KEYWAVE

KW007 / Motion sensor modules

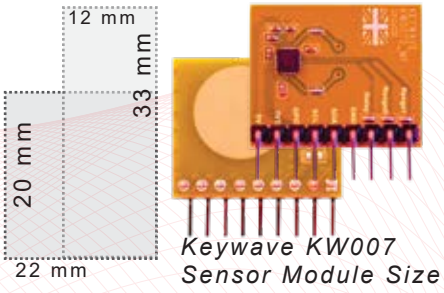
Reliable motion sensing — beyond PIR, without radar complexity.

Lowest Power
No need MCU
Work with AI
Simple, compact

Core sensing value:
- *A simple, accurate, and compact motion sensor*
- *Reduces false triggers compared to PIR*

Deployment / business value
- *Works through non-metal covers*
- *Enables energy-saving applications*

System / integration value
- *Plug-and-play integration (MCU optional), AI Ready*



Keywave KW007 Sensor Module Size

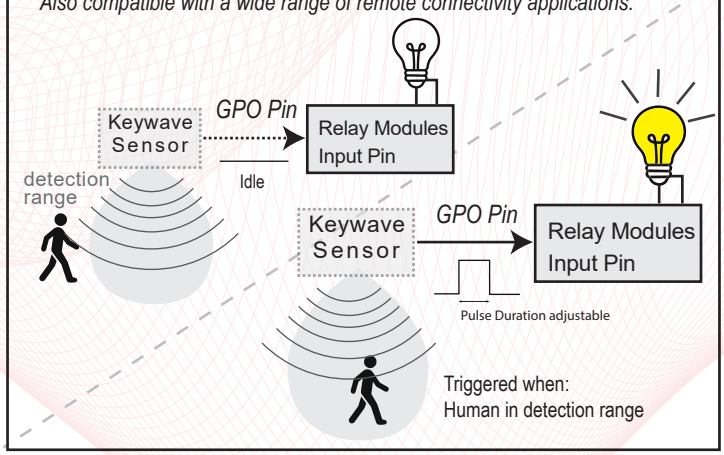
Applications

- Adjustable Range
- Adjustable Pulse Duration
- Works well without MCU
- Very low power consumption
- Very compact

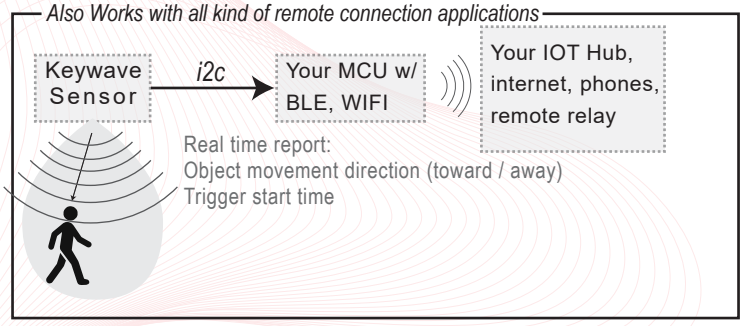
KW007 outputs motion trigger and direction data via GPIO or I²C, enabling a wide range of applications using MCU, AI, and IoT platforms. Ideal for smart buildings, public spaces, and industrial environments where PIR reliability is insufficient.

Connection example *Higher reliability than PIR, Differentiated sensing performance*

Trigger your application using a simple GPIO pin —
No MCU or programming required.
Also compatible with a wide range of remote connectivity applications.



Also Works with all kind of remote connection applications



Data supports condition-based programming for data collection, triggers, wake-on events, time logging, directional triggers, event logging, energy savings, and smart control logic.

KEYWAVE

KW007 / *Motion sensor modules*

Reliable Motion sensing — beyond PIR, without radar complexity.

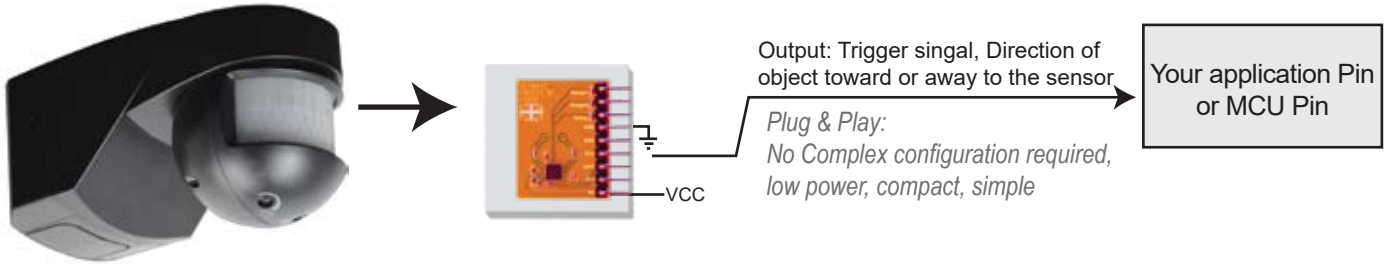
Streamlined Integration: No Radar Expert Needed

Competitor Approach

Bulky (usually 15-20 cm³),
Requires continuous power,
high power consumption

KW007 Our way

Sense through non-metal
Sensor size only ~2cm x 2cm x 1.4 mm
Battery-operable, with multi-year operating life.



