KAWA ELECTRONIC RESEARCH & DEVELOPMENT CENTRE

Service Manual

Reference No. : SM- LCT37ADNDA1TS -001
Revision : 0
Date : 2006.6.6
Page : P.1 of 81

In House Model No. : LCT37AD
Customer Model No. : LCT3701AD

BOM No. : LCT37ADNDA1TS-A01

Description : Service Manual for LCT37AD _CPT_USA

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DOC Rev NO.	The Latest Revision Details	DATE
0	Initial Release	2006-6-6

AKAI

SERVICE MANUAL

Model:

LCT3701AD

I. Safety Instructions

CAUTION

RISK OF ELECTRIC SHOCK DO NOT OPEN

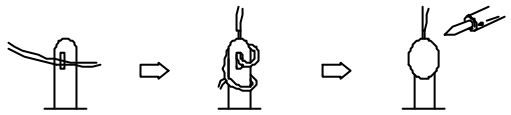
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL ONLY.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated " dangerous voltage" within the product' s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

PRECAUTIONS DURING SERVICING

1. In addition to safety, other parts and assemblies are specified for conformance with such regulations as those applying to spurious radiation. These must also be replaced only with specified replacements. Examples: RF converters, tuner units, antenna selection switches, RF cables, noise-blocking capacitors, noise-blocking filters, etc.
2. Use specified internal Wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads
3. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulating Tape
   2) PVC tubing
   3) Spacers (insulating barriers)
   4) Insulating sheets for transistors
   5) Plastic screws for fixing micro switches
4. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.), wrap ends of wires securely about the terminals before soldering.



5. Make sure that wires do not contact heat generating parts (heat sinks, oxide metal film resistors, fusible resistors, etc.)
6. Check if replaced wires do not contact sharply edged or pointed parts.
7. Make sure that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

MAKE YOUR CONTRIBUTION TO PROTECT THE ENVIRONMENT

Used batteries with the ISO symbol for recycling as well as small accumulators (rechargeable batteries), mini-batteries (cells) and starter batteries should not be thrown into the garbage can.

Please leave them at an appropriate depot.

WARNING:

Before servicing this TV receiver, read the X-RAY RADIATION PRECAUTION, SAFETY INSTRUCTION and PRODUCT SAFETY NOTICE.

X-RAY RADIATION PRECAUTION

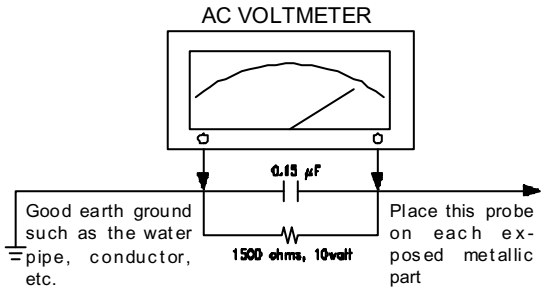
1. Excessively high can produce potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must not exceed the specified limit. The normal value of the high voltage of this TV receiver is 27 KV at zero bean current (minimum brightness). The high voltage must not exceed 30 KV under any circumstances. Each time when a receiver requires servicing, the high voltage should be checked. The reading of the high voltage is recommended to be recorded as a part of the service record, It is important to use an accurate and reliable high voltage meter.
2. The only source of X-RAY RADIATION in this TV receiver is the picture tube. For continued X-RAY RADIATION protection, the replacement tube must be exactly the same type as specified in the parts list.
3. Some parts in this TV receiver have special safety related characteristics for X-RADIATION protection. For continued safety, the parts replacement should be under taken only after referring the PRODUCT SAFETY NOTICE.

SAFETY INSTRUCTION

The service should not be attempted by anyone unfamiliar with the necessary instructions on this TV receiver. The following are the necessary instructions to be observed before servicing.

1. An isolation transformer should be connected in the power line between the receiver and the AC line when a service is performed on the primary of the converter transformer of the set.
2. Comply with all caution and safety related provided on the back of the cabinet, inside the cabinet, on the chassis or picture tube.
3. To avoid a shock hazard, always discharge the picture tube's anode to the chassis ground before removing the anode cap.

4. Completely discharge the high potential voltage of the picture tube before handling. The picture tube is a vacuum and if broken, the glass will explode.
5. When replacing a MAIN PCB in the cabinet, always be certain that all protective are installed properly such as control knobs, adjustment covers or shields, barriers, isolation resistor networks etc.
6. When servicing is required, observe the original lead dressing. Extra precaution should be given to assure correct lead dressing in the high voltage area.
7. Keep wires away from high voltage or high tempera ture components.
8. Before returning the set to the customer, always perform an AC leakage current check on the exposed metallic parts of the cabinet, such as antennas, terminals, screwheads, metal overlay, control shafts, etc., to be sure the set is safe to operate without danger of electrical shock. Plug the AC line cord directly to the AC outlet (do not use a line isolation transformer during this check). Use an AC voltmeter having 5K ohms volt sensitivity or more in the following manner.
   Connect a 1.5K ohm 10 watt resistor paralleled by a 0.15µF AC type capacitor, between a good earth ground (water pipe, conductor etc.,) and the exposed metallic parts, one at a time.
   Measure the AC voltage across the combination of the 1.5K ohm resistor and 0.15 uF capacitor. Reverse the AC plug at the AC outlet and repeat the AC voltage measurements for each exposed metallic part.
   The measured voltage must not exceed 0.3V RMS. This corresponds to 0.5mA AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.
   The resistance measurement should be done between accessible exposed metal parts and power cord plug prongs with the power switch "ON". The resistance should be more than 6M ohms.



AC Leakage Current Check

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this TV receiver have special safety-related characteristics. These characteristics are offer passed unnoticed by visual spection and the protection afforded by them cannot necessarily be obtained by using replacement components rates for a higher voltage, wattage, etc. The replacement parts which have these special safety characteristics are identified by ⚠ marks on the schematic diagram and on the parts list. Before replacing any of these components, read the parts list in this 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, X-RAY RADIATION or other hazards.

Reference No : LCT3701AD

Product Specification

1.1 VIDEO SECTION	CPT (CLAA370WAC02) MK8202 USA
Display size	37”/16:9
Display Resolution	1366 X 768
Pixel Pitch	600μm (H) x 600μm (V)
Peak Brightness	550(nits)
Contract Ratio	1000:1, Typical (1/100 White Window, Dark Room)
View Angle	Hor. And Vert. ≥170 degree
Color Deeps	16.7M Color (R / G/ B each 256 Scales)
PC Resolution Supporting	VGA, SVGA, XGA,WXGA
HDTV Compatible	480p /720p /1080i
Progressive Scanning	Yes
Film Mode Pull Down	Yes
“GAMMA” Correction	Yes
Color Temperature Control	Yes
Comb Filter	Yes
Second De-interlace for Sub picture	No
Wide Mode	Full, 4:3 and Panoramic.
TV System	NTSC M
Dual Tuner System	No
AV Input Color System	PAL /NTSC
PIP	Yes
1.2 AUDIO SECTION	
Audio Output Power	7W×2(8 ohm)
Sound Effect	Spatial Effect and Surround
Tone Control	Yes
1.3 Input Terminals	D-Sub 15 Pin Type (Analog-RGB Input) ×1 HDMI (Ver 1.1) Connector x 1 D-Sub 9 Pin (RS-232) RF (F-type Input) ×2 (ATV, DTV) Component Video-YPbPr × 1 RCA Terminals S-Video Input (Mini Din 4Pin) ×1 Video Input RCA Terminals Stereo Audio Input x 4
1.4 Output Terminals	Audio Output (RCA ; L&R Type) ×1
1.5 Others	
Closed Caption / V-Chip	Yes
Teletext	No
OSD Language	English, Français, Español

Reference No : LCT3701AD

Stereo Decode	MTS with SAP
Power Rating	AC 120V, 60Hz
Power Consumption	≤250W

1.6 Support the Signal Mode
This machine can support the different from VGA signal mode in 6 kinds

Resolution	Horizontal Frequency (kHz)	Vertical Frequency (kHz)
640 x 480	31.50	60.00
	37.86	72.81
800 x 600	35.16	56.25
	37.90	60.32
	48.08	72.19
1024 x 768	48.40	60.00

1.7 HDTV Mode (YPbPr)

Resolution	Horizontal Frequency (KHz)	Vertical Frequency (Hz)
480i	15.734	59.94
480p(720x480)	31.468	59.94
720p(1280x720)	45.00	60.00
1080i(1920x1080)	33.75	60.00

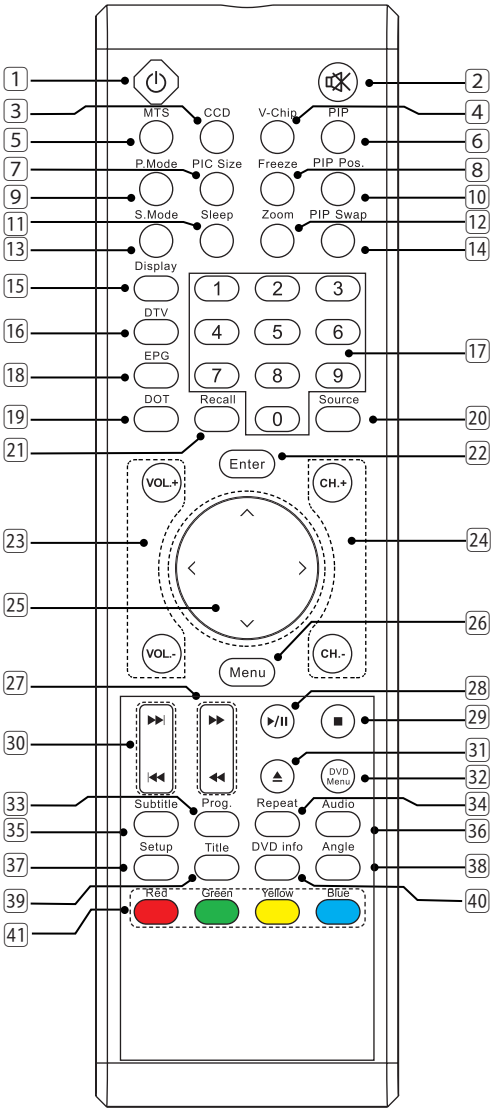
KAWA ELECTRONIC RESEARCH & DEVELOPMENT CENTRE

Reference No : LCT3701AD

Technical Data

1. Power supply	TV	AC 120V, 60Hz	
	Remote control	Battery 3V (UM-3/R6P/AAA×2)	
2. TV system	TV System	NTSC M	ATSC
	Stereo Decode	MTS	MPEG-2
	Closed Caption/V-Chip	Yes	Yes
	Channel	181 CH	2-69 CH
3. Intermediate frequencies	Picture	45.75MHz	
4. Scanning	Horizontal (Hz)	15625/15750	
	Vertical (Hz)	50/60	
5. AC plug		UL Plug	
6. Panel		CLAA370WAC02	
7. Speaker	Internal	8 ohm 10W ×2	
8. Operating temperature	Fulfill all specifications	15°C ~ 30°C	
	Accept picture/sound reproduction	5°C ~ 33°C	
9. Operating relative humidity	Fulfill all specifications	45% ~ 75%	
	Accept picture/sound reproduction	20% ~ 80%	
10. Electrical & optical specification		See the attachment 1.	
11. Circuit diagram drawing No.			
12. Cabinet			
13. Cabinet color			
14. Packing		1 set per	
15. Container stuffing method		RD/05/P/LC26HAB/CSI/02 REV: 01	
16. Dimension (mm) (No packing)	LCD-TV	925.8(W)×657.8(H)×113(D)mm (w/o Stand)	
		925.8(W) × 724.2(H) × 267.5(D)mm (with Stand)	
	Remote control unit	183(L) × 53(W) ×28(T)mm	
17. Net weight	LCD-TV	18.4Kg (with Stand) approx.	
	Remote control	93g	
18. Cell Defect		Subject to Panel supplier specification	

Remote Control



1. **Power** (⏻): Press to turn on and off.
2. **Mute** (🔇): Press to mute the sound. Press again or press VOL+/- to restore the sound.
3. **CCD**: Press to select the Closed Caption mode.
4. **V-Chip**: Press to select the child protect mode.
5. **MTS**: Press repeatedly to cycle through the Multi-channel TV sound (MTS) options: Mono, Stereo and SAP (Second Audio Program).
6. **PIP**: Press this button to enter PIP function.
7. **PIC.Size**: Press to change the screen size, such as Full, 4:3, Panoramic. (Note: In VGA mode, it can select picture size is Full. While in DTV mode, it can select picture size is: Full and 4:3.)
8. **Freeze**: Press to freeze the picture, press again to restore the picture. (This button is not available for VGA mode.)
9. **P.Mode**: Press repeatedly to cycle through the picture mode: Hi-Bright, User, Cinema, Normal and Vivid.
10. **PIP Pos.**: Press to change the PIP window position under PIP mode.
11. **Sleep**: Press repeatedly until it displays the time in minutes (15 Min, 30 Min, 60Min, 90 Min ,120 Min and, OFF) that you want the TV to remain on before shutting off. To cancel sleep time, press **Sleep** button repeatedly until sleep OFF appears.
12. **Zoom**: Press to zoom the image. (This button is not available for VGA mode.)
13. **S.Mode**: Press repeatedly to cycle through the sound mode: Normal, News, Cinema, Concert and User.
14. **PIP Swap**: Press to switches the Main window or Sub window picture.
15. **Display**: Press to display the channel information and it disappear after 3 seconds.
16. **DTV**: Press to select Digital TV mode.
17. **0~9 Number Buttons**: In TV mode, press 0~9 to select a channel; the channel changes after 2 seconds. In DVD mode, press 0~9 to input the items.
18. **EPG**: Press to display EPG (Electronic Program Guide) menu.
19. **DOT**: Press number buttons with it to select the channels directly in DTV.
20. **Source**: Press to select the signal source.
21. **Recall**: Press to return previous channel.
22. **Enter**: To select an item, press Enter to confirm.
23. **VOL +/-**: Press to adjust the volume.
24. **CH +/-**: Press to scan through channels. To scan quickly through channels, press and hold down either channels.
25. <,∧,∨,>: Press <,∧,∨,> to move the on-screen cursor.

(Continued on next page)

26 **Menu**: Press to enter on-screen setup menu, press again to exit.

27 ◀◀, ▶▶ : Press to search the backward or forward.

28 ▶/II : Press to play or pause the DVD disc.

29 ■ : Press to stop playing the disc.

30 |◀◀, ▶▶| : Press to skip the backward or forward.

31 ⏏ : Press to open or close the disc tray.

32 **DVD Menu**: Press to return DVD disc menu.

33 **Prog.**: Press to display the program menu. Press it again to exit.

34 **Repeat**: Press repeatedly to cycle through the options: CHAPTER, TITLE, ALL and nothing.

35 **Subtitle**: Press to select desired DVD subtitle.

36 **Audio**: Press to select desired audio track.

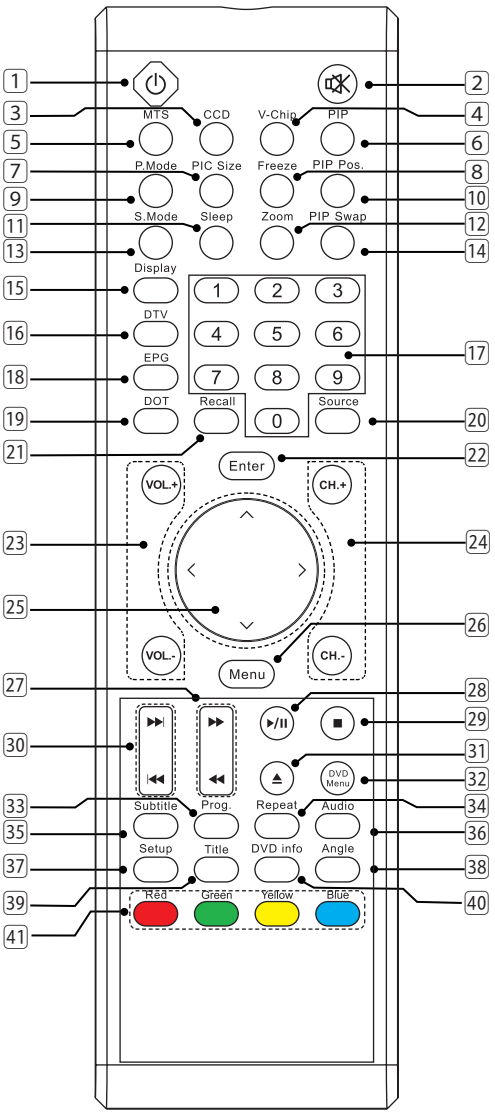
37 **Setup**: Press to display a menu. Press it again to exit menu.

38 **Angle**: Press to select desired viewing angle of the Video (disc feature).

39 **Title**: Press to display to DVD disc title.

40 **DVD Info**: Press to display DVD information.

41 **Color Buttons**:
(Only available in DTV EPG mode)
Red: Press this button to access the red item or page.
Blue: Press this button to access the blue item or page.
Green: Press this button to access the green item or page.
Yellow: Press this button to access the yellow item or page.



Note: Press CH+/- on the remote control can turn on TV set from last preview mode.

Reference No : LCT3701AD

Attachment 1： Electrical & Optical Specification

No.	*Items*	*Instruction*	*Typical*	*Limit*	*Unit*
1	Video sensitivity	For 30dB S/N	44	≤51	dBuV
2	FM sound sensitivity	For 30dB S/N	21	≤35	dBuV
3	Color sensitivity	For RF transmission	37	≤40	dBuV
4	CCD sensitivity	TV screen refreshes 40 times number of mistakes≤8	43	≤50	dBuV
5	Minimum NICAM threshold	Without crackline noise	N/A	N/A	dBuV
6	Stereo Channel Separation	BTSC.	18	≥15	dB
7	AGC static characteristic	Accept. Picture/Sound repr.	90	≥90	dBuV
8	Selectivity	Adjacent sound carrier	30	≥28	dB
		Below adjacent sound carrier	30	≥30	
		Adjacent picture carrier	45	≥40	
		Up adjacent picture carrier	40	≥30	
9	IF rejection		55	≥45	dB
10	Image rejection	VHF	57	≥45	dB
		UHF	55	≥40	
11	AFT pull-in range		±1.0	≥|±1.0|	MHz
12	Chroma sync pull-in range		±500	≥|±200|	Hz
13	Color killer function		-11	≤-10	dB

14	Resolution	RF	Horizontal	PAL	300	≥300	Lines
				NTSC	260	≥240	Lines
			Vertical	PAL	410	≥400	Lines
				NTSC	320	≥300	Lines
		Video	Horizontal		450	≥450	Lines
			Vertical		400	≥400	Lines

15	Color Coordination	White	Xw	Full Pattern	0.285	0.285±0.02	
			Yw		0.293	0.293±0.02	
16	View Angle(Lo/3)	Horizontal			170	≥170	Degree
		Vertical					
17	Overscan			Cross hatch signal	96	94~98	%
18	Picture position			In all direction	±2	≤|±3|	mm
19	H sync pull-in range				±400	≥|±200|	Hz
20	V sync pull-in range				6	≥6	Hz
21	Audio frequency response			±3dB ref. to 1KHz	0.15~12	0.2~12	KHz

22	Max Audio Output Power		7×2	≥5.0×2	W
23	Audio output power 10% THD	1KHz 10% THD	6×2	≥4.0×2	W
24	THD	Po=0.5W	0.5	≤3	%
25	Signal to buzz ratio	coeighting	50	≥30	dB
26	Minimum volume hum	coeighting	6	≤10	mVrms
27	Maximum woofer output power		N/A	N/A	W
28	Woofer audio frequency response	?3dB ref. to 15Hz AV mode	N/A	N/A	Hz
29	Tone low frequency	100Hz ref. to 1KHz AV mode	±8	≥|±3|	dB
30	Tone high frequency	10KHz ref. to 1KHz AV mode	±8	≥|±3|	dB
31	Balance	Center	0	≤|±2|	dB
		Max.	3	>2	
		Min.	-35	≤-30	

32	Video input level		1.0	1±0.3	Vpp
33	Audio input level*（1）		1.0 *	0.5±0.3	Vrms
34	Video output level		N/A	N/A	Vrms
35	Audio output level		0.3	0.5±0.3	Vrms
36	AV Audio input max. level		2	≤2	Vrms
37	AV Audio output L/R Separation		35	≥30	dB
38	Power consumption	Operating	200	≤200	W
		Stand by	3	≤5	W
39	IR receiving distance	0 Degree	7	≥6	m
40	IR receiving angle left/right	5m	60	≥45	Degree
	IR receiving angle Up/down		20	≥15	Degree
41	Dielectric strength	DC 3KV 1min.	5	≤10	mArms
42	The vibration noise from electromagnetic devices in LCD-TV set	The distance between the tester and the LCD-TV set is four times as many as the screen height	No obvious vibration noise can be heard		

Reference No : LCT3701AD

Test Condition

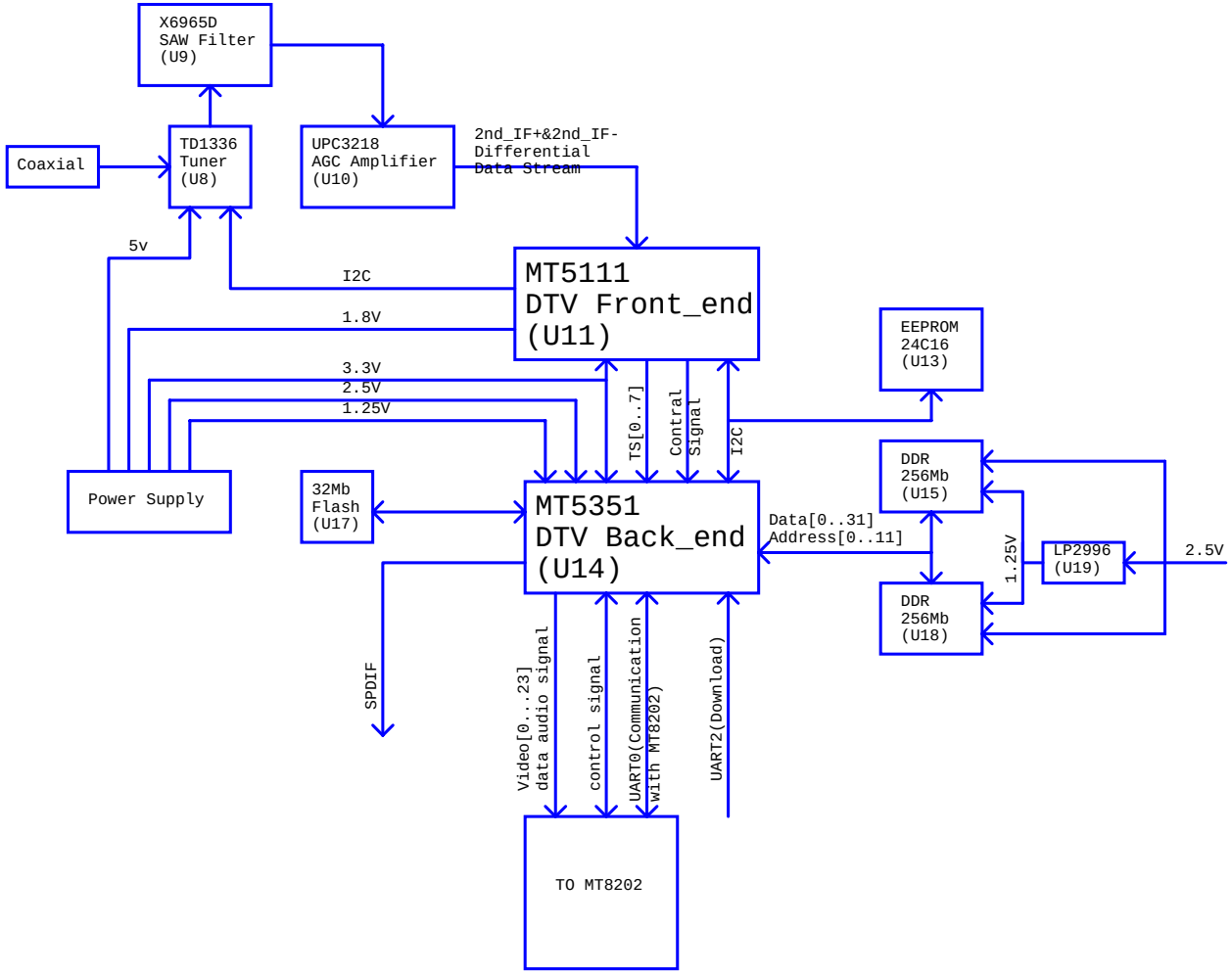
All tests shall be performed under the following conditions unless otherwise specified

1	**Picture Modulation**	**87.5%**
2	**Sound Modulation**	**27KHz Dev. For DK/I/BG** **15KHz Dev. For M/N**
3	**Picture to Sound Ratio**	**10dB**
4	**Sound Artificial Load Resistor**	**8 ohm**
5	**Video signal**	**Stair and Special**
6	**Audio signal**	**1KHz sine wave 0.5Vrms**
7	**Other conditions:** **A. Switch LCD-TV on and let it warm up for more than 30 minutes.** **Viewing distance: 3H (H: Panel High) in front of LCD, about 2M.** **B. Brightness, Contrast, Saturation, Tint, sharpness set at normal.** **C. RF test point: Video output.**	
8	**Note:** ***(1) Now this project cannot fit the limited spec. the typical audio input level is 1.0 Vrms,**	

DVD player's spec. For LCD-TV Combo

Division	Section	Remarks
General	name	AKAI
	Marketing Area(setup default language)	USA
	Power supply	+5v,+3.3v
	Power Consumption	15W
	Manufactruer of Loader mechanism	Foryou DL06-LS
DVD Module	Opitical Pick UP	Sanyo HD-62/65
	Chipset used	MTK 1389FE
Playback Disc Type	Playable Media Type	Playable Disc Type: DVD, CD,
	Playable Disc Type	DVD(Single/ Dual layer, Double sided), CD
	Disc Size	8cm/12cm
	Regional code	Regional 1
	NTSC/ PAL Disc playback	O/O
Video	Video output signal	NTSC
	Video DAC	27MHz/ 10bit
Audio	Audio DAC	48Khz/ 96KHz/24-bit:selectable
	Dynamic range	Present
	Dolby digital decoder	Present
	DTS decoder	optional
	SRS + TruSurround for 2 channel	Not present
	3D Virtual surround for 2 channel	Not present
Playback Features	Fast forward/backward	x2,x4,x8,x16,x32
	Slow motion forward	x1/2,x1/4,x1/8,x1/16
	Slow motion backward	optional
	Still picture	Present
	Frame by frame forward/reverse	Forward only (Step function)
	Skip forward/reverse	Present
	Repeat function	Present
	DVD closed caption	Present
	Transition Effect for picture CD	Not present
	Rotation of picture for picture CDs	Present
	Last Memory	Present
Display user operation	Graphical user interface	Not present
	OSD Language	3 (ENG is base ,SPA and French)
	Subtitle	Present
	Screen saver	Present
	Resume play	Present
	Program function	Present
	PBC ON/OFF	Default on PCB
	Parental lock	Passward : 0000
	Picture mode selector	16:9, 4:3 LB, 4:3 PS(4:3 PS as default)
	Intro scan	Not present
	Digest in VCD	Present, only for PIC CD
	Time search	Present
	Multi angle	Present
	Selectable audio language streams	Present
Front Panel	kalaoke function	x
	VFD/ LED	x
	No. of keys	3(Open/Close, Play, Stop)
Rear Panel	Composite Video output	x
	Component Video output	x
	Progressive scan output (480P)	Present
	2 channel audio output	Present
	Coaxial audio output	Present

ATSC SYSTEM



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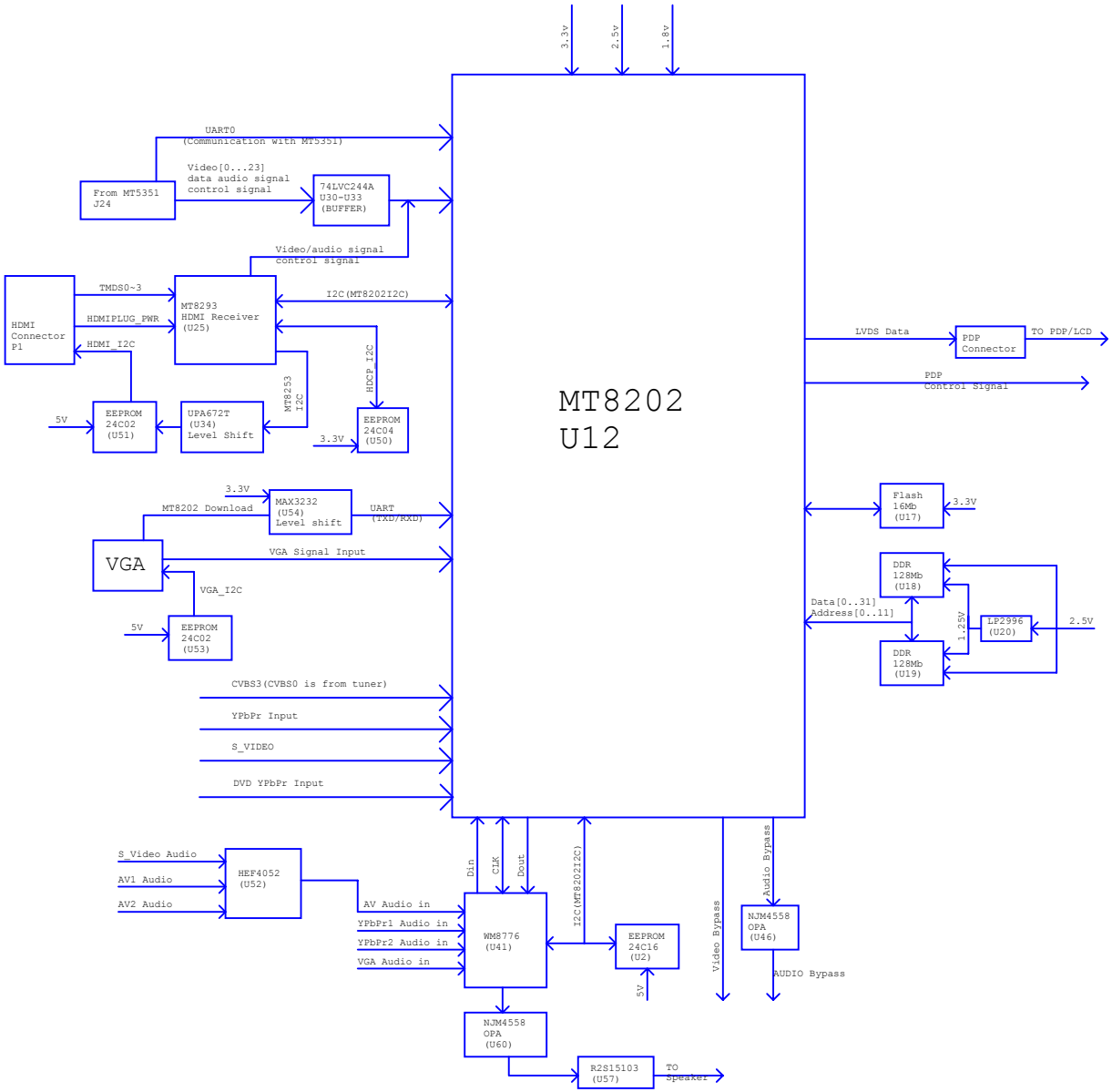

