

## Autonomous Grade, Six Degrees of Freedom Inertial Sensor

### FEATURES

- ▶ Triaxial, digital gyroscope,  $\pm 300^\circ/\text{sec}$ 
  - ▶  $\pm 0.05^\circ$  (typical) axis to axis misalignment
  - ▶  $\pm 0.25^\circ$  (maximum) axis to package misalignment
  - ▶  $1^\circ/\text{hr}$  in-run bias stability
  - ▶  $0.13^\circ/\sqrt{\text{hr}}$  angular random walk
- ