

HN102





Approval

Rev. 01

Issue Date. 2018. 10. 10

Doc No. HN102

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	CheckedII	Approved
			
KB.PARK			YH. HAN

Revision History

Rev.	ECN No.	Description of Changes	Date	Prepared
V1.0		Initial Release	2018. 10. 10	KB.PARK

1. General Specification

No.	Item	Description		
1	Model Name	HN102		
2	LCD Module	LVDS 1920X1080 60Hz 8bit		
3	Input	Display Port		
4	Resolution Support	H: 31 ~ 135kH		
		V: 55 ~ 76Hz		
5	OSD Control	Menu, Select, Down, Up, Power		5 keys
	Plug & Play	VESA DDC 2B Ver1.4		
6	Power Consumption	Supply Voltage	12Vdc	
		Power	3.0 Watt	Board Only
		Analog	DSUB 15P(R, G, B Separate H, V Sync)	
		Digital	Display Port	
		Audio	3W x 3W	
8	Board Size	W x H x D(mm)	110 x 80 x 15	



2. ELECTRICAL SPECIFICATION

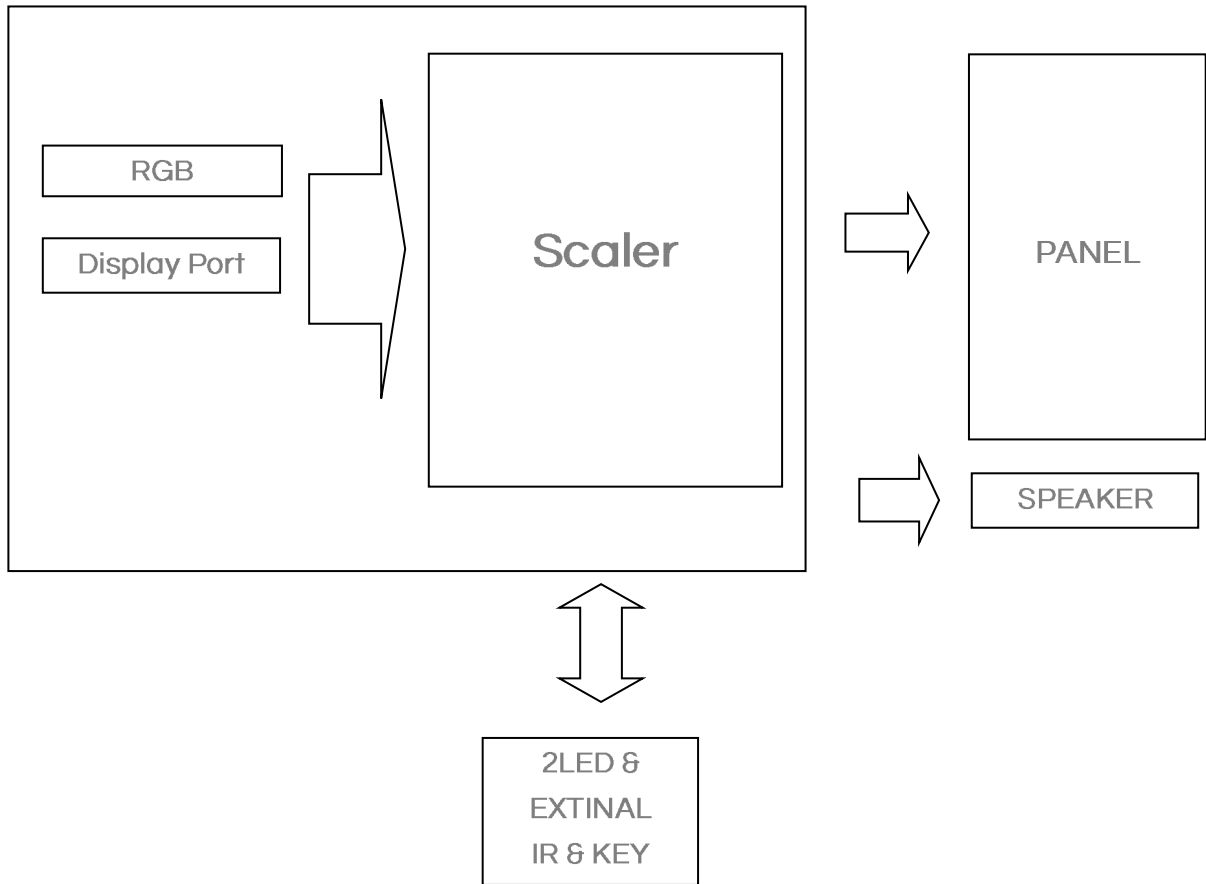
2.1. Input characteristic

Description	Signal	Unit	Min	Typical	Max	Remarks
Power In (12Vdc)						
	Input	12VDC	11.4	12	12.6	
	Consumption	Watt		3		
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
DP Input						
	HBR1	Vp-p	1		1.3	

