

# HI-QHD

**Approval**

Rev. 01





Issue Date.

2017. 07. 25

Doc No.

HI-QHD BOARD 01

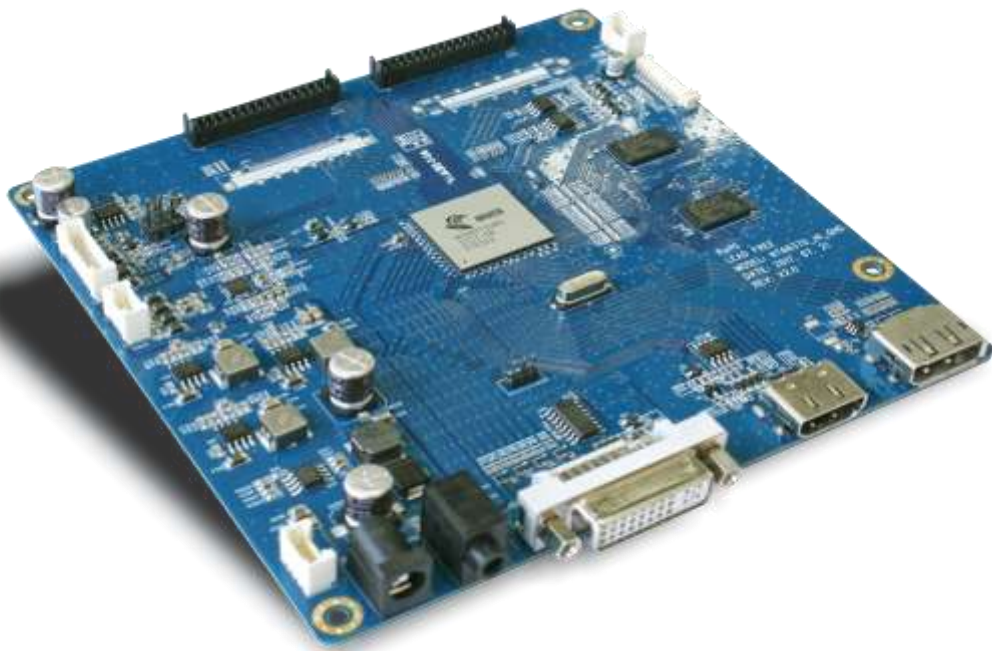
Note | Specification is subject to change without notice.  
Consequently it is better to contact to our company before proceeding with the design of your product incorporating this board

