V23D/V27D/V30D series

LCD-TV(NTSC)

Service Manual

Date: April 15, 2005
Ver. : 1.1

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1. Precautions & Notice

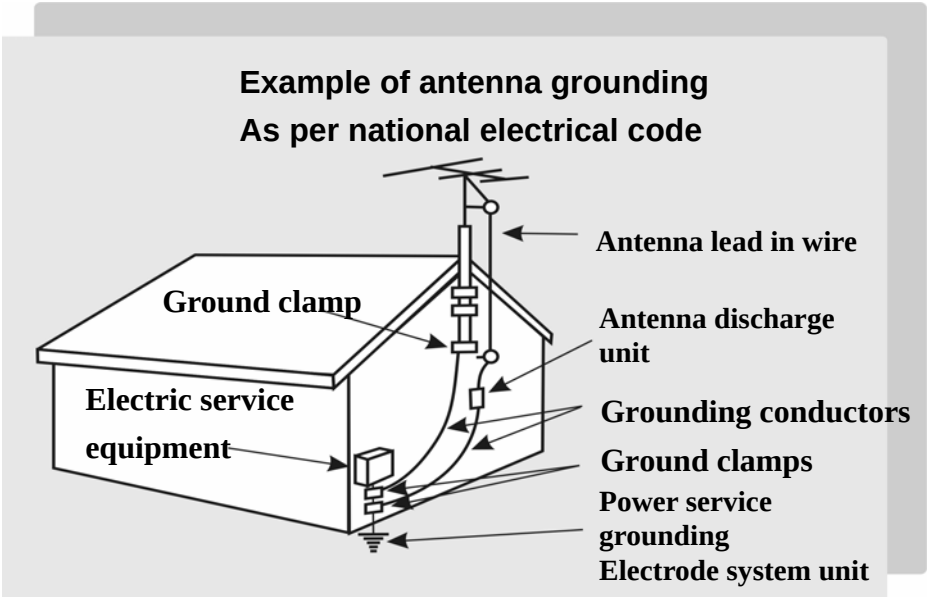
1.1 Safety Precautions

1) Cleaning: Unplug the power cord from the AC outlet before cleaning the product. Use a damp cloth to clean the product. Do not use liquid cleaners or aerosol cleaners.

2) Heat sources: Keep the product away from heat sources such as radiators, heaters, stoves and other heat-generating products (including amplifiers).

3) For added protection for this television equipment during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna. This will prevent damage to the equipment due to lightning and power-line surges.

4) If an outside antenna is connected to the television equipment, be sure the antenna system is grounded so as to provide some protection against voltage surges.



5) An outside antenna system should not be located in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing an outside antenna system, extreme care should be taken to keep from touching such power lines or

circuits as contact with them might be fatal.

6) Ventilation-The vents and other openings in the cabinet are designed for ventilation. Do not cover or block these vents and openings since insufficient ventilation can cause overheating and/or shorten the life of the product. Do not place the product on a bed, sofa, rug or other similar surface, since they can block ventilation opening. This product is not designed for built-in installation; do not place the product in an enclosed place such as a bookcase or rack, unless proper ventilation is provided or the manufacturer's instructions are followed.

1.2Product Safety Notice

1) Many electrical and mechanical parts in this chassis provide special visual safety protection. The protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc.
2) Before replacing any of these components, read the parts list manual carefully. The use of substitute replacement parts, which do not have the same safety characteristics, as specified in the parts list may create shock, fire or other hazards.

1.3 Service Notes

1) When replacing parts or circuit boards, wrap the wires around terminals before soldering.
2) Keep wires away from high temperature components.
3) Keep cable and their shielding in their original position so as to reduce interference.

2. Specifications

Specification

V23DXXX

ITEMS		SPECIFICATION
Display	Screen size	23” wide TFT-LCD panel
	Aspect Ratio	15：9
	Resolution	1280 x 768 (WXGA)
	Contrast ratio	400:1(typ)
	Brightness	450cd/m^2 (typ)
	Viewing Angle	Over 170° (Hor.) / 170° (Vert.)
	OSD Language	Chinese , English, French , German , Spanish
TV I/P	TV standard (CCIR)	NTSC
	TV Turning system	PLL 181 Ch.
	STEREO	MTS+SAP
	CATV	125 CH.
Video I/P	Composite Signal	CVBS
	Y, C Signal	S-Video
	Composite Signal Y, Pb Pr	HDTV system (720p, 1080i)
PC I/P	Signal I/P	DVI-I Connector
	PnP compatibility	DDC / 2B
	I/P Frequency	Analog：F_H：31.5KHz to 60KHz F_V ：56Hz to 75Hz
	Recommended	Analog：1024X768 (60Hz)
Audio I/P	Audio I/P：L/Rx3	Audio 1：CVBS & S-Video
		Audio 2：Y, Pb, Pr
		Audio 3：PC
Video O/P	Composite Signal	TV only
Audio O/P	Audio O/P：L/Px3	Speaker (Build-in)：5W+5W (rms)@THD<10%
		3.5mm miniature stereo phone jack
		Sound level output:：500 mV(rms)
Other Functions	PIP,VoV,3D De-interlace, 3D comb-filter ,V-Chip, C.C. Settings	Yes
	Aspect Ration Switching	Normal → Periscope → Zoom →Full
Power	Power Supply	AC 110V ~ 240V, 50/60Hz
	Power Consumption	＜115W
Wight (net)	10.3Kg (Ref.) (Without Accessories)	
Accessories	Remote Control, Batteries, AC power cord	

V27DXXX

ITEMS		SPECIFICATION
Display	Screen size	27” wide TFT-LCD panel
	Aspect Ratio	16：9
	Resolution	1280 x 720(WXGA)
	Contrast ratio	600:1 (typ)
	Brightness	550cd/m^2 (Typ)
	Viewing Angle	Over 170° (Hor.) / 170° (Vert.)
	OSD Language	Chinese, English, French, German, Spanish
TV I/P	TV standard (CCIR)	NTSC
	TV Turning system	PLL 181 Ch.
	STEREO	MTS+SAP
	CATV	125 CH.
Video I/P	Composite Signal	CVBS
	Y, C Signal	S-Video
	Composite Signal Y, Pb Pr	HDTV system (720p, 1080i)
PC I/P	Signal I/P	DVI-I Connector
	PnP compatibility	DDC / 2B
	I/P Frequency	Analog：F_H：31.5KHz to 60KHz F_V ：56Hz to 75Hz
	Recommended	Analog：1024X768 (60Hz)
Audio I/P	Audio I/P：L/R x 3	Audio 1：CVBS & S-Video
		Audio 2：Y, Pb/Cb, Pr/Cr
		Audio 3：PC
Video O/P	Composite Signal	TV only
Audio O/P	Audio O/P：L/P x 3	Speaker (Build-in)：10W+10W (rms)
		3.5mm miniature stereo phone jack
		Sound level output:：500 mV(rms)
Other Functions	PIP,VOV,3D De-interlace, 3D comb-filter ,V-Chip, C.C. Settings	Yes
	Aspect Ration Switching	Normal → Periscope → Zoom →Full
Power	Power Supply	AC 110V ~ 240V, 50/60Hz
	Power Consumption	＜140W
Wight (net)	14.5Kg (Ref.) (Without Accessories)	
Accessories	Remote Control, Batteries, AC power cord	

V30DXXX

ITEMS		SPECIFICATION
Display	Screen size	29.6” wide TFT-LCD panel
	Aspect Ratio	15：9
	Resolution	1280 x 768 (WXGA)
	Contrast ratio	600:1(typ)
	Brightness	550cd/m^2 (Typ)
	Viewing Angle	Over 170° (Hor.) / 170° (Vert.)
	OSD Language	Chinese , English, French , German , Spanish
TV I/P	TV standard (CCIR)	NTSC
	TV Turning system	PLL 181 Ch.
	STEREO	MTS+SAP
	CATV	125 CH.
Video I/P	Composite Signal	CVBS
	Y, C Signal	S-Video
	Composite Signal Y, Pb, Pr	HDTV Ready (720p, 1080i)
PC I/P	Signal I/P	DVI-I Connector
	PnP compatibility	DDC / 2B
	I/P Frequency	Analog：F_H：31.5KHz to 60KHz F_V ：56Hz to 75Hz
	Recommended	Analog：1024X768 (60Hz)
Audio I/P	Audio I/P：L/Rx3	Audio 1：CVBS & S-Video
		Audio 2：Y, Pb/Cb, Pr/Cr
		Audio 3：PC
Video O/P	Composite Signal	TV only
Audio O/P	Audio O/P：L/Px3	Speaker (Build-in)：10W+10W (rms)
		3.5mm miniature stereo phone jack
		Sound level output: 500 mV(rms)
Other Functions	PIP,VoV,3D De-interlace, 3D comb-filter ,V-Chip, C.C. Settings	Yes
	Aspect Ration Switching	Normal → Periscope → Zoom →Full
Power	Power Supply	AC 110V ~ 240V, 50/60Hz
	Power Consumption	＜150W
Wight (net)	15.2Kg (Ref.) (Without Accessories)	
Accessories	Remote Control, Batteries, AC cord, AC power cord	

PC I/P

Mode No.	Mode Name Resolution	H.Freq.(KHZ) V.Freq.(HZ)	H. Polarity V. Polarity	Pixel CLK (MHZ)
1	VGA 70HZ 640*350	31.469 70.087	+ −	25.175
2	VGA 60HZ 640*480	31.469 59.941	− −	25.175
3	VGA 72HZ 640*480	37.861 72.81	− −	31.5
4	VGA 75HZ 640*480	37.5 75.0	− −	31.5
5	SVGA 60HZ 800*600	35.16 56.25	+ +	36.0
6	SVGA 60HZ 800*600	37.879 60.317	+ +	40.0
7	SVGA 72HZ 800*600	48.077 72.188	+ +	50.0
8	SVGA 75HZ 800*600	46.875 75.0	+ +	49.5
9	XGA 60HZ 1024*768	48.363 60.004	− −	65.0
10	XGA 70HZ 1024*768	56.476 70.069	− −	75.0
11	XGA 75HZ 1024*768	60.023 75.029	+ +	78.75
12	MAC VGA 640*480	35.0 66.667	− −	30.24
13	MAC VGA 832*624	49.725 74.550	− −	57.283
14	US TEXT 720*400	31.469 70.087	− +	28.322
15	WXGA 1280*768	47.73 60	− −	80
16	WXGA 1280*720	45 60	+ +	74.25

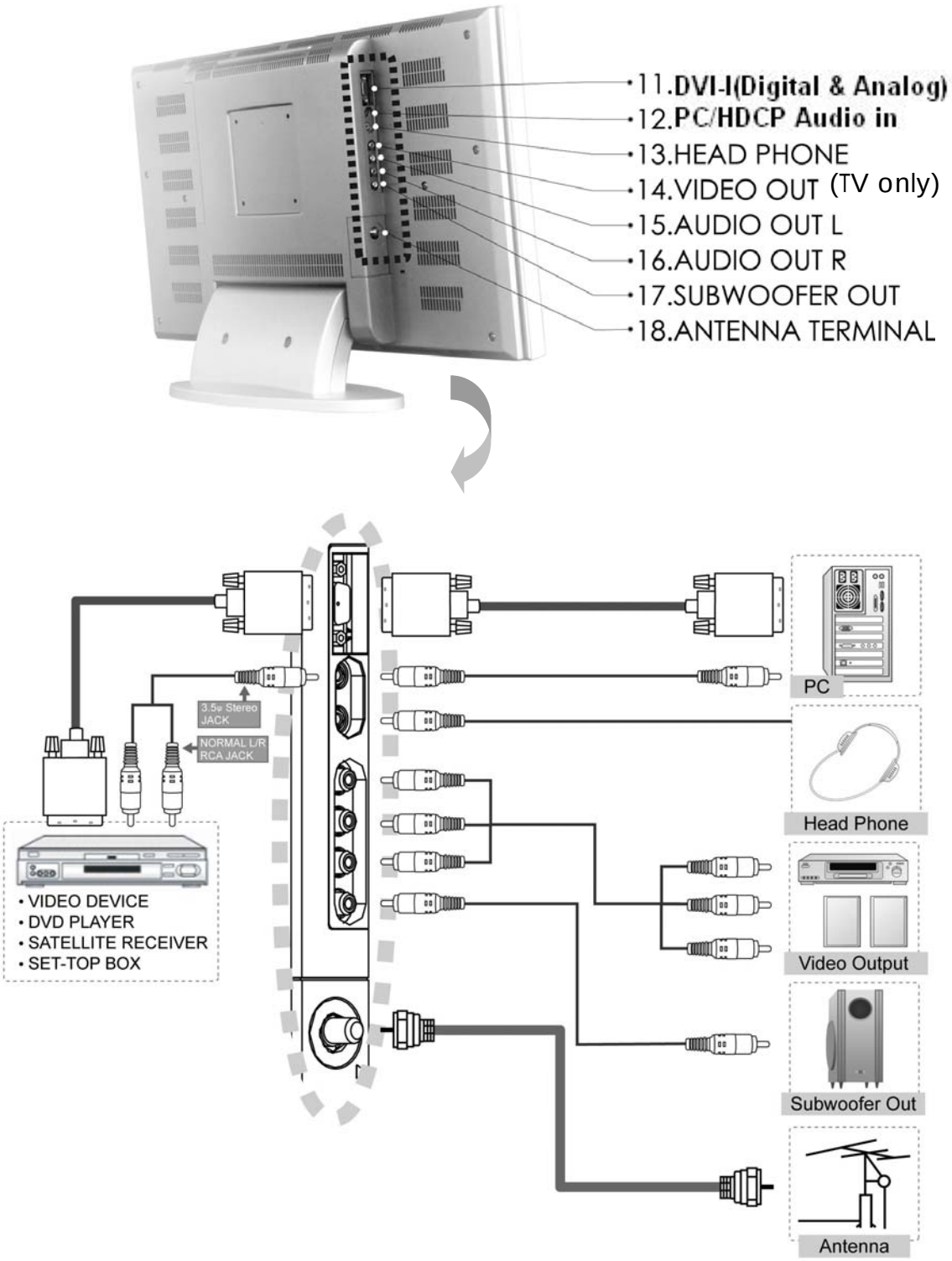
PC I/P

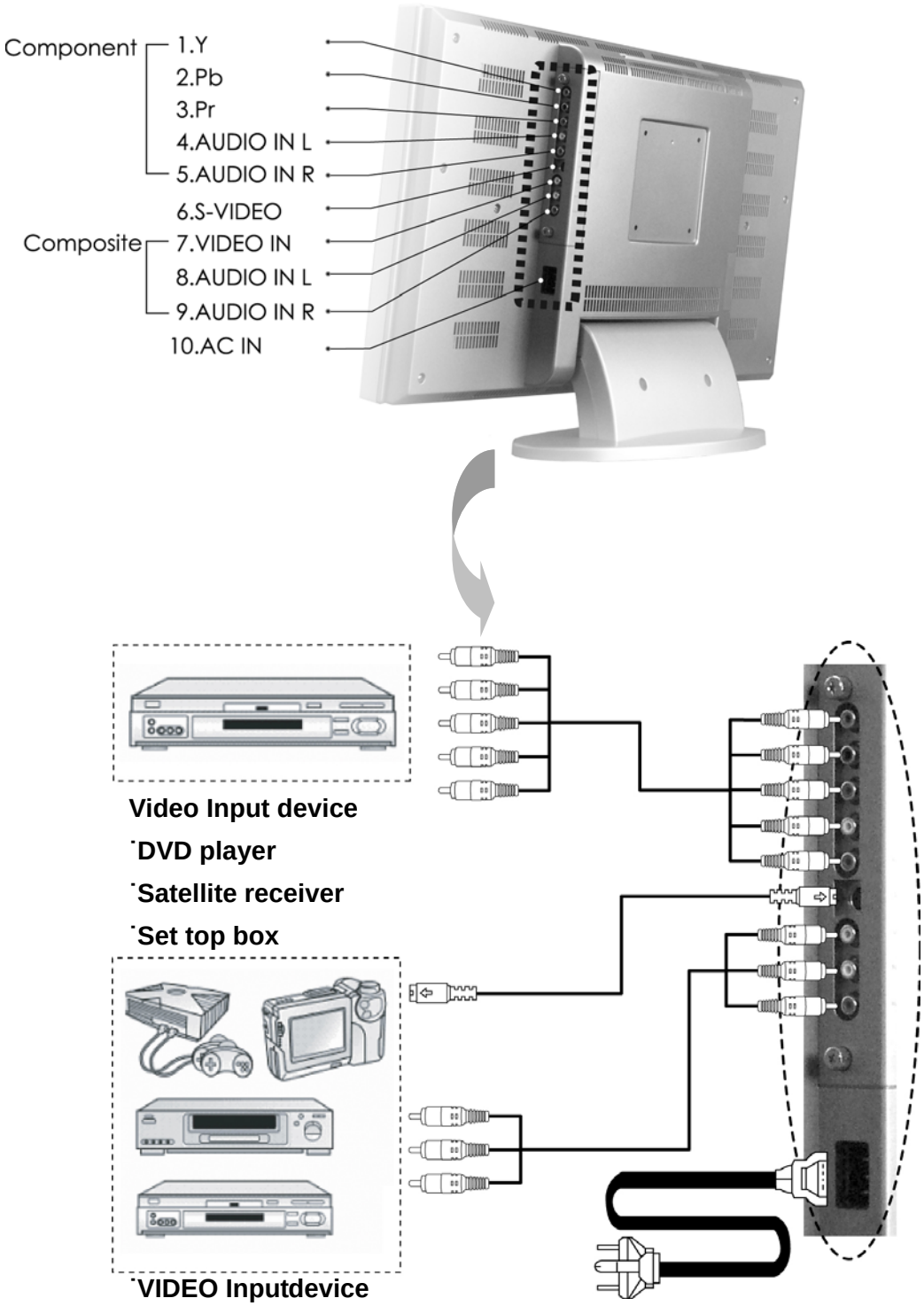
Mode No.	Mode Name Resolution	H.Freq.(KHZ) V.Freq.(HZ)	H. Polarity V. Polarity	Pixel CLK (MHZ)
1	VGA 70HZ 640*350	31.469 70.087	+ −	25.175
2	VGA 60HZ 640*480	31.469 59.941	− −	25.175
3	VGA 72HZ 640*480	37.861 72.81	− −	31.5
4	VGA 75HZ 640*480	37.5 75.0	− −	31.5
5	SVGA 60HZ 800*600	35.16 56.25	+ +	36.0
6	SVGA 60HZ 800*600	37.879 60.317	+ +	40.0
7	SVGA 72HZ 800*600	48.077 72.188	+ +	50.0
8	SVGA 75HZ 800*600	46.875 75.0	+ +	49.5
9	XGA 60HZ 1024*768	48.363 60.004	− −	65.0
10	XGA 70HZ 1024*768	56.476 70.069	− −	75.0
11	XGA 75HZ 1024*768	60.023 75.029	+ +	78.75
12	MAC VGA 640*480	35.0 66.667	− −	30.24
13	MAC VGA 832*624	49.725 74.550	− −	57.283
14	US TEXT 720*400	31.469 70.087	− +	28.322
15	WXGA 1280*768	47.73 60	− −	80
16	WXGA 1280*720	45 60	+ +	74.25

DVI I/P

Mode No.	Mode Name Resolution	H.Freq.(KHZ) V.Freq.(HZ)	H. Polarity V. Polarity	Pixel CLK (MHZ)
1	VGA 60HZ 640*480	31.469 59.941	－ －	25.175 DVI
2	SVGA 60HZ 800*600	37.879 60.317	＋ ＋	40.0 DVI
3	XGA 60HZ 1024*768	48.363 60.004	－ －	65.0 DVI
4	US TEXT 720*400	31.47 70.08	＋ ＋	28.320 DVI

3. Connection & Applications





Video Input device

- **DVD player**
- **Satellite receiver**
- **Set top box**

- **VIDEO Inputdevice**
- **Digital Camera**
- **Satellite receive**
- **Set top box**

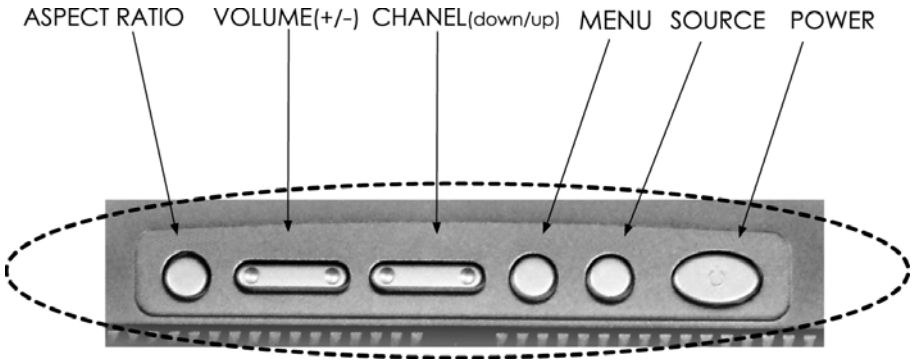
Note:

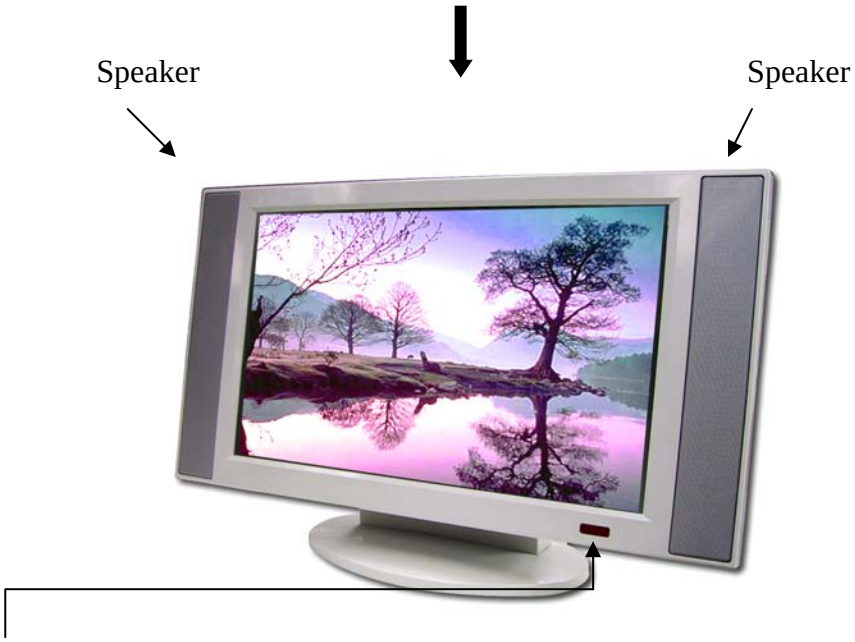
- **Audio out:** The level of Audio O/P is constant. It won't be affected by aligning volume, treble and bass. This connecter should be connected to outer audio amplifier to enlarge the volume.
- **Video O/P:** When user wants to connect Audio and Video O/P of our LCD-TV to VCR for recording program, the O/P has only one choice that is TV mode.
- **Audio O/P:** IF the main display is TV, the Audio O/P must be TV sound; otherwise, if sub display is TV, the Audio I/P must be selected to "Sub", so that the Audio O/P will be TV sound.

4. Control Location

These buttons control your TV's basic features, include the on-screen mean. To use the more advanced features, you must the remote control.

POWER: turn on or turn off the LCD TV.
SOURCE: set up the input source (PC,VIDEO,SV,TV,CV).
MENU: display the main menu.
CHANEL (down/up): change channels on sequence.
VOLUME(+/-): turn up or turn down the volume.
ASPECT RATIO: set up the display (Normal, Periscope, Zoom or Full).



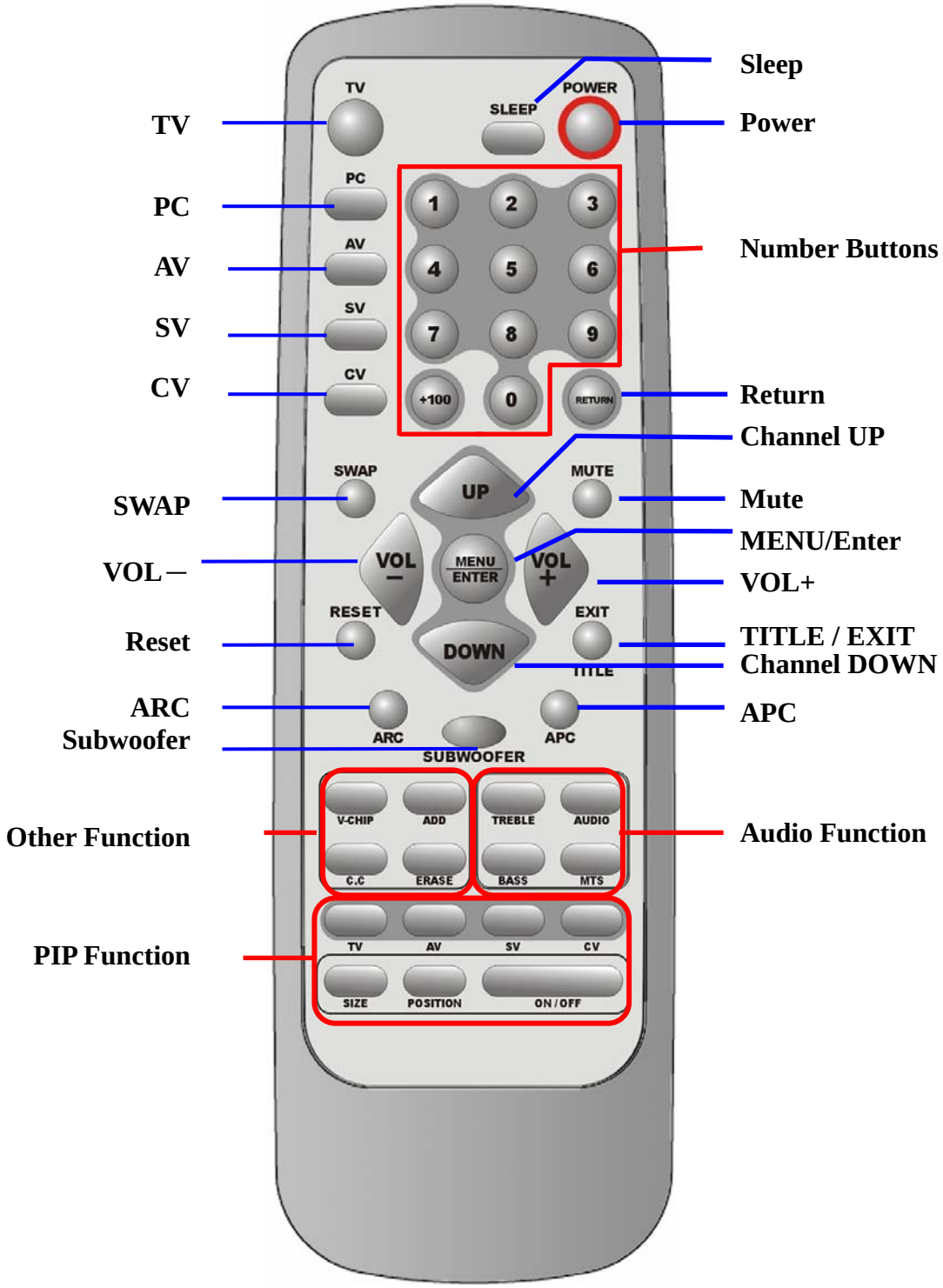


Remote sensor window

Aim the remote control towards this region on the TV.

