*Power Sensing Solutions for a Better Life*

# AHRS380ZA
## ATTITUDE HEADING REFERENCE SYSTEM

The MEMSIC AHRS380ZA is a miniature fully-calibrated Attitude & Heading Reference System designed for demanding embedded applications that require a complete dynamic measurement solution in a robust low-profile package. The AHRS380ZA provides a standard SPI bus for cost-effective board-to-board communications.



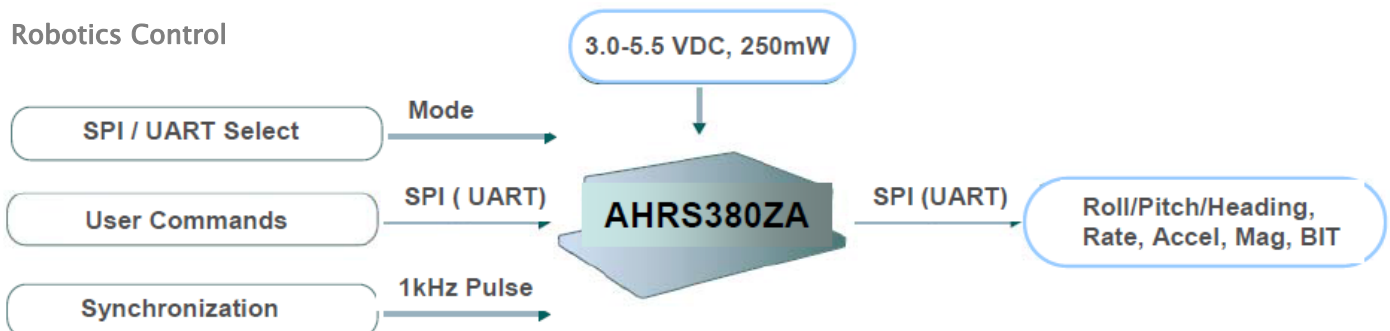*UAV Flight Control*   *Uncertified Avionics*

The MEMSIC AHRS380ZA integrates highly-reliable MEMS 6DOF inertial sensors and 3-axis magnetic sensors with extended Kalman filtering in a miniature factory-calibrated module to provide consistent performance through the extreme operating environments in a wide variety of dynamic control and navigation applications.

## Applications

- Unmanned Vehicle Control
- Uncertified Avionics
- Platform Stabilization
- Robotics Control

## Features

- Complete 9DOF Inertial System
- Roll/Pitch/Heading Outputs
- SPI (or UART) Interface
- Update Rate, 1Hz to 200Hz
- 1KHz Clock Synch Input
- Miniature Package, 24 x 37 x 9.5 mm
- Lightweight < 17 g
- Low Power Consumption < 250 mW
- Wide Temp Range, −40C to +85C
- High Reliability, MTBF > 50k hours



| | 3.0-5.5 VDC, 250mW | |
| --- | --- | --- |
| SPI / UART Select | Mode | |
| User Commands | SPI ( UART) | AHRS380ZA → SPI (UART) → Roll/Pitch/Heading, Rate, Accel, Mag, BIT |
| Synchronization | 1kHz Pulse | |

## Performance — AHRS380ZA-200

| Heading | |
|---|---|
| Range (º) | ± 180 |
| Accuracy (º) | < 3.0 [3], < 1.0 [4] |
| Resolution (º) | < 0.02 |
| **Attitude** | |
| Range: Roll, Pitch (º) | ± 180, ± 90 |
| Accuracy (º) | < 1.0 [3], < 0.2 [4] |
| Resolution (º) | < 0.02 |
| **Angular Rate** | |
| Range: Roll, Pitch, Yaw (º/sec) | ± 200 (± 400 High Range Model) |
| Bias Instability (º/hr) [1,2] | < 10 |
| Bias Stability Over Temp (º/sec) | < 0.1 |
| Resolution (º/sec) | < 0.02 |
| Scale Factor Accuracy (%) | < 0.1 |
| Non-Linearity (%FS) | < 0.1 |
| Angle Random Walk (º/√hr) [2] | < 0.75 |
| Bandwidth (Hz) | 5-50 (user-configurable) |
| **Acceleration** | |
| Range: X, Y Z (g) | ± 4 (± 8 High Range Model) |
| Bias Instability (mg) [1,2] | < 0.02 |
| Bias Stability Over Temp (mg) | < 5 |
| Resolution (mg) | < 0.5 |
| Scale Factor Accuracy (%) | < 0.1 |
| Non-Linearity (%FS) | < 0.1 |
| Velocity Random Walk (m/s/√hr) [2] | < 0.05 |
| Bandwidth (Hz) | 5-50 (user-configurable) |
| **Magnetic Field** | |
| Range: X, Y Z (Gauss) | ± 4 |
| Resolution (mGauss) | < 5 |
| Noise Density (mGauss /√Hz) | < 1 |
| Bandwidth (Hz) | 5 |