Keywave KW007 motion does delivery more than PIR

Category	PIR Sensor	Keywave KW007 (S, SE, L)
Detection principle	Infrared heat change	RF movement in range (motion presence)
False trigger rate	High (heat, sunlight, airflow)	Low (robust to temperature & airflow&vibration)
Detection reliability	Motion-dependent	Motion
Detection through covers	x No	Yes (non-metal)
Environment sensitivity	High	Low (temperature / light independent)
Integration complexity	Very simple	Simple (GPO) to advanced (I²C)
Data output	Trigger only	Trigger + Signal strength, direction data
Typical use cases	Basic lighting, alarms	Smart lighting, HVAC, switches
Power consumption	Very low	Low (< 30 µA system)
Cost	Very low	Higher unit cost, enables BOM reduction and premium product differentiation

KW007 Specification

Methodology	Doppler motion detection
System Current	< 30 µA
Detect Motion Range	10 cm to 12 meters (dynamic adjustable)
Interference immunity	Interference immunity tested against Wi-Fi, BLE, vibration, and temperature variations
Detection angle	Approximately ±55° Degrees in the forward direction

NRE packages: Our silicon is production-ready.

Our NRE packages are not for chip development — they are for tailoring a production-ready sensor solution to your product and accelerating your time-to-market.

- Tier 1 — Configuration NRE
- Tier 2 — Integration & Module NRE
- Tier 3 — Strategic Partner NRE

Please contact our sales for the details.

Hardware and specifications may be updated during different development phases.
Please visit our website to stay up to date and subscribe to our newsletter.

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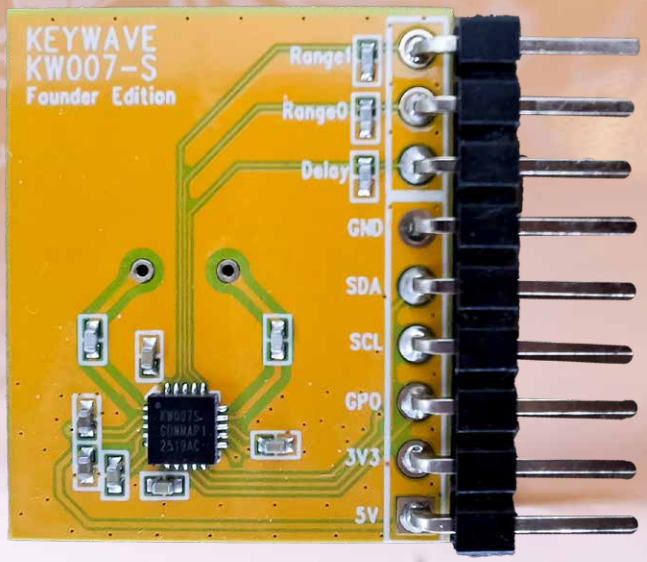
KEYWAVE

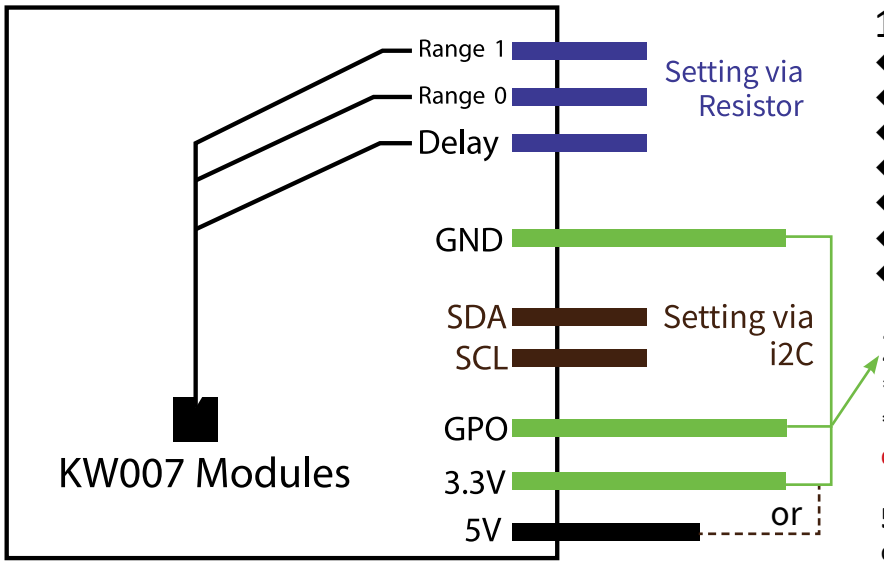
Keywave-KW007

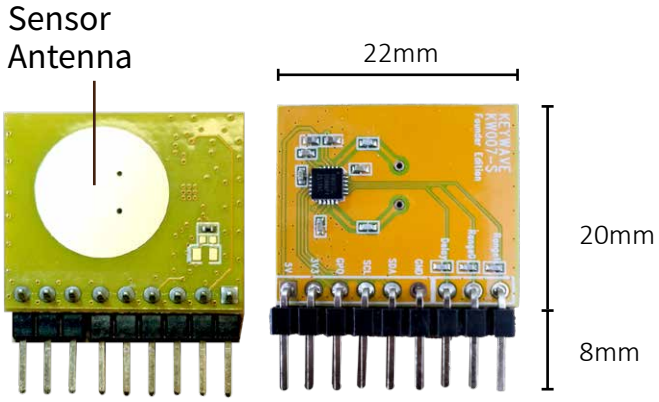
Sensor Module

User Guide (Rev 1.2 • 01/12/2025)

Applicable Models
KW007-S (short-range)
KW007-L (long-range)
KW007-SE (mid-range)







1. Overview

- This guide covers:
- Basic connections (power, GND, GPO)
- Default factory settings
- Resistor-based configuration (Range & Delay)
- I²C control
- Order information
- EVK (evaluation kit)

2. Power and Quick Start

*Power: **3.3 V or 5V**:
**Connection only ONE supply, 3.3V or 5V, do not connect Both.