Prepared	Checked I	Checked	Approved
			
KB. PARK			YH. HAN

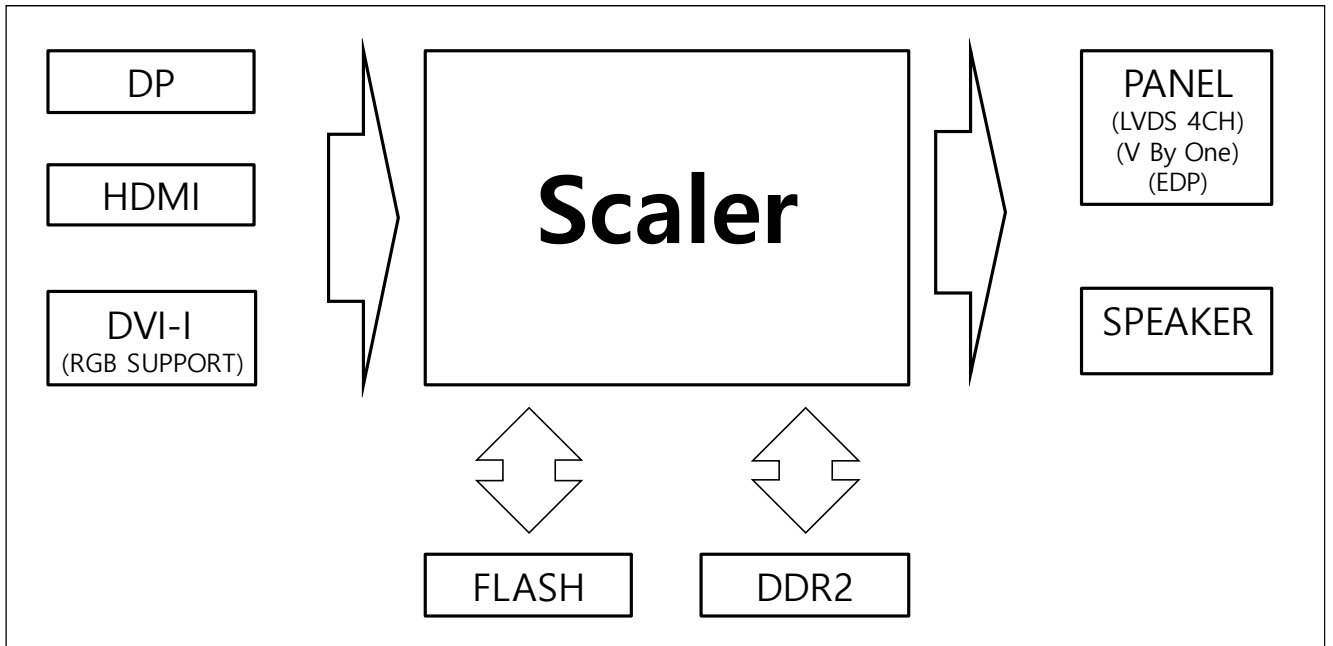


## 1. General Specification

No.	Item	Description		
1	Model Name	HI-QHD		
2	LCD Module	LVDS Quad, eDP 2.7G, V by one - 2560x1600		Output
3	Input	DVI-I(Dual Link)x1 - RGB Support, HDMIx1, DPx1		
4	Resolution Support	H: 31 ~ 80kHz		
		V: 55 ~ 76Hz		
5	OSD Control	Menu, Select, Down, Up, Power		5 keys
	Plug & Play	VESA DDC 2B Ver1.3		
6	Power Consumption	Supply Voltage	12Vdc	
		Power	-	Board Only
7	Signal Connector	Analog	DVI-I (RGB Support) (R, G, B Separate H, V Sync)	
		Digital	DVI-I(Dual Link)	
		HDMI	HDMI 1.4a / HDCP V1.1	
		DP	DisplayPort V1.2	
		Audio	3W + 3W	
8	Board Size	W x H x D(mm)	140 x 145 x 17	
9	Support	PIP Window up to 1920x1080		
		Flip / Mirror Display		



## 2. Functional Block Diagram



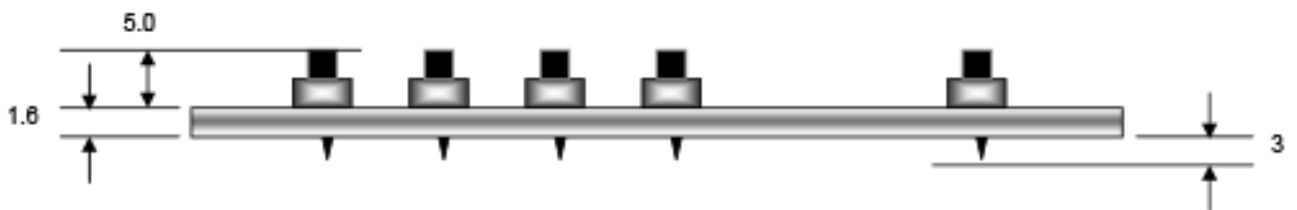
### 3. OSD Control Board

The OSD (On Screen Display) provides certain functions to have clear image and others. This board supports 5 buttons OSD operation as a standard. The control functions defined on OSD operation are as below.

(Unit: mm)

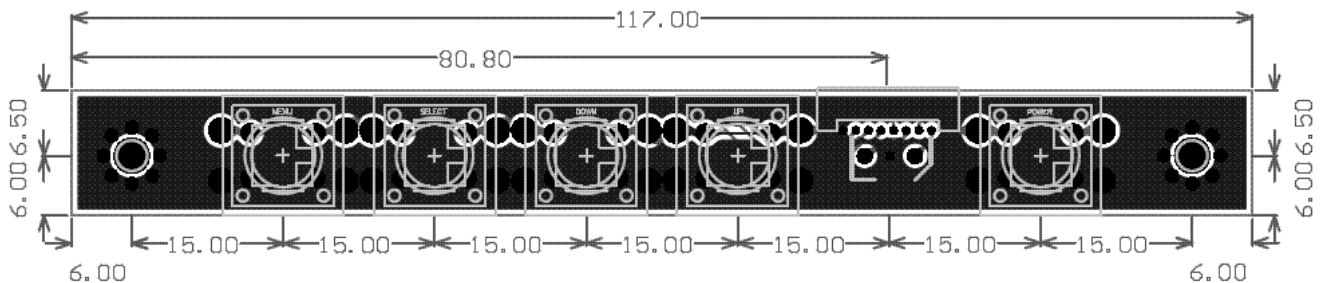


MENU    SELECT    DOWN    UP    LED    POWER



Board Size (W x H x D) : 112 x 12.5 x 6.6 mm

Button	Function	Status	HOT Key
LED	Indicates operation status	Green/ Red	On: Green Off: RED
POWER	Power on/off	On/Off	
MENU	Activate menu / Exit Menu		
SELECT	Input select /Auto Adjust		
DOWN	Cursor control Down / Brightness frame		
UP	Cursor control Up / Volume Adjust		



