SERVICE MANUAL

MODEL : LED1955/LED2255F/LED2455F

(SOURTION MSDV26)

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This manual is the latest at the time of printing, and does not include the modification which may be made after the printing, by the constant improvement of product.

IMPORTANT SAFETY INSTRUCTIONS

This symbol indicates " dangerous voltage " inside the product that presents a risk of electric shock or personal injury.

This symbol indicates important instructions accompanying the product.

Please read this manual carefully before using this product.

- Before connecting the AC power cord ,make sure the voltage designation of the LCD TV corresponds to the local electrical supply .
  If you are unsure of your power supply , ask your local power company .

- Never insert anything metallic into the cabinet openings of the liquid crystal display LCD TV/monitor;otherwise it may create the danger of electric shock.

- To avoid electric shock, Never touch the inside of the LCD TV/monitor .
  Only a qualified technician should open the case of the LCD TV/monitor.

- Never use your LCD TV/monitor if the power cord has been damaged .
  Do not allow anything to rest on the power cord, and keep the cord away from place where people can trip over it .

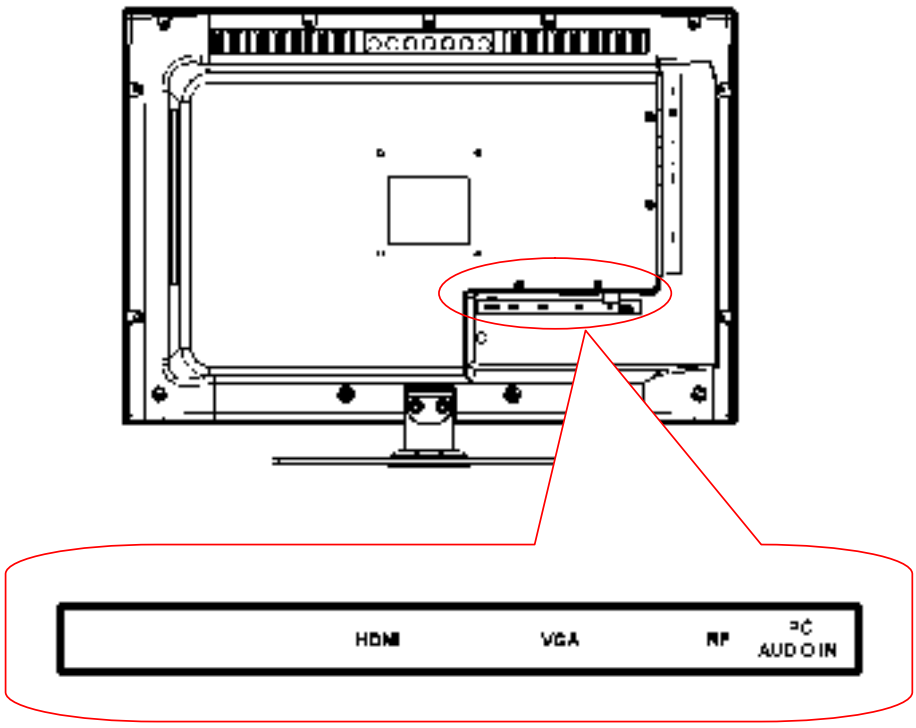
- Be sure to hold the plug, not the cord, when disconnecting the power cord from an electric socket.

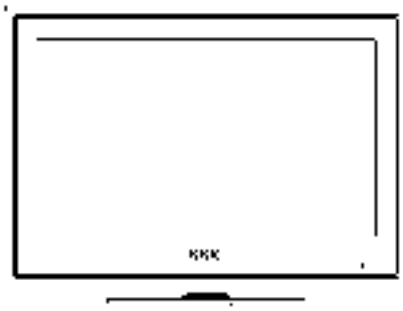
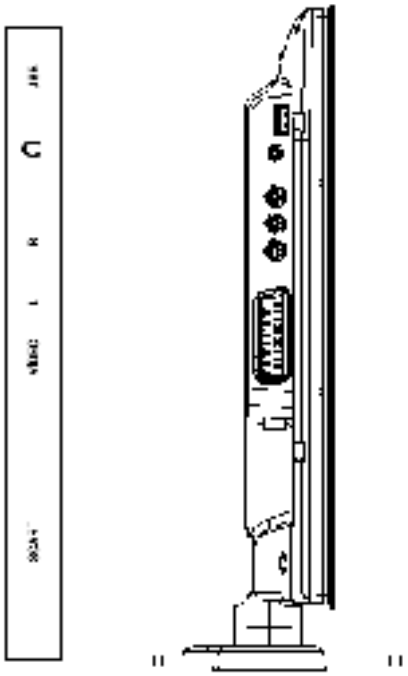
- Openings in the LCD TV/monitor cabinet are provided for ventilation.
  To prevent overheating, these openings should not be blocked or covered. Also, avoid using the LCD TV/monitor on a bed ,sofa ,rug, or other soft surface. Doing so may block the ventilation openings in the bottom of the cabinet. If you put the LCD TV/monitor in a bookcase or some other enclosed space, be sure to provide adequate ventilation.

- Do not expose the LCD TV/monitor to extreme temperature conditions or to extreme humidity conditions.

- The apparatus shall not be exposed to dripping or splashing and that no objects filled with liquids.

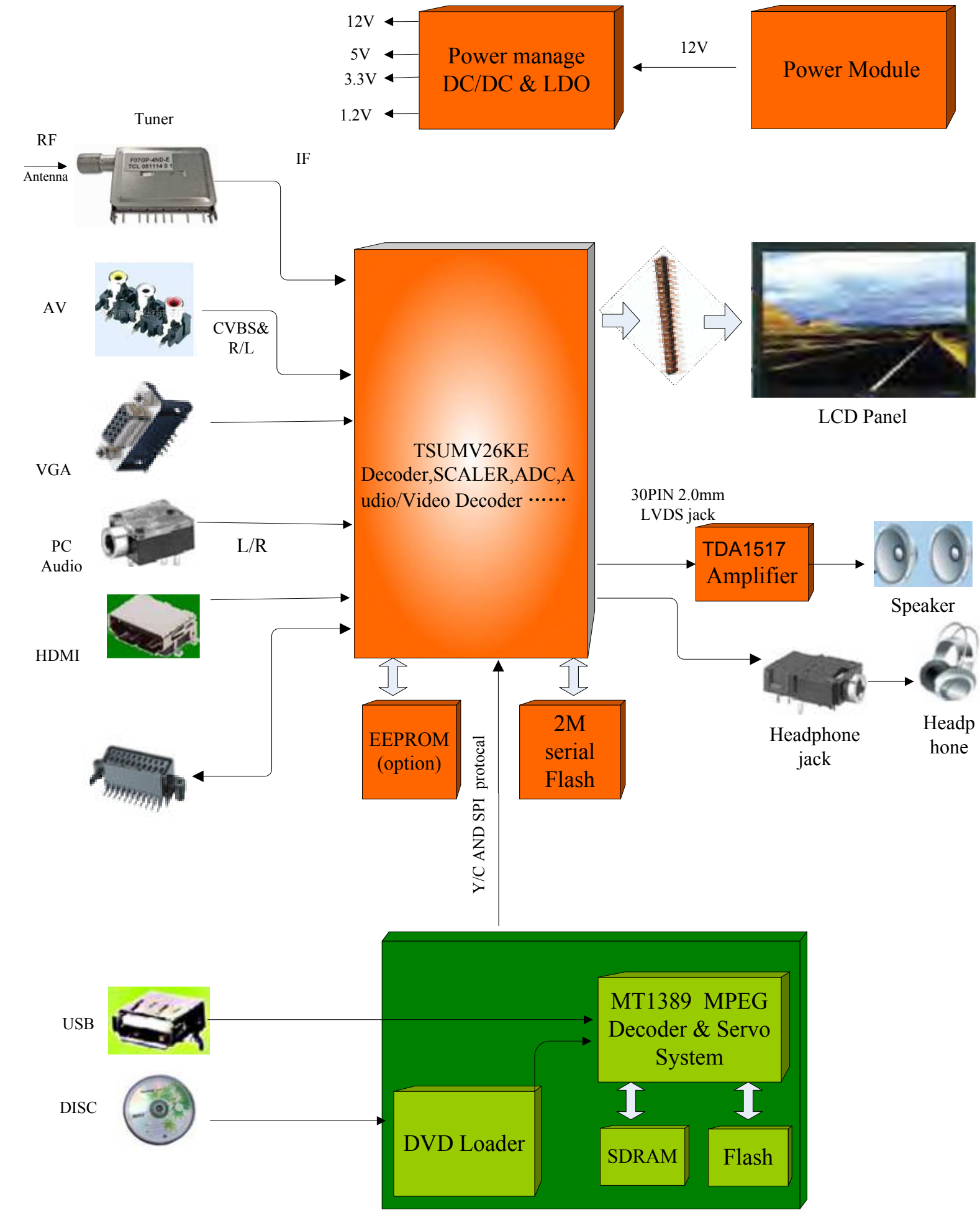
Produce Specification

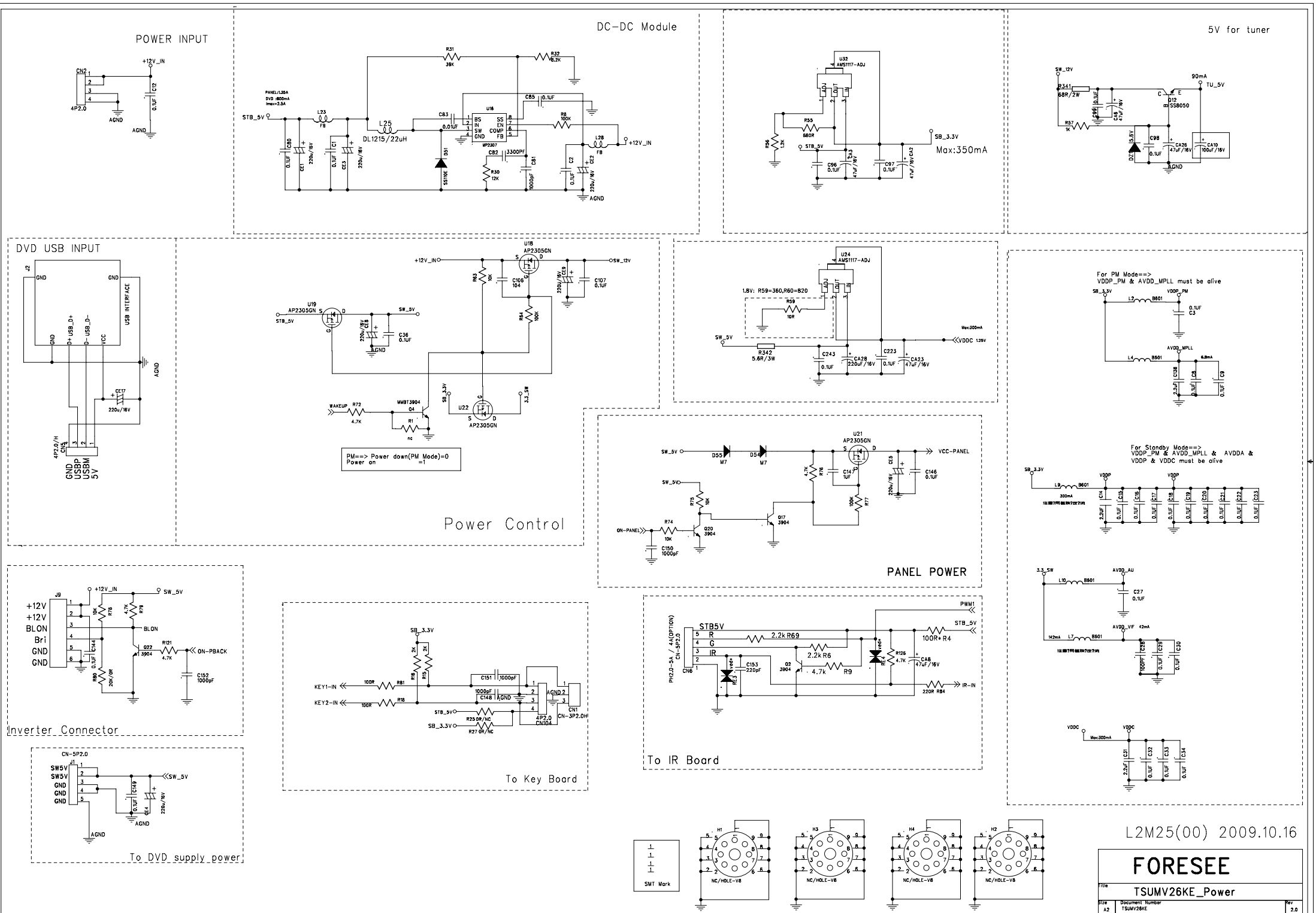
Model	LED1955 LED2255F LED2455F		
Solution	TSUMV26KE		
TV System	PAL BG/DK/ I SECAM BG/DK/L/L'		
Channel Coverage	48.25~863.25 MHz		
Intermediate Frequencies	Picture I.F.	38.90MHz （BG,DK,I）	
	Sound I.F.	33.40 (BG)	
		32.40MHz(DK,L)	
		32.90MHz(I)	
Reception	Tuning System		FS With PLL
	Tuner Band		Standard system with hyper band
	Auto Channel Scanning		Yes
	Number Of Preset Channels		100
DTV System	75 Ohm Unbalanced		
	Power supply: AC 100V-240V, 50/60Hz		
	Bandwidth	7MHz/8MHz	
	Video System	MPEG-2, MPEG-4,H.264 video decoding	
	Sound System	MPEG Audio,Dolby Digital	
Antenna Impedance	75 Ohm Unbalanced		
Power Supply	Power supply: AC 100V-240V, 50/60Hz		
Back Panel Viewing			
	TV KEY	STANDBY,SOURCE, MENU, CH+/CH-, VOL +/-	
	DVD KEY	EJECT(Shared with CH-), PLAY/PAUSE(Shared with CH+)	
	Terminals	HDMI,VGA,RF,PC Audio IN	
	USB2.0 Socket		
	DVD disc notch		

Front Panel Viewing			
	LED Indicators (Red/Green)		Standby/On
Side Viewing			
Terminals	Image In	TV 75ohm Aerial	X 1
		HDMI Connector	X 1
		RCA Jack(CVBS) -Yellow	X 1
Terminals	Audio In	RCA Audio (L/R) Jack - White/Red	X 1
		φ3.5 Stereo Jack	X 1
	VGA In	D-sub 15 Pin VGA Connector	X 1
	USB	USB2.0 Host	X 1
	SCART	Full SCART	X 1
	Audio Output	φ3.5 Earphone Jack	X 1
DVD	DVD Loader	DL-10AH(FOR YOU)	
	Loading Type	Slot-in	
	Disc Format	DVD/CD/VCD/CDR/CDRW/DVD-R/DVD+R/	
		DVD-RW/DVD+RW/SVCD	
	Multimedia Format	MP3/WMA/JPEG/MPEG-1/MPEG-2/MPEG-4 DIVX3.XX-DIVX5.XX	
Audio	Output Power (1 KHz 10% THD)		2.5W
	NICAM / STEREO		Yes
	Bass		Yes
	Treble		Yes
	Balance		Yes
OSD Language	Russian , English		

LCD Panel （Only For Reference, Parameters according to panel model）	LED1955	Brand		INNOLUX
		Model		MT185GW01
		Size		18.5”
		Backlight		LED
		Pixel Pitch		0.3mm (H) x 0.3mm(V)
		Resolution	Horizontal (dots)	1366
			Vertical (Lines)	768
	LED2255F	Brand		LG
		Model		LM215WF4
		Size		21.6”
		Backlight		LED
		Pixel Pitch		0.248 mm x 0.248mm
		Resolution	Horizontal (dots)	1920
			Vertical (Lines)	1080
	LED2455F	Brand		LG
		Model		LM230WF5
		Size		23.6”
		Backlight		LED
		Pixel Pitch		0.265 mm x 0.265mm
		Resolution	Horizontal (dots)	1920
			Vertical (Lines)	1080
Support Resolution(For PC)	Horizontal (dots) (Max)			1920
	Vertical (Lines) (Max)			1080
Speaker	4 Ohm /5W			x2pcs
Power Consumption	On working			45W Max
	Standby			≦1W
Power Consumption	On working			45W Max
	Standby			≦1W
Remote Control				
	Color	Black		
	Batteries	1.5V AAA X2		
	Customer Code	09F6		
	Remark			