## Specifications

| Environment | |
|---|---|
| Operating Temperature (ºC) | -40 to +85 |
| Non-Operating Temperature (ºC) | -55 to +105 |
| Enclosure | Aluminum (Gold Anodized) |
| **Electrical** | |
| Input Voltage (VDC) | 3.0 to 5.5 |
| Power Consumption (mW) | < 250 |
| Digital Interface | SPI or UART (user-configurable) |
| Output Data Rate | 1Hz to 200Hz (user-configurable) |
| Input Clock Sync | 1kHz Sync Pulse |
| **Physical** | |
| Size (mm) | 24.15 x 37.7 x 9.5 |
| Weight (gm) | < 17 |
| Interface Connector | 20-Pin (10 x 2) 1.0 mm pitch header |

## Ordering Information

| Model | Description |
|---|---|
| AHRS380ZA-200 | Attitude and Heading Reference System (Standard Range) |
| AHRS380ZA-400 | Attitude and Heading Reference System (High Range) |

This product has been developed exclusively for commercial applications. It has not been tested for, and makes no representation or warranty as to conformance with, any military specifications or its suitability for any military application or end-use. Additionally, any use of this product for nuclear, chemical or biological weapons, or weapons research, or for any use in missiles, rockets, and/or UAV's of 300km or greater range, or any other activity prohibited by the Export Administration Regulations, is expressly prohibited without the written consent and without obtaining appropriate US export license(s) when required by US law. Diversion contrary to U.S. law is prohibited. Specifications are subject to change without notice.

[1] Allan Variance Curve, constant temperature. [2] 1-sigma error. [3] RMS error under all dynamics.
[4] RMS error under static conditions over full temperature range.

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## ATTITUDE HEADING REFERENCE SYSTEM

### NAV-VIEW
### Configuration and Display Software
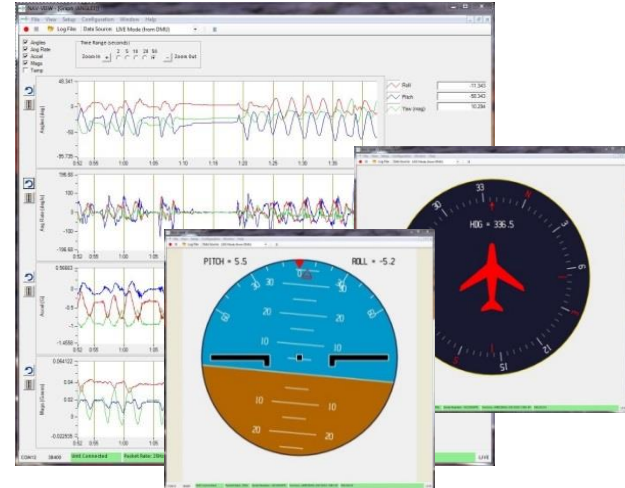


**NAV-VIEW provides an easy to use graphical interface to display, record, playback, and analyze all of the AHRS380ZA Attitude & Heading Reference System parameters.**

**NAV-VIEW can also be used to set a wide range of user-configurable fields in the AHRS380ZA to optimize the system performance for highly dynamic applications.**

**NAV-VIEW software is available for download from MEMSIC's website at: www.memsic.com/support**

### Other Components

**The AHRS380ZA can be evaluated using the EVAL-KIT DMU380ZA-200 or -400 kit (depending on range purchased), allowing direct connection to a PC for use with NAV-VIEW display and configuration software.**

### Support

**For more detailed information please refer to the DMU380ZA-Series User's Manual available online at: www.memsic.com/support**