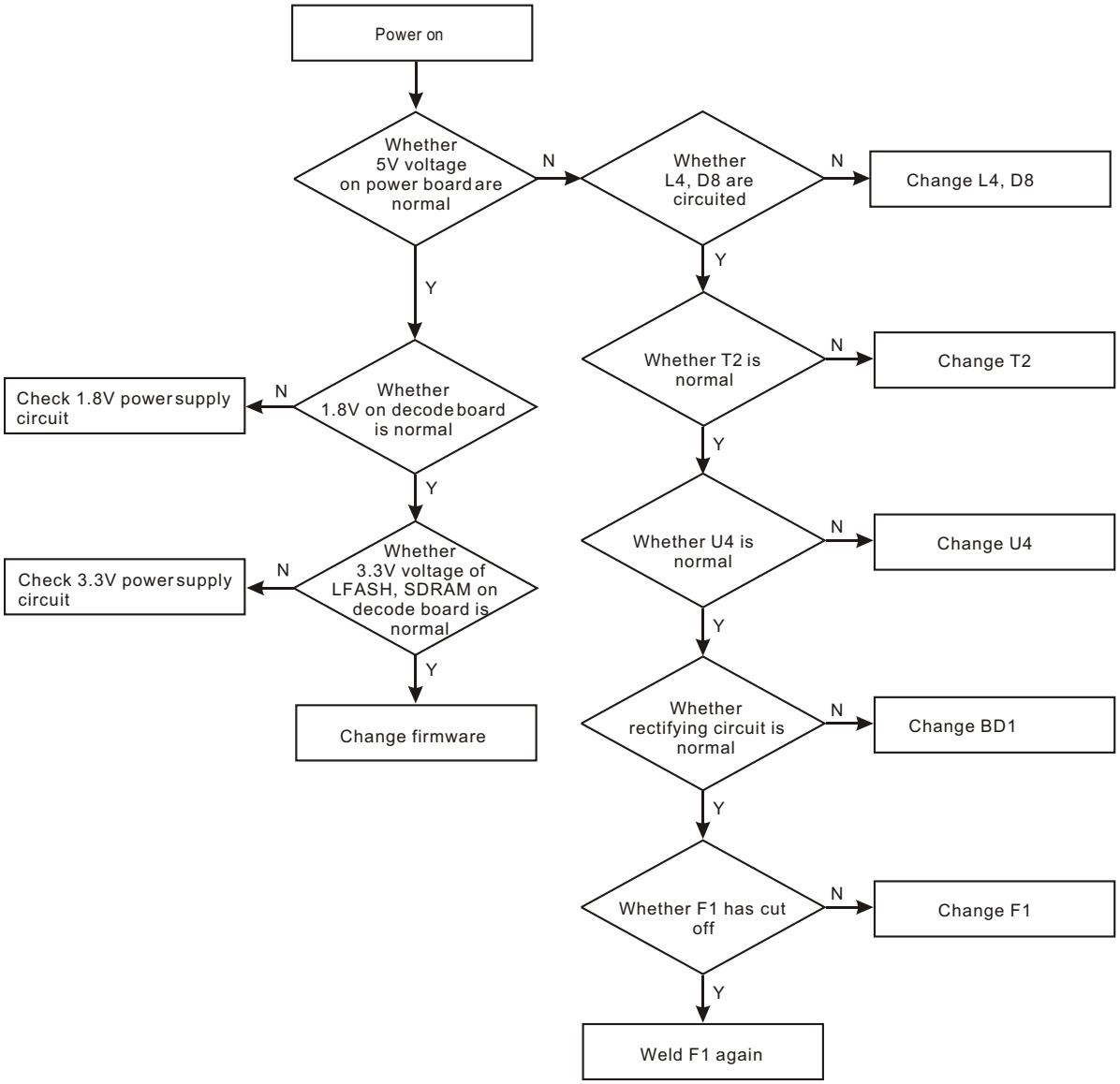
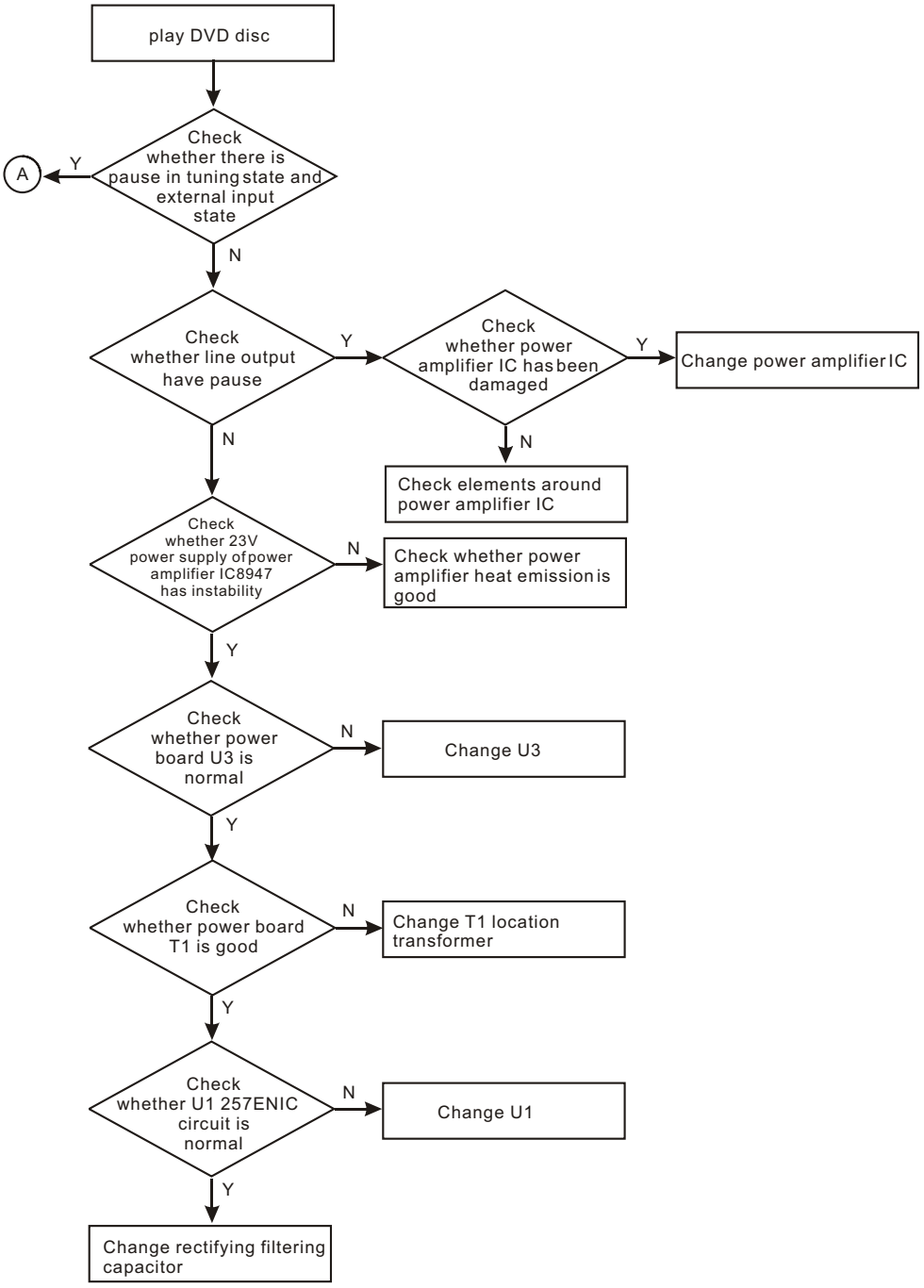


Figure 3.3.2.5 Troubleshooting flow chart for “Power not on”

6. Troubleshooting process for “power amplifier sound output pauses” is shown in the figure 3.3.2.6:



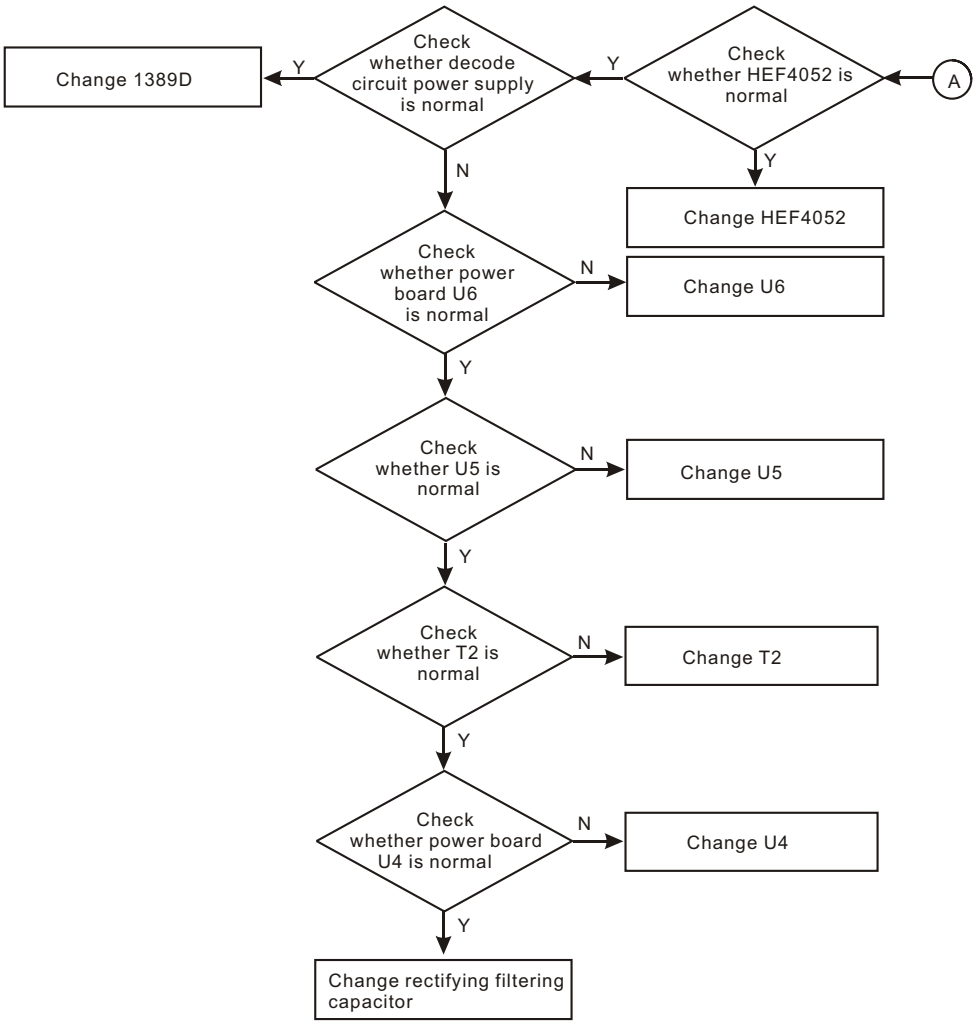
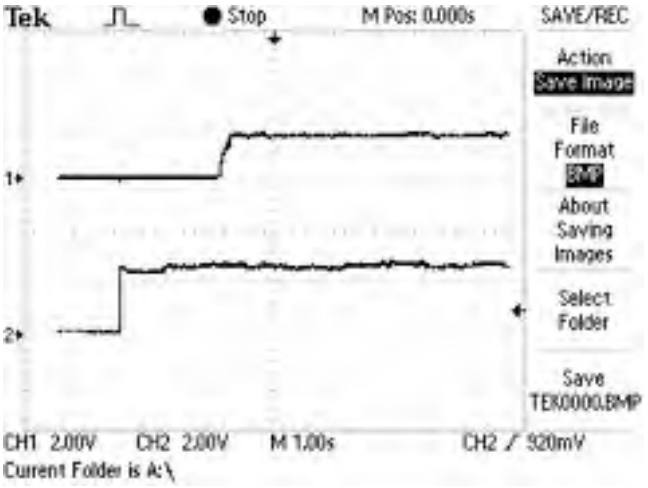


Figure 3.3.2.6 Troubleshooting flow chart for "power amplifier sound output pauses"

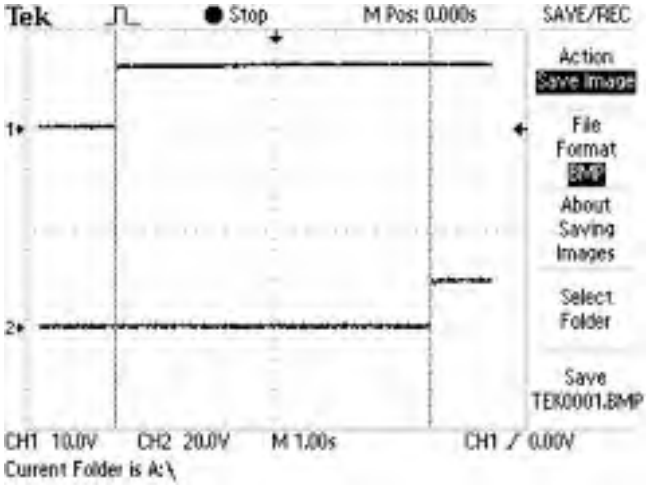
Section Four Signal waveform diagram

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.

