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## **HPD MODULE**

產品規格書

**PRODUCTION SPECIFICATION**

Model No. : HPD305

**Fangtec Corporation**



enables your IPC innovation

Fangtec Corporation 佳又盛股份有限公司

## Revision History

Date	Rev.	Contents
2026/02/26	V1.0	First release



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## 1. Preface

Human Presence Detection (HPD) is a sensing technology used to detect whether a human is present in front of a device.

In notebook PC applications, HPD enables automatic system lock when the user leaves and display wake-up when the user returns, significantly enhancing both user convenience and privacy protection.

The HPD305 Human Presence Detection Module adopts an always-on ultra-low-power architecture and integrates a low-resolution CMOS image sensor.

By outputting image data at  $240 \times 320$  resolution with a frame rate of 3–5 FPS, the module achieves extremely low power consumption of approximately 3 mW, which is significantly lower than the ~300 mW typically required by conventional camera modules.

The HPD305 outputs only a binary human-presence decision indicating whether a person is detected in front of the lens. No identifiable facial images are captured or stored, ensuring strong data protection and user privacy.

The module features a  $103^\circ$  DFOV ultra-wide field of view with a recommended sensing range of 0.2 to 1.2 meters, enabling accurate detection of user approach and presence.

In addition, the HPD305 supports Ambient Light Sensing (ALS), allowing system behavior to be adjusted according to surrounding light conditions, further reducing overall system power consumption.

For system integration, the module provides multiple interface options, including I2C, GPIO, and USB, making it suitable for a wide range of end devices and platforms.



## 2. Features

- Always-On Operation
- 240 × 320 Resolution @ 3–5 FPS
- Ultra-Low Power Consumption (~3 mW)
- Strong Personal Data Privacy Protection
- Ultra-Wide Field of View
- Supports ALS (Ambient Light Sensor)

## 3. Applications

- Notebook PC
- LCD Monitor
- Industrial PC
- Digital Signage
- Kiosk
- Robot
- Television

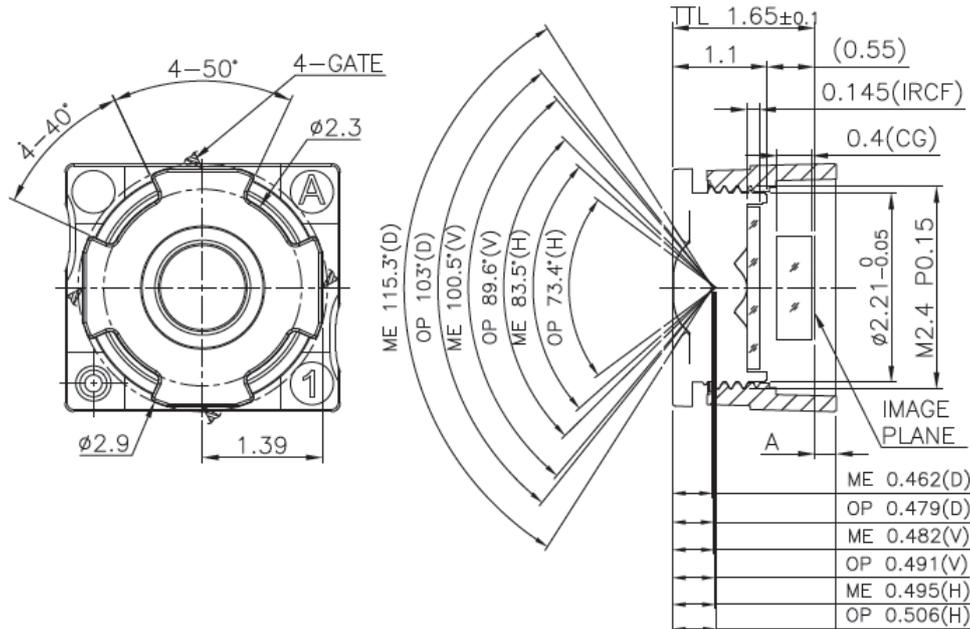
## 4. Key Specification

Module Specification	
Size(LWH/mm)	60.0 x 6.0 x 3.4±0.2 mm (include PCB Thickness)
PCB Thickness	0.8 mm
Output Interface	USB2.0 / I2C / GPIO
Output size	QVGA 240 x 320
Operating Temperature	-20°C to +85°C
Stable image temperature	0°C to +60°C
Max Frame Rates (fps)	5 fps

