

EH-MC17

Low Energy Module Data Sheet

2 April 2020 Version1.9



Professional *Bluetooth* Solution Provider

VERSION HISTORY

Version	Comment
V1.0	First edition
V1.1	Replace the chip with RTL8762CKF, 25/26/27 Pin definition changes
V1.2	Update module power consumption
V1.3	Modify some descriptions to add the master-slave support mode
V1.4	Add module block diagram
V1.5	Add antenna patterns
V1.6	Add MIC certification
V1.7	Modify the pin description
V1.8	Add U.FL port diameter
V1.9	Add connection status indication pin

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1. Introduction

The EH-MC17 is a low power and cost-effective Bluetooth SOC module that supports Bluetooth 5. It has a built-in M4 core, 160KB of RAM, support Bluetooth long range, big data and other new features, also supports SIG mesh.

The module supports multiple working modes, including master-slave integration, multi-master and multi-slave, and one master and multiple slaves, which can meet the needs of multiple application scenarios.

The module provides up to 512kB of ROM space, supports a variety of hardware interfaces, and can directly connect external devices such as sensors without the need for an external processor to meet customer customization needs.

With certifications of CE, IC, FCC, ROHS, SIG, MIC,SRRC, EH-MC17 support customers to build the end device and to enter the market quicker.

2. Quick Specifications

Bluetooth Version	
BLE Version	Bluetooth 5 Low Energy
	Bluetooth/SIG Mesh
Radio	
Frequency	2402MHZ-2480MHZ
Transmit power	+8dBm
Receiver sensitivity	-97dBm
Modulations	GFSK at 1 Mbps, 2 Mbps data rates
Antenna	Integrated (0dBi peak); support onboard antenna or external antenna
BLE Long range	Supported
OTA	Supported
Electrical Specifications	
Power supply	1.8 VDC to 3.6 VDC, 3.3VDC typical
Current consumption	Active TX mode(TX power:0dBm): 8.8mA
	Active TX mode(TX power:4dBm): 10.4mA
	Active TX mode(TX power:7.5dBm): 16.8mA
	Active TX mode(TX power:-20dBm): 7.6mA
	Active RX mode : 6.8mA eg. (RX only @ 1 Mbps @ 3V, DCDC enabled)
	Standby
	Sleep
	System Off, On
Hardware	
Dimension	17.70x11.95x2.20mm
Temperature Range	-40°C to +85°C

Interfaces	UART*2	I2S*2	GPIO*20	I8080	PCM
	SPI Master-slave interface	PWM*8	RTC	SWD	
Certification					
FCC	FCC Identifier: 2ACCRMC17 compliance with FCC Part 15, Sub part C, and section 15.203, 15.205, 15.207,15.209 and 15.247 rules.				
IC	Certification number: 20625-MC17 IC: 12208A-04				
CE	ETSI EN 301 489-1 V2.2.1 (2019-03)*--EMC ETSI EN 301 489-17 V3.2.0 (2017-03)--EMC ETSI EN 300 328 V2.1.1 (2016-11)--Radio EN 50663:2017--Health EN 62479:2010--Health EN60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013--Safety Attestation Number : AOC RSHD190611013-03				
SIG	DID: D046582; QDID: 107942;115668				
SRRC	Certification number: 2019DP8815				
MIC	JAPAN MIC Number:211-191224				
ROHS	Attestation Number : AOC R3SH190613F1552E -13				
Export					
HTS: 8473.30.1180					

