

# 深圳市博合数码科技有限公司

Shenzhen Bohoo Digi-Tech Co.,Ltd

## SPECIFICATION

MODEL: BH-4K02-E

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## REVISION HISTORY

| Rev | DATE     | PAGE  | DESCRIPTION  | AUTHOR   |
|-----|----------|-------|--|----------|
| 1.0 | 18.7.11  | All   | First issued   | Danny Xu |
| 1.1 | 18.11.30 | 2,3,5 | Del eDP description 删除eDP描述;<br>Modify keyboard definition<br>修订按键板CH+, CH-描述, 更改为UP Down。 |          |
| 1.3 | 19.07.18 | 2-5   | 硬件升级版本, 更新产品图片,增加功放功能。   | Danny Xu |
|     |          |       |  |          |
|     |          |       |  |          |

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## 1. GENERAL DESCRIPTION (概述)

**BH-4K02-E** is a multi-function 4K driver board, with 8 lane v-by-one output for Large Size 4K@60Hz panel, it supports HDMI2.0 input and Display Port 1.2a input. It supports 90° or 270° image rotation.

是一款多功能4K显示板卡，可直接驱动8 lane V-by-one 4K 60Hz大尺寸面板。支持1路HDMI2.0输入（支持4K点对点显示），1路DP输入；支持图像90度或270度旋转，广泛用于数字标牌商业显示领域。

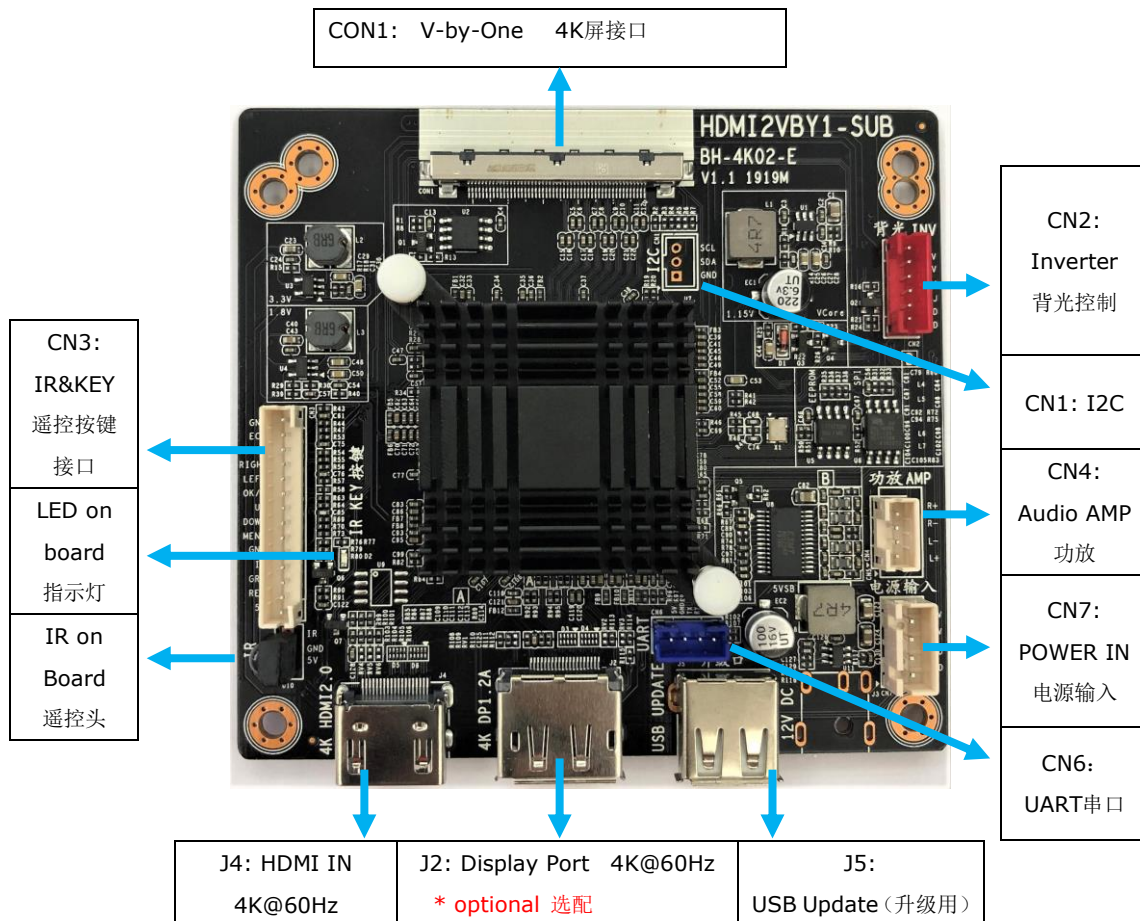
**BH-4K02-E** only need Single 12V power supply, and it's bootup time is less than 4.5 seconds, is suitable for digital signage application.