Backend IC Specification	
Type	tinyML Vision Processor (Built in enhanced NPU)
OS Supported	Windows11, Linux, Android

Sensor Specification	
Optical format	1/13-inch QVGA CMOS Sensor
Active resolution	244H×328V
Unit pixel size	2.5µm x 2.5µm

Lens Specification	
F/No.	2.2 ± 5%
Field of View (OP)	103° (D) 73.4° (H) 89.6° (V)
Focus Distance	60cm

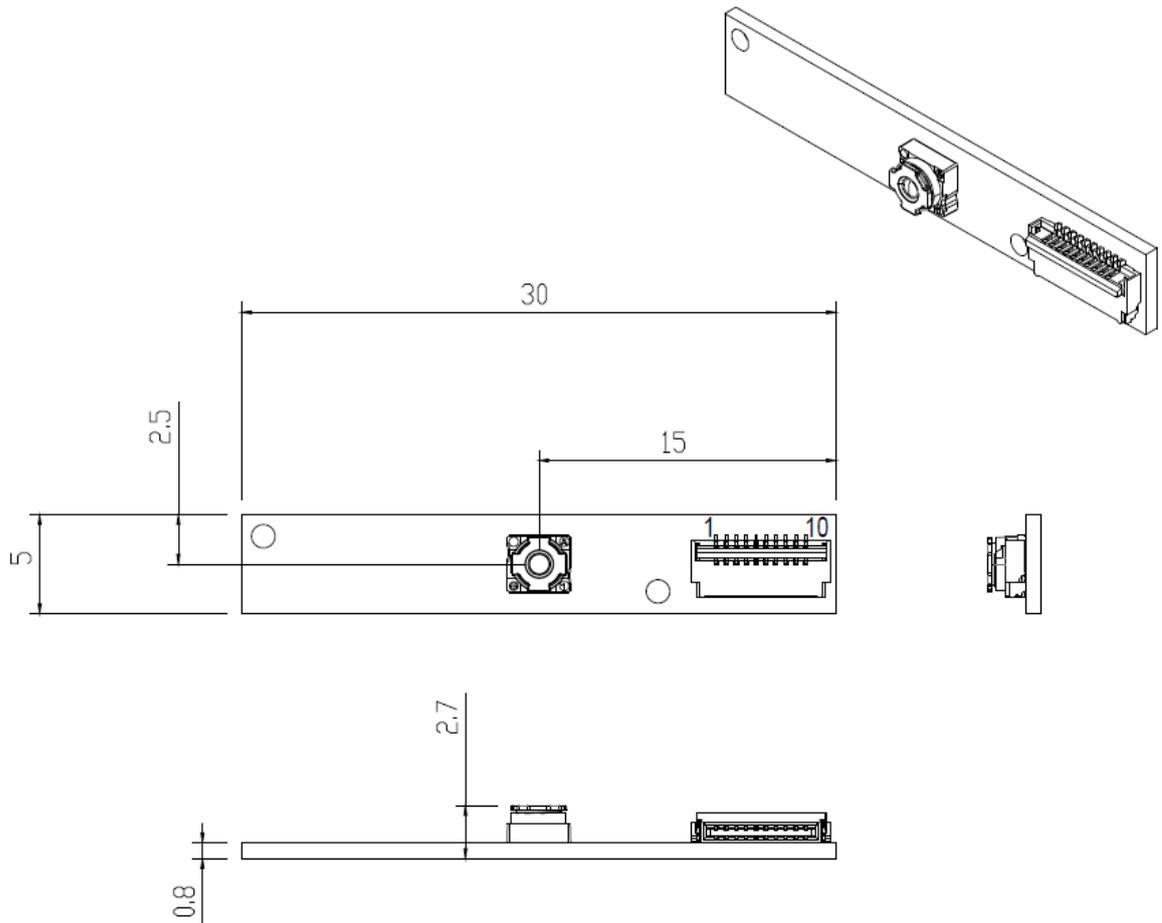


## 5. Pin Description

Pin Number	Name	Pin Type	Function Description
