

深圳市博合数码科技有限公司

Shenzhen Bohoo Digi-Tech Co.,Ltd

SPECIFICATION

MODEL: BH-5660-A

Rev: 1.0

Part Number:

Published Date:

Approved by		
Prepared by 编写	Checked by 审核	Approved by 批准

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REVISION HISTORY

Rev	DATE	PAGE	DESCRIPTION	AUTHOR
1.0	15.11.05	All	First issued	Danny Xu

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1. GENERAL DESCRIPTION （概述）

BH-5660-A is a 4K panel driver board, it supports HDMI2.0 4K@60Hz input and supports 8 lane V-By-One 4K@60Hz or 16 lane V-By-One 4K@120Hz panel, such as 75", 84", 85", 98" etc.

是一款支持HDMI2.0输入，可以直接驱动8/16 lane V-by-one 4K 60Hz/120Hz等超大尺寸面板。

BH-5660-A is usually applied in 4K UHD medical/ security monitor, education whiteboard etc. it supports 4K MEMC for better motion picture quality.

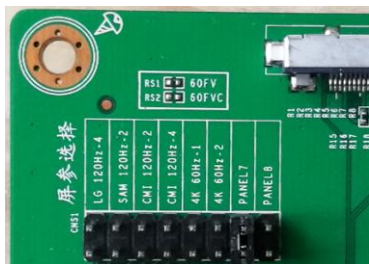
常用于4K监视器，医疗显示器，教育白板等商用显示。可支持4K MEMC。

BH-5660-A's USB slot can be used for updating software and playing multi-media, such as MP3 and JPEG.

该款方案的USB 接口可用于软件升级和多媒体播放。

BH-5660-A can assemble different pin-pin chipsets for different feature, it also can config different panel by Jumper Cap, showed as picture below:

可支持PIN-PIN主芯片，区别和对应功能选择如下表，也可以通过跳线帽配置不同的屏参，方便用户选配不同的屏。

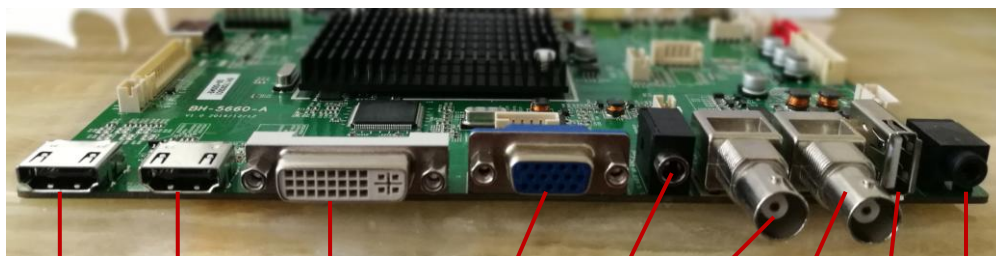


主芯片 chipset	60FV	60FVC
4K 60Hz panel	✓	✓
4K 120Hz panel	✓	×

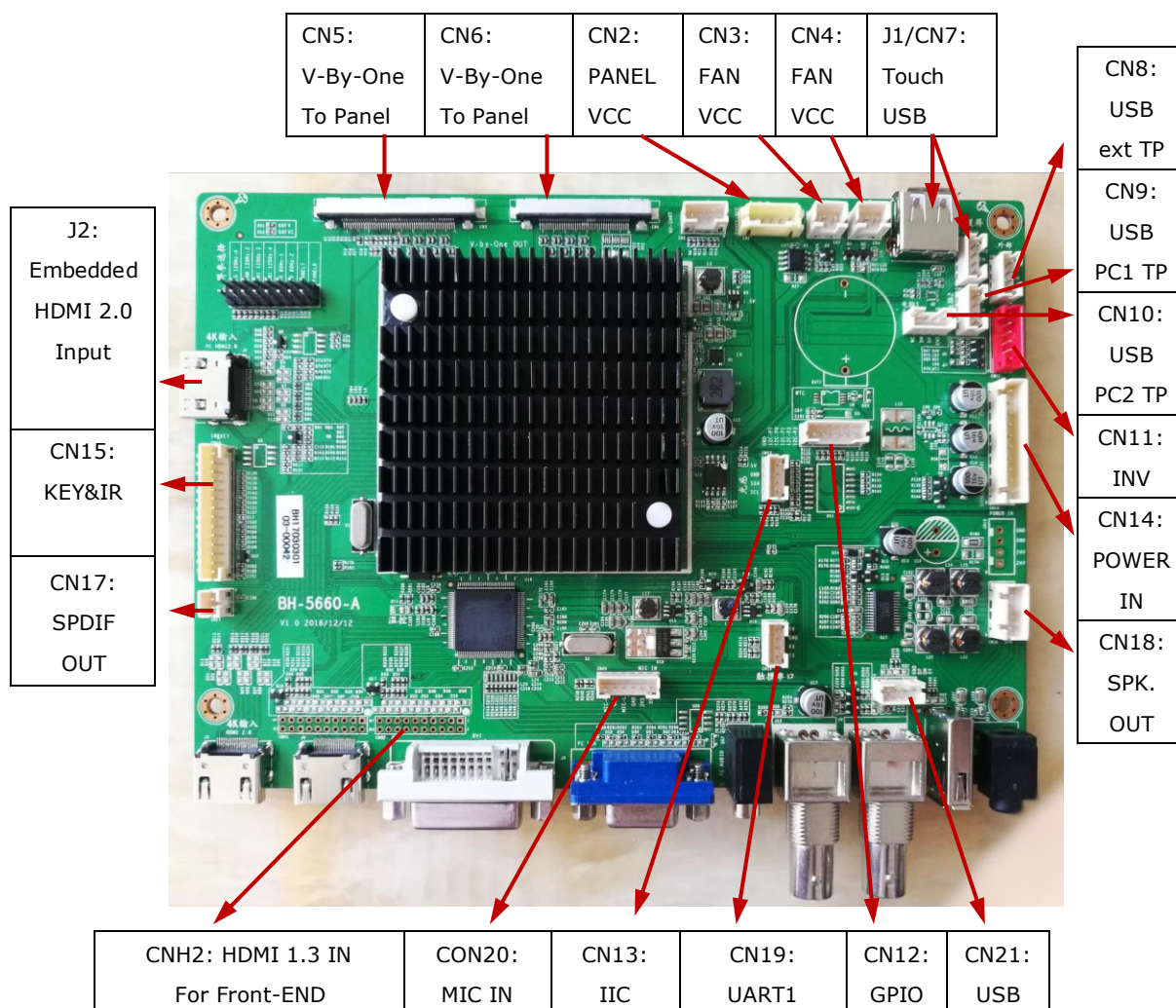
2. FUNCTION LAYOUT （产品外观）

NOTE: The optional connectors and terminals are marked with "*".

FRONT VIEW OF BH-5660-A （前视图）



HDMI2.0 IN	HDMI1.3 IN	DVI IN *	VGA IN	Audio IN	CVBS IN *	CVBS OUT *	USB	EARPHONE OUT
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TOP VIEW OF BH-5660-A (正视图)

*Note: either DVI or CNH2 Front-END HDMI;

前置HDMI或DVI二选一;

USB TP Switch for Education White Board application only;

扩展I/O, 触摸USB切换仅教育白板时使用;

Audio AMP Optional;

音频功放可选;

CVBS input/output with BNC connector Optional;

BNC接口常用于监视器项目, 可以用传统RCA莲花端子, 根据用户需求选择。

3. FEATURES

3.1 Main Features Overview (主要特性)

CHIPSET (主芯片)	Mstar		
MARKET (目标应用)	Education whiteboard; Medical Monitor; Naked eye 3D;		
OSD LANGUAGE (OSD语言)	English, Chinese, Multi-Language, 英文, 中文, 多国语言		
PANEL (面板)	Panel Type(类型)	8/16 lane V-By-One 4K UHD@60Hz/120Hz	
	Resolution (分辨率)	Up to 3840x2160	
VIDEO INPUT (视频信号输入)	PC-RGB	Format (格式)	Up to 1920x1080@60Hz
	CVBS	Video System (视频制式)	PAL/NTSC/SECAM
		Video Level (信号幅度)	1.0 Vp-p ±5%
	DVI	480i, 480p, 576i, 576p, 720p, 1080i, 1080p	
	HDMI	480i, 480p, 576i, 576p, 720p, 1080i, 1080p, 4Kx2K	
AUDIO INPUT (音频信号输入)	Audio	Earphone Input	0.2 ~ 2.0Vrms
AUDIO OUTPUT (音频输出)	Speaker	Frequency response(频率响应)	120Hz~15KHz @±3dB (1KHz 0dB reference signal 参考信号为1KHz 0dB)
		Max Output Power (最大输出功率)	2x8W (8Ω) THD+N<10%@1KHz (Audio input:0.5Vrms)
POWER REQUIREMENT	12V,5V,5VSB(5V standby)		
POWER CONSUMPTION	Standby(待机)	≤ 0.5W	
POWER TO TCON (屏TCON供电)	To Panel (驱屏电压)	12V	
COMB FILTER (梳状滤波器)	3D		
DE-INTERLACE (隔逐行转换)	3D		
KEY FUNCTION (按键功能)	MENU, CH+, CH-, VOL+, VOL-, INPUT, POWER 菜单, 频道+, 频道-, 音量+, 音量-, 信号源, 电源		
Note: Licenses involved in specifications above are supposed to be obtained by customers themselves. 注意: 以上规格涉及License部分需要客户自己根据需要获取。			

