AD BOARD
HN120

Specifications

Approval

Rev. 0

Issue Date. 2018. 06. 05

Doc No. HN120 V1.1

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 II	Approved
			
KB.PARK			YH. HAN

HI DISPLAY
High Quality Display Solution

(주)하이디스플레이 | 경기도 군포시 공단로 140 번길 52, 610/611 호 (당정동, 에이스하이테크시티군포)
HIDISPLAY Co., Ltd. #610/611, ACE-Gunpo, 52, Gongdan-ro140beon-gil, Gunpo-si, Gyeonggi-do, Korea
T +82. 31. 478. 8142 F +82. 31. 601. 9081 E pys1538@hi-display.co.kr H www.hidisplay.co.kr

HN120

Rev.0

Revision History

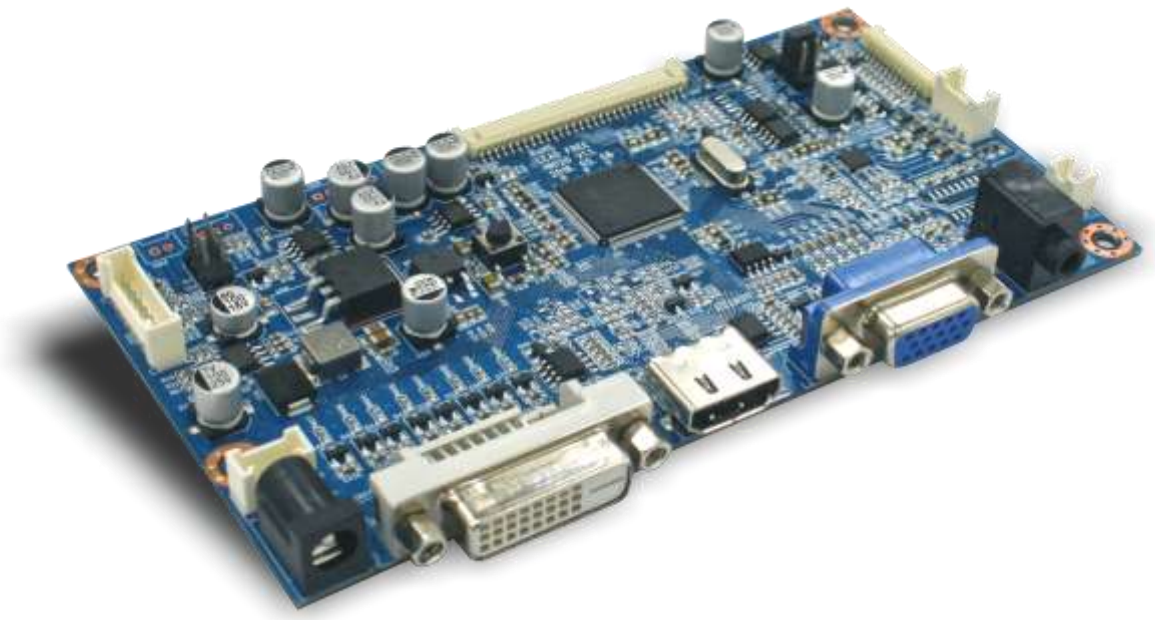
Rev.	ECN No.	Description of Changes	Date	Prepared
0		Initial Release	2018.06.05	K.B PARK

HN120

Rev.0

1. General Specification

No.	Item	Description		
1	Model Name	HN120		
2	LCD Module	LVDS 1920x1080		
3	Input	Analog RGB), HDMI(TMDS),DVI, AUDIO		
4	Resolution Support	H: 31 ~ 80kH		
		V: 55 ~ 76Hz		
5	OSD Control	Input, Menu, Left, Right, Power		5 keys
	Plug & Play	VESA DDC 2B Ver1.3		
6	Power Consumption	Supply Voltage	12Vdc	
		Power		Board Only
7	Signal Connector	Analog	DSUB 15P(R, G, B Separate H, V Sync)	
		Digital	HDMI(TMDS)	
			HDCP Ver1.4	
			DVI	
		Audio	3W x 3W MAX	
8	Board Size	W x H x D(mm)	140 x 74 x 8	