Block Diagram




POWER INPUT
DC-DC Module
5V for tuner
DVD USB INPUT
Power Control
PANEL POWER
Inverter Connector
To DVD supply power
To Key Board
To IR Board
SMT Mark
PM==> Power down(PM Mode)=0
Power on =1
For PM Mode==>
VDDP_PM & AVDD_MPLL must be alive
For Standby Mode==>
VDDP_PM & AVDD_MPLL & AVDDA &
VDDP & VDDC must be alive
1.8V: R59=360,R60=820
SB_3.3V
Max:350mA
SW_5V
STB_5V
+12V_IN
VCC-PANEL
VDDC 1.25V
L12M25(00) 2009.10.16
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TSUMV26KE_Power
Size A2
Document Number TSUMV26KE
Rev 2.0
Date: 9, 2009
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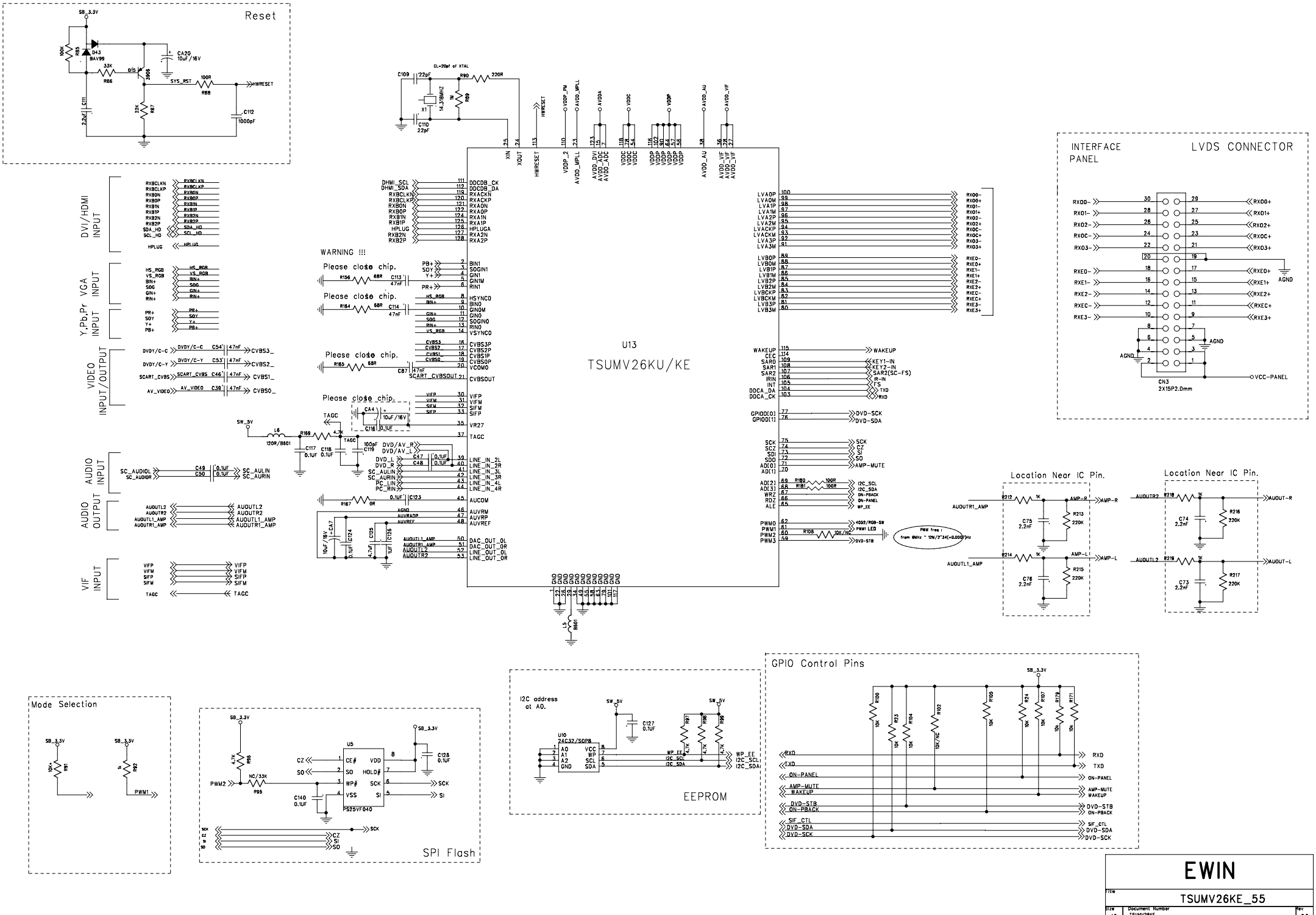

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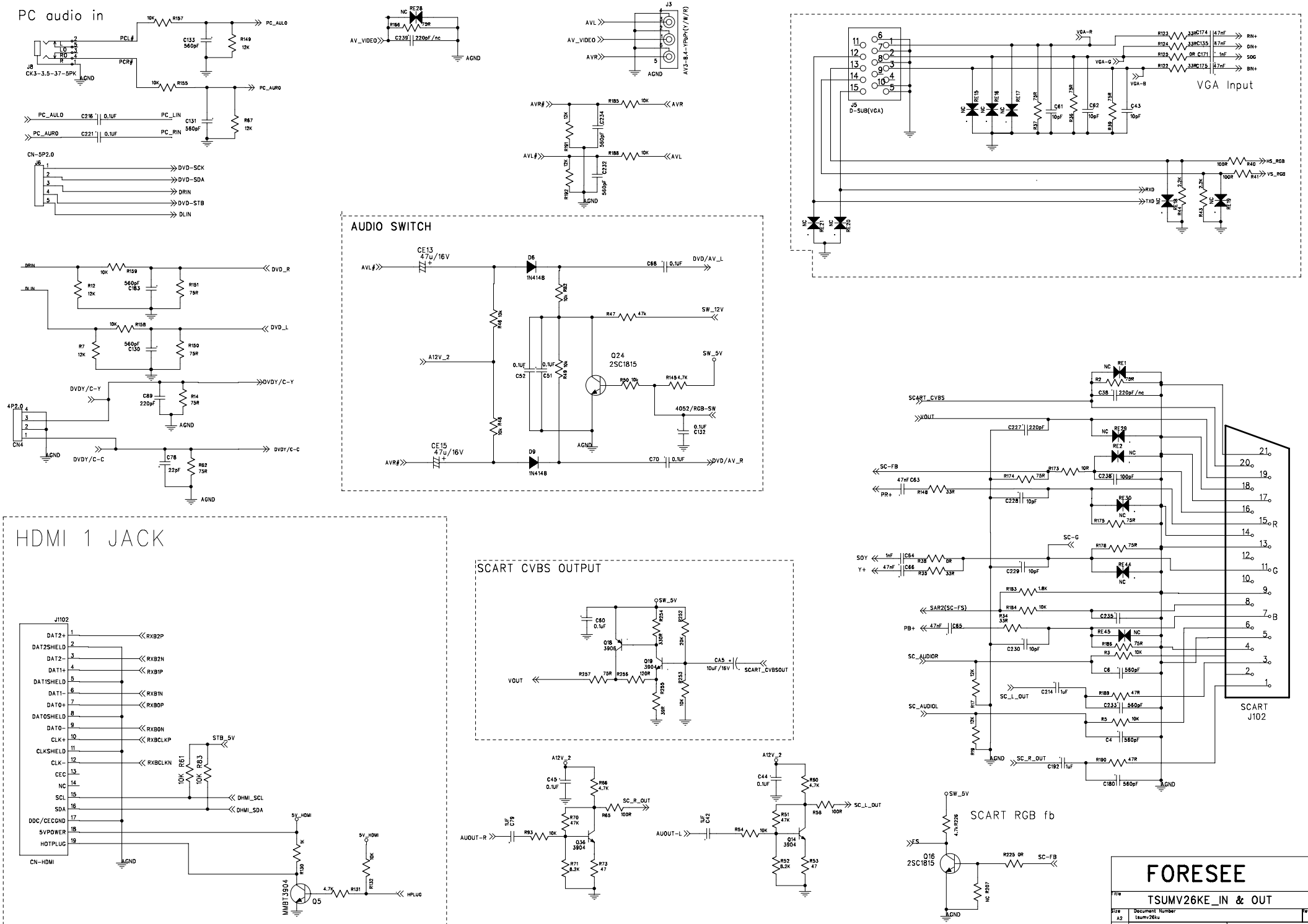
Date:	August, 2009	Sheet 2 of 5


PC audio in
J8
CK3-3.5-37-5PK
PC_AUL0
PC_AUR0
PC_LIN
PC_RIN
CN-5P2.0
J6
DVD-SCK
DVD-SDA
DRIN
DVD-STB
DLIN
AV_VIDEO
AGND
AVL
AVR
AV3-B.4-YPbPr(Y/M/R)
AVR#
AVL#
VGA Input
D-SUB(VGA)
VGA-R
VGA-G
VGA-B
RIN+
GIN+
SOG
BIN+
HS_RGB
VS_RGB
RXD
TXD
AUDIO SWITCH
DVD_R
DVD_L
DVDY/C-Y
DVDY/C-C
4P2.0
CN4
SW_12V
SW_5V
A12V_2
DVD/AV_L
DVD/AV_R
4052/RGB-SW
Q24
2SC1815
HDMI 1 JACK
J1102
CN-HDMI
RXB2P
RXB2N
RXB1P
RXB1N
RXB0P
RXB0N
RXBCLKP
RXBCLKN
DHMI_SCL
DHMI_SDA
STB_5V
5V_HDMI
HPLUG
MMBT3904
Q5
SCART CVBS OUTPUT
SCART_CVBSOUT
VOUT
SCART_CVBS
SCART
J102
SC-FB
PR+
PB+
SOY
Y+
SC-G
SAR2(SC-FS)
SC_AUDIOR
SC_AUDIOL
SC_L_OUT
SC_R_OUT
AUOUT-R
AUOUT-L
SCART RGB fb
Q16
2SC1815
FS
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TSUMV26KE_IN & OUT
Size
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Rev
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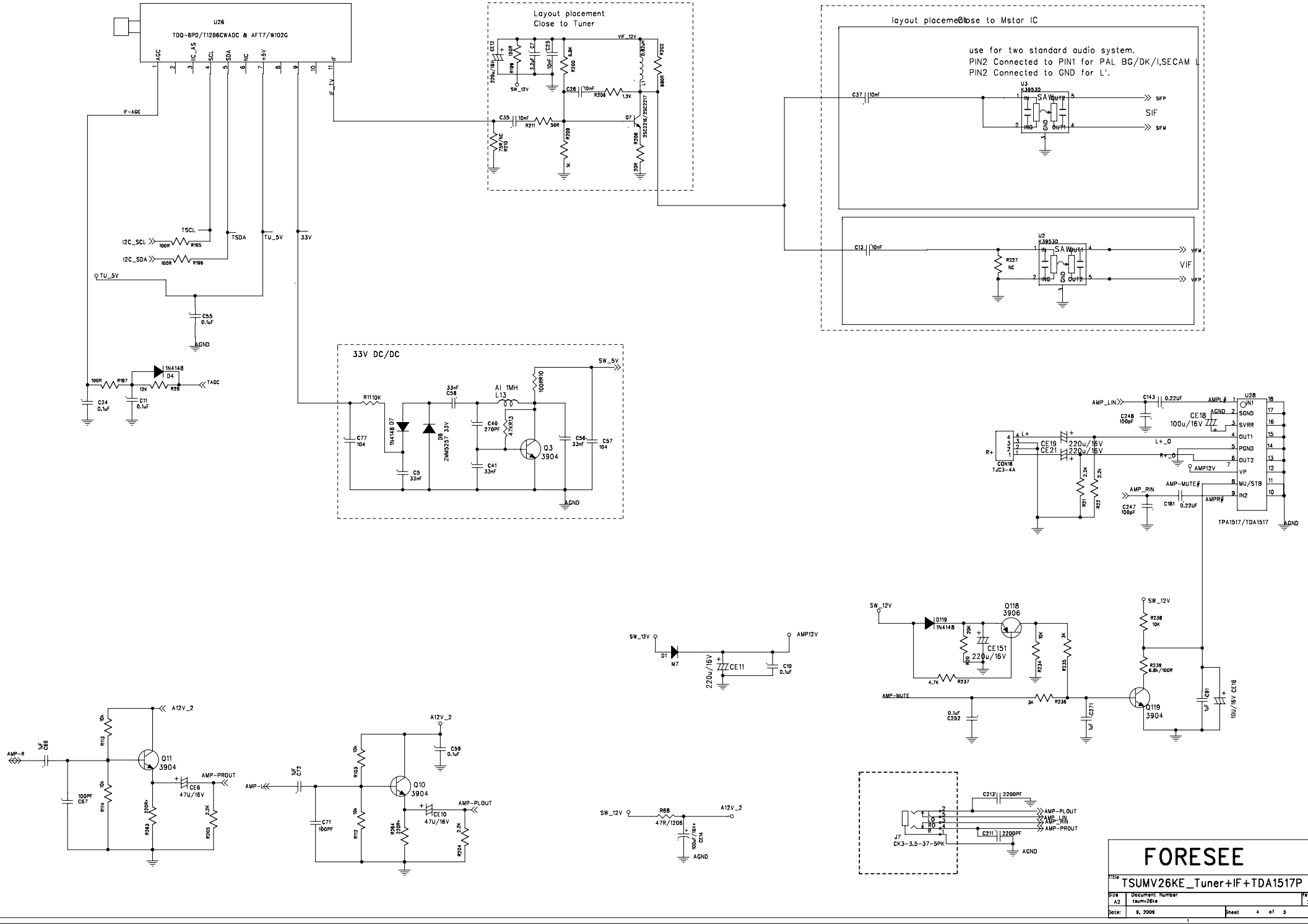
5



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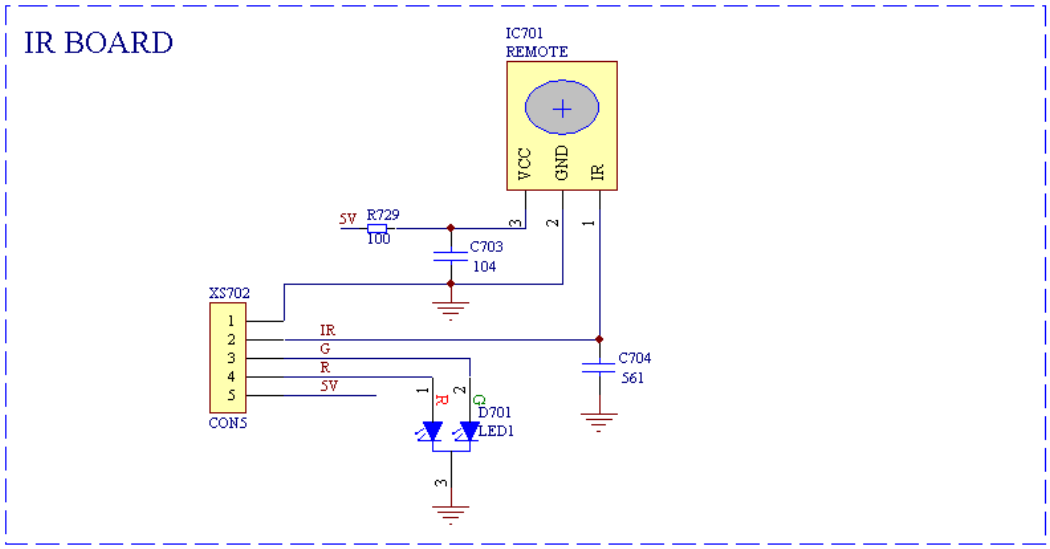
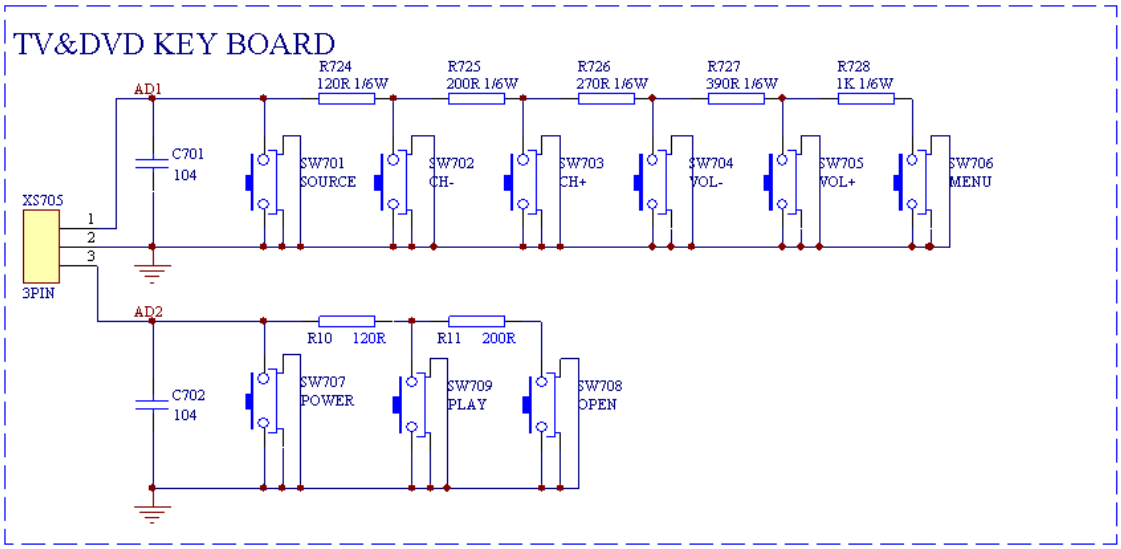
Title	TSUMV26KE_Tuner+IF+TDA1517P	
Size A2	Document Number tsumv26ke	Rev 2.0
Date: 9, 2009	Sheet 4 of 5	