3.2 USB Multi-Media Playback Format (USB 多媒体播放支持格式列表)

Media 媒体	File Ext. 扩展名	Codec 编解码		Remarks 备注
		Video 视频	Audio 音频	
Movie	*.avi	MJPEG	AA3,AC3, PCM, MP2,MP3,	Max Resolution & Frame Rate: 640×480@30 fps,

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			WMA	Max Data Rate: 10 Mbps
		Xvid,MPEG-2, MPEG-4,H.264,Dv iX		Max Resolution & Frame Rate: 1920×1080@30 fps, Max Data Rate: 20 Mbps
	*.mp4	MPEG-2,MPEG-4, H.264,Dvix		
	.ts /.*rp	MPEG-2,H.264		
	*.*kv *.*ov	MPEG-1/2/4, H.264		
	*.*pg	MPEG-1,MPEG-2		
	*.*at	MPEG-1	MP2	Max Resolution: 352x288 Max Data Rate: 20 Mbps
	*.*ob	MPEG-2		Max Resolution: 720x576 Max Data Rate: 20 Mbps
	*.*rm	RV8,RV9,RV10	COOK	Max Resolution & Frame Rate: 1280×720@30 fps, Max Data Rate: 10 Mbps
	*.*rmvb			

Music	*.*p3	-	MP3	Sample Rate(KHz): 32~48 Bit Rate(Kbps): 32~320 Channel: Mono/Stereo
	*.*ma	-	WMA	Sample Rate(KHz): 8~48 Bit Rate(Kbps): 128~320 Channel: Mono/Stereo
	*.*AC	-	MPEG2 AAC	Sample Rate(KHz): 8~48 Bit Rate(Kbps): 128~442 Channel: Mono/Stereo
	*.*4A	-	MPEG-4 AAC	Sample Rate(KHz): 8~48 Bit Rate(Kbps): 128~442 Channel: Mono/Stereo

Photo	*.*pg	Baseline JPEG		Max Resolution: 15360×8640
	*.*peg	Progressive JPEG		Max Resolution: 1024×768
	*.*mp	--		Max Resolution: 9600×6400
	*.*ng	Non-interlaced		Max Resolution: 9600×6400
		Interlaced		Max Resolution: 1200×800

TEXT	*.*t	ANSI/UNICODE GB/UTF8		Max File Size: 1MB
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Notes:

1.

USB Supports file system: Hi Speed FS, FAT32, FAT16, NTFS(compressed NTFS file is not supported).
USB支持文件格式: Hi Speed FS, FAT32,FAT16,NTFS (不支持压缩NTFS文件)

2.

Please don't pull out the USB device under operating.请不要在播放时拔USB.

3.

Licenses are required for MPEG, MP3, WMA, especially AC3 and DivX. Licenses需要客户自行获取。

4.

Mp4 cannot support GMC. Mp4不支持GMC

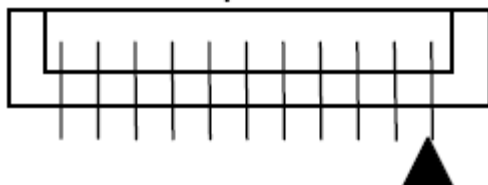
5.

Max storage capacity is 400G. The greatest depth of folders is 30.
最大可接硬盘容量400G，文件夹最多30层。

4. INTERFACE DIFINITION(接口定义)

All connecting plug-ins recognize tacitly the square pin as No.1 pin. The pin definition also refers to PCBA bottom silkscreen. No.1 pin of 2.0/2.54mm pitch sockets show as below picture:

Pin脚顺序，PCB封装方脚均表示第1脚。2.0/2.54mm间距插座缺口朝上时，最左边为第1脚，如下图所示：



◆ CN5 (51PIN/0.5): V-By-One TO PANEL CONNECTOR

- FI-RE51S-HF (manufactured by JAE)
- Mating Connector: FI-R51HL (JAE) or compatible