5V Input Mode: Input voltage is regulated by an on-chip LDO to power the internal core.

3.3V Input Mode: Input voltage bypasses the internal LDO. A low-noise power source is mandatory.

It is recommended to employ an external LDO to minimize supply noise before the IC input.

*__GND:__ Ground
*GPO: Output **(pulled up to 3 V.)**

3. Factory default setting

Model	Detect Range	Output pulse Hold duration (s)
KW007-S	Max, 2 Meter	64 seconds
KW007-L	Max, 10 Meters	64 seconds
KW007-SE	Max, 4 Meters	64 seconds

Overview

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b. Is in possession of the Receiving Party without restriction in relation to disclosure before the date of receipt from the Disclosing Party.
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5. Term: The confidentiality obligations of this Agreement shall remain in effect for a period of 5 years from the date of disclosure of each item of Confidential Information.
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8. Entire Agreement: This Agreement constitutes the entire agreement between the parties with respect to its subject matter and supersedes all prior or contemporaneous agreements or understandings, both written and oral.
This Agreement shall become effective upon the receipt of the product sheets by the Receiving Party, and by receiving the product sheets, the Receiving Party agrees to the terms and conditions outlined in this Agreement.
Keywave Technology Limited ("Disclosing Party")
9. In accordance with our commitment to safeguard proprietary information and enforce the terms of our Non-Disclosure Agreement (NDA), we have integrated unique identification codes within our software. These identifiers are designed to prevent unauthorized information disclosure and facilitate the tracking of usage to ensure compliance with confidentiality obligations.

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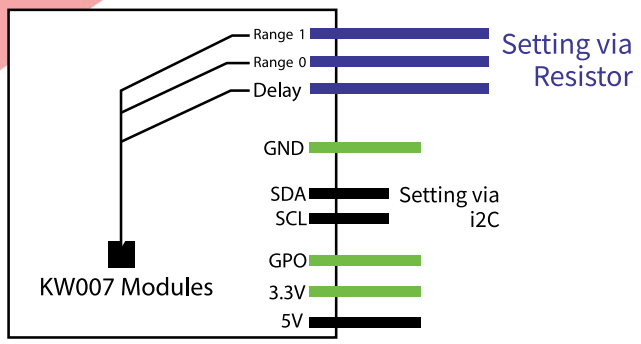
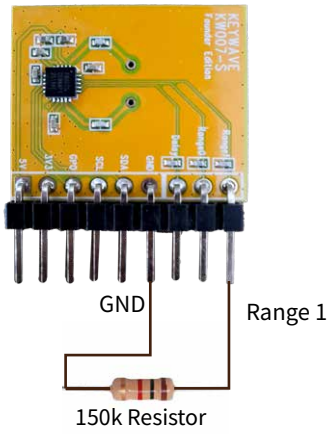


Resisitor connection how to :



4. Custom Configuration via Resistors

Delay (Output-Hold Time): populate the "Delay" pads with 0 Ω, 150 kΩ, 270 kΩ or leave open for different Settings :

Delay (Seconds) - Output Pulse Hold Duration Setting, with resistor connected to GND:

Set Delay	Setting 1	Setting 2	Setting 3	Max
Connect Resistor:	Resistor 0	Resistor 150K	Resistor 270k	Resistor Open
KW007-S	1 sec	2 sec.	4 sec.	64 sec.
KW007-L	1 sec.	16 sec.	32 sec.	64 sec.
KW007-SE	1 sec.	16 sec.	32 sec.	64 sec.

The detection distances listed below are maximum reference values. Actual performance may vary depending on environmental factors and the material or thickness of the product housing. Please adjust the Detection Intensity Level to achieve the optimal distance for your specific application.

Detection Strength (Distance): use R_0 / R_1 resistor pairs connect to GND to get eight level of discrete ranges

Set Distance	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	*All Max
Range 0	0	150kΩ	270kΩ	*Open	0	150kΩ	270kΩ	*Open	*Open
Range 1	0	0	0	0	150kΩ	150kΩ	150kΩ	150kΩ	*Open
KW007-S	**0.1m**	**0.2m**	**0.3m**	**0.5m**	**0.7m**	**1m**	**1.4m**	**2m**	**2.0m**
KW007-L	5m	6m	7m	8m	9m	10m	11m	12m	12m
KW007-SE	0.1m	0.2m	0.3m	0.5m	0.7m	1m	2m	4m	4m