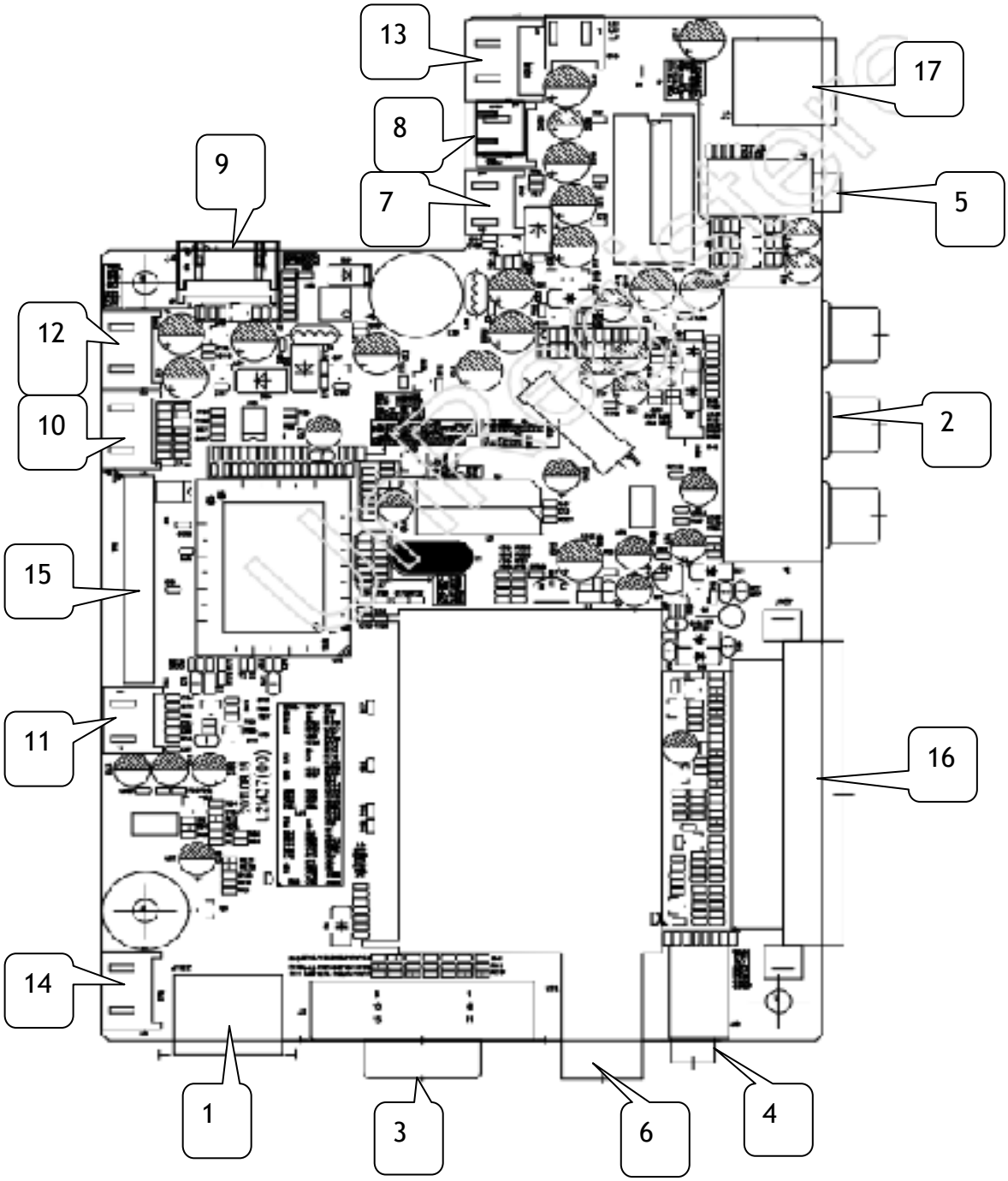
IR BOARD SCHEMATICS



TV&DVD KEY BOARD SCHEMATICS



Interface Description And PIN Function



★ INTERFACE FUNCTION DESCRIPTION

NO	Description	NO	Description
1	HDMI Input	10	DVD Interface
2	CVBS Input	11	DVD Y/C Signal Input
3	VGA Input	12	DVD power supply jack
4	PC　Audio Input	13	Speaker Jack
5	Headphone output	14	IR Jack
6	RF Input	15	LVDS Interface
7	Inside power supply jack	16	SCART Signal Input
8	Key Jack	17	USB2.0 Signal Input
9	Inverter Jack	18	USB Jack（For DVD）

★J9: Inverter jack

NO.	Definition	Description
1	12v	Power Supply
2	12v	Power Supply
3	BLO	Black-Light ON/OFF Control
4	Bri	Brightness Adjustment
5	GND	Ground
6	GND	Ground

★CON16: Speaker jack

NO.	Definition	Description
1	R	Right Speaker Output
2	GND	GND
3	GND	GND
4	L	Left Speaker Output

★ CN104: Key jack

NO.	Definition	Description
1	K1	Key 1 (ADC Input)
2	GND	GND
3	K2	Key 2 (ADC Input)
4	STB5V	POWER STB5V

★J6: DVD INTERFACE

NO.	Definition	Description
1	SCK	SPI Communication Protocol SCL
2	SDA	SPI Communication Protocol SDA
3	DRIN	Right Channel of DVD Audio Input
4	STB	SPI Communication Protocol STB
5	DLIN	Left Channel of DVD Audio Input

★CN4: DVD Y/C Signal Input jack

1	C	DVD Signal C Input
2	GND	GND
3	Y	DVD Signal Y Input
4	GND	GND

★J1: DVD Power jack

NO.	Definition	Description
1	5V	DVD 5V Power Supply
2	5V	DVD 5V Power Supply
3	GND	GND
4	GND	GND
5	GND	GND

★CN6: IR&LED jack

NO.	Definition	Description
1	GND	GND
2	IR	Remote Receiver
3	LED-G	Green Indicator
4	LED-R	Red Indicator
5	5V	Power Supply

★CN5: USB2.0 jack

NO.	Definition	Description
1	D-	USB D- Signal Input
2	D+	USB D+ Signal Input
3	GND	GND

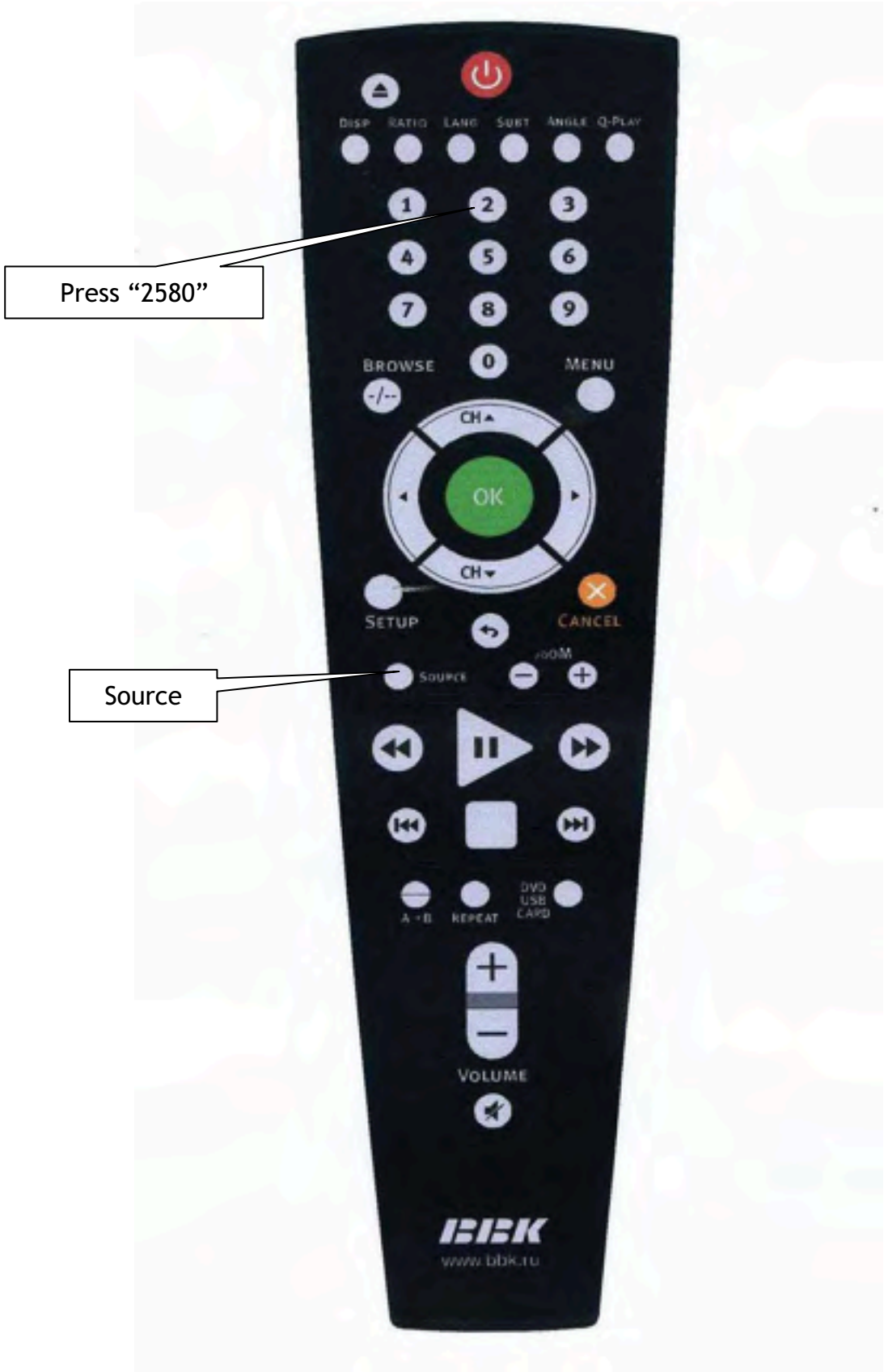
★CN2: Internal power supply jack for small size TV

NO.	Definition	Description
1	12v	Internal 12V Power Supply
2	12v	Internal 12V Power Supply
3	GND	GND
4	GND	GND

★CN3: LVDS Interface

NO.	Definition	Description
1	LCD-VDD	Power for Panel
2	LCD-VDD	Power for Panel
3	LCD-VDD	Power for Panel
4	GND	GND
5	GND	GND
6	GND	GND
7	GND	GND
8	GND	GND
9	EDA3+	LVDS EVEN3+ Signal
10	EDA3-	LVDS EVEN3+ Signal
11	ECK+	LVDS EVEN Clock + Signal
12	ECK-	LVDS EVEN Clock - Signal
13	EDA2+	LVDS EVEN2 + Signal
14	EDA2-	LVDS EVEN2 - Signal
15	EDA1+	LVDS EVEN1 + Signal
16	EDA1-	LVDS EVEN1 - Signal
17	EDA0+	LVDS EVEN0 + Signal
18	EDA0-	LVDS EVEN0 - Signal
19	GND	GND
20	GND	GND
21	ODA3+	LVDS ODD3 + Signal
22	ODA3-	LVDS ODD3 + Signal
23	OCK+	LVDS ODD Clock + Signal
24	OCK-	LVDS ODD Clock - Signal
25	ODA2+	LVDS ODD2 + Signal
26	ODA2-	LVDS ODD2 - Signal
27	ODA1+	LVDS ODD1 + Signal
28	ODA1-	LVDS ODD1 - Signal
29	ODA0+	LVDS ODD0 + Signal
30	ODA0-	LVDS ODD0 - Signal

1) How to enter service mode
   Press “Source” button on the remote control, then press”2580”, the service menu will be displayed.

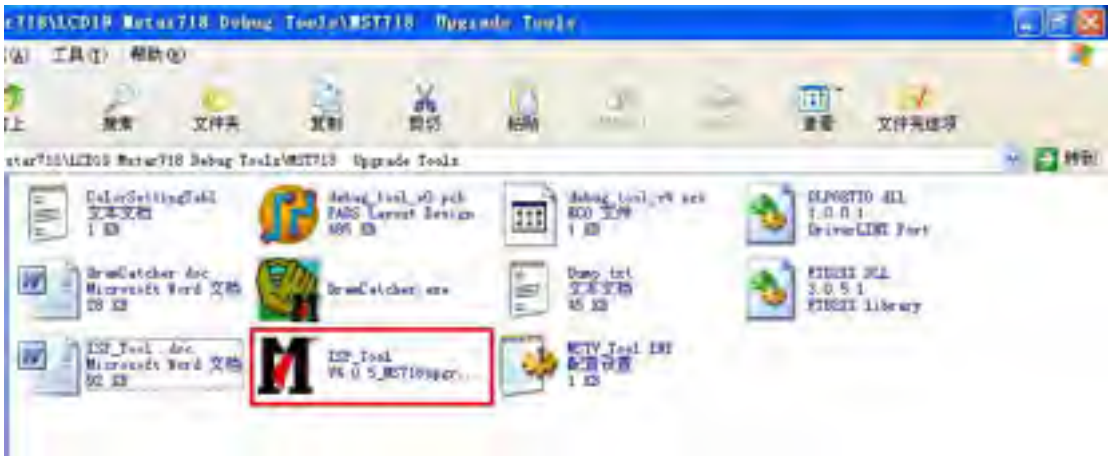


2) Service mode description

Color Temp: select a color temperature mode that you want to adjust;
R Gain: red gain for white balance adjusting;
G Gain: green gain for white balance adjusting;
B Gain: blue gain for white balance adjusting;
R Offset: red offset for white balance adjusting;
G Gain: green offset for white balance adjusting;
B Gain: blue offset for white balance adjusting;
Aging: to turn on or off aging mode, optional setting: On /Off;
Auto config: Auto adjust ADC channel difference, only available in VGA mode;
EEprom clear: reset EEPROM data to default value, all users' program and setting will be lost;
Panel: select different panel for factory;
TTX language: select Teletext language, optional setting: West East Russia;
DVD source set: to turn on or off DVD source in the user menu, optional setting: On/Off;
Hotel mode: to turn on or off hotel mode, optional setting: On/Off;
Key mode:to turn on or off local keyboard, optional setting: On/Off;
Power on: to setting the power on source, optional setting: TV Other;
Power mode: to setting the power on mode, optional setting: Force on Memory standby;
Volume:to setting the max sound volume when hotel mode is active;
AGC: to setting tuner's RF AGC value;
Notes:

1. color temperature adjusting:in different source the white balance can be adjust separated.the details as below:
   1) DVD&YpbPr source use same group color temperature value.
   2) TV&Scart source use same group color temperature value.
   3) VGA&HDMI source use separated color temperature value.
2. Auto Config:please change source to VGA mode and with grey scale pattern then enter service mode to do this item.

1) Open the update tools--Mstar ISP Utility



2) Click “Device” button and double click select correctly type(For TSUMV26 chassis select Pm25LV040 normally)

3) Click “Config” button and click “Auto Detect” button confirm that the PC and ISP tool connect properly. Adjust the LPT port speed to 138K, in order to speed up update process.

4) Click “Read” button then select the binary file of firmware.

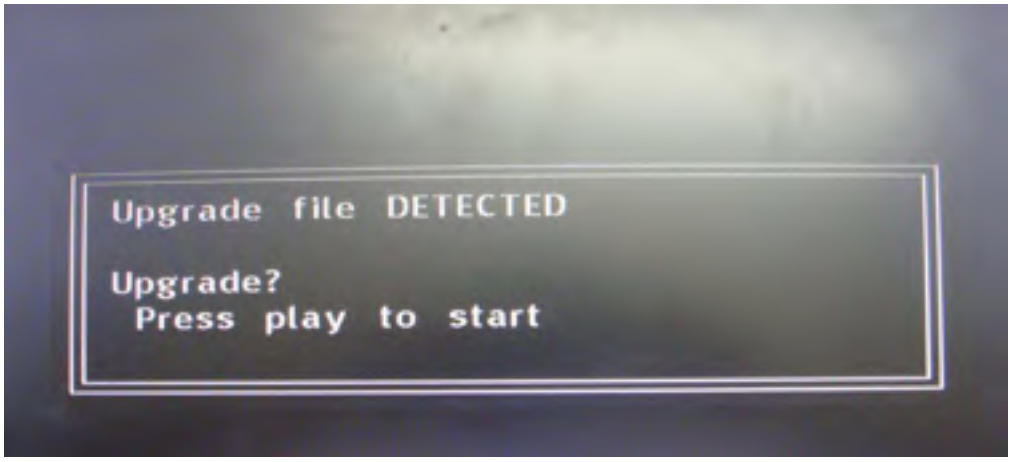
5) Click “Auto” button and remove the marker of “Blank” and “Verify” items. Then click “Run”, after several seconds the update process will be finish.