1	VCC	Power	3.3V DC
2	HID_INT	I/O	GPIO8 / HID INT
3	I2C_SDA	I/O	I2C interface data
4	I2C_SCL	I	I2C interface clock input
5	GND	GND	System Ground
6	D+	Data Transmission	USB Data Read
7	D-	Data Transmission	USB Data Write
8	GND	GND	System Ground
9	IO	I/O	GPIO10 / SSCK
10	IO	I/O	GPIO12 / SMISO

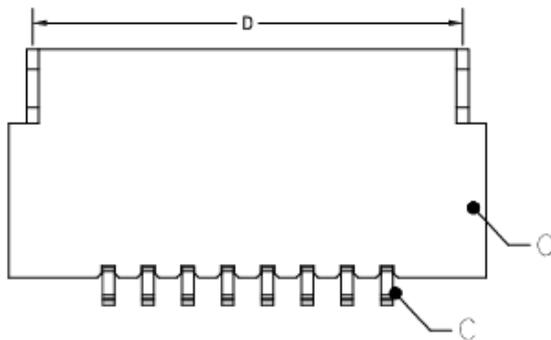
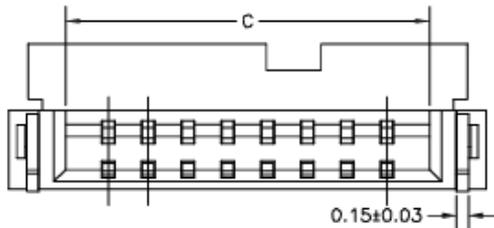
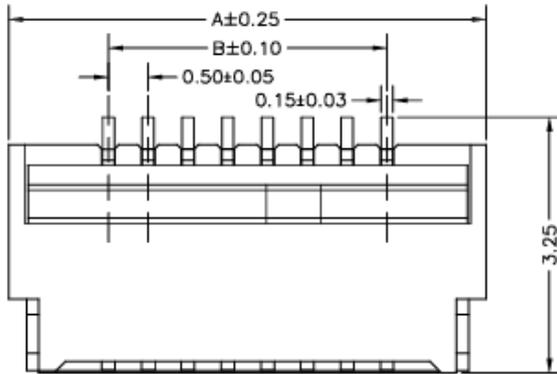
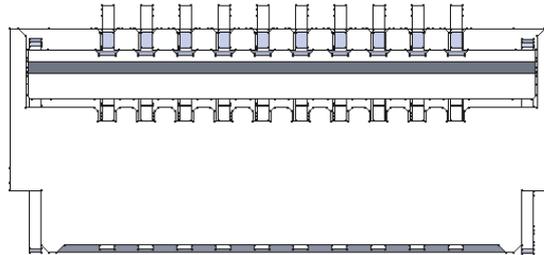