4-1. OSD Function



Luminance page

OSD Menu			
Brightness	Brightness level Control		
	Range of Value	MIN	0
		MAX	100
Contrast	Contrast level Control		
	Range of Value	MIN	0
		MAX	100
Gamma	Gamma level Control		
	Range of Value	MIN	0
		MAX	100
DCR (Dynamic Contraste Ration)	DCR mode select		
	Mode	OFF	
		DBC	
		DCR	
Main SR	Main SR mode select		
	Mode	OFF	
		WEAK	
		MEDIAN	
		STRONG	
		STRONGST	
PIP SR			

4-2. OSD Function



Color page

OSD Menu			
Color Temperature	Color Mode Select		
	Mode		5000K
			6500K
			7500K
			8200K
			9300K
RED	RED level Control		
	Range of Value	MIN	0
		MAX	100
GREEN	GREEN level Control		
	Range of Value	MIN	0
		MAX	100
BLUE	BLUE level Control		
	Range of Value	MIN	0
		MAX	100

4-3. OSD Function



OSD Settings

OSD Menu			
Horizontal	H level Control		
	Range of Value	MIN	0
		MAX	100
Vertical	V level Control		
	Range of Value	MIN	0
		MAX	100
Transparency	Transparency level Control		
	Range of Value	MIN	0
		MAX	4
OSD Time Out	RED level Control		
	Range of Value	MIN	0
		MAX	60



4-4. OSD Function



Set Up

OSD Menu				
Language	Language Select			
	Mode	English	Francais	Ltaliano
		Pyccknn	Espanol	Deutsch
		Portugues	한국어	
Mute	Mute Select			
	Mode	ON		
		OFF		
Input	Input Select			
	Mode	D-SUB		
		DVI		
		HDMI 1		
		DP		
Display Size	Display Size Select			
	Mode	Full Screen		
		Smart Fit		
		4:3		
		Smart 4:3		
Over Scan	Over Scan Select			
	Mode	ON		
		OFF		
Over Driver	Over Driver Select			
	Mode	ON		
		OFF		
Reset	Reset Select			
	Mode	NO		
		YES		
DP Speed	DP Speed Select			
	Mode	2.7G		
		5.4G		