DVD Software upgrade

1）Please rename the upgrading file to “MTK1389FE.BIN”. and download it to a USB device

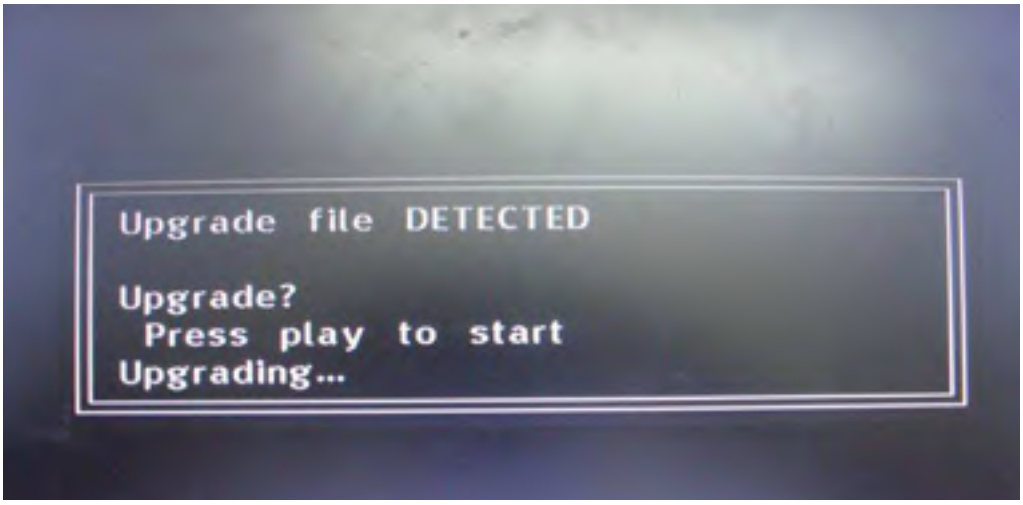
2) Enter DVD source and insert USB device to TV set.

3)Press “DVD USB CARD” button, Will shown a dialog box as below.

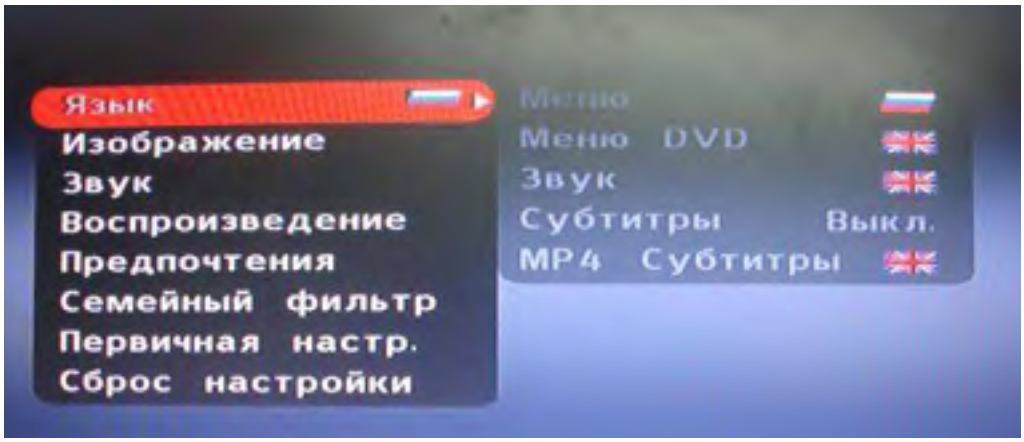


4) Press button on remote control, Will shown a dialog box as below,

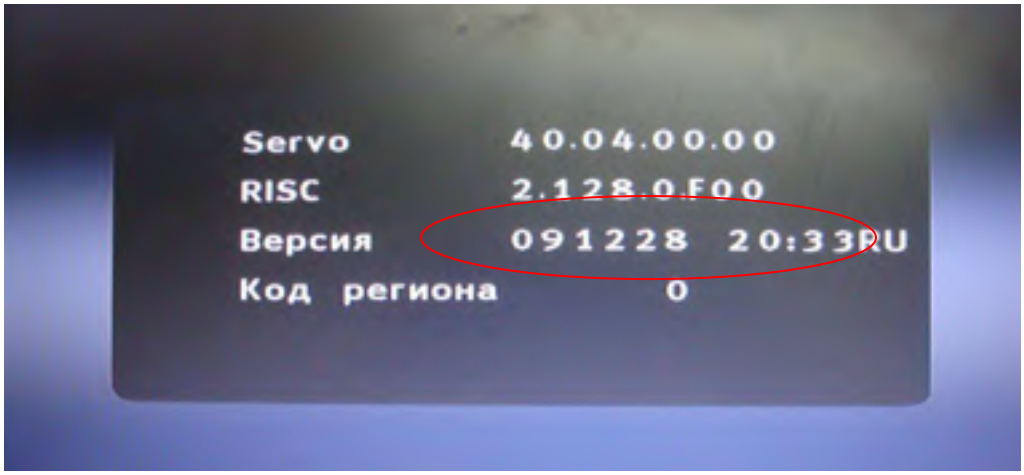
Please wait a few minutes(about 5 minutes) ,then DVD will restart auto .
During upgrading time, make sure to do not power off and pull out USB device.



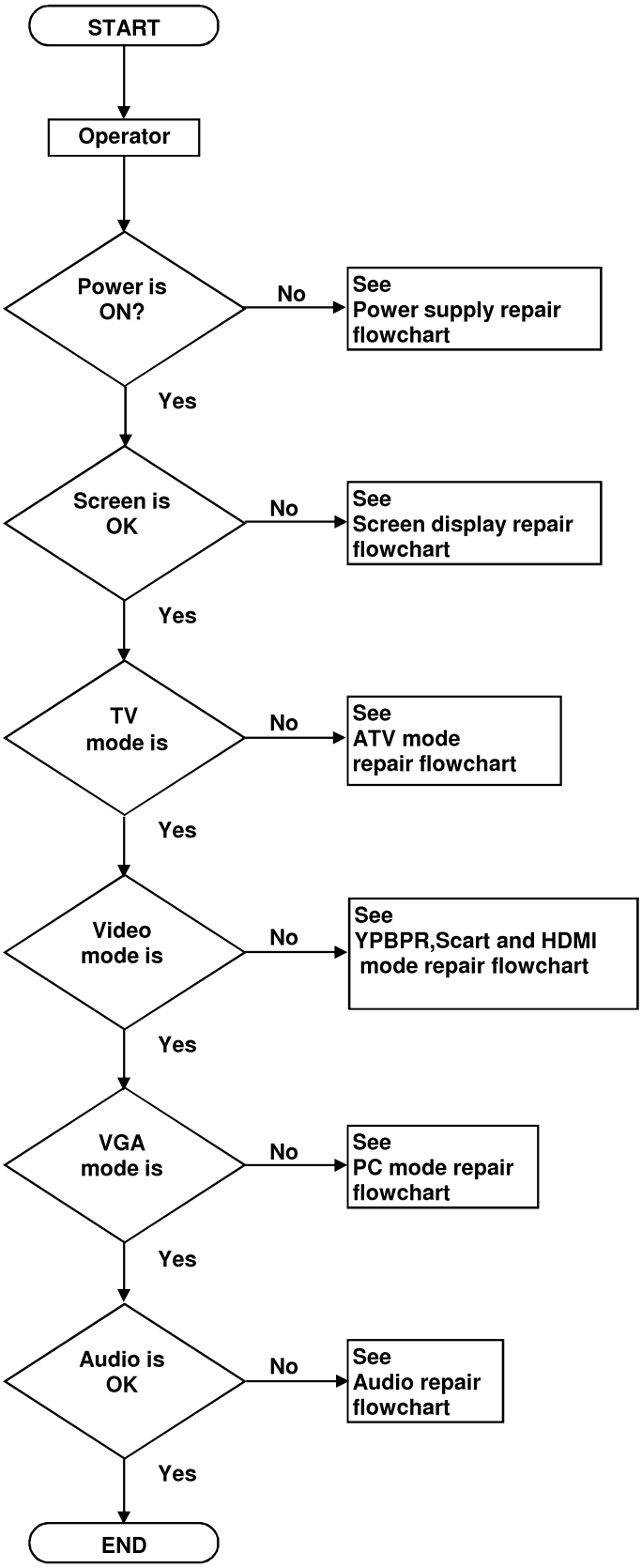
4) After TV restart, Enter DVD setup menu in order to check the version number.



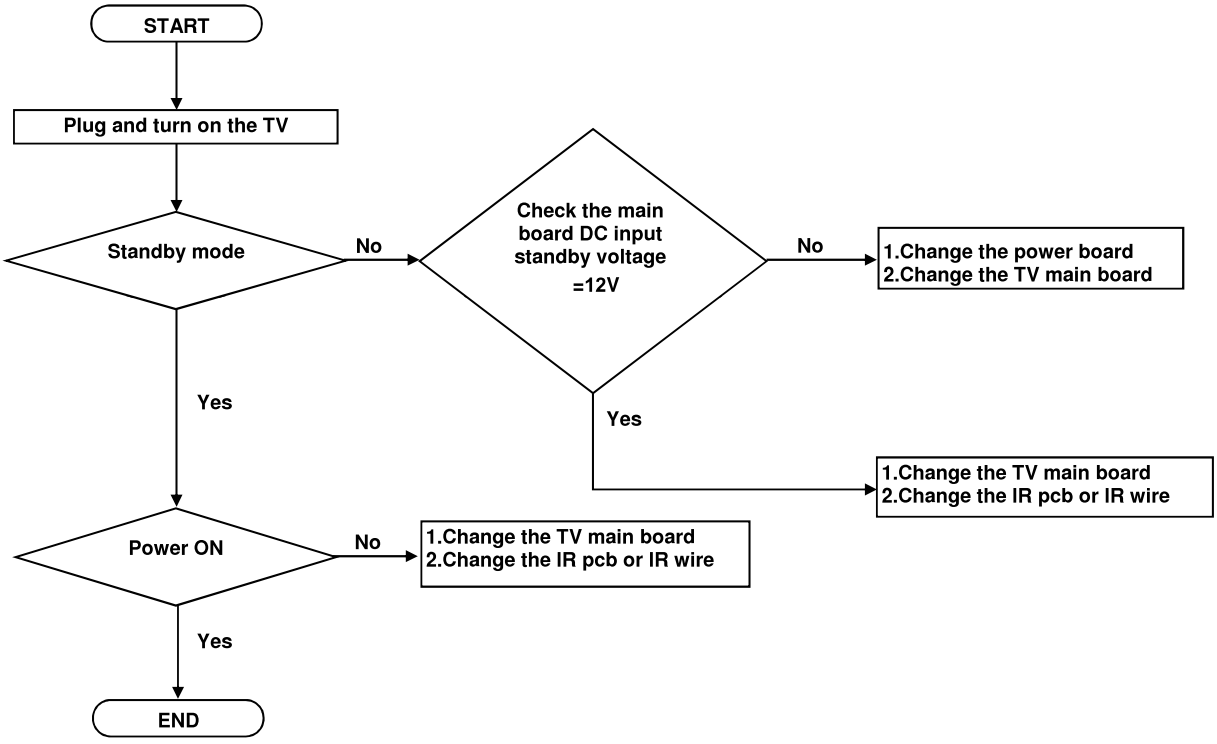
5) Press “9” “2” “1” “0” button serially, You will see DVD factory menu.
A dialog box will be showed as below. Marked with red circle is the version number.