2.2. Output characteristic

Description	Signal	Unit	Min	Typical	Max	Remarks
Panel Power						
	LCD Power(12V)	VDC	11.4	12	12.6	
	LCD Power(5V)	VDC	4.5	5	5.5	
	LCD Power(3.3V)	VDC	3.16	3.3	3.5	
AUDIO Interface						
	Output	Watt		3		
	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	3.3		0	Option
			0		4.0	Option

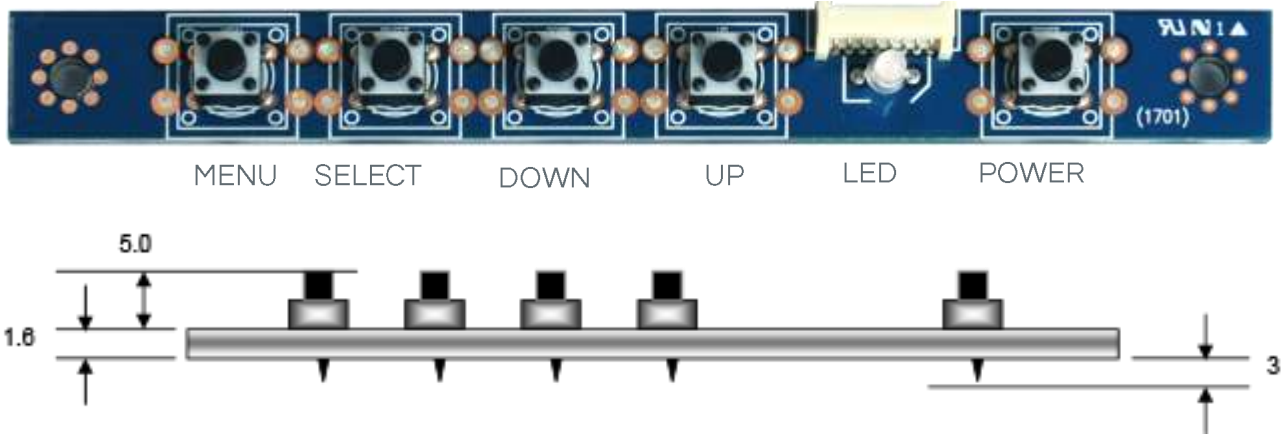
3. FUNCTIONAL BLOCK DIAGRAM



4. OSD Control Board

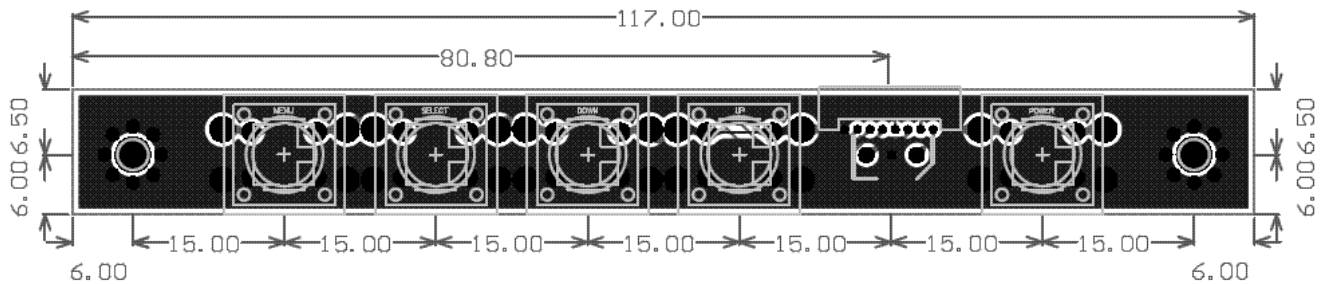
The OSD (On Screen Display) provides certain functions to have clear image and others. This board supports 5 buttons OSD operation as a standard. The control functions defined on OSD operation are as below. (Unit: mm)

