

1. Scope :

- 1.1 High performance picture quality.
- 1.2 Analog RGB-VGA for PC data input only.
- 1.3 Multi-sync capability up to WXGA/75Hz , compatible with standard DOS, VGA,SVGA,XGA,VESA standard timing. Depends on LCD Panel's requirement.
- 1.4 True color 16.7M data processing and display and display driving. Depends on LCD Panel's requirement.
- 1.5 Full control of all relevant display and interface parameter by OSD.
- 1.6 Multi language support 8 languages (English, French, German, Spanish, Italian, Japanese, Russian and Chinese) .
- 1.7 VESA DDC 1/2 Bi, 2B+ compliant.

2. General description :

- 2.1 This AD Board is a TFT LCD Panel control Board that supports LVDS interface only. (TTL Input is optional)
- 2.2 This AD Board is designed for general use of VGA , It is suitable for resolution up to WXGA/75Hz standard timing. Depends on LCD Panel's requirement.
- 2.3 The layout of the OSD menu and keypad function are programmable that depends on customer's request.
- 2.4 SOG and TTL sync(including composited Sync) is typical for VGA connector input.

3. Electrical characteristics (Ta : 25°C) :

3.1 12V input

Symbol	Description	Min	Typ	Max	Unit
Vd1	+12V DC Input	10.8	12	13.2	V
Id1	+12V Current Supply	3.0	--	--	A

3.2 Environment

Temperature	Operating	0°C ~ 50°C
	Storage	-20°C ~ 85°C
Humidity	Operating	20°C ~ 90°C
	Storage	5°C ~ 95°C





3.3 Electrical Parameters

Symbol	Description	Min	Typ	Max	Unit
Pad	Power Consumption AD board only	0.5			A
Vi(sync)	Video Input Signal	0.5	0.7	0.9	Vpp
VHt+	HSYNC input Positive threshold	1.5	1.6	2.2	V
VHt-	HSYNC input Negative threshold	0.7	1.1	1.4	V
FS	Video Sample rate	10		165	MHz
Vt+	VSYNC input Positive threshold		1.8	2.0	V
Vt-	VSYNC input Negative threshold	0.8	1.5		V
VID	Differential Input Voltage	150		1200	mv
Vicom	Input Common Mode Voltage	AVCC-300		AVCC-37	mv
Vbtd	Behavior when Transmitter is disabled	AVCC-10		AVCC+10	mv

3.4 Specification

Category		Specification
Color		16.7M
Input signal	Video Signal	Analog 0.7Vp-p Positive
	Sync Signal	TTL Level Positive or Negative
Frequency	Horizontal	30 ~ 60 KHz, depends on panel spec
	Vertical	56 ~ 75 Hz, depends on panel spec

4. Function on OSD menu :

OSD MENU	Description
 General	Adjust the List : <ul style="list-style-type: none"> ● Brightness of the screen . ● Contrast of the screen . ● Horizontal size of the screen's image . ● Focus of the screen's image . ● Horizontal position of the screen's image . ● Vertical position of the screen's image . ● Sharpness words of the screen's image.
 Color	9300 , 7500 and 6500 Temperature, user Temperature .
 Languages	Multi language support 8 languages (English, French, German, Spanish, Italian, Japanese, Russian and Chinese) .
 Tools	Adjust the List : <ul style="list-style-type: none"> ● OSD position . ● Auto Adjustment : Horizontal position, Vertical position, Horizontal size, Phase and color of the screen's image . Windows's background or characters should be display on full screen prior to proceed this function . ● Recall : "Yes" allows you to recover to the preset mode .



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✘The layout and format of OSD depends on customer's request.

