

Technical Reference Specification

**MULTI INTERFACE CONTROLLER
FOR TFT LCD**

**Model: CC360
REV. 03**

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1. FEATURES

- . State of the art high performance picture and Video quality design
- . Analog RGB, DVI, S-VIDEO and COMPOSITE Video Support.
- . Full CRT multi-sync monitor compatibility
- . Multi-sync capability up to WUXGA resolution @ 60Hz compatible standard DOS, VGA, SVGA, XGA, SXGA, UXGA and WUXGA VESA timing
- . Expand DOS, VGA, SVGA, XGA, SXGA and UXGA to full screen display
- . True color(16.7M) data processing and display driving
- . Single control operated On-Screen-Display (hereafter "OSD") user interface
- . Full control of all relevant display and interface parameters via OSD
- . Multi language support
- . PIP function support. (POP optional)
- . VESA DDC 1/2B compliant
- . Compatible with VESA DPMS power saving modes
- . Low power consumption: VESA DPMS
- . Small form factor: 195 x 120 mm
- . Operating temperature: 0 to 50°C
- . Operating AUDIO Board Interface control(Using Internal Board, option)

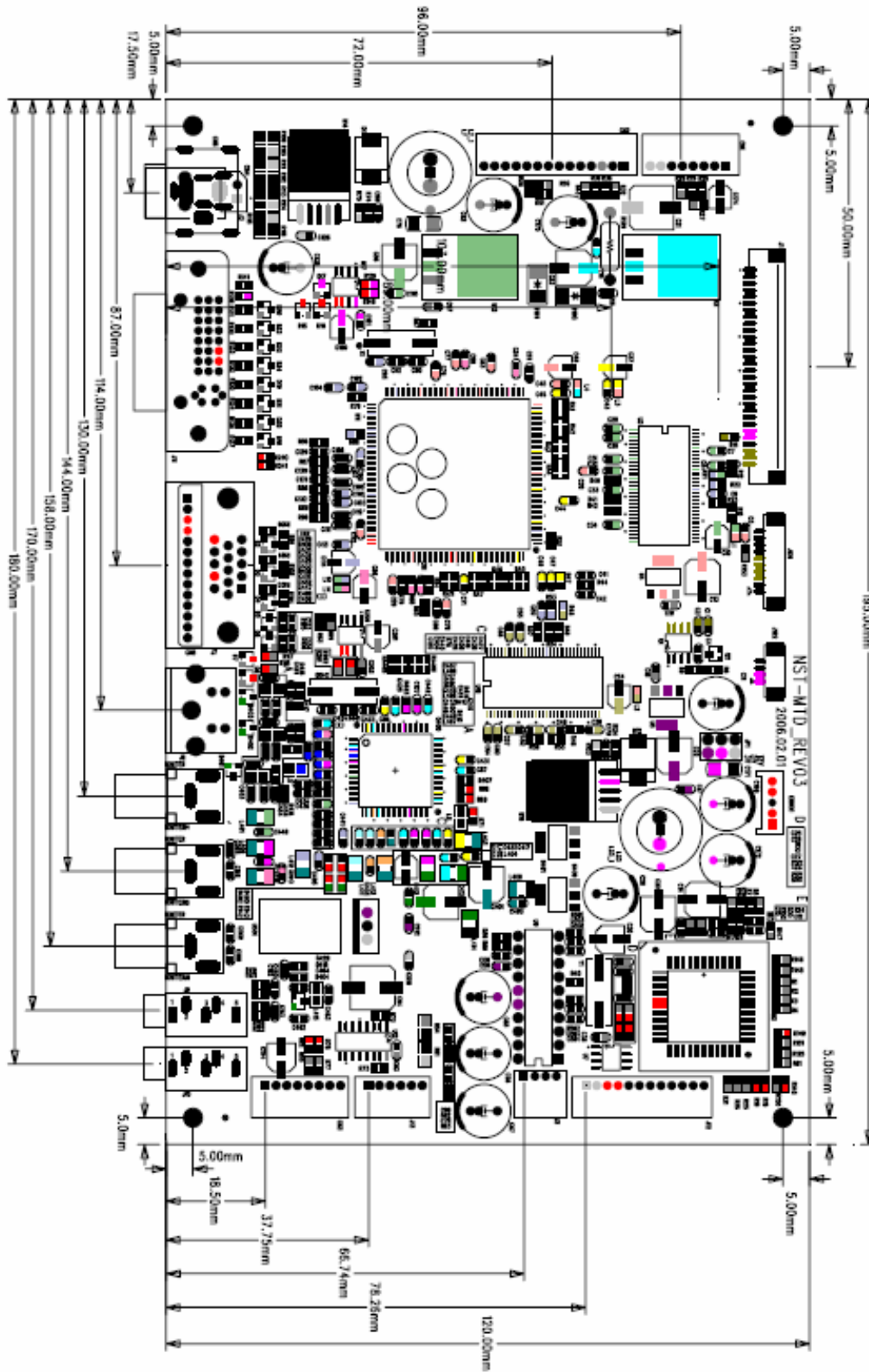
2. GENERAL DESCRIPTION

CC360 is an advanced TFT LCD Monitor Control Board. This design enables a full conventional CRT monitor replacement with a large size Active Matrix LCD module. It is suitable for video resolution up to WUXGA @ 60Hz in all video modes, the full display area of the module is used. The design is implemented as a single printed circuit board.

As the CC360 is designed to act as a full monitor interface. Besides the main functionality of an analog, also various appealing On-Screen-Display Menu layouts are possible on customer's request.

The CC360 is designed to support various TFT LCDs under the WUXGA resolution by BIOS option, customers line-up their monitors with their own identity with following options.