5. Remote Control

The remote control pad works almost as same as ordinary TV remote control that includes the basic function needed while viewing a live video:



Summary of Control Button

Power control	
Press POWER button	Direct to turn on or turn off the display
Selecting the signal source	
Press TV button	Direct to switch to the TV mode.
Press AV button	Direct to switch to the AV Video mode.
Press SV button	Direct to S-Video mode.
Press CV button	Direct to switch to the Component mode (Y Pb Pr).
Press PC button	Direct to switch to the PC mode.
Menu Setting	
Press MENU/ENTER button	Display the main on-screen menu or enter the next menu.
Press TITLE/EXIT button	Display the current channel digits/Exit from the menu.
Changing Channels	
Press UP button	Press Up to change channel on the TV.
Press DOWN button	Press Down to change channel on the TV.
Press 0~9，+100 button	To select channels directly on the TV.
Press RETURN button	Return to the previous channel on the TV.
Sound Control	
Press VOL+ button	Press to turn up the volume.
Press VOL- button	Press to turn down the volume.
Press MUTE button	Press to temporarily cut off the sound.
Press MTS button	Press to choose stereo, mono or separate audio program supply the multi-channel sound services.
Press AUDIO button	Select present audio is main display or sub display.
Press TREBLE button	Adjust the treble of audio.
Press BASS button	Adjust the bass of audio.
Press SUBWOOFER button.	Open the subwoofer function.
PIP Control	
Press ON/OFF button	Press to watch one of video sources on sub display. Press again to make the sub display disappear.
Press TV、AV、SV、CV button	Press to select one of the PIP window input source.
Press SIZE button	To make the PIP window double, large or small.
Press POSITION button	Press to move the PIP window to：Top Left→Top Right→Bottom Right→ Bottom Left→Repeat
Other Function	
Press SWAP button	Change main display and sub display.
Press RESET button	Return to the original factory settings.
Press ARC button	In PC source：Set the picture window to full or normal. In Video source：Set the picture window to normal→full→periscope→zoom.
Press APC button	Select Normal, Clear, Dark, and Theater mode for picture control.
Press SLEEP button	Press to select a present time interval for shut off.
Press V-CHIP button	Set Parent Control function.
Press C.C button	Set the caption of TV programs show on or off.
Press ADD button	Add the channel of TV programs in TV source.
Press ERASE button	Erase the channel of TV programs in TV source.

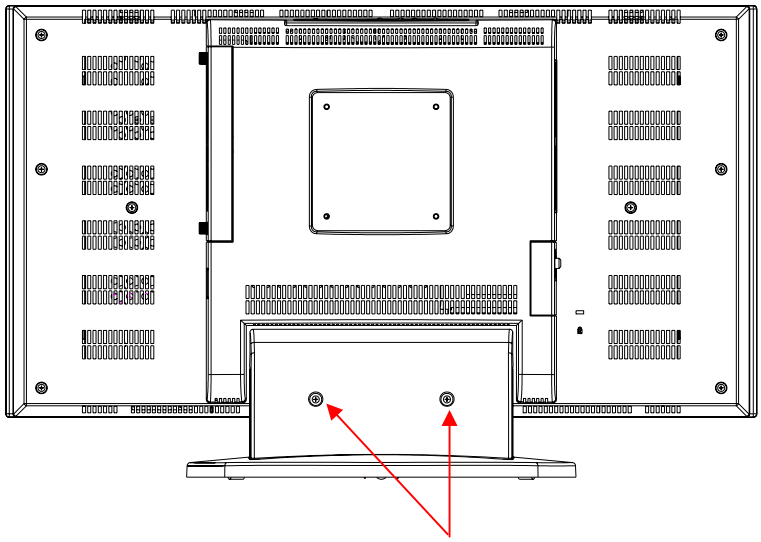
6. Disassembly Instructions

A. Face down the LCD-TV :

Face down the LCD-TV on a smooth plane with a soft material to protect the panel faceplate.

B.Base Neck Removal Procedure :

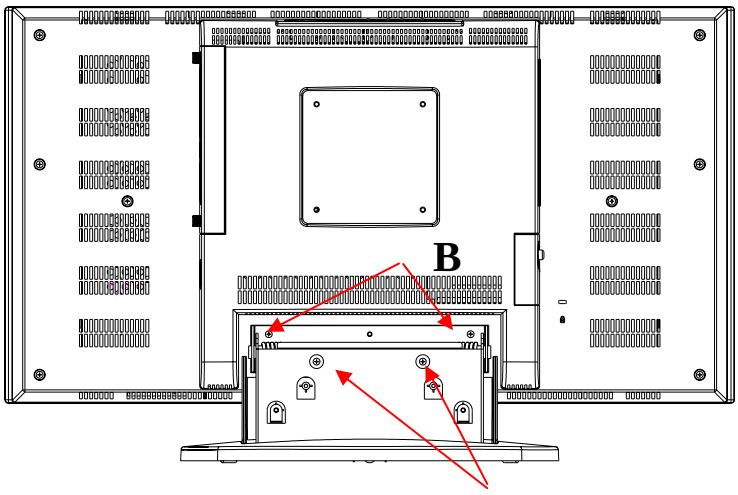
1. Remove 2 screws from Neck Cover. (Indicated as “ A “)
   Then you could take the Back Cover of neck apart from the LCD-TV



A

C. Base Removal Procedure:

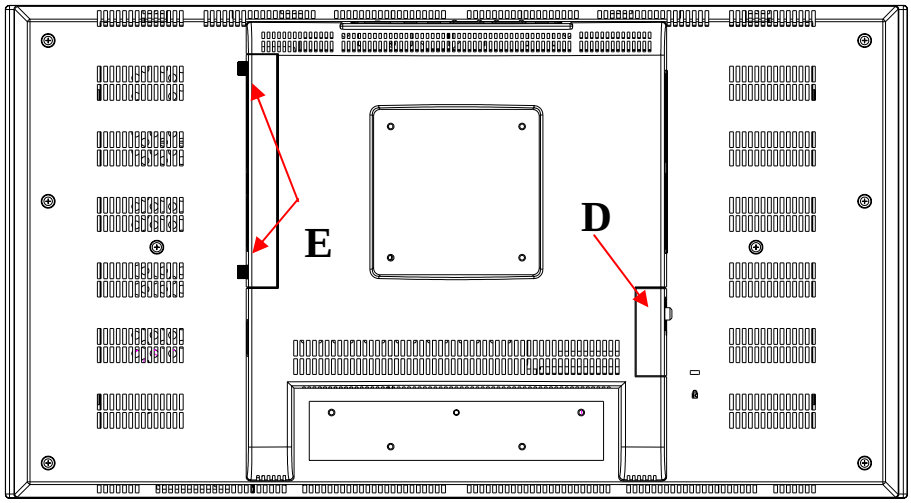
1. Remove 4 screws from the Back Cover. (Indicated as “ B ” and “ C ”)
   Then you could take Base (assembly) apart from the LCD-TV.



C

D. Tuner Cover & AV Cover Removal Procedure:

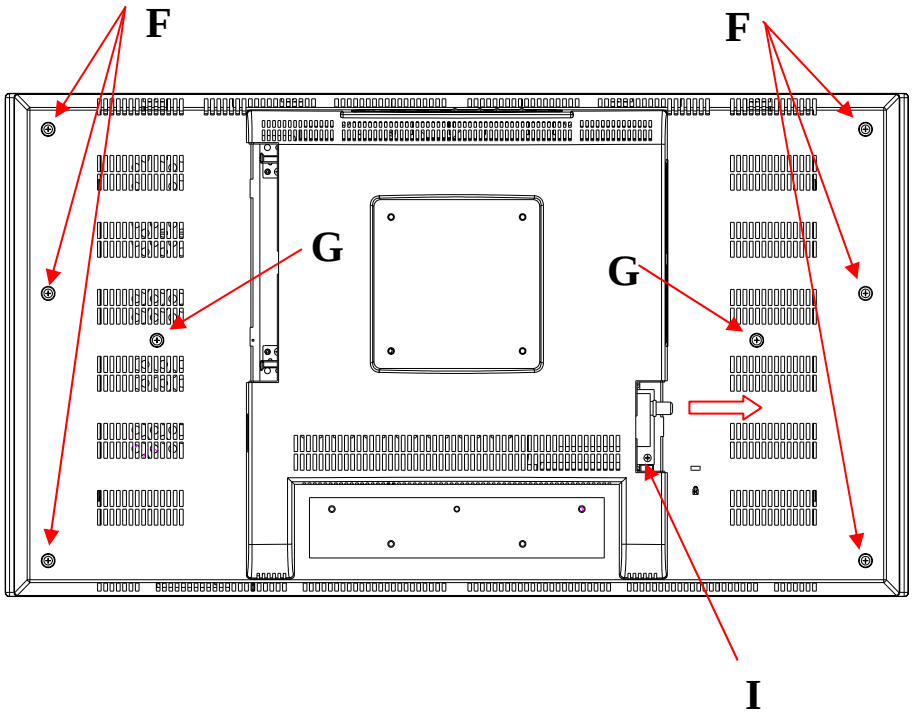
1. Remove Tuner Cover. (Indicated as “D”)
2. Remove AV Cover before, you should be loose the screw (Indicated as “E”)



E. Back Cover Removal Procedure:

1. Remove 8 screws from the Back Cover. (Indicated as “ F “and “ G “)
2. Remove a screw from the Tuner Board. (Indicated as “ I ”)
3. Take slide of tuner board.

   Then you could take Back Cover apart from the LCD-TV.



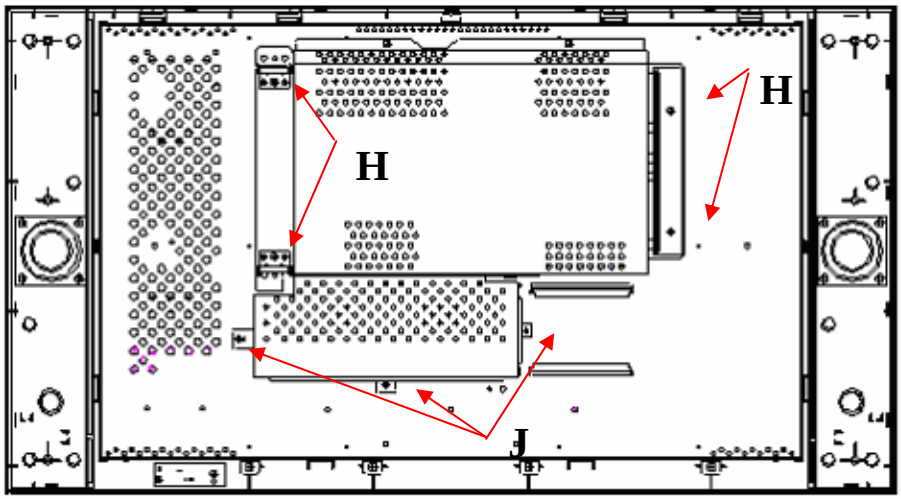
F. Right/Left Side Covers and Tuner Board Removal Procedure:

6.1 Remove 4 screws from Slide of AV PCB & left side Covers. (Indicated as " H ")

6.2 Remove a screw from the Tuner Board. (Indicated as " I ")

6.3 Remove 3 screws from the power case assembly. (Indicated as " J ")

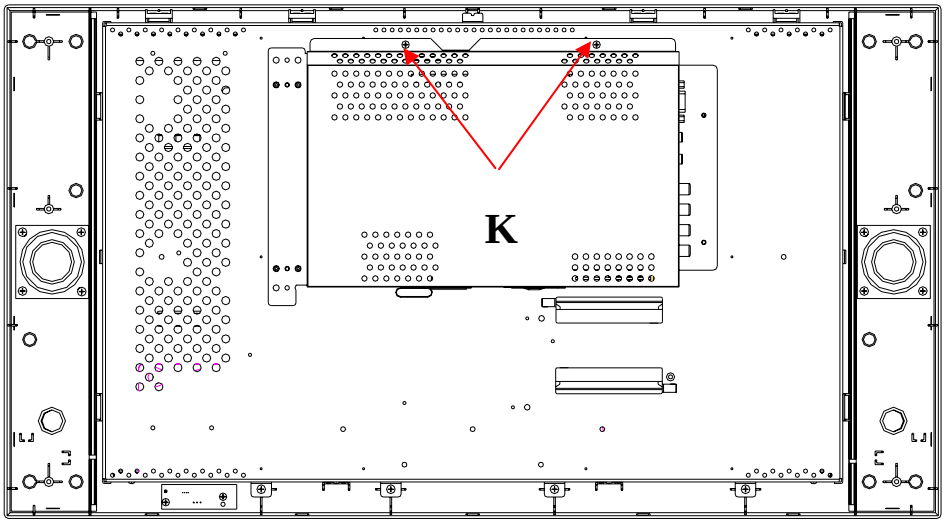
Then you could take Slide of AV PCB, Power case, and Left Side Covers Removal.



G. Main PCB Shield Removal :

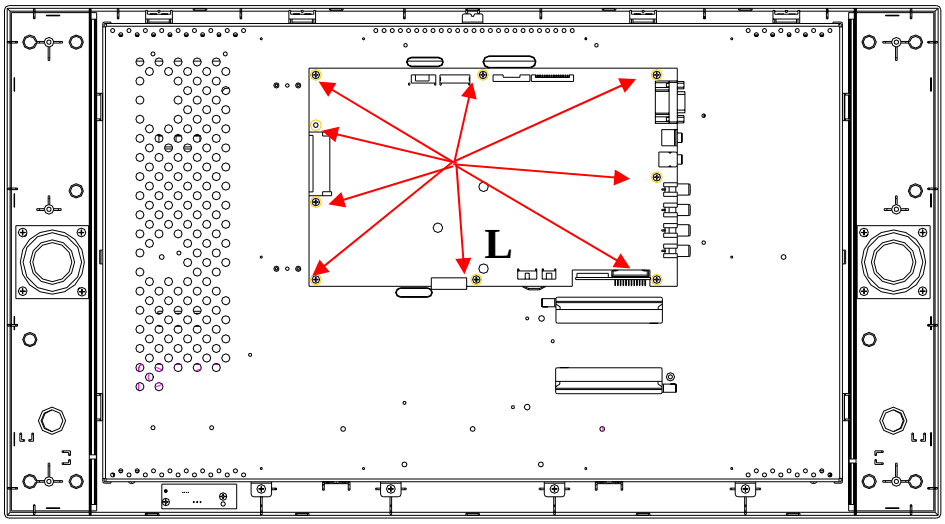
1. Remove 2 screws from Main PCB Shield. (Indicated as " K")

   Then you could take Main PCB Shield apart from Main Bracket and the PCB Board will be shown on it .



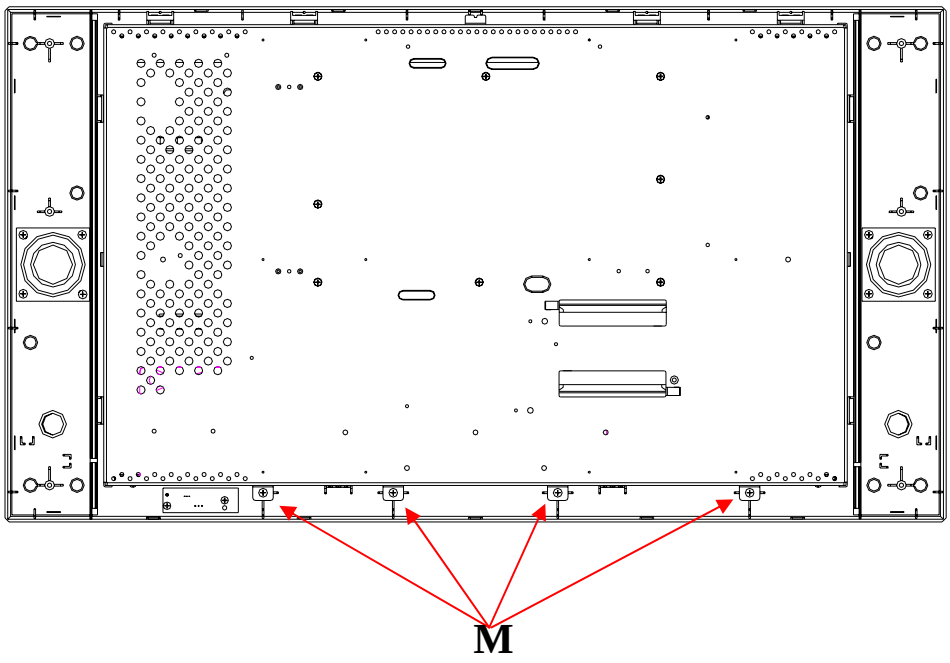
H. Main PCB Removal procedure:

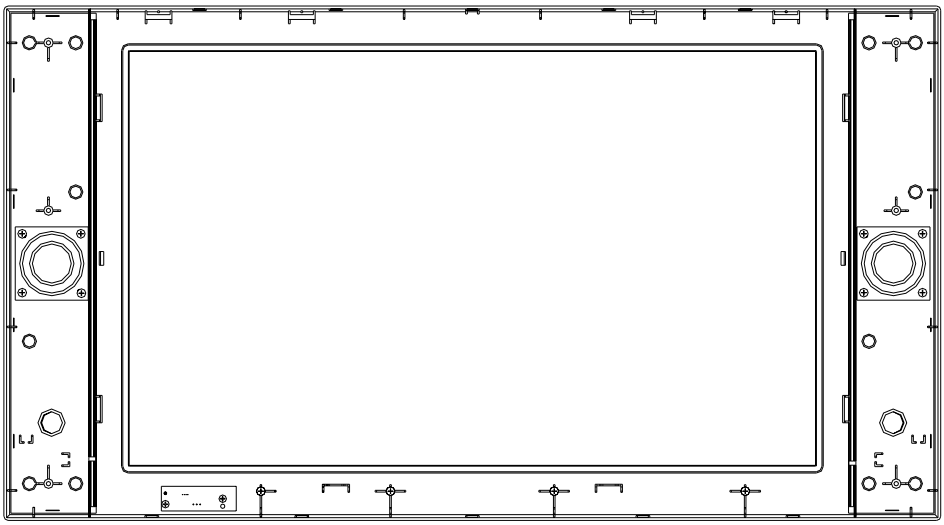
1. Remove 9 screws from the Main PCB. (indicated “ L “)
   Then you could take Main PCB apart from the LCD-TV .



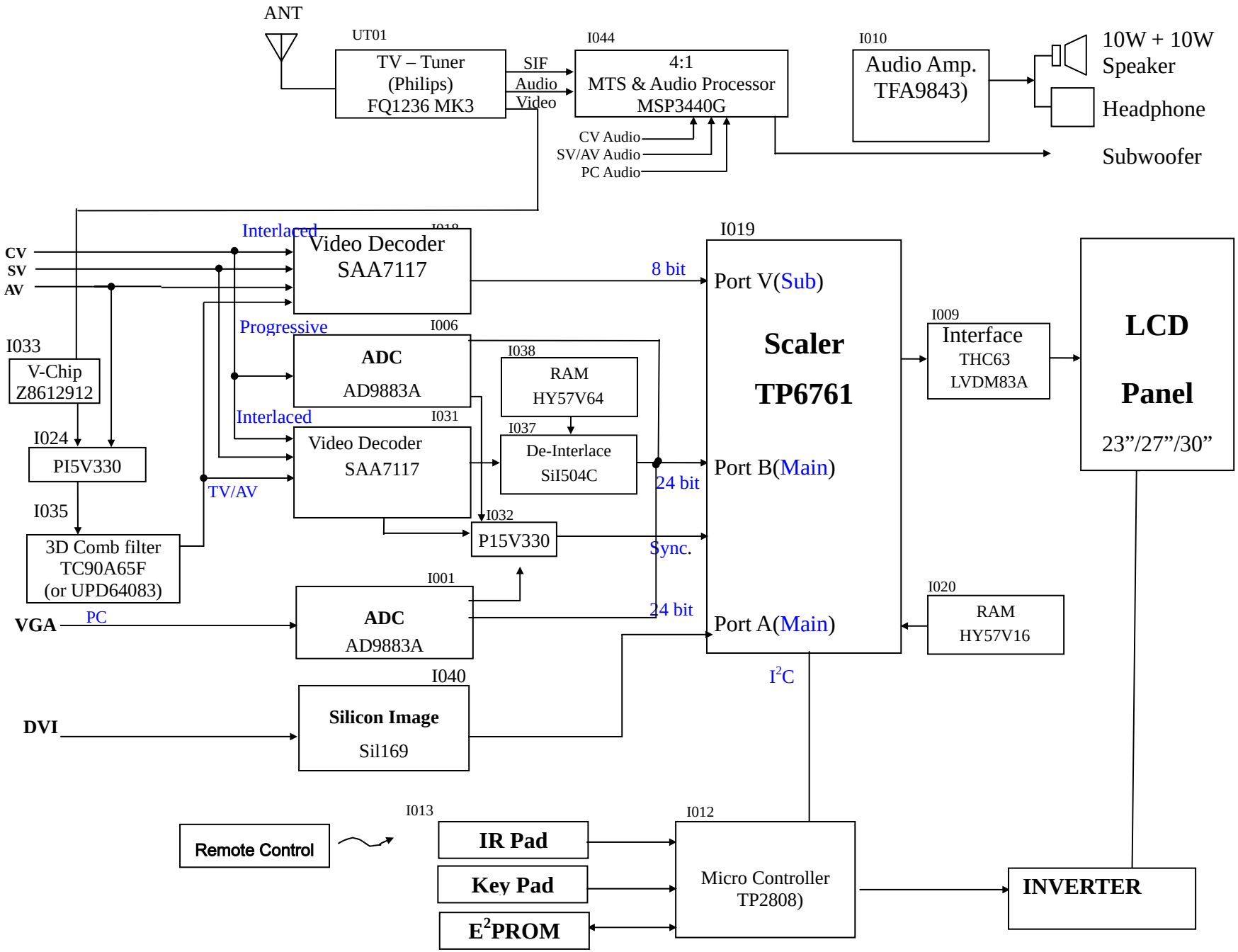
I. Panel Bracket Removal procedure:

1. Remove 4 screws from the Panel Bracket. (Indicated as “ M ”)
   Then you could take Panel Bracket apart from the Front Cover.