NO.	SYMBOL	DESCRIPTION	NO.	SYMBOL	DESCRIPTION
51	12V	Power Supply +12.0V	25	GND	Ground
50	12V	Power Supply +12.0V	24	Rx0n	V-by-One HS DATA LANE0
49	12V	Power Supply +12.0V	23	Rx0p	
48	12V	Power Supply +12.0V	22	GND	Ground
47	12V	Power Supply +12.0V	21	Rx1n	V-by-One HS DATA LANE1
46	12V	Power Supply +12.0V	20	Rx1p	
45	12V	Power Supply +12.0V	19	GND	Ground
44	12V	Power Supply +12.0V	18	Rx2n	V-by-One HS DATA LANE2
43	NC	No Connection	17	Rx2p	
42	GND	Ground	16	GND	Ground
41	GND	Ground	15	Rx3n	V-by-One HS DATA LANE3
40	GND	Ground	14	Rx3p	
39	GND	Ground	13	GND	Ground
38	NC	No Connection	12	Rx4n	V-by-One HS DATA LANE4
37	D_Format0	[1:0]: 10 Default For LG panel Mode3:4 Division	11	Rx4p	
36	D_Format1		10	GND	Ground
35	NC	No Connection	9	Rx5n	V-by-One HS DATA LANE5
34	PNL_SDA	PANEL I2C Data Signal	8	Rx5p	
33	PNL_SCL	PANEL I2C Clock Signal	7	GND	Ground
32	NC	No Connection	6	Rx6n	V-by-One HS DATA LANE6
31	BIT_SEL	'H' or NC = 10bit (Default);	5	Rx6p	
30	NC	No Connection(AGP)	4	GND	Ground
29	NC	No Connection(L_DIM ENABLE)	3	Rx7n	V-by-One HS DATA LANE7
28	GND	Ground	2	Rx7p	
27	HTPDN	Hot Plug Detect	1	GND	Ground
26	LOCKN	Lock Detect	-	-	-

◆ CN6 (41PIN/0.5): V-By-One TO PANEL CONNECTOR

- FI-RE41S-HF (manufactured by JAE)
- Mating Connector: FI-R41HL (JAE) or compatible

NO.	SYMBOL	DESCRIPTION	NO.	SYMBOL	DESCRIPTION
41	GND	Ground	20	GND	Ground
40	Rx8n	V-by-One HS DATA LANE8	19	Rx15n	V-by-One HS DATA LANE15
39	Rx8p		18	Rx15p	
38	GND	Ground	17	GND	Ground
37	Rx9n	V-by-One HS DATA LANE9	16	NC	No Connection
36	Rx9p		15	NC	No Connection
35	GND	Ground	14	GND	Ground
34	Rx10n	V-by-One HS DATA LANE10	13	NC	+12V power supply for some LG Tcon (*note)
33	Rx10p		12	P12V	
32	GND	Ground	11	P12V	
31	Rx11n	V-by-One HS DATA LANE11	10	P12V	
30	Rx11p		9	P12V	
29	GND	Ground	8	P12V	
28	Rx12n	V-by-One HS DATA LANE12	7	P12V	
27	Rx12p		6	P12V	
26	GND	Ground	5	P12V	
25	Rx13n	V-by-One HS DATA LANE13	4	P12V	
24	Rx13p		3	P12V	
23	GND	Ground	2	P12V	
22	Rx14n	V-by-One HS DATA LANE14	1	P12V	
21	Rx14p		-	-	-

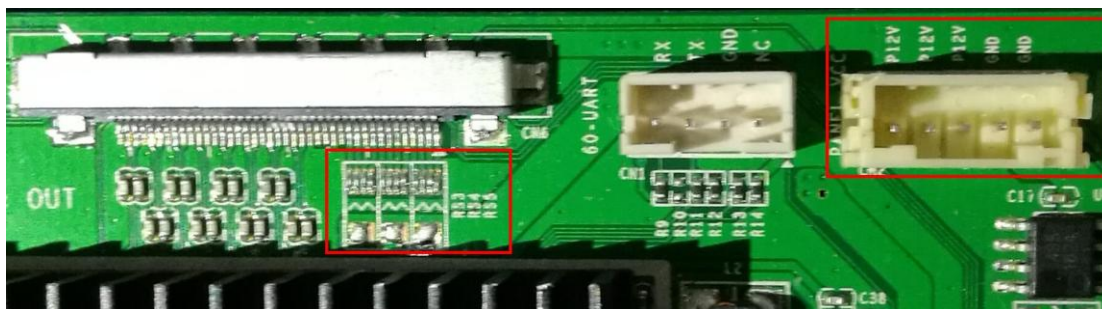
*Note: RS3,RS4,RS5 Default NC, mounted for some LG PANEL;