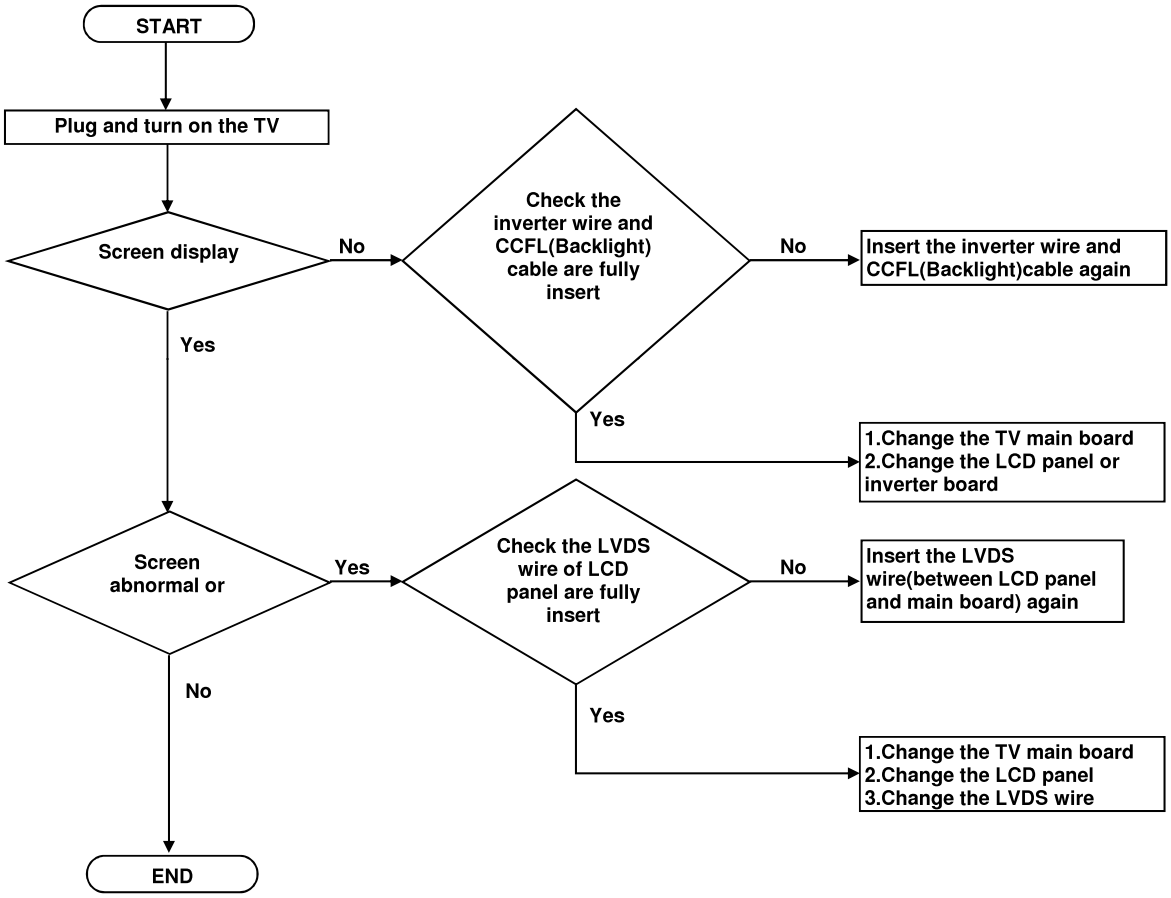
TV Fault finding tree



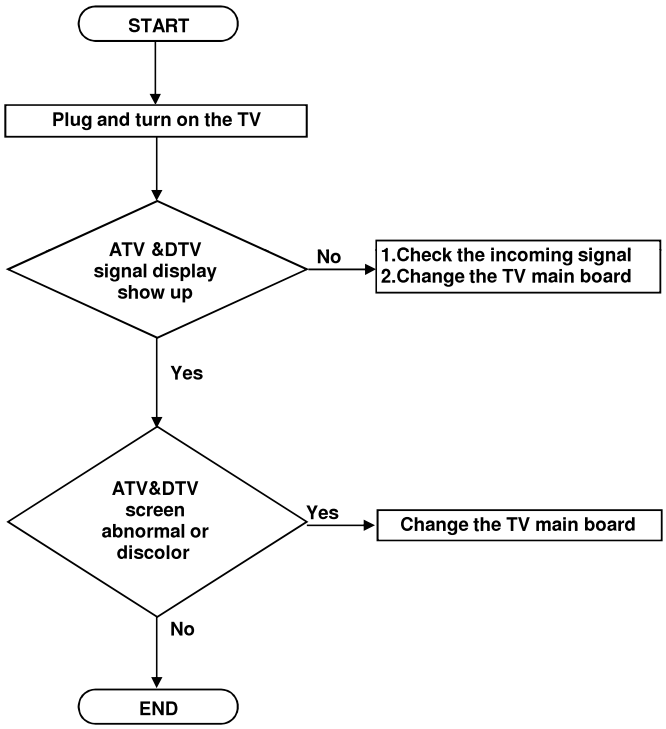
Power supply repair flowchart



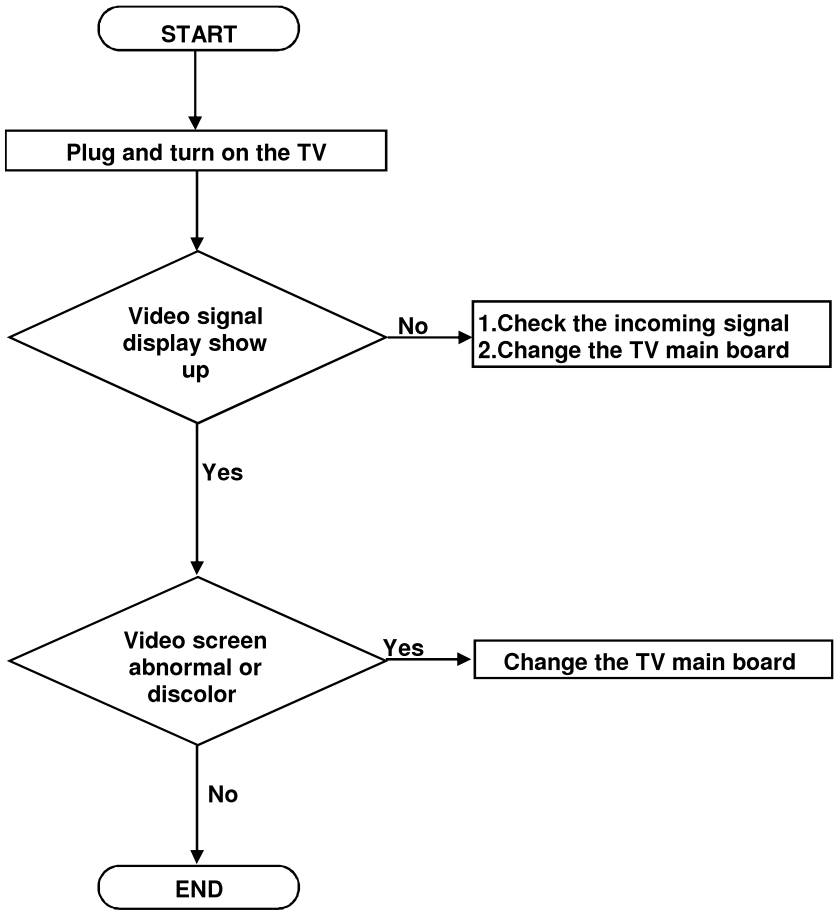
Screen Display repair flowchart



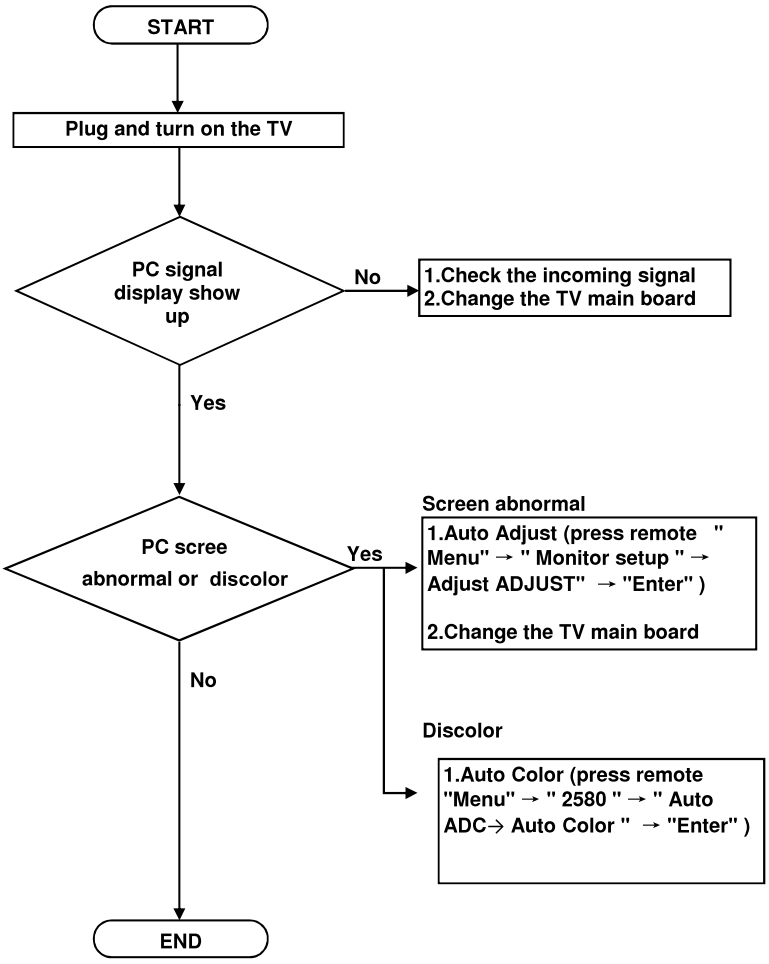
TV mode repair flowchart



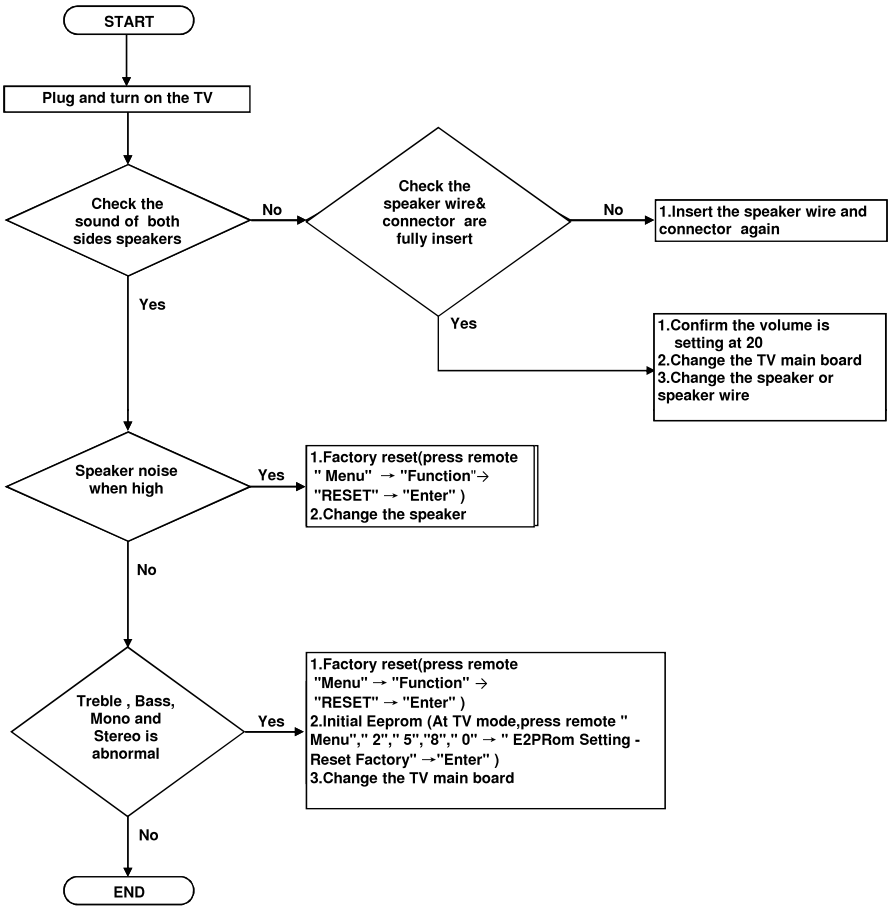
AV,Scart and HDMI mode repair flowchart



PC mode repair flowchart

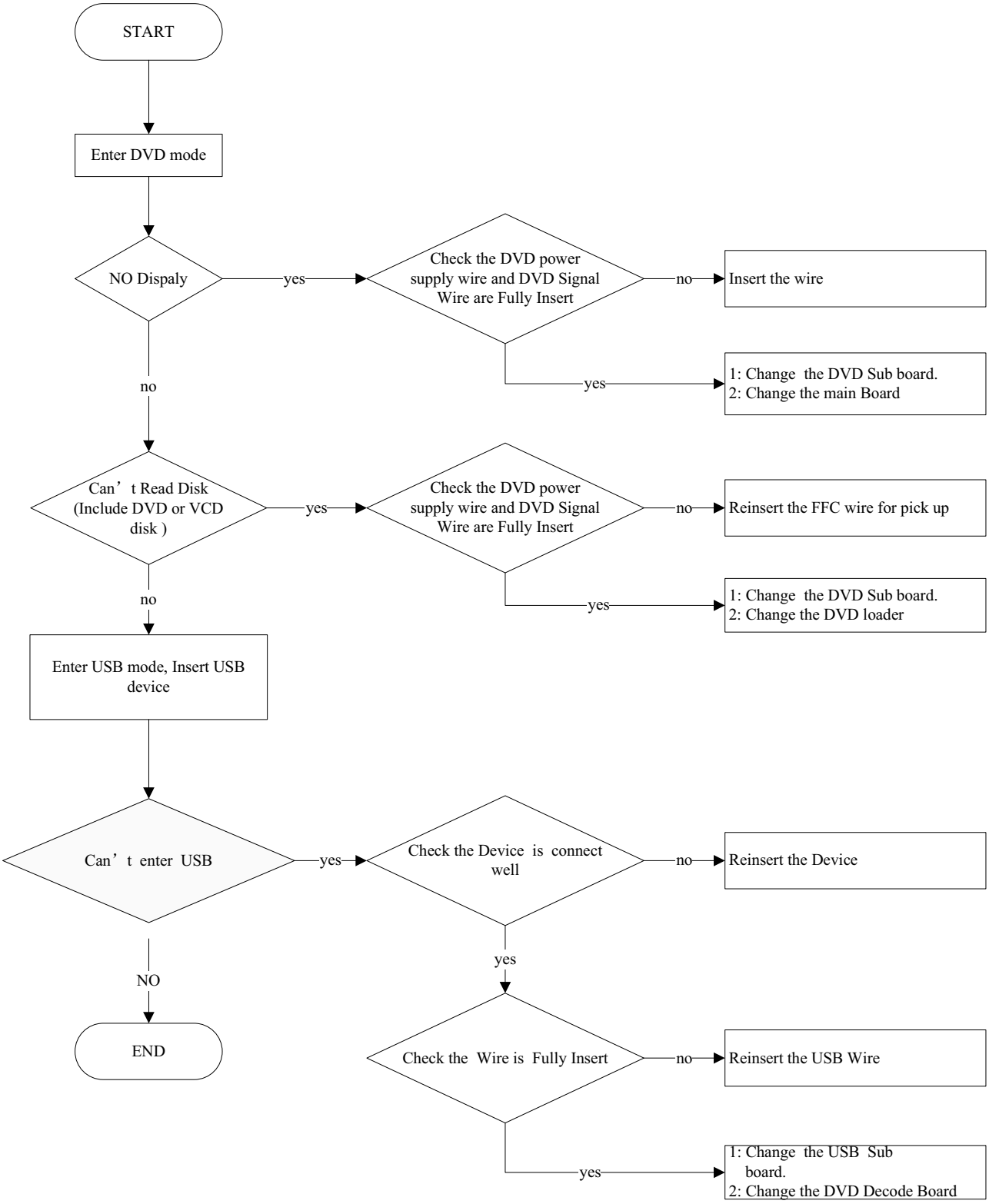


Audio repair flowchart



REMARK : After Default Setting , PC mode must " Auto Color"(press remote " Menu" → "2580" →"Auto ADC"→ "Auto Color" → "Enter")

DVD Repair Flowchart



APPENDIX A : DVD DECODE BOARD SPECIFICATION

1 GENERAL DESCRIPTION

00K104 is a control board of DVD. It supports DVD loaders which are produced by HuaYang It can control a LCD TV(Built-in DVD) with TV control board.

00K104 includes audio output such as 2CH and SPDIF.

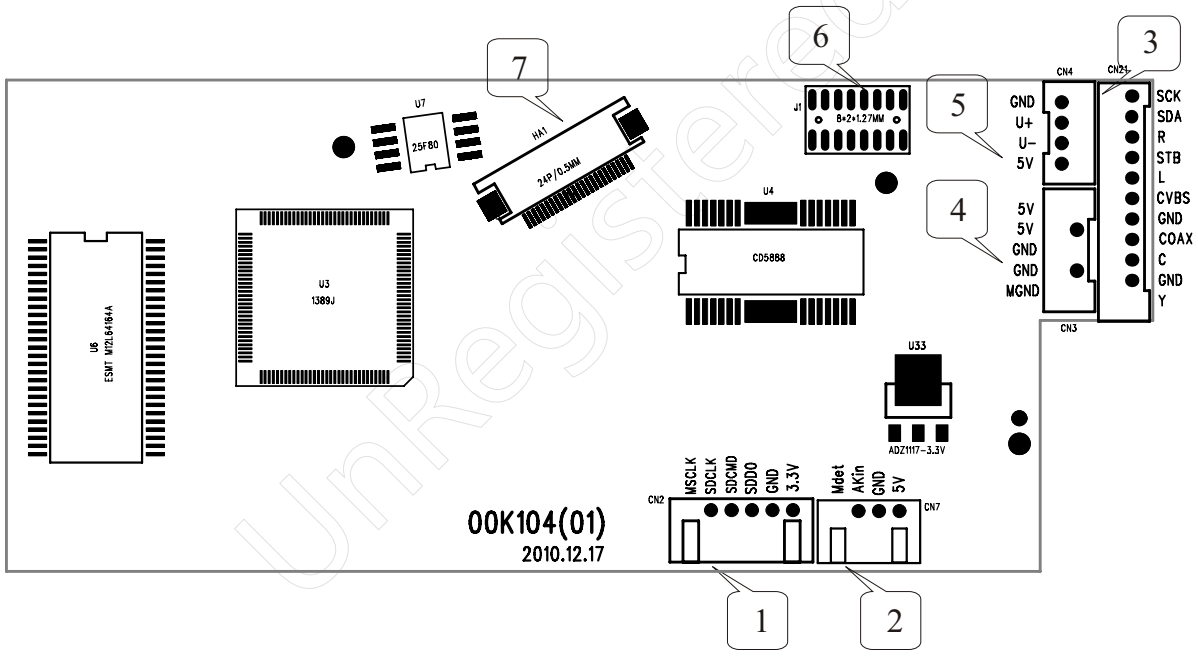
00K104 provides extended functions such as USB2.0 FULL SPEED.

2 FEATURES

In the following table you will find the detailed features.

DVD loader	DL-10HA-00-009
Disc	CD, HDCD, VCD, DVD, DVD+R, DVD-R, DVD+RW, DVD-RW
Multimedia Format	JPEG, MP3, WMA, MPEG-1, MPEG-2, MPEG-4
MPEG4 Format	DIVX3.xx, DIVX5.xx, DIVX4.xx
USB	YES
Video Output	Y/C, CVBS
Audio Output	2CH R/L, Coaxial digital output(SPDIF)
Key functions	N0
OSD languages	English, French, German, Spanish(addible and optional)
Power supply	DC +5V

3 FUNCTION LAYOUT

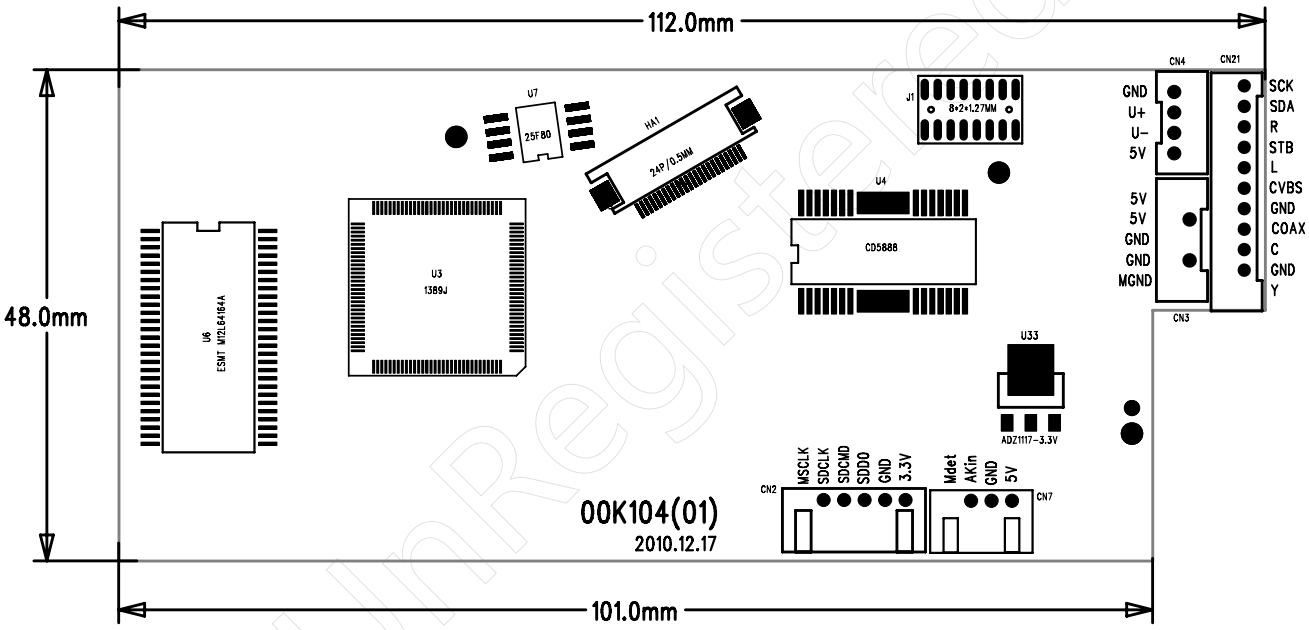


UnRegistered

NO.	DESCRIPTION	NO.	DESCRIPTION
1	CARD Input		
2	KAROAR/Input		
3	DVD Signal Output Connector		
4	Main Power Input		
5	USB/ Input		
6	Motor Motor connection		
7	Loaders Input		

4

4 CONTROL BOARD DIMENSIONS



The height of the whole control board is:19.0mm

5 OPERATION REQUIREMENTS

Can' t be pressed and distorted.

Keep away from static and water.

Relative humidity: ≤ 80%.

Storage temperature: -10~+60 °C.

Operation temperature: 0~+40 °C.