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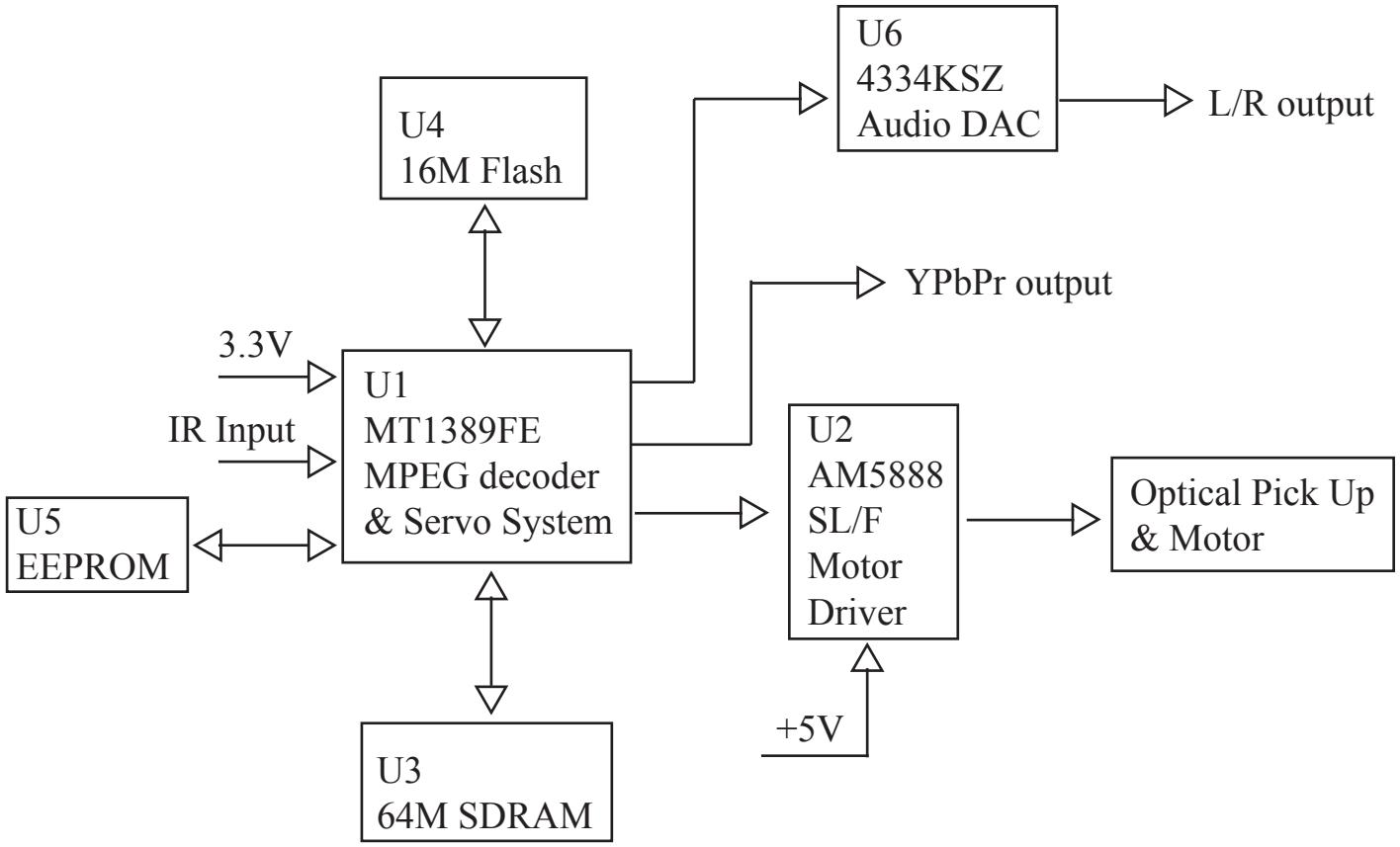
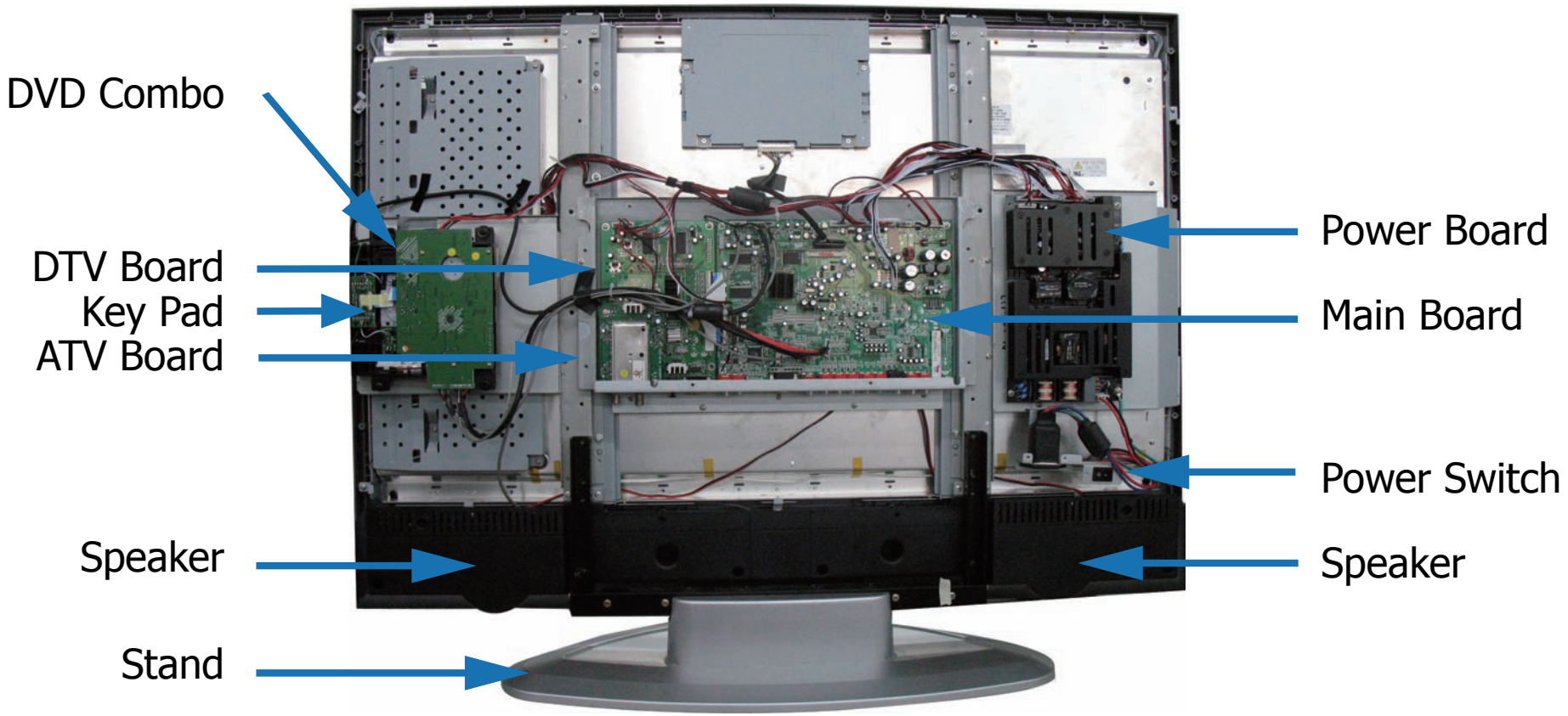
		Checked: <Checker>	
Date: Friday, March 17, 2006		Sheet 2 of 2	

Combo DVD


U6
4334KSZ
Audio DAC
L/R output
U4
16M Flash
YPbPr output
3.3V
U1
MT1389FE
MPEG decoder
& Servo System
IR Input
U2
AM5888
SL/F
Motor
Driver
Optical Pick Up
& Motor
U5
EEPROM
+5V
U3
64M SDRAM

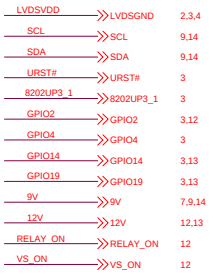
Parts Position

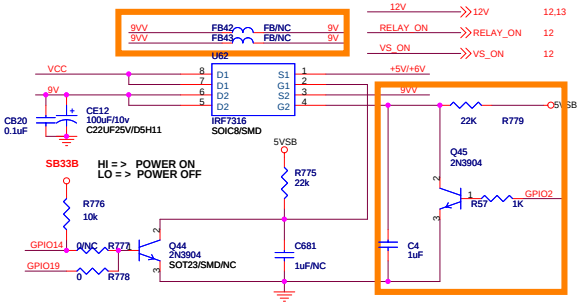


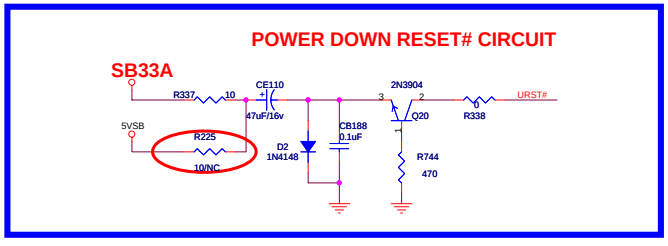
MT8202E (PBGA388) LCDTV BOARD 4 LAYERS FOR AKAI

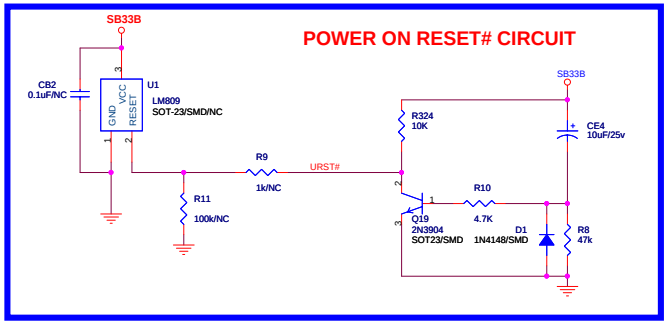
1. INDEX / POWER / RESET / EEPROM
2. LDO
3. MT8202E PBGA388
4. MT8202 DECOUPLING
5. DDR MEMORY & FLASH
6. MT5351 INTERFACE
7. HDMI MT8293
8. DAUGHTER BOARD IN
9. WM8776 & VIDEO BYPASS
10. AUDIO / VIDEO IN CIRCUIT
11 . VGA & PC AUDIO IN
12. LVDS OUT
13. BACK LIGHT / KEYPAD
14. TUNER IN
15. AV IN
16. AUDIO IN
17.AUDIO Amplifier

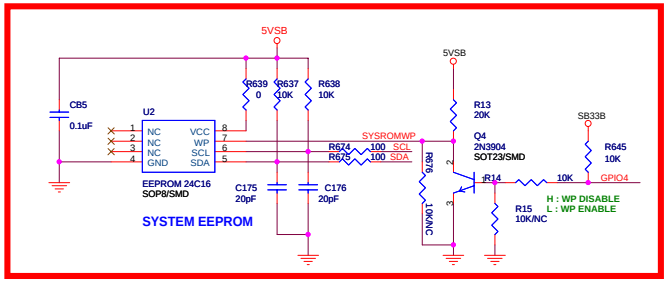
Rev	History	P#	Date
AKAI_MT8202_27US_LVDS_V0.0	New		2005/11/22
AKAI_MT8202_27US_HDMI_LVDS_V0.0	ADD HDMI / VIDEO /AUDIO CONNECTOR INPUT IN		

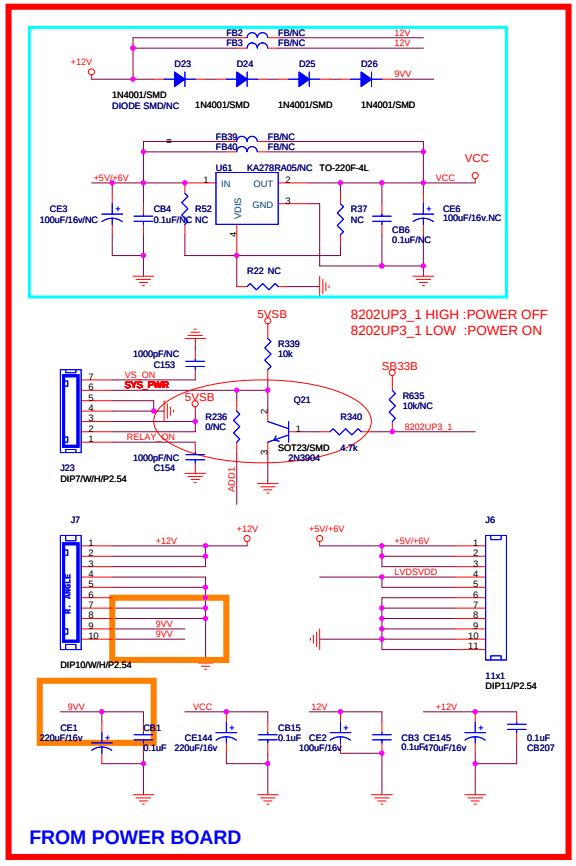


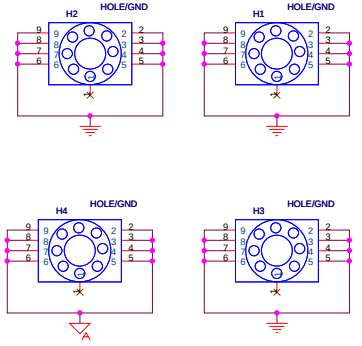












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Title: INDEX / POWER / RESET / EEPROM			
Size: C	Document Number: AKAI_MT8202_27US_LVDS_V0.0	<Designer>	Rev: 1
		Checked: <Checker>	
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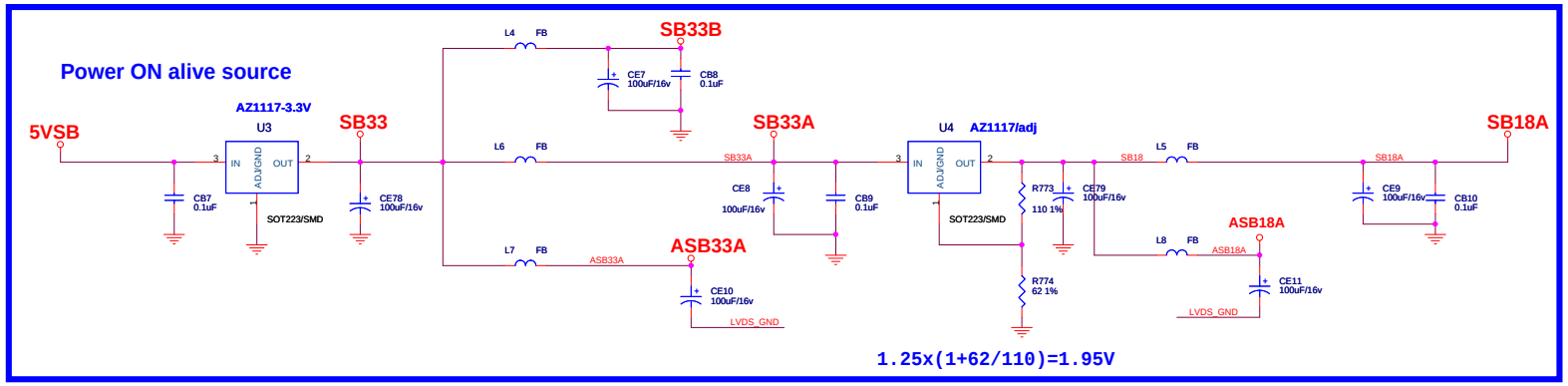

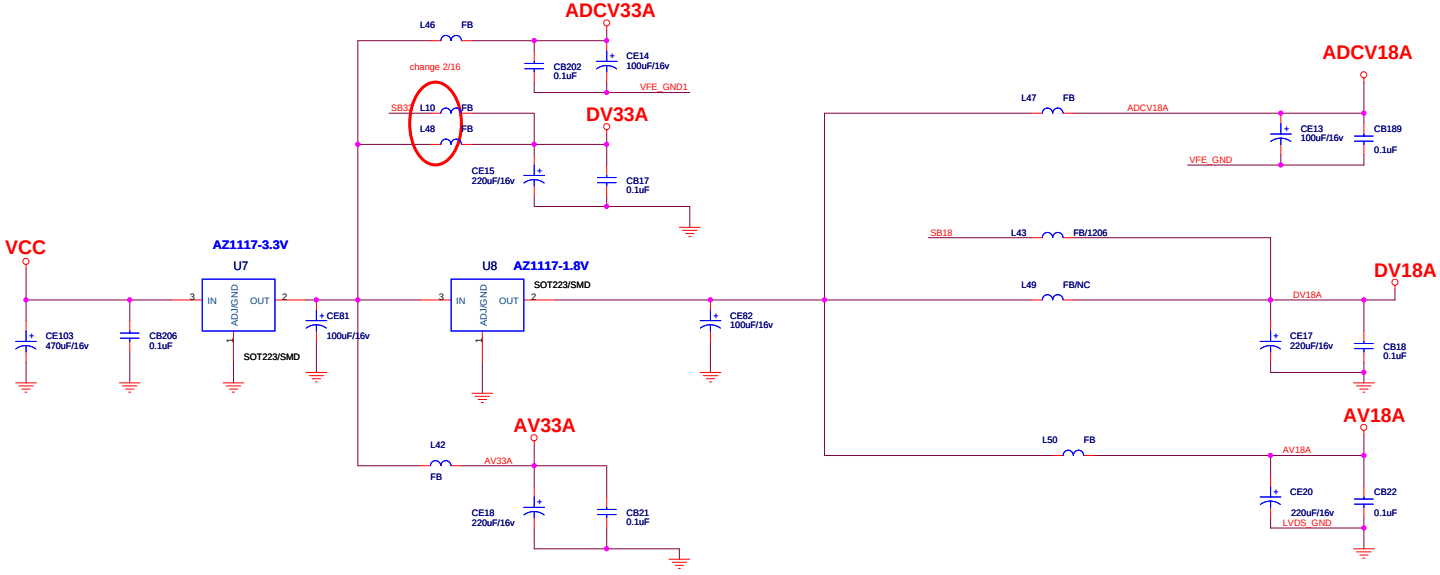

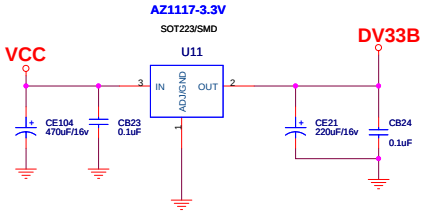

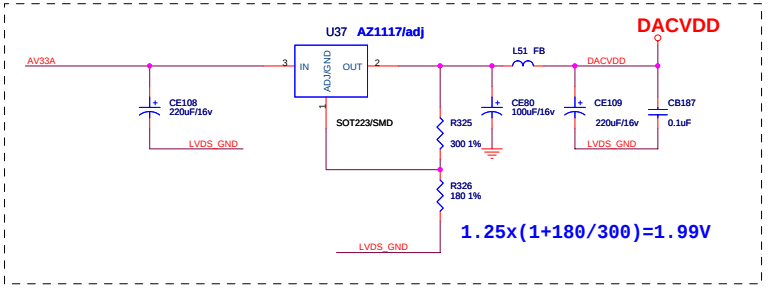

LVDS_GND >> LVDS_GND 3,4,12
VFE_GND >> VFE_GND 3,4,8,11
VFE_GND1 >> VFE_GND1 3,4,8,11

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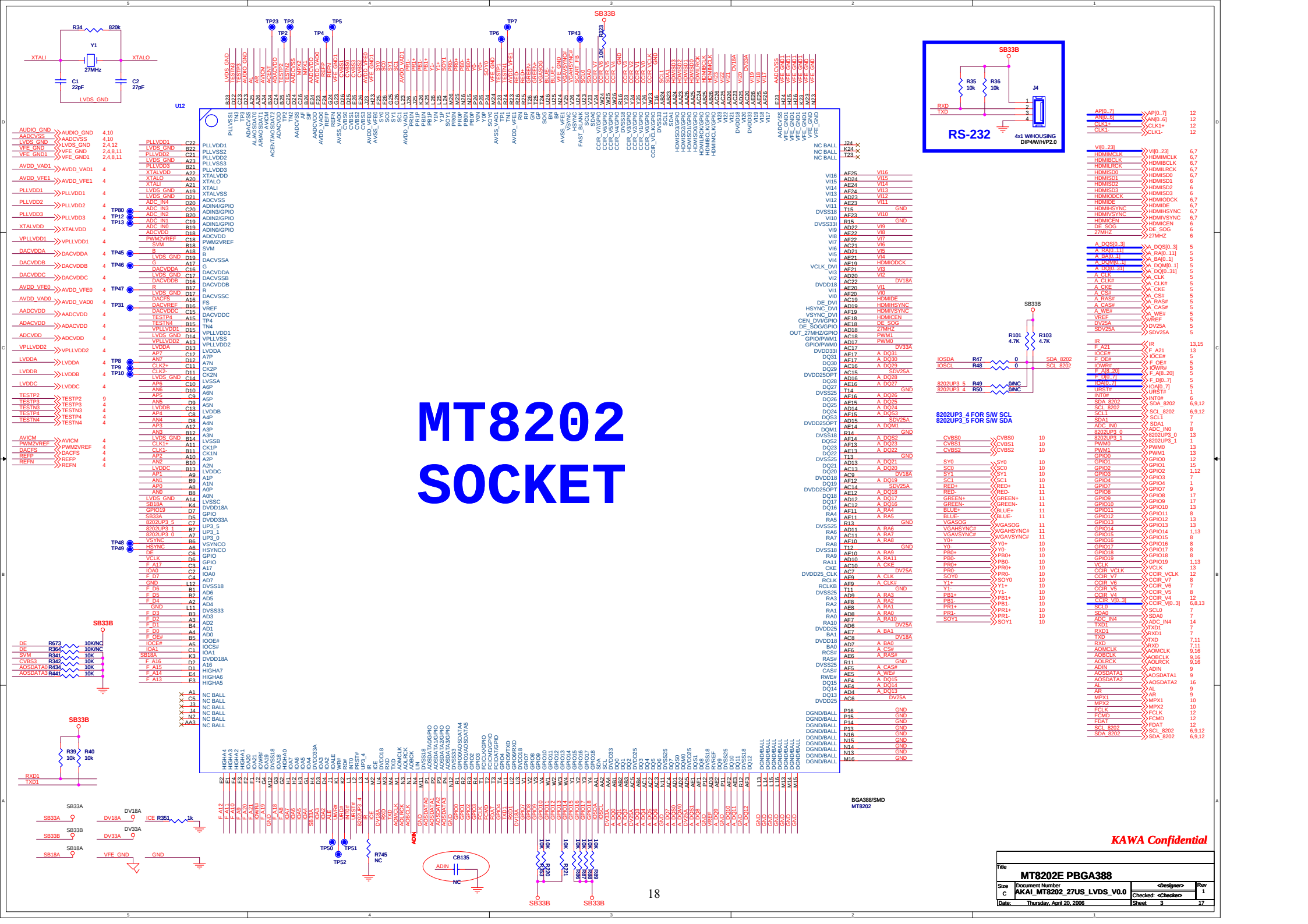

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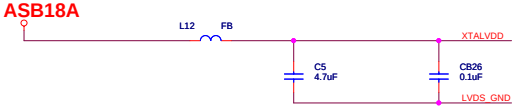
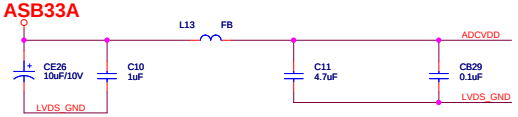
STANDBY ANALOG POWER

ASB18A

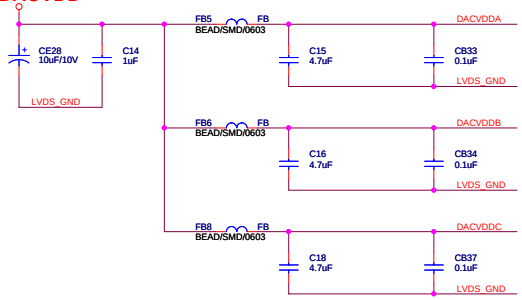


ASB33A



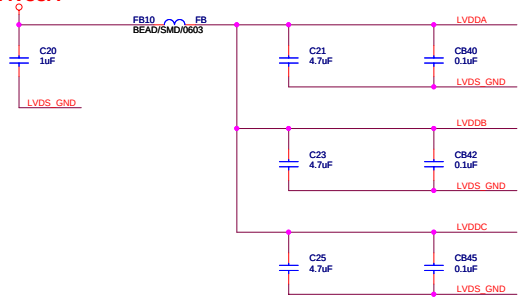
NORMAL VIDEO DAC POWER

DACVDD



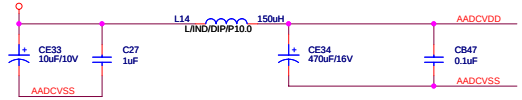
NORMAL VIDEO DAC POWER

AV33A



NORMAL AUDIO ADC / DAC POWER

ADCV33A



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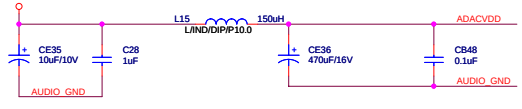

NORMAL ANALOG POWER

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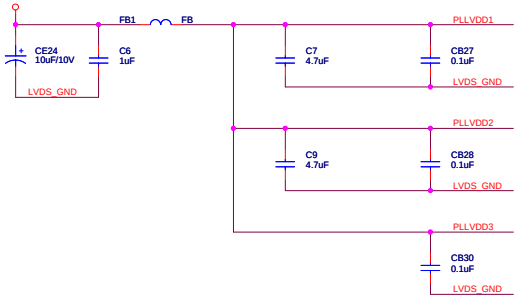
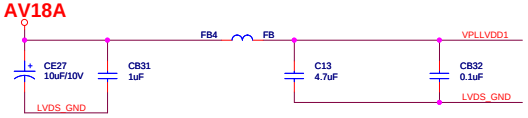


AV18A



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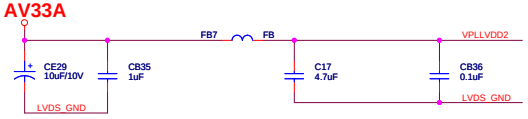
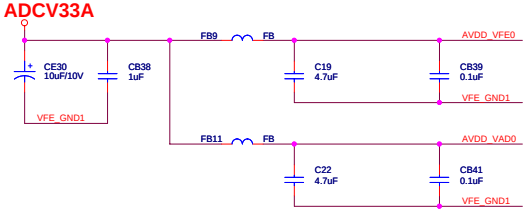


NORMAL VIDEO ADC POWER

ADCV33A



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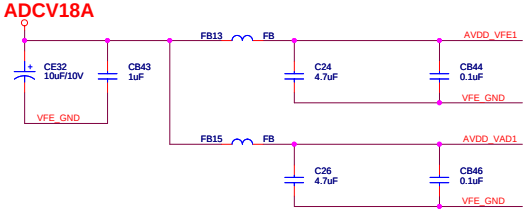
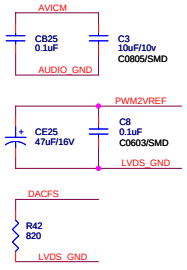
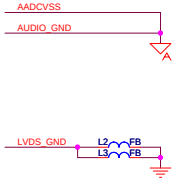
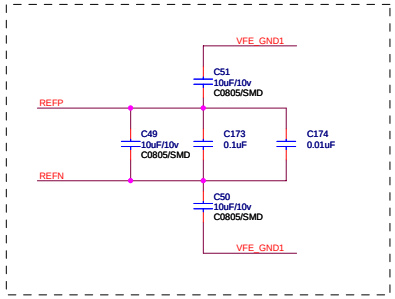


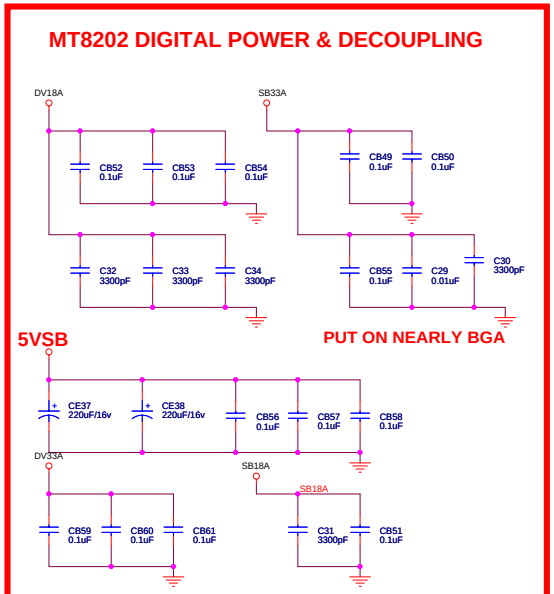






TESTP3	R43	49.9 1%	PLLVDD1
TESTN3	R44	49.9 1%	PLLVDD1
TESTP4	R45	49.9 1%	VPLLVDD1
TESTN4	R46	49.9 1%	VPLLVDD1

MT8202 DIGITAL POWER & DECOUPLING



XTALVDD	XTALVDD 3
ADCVDD	ADCVDD 3
AVICM	AVICM 3
PWM2VREF	PWM2VREF 3
DACFS	DACFS 3
LVDDA	LVDDA 3
LVDDB	LVDDB 3
LVDDC	LVDDC 3
AVDD_VFE0	AVDD_VFE0 3
AVDD_VAD0	AVDD_VAD0 3
AADCVDD	AADCVDD 3
ADACVDD	ADACVDD 3
VPLLVDD1	VPLLVDD1 3
VPLLVDD2	VPLLVDD2 3
AVDD_VAD1	AVDD_VAD1 3
AVDD_VFE1	AVDD_VFE1 3
PLLVDD1	PLLVDD1 3
PLLVDD2	PLLVDD2 3
PLLVDD3	PLLVDD3 3
DACVDDA	DACVDDA 3
DACVDDB	DACVDDB 3
DACVDDC	DACVDDC 3
TESTP3	TESTP3 3
TESTN3	TESTN3 3
TESTP4	TESTP4 3
TESTN4	TESTN4 3
REFP	REFP 3
REFN	REFN 3
AADCVSS	AADCVSS 3,10
AUDIO_GND	AUDIO_GND 3,10
LVDS_GND	LVDS_GND 2,3,12
VFE_GND	VFE_GND 2,3,8,11
AADCVSS	AADCVSS 3,10
VFE_GND1	VFE_GND1 2,3,8,11