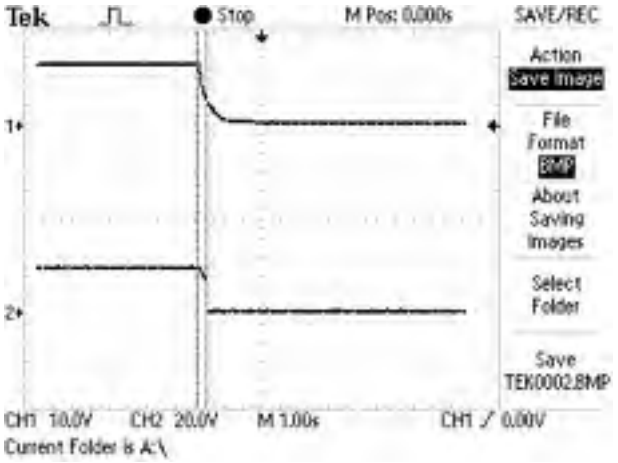
1. Waveform diagram of comparison between reset signal (channel 1) and 3.3V voltage (channel 2):



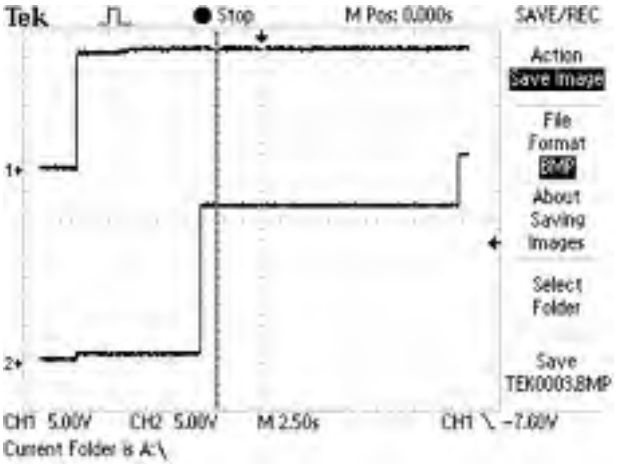
2. Waveform diagram of the comparison between power-on mute signal (channel 1) and +12V (channel 2) power supply:



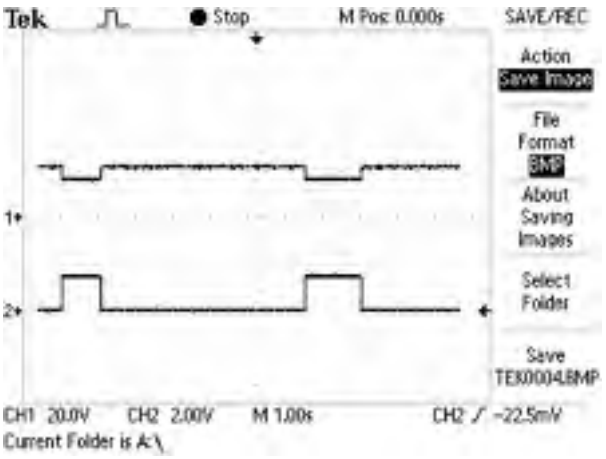
3. Waveform diagram of the comparison between HARDM signal (channel 2) and +12V power (channel 1) when power off:



4. Waveform diagram of the comparison between MUTE signal (channel 2) and +12 power (channel 1) when power on. The increase of MUTE signal goes through 2 steps: the first is 0.6V with durable time 6.5 S; the second is 16V with duration time 13.5 S.



5. Waveform diagram of the comparison between STBY_A/B signal (channel 1) and MUTE signal (channel 2). When mute is on, 1389 gives out low level signal MUTE mote than 310ms to make STBY_A/B signal level pull down to make mute output, and 1389 is mute from inside to make all channels have no output. Centre, surrond channel mute means is the same with that of main channel.



Section Five Function Introduction to IC

3.5.1 function introduction to MT1389DE-L

Function

1 General Description

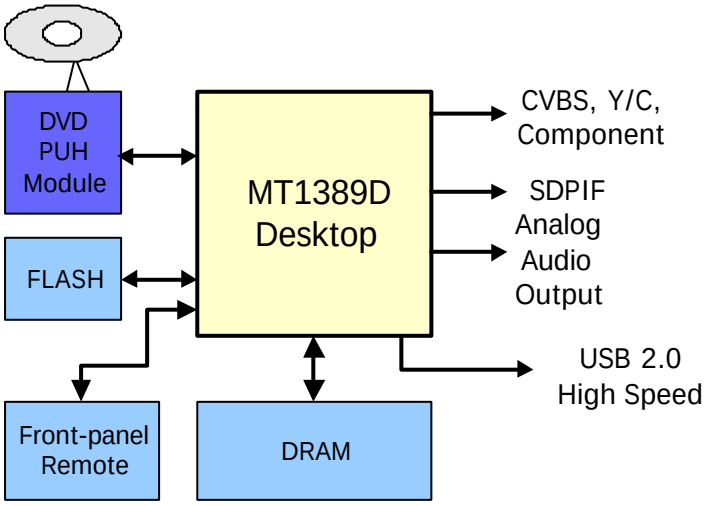
MediaTek MT1389D is a cost-effective DVD system-on-chip (SOC) which incorporates advanced features like MPEG-4 video decoder, high quality TV encoder and state-of-art de-interlace processing. The MT1389D enables consumer electronics manufacturers to build high quality, USB2.0, MS/SD/MMC reader, feature-rich DVD players, portable DVD players or any other home entertainment audio/video devices.

World-Leading Technology: Based on MediaTek's world-leading DVD player SOC architecture, the MT1389L is the New generation of the DVD player SOC. It integrates the MediaTek 3rd generation front-end digital RF amplifier and the Servo/MPEG AV decoder.

Rich Feature for High Valued Product: To enrich the feature of DVD player, the MT1389 equips a simplified MPEG-4 advanced simple profile (ASP) video decoder to fully support the DivX[1] Home Theater profile. It makes the MT1389-based DVD player be capable of playback MPEG-4 content which become more and more popular.

Incredible Audio/Video Quality: The progressive scan of the MT1389D utilized advanced motion-adaptive de-interlace algorithm to achieve the best movie/video playback. It also supports a 3:2 pull down algorithm to give the best film effect. The 108MHz/12-bit video DAC provides users a whole new viewing experience. Built-in 6ch audio DACs and 2ch audio ADCs could give the variable function solutions.

High Performance Memory Storage Device: As the core of Portable DVD players need more capability to support current multimedia contents. The MT1389D provides the interface for the 3-in-1 card reader, which supports Memory-Stick, Secure Digital Memory Card, and MultiMediaCard, to connect with the mainstream digital camera FLASH cards. For the USB application, we adopt **USB2.0 High speed** specification to reach rich-contents transference. **USB 2.0 High speed** will support for high-speed devices. **USB 2.0 High Speed** is suitable for high-performance devices such as high-density storage devices. In addition, **USB 2.0 High Speed** supports old USB 1.0/1.1 software and peripherals, offering impressive and even better compatibility to customers



DVD Player System Diagram Using MT1389L

Key Features

RF/Servo/MPEG Integration
DivX Home Theater Level MPEG4 ASP Video decode
Support Nero-Digital
Support DivX Ultra
High Performance Audio Processor
Progressive Scan
108MHz/12-bit, 4 CH TV Encoder
Internal 6CH Audio DAC
Internal 2CH Audio ADC
USB2.0 High Speed (Host/Device)
3-in-1 MS/SD/MMC reader

Applications

Standard DVD Players

[1] DivX is a trademark of DivXNetworks
[2] **USB High Speed** : 480Mbit/sec. USB Full Speed : 12Mbit/sec.

2 Key Features

- RF/Servo/MPEG Integration
- Embedded 6ch Audio DAC
- Embedded 2ch Audio ADC for Karaoke
- High Performance Audio Processor
- High Performance Progressive Video Processor
- Support Nero-Digital
- Support DivX Ultra
- High Quality 108MHz/12-bit, 4 CH TV Encoder
- USB 2.0 High-Speed

3 Applications

- Standard DVD Players
- DVD Players Home Theater Application
- Portable DVD Players
- TV/DVD Combo Systems

4 General Feature lists

- **Super Integration DVD player single chip**
  - High performance analog RF amplifier
  - Servo controller and data channel processing
  - MPEG-1/MPEG-2/JPEG video
  - Dolby AC-3/DTS Decoder
  - Unified memory architecture
  - Versatile video scaling & quality enhancement
  - OSD & Sub-picture
  - Built-in clock generator
  - Built-in high quality TV encoder
  - Built-in progressive video processor
  - Audio effect post-processor
  - Built-in 5.1-ch Audio DAC
  - Built-in 2-ch Audio ADC for Karaoke
  - USB 2.0 High-Speed
  - MS/SD/MMC 3-in-1 card reader

- **Speed Performance on Servo/Channel Decoding**
  - DVD-ROM up to 4XS
  - CD-ROM up to 24XS

- **Channel Data Processor**
  - Digital data slicer for small jitter capability
  - Built-in high performance data PLL for channel data demodulation
  - EFM/EFM+ data demodulation
  - Enhanced channel data frame sync protection & DVD-ROM sector sync protection

- **Servo Control and Spindle Motor Control**
  - Programmable frequency error gain and phase error gain of spindle PLL to control spindle motor on CLV and CAV mode
  - Built-in ADCs and DACs for digital servo control
  - Provide 2 general PWM
  - Tray control can be PWM output or digital output

- **Embedded Micro controller**
  - Built-in 8032 micro controller
  - Built-in internal 373 and 8-bit programmable lower address port
  - 1024-bytes on-chip RAM
  - Up to 2M bytes FLASH-programming interface
  - Supports 5/3.3-Volt. FLASH interface
  - Supports power-down mode
  - Supports additional serial port

- **DVD-ROM/CD-ROM Decoding Logic**
  - High-speed ECC logic capable of correcting one error per each P-codeword or Q-codeword
  - Automatic sector Mode and Form detection
  - Automatic sector Header verification
  - Decoder Error Notification Interrupt that signals various decoder errors
  - Provide error correction acceleration

- **Buffer Memory Controller**
  - Supports 16Mb/32Mb/64Mb SDRAM
  - Supports 16-bit SDRAM data bus
  - Provides the self-refresh mode SDRAM
  - Block-based sector addressing

- **Video Decode**
  - Decodes MPEG1 video and MPEG2 main level, main profile video (720/480 and 720x576)
  - Decodes MPEG-4 Advanced Simple Profile
  - Support DivX 3.11/4.x/5.x Home Theater Profile
  - Support Nero-Digital
  - Support DivX Ultra
  - Smooth digest view function with I, P and B picture decoding
  - Baseline, extended-sequential and progressive JPEG image decoding
  - Support CD-G titles

- **Video/OSD/SPU/HLI Processor**
  - Arbitrary ratio vertical/horizontal scaling of video, from 0.25X to 256X
  - 65535/256/16/4/2-color bitmap format OSD,
  - 256/16 color RLC format OSD
  - Automatic scrolling of OSD image

- **Audio Effect Processing**
  - Dolby Digital (AC-3)/EX decoding
  - DTS/DTS-ES decoding
  - MPEG-1 layer 1/layer 2 audio decoding

- High Definition Compatible Digital (HDCD)
- Windows Media Audio (WMA)
- Dolby ProLogic II
- Concurrent multi-channel and downmix out
- IEC 60958/61937 output
  - PCM / bit stream / mute mode
  - Custom IEC latency up to 2 frames
- Pink noise and white noise generator
- Karaoke functions
  - Microphone echo
  - Microphone tone control
  - Vocal mute/vocal assistant
  - Key shift up to +/- 8 keys
  - Chorus/Flanger/Harmony/Reverb
- Channel equalizer
- 3D surround processing include virtual surround and speaker separation

■ **TV Encoder**

- Four 108MHz/12bit DACs
- Support NTSC, PAL-BDGHINM, PAL-60
- Support 525p, 625p progressive TV format
- Automatically turn off unconnected channels
- Support PC monitor (VGA)
- Support Macrovision 7.1 L1, Macrovision 525P and 625P
- CGMS-A/WSS
- Closed Caption

■ **Progressive Scan Video**

- Automatic detect film or video source
- 3:2 pull down source detection
- Advanced Motion adaptive de-interlace
- Minimum external memory requirement

■ External Interface

- USB2.0 High Speed (Host/Device)
- Memory-Stick, Secure Digital Memory Card, and MultiMediaCard Interface

■ **Outline**

- 128-pin LQFP package
- 3.3/1.8-Volt. Dual operating voltages

5 Pin Definitions

Abbreviations:

- SR: Slew Rate
- PU: Pull Up
- PD: Pull Down
- SMT: Schmitt Trigger
- 4mA~16mA: Output buffer driving strength.