## 6. Outline Specification

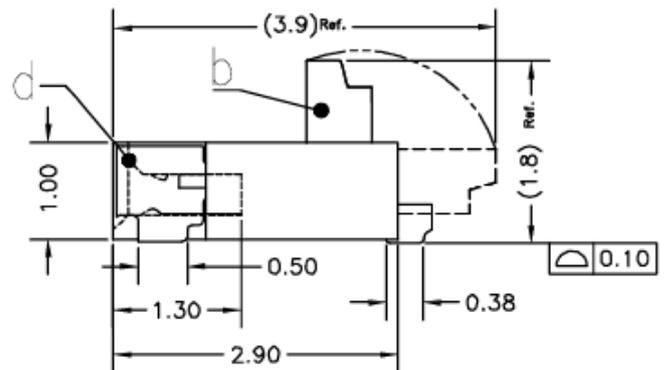


## 7. Connector Specification

FPC connector 0.5mm pitch H=1.0mm 前插後掀



Dimensional Information:				
Part No.	Dimensions			
	A	B	C	D
4P	4.00	1.50	2.57	3.40
5P	4.50	2.00	3.07	3.90
6P	5.00	2.50	3.57	4.40
8P	6.00	3.50	4.57	5.40
10P	7.00	4.50	5.57	6.40
12P	8.00	5.50	6.57	7.40
14P	9.00	6.50	7.57	8.40
16P	10.00	7.50	8.57	9.40
18P	11.00	8.50	9.57	10.40
20P	12.00	9.50	10.57	11.40
22P	13.00	10.50	11.57	12.40
24P	14.00	11.50	12.57	13.40
26P	15.00	12.50	13.57	14.40
28P	16.00	13.50	14.57	15.40
30P	17.00	14.50	15.57	16.40
32P	18.00	15.50	16.57	17.40
34P	19.00	16.50	17.57	18.40
38P	21.00	18.50	19.57	20.40
40P	22.00	19.50	20.57	21.40
45P	24.50	22.00	23.07	23.90
50P	27.00	24.50	25.57	26.40



## 10. I2C Register Table

This document is developed to explain the I2C register address of get register data of HPD(Human Presence Detection) and ALS (Ambient Light Sensor) and Version information.

### Production Related Register:

EV620	Address	length	Value
IC version	0x2003C	2	Reference IC version (Follow ACSII code) =0x20 0x06(fixed)

EV620	Address	length	Value
Firmware version	0x14003	3	Reference FW version (Follow ACSII code) = 0x01 0x05 0x02 = 1.5.2

EV620	Address	length	Value
Project version	0x14017	2	Reference project version 0x05 0x02 = (FW version).0502

EV620	Address	length	Value
Weight version	0x14006	16	Reference WT version (Follow ACSII code) = 0x41 0x43 0x52 0x32 0x2E 0x36 0xFF = ACR2.6??????????

EV620	Address	length	Value
Project code	0x14017	2	Reference Project code (Follow ACSII code) =0x02 0x01 =0201

EV620	Address	length	Value
Device Serial Number	0x14500	16	Reference SN of device (Follow ACSII code) = 0x53 0x4E 0x6E 0x75 0x6D 0xFF = SNnum???????????? It can be updated from flash.

**Data Report Register:**

EV620	Address	length	Value																		
HPD result	0x14461	1	<p>Category id from NN definition It depends on Firmware and Weight definition. For example.</p> <table border="1"> <thead> <tr> <th>0x14461</th> <th>0x14461</th> </tr> </thead> <tbody> <tr> <td>4類</td> <td>7類</td> </tr> <tr> <td>0x00: non attention</td> <td>0x00: Attention</td> </tr> <tr> <td>0x01: Attention</td> <td>0x01: left</td> </tr> <tr> <td>0x02: leave</td> <td>0x02: right</td> </tr> <tr> <td>0x03: multi-person</td> <td>0x03: Back</td> </tr> <tr> <td></td> <td>0x04: leave</td> </tr> <tr> <td></td> <td>0x05: Too close</td> </tr> <tr> <td></td> <td>0x06: Multi-person</td> </tr> </tbody> </table>	0x14461	0x14461	4類	7類	0x00: non attention	0x00: Attention	0x01: Attention	0x01: left	0x02: leave	0x02: right	0x03: multi-person	0x03: Back		0x04: leave		0x05: Too close		0x06: Multi-person
0x14461	0x14461																				
4類	7類																				
0x00: non attention	0x00: Attention																				
0x01: Attention	0x01: left																				
0x02: leave	0x02: right																				
0x03: multi-person	0x03: Back																				
	0x04: leave																				
	0x05: Too close																				
	0x06: Multi-person																				

