

深圳市博合数码科技有限公司

Shenzhen Bohoo Digi-Tech Co.,Ltd

SPECIFICATION

MODEL: BH-4K02-C

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	18.7.11	All	First issued	Danny Xu

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1. GENERAL DESCRIPTION （概述）

BH-4K02-C is a multi-function 4K driver board, with 8 lane v-by-one output for Large Size 4K@60Hz panel, it's OPS interface supports display port (DP1.2a) and HDMI2.0 input. It supports 2 embedded HDMI1.4 input and 1 VGA input;

BH-4K02-C 是一款多功能4K OPS显示板卡，可直接驱动8 lane V-by-one 4K 60Hz大尺寸面板。OPS接口支持HDMI2.0和DisplayPort DP1.2A输入（支持4K点对点显示），2路内置HDMI1.4输入，1路内置VGA输入；

BH-4K02-C supports touch UI and IR touch panel intelligent switching for different input source, it used in Commercial display application, such as education white board, 4K advisement player etc..

BH-4K02-C 支持端口智能切换，红外触摸框智能切换，以及触控手势菜单操作，支持OPS电脑一键开关机等自动控制。常用于教育白板，会议平板，4K监视器，数字标牌等商用显示；

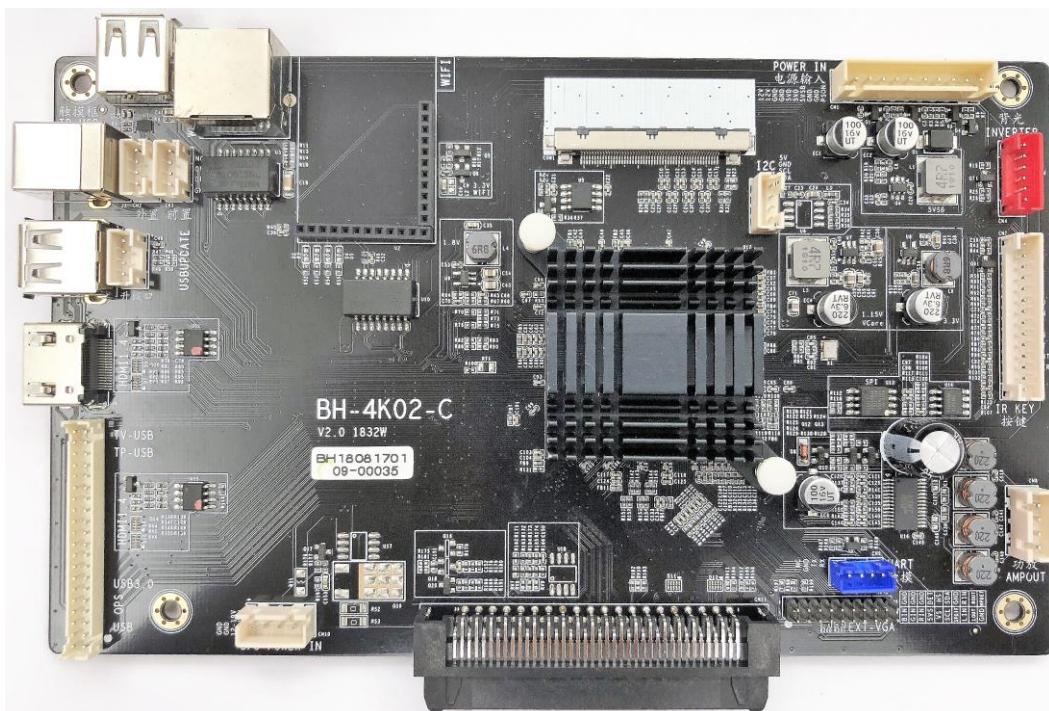
BH-4K02-C 's OPS supports LAN connection, optional WIFI module can support WLAN,WIFI relay, and WIFI router, it's valuable in wireless screen transmission application