UnRegistered

6 INTERFACE DEFINITION

(6PIN/2.0): DVD CARD OUTPUT CONNECTOR

NO.	SYMBOL	DESCRIPTION
1	3.3V	+3.3V DC Power supply
2	MS_CLK	MS Clock
3	SD_CLK	SD Clock
4	SD_CMD	Data
5	SD_DO	Data
6	GND	Ground

(4PIN/2.0): DVD KARAOKE INPUT OUTPUT CONNECTOR

NO.	SYMBOL	DESCRIPTION
1	Mdet	Karaoke Detection switch
2	Akin	Karaoke Input
3	GND	Ground
4	+5V	+5V DC Power supply

(5PIN/2.0):MAIN POWER INPUT

NO.	SYMBOL	DESCRIPTION
1	MGND	Motor Ground
2	GND	Ground
3	GND	Ground
4	+5V	+5V DC Power supply
5	+5V	+5V DC Power supply

(11PIN/2.0): DVD SIGNAL OUTPUT CONNECTOR

NO.	SYMBOL	DESCRIPTION
1	SCK	I/O
2	SDA	I/O
3	R	Audio right channel outp
4	STB	I/O
5	L	Audio left channel outp
6	CVBS	CVBS signal output
7	GND	Ground
8	COAX	SPDIF Output
9	C	Y signal output
10	GND	Ground
11	Y	Y signal output

(4PIN/2.0): DVD USB OUTPUT CONNECTOR

NO.	SYMBOL	DESCRIPTION
1	+5V	+5V DC Power supply
2	U-	Data
3	U+	Data
4	GND	Ground

DVD control board specifi cation for 00K104

(24PIN/0.5 FFC):HITACHI 1200X

NO.	SYMBOL	DESCRIPTION
1	GND	Laser diode
2	PUH_DVDLD	
3	GND	
4	5V	
5	DVDMDI	
6	CDLD	
7	DVD_VR	
8	CD_VR	
9	GND	
10	E	
11	A+5V	
12	VREF1	
13	GND	Photo detector
14	F	
15	B	
16	A	
17	PUHRF	
18	HMF	
19	D	
20	C	
21	RAD-	Actuator
22	RAD+	
23	FOC+	
24	FOC-	

APPENDIX B: Power Supply Board Specification

深圳市博源电子有限公司

SHEN ZHEN TOPOW ELECTRONICS CO.,LTD.

承认书

SWITCHING POWER SUPPLY

CUSTOMER: _____

CUSTOMER DWG. /PART NO.: _____

TOPOW PART NO.: TPE040A

DESCRIPTION.: _____ REV.: 1.0

ISSUE DATE: 2010/6/1

APPROVED SIGNATURES /客户确认		
TOPOW ELECTRONICS（SHEN ZHEN）		
DESIGN/拟制	CHECK/审核	APPROVAL/批准

地址:中国深圳市宝安区福永镇新和村怀德翠海工业园四区 6 栋

ADD: NO.6 BUILDING,NO.4 HUAIDE CUIHAI INDUSTRIAL PARK, FUYONG TOWN, BAOAN DISTRICT, SHENZHEN, CHINA

TEL: 86-755-61181098(88) FAX:86-755-61181099

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1.2.2 DC Output Ripple & Noise. （输出纹波和噪声）

1.2.3 Output Transient Response. （输出动态响应）

1.2.4 DC Output Hold-Up Time. （输出保持时间）

1.2.5 DC Output Overshoot At Turn On & Turn Off.（输出超调）

1.2.6 DC output voltage rise time（输出上升时间）

1.4 Protection: （保护功能）

1..2 DC Output Over current Protection. （输出过流保护）

1..3 DC Output Short Circuit Protection. （输出短路保护）

2 Isolation 绝缘性能

2.1 Isolation Resistance （绝缘阻抗）

2.2 Isolation Withstanding Voltage（绝缘耐压）

3 Safety 安全规格

4 EMC 电磁兼容性

4.1 **EMI** （电磁干扰）

4.2 **EMS** （电磁抗扰）

5. Environmental Requirement 环境

5.1 **Temperature** （环境温度）

5.2 **Humidity** （环境湿度）

5.3 **Altitude** （海拔高度）

5.4 **Cooling Method** （冷却方式）

5.5 **Vibration** （振动耐受）

5.6 **Impact** （冲击耐受）

6 Dimension （物理尺寸）

7 Weight （重量）

8 Pin Connection (连接器脚位定义)

9 Power Supply mounting （安装尺寸）

1.1 Table 1 Input Electrical Characteristics Overview（输入特性）

Input voltage range 输入电压	90Vac to 264Vac
Normal voltage range 标称输入	100Vac to 240Vac
Frequency range 频率范围	50Hz/60Hz±5%
Max input ac current 满载输入电流	1Amax at full load condition
Inrush current (cold start) 浪涌电流	30Atyp peak, 120Vac;60Atyp peak, 220Vac
Efficiency(full load) 效率	80%min at 90Vac; 83%min at 220Vac
Harmonic current 谐波电流	Meet GB17625.1-1998/IEC61000-3-2 class D
Leakage Current 泄漏电流	Less Than 0.75mA, 230Vac input
Standby Power Loss 待机功耗	≦0.5W, 264Vac input
Input Fuse 输入保险	T2A/250Vac

1.2 Output Electrical Characteristics Overview（输出特性）

1.2.1 Table 2 Output Voltage ,Current & Regulation.（输出调整率）

Output Voltage 输出电压	Regulation 调整率	Min. current 最小电流	Rated current 额定电流	Peak current 峰值电流
+12V	±5%	0 A	3A	4A

1.2.2 Table 3 DC Output Ripple & Noise. （输出纹波和噪声）

Output Voltage 输出电压	Ripple & Noise (Max.) 最大纹波和噪音
+12V	120mVp-p@25℃； 200mVp-p@-10℃

Note: 1) Measurements shall be made with an oscilloscope with 20MHz bandwidth.
2) Outputs shall be bypassed at the connector with a 0.1uF ceramic capacitor and a 10uF electrolytic capacitor to simulate system loading.

注： 1)示波器须设置在20 兆赫兹带宽

2）离电源板大于30CM 处输出电源端并联0.1uF 的陶瓷电容和10uF 的电解电容来模拟负载测试。

1.2.3 Output Transient Response. （输出动态响应）

Table 4. Test condition.测试条件

Voltage regulation 电压变化率	Slew Rate 斜率	Test Condition: Load Changing Scope 测试条件：负载变化度
+12V,±5%;	0.2A/uS	Min. to 50% load and 50% to Max load 最小载至半载；半载至满载
所有输出(All outputs) ±5%	0.2A/uS	Min. load to Max load 最小载至满载

Dynamic response measurements shall be set with a load changing repetition rate of 50Hz to 10kHz.

注：动态测试的负载变化频率范围是50赫兹至10千赫兹。

1.2.4 Table 5 DC Output Hold-Up Time. （输出保持时间）

Output Voltage 输出电压	120Vac input 120Vac输入	220Vac input 220Vac输入
+12V	≥10mS	≥10 mS

Note: All of dc output at full load.

注：所有输出带满载

1.2.5 Table 6 DC Output Overshoot At Turn On & Turn Off.（输出超调）

Output Channel	Output(V) shoot	Over voltage(V)超调电压	
		Turn on 开机	Turn off 关机
+ 12V	+ 12V	5%	5%

Note: All of dc output current from Min. to Max.

注：测试时负载范围：最小到最大

1.2.6 Table 7 DC output voltage rise time（输出上升时间）

Output Voltage 输出电压	120Vac input &Full Load 120Vac输入&全载	220Vac input &Full Load 220Vac输入&全载
+12V	≤100 mS	≤100 mS

Note: The output voltages shall rise from10% to 90% of their output voltage.

注：输出从10%上升到90%的时间

1.4 Protection: （保护功能）

1.4.2 Table 10 DC Output Over current Protection. （输出过流保护）

Output Voltage 输出电压	Over Current 过电流	Comments 注解
+12V	≥4Atyp	Hiccup 打嗝

1.4.3 Table 11 DC Output Short Circuit Protection. （输出短路保护）

Output Voltage 输出电压	Comments 注解
+12V	Hiccup 打嗝

2. Isolation（绝缘性能）

2.1 Table 12 （绝缘阻抗）

Input To Output 输入到输出	DC500V 50MΩmin (at room temperature)

2.2 Table 13 （绝缘耐压）

Input To Output 输入到输出	1500Vac 50Hz 1minute ≤10mA

3. Safety （安全规格）

The power supply shall compliance with the following Criterion:

电源安全性满足下列标准

1) UL60950
2) EN60950
3) GB4943-1995

4. EMC （电磁兼容性）

4.1 EMI （电磁干扰）

The power supply shall compliance with the following Criterion:

电源电磁干扰满足下列规则：

1) Conduction Emission : （传导干扰）

*EN55022, CLASS B
*GB9254, CLASS B
*FCC PART15 CLASS B

2) Radiated Emission : （辐射干扰）

*EN55022, CLASS B
*GB9254, CLASS B
*FCC PART15 CLASS B

4.2 EMS （电磁抗扰）

The power supply shall compliance with the following Criterion:

电源电磁抗扰满足下列规则：

1) ESD （静电抗扰）

*GB17626.2-1998/IEC61000-4-2

2) EFT （脉冲群抗扰）

*GB17626.4-1998/IEC61000-4-4 3KV

3) Surge （雷击浪涌）

*GB17626.5-1998/IEC61000-4-5 1.5KV / 3KV

5. Environmental Requirement （工作环境）

5.1 Temperature （环境温度）

* Operating: -5℃ to +40℃ 运行温度：-5℃ to +40℃.

* Store: -20℃ to +80℃ 储存温度：-20℃ to +80℃.

5.2 Humidity （环境湿度）

* Operating: From 10%to90% relative humidity (non-condensing).
* Store: From 5 to 95% relative humidity (non-condensing).

5.3 Altitude （海拔高度）

* Operating: to10,000 ft.
* Store: to 20,000ft.

5.4 Cooling Method （冷却方式）

* Ventilation cooling . 自然冷却

5.5 Vibration Testing（振动测试）

* 10-55Hz, 49.0m/s²(5G), 3minutes period, 60minutes each along X, Y and Z axis.

5.6 Impact Testing（冲击测试）

* 196.1m/s²(20G),11ms, once each X, Y and Z axis.

6. Dimension （物理尺寸）

* 160mm X 60mm X 12mm (长L *宽W * 高H).

7. Weight （重量）：

8. Pin Connection（连接器脚位定义）

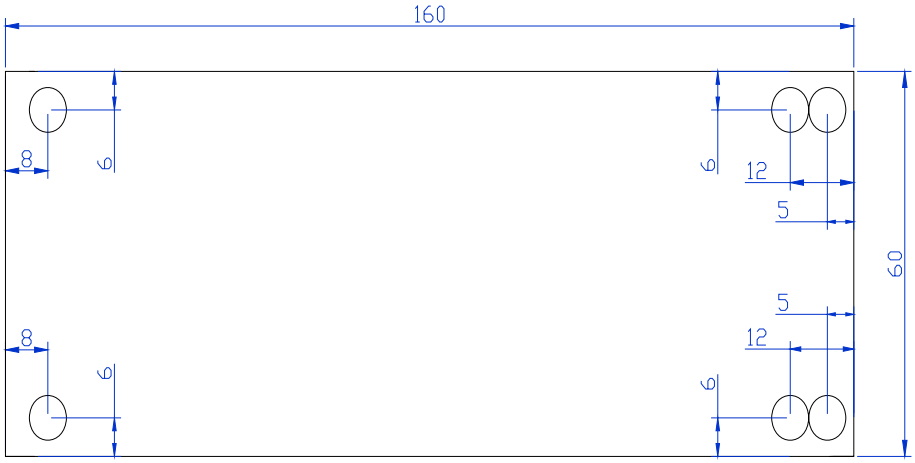
Table 15 Pin-CON2 Connection And Function TYPE : 2.0MM*6PIN

NO.	Pin Connection 连接器脚位	Function 功能
1.2.3	＋12V	＋12V OUTPUT
4.5.6	GND	＋12V RETURN

Table 16 Pin-C0N1 Connection And Function TYPE : 3.96MM*3PIN(中空)

NO.	Pin Connection 连接器脚位	Function 功能
1	AC-L	AC INPUT LINE
2	AC-N	AC INPUT NUTURE

9. Power Supply Mounting （安装尺寸）



深圳市博源电子有限公司

SHEN ZHEN TOPOW ELECTRONICS CO.,LTD.

承认书

SWITCHING POWER SUPPLY

CUSTOMER: _____

CUSTOMER DWG. /PART NO.: _____

TOPOW PART NO.: TPE056

DESCRIPTION.: _____ REV.: 1.0

ISSUE DATE: 2010/6/1

APPROVED SIGNATURES /客户确认		
TOPOW ELECTRONICS (SHEN ZHEN)		
DESIGN/拟制	CHECK/审核	APPROVAL/批准

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ADD: NO.6 BUILDING,NO.4 HUAIDE CUIHAI INDUSTRIAL PARK, FUYONG TOWN, BAOAN DISTRICT, SHENZHEN, CHINA

TEL: 86-755-61181098(88) FAX:86-755-61181099

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1.2.2 DC Output Ripple & Noise. （输出纹波和噪声）

1.2.3 Output Transient Response. （输出动态响应）

1.2.4 DC Output Hold-Up Time. （输出保持时间）

1.2.5 DC Output Overshoot At Turn On & Turn Off.（输出超调）

1.2.6 DC output voltage rise time（输出上升时间）

1.4 Protection: （保护功能）

1..2 DC Output Over current Protection. （输出过流保护）

1..3 DC Output Short Circuit Protection. （输出短路保护）

2 Isolation 绝缘性能

2.1 Isolation Resistance （绝缘阻抗）

2.2 Isolation Withstanding Voltage（绝缘耐压）

3 Safety 安全规格

4 EMC 电磁兼容性

4.1 **EMI** （电磁干扰）

4.2 **EMS** （电磁抗扰）

5. Environmental Requirement 环境

5.1 **Temperature** （环境温度）

5.2 **Humidity** （环境湿度）

5.3 **Altitude** （海拔高度）

5.4 **Cooling Method** （冷却方式）

5.5 **Vibration** （振动耐受）

5.6 **Impact** （冲击耐受）

6 Dimension （物理尺寸）

7 Weight （重量）

8 Pin Connection (连接器脚位定义)

9 Power Supply mounting （安装尺寸）

1.1 Table 1 Input Electrical Characteristics Overview（输入特性）

Input voltage range 输入电压	90Vac to 264Vac
Normal voltage range 标称输入	100Vac to 240Vac
Frequency range 频率范围	50Hz/60Hz±5%
Max input ac current 满载输入电流	1Amax at full load condition
Inrush current (cold start) 浪涌电流	30Atyp peak, 120Vac;60Atyp peak, 220Vac
Efficiency(full load) 效率	80%min at 100Vac; 83%min at 220Vac
Harmonic current 谐波电流	Meet GB17625.1-1998/IEC61000-3-2 class D
Leakage Current 泄漏电流	Less Than 0.75mA, 230Vac input
Standby Power Loss 待机功耗	≦0.5W, 264Vac input
Input Fuse 输入保险	T2A/250Vac

1.2 Output Electrical Characteristics Overview（输出特性）

1.2.1 Table 2 Output Voltage ,Current & Regulation.（输出调整率）

Output Voltage 输出电压	Regulation 调整率	Min. current 最小电流	Rated current 额定电流	Peak current 峰值电流
+12V	±5%	0 A	4A	5A

1.2.2 Table 3 DC Output Ripple & Noise. （输出纹波和噪声）

Output Voltage 输出电压	Ripple & Noise (Max.) 最大纹波和噪音
+12V	120mVp-p@25℃； 200mVp-p@-10℃

Note: 1) Measurements shall be made with an oscilloscope with 20MHz bandwidth.
2) Outputs shall be bypassed at the connector with a 0.1uF ceramic capacitor and a 10uF electrolytic capacitor to simulate system loading.

注： 1)示波器须设置在20 兆赫兹带宽

2）离电源板大于30CM 处输出电源端并联0.1uF 的陶瓷电容和10uF 的电解电容来模拟负载测试。

1.2.3 Output Transient Response. （输出动态响应）

Table 4. Test condition.测试条件

Voltage regulation 电压变化率	Slew Rate 斜率	Test Condition: Load Changing Scope 测试条件：负载变化度
+12V,±5%;	0.2A/uS	Min. to 50% load and 50% to Max load 最小载至半载；半载至满载
所有输出(All outputs) ±5%	0.2A/uS	Min. load to Max load 最小载至满载

Dynamic response measurements shall be set with a load changing repetition rate of 50Hz to 10kHz.

注：动态测试的负载变化频率范围是50赫兹至10千赫兹。

1.2.4 Table 5 DC Output Hold-Up Time. （输出保持时间）

Output Voltage 输出电压	120Vac input 120Vac输入	220Vac input 220Vac输入
+12V	≥10mS	≥10 mS

Note: All of dc output at full load.

注：所有输出带满载

1.2.5 Table 6 DC Output Overshoot At Turn On & Turn Off.（输出超调）

Output Channel	Output(V) shoot	Over voltage(V)超调电压	
		Turn on 开机	Turn off 关机
+ 12V	+ 12V	5%	5%

Note: All of dc output current from Min. to Max.