EV620	Address	length	Value
ALS	0x14480	4	<p>Byte[0]-Byte[3] Read data = 0xFA 0x00 0x00 0x00 Lux Value = <math>250(0xFA)/10 = 25 \text{ Lux}</math> Lux Value range = 0~10000Lux</p>

EV620	Address	length	Value
ACS x	0x14484	4	<p>0. byte[0]-byte[3] Read data = 0x10 0x0E 0x00 0x00 ACS x Value = <math>3600(0xE10) / 10000 = 0.36</math></p>
ACS y	0x14488	4	<p>0. byte[0]-byte[3] Read data = 0x48 0x0D 0x00 0x00 ACS y Value = <math>3400(0xD48) / 10000 = 0.34</math></p>

EV620	Address	length	Value
NN Score	0x14400	16	<p>NN score of class 0x00 ~ 0x0F. e.g. Read 7 class score from 0x14400 to 0x14406 for class 0x00 to 0x06.</p>

**Function Control Register:**

When using below register, please rewrite the register according to operation condition.

EV620	Address	length	Value
USB Connect Control	0x144A5	1	0x01: Enable USB connection 0x02: Disable USB connection

EV620	Address	length	Value
Pivot direction	0x1446E	1	0x00: 0 度 0x01: +90 度 (順時針/Clockwise) 0x02: -90 度 (逆時針/Counterclockwise)

EV620	Address	length	Value
Software Reset	0x20004	1	Write data:0x80 to reset EV620 and wait 2 seconds for reboot.

**2 Vendor Command**

**2.1 Vendor Command Format**

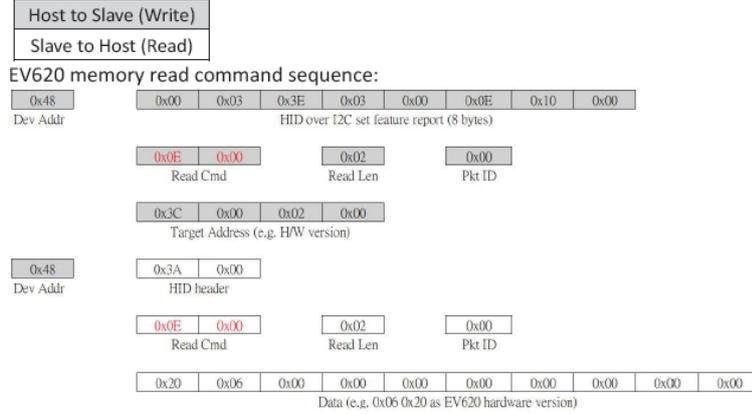
Write command
Read command

- P[4]~P[7], address field, little endian. if address is 0xA0A1A2A3
- P[8]~, data field, little endian.
- I2C Slave ID = 0x48 (7bit, please refer to below table)

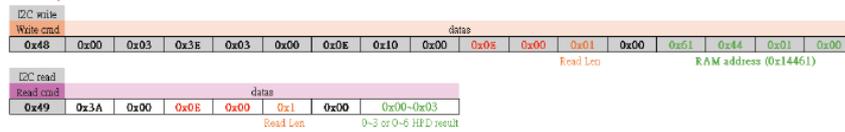
I2C Slave Address							R/W
A6	A5	A4	A3	A2	A1	A0	
MSB							LSB
1	0	0	1	0	0	0	

VCmdIdx		target	description	Packet data					
				P[0] report id	P[1] cmd idx	P[2]	P[3]	P[4]-P[7]	P[8]~
0x00	VCMD_DEV_DATARD	HID	read hid device data ram	0E	00	Request Length	Packet ID	A3 A2 A1 A0	
			returned data packet	0E	00	Active Length	Packet ID	DD DD DD DD ..	
0x01	VCMD_DEV_DATAWR	HID	write hid device data ram	0E	01	Request Length	Packet ID	A3 A2 A1 A0	X3 X2 X1 X0 ..
			returned data packet	0E	01	Active Length	Packet ID		