2. ELECTRICAL SPECIFICATION

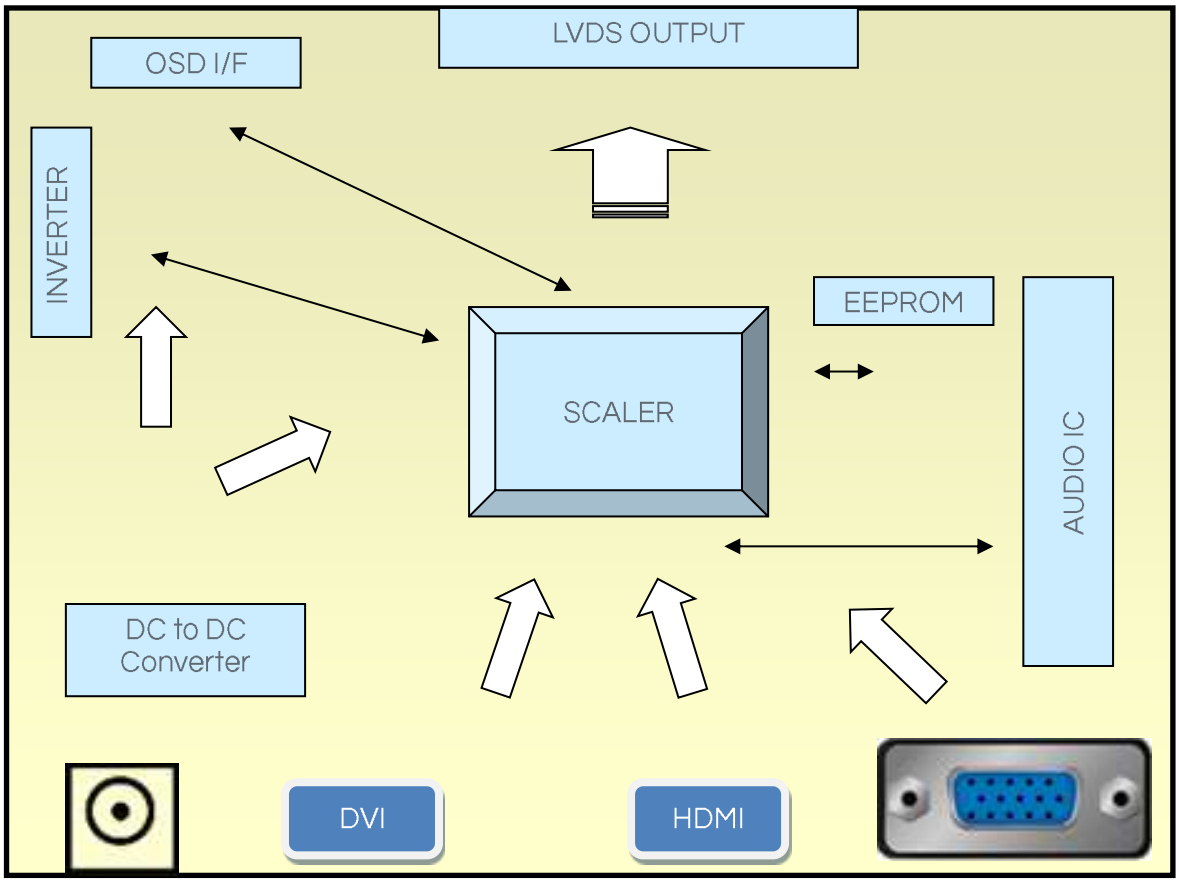
2.1. Input characteristic

Description	Signal	Unit	Min	Typical	Max	Remarks
Power In (12Vdc)						
	Input	12VDC	11.4	12	12.6	
	Consumption	Watt				Board Only
RGB Input						
	Analog RGB	VPP	0	0.7	-	
	Sync	VDC	0	5	5.5	
	H Frequency	KHz	31		80	Depends on Mode
	V Frequency	Hz	55	75	77	Depends on Mode
HDMI Input						
	TMDS	mVp-p	450		900	
DVI Input	TMDS	mVp-p	450	500	900	