Pin	Main	Alt.	Type	Description
Analog Interface (66)				
125	RFIP		Analog Input	AC coupled DVD RF signal input RFIP
126	RFIN	OPOUT	Analog Input	AC coupled DVD RF signal input RFIN
127	RFG	OPINP	Analog Input	Main beam, RF AC input path
128	RFH	OPINN	Analog Input	Main beam, RF AC input path
1	RFA		Analog Input	RF main beam input A
2	RFB		Analog Input	RF main beam input B
3	RFC		Analog Input	RF main beam input C
4	RFD		Analog Input	RF main beam input D
5	RFE		Analog Input	RF sub beam input E
6	RFF		Analog Input	RF sub beam input E
7	AVDD18_2		Analog power	Analog 1.8V power
8	AVDD33_1		Analog Power	Analog 3.3V power
9	XTALI		Input	27MHz crystal input
10	XTALO		Output	27MHz crystal output
11	AGND33		Analog Ground	Analog Ground
12	V20		Analog output	Reference voltage 2.0V
13	V14		Analog output	Reference voltage 1.4V
14	REXT		Analog Input	Current reference input. It generates reference current for RF path. Connect an external 15K resistor to this pin and AVSS
15	MDI1		Analog Input	Laser power monitor input

Pin	Main	Alt.	Type	Description
16	MDI2		Analog Input	Laser power monitor input
17	LDO1		Analog Output	Laser driver output
18	LDO2		Analog Output	Laser driver output
19	AVDD33_2		Analog Power	Analog 3.3V power
20	DMO		Analog Output	Disk motor control output. PWM output
21	FMO		Analog Output	Feed motor control. PWM output
22	TRAY_OPEN		Analog Output	Tray PWM output/Tray open output
23	TRAY_CLOSE		Analog Output	Tray PWM output/Tray close output
24	TRO		Analog Output	Tracking servo output. PDM output of tracking servo compensator
25	FOO		Analog Output	Focus servo output. PDM output of focus servo compensator
26	FG	GPIO2	Analog	1) Motor Hall sensor input 2) GPIO
27	USB_DP		Analog Inout	USB port DPLUS analog pin
28	USB_DM		Analog Inout	USB port DMINUS analog pin
29	VDD33_USB		USB Power	USB Power pin 3.3V
30	VSS33_USB		USB Ground	USB ground pin
31	PAD_VRT		Analog Inout	USB generating reference current
32	VDD18_USB		USB Power	USB Power pin 1.8V
95	DACVDDC		Power	3.3V power pin for video DAC circuitry
96	VREF		Analog	Bandgap reference voltage
97	FS		Analog	Full scale adjustment (suggest to use 560 ohm)
98	DACVSSC		Ground	Ground pin for video DAC circuitry
99	CVBS		Analog	Analog composite output
100	DACVDDB		Power	3.3V power pin for video DAC circuitry
101	DACVDDA		Power	3.3V power pin for video DAC circuitry
102	Y/G		Analog	Green, Y, SY, or CVBS
103	B/CB/PB		Analog	Blue, CB/PB, or SC

Pin	Main	Alt.	Type	Description
104	R/CR/PR		Analog	Red, CR/PR, CVBS, or SY
105	AADVSS		Ground	Ground pin for 2ch audio ADC circuitry
106	AKIN2		Analog	1) Audio ADC input 2 2) MS_CLK set B 3) MCDATA 4) Audio Mute 5) HSYN/VSYN output 6) C5 7) GPIO
107	ADVCM		Analog	1) 2ch audio ADC reference voltageC 2) C6 3) GPIO
108	AKIN1		Analog	1) Audio ADC input 1 2) MS_D0 set B 3) Audio Mute 4) HSYN/VSYN output 5) C7 6) GPIO
109	AADVDD		Power	3.3V power pin for 2ch audio ADC circuitry
110	APLLVDD3		Power	3.3V Power pin for audio clock circuitry
111	APLLCAP		Analog InOut	APLL external capacitance connection
112	ADACVSS2		Ground	Ground pin for audio DAC circuitry
113	ADACVSS1		Ground	Ground pin for audio DAC circuitry
114	ARF / LFE	GPIO	Analog Output	1) Audio DAC sub-woofer channel output 2) While internal audio DAC not used: a. ACLK b. GPIO
115	ARS	GPIO	Analog Output	1) Audio DAC right Surround channel output 2) While internal audio DAC not used: a. ABCK b. GPIO

Pin	Main	Alt.	Type	Description
116	AR	GPIO	Analog Output	1) Audio DAC right channel output 2) While internal audio DAC not used: a. SDATA2 b. GPIO c. RXD2
117	AVCM		Analog	Audio DAC reference voltage
118	AL	GPIO	Analog Output	1) Audio DAC left channel output 2) While internal audio DAC not used: a. SDATA1 b. GPIO c. RXD1
119	ALS	GPIO	Analog Output	1) Audio DAC left Surround channel output 2) While internal audio DAC not used: a. ALRCK b. GPIO
120	ALF /CENTER	GPIO	Analog Output	1) Audio DAC center channel output 2) While internal audio DAC not used: a. ASDATA0 b. GPIO
121	ADACVDD1		Analog Power	3.3V power pin for audio DAC circuitry
122	ADACVDD2		Analog Power	3.3V power pin for audio DAC circuitry
123	AVDD18_1		Analog Power	Analog 1.8V power
124	AGND18		Analog Ground	Analog Ground
General Power/Ground (7)				
54, 90	DVDD18		Power	1.8V power pin for internal digital circuitry
79	DVSS18		Ground	1.8V Ground pin for internal digital circuitry
50, 68,84	DVDD33		Power	3.3V power pin for internal digital circuitry
60	DVSS		Ground	3.3V Ground pin for internal digital circuitry
Micro Controller , Flash Interface and GPIO(12)				
33	GPIO3	INT#	InOut 8mA, SR PD, SMT	1) General purpose IO 3 2) Microcontroller external interrupt 1
34	GPIO4		InOut 4mA, PD	General purpose IO 4

Pin	Main	Alt.	Type	Description
35	GPIO6		InOut 4mA, PD	General purpose IO 6
36	SF_CS_		InOut 8mA, SR PU, SMT	Serial Flash Chip Select
37	SF_DO		InOut 8mA, SR PD, SMT	Serial Flash Dout
38	SF_DI		InOut 8mA, SR PU, SMT	Serial Flash Din
39	SF_CK		InOut 8mA, SR PD, SMT	Serial Flash Clock
40	UP1_6	SCL	InOut 4mA, SR PU, SMT	1) Microcontroller port 1-6 2) I^2C clock pin
41	UP1_7	SDA	InOut 4mA, SR PU, SMT	1) Microcontroller port 1-7 2) I^2C data pin
42	ICE		Input PD, SMT	Microcontroller ICE mode enable
43	PRST#		Input PU, SMT	Power on reset input, active low
44	IR		Input SMT	IR control signal input
Dram Interface (37) (Sorted by position)				
45	RD0		InOut, 4mA	DRAM data 0

Pin	Main	Alt.	Type	Description
46	RD1		InOut 4mA	DRAM data 1
47	RD2		InOut 4mA	DRAM data 2
48	RD3		InOut 4mA	DRAM data 3
49	RD4		InOut 4mA	DRAM data 4
51	RD5		InOut 4mA	DRAM data 5
52	RD6		InOut 4mA	DRAM data 6
53	RD7		InOut 4mA	DRAM data 7
55	DQM0		InOut 4mA, PD	Data mask 0
56	RD15		InOut 4mA	DRAM data 15
57	RD14		InOut 4mA	DRAM data 14
58	RD13		InOut 4mA	DRAM data 13
59	RD12		InOut 4mA	DRAM data 12
61	RD11		InOut 4mA	DRAM data 11
62	RD10		InOut 4mA	DRAM data 10
63	RD9		InOut 4mA	DRAM data 9
64	RD8		InOut 4mA	DRAM data 8

Pin	Main	Alt.	Type	Description
65	DQM1		InOut 4mA, PD	Data mask 1
66	RCLK		InOut 4mA, PD	Dram clock
67	RA11		InOut 4mA, PD	DRAM address bit 11
69	RA9		InOut 4mA, PD	DRAM address 9
70	RA8		InOut 4mA, PD	DRAM address 8
71	RA7		InOut 4mA, PD	DRAM address 7
72	RA6		InOut 4mA, PD	DRAM address 6
73	RA5		InOut 4mA, PD	DRAM address 5
74	RA4		InOut 4mA, PD	DRAM address 4
75	RWE#		Output 4mA, PD	DRAM Write enable, active low
76	CAS#		Output 4mA, PD	DRAM column address strobe, active low
77	RAS#		Output 4mA, PD	DRAM row address strobe, active low
78	BA0		InOut 4mA, PD	DRAM bank address 0
80	BA1		InOut 4mA, PD	DRAM bank address 1
81	RA10		InOut 4mA, PD	DRAM address 10

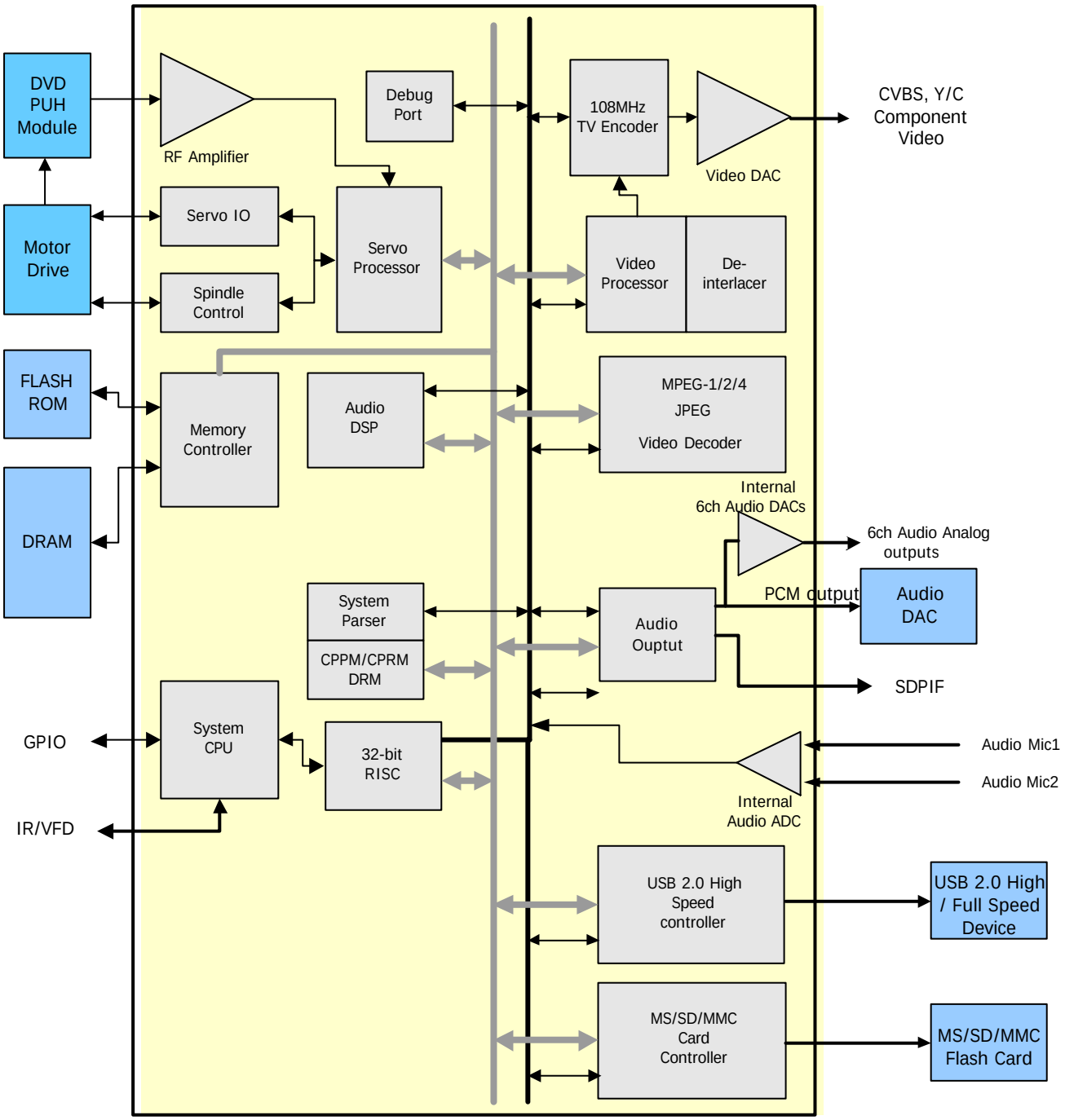
Pin	Main	Alt.	Type	Description
82	RA0		InOut 4mA, PD	DRAM address 0
83	RA1		InOut 4mA, PD	DRAM address 1
85	RA2		InOut 4mA, PD	DRAM address 2
86	RA3		InOut 4mA, PD	DRAM address 3
87	GPIO7	CKE	InOut 4mA, PD	1) GPIO 7 2) Dram Clock Enable 3) MS_CLK set A 4) Audio Mute 5) HSYN/VSYN input 6) C0
GPIO (6)				
88	GPIO8		InOut 4mA, PD	1) GPIO8 2) MS_BS set A 3) SD_CLK set A 4) ASDATA2 5) ACLK 6) Audio Mute 7) HSYN/VSYN input 8) C1
89	GPIO9		InOut 4mA, PU	1) GPIO9 2) MS_D0 set A 3) SD_CMD set A 4) ASDATA1 5) ABCK 6) C2 7) RXD1

Pin	Main	Alt.	Type	Description
91	GPIO10		InOut 4mA, PD	1) GPIO10 2) SD_CLK set B 3) SD_D0 set A 4) ASDATA 0 5) ALRCK 6) HSYN/VSYN output 7) C3 8) TXD1
92	GPIO11		InOut 4mA, PD	1) GPIO11 2) SD_CMD set B 3) MS_BS set B 4) Audio Mute 5) HSYN/VSYN output 6) C4
93	SPDIF	GPIO12	InOut 2mA, PD	1) SPDIF output 2) GPIO12
94	GPIO13		InOut 4mA, PD	1) GPIO13 2) SD_D0 set B 3) ALRCK 4) Audio Mute 5) YUVCLK