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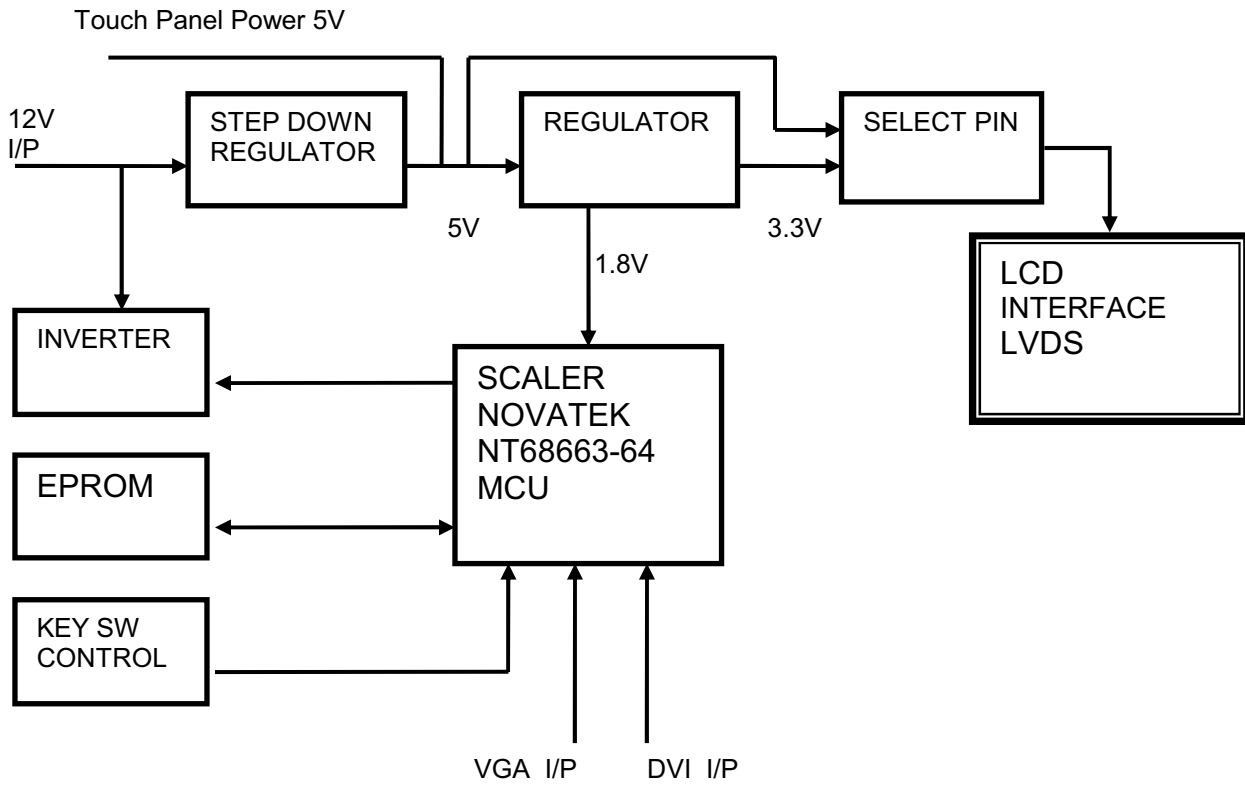
5. Hotkey Function Definition :

OSD key	Function
POWER	POWER ON / OFF
MENU	OSD ON
DOWN	ADJ - / SEL -
UP	ADJ + /SEL +
SEL	Auto adjust (OSD OFF)

✘ The layout of hotkey and function definition depends on customer's request.