注：测试时负载范围：最小到最大

1.2.6 Table 7 DC output voltage rise time（输出上升时间）

Output Voltage 输出电压	120Vac input &Full Load 120V输入&全载	220Vac input &Full Load 220V输入&全载
+12V	≤100 mS	≤100 mS

Note: The output voltages shall rise from10% to 90% of their output voltage.

注：输出从10%上升到90%的时间

1.4 Protection: （保护功能）

1.4.2 Table 10 DC Output Over current Protection. （输出过流保护）

Output Voltage 输出电压	Over Current 过电流	Comments 注解
+12V	≥5Atyp	Hiccup 打嗝

1.4.3 Table 11 DC Output Short Circuit Protection. （输出短路保护）

Output Voltage 输出电压	Comments 注解
+12V	Hiccup 打嗝

2. Isolation（绝缘性能）

2.1 Table 12 （绝缘阻抗）

Input To Output 输入到输出	DC500V 50MΩmin (at room temperature)

2.2 Table 13 （绝缘耐压）

Input To Output 输入到输出	1500Vac 50Hz 1minute ≤10mA

3. Safety （安全规格）

The power supply shall compliance with the following Criterion:

电源安全性满足下列标准

1) UL60950
2) EN60950
3) GB4943-1995

4. EMC （电磁兼容性）

4.1 EMI （电磁干扰）

The power supply shall compliance with the following Criterion:

电源电磁干扰满足下列规则：

1) Conduction Emission : （传导干扰）

*EN55022, CLASS B
*GB9254, CLASS B
*FCC PART15 CLASS B

2) Radiated Emission : （辐射干扰）

*EN55022, CLASS B
*GB9254, CLASS B
*FCC PART15 CLASS B

4.2 EMS （电磁抗扰）

The power supply shall compliance with the following Criterion:

电源电磁抗扰满足下列规则：

1) ESD （静电抗扰）

*GB17626.2-1998/IEC61000-4-2

2) EFT （脉冲群抗扰）

*GB17626.4-1998/IEC61000-4-4 3KV

3) Surge （雷击浪涌）

*GB17626.5-1998/IEC61000-4-5 1.5KV / 3KV

5. Environmental Requirement （工作环境）

5.1 Temperature （环境温度）

* Operating: -5℃ to +40℃ 运行温度：-5℃ to +40℃.

* Store: -20℃ to +80℃ 储存温度：-20℃ to +80℃.

5.2 Humidity （环境湿度）

* Operating: From 10%to90% relative humidity (non-condensing).
* Store: From 5 to 95% relative humidity (non-condensing).

5.3 Altitude （海拔高度）

* Operating: to10,000 ft.
* Store: to 20,000ft.

5.4 Cooling Method （冷却方式）

* Ventilation cooling . 自然冷却

5.5 Vibration Testing（振动测试）

* 10-55Hz, 49.0m/s²(5G), 3minutes period, 60minutes each along X, Y and Z axis.

5.6 Impact Testing（冲击测试）

* 196.1m/s²(20G),11ms, once each X, Y and Z axis.

6. Dimension （物理尺寸）

* 165mm X 65mm X 12mm (长L *宽W * 高H).

7. Weight （重量）：

8. Pin Connection（连接器脚位定义）

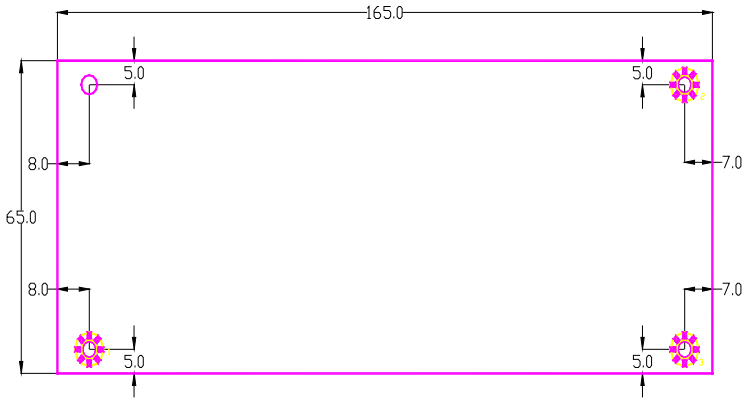
Table 15 Pin-CON2 Connection And Function TYPE : 2.54MM*6PIN

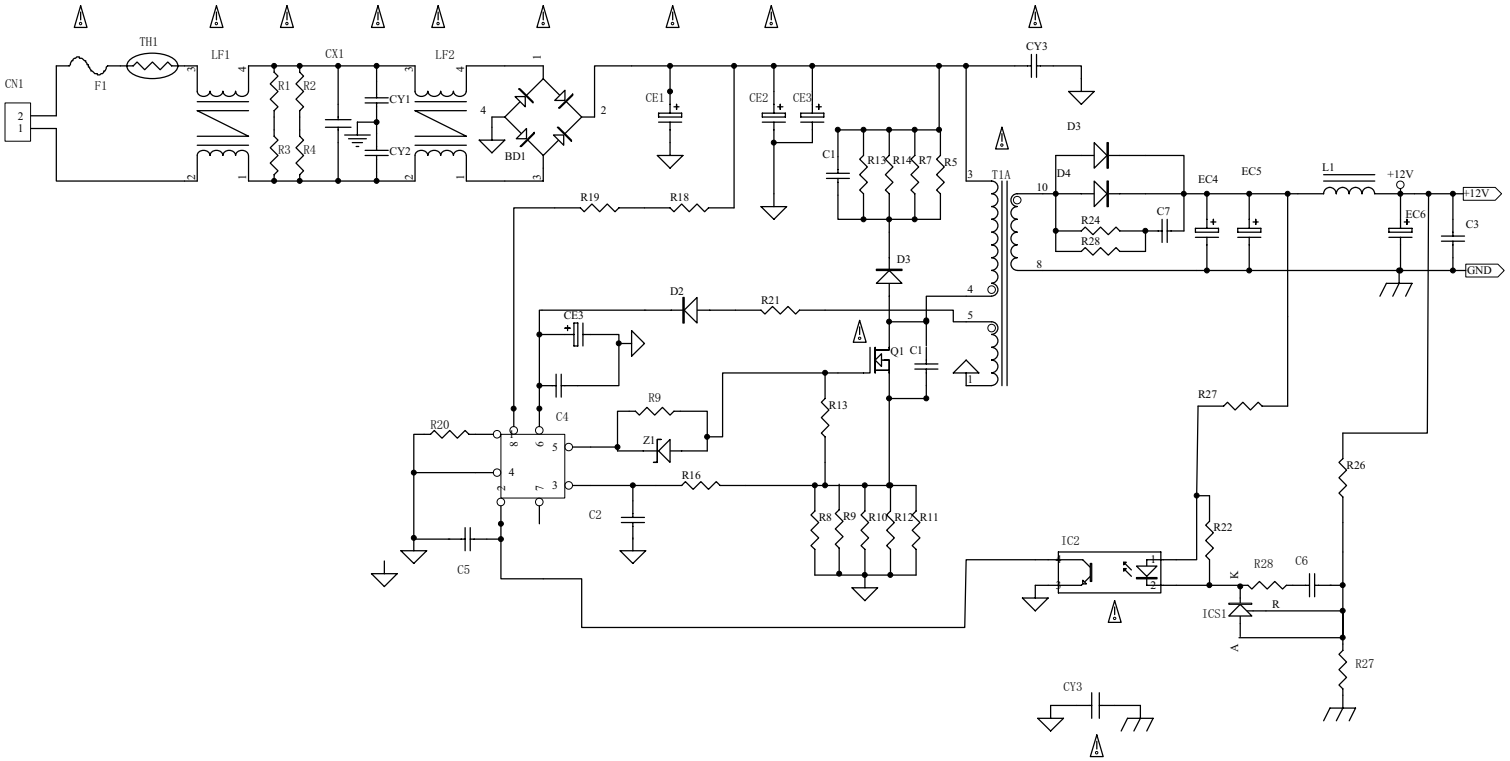
NO.	Pin Connection 连接器脚位	Function 功能
1.2.3	＋12V	＋12V OUTPUT
4.5.6	GND	＋12V RETURN

Table 16 Pin-C0N1 Connection And Function TYPE : 3.96MM*3PIN(中空)

NO.	Pin Connection 连接器脚位	Function 功能
1	AC-L	AC INPUT LINE
2	AC-N	AC INPUT NUTURE

9. Power Supply Mounting （安装尺寸）





Title		
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Date: 19-Jan-2011		Sheet of
File: C:\Documents and Settings\Administrator\Desktop\[illegible] SCH.DDB		

APPENDIX C : BACKLIGHT BOARD SPECIFICATION

产品规格书

SPECIFICATION SHEET

编号：_____

客户名称 Customer	中山市芯睿电子科技有限公司
料号 Pare Care	
品名 Description	LED Driver(LED 背光板)
型号 Model	LDA15-45V160H V1.0
匹配屏型号	M185B3-LA1 &V185B1-LE1 V2.1
日期 DATE	2011-03-31
客户确认签章 Approved by Customer	

批准 Approve	审核 Check	拟制 Prepare

珠海沛程电子有限公司

电话：0756-3818829　3820260　传真：0756-3818826

网址：http://www.paict.cn　E-mail: jason@penic.cn　penic888@163.com

地址：珠海市吉大九洲大道东 1200 号 6 楼

联系人：刘先生 18666113200

PACIT Electronic technology co., ltd

Preliminary LED Driver Specification

18.5” LED driver

PROJECT NO.: LDA15-45V160H

VER: 1.0

2011.03.31

Prepared by: _____

Reviewed by: _____

Approved by: _____

PACIT electronic technology co.,ltd
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Tel: 0756-3818829 3820260
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E-mail: jason@pacit.cn penic888@163.com http://www.pacit.cn

Record of Revision

Revision No	Date	Page	Old description	New Description	Remark
1.0	2011-03-31	All	First Edition for Customer		

1. General description

Scope:

This **LDA15-45V160H** sepic LED driver for 18.5" of LCD backlight system.

2. Applications

18.5" LED Backlight LCD panels For M185B3-LA1 &V185B1-LE1 V2.1

3. Absolute maximum rating

- Input supply voltage .: 11~13 V
- Input current . :0.89A(MAX)
- Input power : 9.82W
- Output current : 25mA x 8CH
- Output power :8.84W
- Brightness adjusted voltage : 0V(MAX)~5.0V(MIN)
- Input signal voltage :0V/OFF 5.0V/ON (ON/OFF/control)
- Ambient operating temperature :0℃~40℃
- Storage temperature :-20℃~80℃
- Operating & storage humidify: 10%~85%
- Over voltage protect(OVP)
- High efficency (TYP:90%)

4.Electrical Requirements

This section defines the electrical requirements for the LED driver

4.1Input Characteristics

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	REMARK
Input voltage	VIN	11	12.0	13	V	
Input current	Iin	-	0.60	0.89	A	Vadj=0V RL= LED Panel
Input power	Pin	-	7.16	9.82	W	Vadj=0V RL= LED Panel
Input voltage	Von/off	-	0	1.0	V	Off State
		2.5	5.0	5.5		On State
Bright adjust	Vadj	5	-	0	V	
Efficiency	η	-	90	-	%	Vadj=0V RL= LED Panel

4.2 Output Characteristics:

4.2.1 DC output CN5:

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	REMARK
Output current	Io	-	20	25	mA	Vadj=0V RL= LED Panel
		1	-	3		Vadj=5V RL= LED Panel
Output voltage	Vo	-	40.3	44.2	V	Von=5V RL= LED Panel
Out power	Puot	-	6.448	8.84	Watt	Von=5V RL=LED Panel
Over voltage	Ovp	52	53	54		LATCH

5.0 Connector:

5.1 DC input connector

5.1.1Connector type (CN1): S6BPHA (6P 2.0mm)

Pin number	Output Name
1,2	Input voltage
3	On/off
4	Vadj
5,6	GND

5.2 Output connector

5.2.1、Connector type（CN5）: 6712K-F12N-02R (ENTERY CO.,LTD)

Pin number	Output Name
1	IRLED(Current Out)
2	IRLED(Current Out)
3	IRLED(Current Out)
4	IRLED(Current Out)
5	NC
6	VLED(Voltage in)
7	VLED(Voltage in)
8	NC
9	IRLED(Current Out)
10	IRLED(Current Out)
11	IRLED(Current Out)
12	IRLED(Current Out)

5.2.2Connector type (CN1): S2BPHA (2P 2.0mm)

Pin number	Output Name
1	VLED(Voltage in)
2	IRLED(Current Out)

6.0 Operating And Storage Temperature And Humidity.

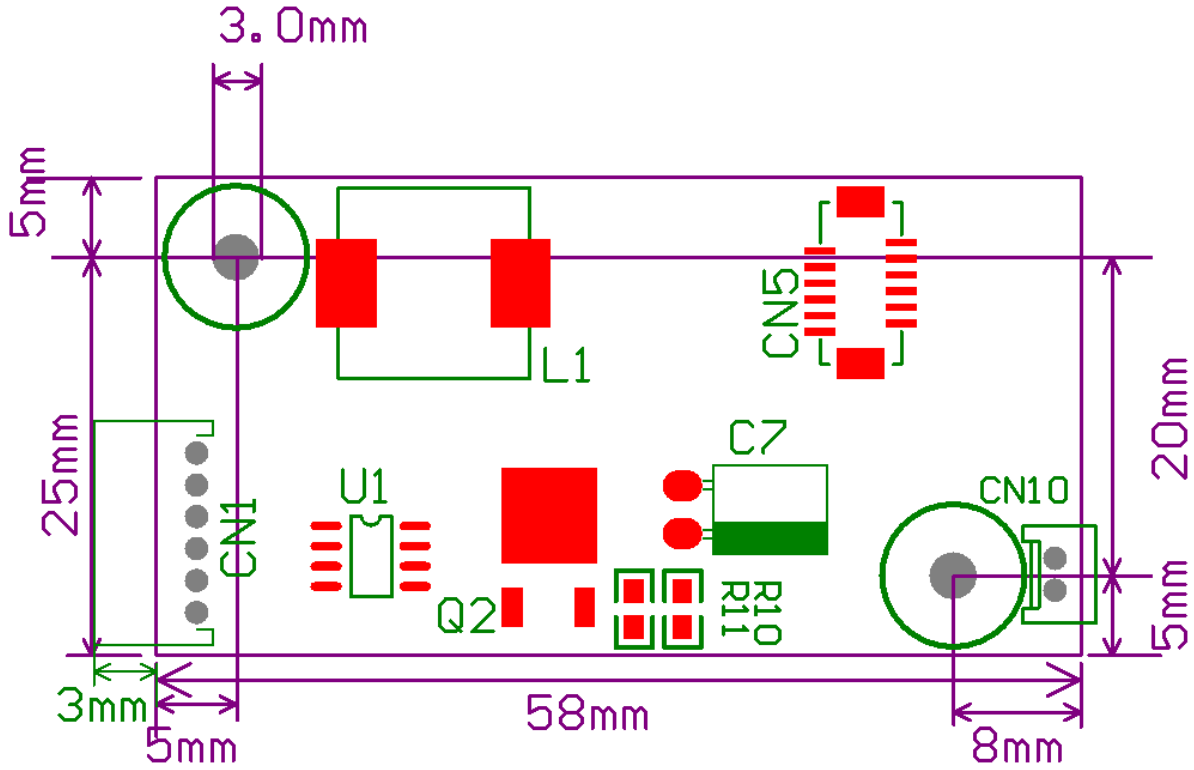
Operating Temperature Range:0 ~ 40℃

Operating Humidity: 10% ~ 85% RH, non-condensing.

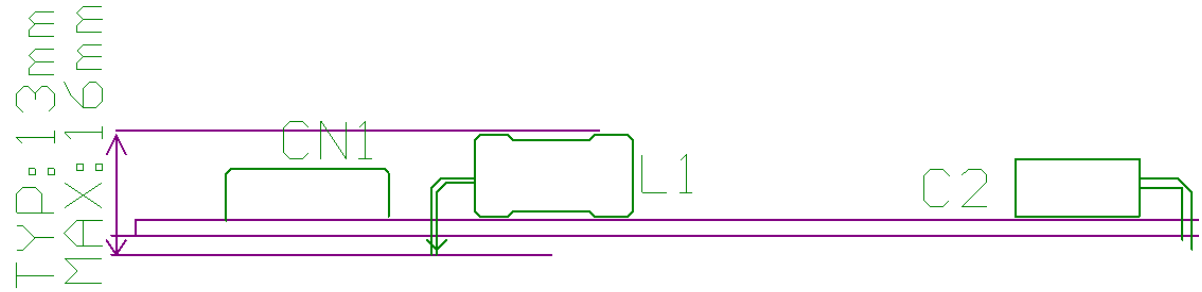
The LED driver shall be capable of operating within these specifications following storage for up to two years:

Storage Temperature Range: -20 ~ 80℃

7.0 SHAPES AND DIMENSIONS



由于电源输入座 CN1 6P2.0 采用弯针卧式的，所以整个座子会凸出板边 3 个毫米
CN10 在板边其座子体积也凸出板边 1 个毫米。



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PACIT Electronic technology co., ltd

产品规格书

SPECIFICATION SHEET

编号：_____

客户名称 Customer	中山市芯睿电子科技有限公司
料号 Pare Care	
品名 Description	LED Driver(LED 背光板)
型号 Model	LDA15-63V240K V1.0
匹配屏型号	LM230WF5-TLD1
日期 DATE	2011-03-31
客户确认签章 Approved by Customer	

批准 Approve	审核 Check	拟制 Prepare

珠海沛程电子有限公司

电话：0756-3818829　3820260　传真：0756-3818826

网址：http://www.paict.cn　E-mail: jason@penic.cn　penic888@163.com

地址：珠海市吉大九洲大道东 1200 号 6 楼

联系人：刘先生 18666113200

PACIT Electronic technology co., ltd

Preliminary LED Driver Specification

23” LED driver

PROJECT NO.: LDA15-63V240K

VER: 1.0

2011.03.31

Prepared by: _____

Reviewed by: _____

Approved by: _____

PACIT electronic technology co.,ltd
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E-mail: jason@pacit.cn penic888@163.com http://www.pacit.cn

Record of Revision

Revision No	Date	Page	Old description	New Description	Remark
1.0	2011-03-31	All	First Edition for Customer		

1. General description

Scope:

This **LDA15-63V240K** sepic LED driver for 23" of LCD backlight system.