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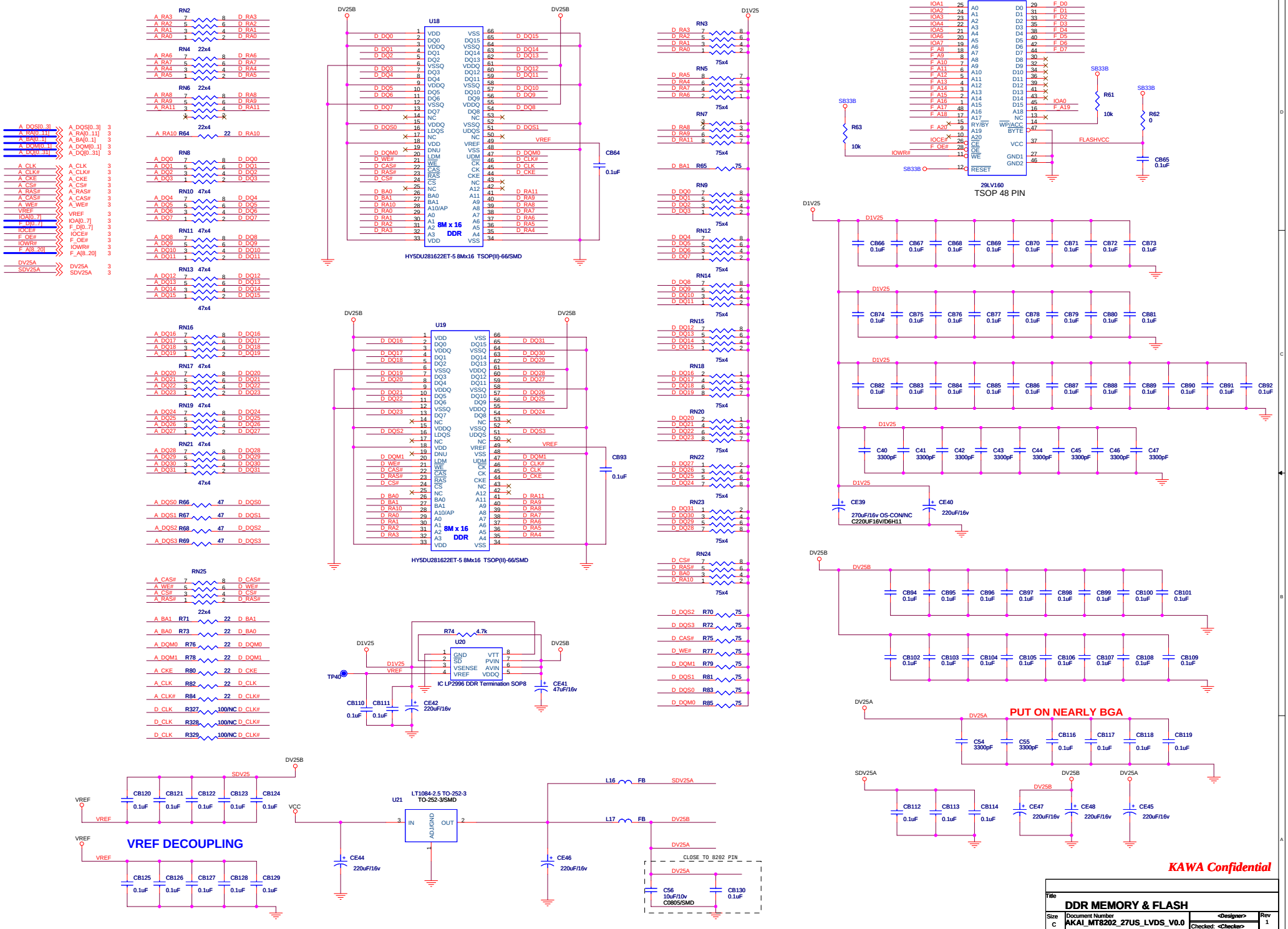
A_DQS[0..3]
A_RA[0..11]
A_BA[0..1]
A_DQM[0..1]
A_DQ[0..31]
A_CLK
A_CLK#
A_CKE
A_CS#
A_RAS#
A_CAS#
A_WE#
VREF
IOA[0..7]
F_DI[0..7]
IOCE#
F_OE#
IOWR#
F_A[8..20]
DV25A
SDV25A
RN2
RN4 22x4
RN6 22x4
RN8
RN10 47x4
RN11 47x4
RN13 47x4
RN16
RN17 47x4
RN19 47x4
RN21 47x4
RN25
R64 22
R66 47
R67 47
R68 47
R69 47
R71 22
R73 22
R76 22
R78 22
R80 22
R82 22
R84 22
R327 100/NC
R328 100/NC
R329 100/NC
U18
U19
8M x 16 DDR
HY5DU281622ET-5 8Mx16 TSOP(II)-66/SMD
DV25B
VREF
CB64 0.1uF
CB93 0.1uF
RN3
RN5
RN7
RN9
RN12
RN14
RN15
RN18
RN20
RN22
RN23
RN24
75x4
R65 75
R70 75
R72 75
R75 75
R77 75
R79 75
R81 75
R83 75
R85 75
U20
IC LP2996 DDR Termination SOP8
R74 4.7k
TP40
CB110 0.1uF
CB111 0.1uF
CE42 220uF/16v
CE41 47uF/16v
D1V25
U17
29LV160
TSOP 48 PIN
SB33B
R61 10k
R62 0
R63 10k
CB65 0.1uF
FLASHVCC
IOWR#
IOCE#
F_OE#
RESET
CB66 0.1uF
CB67 0.1uF
CB68 0.1uF
CB69 0.1uF
CB70 0.1uF
CB71 0.1uF
CB72 0.1uF
CB73 0.1uF
CB74 0.1uF
CB75 0.1uF
CB76 0.1uF
CB77 0.1uF
CB78 0.1uF
CB79 0.1uF
CB80 0.1uF
CB81 0.1uF
CB82 0.1uF
CB83 0.1uF
CB84 0.1uF
CB85 0.1uF
CB86 0.1uF
CB87 0.1uF
CB88 0.1uF
CB89 0.1uF
CB90 0.1uF
CB91 0.1uF
CB92 0.1uF
C40 3300pF
C41 3300pF
C42 3300pF
C43 3300pF
C44 3300pF
C45 3300pF
C46 3300pF
C47 3300pF
CE39 270uF/16v OS-CON/NC C220UF16V/D6H11
CE40 220uF/16v
CB94 0.1uF
CB95 0.1uF
CB96 0.1uF
CB97 0.1uF
CB98 0.1uF
CB99 0.1uF
CB100 0.1uF
CB101 0.1uF
CB102 0.1uF
CB103 0.1uF
CB104 0.1uF
CB105 0.1uF
CB106 0.1uF
CB107 0.1uF
CB108 0.1uF
CB109 0.1uF
PUT ON NEARLY BGA
C54 3300pF
C55 3300pF
CB116 0.1uF
CB117 0.1uF
CB118 0.1uF
CB119 0.1uF
CB112 0.1uF
CB113 0.1uF
CB114 0.1uF
CE47 220uF/16v
CE48 220uF/16v
CE45 220uF/16v
VREF DECOUPLING
CB120 0.1uF
CB121 0.1uF
CB122 0.1uF
CB123 0.1uF
CB124 0.1uF
CB125 0.1uF
CB126 0.1uF
CB127 0.1uF
CB128 0.1uF
CB129 0.1uF
LT1084-2.5 TO-252-3
TO-252-3/SMD
U21
ADJ/GND
IN
OUT
VCC
CE44 220uF/16v
CE46 220uF/16v
L16 FB
L17 FB
SDV25
CLOSE TO 8202 PIN
C56 10uF/10v C0805/SMD
CB130 0.1uF
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DDR MEMORY & FLASH
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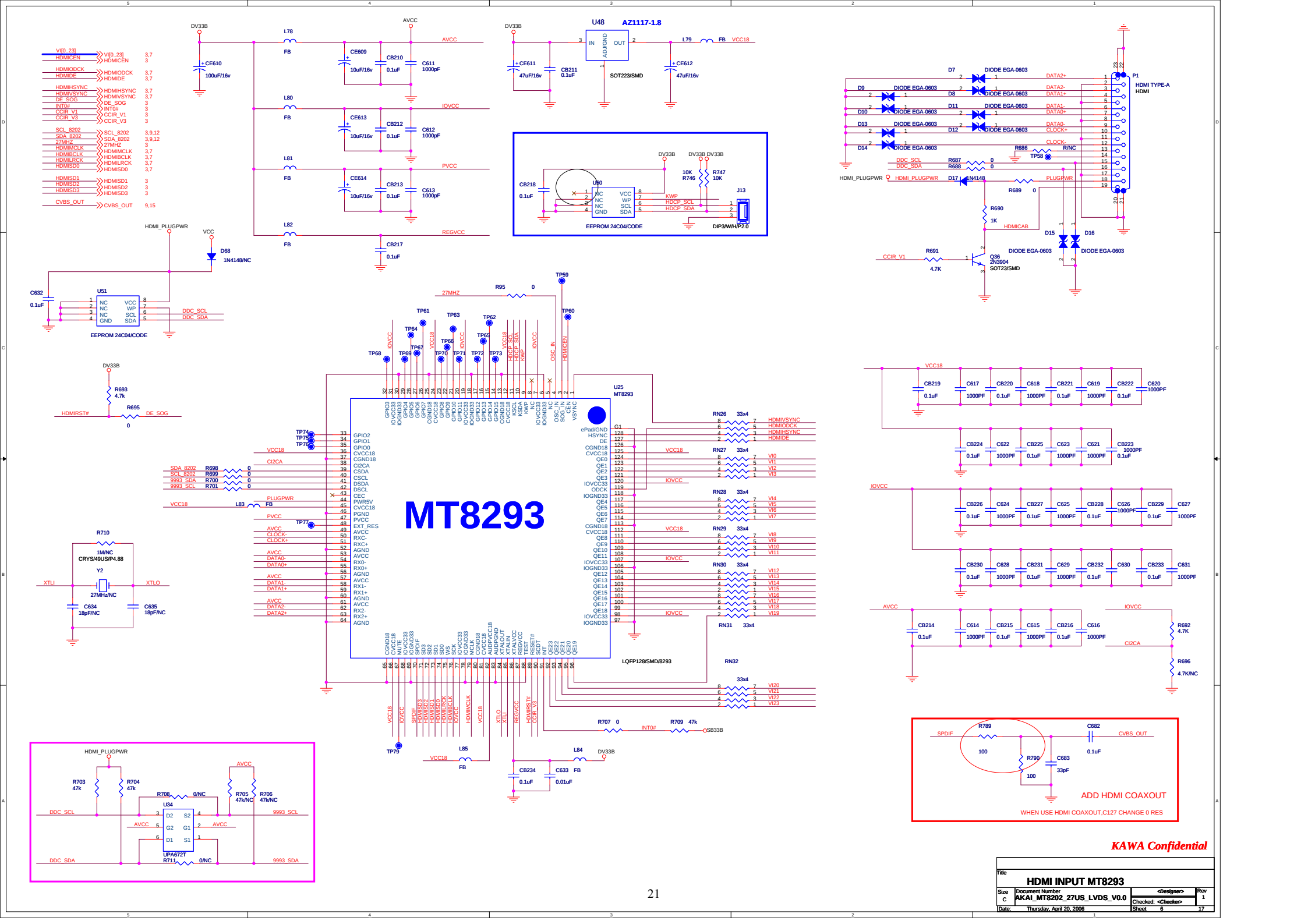
MT8293
U25
MT8293
LQFP128/SMD/8293
U48
AZ1117-1.8
SOT223/SMD
EEPROM 24C04/CODE
DIP3/W/HP2.0
U51
U50
U34
UPA672T
P1
HDMI TYPE-A
HDMI
Q36
2N3904
SOT23/SMD
Y2
27MHZ/NC
ADD HDMI COAXOUT
WHEN USE HDMI COAXOUT,C127 CHANGE 0 RES
KAWA Confidential
HDMI INPUT MT8293
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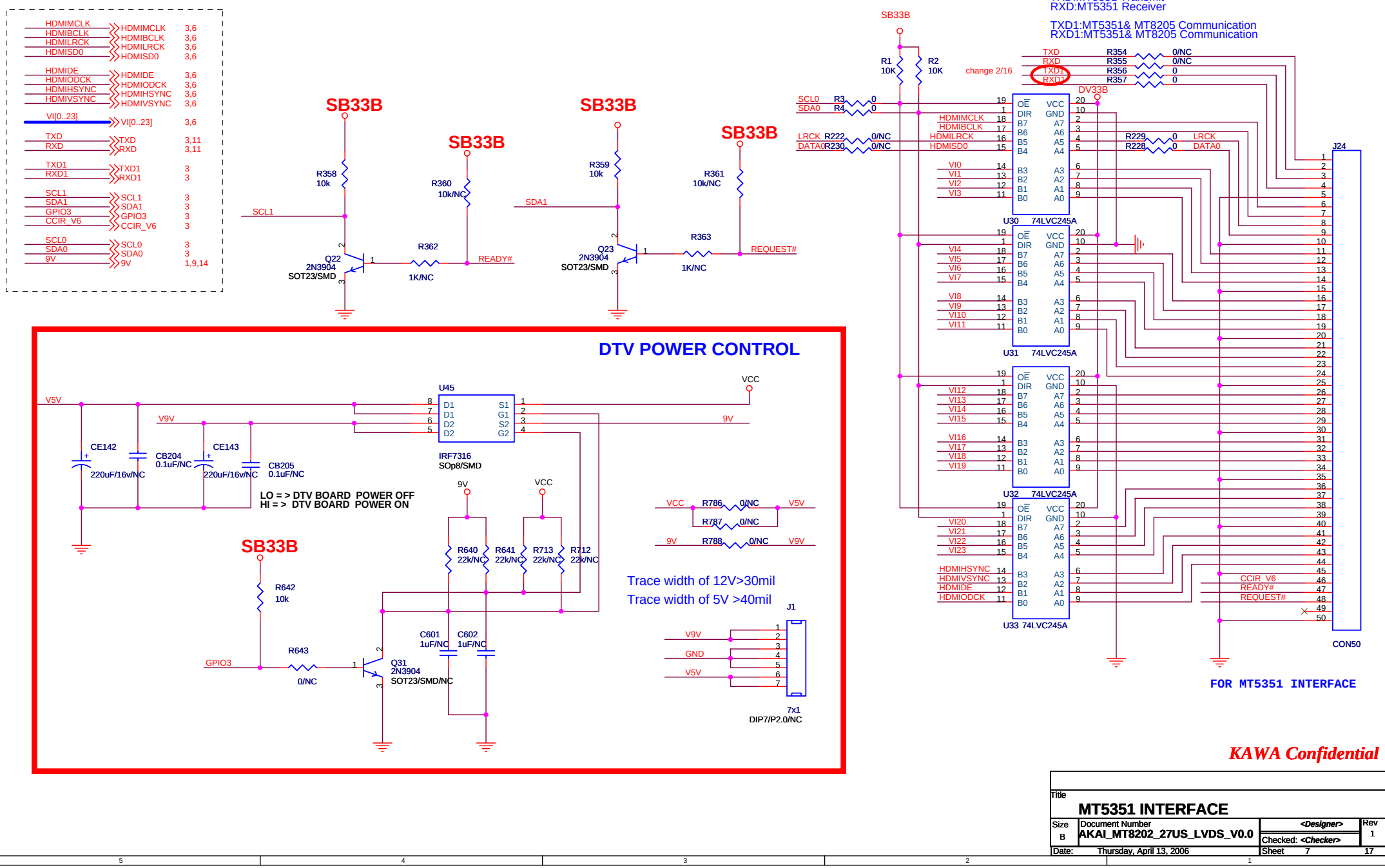
HDMIMCLK 3,6
HDMIBCLK 3,6
HDMILRCK 3,6
HDMISD0 3,6
HDMIDE 3,6
HDMIODCK 3,6
HDMIHSYNC 3,6
HDMIVSYNC 3,6
VI[0..23] 3,6
TXD 3,11
RXD 3,11
TXD1 3
RXD1 3
SCL1 3
SDA1 3
GPIO3 3
CCIR_V6 3
SCL0 3
SDA0 3
9V 1,9,14
SB33B
R358 10k
R360 10k/NC
SCL1
Q22 2N3904 SOT23/SMD
R362
1K/NC
READY#
R359 10k
SDA1
Q23 2N3904 SOT23/SMD
R363
1K/NC
R361 10k/NC
REQUEST#
DTV POWER CONTROL
V5V
V9V
U45
IRF7316 SOp8/SMD
CE142 220uF/16v/NC
CB204 0.1uF/NC
CE143 220uF/16v/NC
CB205 0.1uF/NC
LO = > DTV BOARD POWER OFF
HI = > DTV BOARD POWER ON
VCC
9V
R640 22k/NC
R641 22k/NC
R713 22k/NC
R712 22k/NC
R642 10k
R643 0/NC
GPIO3
Q31 2N3904 SOT23/SMD/NC
C601 1uF/NC
C602 1uF/NC
R786 0/NC
R787 0/NC
R788 0/NC
Trace width of 12V>30mil
Trace width of 5V >40mil
J1
7x1 DIP7/P2.0/NC
TXD:MT5351 Transmit
RXD:MT5351 Receiver
TXD1:MT5351& MT8205 Communication
RXD1:MT5351& MT8205 Communication
change 2/16
R1 10K
R2 10K
R354 0/NC
R355 0/NC
R356 0
R357 0
DV33B
SCL0 R3 0
SDA0 R4 0
LRCK R222 0/NC
DATA0 R230 0/NC
R229 0 LRCK
R228 0 DATA0
U30 74LVC245A
U31 74LVC245A
U32 74LVC245A
U33 74LVC245A
J24
CON50
CCIR_V6
READY#
REQUEST#
FOR MT5351 INTERFACE
KAWA Confidential
Title
MT5351 INTERFACE
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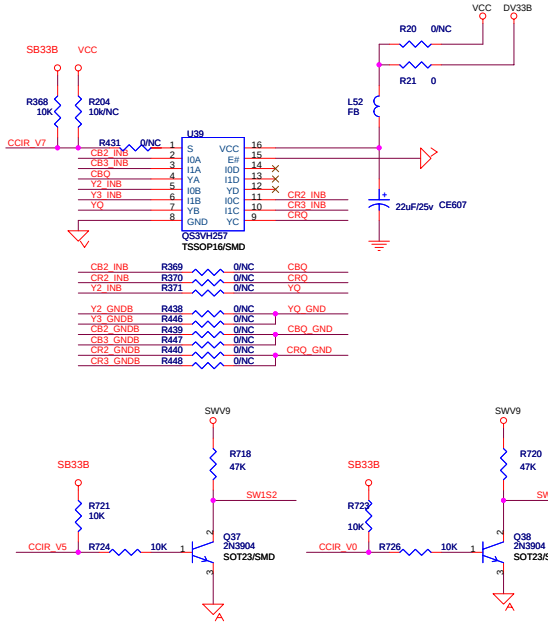
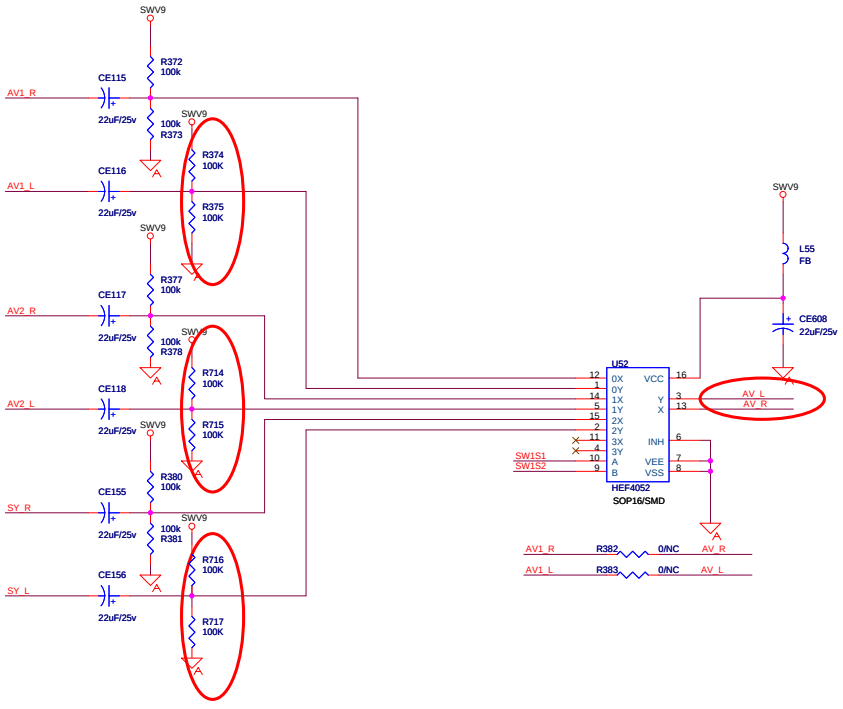
INPUT

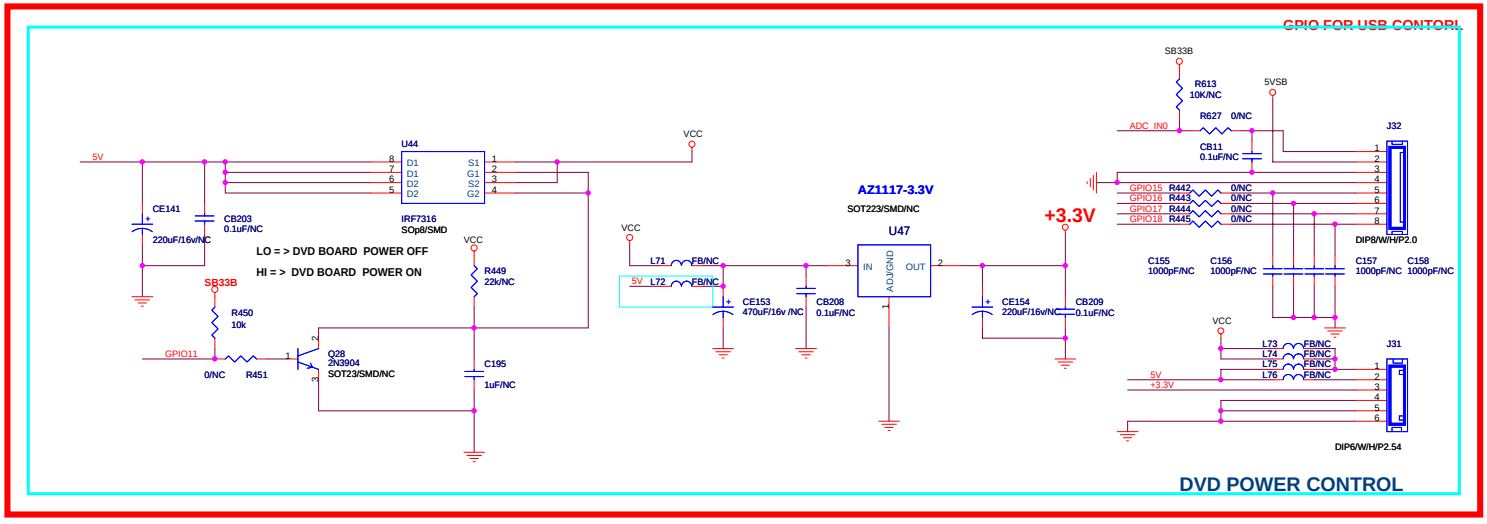
ADC_IN0	ADC_IN0	3
CCIR_V0	CCIR_V0	3
CCIR_V5	CCIR_V5	3
CCIR_V7	CCIR_V7	3
GPIO11	GPIO11	3
GPIO15	GPIO15	3
GPIO16	GPIO16	3
GPIO17	GPIO17	3
GPIO18	GPIO18	3
VFE_GND	VFE_GND	2,3,4,11
AADCVSS	AADCVSS	3,4,10
AV1_R	AV1_R	15
AV1_L	AV1_L	15
AV2_R	AV2_R	15
AV2_L	AV2_L	15
SY_R	SY_R	15
SY_L	SY_L	15
Y2_INB	Y2_INB	15
Y2_GNDB	Y2_GNDB	10,15
CB2_INB	CB2_INB	15
CB2_GNDB	CB2_GNDB	10,15
CR2_INB	CR2_INB	15
CR2_GNDB	CR2_GNDB	10,15
Y3_INB	Y3_INB	15
Y3_GNDB	Y3_GNDB	15
CB3_INB	CB3_INB	15
CB3_GNDB	CB3_GNDB	15
CR3_INB	CR3_INB	15
CR3_GNDB	CR3_GNDB	15
9V	9V	1,7,9,14

OUTPUT

AV_R	AV_R	9
AV_L	AV_L	9
YQ	YQ	10
CBQ	CBQ	10
CRQ	CRQ	10
YQ_GND	YQ_GND	10
CBQ_GND	CBQ_GND	10
CRQ_GND	CRQ_GND	10







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Size: C	Document Number: AKAI_MT8202_27US_LVDS_V0.0	<Designer>	Rev: 1
		Checked: <Checker>	
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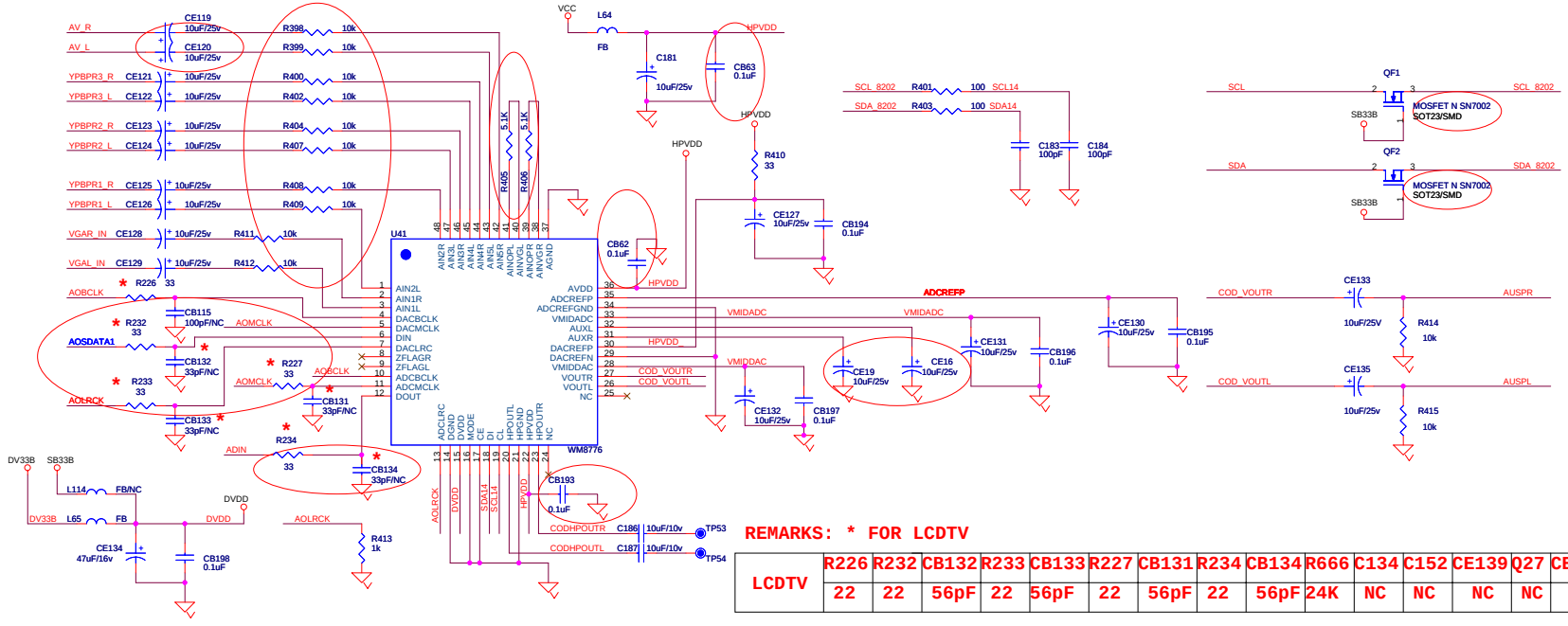
INPUT

GPIO7	GPIO7	3
SCL	SCL	1,14
SDA	SDA	1,14
SDA_8202	SDA_8202	3,6,12
SCL_8202	SCL_8202	3,6,12
AOSDATA1	AOSDATA1	3
AOMCLK	AOMCLK	3,16
AOBCLK	AOBCLK	3,16
AOLRCK	AOLRCK	3,16
ADIN	ADIN	3
AV_R	AV_R	8
AV_L	AV_L	8
YPBPR1_L	YPBPR1_L	15
YPBPR1_R	YPBPR1_R	15
YPBPR2_R	YPBPR2_R	15
YPBPR2_L	YPBPR2_L	15
YPBPR3_R	YPBPR3_R	15
YPBPR3_L	YPBPR3_L	15
VGAR_IN	VGAR_IN	11
VGAL_IN	VGAL_IN	11
TESTP2	TESTP2	3
AR	AR	3
AL	AL	3
MU	MU	16
A_MUTE	A_MUTE	17
9V	9V	1,7,14

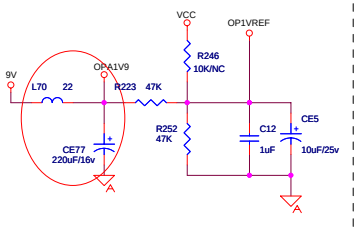
OUTPUT

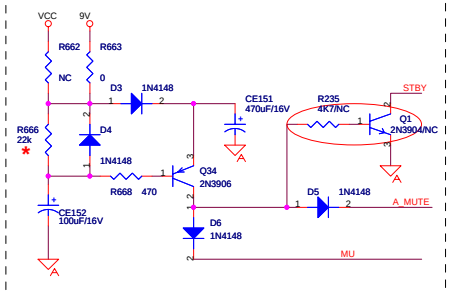
AUSPR	AUSPR	16
AUSPL	AUSPL	16
AVR_OUT	AVR_OUT	15
AVL_OUT	AVL_OUT	15
CVBS_OUT	CVBS_OUT	6,15

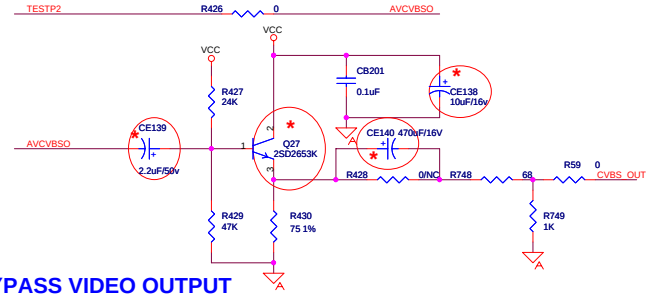


REMARKS: * FOR LCDTV

	R226	R232	CB132	R233	CB133	R227	CB131	R234	CB134	R666	C134	C152	CE139	Q27	CE140	CE138
LCDTV	22	22	56pF	22	56pF	22	56pF	22	56pF	24K	NC	NC	NC	NC	NC	NC

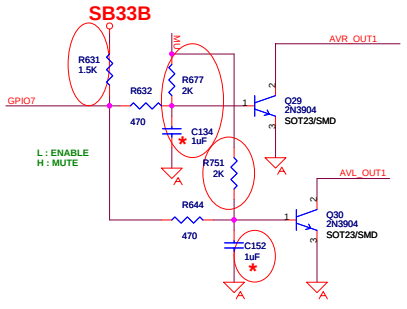




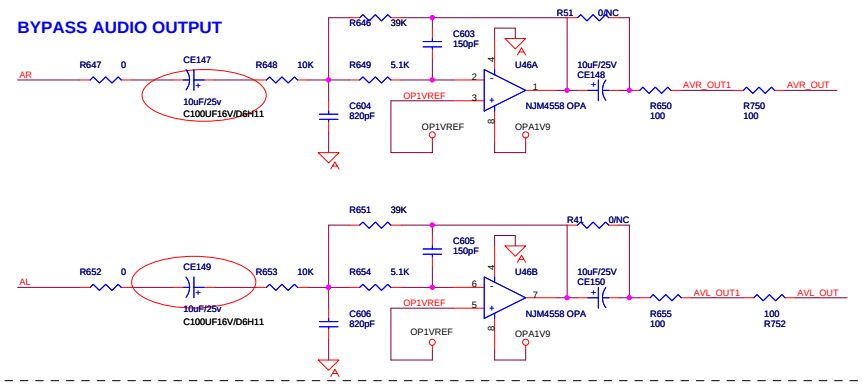


BYPASS VIDEO OUTPUT

AUDIO BYPASS MUTE



BYPASS AUDIO OUTPUT



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Title	M8776 & VIDEO BYPASS		
Size C	Document Number AKAI_MT8202_27US_LVDS_V0.0	<Designer> Checked: <Checker>	Rev 1
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CVBS0 CVBS0 3
CVBS1 CVBS1 3
CVBS2 CVBS2 3

SY0 SY0 3
SC0 SC0 3

SY1 SY1 3
SC1 SC1 3

Y0+ Y0+ 3
Y0- Y0- 3
PB0+ PB0+ 3
PB0- PB0- 3
PR0+ PR0+ 3
PR0- PR0- 3
SOY0 SOY0 3

Y1+ Y1+ 3
Y1- Y1- 3
PB1+ PB1+ 3
PB1- PB1- 3
PR1+ PR1+ 3
PR1- PR1- 3
SOY1 SOY1 3

MPX1 MPX1 3

MPX2 MPX2 3

TO MT8202

TV_GND TV_GND 14
CVBS_0 CVBS_0 14
SIF SIF 14
AF AF 14
CVBS_1 CVBS_1 15
CVBS1_GND CVBS1_GND 15
CVBS_2 CVBS_2 15
CVBS2_GND CVBS2_GND 15
SY_1 SY_1 15
SY_1_GND SY_1_GND 15
SC_1 SC_1 15
SC_1_GND SC_1_GND 15
SY_0 SY_0 15
SY_0_GND SY_0_GND 15
SC_0 SC_0 15
SC_0_GND SC_0_GND 15

SOY1 SOY1 3
SOY0 SOY0 3
Y1_INB Y1_INB 15
Y1_GNDB Y1_GNDB 8,15
CR1_INB CR1_INB 15
CR1_GNDB CR1_GNDB 8,15
CB1_INB CB1_INB 15
CB1_GNDB CB1_GNDB 8,15
CBQ CBQ 8
CRQ CRQ 8
YQ YQ 8
YQ_GND YQ_GND 8
CBQ_GND CBQ_GND 8
CRQ_GND CRQ_GND 8

FROM AV BOARD

AADCVSS AADCVSS 3,4

THIS PAGE NEARLY IC

CVBS_0 R197 0 C110 47nF CVBS0
C113 330pF TV_GND

CVBS_1 R200 0 C117 47nF CVBS1
C120 330pF CVBS1_GND

CVBS_2 R424 0 C188 47nF CVBS2
C189 330pF CVBS2_GND

SY_0 R198 0 C111 47nF SY0
C114 330pF SY_0_GND

SC_0 R201 0 C118 47nF SC0
C121 330pF SC_0_GND

SY_1 R205 0 C125 47nF SY1
C128 330pF SY_1_GND

SC_1 R209 0 C132 47nF SC1
C135 330pF SC_1_GND

R55 0 C112 4.7nF SOY0

YQ R199 68 C115 100nF Y0+
C116 15pF
YQ_GND R202 100 C119 100nF Y0-

CBQ R203 68 C122 100nF PB0+
C123 15pF
CBQ_GND R206 100 C126 100nF PB0-

CRQ R207 68 C129 100nF PR0+
C130 15pF
CRQ_GND R210 100 C133 100nF PR0-

R56 0 C136 4.7nF SOY1

Y1_INB R211 68 C137 100nF Y1+
C138 15pF
Y1_GNDB R213 100 C140 100nF Y1-

CB1_INB R214 68 C141 100nF PB1+
C142 15pF
CB1_GNDB R217 100 C145 100nF PB1-

CR1_INB R218 68 C146 100nF PR1+
C147 15pF
CR1_GNDB R219 100 C148 100nF PR1-

FROM Tuner

SIF R212 8.2K C139 10nF MPX1
C48 1.8pF AADCVSS

AF R215 39K R216 39K CE70 + 47uF/16V MPX2
C143 15pF C144 15pF AADCVSS

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Title	AUDIO / VIDEO IN CIRCUIT		
Size C	Document Number AKAI_MT8202_27US_LVDS_V0.0	<Designer> Checked: <Checker>	Rev 1
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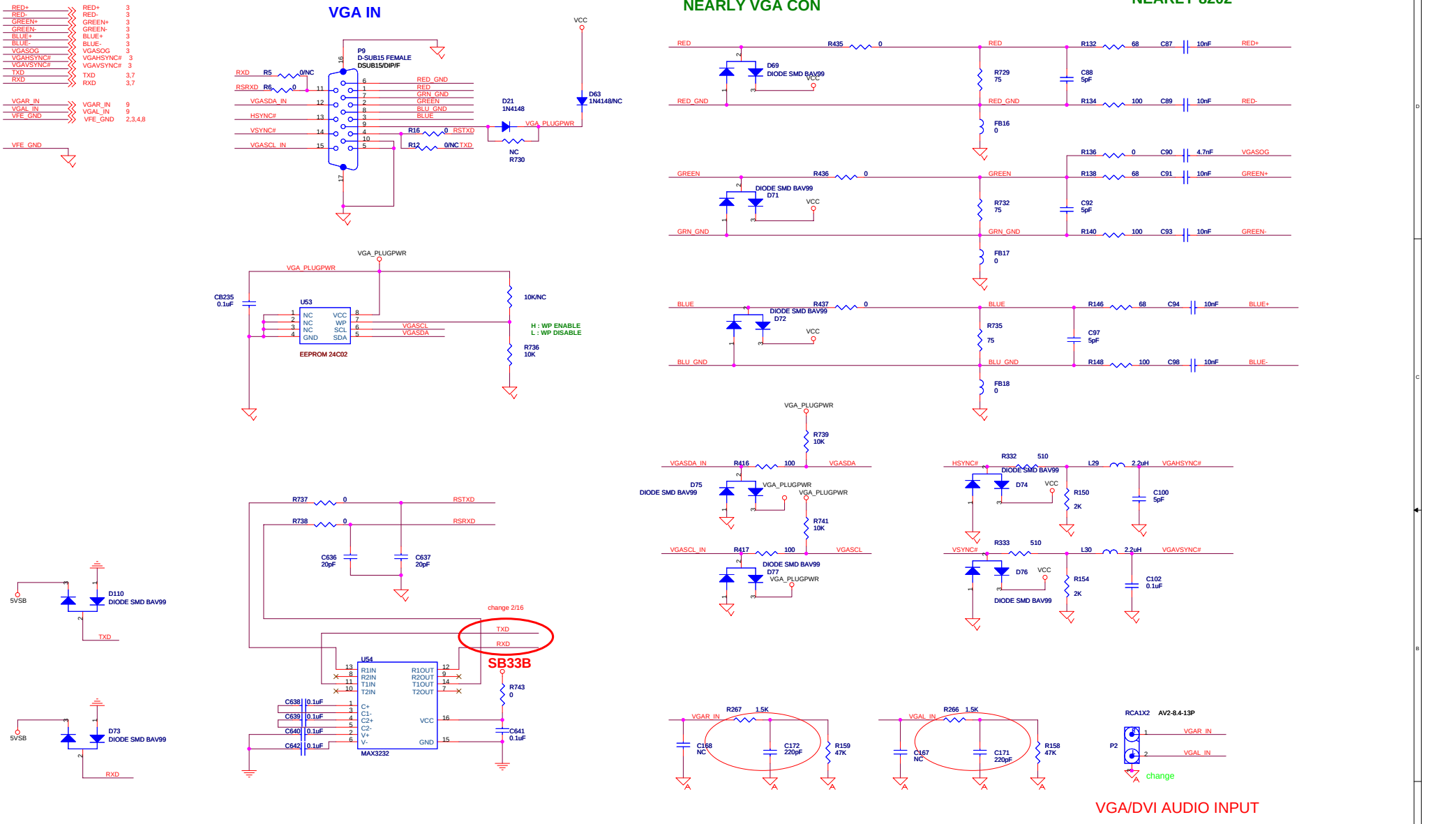
VGA IN
NEARLY VGA CON
NEARLY 8202
RED+ RED- GREEN+ GREEN- BLUE+ BLUE- VGASOG VGAHSYNC# VGAVSYNC# TXD RXD
VGAR_IN VGAL_IN VFE_GND
P9 D-SUB15 FEMALE DSUB15/DIP/F
RXD R5 0/NC
RSRXD R6 0
VGASDA_IN HSYNC# VSYNC# VGASCL_IN
RED_GND RED GRN_GND GREEN BLU_GND BLUE
R16 0 RSTXD
R12 0/NC TXD
D21 1N4148
VGA_PLUGPWR
NC R730
VCC
D63 1N4148/NC
D69 DIODE SMD BAV99
R435 0
R729 75
C88 5pF
R132 68 C87 10nF
R134 100 C89 10nF
FB16 0
D71 DIODE SMD BAV99
R436 0
R732 75
C92 5pF
R136 0 C90 4.7nF
R138 68 C91 10nF
R140 100 C93 10nF
FB17 0
D72 DIODE SMD BAV99
R437 0
R735 75
C97 5pF
R146 68 C94 10nF
R148 100 C98 10nF
FB18 0
CB235 0.1uF
U53
NC NC NC GND
VCC WP SCL SDA
EEPROM 24C02
10K/NC
R736 10K
H : WP ENABLE
L : WP DISABLE
R739 10K
R416 100
R741 10K
R417 100
D75 DIODE SMD BAV99
D77 DIODE SMD BAV99
R332 510
L29 2.2uH
D74 DIODE SMD BAV99
R150 2K
C100 5pF
R333 510
L30 2.2uH
D76 DIODE SMD BAV99
R154 2K
C102 0.1uF
R737 0
R738 0
C636 20pF
C637 20pF
change 2/16
SB33B
U54
MAX3232
R1IN R2IN T1IN T2IN
R1OUT R2OUT T1OUT T2OUT
C+ C1- C2+ C2- V+ V-
VCC GND
C638 0.1uF
C639 0.1uF
C640 0.1uF
C642 0.1uF
R743 0
C641 0.1uF
D110 DIODE SMD BAV99
D73 DIODE SMD BAV99
5VSB
R267 1.5K
C168 NC
C172 220pF
R159 47K
R266 1.5K
C167 NC
C171 220pF
R158 47K
RCA1X2 AV2-8.4-13P
P2
change
VGA/DVI AUDIO INPUT
KAWA Confidential
Title VGA IN & PC AUDIO IN
Size C
Document Number AKAI_MT8202_27US_LVDS_V0.0
Rev 1
Designer
Checked: Checker
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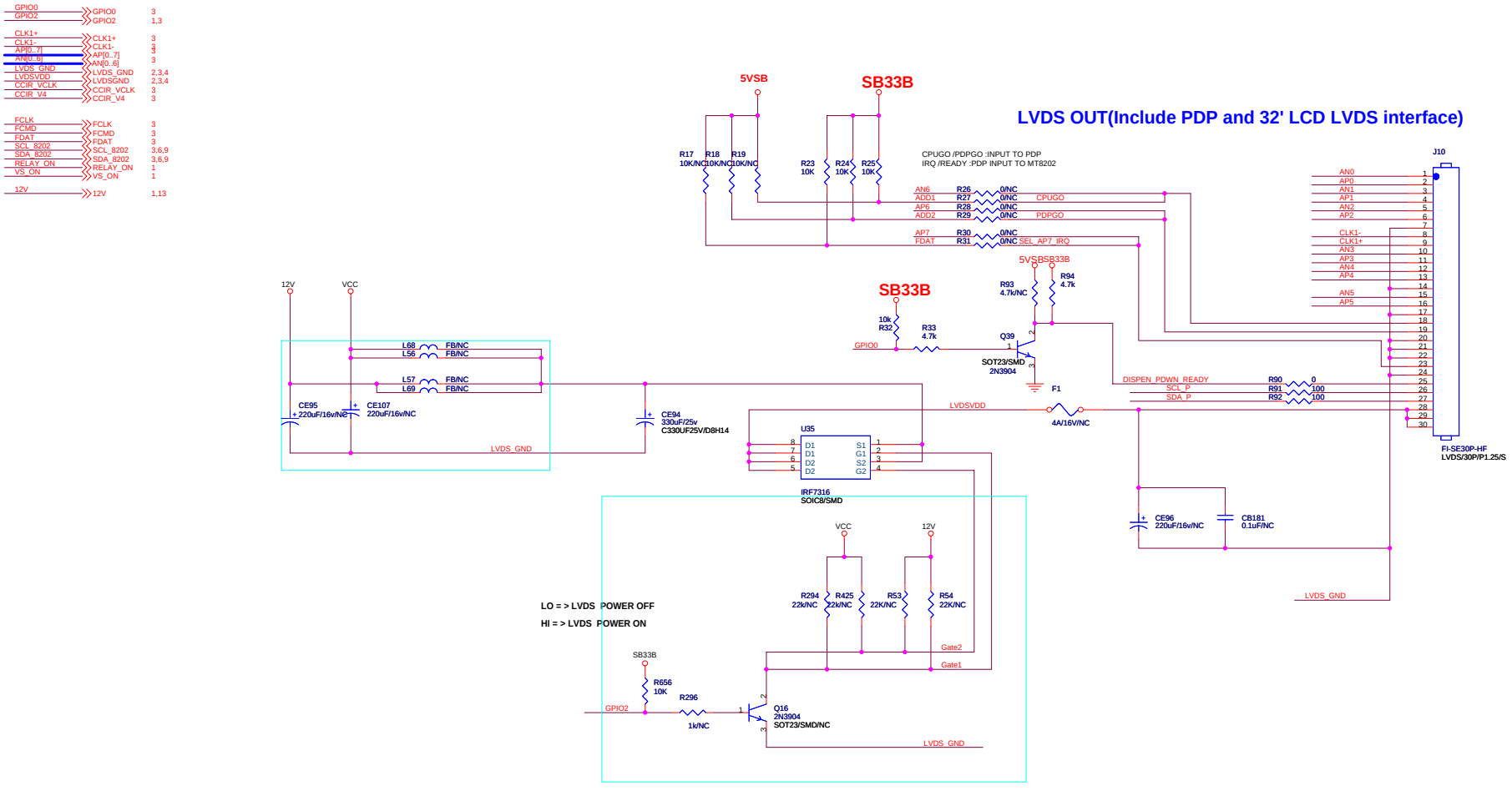