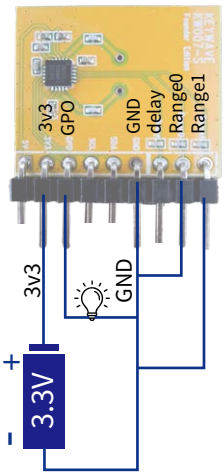
*0 = connect to GND

* Open = no resistor fitted (∞ Ω) and not connect to GND

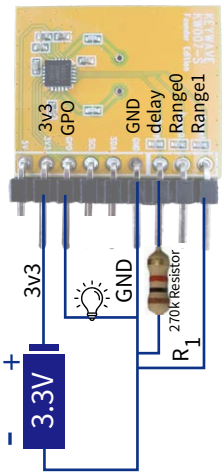
*All Max include Max sentitivity

Connection Examples:

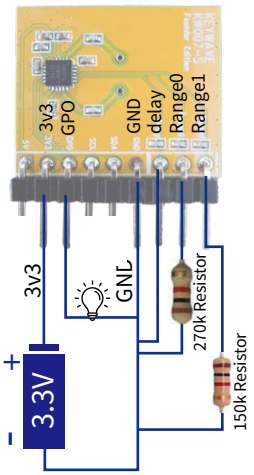
KW007S
Range : Level 1 (~0.1m)
GPO Hold Time:
64 sec (Max)



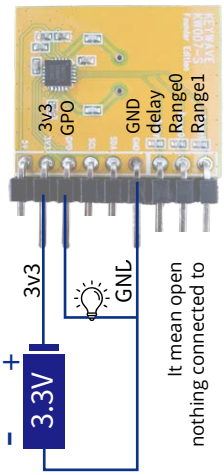
KW007S
Range : Level 4 (~0.5m)
GPO Hold Time:
4 sec (setting 3)



KW007S
Range : Level 7 (~1.4m)
GPO Hold Time:
1 sec (setting 2)



KW007S All Max
Range : Max
GPO Hold Time: Max



Setting by Resistor

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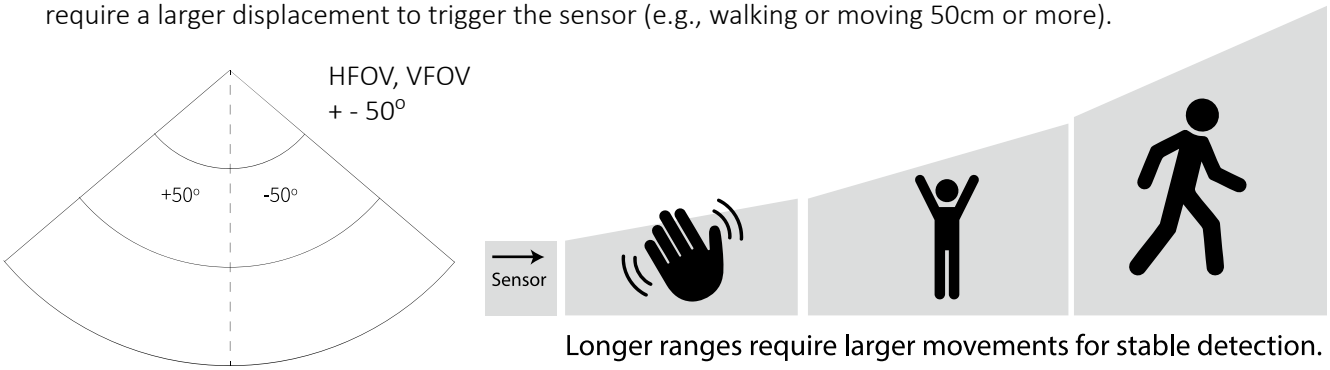
5. Detection Characteristics

Our sensor is designed to detect active motion. At close range, the sensor is highly sensitive and can detect small gestures like a hand wave. However, as the detection range increases, the environment becomes more complex. To maintain stability and prevent false triggers, targets at a greater distance require a larger displacement to trigger the sensor (e.g., walking or moving 50cm or more).



Longer ranges require larger movements for stable detection.

6. Custom Configuration Via I²C (Dynamic) [redacted]

All range and pulse-width parameters can also be re-programmed on-the-fly over I²C.

Interface pins: SDA, SCL
Configurable registers: Pulse Duration (1 s – 64 s)
Detection Range (full continuous range, not limited to the eight resistor presets)
Use case: let your MCU or a Windows-based host adjust sensitivity and timeout in real time.
Please request and read additional Software development Guide for detail info.

7. Ordering & Custom Builds

10 000+ units: Specify your desired detection range & pulse duration, and we'll pre-program your modules.

IC-Only Purchases: available on request—please contact your Keywave sales representative.
or mail to : cc@keywavetech.co.uk