RS3,RS4,RS5默认空贴, 部分LG屏需要41p座子供电;

CN2 for LG panel Tcon power supply separately,

CN2 给TCON板单独供电(详见CN2接口定义说明);

show as below picture:



◆ **CN2 (5PIN/2.0): PANEL VCC CONNECTOR(屏电压接口)**

NO.	SYMBOL	DESCRIPTION
1	GND	Ground
2	GND	
3	12V	+12V Power Supply for PANEL Tcon
4	12V	
5	12V	

◆ **CN3 (2PIN/2.0): FAN VCC CONNECTOR(风扇接口)**

NO.	SYMBOL	DESCRIPTION
1	12V	+12V Power Supply for FAN
2	GND	Ground

◆ **CN4 (2PIN/2.0): FAN VCC CONNECTOR(风扇接口)**

NO.	SYMBOL	DESCRIPTION
1	12V	+12V Power Supply for FAN
2	GND	Ground

◆ **CN7 (4PIN/2.0): TOUCH USB IN(触摸框USB输入)**

NO.	SYMBOL	DESCRIPTION
1	5VD	+5V Power Supply for Touch panel
2	DM	USB D-
3	DP	USB D+
4	GND	Ground

◆ **CN8 (4PIN/2.0): TOUCH USB FOR EXT-PC(触摸框USB外部电脑端口)**

NO.	SYMBOL	DESCRIPTION
1	NC	NC
2	DM	USB D-
3	DP	USB D+
4	GND	Ground

◆ **CN10 (4PIN/2.5): TOUCH USB FOR PC1(触摸框USB内部电脑1端口)**

NO.	SYMBOL	DESCRIPTION
1	NC	NC
2	DM	USB D-
3	DP	USB D+
4	GND	Ground

◆ **CN9 (4PIN/2.5): TOUCH USB FOR PC2(触摸框USB内部电脑2端口)**

NO.	SYMBOL	DESCRIPTION
1	NC	NC
2	DM	USB D-
3	DP	USB D+
4	GND	Ground

◆ **CN11 (6PIN/2.0): INVERTER CONNECTOR**

NO.	SYMBOL	DESCRIPTION
1	GND	Ground
2	GND	Ground
3	ADJ	Backlight brightness adjust(0V-3V)
4	ON/OFF	Backlight Control(H:ON, L:OFF)
5	12V	+12V Power Supply
6	12V	+12V Power Supply

◆ **CN14 (10PIN/2.5): POWER IN CONNECTOR**

NO.	SYMBOL	DESCRIPTION
1	STB	Power Standby Control(H:work, L:Standby)
2	GND	Ground
3	GND	Ground
4	5VS	+5V Standby Power Supply
5	5V	+5V Normal Power Supply
6	5V	+5V Normal Power Supply
7	GND	Ground
8	GND	Ground
9	12V	+12V Normal Power Supply
10	12V	+12V Normal Power Supply

◆ **CON15 (14PIN/2.0): IR&KEY BOARD CONNECTOR 遥控按键接口**

NO.	SYMBOL	DESCRIPTION
1	GND	Ground
2	K7/ECO	ADC KEY7 (ECO Key) ECO键
3	K6/P	ADC KEY6 (Power Key default) 默认电源键
4	K5/M	ADC KEY5 (Menu Key default) 默认菜单键
5	K4/V-	ADC KEY4 (Volume- Key default) 默认音量减键
6	K3/V+	ADC KEY3 (Volume+ Key default) 默认音量加键
7	K2/CH-	ADC KEY2 (CH- Key default) 默认频道减键
8	K1/CH+	ADC KEY1 (CH+ Key default) 默认频道加键
9	K0/S	ADC KEY0 (Source Key default) 默认信号源键
10	GND	Ground

11	IR	Remote control 红外遥控接收
12	GRN	Green indicator 绿色指示灯
13	RED	Red indicator 红色指示灯
14	5V	+5V power supply for IR 遥控接收头5V供电

***Note1:** Default key function is strongly recommended, please don't change it, especially for Power key.

If you want use ADC key board, you need connect pin3: K6/P and pin5: VOL-, and leave other open, please contact our HW engineer first for reference key board application circuit.