Appearance



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

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 / Source		
DOWN	Cursor control Down		
UP	Cursor control Up / Volume Select		



5-1. OSD FUNCTION



Luminance page

OSD Menu			
Brightness	Brightness level Control		
	Range of Value	MIN	0
		MAX	100
Gamma	Gamma value Select		
	Mode	ON	
		OFF	
DCR (Dynamic Contrast Ration)	DCR mode Select		
	Mode	OFF	
		DBC	
		DCR	
Super Resolution	Super Resolution mode Select		
	Mode	OFF	
		Weak	
		Median	
		Strong	
	Strongest		

5-2. OSD FUNCTION



Color page

OSD Menu		
H Position	Color Temperature mode Select	
	Mode	5000K
		6500K
		7500K
		8200K
		9200K
		9300K
		11500K
		SRGB
		User Define
Red		
Green		
Blue		

5-3. OSD FUNCTION



OSD Settings page

OSD Menu			
H Position	OSD Horizontal position Control		
	Range of Value	MIN	0
		MAX	100
V Position	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	0
		MAX	60
OSD Rotation	OSD Rotation mode Select		
	Mode	ON	
		OFF	

5-4. OSD FUNCTION

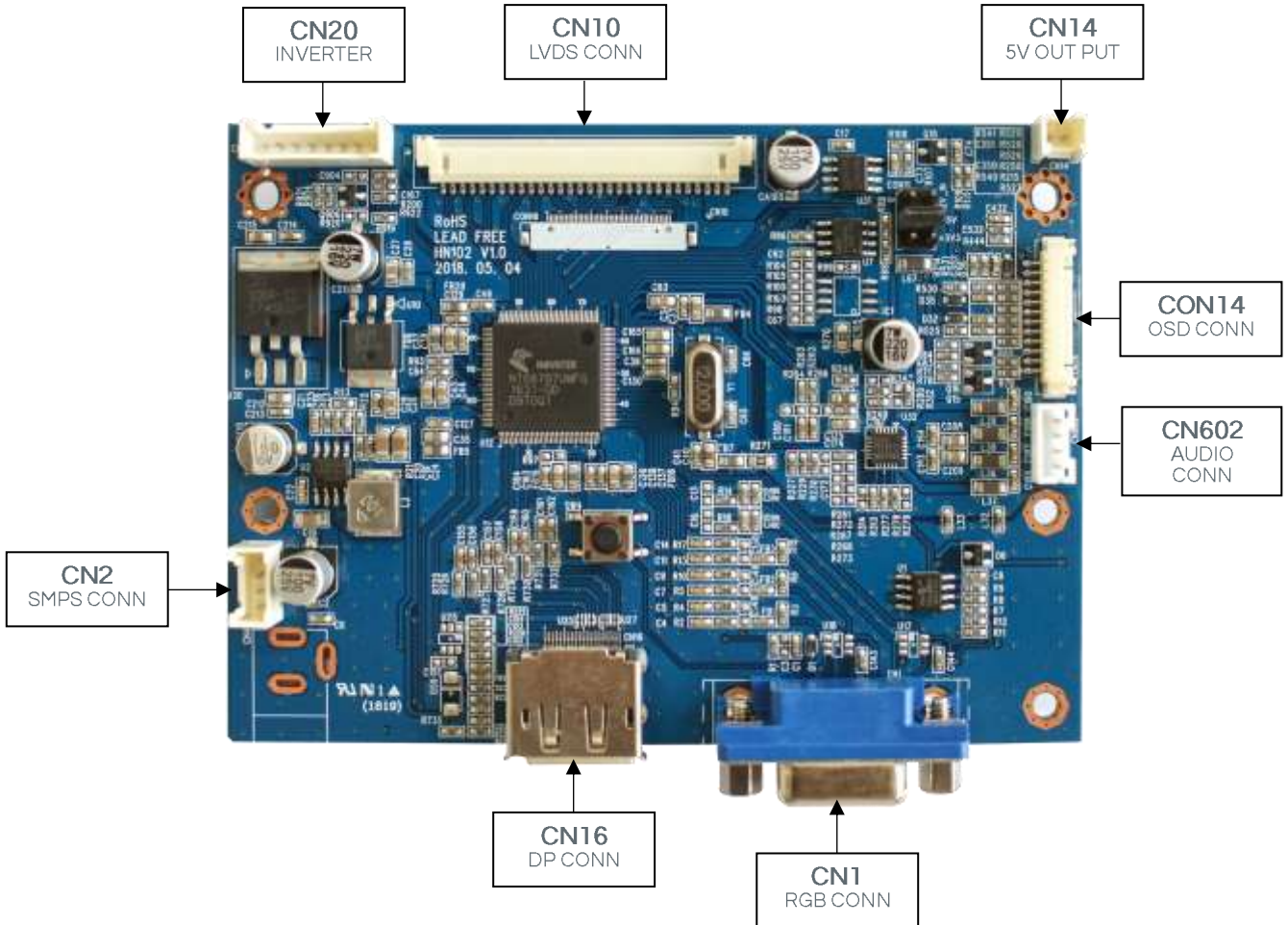


Setup page

OSD Menu				
Language	Aspect Ratio Mode Select			
	English	Spanish	French	German
	Italian	Portuguese	Russian	Chinese
Mute	Audio Mute Select			
	Mode	ON		
		OFF		
Input	Input signal Select			
	Mode	HDMI		
		DP		
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	ON		
		OFF		

6. CONNECTOR, PINOUT & JUMPERS

The various connectors are:



Summary:

Reference	Item	Description	Type	Manufacture
CN1	Connector	RGB Connector	DSUB-15P	YENDA