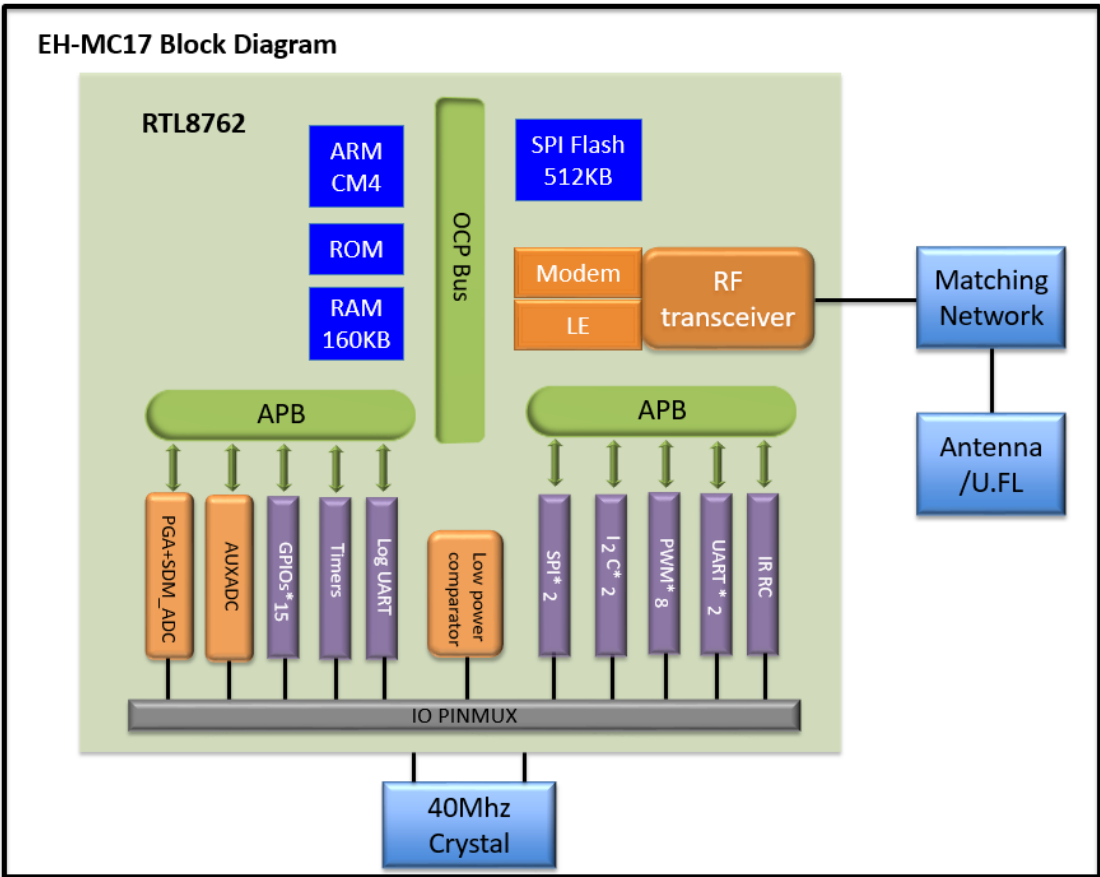
3. Applications

- Smart buildings, Smart cities
- Industry 4.0
- Low-Power Sensor Networks
- Fitness / Sports / Health
- Smart Home
- Smart lighting systems
- iBeacons™ / Proximity
- BLE Mesh applications
- Smart Toys / accessories
- Internet of Things
- Hotel Automation
- Office Automation

4. Ordering Information

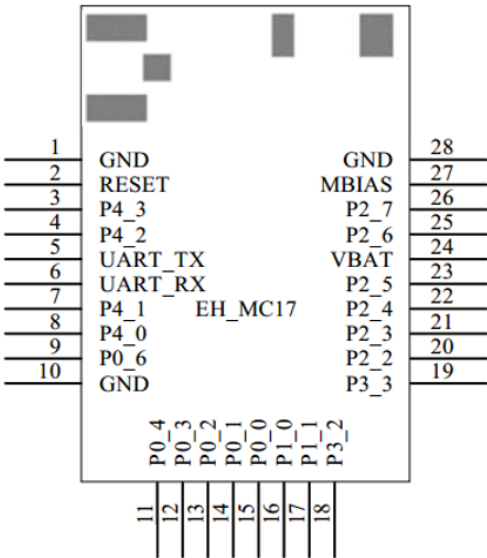
Part number	description
EH-MC17	Module with ceramic antenna
EH-MC17B	Module with U.FL port, diameter: 2mm

