

Service Manual

Reference No. : SM-LC26HABCUSXM1 -003
 Revision : 2
 Date : 2006.Jan.23
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In House Model No. : LCT26HAB
 Customer Model No. : LCT2715

BOM No : LC26HABCUSXM1-A03

Description : Service Manual for LCT2715 _CMO_ USA

Prepared By: 孫燕

Checked By: Electronic Engineer 方德子

Mechanical Engineer 譚振林 06-1-22

Approved By: Engineering Manager [Signature]

Received By: MK Department 袁志

DOC Rev NO.	The Latest Revision Details	DATE
0	Initial Release	2005-9-2
1	Version 1 (Change Panel From CMO V270W1-L03, 1280x720 to CMO V270B1-L01, 1366x768) Difference: Page 6, 9, 47-77, 79	2005-9-9
2	Version 2 (Change Exploded View in P78)	2006-1-23

AKAI

SERVICE MANUAL





Model:

LCT2715

Safety Instructions
Production specification.
Block Diagram
Circuit Diagram
Disassembly
Pin Descriptions
LCD Panel specification
Exploded View Diagram
Spare parts list
V-chip password and software upgrade

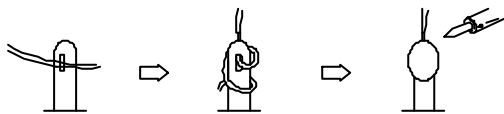
This manual is the latest at the time of printing, and does not include the modification which may be made after the printing, by the constant improvement of product.

I. Safety Instructions

 <div style="border: 1px solid black; padding: 5px; text-align: center;">CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN</div>  <p>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.</p>	 <p>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.</p>
	 <p>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.</p>

PRECAUTIONS DURING SERVICING

- 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.
- Use specified internal Wiring. Note especially:
 - Wires covered with PVC tubing
 - Double insulated wires
 - High voltage leads
- Use specified insulating materials for hazardous live parts. Note especially:
 - Insulating Tape
 - PVC tubing
 - Spacers (insulating barriers)
 - Insulating sheets for transistors
 - Plastic screws for fixing micro switches
- When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.), wrap ends of wires securely about the terminals before soldering.



- Make sure that wires do not contact heat generating parts (heat sinks, oxide metal film resistors, fusible resistors, etc.)
- Check if replaced wires do not contact sharply edged or pointed parts.
- 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

- 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 beam 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.
- 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.
- 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.

- 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.
- Comply with all caution and safety related provided on the back of the cabinet, inside the cabinet, on the chassis or picture tube.
- 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 temperature 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 0.15 μ F AC type capacitor, between a good earth ground (water pipe, conductor etc.) and the exposed metallic parts, one at a time.

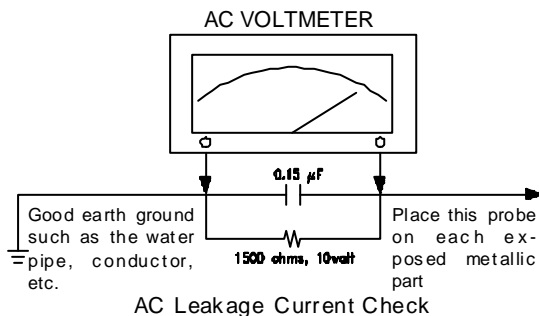
Measure the AC voltage across the combination of the 1.5K ohm resistor and 0.15 uF capacitor. Reverse the AC plug at the AC outlet and repeat the AC voltage measurements for each exposed metallic part.

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.

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 \triangle 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.



Product Specification

Reference No. : LC27HAB002
Revision : 0
Date : 2005.08.1
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Model No. : LC27HAB
Customer Model No. : LCT2715
Design Code : LC27HABCUSXM1-A01

BOM No. : LC27HABCUSXM1-A01

Artwork Ass'y No. : 580-L26ABHM-TU02L

Description : AKAL LCD TV 26" NTSC AC100V-240 V AC USA

Checked By: **Electronic Engineer** _____

Mechanical Engineer _____

Approved By: **Engineering Manager** _____

Approved By: **PM Department Head** _____

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

KAWA ELECTRONIC RESEARCH & DEVELOPMENT CENTRE

Reference No : LC27HAB001
Revision : 0
Date : 2005.8.1
Page : P. 2 of 8

General Description

1. Main features	
Production Description	AKAL LCD TV 27" NTSC AC100V-240VAC USA
Panel Supplier and Model	CHIMEI V270B1-L01
Chips Solution	MK8205
Market	USA
1.1 VIDEO SECTION	
Display size	27"/16:9
Display Resolution	1366 X 768
Pixel Pitch	0.1460mm×0.4365mm
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,Fill Aspect Ratio,Nonliner,LB to 16:9, LB subtitles to 16:9 or Anamorphic
TV System	NTSC M
Dual Tuner System	No
AV Input Color System	PAL /NTSC
PIP	Basic mode (video on graphic mode,resolution≥1024×768)
1.2 AUDIO SECTION	
Audio Output Power	6W×2 Max.(8 ohm)
Sound Effect	NO
Tone Control	Yes
1.3 Input Terminals	D-Sub 15 Pin Type(Analog-RGB Input) ×1 D-Sub 9 Pin (RS-233 Input) ×1 Component Video-YPbPr/YCbCr ×2 RCA Terminals S-Video Input (Mini Din 4Pin) ×1 Video Input RCA Terminals Y / Pb / Pr, Y / Cb / Cr (RCA Type) ×2 Stereo Audio Input for YPbPr / YCbCr x 2 (3.5mm Phone Type) ×1
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

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Stereo Decode	MTS with SAP
Power Rating	AC 100-240V, 50/60Hz
Power Consumption	200W

1.6 Support the Signal Mode

This machine can support the different from VGA signal mode in 19 kinds

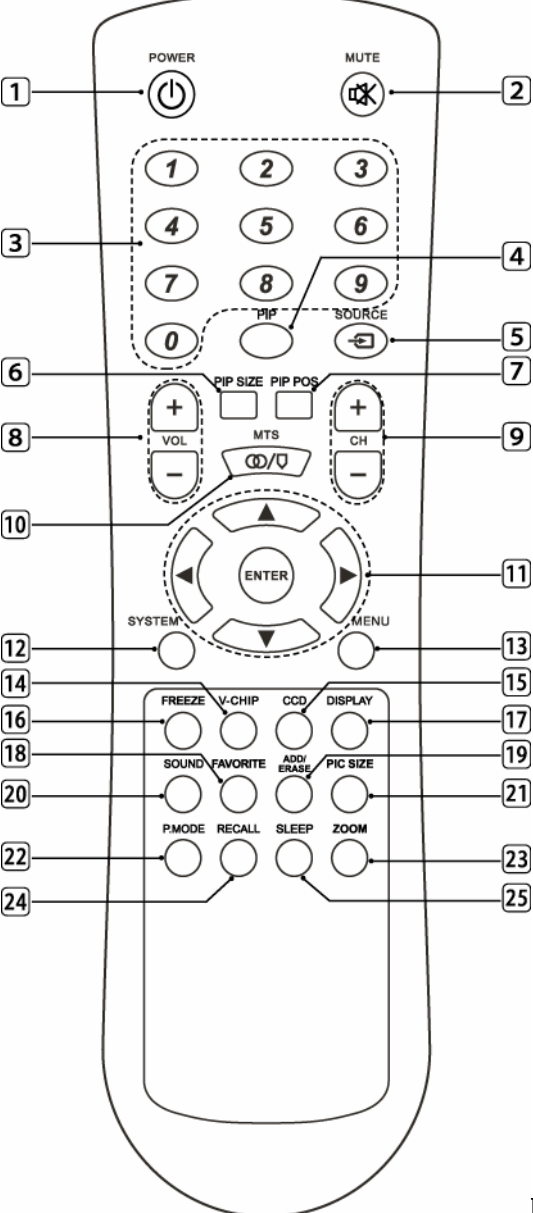
No	Resolution	Horizontal Frequency(Hz)	Vertical Frequency(KHz)	Dot Clock Frequency(MHz)
1)	640×480	31.50	60.00	25.18
2)	640×480	35.00	67.00	30.24
3)	640×480	37.50	75.00	31.50
4)	640×480	37.86	72.81	31.50
5)	720×400	31.47	70.08	28.32
6)	800×600	35.16	56.25	36.00
7)	800×600	37.90	60.32	40.00
8)	800×600	46.90	75.00	49.50
9)	800×600	48.08	72.19	50.00
10)	832×624	49.00	75.00	57.27
11)	1024×768	48.40	60.00	65.00
12)	1024×768	56.50	70.00	75.00
13)	1024×768	60.00	75.00	78.75
14)	1152×864	63.86	70.02	94.51
15)	1152×864	67.52	75.02	108.03
16)	1280×960	60.02	60.02	108.04
17)	1280×1024	64.00	60.01	108.00

1.7 HDTV Mode (YPbPr)

No	Resolution	Horizontal Frequency(KHz)	Vertical Frequency(Hz)	Dot Clock Frequency(MHz)
1)	480i	15.734	59.94	13.50
2)	480p(720×480)	31.468	59.94	27.00
3)	576p(720×576)	31.25	50.00	27.00
4)	720p(1280×720)	37.50	50.00	74.25
5)	720p(1280×720)	45.00	60.00	74.25
6)	1080i(1920×1080)	33.75	60.00	74.25

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2. LCD local control button	Main power : push switch Channel +/- volume up/down menu input. standby : soft touch
3. Led indicators :	Power on: Green Standby: Red
4. OSD language	English, Français, Español
5. OSD	Full on screen display
<p>6. Remote control unit Customer Remote Code: 609F(NEC)</p> <p>1 POWER button 2 MUTE button 3 0-9 DIGITAL button 4 PIP button 5 SOURCE button 6 PIP SIZE button 7 PIP POS button 8 VOL +/- button 9 CH +/- button 10 MTS button 11 UP/DOWN,LEFT/RIGHT ENTER buttons 12 SYSTEM button 13 MENU button 14 V-CHIP button 15 CCD button 16 FREEZE button 17 DISPLAY buttons 18 FAVORITE button 19 ADD/ERASE buttons 20 SOUND button 21 PIC SIZE button 22 P.MODE button 23 ZOOM button 24 RECALL button 25 SLEEP button</p>	 <p style="text-align: right;">E7501-051001</p>
7. Safety standard	UL/FCC/cUL
8. EMC standard	15 Parts of the FCC rules,CLASS B
9. Performance standard	LCD-TV Standard
10. Accessories	Battery 2pcs User Manual 1pcs AC Cable 1pcs Remote Control 1pcs The Accessories box 1pcs

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Technical Data

1. Chassis		MICO
2. Power supply	TV	AC 100-240 V, 50/60Hz
	Remote controller	Battery 3V (UM-4/R03/AAA×2)
3. TV system	RF input	NTSC M
	Video input	PAL/NTSC 3.58/NTSC 4.43
4. Receiving channels	TV	VHF-L : 2~6CH VHF-H : 7~13CH UHF : 14~69CH
	CATV	1~125CH
5. Intermediate frequencies	Picture	45.75MHz
6. Scanning	Horizontal (Hz)	15625/15750
	Vertical (Hz)	50/60
7. AC plug		UL Plug
8. Panel		V270B1-L01
9. Speaker	Internal	8 ohm 10W (max) ×2
10. Operating temperature	Fulfill all specifications	15°C ~ 30°C
	Accept picture/sound reproduction	5°C ~ 33°C
11. Operating relative humidity	Fulfill all specifications	45% ~ 75%
	Accept picture/sound reproduction	20% ~ 80%
12. Electrical & optical specification		See the attachment 1.
13. Circuit diagram drawing No.		LC26HAB
15. Cabinet		
16. Cabinet color		
17. Packing		1 set per
18. Container stuffing method		RD/05/P/LC26HAB/CSI/02 REV: 01
19. Dimension (mm) (No packing)	LCD-TV	883(W) × 468(H) × 110(D)mm (w/o Stand)
		883(W) × 523(H) × 250(D)mm (with Stand)
	Remote control unit	183(L) × 53(W) × 28(T)mm
20. Net weight	LCD-TV	14.1Kg (with Stand) approx.
	Remote controller	70g (approx.)
21. Cell Defect		Subject to Panel supplier specification

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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	0.295	0.295±0.02	
			Yw		0.300	0.300±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

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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* (2)		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
		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			

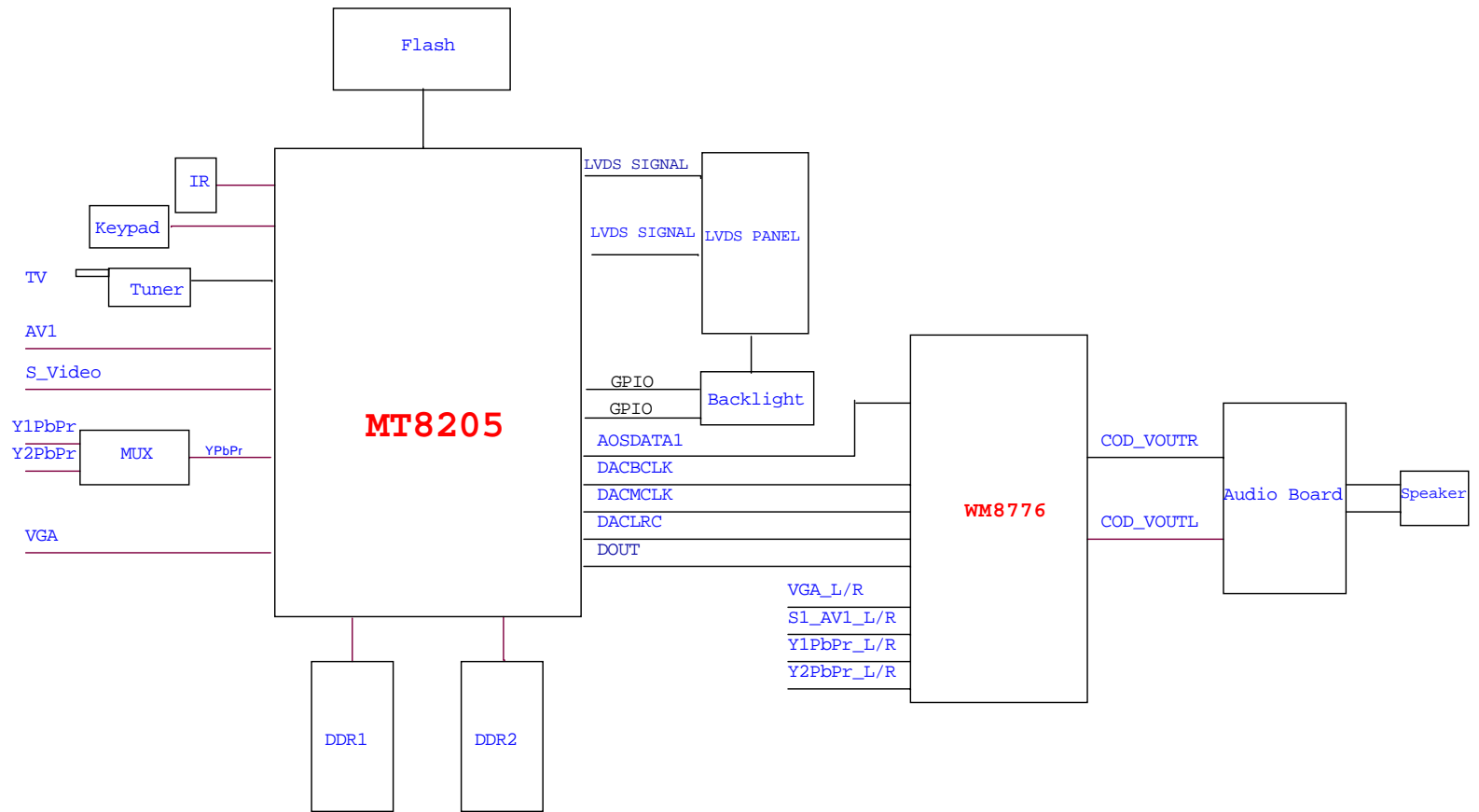
KAWA ELECTRONIC RESEARCH & DEVELOPMENT CENTRE

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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. Ambient light: $\leq 0.1 \text{ cd/ m}^2$ B. Brightness, Contrast, Saturation, Tint, sharpness set at normal. C. Connect RMS volt meter to speaker terminals and adjust the LCD volume to get 500mW RMS power at each terminals. D. With image sticking protection of LCD module. The luminance will descend by time on a same still screen and rapidly go down in 5 minutes, when measuring the color tracking and luminance of a same still screen, be sure to accomplish the measurement in one minute to ensure its accuracy. E. Due to the structure of LCD module. The extra-high-bright same screen should not hold over 5 minutes for fear of branding on the panel. F. 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, *(2) The audio out level is controlled by the volume level, the range is from 0 to 0.5Vrms.	

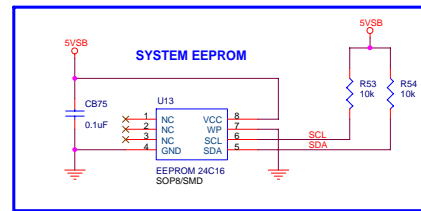
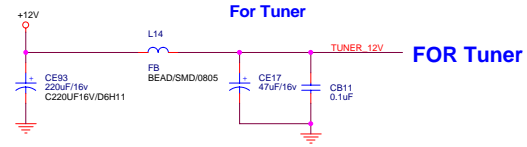
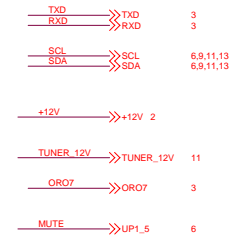
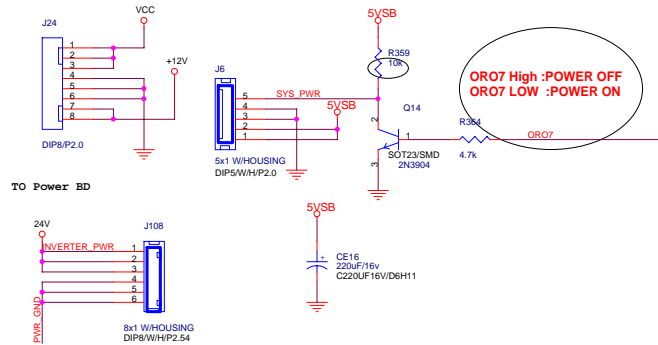
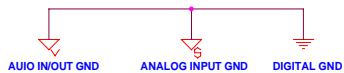
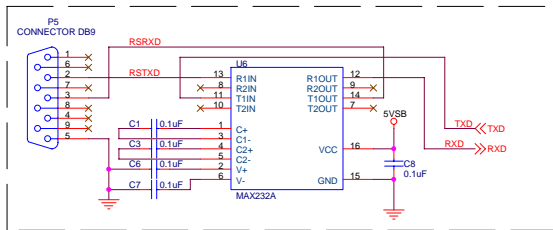
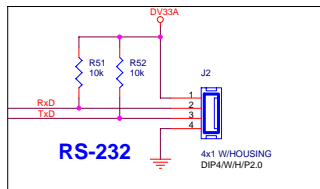
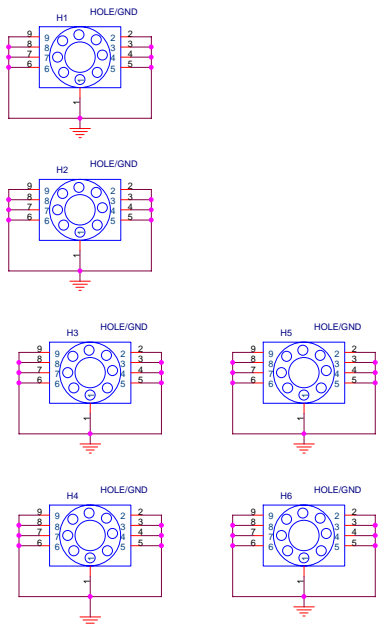


MT8205E (PBGA388) LCDTV BOARD 4 LAYERS

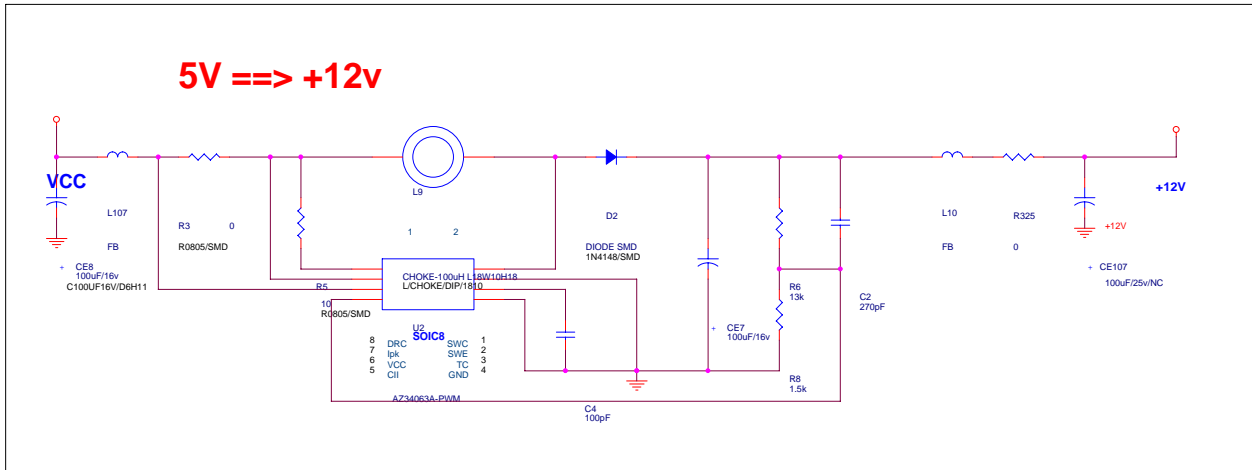
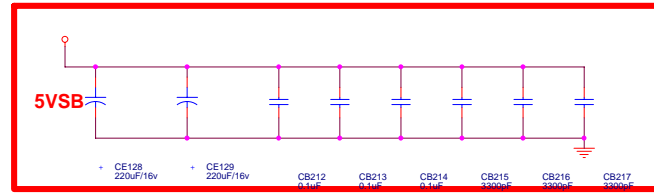
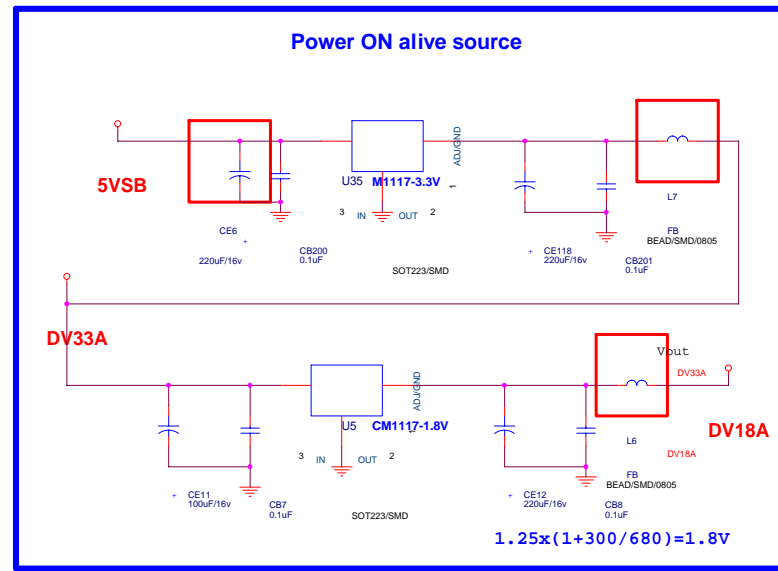
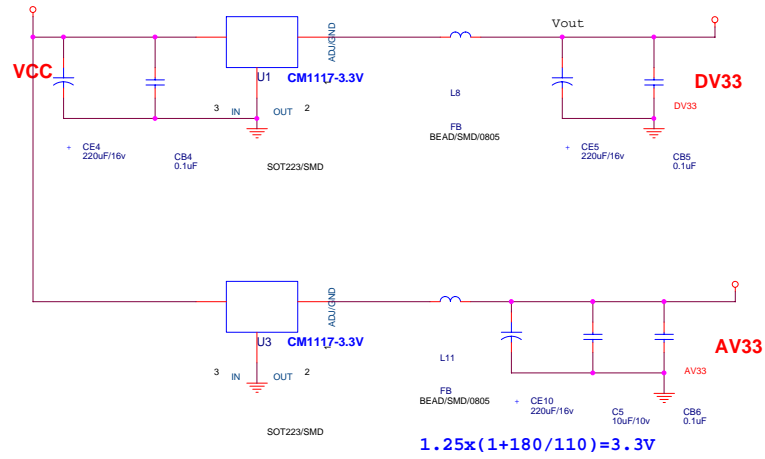
1. INDEX
2. LDO
3. MT8205E PBGA388
4. MT8205 ANALOG DECOUPLING
5. MT8205 DIGITAL DECOUPLING
6. ICE I/F
7. DDR MEMORY & FLASH
8. DVI INPUT
9. AD9883
10. VGA IN & PC AUDIO IN
11. VIDEO IN & TUNER I/O
13. WM8776 AUDIO CODEC
14. LVDS / CRT / TTL OUT
15. BACK LIGHT / KEYPAD
16. READER CARD I/F

Rev	History	P#	Date
V0.1	1. FIRST VERSION		2004/11/29
V0.2	1. 2.5V use 5VSB conversion. All 0402 change to 0603 2. LED_RED/GRN CIRCUIT CHANGE 3. Change Power on/off circuit(ORO7 CTRL PIN) 4. WM8776 DVDD Needed 5. Del the Si9936 LVDS Parts 6. Del DVI&AD9883 PARTS		2005/03/09

UP3_0 BLACKLIGHT ON/OFF
MUTE<-->UP1_5



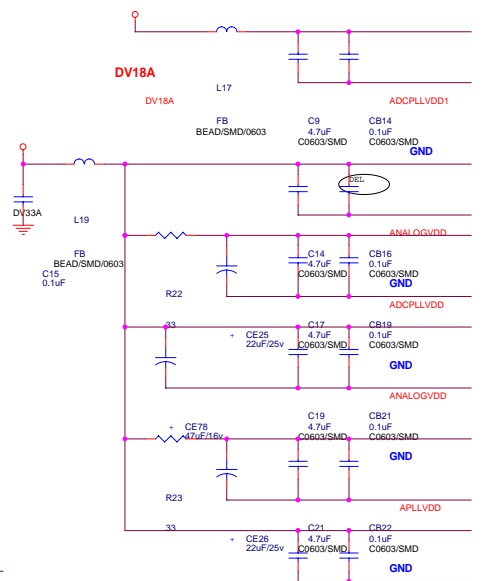
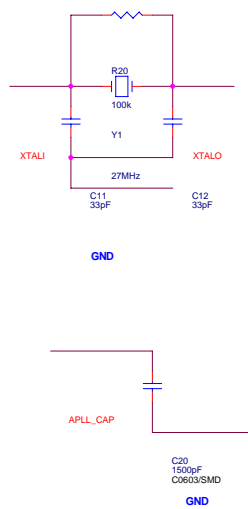
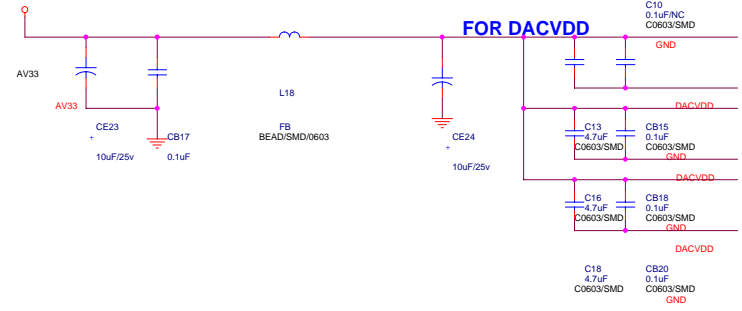
Title			LCD TV - MediaTek MT8205 Solution		
Size	Doc Number		Rev		
C	INDEX		V0.1		
Date:	Tuesday, May 10, 2005	Sheet	1	of	16