2.2. Output characteristic

Description	Signal	Unit	Min	Typical	Max	Remarks
Panel Power						
	LCD Power(12V)	VDC	11.4	12	12.6	Jumper option
	LCD Power(5V)	VDC	4.5	5	5.5	Jumper option
	LCD Power(3.3V)	VDC	3.16	3.3	3.5	Jumper option
LVDS Interface						
	Differential output	Vp-p (mV)	250	350	450	Differential +/-
AUDIO Interface						
	Output	Watt		5	6	
	Frequence	Hz	20Hz		20KHz	
	THD	POUT=3W@ 4Ω, THD 10%(at 5V)				
Inverter Interface						
	Power	V	11.4	12	12.6	Depends on Power
	On/Off control	V	0		3.3	L=off, H=on
	Brightness control	V	5		0	Option
			0		5	Option

3. FUNCTIONAL BLOCK DIAGRAM



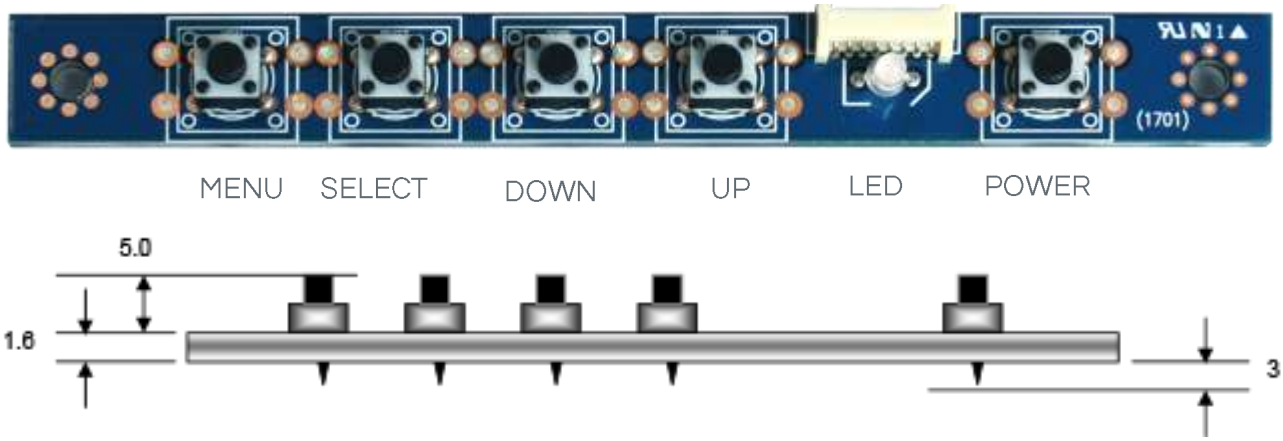
HN120

Rev.0

4. OSD Control Board

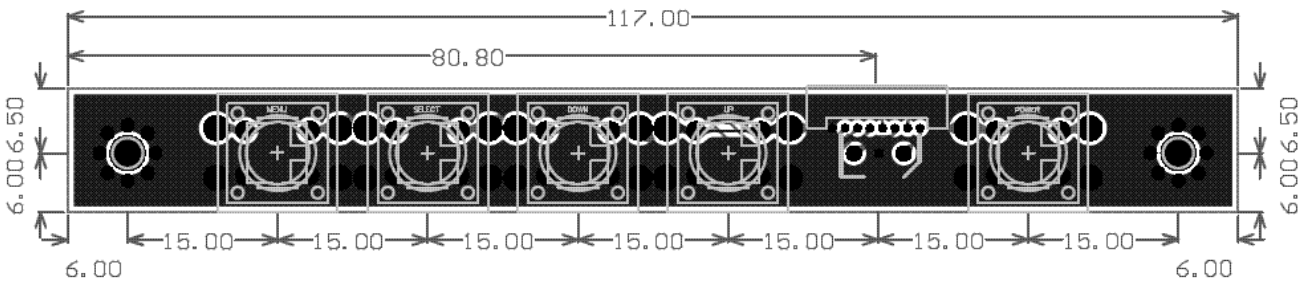
The OSD (On Screen Display) provides certain functions to have clear image and others. This board supports 5 buttons OSD operation as a standard. The control functions defined on OSD operation are as below. (Unit: mm)