CN16	Connector	DP Connector		
CN2	Connector	Power Connector	SMW200-04P-2.0mm	YEONHO
CN20	Connector	INVERTER Connector	SMW200-08P-2.0mm	YEONHO
CN10	Connector	LVDS Connector	12507WR-30P	YEONHO
CN14	Connector	5V OUTPUT Connector	SMW200-02P-2.0mm	YEONHO
CON14	Connector	OSD Connector	12505WR-12P	YEONHO
CN602	Connector	AUDIO Connector	20010WS-04P	YEONHO

CN1: D-SUB 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

CN16: Display Port Connector

Pin No.	Symbol	Description
1	DPX3-	P Channel1 input data pair 3-
2	GND	Ground
3	DPX3+	DP Channel1 input data pair 3+
4	DPX2-	DP Channel1 input data pair 2-
5	GND	Ground
6	DPX2+	DP Channel1 input data pair 2+
7	DPX1-	DP Channel1 input data pair 1-
8	GND	Ground
9	DPX1+	DP Channel1 input data pair 1+
10	DPX0-	DP Channel1 input data pair 0-
11	DET_DP	DP Cable Connection Detect
12	DPX0+	DP Channel1 input data pair 0+
13	NC	Not Connect
14	NC	Not Connect
15	AUX+	DP Channel AUX+
16	GND-	Ground
17	AUX-	DP Channel1 AUX-
18	HPD_DP	DP Channel1 hot-plug detect
19	GND	Ground
20	NC	Not Connect
21	GND	Ground
22	GND	Ground
23	GND	Ground
24	GND	Ground

CN2: SMPS Connector

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

CN20: Invertor Connector

Pin No.	Symbol	Description
1~2	12V_IN	12V Power in
3~4	+5V	+5V
5	GND	Ground
6	GND	Ground
7	BL-ON/OFF	Backlight on signal
8	BL-ADJUST	Backlight dimming signal

CN10: LVDS 60Hz Connector

Pin No.	Symbol	Description
1~3	PANEL-VCC	Panel Power (12V/18V, 5V or 3.3V)
4~6	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)