MT8205 ANALOG DECOUPLING

- DACVREF >> DACVREF 3
- DACFS >> DACFS 3
- ADCPDLLVD1 >> ADCPLLVD1 3
- ADCPDLLVD >> ADCPLLVD 3
- APLLVD >> APLLVD 3
- ANALOGVDD >> ANALOGVDD 3
- VPLLVD >> VPLLVD 3
- LVDDA >> LVDDA 3
- ADCVDD >> ADCVDD 3
- DACVDD >> DACVDD 3

- AVCM >> AVCM 3
- VOCM >> VOCM 3
- VICM >> VICM 3
- VREFP4 >> VREFP4 3
- VREFM4 >> VREFM4 3
- ADCVDD0 >> ADCVDD0 3
- PWM2VREF >> PWM2VREF 3
- AUXTOP >> AUXTOP 3
- AUXBOTTOM >> AUXBOTTOM 3
- REXTA >> REXTA 3
- APLL_CAP >> APLL_CAP 3
- XTALI >> XTALI 3
- XTALO >> XTALO 3



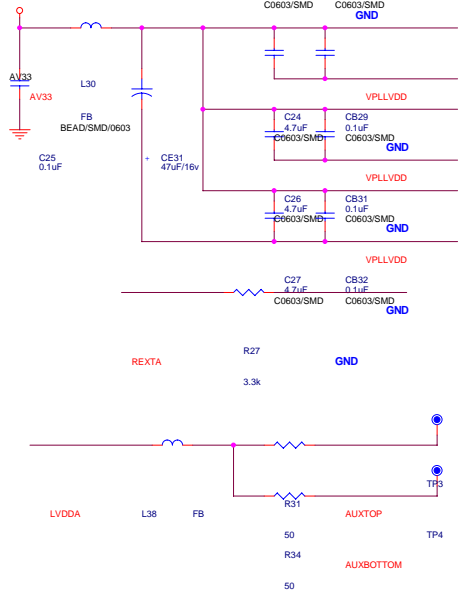
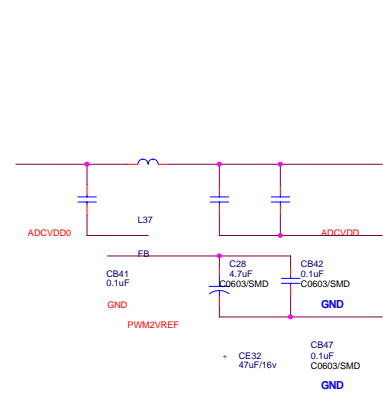
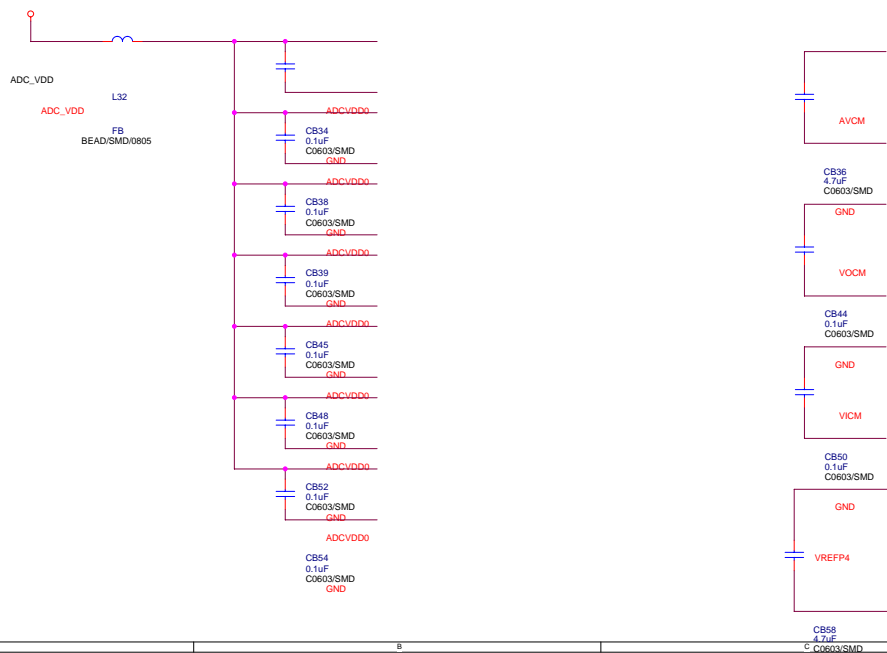
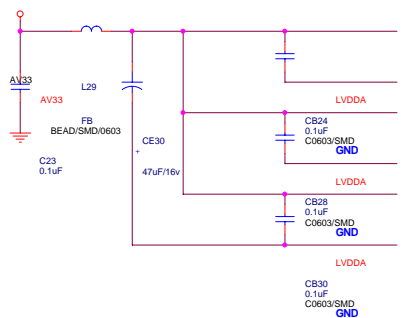
FOR ADCVDD

Note for Fix or Adj Regulator

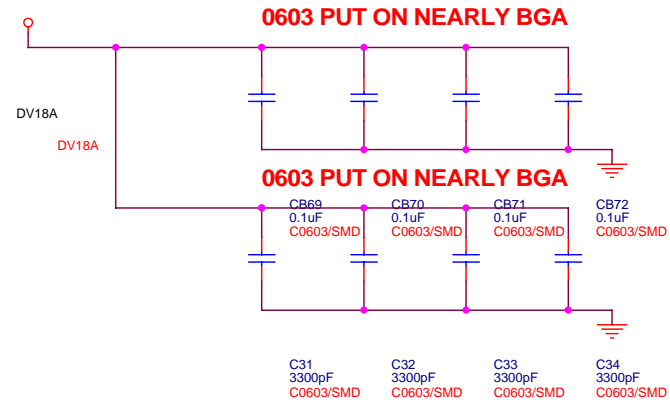
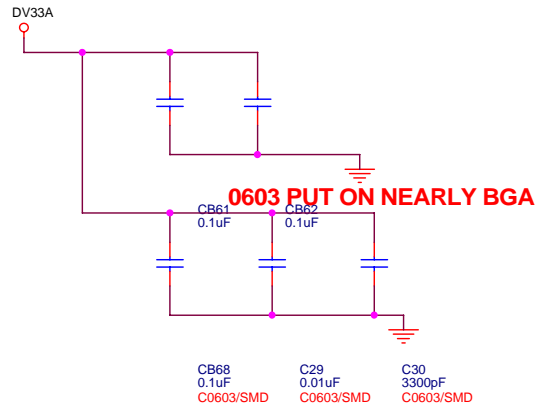
AZ1117	Rdown	Rup
Fix regulator	0 ohm	OFF
Adj regulator	180 1%	110 1%

1.25x(1+Rdown/Rup)

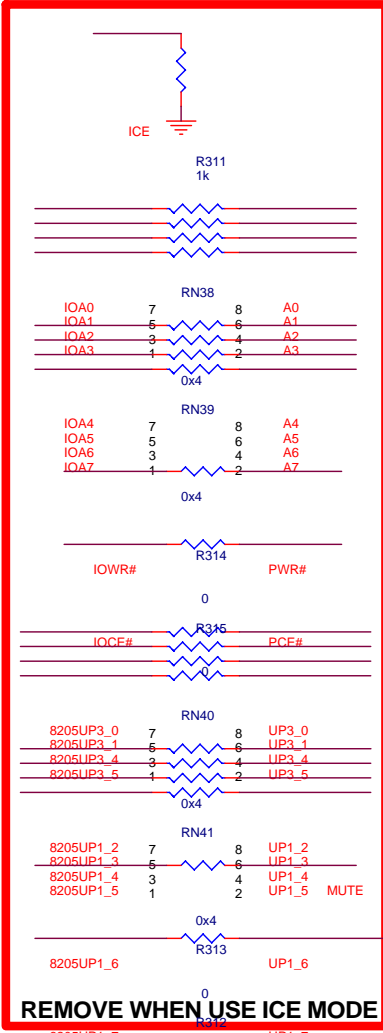
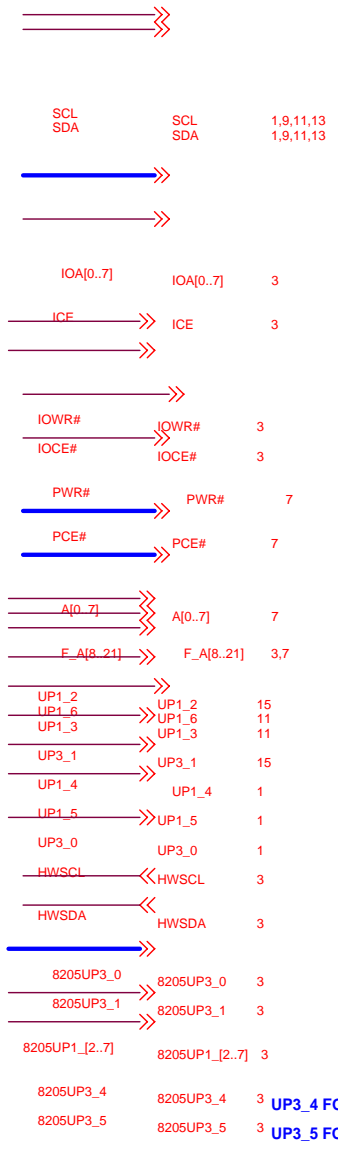
1.25x(1+180/110)=3.3V



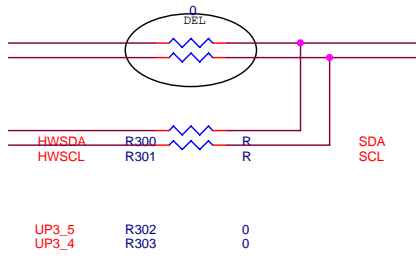
MT8205 DIGITAL POWER & DECOUPLING



Title		
LCD TV - MediaTek MT8205 Solution		
Size	Doc Number	Rev
B	MT8205 DECOUPOMG--DIGITAL	V0.1
Date:	Tuesday, May 10, 2005	Sheet 5 of 16



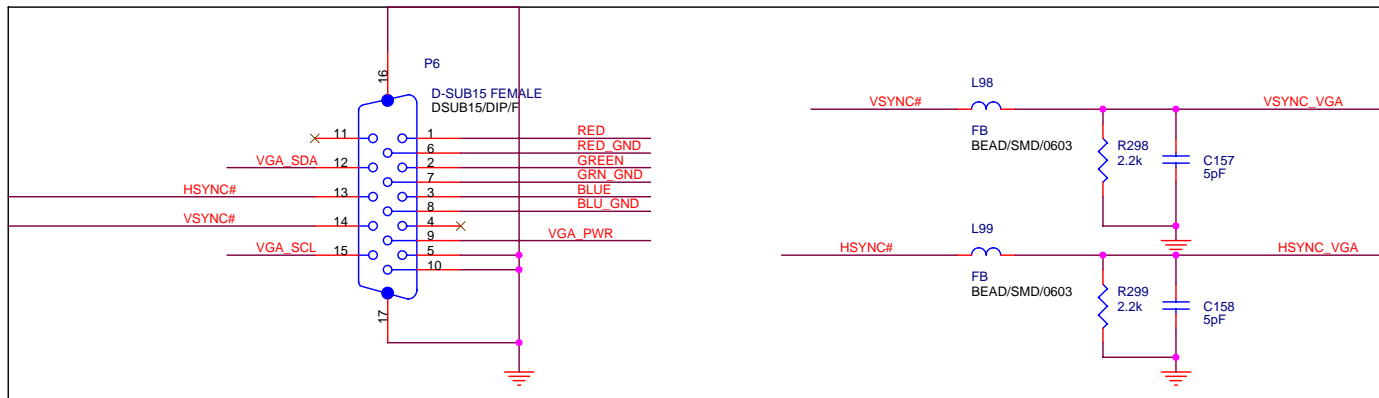
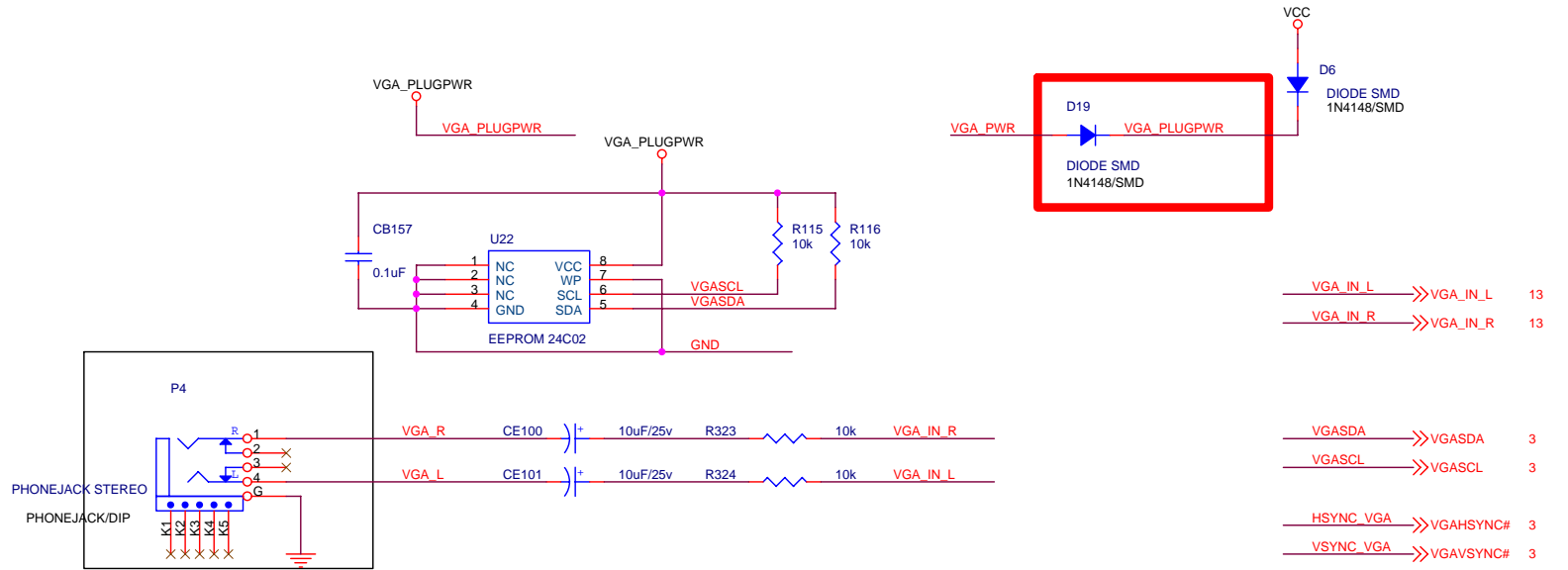
REMOVE WHEN USE ICE MODE



TP28

TEST POINT DIP1.0
TP/DIP/D1.0

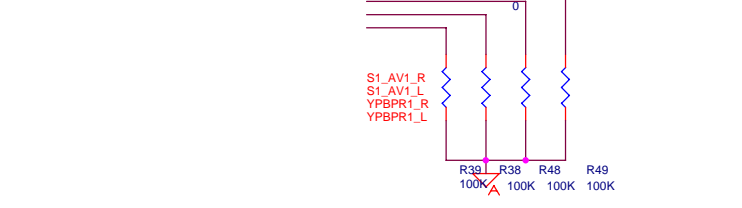
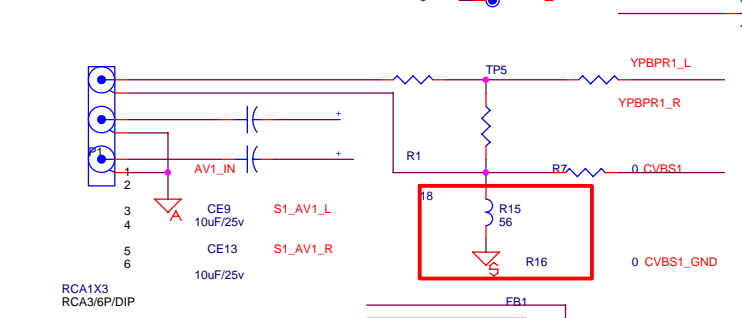
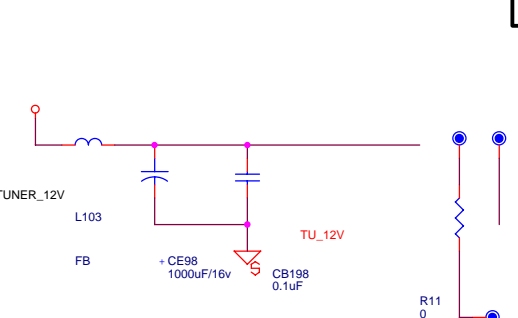
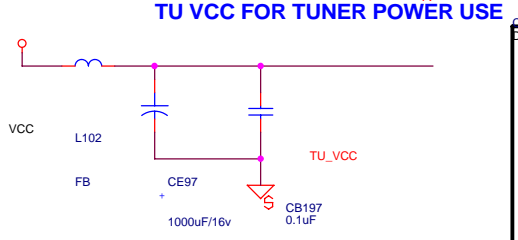
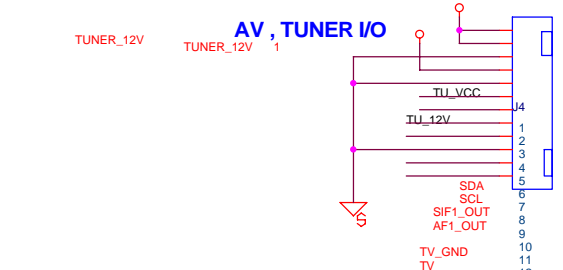
Title		
LCD TV - MediaTek MT8205 Solution		
Size	Doc Number	Rev
B	MT8205 DECOUPOMG--DIGITAL	V0.1
Date:	Tuesday, May 10, 2005	Sheet 6 of 16



Title LCD TV - MediaTek MT8205 Solution		
Size B	Doc Number VGA IN&PC AUDIO IN	Rev V0.1
Date: Tuesday, May 10, 2005	Sheet 10	of 16

- >>>
- >>>
- >>>
- Y >>> Y 12
- Y_GND >>> Y_GND 12
- CB >>> CB 12
- CB_GND >>> CB_GND 12
- CR >>> CR 12
- CR_GND >>> CR_GND 12
- SOY >>> SOY 3
- SY >>> SY 12
- SY_GND >>> SY_GND 12
- SC >>> SC 12
- SC_GND >>> SC_GND 12
- TV >>> TV 12
- TV_GND >>> TV_GND 12
- CVBS0 >>> CVBS0 12
- CVBS1 >>> CVBS1 12
- CVBS1_GND >>> CVBS1_GND 12
- >>>
- SIF1_OUT >>> SIF1_OUT 12
- AF1_OUT >>> AF1_OUT 12
- >>>
- SCL >>> SCL 1,6,9,13
- SDA >>> SDA 1,6,9,13
- >>>
- OGO0 >>> OGO0 3
- OGO1 >>> OGO1 3
- OGO2 >>> OGO2 3
- OGO3 >>> OGO3 3
- OGO4 >>> OGO4 3
- OGO5 >>> OGO5 3
- OGO6 >>> OGO6 3
- ORO6 >>> ORO6 3
- ORO7 >>> ORO7 3
- S1_AV1_L >>> S1_AV1_L 11
- S1_AV1_R >>> S1_AV1_R 11
- YPBPR1_L >>> YPBPR1_L 11
- YPBPR1_R >>> YPBPR1_R 11

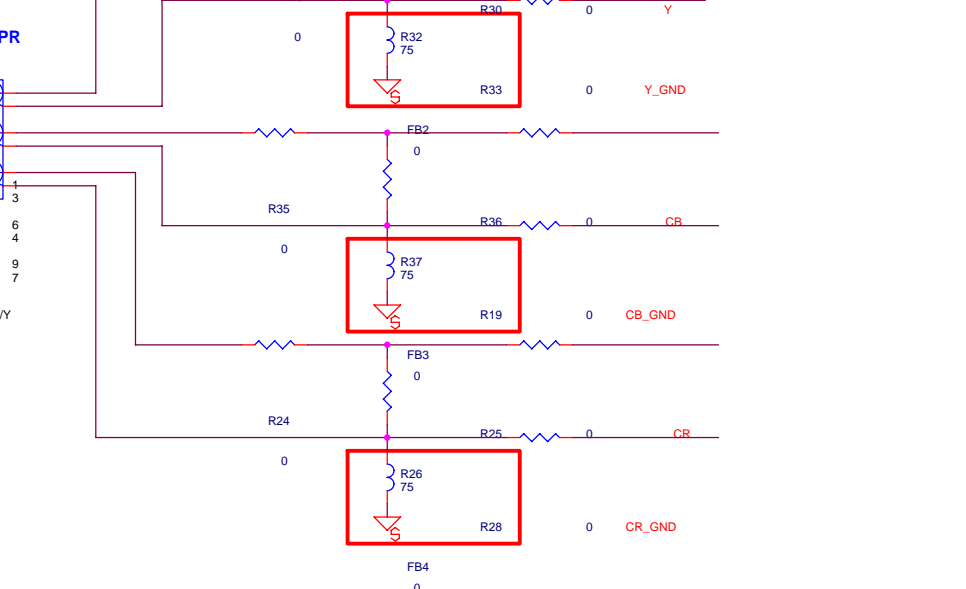
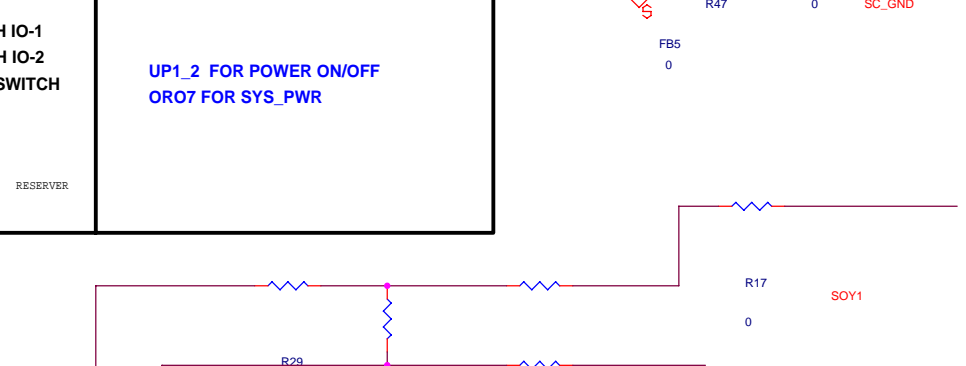
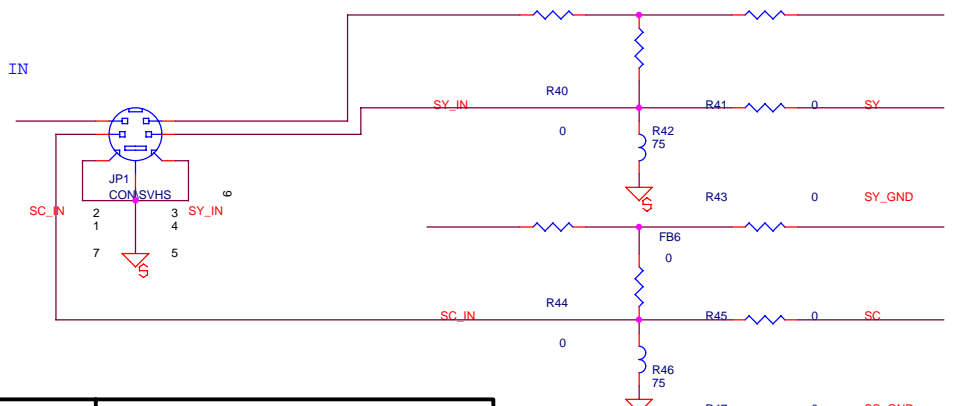
CVBS0---TUNER1
 CVBS1---FRONT BD AV_IN
 CVBS2---AV BD (AV/S-V) IN