Appearance



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

Button	Function	Status	HOT Key
LED	Indicates operation status	Green/ Red/ Amber	On: Green Off: Red No Signal: Amber
POWER	Power on/off	On/Off	
MENU	Activate menu / Exit Menu		
SELECT	Menu Select / Source(option)		
DOWN	Cursor control Down / Auto Adjust		
UP	Cursor control Up		



HN120

5-1. 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 mode Select		
	Mode	ON	
		OFF	
DCR (Dynamic Contrast Ration)	DCR mode Select		
	Mode	OFF	
		DCR	
		DBC	
Super Resolution	Super Resolution mode Select		
	Mode	OFF	
		Weak	
		Median	
		Strong	
		Strongest	

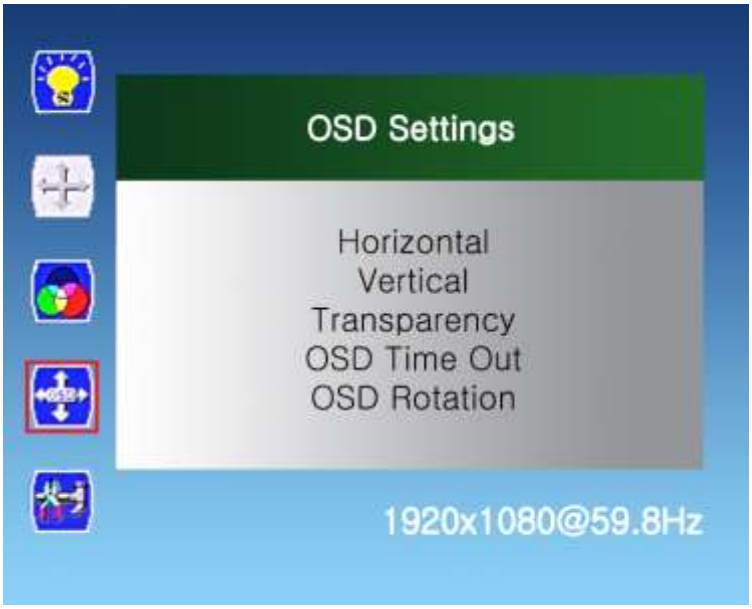
HN120

5-2. OSD FUNCTION

Color page

OSD Menu			
Color Temperature	Color Temperature mode Select		
	Mode	5000K	
		6500K	
		7500K	
		8200K	
		9300K	
		11500K	
		sRGB	
		User Define	
Color level Control			
Red, Green, Blue	Range of Value	MIN	0
		MAX	100

5-3. OSD FUNCTION



OSD Settings page

OSD Menu			
Horizontal	OSD position Control		
	Range of Value	MIN	0
		MAX	100
Vertical	OSD Vertical position Control		
	Range of Value	MIN	0
		MAX	100
Transparency	Transparency level Control		
	Range of Value	MIN	0
		MAX	4
OSD Time Out	OSD Time Out level Control		
	Range of Value	MIN	5
		MAX	60
OSD Rotation	OSD Rotation mode Select		
	Mode	ON	
		OFF	