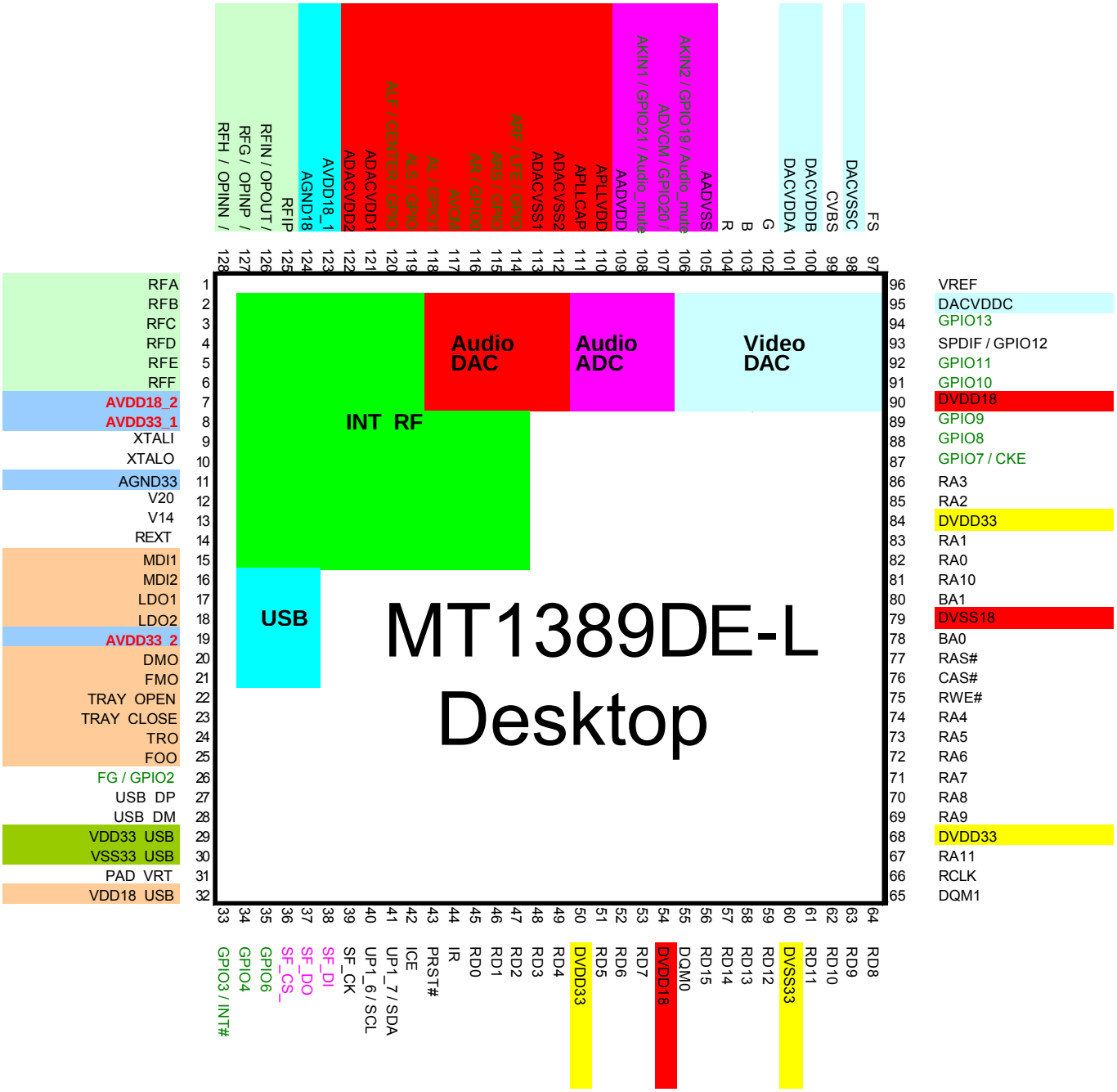
Note:

1. The Main column is the main function, Alt. means alternative function.
2. The multi-function GPIO pins are set to green characters.

6 Functional Block



6 Pin Assignment



3.5.1 Function introduction to HEF4052B

1. DESCRIPTION

The HEF4052B (U12) is a dual 4-channel analogue multiplexer/demultiplexer with common channel select logic. Each multiplexer/demultiplexer has four independent inputs/outputs (Y_0 to Y_3) and a common input/output (Z). The common channel select logic includes two address inputs (A_0 and A_1) and an active LOW enable input ($\overline{E}$). Both multiplexers/demultiplexers contain four bidirectional analogue switches, each with one side connected to an independent input/output (Y_0 to Y_3) and the other side connected to a common input/output (Z). With $\overline{E}$ LOW, one of the four switches is selected (low impedance ON-state) by A_0 and A_1. With $\overline{E}$ HIGH, all switches are in the high impedance OFF-state, independent of A_0 and A_1. V_{DD} and V_{SS} are the supply voltage connections for the digital control inputs (A_0, A_1 and $\overline{E}$). The V_{DD} to V_{SS} range is 3 to 15 V. The analogue inputs/outputs (Y_0 to Y_3, and Z) can swing between V_{DD} as a positive limit and V_{EE} as a negative limit. $V_{DD} - V_{EE}$ may not exceed 15 V. For operation as a digital multiplexer/demultiplexer, V_{EE} is connected to V_{SS} (typically ground).

3. PIN DESCRIPTION

Pin	Name	Description	Pin	Name	Description
1	Y_{0B}	independent inputs/outputs	9	A_1	address inputs
2	Y_{2B}	independent inputs/outputs	10	A_0	address inputs
3	Z_B	common inputs/outputs	11	Y_{3A}	independent inputs/outputs
4	Y_{3B}	independent inputs/outputs	12	Y_{0A}	independent inputs/outputs
5	Y_{1B}	independent inputs/outputs	13	Z_A	common inputs/outputs
6	$\overline{E}$	enable input (active LOW)	14	Y_{1A}	independent inputs/outputs
7	V_{EE}	Negative Power Supply	15	Y_{2A}	independent inputs/outputs
8	V_{SS}	Ground	16	V_{DD}	Positive Power Supply

3.5.2 Function introduction to EON-F16-100HIP

EON-F16-100HIP (U6) is a 16Mbit FLASH memorizer, and the damage of U6 may cause troubles, such as power not on, no disc reading and power on picture mosaic. Pin function is shown as the following table:

1. **SIGNAL DESCRIPTION**

Serial Data Input (DI)
The SPI Serial Data Input (DI) pin provides a means for instructions, addresses and data to be serially written to (shifted into) the device. Data is latched on the rising edge of the Serial Clock (CLK) input pin.

Serial Data Output (DO)
The SPI Serial Data Output (DO) pin provides a means for data and status to be serially read from (shifted out of) the device. Data is shifted out on the falling edge of the Serial Clock (CLK) input pin.

Serial Clock (CLK)
The SPI Serial Clock Input (CLK) pin provides the timing for serial input and output operations. ("See SPI Mode")

Chip Select (CS#)
The SPI Chip Select (CS#) pin enables and disables device operation. When CS# is high the device is deselected and the Serial Data Output (DO) pin is at high impedance. When deselected, the devices power consumption will be at standby levels unless an internal erase, program or status register cycle is in progress. When CS# is brought low the device will be selected, power consumption will increase to active levels and instructions can be written to and data read from the device. After power-up, CS# must transition from high to low before a new instruction will be accepted.

Hold (HOLD#)
The HOLD pin allows the device to be paused while it is actively selected. When HOLD is brought low, while CS# is low, the DO pin will be at high impedance and signals on the DI and CLK pins will be ignored (don't care). The hold function can be useful when multiple devices are sharing the same SPI signals.

Write Protect (WP#)
The Write Protect (WP#) pin can be used to prevent the Status Register from being written. Used in conjunction with the Status Register's Block Protect (BP0, BP1and BP2) bits and Status Register Protect (SRP) bits, a portion or the entire memory array can be hardware protected.

2. PIN DESCRIPTION

Pin	Name	Function	Pin	Name	Function
1	CS#	Chip Enable	5	DI	Serial Data Input
2	DO	Serial Data Output	6	CLK	Serial Clock Input
3	WP#	Write Protect	7	HOLD#	Hold Input
4	Vss	Ground	8	Vcc	Supply Voltage (2.7-3.6V)

3.5.3 Function introduction to HY57V641620FTP-6

64M 16-bit memorizer SDRAM (U5) with the player and the working clock frequency is 166/143MHZ. The function of 16SDRAM in DVD players is to memorizer the program of AML3298 taken out from FLASH and information of image and sound taken out from disc to form buffer, add the stability of information output and add anti-shaking effect of player. Pin function introduction is shown as the following table:

Pin	Name	Function	Signal flow	Pin	Name	Function	Signal flow
1	VDD	3.3V power supply		28	VSS	Ground	
2	DQ0	Data bus	I/O	29	MA4	Address bus	I
3	VDDQ	3.3V power supply	I/O	30	MA5	Address bus	I
4	DQ1	Data bus	I/O	31	MA6	Address bus	I
5	DQ2	Data bus	I/O	32	MA7	Address bus	I
6	VSSQ	Ground		33	MA8	Address bus	I
7	DQ3	Data bus	I/O	34	MA9	Address bus	I
8	DQ4	Data bus	I/O	35	MA11	Address bus	I
9	VDDQ	3.3V power supply		36	NC	Blank	
10	DQ5	Data bus	I/O	37	CKE	Clock enable signal	I
11	DQ6	Data bus	I/O	38	CLK	System clock input	I
12	VSSQ	Ground		39	UDQM	Data input/output screen-shielded signal	I
13	DQ7	Data bus	I/O	40	NC	Blank	
14	VDD	3.3V power supply		41	VSS	Ground	

15	LDQM	Data input/output screen-shielded signal	I	42	DQ8	Data bus	I/O
16	WE	Write control signal	I	43	VDDQ	3.3V power supply	
17	CAS	Line address gating signal	I	44	DQ9	Data bus	I/O
18	RAS	Row address gating signal	I	45	DQ10	Data bus	I/O
19	CS	Chip selection signal	I	46	VSSQ	Ground	
20	SD-BS0	Segmanr address 0 gating signal	I	47	DQ11	Data bus	I/O
21	SD-BS1	Segmanr address 1 gating signal	I	48	DQ12	Data bus	I/O
22	MA10	Address bus	I	49	VDDQ	3.3V power supply	
23	MA0	Address bus	I	50	DQ13	Data bus	I/O
24	MA1	Address bus	I	51	DQ14	Data bus	I/O
25	MA2	Address bus	I	52	VSSQ	Ground	
26	MA3	Address bus	I	53	DQ15	Data bus	I/O
27	VDD	3.3V power supply		54	VSS	Ground	

3.5.4 Function introduction to HEF4094B

1. DESCRIPTION

The HEF4094B(U2) is an 8-stage serial shift register having a storage latch associated with each stage for strobing data from the serial input to parallel buffered 3-state outputs O_0 to O_7. The parallel outputs may be connected directly to common bus lines. Data is shifted on positive-going clock transitions. The data in each shift register stage is transferred to the storage register when the strobe (STR) input is HIGH. Data in the storage register appears at the outputs whenever the output enable (EO) signal is HIGH.

2. FEATURES

- Wide supply voltage range: 3.0V to 18V
- High noise immunity: 0.45 VDD (typ.)
- Low power TTL compatibility:
  Fan out of 2 driving 74L or 1 driving 74LS
- 3-STATE outputs

3. PIN DESCRIPTION

Pin	Name	Function	Description	Pin	Name	Function	Description

1	STROBE	Store enable		9	QS		Nc
2	DATA	Data input	VS data input:VSDA	10	Q'S		Nc
3	CLOCK	clock	Clock input:VSCK	11	Q8		Nc
4	Q1		Reset inpit: RSR	12	Q7		Mute: LRSWMUT
5	Q2		Mute :SCMUT	13	Q6		VDATA3
6	Q3		AGND	14	Q5		Headphone mute output: HDET
7	Q4			15	OUTB	Output enable	
8	VSS	ground		16	VDD	Power supply	

3.5.5 Function introduction to AM5888

1. DESCRIPTION

The AM5888S(U3) is a five-channel BTL driver IC for driving the motors and actuators such as used in DVD player and consists of two independent precision voltage regulators with adjustable range from 1.25V to 4 V. It supports a variety of applications. Also, Pb free package is selectable (Please refer to Marking Identification).

2. PIN DESCRIPTION

PIN No	Pin Name	Function
1	VINFC	Input for focus driver
2	TRB_1	Connect to external transistor base
3	REGO2	Regulator voltage output, connect to external transistor collector
4	VINSL+	Input for the sled driver
5	REGO1	Regulator voltage output, connect to external transistor collector
6	FWD	Tray driver forward input
7	REV	Tray driver reverse input
8	Vcc1	Vcc for pre-drive block and power block of sled and tray
9	VOTR-	Tray driver output (-)
10	VOTR+	Tray driver output (+)
11	VOSL+	Sled driver output (+)
12	VOSL-	Sled driver output (-)
13	VOFC-	Focus driver output (-)
14	VOFC+	Focus driver output (+)

15	VOTK+	Tracking driver output (+)
16	VOTK-	Tracking driver output (-)
17	VOLD+	Spindle driver output (+)
18	VOLD-	Spindle driver output (-)
19	Vcc2	Vcc for power block of spindle, tracking and focus
20	NC	No Connection
21	VCTL	Speed control input of tray driver
22	GND	Ground
23	VINLD	Input for spindle driver
24	NC	No Connection
25	TRB_2	Connect to external transistor base
26	VINTK	Input for tracking driver
27	BIAS	Input for reference voltage
28	MUTE	Input for mute control

Notes) Symbol of + and – (output of drivers) means polarity to input pin.
(For example, if voltage of pin1 is high, pin14 is high.)

3.5.6 function introduction to 4558

1. Description

The RC4558 and RM4558 devices (U7,U8,U9,U10) are dual general-purpose operational amplifiers.

The high common-mode input voltage range and the absence of latch-up make these amplifiers ideal for voltage-follower applications. The devices are short-circuit protected and the internal frequency compensation ensures stability without external components.

The RC4558 is characterized for operation from $0^{\circ}C$ to $70^{\circ}C$, and the RM4558 is characterized for operation over the full military temperature range of $-55^{\circ}C$ to $125^{\circ}C$.

