

EH-MC23

AIoT Module Datasheet
BLE 5.3 & Zigbee & Thread



Feb 2025 Ver 1.0

Professional *AIoT* Solution Provider

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1、Module Overview

1.1 Features

ITEM	SPECIFICATION	
Microcontroller	ARM Cortex-M0+ CPU (Maximum 48MHz) • SRAM:36kB/64KB • Serial Flash:512KB • ROM:12KB	
Standards	• BLE 5.3, Zigbee, Thread	
BLE Radio	Tx Power • -20dBm to +8dBm Rx Sensitivity • 125kbps:-102dBm • 1Mbps:-96.5dBm • 2Mbps:-92dBm	Active Tx Power • RX mode:5.3mA • Active TX mode:5.1mA@0dBm • Active TX mode:<11.0mA@8dBm • Deep LPS: <710nA • Power Down:165nA
Power Consumption	Deep LPS: 1.0uA(with 16K RAM retention,32KHz RC)	
Peripherals	22 x GPIO(mux'ed) 1 x SPI(master or slave) 1 x I2C(master) 1 x UART	4 x Timers 8 x μ DMA 1 x Watchdog Timer
Voltage	输入电源:1.71V~3.8V, 3.3V (典型)	
Environmental	温度: • 工作温度: -40°C ~ 85°C • 存储温度: -40°C ~125°C	湿度: • 相对湿度: < 90% Non-condensing • 存储湿度: < 90% Non-condensing
Physical Dimension	尺寸: 18 x 12 x 2.2 mm 13.7 x 12 x 2.2mm 重量: 0.85g	Pin脚: 27-pin 天线: PCB 天线/外置天线
Certification	FCC, CE, IC, SRRC, Rohs	

1.2 Description

The EH-MC23 is a Bluetooth 5.3 low – power 2.4GHz multi-application module. It combines the excellent performance of the leading RF transceiver with a low – power ARM Cortex – M0+ 48MHz processor, a power management unit, an ADC, and an intelligent I/O allocation controller. Notably, the EH – MC23 module exhibits outstanding ultra – low – power performance.

This chip integrates a high – performance MCU with a speed of up to 48MHz, as well as DMA, GPIO, SPI, UART, timer, and watchdog functions. It also supports a 32MHz external crystal and integrates a multi – purpose 12 – bit ADC with up to 12 channels. In addition, the EH – MC23 integrates on – chip 36K/48K SRAM and supports user – defined IDE on – chip system development, with SFLASH MCU and JTAG software upgrade functions.

The EH – MC23 operates in a host – less mode and can run the Bluetooth stack and applications without an external MCU. It can also be used as a BLE transceiver in a hosted (HCI) mode through the UART interface (AT commands) with an external host running the Bluetooth stack and applications. This module supports Apple Find My Network and Google Find My Device positioning services. It has passed strict regulatory compliance tests and has been certified by FCC, CE, IC, SRRC, meeting the environmental requirements of RoHS and WEEE directives.

Model Name	RAM	Flash	Antenna
EH-MC23	36K	512KB	PCB
EH-MC23-M	64K	512KB	PCB
EH-MC23B	36K	512KB	External
EH-MC23B-M	64K	512KB	External

Table 1: EH-MC23 Series comparison

1.3 Applications

- Find My Network (Apple)
- Smart Home
- Beacon
- Smart Building
- Smart Hardware
- Electronic Tag
- Remote Control
- Industrial Automation
- Smart Toys
- Mesh

