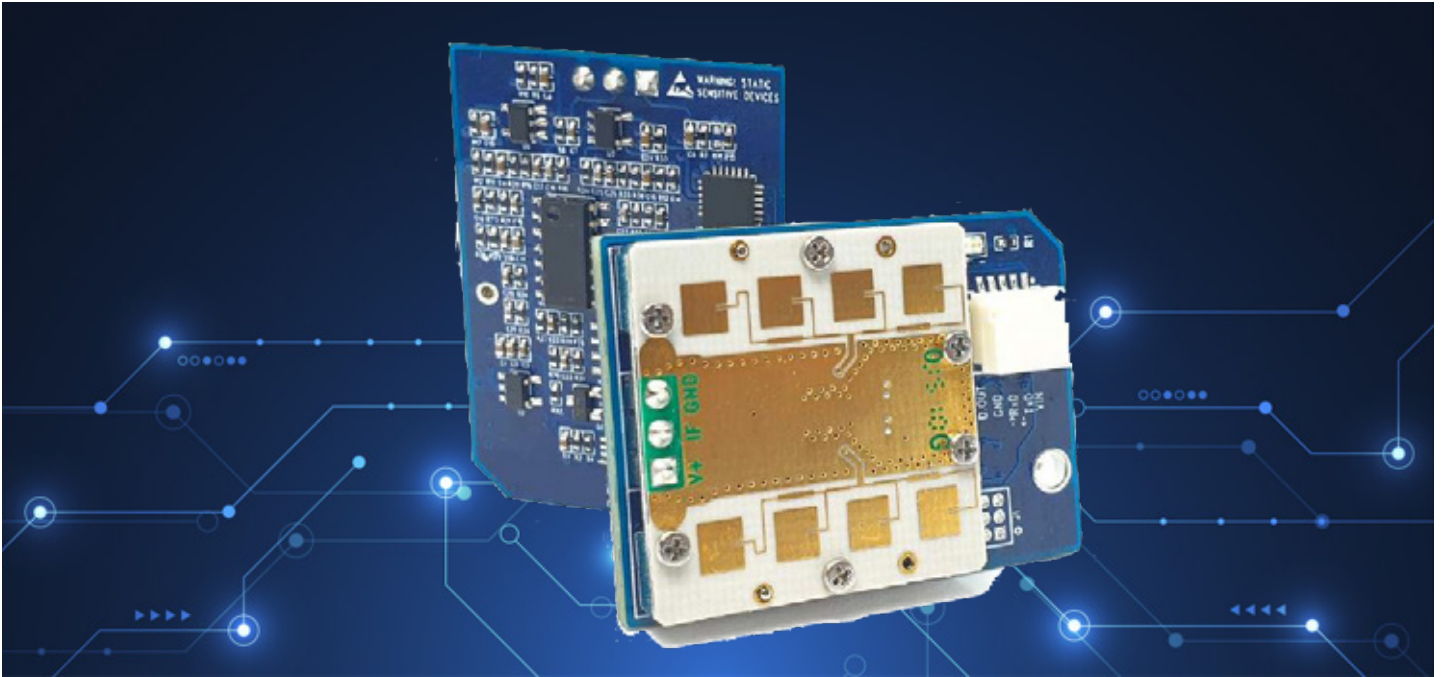AGIL® Sense

MP331

K-band Ranging Motion Detector

MP331 is a K-band motion detector with ranging and direction discrimination capabilities. This motion detector is de-signed and built-in with signal processing to provide the range, speed and direction information of a moving target through the UART communication protocol.
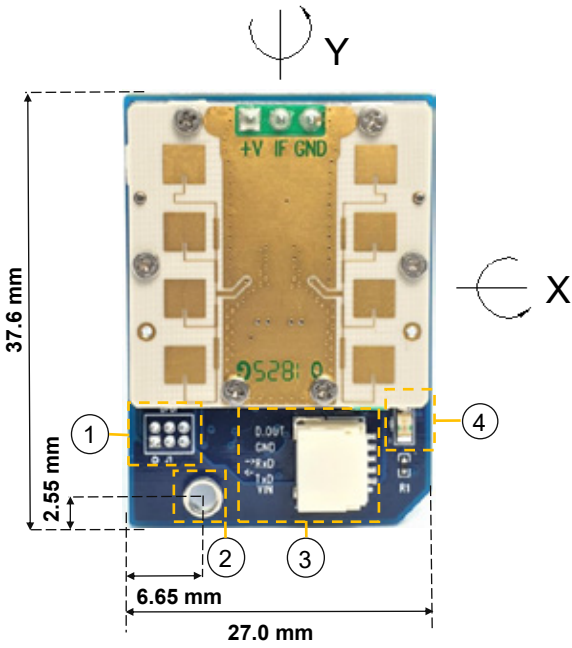
Key Applications