BH-4K02-C OPS支持LAN连接，可选配WIFI模块,实现WIFI中继和路由功能。应用于会议平板的无线传屏。

2. FUNCTION LAYOUT （产品外观）

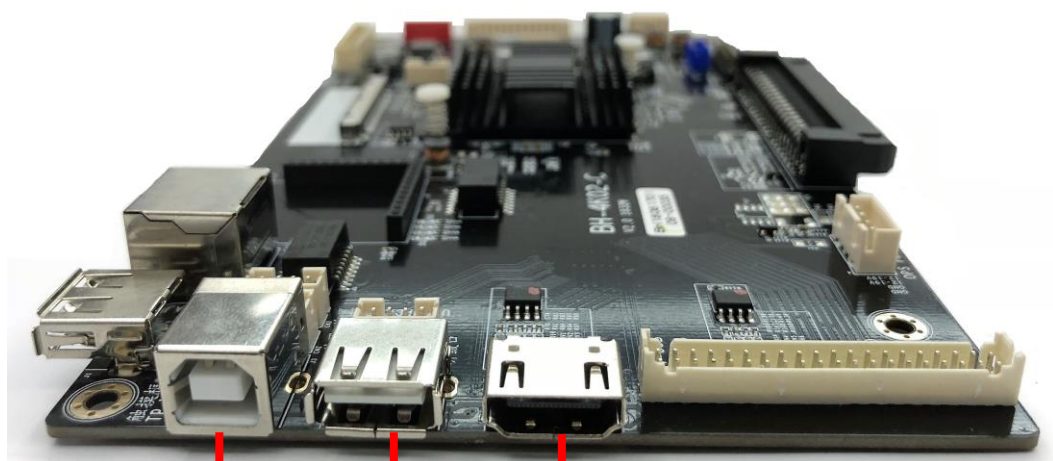
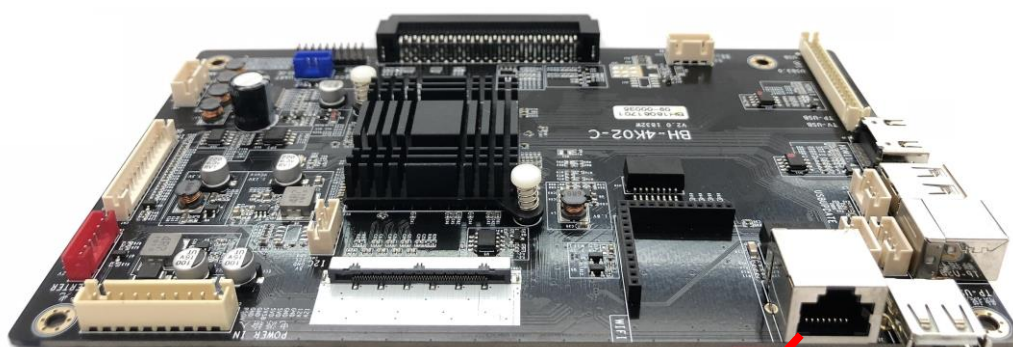
NOTE: The optional connectors and terminals are marked with "*".