HN120

Rev.0

5-4. OSD FUNCTION

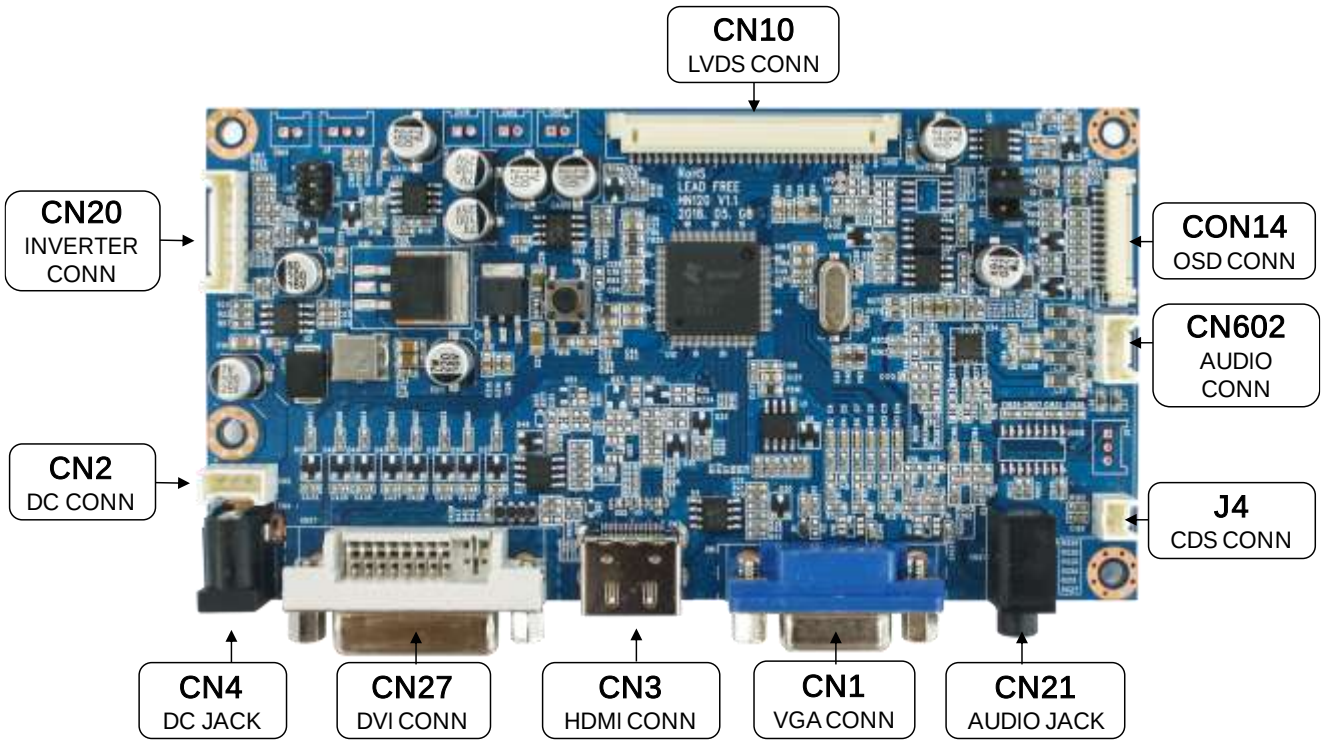
Setup page

OSD Menu			
Language	Language mode Select		
	English		
	한국어		
Mute	Audio Mute Select		
	Mode	ON	
		OFF	
Input	Input signal Select		
	Mode	D-SUB	DVI
		HDMI	AUTO
Display Size	Display Size Select		
	Mode	Full Screen	Smart Fit
		4:3	Smart 4:3
Over Scan	Over Scan mode Select		
	Mode	ON	
		OFF	
Over Driver	Over Driver mode Select		
	Mode	ON	
		OFF	
Reset	Restore to default Value		
	Mode	YES	
		NO	

HN120

6. CONNECTOR, PINOUT & JUMPERS

The various connectors are:



Summary:

Reference	Item	Description	Type	Manufacture
CN21	Connector	Audio Connector	CKX3-3.5-11	-
CN1	Connector	Analog RGB Input Connector	SUB-15P	-
CN3	Connector	HDMI Input Connector	HDMI	-
CN27	Connector	DVI Connector	DVI-D 24P	-
CN4	Jack	Dc power Jack	2.5ø DC Jack	-
CN2	Connector	SMPS Connector	SMW200-04P-2.0mm	YEONHO
CN20	Connector	Inverter Connector	SMW200-08P-2.0mm	YEONHO
CN10	Connector	LVDS Connector	12507WR-30P	YEONHO
CON14	Connector	OSD Connector	12505wr-12P	YEONHO
CN602	Connector	AUDIO Connector	SMW200-04P	
J4	Connector	CDS Connector	SMW200-02P	YEONHO