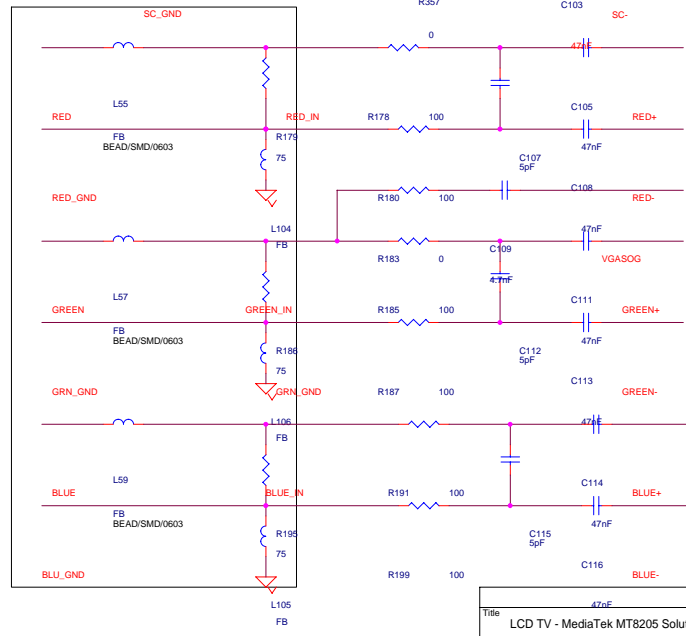
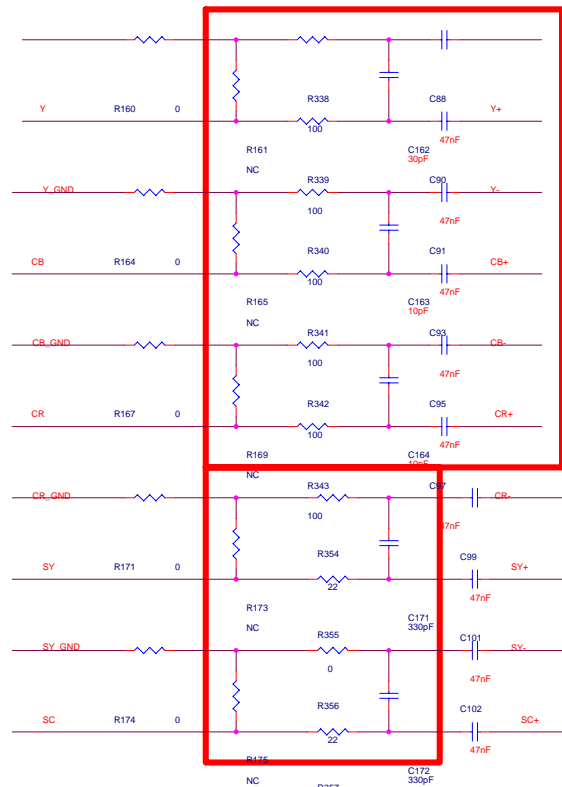
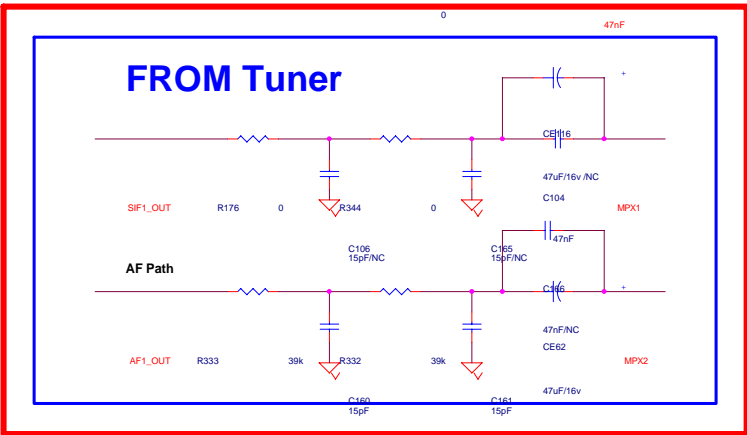
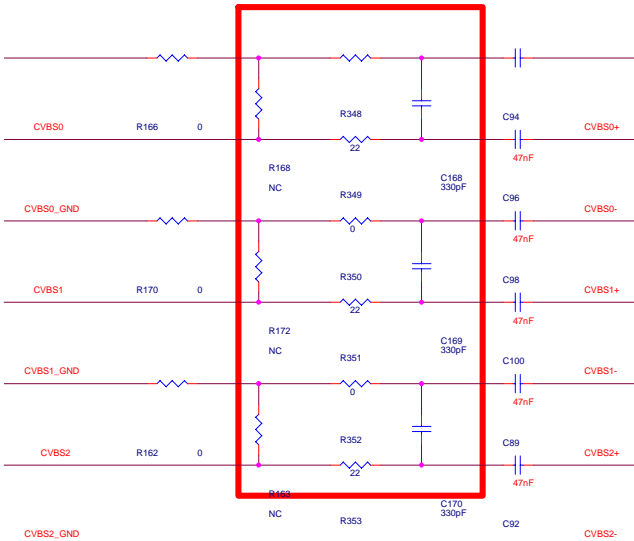
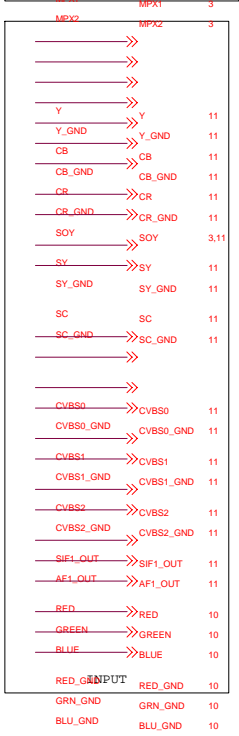
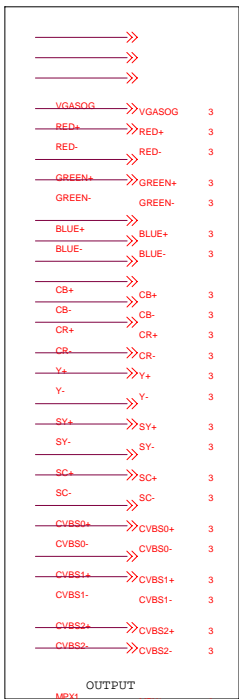
OGO3 FOR AV SWITCH IO-1
ORO7 FOR TUNER SIF SELECT SWITCH IO-1
OGO0 FOR TUNER SIF SELECT SWITCH IO-2
OGO1 FOR TUNER BOARD PAL/NTSC SWITCH
ORO6 FOR AUDIO 1st SWITCH IO-1
OGO5 FOR AUDIO 1st SWITCH IO-2
OGO6 FOR AUDIO 2nd SWITCH IO-1
OGO2 FOR AUDIO 2nd SWITCH IO-2
OGO4 FOR AUDIO 2nd SWITCH IO-2

UP1_2 FOR POWER ON/OFF
ORO7 FOR SYS_PWR

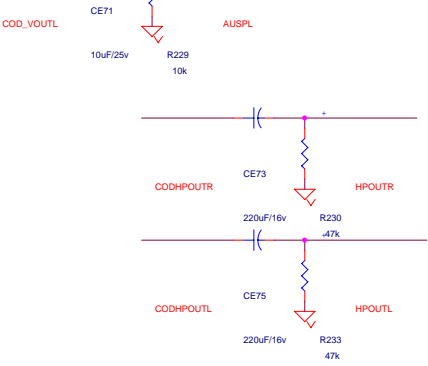
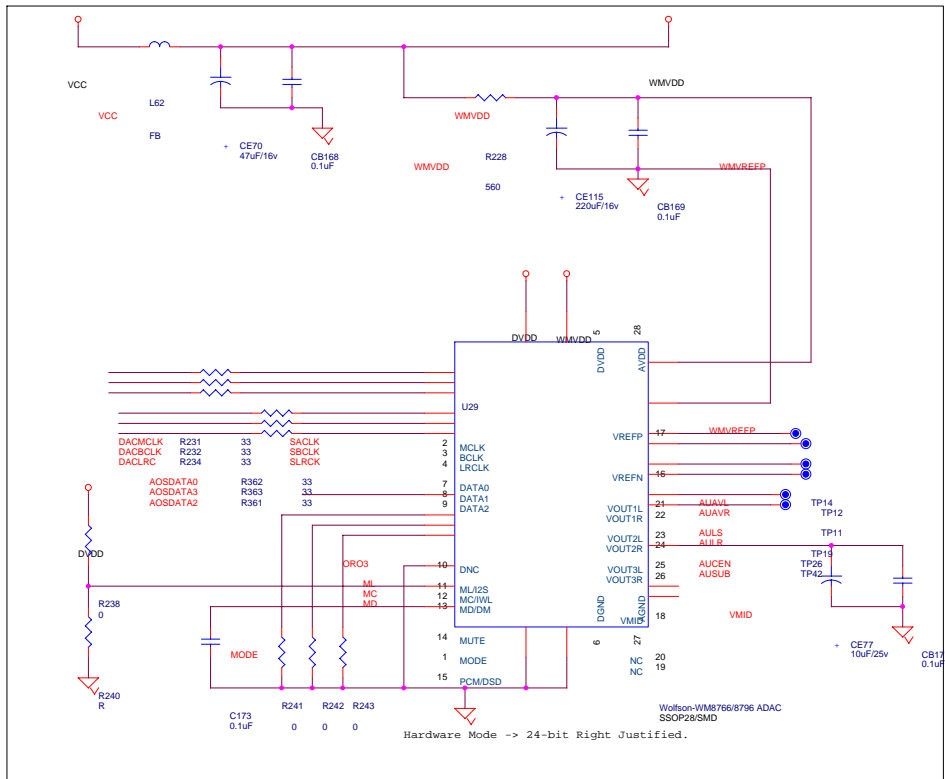
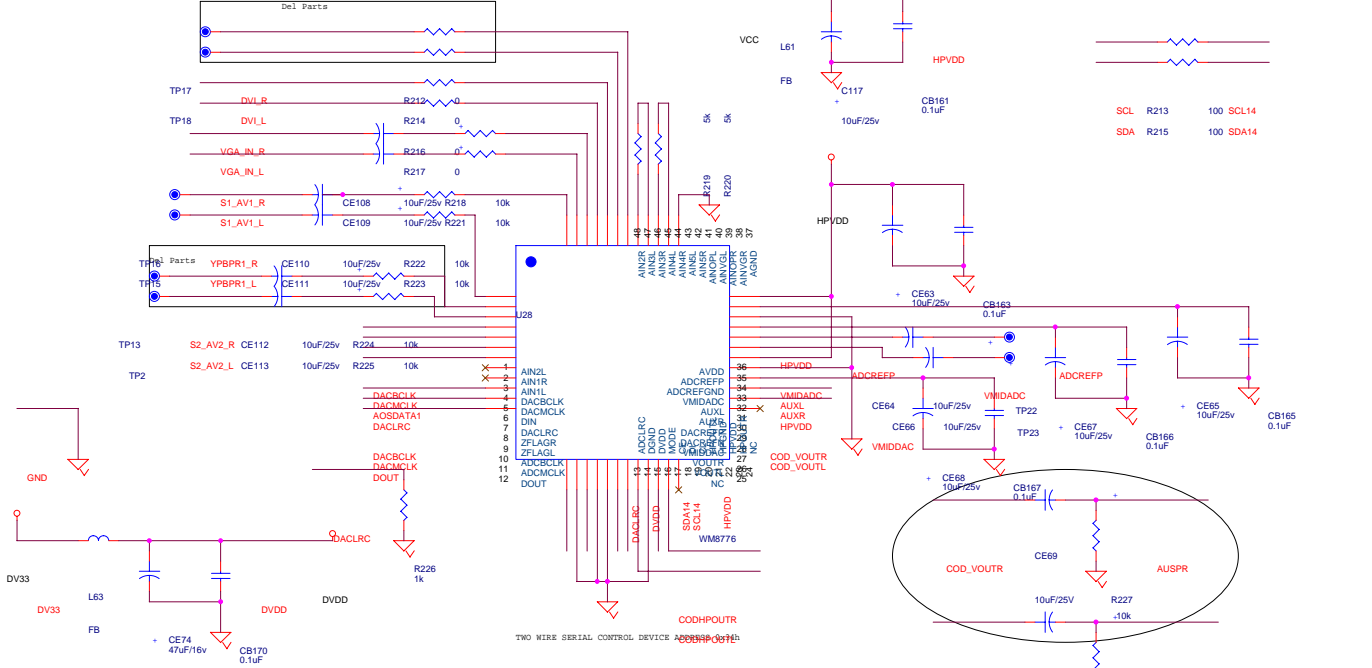
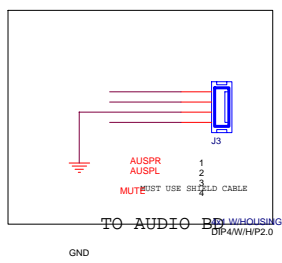
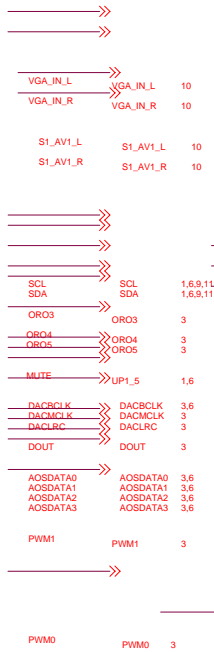
RESERVER



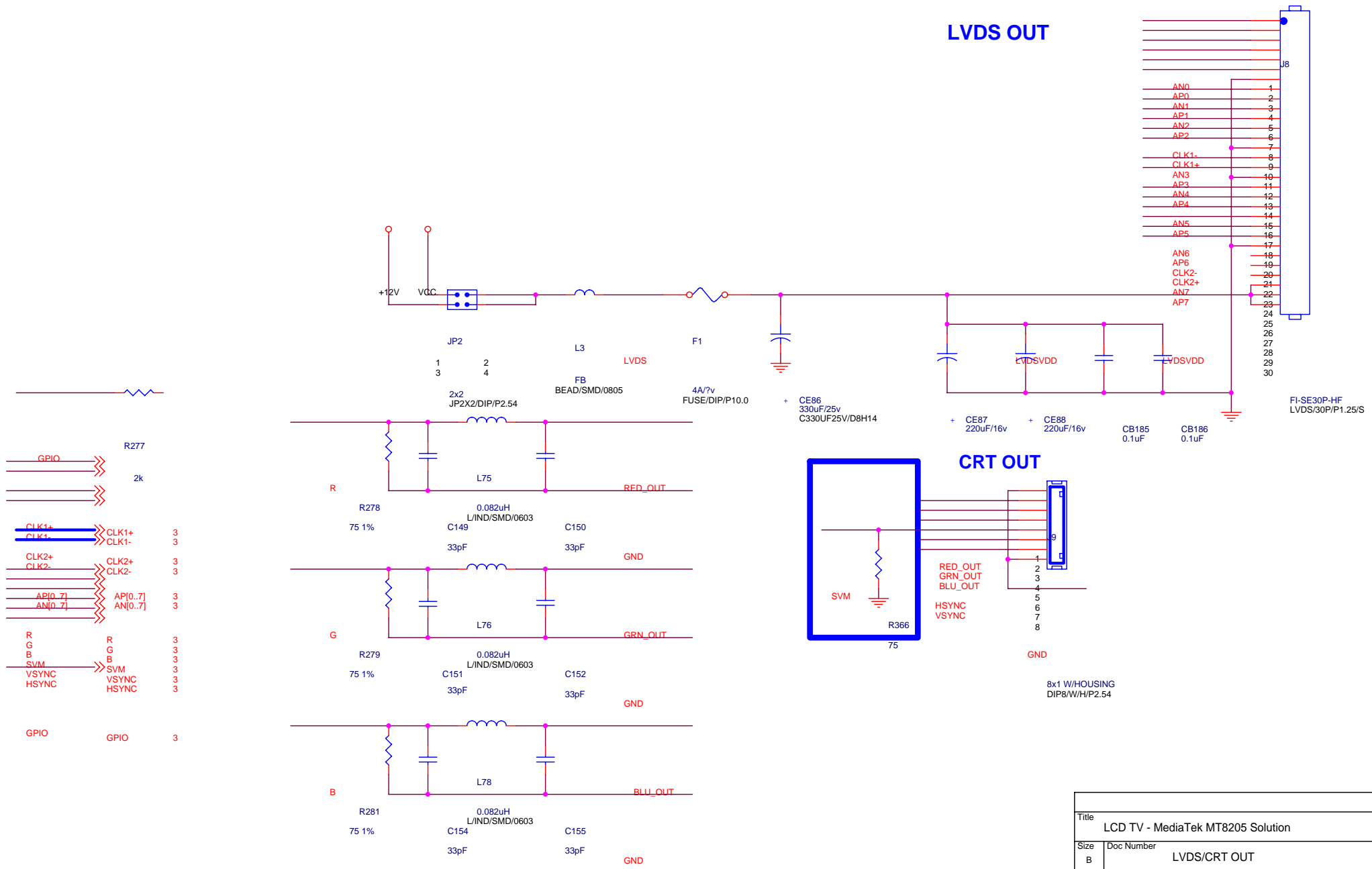
Title LCD TV - MediaTek MT8205 Solution		
Size A3	Doc Number VIDEO IN & TUNER IO	Rev V0.1
Date: Tuesday, May 10, 2005	Sheet 11	of 16



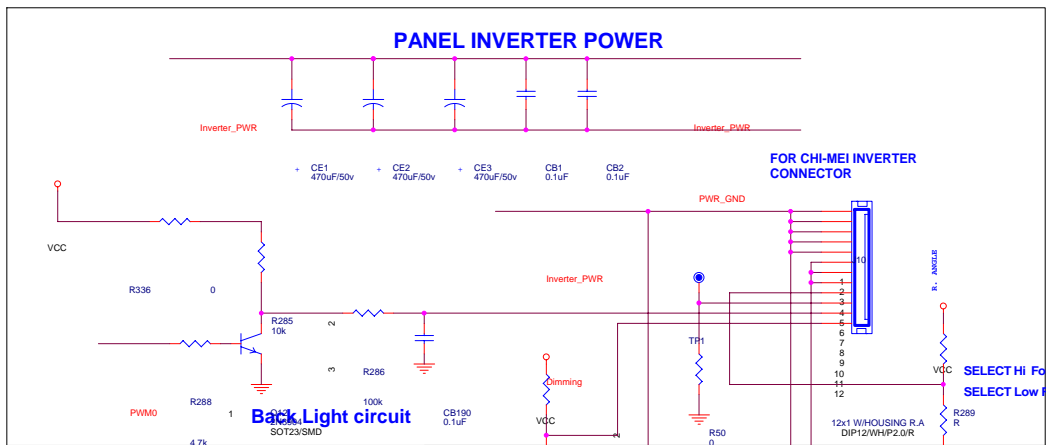
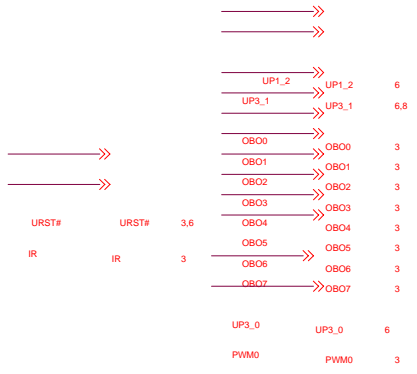
Title	LCD TV - MediaTek MT8205 Solution	
Size	Doc Number	Rev
C	AUDIO/VIDEO IN CIRCUIT	V0.1
Date:	Tuesday, May 10, 2005	Sheet 12 of 16



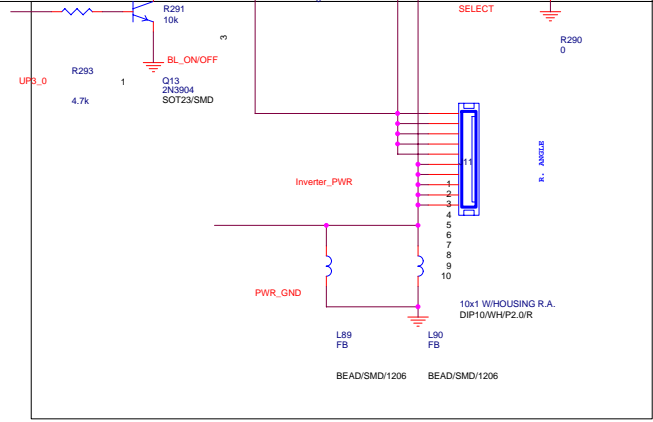
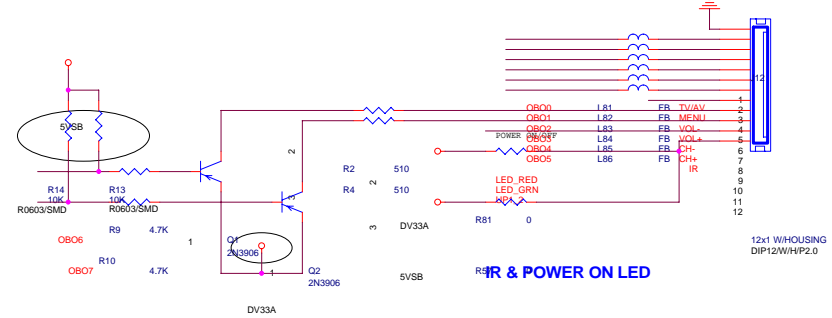
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Size	Doc Number	WM8776/WM8766/AUDIO CODEC	Rev
C			V0.1
Date:	Tuesday, May 10, 2005	Sheet	13 of 16



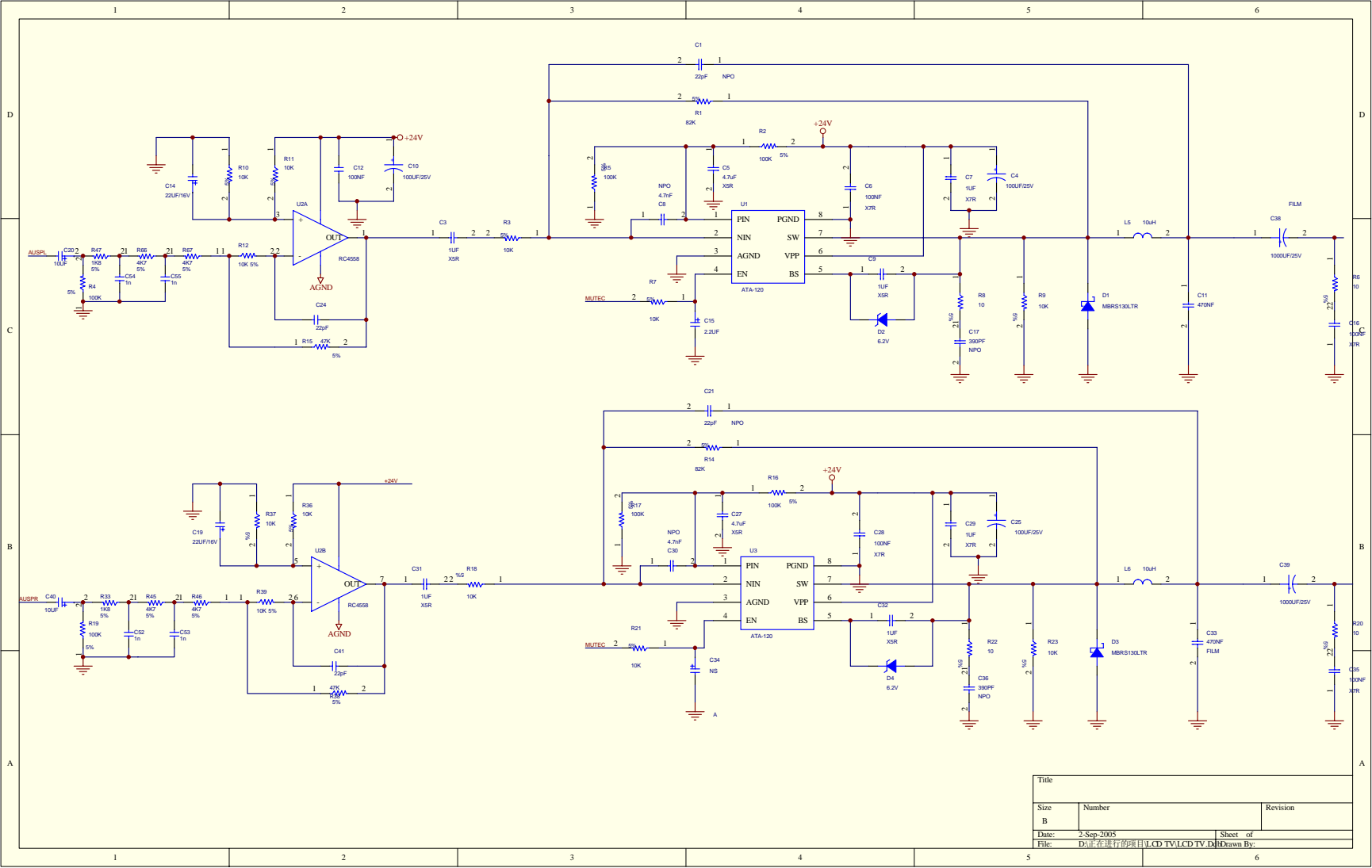
Title			LCD TV - MediaTek MT8205 Solution		
Size	Doc Number				Rev
B	LVDS/CRT OUT				V0.1
Date:	Tuesday, May 10, 2005	Sheet	14	of	16



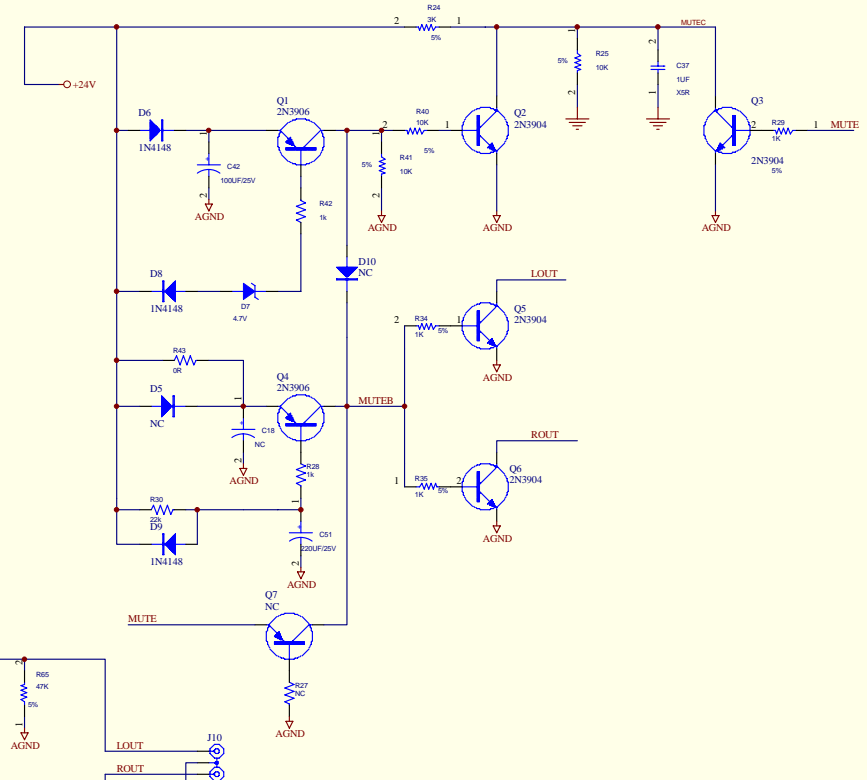
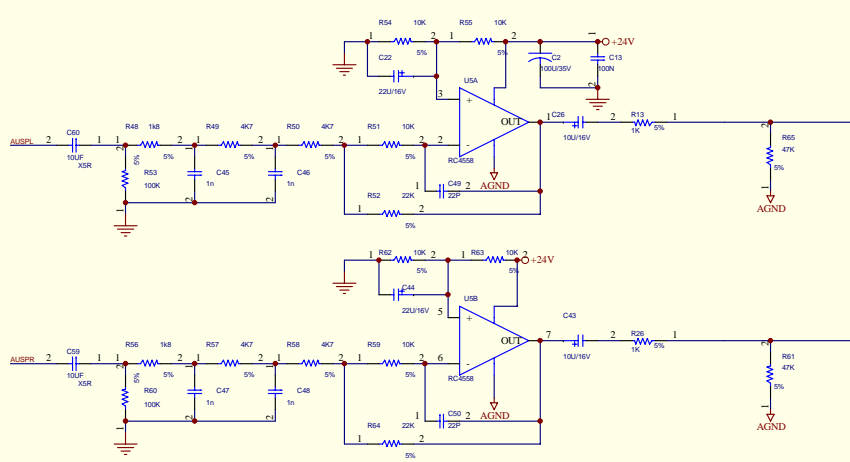
KEYPAD - MAX 8-KEYS



Title		
LCD TV - MediaTek MT8205 Solution		
Size	Doc Number	Rev
C	BACK_LIGHT/KEYPAD	V0.1
Date:	Tuesday, May 10, 2005	Sheet 15 of 16



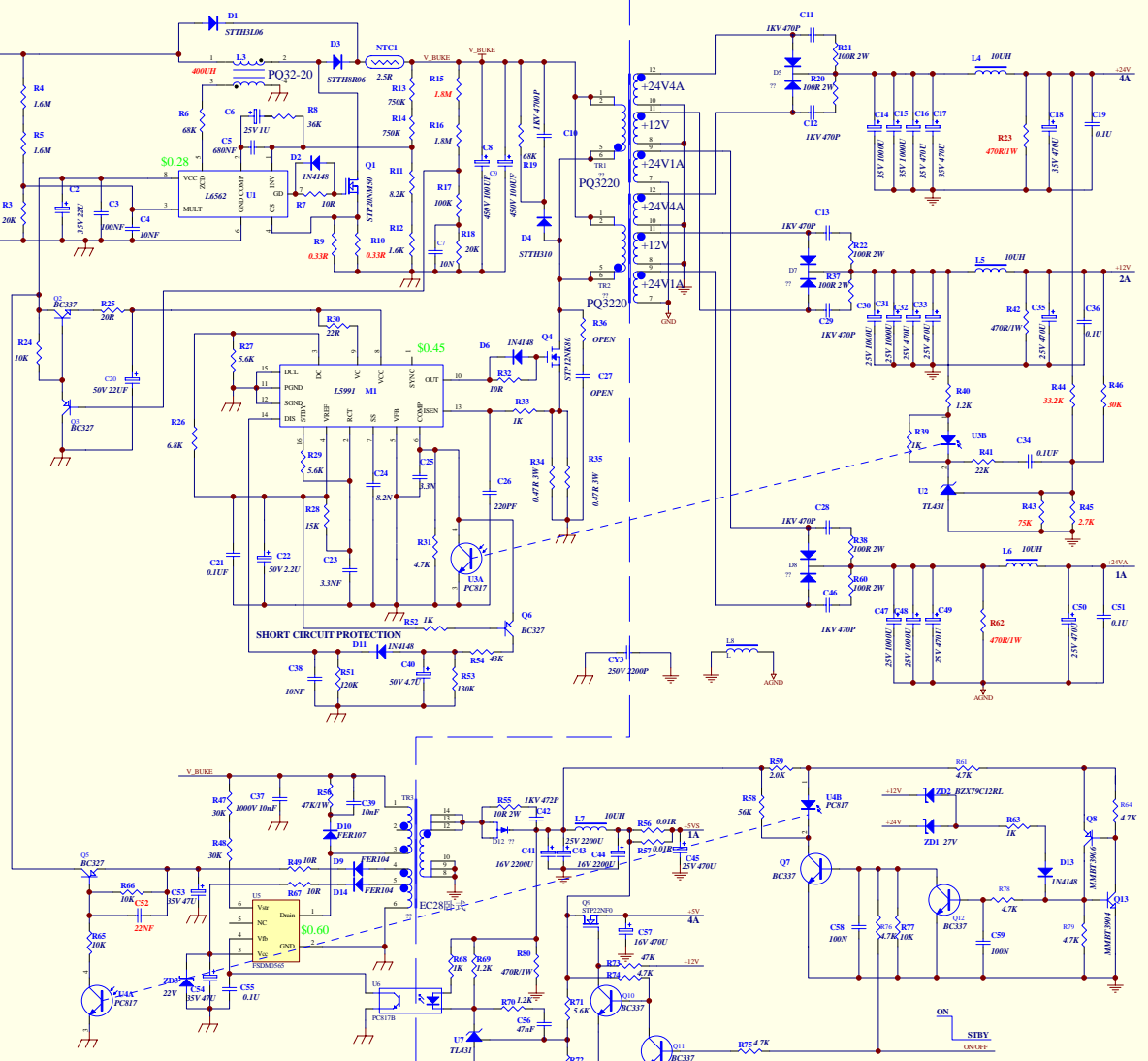
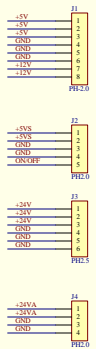
Title		
Size	Number	Revision
B	2-Sep-2005	
Date:	2-Sep-2005	Sheet of
File:	D:\正在进行的項目\LCD TV\LCD TV.D	Drawn By:



Title		
Size B	Number	Revision
Date: 2-Sep-2005	Sheet of	
File: 欧司龙液晶投影机LCD TVLCD TV.DWG	Drawn By:	

LCD-TV 200W SMPS SPEC:

- 1. +5V 4A
- 2. +5VS 1A (Standby 5V)
- 3. +12V 2A
- 4. +24V 4A
- 5. +24VA 1A



Title	LCD-TV 200W SMPS Sch	
Size	Number	Revision
Sheet C		Ver1.0
Date	31st 2005	Sheet of 1/1
File		

Basic Operations & Circuit Description

Main Electric Components

(1). MODULE:

There are 1 pc. panel and 2 pcs. PCB including 1 pc. INVERTER board(L), 1 pc. T-CONTROL board,

(2).SIGNAL PROCESS

There are 4 pcs. PCBs including

- 1 pc. Audio&Tuner board,
- 1 pc. Main digital board,
- 1 pc. Keypad board,
- 1 pc. Remote Control Receiver board,

(3).POWER

There are 1 pc. PCB for power.