7. Block Diagram



8. Troubleshooting

8.1 Symptom Codes :

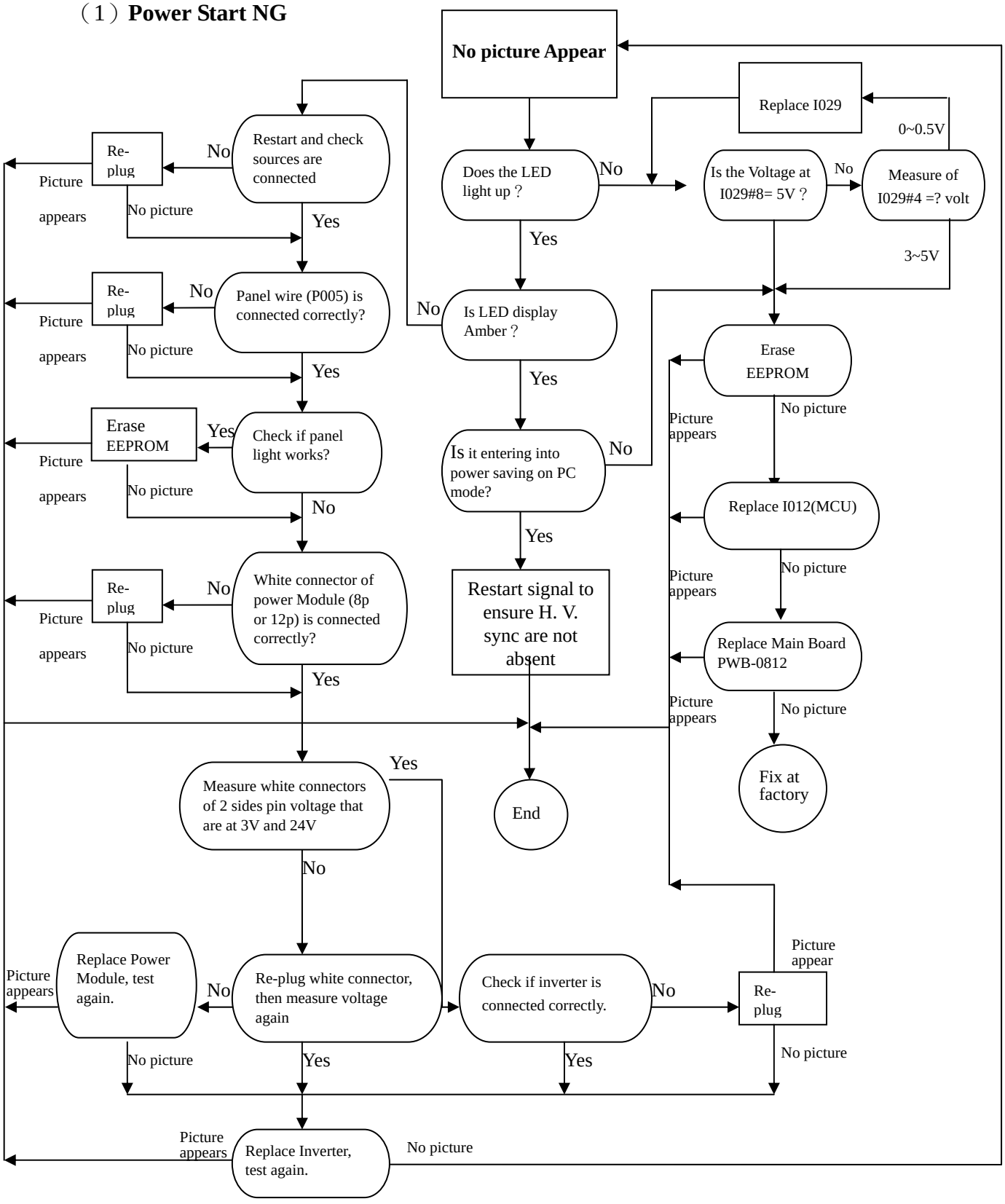
	CODE	SYMPTOM	COUNTERMEASURES
No picture and and no Sound	**NP1**	No Picture and No Sound in TV mode.	● Make sure the Power cord and Antenna cable are properly connected . ● Make sure the batteries in remote control are not flat. ● Switch to TV source by pressing **TV** button. ● Select the correct signal source: "**ANT**" or "**STD/ HRC/ IRC** " in OSD menu. ● Run "**Auto Scan** " in OSD menu.
	NP2	No Picture and No Sound in video mode.	● Check the connection between the optional video equipment and the TV. ● Press **AV, SV,** or **CV** button on the remote control to select the corresponding video source.
	NP3	TV is automatically turned off.	● Check if the "SLEEP" timer is activated . ● Press **POWER** button to turn on the TV once again.
	NP4	Screen appears "**totally snowy**" in TV mode. After 10 min., it turns off automatically.	● Check if Aerial cable is correctly connected. ● Press **POWER** button to turn on the TV again. ● Press **CH Up/Down** buttons to change channels.
	NP5	Screen appears "**No Signal**" in video mode. After 10 min., it turns off automatically.	● Check if Video Cable is correctly connected and Video Device is normal. ● Press **POWER** button to turn on the TV again. ● Press **AV, SV,** or **CV** button on the remote control to select the corresponding video source.
Poor Picture	**PP1**	Double Images / Ghosts	If the TV suffers interference from signals reflecting from mountains or buildings , double-pictures or Ghosts will occur. ● Adjust the Antenna's location and direction ● Replace it with one with better directionality. ● Turn off or disconnect the booster if it is in use , as the booster may be inappropriate.
	PP2	Snowy picture and noisy Sound	If snow totally blocks out the picture , there may be a problem with the Antenna or Antenna Cable . ● Have the TV and Antenna been connected properly ? Has the Antenna cable been damaged ? ● Is the Antenna pointing in the right direction ? ● Is the Antenna itself faulty ? ● Try using a booster , as signal transmission may be low.
	PP3	Distorted picture and noisy sound	● Turn off or disconnected the booster if it is in use , as broadcast signals may be too strong.
	PP4	Dotted Lines / Stripes in the picture.	If the TV or Antenna suffers interference from other equipment , stripes or noise may appear in the picture. ● Keep the TV away from noise sources such as personal computer , amplifier , cars, motorcycles or hair-dryers. ● If the aerial suffers interference from a radio tower or high-voltage wire , contact the local dealer.

	CODE	SYMPTOM	COUNTERMEASURES
Poor Picture	**PP5**	Stripe noise.	● Check the coaxial cable connected with the TV is not oxidized ● Do not use 300 ohm twin lead cables as interference may occur ● It is recommended to use a 75 ohm coaxial cable (not supplied) to get premium quality picture. ● Keep the aerial cable away from other connecting cables.
	PP6	No color, too light or too dark	● Adjust the picture settings — APC, Brightness, Contrast, Saturation , Color Temp. ● Press **RESET** button on remote control to return all settings to factory settings.
	PP7	Poor picture on particular channel.	● Use "**Fine Tune**" in OSD to manually adjust a particular channel for optimal reception.
No Sound or Noisy Sound	**NS1**	Good picture, no sound	● Make sure the headphone is not connected. (option) ● Check audio connections between Equipment & LCD-TV. ● Press **MUTE** or **VOL Up** to cancel the muting.
	NS2	Noisy noise	● Make sure that the antenna connected is 75 ohm coaxial cable (not supplied) , not 300 ohm twin lead cables . ● Keep the antenna cable away from other connecting cables. ● Press **MTS** button to select "Mono" which will reduce the noise. ● Adjust **BASS** or **TREBLE** properly on remote control.
PC	**PC1**	PC display is Not Full Screen	● Select "**Auto Image**" in OSD menu to optimize the image . ● If executing Auto Image Adjust still can not achieve full screen display, adjust "**V. Position"** and "**H. Position"** in PC mode
	PC2	Horizontal Noise or Color pattern is not uniform	● Select **"Auto Image"** in OSD menu to optimize the image . ● If still no good , adjust **"Phase"** in OSD menu
	PC3	"**Out of Range**" message	● Maximum PC resolution supported is 1280x768 , so the screen will appear "Out of range" at higher resolution. ● Reduce the resolution to1280x768 from the PC. **Note** 20″ panel resolution is 640 x 480.
	PC4	No Sound	● Make sure PC audio Input is well connected.
	PC5	After **"No Signal "** has appeared on PC mode for a while, the view disappears and the **LED Indicator** turns from Green to**"Amber"** .	● Press any key on keyboard or move the mouse to activate the PC , because the PC may go to power saving status. ● Check if the D-sub or DVI connector (Cable) is disconnected or loose.

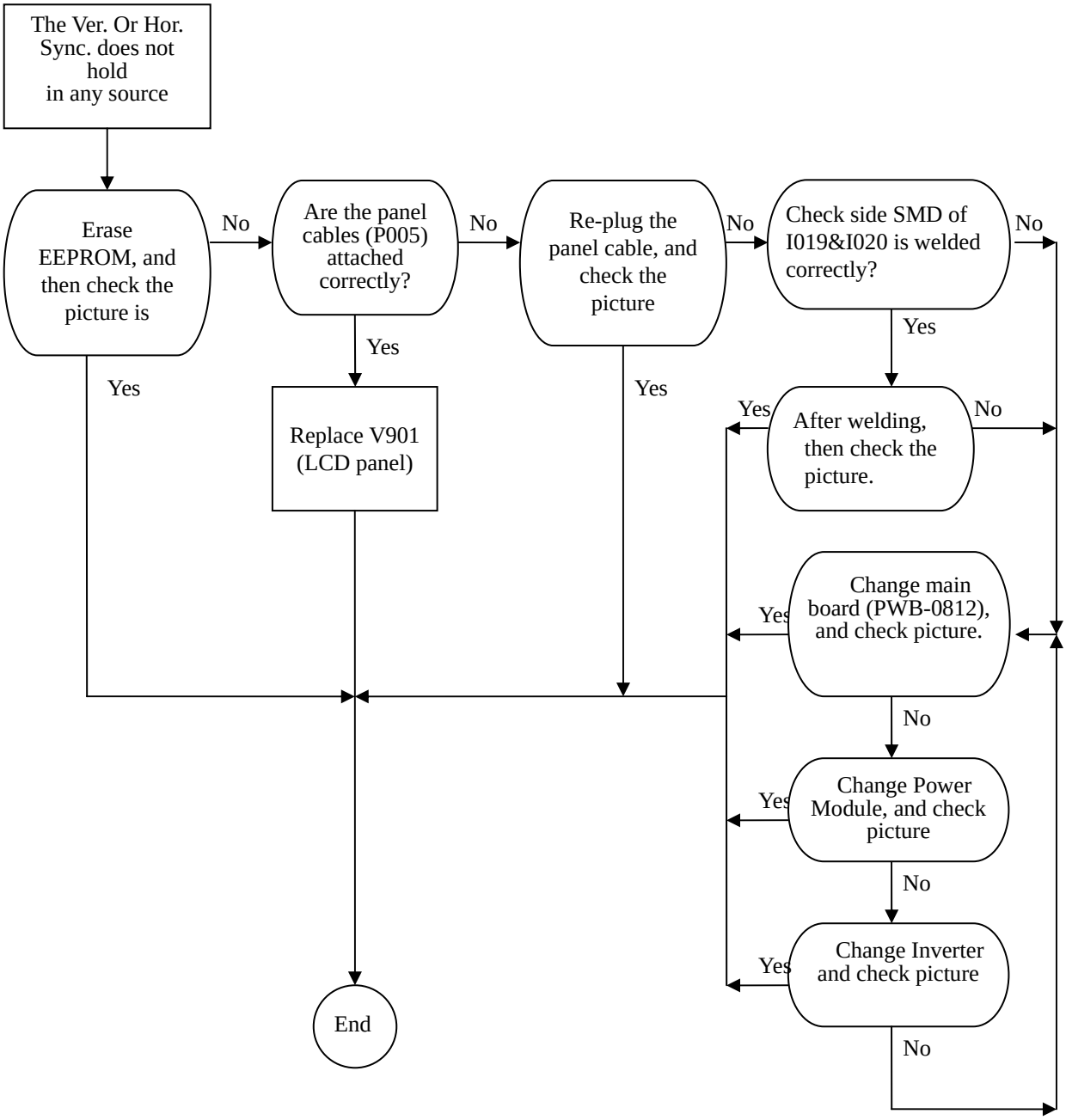
	CODE	SYMPTOM	COUNTERMEASURES
Remote Control	**RC1**	Remote Control does not work	● Make sure the batteries in remote control are not flat ● Check the polarity of the batteries ● Use the remote control in the front of the TV or from less than seven meters away. ● make sure the Remote Sensor Window is not under strong lighting.
	RC2	Can not change channels with the remote control	● Press **TV** button to switch to TV mode.
Picture Halt / Abnormal	**PH1**	Picture suddenly **Stops Responding** or **abnormal**.	● Press **RESET** button on remote control . ● Unplug and then plug the Power Cord of the TV from the AC outlet.
	NG1	Issues can't be solved.	● If the picture still abnormal, execute " **Clear EEPROM**". **STEPS :** 1. Press POWER key to turn off the LCD-TV. 2. Press CH▽ key, then press Power key of remote control to turn on the LCD-TV, after 3 seconds, then release CH▽ key. 3. When「INITIAL EEPROM」appears on the screen, on the INTTAL EEPROM is complete. Note : Remind user that every setting will return to factory preset mode including PIN of parental control (PIN :1234), channel setting.
Note	1. CV and PC including D-sub or DVI modes, are not available on Sub-display of PIP . 2. If main display is CV , PIP mode is not available.		

8.2 Troubleshooting Flow Chart

（1）Power Start NG



(2) **Picture abnormal**



Steps to clean EEPROM

1. Press POWER key to turn off the LCD-TV.

2. Press CH▽ key, then press Power key of remote control to turn on the LCD-TV, after 3 seconds, then release CH▽ key.

3. When「INITIAL EEPROM」appears on the screen, on the INTTAL EEPROM is complete.

Trouble Shooting

1. MCU platform using Topro TP2808
2. Label：V30DMBT-U21

WBK	→Custom
V30D-U21	→Model NO.
MP 1.1	→Edition

3. Check Sum：3E86H

BIOS Version：V30DMBT-U21 WBK-MP 1.1 12/21/04

EEPROM INITIAL：Power + Channel Down

4. Enter Factory Mode：Power + Menu Key
5. Leave Factory Mode：Power off
6. Self – Test Mode (for Burn in)：Push Menu + Channel Up + Power ON、Key at same time, and then loose Power On Key first、Keep push Menu and Channel Up Keys for 2 seconds、test pattern will appear on the screen(Self-Test Mode can't be disable by disconnecting Power Supply, it must thru. Power Key).
7. Disable Self-Test Mode：Push Power Off/On Key

9. Electronic Circuit Description

9.1 Main Board Circuit

(1) DVI-I signal

Refer to circuit diagram of PWB-0812

The analog RGB video input signals are supplied through the DVI-I cable which is terminated at P022. These three input signals are approximately 0.7Vpp in amplitude. R374、R301 and R327 give resistance of 75Ω respectively for impedance matching. These R、G、B video signals are ac coupled via 0.047U capacitor C021、C016 、C013 and then fed into the I001 AD converter (MST9883C) at Pin54、49 and 43 respectively. These analog R、G、B video signals are converted to the their digital forms in I001. The outputs of digital data including 8 bits red、8 bits green、8b bits blue signals are assigned at Pin70 ~ 77、Pin 2 ~ 9 and Pin 12 ~ 19 of I001，and applied to Port A of I019 (Scaler：TP6761) Hsync & Vsync are applied to I001 (MST9883C) #30 & #31 and the processed signal taken from #66 & #64 are fed into I019 (TP6761) #18、#19..

CLK signal is taken from I001 (MST9883C) #67 and applied to I019 (TP6761) #156.The LCD-TV is designed to have the DDC/2B FUNCTIONS. Communication between the LCD-TV and computer for DDC is via P022 (DVI-I connector) #20、#21 which are defined as SCL、SDA signals. The computer will read out the EDID from the I011 (EEPROM) and the EDID data is written into the EEPROM in the factory during production.

The digital input signal through DVI-I cable which is terminated at P022. Input signal from TMDS low voltage differential signal input data pairs Pin 80、81、85、86、90、91 and TMDS signal input clock pairs 93、94 are fed into I040 (SiI 169).

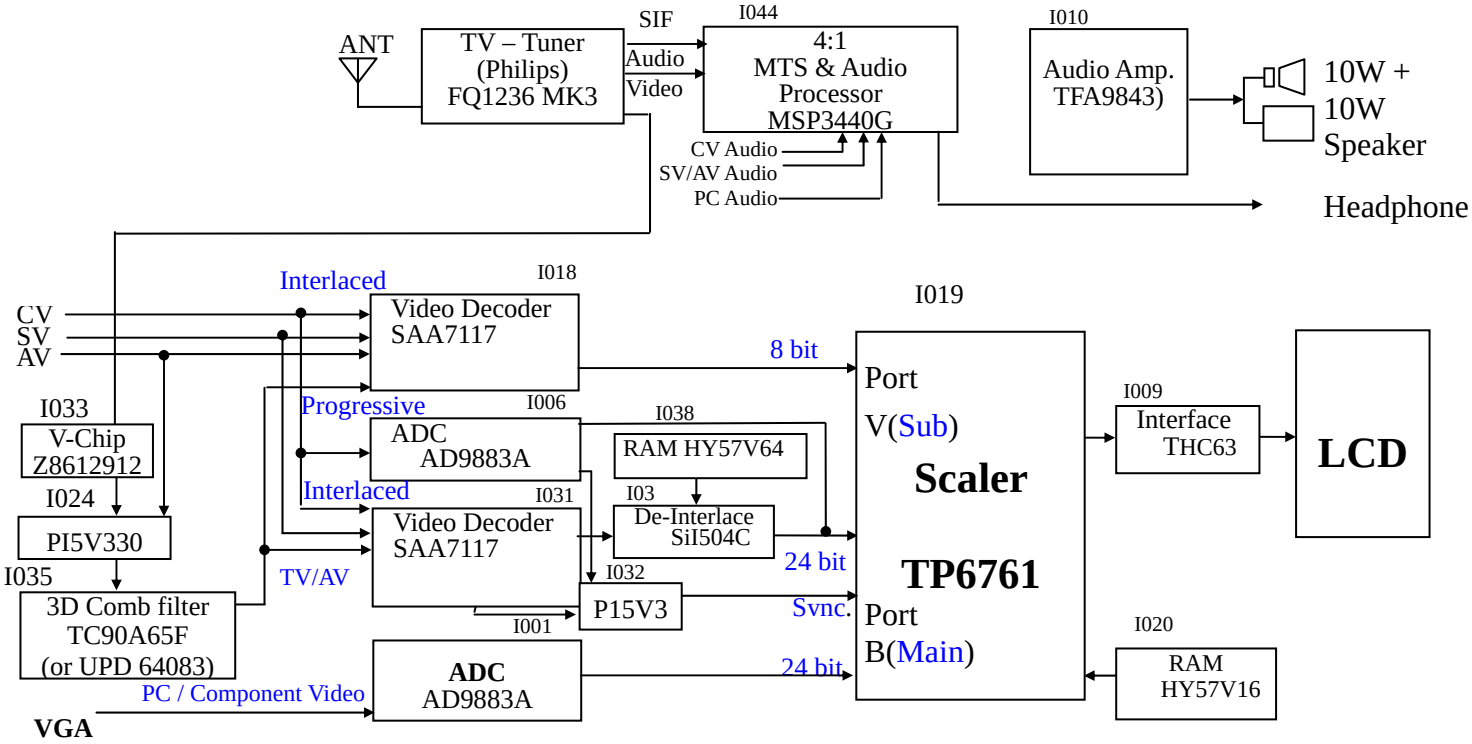
The I040 (SiI 169) supports High-bandwidth Digital Content Protection (HDCP) by decrypting the pixel data stream received from an HDCP transmitter in the video host system. HDCP provides a secure method of delivering high-definition content between a host (such as a set-top box, DVD player, or D-VHS player) and display (such as an HDTV, projector, or A/V receiver).

The SiI 169 comes pre-programmed with a production set of HDCP keys in its internal EEPROM. In this way the keys are provided the highest level of protection as required by the HDCP specification.

(2) AV Signal

Refer to the page 8 in circuit diagram of PWB-0812.

V30DXXX / V27DXXX can process 4 different Video signals，including Composite Video (CVBS)、Separate Video (S-Video) and Component Video (YUV). Component Video also includes two types Y Cb/Cr and Y Pb/Pr, and I018,I031 SAA7117 is 16 channels analog input. There are 4 A/D in it's I/O port, So it can match this model. Examples for different of input source signals are listed one by one as follow. (please refer to the circuit diagram)：



A. TV：

i. TV signals enter from ANT to Pin#1 of UT01 FQ1236 MK3 Tuner. Pin #14 output Audio MPX signal, while Pin#12 output TV (CVBS) Video signal.

ii. Audio MPX signal does MTS demodulation from I044 (I044 MSP3440G). It can output Audio signal including Mono、 Stereo、Sap and so on. Then through I010 (Audio Power Amp) to Speaker.

iii. After the Video signal to the V-Chip circuit (I025 NJM2244、I033 Z86129、I030 74HC126) to modulate it, output to I031 SAA7117 Video Decoder (Main) or I018 SAA7117 Video Decoder (Sub) circuit to do modulation and Video source exchanges for CVBS signal type. Then CVBS signal changes to the ITU-656 type by I031 or I018 and outputs to I019 Scaler to process. 8 Bit belongs to Data parts, and H sync, V sync, CLK directly connect to Pin#162、163、164 of Scaler. Then R、G、B signal respectively output six bits to panel.

B. CV (Y Pb Pr)：

Entering from P50 signal, then enters Pin#43、48、54 of AD9883 passed by the matching impedance resister and capacitance. It converts to RGB signal of YUV by I006 and passes to Port B of I019 by six row-resister RP08 ~ RP12. Then output to panel.

C. Audio：

The rest of Audio source all connect Audio Processor (I044：MSP3440) to each left and right voice channels. Controlled by MCU (I012) and selected through I044, just output one source to Audio Power Amp (I010： TFA9843) to Speaker.

(3) MCU

Microcontroller
Refer to circuit diagrams Sheet 5 of 11.
The microcontroller I012 Topro TP2808 is running with the clock based on 14.318 MHz by X003.

C127 and R096 constitute a reset circuit. It properly the necessary active high reset signal for I012 (Microcontroller) to operator properly. This reset signal is result that is fed into I012 (Pin#10) to provide the necessary system reset for the proper operation of I012.

The signal IR- DAT (Pin#15 of I012) is used for Infrared Receiver. If the IR Received some signal，I012 will send interrupt signal by Pin #2、3 (MSDA、MSCL) to control any chip.

The signal designated AD0 ~ AD7 (Pin36 ~ 43 of I012) are data signal used for transferring data between I012 and I019.
The signal TXD and RXD (Pin#13、11 of I012) are used for debugging during firmware.
I013 (24LC16B) provides necessary non-volatile storage for system operating variables and parameters. It is controlled by I012 via MSDA and MSCL signal, witch pulled-up to +5V voltage with R092 and R093 (10KΩ).

(4) Panel interface

Refer to circuit diagrams Sheet 6 of PWB-0812
The signals of panel interface are all from I019 to the LCD Panel.
The signal FPVCC (Pin#96 of I019) and MMTB3904 (Q003) control the +5V power to the LCD Panel.
The signals FPBACK and DVD0 (Pin#95、62 of I019) are used for the control of backlight's On / Off state and Panel luminance.
The signals SHFCLK、PDE、PVYSNC、PHSYC come from Pin#90 ~ 94 of I019, and then fed into P005. These four signals are used for panel image display controls.

Pin#A1BLU0 ~ 7、A1GRN0 ~ 7、A1RED0 ~ 7 and B1BLU0 ~ 7、B1GRN0 ~ 7、B1RED0 ~7 are data output from I019 to P005 and P802(to LCD Panel). They are buffered by LP02,LP04,LP06,LP08,LP10,LP12 and filtered associated capacitors. These outputs are organized into even and odd connectors, each with 18 bits.

9.2 Keyboard Circuit & IR Lens board

The keyboard and IR lens circuit are shown in chapter 10-3 of the circuit diagrams.

9.3 Inverter Circuit

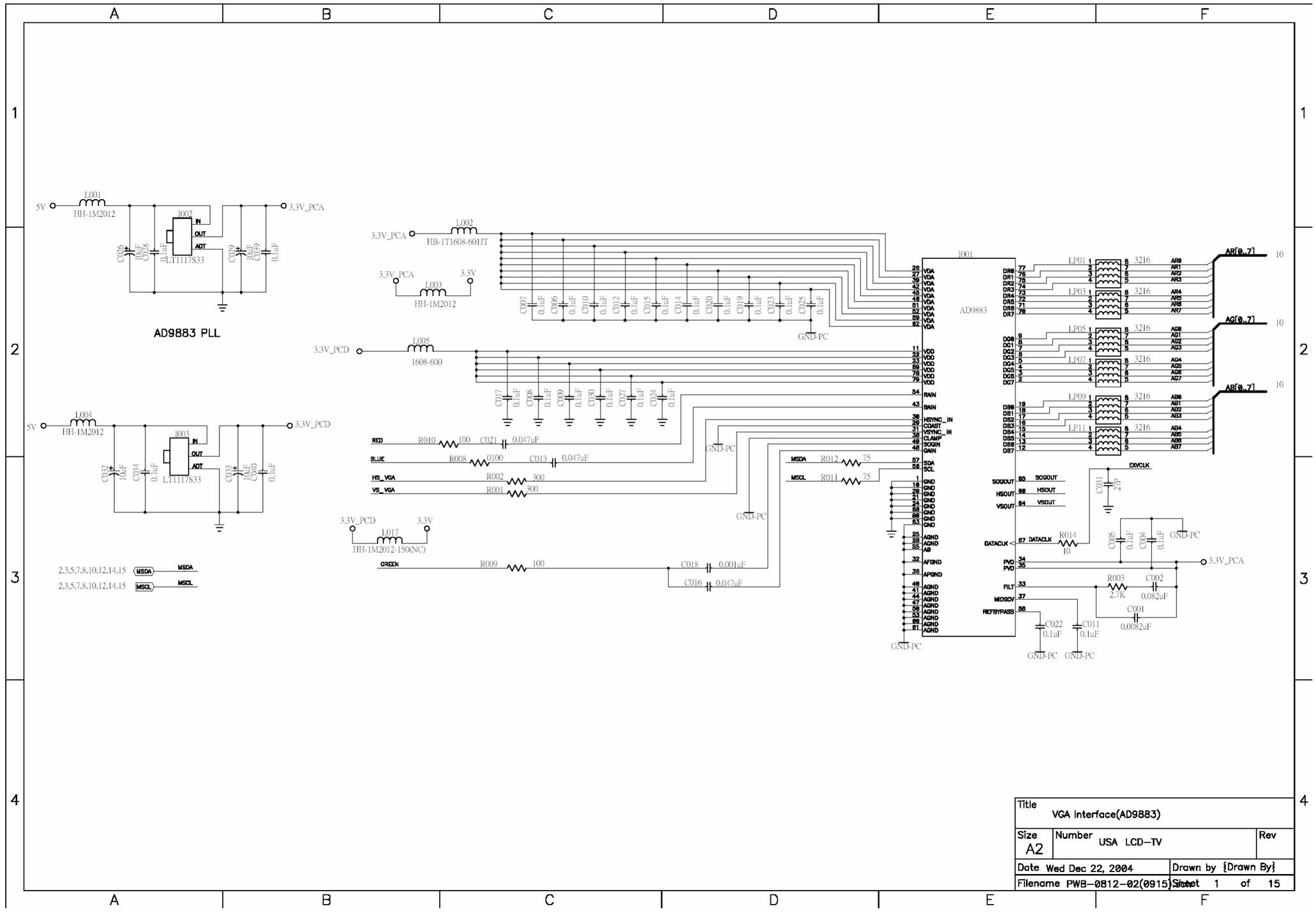
The inverter board is fed with +24V through P802#1~#5 on Power module and offers 4.1ma (typical) to each lamp of backlight in LCD panel.
The brightness adjusted in OSD menu is to control the voltage at P802#11 while this voltage is offered by I019 (Scaler：TP6761)#62.
The range of the voltage is from 0V to 3.3V. If the voltage of P802#11 is 0V, the screen will get light; if it's 3.3V, the screen will get dim. It means that the different voltage will change the lamp current through the inverter to make the screen lighter or dimmer.