• Automatic door control

• Robotics

• Lighting control

• Home automation

• Security Alarm

Key Features

• Small and flat profile

• Low current consumption

• Motion detection

• Speed detection

• Ranging

• Directional discrimination

• Digital signal output

• UART Communication Protocol

ST Engineering

On-board Connector and Controls

Label	Description	Functions
1	6 positions, 2 rows, 1.27×1.27	Programming interface
2	Ø2.5 mm PCB mounting holes	Mounting hole to attach PCB to an
3	5 contacts, 1 row, 1.00 mm pitch header[1]	Digital output, UART interface and power supply **D.OUT** – Digital IF Output **GND** – Ground **RxD** – N/A (reserved) **TxD** – UART TXD **VIN** – +5VDC power supply
4	LED	LED to indicate on/off status of the

[1]Mating receptacle for header: NSHR-05V-S from JST (JAPAN SOLDERLESS TERMINALS).

Block Diagram
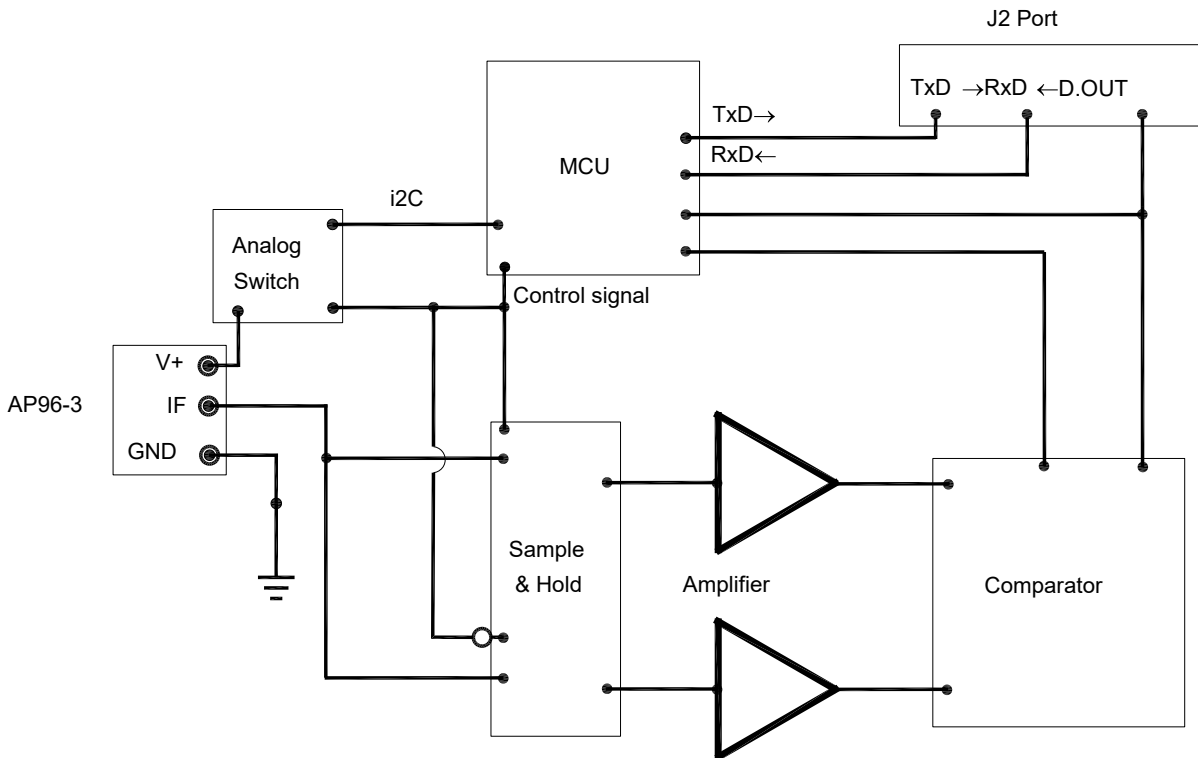
Technical Specifications

PARAMETER	REMARKS	MIN	TYP	MAX
SENSOR PERFORMANCE				
Transmitting Frequency (GHz)			24.125	
Transmitter Output Power (dBm)			15	
Operating Range (mm)		500		5000
Accuracy (mm)			500	
Field of View, 3 dB (°)	X/Y		32/80	
Detectable Velocity (mm/s)		100		2400
IF AMPLIFIER				
Gain (dB)	Fixed		70	
Bandwidth (Hz)			15-300	
MECHANICAL PROPERTIES				
Dimensions (mm)			37.6 × 27.0 × 8.5	
Weight (g)	Without cable		6.6	
INTERFACES				
Supported interface	UART			
Supported connector	5 Pin GPIO/ JST			
GENERAL				
Supply Voltage, VIN (V_{DC})		4.75	5	5.25
Current Consumption (mA)	Includes AP96-3		50	
Operating Temperature (°C)		-15		55

Unless noted otherwise, the specifications are measured at +25°C.