PCB function

1. Power:

- (1). Input voltage: AC 100V~240V, 47Hz~63Hz.
Input range: AC 90V(Min)~264V(Max) auto regulation.
- (2). To provide power for PCBs.
 - a). +24V for Inverter.
 - b). +5Vsb for standby,
 - c). +5V for signal power,
 - d). +24V for Audio Amp power and converter to
 - e). +12V for Tuner power.

2. Main (Video InterFace) board:

- (1). Decoder the video signal (TV,CVBS,S-VIDEO) from analog to digital signal.
- (2). Converter the Video signals(TV,CVBS,S-VIDEO) and graphics signal (VGA,YPbPr) from internace to progressive,
- (3). Converter the Digital to fit the panel display mode and output the LVDS signal to Panel.

3. Tuner & Audio Board :

- (1) Convert TV RF signal to video and audio signal to Main board.
- (2). Decoder the TV SIF signal to audio signal,
- (3). Converter the audio to audio Ampifile and out put to the speaker.

4. KEYBOARD

To get the main button control on LCD_TV as SOURCE,MENU, CHANNEL +,CHANNEL -, VOL +,VOL-, STANDBY functions.

5. Remote control board

Receive the remote signal and active for the control.

6. T-CONTROL board

Converter the LVDS signal to the digital signal for fitting the PANEL.

7. INVERTER board

Converter the low DC voltage +24V to high AC voltage to drive the backlight.

PCB failure analysis

1. CONTROL:

- a. Abnormal noise on screen.
- b. No picture.

2. MAIN (VIDEO):

- a. Lacking color, Bad color scale.
- b. No voice.
- c. No picture but with signals output, OSD and back light.
- d. Abnormal noise on screen.

3. POWER:

- No picture, no power output.

Basic operation of LCD-TV

1. After turning on power switch, power board sends 5Vst-by Volt to Micro Processor IC waiting for ON signals from Key Switch or Remote Receiver.

2. When the ON signal from Key Switch or Remote Receiver is detected, Micro Processor will send ON Control signals to Power. Then Power sends (5Vsc, 12Vsc, 24V and RLY ON, Vs ON) to PCBs working. This time VIF will send signals to display back light, OSD on the panel and start to search available signal sources. If the audio signals input, them will be amplified by Audio AMP and transmitted to Speakers.

3. If some abnormal signals are detected (for example: over volts, over current, over temperature and under volts), the system will be shut down by Power off.

LCD basic display theory.

When an electrical field is applied to the LC planes, the LC molecules re-align themselves so that they are parallel to the electrical field. This electrical process is known as **twisted nematic field effect** or **TNFE**. In this alignment, polarized light is not twisted as it passes through the LC material (see Diagram 3A and 3B). If the front polarizer is oriented perpendicular to the rear polarizer, light will pass through the energized display but will be blocked by the rear polarizer. An LCD in this form is acting as a light shutter.

Displays with variable characters are created by selectively etching away the conductive surface that was originally deposited on the glass. Etched areas become the display's background; unetched areas become the display's characters.

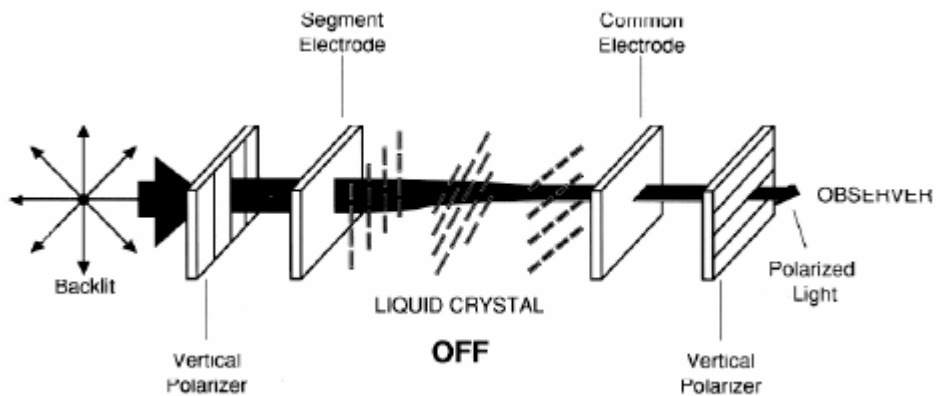


Diagram 3A. The "off" state of a TN LCD—the LC molecules form a twist and therefore cause polarized light to twist as it passes through.

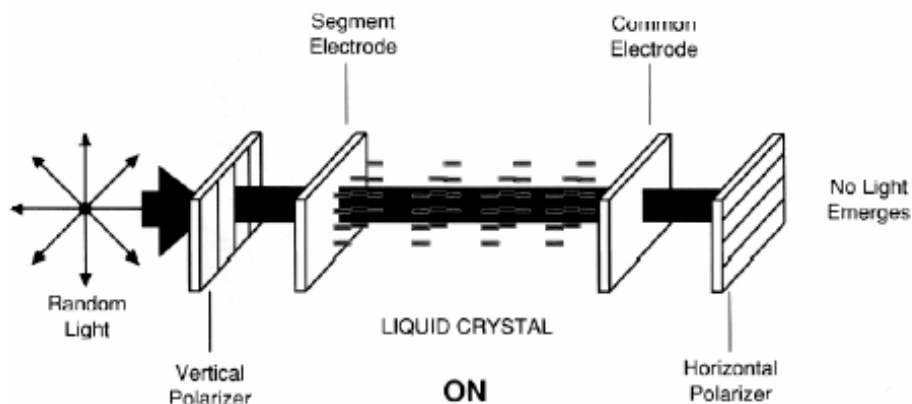


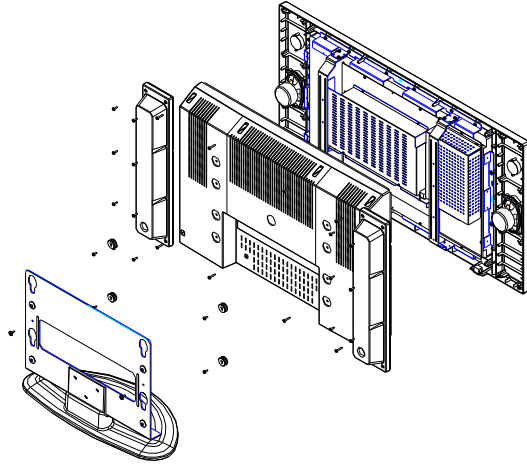
Diagram 3B. The "on" state—the electrical field re-aligns the LC molecules so they do not twist the polarized light.

Disassembly

In case of trouble, etc., Necessitating disassemble, please disassemble in the order shown in the illustrations.

Reassemble in the reverse order.

1. Removal of the Back Cover



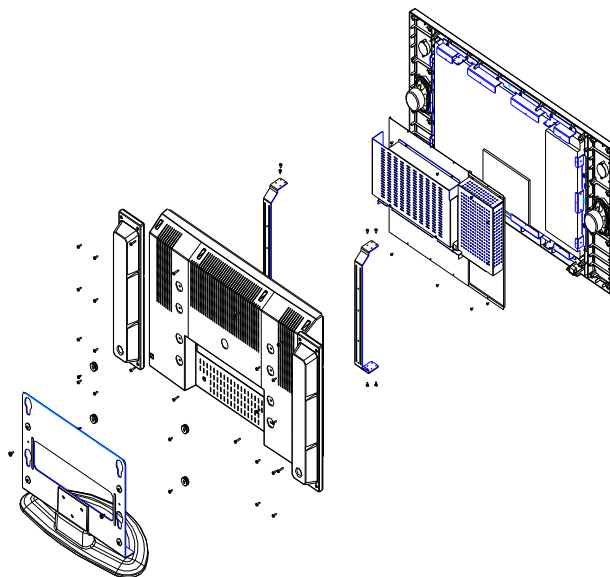
2. Removal of the MAIN PCB

a. Remove the screws.

b. Slide out the LCD chassis slightly; pull up the connector of AC cord from PCB; pull up the LCD PCB from LCD.

c. Remove the Anode cap from Thepicture tube. To avoid a shock hazard, be sure to discharge

d. Take out the LCD chassis.



IC DESCRIPTION

-MT8205G

-AT24C02

-MX29LV160BBTC

-LP2996

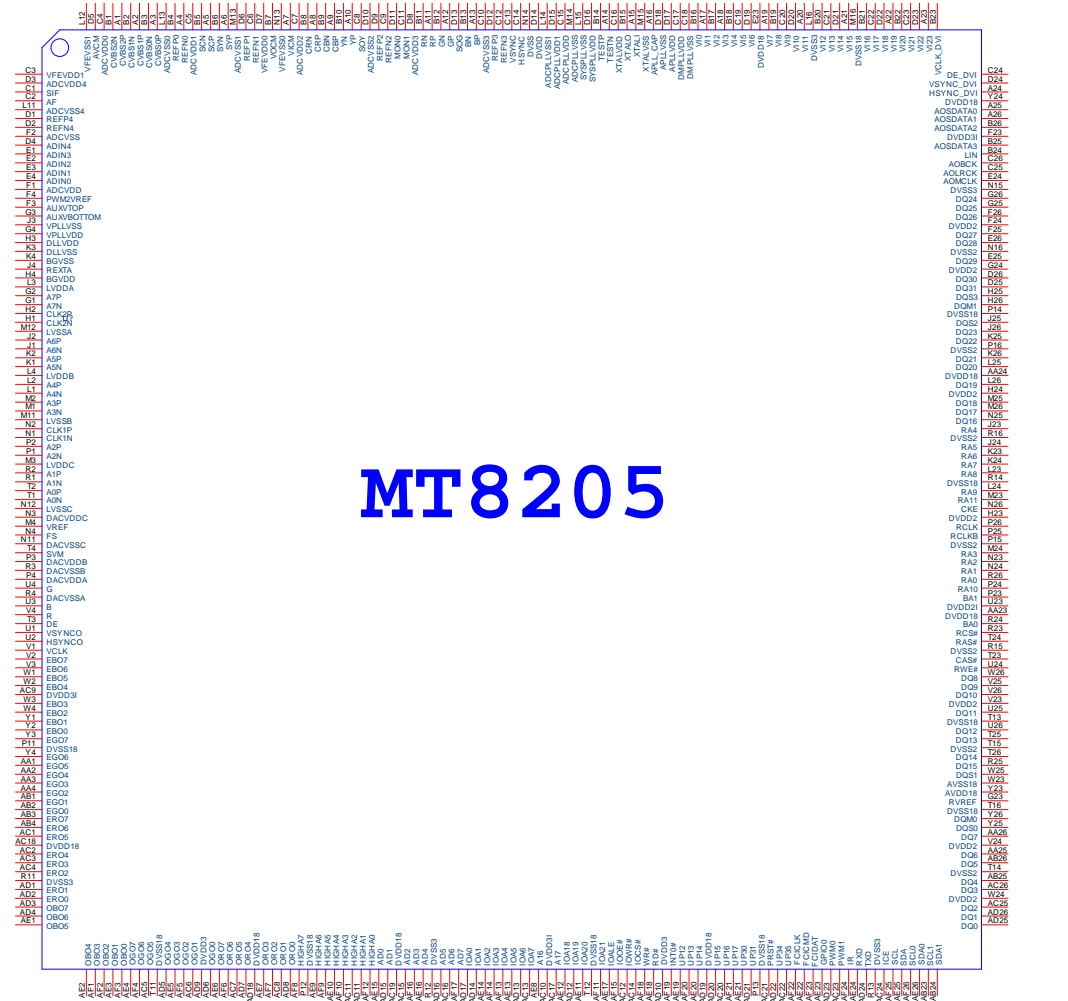
-AZ1117/H

-WM8776

-MX232A

-ISAV330

Pinout information



Pin Descriptions

2.3 Pin Descriptions

Table 2-1 provides detail video/audio port pin descriptions.

Table 2-1 video/audio port pin descriptions.

Pin	Symbol	Type	Description
E24	AOMCLK	O	Audio out master clock
C25	AOLRCK	O	Audio out left-right clock
C26	AOBCK	O	Audio out bit clock
A25	AOSDATA0	O	Audio out data line 0
A26	AOSDATA1	O	Audio out data line 1
B26	AOSDATA2	O	Audio out data line 2
B25	AOSDATA3	O	Audio out data line 3
B24	LIN	I	Audio line in
A3	CVBS0P	I	Composite Video input 0
A2	CVBS1P	I	Composite Video input 1
A1	CVBS2P	I	Composite Video input 2
C1	SIF	I	Tuner Sound SIF
C2	AF	I	Tuner Sound AF

Features

- Low Voltage and Standard Voltage Operation
 - 5.0 (V_{CC} = 4.5V to 5.5V)
 - 2.7 (V_{CC} = 2.7V to 5.5V)
 - 2.5 (V_{CC} = 2.5V to 5.5V)
 - 1.8 (V_{CC} = 1.8V to 5.5V)
- Internally Organized 128 x 8 (1K), 256 x 8 (2K), 512 x 8 (4K), 1024 x 8 (8K) or 2048 x 8 (16K)
- 2-Wire Serial Interface
- Bidirectional Data Transfer Protocol
- 100 kHz (1.8V, 2.5V, 2.7V) and 400 kHz (5V) Compatibility
- Write Protect Pin for Hardware Data Protection
- 8-Byte Page (1K, 2K), 16-Byte Page (4K, 8K, 16K) Write Modes
- Partial Page Writes Are Allowed
- Self-Timed Write Cycle (10 ms max)
- High Reliability
 - Endurance: 1 Million Cycles
 - Data Retention: 100 Years
- Automotive Grade and Extended Temperature Devices Available
- 8-Pin and 14-Pin JEDEC SOIC and 8-Pin PDIP Packages

Description

The AT24C01A/02/04/08/16 provides 1024/2048/4096/8192/16384 bits of serial electrically erasable and programmable read only memory (EEPROM) organized as 128/256/512/1024/2048 words of 8 bits each. The device is optimized for use in many industrial and commercial applications where low power and low voltage operation are essential. The AT24C01A/02/04/08/16 is available in space saving 8-pin PDIP, 8-pin and 14-pin SOIC packages and is accessed via a 2-wire serial interface. In addition, the entire family is available in 5.0V (4.5V to 5.5V), 2.7V (2.7V to 5.5V), 2.5V (2.5V to 5.5V) and 1.8V (1.8V to 5.5V) versions.

2-Wire Serial CMOS E²PROM

1K (128 x 8)

2K (256 x 8)

4K (512 x 8)

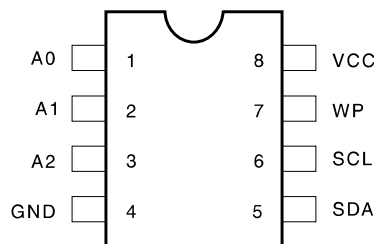
8K (1024 x 8)

16K (2048 x 8)

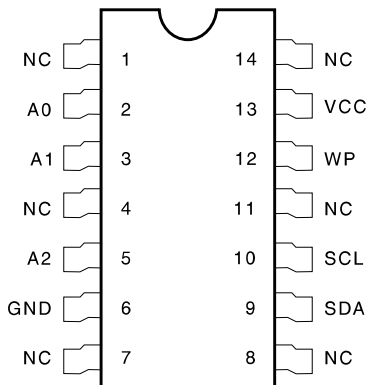
Pin Configurations

Pin Name	Function
A ₀ to A ₂	Address Inputs
SDA	Serial Data
SCL	Serial Clock Input
WP	Write Protect
NC	No Connect

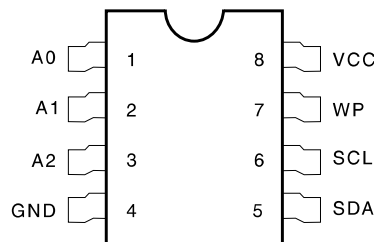
8-Pin PDIP



14-Pin SOIC



8-Pin SOIC

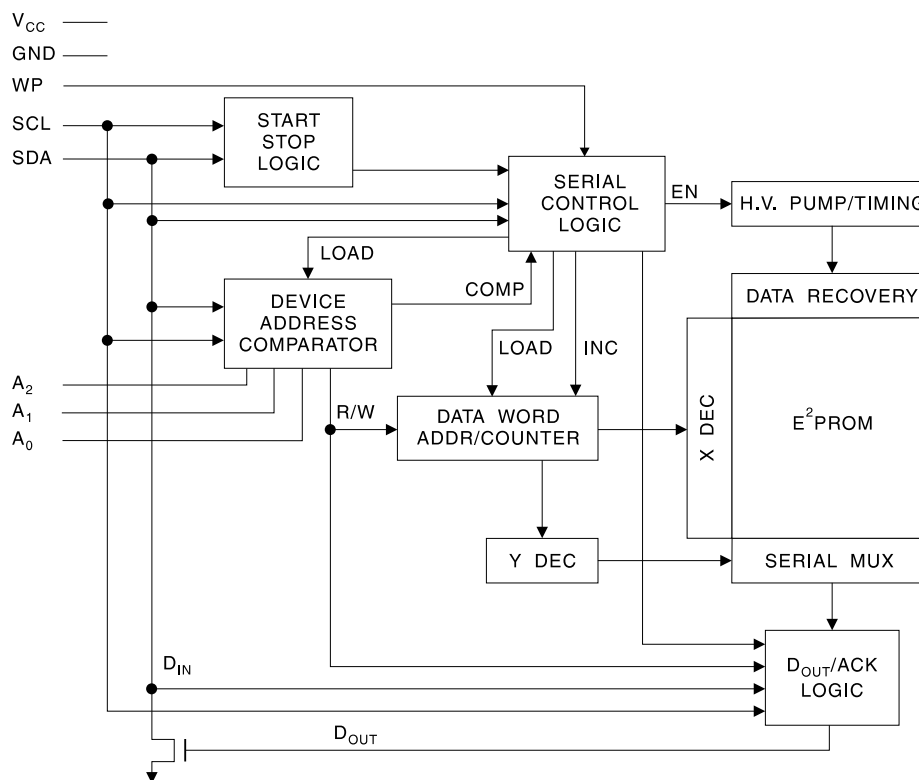


Absolute Maximum Ratings*

Operating Temperature.....	-55°C to +125°C
Storage Temperature.....	-65°C to +150°C
Voltage on Any Pin with Respect to Ground	-0.1V to +7.0V
Maximum Operating Voltage	6.25V
DC Output Current.....	5.0 mA

*NOTICE: Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Block Diagram



Pin Description

SERIAL CLOCK (SCL): The SCL input is used to positive edge clock data into each E²PROM device and negative edge clock data out of each device.

SERIAL DATA (SDA): The SDA pin is bidirectional for serial data transfer. This pin is open-drain driven and may be wire-ORed with any number of other open-drain or open collector devices.

DEVICE/PAGE ADDRESSES (A2, A1, A0): The A2, A1 and A0 pins are device address inputs that are hard wired for the AT24C01A and the AT24C02. As many as eight 1K/2K devices may be addressed on a single bus system (device addressing is discussed in detail under the Device Addressing section).

The AT24C04 uses the A2 and A1 inputs for hard wire addressing and a total of four 4K devices may be addressed on a single bus system. The A0 pin is a no connect.

The AT24C08 only uses the A2 input for hardwire addressing and a total of two 8K devices may be addressed on a single bus system. The A0 and A1 pins are no connects.

The AT24C16 does not use the device address pins which limits the number of devices on a single bus to one. The A0, A1 and A2 pins are no connects.

(continued)



MX29LV160BT/BB

16M-BIT [2Mx8/1Mx16] CMOS SINGLE VOLTAGE 3V ONLY FLASH MEMORY

FEATURES

- Extended single - supply voltage range 2.7V to 3.6V
- 2,097,152 x 8/1,048,576 x 16 switchable
- Single power supply operation
 - 3.0V only operation for read, erase and program operation
- **Fully compatible with MX29LV160A device**
- Fast access time: 70/90ns
- Low power consumption
 - 30mA maximum active current
 - 0.2uA typical standby current
- Command register architecture
 - Byte/word Programming (9us/11us typical)
 - Sector Erase (Sector structure 16K-Bytex1, 8K-Bytex2, 32K-Bytex1, and 64K-Byte x31)
- Auto Erase (chip & sector) and Auto Program
 - Automatically erase any combination of sectors with Erase Suspend capability.
 - Automatically program and verify data at specified address
- Erase Suspend/Erase Resume
 - Suspends sector erase operation to read data from, or program data to, any sector that is not being erased, then resumes the erase.
- Status Reply
 - Data polling & Toggle bit for detection of program and erase operation completion.
- Ready/Busy pin (RY/BY)
 - Provides a hardware method of detecting program or erase operation completion.
- Sector protection
 - Hardware method to disable any combination of sectors from program or erase operations
 - Temporary sector unprotect allows code changes in previously locked sectors.
- CFI (Common Flash Interface) compliant
 - Flash device parameters stored on the device and provide the host system to access
- 100,000 minimum erase/program cycles
- Latch-up protected to 100mA from -1V to VCC+1V
- Boot Sector Architecture
 - T = Top Boot Sector
 - B = Bottom Boot Sector
- Low VCC write inhibit is equal to or less than 1.4V
- Package type:
 - 44-pin SOP
 - 48-pin TSOP
 - 48-ball CSP
- Compatibility with JEDEC standard
 - Pinout and software compatible with single-power supply Flash
- 10 years data retention

GENERAL DESCRIPTION

The MX29LV160BT/BB is a 16-mega bit Flash memory organized as 2M bytes of 8 bits or 1M words of 16 bits. MXIC's Flash memories offer the most cost-effective and reliable read/write non-volatile random access memory. The MX29LV160BT/BB is packaged in 44-pin SOP, 48-pin TSOP and 48-ball CSP. It is designed to be reprogrammed and erased in system or in standard EPROM programmers.

The standard MX29LV160BT/BB offers access time as fast as 70ns, allowing operation of high-speed microprocessors without wait states. To eliminate bus contention, the MX29LV160BT/BB has separate chip enable (\overline{CE}) and output enable (\overline{OE}) controls.

MXIC's Flash memories augment EPROM functionality with in-circuit electrical erasure and programming. The MX29LV160BT/BB uses a command register to manage this functionality. The command register allows for

100% TTL level control inputs and fixed power supply levels during erase and programming, while maintaining maximum EPROM compatibility.

MXIC Flash technology reliably stores memory contents even after 100,000 erase and program cycles. The MXIC cell is designed to optimize the erase and programming mechanisms. In addition, the combination of advanced tunnel oxide processing and low internal electric fields for erase and program operations produces reliable cycling. The MX29LV160BT/BB uses a 2.7V~3.6V VCC supply to perform the High Reliability Erase and auto Program/Erase algorithms.

The highest degree of latch-up protection is achieved with MXIC's proprietary non-epi process. Latch-up protection is proved for stresses up to 100 milliamps on address and data pin from -1V to VCC + 1V.

LP2996 DDR Termination Regulator

General Description

The LP2996 linear regulator is designed to meet the JEDEC SSTL-2 specifications for termination of DDR-SDRAM. The device contains a high-speed operational amplifier to provide excellent response to load transients. The output stage prevents shoot through while delivering 1.5A continuous current and transient peaks up to 3A in the application as required for DDR-SDRAM termination. The LP2996 also incorporates a V_{SENSE} pin to provide superior load regulation and a V_{REF} output as a reference for the chipset and DIMMs.

An additional feature found on the LP2996 is an active low shutdown (\overline{SD}) pin that provides Suspend To RAM (STR) functionality. When \overline{SD} is pulled low the V_{TT} output will tri-state providing a high impedance output, but, V_{REF} will remain active. A power savings advantage can be obtained in this mode through lower quiescent current.