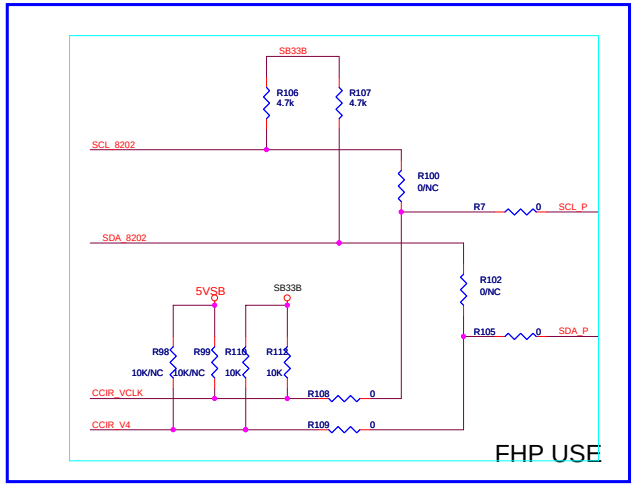

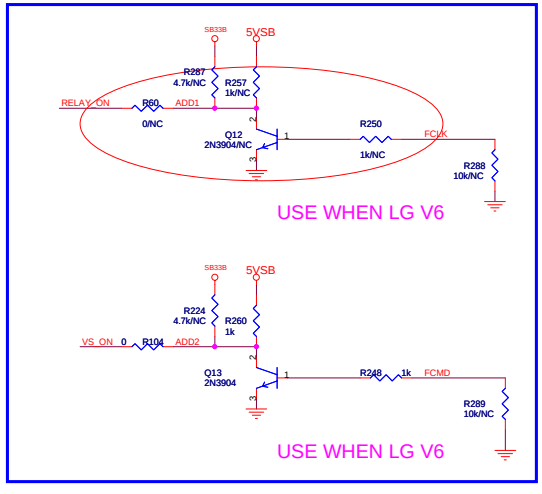

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Title: LVDS OUT			
Size: C	Document Number: AKAI_MT8202_27US_LVDS_V0.0	<Designer>	Rev: 1
		Checked: <Checker>	
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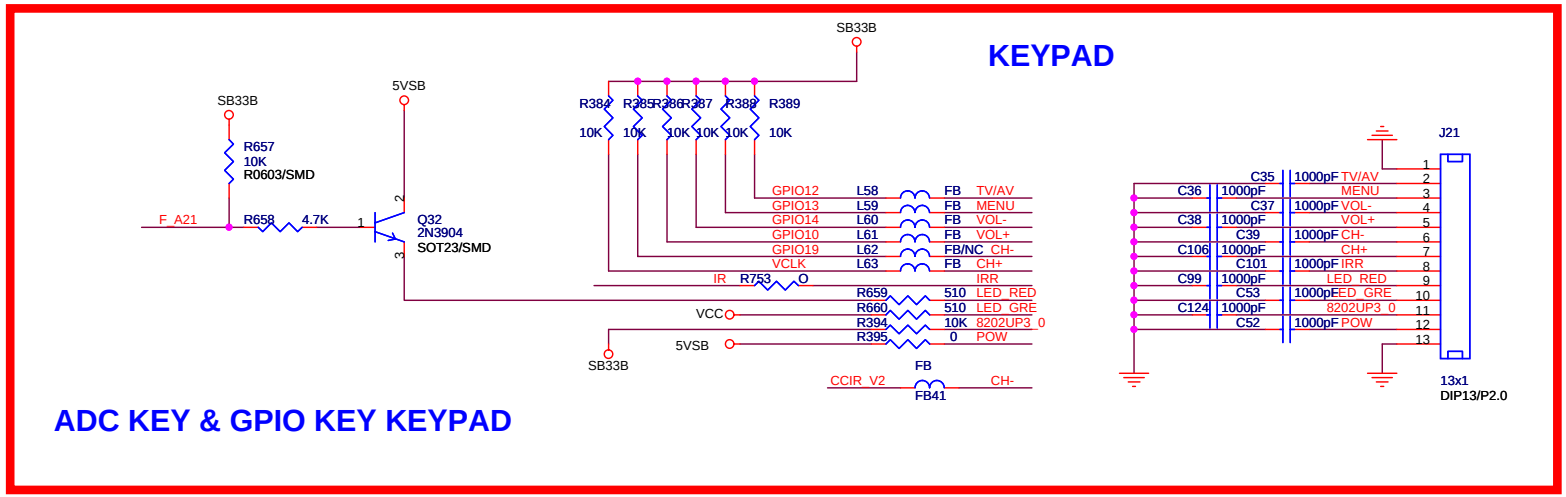
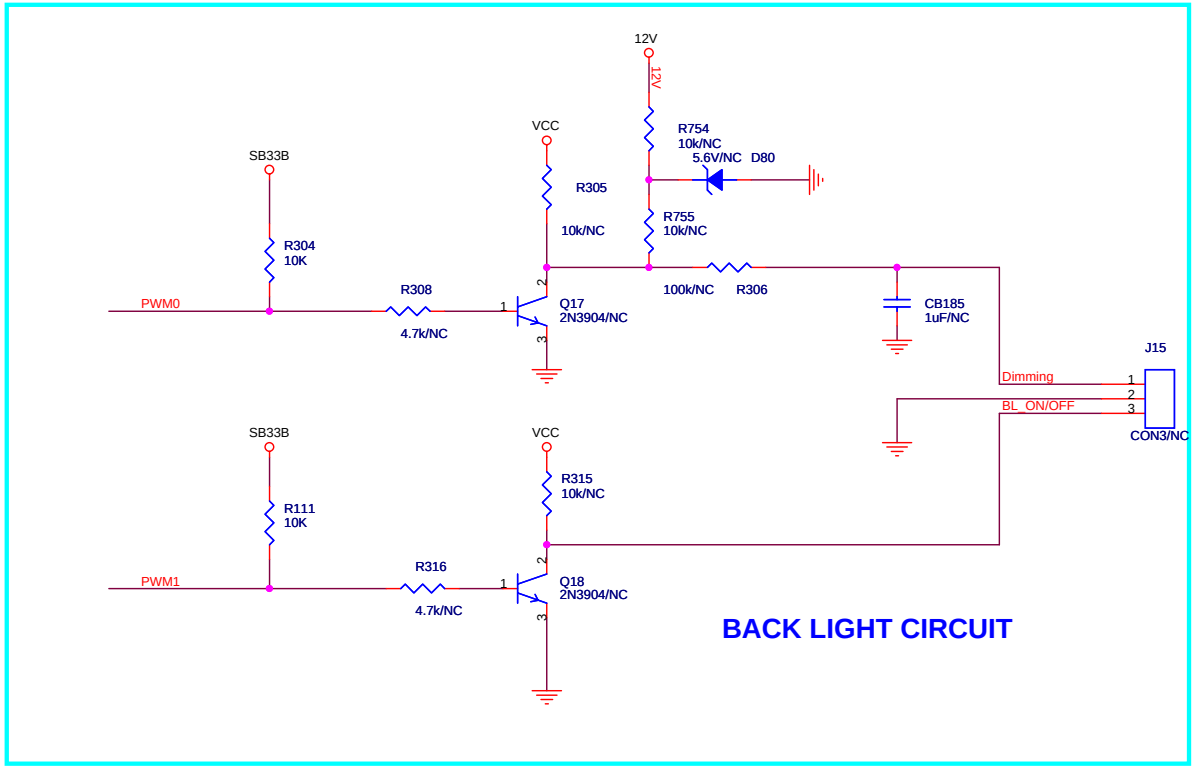
IR	IR	3,15
GPIO10	GPIO10	3
GPIO12	GPIO12	3
GPIO13	GPIO13	3
GPIO14	GPIO14	1,3
PWM0	PWM0	3
PWM1	PWM1	3
8202UP3_0	8202UP3_0	3
GPIO14	GPIO14	1,3
GPIO19	GPIO19	1,3
VCLK	VCLK	3
F_A21	F_A21	3
CCIR_V2	CCIR_V2	3
12V	12V	1,12





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Title: BACK LIGHT / KEYPAD			
Size: B	Document Number: AKAI_MT8202_27US_LVDS_V0.0	<Designer>	Rev: 1
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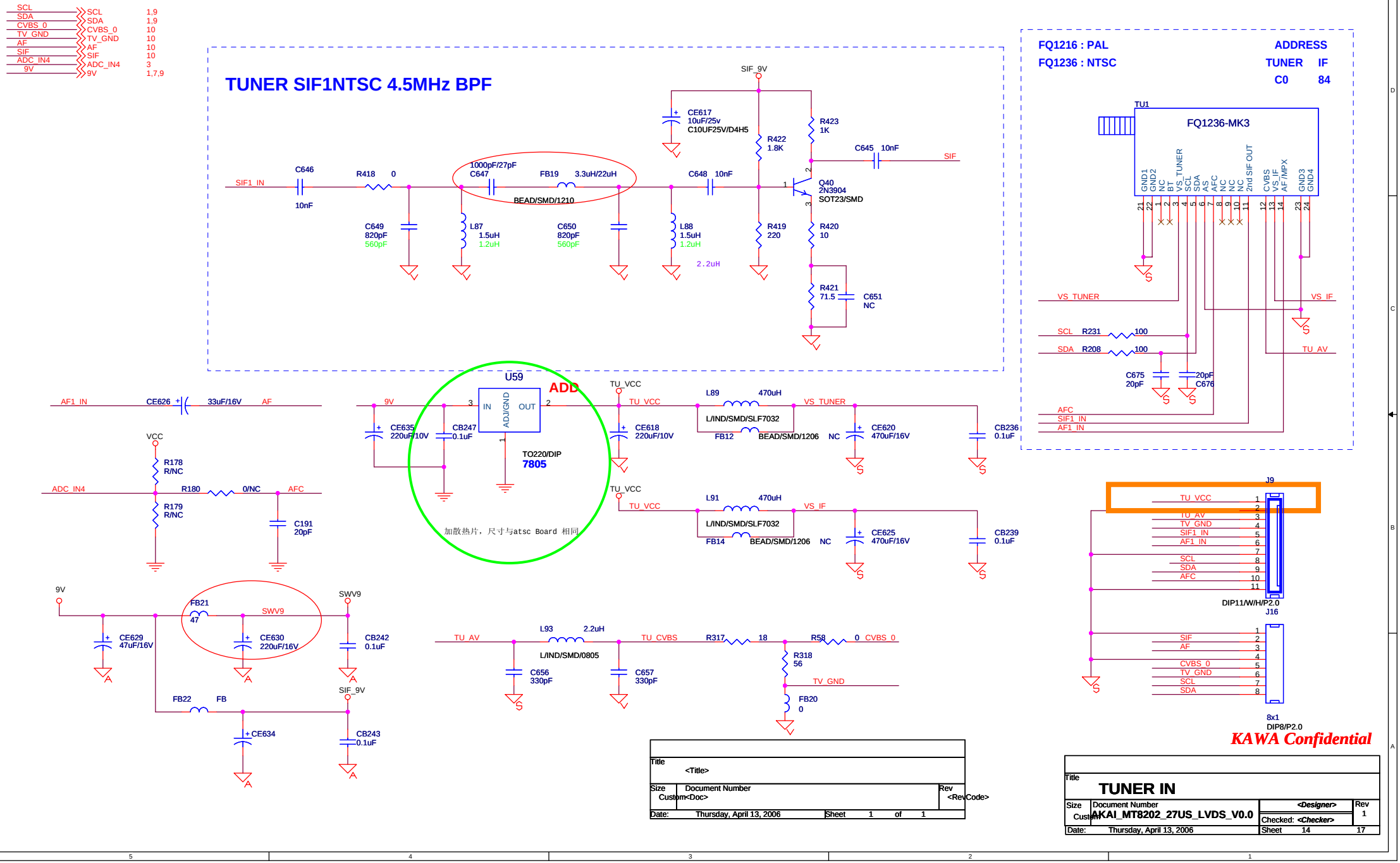
SCL 1,9
SDA 1,9
CVBS_0 10
TV_GND 10
AF 10
SIF 10
ADC_IN4 3
9V 1,7,9
TUNER SIF1NTSC 4.5MHz BPF
SIF_9V
CE617 10uF/25v C10UF25V/D4H5
R423 1K
R422 1.8K
C645 10nF
SIF
SIF1_IN
C646 10nF
R418 0
1000pF/27pF C647
FB19 3.3uH/22uH
BEAD/SMD/1210
C648 10nF
Q40 2N3904 SOT23/SMD
C649 820pF 560pF
L87 1.5uH 1.2uH
C650 820pF 560pF
L88 1.5uH 1.2uH
2.2uH
R419 220
R420 10
R421 71.5
C651 NC
FQ1216 : PAL
FQ1236 : NTSC
ADDRESS
TUNER IF
C0 84
TU1
FQ1236-MK3
GND1 GND2 NC BT VS_TUNER SCL SDA AS AFC NC NC NC 2nd SIF OUT CVBS VS_IF AF/MPX GND3 GND4
VS_TUNER
VS_IF
SCL R231 100
SDA R208 100
TU_AV
C675 20pF
C676 20pF
AFC
SIF1_IN
AF1_IN
AF1_IN CE626 33uF/16V AF
VCC
R178 R/NC
ADC_IN4 R180 0/NC AFC
R179 R/NC
C191 20pF
U59
ADD
9V
IN ADJ/GND OUT
CE635 220uF/10V
CB247 0.1uF
TO220/DIP
7805
加散热片，尺寸与atsc Board 相同
TU_VCC
CE618 220uF/10V
L89 470uH
L/IND/SMD/SLF7032
VS_TUNER
FB12 BEAD/SMD/1206 NC
CE620 470uF/16V
CB236 0.1uF
L91 470uH
VS_IF
FB14 BEAD/SMD/1206 NC
CE625 470uF/16V
CB239 0.1uF
9V
FB21 47
SWV9
CE629 47uF/16V
CE630 220uF/16V
CB242 0.1uF
FB22 FB
SIF_9V
CE634
CB243 0.1uF
TU_AV
L93 2.2uH
L/IND/SMD/0805
TU_CVBS
R317 18
R58 0 CVBS_0
C656 330pF
C657 330pF
R318 56
TV_GND
FB20 0
J9
TU_VCC
TU_AV
TV_GND
SIF1_IN
AF1_IN
SCL
SDA
AFC
DIP11/W/H/P2.0
J16
SIF
AF
CVBS_0
TV_GND
SCL
SDA
8x1
DIP8/P2.0
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Title
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Size Custom
Document Number <Doc>
Rev <RevCode>
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Title
TUNER IN
Size Custom
Document Number AKAI_MT8202_27US_LVDS_V0.0
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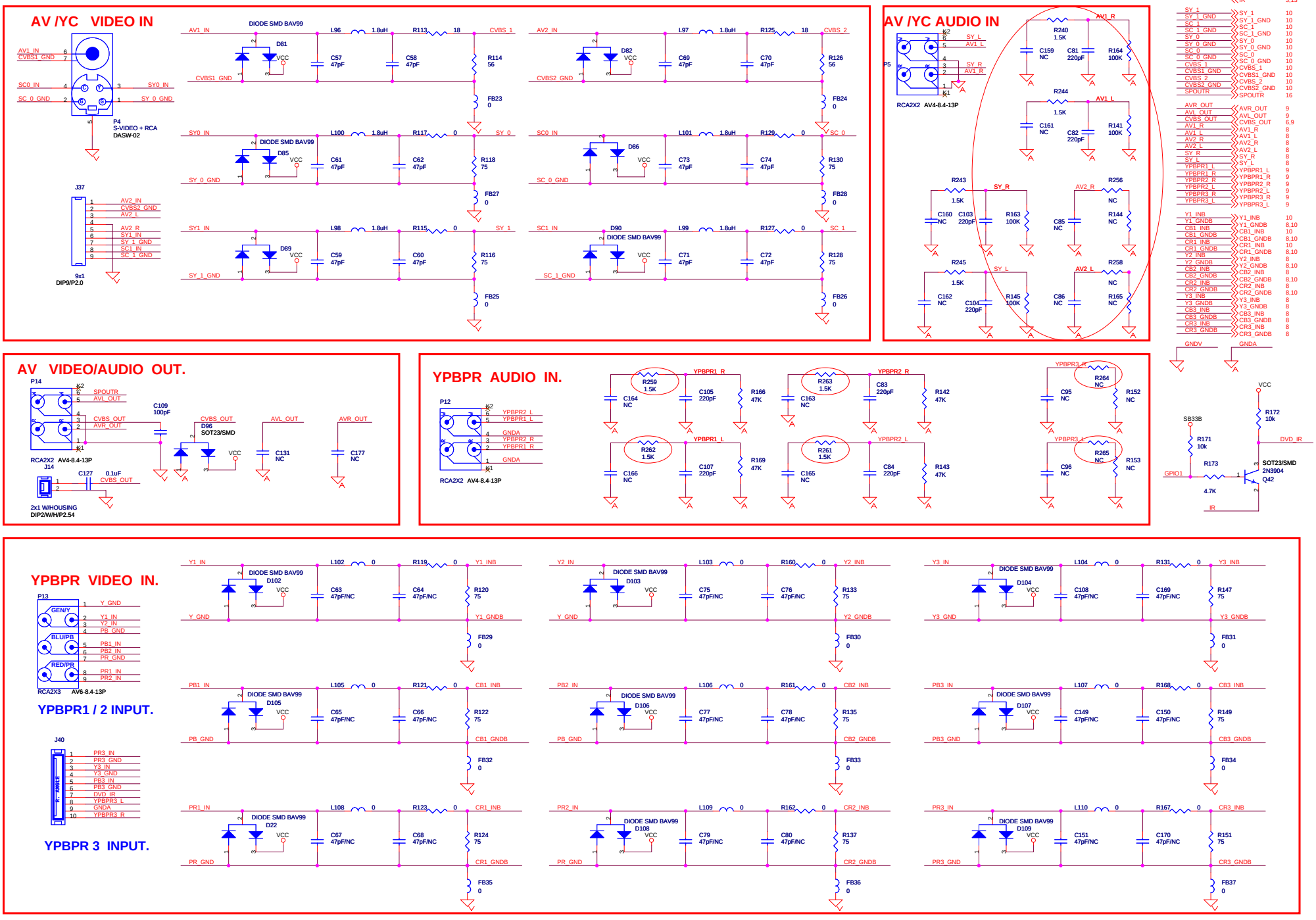
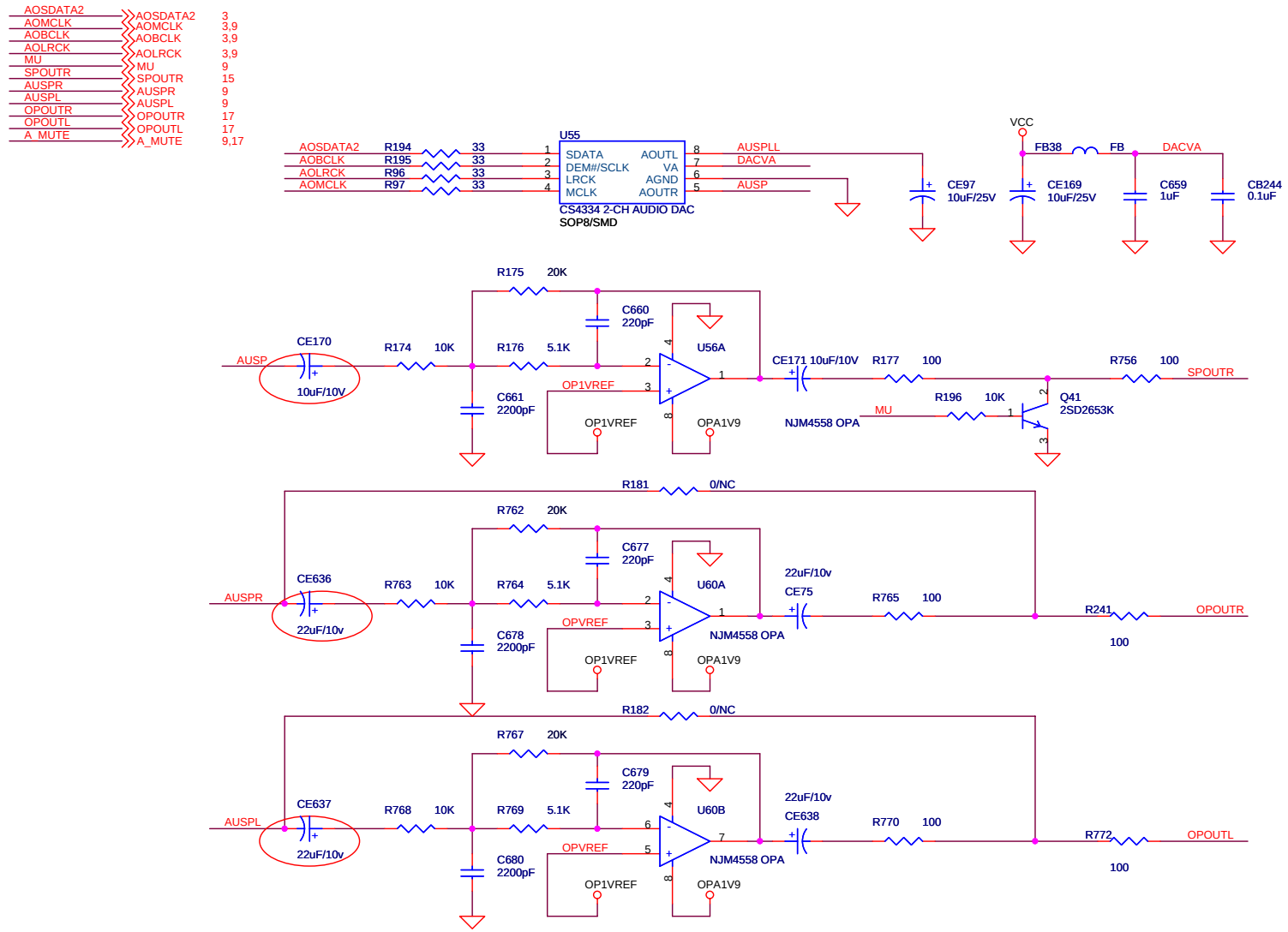


Title	AV IN		
Size C	Document Number AKAI_MT8202_27US_LVDS_V0.0	<Designer>	Rev 1
		Checked: <Checker>	
Date: Thursday, April 13, 2006		Sheet 15	17



GPIO DECRIPTION

UP3_4 : SW SCL
UP3_5 : SW SDA
ERO0/UP3_0 :KEYPAD POWER
ERO1/UP3_1 : MAIN POWER SWITCH
VCLK : KEPAD CH+
GPIO19 : KEPAD CH-
DE/GPIO : DVD IR
CCIR_CLK : PDP USE
CCIR_V4 : PDP USE
GPIO0 : PDP USE
GPIO1 : NO USE
GPIO2 : LVDS POWER SW
GPIO3 : DTV POWER CONTROL
GPIO4 : EEPROM WRITE PROTECT
GPIO5/TXD : 2nd UART FOR MT5351
GPIO6/RXD : 2nd UART FOR MT5351
GPIO7 : AUDIO BYPASS MUTE CONTROL
GPIO8 : SPEAKER SWITCH
GPIO9 : AUDIO MUTE
GPIO10 : Indicates active video at HDMI port
GPIO11 : DVD POWER CONTROL
GPIO12 : AV SWITCH
GPIO13 : HDMI Hot Plug Detect
GPIO14 : NO USE
GPIO[15..18] : FOR DVD CONTROL
GPIO/PWM0 : DIMMING
GPIO/PWM1 : BACKLIGHT ON/OFF
OUT_27Mhz/GPIO : HDMI CRYSTAL
SDA1 : TO MT5351 I/F REQUEST
SCL1 : TO MT5351 I/F READY
F_A21 : KEYPAD(LED RED)
ADCIN0 : KEYPAD
ADCIN3:PDP 5VD DETECT
ADCIN4:FOR TUNER AFC

CCIR_V[0-3] : KEYPAD
CCIR_V5 : AUDIO SWITCH
CCIR_V6 : RESET DTV
CCIR_V7 : YPBPR VIDEO SWITCH

Title: SUB WOOFER			
Size: B	Document Number: AKAI_MT8202_27US_LVDS_V0.0	<Designer>	Rev: 1
		Checked: <Checker>	
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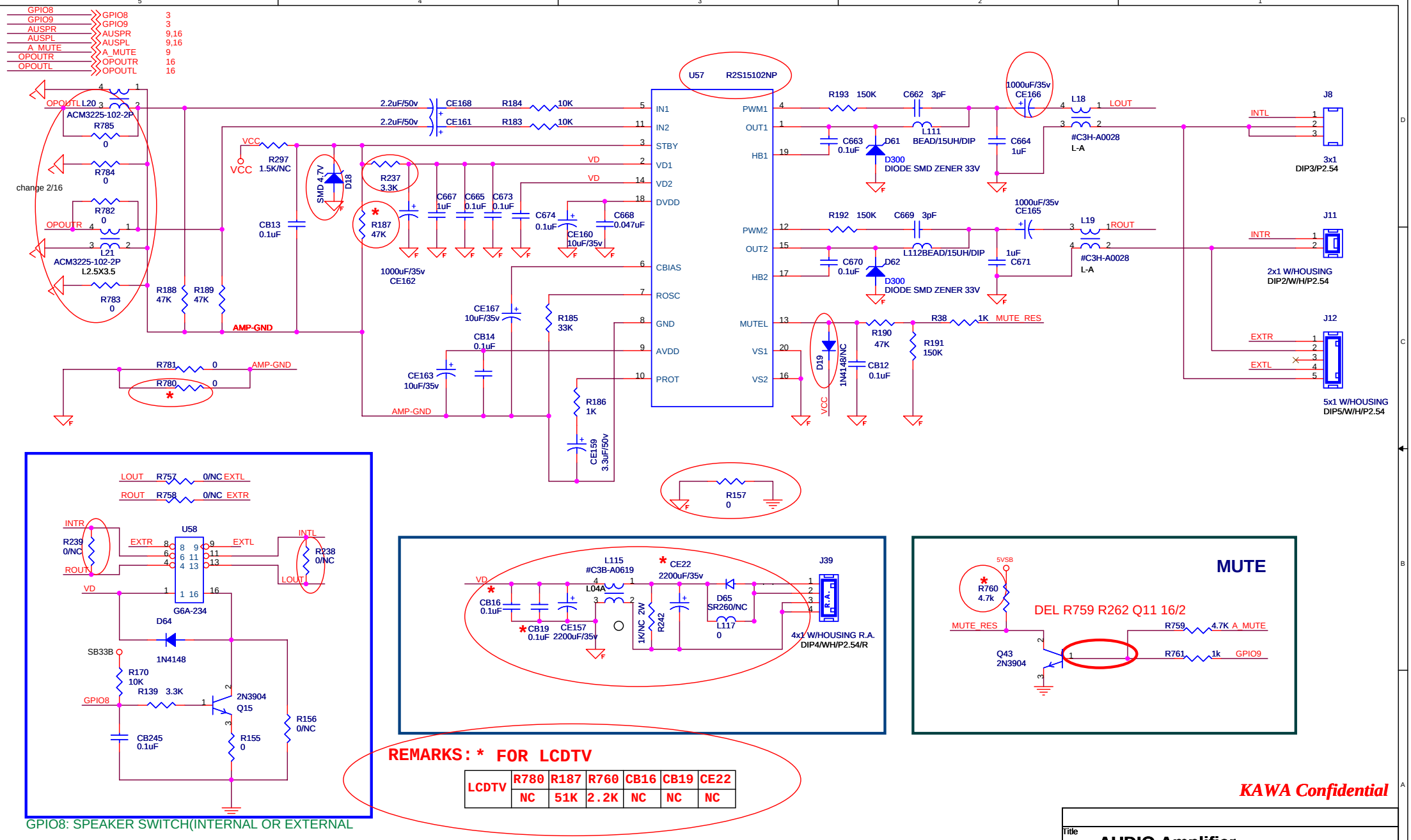

REMARKS: * FOR LCDTV

LCDTV	R780	R187	R760	CB16	CB19	CE22
	NC	51K	2.2K	NC	NC	NC

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Title: AUDIO Amplifier			
Size: B	Document Number: AKAI_MT8202_27US_LVDS_V0.0	<Designer>	Rev: 1
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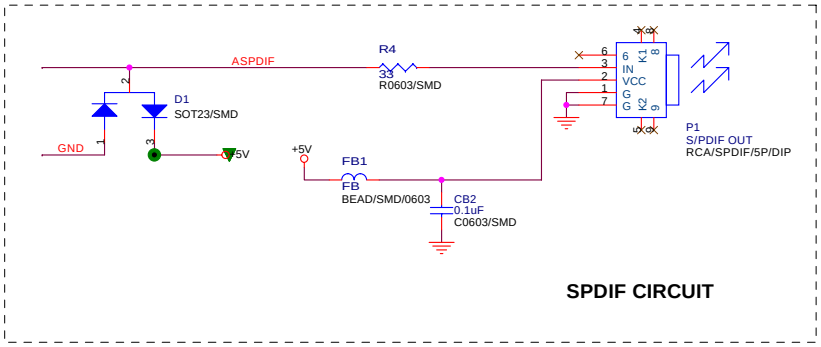
MT5111 / MT5351 REFERENCE DESIGN - 4 LAYERS

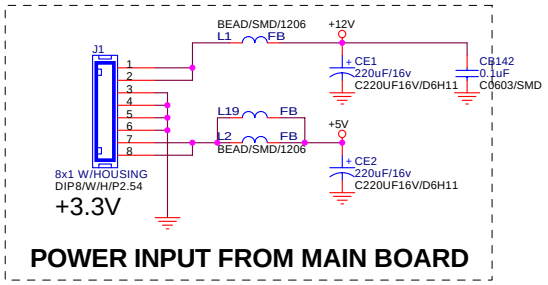
Rev	History	P#	DATE
RA-V1	INITIAL VERSION		2005/06/15
RA-V2	ADDED AUDIO SWITCH / REFINE POWER CIRCUIT		2005/07/14

NS : NON-STUFF

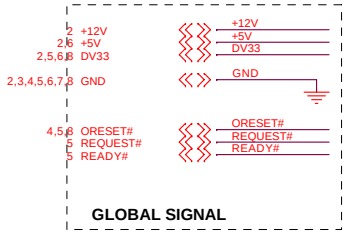
NAME	TYPE	DEVICE
+12V	POWER +12V	POWER SUPPLY
+5V	POWER +5V	POWER SUPPLY
+5V_tuner	POWER +5V	TUNER POWER
DV33_DM	POWER +3V3	MT5111 POWER
DV18	POWER +1V8	MT5111 POWER
DV33	POWER +3V3	MT5351 POWER
AV33	POWER +3V3	MT5351 ANALOG POWER
DV25	POWER +2V5	MT5351 DDR POWER
DV12	POWER +1V2	MT5351 POWER
GND	GROUND	GROUND