5. Block Diagram



6. Pin Descriptions

6.1 Pin-out



6.2 Pin Descriptions

No.	Pin Name	Function	Remark
1	GND	-	-
2	RESET	-	The test point for MP needs to be reserved Use of calibration, Global reset, active low.
3	P4_3	General input/output	Bluetooth connection status indication pin, connect low electrical level, disconnect high electrical level.
4	P4_2	General input/output	-
5	UART TX	P3_0	The test point for MP needs to be reserved Use of calibration.
6	UART RX	P3_1	The test point for MP needs to be reserved Use of calibration.
7	P4_1	General input/output	-
8	P4_0	General input/output	-
9	P0_6	General input/output	-
10	GND	-	-
11	P0_4	General input/output	-
12	P0_3	LOG_UART TX.	The test point for MP needs. Power on trap: Pull-up for normal operation Pull-down for firmware download by serial port,
13	P0_2	General input/output	-
14	P0_1	General input/output;	-
15	P0_0	General input/output;	-
16	P1_0	General input/output;	SWDIO (default)
17	P1_1	General input/output;	SWDCLK(default)
18	P3_2	General input/output;	-
19	P3_3	General input/output;	-
20	P2_2	General input/output;	Internal AUXADC input 2

21	P2_3	General input/output;	Internal AUXADC input 3
22	P2_4	General input/output;	Internal AUXADC input 4
23	P2_5	General input/output;	AUXADC input 5
24	VBAT	-	Battery voltage input
25	P2_6	General input/output;	AUXADC input 6 simulation MIC input N
26	P2_7	General input/output;	AUXADC input 7 simulation MIC input P
27	MBIAS	IO	Bias of microphone When microphone bias is not used, pin sharing is GPIO
28	GND	-	-

NOTE:

- 1 General input/output; 8mA drive capability. Support Wake up function. All are internal strong/weak pull-up and pull-down.
- 2 The test point for MP should be reserved include UART TX, UART RX, LOG_UART TX, RESET.
- 3 For debug, the SWDIO and SWDCLK test point are suggested to be reserved.
- 4 if work with MCU chip, the reset pin is suggested to be connected.

7. Electrical Specifications

7.1 Recommended Operation Conditions

Operating Condition	Min	Typical	Max	Unit
Operating Temperature Range	-40	+20	+85	°C
Storage Temperature Range	-40	+20	+85	°C
Battery (VDD_BAT) operation	2.1	+3.0	+3.6	V
I/O Supply Voltage (VDD_PIO)	1.8	+3.0	+3.6	V
AIO input	0	-	+3.3	V
Frequency range	2402		2480	MHz

7.2 Module power consumption

- Working current: Condition: VBAT=3V, VDDIO=3V, ambient temperature: 25°C

Power mode	Current Consumption(Max)	Unit
Active RX mode	6.8	mA

Active TX mode(TX power:-20dBm)	7.6	mA
Active TX mode(TX power:0dBm)	8.8	mA
Active TX mode(TX power:4dBm)	10.4	mA
Active TX mode(TX power:7.5dBm)	16.8	mA

Table 1: Module average power consumption

- minimum power consumption: Condition: VBAT=3V, VDDIO=3V, ambient temperature:25℃

Power Mode	Always on Registers	32k RCOSC/XTAL	Retention SRAM	CPU	Wakeup Method	Current Consumption (typical)
Power down	ON	OFF	OFF	OFF	Wakeup by GPIO	450nA
Deep LPS	ON	ON	Retention	OFF	Wakeup by GPIO,timer	2.5 μ A(with 160K SRAM in retention state)

Table 2: Module minimum power consumption

Condition	Level	Max Rating
Human body contact discharge rate JEDEC EIA/JESD22-A114	1C	2000V (all pins)
Charge device type according to contact discharge JEDEC EIA/JESD22-C101	C1	500V (all pins)