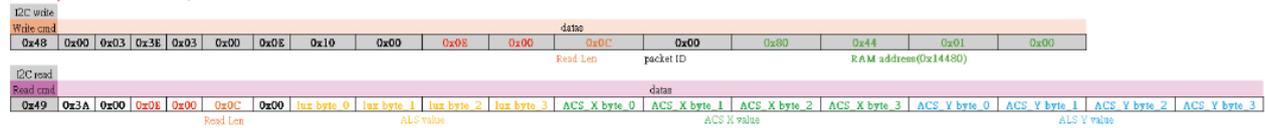
## 2.2 Vendor Command Protocol



### Example of read HPD result:



### Example of read ALS/ACS result:

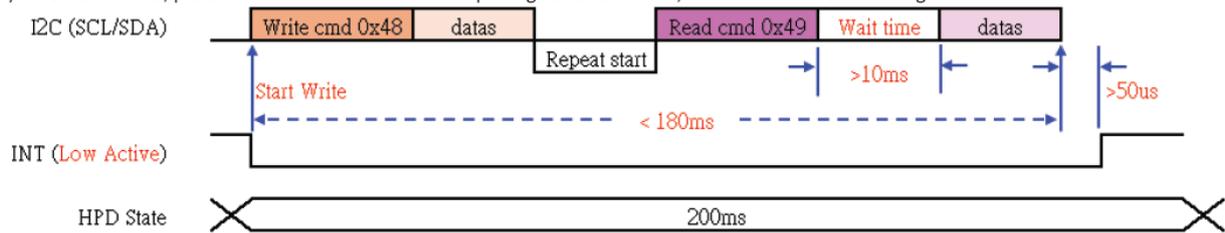


## 2.3 I2C Repeat Start Format Requirement

If customer support stretch to read I2C data, please ignore below request (2).

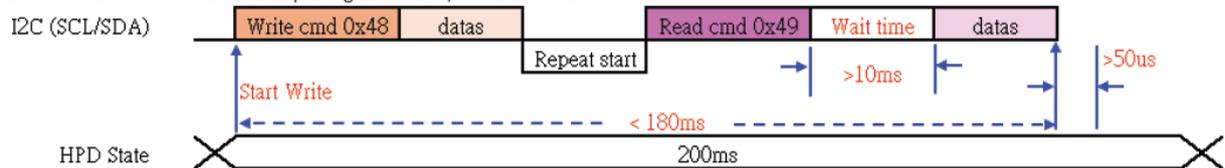
If customer use I2C repeat start and **Query mode** to read I2C data, please follow below timing request.

- (1) When HPD status changed, INT state will pull "Low". Please start Write command after then.
- (2) After complete Write command and before first read data, please wait at least **10ms**.
- (3) After read data, please wait at least **50us** after completing Read command, until INT state become "High".



If customer use I2C repeat start and **Polling mode** to read I2C data, please follow below timing request.

Please wait at least **50us** after completing each Read/Write command.



Note 1: I2C slave timing specification please refer to module datasheet. The interval of each query should longer than **200ms**.

Note 2: In order not to miss HPD result, please read HPD status within **180ms** after INT pin state change from "High" to "Low".

Note 3: When read ALS/ACS result, system can query at any time without checking INT pin state. It is recommended to design 1sec or 2 sec

with polling mode, it depends on system performance.

Note 4: It is recommended to design a timer function to avoid Host stuck when executing R/W command. (e.g. When detecting INT falling edge, start counting **200ms**. Detect INT state again after **200ms**, repeat R/W command again while detected INT state is "Low".

Note 5: If you use GPIO to simulate I2C behavior, due to GPIO clock skew not as stable issue, the "wait time" below may need to be extended to more than 30ms depending on the GPIO condition.



## 11. GPIO Table Pin :

	GPIO 12 = L	GPIO 12 = H
GPIO 10 = L	Attention	Multi-Person
GPIO 10 = H	Not Attention	Leave