For the latest updates, visit our website: www.keywavewtech.co.uk

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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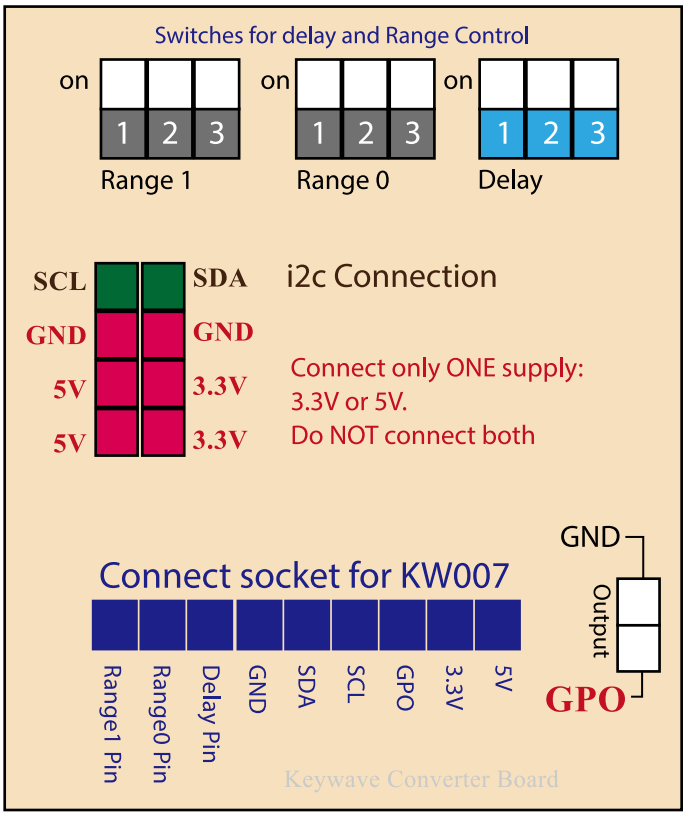
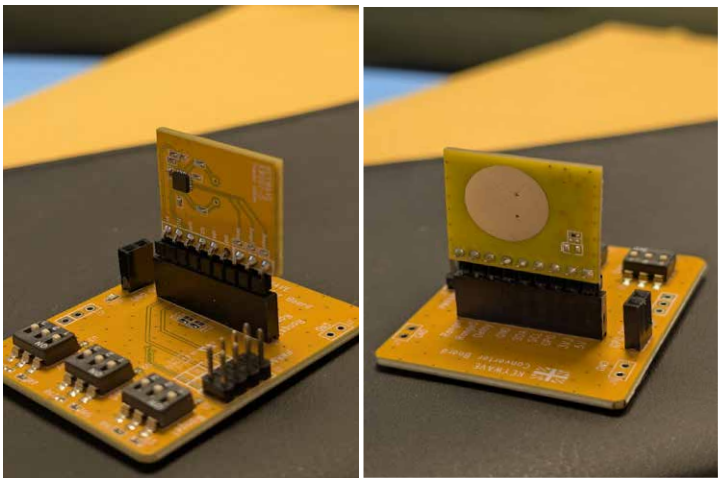
8. Evaluation Kit (EVK) for KW007 Sensor Module

To help you get started quickly with the KW007 Sensor Module, we provide an Evaluation Kit (EVK) designed to make the integration process seamless. The EVK allows you to easily modify key parameters such as GPO Hold time duration and detection range to suit the needs of your specific project.

With simple adjustments, you can tailor the sensor's performance to optimize for different applications, ensuring that the KW007 fits perfectly into your design requirements. Whether you're working on short-range detection or need extended durations for long-term monitoring, the EVK provides the flexibility to make these changes quickly and efficiently.



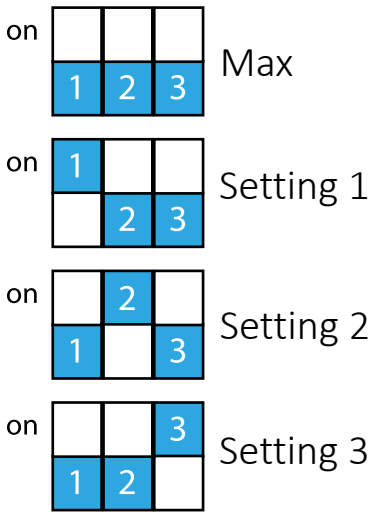
#EVK (Converter Board) Layout.



* Sensor install Direction

Output Pulse Duration (GPO High Time) Switch:

This setting determines how long the GPO pin remains in a HIGH state after the sensor is triggered.



	KW007S	KW007L	KW007SE
Max	64 sec	64 sec	64 sec
Setting 1	1 sec	1 sec	1 sec
Setting 2	2 sec	32 sec	32 sec
Setting 3	4 sec	16 sec	16 sec

EVK Board

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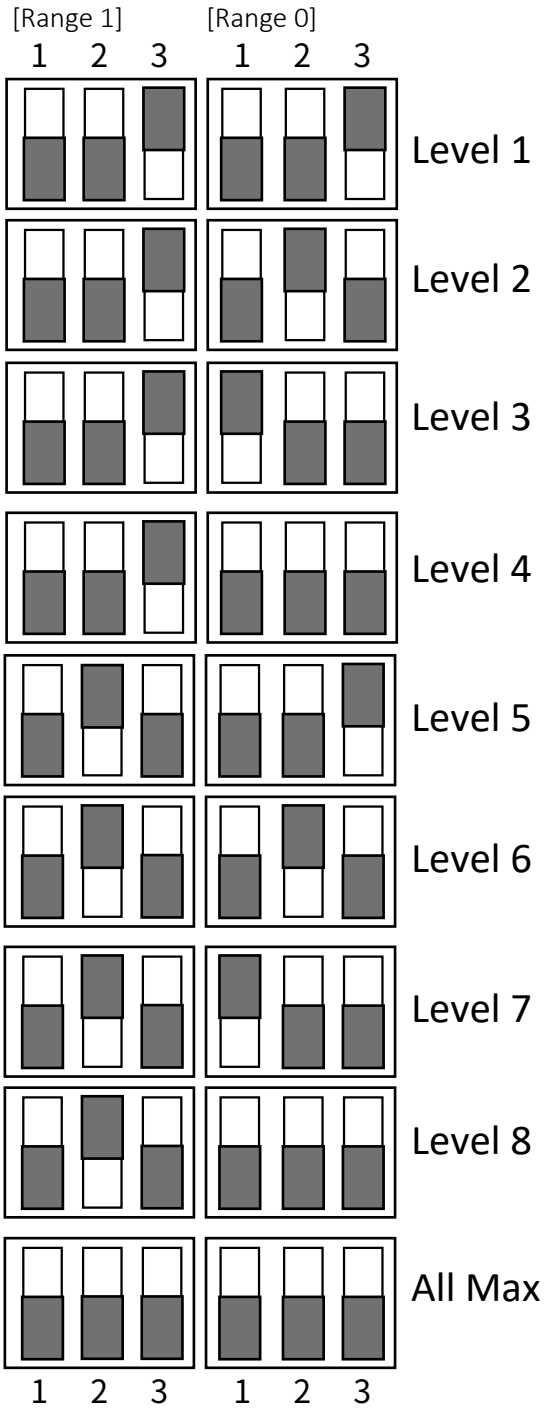
Detection Strength / Range Adjustment Switch:



The detection distances listed below are maximum reference values. Actual performance may vary depending on environmental factors and the material or thickness of the product housing. Please adjust the Detection Intensity Level to achieve the optimal distance for your specific application.

	KW007S	KW007L	KW007SE
at Level 1	0.1 meter	5 meter	0.1 meter
at Level 2	0.2 meter	6 meter	0.2 meter
at Level 3	0.3 meter	7 meter	0.3 meter
at Level 4	0.5 meter	8 meter	0.5 meter
at Level 5	0.7 meter	9 meter	0.7 meter
at Level 6	1 meter	10 meter	1 meter
at Level 7	1.4 meter	11 meter	2 meter
at Level 8	2 meter	12 meter	4 meter
at All Max (Range and Sensitivity)	2 meter	12 meter	4 meter

For the latest updates, visit our website: www.keywavewtech.co.uk

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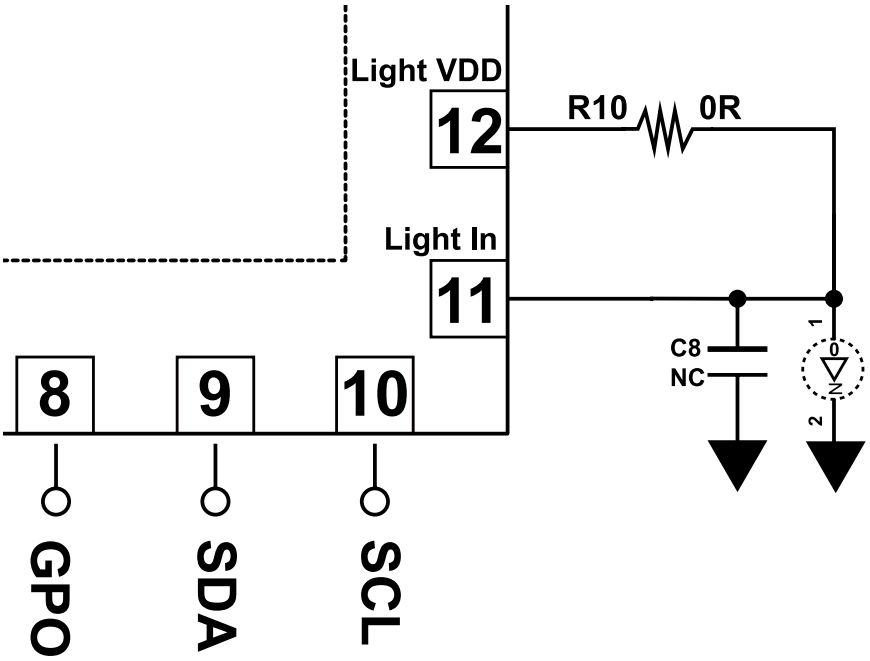
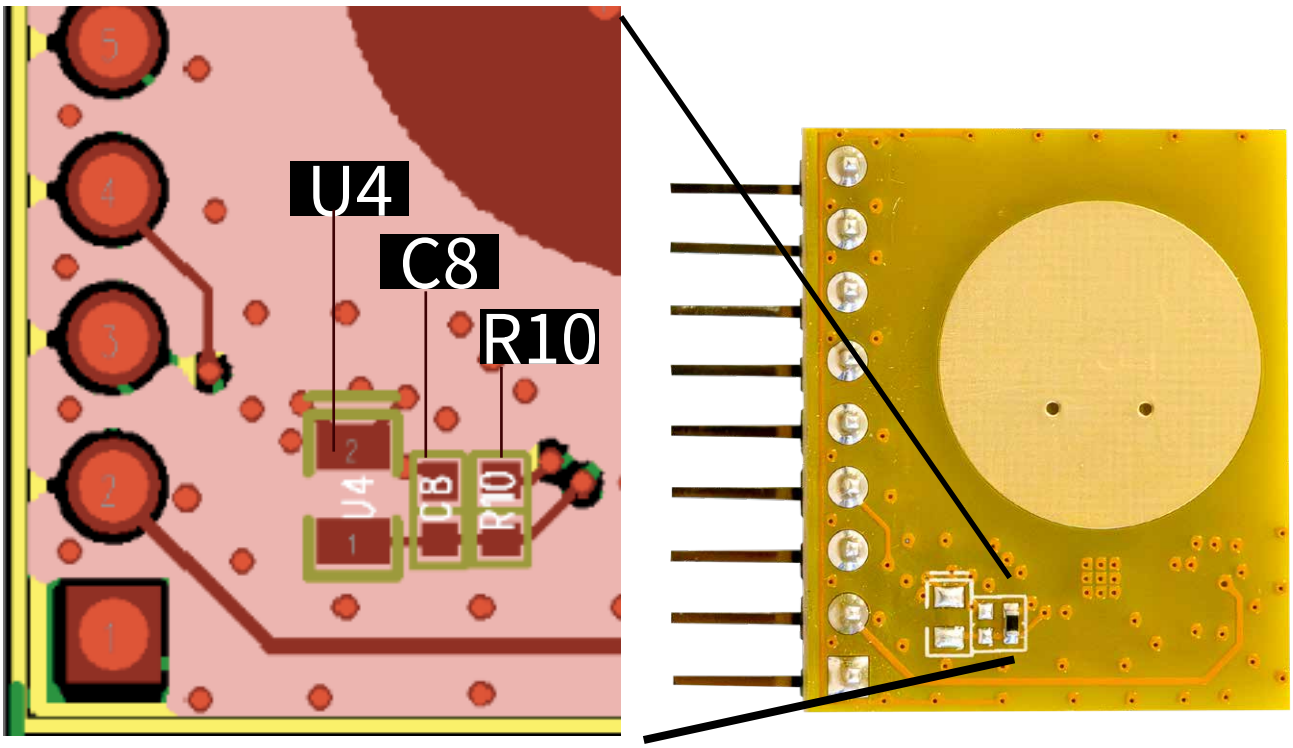
Ambient light sensing