6. Block Diagram :

OPTIONAL

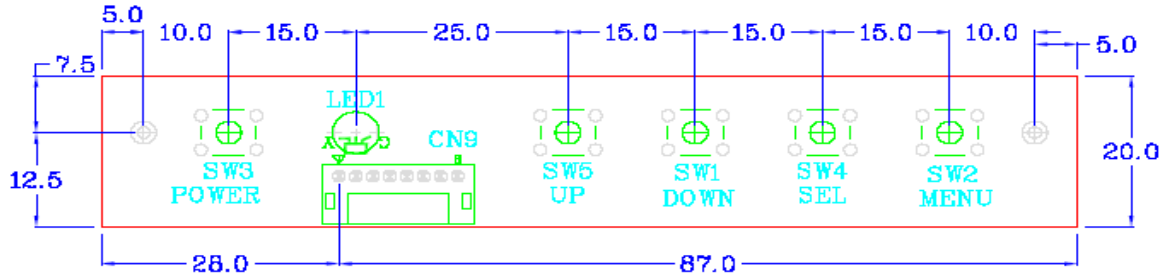


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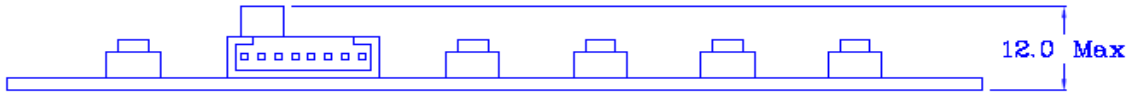
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7.2 key board dimension



HB101-3.PCB
Unit: mm

COMPONENT SIDE



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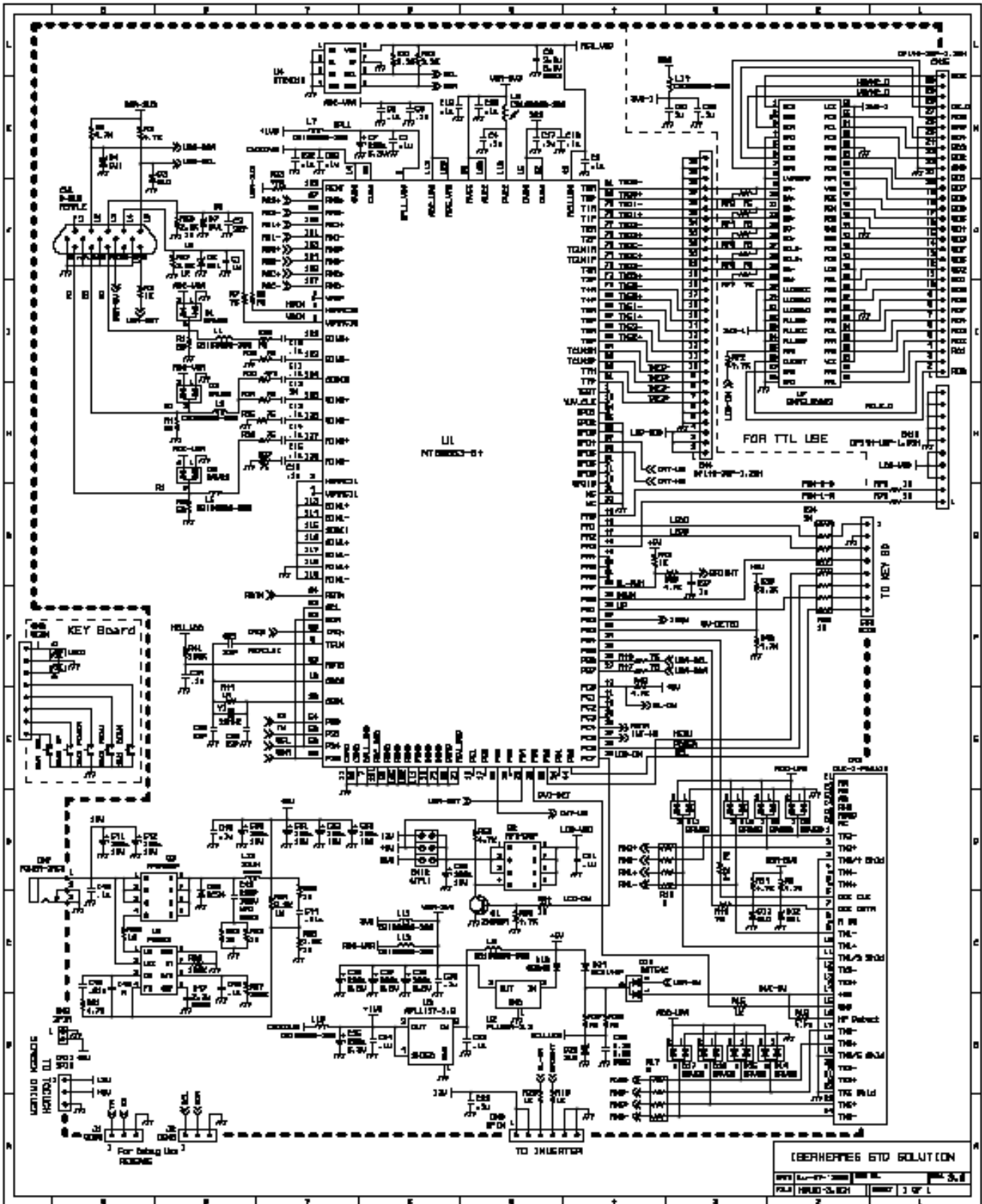
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8. Circuit Diagram :