3.DIMENSION



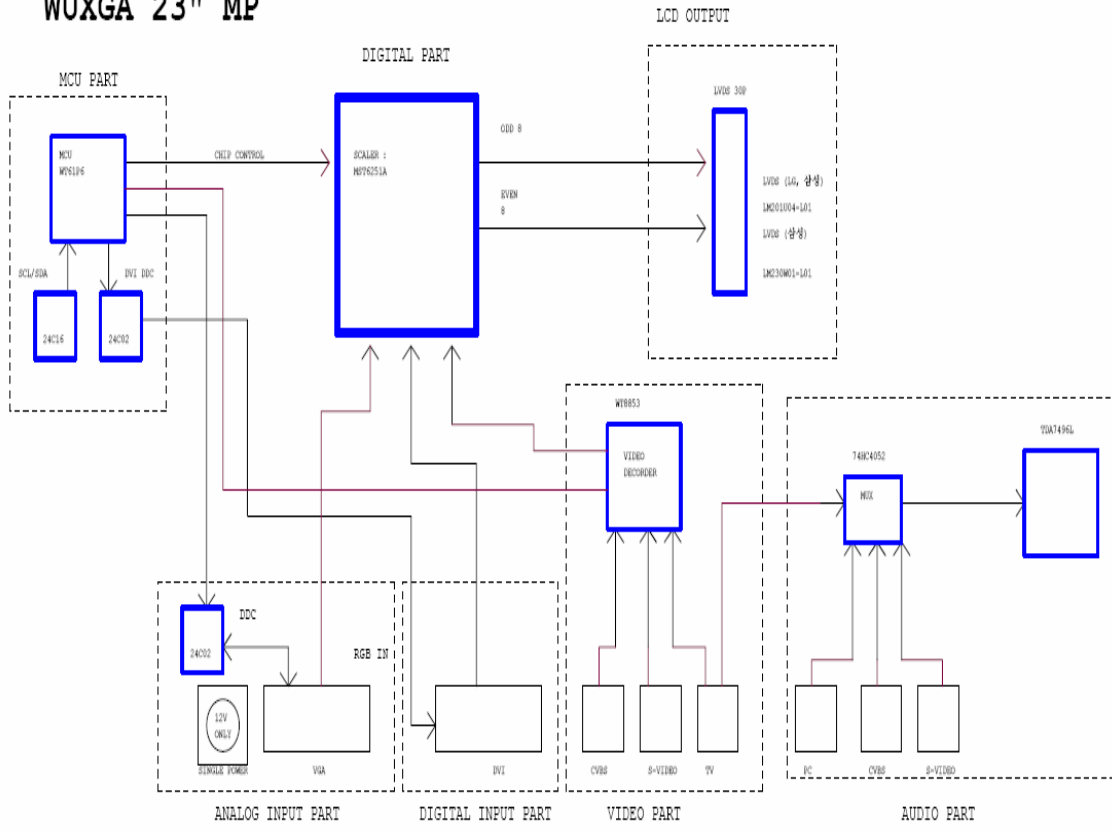
4. BLOCK DIAGRAM

CC&F

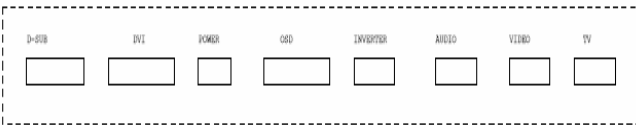
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DRAWING DATE : 2006, 01, 05

