

# M200C-IMU Inertial Measurement Unit

SKU :M200C-IMU

## PRODUCT DESCRIPTION

M200C-IMU is a micromechanical technology (MEMS) based inertial measurement unit (IMU) with built-in high performance MEMS gyro and MEMS accelerometer, outputting 3 angular velocities and 3 accelerations.

M200C-IMU has high reliability and environmental adaptability. By matching different software, the product can be widely used in guided munitions, tactical and industrial UAVs, guidance heads, autopilot and other fields.



## PRODUCT FEATURES

- Three-axis digital gyroscope:
  - a)  $\pm 450^\circ/\text{s}$  dynamic measurement range;
  - b) Zero deviation stability:  $20^\circ/\text{h}$  (GJB,10S);
- Three-axis digital accelerometer: a)  $\pm 16\text{g}$  dynamic measurement range
  - a)  $\pm 16\text{g}$  dynamic measurement range;
  - b) Zero deviation stability:  $0.5\text{mg}$  (GJB,10S);
- High reliability: MTBF>20000h;
- Guaranteed accuracy over the full temperature range (-40°C~70°C): built-in high-performance temperature calibration and compensation algorithm;
- Applicable to work under strong vibration conditions;
- Interface 1 way UART

## APPLICATION AREAS

- Guided munitions
- Guidance head
- Tactical and industrial UAVs
- Autopilot

## PERFORMANCE INDEX

Parameters		Test conditions	Minimum value	Typical values	Maximum value	Unit
Gyro	Dynamic measurement range			450		/s
	Zero Bias Stability	10s average (-40°C~+70°C, constant temperature)		20		/h
	Zero Bias	Zero bias range		$\pm 0.2$		/s
		Zero bias variation in the full temperature range ①		$\pm 0.1$		/s
	Start-by-start repeatability, Z-		30			/h

Parameters		Test conditions	Minimum value	Typical values	Maximum value	Unit
Accelerometer	axis	Effect of linear acceleration on zero bias		10		°/h/g
		Vibration ② on zero bias effect, pre-vibration and post-vibration changes②		10		°/h/g
		Vibration②Impact on zero bias, mid-vibration post-vibration variation②		10		°/h/g
	Scale Factor	Scaling factor nonlinearity		500		ppm
		Scaling factor accuracy		2000		ppm
	Noise Density			0.003		°/s/√Hz
	Resolution			$3.052 \times 10^{-7}$		°/s/LSB
	Dynamic measurement range			16		g
	Zero Bias Stability	10s average (-40°C~+70°C, fixed temperature)		0.5		mg
Other Performance	Zero Bias	Zero bias range		5		mg
		Zero bias variation over the full temperature range		5		mg
	Scale Factor	Start-by-start repeatability		0.5		mg
		Scaling factor nonlinearity		500		ppm
		Scaling factor accuracy		2000		ppm
	Noise Density			0.05		mg/√Hz
	Resolution			$1.221 \times 10^{-8}$		g/LSB
Communication interface	Start-up time			2		s
	Bandwidth			200		Hz
	Delay time			10		ms
Electrical Characteristics	1 UART	Baud rate		460.8		Kbps
	Sampling frequency	UART		500		Hz
Structural characteristics	Voltage		4.8	5	5.2	V
	Power consumption			1.5		W
	Ripple	P-P		100		mV
Operating environment	Dimension			$58.7 \times 42 \times 8$		mm
	Weight			35		g
Reliability	Operating Temperature		-40		70	°C
	Storage Temperature		-45		75	°C
	Vibration			20~2000Hz, 6.06g		
	Shock			500g		
Continuous Operating	MTBF			20000		h
	Operating			120		h

Parameters	Test conditions	Minimum value	Typical values	Maximum value	Unit
	Time				
①: Calculate the zero deviation of the whole temperature change process, temperature change rate $\leq 1^{\circ}\text{C}/\text{min}$ , temperature range $-40^{\circ}\text{C} \sim +70^{\circ}\text{C}$ ;					
②: Vibration condition is 6.06g, 20Hz~2000Hz					

## ELECTRICAL INTERFACE

Connector model: A1251WR-S-4P;

Connector points are defined in the following table:

Pins	Definition	Function	Remarks
1	5V	DC power input	
2	GND	Ground	
3	TX LV-TTL	Serial port transmit	3.3V
4	RX LV-TTL	Serial Receive	3.3V

## SOFTWARE INTERFACE

Baud rate: 460800 bps;

Transmission frequency: 500Hz;