单12V供电，开机速度快(4.5S出图)，为数字标牌等商用显示领域提供方便实用的4K显示驱动方案。

## 2. FUNCTION LAYOUT (产品外观)

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

### INTERFACE VIEW OF BH-4K02-E (内部接口示意图)



### 3. FEATURES

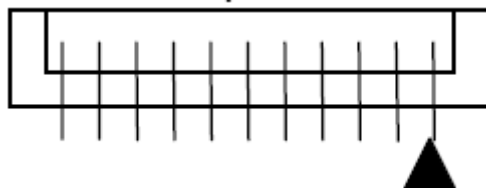
#### 3.1 Main Features Overview (主要特性)

|  |  |  |        |
|--|--|--|--------|
| CHIPSET ( 主芯片)   | Mstar  |  |        |
| MARKET (目标应用)  | 4K Monitor; Education whiteboard; Medical Monitor;                               |  |        |
| 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)   | Display Port   | 480i, 480p, 576i, 576p, 720p, 1080i, 1080p, 4Kx2K@60Hz |        |
|  | HDMI   | 480i, 480p, 576i, 576p, 720p, 1080i, 1080p, 4Kx2K@60Hz |        |
| POWER REQUIREMENT  | 12V  |  |        |
| 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, UP, Down, VOL+, VOL-, INPUT, POWER, ECO<br>菜单, 上, 下, 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.<br>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 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:



#### ◆ 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                    | -   | -      | -                      |

◆ **CN2 (6PIN/2.0): INVERTER CONNECTOR** 背光控制接口

| 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                            |

◆ **CN6 (4PIN/2.5): POWER IN CONNECTOR** 电源输入接口

| NO. | SYMBOL | DESCRIPTION |
|-----|--------|-------------|
| 1   | GND    | Ground      |
| 2   | GND    |             |

|   |     |                   |
|---|-----|-------------------|
| 3 | 12V | +12V Power Supply |
| 4 | 12V | +12V Power Supply |

◆ **CN1 (3PIN/2.0): I2C CONNECTOR** I2C接口接口

| NO. | SYMBOL | DESCRIPTION      |
|-----|--------|------------------|
| 1   | GND    | Ground           |
| 2   | SDA    | IIC Data Signal  |
| 3   | SCL    | IIC Clock Signal |