WUXGA 23" MP

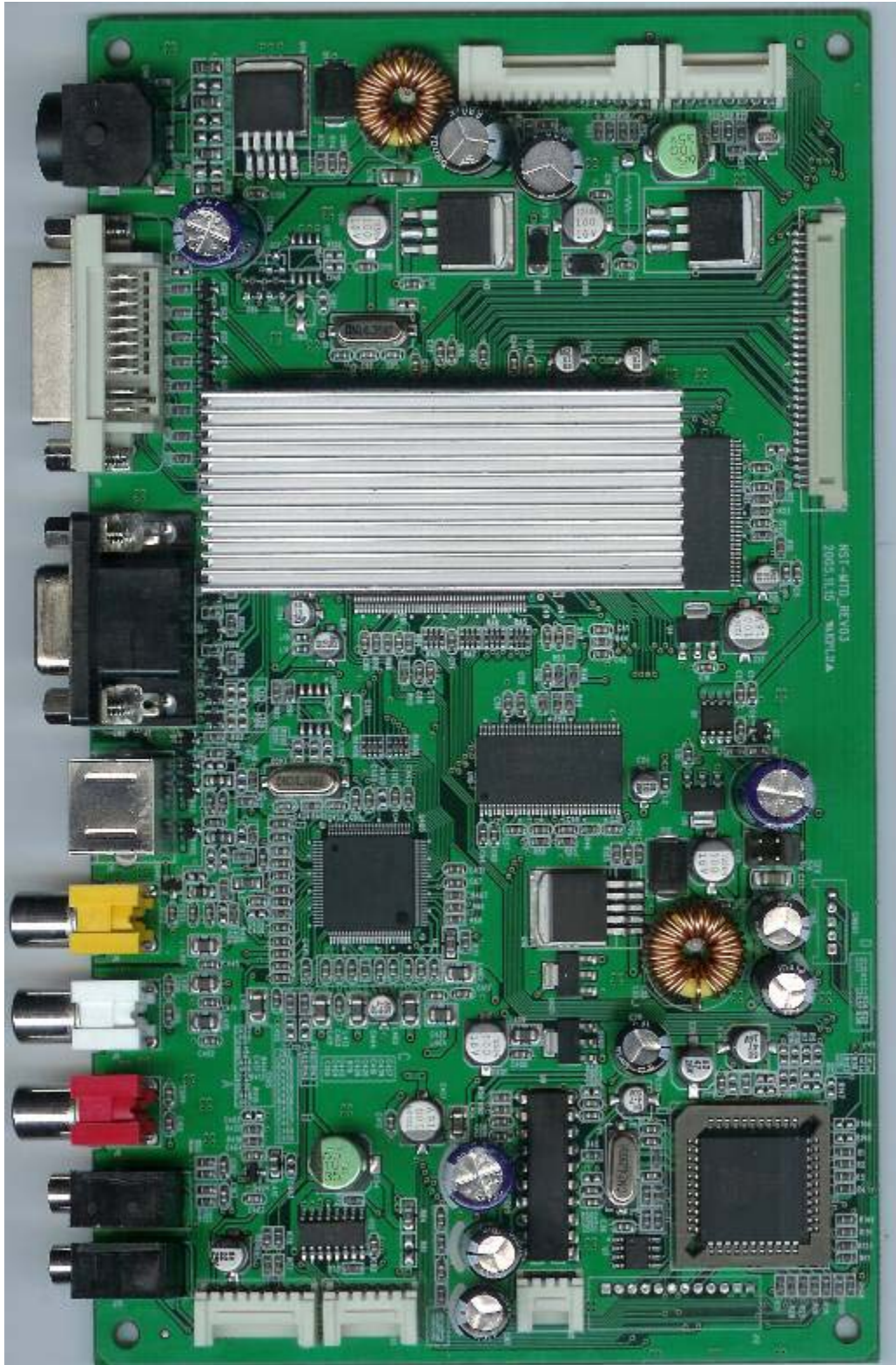


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5. PICTURE



6. PINNING INFORMATION

6.1. DIMENSION & CONNECTORS

6.2. ELECTRICAL CONNECTORS

NO	Service	Maker	Part number	Description	Mating Housing
5.3.1	LCD I/F(LVDS)	JAE	F1-WE31P-HF	1.25mm,31P,R/A	
5.3.3	OSD I/F	MOLEX	53015-10P	2mm, 10P,R/A	
5.3.4	INVERTER IN	MOLEX	53015-10P	2mm, 10P,R/A	
5.3.6	DC IN		DC005-2.0Ø	2.0Ø,R/A	2.0pi, DC Adapter
5.3.7	VGA IN		DSH03-15F-R	15p R/A	Standard VGA cable(Male)
5.3.8	S-VIDEO		MD24-4PSC5	4pin/R/A	Standard SVHS cable(Male)
5.3.9	COMPOSITE		AV-8.4-5A(Y)	3pin,R/A	Standard RCA cable(Male)

6.3. PIN CONNECTIONS

6.3.1 LCD I/F (LVDS) (J1)

Pin No.	Function	Pin No.	Function	Pin No.	Function	Pin No.	Function
1	VCC	9	LVA3M	17	LVA0P	25	LVB2M
2	VCC	10	LVACKP	18	LVA0M	26	GND
3	VCC	11	LVACKM	19	GND	27	LVB1P
4	NC	12	LVA2P	20	LVB3P	28	LVP1M
5	GND	13	LVA2M	21	LVB3M	29	LVB0P
6	NC	14	GND	22	LVBCKP	30	LVB0M
7	GND	15	LVA1P	23	LVBCKM	31	GND