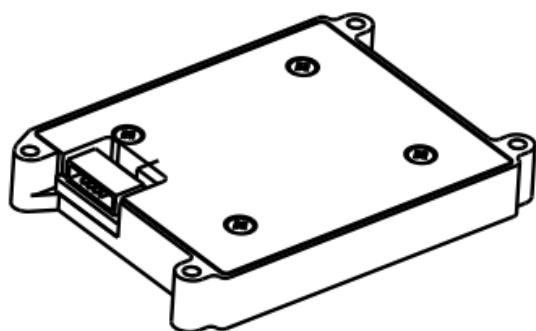
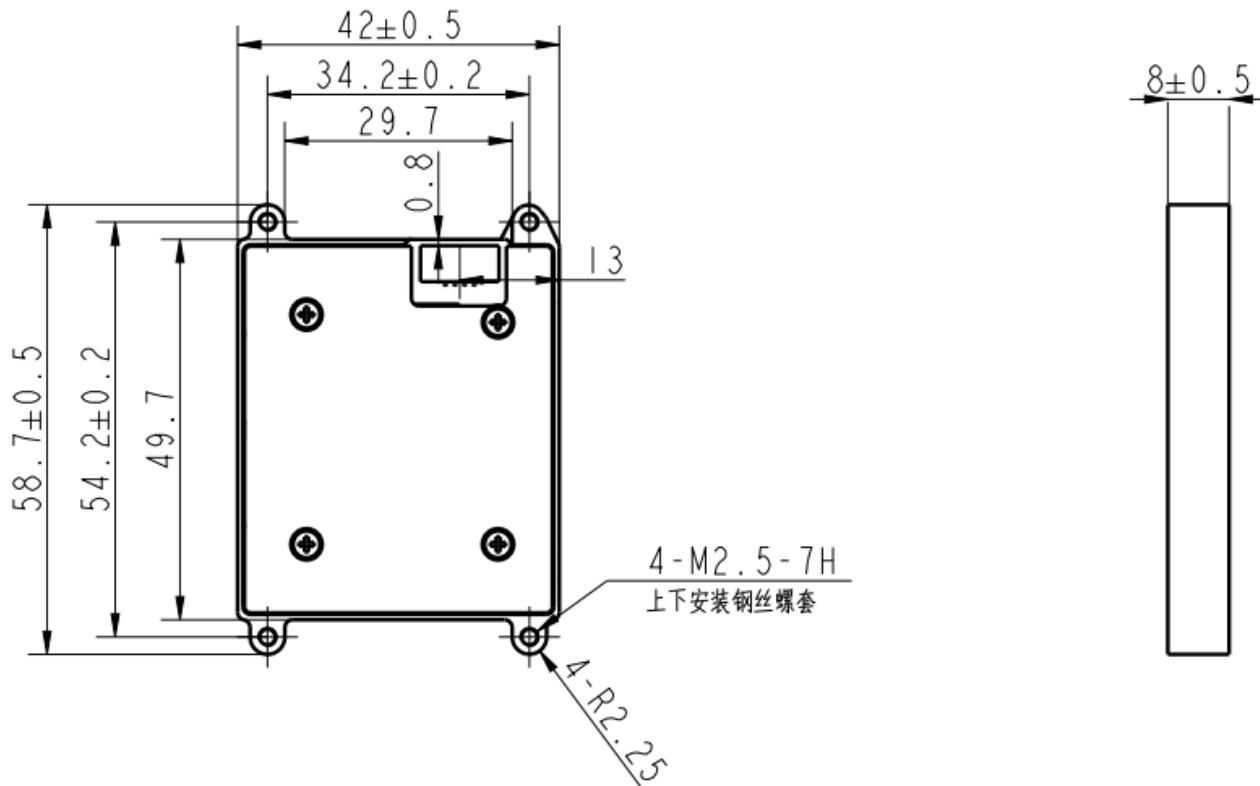
Data format: 8 data bits, 1 stop bit, no parity bit;

Data is transmitted with low first and then high.

Communication protocols are listed in the following table:

Bytes	Data	Form	Resolution	Remarks
1	0x5A	Uint8		
2	0x5A	Uint8		
3-6	Angular velocity X	float		
7-10	Angular velocity Y	float		
11-14	Angular velocity Z	float		
15-18	Acceleration X	float		
19-22	Acceleration Y	float		
23-26	Acceleration Z	float		
27-30	Reserved	Uint8		
31	Temperature	int8	1°C	Range: -128 to 127
32	and calibration	Uint8		1-31 byte summation, taking the lower 8 bits

## STRUCTURAL INTERFACE



Structure shape diagram