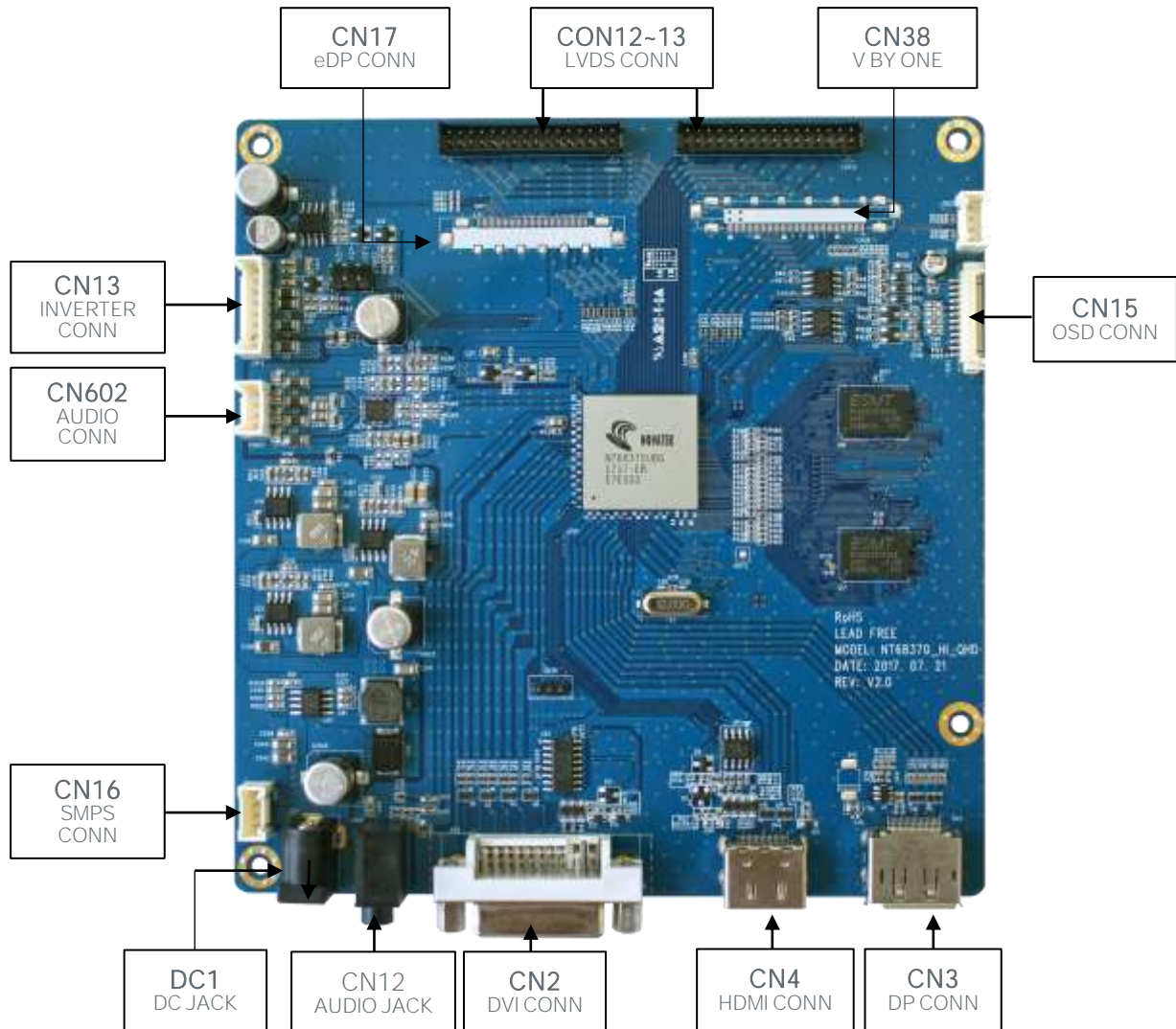
4-5. OSD Function



Picture Mode

PIP / PBP	PIP/PBP Select	
	Mode	Off
		PIP L.T
		PIP R.T
		PIP R.B
		PIP L.B
		PBP : SBS
PBP : TB		
Select Input2	Input Select	
	Mode	D-SUB
		DVI
		HDMI 1
DP		
PIP Size	PIP Size Select	
	Mode	640x480
		800x600
		1024x768
		1280x1024
1920x1080		

## 5. Connector, Pinout & Jumpers



Summary:

Reference	Item	Description	Type	Manufacture
CON12~13	CONNECTOR	LVDS CONNECTOR	YDW200-32P	YEONHO
CN38	CONNECTOR	V BY ONE CONNECTOR	FI-RE51S-HF	JAE
CN15	CONNECTOR	OSD CONNECTOR	12505WR-12	YEONHO
CN3	CONNECTOR	DP CONNECTOR	G3167JB253-001-H	WIESON
CN4	CONNECTOR	HDMI CONNECTOR	HDMI 19P(R-S151L-3)	CFD ELEC
CN2	CONNECTOR	DVI CONNECTOR	DVI 25PIN 3LAYER	CFD ELEC
CN12	JACK	AUDIO JACK	PJ-325D	LONGFA
DC1	JACK	DC JACK	DC-JACK, 3P, R/A	CFD
CN16	CONNECTOR	SMPS CONNECTOR	SMW200-04	YEONHO
CN602	CONNECTOR	AUDIO CONNECTOR	SMW200-04	YEONHO
CN13	CONNECTOR	INVERTER CONNECTOR	SMW200-08	YEONHO
CN17	CONNECTOR	eDP CONNECTOR	20455-030E-02	IPEX