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2、Block Diagram

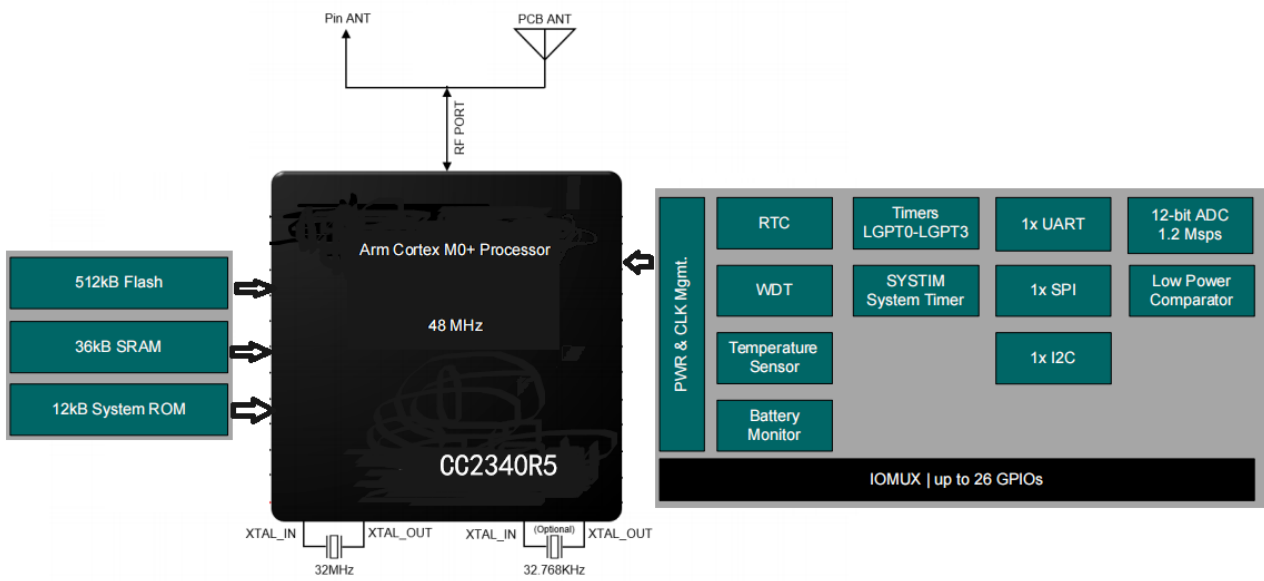


Figure1: Block Diagram

3、Pin Definitions

3.1 Pin Map

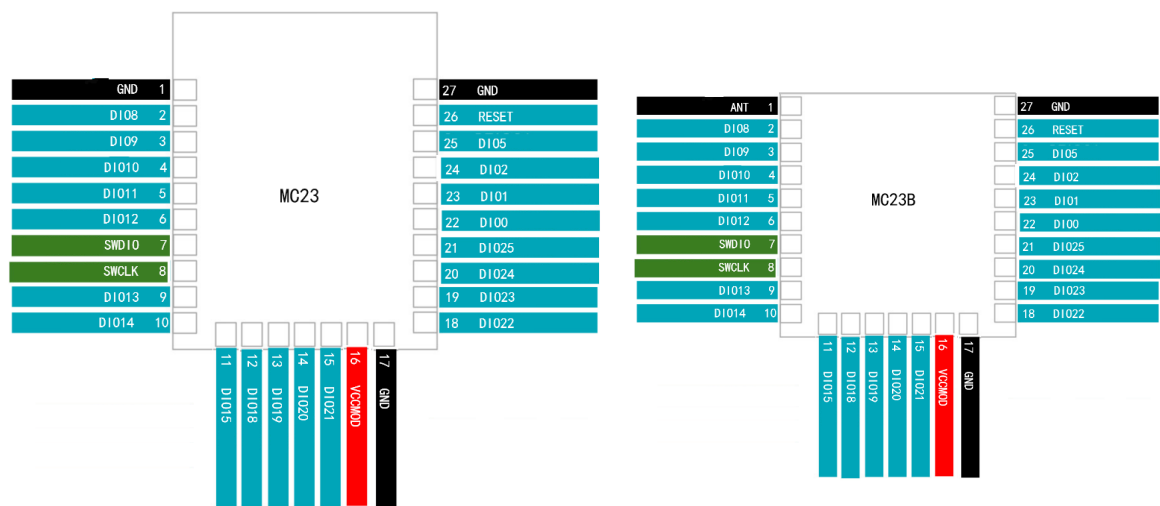


Figure2: EH-MC23 and EH-MC23B Pin Map

3.2 Pin Definition

Pin	Pin Name	Type	Power Domain	Description
1	GND/ANT (MC23B)	–	–	Ground/ANT (MC23B)
2	DIO8	DIO	PWR	Digital GPIO
3	DIO9	DIO	PWR	Digital GPIO
4	DIO10	DIO	PWR	Digital GPIO
5	DIO11	DIO	PWR	Digital GPIO
6	DIO12	DIO	PWR	Digital GPIO
7	SWDIO	DIO	PWR	SWDIO
8	SWCLK	DIO	PWR	SWCLK
9	DIO13	DIO	PWR	Digital GPIO
10	DIO14	DIO	PWR	Digital GPIO
11	DIO15	DIO	PWR	Digital GPIO
12	DIO18	DIO	PWR	Digital GPIO
13	DIO19	DIO	PWR	Digital GPIO
14	DIO20	DIO	PWR	Digital GPIO
15	DIO21	DIO	PWR	Digital GPIO
16	VCCMOD	PWR	–	Power Input (1.71~3.8V)
17	GND	DIO	PWR	Ground
18	DIO22	DIO	PWR	Digital GPIO
19	DIO23	DIO	PWR	Digital GPIO
20	DIO24	DIO	PWR	Digital GPIO
21	DIO25	DIO	PWR	Digital GPIO
22	DIO00	DIO	PWR	Digital GPIO
23	DIO01	DIO	PWR	Digital GPIO
24	DIO02	DIO	PWR	Digital GPIO
25	DIO05	DIO	PWR	Digital GPIO
26	RESET	DIO	PWR	RESET
27	GND	GND	GND	Ground

Table2: Pin Definition

4、Electrical Characteristics

4.1 Absolute Maximum Ratings