8	LVA3P	16	LVA1M	24	LVB2P	32	GND

6.3.2 AUDIO I/F (J2)

Pin No.	Function	Pin No.	Function
1	OUT_L	2	GND
3	GND	4	OUT_R

6.3.3 OSD I/F (CN2)

Pin No.	Function	Pin No.	Function	Pin No.	Function	Pin No.	Function
1	LED_A	4	IR_REMOTE	7	AUTO	10	DOWN
2	LED_G	5	GND	8	SELECT	11	MENU
3	5V	6	UP	9	PWR	12	KEY_SOURCE

6.3.4 INVERTER IN (CN1)

Pin No.	Function	Pin No.	Function	Pin No.	Function
1	BLT_ADJ	4	NC	7	12V_INV
2	BLT_ON/OFF	5	GND	8	12V_INV
3	GND	6	GND		

6.3.5 DVI I/F (J11)

Pin No.	Function	Pin No.	Function	Pin No.	Function	Pin No.	Function
1	TX2-	2	TX2+	3	TX2/4 SHIELD	4	TX4-
5	TX4+	6	DDC CLK	7	DDCDATA	8	NC
9	TX1-	10	TX1+	11	TX1/3 SHIELD	12	TX3-
13	TX3+	14	+5V	15	GND	16	HP DETECT
17	TX0-	18	TX0+	19	TX0/5 SHIELD	20	TX5-
21	TX5+	22	TX CLK SHIELD	23	TX CLK+	24	TX CLK-
25	NC	26	NC	27	NC	28	NC
29	NC	30	NC	31	SHELL1	32	NC
33	NC	34	SHELL3				

6.3.6 DC-IN (CN6)

Pin No.	Function	Pin No.	Function	Pin No.	Function
1	GND	2	12V_INV	3	12V_INV
4	12V_INV	5	GND	6	GND
7	GND	8	GND	9	GND
10	GND	11	GND		