## 5-1. Connector, Pinout & Jumpers

CN12~13: LVDS Connector

Pin No.	Symbol	Description
1	VDD	PANEL VDD
2	VDD	PANEL VDD
3	VDD	PANEL VDD
4	NC	-
5	GND	Ground
6	TXB4+	Positive(+) LVDS 4data(B Port)
7	TXB4-	Negative(-) LVDS 4data(B Port)
8	TXB3+	Positive(+) LVDS 3data(B Port)
9	TXB3-	Negative(-) LVDS 3data(B Port)
10	TXBC+	Positive(+) LVDS Clock data(B Port)
11	TXBC-	Negative(-) LVDS Clock data(B Port)
12	GND	Ground
13	TXB2+	Positive(+) LVDS 2data(B Port)
14	TXB2-	Negative(-) LVDS 2data(B Port)
15	TXB1+	Positive(+) LVDS 1data(B Port)
16	TXB1-	Negative(-) LVDS 1data(B Port)
17	TXB0+	Positive(+) LVDS 0data(B Port)
18	TXB0-	Negative(-) LVDS 0data(B Port)
19	GND	Ground
20	TXA4+	Positive(+) LVDS 4data(A Port)
21	TXA4-	Negative(-) LVDS 4data(A Port)
22	TXA3+	Positive(+) LVDS 3data(A Port)
23	TXA3-	Negative(-) LVDS 3data(A Port)
24	TXAC+	Positive(+) LVDS Clock data(A Port)
25	TXAC-	Negative(-) LVDS Clock data(A Port)
26	GND	Ground
27	TXA2+	Positive(+) LVDS 2data(A Port)
28	TXA2-	Negative(-) LVDS 2data(A Port)
29	TXA1+	Positive(+) LVDS 1data(A Port)
30	TXA1-	Negative(-) LVDS 1data(A Port)
31	TXA0+	Positive(+) LVDS 0data(A Port)
32	TXA0-	Negative(-) LVDS 0data(A Port)

## 5-2. Connector, Pinout & Jumpers

CN38: V by One Connector

Pin No.	Symbol	Description
1	GND	Ground
2	VBY7P	V BY ONE 7+
3	VBY7N	V BY ONE 7-
4	GND	Ground
5	VBY6P	V BY ONE 6+
6	VBY6N	V BY ONE 6-
7	GND	Ground
8	VBY5P	V BY ONE 5+
9	VBY5N	V BY ONE 5-
10	GND	Ground
11	VBY4P	V BY ONE 4+
12	VBY4N	V BY ONE 4-
13	GND	Ground
14	VBY3P	V BY ONE 3+
15	VBY3N	V BY ONE 3-
16	GND	Ground
17	VBY2P	V BY ONE 2+
18	VBY2N	V BY ONE 2-
19	GND	Ground
20	VBY1P	V BY ONE 1+
21	VBY1N	V BY ONE 1-
22	GND	Ground
23	VBY0P	V BY ONE 0+
24	VBY0N	V BY ONE 0-
25	GND	Ground
26	VBYLOCKN	Lock Detect
27	VBYHTPDN	Hot Plug Detect
28 ~ 32	NC	No Connection
33	EE_SCL	SCL For I2C
34	EE_SDA	SDA For I2C
35 ~ 38	NC	No Connection
39 ~ 42	GND	Ground
43 ~ 44	NC	No Connection
45 ~ 51	VLCD	PANEL VCC

### 5-3. Connector, Pinout & Jumpers

#### CN15: OSD Connector

Pin No.	Symbol	Description
1	LED-Red	Red Color
2	LED-Green	Green Color
3	GND	Ground
4	NC	NC
5	MENU	For Menu Switch
6	AUTO	For Auto Switch
7	DOWN	For Down Switch
8	UP	For Up Switch
9	POWER	For Power Switch
10	GND	Ground
11	IR_OUT	IR DATA
12	+3V3	IR Power 3.3V

#### CN3: DP Connector

Pin No.	Symbol	Description
1	DP_2_RX_3N	DP Channel1 input data pair 3-
2	GND	Ground
3	DP_2_RX_3P	DP Channel1 input data pair 3+
4	DP_2_RX_2N	DP Channel1 input data pair 2-
5	GND	Ground
6	DP_2_RX_2P	DP Channel1 input data pair 2+
7	DP_2_RX_1N	DP Channel1 input data pair 1-
8	GND	Ground
9	DP_2_RX_1P	DP Channel1 input data pair 1+
10	DP_2_RX_0N	P Channel1 input data pair 0-
11	GND	Ground
12	DP_2_RX_0P	DP Channel1 input data pair 0+
13	GND	Ground
14	GND	Ground
15	AUX_C_DAP	DP Channel1 AUX+
16	GND-	Ground
17	AUX_C_DAN	DP Channel1 AUX-
18	DP_2_RX_HPD	DP Channel1 hot-plug detect
19	GND	Ground
20	NC	Not Connect