The absolute maximum ratings provided in this section reflect the stress levels that, if exceeded, may cause permanent damage to the device. No functionality is guaranteed outside the operating specifications. Functionality and reliability are only guaranteed within the operating.

Parameter	Min	Typ	Max	Unit
Supply voltage (VDDS)	-0.3	-	4.1	V
Maximum Junction Temperature	-40	-	125	°C
Storage Temperature	-40	-	150	°C

Table 3: Absolute Maximum Ratings

4.2 Recommended Operating Conditions

Rating	Min	Typ	Max	Unit
Operating ambient temperature	-40	-	85	°C
Supply Voltage(VCC)	1.71	3.0	3.8	V
I/O supply Voltage	1.8	-	VDD_BAT	V
Frequency range	2360	-	2510	MHz

Table 4: Recommended Operating Conditions

4.3 Power Consumption

The current consumption measurements are taken with a 3.3V supply at 25 °C of ambient temperature at the RF port. All transmitters' measurements are based on 100% duty cycle.

Work Mode	Description		Peak(mA)
Active (RF working)	RX		5.3mA
	TX	TX Power:0dBm	5.1mA
		TX Power:+8dBm	<11.0mA

Table5: Active Mode Power Consumption

Minimum power consumption: Condition: VCC=3.3V, ambient temperature:25°C

Parameter	32kHz RCOSC	Retention SRAM	Wake-up	Current Consumption (Typical)
Power Down	Off	Off	Wake-up by GPIO	150nA
Sleep Mode	On	Retention	Wake-up by GPIO,Timer	710nA