Note 1: MP331 comes with an AP96–3 miniature K-band microwave sensor module.
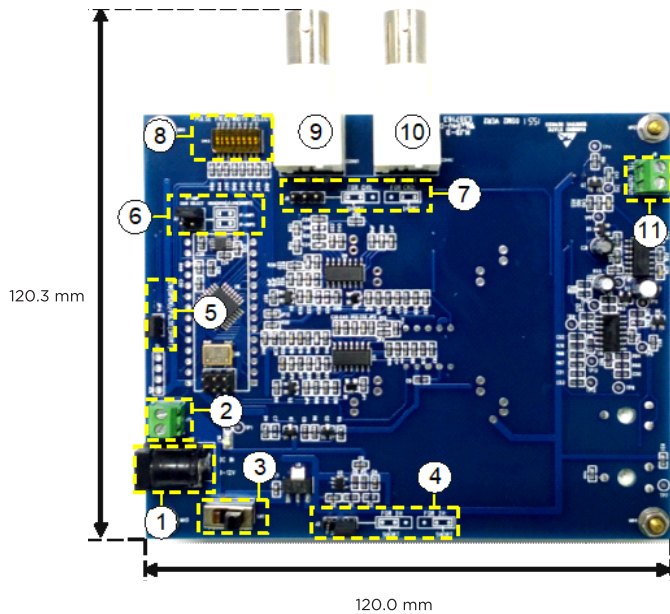**Note 2:** CAUTION: ELECTROSTATIC SENSITIVE DEVICE. Observe precautions for handling and storage

Communication Protocol

• Standard UART

• Baud rate: 115,200 bps

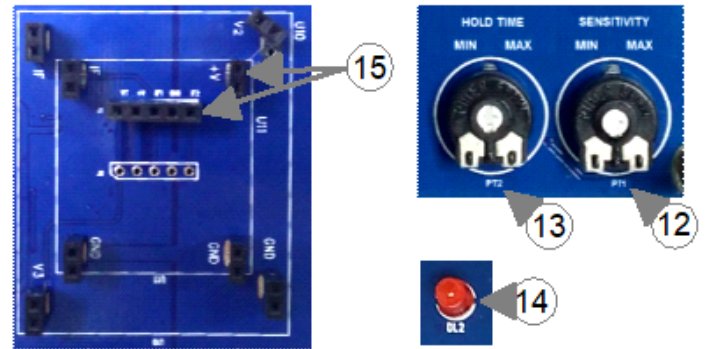• Data length: 8 bits, 1 start bit, 1 stop bit and no parity bits

D.OUT	–	Digital IF Output (optional)
GND	–	Ground
RxD	–	N/A (reserved)
TxD	–	UART TXD
VIN	–	+5VDC power supply
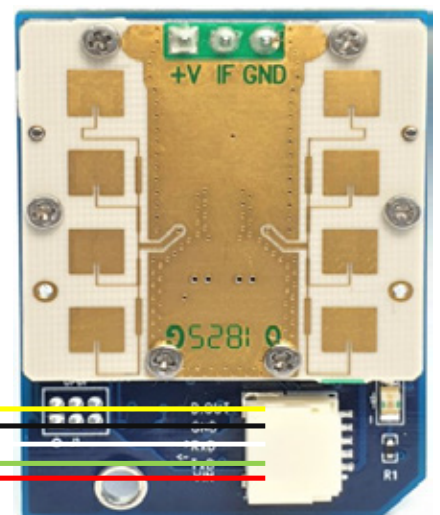
On-board Connectors and Controls

120.3 mm

120.0 mm

Underside of Board

Data Format for Serial Transmission Interface

LABEL	DESCRIPTION	FUNCTIONS
Byte 1	0xFE	Packet header
Byte 2	0x1	Version ID
Byte 3	0xXX	Distance (MSB)
Byte 4	0xXX	Distance (LSB)
Byte 5	0xXX	Velocity (MSB)
Byte 6	0xXX	Velocity (LSB)
Byte 7	0xXX	Direction

Each output data packet consists of 7 bytes. Details of the packet structure is shown in the table below.

Distance:
Bytes 3 and 4 output the distance in mm, in hexadecimal format. For example, for a target distance of 2,250 mm, bytes 3 and 4 would be 0x08 and 0xCA respectively.

Velocity:
Bytes 5 and 6 output the velocity in mm/s, in hexadecimal format. For example, for a target velocity of 2,250 mm/s, bytes 5 and 6 would be 0x08 and 0xCA respectively.

Direction:
Byte 7 outputs direction information. For example, 0x01 indicates that the target is approaching the sensor and 0x00 indicates that it is receding.

Note:
When no moving target is detected, 0xFF will be output to bytes 3 to 7 of the data packet.