TOP VIEW OF BH-4K02-C （正视图）



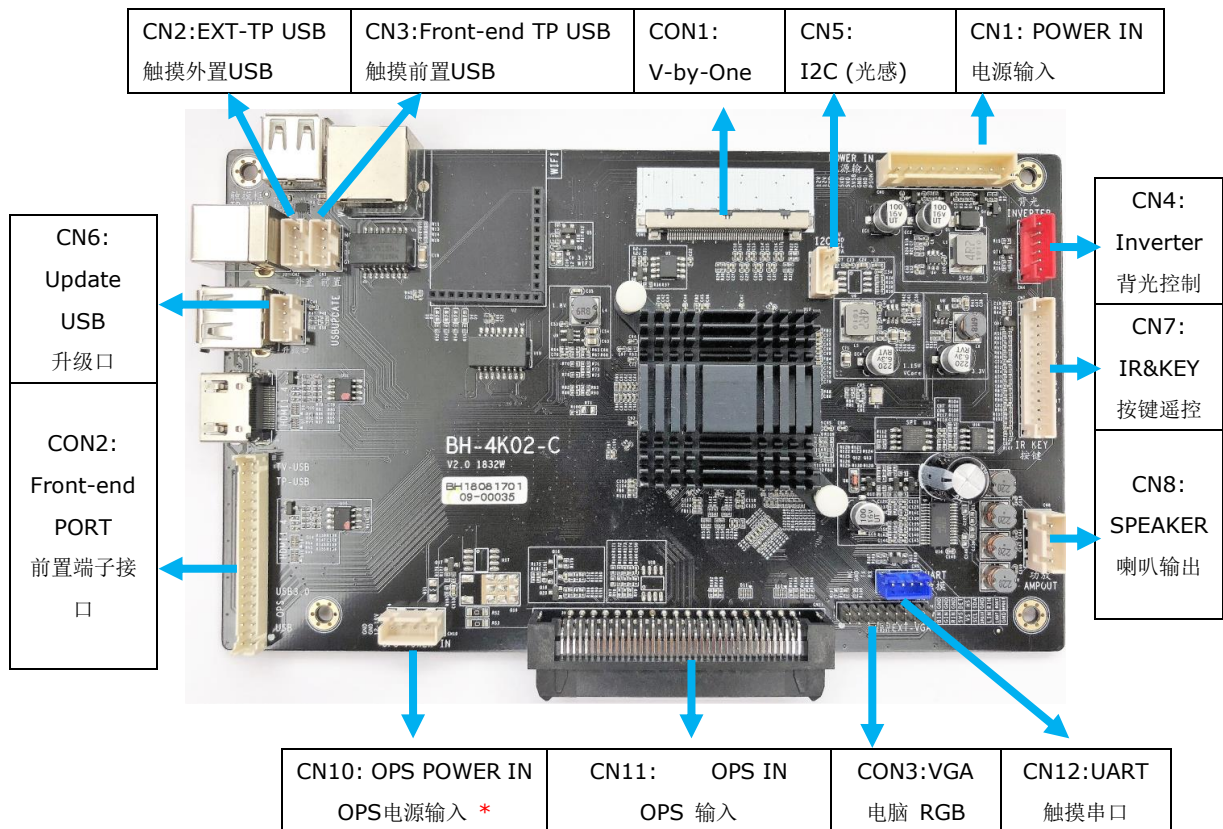
FRONT VIEW OF BH-4K02-C (外部接口视图)

OPS

Touch Panel USB-B
触摸框USBUSB Update
USB升级口HDMI1.4 INPUT
HDMI1.4输入

WLAN IN *

Touch Panel USB INPUT
触摸框USB输入

INTERFACE VIEW OF BH-4K02-C (内部接口示意图)**3. FEATURES****3.1 Main Features Overview (主要特性)**

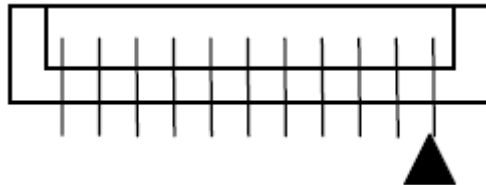
CHIPSET (主芯片)	Mstar		
MARKET (目标应用)	4K Monitor; Education whiteboard; Medical Monitor; Surface pad		
OSD LANGUAGE (OSD语言)	English, Chinese, Multi-Language, 英文, 中文, 多国语言		
PANEL (面板)	Panel Type(类型)	8 lane V-By-One 4K UHD@60Hz	
	Resolution (分辨率)	Up to 3840x2160	
VIDEO INPUT (视频信号输入)	PC-RGB	Format (格式)	Up to 1920x1080@60Hz
	Display Port	480i, 480p, 576i, 576p, 720p, 1080i, 1080p, 4Kx2K@60H	
	HDMI1.4	480i, 480p, 576i, 576p, 720p, 1080i, 1080p, 4Kx2K@30Hz	
	HDMI2.0	480i, 480p, 576i, 576p, 720p, 1080i, 1080p, 4Kx2K@60Hz	
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) or Single 12V(大尺寸和单12V电源兼容)		
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, ECO 菜单, 频道+, 频道-, 音量+, 音量-, 信号源, 电源, 节能		
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。			