## 5-4. Connector, Pinout & Jumpers

### CN4: HDMI Connector

Pin No.	Symbol	Description
1	HDMI_1_D2+	HDMI 2line 2data+
2	CD-SENSE-1	MHL Cable Detect Sense
3	HDMI_1_D2-	HDMI 2line 2data-
4	HDMI_1_D1+	HDMI 2line 1data+
5	GND	Ground
6	HDMI_1_D1-	HDMI 2line 1data-
7	HDMI_1_D0+	HDMI 2line 0data+
8	GND	Ground
9	HDMI_1_D0-	HDMI 2line 0data-
10	HDMI_1_CK+	HDMI 2line CLK+
11	GND	Ground
12	HDMI_1_CK	HDMI 2line CLK-
13	CEC	HDMI CEC
14	NC	Not Connect
15	HDMI_1_DDCCK	HDMI DDC SCL
16	HDMI_1_DDCDA	HDMI DDC SDA
17	GND	Ground
18	HDMI_TX_5V-1	HDMI power signal
19	CBUS-HPD-1	HPD pin

### CN12: AUDIO JACK

Pin No.	Symbol	Description
1	GND	Ground
2	GND	Ground
3	VGA-AULIN	Audio Left in
4	GND	Ground
5	VGA-AURIN	Audio Right in

### DC1: DC JACK

Pin No.	Symbol	Description
1	+12V_NORMAL	12V
2	GND	Ground
3	GND	Ground

## 5-5. Connector, Pinout & Jumpers

CN2: DVI Connector

Pin No.	Symbol	Description
1	HDMIO-RX2-	TMDS DATA2 Differential Negative Signal
2	HDMIO-RX2+	TMDS DATA2 Differential Positive Signal
3	GND	Ground
4	NC	No Connection
5	NC	No Connection
6	HDMIO-DDC-SCL	The Clock Line for the DDC Interface
7	HDMIO-DDC-SDA	The Data Line for the DDC Interface
8	NC	No Connection
9	HDMIO-RX1-	TMDS DATA1 Differential Negative Signal
10	HDMIO-RX1+	TMDS DATA1 Differential Positive Signal
11	GND	Ground
12	NC	No Connection
13	NC	No Connection
14	HDMIO/5V	5 Volt signal for EDID
15	NC	No Connection
16	HDMIO-HPD	Identify the presence of a monitor
17	HDMIO-RX0-	TMDS DATA0 Differential Negative Signal
18	HDMIO-RX0+	TMDS DATA0 Differential Positive Signal
19	GND	Ground
20	NC	No Connection
21	NC	No Connection
22	GND	Ground
23	HDMIO-RXC+	TMDS CLOCK Differential Positive Signal
24	HDMIO-RXC-	TMDS CLOCK Differential Negative Signal
25	NC	No Connection
26	NC	No Connection
27	NC	No Connection
28	NC	No Connection
29	NC	No Connection
30	NC	No Connection
31	GND	Ground
32	GND	Ground



## 5-6. Connector, Pinout & Jumpers

### CN16: SMPS Connector

Pin No.	Symbol	Description
1	+12V_NORMAL	12V
2	+12V_NORMAL	12V
3	GND	Ground
4	GND	Ground

### CN602: AUDIO Connector

Pin No.	Symbol	Description
1	OUT1A	Speaker Right -
2	OUT1B	Speaker Right +
3	OUT2A	Speaker Left +
4	OUT2B	Speaker Left -