Table7: Low Power Mode Power Consumption

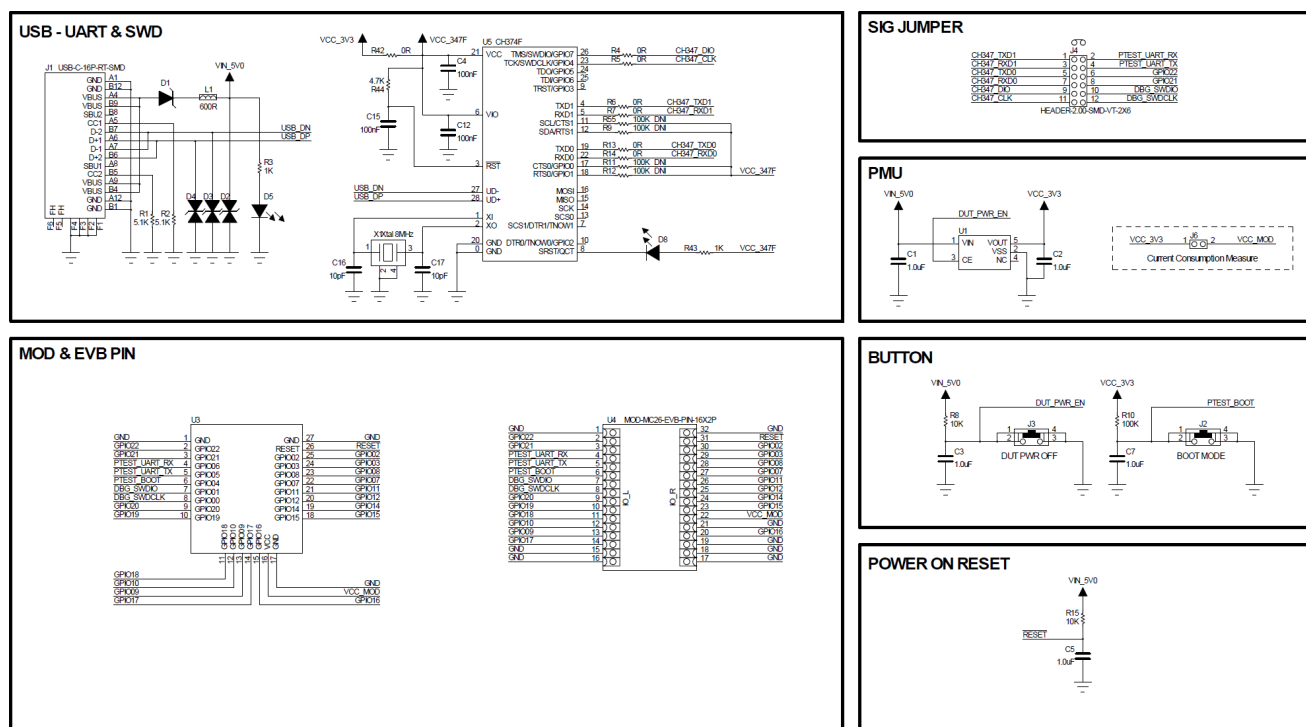
4.4 Radio Performance

Parameter	Bandwidth	Modulation	Rate	Type	Unit
Tx Power	2MHz	GFSK	1Mbps	+8	dBm
			2Mbps	+8	dBm
Rx Sensitivity			1Mbps	−96.5	dBm
			2Mbps	−92	dBm

Table8: BLE Radio Characteristics

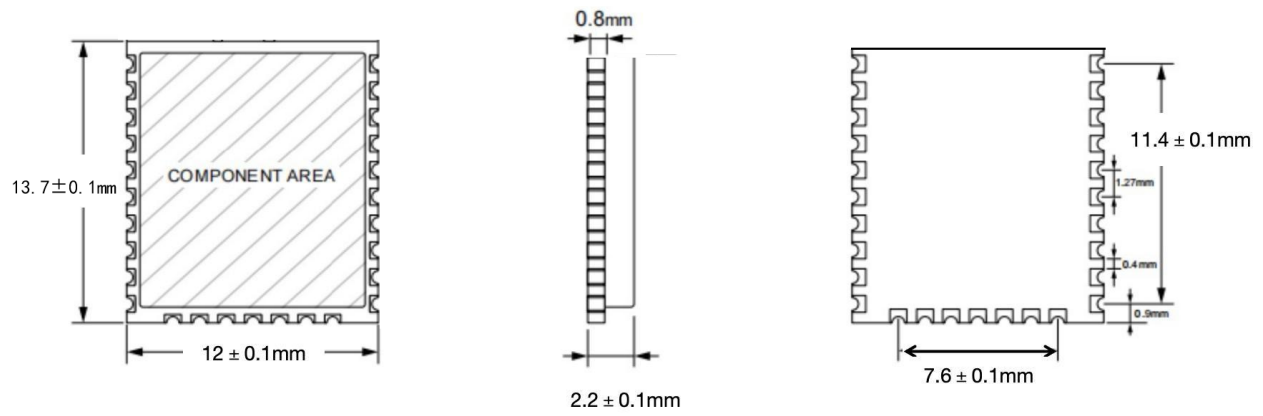
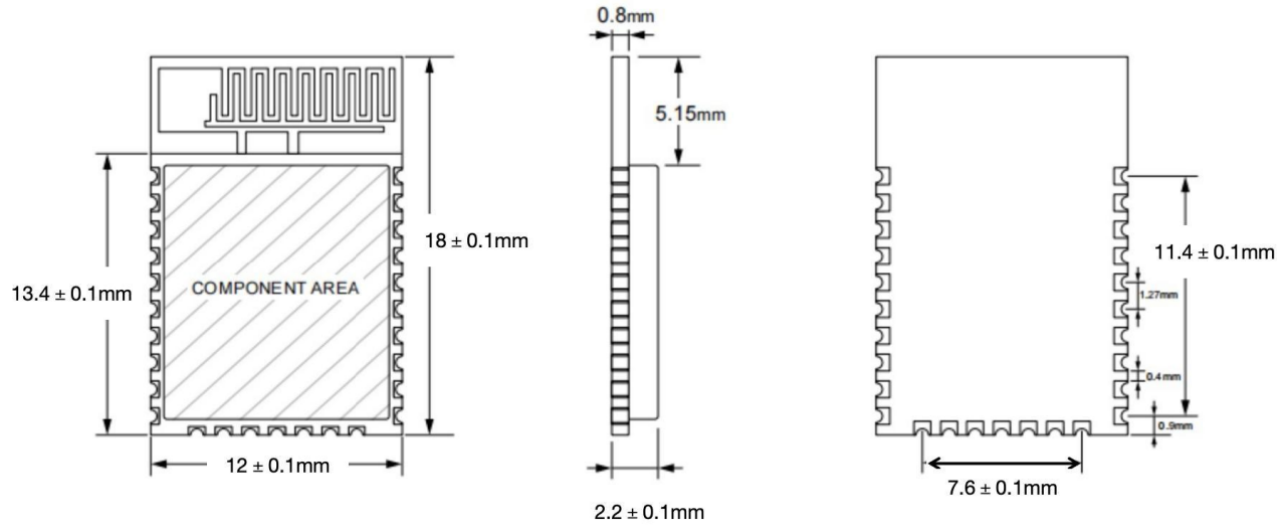
5、 Peripheral Schematics