推荐不改变默认的按键定义顺序，特别是电源和频道加减键。如果希望使用3P线连接按键板，请连接第3脚(Power)，第5脚(VOL-)用于按键电压采样，并请联系敝公司工程师提供参考的按键板电路图。

◆ CN16 (4PIN/2.5): POWER IN CONNECTOR (optional)

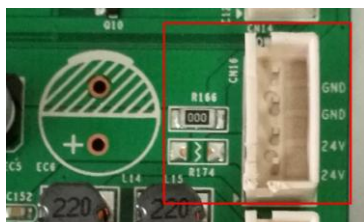
NO.	SYMBOL	DESCRIPTION
1	24V	+24V Power Supply for Audio AMP 功放+24V电源输入
2	24V	+24V Power Supply for Audio AMP 功放+24V电源输入
3	GND	Ground
4	GND	Ground

*Note: NC default (R166 Mounted): Audio AMP use +12V Power Supply for 2*8W Speaker OUT;

R174 Mounted: Audio AMP use +12V Power Supply for $\geq 2*10W$ Speaker OUT.

主板贴R166/1206封装电阻时，功放默认12V供电，CN16不用接入电源，最大支持2*8W喇叭输出。

主板贴R175/1206封装电阻时，功放改接电源板24V供电，提高功放输出功率。如下图所示：



◆ CN18 (4PIN/2.5): SPEAKER CONNECTOR 喇叭接口

NO.	SYMBOL	DESCRIPTION
1	R+	Audio Right Channel Output+ 右声道正输出
2	R-	Audio Right Channel Output- 右声道负输出
3	L-	Audio Left Channel Output- 左声道负输出
4	L+	Audio Left Channel Output+ 左声道正输出

◆ CN17 (2PIN/2.0): SPDIF OUT CONNECTOR

NO.	SYMBOL	DESCRIPTION
1	SPDIF	SPDIF OUT (同轴数字音频输出)
2	GND	GND

◆ CN19 (4PIN/2.0): UART CONNECTOR 触摸串口

NO.	SYMBOL	DESCRIPTION
1	5VD	+5V Power Supply

2	GND	Ground
3	RX	UART Receiver Signal
4	TX	UART Transmitter Signal

◆ **CN20 (2PIN/2.0): MIC IN CONNECTOR** 前置音频输入接口

NO.	SYMBOL	DESCRIPTION
1	5V	+5V Power Supply for MIC Module
2	3V3	+3.3V Power Supply for MIC Module
3	GND	Ground
4	MIC-L	MIC Audio Left Channel IN 前置或者麦克风音频左声道输入
5	GND	Ground
6	MIC-R	MIC Audio Right Channel IN 前置或者麦克风音频右声道输入

◆ **CN21 (4PIN/2.0): TV USB CONNECTOR** 前置TV USB接口

NO.	SYMBOL	DESCRIPTION
1	5VD	+5V Power Supply for Front-end USB
2	DM	USB D-
3	DP	USB D+
4	GND	Ground

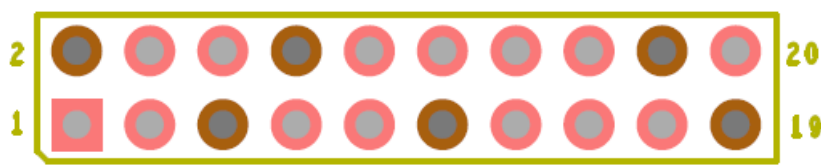
◆ **CN13 (4PIN/2.0): I2C CONNECTOR** I2C接口(可用于数字光感)

NO.	SYMBOL	DESCRIPTION
1	5V	+5V Power Supply
2	GND	Ground
3	SDA	IIC Data Signal
4	SCL	IIC Clock Signal

◆ **CN12 (6PIN/2.0): GPIO CONNECTOR** GPIO接口

NO.	SYMBOL	DESCRIPTION
1	I2C-P3	I2C Extended I/O P3 扩展IO P3
2	I2C-P2	I2C Extended I/O P2 扩展IO P2
3	I2C-P1	I2C Extended I/O P1 扩展IO P1
4	I2C-P0	I2C Extended I/O P0 (PC-ON/OFF) 扩展IO P1(内部电脑开关)
5	I2C-P7	I2C Extended I/O P7 (PC-DET) 扩展IO P7 (内部电脑运行状态检测)
6	GND	Ground