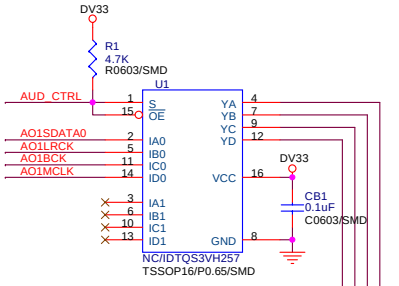
SPDIF CIRCUIT

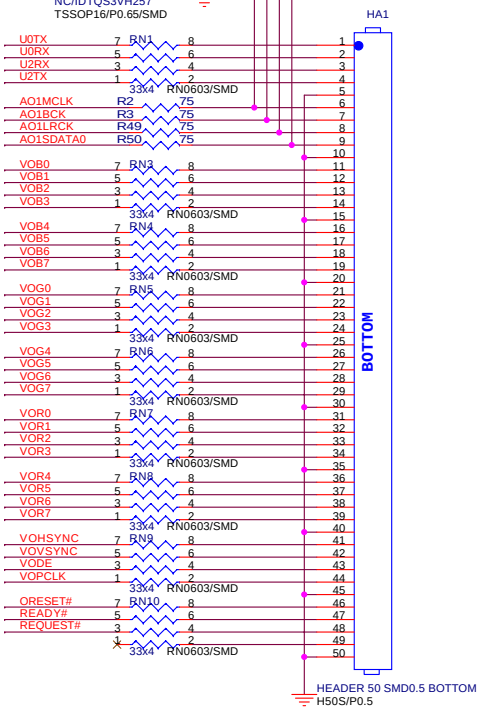


POWER INPUT FROM MAIN BOARD

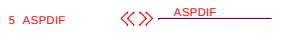


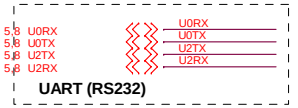
GLOBAL SIGNAL



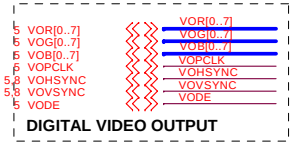


DIGITAL OUTPUT



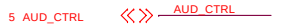


UART (RS232)



DIGITAL VIDEO OUTPUT

DIGITAL AUDIO INTERFACE



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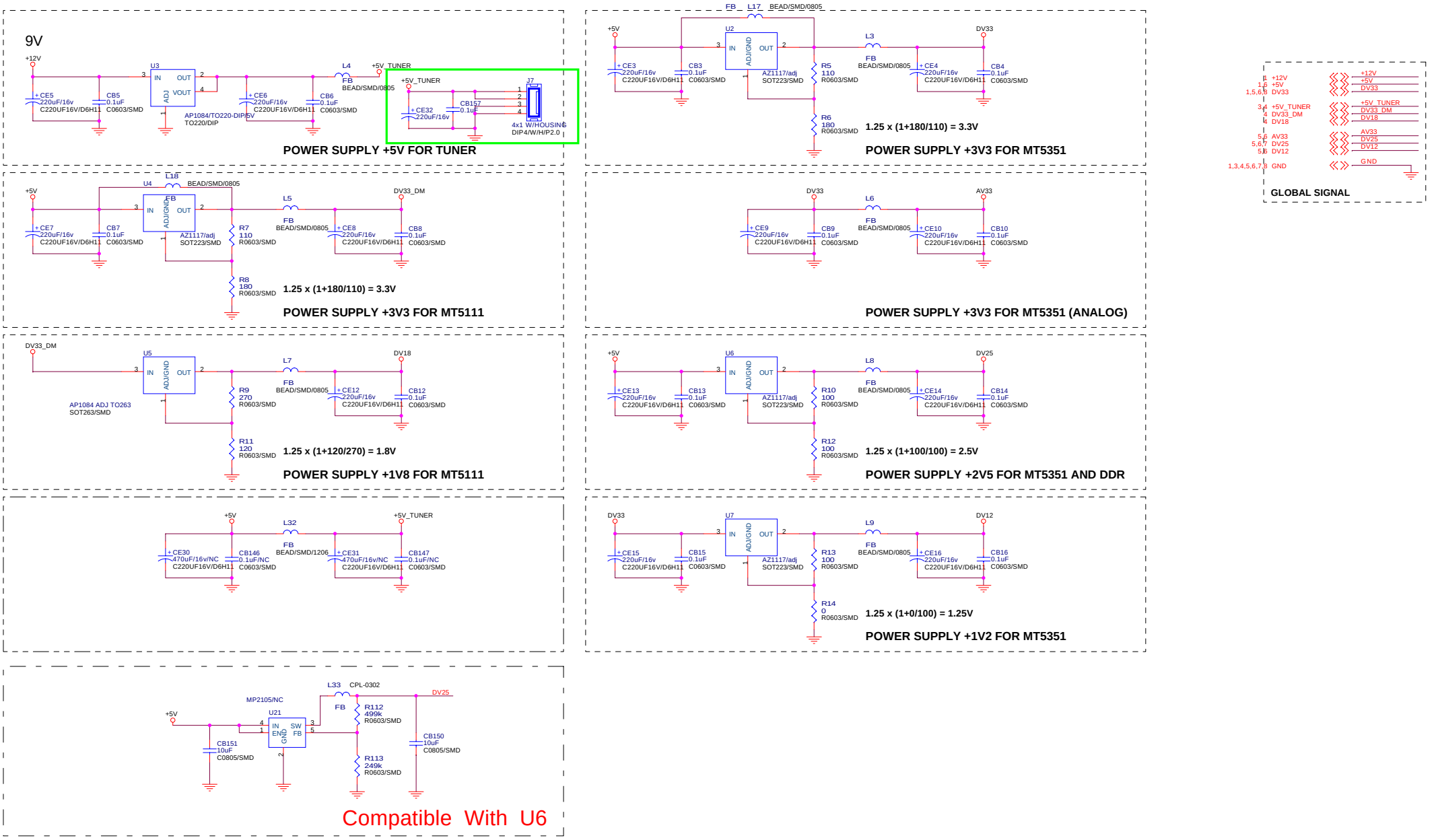

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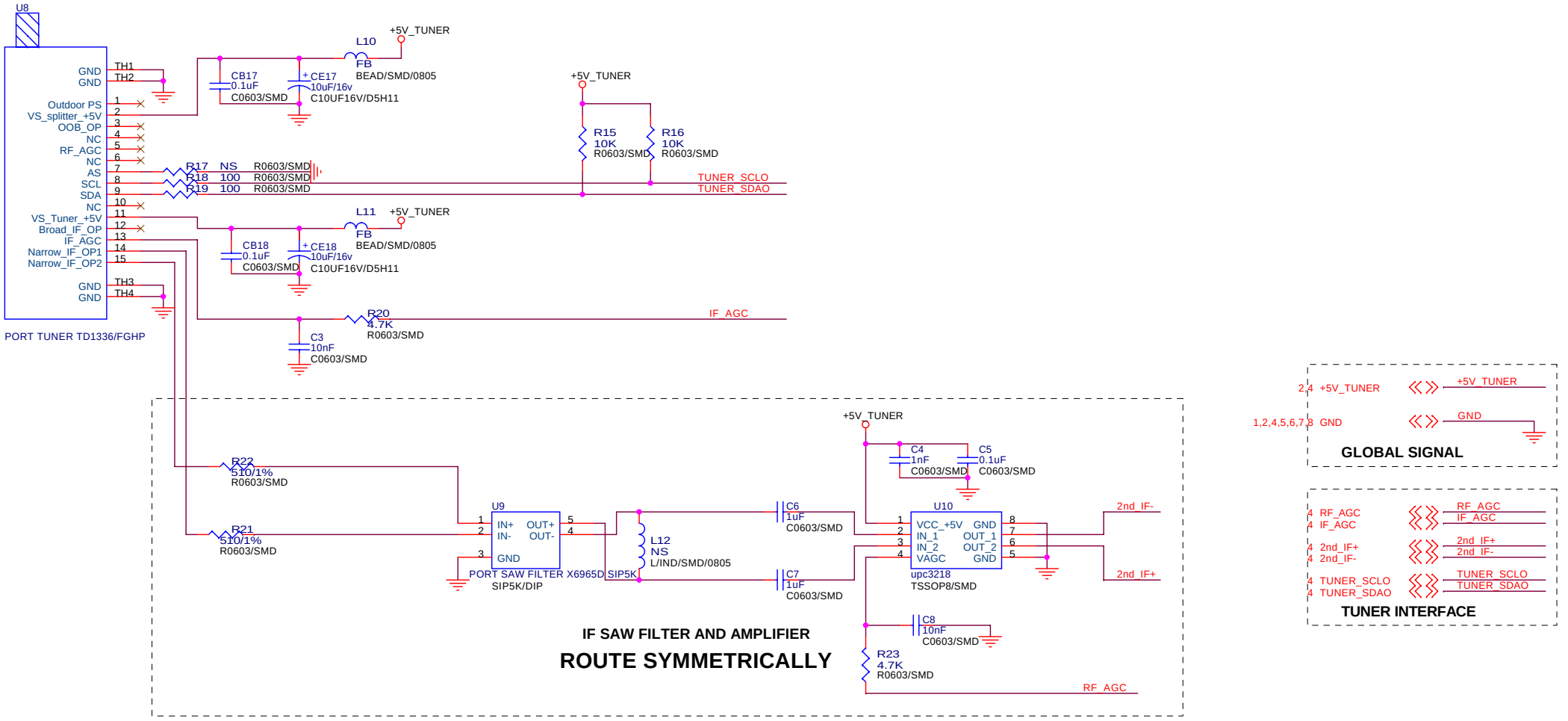

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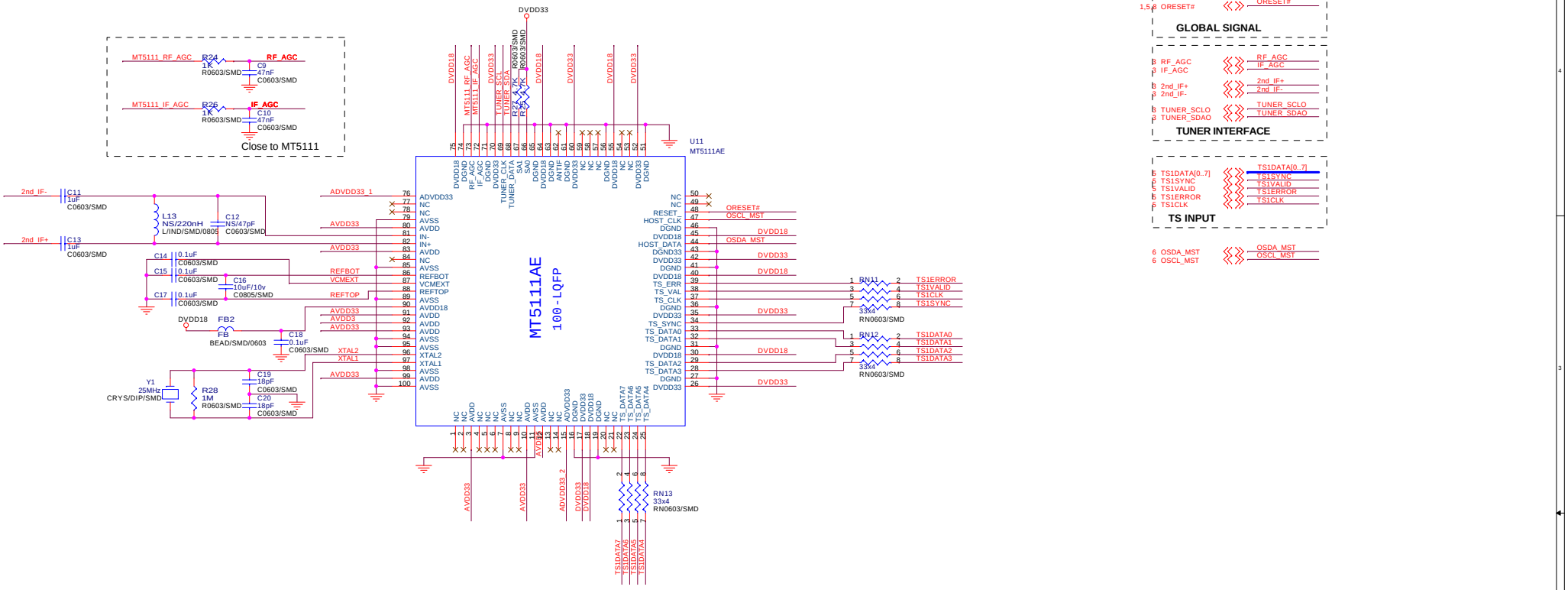

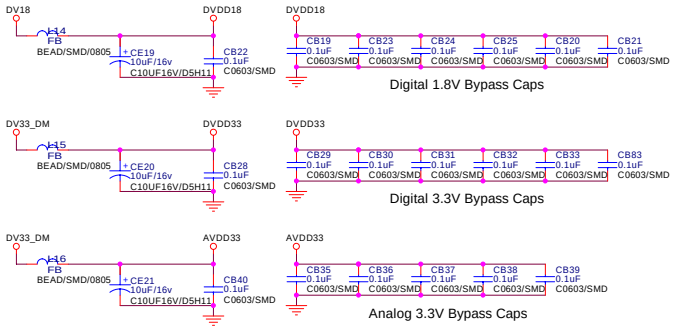

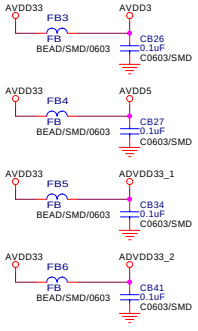

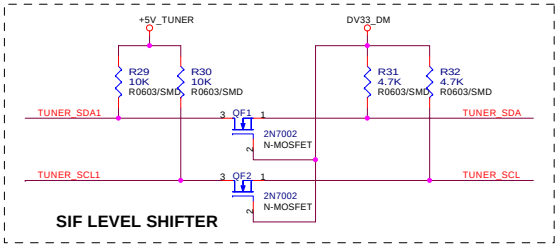

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Size: C	Document Number: MT5351RA-V2	TwinSon Chan	Rev: 1
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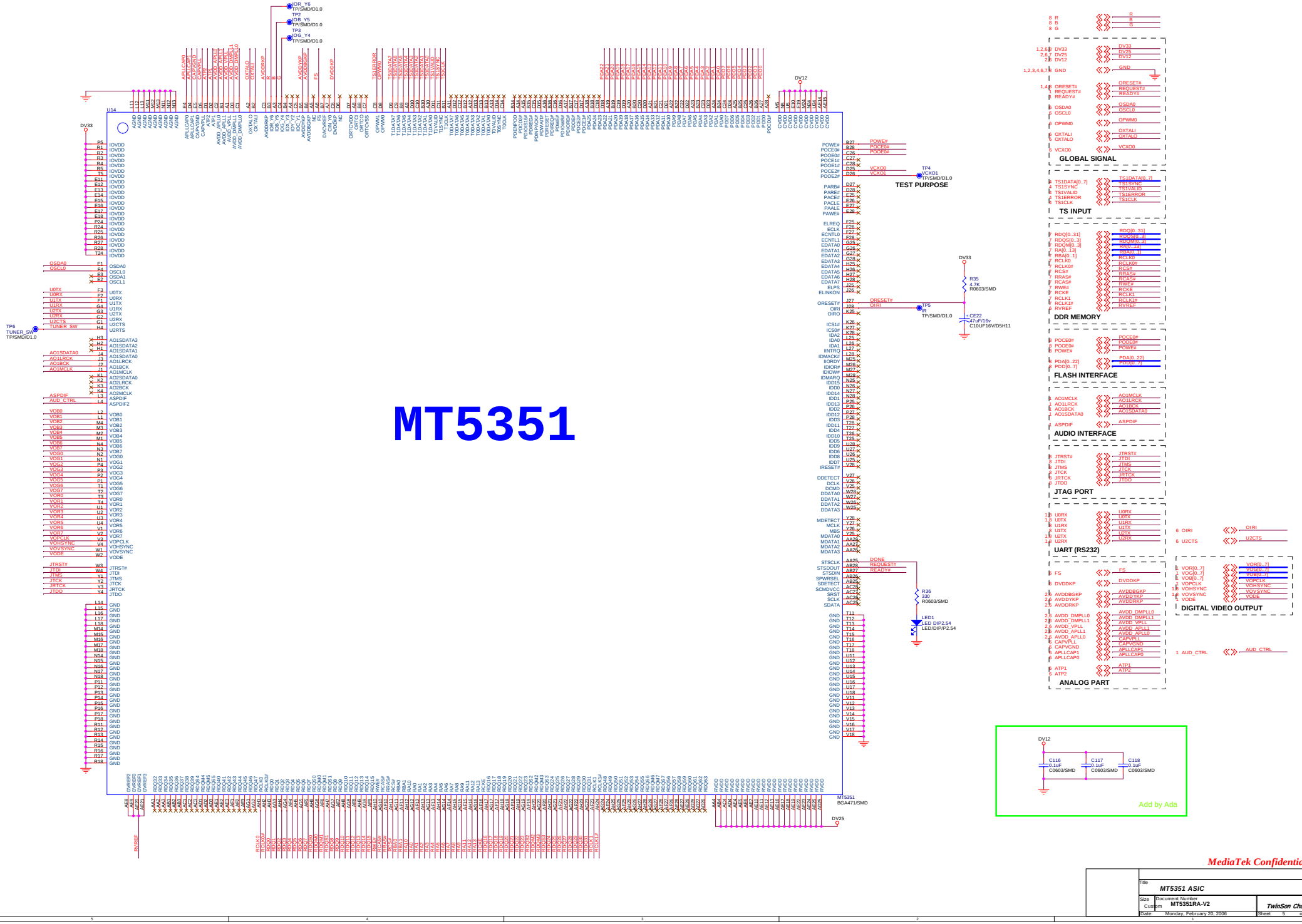

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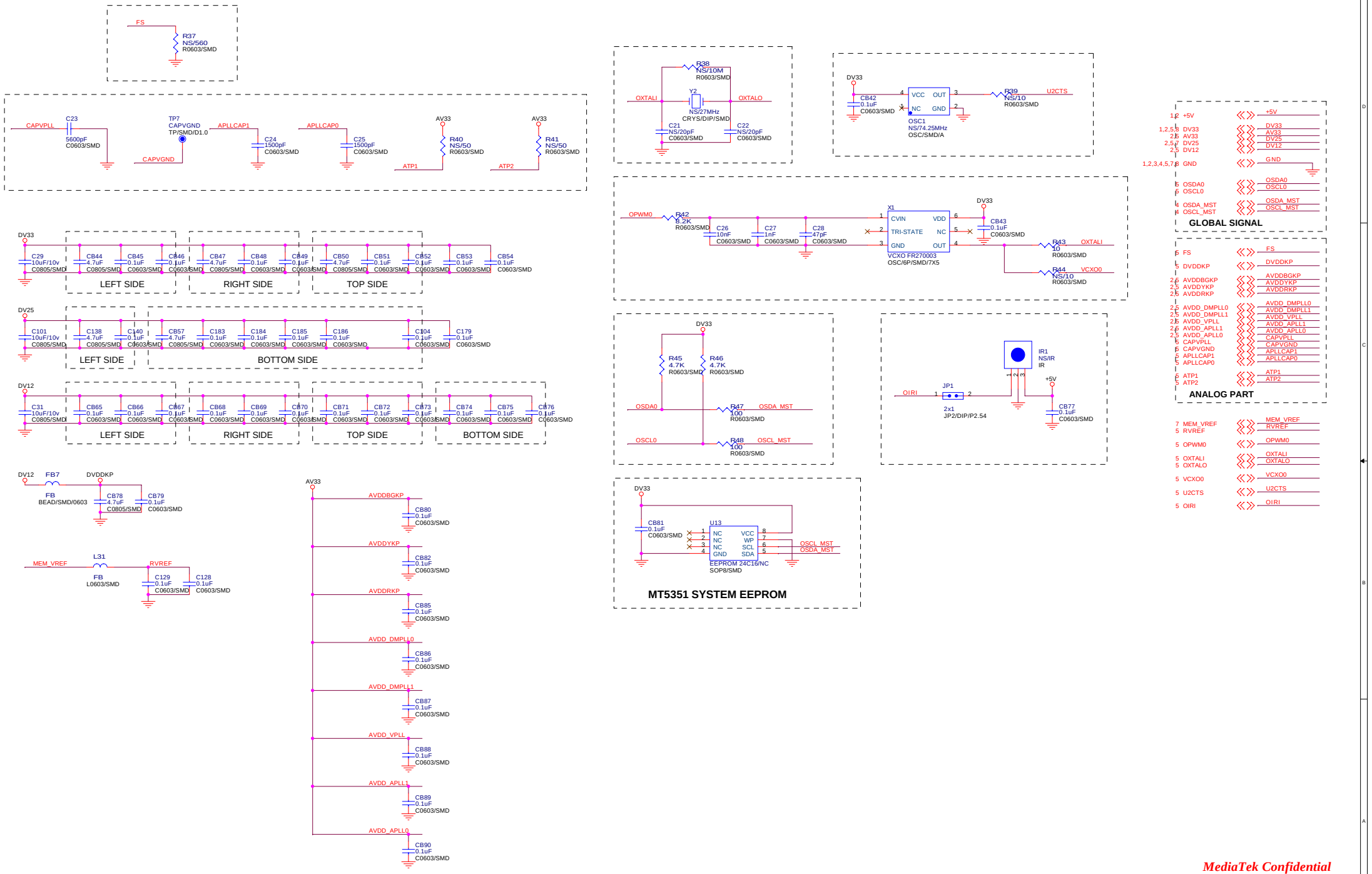

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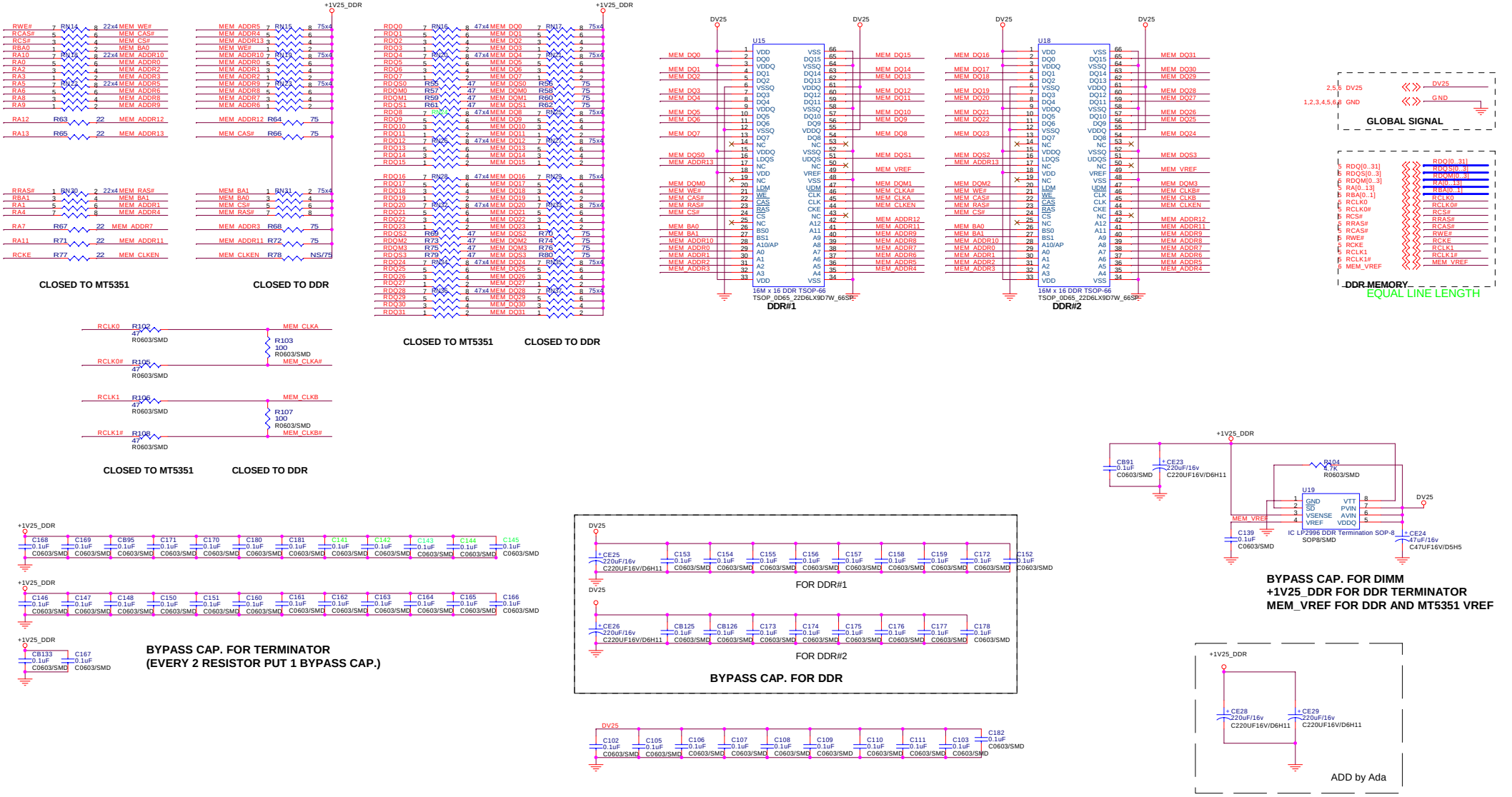

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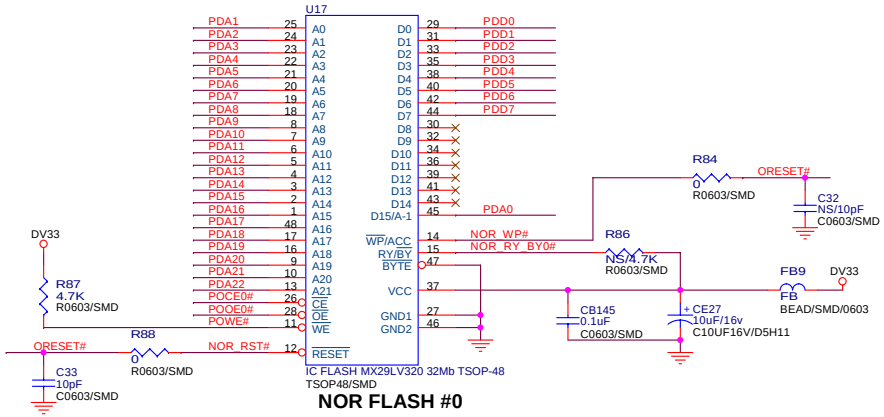
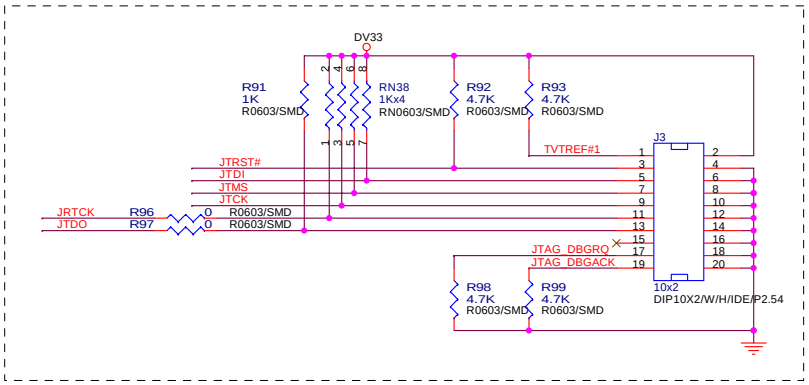
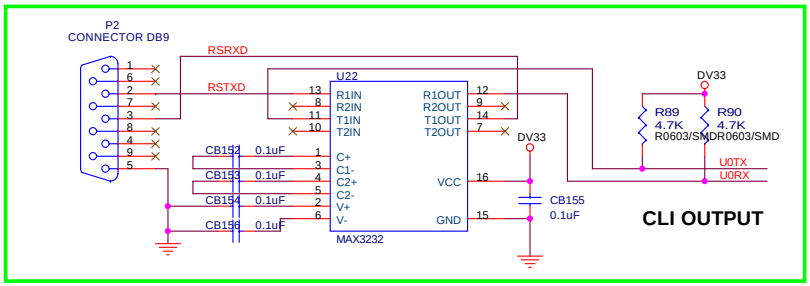
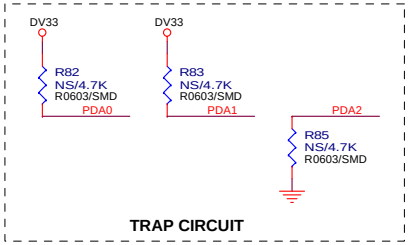


NOR FLASH #0

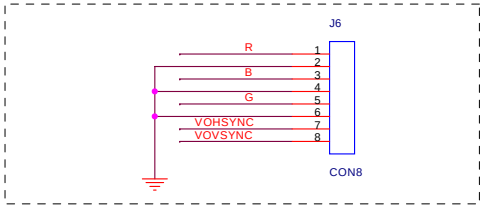


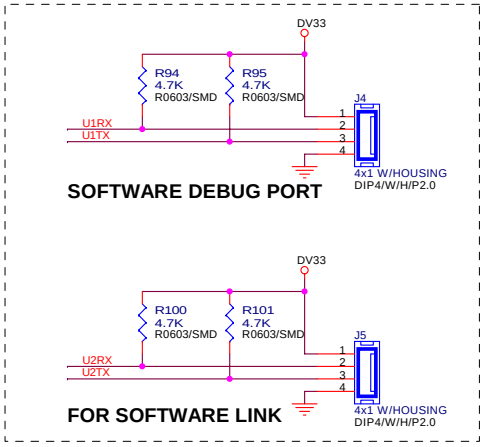


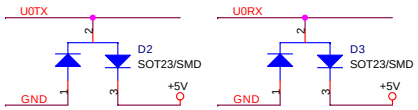
CLI OUTPUT

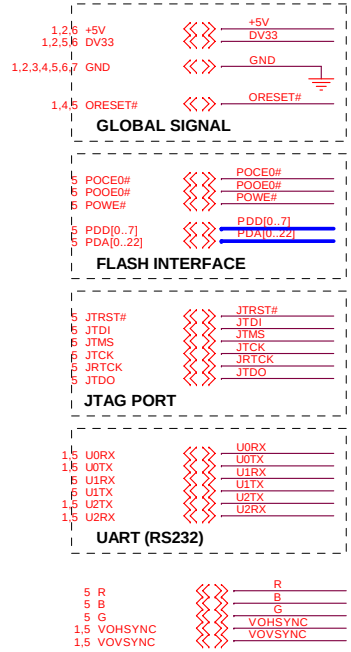


TRAP CIRCUIT









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Title: NOR FLASH / JTAG / UART			
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Main IC Specifications

- M13S128168A (ESMT)
  2M x 16 Bit x 4 Banks Double Data Rate SDRAW

- MT5111CE
  Single-Chip HDTV/CATV Demodulator

- MT5351
  MT5351 is a DTV Backend Decoder SOC which support flexible transport demux, HD MPEG-2 video decoder, MPEG1,2, MP3, AC3 audio decoder, HDTV encoder. MT5351 is powered by ARM 926EJ with 16K I-Cache and 16K D-Cache. It can support 64Mb to 1Gb DDR DRAM devices with configurable 32/64 bit data bus interface.

- MT8202
  MT8202G is a highly integrated Single-Chip for LCD TV supporting video input and output format up to HDTV. It includes 3D comb filter TV decoder to retrieve the best image from popular composite signals.

- MT8293
  HDMI PanelLink Cinema Receiver

- R2S15102NP
  Digital Power Amplifier R2S15102NP

- WM8776
  24-bit, 192kHz Stereo CODEC with 5 Channel I/P Multiplexer

To :
Date : 2005.09.09

CPT TFT-LCD

CLAA370WA02

ACCEPTED BY：

TENTATIVE

APPROVED BY	CHECKED BY	PREPARED BY
		TFT-LCD Product Planning Management General Division

RECORD OF REVISIONS

Revision No.	Date	Description	Page
Ver 1.0	2005/09/09	Preliminary specification first issued.	--

CONTENTS

1. OVERVIEW

CLAA370WA02 is 37” color (94.03cm) TFT-LCD (Thin Film Transistor Liquid Crystal Display) module composed of LCD panel, LVDS driver ICs, control circuit and backlight. By applying 8 bit digital data, 1366*768, 16.7 million-color images are displayed on the 37” diagonal screen. Inverter for backlight is included in this module. General specification are summarized in the following table:

1.1 GENERAL INFORMATION

ITEM	SPECIFICATION	UNIT
Display Area	819.6(H) × 460.8(V) (37.0 inch diagonal)	mm
Number of Pixels	1366(H) × 768(V)	16:9
Pixel Pitch	0.6(H) × 0.6(V)	mm
Bezel Opening Area	826.6 x 467.8	mm
Color Pixel Arrangement	RGB Vertical Strip	
Display Mode	Normally Black	
Number of Colors	16.7M (8bits)	color
Surface Treatment	Hard coating: 2H, Anti-reflective coating <less than 3% reflection.	
Total Module Power	140 (B/L with inverter 130W at 5.0mA)	W

1.2 MECHANICAL INFORMATION

ITEM			MIN	TYP.	MAX.	UNIT
Module outline dimension	Horizontal(H)		876.0	877.0	878.0	mm
	Vertical(V)		515.8	516.8	517.8	mm
	Depth(D)	without inverter	44.3	45.3	46.3	mm
		with inverter	54.1	55.1	56.1	mm
Module Weight			-	8600	-	g

2. ABSOLUTE MAXIMUM RATINGS

The following are maximun values which, if exceeded, may cause faulty operation or damage to the panel module.