### CN13: Invertor Connector

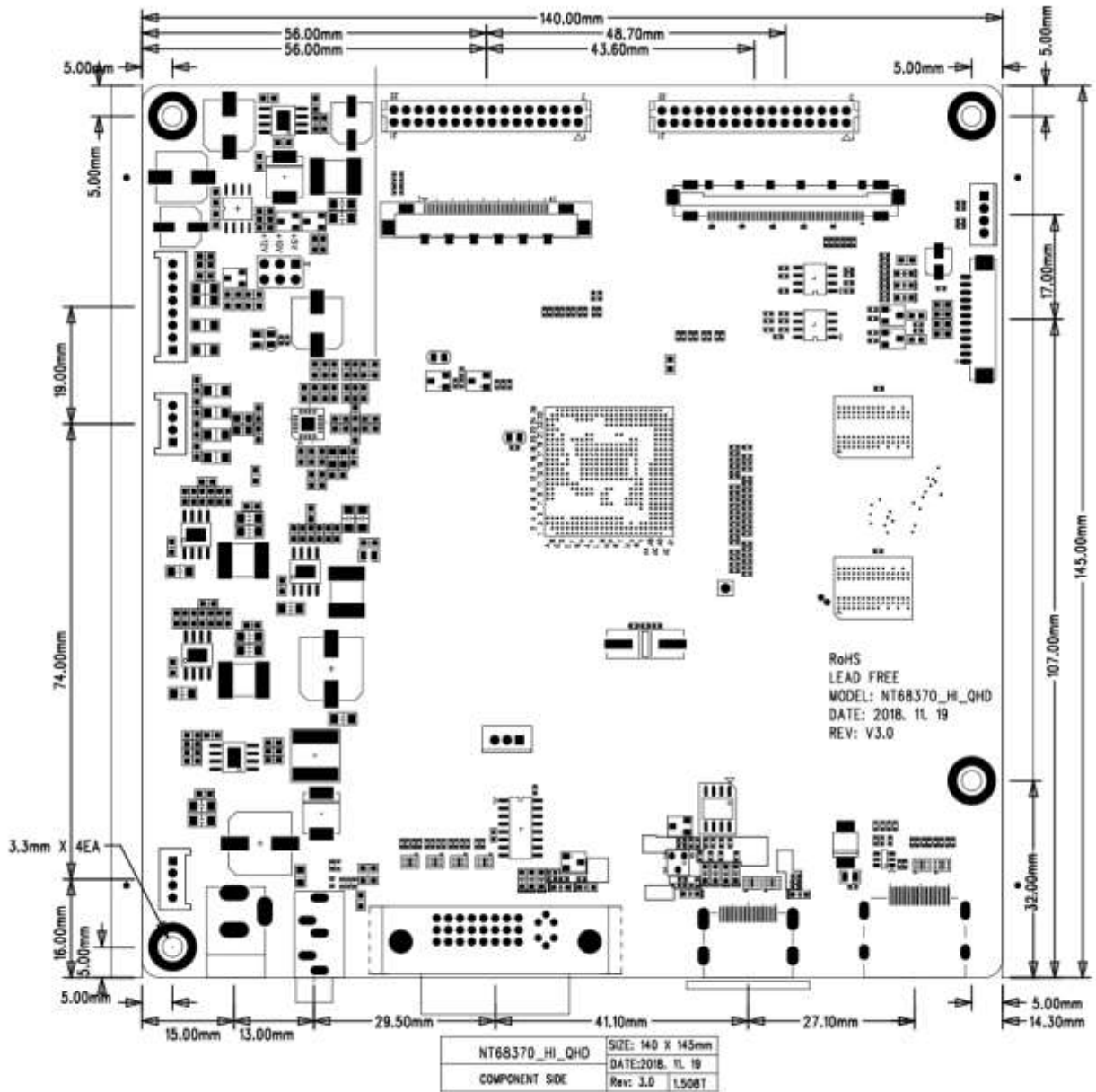
Pin No.	Symbol	Description
1	+12V_NORMAL	12V
2	+12V_NORMAL	12V
3	+5V_NORMAL	5V
4	ADJ_PWM	Adjust PWM
5	GND	Ground
6	GND	Ground
7	BL-ON/OFF	Backlight on signal
8	BL-ADJUST	Backlight dimming signal

## 5-7. Connector, Pinout & Jumpers

CN17: eDP Connector

Pin No.	Symbol	Description
1	NC	-
2	LANE1_N	EDP_TX1N
3	LANE1_P	EDP_TX1P
4	GND	Ground
5	LANE0_N	EDP_TX0N
6	LANE0_P	EDP_TX0P
7	GND	Ground
8	AUX_CH_P	EDP_AUXP
9	AUX_CH_N	EDP_AUXN
10	GND	Ground
11	LCD VCC	PANEL_VDD
12	LCD VCC	PANEL_VDD
13	NC	-
14	LANE2_N	EDP_TX2N
15	LANE2_P	EDP_TX2P
16	GND	Ground
17	HPD	EDP_TXHPD
18	GND	Ground
19	LANE3_N	EDP_TX3N
20	LANE3_P	EDP_TX3P
21	GND	Ground
22	BL_EN	BKL_EN
23	BL_PWM	BKL_DIM
24	NC	-
25	NC	-
26	BL PW12V	12V
27	BL PW12V	12V
28	BL PW12V	12V
29	BL PW12V	12V
30	BL PW12V	12V
31	GND	Ground
32	GND	Ground
33	GND	Ground
34	GND	Ground

6. CONTROLLER DIMENSIONS



[DIMENSION DOWNLOAD](#)

## 7. APPLICATION NOTES

### A. USING THE CONTROLLER WITHOUT BOTTONS ATTACHED:

This is very straightforward:

- ▷ Firstly setup the controller/display system with the buttons. With the attached controllers and display system active make any settings for color, contrast and image position as required then switch everything off.
- ▷ Remove the control switches, the 7-way cable.
- ▷ Refer to inverter specifications for details as to fixing brightness to a desired level, this may require a resistor, an open circuit or closed circuit depending on inverter

### B. INVERTER CONNECTION:

There are 3 potential issues to consider with inverter connection:

- ▷ Power
- ▷ ON/OFF
- ▷ Brightness (DIM-ADJ)

Inverter power : This should be matched with the inverter specification.