CN1: DSUB Connector

Pin No.	Symbol	Description
1	RGB1_R+	VGA Red analog signal
2	RGB1_G+	VGA Green analog signal
3	RGB1_B+	VGA Blue analog signal
4	NC	No Connection
5	DET_VGA	VGA Cable Connection Detect
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	VGA_5V	VGA 5V input
10	GND	Ground
11	NC	No Connection
12	SDA	VGA DDC-SDA
13	VGA_HSYNC	Horizontal Sync
14	VGA_VSYNC	Vertical Sync
15	SCL	VGA DDC-SCL

CN3: HDMI Connector

Pin No.	Symbol	Description
1	HDMI0-RX2P	HDMI 2line 2data +
2	GND	Ground
3	HDMI0-RX2N	HDMI 2line 2data -
4	HDMI0-RX1P	HDMI 2line 1data +
5	GND	Ground
6	HDMI0-RX1N	HDMI 2line 1data -
7	HDMI0-RX0P	HDMI 2line 0data +
8	GND	Ground
9	HDMI0-RX0N	HDMI 2line 0data -
10	HDMI0-CLKP	HDMI 2line CLK+
11	GND	Ground
12	HDMI0-CLKN	HDMI 2line CLK -
13	CEC	HDMI CEC
14	HDMI_ARC	Opt
15	DMI0-DDC-SCL	HDMI DDC SCL
16	HDMI0-DDC-SDA	HDMI DDC SDA
17	GND	Ground
18	HDMI0/5V	HDMI power signal
19	HDMI0-HPD	HPD pin

CN27: DVI Input Connector

Pin No.	Symbol	Description
1	TMDS DATA2-	TMDS DATA2 Differential Negative Signal
2	TMDS DATA2+	TMDS DATA2 Differential Positive Signal
3	TMDS DATA2 Shield	Shield for TMDS Channel #2
4	NC	No Connection
5	NC	No Connection
6	DDC Clock	The Data Line for the DDC Interface
7	DDC Data	The Clock Line for the DDC Interface
8	NC	No Connection
9	TMDS DATA1-	TMDS DATA1 Differential Negative Signal
10	TMDS DATA1+	TMDS DATA1 Differential Positive Signal
11	TMDS DATA1 Shield	Shield for TMDS Channel #1
12	NC	No Connection
13	NC	No Connection
14	+5V Power	+5 Volt signal for EDID (Un-powered Monitor)
15	GND(for +5V	Ground for +5 Volt Power pin, Sync return
16	HPD	Identify the presence of a monitor
17	TMDS DATA0-	TMDS DATA0 Differential Negative Signal
18	TMDS DATA0+	TMDS DATA0 Differential Positive Signal
19	TMDS DATA0 Shield	Shield for TMDS Channel #0
20	NC	No Connection
21	NC	No Connection
22	TMDS CLOCK Shield	Shield for TMDS Clock differential Pair
23	TMDS CLOCK+	TMDS DATA0 Differential Positive Signal
24	TMDS CLOCK-	TMDS DATA0 Differential Negative Signal

CN4: DC power Input Jack(12V)

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

CN2: SMPS Connector

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

CN20: Backlight Inverter Connector

Pin No.	Symbol	Description
1	VCC	12V
2	VCC	12V
3	VCC	5V
4	PWM	PWM dimming control signal
5	GND	Ground
6	GND	Ground
7	ON/OFF	Inverter digital ON(3.3V)/OFF(0V) signal
8	ADJ	DIM-adjustment