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
Power Supply Voltage For LCD	VCC	-0.3	14.0	V	
Input voltage of inverter	VBL	-0.3	27	V	
Inverter dimming	VDIM	-0.3	5.5	Vdc	
Backlight on/off	V_{BLON}	-0.3	5.5	Vdc	
Operation Ambient Temperature	T_{op}	0	50	℃	*1) *2) *3)
Storage Temperature	T_{stg}	-20	60	℃	*1) *2)

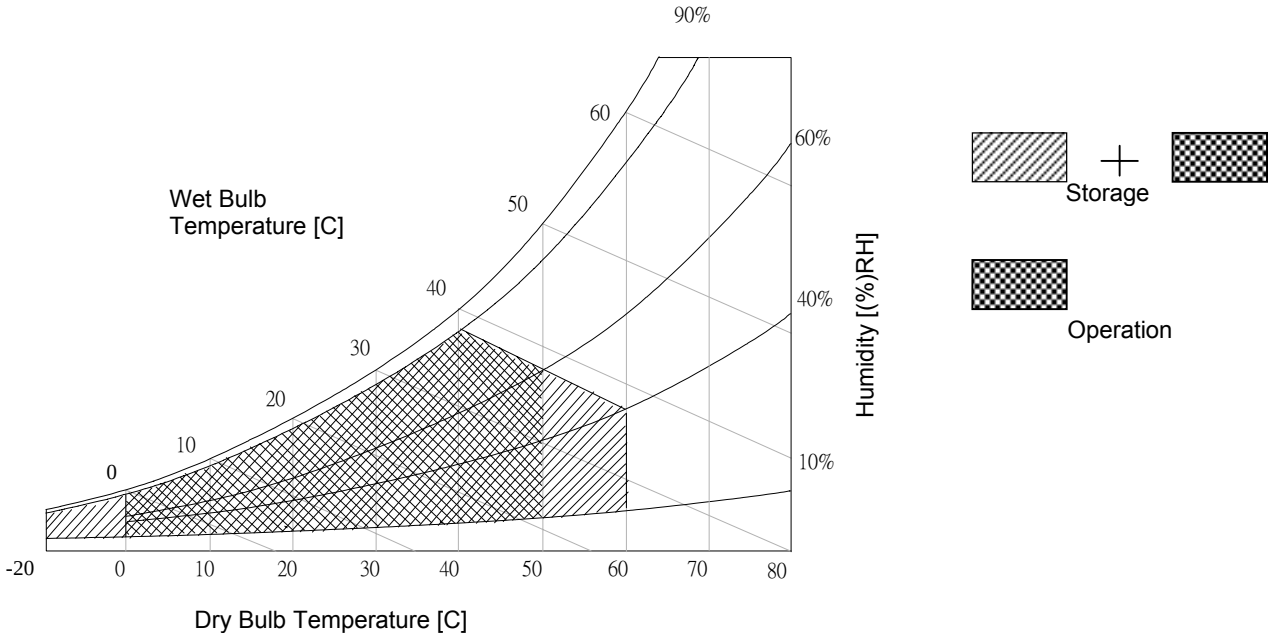
[Note1] The relative temperature and humidity range are as below sketch

Humidity≦85%RH without condensation.

Relative Humidity ≦90% (Ta≦ 40℃), Wet Bulb Temperature ≦39℃ (Ta≧40℃)

[Note2] If you use the product in a environment which's over the definition of temperature and humidity too long,it will effect the result of visual inspecfion.

[Note3] If you operate the product in normal temperature range, the center surface of panel should be under 60℃.



3. ELECTRICAL CHARACTERISTICS

3.1 TFT-LCD MODULE

Ta=25℃

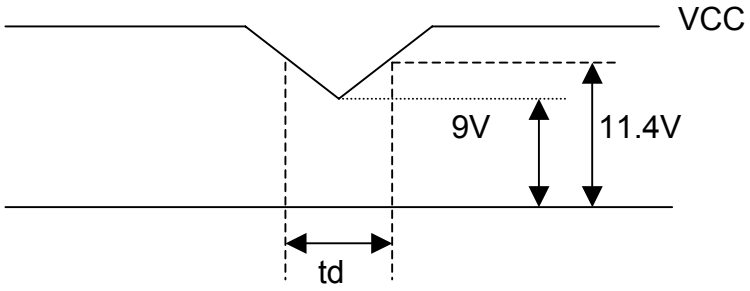
ITEM		SYMBOL	MIN	TYP	MAX	UNIT	REMARK
LCD Power Supply Voltage		VCC	11.4	12.0	12.6	V	*1)
Ripple Voltage		Vrpd	--	--	100	mVp-p	VIN=+12.0V
Rush current		Irush	--	--	3	A	*2)
LCD Power Supply Current	White	ICC		540	--	mA	*3)
	Black			400			
	RGB stripe			570			
LCD power consumption		Pc	--	6.84	--	W	
High input voltage of LVDS		V_{IN+}	--	--	100	mV	*4)
Low input voltage of LVDS		V_{IN-}	100	--	--	mV	
nput common voltage of LVDS		VCM	--	1.25	-	V	
Input terminal resist of LVDS		R_T	--	100	--	ohm	

[Note 1] The module should be always operated within above ranges.

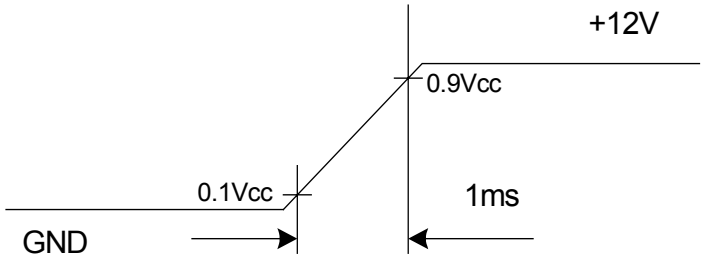
VCC-dip state:

1) When 9V≦VCC＜11.4 V, td≦10 ms.

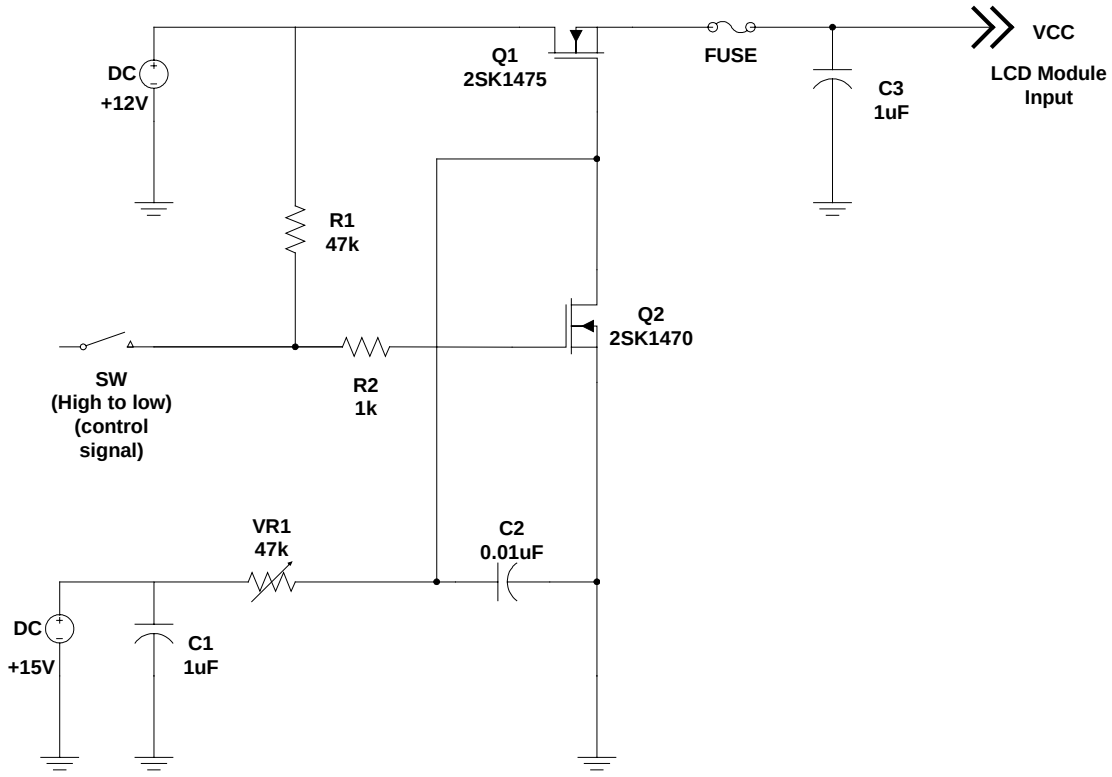
2) VCC ＞ 11.4V, VCC-dip condition should also follow the VCC-turn-off condition.



[Note 2] Measure conditions:

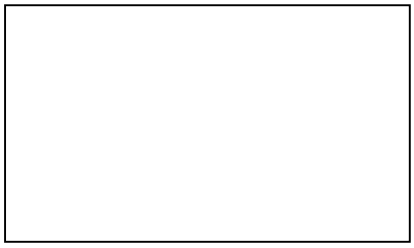


Vcc rising time is 1 ms



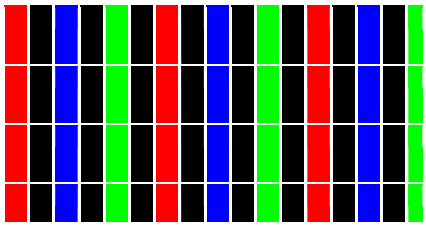
[Note 3] The specified power supply current is under condition at Vcc=12V, Ta=25+/-2℃, f_V=60Hz, whereas a power dissipation check pattern below is displayed.

a. White pattern

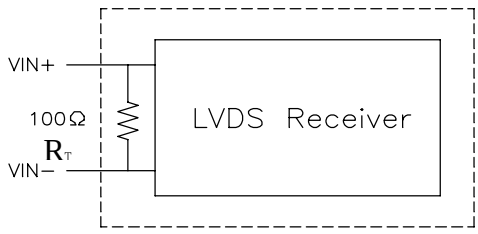


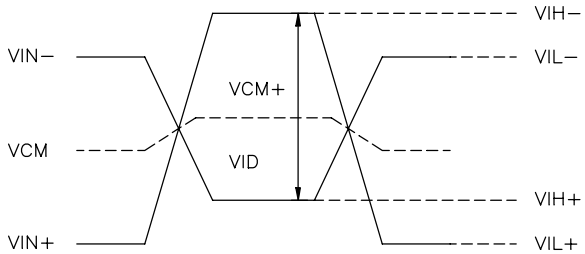
b. Black pattern

c. RGB Stripe pattern



[Note 4] LVDS signal definition:





VID = VIN_+ – VIN-, △VCM = ｜VCM_+–VCM-｜,

△VID = ｜VID_+–VID-｜, VID+ = ｜VIH_+–VIH-｜,

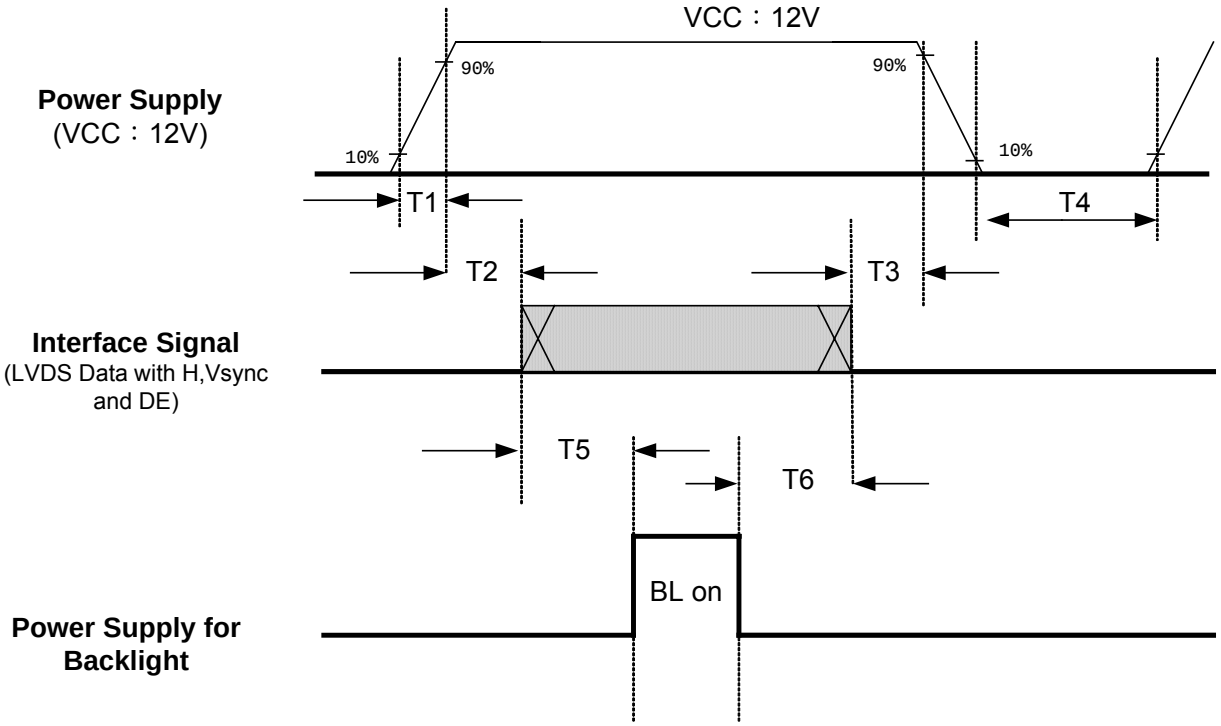
VID- = ｜VIL_+–VIL-｜, VCM = (VIN_++VIN-) / 2,

VCM+ = (VIH_++VIH-) / 2,VCM- =(VIL_++VIL-) / 2

VIN+: Positive differential DATA & CLK input

VIN-: Negative differential DATA & CLK input

3-2 POWER SEQUENCE



Power Sequence Table

Parameter	Value			Unit
	Min	Typ	Max	
T1	1	---	30	ms
T2	0	---	50	ms
T3	0	---	50	ms
T4	2000	---		ms
T5	1000	---		ms
T6	100	---		ms

[Note 1] Please avoid floating state of interface signal at invalid period.

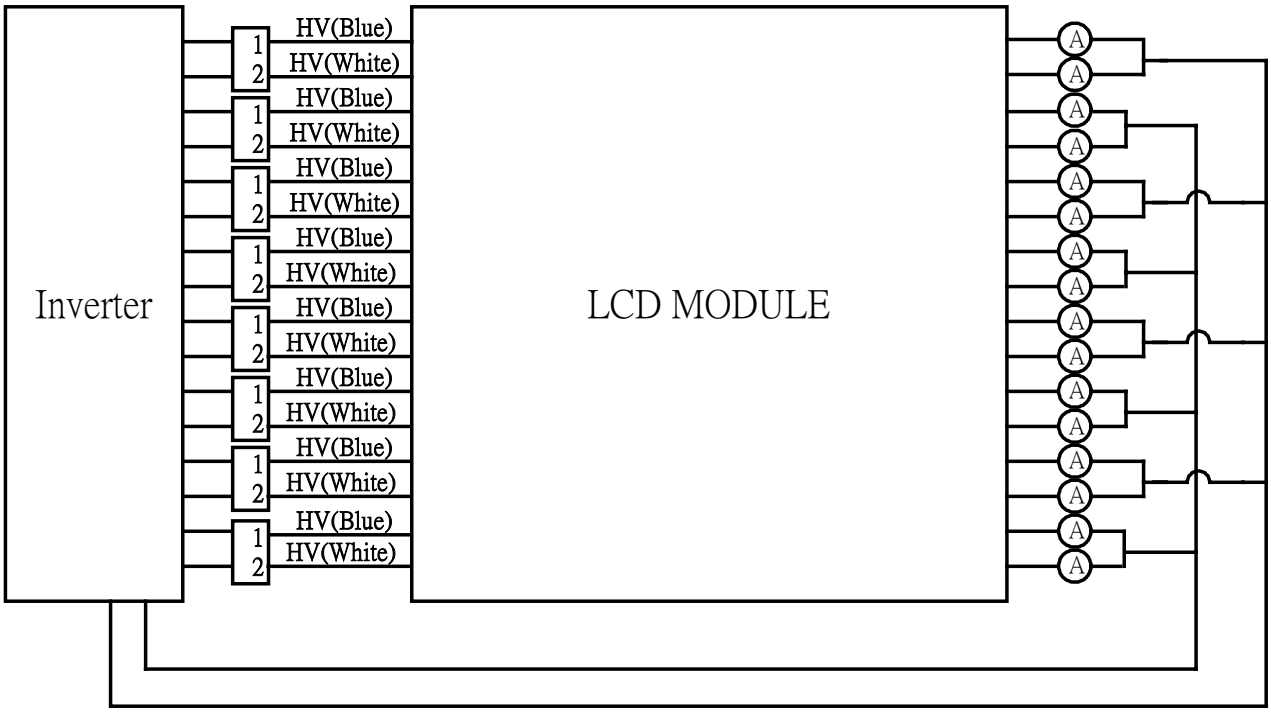
[Note 2] When the interface signal is invalid, be sure to pull down the power supply of LCD to 0V.

[Note 3] Lamp power must be turn off after power supply of LCD which the interface signal is valid.

3-3 BACKLIGHT INVERTER UNIT

ITEM		SYMBOL	MIN	TYP	MAX	UNIT	REMARK
Lamp voltage		VL	--	1400	--	Vrms	IL=5.0mA
Lamp current		IL	4.5	5	5.5	mArms	*1)
Lamp life time		LT	50000	--	--	hr	*2)
Input voltage of inverter		VBL	21.6	24	26.4	V	*3)
Input current of inverter		IIN0	--	(5.7)	--	A	*4)
		IIN	--	(5.4)	--		*5)
Lamp frequency		FL	61.5	63.5	65.5	KHz	*6)
Inverter dimming voltage		VDIM	0	--	5	Vdc	*7)
Inverter duty ratio		D	20	--	100	%	VDIM=5V(MAX.)
Inverter opening voltage		Vopen	2300	--	2700	Vrms	
Backlight on /off control voltage	ON	V_{BLON}	2.0	--	5	V	
	OFF		0	--	0.8		
Power consumption		BLW0	--	(140)	--	W	*4)
		BLW	--	(130)	--		*5)

[Note 1] Lamp Current measurement method: (The current meter is connected to low voltage end) Take the average of 16 CCFLs' lamp current as V_{DIM} = 5V after power on for 30 minutes.



[Note2] Definition of the lamp life time:
When lamp luminance redue to 50% or lower than its initial value.

[Note3] Ripple voltage that occur at the instant of power-on can't exceed 30V.

[Note4] 25°C; V_{DIM} = 5V(MAX.), After power on for 5 seconds.

[Note5] 25°C; V_{DIM} = 5V(MAX.), After power on for 30 Minutes.

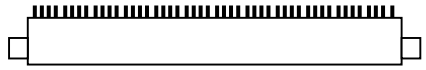
[Note6] Electrical and optical characterisitics color chromaticity are not included for being maintainable in a range +/- 10% when the inverter operates within this frequency range.

[Note7] Brightness is the darkest when V_{DIM} = 0V
Brightness is the brightest when V_{DIM} = 5V

4. INTERFACE PIN CONNECTION

4.1 TFT LCD MODULE

Connector Part No.: 20389-030E (I-PEX)



1 30

Pin NO	Symbol	Description	Note
1	VCC	Power supply: +12V	
2	VCC	Power supply: +12V	
3	GND	Ground	
4	GND	Ground	
5	RxIN0-	Data-	
6	RxIN0+	Data+	
7	GND	Ground	
8	RxIN1-	Data-	
9	RxIN1+	Data+	
10	GND	Ground	
11	RxIN2-	Data-	
12	RxIN2+	Data+	
13	GND	Ground	
14	RxCLKIN-	Clock-	
15	RxCLKIN+	Clock+	
16	GND	Ground	
17	RxIN3-	Data-	
18	RxIN3+	Data+	
19	NC	NC	
20	NC	NC	
21	NC	NC	
22	NC	NC	
23	NC	NC	
24	NC	NC	
25	NC	NC	
26	NC	NC	
27	DMS	LVDS Data Mapping Select	*1)
28	NC	NC	
29	NC	NC	
30	GND	Ground	

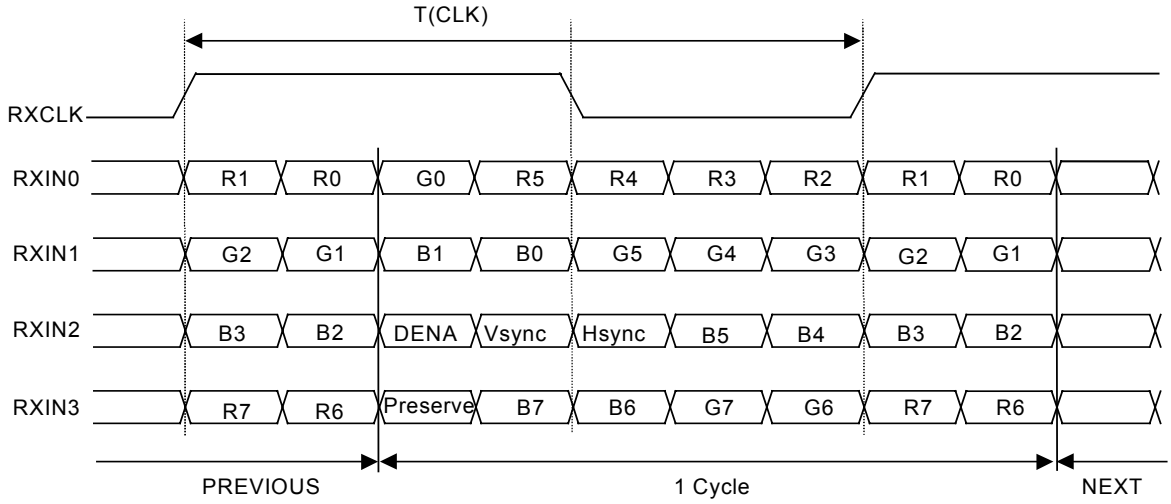
[Note 1] LVDS OPTION PIN 27(DMS):

DMS (Pin 27)	LVDS format
GND	No-JEIDA
NC	JEIDA

4-2 LVDS DATA MAPPING

1) Pin 27: GND, Non-JEIDA mode

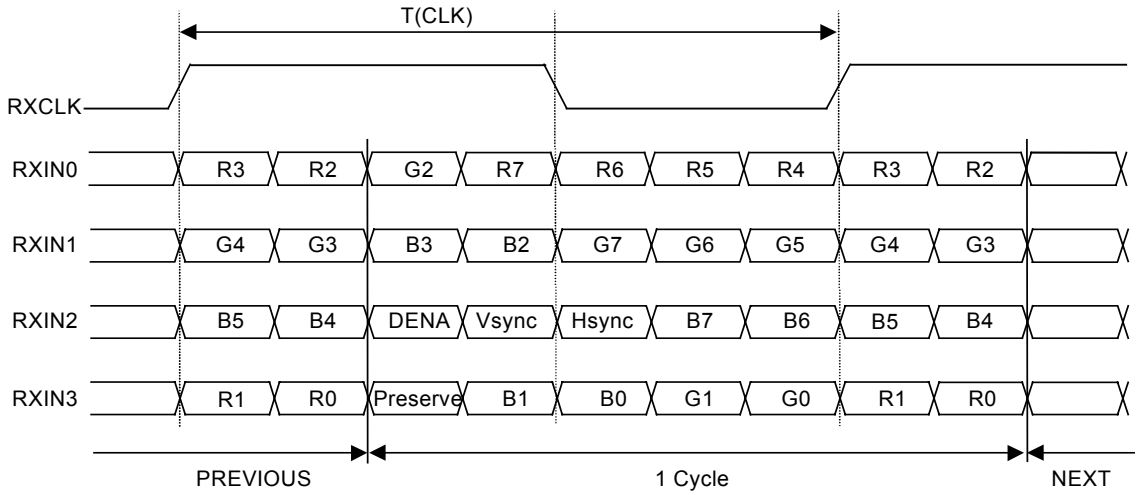
Non-JEIDA SPEC



Note: R/G/B[7]s are MSBs and R/G/B[0]s are LSBs

2) Pin 27: NC, JEIDA mode

JEIDA SPEC



Note: R/G/B[7]s are MSBs and R/G/B[0]s are LSBs

4-3. INVERTER

Connector

1) Connector (Receptacle)
   S14B-PH-SM3-TB (JST) or compatible.
2) Mating connector (Plug)
   PRH-14 (JST) or compatible.

PIN NO	SYMBOL	DESCRIPTION	NOTE
1	VBL	Supply Voltage 24V	
2	VBL	Supply Voltage 24V	
3	VBL	Supply Voltage 24V	
4	VBL	Supply Voltage 24V	
5	VBL	Supply Voltage 24V	
6	GND	Ground	
7	GND	Ground	
8	GND	Ground	
9	GND	Ground	
10	GND	Ground	
11	NC	NC(Test pin or else)	
12	BLON	ON/OFF Control	*1)
13	VDIM	0V~5V	*2)
14	GND	GND	

[Note 1] ON=5V, OFF=0V; When this PIN is disconnecting with power, the Inverter is in OFF status.

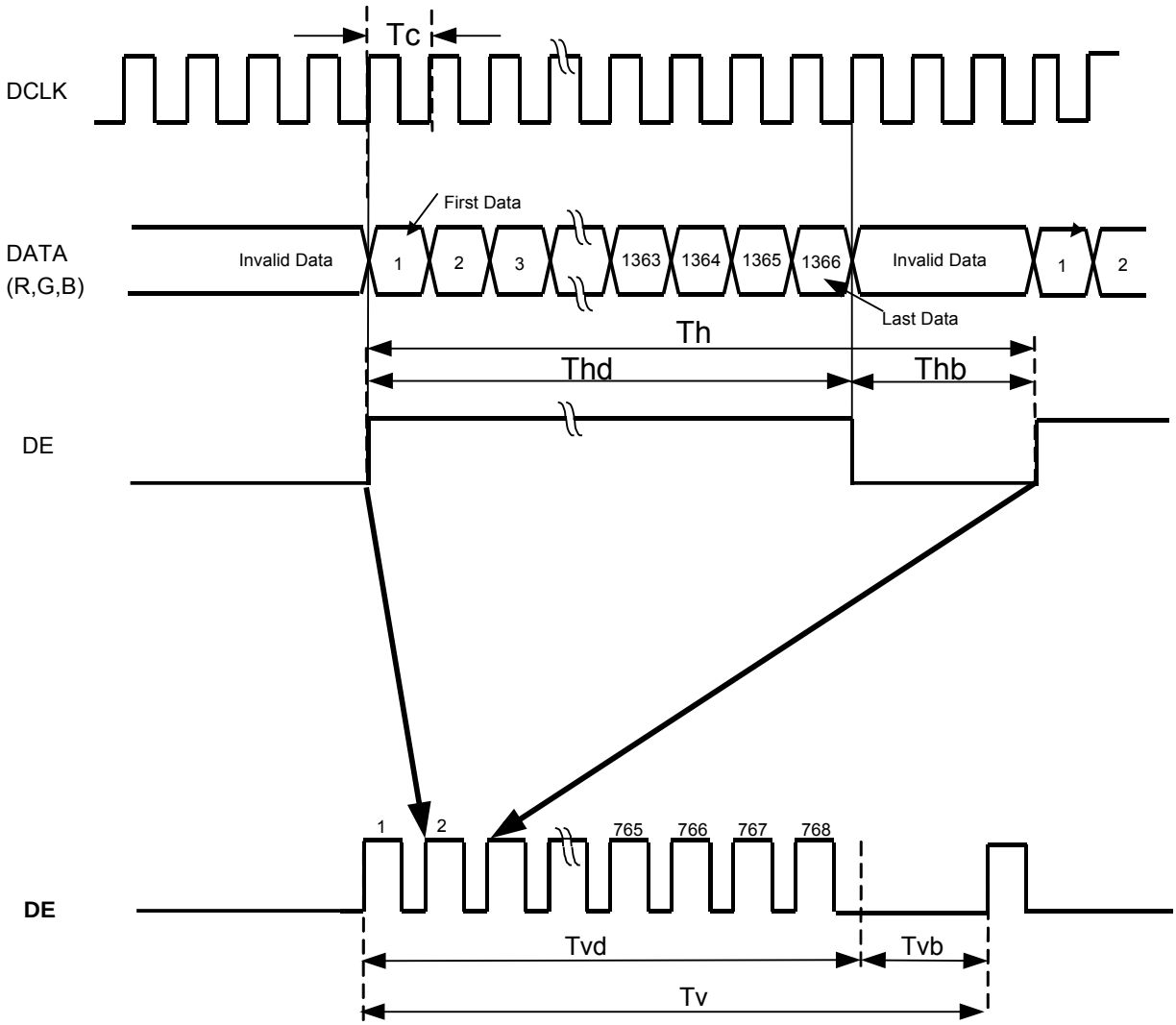
[Note 2] Max Brightness =5V, Min Brightness =0V; When this PIN is disconnecting with power, the output status of Inverter is the same as VDIM＝0V.

5. INTERFACE TIMING

5-1 TIMING SPECIFICATION

Signal	Item	Symbol	Min	Typ	Max	Unit	Note
Clock	Frequency	1/Tc	62.7	80	84	MHz	
Vertcial Active Display Term	Frame Rate	Fr	47	60	63	Hz	
	Total	Tv	790	810	888	Th	Tv=Tvd+Tvb
	Display	Tvd	768	768	768	Th	
	Blank	Tvb	22	42	120	Th	
Horizontal Active Display Term	Total	Th	1575	1648	1936	Tc	Th=Thd+Thb
	Display	Thd	1366	1366	1366	Tc	
	Blank	Thb	209	282	570	Tc	

5-2. TIMING CHART



5-3. COLOR DATA ASSIGNMENT

Color		Input Color Data																							
		Red								Green								Blue							
		MSB							LSB	MSB							LSB	MSB							LSB
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Color	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Blue(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Megenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Red	Red(000) Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(001)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(002)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	---------- ----------	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	---------- ----------	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	Red(253)	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(255) Bright	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Green	Green(000) Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(001)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Green(002)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	---------- ----------	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	---------- ----------	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	Green(253)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	Green(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Green(255) Bright	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Blue	Blue(000) Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue(001)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue(002)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	---------- ----------	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	---------- ----------	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	Blue(253)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1

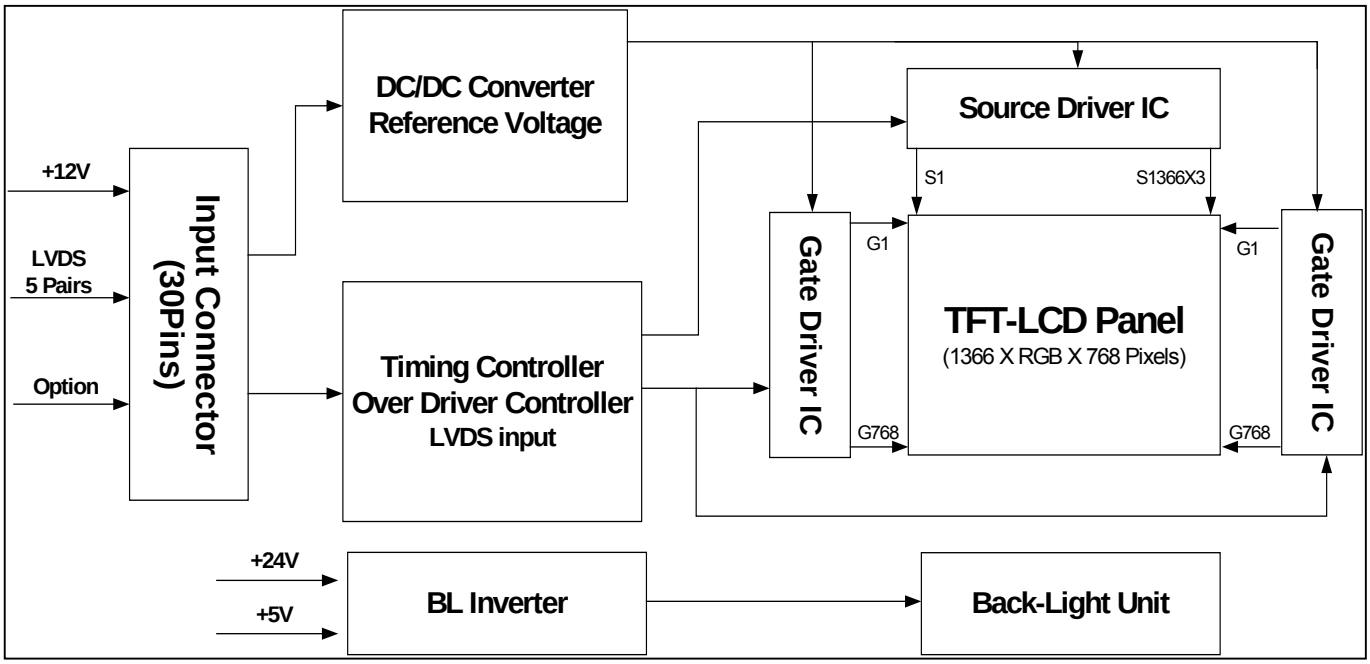
[Note 1] Definition of gray scale

Color (n): n indicates gray scale level, higher n means brighter level.

[Note 2] Data: 1-High, 0-Low

6. BLOCK DIAGRAM

6.1 TFT LCD MODULE



6-2. BACKLIGHT UNIT

[Note 1] Lamp connector

HV(CN2): BHR-02(8.0)VS-1 (JST)*8 Mating connector: SM02 (8.0) B-BHS-1-TA (JST)

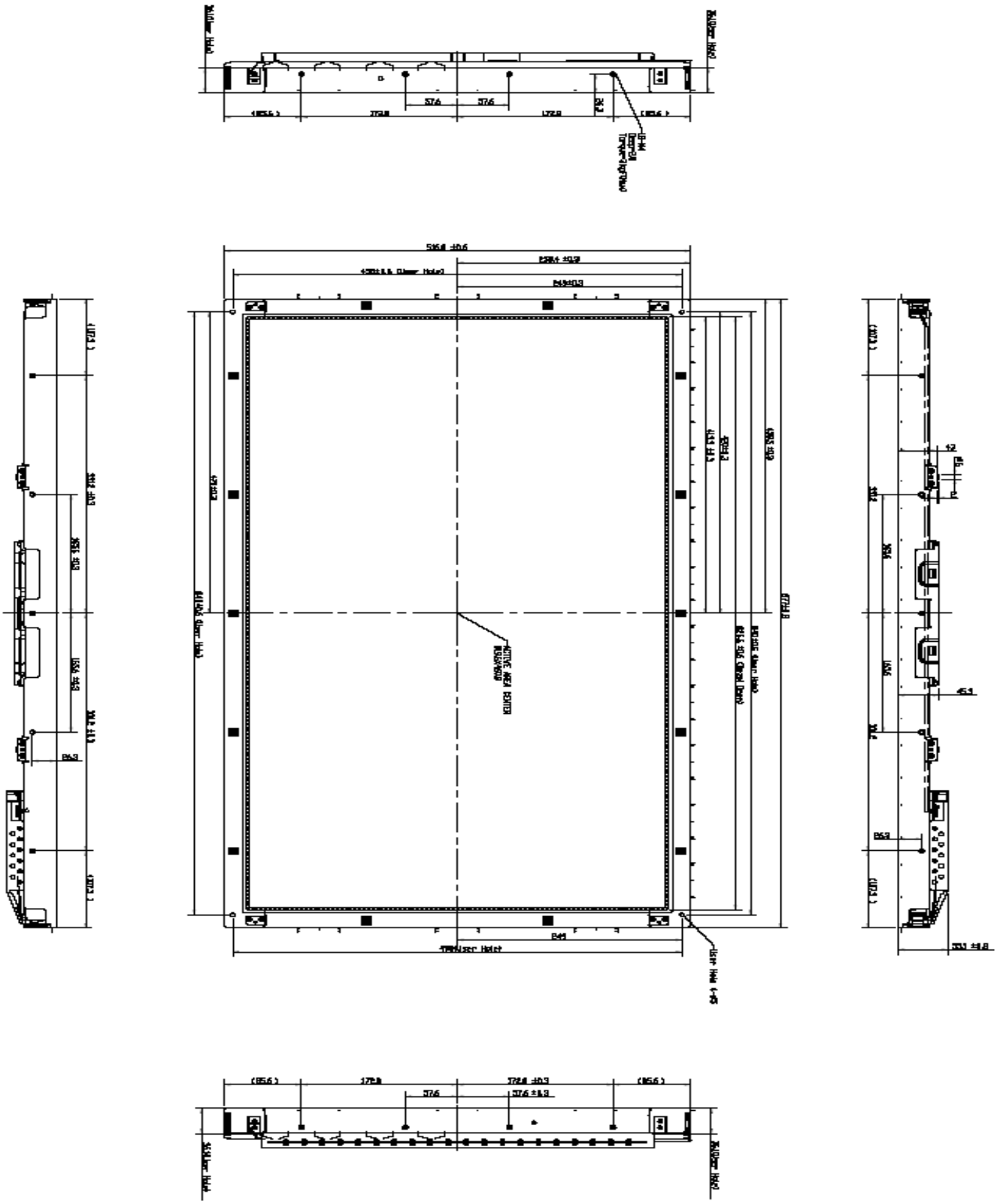
LV1: BHSR-02VS-1 (JST); Mating connector: SM02B_BHSS-1-TB

7. MECHANICAL SPECIFICATION

7-1. FRONT SIDE

(Include Inverter, if the dimension is not clear, please refer to the table.)