2. FEATURES

- Continuous-Short-Circuit Protection
- Wide Common-Mode and Differential
- Voltage Ranges
- No Frequency Compensation Required
- Low Power Consumption
- No Latch-Up
- Unity-Gain Bandwidth . . . 3 MHz Typ
- Gain and Phase Match Between Amplifiers

- ◆ Low Noise
- ◆ Designed To Be Interchangeable With
- ◆ Raytheon RC4558 and RM4558 Devices

3. PIN CONFIGURATION

PIN No	Symbol	I/O	Description
1	1OUT	O	Output 1
2	1IN–	I	Inverting Input Pin 1
3	1IN+	I	Non-Inverting Input Pin 1
4	VCC–	I	Negative Power Supply
5	2IN+	I	Non-Inverting Input Pin 2
6	2IN–	I	Inverting Input Pin 2
7	2OUT	O	Output 2
8	VCC+	I	Positive Power Supply

3.5.7 function introduction to TDA8947J

1. Description

The TDA8947J (U7,U8) contains four identical audio power amplifiers. The TDA8947J can be used as: four Single-Ended (SE) channels with a fixed gain of 26 dB, two times Bridge-Tied Load (BTL) channels with a fixed gain of 32 dB or two times SE channels (26 dB gain) plus one BTL channel (32 dB gain) operating as a 2.1 system.

The TDA8947J comes in a 17-pin Dil-Bent-Sil (DBS) power package. The TDA8947J is pin compatible with the TDA8944AJ and TDA8946AJ.

The TDA8947J contains a unique protection circuit that is solely based on multiple temperature measurements inside the chip. This gives maximum output power for all supply voltages and load conditions with no unnecessary audio holes. Almost any supply voltage and load impedance combination can be made as long as thermal boundary conditions (number of channels used, external heatsink and ambient temperature) allow it.

2. FEATURES

- SE: 1 W to 25 W, BTL: 4 W to 50 W operation possibility (2.1 system)
- Soft clipping
- Standby and mute mode
- No on/off switching plops
- Low standby current
- High supply voltage ripple rejection
- Outputs short-circuit protected to ground, supply and across the load
- Thermally protected
- Pin compatible with TDA8944AJ and TDA8946AJ.

3. PIN CONFIGURATION

PIN No	Symbol	I/O	Description
1	OUT1+	O	non inverted loudspeaker output of channel 1
2	GND1	I	ground of channels 1 and 2
3	VCC1	I	supply voltage channels 1 and 2
4	OUT2-	O	inverted loudspeaker output of channel 2
5	MODE2	I	mode selection 2 input: mute and on for channels 3 and 4
6	IN2+	I	input channel 2
7	SGND	I	signal ground
8	IN1+	I	input channel 1
9	IN3+	I	input channel 3
10	MODE1	I	mode selection 1 input: standby, mute and on for all channels
11	SVR	I	half supply voltage decoupling (ripple rejection)
12	IN4+	I	input channel 4
13	CIV	I	common input voltage decoupling
14	OUT3-	O	inverted loudspeaker output of channel 3
15	GND2	I	ground of channels 3 and 4
16	VCC2	I	supply voltage channels 3 and 4
17	OUT4+	O	non inverted loudspeaker output of channel 4

3.5.8 function introduction to SM1628

1. DESCRIPTION

SM1628(U1) is an LED Controller driven on a 1/7 to 1/8 duty factor. Eleven segment output lines, six grid output lines, 1 segment/grid output lines, one display memory, control circuit, key scan circuit are all incorporated into a single chip to build a highly reliable peripheral device for a single chip microcomputer. Serial data is fed to SM1628 via a four-line serial interface. Housed in a 28-pin SO Package, SM1628 pin assignments and application circuit are optimized for easy PCB Layout and cost saving advantages.

2. FEATURES

◆ CMOS Technology

◆ Low Power Consumption

◆ Multiple Display Modes (10 segment, 7 Grid to 13 segment, 4 Grid)

◆ Key Scanning (10 x 2 Matrix)

◆ 8-Step Dimming Circuitry

◆ Serial Interface for Clock, Data Input, Data Output, Strobe Pins

◆ Available in 28-pin, SOP Package

3. PIN DESCRIPTION

PIN	Symbol	I/O	Description
1	OSC	I	Oscillator Input P in
2	DI/O	I/O	Data output or Data input
3	CLK	I	Clock input
4	STB	I	Serial interface strobe
5	K1	I	Key data input
6	K2	I	Key data input
7	VDD	I	Power supply
8	SG1/KS1	O	Segment output
9	SG2/KS2	O	Segment output
10	SG3/KS3	O	Segment output
11	SG4/KS4	O	Segment output
12	SG5/KS5	O	Segment output
13	SG6/KS6	O	Segment output
14	SG7/KS7	O	Segment output
15	SG8/KS8	O	Segment output
16	SG9/KS9	O	Segment output
17	SG10/KS10	O	Segment output
18	SG12/GR7	O	Segment output
19	GR6	O	Grid output
20	GR5	O	Grid output

21	VDD	I	Power input
22	GND	I	Ground
23	GR4	O	Grid output
24	GR3	O	Grid output
25	GND	I	Ground
26	GR2	O	Grid output
27	GR1	O	Grid output
28	GND	I	Ground

3.5.9 function introduction to TNY275PN & TOP257EN

1. DESCRIPTION

The Fairchild Power Switch(FPS) product family is specially designed for an off-line SMPS with minimal external components. The Fairchild Power Switch(FPS) consist of high voltage power SenseFET and current mode PWM IC. Included PWM controller features integrated fixed frequency oscillator, under voltage lock-out, leading edge blanking, optimized gate turn-on/turn-off driver, thermal shutdown protection, over voltage protection, and temperature compensated precision current sources for loopcompensation and fault protection circuitry. Compared to discrete MOSFET and PWM controller or RCC solution, a Fairchild Power Switch(FPS) can reduce total component count, design size, weight and at the same time increase efficiency, productivity, and system reliability. It has a basic platform well suited for cost effective design in either a flyback converter or a forward converter.

2. FEATURES

- ◆ Precision fixed operating frequency (132kHz) , TOP257EN (132/66KHz)
- ◆ Low start-up current(typ. 100uA)
- ◆ Pulse by pulse current limiting
- ◆ Over current protection
- ◆ Over voltage protecton (Min. 25V), TOP257EN (Min. 23V)
- ◆ Internal thermal shutdown function
- ◆ Under voltage lockout
- ◆ Internal high voltage sense FET
- ◆ Auto-restart mode

3.5.10 Function introduction to PC817

PC817 (U2, U5) is a photoelectric coupler, shown as the figure 3.5.17.1. The right side is a light emitting diode, which sends out light of different intensity according to the strength of voltage inputted from the right side, generates photocurrent of different intensity on the left side according to light of different intensity, and outputs from position D. The higher of the voltage inputted from the right side, the stronger of the light emitted from light emitting diode and the larger of the photocurrent produced from position D. The lower of the voltage inputted from the right side of photoelectric coupler, the weaker of the light emitted from light emitting diode and the weaker of the current outputted from position D.

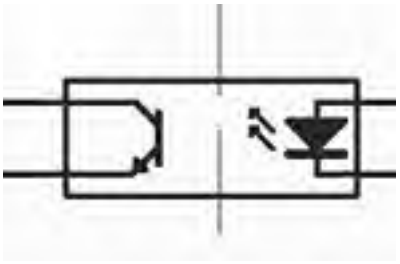


Figure 3.5.17.1 2501 outside drawing

3.5.11 Function introduction to TL431A

TL431A (U3, U6) is a 2.5V comparator, shown as the figure 3.5.18.1. Compared the inputted voltage of R end with 2.5V, when voltage of R end is more than 2.5V, KA end is on and photoelectric coupler starts to send out photocurrent; when voltage of R end is less than 2.5V, KA end is cutoff and photoelectric coupler does not send out photocurrent. CPU+3.3V in power board circuit must be kept in 3.3V, for the function of comparator. No matter more than or less than 3.3V, through on and off status of comparator, it will control the on state of the output end of photoelectric coupler LM431A to adjust the output space occupation ratio of switch module to control the output voltage of transformer and masthead the power.

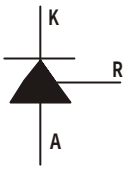


Figure 3.5.18.1 LM431A outside drawing

Chapter Four

Disassembly and Assembly Process

DVD players manufactured in BBK are largely identical but with minor differences and are mainly composed of loader components, control panel components, decode and servo board components, power board components, power amplifier board components, MIC board components and SCART board components. In order to speed up the compilation of “Service Manual”, we shall not give repeat explanation to model with minor differences in chapter four “Disassembly and Assembly Process” for the later compiled service manuals. For disassembly and assembly process in this chapter, please refer to chapter 4 of “DK1240S Service Manual”.

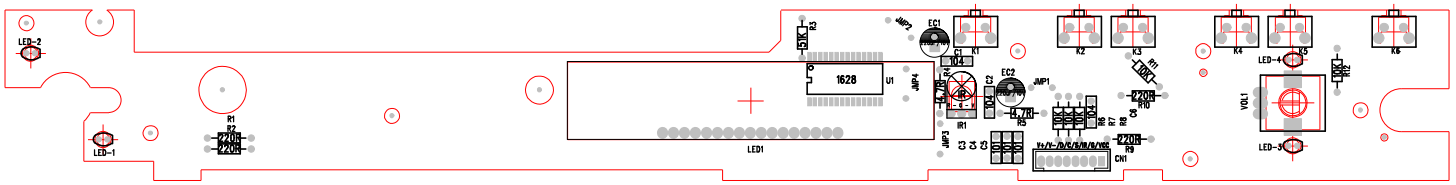
The pictures of this model are shown as follows:

Chapter Cinque

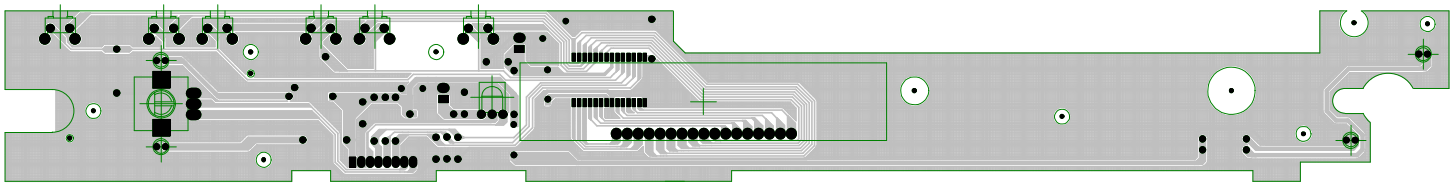
PCB board & Circuit diagram

Section One PCB board

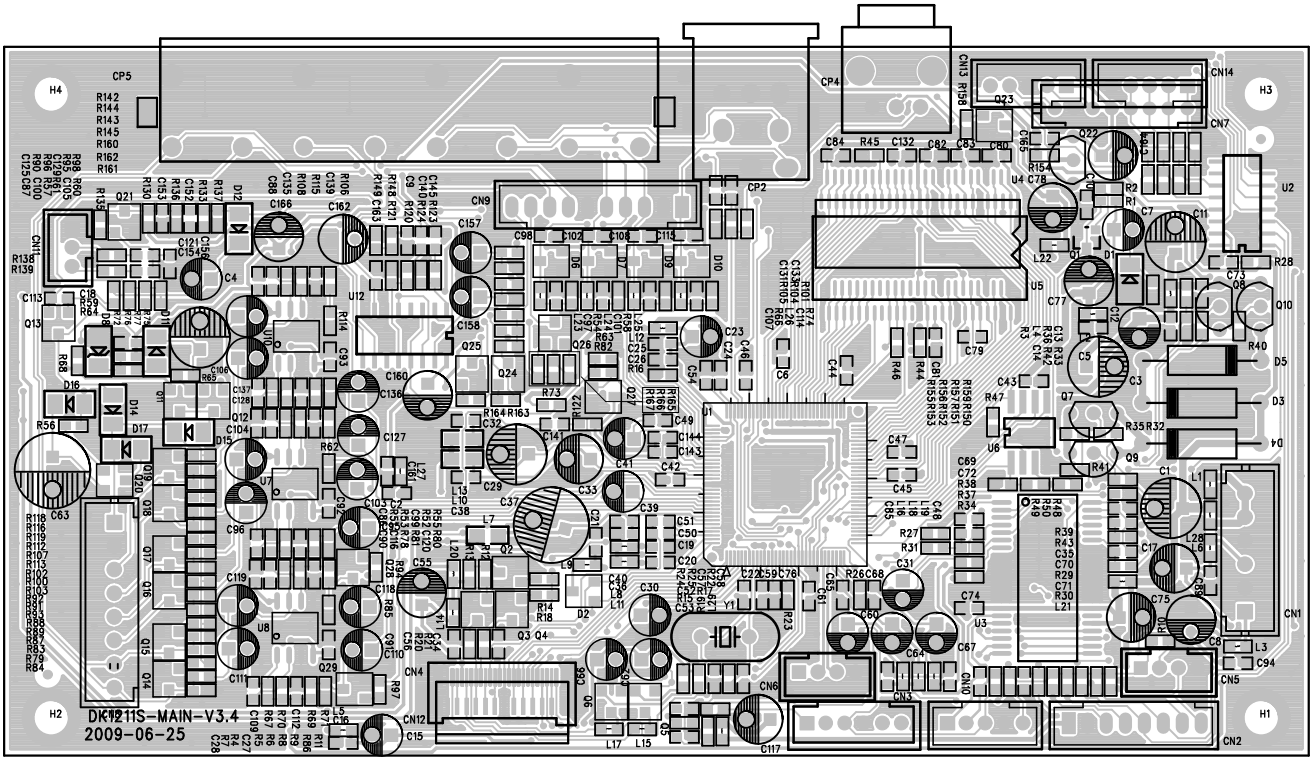
5.1.1 Surface layer of KEY SCAN Board



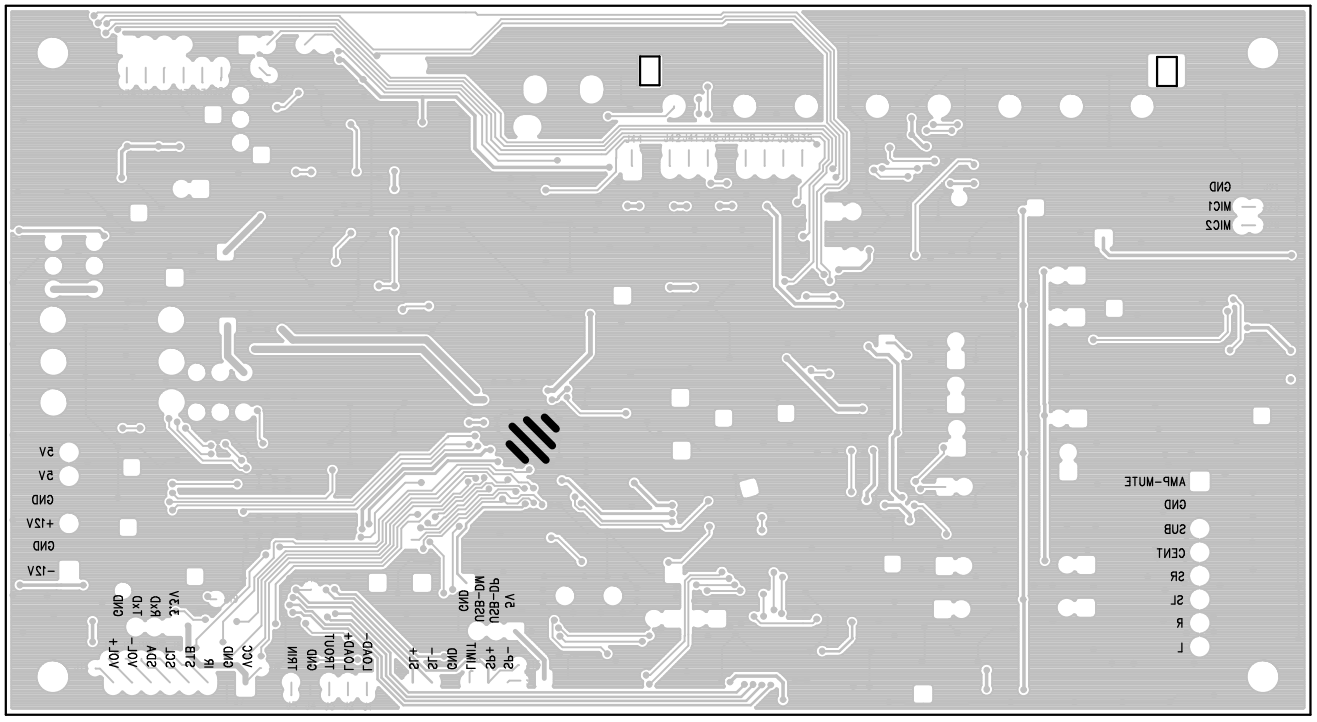
5.1.2 Bottom layer of KEY SCAN Board



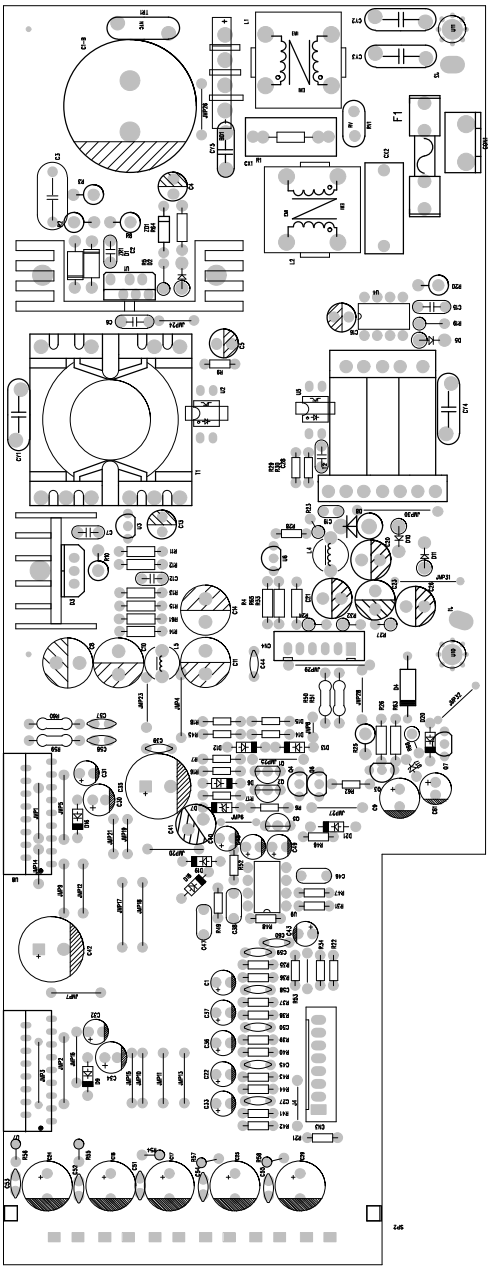
5.1.3 Surface layer of DECODE Board



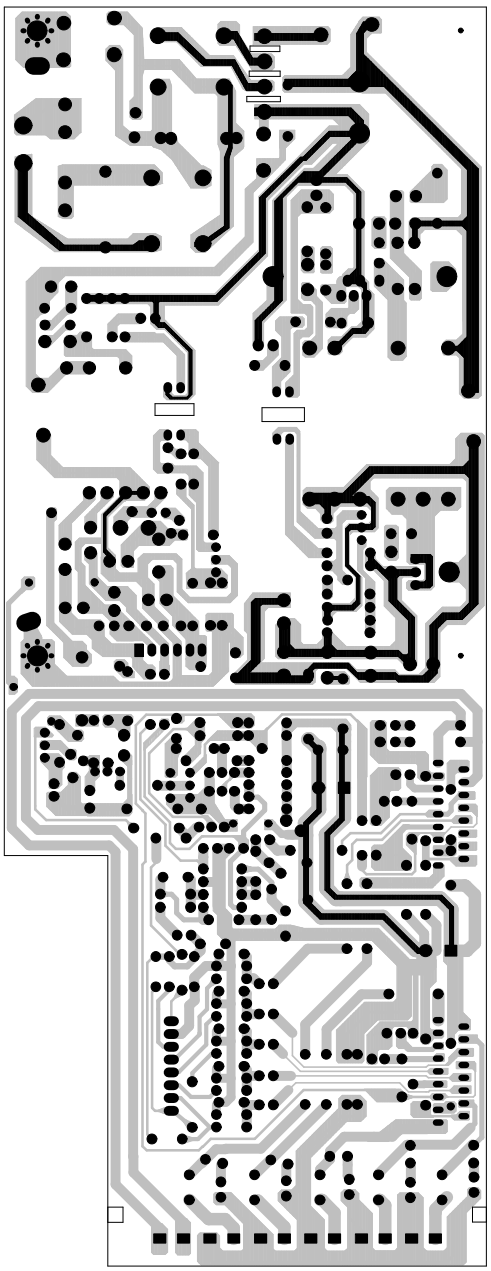
5.1.4 Bottom layer of DECODE Board



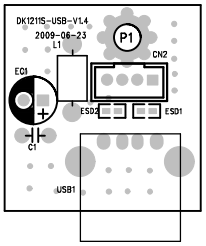
5.1.5 Surface layer of POWER & AMPLIFIER Board

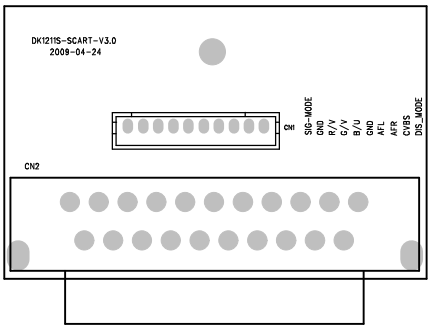


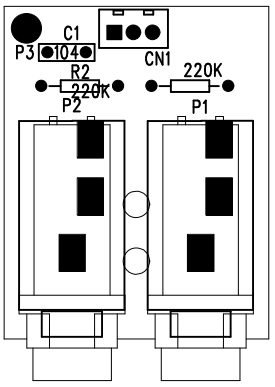
5.1.6 Bottom layer of POWER & AMPLIFIER Board



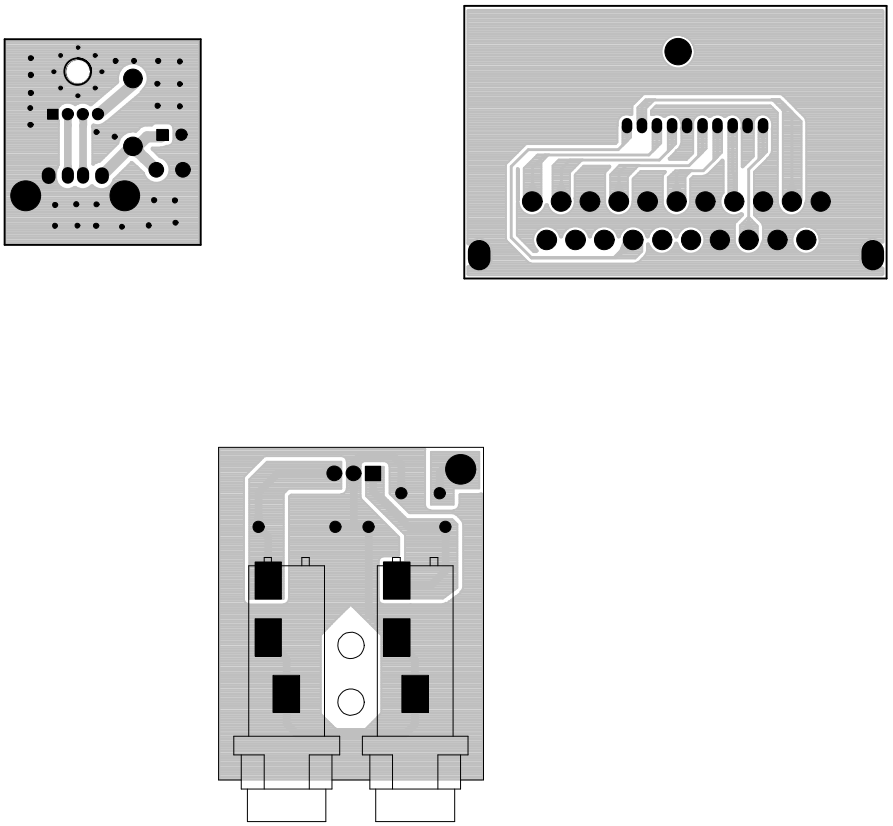
5.1.7 Surface layer of USB/SCART/MIC Board





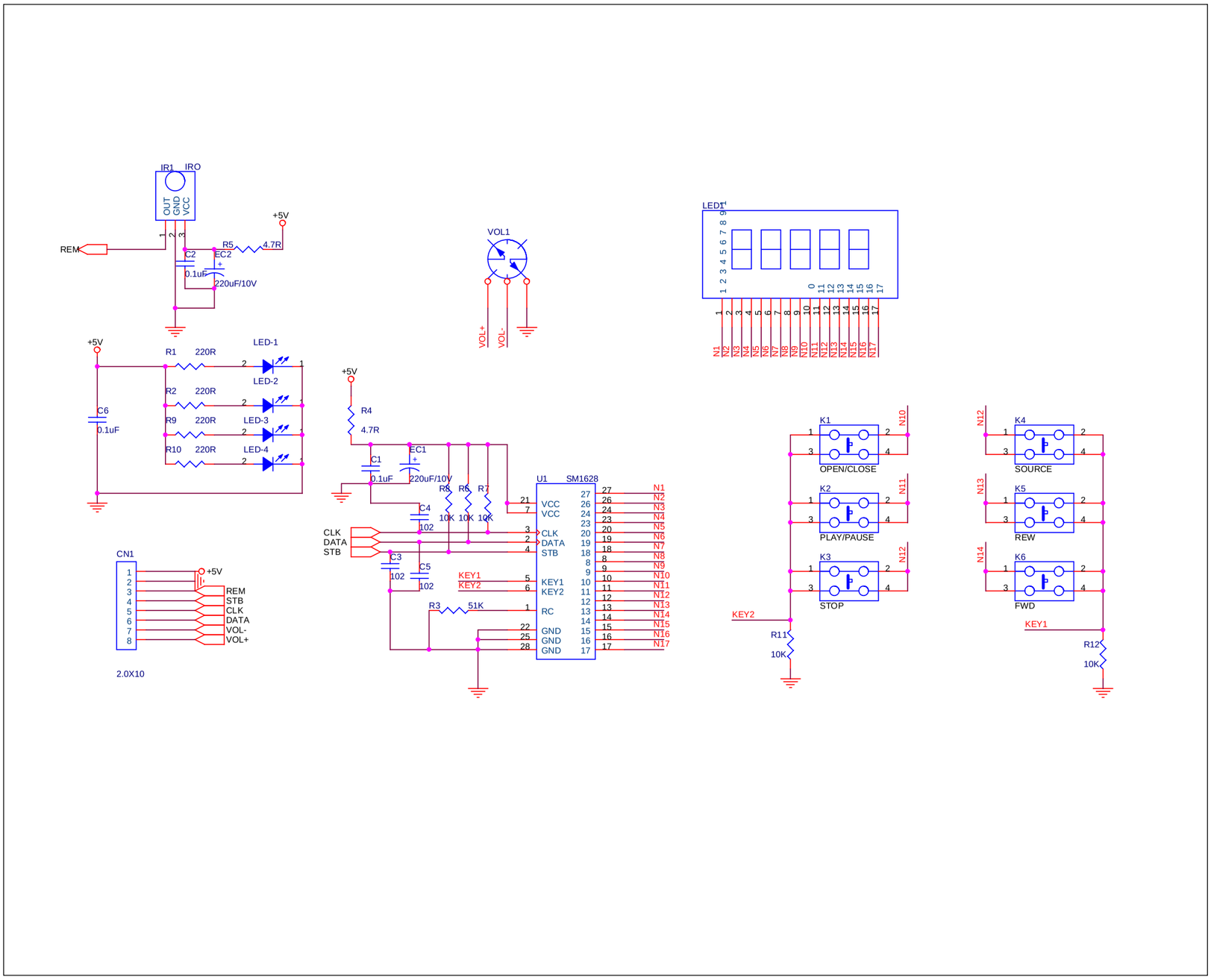


5.1.8 Bottom layer of USB/SCART/MIC Board



Section Two circuit diagram

5.2.1 KEY SCAN Board



SDRAM (Dual Layout)