CN10: LVDS 8 Bit Dual Interface Connector

Pin No.	Symbol	Description
1	MOD_PWR	Panel Power (12V/18V, 5V or 3.3V)
2	MOD_PWR	Panel Power (12V/18V, 5V or 3.3V)
3	MOD_PWR	Panel Power (12V/18V, 5V or 3.3V)
4	N.C	No Connection
5	N.C	No Connection
6	N.C	No Connection
7	GND	Ground
8	Y3P-EVEN	Positive(+) LVDS differential first 3 data(B port)
9	Y3M-EVEN	Negative(-) LVDS differential first 3 data(B port)
10	YCP-EVEN	Positive(+) LVDS differential first Clock(B port)
11	YCM-EVEN	Negative(-) LVDS differential first Clock(B port)
12	Y2P-EVEN	Positive(+) LVDS differential first 2 data(B port)
13	Y2M-EVEN	Negative(-) LVDS differential first 2 data(B port)
14	GND	Ground
15	Y1P-EVEN	Positive(+) LVDS differential first 1 data(B port)
16	Y1M-EVEN	Negative(-) LVDS differential first 1 data(B port)
17	GND	Ground
18	Y0P-EVEN	Positive(+) LVDS differential first 0 data(B port)
19	Y0M-EVEN	Negative(-) LVDS differential first 0 data(B port)
20	Y3P-ODD	Positive(+) LVDS differential second 3 data(A port)
21	Y3M-ODD	Negative(-) LVDS differential second 3 data(A port)
22	YCP-ODD	Positive(+) LVDS differential second Clock(A port)
23	YCM-ODD	Negative(-) LVDS differential second Clock(A port)
24	GND	Ground
25	Y2P-ODD	Positive(+) LVDS differential second 2 data(A port)
26	Y2M-ODD	Negative(-) LVDS differential second 2 data(A port)
27	Y1P-ODD	Positive(+) LVDS differential second 1 data(A port)
28	Y1M-ODD	Negative(-) LVDS differential second 1 data(A port)
29	Y0P-ODD	Positive(+) LVDS differential second 0 data(A port)
30	Y0M-ODD	Negative(-) LVDS differential second 0 data(A port)

CON14: OSD Connector

Pin No.	Symbol	Description
1	LED-Red	RED Color
2	LED-Green	GREEN Color
3	GND	Ground
4	AUTO	For Auto Switch
5	MENU	For Menu Switch
6	SEL	For Select Switch
7	DOWN	For Down Switch
8	UP	For Up Switch
9	POWER	For Power Switch
10	GND	Ground
11	IRD	IR DATA
12	5V	IR POWER 5V

CN602: AUDIO Output

Pin No.	Symbol	Description
1	L+	LEFT +
2	L_	LEFT -
3	R+	RIGHT +
4	R-	RIGHT -

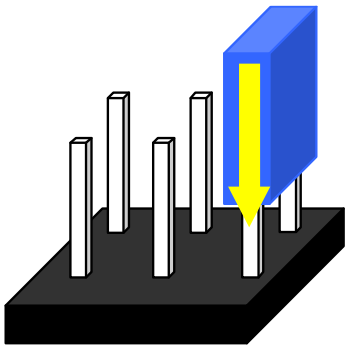
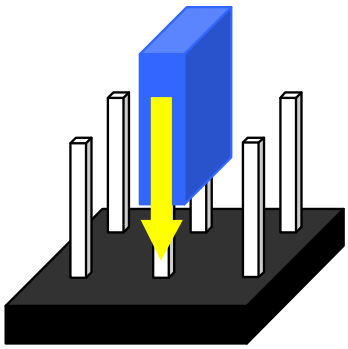
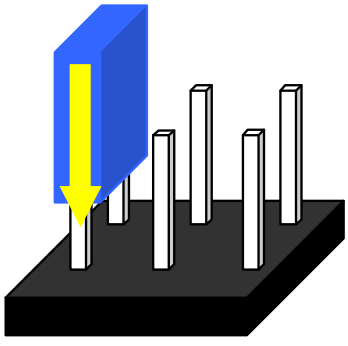
J4: CDS Connector