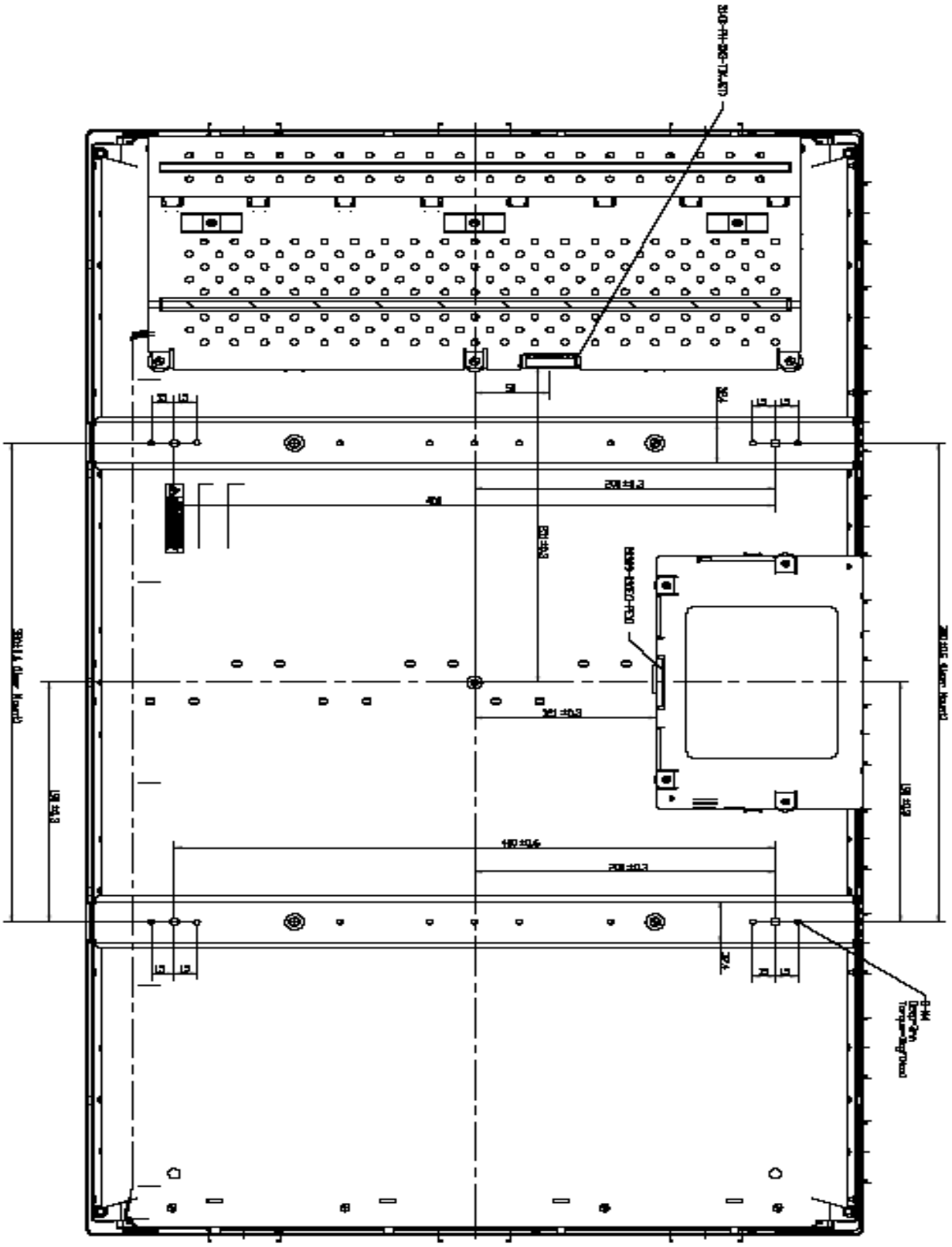
[Unit: mm]



7-2. REAR SIDE

(Include Inverter, if the dimension is not clear, please refer to the table.)

[Unit: mm]



8.OPTICAL CHARACTERISTICS

Ta = 25°C, VCC=12V

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARKS
Contrast (CEN)		CR	θ=ψ= 0° Point-5	800	1000	--	--	*1)*2)*3)
Luminance	Central luminance	Lwc	θ=ψ= 0°	450	550	--	cd/m^2	
	5P Luminance (AVG)	Lw9	θ=ψ= 0°	--	500	--	cd/m^2	*2)*3)
	Uniformity	△Lw	θ=ψ= 0°	75	--	--	%	*2)*3)
Response Time (White – Black)		tr	θ=ψ= 0°	--	10	20	ms	*3)*4)
		tf	θ=ψ= 0°		5	10	ms	*3)*4)
Response Time (Gray to gray)		trg, tfg		--	8	10	ms	*5)
Image sticking		tis	2 h	--	--	5	sec	*6)
			24 h	--	--	< 16	sec	*6)
View angle	Horizontal	ψ	CR ≧ 10 Point-5	-80~80	-85~85	--	°	*2)*3)
	Vertical	θ		-80~80	-85~85	--	°	*2)*3)
Crosstalk Ratio		CMR	θ=ψ= 0°	--	--	1	%	*3)*7)
Color Chromaticity	Red	Rx Ry	θ=ψ= 0° Point-5	TBD	TBD	TBD	--	*2)*3)
	Green	Gx Gy		TBD	TBD	TBD		
	Blue	Bx By		TBD	TBD	TBD		
	White	Wx Wy		TBD	TBD	TBD		
Color Temperature		Tc		--	9300	--	K	*3)
Color Gamut		CG		--	75	--	%	*8)

- Contrast, Luminance, Color Chromaticity, Color Temperature and Crosstalk Ratio are measured by using: BM-5A (TOPCON) [under the dark room condition (no ambient light)].
- Response Time is measured by using: Westar TRD-100
- View angle and Response Time(Gray to gray) are measured by using: EZ contrast XL-88

■ Measurement Condition:

After lighting on the panel 30 mins, you can proceed the Measurement testing.

The definiton of Typ value is under status of lamp current as V_{DIM} = 5V after power on for 30 minutes

■ Definition of these measurement items is as follows:

[Note1] Definition of Contrast Ratio:

〔 These items are measured using BM-5A (TOPCON) under the dark room condition (no ambient light). 〕

CR= ON (White) Luminance / OFF (Black) Luminance

[Note 2] Definition of Luminance, Luminance uniformity, Contrast and the Deviation of Color Coordinate:

Luminance and Contrast: To measure at the center position “5” on the screen (NO.5), see Fig.8-1 below.

Luminance uniformity: Lw (MAX) and Lw(MIN) are the maximum and minimum luminance value measure at the position “1~5” on the screen (NO.1~5), see Fig.8-1 and below show equation:

ΔLw＝ [(Lw(MIN)) / Lw(MAX)] × 100%

The Deviation of Color Coordinate: To measure at the position “1~9” on the screen (NO.1~9), see Fig.8-1 below.

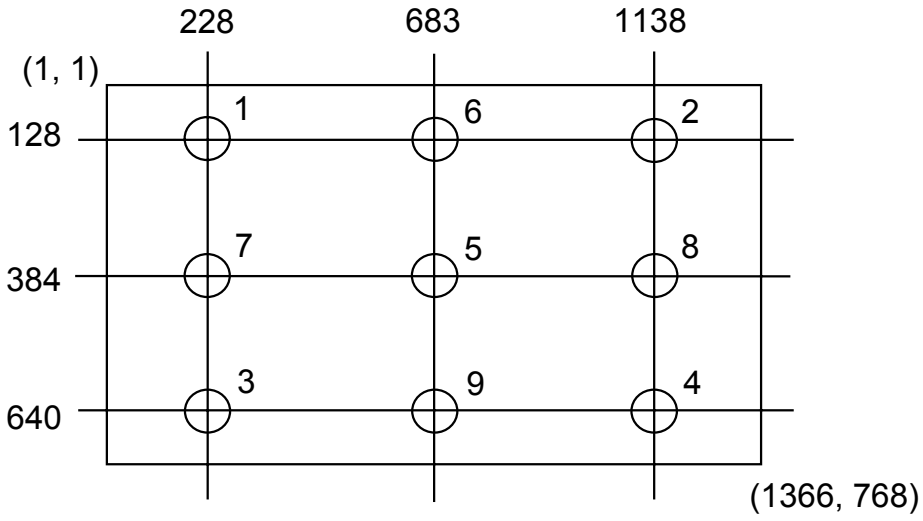


Figure 8-1. Measurement positions

[Note3] Definition of Viewing Angle (θ, ϕ):

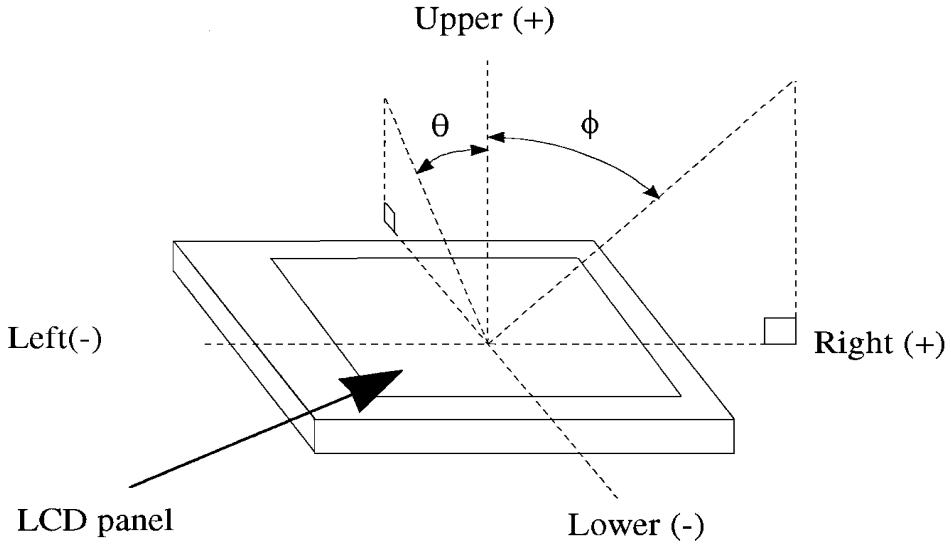


Figure 8-2. Definition of Viewing Angle

[Note 4] Definition of Response Time (White – Black)

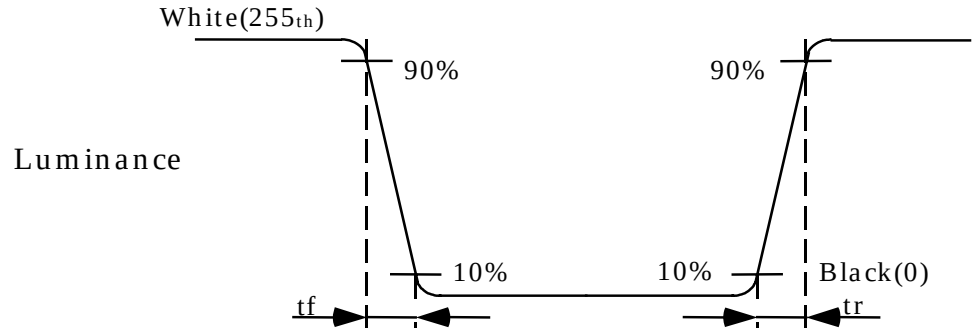


Figure 8-3. Definition of Response Time (White – Black)

[Note 5] Definition of Response Time (Gray to Gray, 5 × 5 levels)

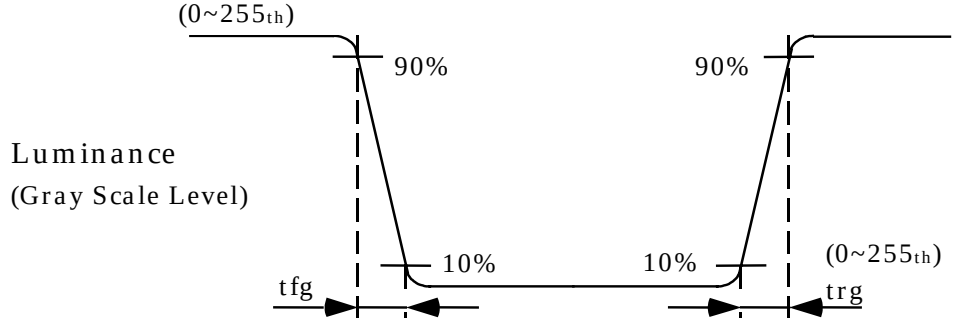


Figure 8-4. Definition of Response Time (Gray to Gray)

- The driving signal time means the signal of gray level 0、63、127、191、255.
- Gray to gray average means the average switching time of gray level 0、63、127、191、255 to each other.
- The LCD module should be stabilized at given temperature for 1 hour to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 1 hour in a windless room.

[Note6] Image sticking test method:

Continuously display the test pattern shown in the figure below for specified time. To change the module frame to gray pattern (gray 127 pattern), and it's displaying grade still under specfication.

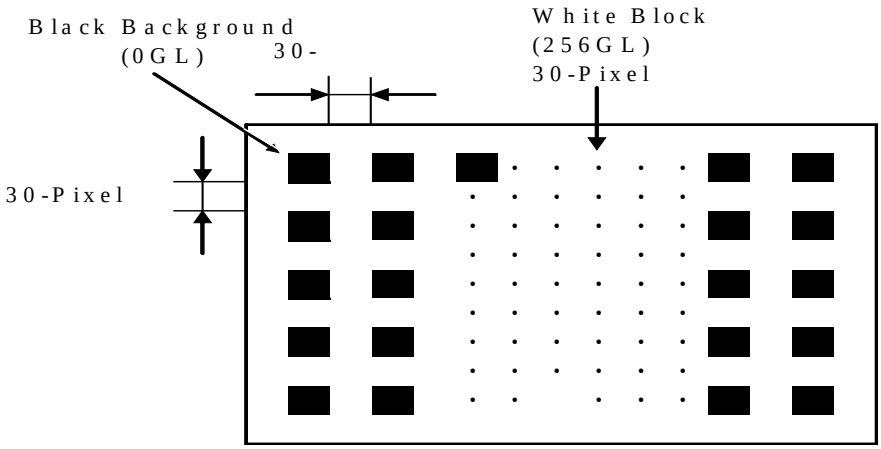


Figure 8-5. The Pattern of Image Sticking Test

[Note 7] Definition of Cross Talk Ratio

CMR = MAX (***(| (LB1-LA) / LC |) × 100% , (| (LB2 – LA) / LC |) × 100%***)

LA: Pattern A (Half-Tone pattern) Measure point Luminance

LB1, LB2: Pattern B1, Pattern B2 Measure point Luminance

LC: Pattern C(white pattern) Measure point Luminance

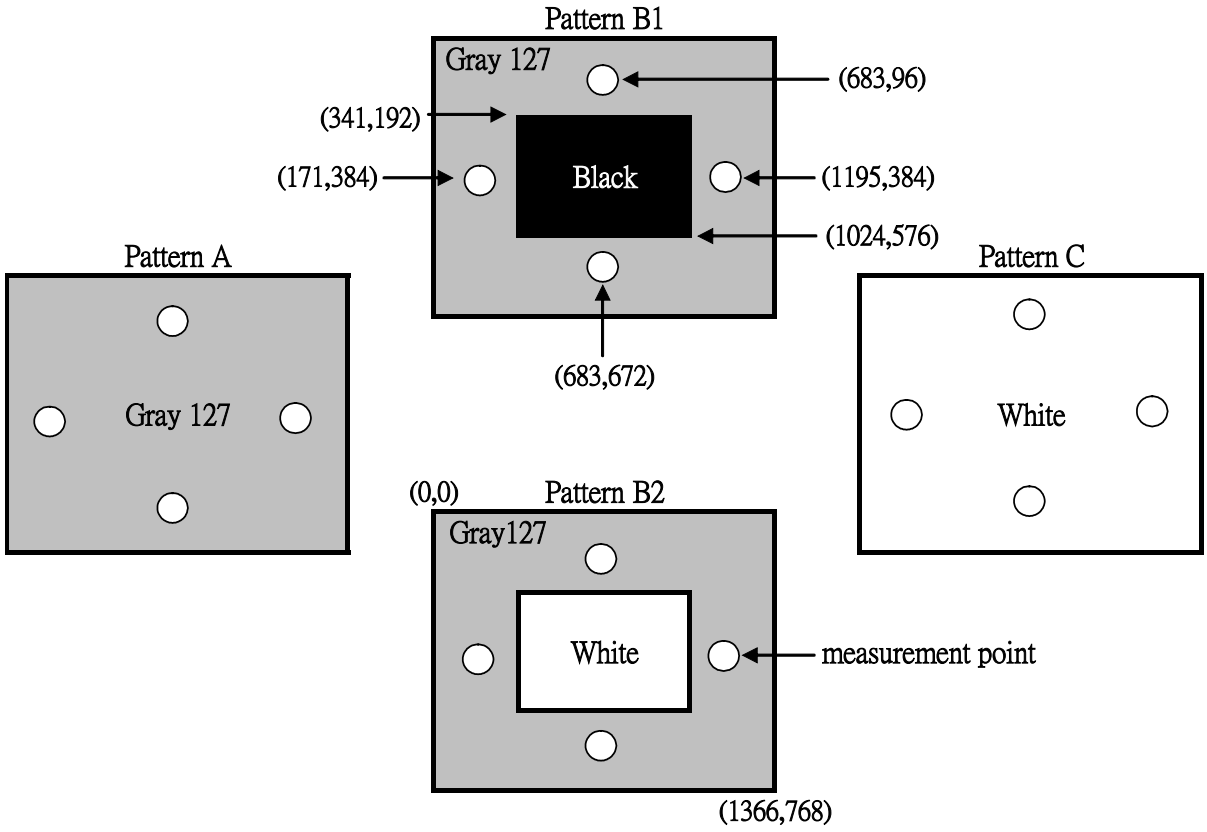


Figure 8-6. Cross Talk

[Note 8] Definition of Color Gamut:

To measure RGB three sub-pixels color gamut coordinate at CIE coordinate chart from the center of module , to form a triangle area = A_{RGB}.

RGB three sub-pixels of NTSC at CIE coordinate chart to form a triangle area = N_{RGB}.

$$CG = \frac{A_{RGB}}{N_{RGB}} \times 100$$

9.RELIABILITY TEST CONDITIONS

9-1.TEMPERTURE AND HUMIDITY

TEST ITEMS	CONDITIONS
High Temperature Operation	50℃; 240hrs
High Temperature Storage	60℃; 240hrs
High Temperature High Humidity Operation	50℃; 90% RH; 240 hrs (No condensation)
Low Temperature Operation	0℃; 240 hrs
Low Temperature Storage	-20℃; 240 hrs

9-2. SHOCK AND VIBRATION

ITEMS	CONDITIONS
Shock (Non-Operation)	Shock level: 980m/s^2(100G) Waveform: half sinusoidal wave, 2ms Number of shocks: one shock input in each direction of three mutually perpendicular axes for a total of six shock inputs.
Vibration (Non-Operation)	Vibration level: 9.8m/s^2 (1.0G) zero to peak Waveform: sinusoidal Frequency range: 10 to 300 Hz Frequency sweep rate: 0.5 octave/min Duration: each x, y, z axis: 10 min, total 30 mins

9-3. Judgment standard

The judgment of the above test should be made as follow:

- Pass: Normal display image with no obvious non-uniformity and no line defect. Partial transformation of the module parts shall be ignored.
- Fail: No display , obvious non-uniformity, or line defects.

10. HANDLING PRECAUTIONS FOR TFT-LCD MODULE

Please pay attention to the followings in handling TFT-LCD products.

10.1 ASSEMBLY PRECAUTION

(1) Please use the mounting hole on the module side in installing and do not beading or wrenching
LCD in assembling. And please do not drop, bend or twist LCD module in handling.

(2) Please design display housing in accordance with the following guidelines.

- Housing case must be destined carefully and do not to put stresses on LCD all sides or wrench module. The stresses may cause non-uniformity even if there is no non-uniformity statically.
- Keep sufficient clearance between LCD module back surface and housing when the LCD module is mounted. Approximately 1.0 mm of the clearance in the design is recommended taking into account the tolerance of LCD module thickness and mounting structure height on the housing.
- When some parts, such as, FPC cable and ferrite plate, are installed underneath the LCD module, still sufficient clearance is required, such as 0.5mm. This clearance is, especially, to be reconsidered when the additional parts are implemented for EMI countermeasure.
- Design the inverter location and connector position carefully so as not to put stress on lamp cable.
- Keep sufficient clearance between LCD module and the other parts, such as inverter and speaker so as not to interface the LCD module. Approximately 1.0mm of the clearance in the design is recommended.

(3) Please do not push or scratch LCD panel surface with any-thing hard. And do not soil LCD panel surface by touching with bare hands. (Polarizer film and surface of LCD panel are easy to be flawed.)

(4) Please do not press any parts on the rear side such as source TCP, gate TCP, control circuit board and FPC during handling the LCD module. If pressing rear part could not be avoided, handle the LCD module with care not to damage them.

(5) Please wipe out LCD panel surface with absorbent cotton or soft clothe in case of it being soiled.

(6) Please wipe out drops of adhesives like saliva and water on LCD panel surface immediately. They might damage to cause panel surface variation and color change.

(7) Please do not take a LCD module to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.

(8) Please do not touch metal frames with bare hands and soiled gloves. A color change of the metal frames can happen during a long preservation of soiled LCD modules.

(9) Please pay attention to handling lead wire of backlight so that it is not tugged in connecting with inverter.

10.2 OPERATING PRECAUTIONS

(1) Please be sure to turn off the power supply before connecting and disconnecting signal input cable.

(2) Please do not change variable resistance settings in LCD module. They are adjusted to the most suitable value. If they are changed, it might happen LCD does not satisfy the characteristics specification.

(3) Please consider that LCD backlight takes longer time to become stable of radiation characteristics in low temperature than in room temperature.

(4) A condensation might happen on the surface and inside of LCD module in case of sudden change of ambient temperature.

(5) Please pay attention to displaying the same pattern for a very long time. Image might stick on LCD. If then, time going on can make LCD work well.

(6) Please obey the same caution descriptions as ones that need to pay attention to ordinary electronic parts.

10.3 PRECAUTIONS WITH ELECTROSTATICS

(1) This LCD module use CMOS-IC on circuit board and TFT-LCD panel, and so it is easy to be affected by electrostatics. Please be careful with electrostatics by the way of your body connecting to the ground and so on.

(2) Please remove protection film very slowly on the surface of LCD module to prevent from electrostatics occurrence.

10.4 STORAGE PRECAUTIONS

(1) When you store LCD for a long time, it is recommended to keep the temperature between 0℃ ~40℃ without the exposure of sunlight and keep the humidity less than 90%RH.

(2) Please do not leave the LCD in the environment of high humidity and high temperature such as 60℃ 90%RH.

(3) Please do not leave the LCD in the environment of low temperature(can not lower than -20℃).

10.5 SAFETY PRECAUTIONS

(1) When you waste LCD, it is recommended to crush damaged or unnecessary LCD into pieces and wash them off with solvents such as acetone and ethanol, which should later be burned.

(2) If any liquid leaks out of a damaged-glass cell and comes in contact with the hands, wash off thoroughly with soap and water.

10.6 OTHERS

(1) A strong incident light into LCD panel might cause display characteristics' changing inferior because of polarizer film, color filter, and other materials becoming inferior. Please do not expose LCD module direct sunlight Land strong UV rays.

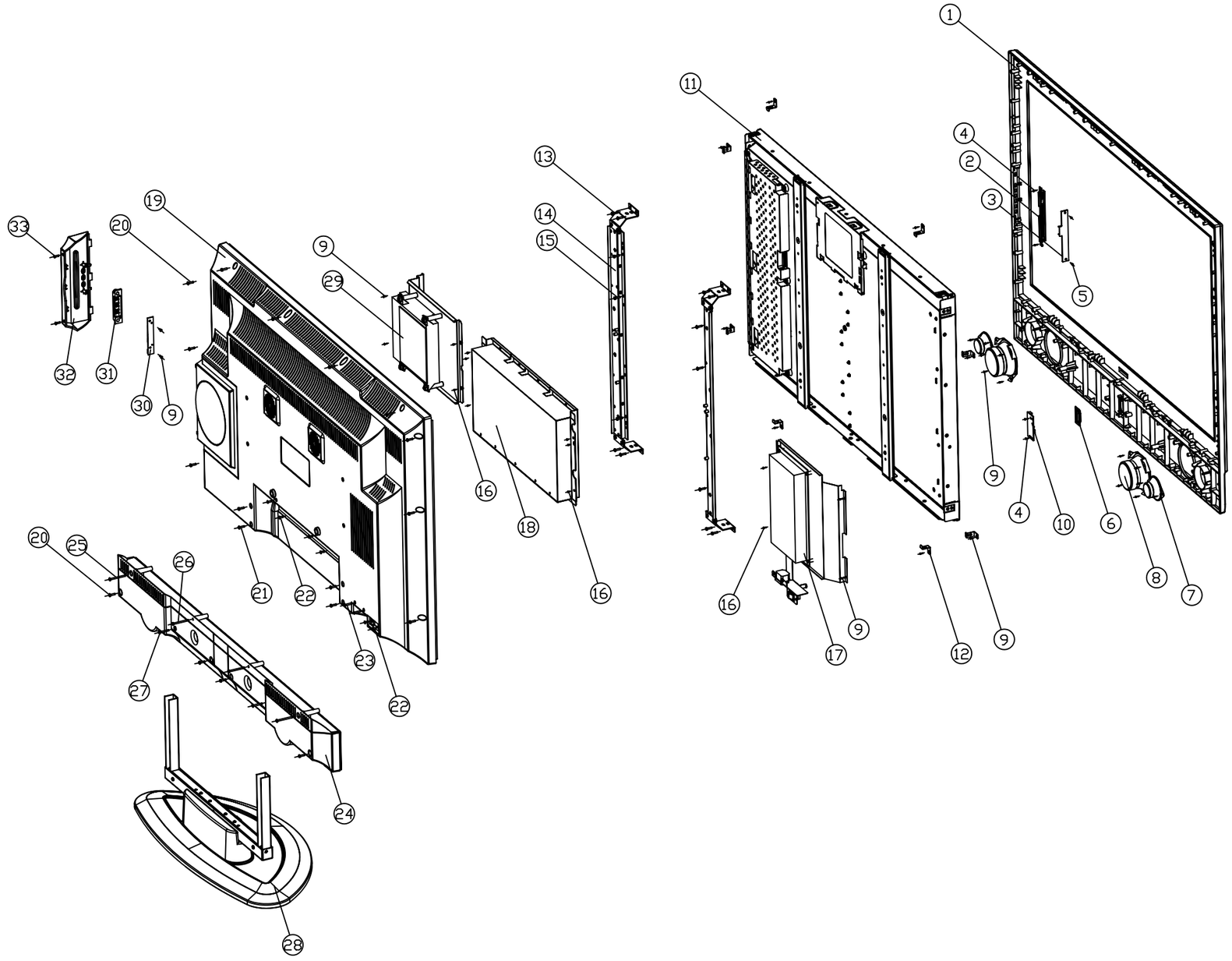
(2) Please pay attention on the side of LCD module do not contact with other materials in preserving it alone.

(3) For the packaging box, please pay attention to the followings:

- Packaging box and inner case for LCD are designed to protect the LCD from the damage or scratching during transportation. Please do not open except picking LCD up from the box.
- Please do not pile them up more than 3 boxes. (They are not designed so.) And please do not turn over.
- Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.
- Packing box and inner case for LCD are made of cardboard. So please pay attention not to get them wet. (Such as keep them way the high humidity or wet place.)

NOTE : THIS RELEASED DRAWING WAS PRODUCED BY COMPUTER , DO NOT UPDATE MASTER MANUALLY

DWG. REV.	ZONE	DESCRIPTION	DATE	REVISOR
		REL FOR TOOLING		LJ



IETM	DESCRIPTION	TYPE	QTY	REMARK
33	TAPPING SCREW	PART	2	
32	DVD KEY COVER	PART	1	
31	DVD KEY	PART	1	
30	DVD KEY PCB	ASSEMBLY	1	
29	DVD ASSY	ASSEMBLY	1	
28	BASE ASSY	ASSEMBLY	1	
27	TAPPING SCREW	PART	2	
26	TAPPING SCREW	PART	2	
25	TAPPING SCREW	PART	2	
24	SPEAKER CABINET BACK	PART	1	
23	MACH SCREW	PART	2	
22	MACH SCREW	PART	6	
21	MACH SCREW	PART	4	
20	TAPPING SCREW	PART	14	
19	BACK CABINET	PART	1	
18	MAIN BOARD ASSY	ASSEMBLY	1	
17	POWER ASSY	ASSEMBLY	1	
16	MACH SCREW	PART	10	
15	MACH SCREW	PART	6	
14	MAIN SUPORT	PART	2	
13	TAPPING SCREW	PART	8	
12	'Z'BKT FRO PANEL	PART	8	
11	37' PANEL ASSY	ASSEMBLY	1	
10	REMOTE PCB	PART	1	
9	TAPPING SCREW	PART	26	
8	BOURDON SPEAKER	PART	2	
7	ALT SPEAKER	PART	2	
6	REMOTE LENS	PART	1	
5	TAPPING SCREW	PART	2	
4	TAPPING SCREW	PART	4	
3	FUNCTION KEY PCB ASSY	ASSEMBLY	1	
2	FUNCTION KEY	PART	1	
1	FRONT CABINET	PART	1	

DRAWN.	LJ				
CHECKED					
APPRD.					

3rd ANGLE PROJECTION

TOLERENCE UNLESS OTHERWISE SPECIFIED

0:	± 0.30
0.0	± 0.10
0.00:	± 0.05
ANGULAR:	± 0.3°
UNIT :	mm

KAWA ELECTRONIC R & D CENTRE

MATL.