9.4 Power Module

The Power Module circuit shown in chapter 10-6. The Power Module provide +5V +24V though P802 for whole system.

10. Circuit Diagram

PCB Main Board Circuit



I006
AD9883
3.3V_CV_A
3.3V_CV_D
3.3V
L032
HH-1M2012-150
L020
HB-1T1608-601JT
L014
HH-1M2012-150(NC)
L030
HB-1T1608-601JT
GND-V
RED_CR
BULE_CB
GREEN_Y
COAST
MSDA
MSCL
AD9883B
DCLK_9883
DATACLK
BRV[0..7]
BBY[0..7]
BGU[0..7]
10,13
RP07
RP08
RP09
RP10
RP11
RP12
100X4
HSOUTB
SOGOUTB
VSOUTB
HS_9883
DHS_9883
DVS_9883
DCLK_9883
AD9883 PLL
AD9883 AD
LT1117S33
5V
L011
HH-1M2012 -150(NC)
L015
HH-1M2012-150
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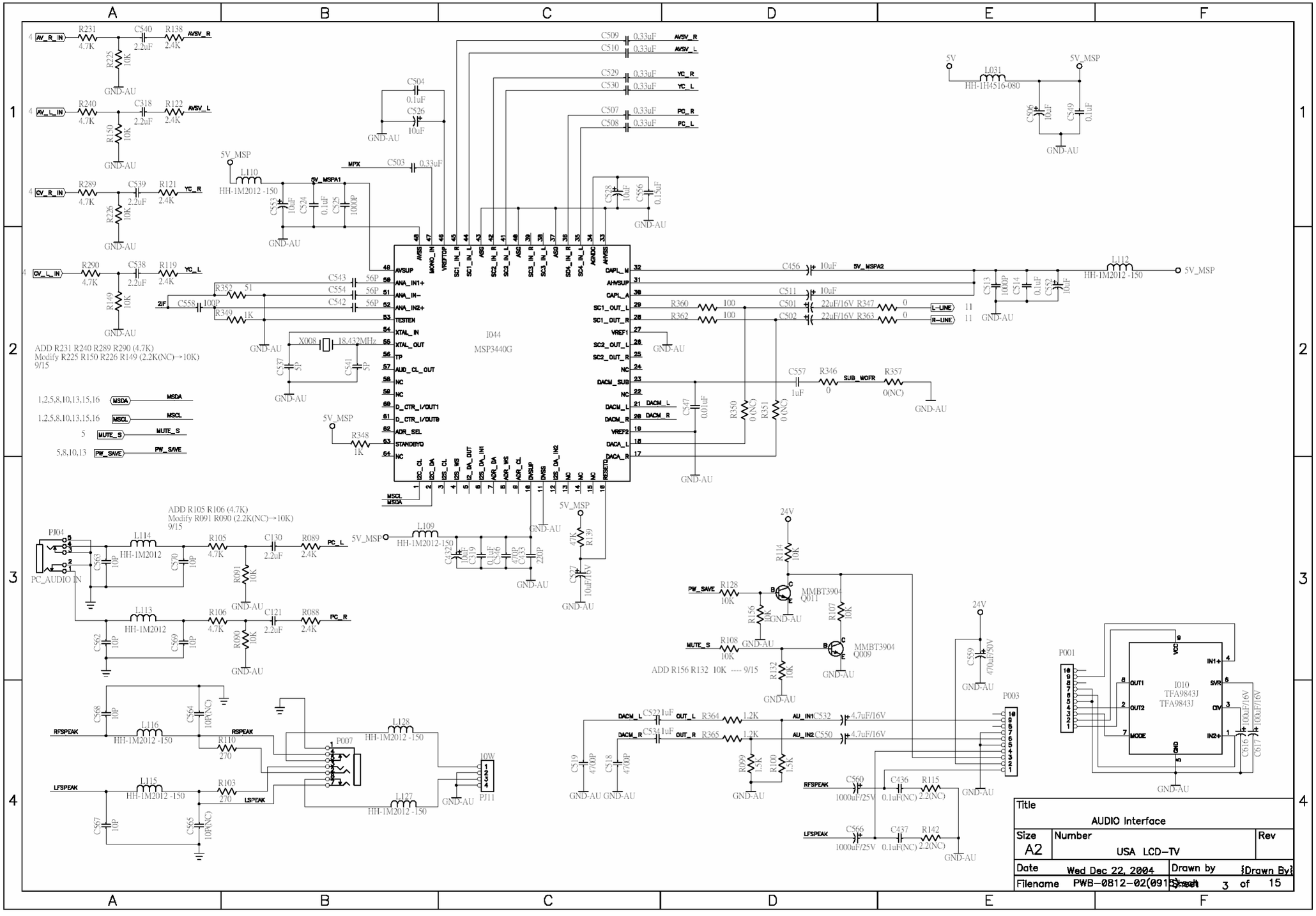
YPrPb Interface (AD9883)
Size
A2
Number
USA LCD-TV
Rev
Date
Wed Dec 22, 2004
Drawn by
{Drawn By}
Filename
PWB-0812-02(0915).sch
Sheet
2
of
15


ADD R231 R240 R289 R290 (4.7K)
Modify R225 R150 R226 R149 (2.2K(NC)→10K)
9/15
ADD R105 R106 (4.7K)
Modify R091 R090 (2.2K(NC)→10K)
9/15
ADD R156 R132 10K ---- 9/15
I044
MSP3440G
I010
TFA9843J
TFA9843J
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AUDIO Interface
Size
A2
Number
USA LCD-TV
Rev
Date
Wed Dec 22, 2004
Drawn by
{Drawn By}
Filename
PWB-0812-02(091
Sheet
3
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15

NEC-AV
AV-COM
L045
HH-1M2012
R271
56
SAA_AV
C338
10P(NC)
C368
10P(NC)
BAV99
D038
R272
100
5V
GND-V
AV_L
L071
HH-1M2012
AV_L_IN
C373
10P(NC)
Y
L094
HH-1M2012-150
Y_IN
R278
27
SAA_Y
C374
10P(NC)
C364
10P(NC)
BAV99
D045
R277
47
S_LUM
L040
HH-1M2012
R274
27
SAA_LUM
C337
10P(NC)
C363
10P(NC)
BAV99
D039
R273
47
AV_R
L118
HH-1M2012
AV_R_IN
C365
10P(NC)
CB/PB
L087
HH-1M2012-150
CB_IN
R279
27
SAA_CB
C369
10P(NC)
C370
10P(NC)
D046
BAV99
R280
47
S_CHR
L039
HH-1M2012
R276
27
SAA_CHR
C375
10P(NC)
C376
10P(NC)
BAV99
D040
R275
47
CV_R
L073
HH-1M2012
CV_R_IN
C366
10P(NC)
CR/PR
L092
HH-1M2012-150
CR_IN
R281
27
SAA_CR
C371
10P(NC)
C372
10P(NC)
D047
BAV99
R282
47
CV_L
L070
HH-1M2012
CV_L_IN
C367
10P(NC)
P050
SLOT-30P
SAA_TV
SAA_AV
SAA_LUM
SAA_CHR
SAA_Y
SAA_CB
SAA_CR
AV_R_IN
AV_L_IN
CV_R_IN
CV_L_IN
8,9,12
8,9,12
8,9
8,9
2,8,9
2,8,9
2,8,9
3
3
3
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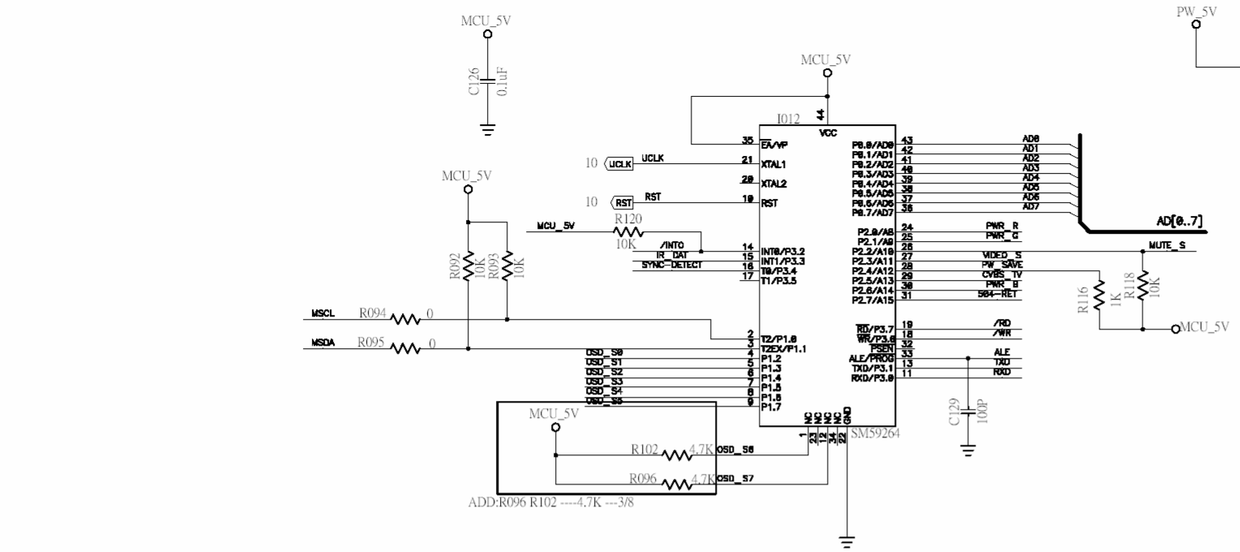
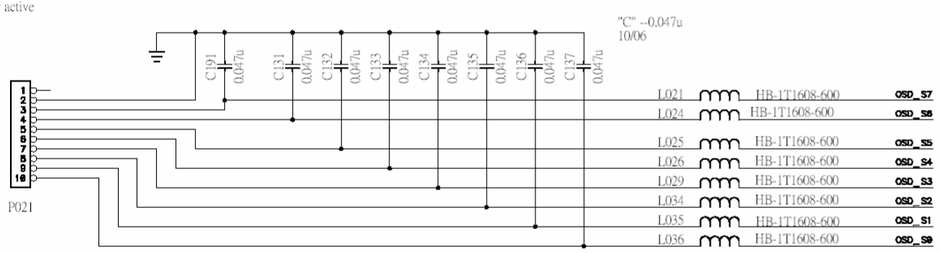
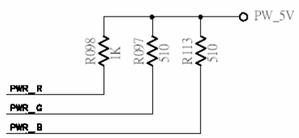
Size A2
Number USA LCD-TV
Rev
Date Wed Dec 22, 2004
Drawn by {Drawn By}
Filename PWB-0812-02(0915).Sch
Sheet 4 of 15



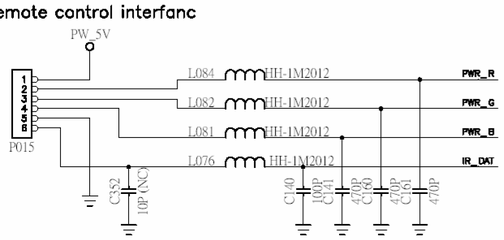
Keypad interface

low active

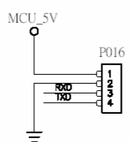


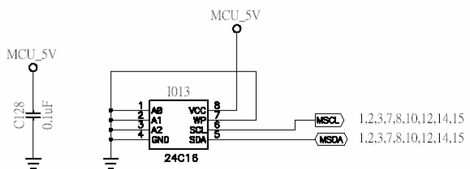


Remote control interfanc



Debug part





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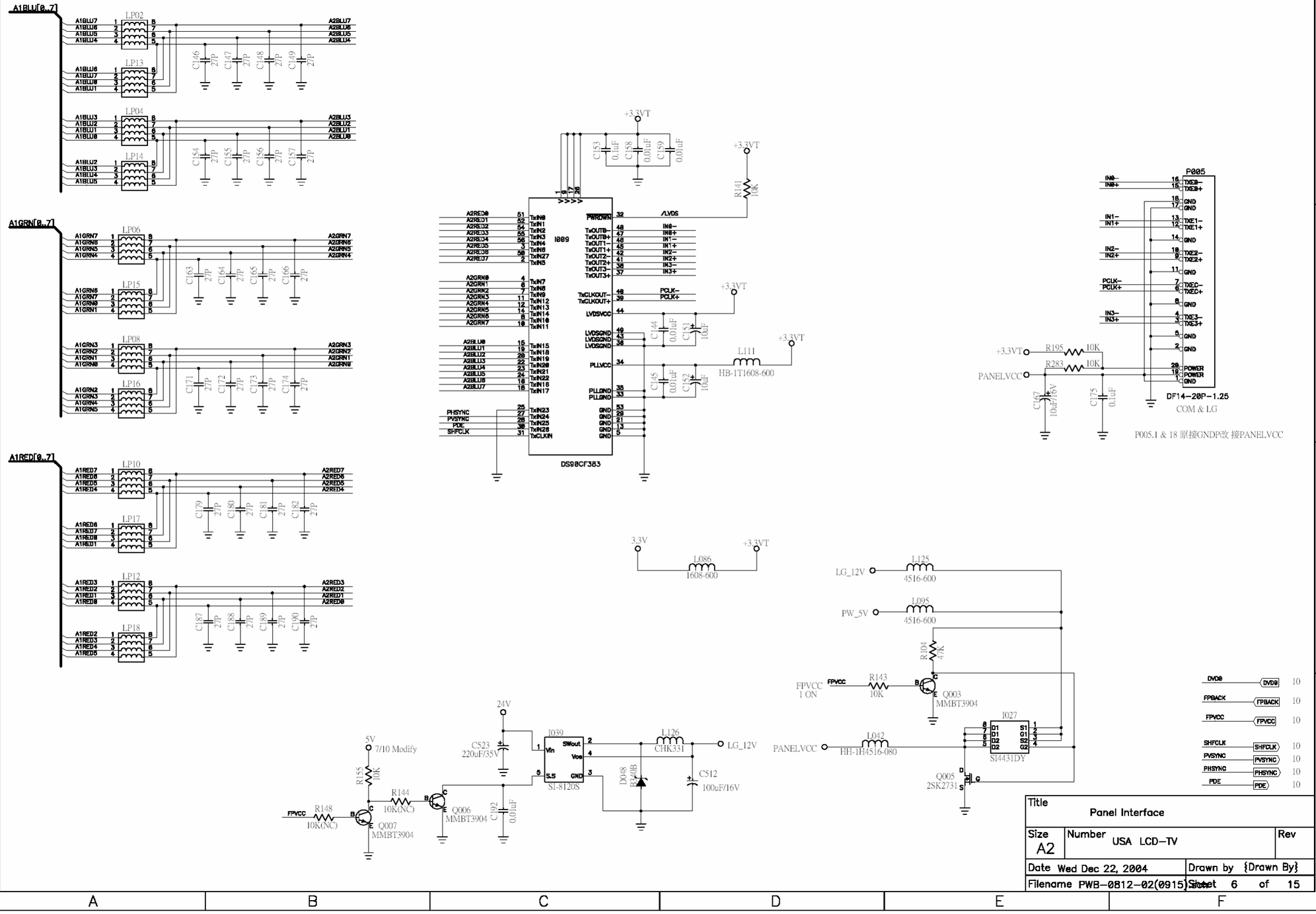
Date Wed Dec 22, 2004		Drawn by {Drawn By}	
Filename PWB-0812-02(091		Sheet 5 of 15	


A1BLU[0..7]
A1GRN[0..7]
A1RED[0..7]
LP02
LP13
LP04
LP14
LP06
LP15
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LP16
LP10
LP17
LP12
LP18
C146 27P
C147 27P
C148 27P
C149 27P
C154 27P
C155 27P
C156 27P
C157 27P
C163 27P
C164 27P
C165 27P
C166 27P
C171 27P
C172 27P
C173 27P
C174 27P
C179 27P
C180 27P
C181 27P
C182 27P
C187 27P
C188 27P
C189 27P
C190 27P
+3.3VT
C153 0.1uF
C158 0.01uF
C159 0.01uF
R141 10K
I009
DS90CF383
/LVDS
PCLK-
PCLK+
C144 0.01uF
C161 10uF
C145 0.01uF
C162 10uF
L111
HB-1T1608-600
3.3V
L086
1608-600
L125
4516-600
LG_12V
L095
4516-600
PW_5V
R104 47K
FPVCC
1 ON
R143 10K
Q003
MMBT3904
I027
SI4431DY
PANELVCC
L042
HH-IH4516-080
Q005
2SK2731
R195 10K
R283 10K
C167 10uF/16V
C175 0.1uF
P005
DF14-20P-1.25
COM & LG
P005.1 & 18 原接GNDP改 接PANELVCC
24V
5V
7/10 Modify
R155 10K
R144 10K(NC)
R148 10K(NC)
Q006
MMBT3904
Q007
MMBT3904
C523 220uF/35V
I039
SI-8120S
C102 0.01uF
L126
CHK331
LG_12V
D048
B340B
C512 100uF/16V
DVDB
FPBACK
FPVCC
SHFCLK
PVSYNC
PHSYNC
PDE
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Panel Interface
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Rev
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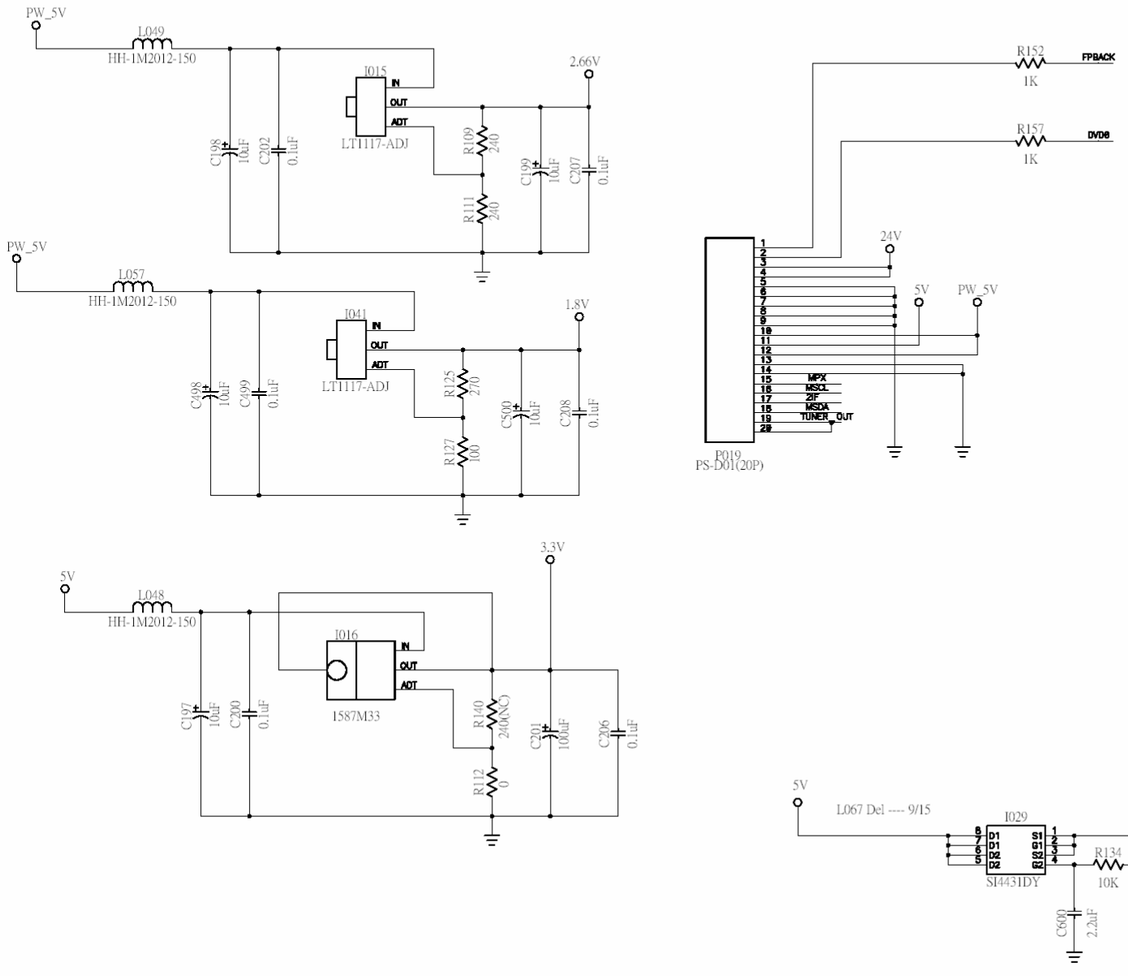
Sheet 6 of 15



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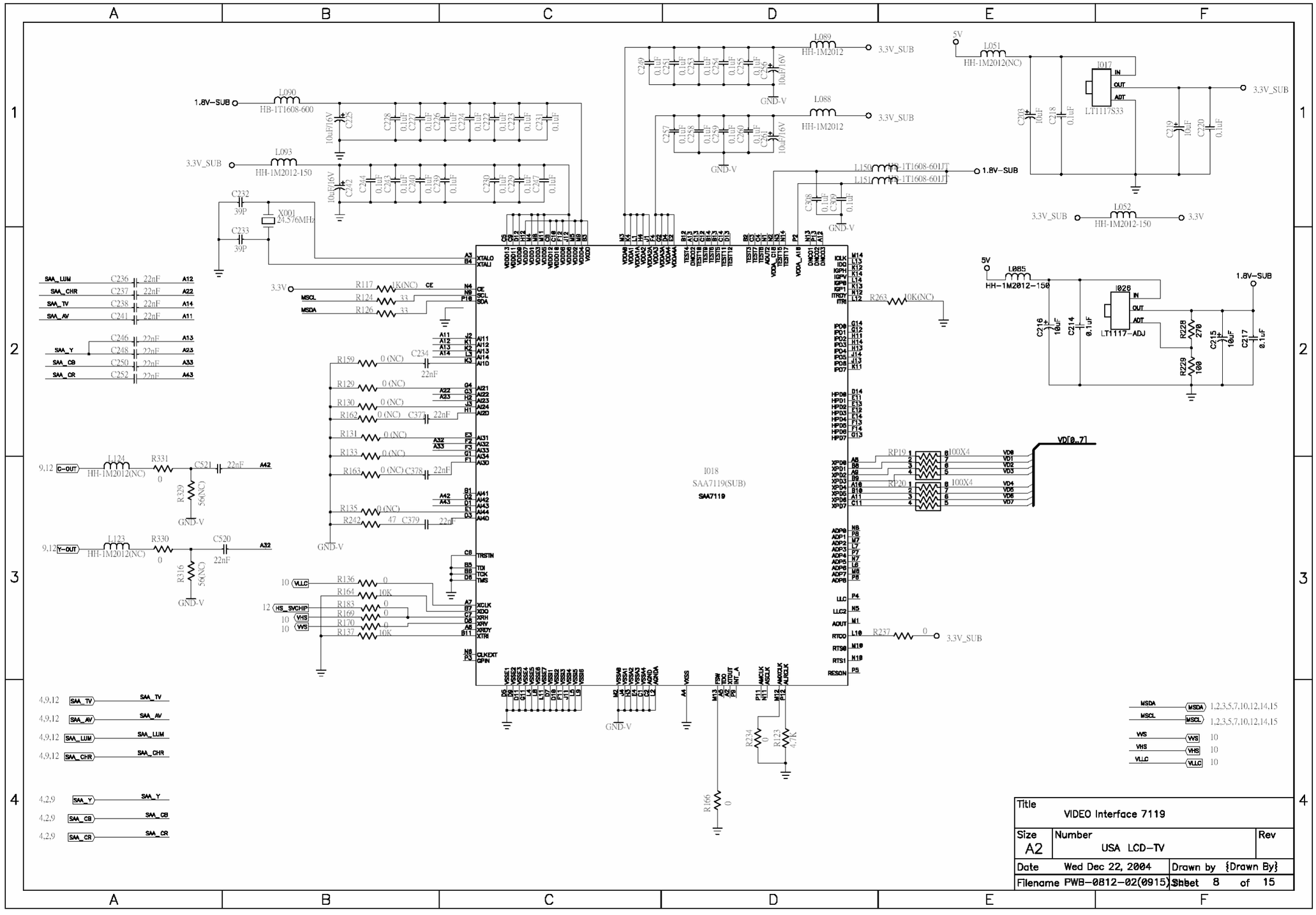
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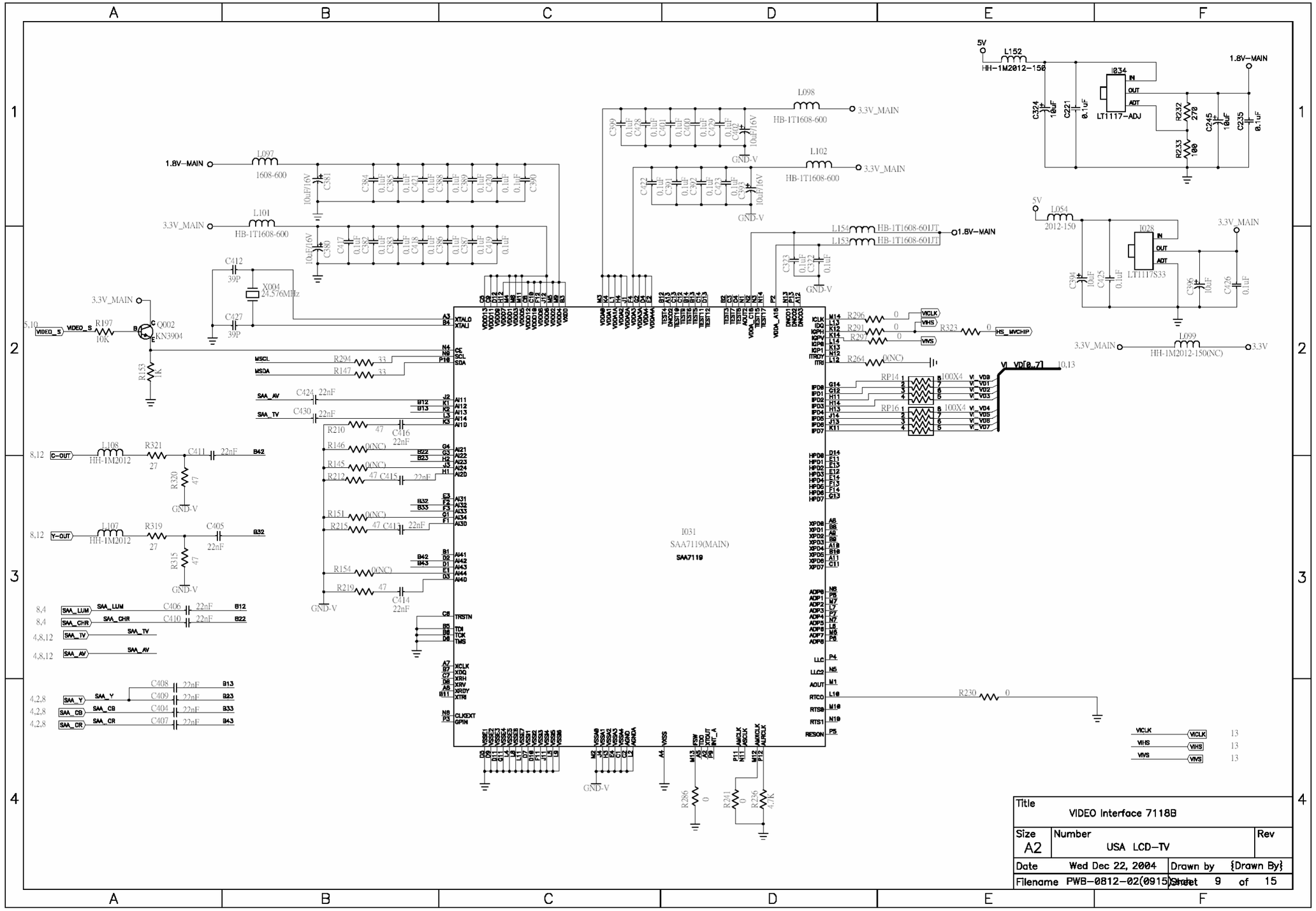
SAA7119(SUB)
SAA7119
VIDEO Interface 7119
USA LCD-TV
Wed Dec 22, 2004
PWB-0812-02(0915)
Sheet 8 of 15