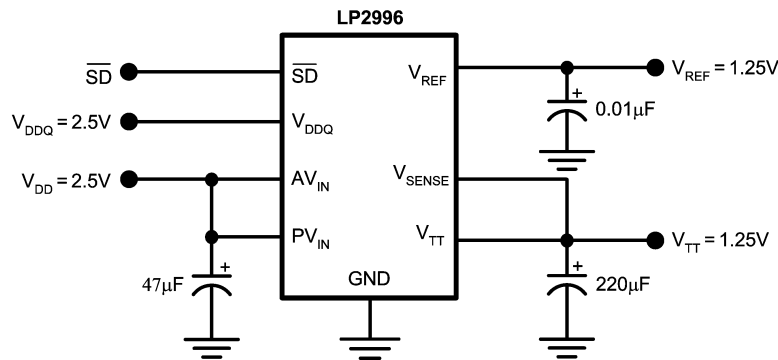
Features

- Source and sink current
- Low output voltage offset
- No external resistors required
- Linear topology
- Suspend to Ram (STR) functionality
- Low external component count
- Thermal Shutdown
- Available in SO-8, PSOP-8 or LLP-16 packages

Applications

- DDR-I and DDR-II Termination Voltage
- SSTL-2 and SSTL-3 Termination
- HSTL Termination

Typical Application Circuit



20057518

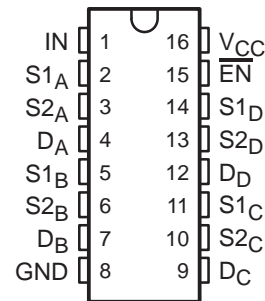
TS5V330

QUAD SPDT WIDE-BANDWIDTH VIDEO SWITCH WITH LOW ON-STATE RESISTANCE

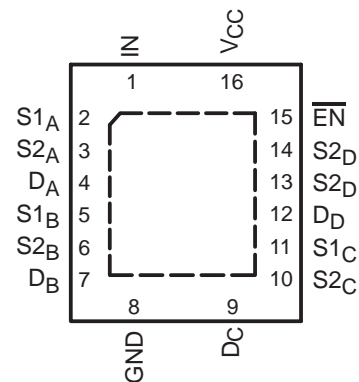
SCDS164A – MAY 2004 – REVISED MAY 2004

- Low Differential Gain and Phase ($D_G = 0.64\%$, $D_P = 0.1$ Degrees Typ)
- Wide Bandwidth (BW = 300 MHz Min)
- Low Crosstalk ($X_{TALK} = -63$ dB Typ)
- Low Power Consumption ($I_{CC} = 3 \mu\text{A}$ Max)
- Bidirectional Data Flow, With Near-Zero Propagation Delay
- Low ON-State Resistance ($r_{on} = 3 \Omega$ Typ)
- V_{CC} Operating Range From 4.5 V to 5.5 V
- I_{off} Supports Partial-Power-Down Mode Operation
- Data and Control Inputs Provide Undershoot Clamp Diode
- Control Inputs Can Be Driven by TTL or 5-V/3.3-V CMOS Outputs
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Performance Tested Per JESD 22
 - 2000-V Human-Body Model (A114-B, Class II)
 - 1000-V Charged-Device Model (C101)
- Suitable for Both RGB and Composite-Video Switching

D, DBQ, OR PW PACKAGE
(TOP VIEW)



RGY PACKAGE
(TOP VIEW)



description/ordering information

The TI TS5V330 video switch is a 4-bit 1-of-2 multiplexer/demultiplexer with a single switch-enable (\overline{EN}) input. When \overline{EN} is low, the switch is enabled and the D port is connected to the S port. When \overline{EN} is high, the switch is disabled and the high-impedance state exists between the D and S ports. The select (IN) input controls the data path of the multiplexer/demultiplexer.

ORDERING INFORMATION

T_A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–40°C to 85°C	QFN – RGY	Tape and reel	TS5V330RGYR	TE330
	SOIC – D	Tube	TS5V330D	TS5V330
		Tape and reel	TS5V330DR	
	SSOP (QSOP) – DBQ	Tape and reel	TS5V330DBQR	TE330
	TSSOP – PW	Tube	TS5V330PW	TE330
		Tape and reel	TS5V330PWR	

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.



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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

**TEXAS
INSTRUMENTS**

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

DESCRIPTION

The WM8776 is a high performance, stereo audio CODEC with five channel input selector. The WM8776 is ideal for surround sound processing applications for home hi-fi, DVD-RW and other audio visual equipment.

A stereo 24-bit multi-bit sigma delta ADC is used with a five stereo channel input mixer. Each ADC channel has programmable gain control with automatic level control. Digital audio output word lengths from 16-32 bits and sampling rates from 32kHz to 96kHz are supported.

A stereo 24-bit multi-bit sigma delta DAC is used with digital audio input word lengths from 16-32 bits and sampling rates from 32kHz to 192kHz. The DAC has an input mixer allowing an external analogue signal to be mixed with the DAC signal. There are also Headphone and line outputs, with volume controls for the headphones.

The WM8776 supports fully independent sample rates for the ADC and DAC. The audio data interface supports I²S, left justified, right justified and DSP formats.

The device is controlled in software via a 2 or 3 wire serial interface, selected by the MODE pin, which provides access to all features including channel selection, volume controls, mutes, and de-emphasis facilities.

The device is available in a 48-pin TQFP package.

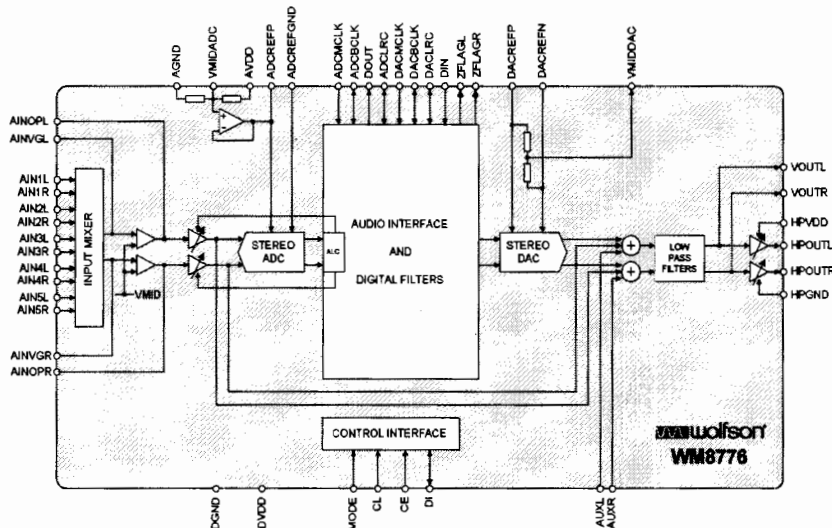
FEATURES

- Audio Performance
 - 108dB SNR ('A' weighted @ 48kHz) DAC
 - 102dB SNR ('A' weighted @ 48kHz) ADC
- DAC Sampling Frequency: 32kHz – 192kHz
- ADC Sampling Frequency: 32kHz – 96kHz
- Five stereo ADC inputs with analogue gain adjust from +24dB to -21dB in 0.5dB steps
- Programmable Limiter or Automatic Level Control (ALC)
- Stereo DAC with independent analogue and digital volume controls
- Stereo Headphone and Line Output
- 3-Wire SPI Compatible or 2-Wire Software Serial Control Interface
- Master or Slave Clocking Mode
- Programmable Audio Data Interface Modes
 - I²S, Left, Right Justified or DSP
 - 16/20/24/32 bit Word Lengths
- Analogue Bypass Path Feature
- Selectable AUX input to the volume controls
- 2.7V to 5.5V Analogue, 2.7V to 3.6V Digital supply Operation

APPLICATIONS

- Surround Sound AV Processors and Hi-Fi systems
- DVD-RW

BLOCK DIAGRAM





±15kV ESD-Protected, +5V RS-232 Transceivers

General Description

The MAX202E-MAX213E, MAX232E/MAX241E line drivers/receivers are designed for RS-232 and V.28 communications in harsh environments. Each transmitter output and receiver input is protected against ±15kV electrostatic discharge (ESD) shocks, without latchup. The various combinations of features are outlined in the *Selection Guide*. The drivers and receivers for all ten devices meet all EIA/TIA-232E and CCITT V.28 specifications at data rates up to 120kbps, when loaded in accordance with the EIA/TIA-232E specification.

The MAX211E/MAX213E/MAX241E are available in 28-pin SO packages, as well as a 28-pin SSOP that uses 60% less board space. The MAX202E/MAX232E come in 16-pin narrow SO, wide SO, and DIP packages. The MAX203E comes in a 20-pin DIP/SO package, and needs no external charge-pump capacitors. The MAX205E comes in a 24-pin wide DIP package, and also eliminates external charge-pump capacitors. The MAX206E/MAX207E/MAX208E come in 24-pin SO, SSOP, and narrow DIP packages. The MAX232E/MAX241E operate with four 1μF capacitors, while the MAX202E/MAX206E/MAX207E/MAX208E/MAX211E/MAX213E operate with four 0.1μF capacitors, further reducing cost and board space.

Applications

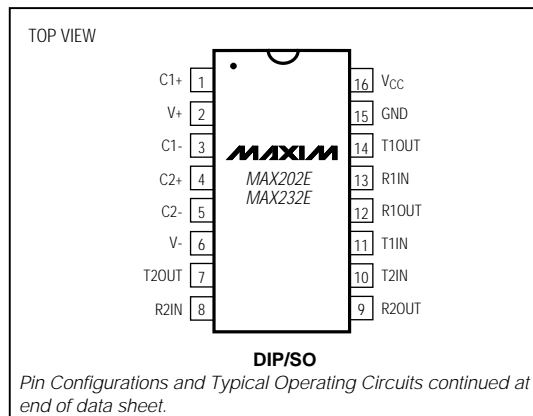
Notebook, Subnotebook, and Palmtop Computers
Battery-Powered Equipment
Hand-Held Equipment

Ordering Information appears at end of data sheet.

Features

- ♦ **ESD Protection for RS-232 I/O Pins:**
 - ±15kV—Human Body Model
 - ±8kV—IEC1000-4-2, Contact Discharge
 - ±15kV—IEC1000-4-2, Air-Gap Discharge
- ♦ **Latchup Free (unlike bipolar equivalents)**
- ♦ **Guaranteed 120kbps Data Rate—LapLink™ Compatible**
- ♦ **Guaranteed 3V/μs Min Slew Rate**
- ♦ **Operate from a Single +5V Power Supply**

Pin Configurations



Selection Guide

PART	No. of RS-232 DRIVERS	No. of RS-232 RECEIVERS	RECEIVERS ACTIVE IN SHUTDOWN	No. of EXTERNAL CAPACITORS	LOW-POWER SHUTDOWN	TTL THREE-STATE
MAX202E	2	2	0	4 (0.1μF)	No	No
MAX203E	2	2	0	None	No	No
MAX205E	5	5	0	None	Yes	Yes
MAX206E	4	3	0	4 (0.1μF)	Yes	Yes
MAX207E	5	3	0	4 (0.1μF)	No	No
MAX208E	4	4	0	4 (0.1μF)	No	No
MAX211E	4	5	0	4 (0.1μF)	Yes	Yes
MAX213E	4	5	2	4 (0.1μF)	Yes	Yes
MAX232E	2	2	0	4 (1μF)	No	No
MAX241E	4	5	0	4 (1μF)	Yes	Yes

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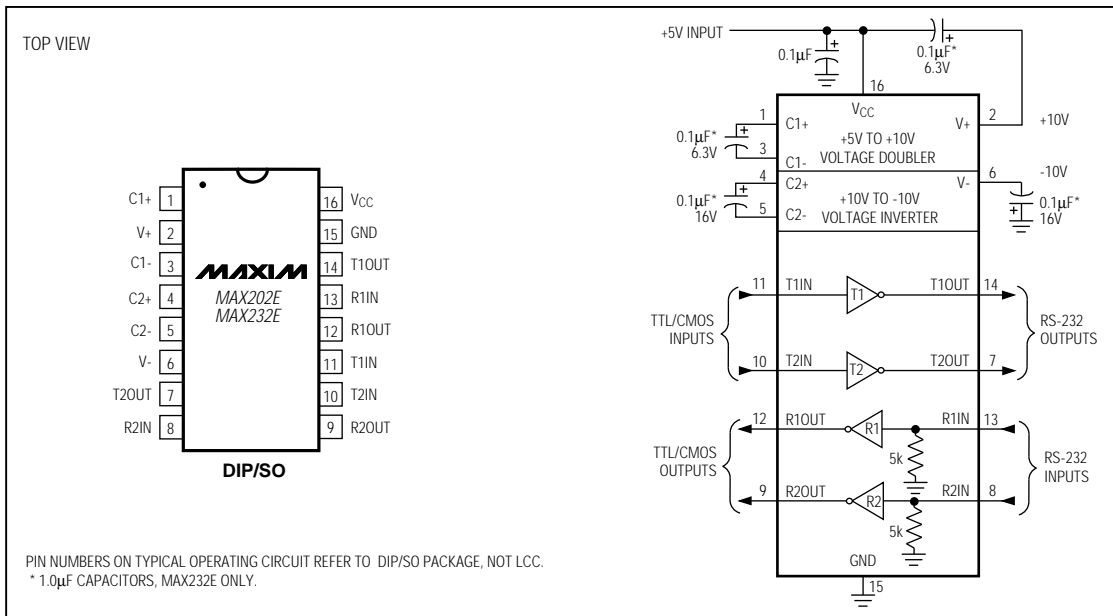
MAX202E-MAX213E, MAX232E/MAX241E

±15kV ESD-Protected, +5V RS-232 Transceivers

Table 3. DB9 Cable Connections
Commonly Used for EIA/TIAE-232E and V.24 Asynchronous Interfaces

PIN	CONNECTION	
1	Received Line Signal Detector (sometimes called Carrier Detect, DCD)	Handshake from DCE
2	Receive Data (RD)	Data from DCE
3	Transmit Data (TD)	Data from DTE
4	Data Terminal Ready	Handshake from DTE
5	Signal Ground	Reference point for signals
6	Data Set Ready (DSR)	Handshake from DCE
7	Request to Send (RTS)	Handshake from DTE
8	Clear to Send (CTS)	Handshake from DCE
9	Ring Indicator	Handshake from DCE

Pin Configurations and Typical Operating Circuits (continued)



TFT LCD Preliminary Specification

MODEL NO.: V270B1 - L01

LCD TV Head Division	
AVP	郭振隆

QRA Dept.	TVHD / PDD		
	DDIII	DDII	DDI
Approval	Approval	Approval	Approval
陳永一	李汪洋	藍文錦	林文聰

LCD TV Marketing and Product Management Division	
Product Manager	陳立宜 謝芳宜

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REVISION HISTORY

Version	Date	Page (New)	Section	Description
Ver 1.0	Jun. 15,'05	All	All	Preliminary Specification was first issued.

1. GENERAL DESCRIPTION

1.1 OVERVIEW

V270B1- L01 is a TFT Liquid Crystal Display module with 14-CCFL Backlight unit and 1ch-LVDS interface. The display diagonal is 27". This module supports 1366 x 768 WXGA format and can display true 16.7M colors(8-bits colors). The inverter module for backlight is built-in.

1.2 FEATURES

- Excellent brightness (550 nits)
- Ultra high contrast ratio (1000:1)
- Fast response time (8ms)
- High color saturation NTSC 75%
- WXGA (1366 x 768 pixels) resolution
- DE (Data Enable) only mode
- LVDS (Low Voltage Differential Signaling) interface
- Optimized response time for both 50/60 Hz frame rate
- Ultra wide viewing angle: 176(H)/176(V) (CR>20) Super MVA technology
- 180 degree rotation display option
- Low color shift function option
- Color reproduction (Nature color)

1.3 APPLICATION

- TFT LCD TVs
- High brightness, multi-media displays

1.4 GENERAL SPECIFICATIONS

Item	Specification	Unit	Note
Active Area	596.259 (H) x 335.232 (V) (27" diagonal)	mm	(1)
Bezel Opening Area	603.22 (H) x 341.98 (V)	mm	
Driver Element	a-si TFT active matrix	-	
Pixel Number	1366 x R.G.B. x 768	pixel	
Pixel Pitch (Sub Pixel)	0.1460 (H) x 0.4365 (V)	mm	
Pixel Arrangement	RGB vertical stripe	-	
Display Colors	16.7M	color	
Display Operation Mode	Transmissive mode / Normally black	-	
Surface Treatment	Hardness : 3H, Haze : 40% Anti-reflective coating < 2% reflection	-	

1.5 MECHANICAL SPECIFICATIONS

Item	Min.	Typ.	Max.	Unit	Note	
Module Size	Horizontal(H)	636.85	637.55	638.25	mm	
	Vertical(V)	379.1	379.8	380.5	mm	
	Depth(D)	33.9	35.4	36.9	mm	To PCB cover
	Depth(D)	39.2	40.7	42.2	mm	To inverter cover
Weight	3700	4000	4300	g		

Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

2. ABSOLUTE MAXIMUM RATINGS

2.1 ABSOLUTE RATINGS OF ENVIRONMENT

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	T _{ST}	-20	+60	°C	(1)
Operating Ambient Temperature	T _{OP}	0	+50	°C	(1), (2)
Shock (Non-Operating)	S _{NOF}	-	50	G	(3), (5)
Vibration (Non-Operating)	V _{NOF}	-	1.0	G	(4), (5)

Note (1) Temperature and relative humidity range is shown in the figure below.

(a) 90 %RH Max. (Ta ≤ 40 °C).

(b) Wet-bulb temperature should be 39 °C Max. (Ta > 40 °C).

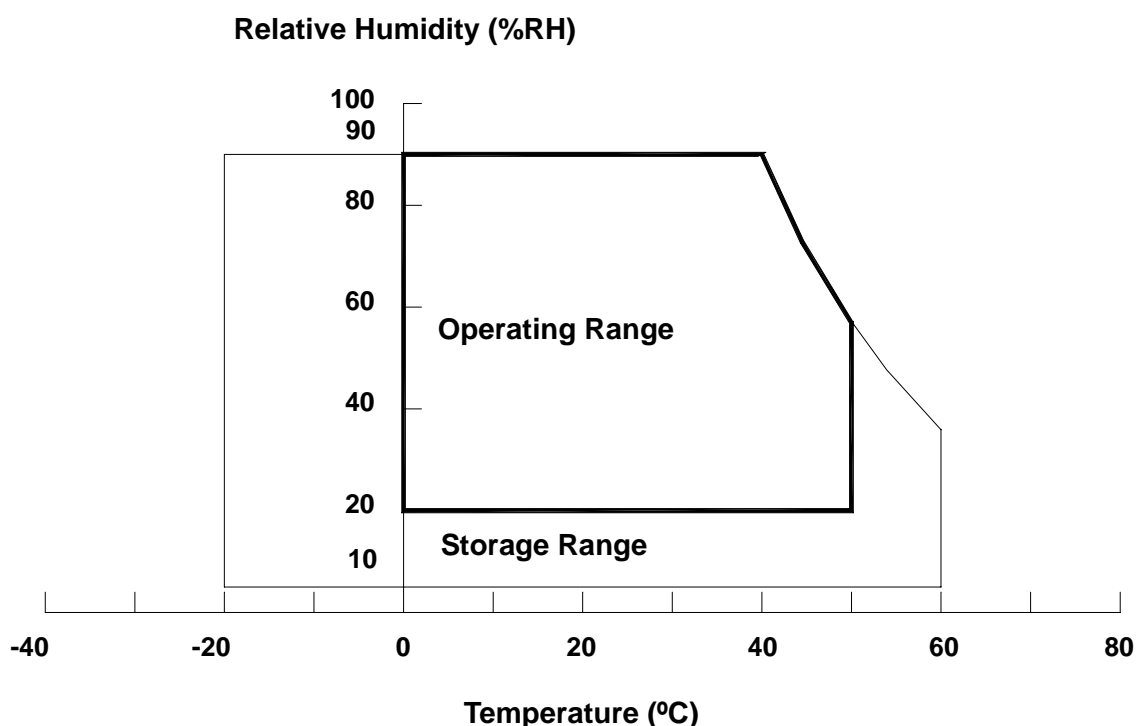
(c) No condensation.

Note (2) The maximum operating temperature is based on the test condition that the surface temperature of display area is less than or equal to 60 °C with LCD module alone in a temperature controlled chamber. Thermal management should be considered in final product design to prevent the surface temperature of display area from being over 60 °C. The range of operating temperature may degrade in case of improper thermal management in final product design.

Note (3) 11 ms, half sine wave, 1 time for ± X, ± Y, ± Z.

Note (4) 10 ~ 500 Hz, 10 min, 1 time each X, Y, Z.

Note (5) At testing Vibration and Shock, the fixture in holding the module has to be hard and rigid enough so that the module would not be twisted or bent by the fixture.



2.2 ELECTRICAL ABSOLUTE RATINGS

2.2.1 TFT LCD MODULE

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Power Supply Voltage	V _{CC}	-0.3	6.0	V	(1)
Input Signal Voltage	V _{IN}	-0.3	3.6	V	

2.2.2 BACKLIGHT UNIT

Item	Symbol	Test Condition	Min.	Type	Max.	Unit	Note
Lamp Voltage	V _W	T _a = 25	-	-	3000	V _{RMS}	
Power Supply Voltage	V _{BL}	-	0	-	30	V	(1)
Control Signal Level	-	-	-0.3	-	7	V	(1), (3)

Note (1) Permanent damage to the device may occur if maximum values are exceeded. Functional operation should be restricted to the conditions described under normal operating conditions.

Note (2) No moisture condensation or freezing.

Note (3) The control signals includes Backlight On/Off Control, Internal PWM Control, External PWM Control and Internal/External PWM Selection.

3. ELECTRICAL CHARACTERISTICS

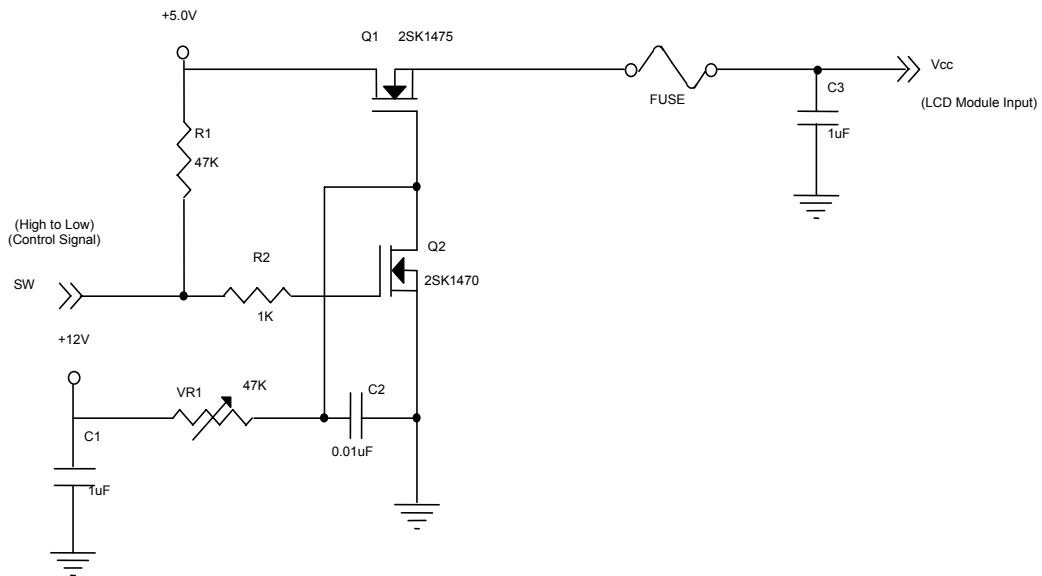
3.1 TFT LCD MODULE

Ta = 25 ± 2 °C

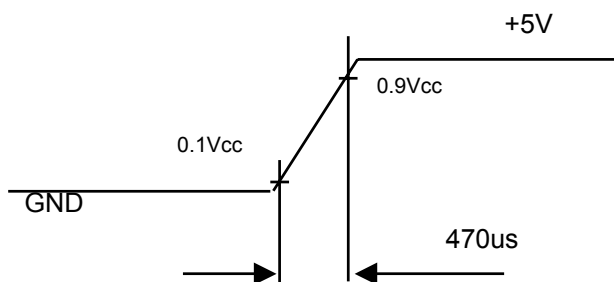
Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power Supply Voltage		V _{CC}	4.5	5.0	5.5	V	(1)
Power Supply Ripple Voltage		V _{RP}	-	-	150	mV	
Rush Current		I _{RUSH}	-	-	3.0	A	(2)
Power Supply Current	White	I _{CC}	-	1.8	-	A	(3)
	Black		-	1.2	-	A	
	Vertical Stripe		-	1.65	-	A	
LVDS Interface	Differential Input High Threshold Voltage	V _{LVTH}	-	-	+100	mV	
	Differential Input Low Threshold Voltage	V _{LVTL}	-100	-	-	mV	
	Common Input Voltage	V _{LVC}	1.125	1.25	1.375	V	
	Terminating Resistor	R _T		100		ohm	
CMOS interface	Input High Threshold Voltage	V _{IH}	2.7	-	3.3	V	
	Input Low Threshold Voltage	V _{IL}	0	-	0.7	V	

Note (1) The module should be always operated within above ranges.

Note (2) Measurement Conditions:

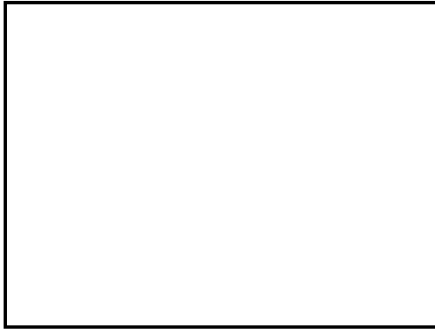


Vcc rising time is 470us



Note (3) The specified power supply current is under the conditions at $V_{cc} = 5\text{ V}$, $T_a = 25 \pm 2\text{ }^\circ\text{C}$, $f_v = 60\text{ Hz}$, whereas a power dissipation check pattern below is displayed.

a. White Pattern



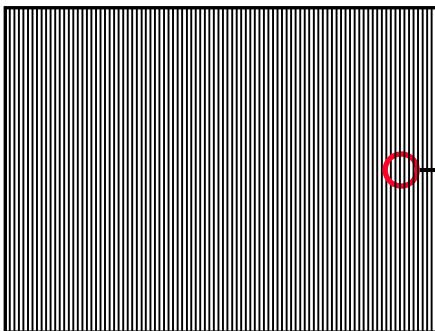
Active Area

b. Black Pattern

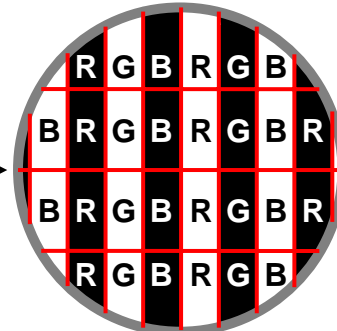


Active Area

c. Vertical Stripe Pattern



Active Area



3.2 BACKLIGHT INVERTER UNIT

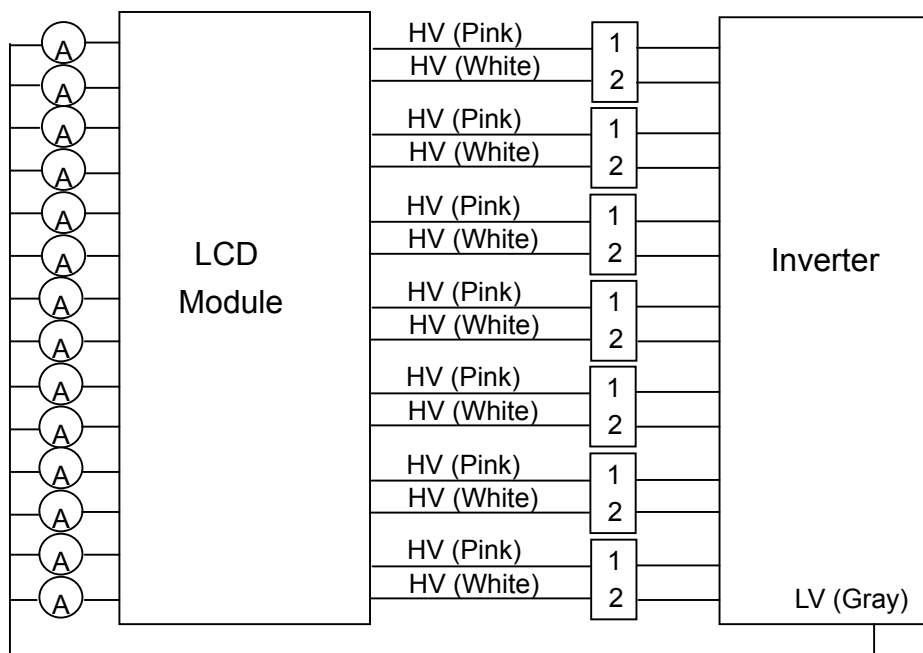
3.2.1 CCFL (Cold Cathode Fluorescent Lamp) CHARACTERISTICS ($T_a = 25 \pm 2\text{ }^\circ\text{C}$)

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Lamp Voltage	V_w	-	1120	-	V_{RMS}	$I_L = 4.7\text{mA}$
Lamp Current	I_L	4.2	4.7	5.2	mA_{RMS}	(1)
Lamp Starting Voltage	V_s	-	-	1650	V_{RMS}	(2), $T_a = 0\text{ }^\circ\text{C}$
		-	-	1500	V_{RMS}	(2), $T_a = 25\text{ }^\circ\text{C}$
Operating Frequency	F_o	50	-	70	KHz	(3)
Lamp Life Time	L_{BL}	50,000	60,000	-	Hrs	(4)

3.2.2 INVERTER CHARACTERISTICS (Ta = 25 ± 2 °C)

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Power Consumption	P _{BL}	-	92	-	W	(5), I _L = 4.7mA
Power Supply Voltage	V _{BL}	22.8	24	25.2	V _{DC}	
Power Supply Current	I _{BL}	-	3.8	-	A	Non Dimming
Input Ripple Noise	-	-	-	500	mV _{P-P}	V _{BL} = 22.8V
Backlight Turn on Voltage	V _{BS}	1790	-	-	V _{RMS}	Ta = 0 °C
		1200	-	-	V _{RMS}	Ta = 25 °C
Oscillating Frequency	F _W	53	56	59	kHz	
Dimming Frequency	F _B	150	160	170	Hz	
Minimum Duty Ratio	D _{MIN}	-	10	-	%	

Note (1) Lamp current is measured by utilizing high frequency current meters as shown below:



Note (2) The lamp starting voltage V_s should be applied to the lamp for more than 1 second under starting up duration. Otherwise the lamp could not be lighted on completed.