Table 3: ESD Protection

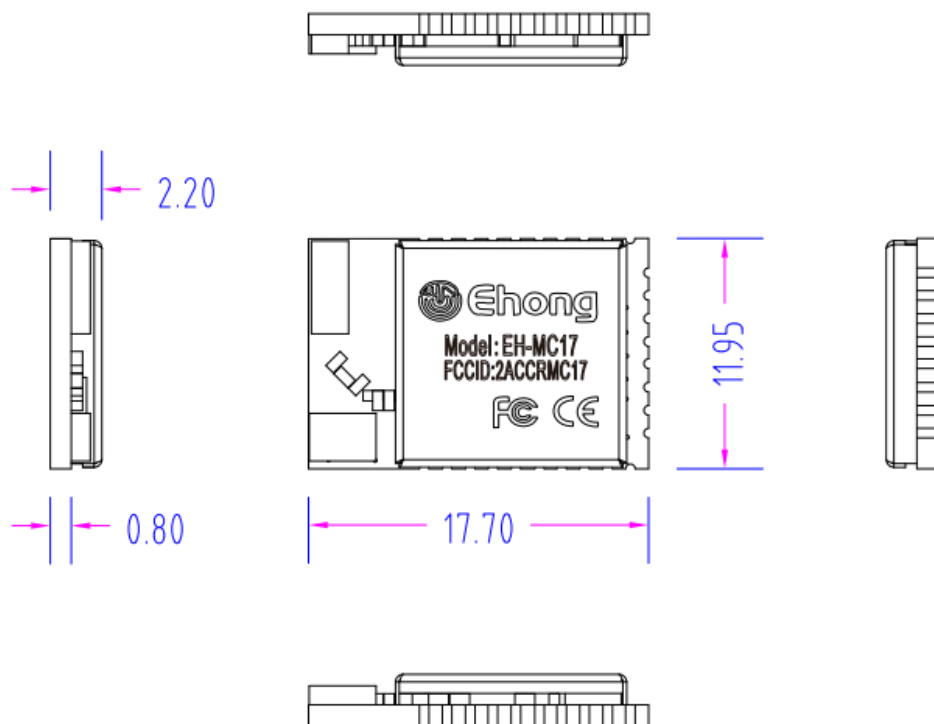
8. Software/ Firmware

Software Support	
Standard Software	Ehong provide module with standard software for customer to develop. Support to make some modification and support customized MAC address
SDK development	Ehong provide SDK and description
Software encryption	Support software encryption for mass production

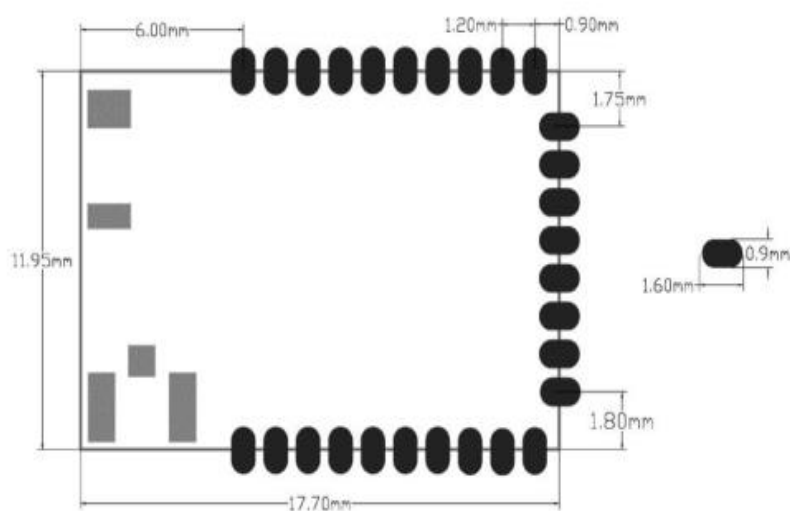
Table 4: software supports

9. Mechanical Data

9.1 Dimensions



9.2 Recommended PCB Land Pads



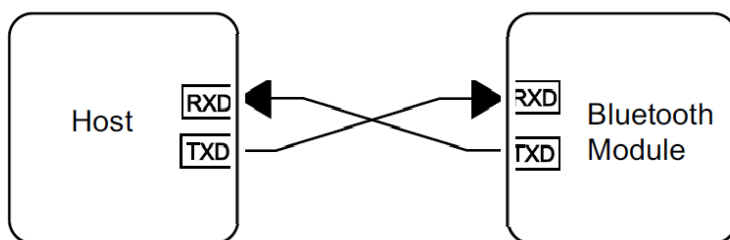
10. Physical Interfaces

10.1 GPIO

The General input/output can be set different function according the the pinmux configuration in the code including PWM, UART, i2C etc.

10.2 UART

The MC17 supports three UARTs, two interfaces support full-duplex transmission and reception, and one interface supports LOG (P0_3). Support hardware flow control through RTS and CTS.



Note: Baud rate supports from 1200 bps from 2Mbps

10.3 I2C Master/ Slave

There are two independent I2C interfaces in the MC17 consisting of a serial data line (SDA) and a serial clock (SCL). Both I2C interfaces can be configured in master-slave mode. Supports 7/10-bit I2C address; configurable I2C address (slave mode); standard rate (1-100kHz), fast rate (100kHz-400kHz); TXFIFO 8-bit*24; RXFIFO 8-bit*40; DMA support.