I031
SAA7119(MAIN)
SAA7119
I034
LT1117-ADJ
I028
LT1117S33
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A2
Number
USA LCD-TV
Rev
Date
Wed Dec 22, 2004
Drawn by
{Drawn By}
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PWB-0812-02(0915)
Sheet
9
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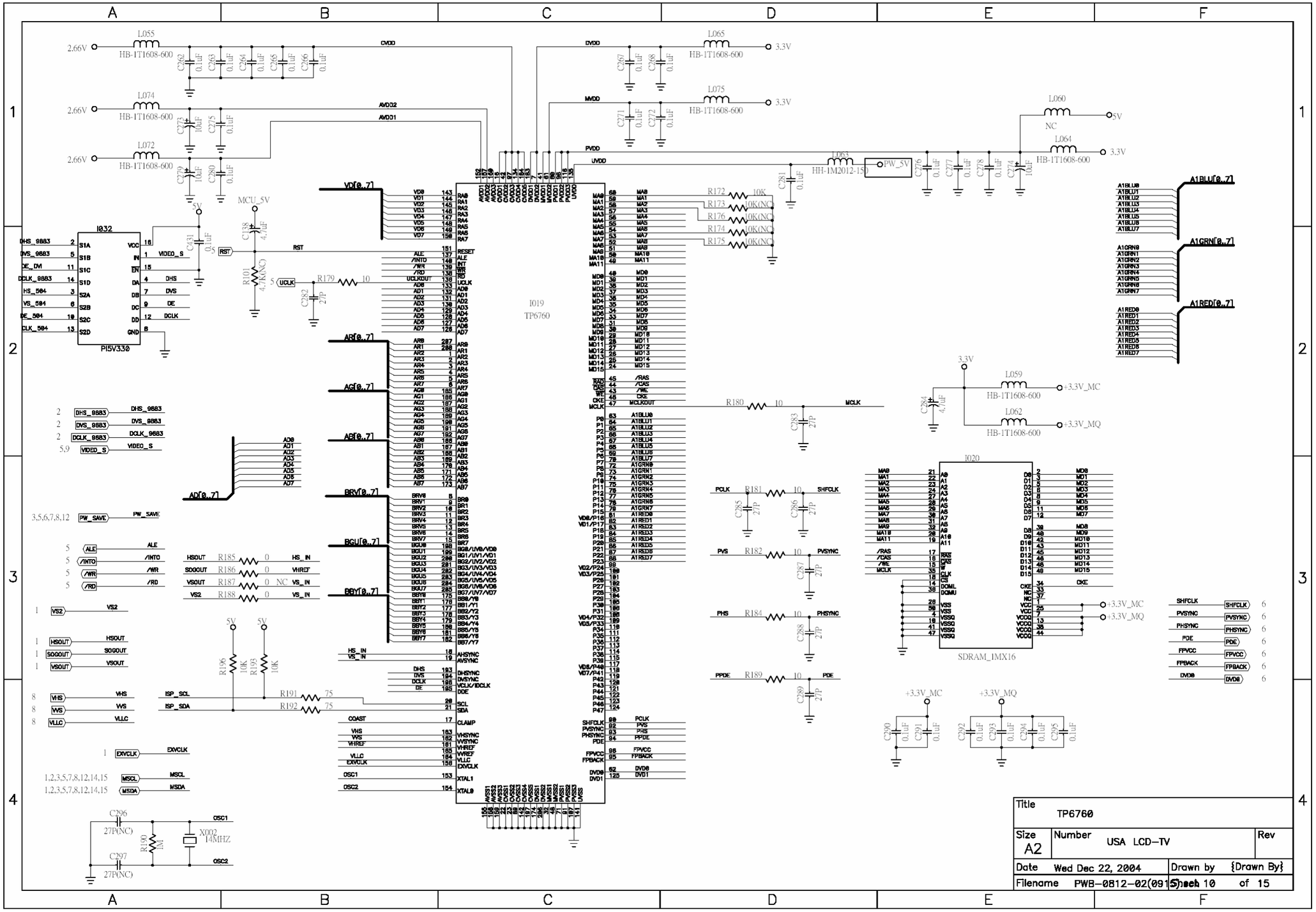
15


I019
TP6760
I032
PI5V330
I020
SDRAM_IMX16
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TP6760
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A2
Number
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Rev
Date
Wed Dec 22, 2004
Drawn by
{Drawn By}
Filename
PWB-0812-02(091)
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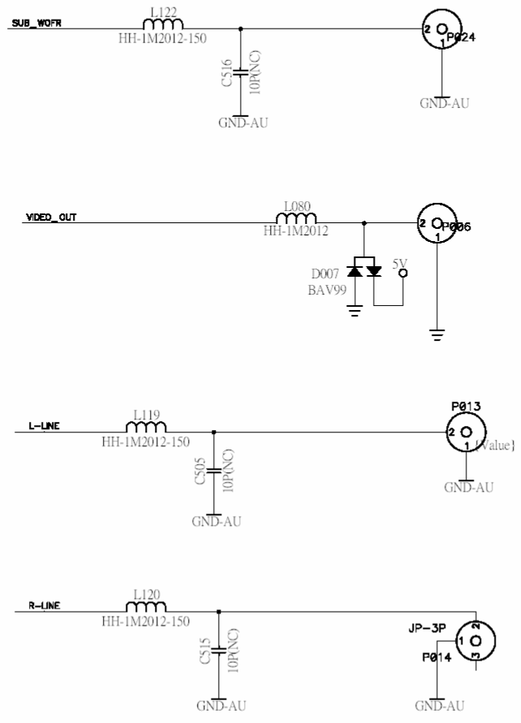

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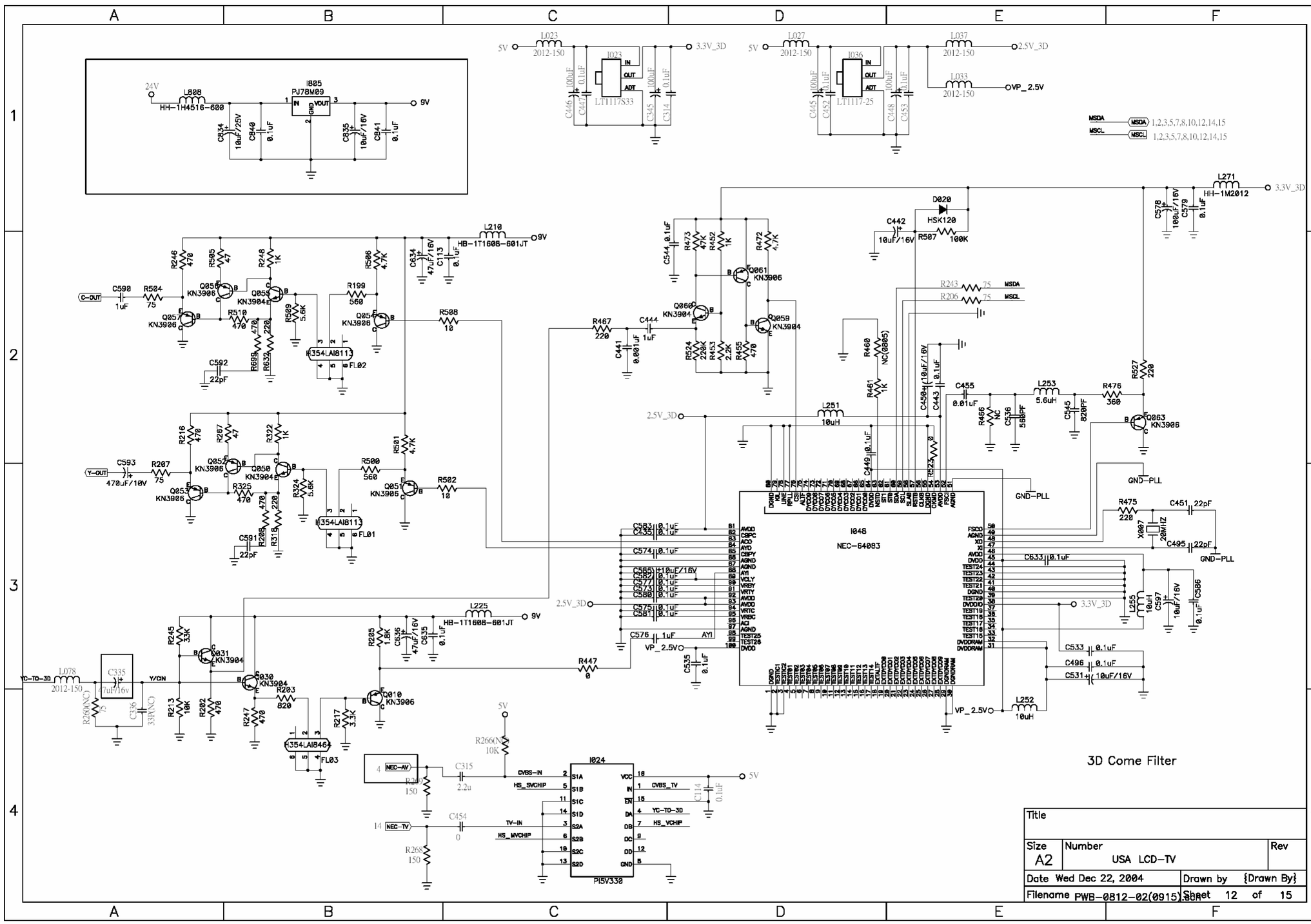
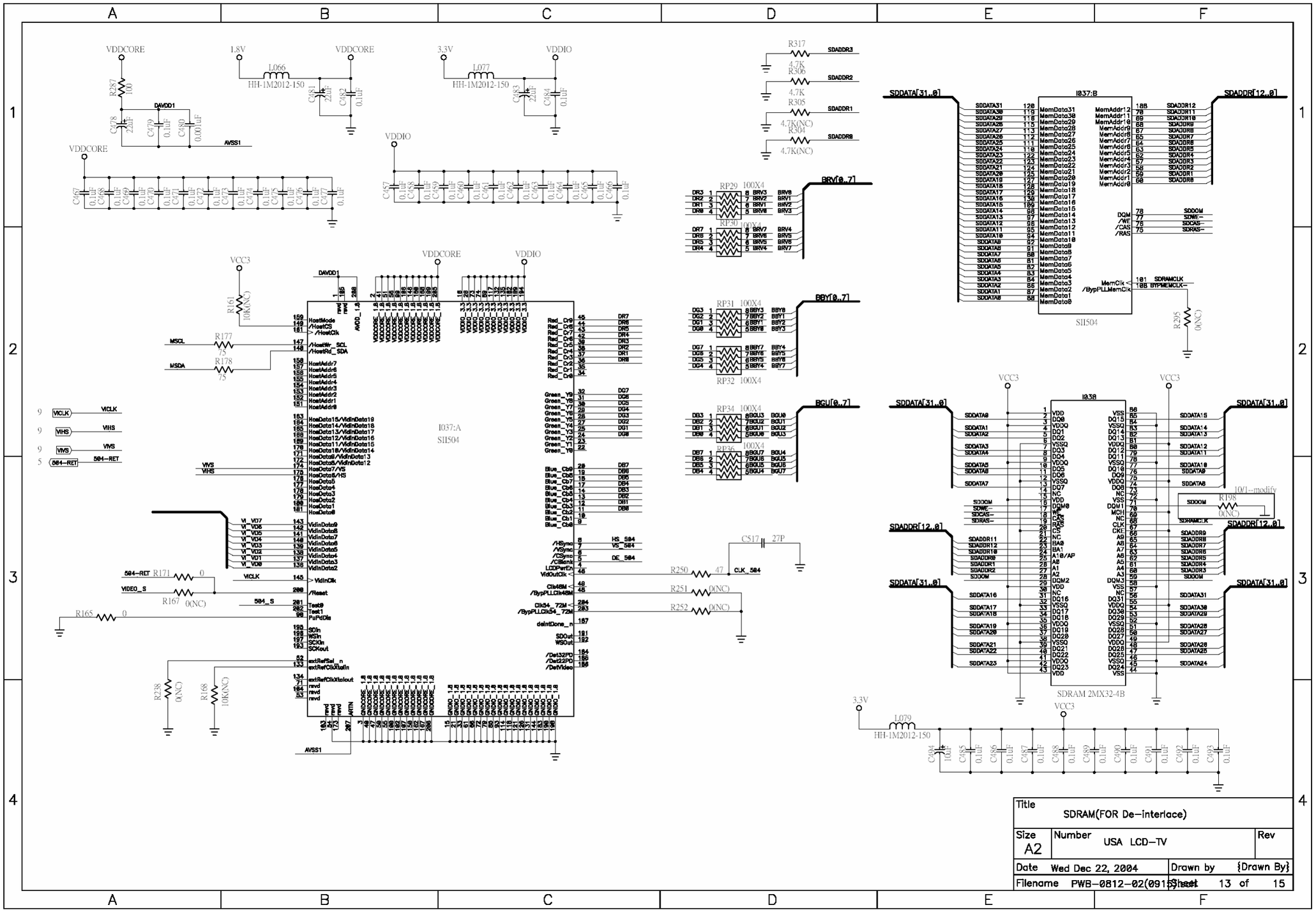
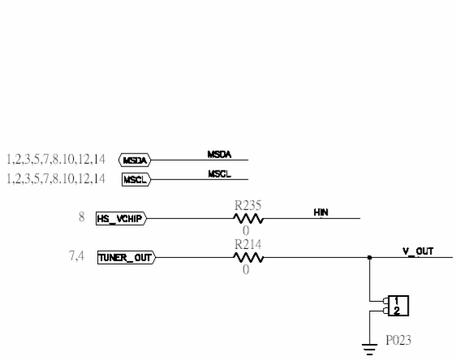
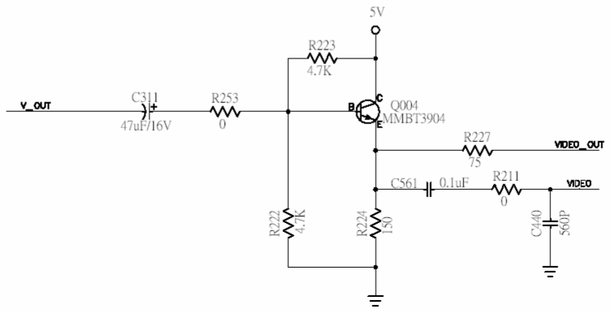
Filename	PWB-0812-02(0915).Sch	Sheet 11 of 15

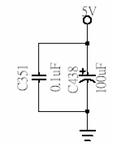

3D Come Filter
Title
Size
A2
Number
USA LCD-TV
Rev
Date Wed Dec 22, 2004
Drawn by {Drawn By}
Filename PWB-0812-02(0915).sch
Sheet 12 of 15
I048
NEC-64083
I024
PI5V330
I805
PJ78M09
I023
LT1117S33
I036
LT1117-25
I354LAI8113
I354LAI8464
L808
HH-1H4516-600
L210
HB-1T1608-601JT
L225
HB-1T1608-601JT
L271
HH-1M2012
L078
2012-150
L023
2012-150
L027
2012-150
L037
2012-150
L033
2012-150
L251
10uH
L252
10uH
L253
5.6uH
L255
10uH
D020
HSK120
Q061
KN3906
Q060
KN3904
Q059
KN3904
Q063
KN3906
Q057
KN3906
Q055
KN3904
Q054
KN3906
Q053
KN3906
Q052
KN3906
Q050
KN3904
Q051
KN3906
Q031
KN3904
Q030
KN3904
Q010
KN3906
X007
20MHZ
C-OUT
Y-OUT
YC-TO-3D
Y/CIN
NEC-AV
NEC-TV
CVBS-IN
HS_SVCHIP
TV-IN
HS_MVCHIP
CVBS_TV
YC-TO-3D
HS_VCHIP
GND-PLL
VP_2.5V
3.3V_3D
2.5V_3D
5V
9V
24V
MSDA
MSCL
1,2,3,5,7,8,10,12,14,15

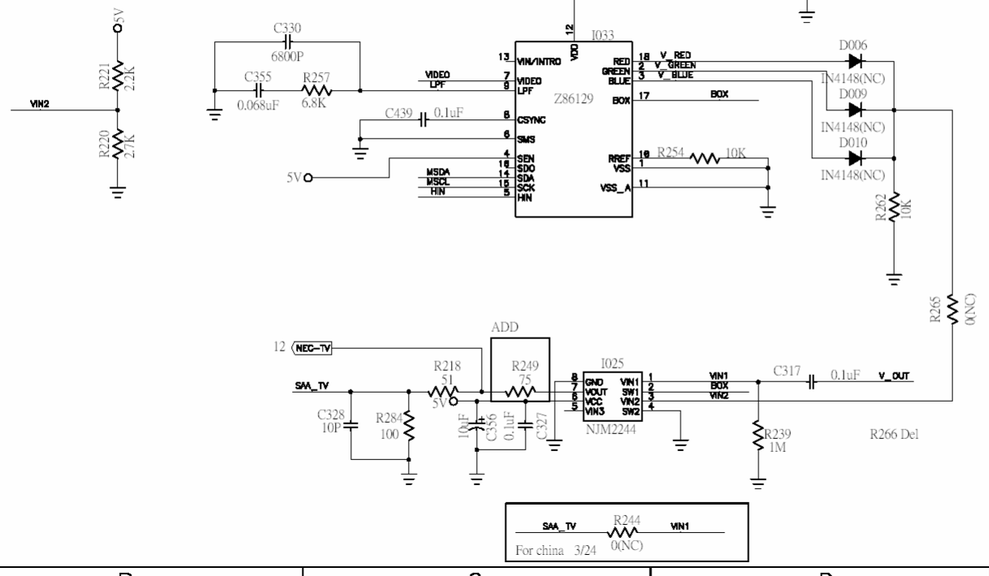


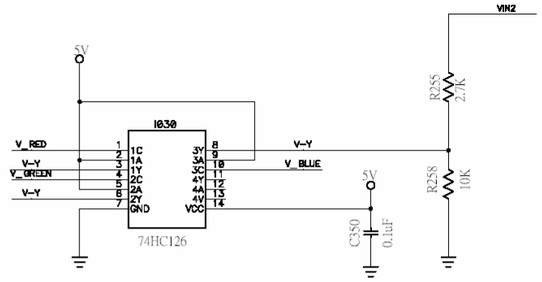
I037:A
SII504
I037:B
SII504
I038
SDRAM 2MX32-4B
Title
SDRAM(FOR De-interlace)
Size
A2
Number
USA LCD-TV
Rev
Date
Wed Dec 22, 2004
Drawn by
{Drawn By}
Filename
PWB-0812-02(0915).sch
Sheet
13 of 15