CN14: 5V OutPut Connector

Pin No.	Symbol	Description
1	GND	Ground
2	+5V	+5V

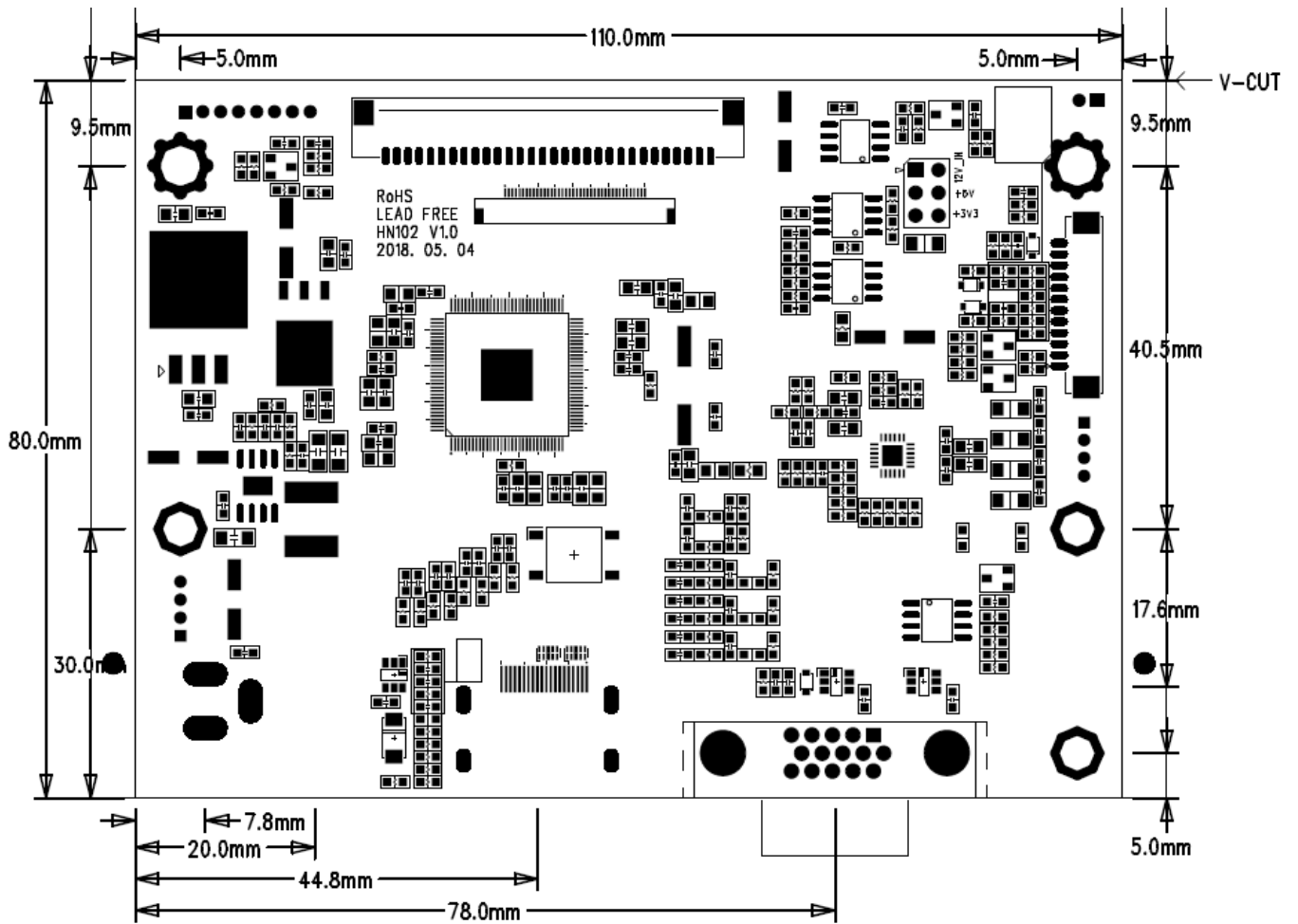
CON14: OSD Connector

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

CN602: AUDIO Connector

Pin No.	Symbol	Description
1	R-	Speaker Right -
2	R+	Speaker Right +
3	L+	Speaker Left +
4	L-	Speaker Left -

8. CONTROLLER DIMENSIONS



[DIMENSION DOWNLOAD](#)

9. 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.

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 more clear and stable image on a screen.

RGB input format

Spec Mode	Pixel Freq. MHz	Horizontal Timing		Vertical Timing	
		Freq.	Active	Freq.	Active
		KHz	Pixel	Hz	Line
720*400@85Hz	35.500	37.927	720	85.000	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

DP input format

Spec Mode	Horizontal Timing		Vertical Timing	
	Freq.	Active	Freq.	Active
	KHz	Pixel	Hz	Line
720X480(P)	31.469	720	59.94	480
1280X720(P)	45	1280	60	720
1920X1080(P)	33.75	1920	60	540
1280X720(P)	37.50	720	50	720
1920X1080(I)	28.125	1920	50	540
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	920	30	1080