6.3.7 VGA IN (J7)

Pin No.	Function	Pin No.	Function	Pin No.	Function
1	RED	6	RED, GREEN	11	NC
2	GREEN	7	GREEN	12	DDC_SDA
3	BLUE	8	BLUE, GREEN	13	HSYNC
4	NC	9	A +5	14	VSYNC
5	GND	10	GND	15	DDC_SCL

6.3.8 S-VIDEO (J8)

Pin No.	Function	Pin No.	Function	Pin No.	Function	Pin No.	Function
1	GND	2	GND	3	S-VIDEO_LUMA	4	S-VIDEO_CHROMA
5	GND	6	GND				

6.3.9 COMPOSITE I/F (J4)

Pin No.	Function
1	CVBS IN
2	GND
3	GND

7. REFERENCE DATA

7.1. LIMITING VALUES

Symbol	Description	Min	Max	Unit
V _{DD}	DC Power supply	10V ¹⁾	25V ²⁾	V
I _{DD}	Input current	0.0	+5.0	I
V _{i(RGB)}	Video input signal	-0.3	+3.0	VDC

Note 1) 2) In case Panel Voltage is over 12V, The panel voltage is determined by input Voltage.

7.2. FEATURES

Parameter	Value	Unit
Overall dimensions		
Width	195	mm
height	120	mm
Depth (from PCB bottom)	15	mm
Max. output resolution	1600X1200	pixel
Data processing	8 x 3	bits
Input impedance		
Video	75	ohm
Sync	-	ohm
Sync polarities	+/-	
Sync levels	TTL	
Supply voltage	10 ~ 24V ¹⁾	V DC
Max. number of colors	16.7M	colors
Operating temperature	0 ~ 50	°C
Storage temperature	-20 ~ 70	°C
Max. weight	132	g

Note 1) In case Panel Voltage is over 12V, The panel voltage is determined by input Voltage.

7.3. ELECTRICAL PARAMETERS

7.3.1 General Description

Symbol	Description	Min	Typ	Max	Unit
V _{DD}	DC Power supply	10 ¹⁾		25 ²⁾	V
V _{I(RGB)}	Video input signal(w.r.t. GND)	0.5	0.7	1.0	V _{pp}
f _s	Video sample rate			160	MHz
f _{HS}	Horizontal sync frequency	30		75	KHz
f _{VS}	Vertical sync frequency	56		60	Hz
F _{SIH}	Sync input high level	3.3		5	V
V _{SIL}	Sync input low level			0.8	VDC
I _{DD1}	Supply current +12V(w/o LCD & inverter)				
I _{DD2}	(with LCD & inverter)				
I _{DDPS1}	Supply current (w/o LCD & inverter, power save)				
I _{DDPS2}	(with LCD & inverter, power save)				

Note 1) 2) In case Panel Voltage is over 12V, The panel voltage is determined by input Voltage.

7.3.3 Inverter Description (6-LAMP)

Symbol	Description	Min	Typ	Max	Unit
V _{IND}	+18V DC	17 ¹⁾	18 ²⁾	19 ³⁾	V
I _{IND}	Input Current	-	2.0	1.55	A
F _s	Switching Frequency	30	45	60	KHz
C _{out1}	Lamp output current	3.5	6.5	8.0	mArms
V _{OPEN}	Open Voltage	1.4	-	-	KVrms

Note 1) 2) 3) LM230W01 panel standard

8. Setup for Operation

The OSD (On Screen Display) provides certain functions to have clear image and others. This board supports 6 buttons OSD operation as a standard. The control functions defined on OSD operation are as below.

8.1.1. OSD Hot Key Function

OSD Key	Key Function
MENU	If press Menu key, OSD menu window opens.
Up	If press up arrow key, is raise volume.
Down	If press down arrow key, volume becomes low.
Selselect	If press this key, do select function when osd on & do input source Select rotation when osd off.
Auto	If press this key, do Auto Adjust.
Power	If press power key, can do monitor on / off.