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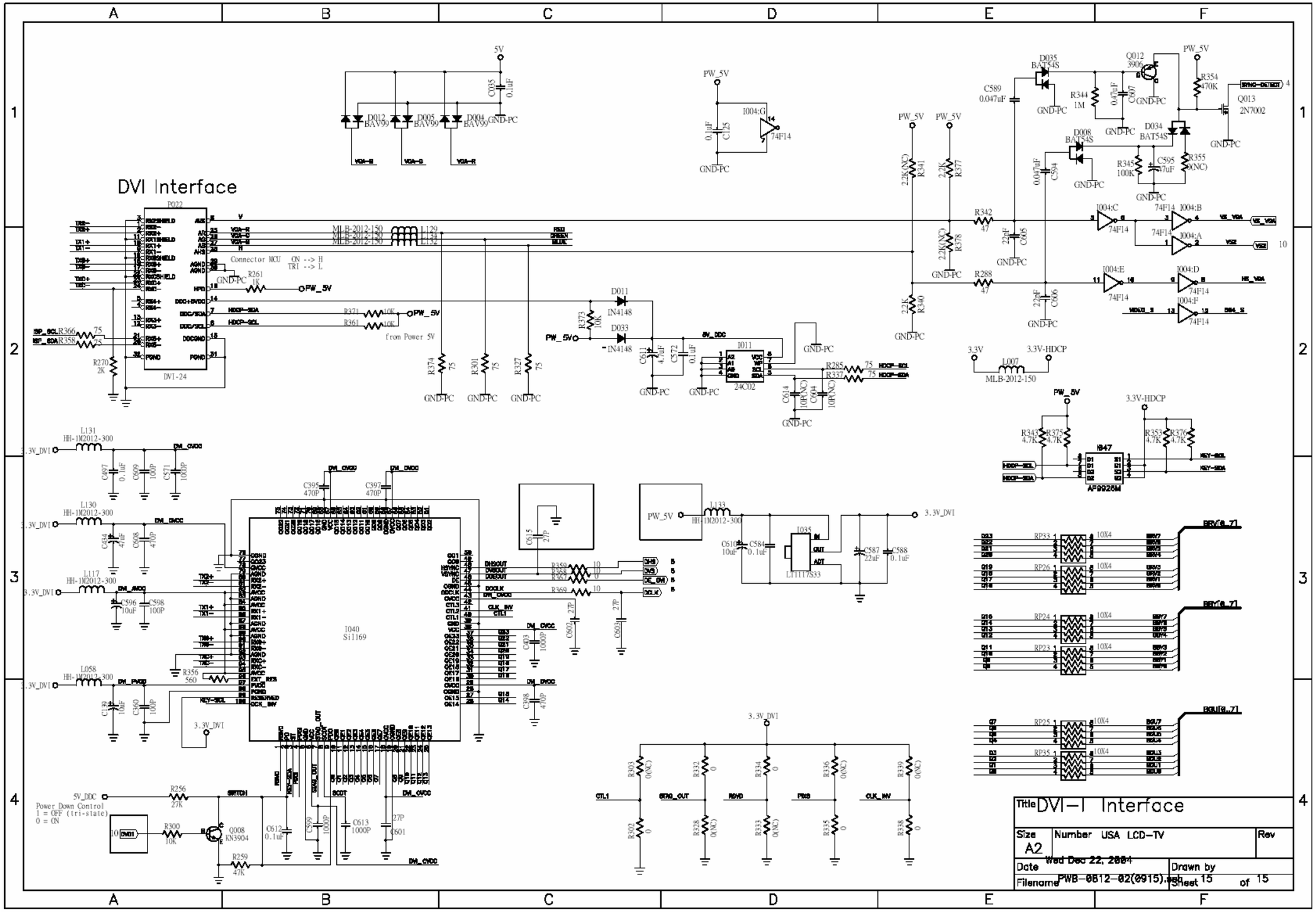
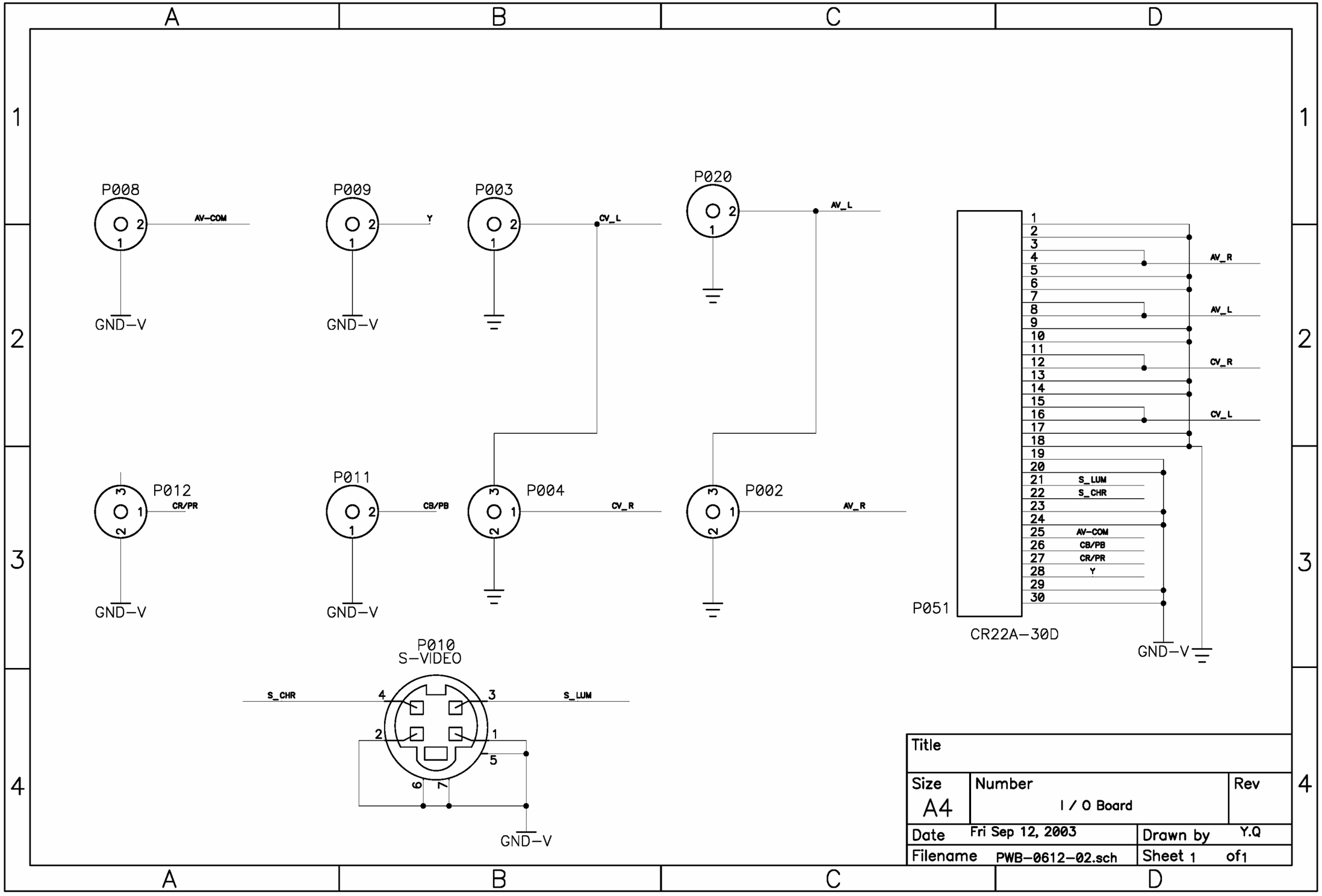
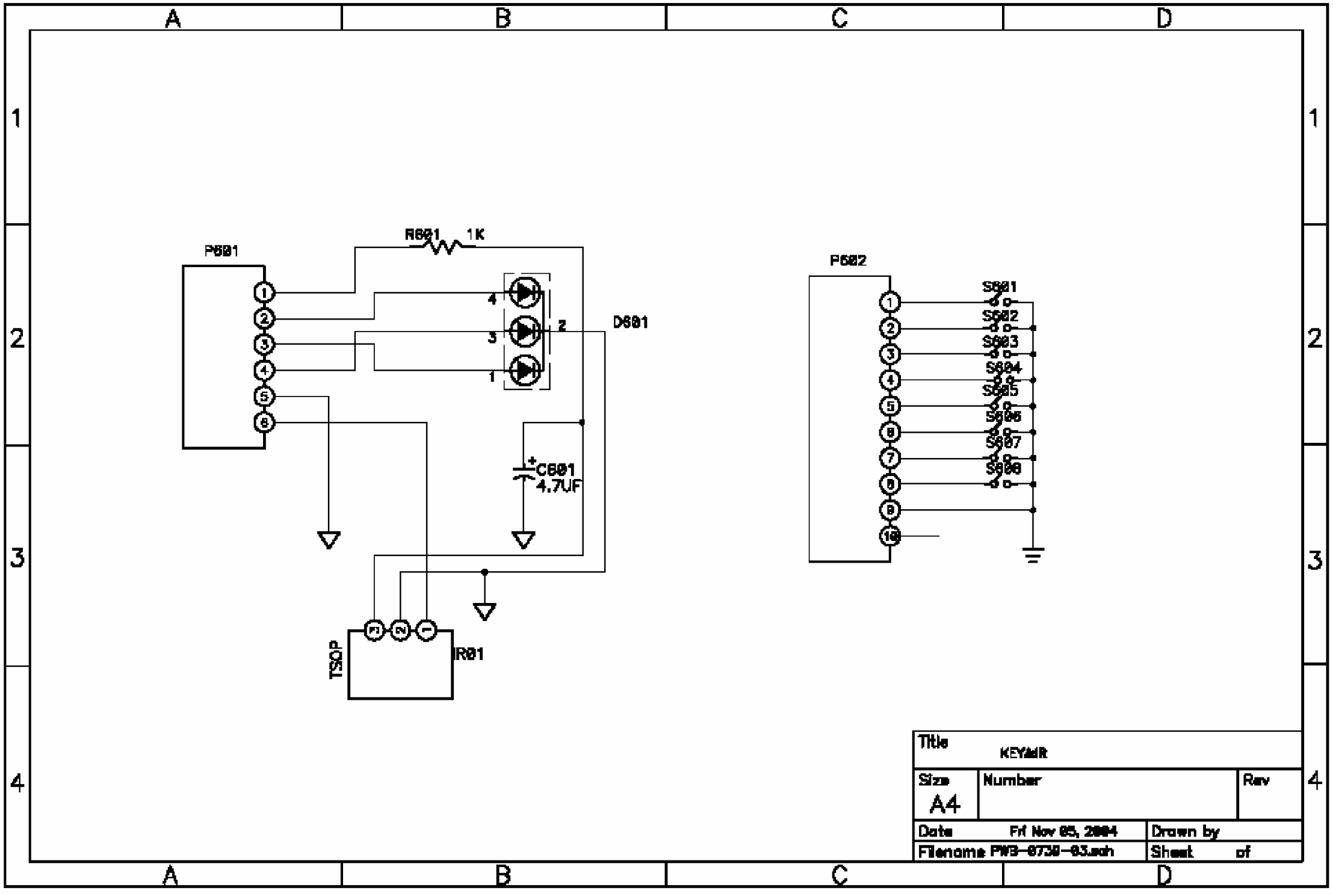
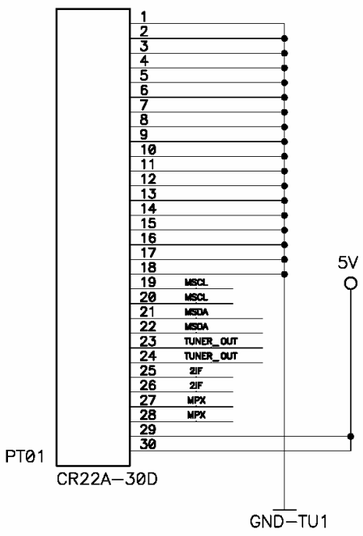
Size A2	Number USA LCD-TV
Rev	
Date	Wed Dec 22, 2004
Drawn by	{Drawn By}
Filename	PWB-0812-02(0915).SCH
Sheet	14 of 15


DVI Interface
P022
DVI-24
I040
Si1169
I011
24C02
I035
LT1117S33
I047
AP9926M
Connector MCU ON --> H TRI --> L
from Power 5V
Power Down Control
1 = OFF (tri-state)
0 = ON
Title DVI-I Interface
Size A2
Number USA LCD-TV
Rev
Date Wed Dec 22, 2004
Drawn by
Filename PWB-0812-02(0915).sch
Sheet 15 of 15

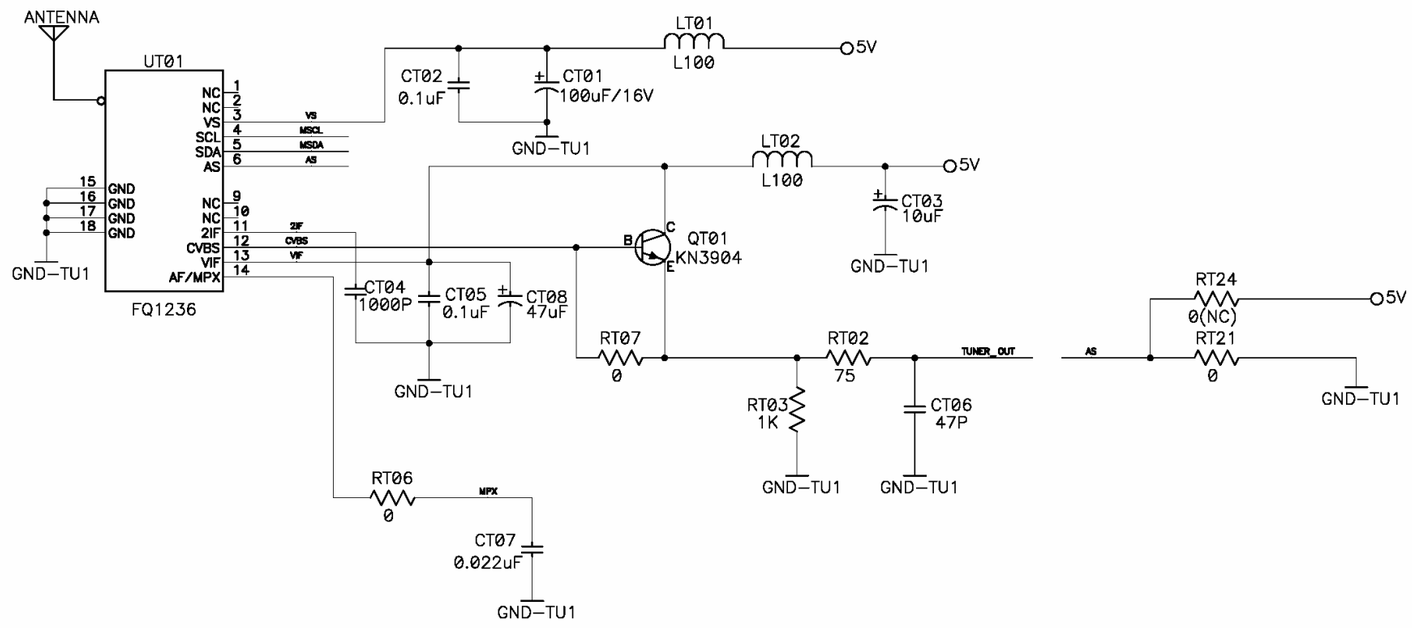

A
B
C
D
1
2
3
4
P008
AV-COM
GND-V
P009
Y
GND-V
P003
CV_L
P020
AV_L
P012
CR/PR
GND-V
P011
CB/PB
GND-V
P004
CV_R
P002
AV_R
P010
S-VIDEO
S_CHR
S_LUM
GND-V
P051
CR22A-30D
AV_R
AV_L
CV_R
CV_L
S_LUM
S_CHR
AV-COM
CB/PB
CR/PR
Y
GND-V
Title
Size
A4
Number
I / O Board
Rev
Date
Fri Sep 12, 2003
Drawn by
Y.Q
Filename
PWB-0612-02.sch
Sheet 1
of1


A
B
C
D
1
2
3
4
P601
R601 1K
D601
C601
4.7UF
TSOP
IR01
P602
S601
S602
S603
S604
S605
S606
S607
S608
Title
KEYADR
Size
A4
Number
Rev
Date
Fri Nov 05, 2004
Drawn by
Filename PWB-0730-03.sch
Sheet of

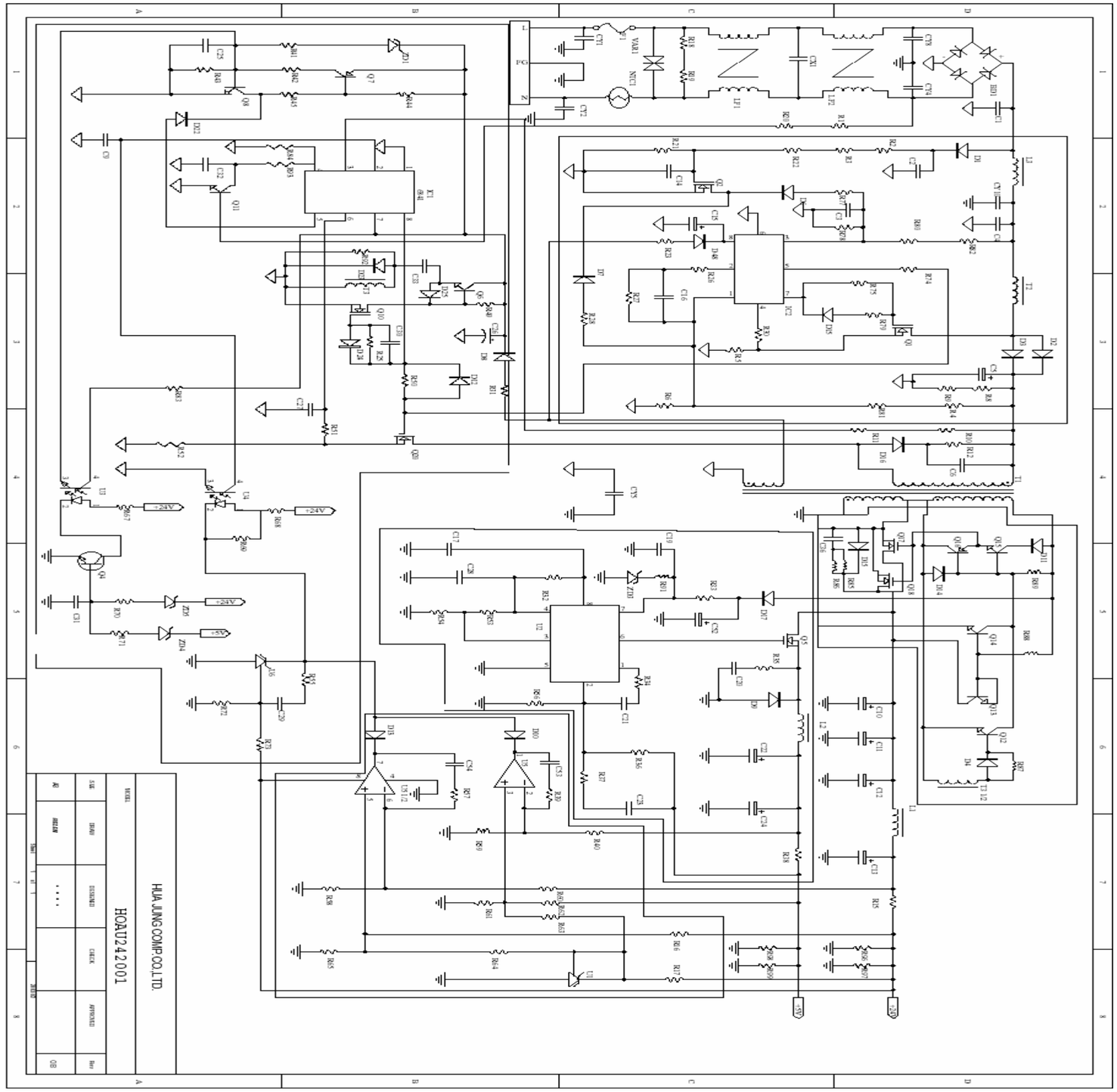
Connector



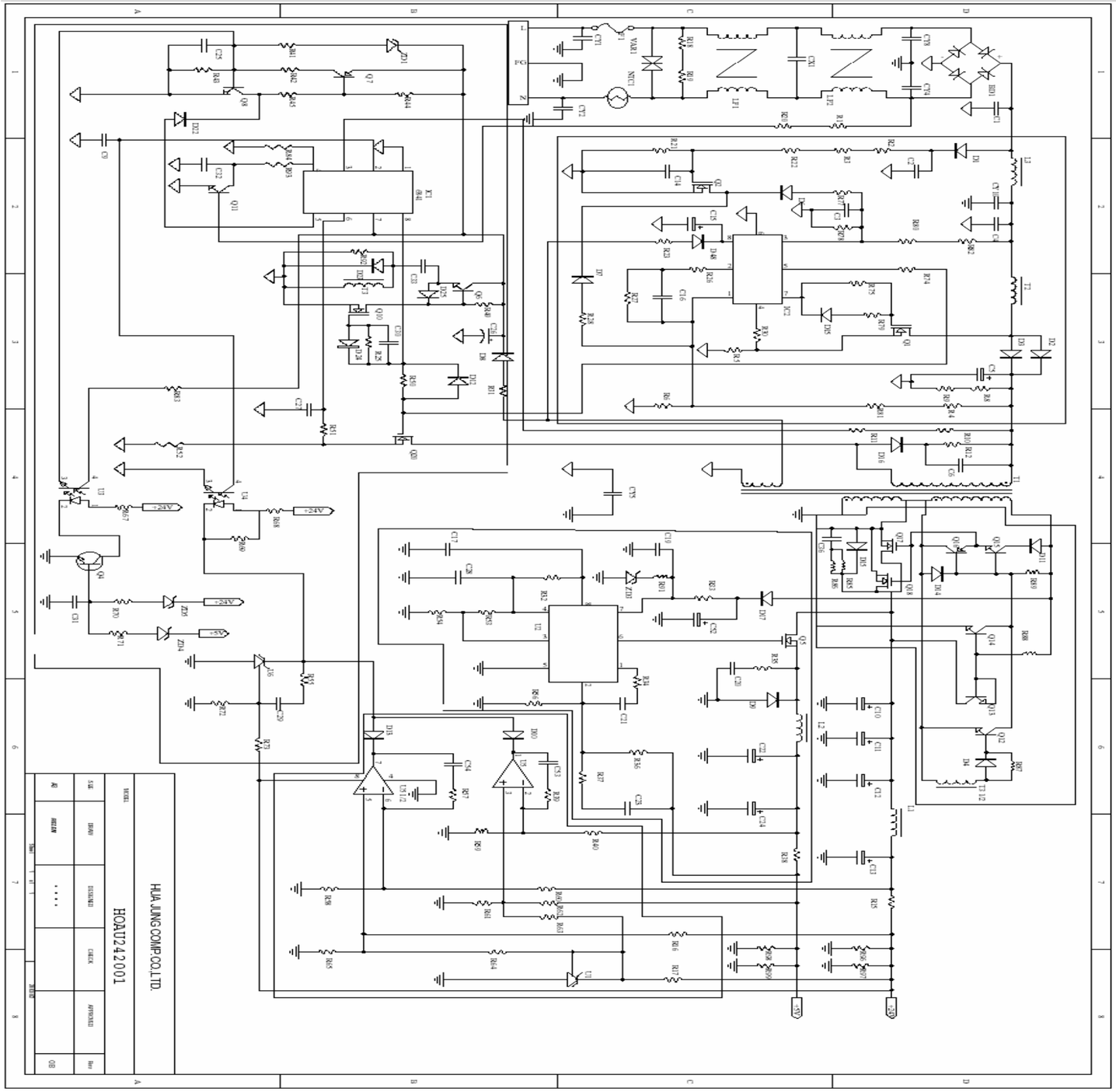
Tuner Power Control



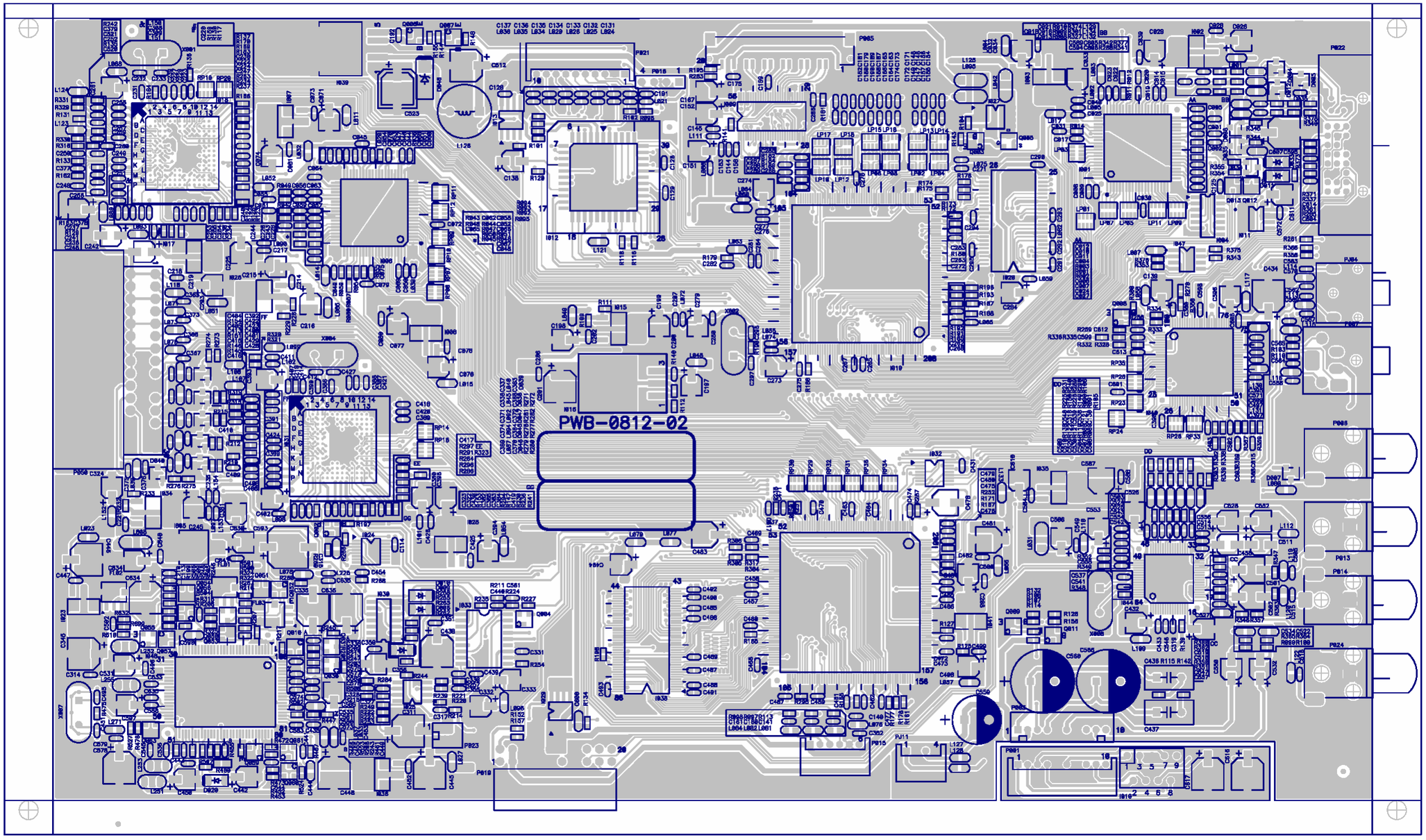
Title	Tuner Interface		
Size A3	Number		Rev
Date	Fri Sep 12, 2003	Drawn by	Y.Q.CHEN
Filename	PWB-0707-01.sch	Sheet	1 of 1


HUA JUNG COMP.CO.,LTD.
HOAU242001

11. PCB Layout



TATUNG CO.	LAYER NO: TOP SILK LAYER
Designed by Electronic R & D Division TEL:2592-5252 EXT3127	FILE NO:PWB-0812-02(8915).pcb
	DATE:Thu Sep 16, 2004