Note (3) The lamp frequency may produce interference with horizontal synchronous frequency from the display, and this may cause line flow on the display. In order to avoid interference, the lamp frequency should be detached from the horizontal synchronous frequency and its harmonics as far as possible.

Note (4) The life time of a lamp is defined as when the brightness is larger than 50% of its original value and the effective discharge length is longer than 80% of its original length (Effective discharge length is defined as an area that has equal to or more than 70% brightness compared to the brightness at the center point.) as the time in which it continues to operate under the condition $T_a = 25 \pm 2$ and $I_L = 4.2 \sim 5.2 \text{ mA}_{\text{RMS}}$.

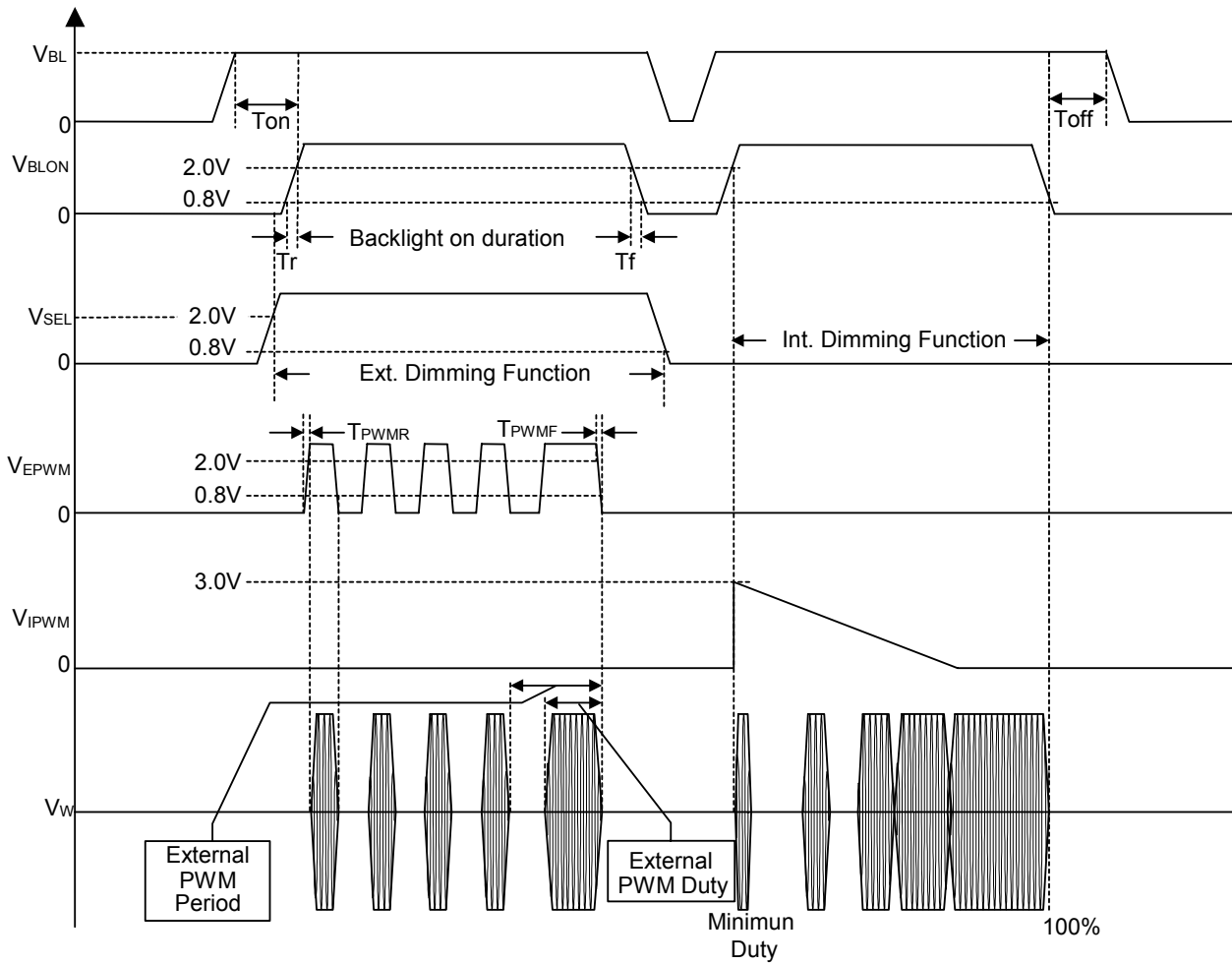
Note (5) The power supply capacity should be higher than the total inverter power consumption P_{BL} . Since the pulse width modulation (PWM) mode was applied for backlight dimming, the driving current changed as PWM duty on and off. The transient response of power supply should be considered for the changing loading when inverter dimming.

3.2.3 INVERTER INTERFACE CHARACTERISTICS

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit	Note	
On/Off Control Voltage	ON	V_{BLON}	-	2.0	-	5.0	V	
	OFF		-	0	-	0.8	V	
Internal/External PWM Select Voltage	HI	V_{SEL}	-	2.0	-	5.0	V	
	LO		-	0	-	0.8	V	
Internal PWM Control Voltage	MAX	V_{IPWM}	$V_{\text{SEL}} = \text{L}$	-	-	3.0	V	minimum duty ratio
	MIN			-	0	-	V	maximum duty ratio
External PWM Control Voltage	HI	V_{EPWM}	$V_{\text{SEL}} = \text{H}$	2.0	-	5.0	V	duty on
	LO			0	-	0.8	V	duty off
Control Signal Rising Time	T_r	-	-	-	100	ms		
Control Signal Falling Time	T_f	-	-	-	100	ms		
PWM Signal Rising Time	T_{PWMR}	-	-	-	50	us		
PWM Signal Falling Time	T_{PWMF}	-	-	-	50	us		
Input impedance	R_{IN}	-	1	-	-	M		
BLON Delay Time	T_{on}	-	1	-	-	ms		
BLON Off Time	T_{off}	-	1	-	-	ms		

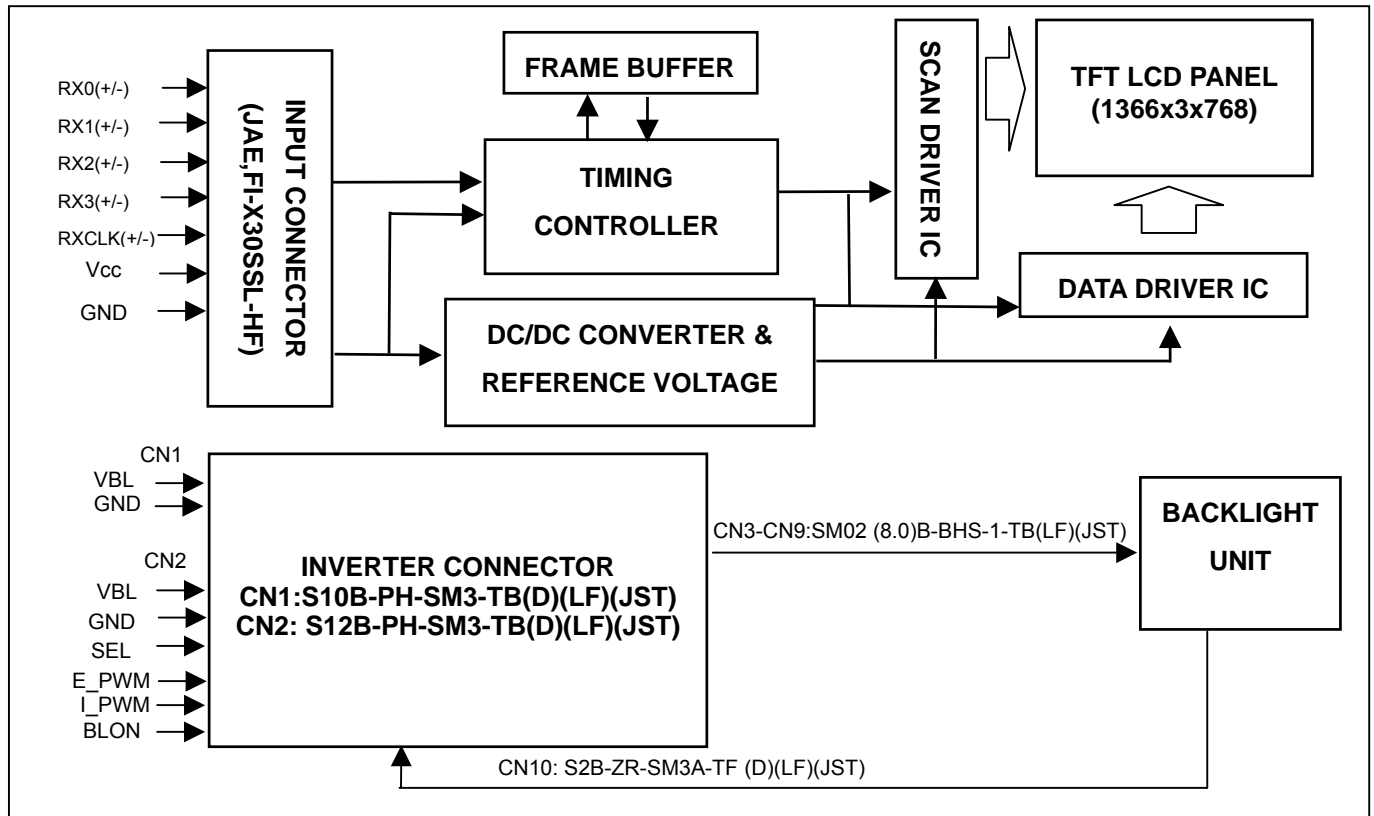
Note (1) The SEL signal should be valid before backlight turns on by BLON signal. It is inhibited to change the internal/external PWM selection (SEL) during backlight turn on period.

Note (2) The power sequence and control signal timing are shown as the following figure.



4. BLOCK DIAGRAM

4.1 TFT LCD MODULE



5. INTERFACE PIN CONNECTION

5.1 TFT LCD MODULE

CNF1 Connector Pin Assignment

Pin No.	Symbol	Description	Note
1	GND	Ground	
2	RPF	Display Rotation	(3)
3	SELLVDS	Select LVDS data format	(5)
4	NC	No Connection	(2)
5	NC	No Connection	
6	ODSEL	Overdrive Lookup Table Selection	(4)
7	EN LCS	Low Color Shift	(6)
8	GND	Ground	
9	RX0-	Negative transmission data of pixel 0	
10	RX0+	Positive transmission data of pixel 0	
11	RX1-	Negative transmission data of pixel 1	
12	RX1+	Positive transmission data of pixel 1	
13	RX2-	Negative transmission data of pixel 2	
14	RX2+	Positive transmission data of pixel 2	
15	RXCLK-	Negative of clock	
16	RXCLK+	Positive of clock	
17	RX3-	Negative transmission data of pixel 3	
18	RX3+	Positive transmission data of pixel 3	
19	GND	Ground	
20	GND	Ground	
21	GND	Ground	
22	GND	Ground	
23	GND	Ground	
24	GND	Ground	
25	GND	Ground	
26	VCC	Power supply: +5V	
27	VCC	Power supply: +5V	
28	VCC	Power supply: +5V	
29	VCC	Power supply: +5V	
30	VCC	Power supply: +5V	

Note (1) Connector Part No.: FI-X30SSL-HF(JAE) or compatible

Note (2) Reserved for internal use. Left it open.

Note (3) Low : normal display (default), High : display with 180 degree rotation

Note (4) Overdrive lookup table selection. The Overdrive lookup table should be selected in accordance to the frame rate to optimize image quality.

ODSEL	Note
L	Lookup table was optimized for 60 Hz frame rate.
H	Lookup table was optimized for 50 Hz frame rate.

Note (5) Please refer to 5.5 LVDS INTERFACE (Page 17)

Note (6) Enable Low color shift function.

EN LCS	Note
L	Low color shift off
H	Low color shift on

5.2 BACKLIGHT UNIT

The pin configuration for the housing and leader wire is shown in the table below.

CN3-CN9 (Housing): BHR-03VS-1 (JST)

Pin No.	Symbol	Description	Wire Color
1	HV	High Voltage	Pink
2	HV	High Voltage	White

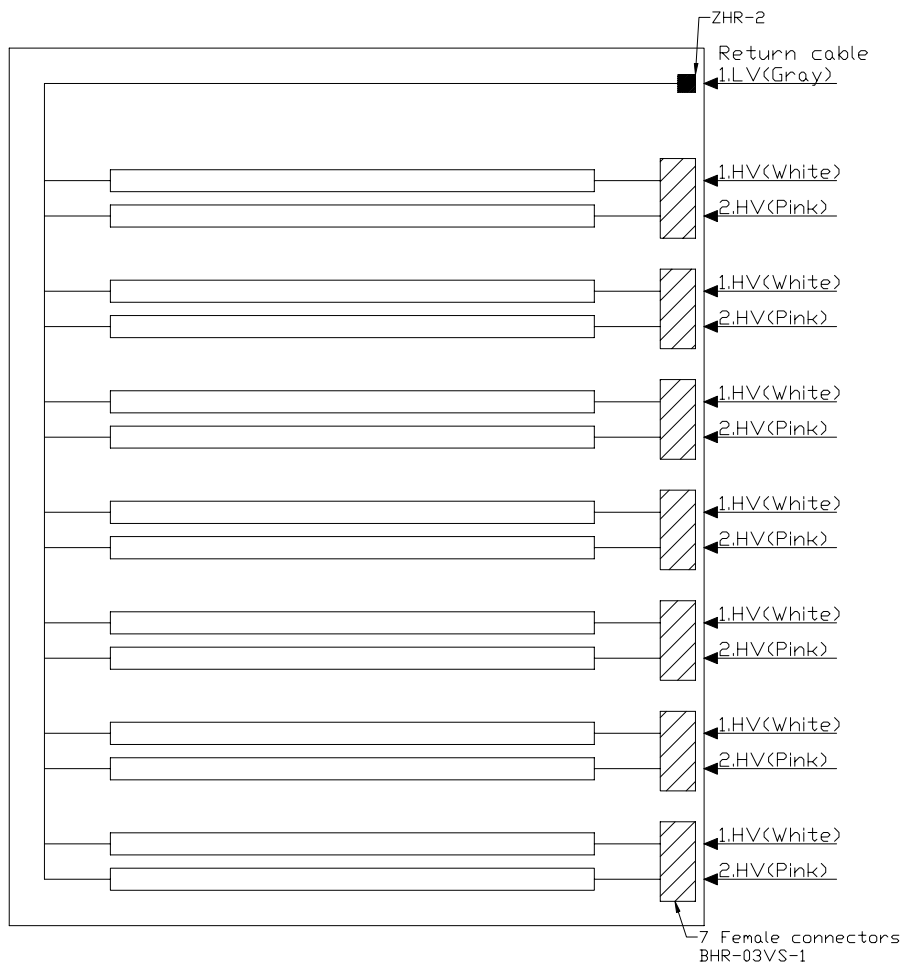
Note (1) The backlight interface housing for high voltage side is a model BHR-03VS-1, manufactured by JST.

The mating header on inverter part number is SM02(8.0)B-BHS-1-TB(LF) or equivalent.

CN10 (Housing): ZHR-2 (JST) or equivalent

Pin No.	Symbol	Description	Wire Color
1	LV	Low Voltage (+)	Gray
2	NC	No Connection	-

Note (2) The backlight interface housing and return cable for low voltage side is a model ZHR-2 , manufactured by JST or equivalent. The mating header on inverter part number is S2B-ZR-SM3A-TF(D)(LF) or equivalent.



5.3 INVERTER UNIT

CN1(Header):S10B-PH-SM3-TB(D)(LF)(JST) or equivalent.

Pin	Name	Description
1	VBL	+24V Power input
2		
3		
4		
5		
6	GND	Ground
7		
8		
9		
10		

CN2(Header): S12B-PH-SM3-TB(D)(LF)(JST) or equivalent.

Pin	Name	Description
1	VBL	+24V Power input
2		
3		
4		
5		
6	GND	Ground
7		
8		
9	SEL	Internal/external PWM selection High : external dimming Low : internal dimming
10	E_PWM	External PWM control signal E_PWM should be connected to low when internal PWM was selected (SEL = low).
11	I_PWM	Internal PWM control signal I_PWM should be connected to ground when external PWM was selected (SEL = high).
12	BLON	Backlight on/off control

CN3-CN9(Header): SM02(8.0)B-BHS-1-TB(LF)(JST) or equivalent

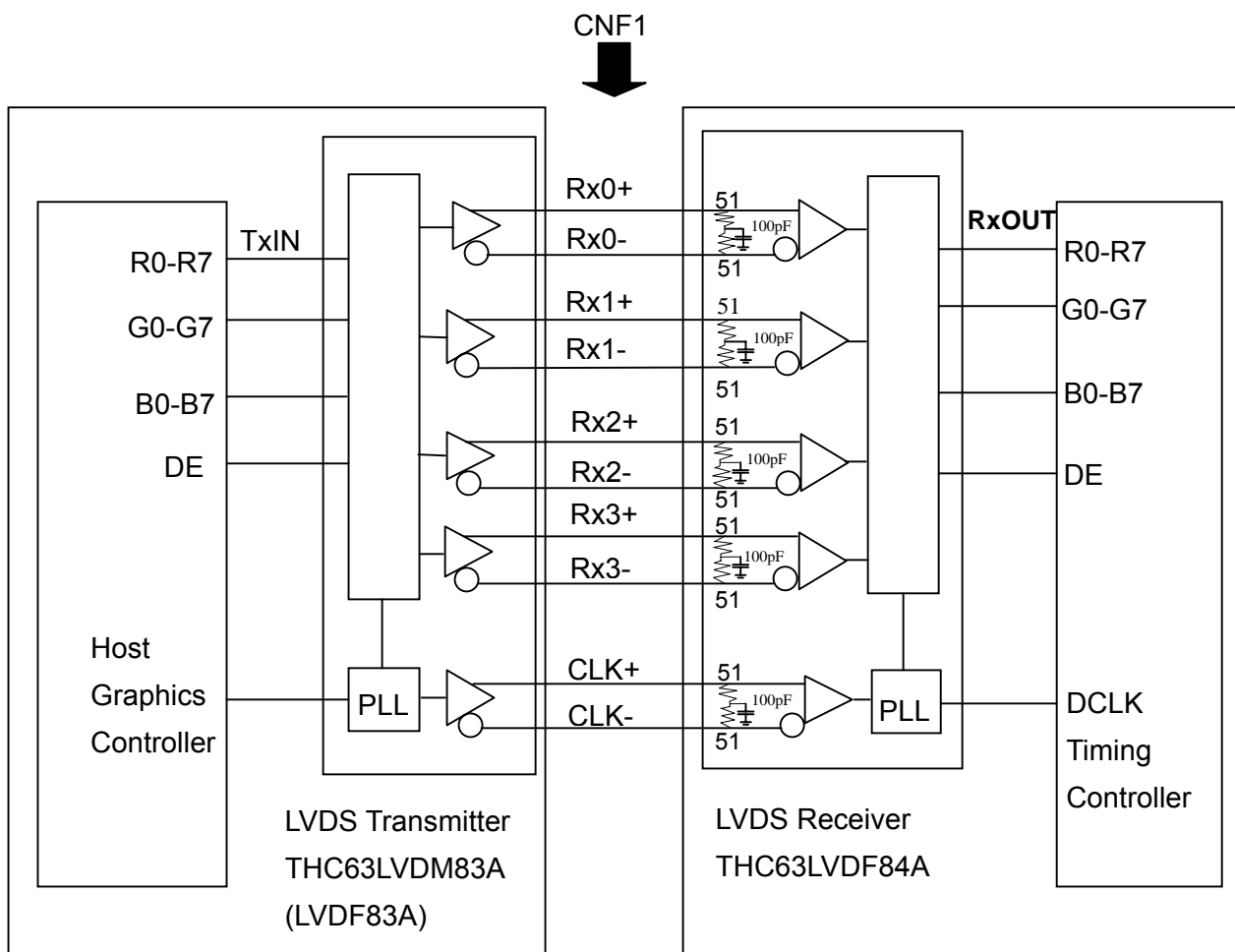
Pin	Name	Description
1	CCFL HOT	CCFL high voltage
2	CCFL HOT	CCFL high voltage

CN10(Header): S2B-ZR-SM3A-TF(D)(LF)(JST) or equivalent

Pin	Name	Description
1	CCFL COLD	CCFL low voltage
2	NC	-

Note (1) Floating of any control signal is not allowed.

5.4 BLOCK DIAGRAM OF INTERFACE



R0~R7 : Pixel R Data ,
 G0~G7 : Pixel G Data ,
 B0~B7 : Pixel B Data ,
 DE : Data enable signal

Note (1) The system must have the transmitter to drive the module.

Note (2) LVDS cable impedance shall be 50 ohms per signal line or about 100 ohms per twist-pair line when it is used differentially.

5.5 LVDS INTERFACE

	SIGNAL		TRANSMITTER THC63LVDM83A		INTERFACE CONNECTOR		RECEIVER THC63LVDF84A		TFT CONTROL INPUT			
	SELLVDS =L	SELLVDS =H	PIN	INPUT	Host	TFT-LCD	PIN	OUTPUT	SELLVDS =L	SELLVDS =H		
24 bit	R0	R2	51	TxIN0	TA OUT0+	Rx 0+	27	Rx OUT0	R0	R2		
	R1	R3	52	TxIN1			29	Rx OUT1	R1	R3		
	R2	R4	54	TxIN2			30	Rx OUT2	R2	R4		
	R3	R5	55	TxIN3			32	Rx OUT3	R3	R5		
	R4	R6	56	TxIN4			33	Rx OUT4	R4	R6		
	R5	R7	3	TxIN6			TA OUT0-	Rx 0-	35	Rx OUT6	R5	R7
	G0	G2	4	TxIN7			37	Rx OUT7	G0	G2		
	G1	G3	6	TxIN8	38	Rx OUT8	G1	G3				
	G2	G4	7	TxIN9	39	Rx OUT9	G2	G4				
	G3	G5	11	TxIN12	TA OUT1+	Rx 1+	43	Rx OUT12	G3	G5		
	G4	G6	12	TxIN13	45	Rx OUT13	G4	G6				
	G5	G7	14	TxIN14	46	Rx OUT14	G5	G7				
	B0	B2	15	TxIN15	TA OUT1-	Rx 1-	47	Rx OUT15	B0	B2		
	B1	B3	19	TxIN18	51	Rx OUT18	B1	B3				
	B2	B4	20	TxIN19	53	Rx OUT19	B2	B4				
	B3	B5	22	TxIN20	54	Rx OUT20	B3	B5				
	B4	B6	23	TxIN21	TA OUT2+	Rx 2+	55	Rx OUT21	B4	B6		
	B5	B7	24	TxIN22	1	Rx OUT22	B5	B7				
	DE	DE	30	TxIN26	6	Rx OUT26	DE	DE				
	R6	R0	50	TxIN27	TA OUT2-	Rx 2-	7	Rx OUT27	R6	R0		
	R7	R1	2	TxIN5	34	Rx OUT5	R7	R1				
	G6	G0	8	TxIN10	41	Rx OUT10	G6	G0				
	G7	G1	10	TxIN11	42	Rx OUT11	G7	G1				
	B6	B0	16	TxIN16	TA OUT3+	Rx 3+	49	Rx OUT16	B6	B0		
	B7	B1	18	TxIN17	50	Rx OUT17	B7	B1				
	RSVD 1	RSVD 1	25	TxIN23	2	Rx OUT23	NC	NC				
	RSVD 2	RSVD 2	27	TxIN24	TA OUT3-	Rx 3-	3	Rx OUT24	NC	NC		
	RSVD 3	RSVD 3	28	TxIN25	5	Rx OUT25	NC	NC				
	DCLK	31	TxCLK IN	TxCLK OUT+	RxCLK IN+	26	RxCLK OUT	DCLK				
				TxCLK OUT-	RxCLK IN-							

R0~R7: Pixel R Data (7; MSB, 0; LSB)

G0~G7: Pixel G Data (7; MSB, 0; LSB)

B0~B7: Pixel B Data (7; MSB, 0; LSB)

DE: Data enable signal

Notes(1) RSVD(reserved)pins on the transmitter shall be "H" or "L".

5.6 COLOR DATA INPUT ASSIGNMENT

The brightness of each primary color (red, green and blue) is based on the 8-bit gray scale data input for the color. The higher the binary input, the brighter the color. The table below provides the assignment of color versus data input.