◆ **CNH1 (2*10PIN/2.0): BUILT-IN HDMI CONNECTOR** 内部HDMI接口



NO.	SYMBOL	DESCRIPTION	NO.	SYMBOL	DESCRIPTION
1	Rx2P	HDMI TMDS Data2+	2	GND	Ground
3	Rx2n	HDMI TMDS Data2-	4	Rx1p	HDMI TMDS Data1+
5	GND	Ground	6	Rx1n	HDMI TMDS Data1-
7	Rx0P	HDMI TMDS Data0+	8	GND	Ground
9	Rx0N	HDMI TMDS Data0-	10	CLKP	HDMI TMDS Clock+
11	GND	Ground	12	CLKN	HDMI TMDS Clock-
13	NC	No Connection	14	NC	No Connection
15	HDMI-SDA	HDMI I2C Data Signal	16	HDMI-SCL	HDMI I2C Clock Signal
17	H5V	HDMI 5V	18	GND	Ground
19	GND	Ground	20	HPD	HDMI Hot Plug Detect

◆ **CNH2 (2*10PIN/2.0): Front-End HDMI CONNECTOR** 前置HDMI接口

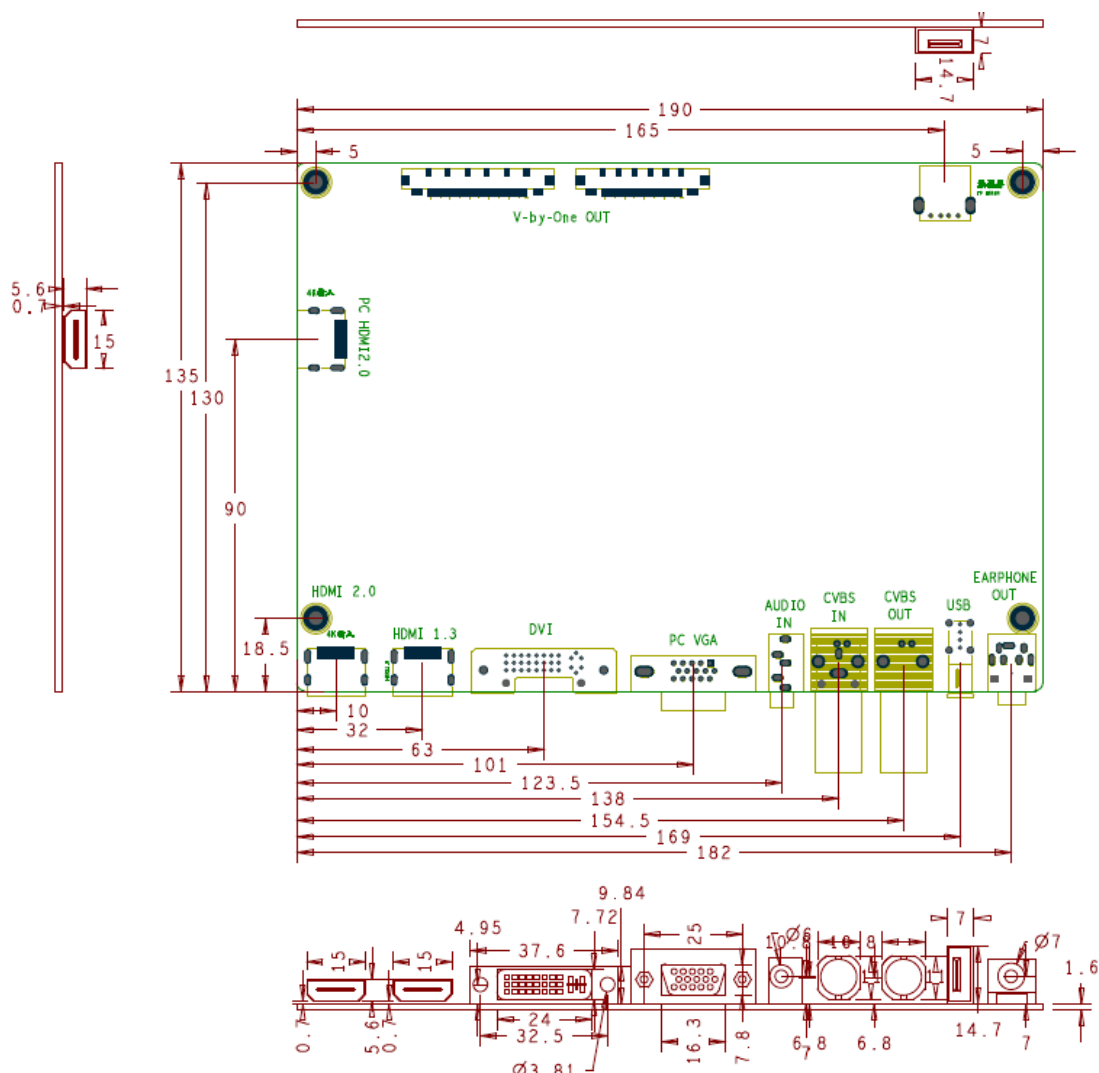
NO.	SYMBOL	DESCRIPTION	NO.	SYMBOL	DESCRIPTION
1	Rx2P	HDMI TMDS Data2+	2	GND	Ground
3	Rx2n	HDMI TMDS Data2-	4	Rx1p	HDMI TMDS Data1+
5	GND	Ground	6	Rx1n	HDMI TMDS Data1-
7	Rx0P	HDMI TMDS Data0+	8	GND	Ground
9	Rx0N	HDMI TMDS Data0-	10	CLKP	HDMI TMDS Clock+
11	GND	Ground	12	CLKN	HDMI TMDS Clock-
13	NC	No Connection	14	NC	No Connection
15	HDMI-SDA	HDMI I2C Data Signal	16	HDMI-SCL	HDMI I2C Clock Signal
17	H5V	HDMI 5V	18	GND	Ground
19	GND	Ground	20	HPD	HDMI Hot Plug Detect