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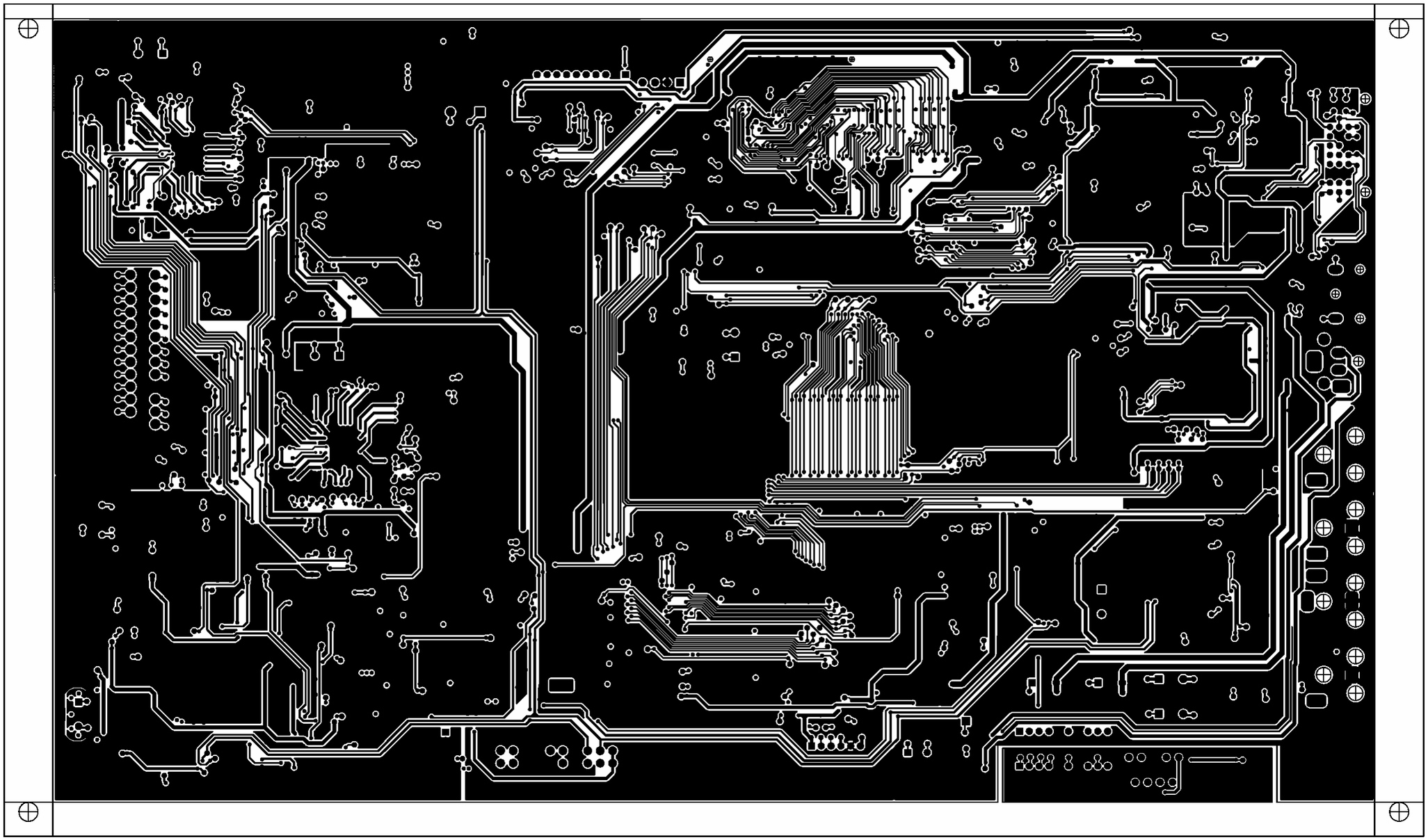
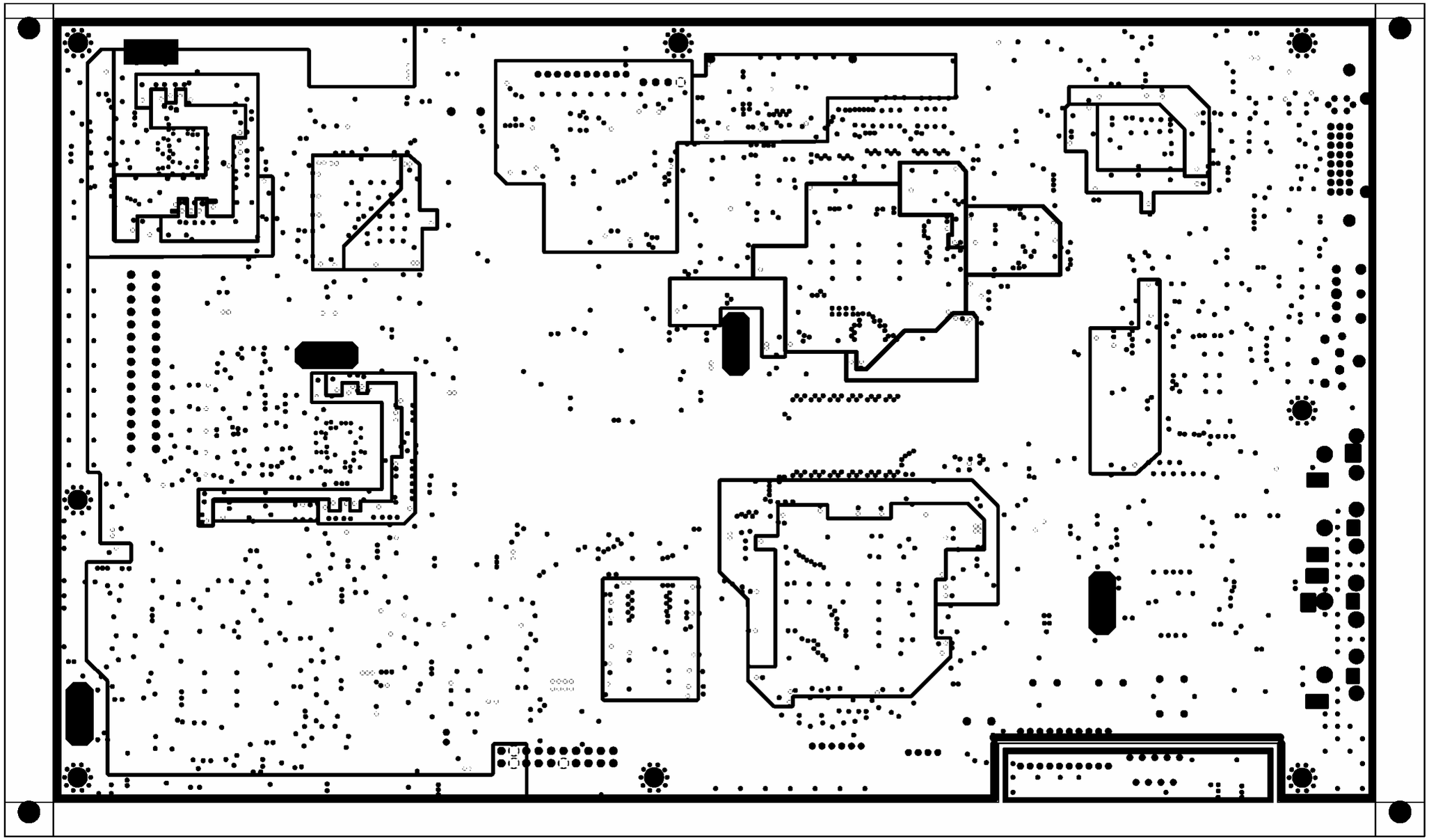


TATUNG CO.	LAYER NO: POWER LAYER
Designed by Electronic R & D Division TEL:2592-5252 EXT3127	FILE NO:PWB-6812-02(6915).pcb
	DATE:Thu Sep 16, 2004



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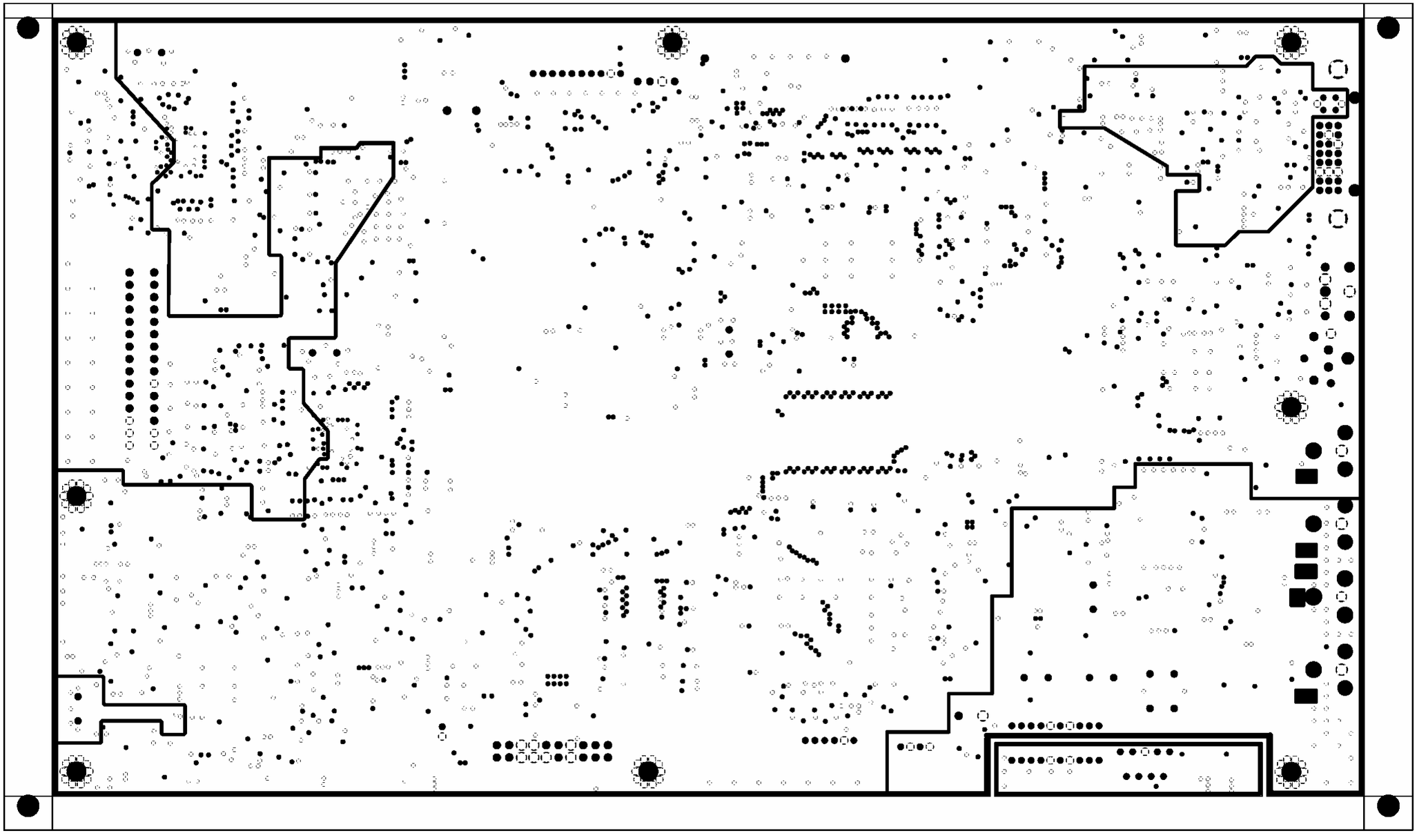
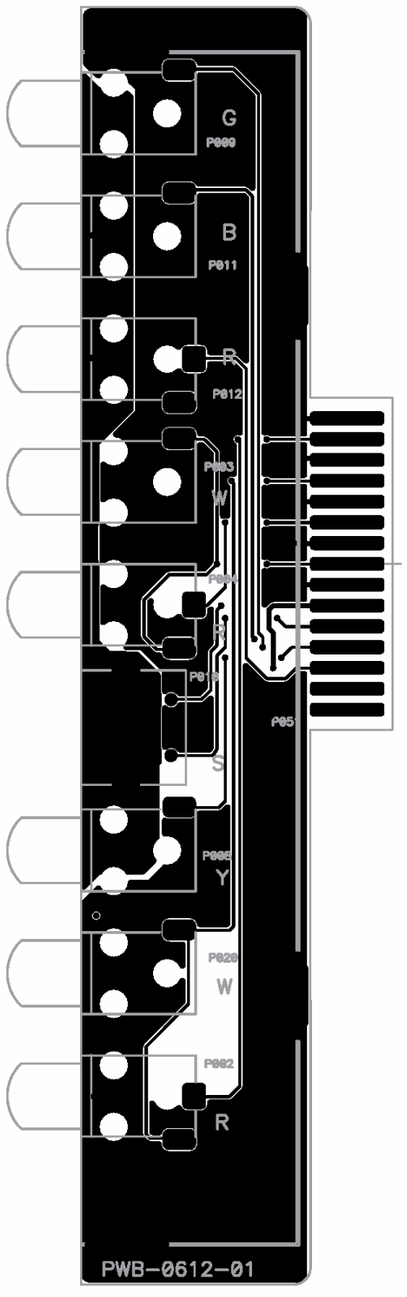
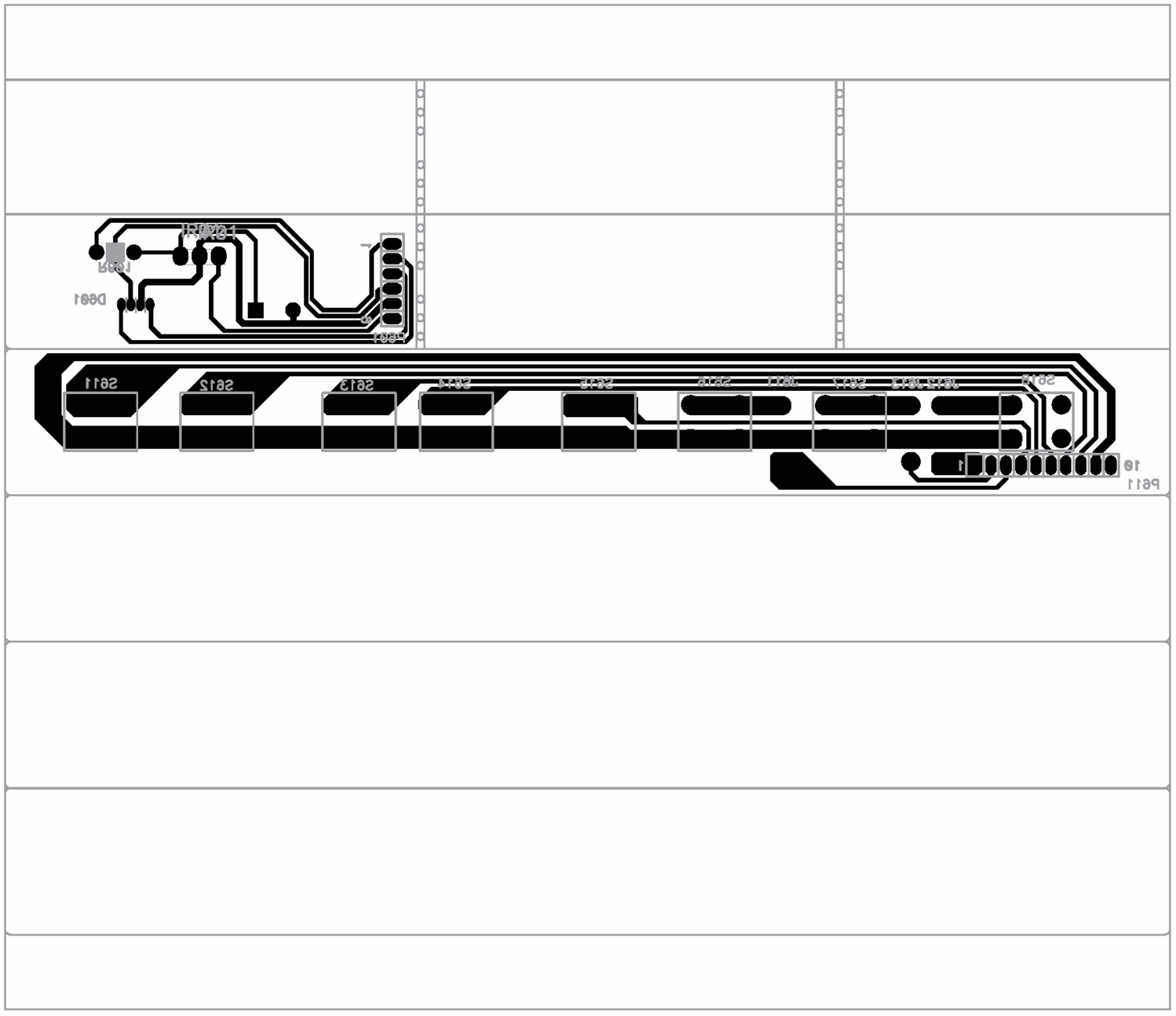


TATUNG CO.	LAYER NO: TOP SILKTOPAYER
Doc No.:7CDDC Designed by Electronic R & D Division TEL:2592-5252 EXT 3127	FILE NO:PWB-0612-02.pcb
	DATE: Fri Sep 05, 2003





TATUNG CO.	LAYER NO: BOTTOM SILK LAYER
Doc No.:7CDDC Designed by Electronic R & D Division TEL:2592-5252 EXT 3127	FILE NO:PWB-0565-02.pcb
	DATE: Fri Sep 05, 2003

CAM350 V 5.0 : Fri Sep 12 16:30:15 2003 - (Untitled)

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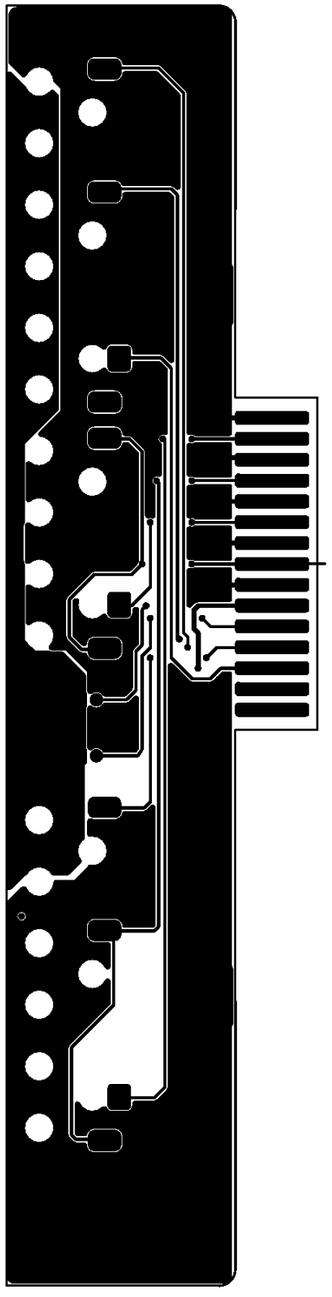

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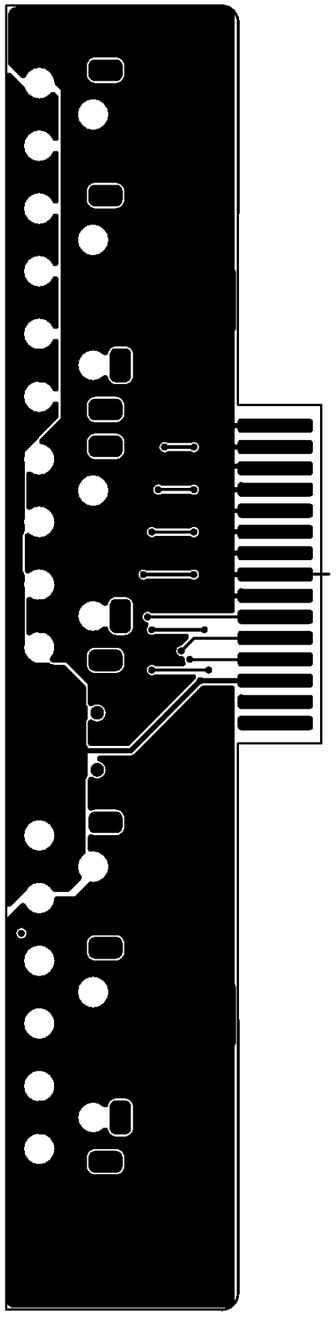

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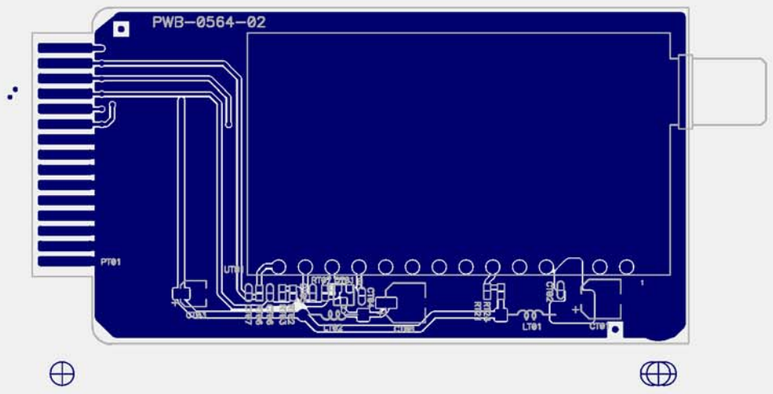
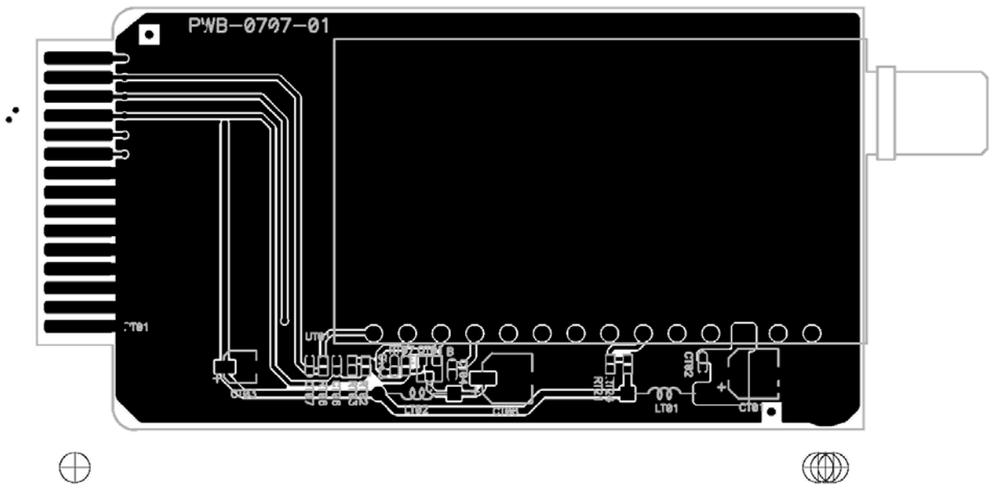


TATUNG CO. Doc No.:7CDDC Designed by Electronic R & D Division TEL:2592-5252 EXT 3127	LAYER NO: TOP SILKTOPLAYER FILE NO:PWB-0564-02.pcb DATE: Tue Jul 22, 2003



TATUNG CO. Doc No.:7CDDC Designed by Electronic R & D Division TEL:2592-5252 EXT 3127	LAYER NO: TOP SILKTOPLAYER FILE NO:PWB-0707-01.pcb DATE: Mon Sep 08, 2003

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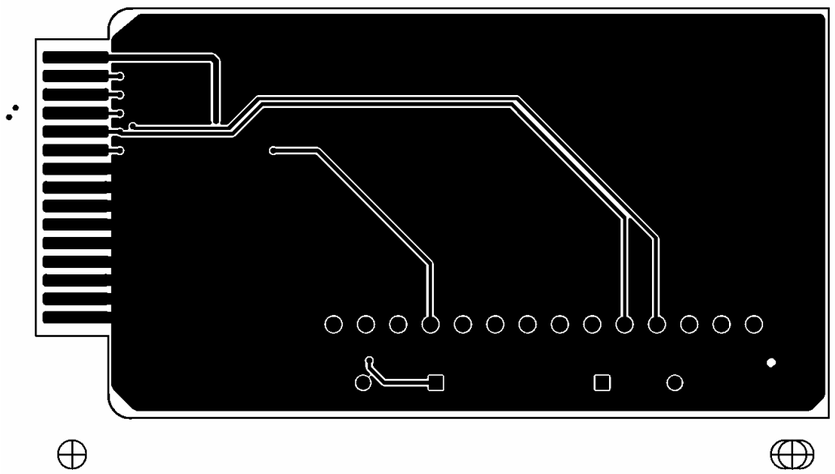

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Doc No.:7CDDC Designed by Electronic R & D Division TEL:2592-5252 EXT 3127	FILE NO:PWB-0564-02.pcb
	DATE: Tue Jul 22, 2003

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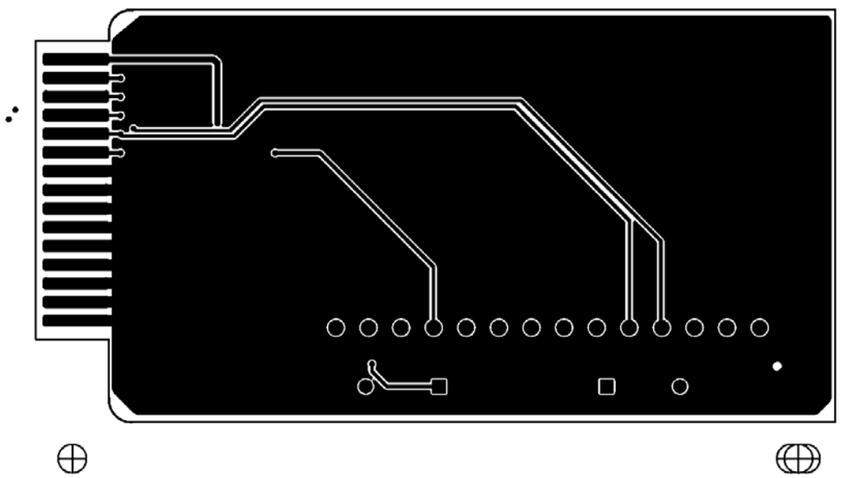