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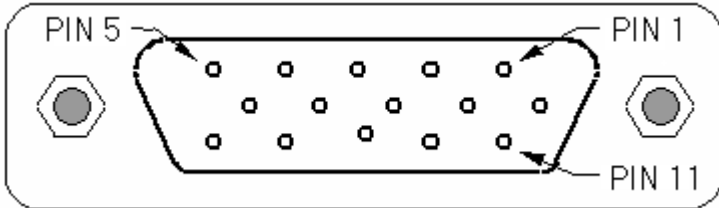
9. EMI Requirement :

Combined with the customer product shall pass FCC PART15/CISPR22 classes A or B which depends on Customer's requirement.

10. Connector :

Location	Original	Compatible	Mating housing
CN1 (VGA)	VGA D-SUB CONN,15P	Mini D-SUB, 90° , 15P (3*5) , FEMALE	VGA -15P-MALE
CN2 (DVI)	DVI-I Connector		
CN3 (OSD)	JS-1251R-8	JS-1251R-8	PHR-8
CN4 (LVDS)	DF14H-30P- 1.25H	JS-1235R-30	TU1217HNO-30P, STM-P240430
CN 11 (Touch Panel Power)	JS-1125R-3	JS-1251R-3	JST-PHR-3 ECI-2020-03
CN7 (Power)	DC Jack		
CN8 (Inverter)	JS-1251R-6	JS-1251R-6	JS-1124-6
CN12 (LCD PANEL POWER SEL)	A2016WV-s-2 x3P	A2016WV-s-2x3P	ECI-2562H-06 (2*3)
CN15 (TTL-1)	DF14H-30P- 1.25H	JS-1235R-30	TU1217HNO-30P, STM-P240430
CN16 (TTL-2)	DF14H-10P- 1.25H	JS-1235R-10	TU1217HNO-10P, STM-P240410

11. Pin Assignment



11.1 CN1,connector for VGA input

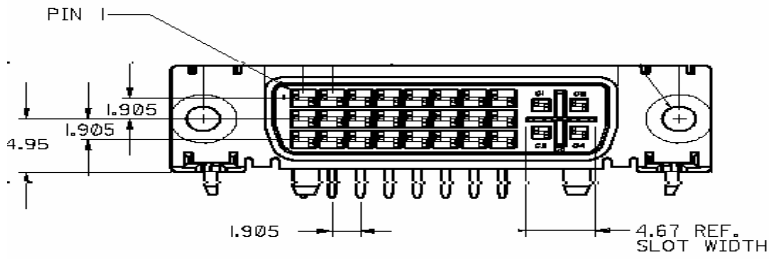
Connector Used: VGA Connector 15 pin D-SUB