Inverter ON/OFF : This is a pin provided on some inverter for ON/OFF function and is used by this panel controller for VESA DPMS compliance. If the inverter does not have on/off pin or the on/off pin is not used DPMS will not operate. Pin5 should be matched to the inverter specification for the ON/OFF pin.

Brightness Dimming control : This controller boards are supported analog dimming and PWM dimming control method too. And it is important to consider the specifications for the inverter to be used.

## 8. APPLICABLE GRAPHIC MODE

The microprocessor measures the, H- sync V- sync and 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 Graphic modes shown on the table below and Provide mare clear and stable image on a screen.

PC, DVI input format

Spec Mode	Pixel Freq. MHz	Horizontal Timing		Vertical Timing	
		Freq. KHz	Active Pixel	Freq. Hz	Active Lind
		640*350@70Hz	25.144	31.430	640
640*400@70Hz	28.287	31.430	640	70.000	400
720*400@ 70Hz	28.287	31.430	720	70.000	400
640*480@60Hz	28.175	31.469	640	59.940	480
640*480@72Hz	31.500	37.861	640	72.809	480
640*480@75Hz	31.500	37.500	640	75.000	480
800*600@56 Hz	36.000	35.156	800	56.250	600
800*600@60Hz	40.000	37.879	800	60.317	600
800*600@72Hz	50.000	48.077	800	72.188	600
800*600@75Hz	49.500	46.875	800	75.000	600
1024*768@60Hz	65.000	48.363	1024	60.005	768
1024*768@ 70Hz	75.000	56.476	1024	70.070	768
1024*768@75Hz	78.750	60.023	1024	75.030	768
1280*720@60Hz	74.500	44.772	1280	59.855	720
1280*720@75Hz	95.75	56.456	1280	74.777	720
1280*768@60Hz	80.14	47.7	1280	60	768
1280*768@75Hz	102.25	60.289	1280	74.893	768
1280*960@60Hz	101.25	59.699	1280	59.939	960
1280*960@75Hz	129.6	75	1280	75	960
1360*768@60Hz	84.75	47.72	1360	59.799	768
1280*1024@60Hz	108.000	63.981	1280	60.020	1024
1280*1024@75Hz	135.000	79.976	1280	75.035	1024
1600*1200@60Hz	162.000	75.000	1600	60.000	1200
1920*1080@60Hz	138.500	66.587	1920	59.934	1080
1920*1200@60Hz	193.250	74.556	1920	59.885	1200
2560*1440@60Hz					

## HDMI input format

Mode \ Spec	Horizontal Timing		Vertical Timing	
	Freq.	Active	Freq.	Active
	KHz	Pixel	Hz	Lind
720X480(P)	31.469	720	59.94	480
1280X720(P)	45	1280	60	720
1920X1080(P)	33.75	1920	60	540
720X480(I)	15.734	720	59.94	240
720X576(P)	31.25	720	50	576
1280X720(P)	37.50	720	50	720
1920X1080(I)	28.125	1920	50	540
720X576(I)	15.625	720	50	288
1920X1080(P)	67.432	1920	59.940	1080
1920X1080(P)	56.250	1920	50	1080
1920X1080(I)	26.973	1920	23.976	1080
1920X1080(I)	33.750	1920	30	1080
2560X1440 30Hz		3840	30	2160
2560X1440 60Hz		3840	60	2160

## DP input format

Mode \ Spec	Horizontal Timing		Vertical Timing	
	Freq.	Active	Freq.	Active
	KHz	Pixel	Hz	Lind
720X480(P)	31.469	720	59.94	480
1280X720(P)	45	1280	60	720
1920X1080(P)	33.75	1920	60	540
720X480(I)	15.734	720	59.94	240
720X576(P)	31.25	720	50	576
1280X720(P)	37.50	720	50	720
1920X1080(I)	28.125	1920	50	540
720X576(I)	15.625	720	50	288
1920X1080(P)	67.432	1920	59.940	1080
1920X1080(P)	56.250	1920	50	1080
1920X1080(I)	26.973	1920	23.976	1080
1920X1080(I)	33.750	1920	30	1080
2560X1440 30Hz		3840	30	2160
2560X1440 60Hz		3840	60	2160