8.1.2. OSD MENU

OSD menu	Sub menu & function
Brightness	Brightness
Contrast	Contrast
Color Control	User, Bluish, Reddish
Position	H. Position, V. Position
Clock Phase	Phase, Clock
Miscellaneous	RECALL, OSD TIME, OSD POSITION, AUTO COLOR, auto adjust
LANGUAGE	English, Spanish, Dutch, French, Italian, Svenska, suomi, Dansk, Portuguese, Deutsch, Korean, Chinese, Japanese
AUDIO	Volume, AUDIO
PIP CONTROL (OPTION)	PIP ON/OFF, PIP source, PIP position, PIP Size
INPUT SELECT	Analog, Digital, S-Video, CVBS, TV
TV (Option)	Auto search, Channel edit, Fine tuning, TV mode, Manual set

9. Applicable Graphic Mode

The microprocessor measures the H-sync, V-sync and V-sync/H-sync polarity for RGB inputs, and uses this timing information to control all of the display operation to get the proper image on a screen.

This board can detect all VESA standard and MAC Graphic modes shown on the table below and provide more clear and stable image on a screen.

Table 8.1) RGB Input format

Mode \ Spec.	Pixel Freq.	Horizontal Timing				Vertical Timing			
		Sync Polar	Freq.	Total	Active	Sync Polar	Freq.	Total	Active
	MHz		KHz	Pixel	Pixel		Hz	Line	Line
640x350 @70Hz	25.144 VESA	P	31.430	800	640	N	70.000	449	350
720x400 @70Hz	28.287 VESA	N	31.430	900	720	P	70.000	449	400
640x480 @60Hz	25.175 VESA	N	31.469	800	640	N	59.940	525	480
640x480 @72Hz	31.500 VESA	N	37.861	832	640	N	72.809	520	480
640x480 @75Hz	31.500 VESA	N	37.500	840	640	N	75.000	500	480
800x600 @56Hz	36.000 VESA	P	35.156	1024	800	P	56.250	625	600
800x600 @60Hz	40.000 VESA	P	37.879	1056	800	P	60.317	628	600
800x600 @72Hz	50.000 VESA	P	48.077	1040	800	P	72.188	666	600
800x600 @75Hz	49.500 VESA	P	46.875	1056	800	P	75.000	625	600
1024x768 @60Hz	65.000 VESA	N	48.363	1344	1024	N	60.005	806	768
1024x768 @70Hz	75.000 VESA	N	56.476	1328	1024	N	70.070	806	768
1024x768 @75Hz	78.750 VESA	P	60.023	1312	1024	P	75.030	800	768
1280x1024 @60Hz	108.00 VESA	P	64.000	1688	1280	P	60.000	1066	1024
1280x1024 @70Hz	125 VESA	N	74.400	1680	1280	N	70.000	1063	1024
1280x1024 @75Hz	135.00 VESA	P	79.900	1688	1280	P	75.000	1066	1024
1600x1200 @60Hz	160.00 VESA	P	75.000	1728	1600	P	60.000	1280	1200
1920x1080 @75Hz	172.75 VESA	P	67.061	2576	1920	P	59.983	1118	1080
1920x1200 @60Hz	193.125 VESA	P	74.508	2592	1920	N	59.990	1240	1200

10.Appendix

This board can support various LCD panels, which has VGA, SVGA, XGA, SXGA, UXGA and WUXGA resolution. The table below shows the model names of LCD panel, jumper setting for LCD power for each LCD panel that can work with This B/D, up to the “updated date”. And We will try continuously to add the model names of the LCD panel that have been tested.

Table 9.1) Tested LCD Panel List

N0	Model Name	LCD Vendor	VCC	Remarks
1	LTM170E5	Sam Sung	5V	
2	LTM170E4	Sam Sung	5V	
3	LTM170EH	Sam Sung	5V	
4	LM170E01	LG.PHILIPS	5V	
5	LTMU213U4	Sam Sung	5V	
6	LTM201U1	Sam Sung	18V	
7	LM201U04	LG.PHILIPS	18V	
8	LM230W01	LG.PHILIPS	18V	
9	LC320W01	LG.PHILIPS	12V	With SMPS
10	LC370WX1	LG.PHILIPS	12V	With SMPS
11	LC420W02	LG.PHILIPS	12V	With SMPS