Pin No.	Symbol	Description
1	IN	CDS IN
2	GND	Ground

HN120

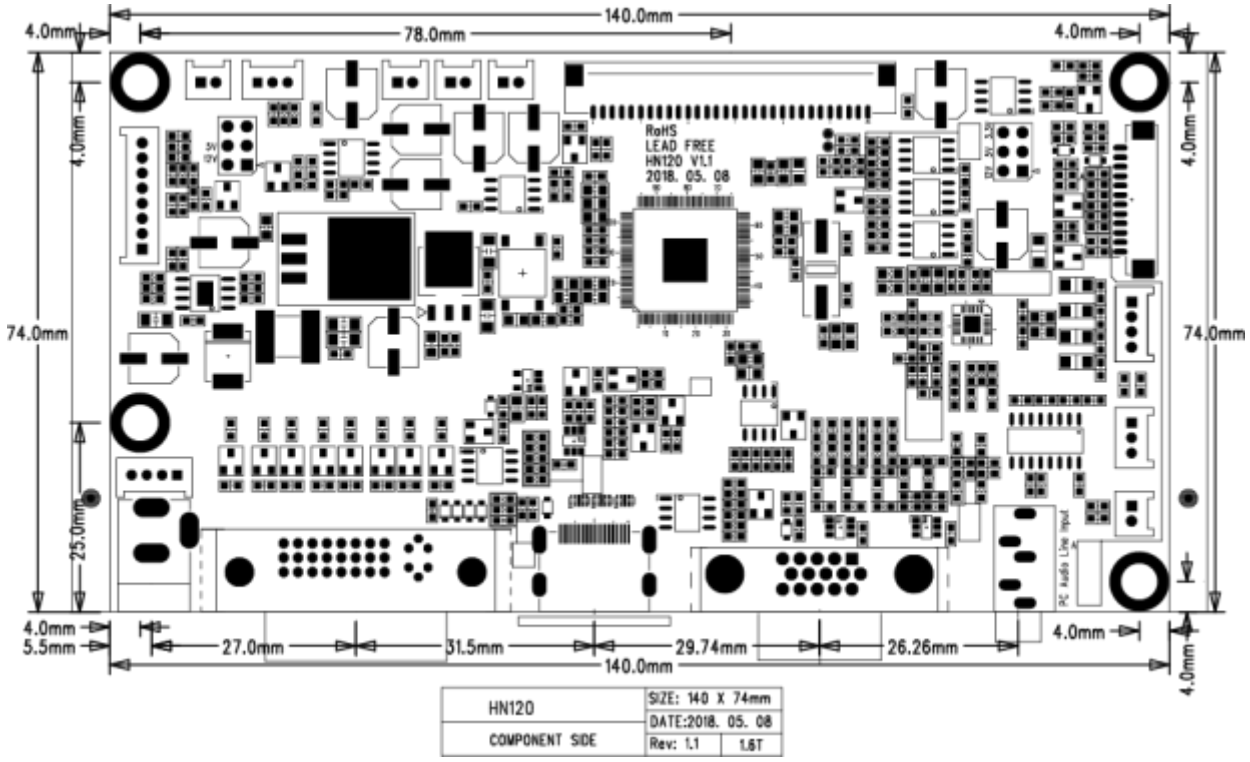
Rev.0

Summary: Panel Power setting

Reference	Description	Connector Type
CON11	3.3V panel power CAUTION: Incorrect setting can damage panel	
	5.0V panel power CAUTION: Incorrect setting can damage panel	
	12V/18V panel power CAUTION: Incorrect setting can damage panel	

CAUTION: Incorrect setting can damage panel

7. CONTROLLER DIMENSIONS



DIMENSION DOWNLOAD

8. 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 analog dimming control method. And it is important to consider the specifications for the inverter to be used.

9. 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 input format

Spec / Mode	Pixel Freq.	Horizontal Timing		Vertical Timing	
		Freq.	Active	Freq.	Active
	MHz	KHz	Pixel	Hz	Lind
640*350@70Hz	25.144	31.430	640	70.000	350
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
1366*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

HN120

Rev.0

HDMI input format

Spec / Mode	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(I)	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

HN120

10. Serial Number