Color		Data Signal																						
		Red								Green								Blue						
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Blue	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
	Magenta	1	1	1	1	1	1	1	1	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	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
Gray Scale Of Red	Red(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Red(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Red(2)	0	0	0	0	0	0	1	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	
	Red(254)	1	1	1	1	1	1	1	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	
Gray Scale Of Green	Green(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
	Green(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	
	Green(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	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	
Gray Scale Of Blue	Blue(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Blue(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
	Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	Blue(253)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	
	Blue(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	
	Blue(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	

Note (1) 0: Low Level Voltage, 1: High Level Voltage

6. INTERFACE TIMING

6.1 INPUT SIGNAL TIMING SPECIFICATIONS

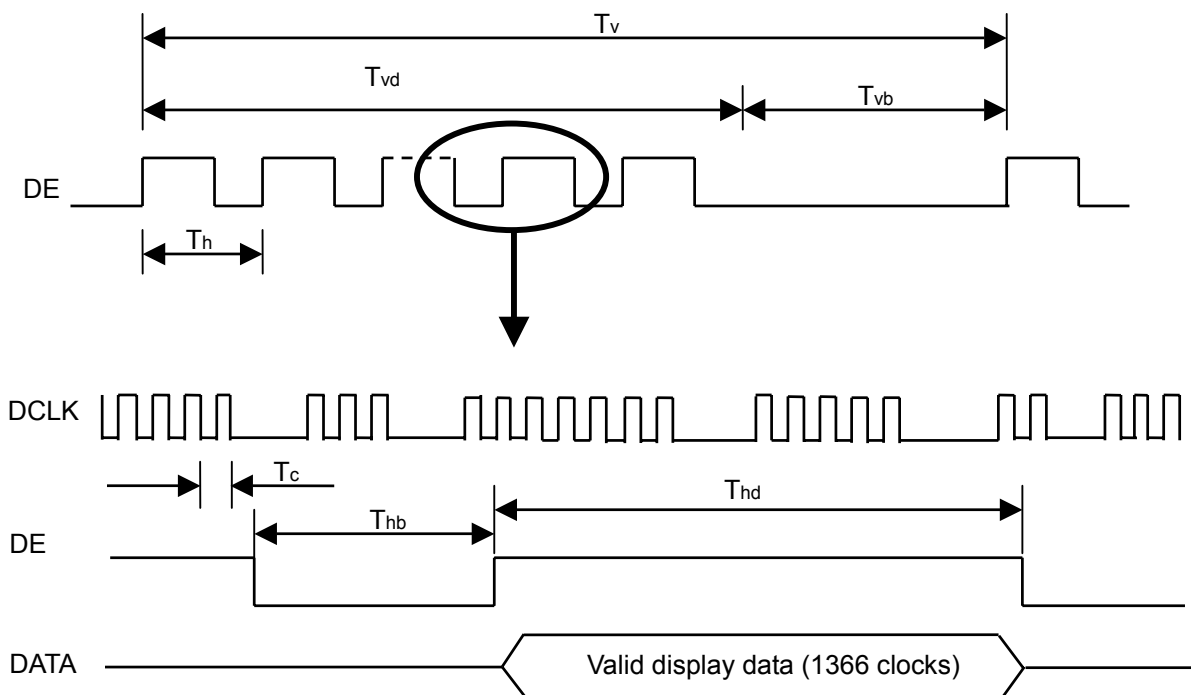
The input signal timing specifications are shown as the following table and timing diagram.

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
LVDS Receiver Clock	Frequency	1/Tc	60	86	88	MHz	
	Input cycle to cycle jitter	Trcl	-	-	200	ps	
LVDS Receiver Data	Setup Time	Tlvsu	600	-	-	ps	
	Hold Time	Tlvhd	600	-	-	ps	
Vertical Active Display Term	Frame Rate	Fr5	47	50	53	Hz	(2)
		Fr6	57	60	63	Hz	
	Total	Tv	770	795	888	Th	Tv=Tvd+Tvb
	Display	Tvd	768	768	768	Th	-
	Blank	Tvb	2	27	120	Th	-
Horizontal Active Display Term	Total	Th	1436	1798	1936	Tc	Th=Thd+Thb
	Display	Thd	1366	1366	1366	Tc	-
	Blank	Thb	70	432	570	Tc	-

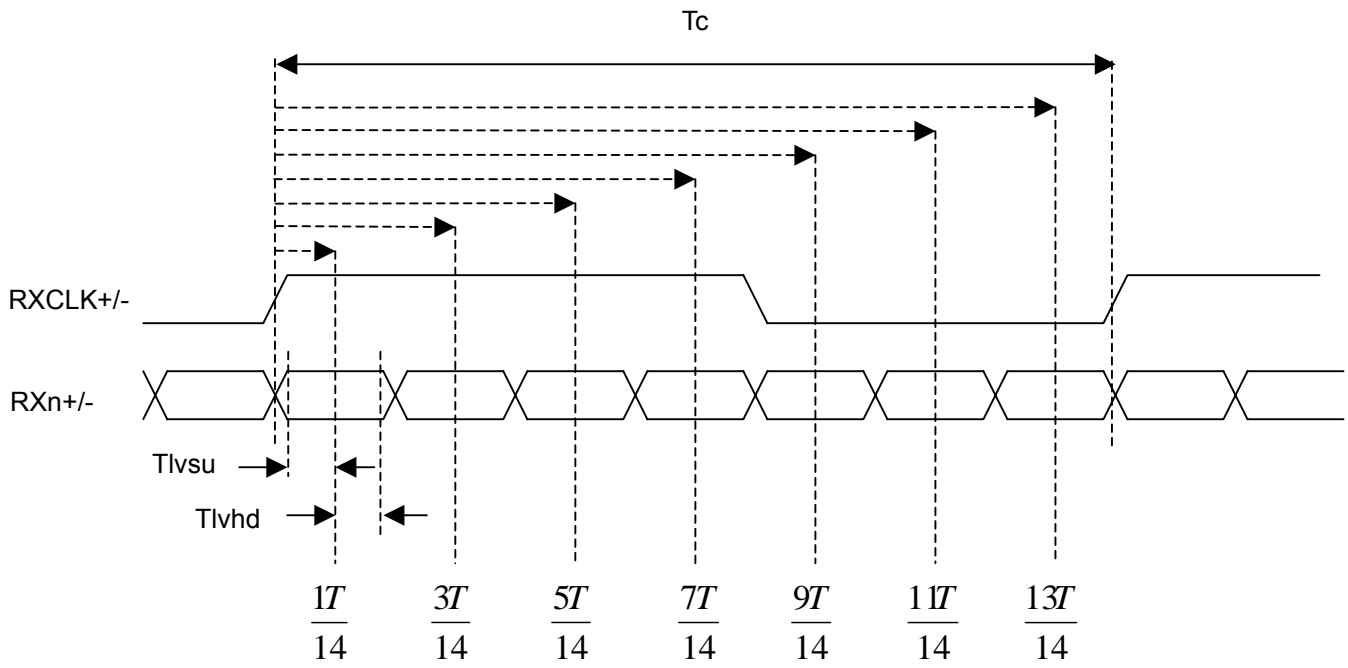
Note (1) Since this module is operated in DE only mode, Hsync and Vsync input signals should be set to low logic level. Otherwise, this module would operate abnormally.

(2) Please refer to 5.1 for detail information.

INPUT SIGNAL TIMING DIAGRAM

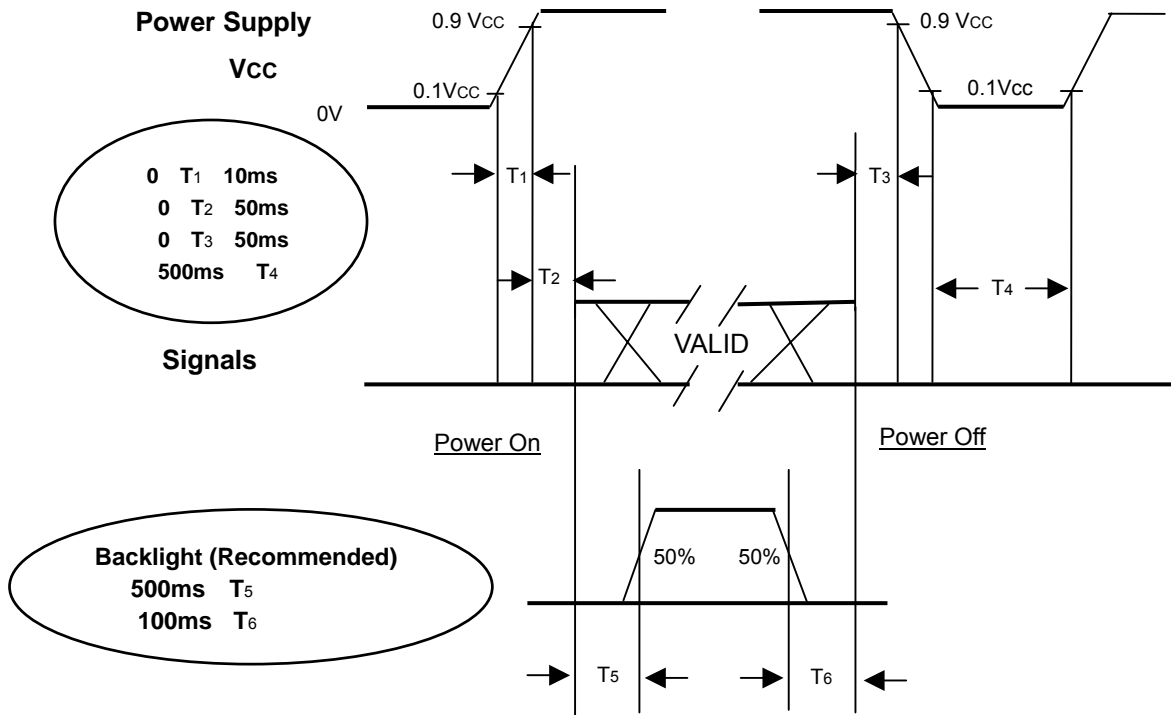


LVDS RECEIVER INTERFACE TIMING DIAGRAM



6.2 POWER ON/OFF SEQUENCE

To prevent a latch-up or DC operation of LCD module, the power on/off sequence should be as the diagram below.



Power ON/OFF Sequence

- Note (1) The supply voltage of the external system for the module input should follow the definition of Vcc.
- Note (2) Apply the lamp voltage within the LCD operation range. When the backlight turns on before the LCD operation or the LCD turns off before the backlight turns off, the display may momentarily become abnormal screen.
- Note (3) In case of Vcc is in off level, please keep the level of input signals on the low or high impedance.
- Note (4) T4 should be measured after the module has been fully discharged between power off and on period.
- Note (5) Interface signal shall not be kept at high impedance when the power is on.

7. OPTICAL CHARACTERISTICS

7.1 TEST CONDITIONS

Item	Symbol	Value	Unit
Ambient Temperature	Ta	25±2	°C
Ambient Humidity	Ha	50±10	%RH
Supply Voltage	V _{CC}	5.0	V
Input Signal	According to typical value in "3. ELECTRICAL CHARACTERISTICS"		
Lamp Current	I _L	4.7 ± 0.5	mA
Oscillating Frequency (Inverter)	F _w	56 ± 3	KHz

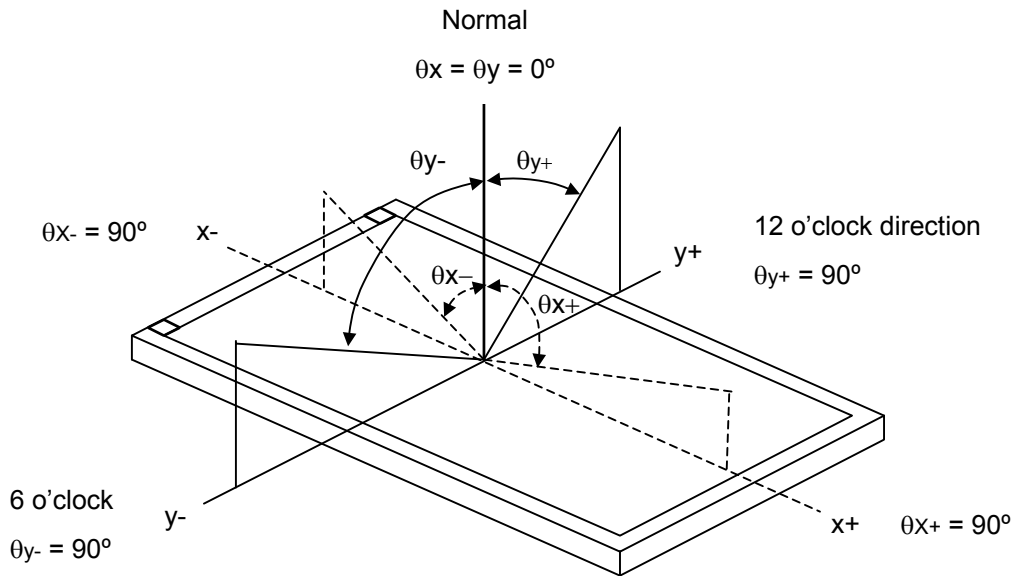
7.2 OPTICAL SPECIFICATIONS

The relative measurement methods of optical characteristics are shown in 7.2. The following items should be measured under the test conditions described in 7.1 and stable environment shown in Note (6).

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	Viewing Normal Angle $\theta_x=0^\circ, \theta_y=0^\circ$		(1000)		-	(2)
Response Time		Gray to gray average			(8)		ms	(3)
Center Luminance of White		L _c			(550)		cd/m ²	(4)
White Variation		δW				(1.3)	-	(7)
Cross Talk		CT				(4)	%	(5)
Color Chromaticity	Red	R _x			(0.652)		-	(6)
		R _y			(0.331)		-	
	Green	G _x			(0.275)		-	
		G _y			(0.597)		-	
	Blue	B _x			(0.143)		-	
		B _y		(0.063)		-		
	White	W _x		(0.285)		-		
	W _y		(0.293)		Target			
Color Gamut		CG		(75)		%	NTSC	
Viewing Angle	Horizontal	θ _{x+}	CR≥20		(88)		Deg.	(1)
		θ _{x-}			(88)			
	Vertical	θ _{y+}			(88)			
		θ _{y-}			(88)			

Note (1) Definition of Viewing Angle (θ_x, θ_y):

Viewing angles are measured by EZ-Contrast 160R (Eldim)



Note (2) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{255} / L_0$$

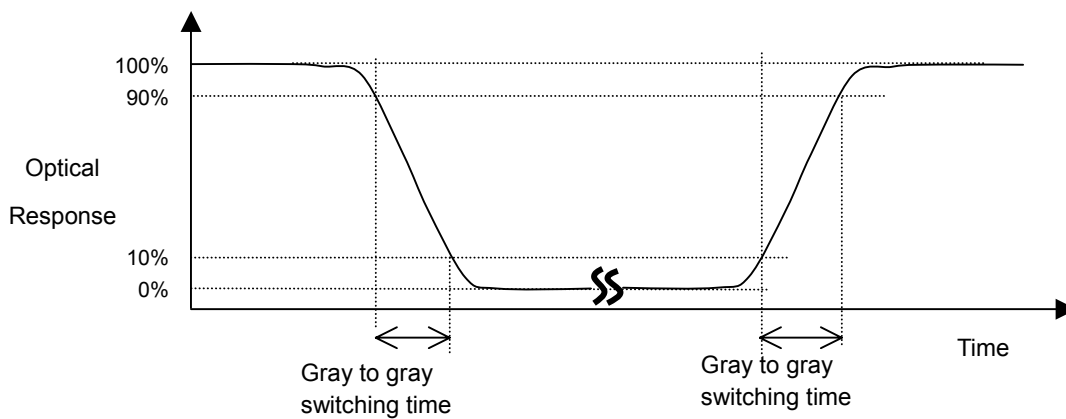
L255: Luminance of gray level 255

L 0: Luminance of gray level 0

$$\text{CR} = \text{CR} (5)$$

CR (X) is corresponding to the Contrast Ratio of the point X at the figure in Note (7).

Note (3) Definition of Gray to Gray Switching Time :



The driving signal means the signal of gray level 0, 63, 127, 191, 255.

Gray to gray average time means the average switching time of gray level 0 ,63,127,191,255 to each other .

Note (4) Definition of Luminance of White (L_C, L_{AVE}):

Measure the luminance of gray level 255 at center point and 5 points

$$L_C = L(5)$$

$$L_{AVE} = [L(1) + L(2) + L(3) + L(4) + L(5)] / 5$$

$L(x)$ is corresponding to the luminance of the point X at the figure in Note (7).

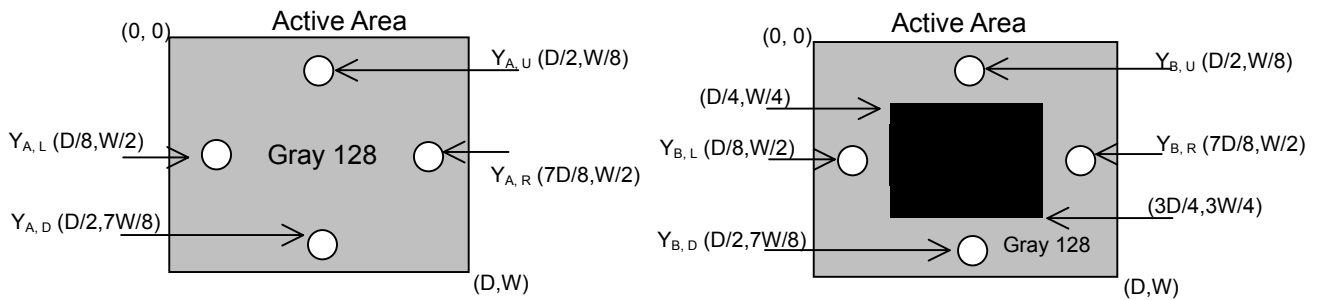
Note (5) Definition of Cross Talk (CT):

$$CT = |Y_B - Y_A| / Y_A \times 100 (\%)$$

Where:

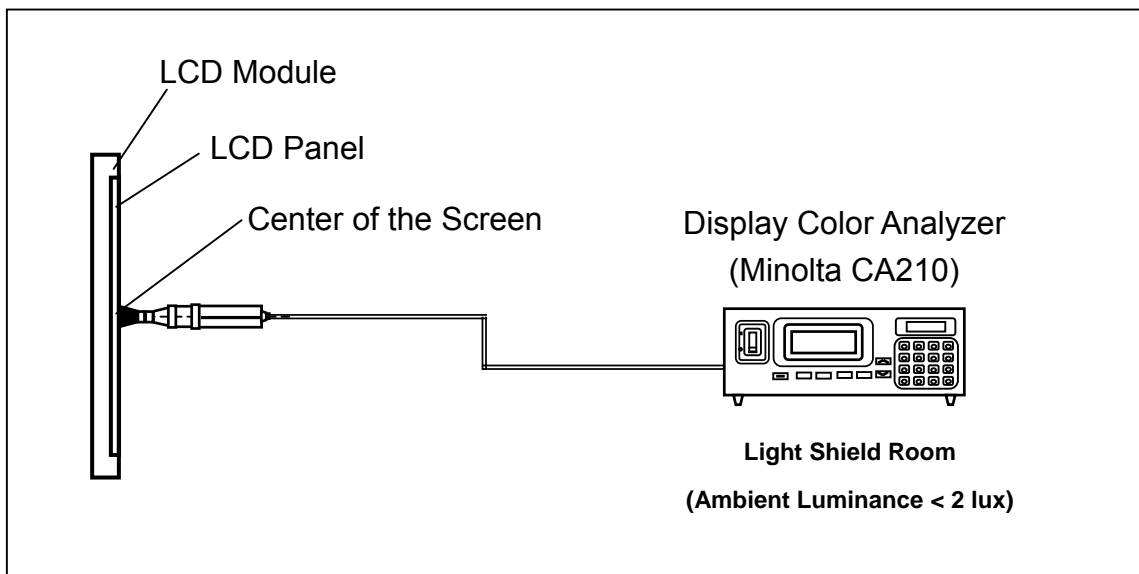
Y_A = Luminance of measured location without gray level 0 pattern (cd/m^2)

Y_B = Luminance of measured location with gray level 0 pattern (cd/m^2)



Note (6) Measurement Setup:

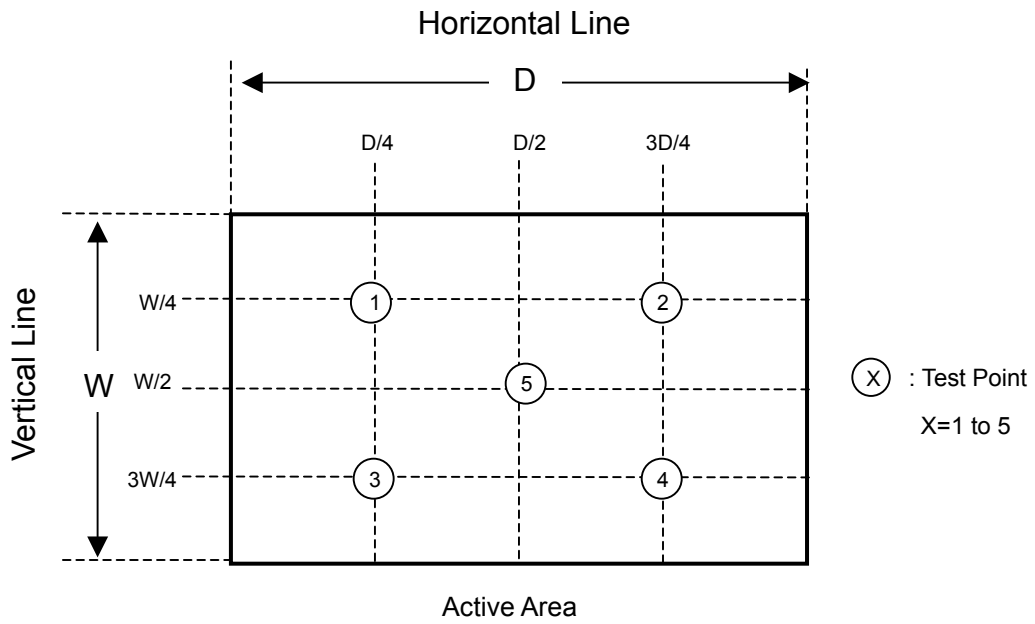
The LCD module should be stabilized at given temperature for 1 hour to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 1 hour in a windless room.



Note (7) Definition of White Variation (δW):

Measure the luminance of gray level 255 at 5 points

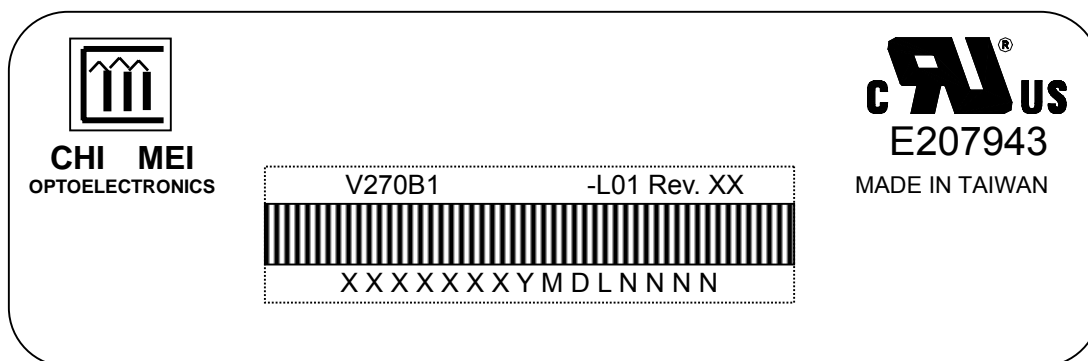
$$\delta W = \text{Maximum [L (1), L (2), L (3), L (4), L (5)]} / \text{Minimum [L (1), L (2), L (3), L (4), L (5)]}$$



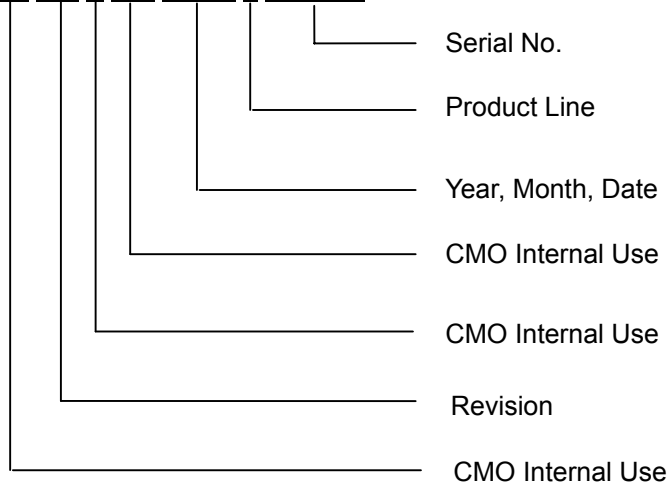
8. DEFINITION OF LABELS

8.1 CMO MODULE LABEL

The barcode nameplate is pasted on each module as illustration, and its definitions are as following explanation.



- (a) Model Name: V270B1-L01
- (b) Revision: Rev. XX, for example: A0, A1... B1, B2... or C1, C2...etc.
- (c) Serial ID: XXXXXXXXYMDLNNNN



Serial ID includes the information as below:

- (a) Manufactured Date: Year: 1~9, for 2001~2009
 Month: 1~9, A~C, for Jan. ~ Dec.
 Day: 1~9, A~Y, for 1st to 31st, exclude I ,O, and U.
- (b) Revision Code: Cover all the change
- (c) Serial No.: Manufacturing sequence of product
- (d) Product Line: 1 -> Line1, 2 -> Line 2, ...etc.