4. INTERFACE DEFINITION(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:



◆ CON1 (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	eHPD1	Reserved (for eDP panel)	12	Rx4n	V-by-One HS DATA LANE4
37	AUX_T1P	Reserved (eDP Aux Data pair 1)	11	Rx4p	
36	AUX_T1N		10	GND	Ground
35	BL_ON	Reserved (for eDP Panel)	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	eHPD0	Reserved (for eDP panel)	6	Rx6n	V-by-One HS DATA LANE6
31	BL_DIM	Reserved (for eDP Panel)	5	Rx6p	
30	AUX_T0P	Reserved (eDP Aux Data pair 0)	4	GND	Ground
29	AUX_T0N		3	Rx7n	V-by-One HS DATA LANE7
28	NC	No Connection	2	Rx7p	
27	HTPDN	Hot Plug Detect	1	GND	Ground
26	LOCKN	Lock Detect	-	-	-

◆ **CN11 (80PIN/1.27): OPS CONNECTOR** OPS接口

- TX24A-80R-LT-H1E (manufactured by JAE)
- Mating Connector: TX25A-80P-LT-H1E (JAE) or compatible

NO.	SYMBOL	DESCRIPTION	NO.	SYMBOL	DESCRIPTION
40	12V-19V	+12V For Android / 12V-19V For X86 Power Supply (NOTE1)	80	GND	Ground
39	12V-19V		79	GND	
38	12V-19V		78	GND	
37	12V-19V		77	GND	
36	12V-19V		76	GND	
35	12V-19V		75	GND	
34	12V-19V		74	STATUS	OPS Power status
33	12V-19V		73	PS_ON#	Power ON/OFF control
32	GND	Ground	72	PB_DET	Pluggable board detect
31	DVI_HPD	HDMI2.0 Hot Plug	71	CEC	HDMI CEC
30	DDC_CLK	HDMI2.0 DDC Clock	70	NC	No Connection
29	DDC_DATA	HDMI2.0 DDC Data	69	NC	
28	GND	Ground	68	GND	Ground
27	TMDS2+	HDMI2.0 D2 pair	67	USB_PP0	OPS USB2.0 for Front-End 前置OPS USB 2.0
26	TMDS2-		66	USB_PN0	
25	GND	Ground	65	GND	Ground
24	TMDS1+	HDMI2.0 D1 pair	64	USB_PP1	USB Connect to Touch Panel 连接红外框
23	TMDS1-		63	USB_PN1	