This circuitry is used to implement the ambient light sensing function on our module. Recommended component values are as follows:

R10 : 1 MΩ
C8 : 100 nF
U4 : SLPT0805AC (ambient light sensor)



Ambient Light Funciton

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Electrical Specification -

Absolute Maximum Ratings

Characteristic	Symbol	Min.	Typ.	Max.	Units
5V supply voltage	V_{DD5V}	-0.3	-	6.0	V
3V supply voltage	V_{DD3V}	-0.3	-	3.6	V
Digital I/O voltage	V_{DIO}	-0.3	-	3.6	V
Ambient Temperature	T_A	-25	-	85	°C

DC Characteristics

VDD5 serves as the power supply input.

Characteristic		Symbol	Min.	Typ.	Max.	Units
Supply voltage via 5V pin		V_{DD5V}	3.3	5.0	6.0	V
Supply voltage via 3V pin		V_{DD3V}	2.5	3.0	3.6	V
Operation Current	KW007-L	I_{DC}	-	100	-	μA
	KW007-S/SE	I_{DC}	-	30	-	μA

RF Characteristics

Characteristic	Symbol	Min.	Typ.	Max.	Units
Operation frequency	F_{RF}	5.725	-	5.875	GHz
RF output power	P_{RF}	-	2	-	dBm
Detection range	Range	-	-	12*	m

*Horizontal alignment at 1m height.

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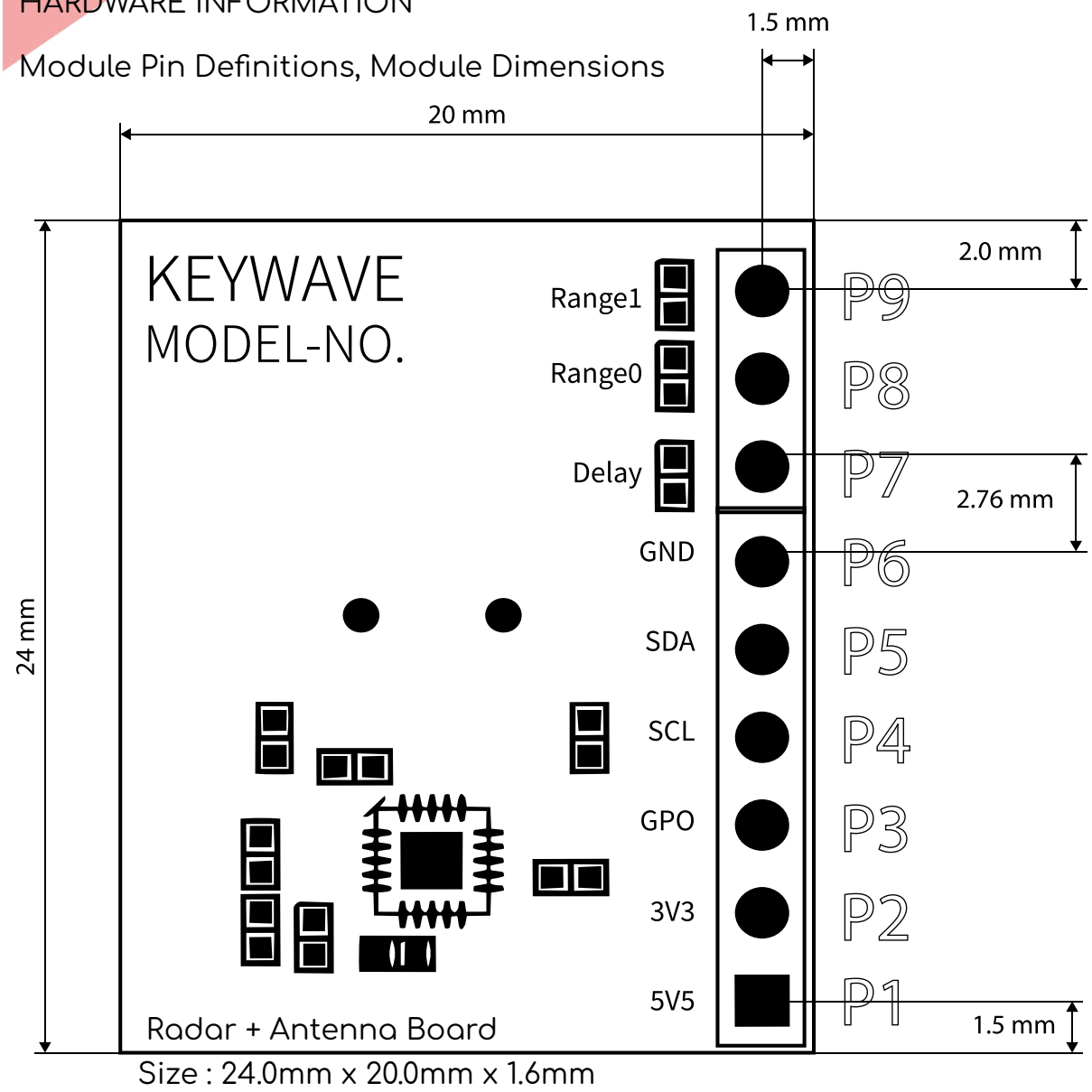
HARDWARE INFORMATION