U4

MA0 21 · MA1 22 · MA2 23 · MA3 24 · MA4 27 · MA5 28 · MA6 29 · MA7 30 · MA8 31 · MA9 32 · MA10 20 · DBA0 19

A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 BA/A11

SDCLK 35 · SDCKE 34

CLK CKE

DCS# 18 · DRAS# 17 · DCAS# 16 · DWE# 15

CS RAS CAS WE

DQM0 14 · DQM1 36

DQML DQMH

33 · 37

NC NC

26 · 50

VSS VSS

DQ0 2 · DQ1 3 · DQ2 5 · DQ3 6 · DQ4 8 · DQ5 9 · DQ6 11 · DQ7 12 · DQ8 39 · DQ9 40 · DQ10 42 · DQ11 43 · DQ12 45 · DQ13 46 · DQ14 48 · DQ15 49

VCC 1 · VCC 25

VCCQ 7 · VCCQ 13 · VCCQ 38 · VCCQ 44

VSSQ 4 · VSSQ 10 · VSSQ 41 · VSSQ 47

SD33

ESMT M12L16161A-7/NC

SD33 R44 10k SDCKE

R45 10k DCS#

DCLK R46 33 SDCLK

BA1 DBA1

BA0 DBA0

RAS# DRAS#

CAS# DCAS#

WE# DWE#

U5

MA0 23 · MA1 24 · MA2 25 · MA3 26 · MA4 29 · MA5 30 · MA6 31 · MA7 32 · MA8 33 · MA9 34 · MA10 22 · MA11 35 · DBA0 20 · DBA1 21

A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10/AP A11 BA0/A13 BA1/A12

SDCLK 38 · SDCKE 37

CLK CKE

DCS# 19 · DRAS# 18 · DCAS# 17 · DWE# 16

CS RAS CAS WE

DQM0 15 · DQM1 39

DQML DQMH

36 · 40

NC NC

54 · 41 · 28

VSS VSS VSS

DQ0 2 · DQ1 4 · DQ2 5 · DQ3 7 · DQ4 8 · DQ5 10 · DQ6 11 · DQ7 13 · DQ8 42 · DQ9 44 · DQ10 45 · DQ11 47 · DQ12 48 · DQ13 50 · DQ14 51 · DQ15 53

VCC 1 · VCC 14 · VCC 27

VCCQ 3 · VCCQ 9 · VCCQ 43 · VCCQ 49

VSSQ 6 · VSSQ 12 · VSSQ 46 · VSSQ 52

SD33

HY57V641620FTP-6(64M)

DV33 L22 FB SD33

+C77 47uF/10v

+C78 100uF/10v

SD33 C79 0.1uF · C80 0.1uF · C81 0.1uF

SD33 C82 0.1uF · C83 0.1uF · C84 0.1uF

DQ[0..15] DQ[0..15] (2)
MA[0..11] MA[0..11] (2)
DQM[0..1] DQM[0..1] (2)
BA[0..1] BA[0..1] (2)
DCLK DCLK (2)
RAS# RAS# (2)
CAS# CAS# (2)
WE# WE# (2)

DRAM I/F

SF_CK SF_CK (2)
SF_CS SF_CS (2)
SF_DI SF_DI (2)
SF_DO SF_DO (2)

S-FLASH

USB_DP USB_DP (2)
USB_DM USB_DM (2)

USB

S-FLASH

U6

SF_CS 1 · SO 2 · WP# 3 · VSS 4

CE# VDD HOLD# SCK SI

8 · 7 · 6 · 5

SF_CK SF_DI

DV33 R48 10k

DV33 R47 10k DV33

C85 0.1uF

EON-F16

16M

DV33 R49 10k SF_CS R50 10k/NC

CN1 6P,2.5mm

-P12V 1 · +P12V 2 · 3 · 4 · 5 · 5V 6

-P12V L3 FB -12V C8 47uF/16v C9 0.1uF -12V

+P12V L6 FB +12V C17 47uF/16v C18 0.1uF +12V

PV33 C5 0.1uF · C3 220uF/6.3v · C4 47uF/6.3v · C6 0.1uF

PV33 L2 FB DV33

PV18 C13 0.1uF · C11 220uF/6.3v · C12 47uF/6.3v · C14 0.1uF

PV18 L4 FB V18

DV33 L5 FB RFV33 C15 47uF/6.3v · C16 0.1uF

5V L1 FB L28 FB VCC C1 220uF/10v · C2 0.1uF

RESET Circuit

DV33 R1 10k URST# C7 10u R2 100 Q1 3904 C10 0.1u D1 1N4148 R3 10k

URST# URST# (2)

H1 HOLE · H2 HOLE · H3 HOLE · H4 HOLE

MT1389DE-L
LQFP 128
Desktop
V1.0

SERVO RF DeCAP.

RF Reference

Chip Decap.