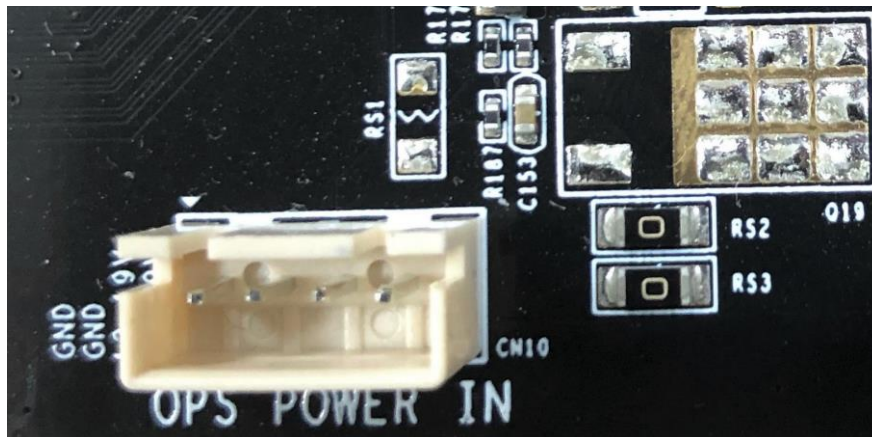
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22	GND	Ground	62	GND	Ground
21	TMDS0+	HDMI2.0 D0 pair	61	USB_PP2	OPS USB 3.0
20	TMDS0-		60	USB_PN2	
19	GND	Ground	59	GND	Ground
18	TMDCLK+	HDMI2.0 Clock pair	58	SSTX+	OPS USB 3.0
17	TMDCLK-		57	SSTX-	
16	GND	Ground	56	GND	Ground
15	DDP_HPD	Display Port Hot plug	55	SSRX+	OPS USB 3.0
14	DDP_AUXP	Display Port AUX Pair	54	SSRX-	
13	DDP_AUXN		53	GND	Ground
12	GND	Ground	52	UART TXD	UART 3.3V Transceiver data
11	DDP_0P	Display Port D0 Pair	51	UART RXD	UART 3.3V Receiver data
10	DDP_0N		50	NC	No Connection
9	GND	Ground	49	NC	No Connection
8	DDP_1P	Display Port D1 Pair	48	NC	
7	DDP_1N		47	NC	
6	GND	Ground	46	NC	
5	DDP_2P	Display Port D2 Pair	45	NC	OPS LAN (Note2)
4	DDP_2N		44	TD2-	
3	GND	Ground	43	TD2+	
2	DDP_3P	Display Port D3 Pair	42	TD1-	
1	DDP_3N		41	TD1+	

NOTE1:

OPS电源可通过CN10外接19V输入，请留意需要空贴RS1，否则19V会同12V短路，会导致烧板烧屏；
OPS电源也可通过CN10外接12V输入或者贴RS1情况下直接从主板线路上取电（在android盒子下适用）；
Please leave RS1 open when use external power supply through CN10, otherwise the mainboard and panel maybe damage;
RS1 can be mounted for Android OPS box 12V power supply.



◆ CN1 (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

◆ CN2 (4PIN/2.0): TOUCH USB FOR EXT-PC(触摸框USB外部端口)

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

◆ CN3 (4PIN/2.0): TOUCH USB FOR Front-end PORT(触摸框USB前置端口)

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

◆ CN4 (6PIN/2.0): INVERTER CONNECTOR

NO.	SYMBOL	DESCRIPTION
1	GND	Ground
2	GND	Ground
3	ADJ	Backlight brightness adjust(0V-3V, 默认3.3V最亮)
4	ON/OFF	Backlight Control(H:ON, L:OFF)
5	12V	+12V Power Supply
6	12V	+12V Power Supply

◆ CN5 (4PIN/2.0): I2C CONNECTOR I2C接口

NO.	SYMBOL	DESCRIPTION
-----	--------	-------------

1	5V	+5V Power Supply
2	GND	Ground
3	SCL	IIC Clock Signal
4	SDA	IIC Data Signal

◆ **CN6 (4PIN/2.0): USB FOR UPDATE(USB升级口)**

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

◆ **CN6 (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) 节能键 (控制背光开关)
3	K6/Power	ADC KEY6 (Power Key default) 默认电源键
4	K5/Right	ADC KEY5 (Volume+ Key default) 默认音量加/右键
5	K4/Left	ADC KEY4 (Volume- Key default) 默认音量减/左键
6	K3/ok	ADC KEY3 (Source Key default) 默认输入源/确认键
7	K2/Up	ADC KEY2 (UP Key default) 默认向上键
8	K1/Down	ADC KEY1 (DOWN Key default) 默认向下键
9	K0/Menu	ADC KEY0 (Menu Key default) 默认菜单键
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