Pin No.	Pin Assignment	I/O	Pin Description
1	RED	I	RED Video Input Signal
2	GREEN	I	GREEN Video Input Signal
3	BLUE	I	BLUE Video Input Signal
4	NC	-	No Connection
5	VGA - DET	I	Hot Plug Detect
6	GND	P	GND for RED video signal
7	GND	P	GND for GREEN video signal
8	GND	P	GND for BLUE video signal
9	VGA 5V	P	VGA 5V
10	SYNC. Return	P	GND for Sync. Signal
11	NC	-	No Connection
12	DDC data	I/O	Serial Data I/O Pin for DDC
13	HSYNC.	I	Horizontal Sync. Signal
14	VSNC	I	Vertical Sync. Signal
15	DDC clock	I/O	Serial Clock I/O Pin for DDC

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11.2 CN2,connector for DVI-I input
Connector Used: DVI Connector 6 Pin + 24 Pin

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Pin No.	Pin Assignment	I/O	Pin Description
C1	Analog Red	O	NC.
C2	Analog Green	O	NC.
C3	Analog Blue	O	NC.
C4	Analog Horizontal Sync	O	NC.
C5	Analog Ground (analog R,G, &B return)	O	NC.
C6			NC.
1	T.M.D.S. Data2-	O	T.M.D.S. Data2-
2	T.M.D.S. Data2+	O	T.M.D.S. Data2+
3	T.M.D.S. Data2/4 Shield	P	Ground
4	T.M.D.S. Data4-	O	NC.
5	T.M.D.S. Data4+	O	NC.
6	DDC Clock	I/O	DDC Clock
7	DDC Data	I/O	DDC Data
8	Analog Vertical Sync	O	NC.
9	T.M.D.S. Data1-	O	T.M.D.S. Data1-
10	T.M.D.S. Data1+	O	T.M.D.S. Data1+
11	T.M.D.S. Data1/3 Shield	P	Ground
12	T.M.D.S. Data3-	O	NC.
13	T.M.D.S. Data3+	O	NC.
14	+5V Power	P	+5V Power
15	Ground (return for +5V, Hsync, and Vsync)	P	Ground (return for +5V, Hsync, and Vsync)
16	Hot Plug Detect	I	Ground
17	T.M.D.S. Data0-	O	T.M.D.S. Data0-
18	T.M.D.S. Data0+	O	T.M.D.S. Data0+
19	T.M.D.S. Data0/5 Shield	P	Ground
20	T.M.D.S. Data5-	O	NC.

Pin No.	Pin Assignment	I/O	Pin Description
21	T.M.D.S. Data5+	O	NC.
22	T.M.D.S. Clock Shield	P	Ground
23	T.M.D.S. Clock+	O	T.M.D.S. Clock+
24	T.M.D.S. Clock-	O	T.M.D.S. Clock-

11.3 CN3 Connector for OSD (Key Control)

Connector Used: WAFER 8PIN P=2.0 mm (JST-S8B-PH-K-S)

Pin No.	Pin Assignment	I/O	Pin Description
1	LED O	O	Output terminal for ORANGE Color LED Indicator
2	GND	P	GND
3	LED G	O	Output terminal for GREEN Color LED Indicator
4	LEFT	I	Left Selection
5	MENU	I	OSD ON
6	PWR	I	Power On/Off Switch
7	RIGHT	I	Right Selection
8	EXIT	I	AUTO ADJ / EXIT OSD (OSD OFF)

11.4 CN4, LVDS Signal output

Connector Used: TU1217HNO-30PIN P=1.25mm (STM-P240430)

Pin No.	Symbol	I/O	Description
1	LCD_VDD	P	POWER OUTPUT
2	LCD_VDD	P	POWER OUTPUT
3	LCD_VDD	P	POWER OUTPUT
4	GND	P	GND
5	GND	P	GND
6	RXE3+	O	Positive LVDS differential data output of channel 7
7	RXE3-	O	Negative LVDS differential data output of channel 7
8	RXEC+	O	Positive LVDS differential clock 1 output
9	RXEC-	O	Negative LVDS differential clock 1 output
10	RXE2+	O	Positive LVDS differential data output of channel 6
11	RXE2-	O	Negative LVDS differential data output of channel 6
12	RXE1+	O	Positive LVDS differential data output of channel 5