2. Applications

23" LED Backlight LCD panels For LG LM230WF5-TLD1

3. Absolute maximum rating

- Input supply voltage .: 11~13V
- Input current . : 1.48A(MAX @11V)
- Input power : 16.32W
- Output current : 255mA MAX
- Output power : 14.69W
- Brightness adjusted voltage : 0V(MAX)~5.0V(MIN)
- Input signal voltage :0V/OFF 5.0V/ON (ON/OFF/control)
- Ambient operating temperature :0℃~40℃
- Storage temperature :-20℃~80℃
- Operating & storage humidify: 10%~85%
- Over voltage protect(OVP)
- High efficency (TYP:90%)

4.Electrical Requirements

This section defines the electrical requirements for the LED driver

4.1Input Characteristics

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	REMARK
Input voltage	VIN	11	12.0	13.0	V	
Input current	Iin	-	1.28	1.48	A	Vadj=0VRL= LM230WF5-LA1 Panel
Input power	Pin	-	15.35	16.32	W	Vadj=0VRL= LM230WF5-LA1 Panel
Input voltage	Von/off	-	0	1.0	V	Off State
		2.5	5.0	5.5		On State
Bright adjust	Vadj	5	-	0	V	0V MAX
Efficiency	η	-	90	-	%	Vadj=0VRL= LM230WF5-LA1 Panel

4.2 Output Characteristics:

4.2.1 DC output CN9:

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	REMARK
Output current	IRLED	225	240	255	mA	Vadj=0VRL= LM230WF5-LA1 Panel
		1	-	30		Vadj=0VRL= LM230WF5-LA1 Panel
Output voltage	VLB	54	57.6	61.2	V	Vadj=0VRL= LM230WF5-LA1 Panel
Output power	PO	12.96	13.82	14.69	W	Vadj=0VRL= LM230WF5-LA1 Panel
Over voltage	OVP	52	53	54	V	LATCH

5.0 Connector:

5.1 DC input connector

5.1.1Connector type (CN1): S6BPHA (6P 2.0mm)

Pin number	Output Name
1,2	Input voltage
3	On/off
4	Vadj
5,6	GND

5.2 Output connector

5.2.1、Connector type（CN9）: 6P1.0 FFC 立式连接座 (ENTERY CO.,LTD)

Pin number	Output Name
1	IRLED(Current Out)
2	IRLED(Current Out)
3	VLED(Voltage in)
4	VLED(Voltage in)
5	IRLED(Current Out)
6	IRLED(Current Out)

5.2.2Connector type (CN1): S2BPHA (2P 2.0mm)

Pin number	Output Name
1	VLED(Voltage in)
2	IRLED(Current Out)

6.0 Operating And Storage Temperature And Humidity.

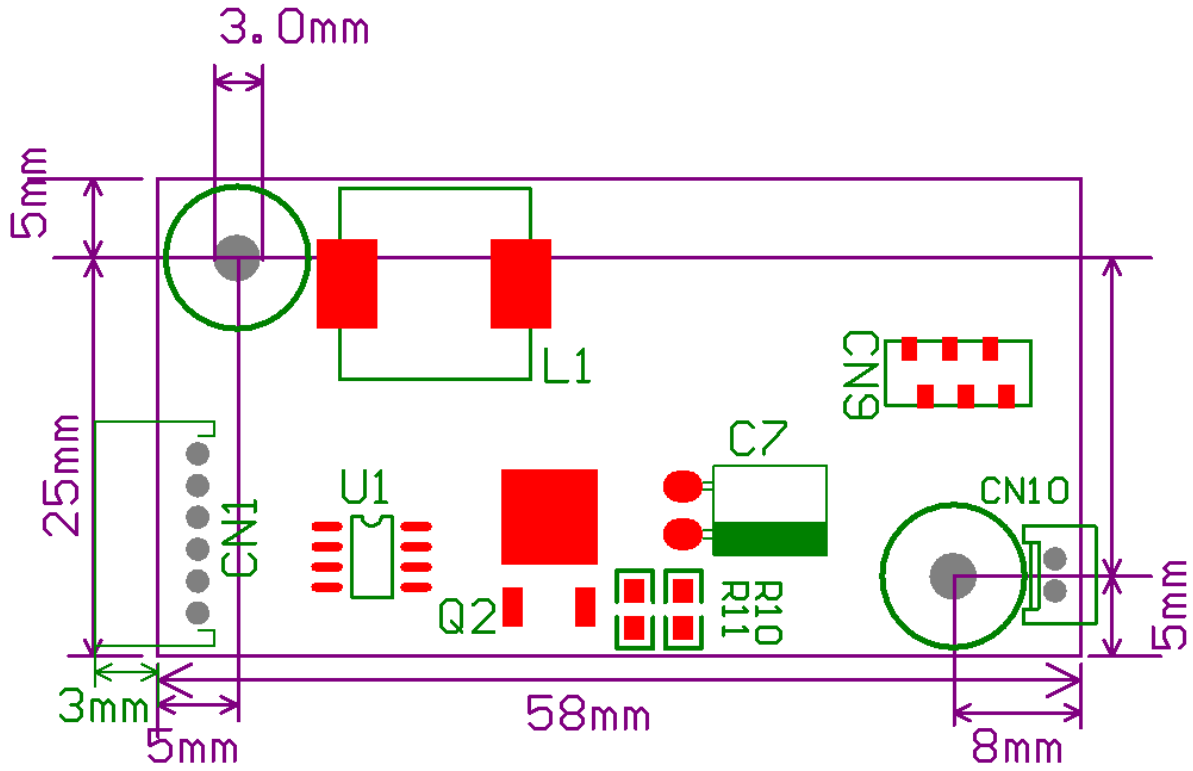
Operating Temperature Range:0 ~ 40℃

Operating Humidity: 10% ~ 85% RH, non-condensing.

The LED driver shall be capable of operating within these specifications following storage for up to two years:

Storage Temperature Range: -20 ~ 80℃

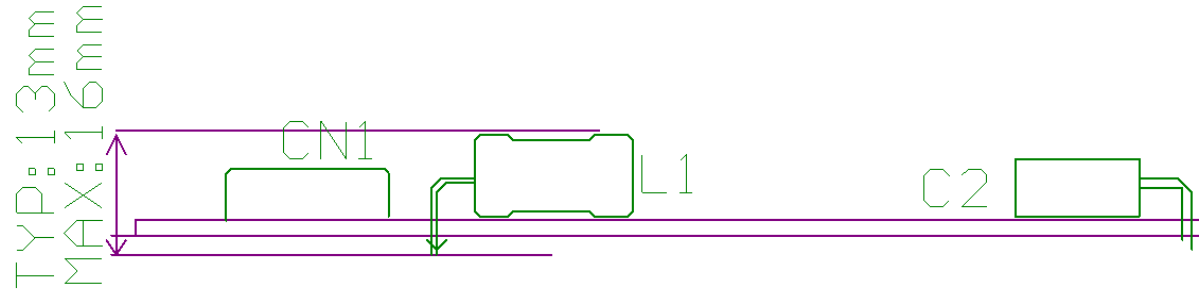
7.0 SHAPES AND DIMENSIONS



●由于电源输入座 CN1 6P2.0 采用弯针卧式的，所以整个座子会凸出板边 3 个毫米。

●CN10 在板边其座子体积也凸出板边 1 个毫米。

●Q2 TO-252 封装的 MOS 管，常规是使用 2504，GTM；12N10，TO-252，100V12A CEU 可代用。



PACIT Electronic technology co., ltd

产品规格书

SPECIFICATION SHEET

编号：_____

客户名称 Customer	中山市芯睿电子科技有限公司
料号 Pare Care	
品名 Description	LED Driver(LED 背光板)
型号 Model	LDA15-45V240H V1.0
匹配屏型号	M215H3-LA1 V236H3-DE01 K1.0
日期 DATE	2011-03-31
客户确认签章 Approved by Customer	

批准 Approve	审核 Check	拟制 Prepare

珠海沛程电子有限公司

电话：0756-3818829 3820260 传真：0756-3818826

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地址：珠海市吉大九洲大道东 1200 号 6 楼

联系人：刘先生 18666113200

PACIT Electronic technology co., ltd

Preliminary LED Driver Specification

21.5” LED driver

PROJECT NO.: LDA15-45V240H

VER: 1.0

2011.03.31

Prepared by: _____

Reviewed by: _____

Approved by: _____

Record of Revision

Revision No	Date	Page	Old description	New Description	Remark
1.0	2011-03-31	All	First Edition for Customer		

1. General description

Scope:

This **LDA15-45V240H** sepic LED driver for 21.5~24" of LCD backlight system.

2. Applications

21.5" LED Backlight LCD panels For CMO M215H3-LA1 V236H1-DE01 K1.0

3. Absolute maximum rating

- Input supply voltage .: 11~13V
- Input current . : 1.18A(MAX @11V)
- Input power : 12.95W
- Output current : 264mA MAX
- Output power : 11.66W
- Brightness adjusted voltage : 0V(MAX)~5.0V(MIN)
- Input signal voltage :0V/OFF 5.0V/ON (ON/OFF/control)
- Ambient operating temperature :0℃~40℃
- Storage temperature :-20℃~80℃
- Operating & storage humidify: 10%~85%
- Over voltage protect(OVP)
- High efficency (TYP:90%)

4.Electrical Requirements

This section defines the electrical requirements for the LED driver

4.1Input Characteristics

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	REMARK
Input voltage	VIN	11	12.0	13.0	V	
Input current	Iin	-	0.95	1.18	A	Vadj=0V RL= M215H3-LA1 Panel
Input power	Pin	-	11.44	12.95	W	Vadj=0V RL= M215H3-LA1 Panel
Input voltage	Von/off	-	0	1.0	V	Off State
		2.5	5.0	5.5		On State
Bright adjust	Vadj	5	-	0	V	0V MAX
Efficiency	η	-	90	-	%	Vadj=0V RL= M236H3-LA2 Panel

4.2 Output Characteristics:

4.2.1 DC output CN5:

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	REMARK
Output current	IRLED	216	240	264	mA	Vadj=0V RL= M215H3-LA1
		0	-	20		Vadj=5V RL= M215H3-LA1
Output voltage	VLB	23.1	42.9	44.2	V	Vadj=0V RL= M215H3-LA1 Panel
Output power	PO	-	10.3	11.66	W	Vadj=0V RL= M215H3-LA1 Panel
Over voltage	OVP	52	53	54	V	LATCH

5.0 Connector:

5.1 DC input connector

5.1.1Connector type (CN1): S6BPHA (6P 2.0mm)

Pin number	Output Name
1,2	Input voltage
3	On/off
4	Vadj
5,6	GND

5.2 Output connector

5.2.1、Connector type（CN5）: 6712K-F12N-02R (ENTERY CO.,LTD)

Pin number	Output Name
1	IRLED(Current Out)
2	IRLED(Current Out)
3	IRLED(Current Out)
4	IRLED(Current Out)
5	IRLED(Current Out)
6	VLED(Voltage in)
7	VLED(Voltage in)
8	IRLED(Current Out)
9	IRLED(Current Out)
10	IRLED(Current Out)
11	IRLED(Current Out)
12	IRLED(Current Out)

5.2.2Connector type (CN1): S2BPHA (2P 2.0mm)

Pin number	Output Name
1	VLED(Voltage in)
2	IRLED(Current Out)

6.0 Operating And Storage Temperature And Humidity.

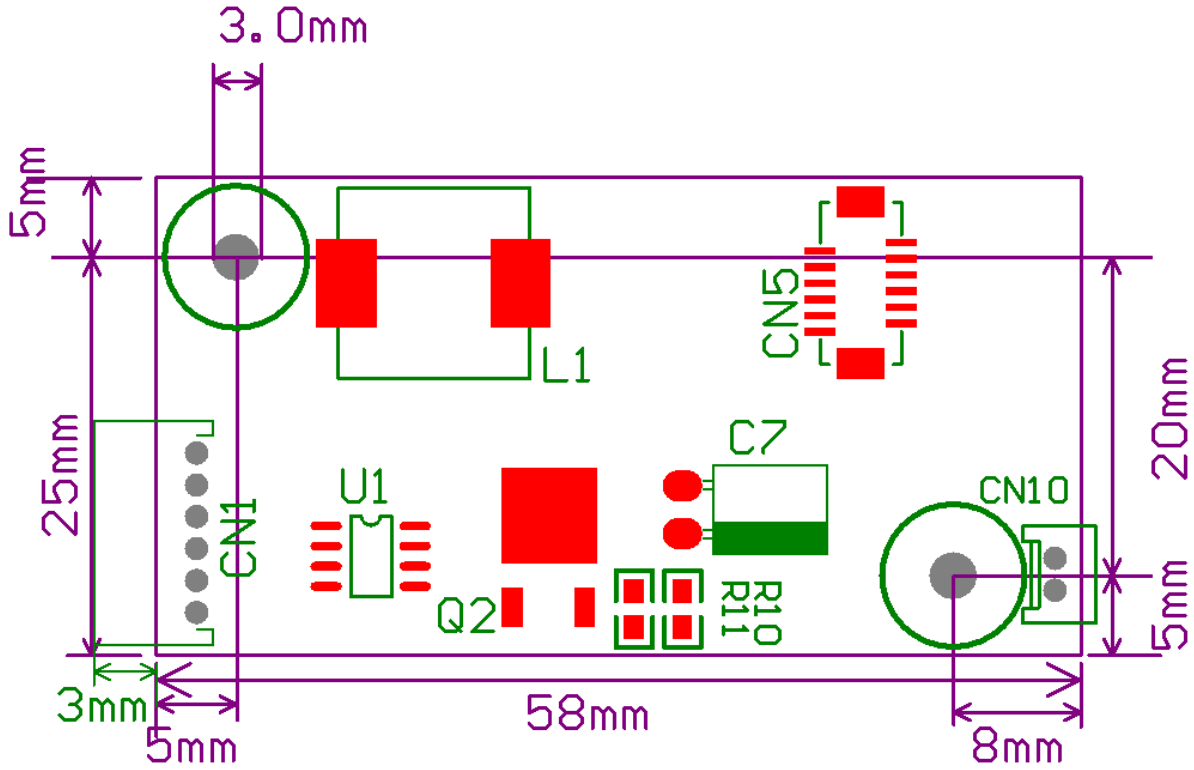
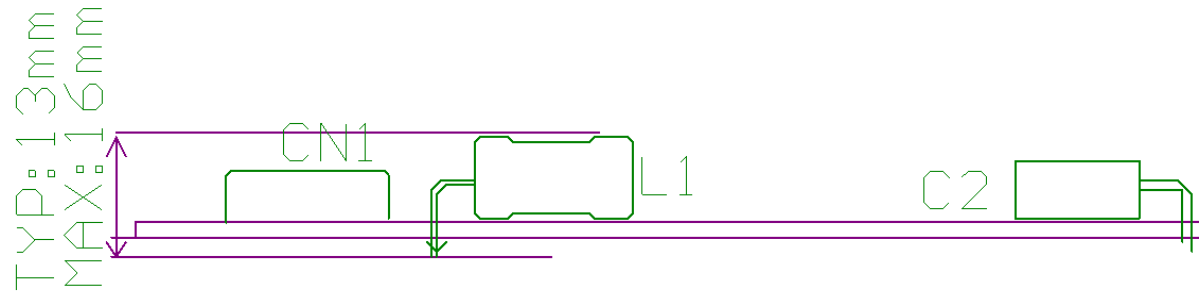
Operating Temperature Range:0 ~ 40℃

Operating Humidity: 10% ~ 85% RH, non-condensing.

The LED driver shall be capable of operating within these specifications following storage for up to two years:

Storage Temperature Range: -20 ~ 80℃

7.0 SHAPES AND DIMENSIONS



由于电源输入座 CN1 6P2.0 采用弯针卧式的，所以整个座子会凸出板边 3 个毫米
CN10 在板边其座子体积也凸出板边 1 个毫米。