FINISH

TITLE LCT3785TA-EXP

MODEL NO. LCT37AD

A3 | PART NO. LCT3785TA-EXP | DWG. NO. LCT3785TA-EXP

SCALE 1:10 | QTY. 1 | SHEET 1 OF 1

Spare part list of LCT3701AD

Item	Part Number	Part Description	Usage / unit	Unit	Key/Spare
	LCT37ADNDA1TS-A01	AKAI LCT3701AD MT8202+DVD AC120V/60HZ USA SILVER			
1>	510-L37SD01-02AK	CARTON BOX AKAI LCT3701AD (S-MT8202) CPT USA K	1	Piece	K
2>	580-L37AD1A-01AP	IB E FOR AKAI LCT37AD S-MT8202 (DTV+PIP+DVD) CPT USA	1	Piece	K
3>	E7501-061002	REMOTE CONTROL K002 AKAI FOR MT8202 +DVD PIP 60KEYS SIL/BLK LCT37"	1	Piece	K
4>	771EL37AD02-02	PCB ASS'Y MAIN S-MT8202 ATSC&DVD CPT LCT37"	1	SET	K
5>	771L37AD01-01	NTSC TUNER PCB ASSY FOR LCD37	1	SET	K
6>	771S42D102-01	ATSC TUNER PCB ASSY (MT5111CE)	1	SET	K
7>	200-L37AD01-01AA	CABINET FRONT SILVER/BLACK LCT37AD CPT A	1	Piece	S
8>	202-L37AD03-01AA	CABINET BACK BLACK LCT3701AD A	1	Piece	S
9>	206-L37AD01-01R	SPEAKER BACK COVER BLACK	1	Piece	S
10>	258-L20AD01-01A	DVD FUNCTION KNOB COVER BLACK	1	Piece	S
11>	269-42SD01-01L	REMOTE RECEIVE LENS	1	Piece	S
12>	277-L27AD11-01S	DVD FUNCTION KNOB BLK LCT2701TD S	1	Piece	S
13>	277-L32AD11-03S	FUNCTION KEY SILVER AKAI LCT32AD (MATERIAL:GREY) S	1	Piece	S
14>	300-L37AD03-02C	POLYFOAM BOTTOM	1	Piece	S
15>	300-L37AD04-02C	POLYFOAM TOP	1	Piece	S
16>	310-030404-01	POLYBAG 110MMX80MMX0.04MM	1	Piece	S
17>	310-111404-07V	POLYBAG 11"X14"X0.04 FV	1	Piece	S
18>	310-444750-07V	POLYBAG 44X47X50	1	Piece	S
19>	370-42D102-01	PAD CORD SPONG FOR SPK	1	Piece	S
20>	384-L32AB01-04AHA	PVC SHEET FOR TERMINAL (MTK-8202) W/DVD	1	Piece	S
21>	387-L37AD01-02AH	MODEL PLATE AKAI LCT3701AD (S-MT8202) CPT USA H	1	Piece	S
22>	388-42D103-01H	CAUTION PLATE ENG 42D1 H	1	Piece	S
23>	429-L32AD01-01S	POWER JACK BRACKET L32AD S	1	Piece	S
24>	436-L32AB0D-01S	TERMINAL SHEET	1	Piece	S
25>	481-L32AB06-01S	SHIELDING BOTTOM MT8202	1	Piece	S
26>	481-L37AD02-01S	DVD SHIELDING BOTTOM	1	Piece	S
27>	481-L37AD11-01S	POWER SHIELDING BOTTOM L37AD S	1	Piece	S
28>	483-L32AB22-01S	SHIELDING COVER	1	Piece	S
29>	486-M32111-01	NAME PLATE M AKAI	1	Piece	S
30>	522-421D01-01	MASKING PAPER	1	Piece	S
31>	563-119-	SERIAL NO. LABEL	1	Piece	S

Spare part list of LCT3701AD

Item	Part Number	Part Description	Usage / unit	Unit	Key/Spare
32>	568-P46T02-02	WARNING LB ENG 42SF NIL	1	Piece	S
33>	579-42D102-09	SERIAL NO/BAR CODE LABEL 42D1	1	Piece	S
34>	579-42D105-01	PROTECTIVE EARTH LABEL FOR ESA 42TD1	1	Piece	S
35>	579-L32AD03-02	CLASS I LASER PRODUCT LOGO	1	Piece	S
36>	579-L32AD04-01	LASER WARNING LABEL AKAI LC32AD	1	Piece	S
37>	579-L37AD01-03AP	BAR CODE NO LABEL (W/SERIAL NO) FOR LCT3701AD USA P	2	Piece	S
38>	590-L37AD01-02AP	WARRANTY CARD AKAI ENG LCT3701AD USA P	1	Piece	S
39>	593-L37AD01-02AP	AKAI INSERTION CARD ENG LCT3701AD USA P	1	Piece	S
40>	E3219-002003	EI I LET EMI FILTER WIT WIRES IOSSI-R-Q(B) HIGH&LOW	1	Piece	S
41>	E3404-157004	AC CORD UL 1.88M (YY-3/ST3 YUNBIAO)	1	Piece	S
42>	E3407-081001	CORD FFC P0.5 50P L=110 B-0.5-50X110-4(8)X4(8)-0.3X0.035	1	Piece	S
43>	E3421-229007	WIRE ASSY 1H3.96-2KN3 0N2 L400 CJ 3P 27"LCD	1	Piece	S
44>	E3421-924009	WIRE ASSY 2P L120	2	Piece	S
45>	E3421-925061	WIRE ASSY 300MM 3WIRES #20 1617 FOR 32LCD COMBO POWER INPUT	1	Piece	S
46>	E3421-925127	WIRE ASSY TJC3-2Y L860 SPK-R MT8202	1	Piece	S
47>	E3421-925128	WIRE ASSY 16P/2.0 FOR MT8202 POWER 5V/12V	1	Piece	S
48>	E3421-925138	WIRE ASSY P2.5/4P 4P2.0 L360MM AMP 24V MT8202 37" COMBO	1	Piece	S
49>	E3421-925139	WIRE ASSY TJC3-3Y L720MM LCD37" MT8202 SPK-L	1	Piece	S
50>	E3421-926119	WIRE ASSY P2.0 8P L=215 TV/SIF	1	Piece	S
51>	E3461-064039	WIRE ASSY 5P2.5 L560MM 5V 3.3V SIGNAL WIRE EMI MT8202	1	Piece	S
52>	E3461-064040	WIRE ASSY P2.0 14P/3P2.0/8P2.5 L400MM/L700MM INVERTER MT8202	1	Piece	S
53>	E3461-064042	WIRE ASSY 1H2.5-2H2.0 20099 L350 7P/5P FOR MT8202 37" STANDBY	1	Piece	S
54>	E3471-000048	WIRE WS SHIELD WIRE FOR 32LCD TV+COMBO KEY WIRE FOR DVD	1	Piece	S
55>	E3471-000054	WIRE WS SHIELD 6P2.0/2P2.5/8P2.0 L440MM COMBO 37LCD MT8202	1	Piece	S
56>	E3471-000055	WIRE WS SHIELD 11P/10P2.0 TV+COMBO DVD 37LCD MT8202 L480MM	1	Piece	S
57>	E3471-000056	WIRE WS SHIELD FOR37LCD COMBO MICO KEY 13P/8P+5P L650/L750MM W/EMI	1	Piece	S
58>	E3471-001002	WIRE WS SHIELD P1.0 0P L=220 FOR CPT LCD37"	1	Piece	S
59>	E4101-027001	SWITCH POW MR-22-N2BB-F2 ROCKET	1	Piece	S
60>	E4801-124001	SPEAKER 8 OHM 10W D3" YD78-1	2	Piece	S
61>	E4802-014001	TWEETER 6 OHM 10W D2" YD52-1	2	Piece	S
62>	E6203-37TD01	DISPLAY LCD 37" CPT WXGA CLAA370WA02	1	Piece	S
63>	E7301-010002	BATTERY AAA R03P1.5V <2>	2	Piece	S

Spare part list of LCT3701AD

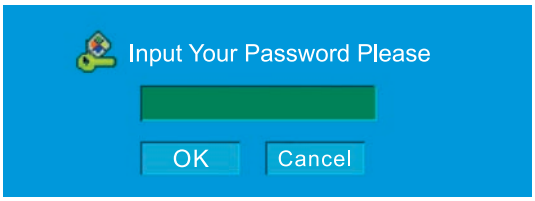
Item	Part Number	Part Description	Usage / unit	Unit	Key/Spare
64>	E7801-D01001	DVD PCB ASSY MICO FOR MT8202	1	SET	S
65>	E7801-P02003	PCB ASSY PSU BOARD MEGMEET MLT386X FOR 37LCD AC110-240V OUTPUT 12V/8V/24V 250W	1	SET	S
66>	734-L37AD03-02	PLASTIC BASE LCD37" SILVER	1	SET	S
67>	771BL27AD01-01	IR RECEIVE PCB ASSY FOR LCT27AD ATSC & DVD S-MT8202G	1	SET	S
68>	771KL27AD01-01	KEY PCB ASSY FOR TV S-MT8202G ATSC & DVD	1	SET	S

If you forget your V-Chip Password

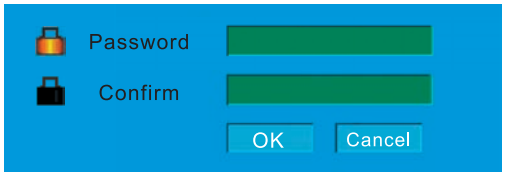
- Omnipotence V-Chip Password: 8202.

Using the “Change Password” item

1. When enter the “V-Chip” menu, select “Change Password”.
2. Press ▲ or ▼ button to highlight the “Change Password” item.
3. Press **Enter** button to confirm and pop up a menu.



4. Use 0~9 buttons input the omnipotence password(8202), then Press **Enter** button to enter and pop up a menu.



5. Use 0~9 buttons input your new password.
6. Press ▼ button to move to confirm blank.
7. Use 0~9 buttons input your new password again.
8. Press **Enter** button to confirm

-Suggest: Change to your familiar Password again.

Software Upgrade

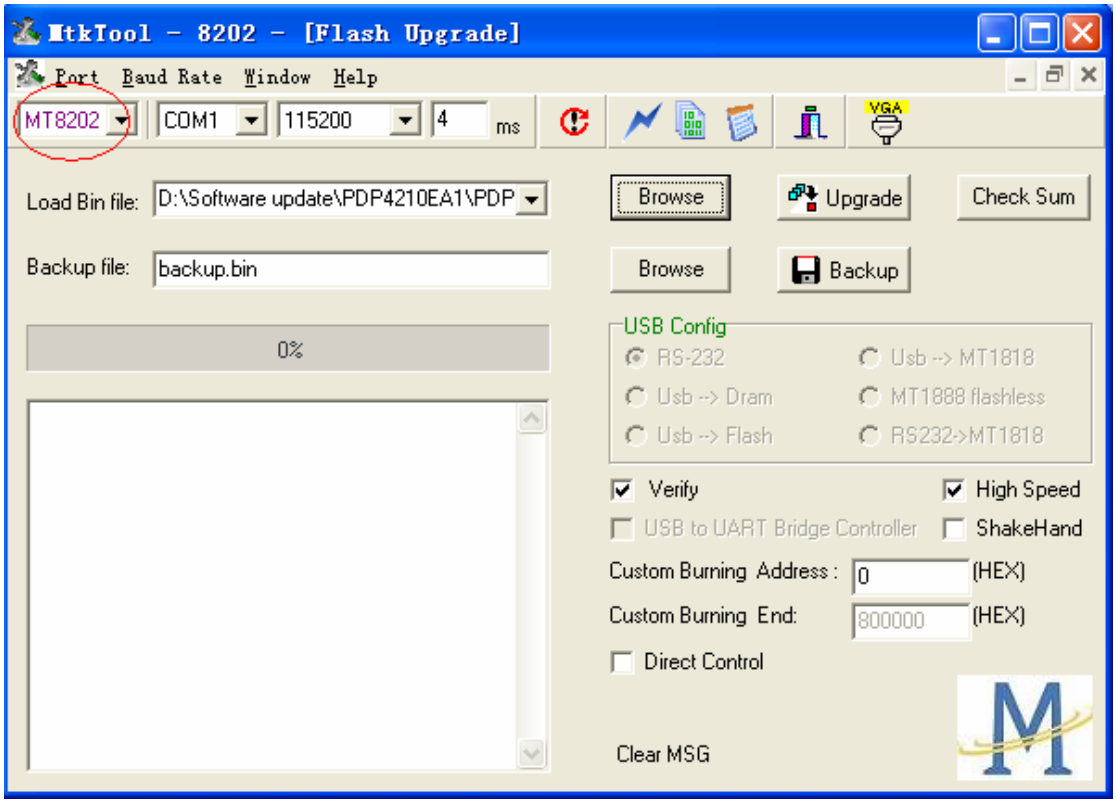
Process of update MT8202

Preparing :

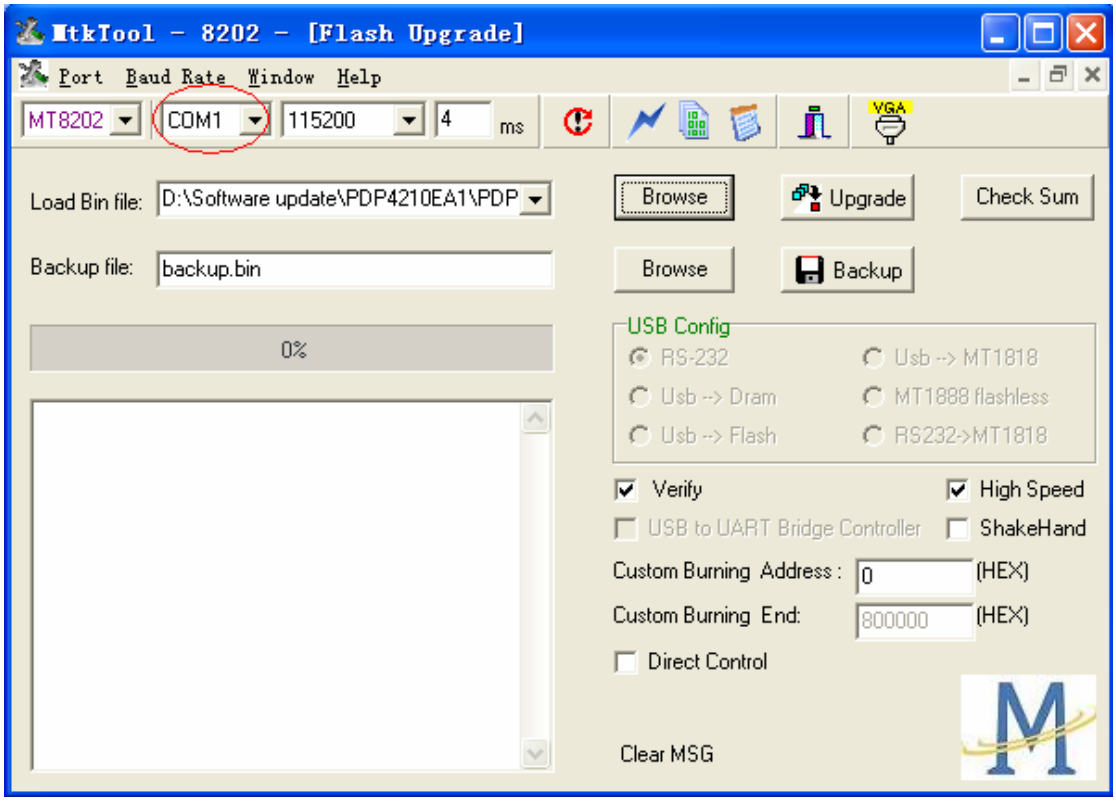
1. Connect **RS232-VGA download line**, One connector is connected to **VGA connect port of LCD TV** ,while another side is connected to PC COM port.
2. Store the MtkTool into the PC .

Downloading :

3. Turn on AC power switch of the LCD TV and then press the button “standby” of the remote control . The image could be found on the screen of the LCD TV while the color of the power indicator is green . (the mode of the LCD TV will be standby mode if after turn on the main power switch only .)
4. Execute MTKtool and select the chipset as MT8202. (the software of MTKtool will be sent to your side)

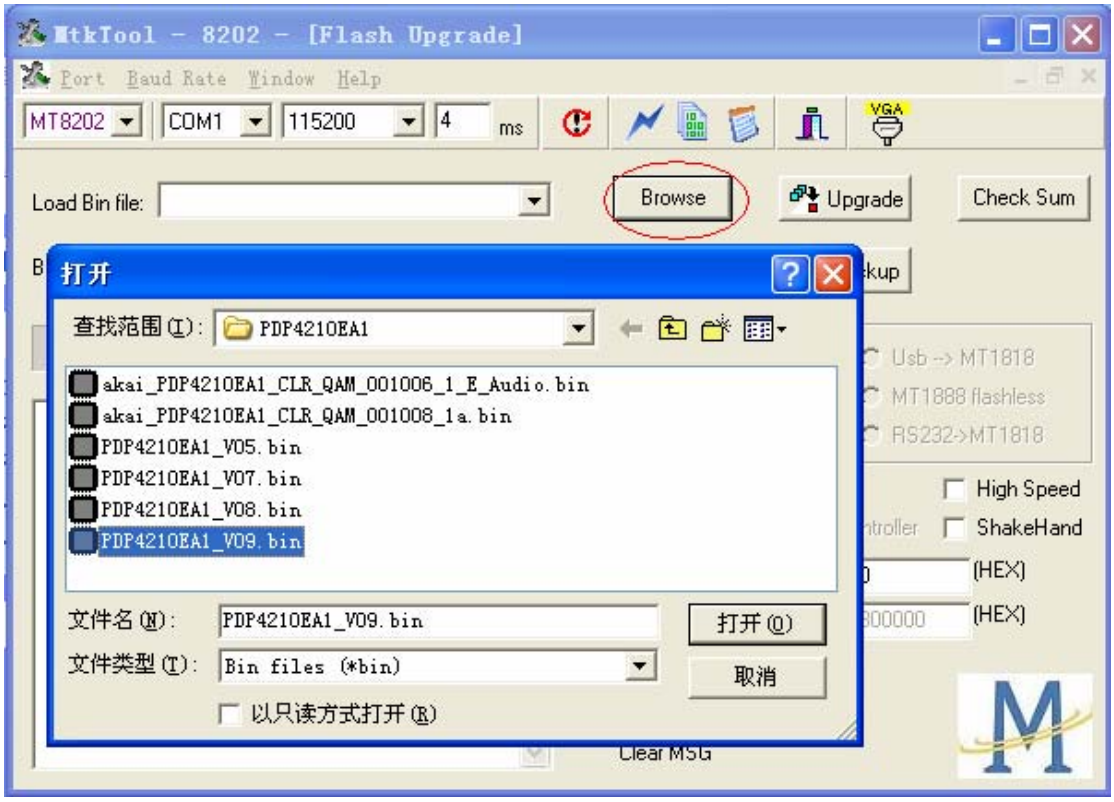


5. Select current COM port. (please try to check the COM port of your PC).

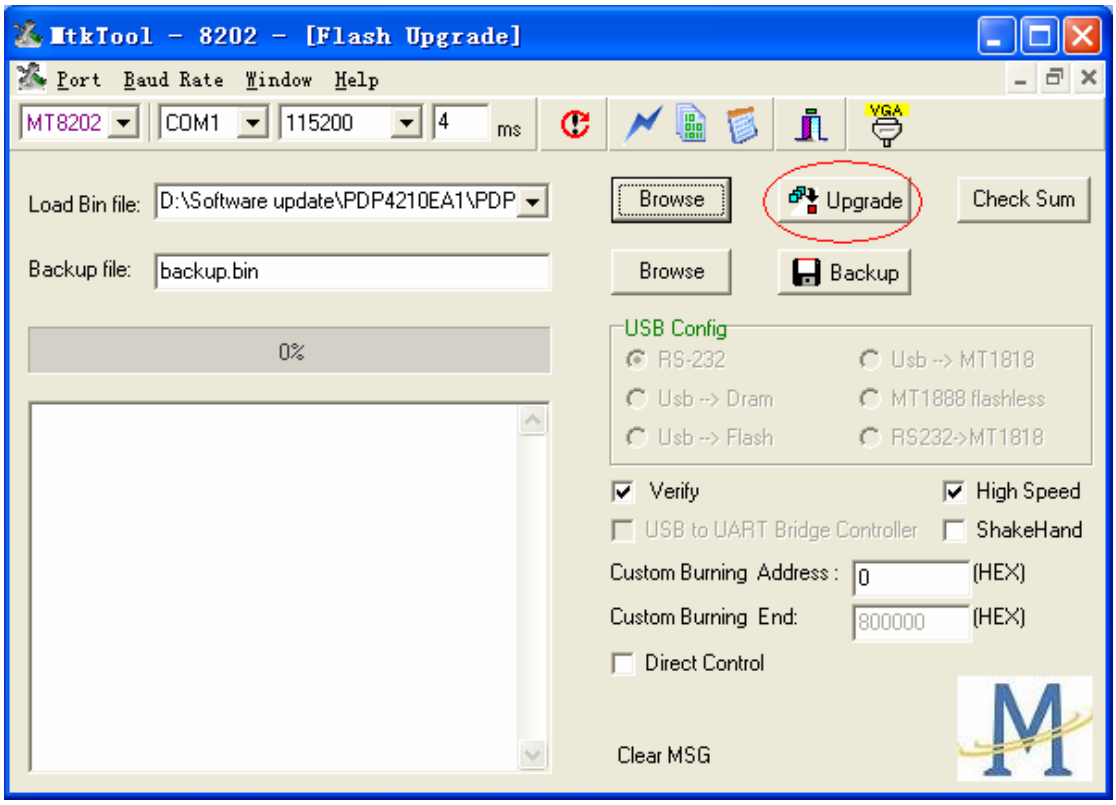


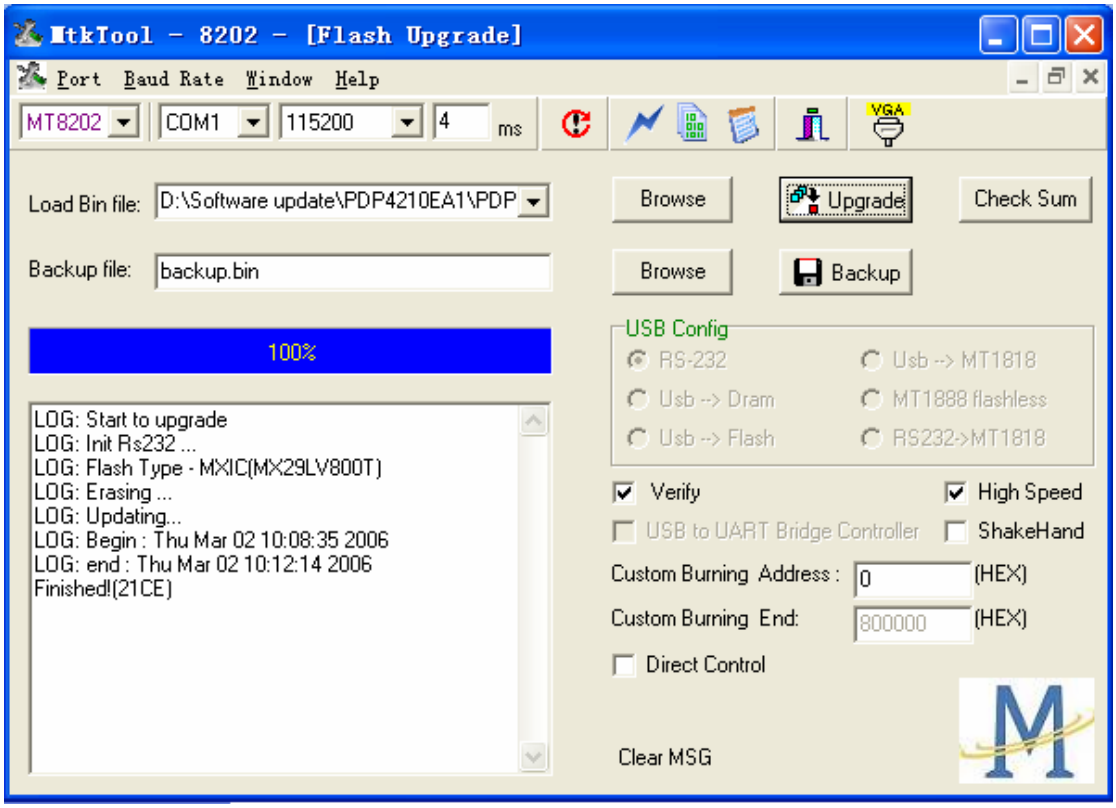
6. Choose the bit rate as 115200.

7. Select the update binary by pressing browse button. For exemple,the binary file name is PDP4210EA1_V09.bin. (this update firmware will be sent to your side)



8. Press Upgrade button and start update process.





9. The update process is successful as the progress bar is 100%. After the update process is ok,

turn off power and wait indicator light is off. Turn on power and TV can work.

Checking

It is needed to check the version of the firmware for MT8202 which has been download into the LCD TV .

Press Menu button of the remote control，following input “8202”of the remote control and OSD menu for Factory Setting is appeared on the screen .

Use the remote control and select the mode of Firmware Version and then enter the mode of Firmware Version . It is easy to be found the version of the current firmware for MT8202 is as the following : “Factory ID : LCT3701AD_VXX ”

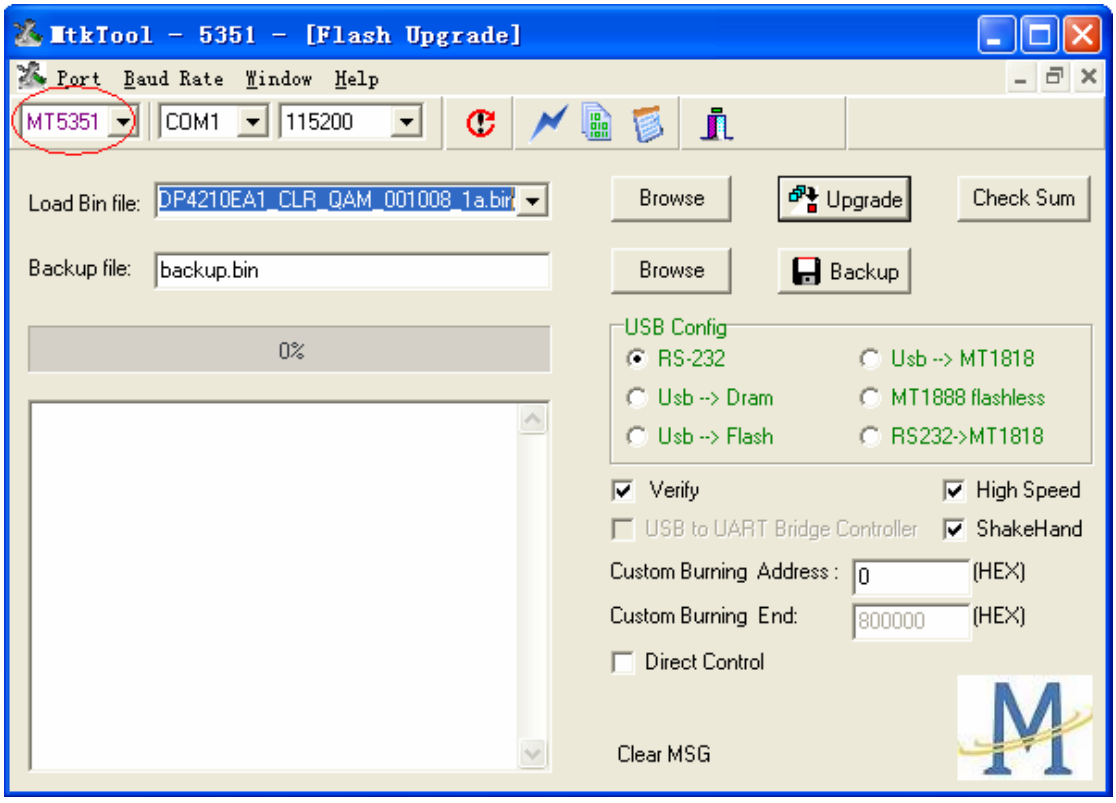
Process of update MT5351AG

Preparing :

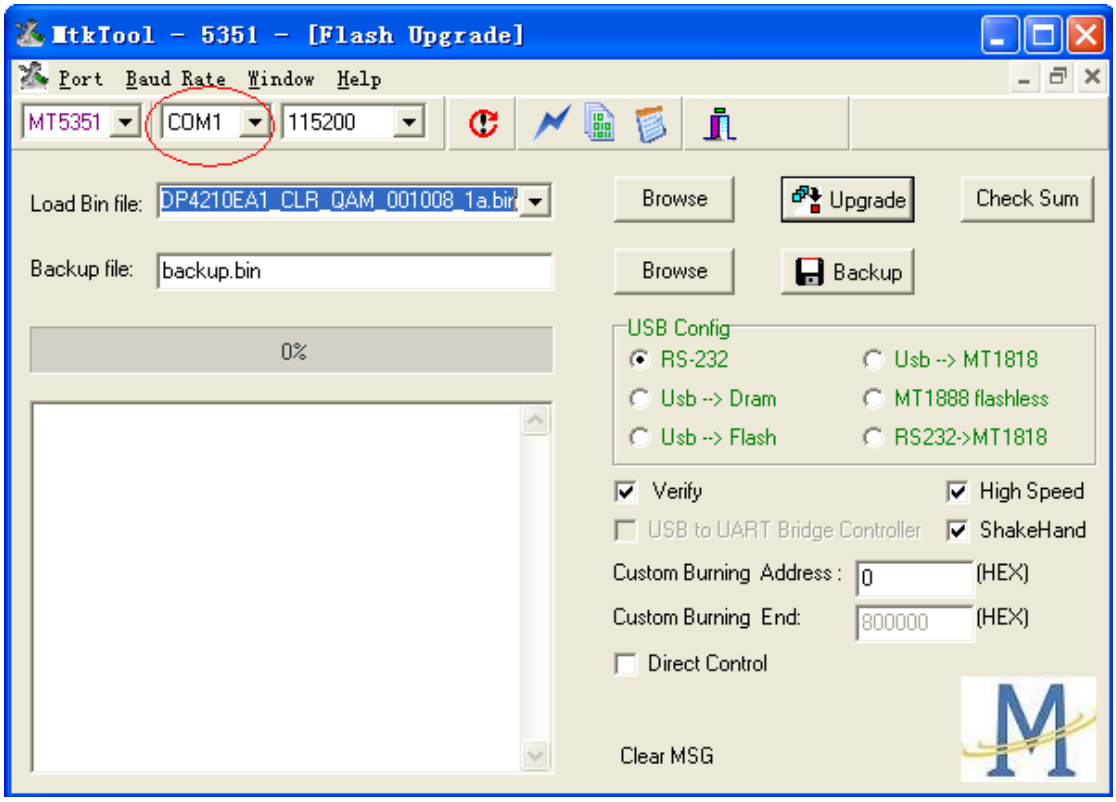
1. Connect **RS232 download line**, One connector is connected to **RS232 connect port of LCD TV** ， while another side is connected to PC COM port.
2. Store the MtkTool into the PC

Downloading :

3. Turn on AC power switch of the LCD TV and then press the button “standby” of the remote control . The image could be found on the screen of the LCD TV while the color of the power indicator is green . (the mode of the LCD TV will be standby mode if after turn on the main power switch only .)
4. Execute MTKtool and select the chipset as MT5351AG. (the software of MTKtool will be sent to your side)



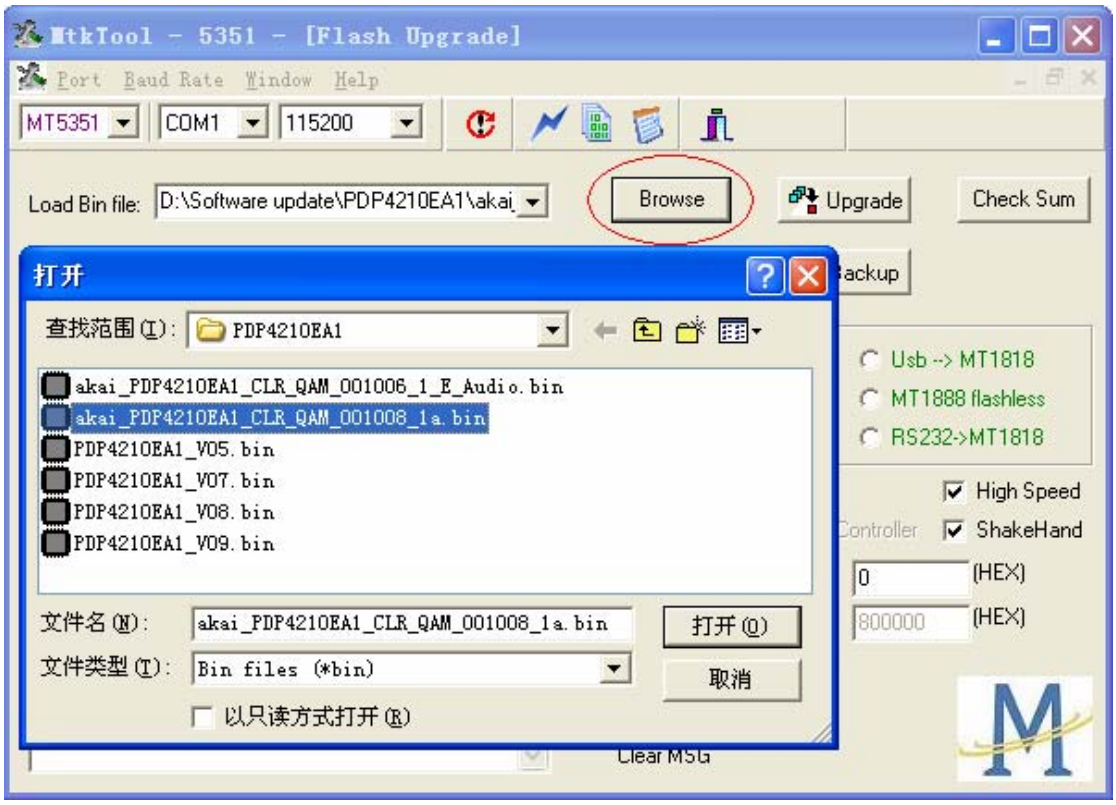
5. Select current COM port. (please try to check the COM port of your PC).



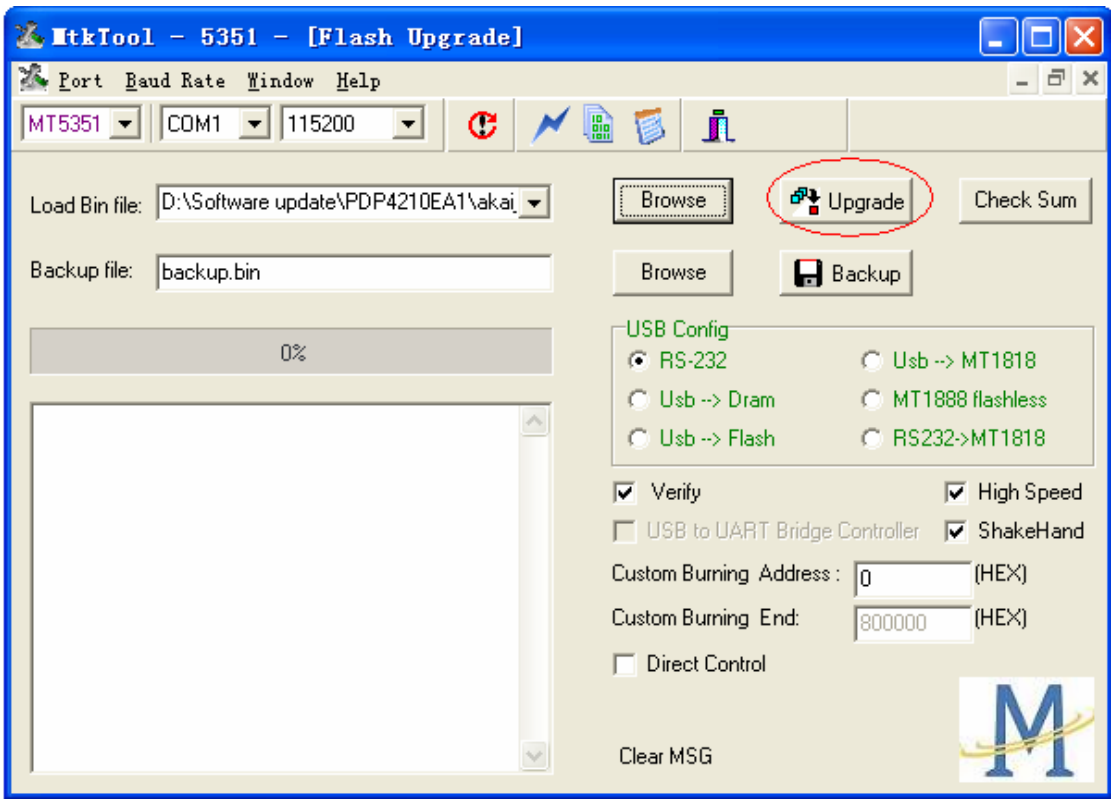
6. Choose the bit rate as 115200.

7. Select the update binary by pressing browse button. For exemple,the binary file name is

XXXX_PDP4210EA1_000000XX_X_P.bin. (this update firmware will be sent to your side)



8. Press Upgrade button and start update process.



9. The update process is successful as the progress bar is 100%. After the update process is ok, turn off power and wait indicator light is off. Turn on power and TV can work.

Checking :

It is needed to check the version of the firmware for MT5351AG which has been download into the LCD TV .

Press Menu button of the remote control and the main OSD menu is appeared on the screen .

Use the remote control and select the DTV menu . following input “0000” (zero , zero , zero , zero) of the remote control .Then enter the mode of factory after input the digits .

It is easy to be found the version of the current firmware for MT5351AG is “LCT3701AD CLA_QAM_XXXXXX_XX”under the mode of factory .