This is the typical application circuit of the module connected with peripheral components (for example, power supply, antenna, reset button, and UART interface).



6、 Mechanical Specification

6.1 Dimensional View



EH-MC26 Datasheet



7、Development Kit

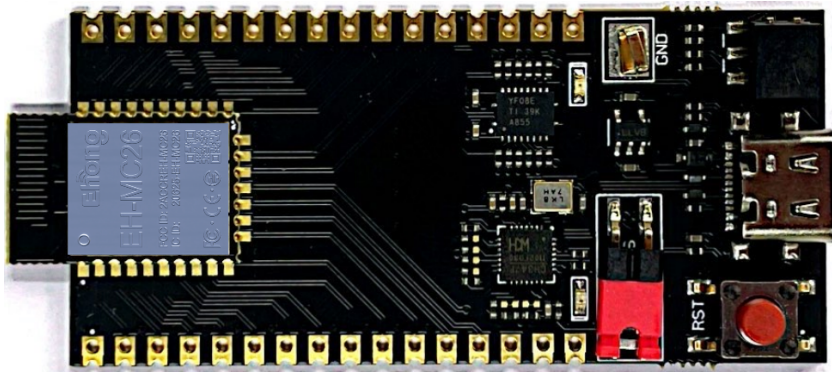


Figure 8: EH-MC26 Development Kit

The EH-MC23-EVK development board supports three colors led, key functions and comes with a serial chip to meet customers' basic development and verification needs. The EH-MC26-EVK also uses 2.54 standard pins to lead the module's universal iO and five-way dip switches, making it easy for customers to use and improving secondary development efficiency.