◆ **CNS1 (2*8PIN/2.5): PANEL SELECTION CONNECTOR** 屏参选择接口

NO.	SYMBOL	DESCRIPTION
1	PANEL1	PANEL Parameter Selection
2	PANEL2	
3	PANEL3	
4	PANEL4	
5	PANEL5	
6	PANEL6	
7	PANEL7	
8	PANEL8	

5. PCB Dimension 尺寸图

The overall height of BH-5660-A is 18 mm.



6. CONFIGURATION & GENERAL PRECAUTIONS

使用环境和注意事项

- Storage temperature: -10~60°C.
- 存储温度: -10~60°C。
- Operation temperature: 0~40°C.
- 工作温度: 0~40°C。
- Operating: 10% to 90% (Non-condensing, 无冷凝)
- 工作湿度: 10% ~ 90%
- Store: 5% to 95%
- 储存湿度: 5%~95%

- Operating: 10,000ft (max)
- 工作高度: 10,000ft (最大)
- Store: 20,000ft (max)
- 储存高度: 20,000ft (最大)
- Vibration (振动) 5-55Hz, 19.6m/s²(2G), 20minutes each along X, Y and Z axis.
- Protect the board from static electricity in case of damage to the IC.
- 请使板卡远离静电。
- Keep the board away from conductor when it is working.
- 请确保板卡工作时远离导体。
- Don't push or pull the connectors when the board is working.
- 板卡工作时请勿按压和扭曲。
- Don't press, distort or disassemble the board.
- 请勿拆解板卡。
- Clean the board with soft dry cloth when it's dirty.
- 如果板卡脏了, 请用干布擦拭。
- Don't wire in the board to power supply before panel is correctly connected.
- 正确接好驱屏线前请勿接通电源。
- Inner wires of the whole set should match reasonable, we suggest the LVDS twisted pair wire between the main board and panel must be tied up well and try to use shielding wire. If it's possible, try to put on the magnetic belt ring on the wire which near the board terminal, each connected wire try to not directly cross the PCB board, especially cross over from the main chips, avoid affecting the whole set EMC performance.
- 机内需合理布线, 芯片上方不建议走线, LVDS屏线必须使用双绞线并建议使用屏蔽网, 同时将地环锁死在PCB孔位上。

7. PACKING, SHIPPING & STORING (包装、运输、贮存)

7.1、Packing (包装)

Product name, part number, supplier's logo, QC stamp, Pb-free display and date must be printed on the package case.

包装箱上有产品名称、型号、厂家标识、厂家质量部门的检验合格证、制造日期等。

7.2、Shipping (运输)

This product can be transported through land, sea or air. Measures should be taken for water and sun proof. Also, it should be handled with care.

适应于车、船、飞机运输, 运输中应遮蓬、防晒、文明装卸。

7.3、Storing(贮存)

Please keep staying in the package case before using and keep away from hazardous gas, flammable or explosive substances and erosive chemical material. Avoid dramatic vibration or shock and strong magnetic field. The package cases should be racked 20cm above the ground and 50cm away from the wall, window, heat source or ventilation port. Generally the storage term of this product is 2 years. All the products should be double checked after that time.

产品未使用时应存放在包装箱内, 仓库内不允许有有害气体, 易燃, 易爆的产品及有腐蚀性的化学物品, 并且无强烈的机械振动, 冲击和强磁场作用, 包装箱应垫离地至少20cm高, 距离墙壁、热源、窗口或空气入口至少50cm, 在本规定条件下的贮存期一般为2年, 超过2年后应重新进行检验。