9. PACKAGING

9.1 PACKING SPECIFICATIONS

- (1) 4 LCD TV modules / 1 Box
- (2) Box dimensions : 742(L) X 327 (W) X 510 (H)
- (3) Weight : approximately 19Kg (4 modules per box)

9.2 PACKING METHOD

Figures 9-1 and 9-2 are the packing method

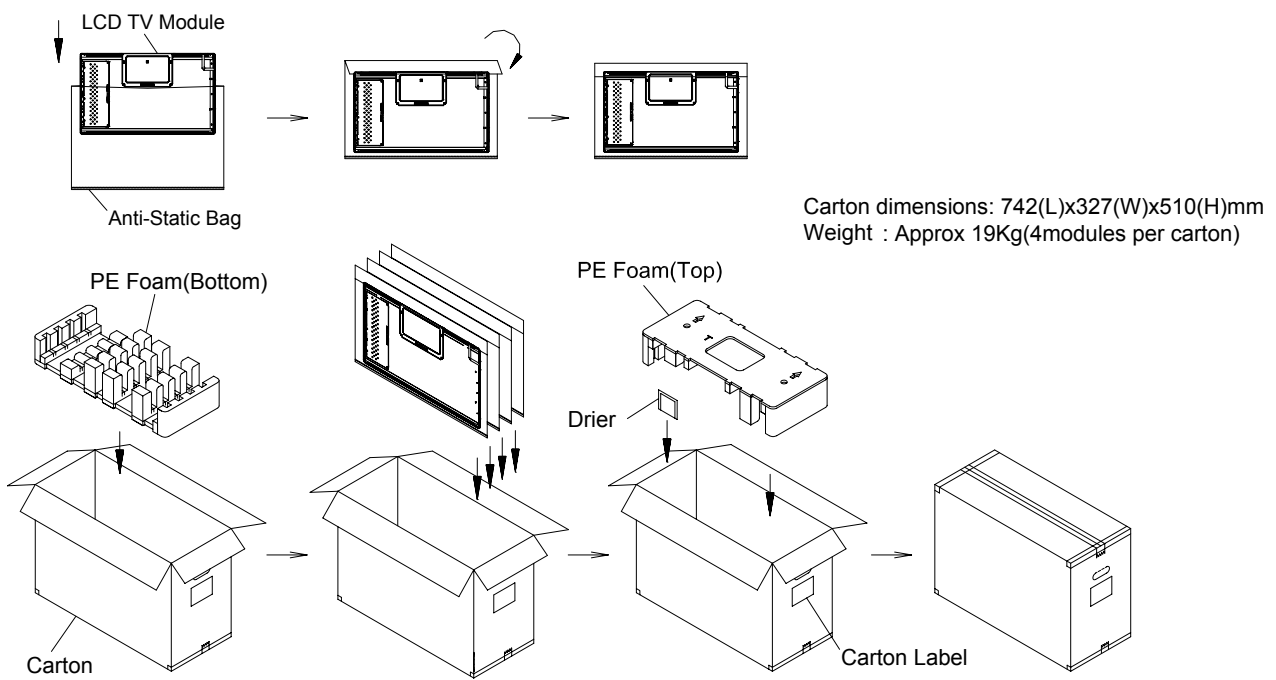


Figure.9-1 packing method

Corner Protector:L1020*50mm*50mm
Pallet:L1100*W1100*H135mm
Corrugated Fiberboard:L1100*W1100mm
Pallet Stack:L1100*W1100*H1160mm
Gross:168kg

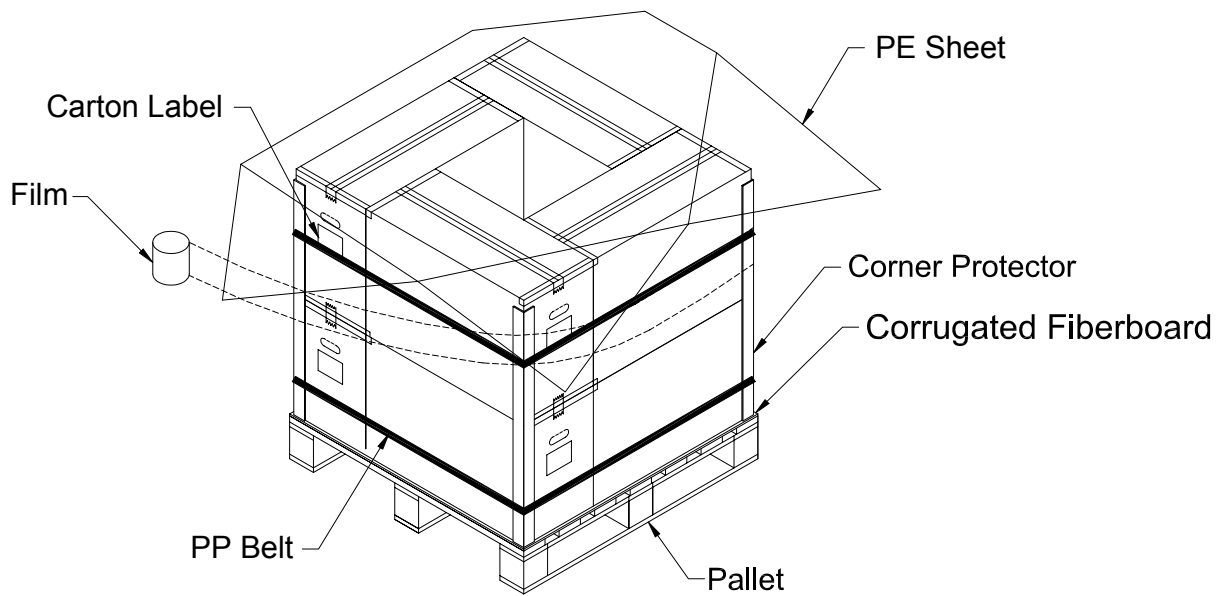


Figure. 9-2 packing method

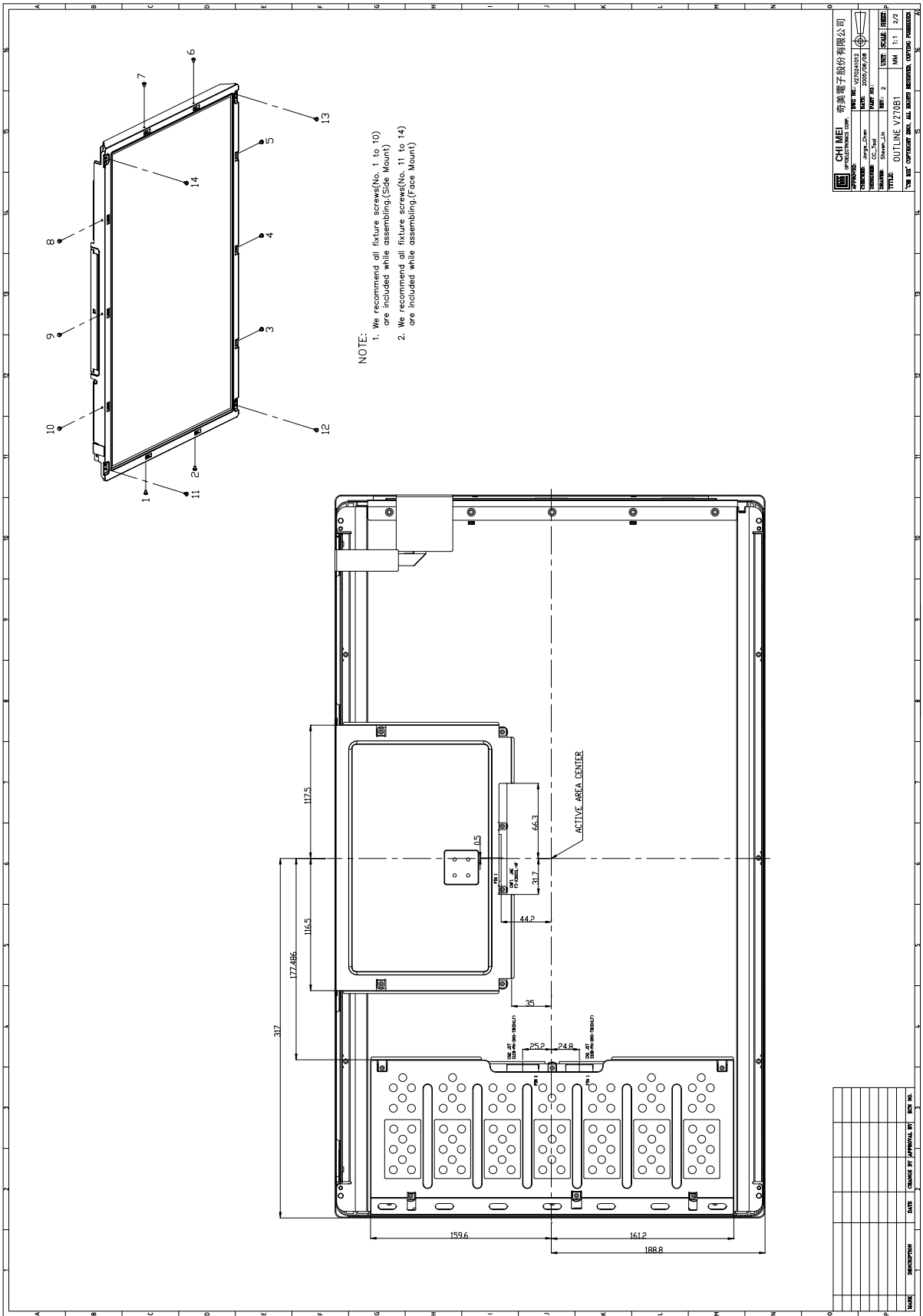
10. PRECAUTIONS

10.1 ASSEMBLY AND HANDLING PRECAUTIONS

- (1) Do not apply rough force such as bending or twisting to the module during assembly.
- (2) It is recommended to assemble or to install a module into the user's system in clean working areas.
The dust and oil may cause electrical short or worsen the polarizer.
- (3) Do not apply pressure or impulse to the module to prevent the damage of LCD panel and backlight.
- (4) Always follow the correct power-on sequence when the LCD module is turned on. This can prevent the damage and latch-up of the CMOS LSI chips.
- (5) Do not plug in or pull out the I/F connector while the module is in operation.
- (6) Do not disassemble the module.
- (7) Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.
- (8) Moisture can easily penetrate into LCD module and may cause the damage during operation.
- (9) High temperature or humidity may deteriorate the performance of LCD module. Please store LCD modules in the specified storage conditions.
- (10) When ambient temperature is lower than 10°C, the display quality might be reduced. For example, the response time will become slow, and the starting voltage of CCFL will be higher than that of room temperature.

10.2 SAFETY PRECAUTIONS

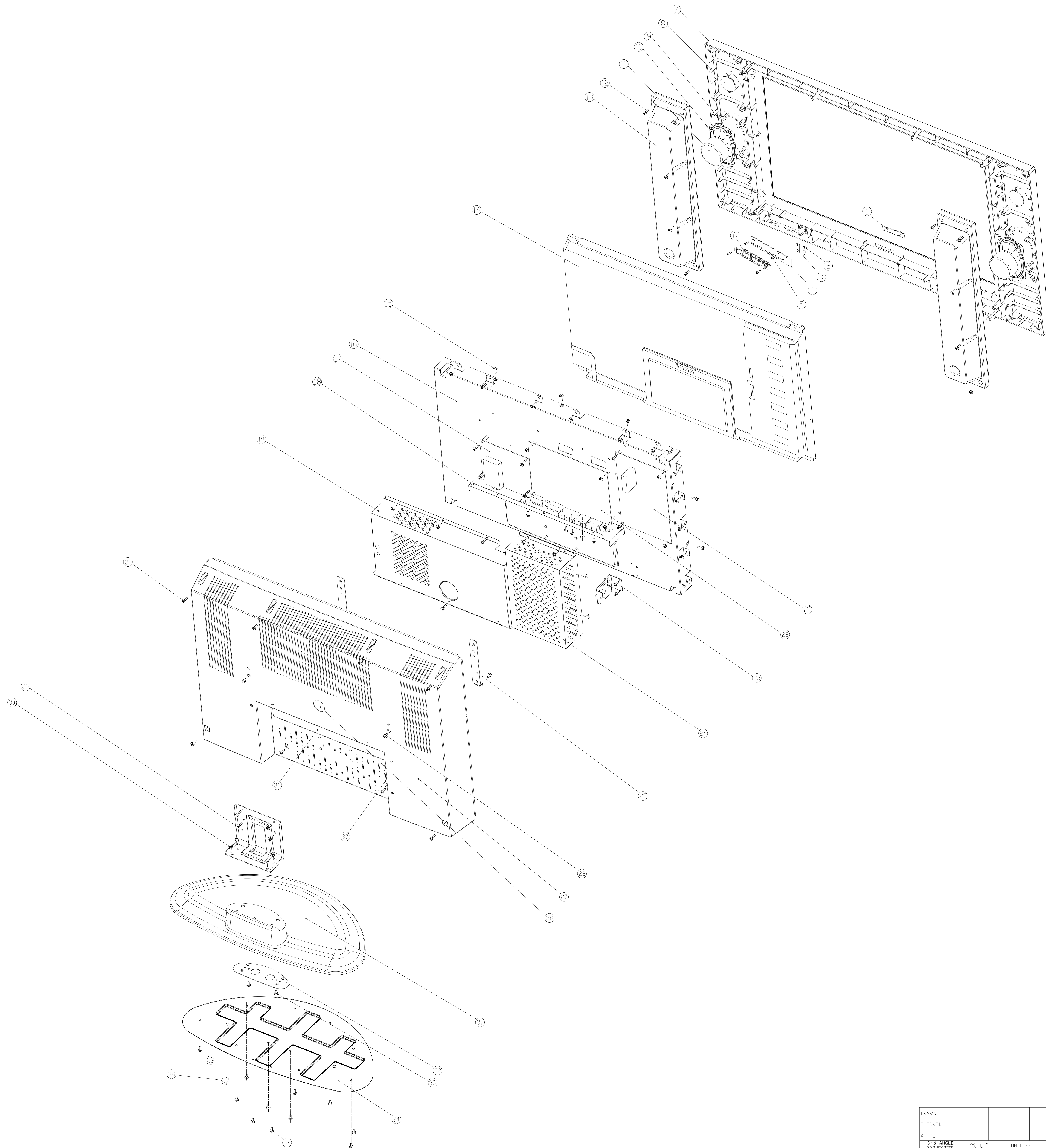
- (1) The startup voltage of a backlight is over 1000 Volts. It may cause an electrical shock while assembling with the inverter. Do not disassemble the module or insert anything into the backlight unit.
- (2) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.
- (3) After the module's end of life, it is not harmful in case of normal operation and storage.



NOTE:
 1. We recommend all fixture screws(No. 1 to 10) are included while assembling.(Side Mount)
 2. We recommend all fixture screws(No. 11 to 14) are included while assembling.(Face Mount)

CHI MEI 奇美電子股份有限公司	
CHIEF ENGINEER	DATE: 2007/09/26
DESIGNER: JONG-CHUN	DRAWING NO: 10352423
APPROVER: CC-Fai	UNIT: MM
DATE: 2007/09/26	SCALE: 1:1
PROJECT: OUTLINE V27091	DATE: 2007/09/26
YOU ARE REQUESTED TO SIGN ALL SHEETS BEFORE LEAVING THE OFFICE	

NO.	REVISION	DATE	REVISION BY	APPROVAL BY



ITEM	PART NO	DESCRIPTION	QTY.	TYPE	REMARK
38	370-420101-01	RUBBER FOOT 20X20X7.0MM	4	PART	
37	308-127A01-01H	POWER PLATE	1	PART	
36	389-26LA01-04H	FUNCTION PVC PLATE	1	PART	
35	610-300210-10	FS R803X10	2	PART	
34	449-27LA01-01	STAND BASE PLATE	1	PART	
33	614-300108-10	S-TAP SCREW BID 3.0X8	4	PART	
32	423-27LA08-01	MIDDLE SUPPORT PLATE	1	PART	
31	230-26LA11-01RV	STAND COVER	1	PART	
30	604-508022-00	MACH. SCREW BINDING M5X22MM	8	PART	
29	423-27LA17-01	STAND SUPPORT PLATE	1	PART	
28	389-27LA01-01H	PVC SHEET	1	PART	
27	200-26LA11-01AV	BACK CABINET	1	PART	
26	601-305010-00	MACHSCREW CTS 3X8	2	PART	
25	423-27LA09-01	WALL BRACKET	2	PART	
24	481-27LA12-01	SHIELD COVER FOR POWER PCB	1	PART	
23	426-27LA11-01	BRACKET FOR POWER JACK	1	PART	
22	E7802-004006	PCB ASSY MAIN BOARD	1	ASSY	
21	E7802-004002	PCB ASSY POWER200 BOARD	1	ASSY	
20	614-400420-10	S-TAP SCREW BID 4X20	8	PART	
19	481-27LA01-01	SHIELD COVER FOR MAIN PCB	1	PART	
18	436-27LA01-01	BACK TERMINAL SHEET	1	PART	
17	E7802-004003	PCB ASSY TUNER AMP BOARD	1	ASSY	
16	428-27LA01-01	MAIN METAL PLATE FOR PANEL	1	PART	
15	608-305004-10	MACH SCREW PAN-WASHER M3X4	10	PART	
14	E3471-000046	CMU(136X768)	1	PART	
13	806-26LA01-01PV	SPEAKER BACK CABINET	2	PART	
12	614-400412-10	S-TAP SCREW BID 4X12	40	PART	
11	E4801-123001	SPEAKER 8 OHM 10W D2.5X4"	2	PART	
10	379-972502-01H	SPECIAL RUBBER PARTS	8	PART	
9	379-972501-01Y	SPECIAL RUBBER PARTS	8	PART	
8	389-26LA02-01H	OTHER PVC PLATE	2	PART	
7	200-26LA01-01AV	CABINET FRONT AKAI	1	PART	
6	277-26LA01-01S	FUNCTION KNOB	1	PART	
5	610-300210-10	STP SCREW 3X10	11	PART	
4	1771-126A01-01	KEY PCB ASSY	1	ASSY	
3	269-290804-01L	SENSOR LENS	1	PART	
2	269-290803-01S	POWER LENS	1	PART	
1	486-M32111-01	NAME PLATE M AKAI	1	PART	

DRAWN		TOLERANCE LIMITS	[TUM] ELECTRONIC R & D CENTRE	TITLE	EXPLODE VIEW
CHECKED		0.01-0.04		MODEL NO.	LC171715
APPRD.		0.04-0.09		MATL.	
		0.09-0.25		FINISH	
		0.25MM+ABOVE		SCALE 1:1	QTY.
					SHEET 0F

SPARE PART LIST

LC27HAB CUSXM1-A01

AKAI

MICO

USA

LCT2715(FULL PIP)

Item	Component	Description/Country Origin	Unit	Quantity
一, ELECT PART				
1	E1301-041090	CAPACITOR EC V A SAIL 100M 16DC T05	PCS	1
2	E1501-001001	RESISTOR CBF H 1/6W 100J T52	PCS	1
3	E1501-001004	RESISTOR CBF H 1/6W 103J T52	PCS	7
4	E2509-094001	DIODE LED A D3.0 GR/RD (LT036	PCS	1
5	E2701-023002	DETECTOR IR AT138A	PCS	1
6	E3101-171001	PLUG V HX2007(PH)-12A P2.0 12P WHT	PCS	1
7	E3204-023001	SOCKET AC HF-301 FOR 26LA	PCS	1
8	E3403-001001	TUBE SHRINKABLE D30.0 BLK 600V	M	0.04
9	E3403-004001	TUBE SUMITUBE D5.0 BLK 600V	M	0.105
10	E3403-005001	TUBE SHRINKABLE D20.0 BLK	M	0.03
11	E3421-229007	WIRE ASSY 1H3.96-2KN3 0N2 L400 CJ	PCS	1
12	E3421-925029	WIRE ASSY PH2.0-12Y/12Y L=550MM KEY	PCS	1
13	E3421-925030	WIRE ASSY PH2.0-8Y/8Y 5V/12V L=220	PCS	1
14	E3421-925031	WIRE ASSY PH2.0-5Y/5Y L=250MM 5VSB	PCS	1
15	E3421-925032	WIRE ASSY PH2.0-4Y/4Y L=450MM AMP2	PCS	1
16	E3421-925033	WIRE ASSY PH2.0-12Y/12Y L=250MM IN	PCS	1
17	E3421-925034	WIRE ASSY PH2.0-10Y/10Y L=250MM INV	PCS	1
18	E3421-925035	WIRE ASSY PH2.0-4Y/4Y L=100MM AUDI	PCS	1
19	E3421-925036	WIRE ASSY PH2.0-12Y/12Y L=280MM TU	PCS	1
20	E3421-925037	WIRE ASSY TTJC3-2Y L=450MM SPK-R	PCS	1
21	E3421-925038	WIRE ASSY TJC3-2Y L=850MM SPK-L	PCS	1
22	E3421-925039	WIRE ASSY LVDS L=300MM 30P/30P	PCS	1
23	E3421-925040	WIRE ASSY TJC3-6Y/6Y L=350MM POWER	PCS	1
24	E3421-941001	WIRE ASSY 1KN5-2TKN0 45 L110 BJ	PCS	1
25	E3451-000406	WIRE WD 1672#20 RED L=250MM	PCS	1
26	E3451-000407	WIRE WD 1672#20 BLACK L=250MM	PCS	1
27	E3731-052020	PCB KEY V0 124.5X20.5MM W 1.6MM 2 LA	PCS	1
28	E4101-027001	SWITCH POW MR-22-N2BB-F2 ROCKET	PCS	1
29	E4102-044001	SWITCH TACT H 6*6*5W	PCS	7
30	E4801-123001	SPEAKER 8 OHM 10W D2.5X4" YDT711 (SG	PCS	2
31	E6203-024001	DISPLAY LCD 27" V270W1-L03	PCS	1
32	E7802-004001	PCB ASSY MAIN BOARD FOR 27" LCD MICO	SET	1
33	E7802-004002	PCB ASSY POWER200 BOARD FOR 27" LCD	SET	1
34	E7802-004003	PCB ASSY TUNER AMP BOARD FOR 27" LCD	SET	1
二, MECH PART				
1	200-26LA21-04AV	CABINET FRONT AKAI BLK LCT2715 (MICO	PCS	1
2	202-26LA11-01AV	BACK CABINET 26LA A (470+70%)	PCS	1
3	206-26LA01-01PV	THE BACK COVER SPEAKER 26LA P (470	PCS	2
4	230-26LA11-02RV	STAND COVER 26LA BLK LCT2715 R	PCS	1
5	269-290803-01S	POWER LENS (D) 2908	PCS	1
6	269-290804-01L	SENSOR LENS (D) 2908	PCS	1
7	277-26LA01-01S	FUNCTION KNOB 26LA	PCS	1
8	361-101261-01	CABLE TIE	PCS	5

9	370-42D101-01	RUBBER FOOT 20X20X7.0MM 42D1	PCS	4
10	379-972501-01Y	SPECIAL RUBBER PARTS SPK 9725	PCS	8
11	379-972502-01Y	SPECIAL RUBBER PARTS 9725	PCS	8
12	388-L27AB01-01H	POWER PLATE AKAI LC26HAB H	PCS	1
13	389-26LA01-07H	PVC PLATE AKAI FOR TERMINAL SHEET LC	PCS	1
14	389-26LA02-01H	OTHER PVC PLATE 26LA	PCS	2
15	389-27LA01-01H	PVC SHEET FOR BACK CABINET GATE	PCS	1
16	423-27LA07-01	STAND SUPPORT PLATE SPCC 27LA	PCS	1
17	423-27LA08-01	METAL PLATE FOR STAND SUPPORT PLATE	PCS	1
18	423-27LA09-01	METAL PLATE FOR WALL BRACKET 27LA	PCS	2
19	426-27LA11-01	SUPPORT BRACKET FOR POWER JACK 27LA	PCS	1
20	428-27LA11-01	MAIN METAL PLATE FOR PANEL 27LA	PCS	1
21	436-27LA01-01	BACK TERMINAL SHEET 27LA	PCS	1
22	449-27LA01-01	METAL PLATE FOR STAND BASE	PCS	1
23	481-27LA01-01	SHIELD COVER FOR MAIN PCB 27LA TINPL	PCS	1
24	481-27LA02-01	SHIELD COVER FOR POWER PCB 27LA TINP	PCS	1
25	486-M321111-01	NAME PLATE M AKAI	PCS	1
26	521-100105-01	FELT PAPER 100X10X0.5	PCS	10
27	521-150105-01	FELT PAPER 150X10X0.5	PCS	25
28	563-119-	SERIAL NO. LABEL	PCS	1
29	579-LC2701-03	UPC LABEL (50X23)MM OF UNIT LCT2715(PCS	1
30	579-LC2702-03	UPC LABEL OF G/B LCT2715 MICO)	PCS	2
31	580-L26ABHM-TU01	L I B E FOR AKAI LC26HAB CMO MICO USA	PCS	1
32	590-LC2701-03	INSERTION CARD AKAI LC26HAB	PCS	1
33	590-LC2701-04	WARRANTY CARD AKAI LCT2715 216X279MM	PCS	1
34	601-305008-00	MACH.SCREW CTS 3X8 BZN +	PCS	3
35	601-305010-00	MACH.SCREW CTS 3X10 BZN +	PCS	5
36	602-305004-10	MACH. SCREW PAN-WASHER M3X4 NIP +H	PCS	30
37	602-305008-10	MACH.SCREW WHR 3X8 NIP +	PCS	12
38	604-305022-00	MACH. SCREW BINDING M3X22MM B ZNP +H	PCS	2
39	604-508022-00	MACH. SCREW BINDING M5X22MM B ZNP +H	PCS	8
1	610-300210-10	TS RBD3X10 A NIP +H	PCS	11
2	614-300108-10	S-TAP SCREW BID 3.0X8	PCS	4
3	614-400412-10	S-TAP.SCREW BID 4X12 D NIP +	PCS	40
4	614-400420-10	S-TAP.SCREW BID 4X20 T NIP +	PCS	8
5	615-400414-10	S-TAP.SCREW BWH 4X14 T NIP +	PCS	8
6	802-005005-20	TAPE 2S T4000 5X50M	RLS	0.0198

三, PACKING

1	300-27AB01-02C	POLYFOAM TOP 27AB	PCS	1
2	300-27AB02-02C	POLYFOAM BOTTOM 27AB	PCS	1
3	310-111404-07V	POLYBAG 11"X14"X0.04	PCS	1
4	310-453510-07V	BAG LAMIFILM	PCS	1
5	510-27LA02-03K	GIFT BOX AKAI LCT2715 (MICO) K	PCS	1
7	E3404-157001	AC CORD UL 1.88M MET-4D7+SJT 16AWG/	PCS	1
8	E7301-010002	BATTERY AAA R03P1.5V <2>	PCS	2
9	E7501-051004	REMOTE CRTL FOR 27" USA LCT2716	SET	1

If you forget your V-Chip Password

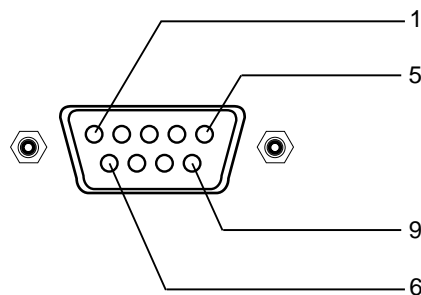
- Omnipotence V-Chip Password: **8205**.
- Press **MENU** button.
- Press **LEFT RIGHT** buttons to highlight "MISC" Menu.
- Press **Up, Down** buttons to highlight "ParentalD".
- Press **ENTER** button to pop up "Input your Password Please".
- Use the **Number buttons** (0~9) to enter an omnipotence Password.
- Press **ENTER** button to confirm and your can select "CHANGE PASSWORD".
- Suggest: Change to your familiar Password again.

Software upgrade

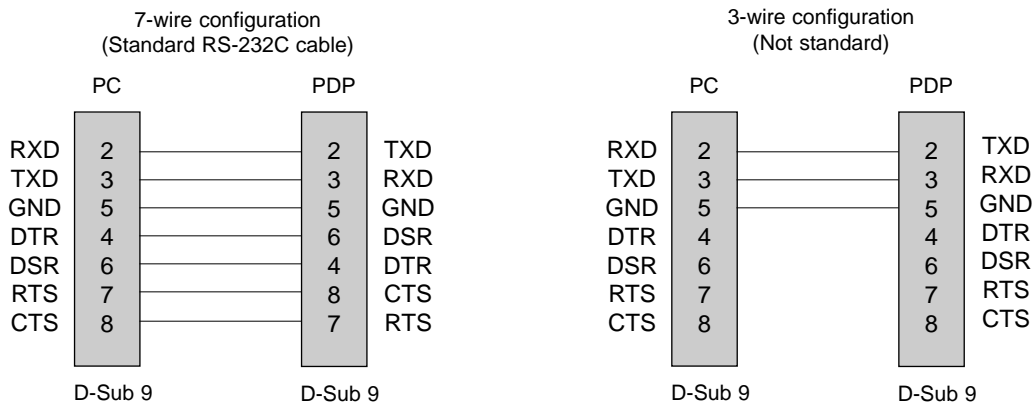
- Connect the RS-232C input jack to an external control device (such as a computer) and software upgrade.

Type of connector; D-Sub 9-pin male

No.	Pin name
1	No connection
2	RXD (Receive data)
3	TXD (Transmit data)
4	DTR (DTE side ready)
5	GND
6	DSR (DCE side ready)
7	RTS (Ready to send)
8	CTS (Clear to send)
9	No Connection



RS-232C configurations



Software upgrade Process

- Power Switch OFF.
- Connect the serial port of the control device to the RS-232 jack on the LCD-TV back panel.
RS-232C connection cables are not supplied with the LCD-TV.
- Power Switch ON. The power indicator on the front of the panel should now display red, means that the LCD-TV is in standby mode.
- Copy the software (MTKTOOL) to the computer.
- Open the software (MTKTOOL.EXE)
- Select MTK 8205 and Point "browse" on the interface of the MTKTOOL.exe.
- Select the file which will be update.
- Point "update" on the interface of the MTKTOOL.exe.
- Waiting for the upgrader programing, when it is finished, the bar will display 100%.
- After the upgrader is finished, shut down the power switch, take out the RS-232C connection after the power indicator is extinguished.

Note: After upgrading, the first time of power on will be some long.