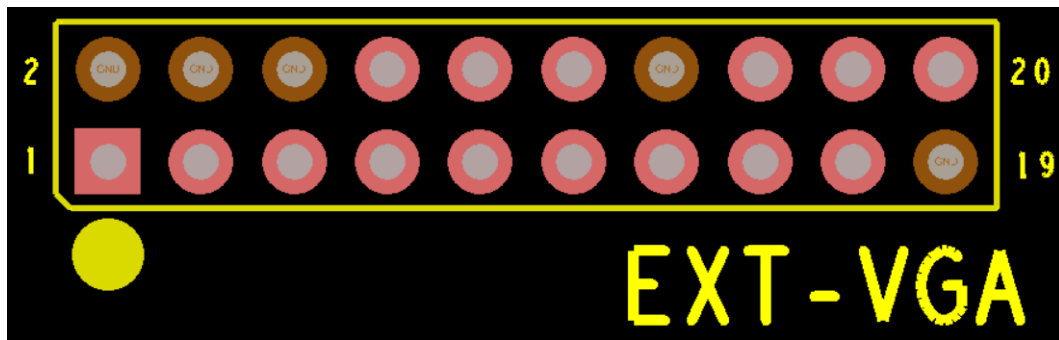
◆ **CN8 (4PIN/2.5): SPEAKER CONNECTOR 喇叭接口**

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

◆ **CN9 (4PIN/2.0): UART CONNECTOR 触摸串口**

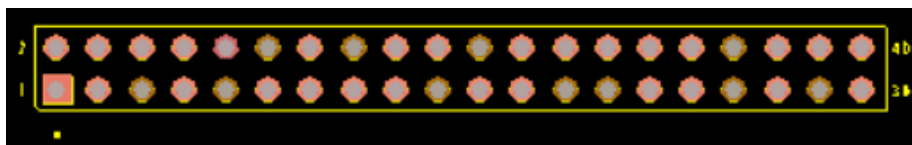
NO.	SYMBOL	DESCRIPTION
1	NC	No Connection
2	GND	Ground
3	TX	UART Transmitter Signal
4	RX	UART Receiver Signal

◆ **CON3 (2*10PIN/2.0): BUILT-IN VGA CONNECTOR** 内部VGA接口



NO.	SYMBOL	DESCRIPTION	NO.	SYMBOL	DESCRIPTION
1	BIN	PC-RGB BIN	2	GND	Ground
3	GIN	PC-RGB GIN	4	GND	Ground
5	RIN	PC-RGB RIN	6	GND	Ground
7	5VS	5V Power supply	8	DET	VGA Signa Detect
9	VS	PC-RGB V-sync	10	HS	PC-RGB H-sync
11	SCL	PC-RGB DDC Clock signal	12	SDA	PC-RGB DDC DATA signal
13	SPDIF	SPDIF OUT	14	GND	Ground
15	LIN	PC Audio Left IN	16	RIN	PC Audio Right IN
17	LOUT	Line Out Left	18	ROUT	Line Out Right
19	GND	Ground	20	HPDET	Headphone detect