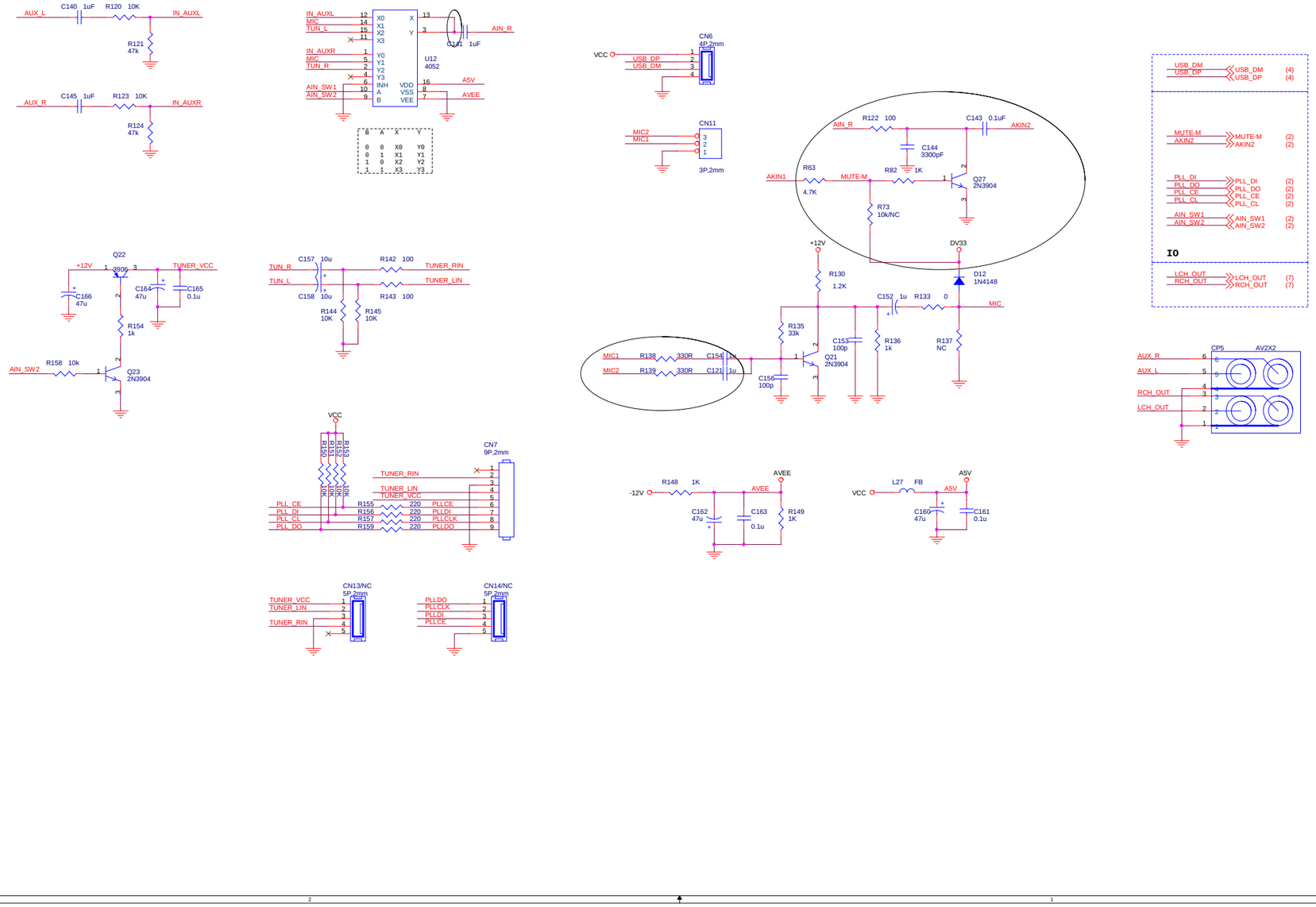
Very Important to reduce Noise

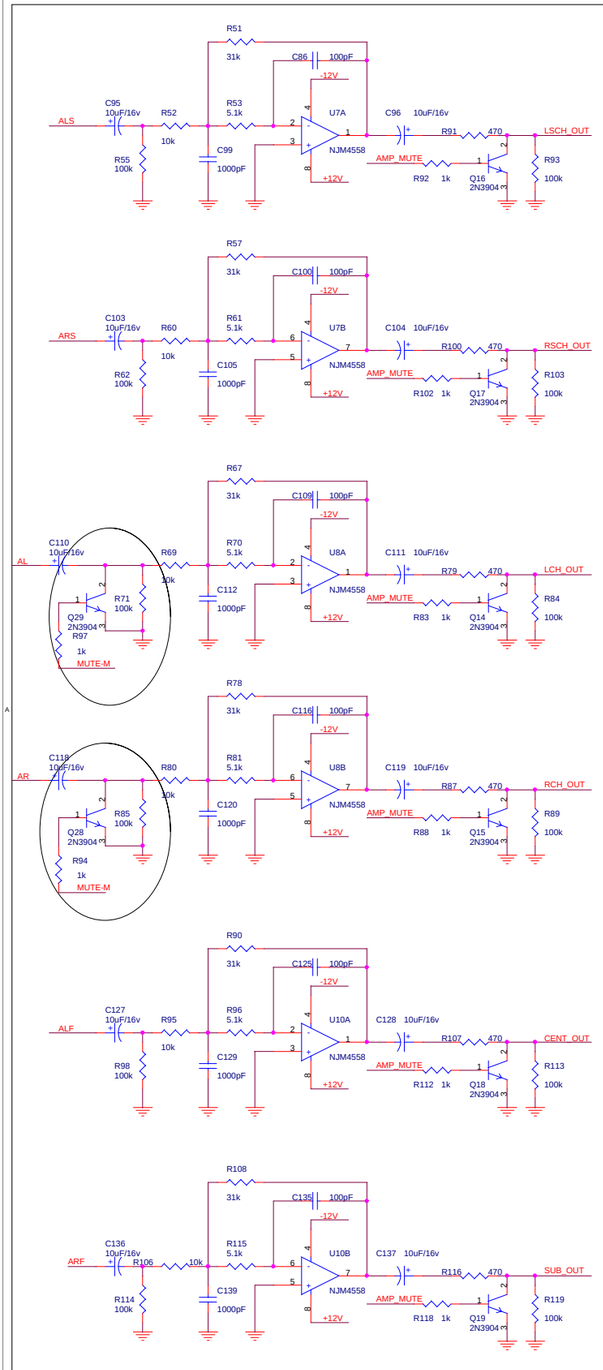
SANYO
HD850

TOP

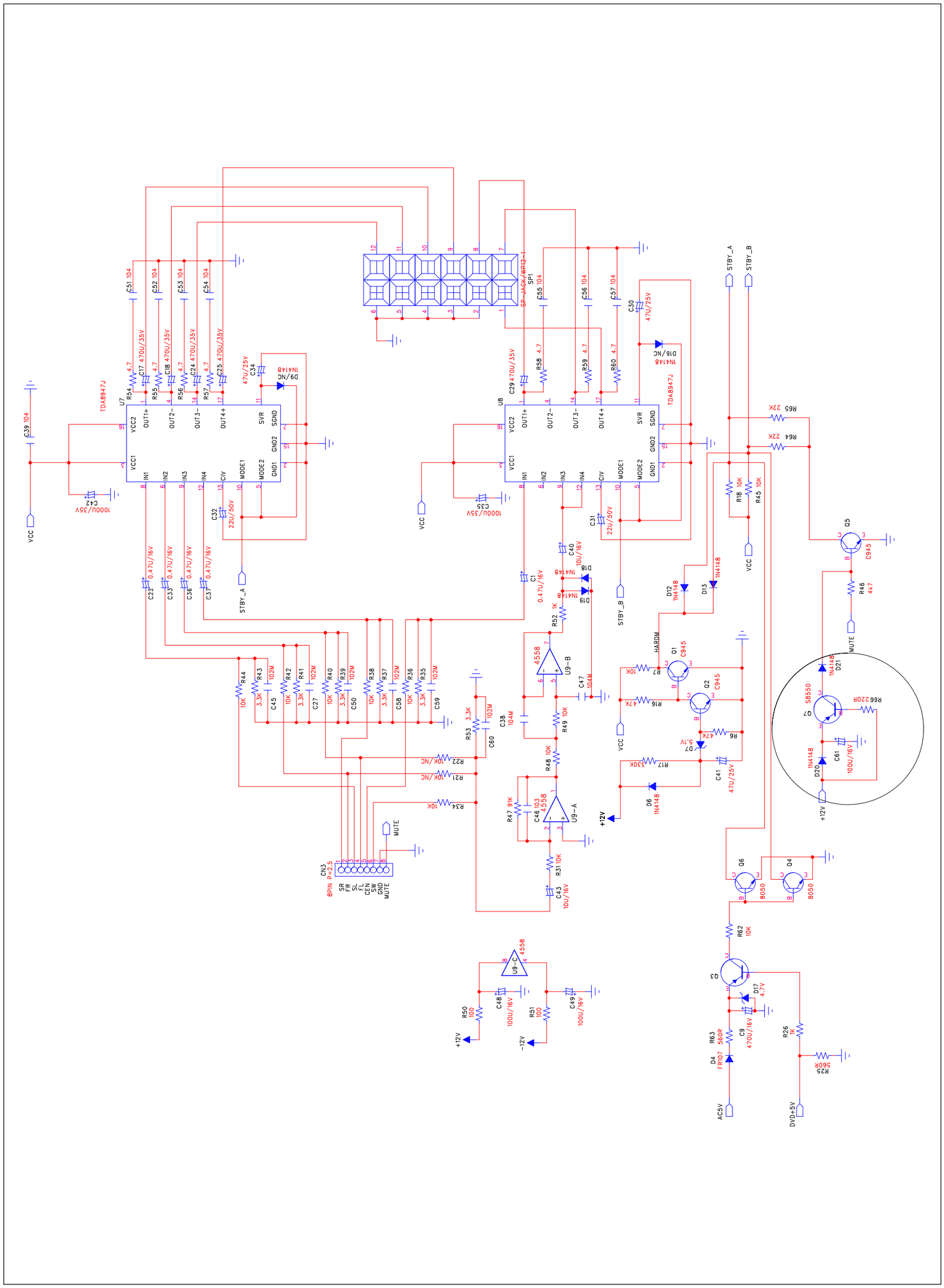
MT1389L/K/SMD
LQFP128/SMD/1389L-MARKAAA

DRAM I/F
S-FLASH
AUDIO I/F
VIDEO I/F
USB I/F
IO
I2C BUS
IO

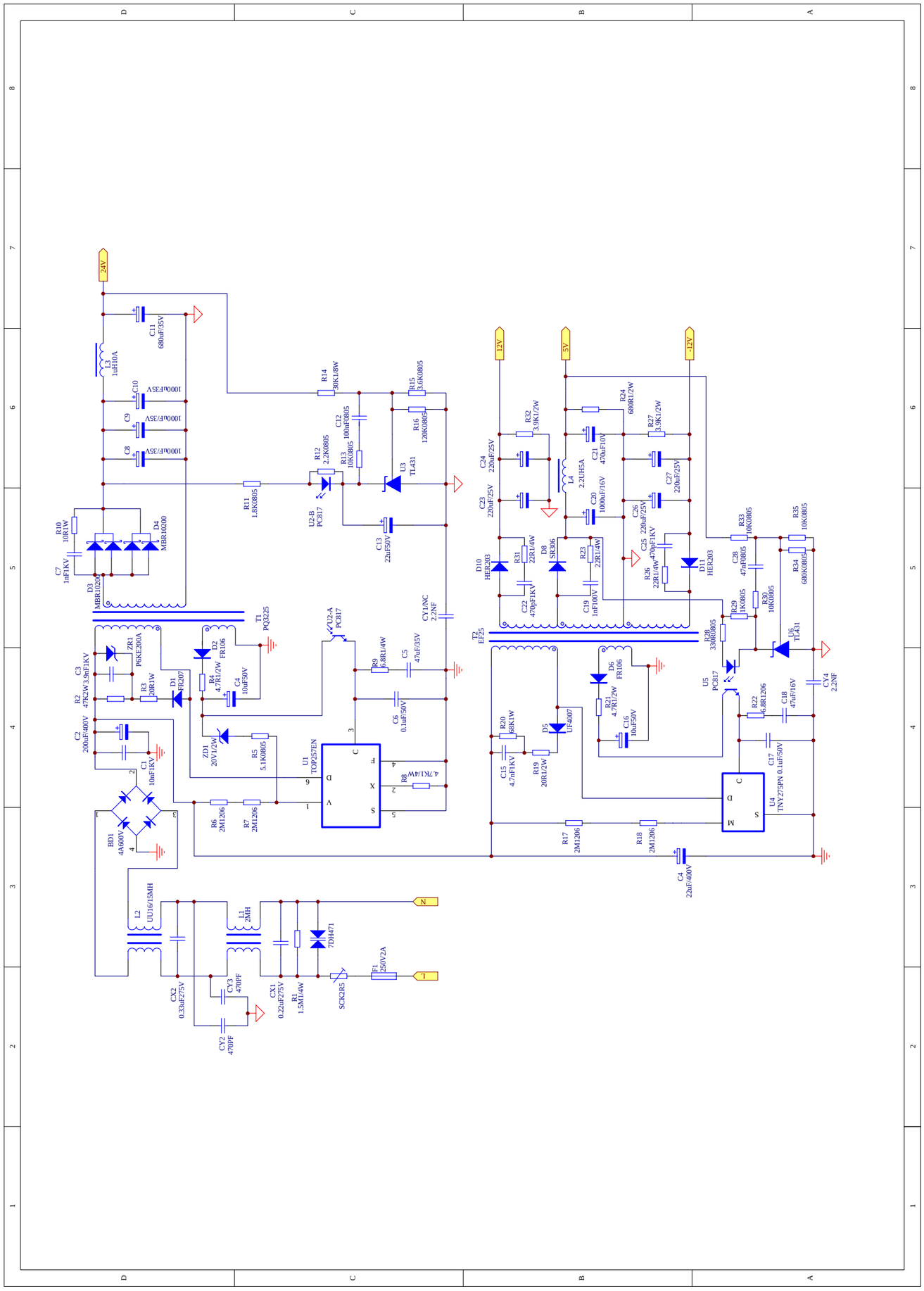

AUX_L
C140 1uF
R120 10K
IN_AUXL
R121 47k
AUX_R
C145 1uF
R123 10K
IN_AUXR
R124 47k
IN_AUXL
MIC
TUN_L
IN_AUXR
MIC
TUN_R
AIN_SW1
AIN_SW2
X0
X1
X2
X3
Y0
Y1
Y2
Y3
INH
A
B
X
Y
VDD
VSS
VEE
U12
4052
C141 1uF
AIN_R
A5V
AVEE
VCC
USB_DP
USB_DM
CN6
4P,2mm
MIC2
MIC1
CN11
3P,2mm
AIN_R
R122 100
C143 0.1uF
AKIN2
C144 3300pF
AKIN1
R63 4.7K
MUTE-M
R82 1K
Q27 2N3904
R73 10K/NC
+12V
DV33
R130 1.2K
D12 1N4148
C152 1u
R133 0
MIC
R135 33k
C153 100p
R136 1k
R137 NC
MIC1
R138 330R
C154 1u
MIC2
R139 330R
C121 1u
Q21 2N3904
C156 100p
USB_DM
USB_DP
MUTE-M
AKIN2
PLL_DI
PLL_DO
PLL_CE
PLL_CL
AIN_SW1
AIN_SW2
IO
LCH_OUT
RCH_OUT
(4)
(2)
(7)
CP5
AV2X2
AUX_R
AUX_L
RCH_OUT
LCH_OUT
Q22
+12V
3906
TUNER_VCC
C166 47u
C164 47u
C165 0.1u
R154 1k
AIN_SW2
R158 10k
Q23 2N3904
C157 10u
TUN_R
TUN_L
C158 10u
R142 100
TUNER_RIN
TUNER_LIN
R143 100
R144 10K
R145 10K
VCC
R150
R151
R152
R153
10K
TUNER_RIN
TUNER_LIN
TUNER_VCC
PLL_CE
PLL_DI
PLL_CL
PLL_DO
R155 220 PLLCE
R156 220 PLLDI
R157 220 PLLCLK
R159 220 PLLDO
CN7
9P,2mm
R148 1K
AVEE
-12V
C162 47u
C163 0.1u
R149 1K
L27 FB
A5V
VCC
C160 47u
C161 0.1u
CN13/NC
5P,2mm
TUNER_VCC
TUNER_LIN
TUNER_RIN
CN14/NC
5P,2mm
PLLDO
PLLCLK
PLLDI
PLLCE


R51
31k
C86 100pF
-12V
ALS
C95 10uF/16v
R52 10k
R53 5.1k
U7A
C96 10uF/16v
R91 470
LSCH_OUT
NJM4558
AMP_MUTE
R92 1k
Q16 2N3904
R93 100k
R55 100k
C99 1000pF
+12V
R57
C100 100pF
ARS
C103 10uF/16v
R60 10k
R61 5.1k
U7B
C104 10uF/16v
R100 470
RSCH_OUT
R102 1k
Q17 2N3904
R103 100k
R62 100k
C105 1000pF
R67
C109 100pF
AL
C110 10uF/16v
R69 10k
R70 5.1k
U8A
C111 10uF/16v
R79 470
LCH_OUT
R83 1k
Q14 2N3904
R84 100k
R71 100k
Q29 2N3904
R97 1k
MUTE-M
C112 1000pF
R78
C116 100pF
AR
C119 10uF/16v
R80 10k
R81 5.1k
U8B
C119 10uF/16v
R87 470
RCH_OUT
R88 1k
Q15 2N3904
R89 100k
R85 100k
Q28 2N3904
R94 1k
MUTE-M
C120 1000pF
R90
C125 100pF
ALF
C127 10uF/16v
R95 10k
R96 5.1k
U10A
C128 10uF/16v
R107 470
CENT_OUT
R112 1k
Q18 2N3904
R113 100k
R98 100k
C129 1000pF
R108
C135 100pF
ARF
C136 10uF/16v
R106 10k
R115 5.1k
U10B
C137 10uF/16v
R116 470
SUB_OUT
R118 1k
Q19 2N3904
R119 100k
R114 100k
C139 1000pF
NJM4558
+12V
-12V
+12V
C87 0.1u
C88 0.1u
C89 0.1u
C90 0.1u
-12V
C91 0.1u
C92 0.1u
C93 0.1u
C94 0.1u
MUTE_Circuit
+12V
R59 200K
VCC
R64 7.5K
Q11
A_MUTE
2N3906
Zener / 5V1(dip)
D8
D11 1N4148
Power On Mute
C106 220U10V
R65 10K
Q12
2N3906
Power Off Mute
VCC
R68 10K
DV33
R72 NC
Q13 NC
MUTE1
C113 NC
R75 10K
AUDIO_MUTE
R76 NC
R77 0R
D14 1N4148
MUTE1
AMP_MUTE
D15 1N4148
A_MUTE
AMP_MUTE
+12V
D16 1N4148/NC
Q20 8550/NC
D17 1N4148/NC
AMP_MUTE
R56 220R/NC
C83 470uF/16v/NC
+12V
R160 2.2k
ASPECT
0-2 STANDBY
4.5-7.0 16:9
9.5-12 4:3
FUNCTION impedance>=10K
R161 2.2k
R162 75
R163 2.2k
FS0
Q24 2N3904
R164 2.2k
FS1
Q25 2N3904
DV33
R165 75
Q26 2N3906
RGB/CVBS
R166 4.7k
R167 2.2k
FS2
0-0.4 CVBS
1.0-3.0 RGB
VIDIEO impedance=75R
V_R
L23 1.8uH
SY
R/V_OUT
R54 75/1%
C97 100pF
C98 100pF
D6 BAV99
VCC
V_B
L24 1.8uH
SC
B/U_OUT
R58 75/1%
C101 100pF
C102 100pF
D7 BAV99
VCC
V_G
L25 1.8uH
G/Y_OUT
R66 75/1%
C107 100pF
C108 100pF
D9 BAV99
VCC
CVBS_OUT
L26 1.8uH
CVBSO
R74 75/1%
C114 100pF
C115 100pF
D10 BAV99
VCC
CP2
SAV-2(S-video)
CVBSO
SY
SC
CN9
10P,2MM
CVBSO
G/Y_OUT
R/V_OUT
B/U_OUT
LCH_OUT
RCH_OUT
RGB/CVBS
ASPECT
CP3
AV2X2
COAXIAL
G/Y_OUT
R/V_OUT
B/U_OUT
R101 33
OPTICAL
ASPDIF
R104 100
C131 0.1uF
COAXIAL
R105 100
C133 330pF
C132 0.1uF
VCC
NC
NC
IN
VCC
GND
CP4
HSIF32T(OPTICAL)
AR
AL
ARS
ALS
ARF
ALF
ASPDIF
CVBS_OUT
V_R
V_B
V_G
MUTE_AMP
AUDIO_MUTE
A/V I/F
SCL
SDA
I2C BUS
FS0
FS1
FS2
LCH_OUT
RCH_OUT
CN8
8P,2MM
LCH_OUT
RCH_OUT
LSCH_OUT
RSCH_OUT
CENT_OUT
SUB_OUT
AMP_MUTE

5.2.3 AMPLIFIER POWER Board



5.2.4 POWER Board



5.2.5 USB/SCART/MIC Board