8、Product Handling

8.1 Storage Conditions

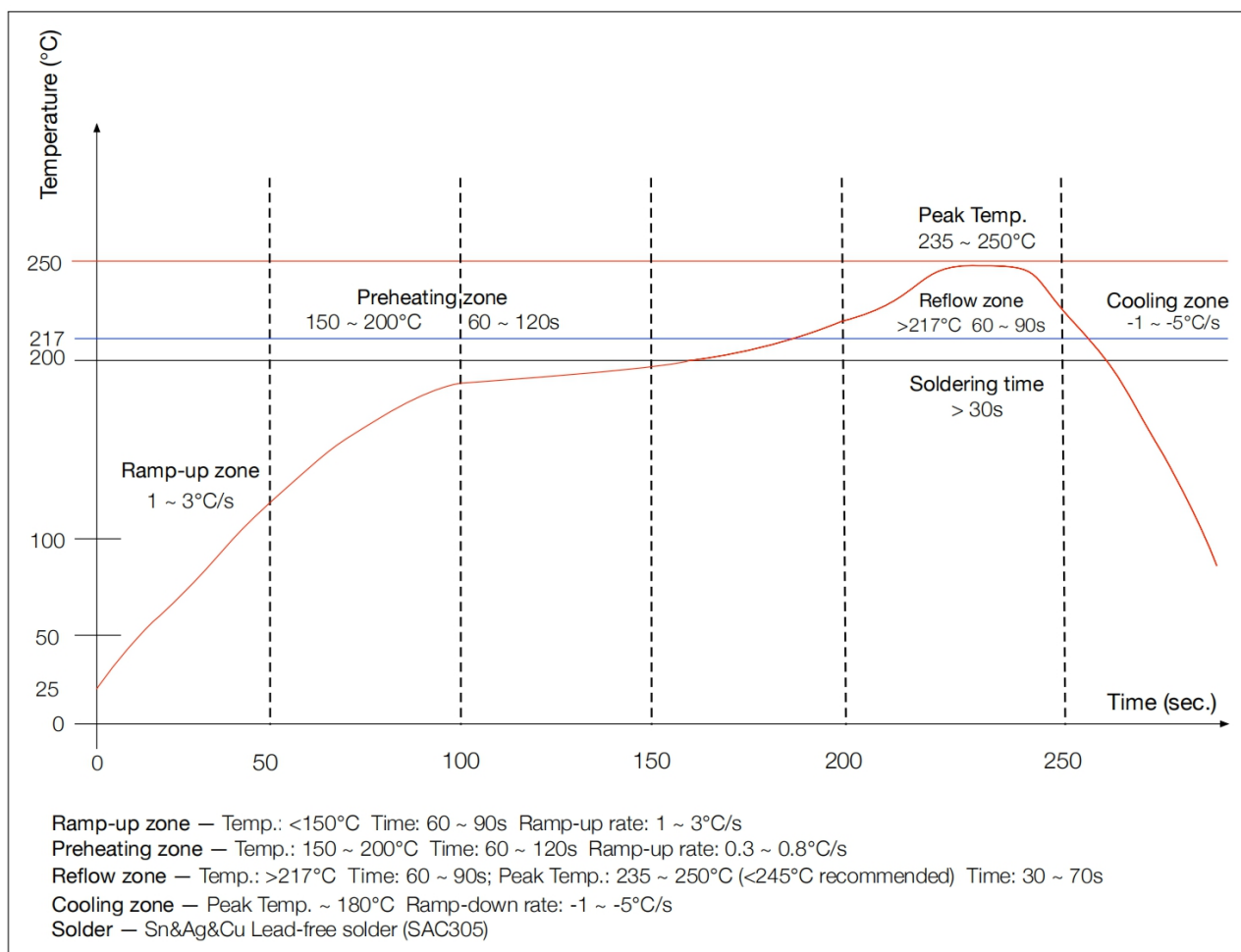
- The products sealed in moisture barrier bags (MBB) should be stored in a non-condensing atmospheric environment of $< 40\text{ }^{\circ}\text{C}$ and $/90\%\text{RH}$. The module is rated at the moisture sensitivity level (MSL) of 3.
- After unpacking, the module must be soldered within 168 hours with the factory conditions $25\pm 5\text{ }^{\circ}\text{C}$ and $/60\%\text{RH}$. If the above conditions are not met, the module needs to be baked.

8.2 Electrostatic Discharge (ESD)

- Human body model (HBM): $\pm 2000\text{ V}$
- Charged-device model (CDM): $\pm 500\text{ V}$

8.3 Reflow Profile

Solder the module in a single reflow.



ultrasonic welders or ultrasonic cleaners. This vibration may induce resonance in the in-module crystal and lead to its malfunction or even failure. As a consequence, the module may stop working or its performance may deteriorate.

9、Related Documentation and Resources

9.1 Ehong Documents

Visit website and download:

<https://www.ehonglink.com/h-pd-466.html>

Supports: support@ehonglink.com

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9.2 Revision History

Data	Version	Release notes
2025-1	V1.0	Preliminary Release