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Pin No.	Symbol	I/O	Description
13	RXE1-	O	Negative LVDS differential data output of channel 5
14	RXE0+	O	Positive LVDS differential data output of channel 4
15	RXE0-	O	Negative LVDS differential data output of channel 4
16	GND	P	GND
17	GND	P	GND
18	RXO3+	O	Positive LVDS differential data output of channel 3
19	RXO3-	O	Negative LVDS differential data output of channel 3
20	RXOC+	O	Positive LVDS differential clock 0 output
21	RXOC-	O	Negative LVDS differential clock 0 output
22	RXO2+	O	Positive LVDS differential data output of channel 2
23	RXO2-	O	Negative LVDS differential data output of channel 2
24	RXO1+	O	Positive LVDS differential data output of channel 1
25	RXO1-	O	Negative LVDS differential data output of channel 1
26	RXO0+	O	Positive LVDS differential data output of channel 0
27	RXO0-	O	Negative LVDS differential data output of channel 0
28	GND	P	GND
29	GND	P	GND
30	GND	P	GND

Note : 1、 2、 3 LCD_VDD depends on LCD Panel's requirement.

11.5 CN8, Connector for Inverter (JS-1251R-6)

Pin No.	Pin Assignment	I/O	Pin Description
1	Vin	P	+12V
2	Vin	P	+12V
3	Inverter Signal		BL_ON
4	Inverter Signal		Brighness
5	Vin	P	GND
6	Vin	P	GND



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11.6 CN11, Connector for Touch Panel Power (JS-1251R-2)

Pin No.	Pin Assignment	I/O	Pin Description
1	Vin	P	+12V
2	Vin	P	+5V
3	Vin	P	GND

11.7 CN12, Connector for Panel TCON Power Selection (A2016WV-s-2 x3P 180°)

Pin No.	Pin Assignment	I/O	Pin Description
1	VOUT	P	+3V3
2	VOUT	P	+5Vp
3	VOUT	P	+12V

Note : 1、 2、 3 VOUT select depends on LCD Panel's requirement.

11.8 CN15, Connector for TTL-1 Port (DF14H-30P-1.25H)

Pin No.	Pin Assignment	I/O	Pin Description
1	R00	O	
2	MCLK_0	O	
3	R01	O	
4	R02	O	
5	R03	O	
6	R04	O	
7	R07	O	
8	R05	O	
9	G00	O	
10	G01	O	
11	G02	O	
12	G06	O	
13	G07	O	
14	G03	O	
15	G04	O	
16	G05	O	
17	B00	O	
18	B06	O	
19	B07	O	
20	B01	O	
21	GND	P	
22	B02	O	
23	B03	O	
24	B04	O	
25	GND	P	

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26	R06	O	
27	DE_O	O	
28	VSYNCO	O	
29	HSYNCO	O	
30	B05	O	

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11.9 CN16, Connector for TTL-2 Port (DF14H-10P-1.25H)

Pin No.	Pin Assignment	I/O	Pin Description
1	NC.		
2	NC.		
3	LCD_VDD	P	POWER OUTPUT
4	LCD_VDD	P	POWER OUTPUT
5	LCD_VDD	P	POWER OUTPUT
6	GND	P	GND
7	GND	P	GND
8	GND	P	GND
9	GND	P	GND
10	GND	P	GND

Note : 3、4、5 LCD_VDD depends on LCD Panel's requirement.