◆ **CN3 (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       |

◆ **CN6 (4PIN/2.0): UART CONNECTOR** 串口TTL接口

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

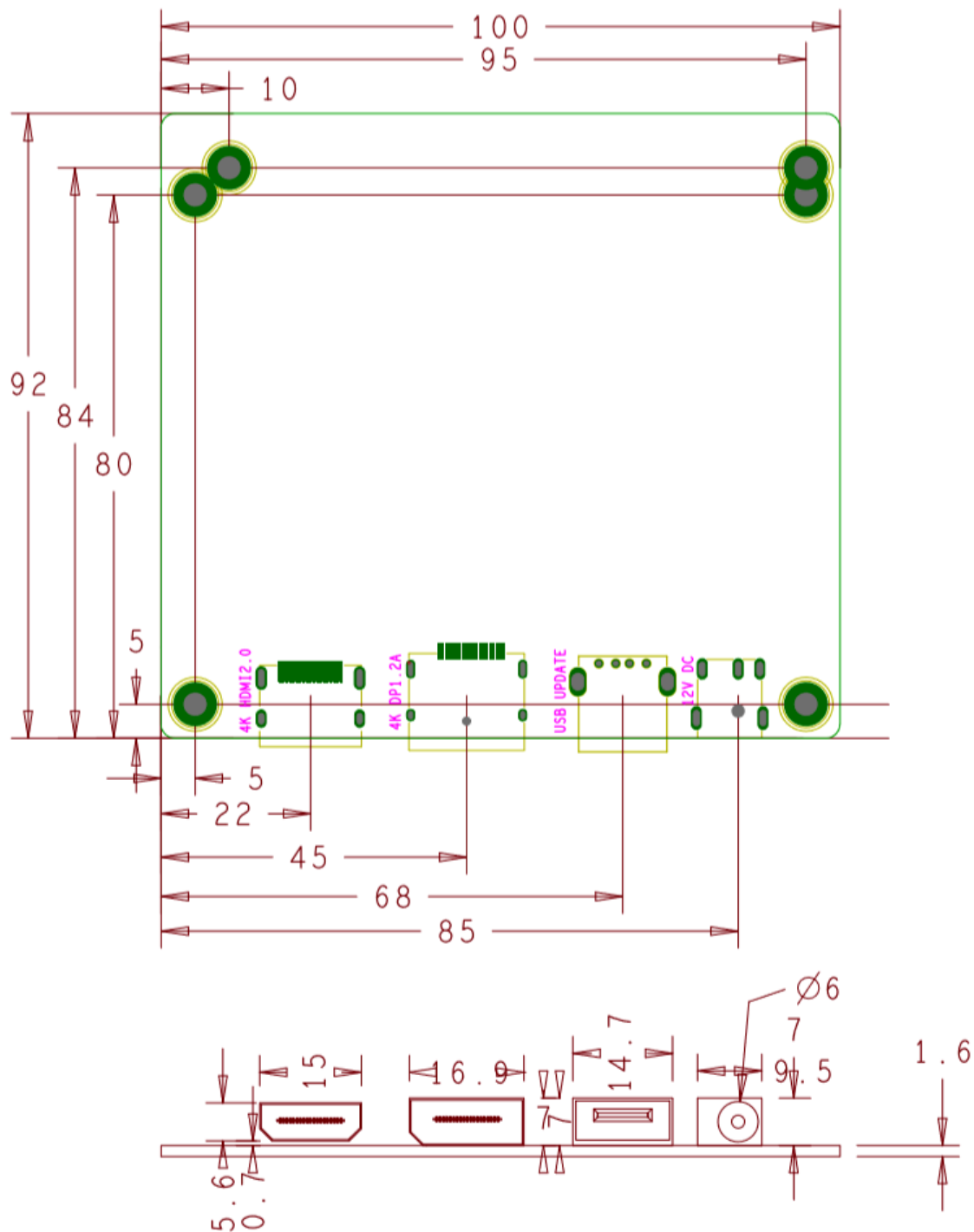
◆ **CN4 (4PIN/2.0): SPEAKER CONNECTOR** 喇叭接口

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

|   |    |                                    |
|---|----|------------------------------------|
| 4 | R+ | Audio Right Channel Output+ 右声道正输出 |
|---|----|------------------------------------|

## 5. PCB Dimension 尺寸图

The overall height of BH-4K02-E 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/s<sup>2</sup>(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，运输中应遮篷、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。