10.4 SPI

The MC17 has two separate SPI interfaces. SPI0 supports master-slave mode, and SPI1 only supports master mode.

10.5 More interfaces

MC17 has microphone interface, audio output interface, I8080 LCD controller interface

11. RF Design Notes

11.1 Recommended RF Layout & Ground Plane

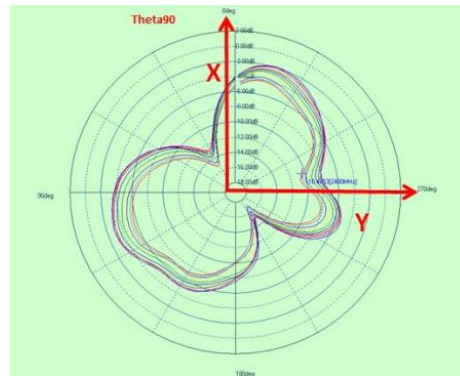
For the EH-MC17, the integrated antenna requires a suitable ground plane to radiate effectively.

The area under and extending out from the antenna portion of the module should be kept clear of copper and other metal. The module should be placed at the edge of the PCB with the antenna edge facing out.

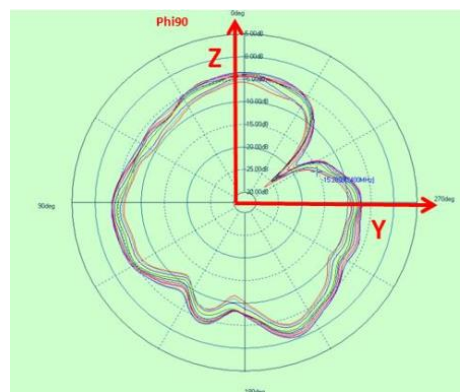
11.2 Antenna Patterns

Antenna patterns are based on the EH-MC17 Evaluation Kit

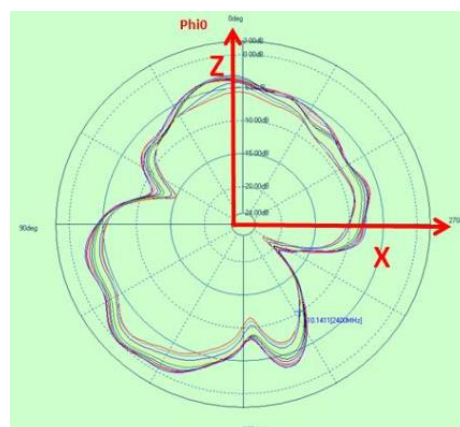
11.2.1 X-Y Plane



11.2.2 Y-Z Plane



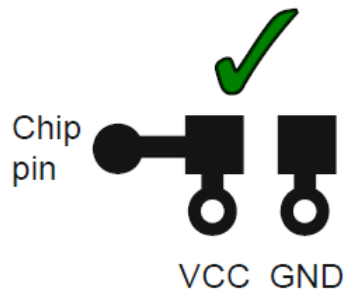
11.2.3 X-Z Plane



12. Layout and Soldering

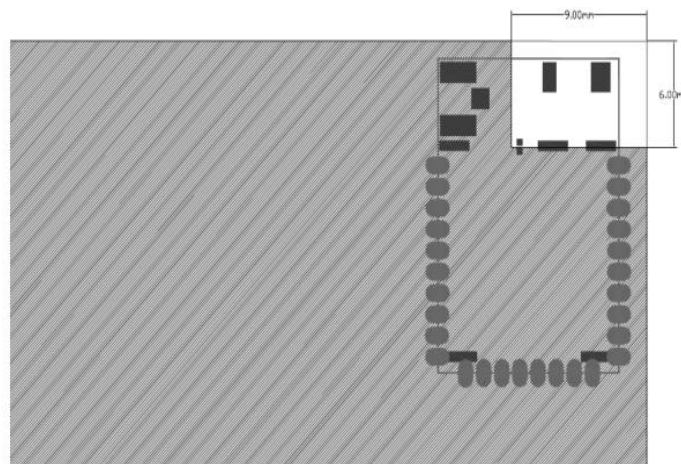
12.1 Layout

- Module power supply: 3v button battery or DC 3.3v
- Power pin connection capacitor is as close as possible to chip and pin
- Decoupling the power supply from the chip using a capacitor
- Use capacitors to prevent noise from coupling back to the power plane.