12. Vesa Timing Support :

Item	SPEC MODE	Pixel Freq. MHZ	Horizontal Timing				Vertical Timing			
			Sync Polar	Freq. KHz	Total Pixel	Active Pixel	Sync Polar	Freq. Hz	Total Line	Active Line
	1	720×400 @70Hz	28.287 VESA	N	31.430	900	720	P	70.000	449
2	640×480 @60Hz	25.175 VESA	N	31.469	800	640	N	59.940	525	480
	640×480 @72Hz	31.500 VESA	N	37.861	832	640	N	72.809	520	480
	640×480 @75Hz	31.500 VESA	N	37.500	840	640	N	75.000	500	480
3	800×600 @60Hz	40.000 VESA	P	37.879	1056	800	P	60.317	628	600
	800×600 @72Hz	50.000 VESA	P	48.077	1040	800	P	72.188	666	600
	800×600 @75Hz	49.500 VESA	P	46.875	1056	800	P	75.000	625	600
4	1024×768 @60Hz	65.000 VESA	N	48.363	1344	1024	N	60.005	806	768
	1024×768 @70Hz	75.000 VESA	N	56.476	1328	1024	N	70.069	806	768
	1024×768 @75Hz	78.750 VESA	P	60.023	1312	1024	P	75.029	800	768
5	1152×864 @75Hz	108.000 VESA	P	67.500	1600	1152	P	75.000	900	864
6	1280×768 @60Hz	79.500 CVT	N	47.776	1664	1280	P	59.870	798	768
	1280×768 @75Hz	102.250 CVT	N	60.289	1696	1280	P	74.893	805	768
7	1280×960 @60Hz	108.000 VESA	P	60.000	1800	1280	P	60.000	1000	960
8	1280×1024 @60Hz	108.000 VESA	P	63.981	1688	1280	P	60.020	1066	1024
	1280×1024 @75Hz	135.000 VESA	P	79.976	1688	1280	P	75.025	1066	1024
9	1360×768 @60Hz	85.500 VESA	P	47.712	1792	1360	P	60.015	795	768
10	1440×900 @60Hz	88.750 CVT	P	55.935	1904	1440	N	59.887	934	900
	1440×900 @75Hz	136.750 CVT	N	70.635	1936	1440	P	74.984	942	900

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Item	SPEC MODE	Pixel Freq.	Horizontal Timing				Vertical Timing			
		MHZ	Sync Polar	Freq. KHz	Total Pixel	Active Pixel	Sync Polar	Freq. Hz	Total Line	Active Line
	11	1600x1200 @60Hz	162.000 VESA	P	75.000	2160	1600	P	60.000	1250
1600x1200 @70Hz		189.000 VESA	P	87.500	2160	1600	P	70.000	1250	1200
1600x1200 @75Hz		202.500 VESA	P	93.750	2160	1600	P	75.000	1250	1200
12	1680x1050 @60Hz	146.250 CVT	N	65.290	2240	1680	P	59.954	1089	1050

Note : Timings depends on LCD Panel's requirement.

13. Ppendix :

This board supports various 16:9 panels and supports VESA standard timing VGA, XGA, SXGA, WXGA resolution.

The following table shows the model names of LCD panel, jumper setting for LCD panel power that can work with this A/D board and have been fully tested. The information contained herein is subject to change without notice.

LCD Panel Setting List :

No.	Model Name	LCD Maker	TCON VCC	Remarks
1	G104SN03	AUO	3V	
2	LB121S02 (TTL)	LG	3V	
3	LB121S03	LG	3V	
4	LM150X08	LG	3V	
5	G150XG01	AUO	3V	
6	M170EG01	AUO	5V	
7	M190EG01	AUO	5V	
8	M220EW01	AUO	5V	

Reamrk_1: LVDS wire depends on Panel requirtmad, please consult ADS .
 Reamrk_2: LVDS wire depends on Panel requirtmad, please consult ADS .

14. Remarks :

14.1 Firmware No. :

Scaler - date - version

NT663 - 15N - 071019V

14.2 Serial No. :

A	B	C	D	E	F	G	H	I	J	K
Customer (Standard = X)	Model	Year	Month	Lot no.	serial number					PCB board



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