Module Pin Definitions, Module Dimensions



Size : 24.0mm x 20.0mm x 1.6mm

Pin No.	Pin Name	Description
P1	5V	5 V supply input (Default)
P2	3V3	3.3 V supply input or output
P3	GPO	General-purpose output
P4	SCL	I2C clock
P5	SDA	I2C data
P6	GND	Ground
P7	Delay	GPO extension time setting pin
P8	Range0	Radar detection range setting pin
P9	Range1	Radar detection range setting pin

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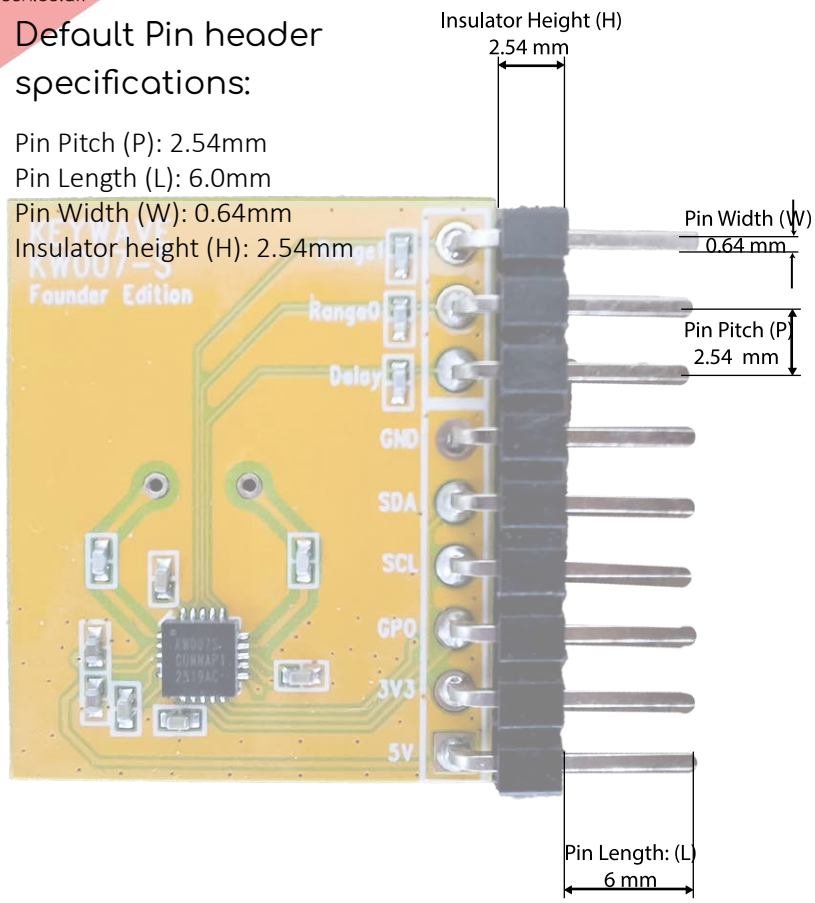
Default Pin header specifications:

Pin Pitch (P): 2.54mm
Pin Length (L): 6.0mm
Pin Width (W): 0.64mm
Insulator height (H): 2.54mm



Custom Pin and socket Options:

Custom Builds (Setting, pins etc)

10 000+ units: Specify your desired detection range & pulse duration, and we'll pre-program your modules.
IC-Only Purchases: available on request—please contact your Keywave sales representative.
or mail to : cc@keywavetech.co.uk

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