12.2 Layout Guidelines

To optimize antenna performance, place the module in the corner of the PCB as shown in Figure 6. Do not cover copper and trace the antenna clearance area. Keep the antenna area as far away as possible from the power supply and metal components. Connect all GND pins directly to a solid GND plane. Place GND vias as close as possible to the GND pin. Use a good layout method to avoid excessive noise coupling with signal lines or supply voltage lines.



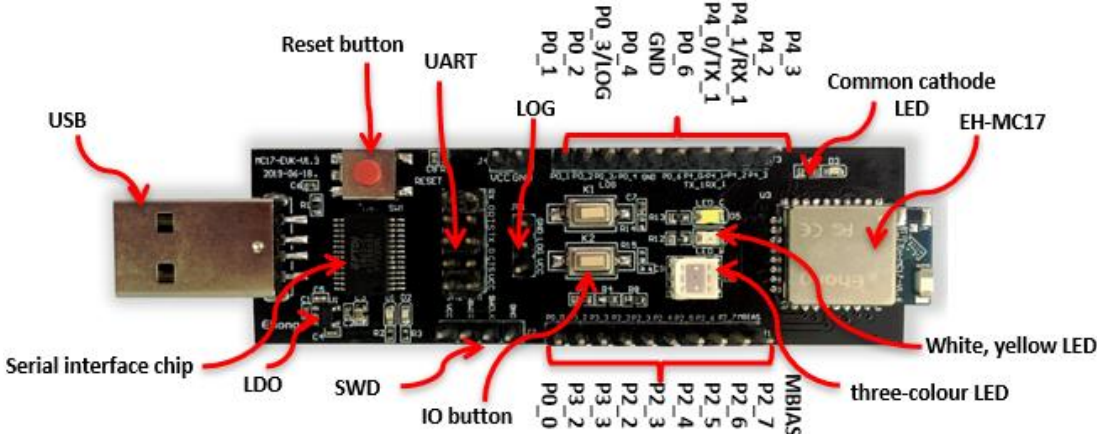
13. Development Kit

EH-MC17-EVK was designed based on EH-MC17 module.

The development board integrates LED, reset button, IO interface, PWM interface, I2C interface and

SWD interface. There are 20 IO ports (not including download serial port).

This development board has a rich interface and complete integrity, which can help customers easily complete product development and testing.



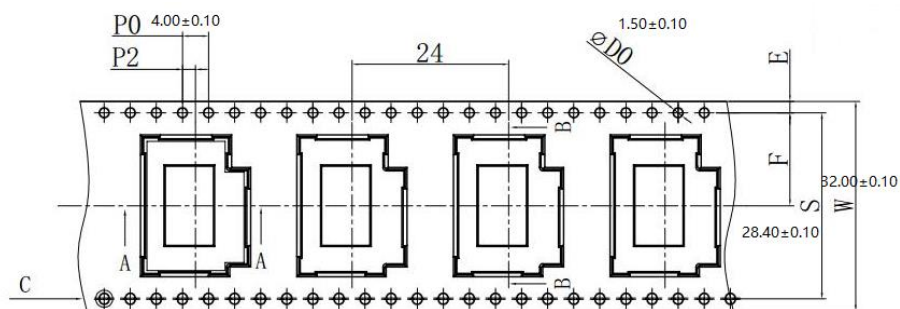
14. Certifications

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SIG	DID: D046582; QDID: 107942;115668
SRRC	Certification number: 2019DP8815
ROHS	Attestation Number : AOC R3SH190613F1552E -13

15. Packaging and Labeling

15.1 Carrier Tape Dimensions

Modules are packaged on reels loaded with 1000 modules. Each reel is placed in an antistatic bag with a desiccant pack and a humidity card and placed in an 36x25x12cm box. Anti-static warnings and labels adhere to the outside of the bag.



15.2 Packing Label

Ehong	
Customer Name	XXXX
PO#	***** 
Material NO.	85200X
Model	EH-XX
Quantity	XX PCS 
Date	XX/XX/XX 
  	

16. Related Documents

Ehong Documents:

Visit website and download: http://www.ehonglink.com/en/h-pd-35.html#_pp=118_1336

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