◆ **CON2 (2*20PIN/2.0): Front-end PORT CONNECTOR** 前置端口接口

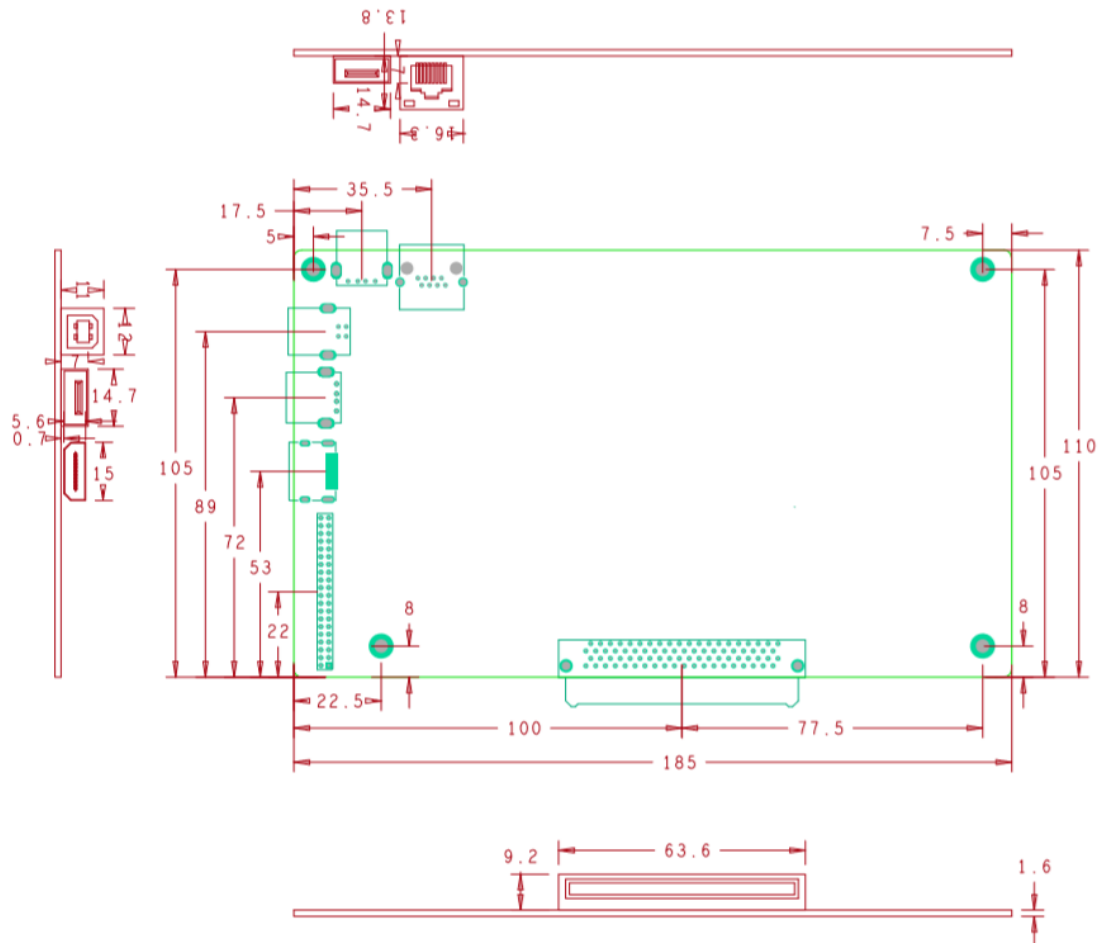


NO.	SYMBOL	DESCRIPTION	NO.	SYMBOL	DESCRIPTION
1	PSON	OPS PSON	2	PG_LED	OPS Power Status LED
3	USBDN	OPS USB2.0 D-	4	USBDP	OPS USB2.0 D+
5	GND	Ground	6	5V	5V Power Supply
7	DN_30	OPS USB3.0 D-	8	DP_30	OPS USB3.0 D+
9	GND	Ground	10	SSRXN	OPS USB3.0 SSRX-
11	SSRXP	OPS USB3.0 SSRX+	12	GND	Ground

13	SSTXN	OPS USB3.0 SSTX-	14	SSTXP	OPS USB3.0 SSTX+
15	HD2P	Front-end HDMI1.4 D2+	16	GND	Ground
17	HD2N	Front-end HDMI1.4 D2-	18	HD1P	Front-end HDMI1.4 D1+
19	GND	Ground	20	HD1N	Front-end HDMI1.4 D1-
21	HD0P	Front-end HDMI1.4 D0+	22	GND	Ground
23	HD0N	Front-end HDMI1.4 D0-	24	CLKDP	Front-end HDMI1.4 Clock+
25	GND	Ground	26	CLKDN	Front-end HDMI1.4 Clock-
27	GND	Ground	28	CEC	HDMI CEC
29	HSDA	Front-end HDMI DDC Data	30	HSCL	Front-end HDMI DDC Clock
31	HDMI5V	Front-end HDMI 5V IN	32	HPD	Front-end HDMI Hot Plug
33	GND	Ground	34	GND	Ground
35	TP_DN	Front-end TP USB D-	36	TP_DP	Front-end TP USB D+
37	GND	Ground	38	5V	5V Power Supply
39	TV_DN	Update USB D-	40	TV_DP	Update USB D+

5. PCB Dimension 尺寸图

The overall height of BH-4K02-C 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。