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	DATE: Tue Jul 22, 2003

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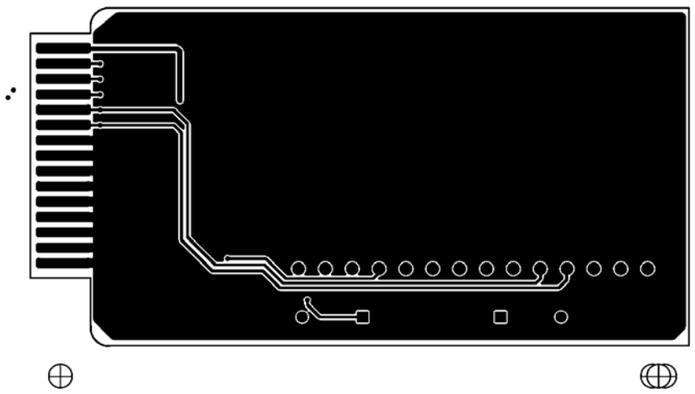
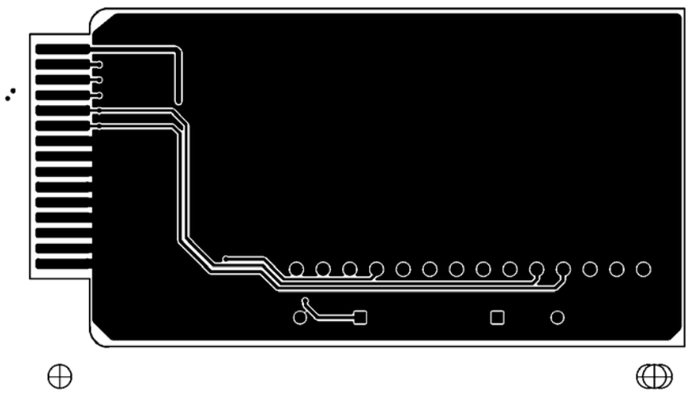
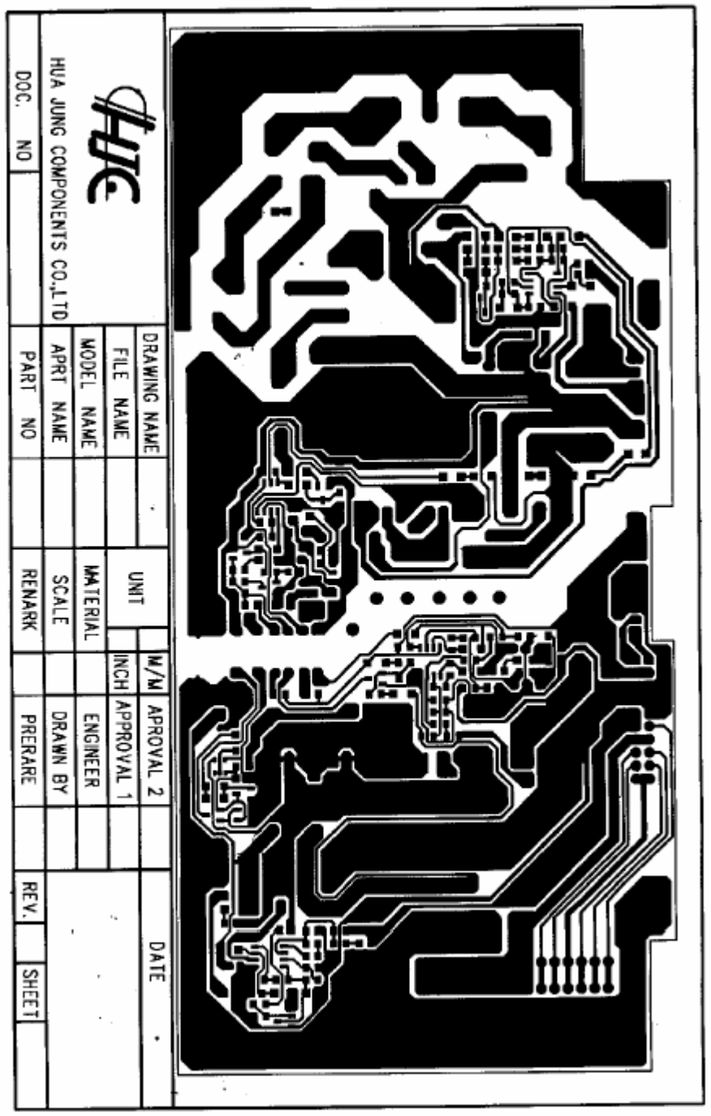


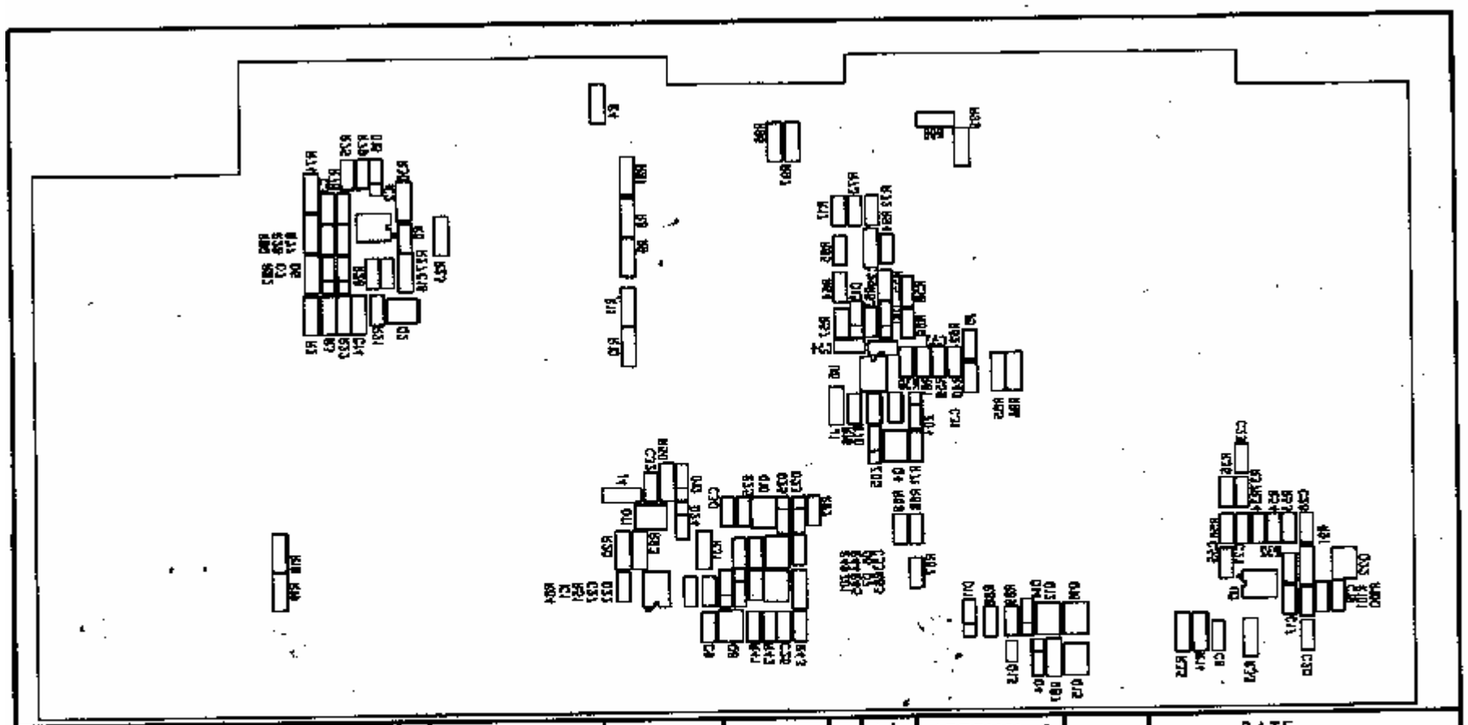
TATUNG CO. Doc No.:7CDDC Designed by Electronic R & D Division TEL:2592-5252 EXT 3127	LAYER NO: BOTTOM FILE NO:PWB-0707-01.pcb DATE: Mon Sep 08, 2003



TATUNG CO. Doc No.:7CDDC Designed by Electronic R & D Division TEL:2592-5252 EXT 3127	LAYER NO: BOTTOM FILE NO:PWB-0707-01.pcb DATE: Mon Sep 08, 2003

POWER Layout





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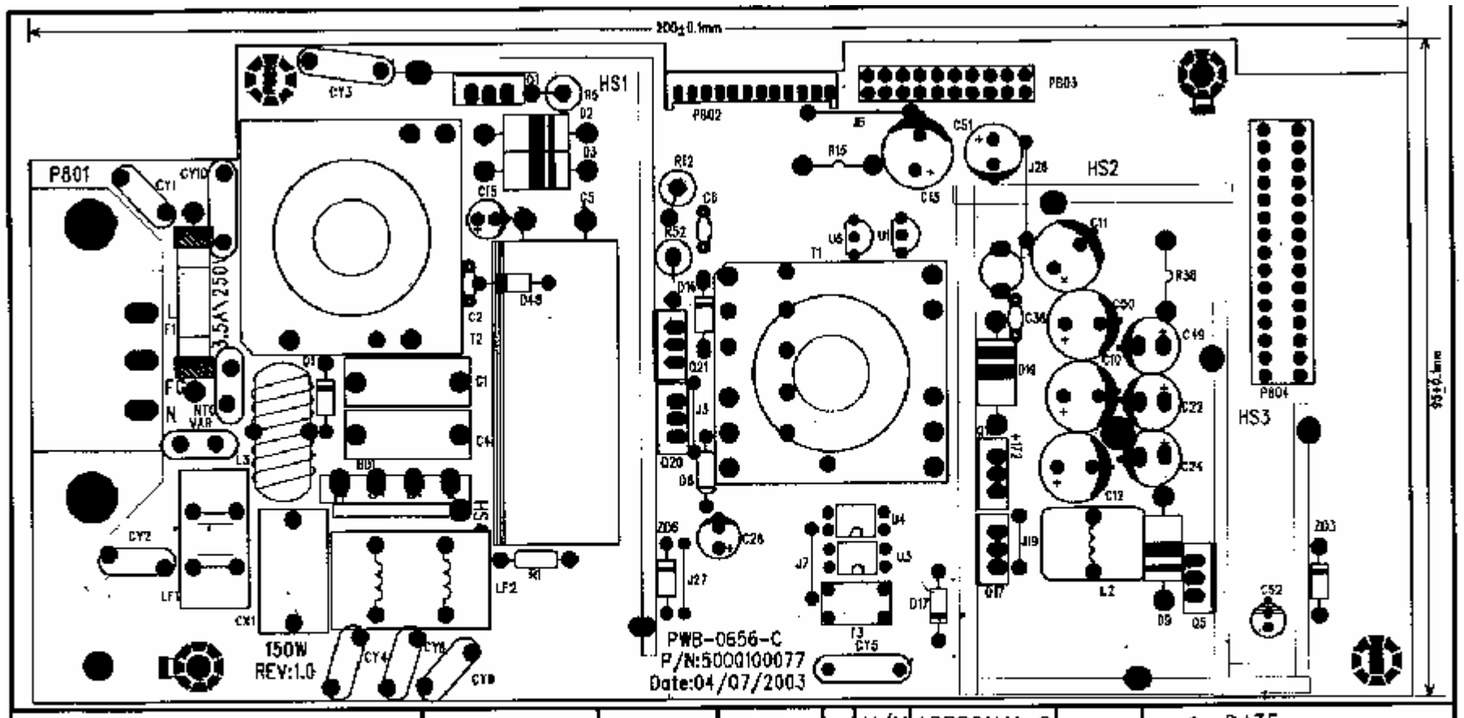
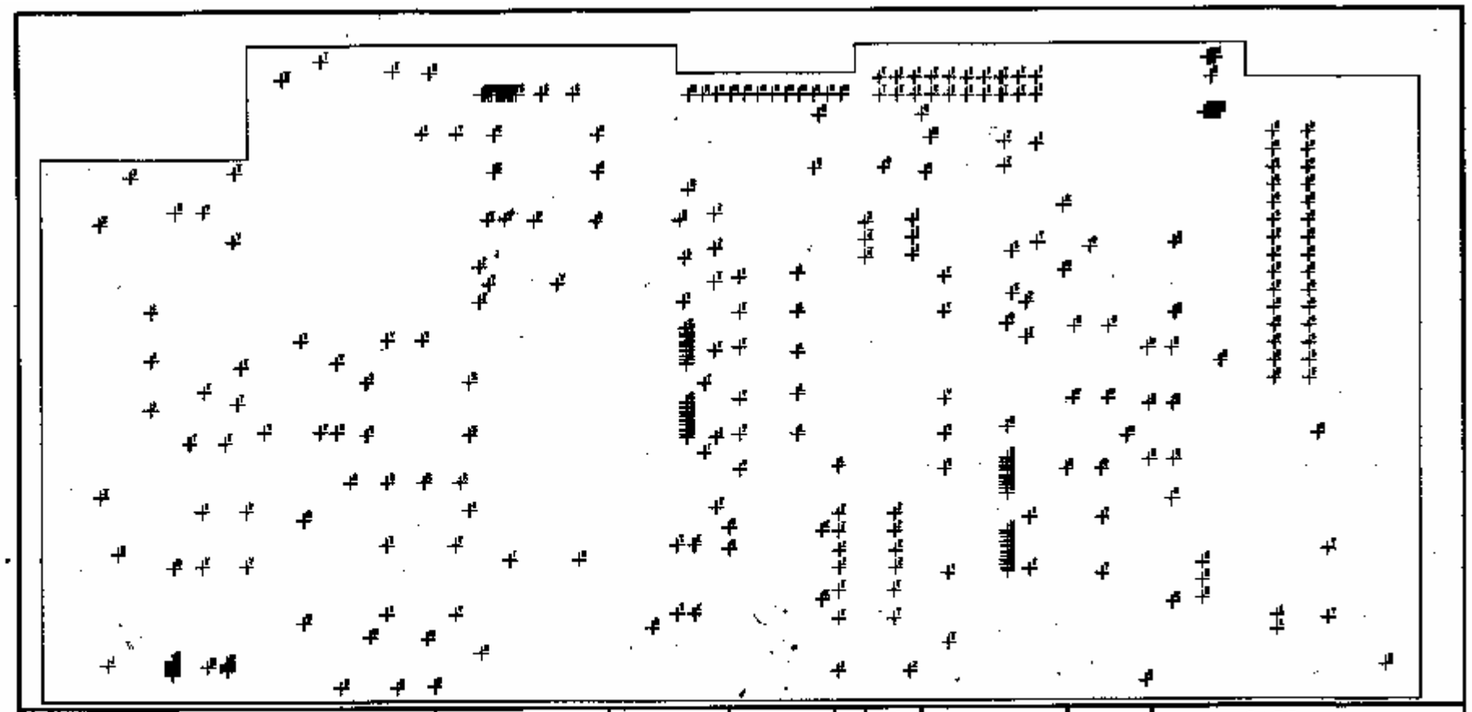
	FILE NAME		INCH	APPROVAL 1		
	MODEL NAME	MATERIAL		ENGINEER		
	APRT NAME	SCALE		DRAWN BY		
DOC. NO	PART NO	RENARK		PRERARE	REV.	SHEET



HUA JUNG COMPONENTS CO.,LTD	DRAWING NAME		UNIT	M/M	APPROVAL 2		DATE
	FILE NAME			INCH	APPROVAL 1		
	MODEL NAME		MATERIAL		ENGINEER		
	APRT NAME		SCALE		DRAWN BY		
DOC. NO.	PART NO.		REMARK		PRERARE		REV. SHEET

SIZE	QTY	SYM	PLTD
3.6	2	H	x
1.8	3	I	x
2	2	J	x
0.8	18	K	x
4	6	L	x
2.2	1	M	x
0.94	12	N	x
1.3	6	O	x
3.6068	1	P	x
1.4	26	Q	x
1.5	16	R	x
1.1938	31	S	x
1	40	T	x
0.9144	58	U	x
1.2	42	V	x
3.5	3	W	x
4.5	4	X	x
1.1	40	Y	x
0.9	28	Z	x



HJC HUA JUNG COMPONENTS CO.,LTD	DRAWING NAME		UNIT	M/M	APROVAL 2	DATE
	FILE NAME			INCH	APPROVAL 1	
	MODEL NAME		MATERIAL		ENGINEER	
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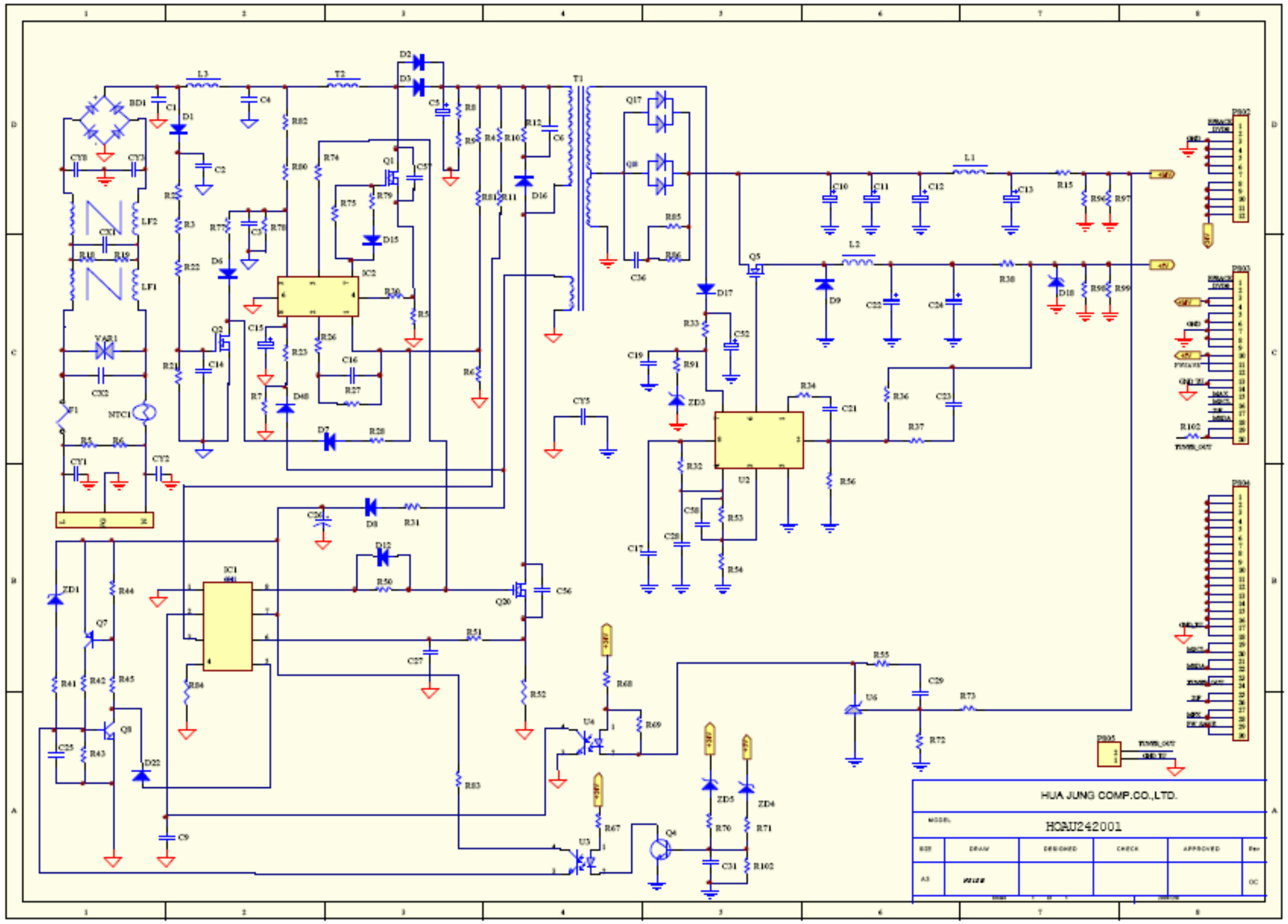
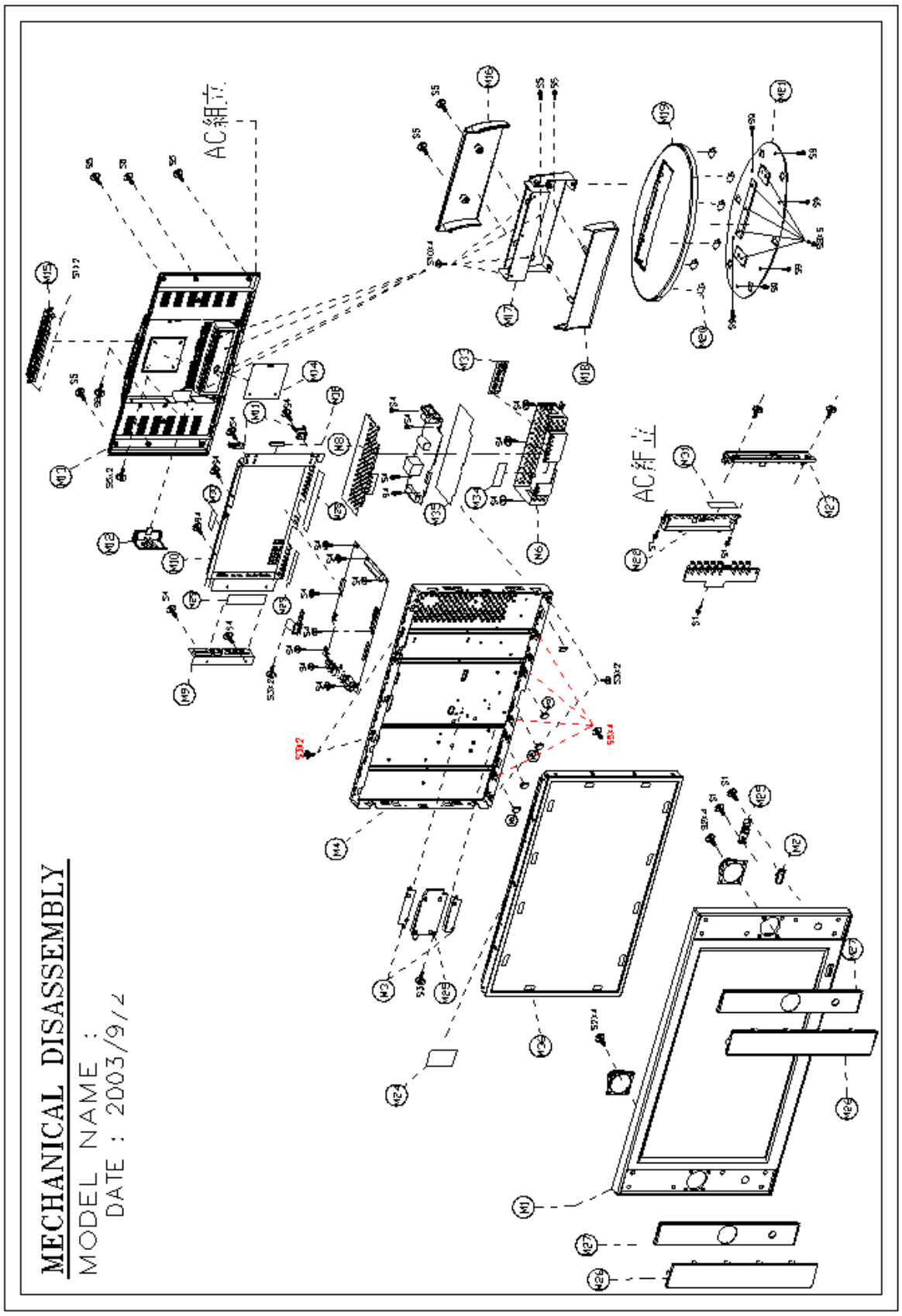
DOC. NO	PART NO		RENARK		PRERARE	REV. / SHEET


HUA JUNG COMP.CO.,LTD.
MODEL
HCAU242001
DRAW
DESIGNED
CHECK
APPROVED
A3

12. Electrical Part List

Model / part number		V23DXXX	V27DXXX	V30DXXX	NOTE
EE PARTS	TFT Panel	LG LC230W01-5051253665 (include Inverter)	CMO V270W1 1.5051253656 (include Inverter)	CMO V296W1 1.5051253668 (include Inverter)	
	Inverter	panel is included	panel is included	panel is included	
	Power Module	6693006615(RA) 6693006611(RB)	1.HOAU242001 150W 6693006610(RA) 2.PHIHONG 150W 6693006601(RB)	6693006610(RA) 6693006601(RB)	
	Tuner Board	PWB-0707 U12-5097632521	PWB-0707 U05-5097632508 U12-5097632519 U21-5097632519	PWB-0707 U05-5097632509 U21-5097632523	
	I/O Board	PWB-0612 U12-5097624527	PWB-0612 U05-5097624513 U12-5097624523 U21-5097624523	PWB-0612 U05-5097624514 U21-5097624530	
	IR Board	PWB-0739-2 U12-5098800942	PWB-0739-2 U05-5098800801 U12-5098800908 U21-5098800908	PWB-0739-2 U05-5098800803 U21-5098800969	
	Key Board	PWB-0739-1 U12-5098800941	PWB-0739-1 U05-5098800800 U12-5098800907 U21-5098800907	PWB-0739-1 U05-5098800802 U21-5098800968	
	Main Board	PWB-0812 U12-5097641403	PWB-0812 U05-5097641400 U12-5097641402 U21-5097641402	PWB-0812 U05-5097641401 U21-5097641405	

	Speaker	U12-5055123800	U05-5055126200 U12-5055126200	U05-5055125600 U21-5055123700	
	Remote control		U05-5052731052 U12-5052731043 U21-5000100072	U05-5052731052 U21-5000100072	
	MCU	6647021817	6647021817	6647021817	Note: Different model have different firmware version.
	Signal Cable		DVI-I cable U05-5057424010 U21-5057424010	DVI-I cable U05-5057424010 U21-5057424010	
	Power Cord	U12-5056705900	U05-E056705900 U12-5056705900 U21-5056705900	U05-E056705900 U21-5056705900	
	User’s Manual	U12-5030007049	U05-5030057109 U12-5030057126	U05-5030057109 U21-5030057146	
ME PARTS	Front Cover	U12-5641101101	U05-5641101601 U12-5641101003 U21-5641101002	U05-5641101401 U21-5642298207	
	Back Cover	U12-5642294312	U05-5642292206 U12-5642292209 U21-5642292210	U05-5642292010 U21-5642292018	
	Base	U12-5641416405	U05-5640410000 U12-5641412707 U21-5641416305	U05-5640410000 U21-5641412707	

13. Mechanical Disassembly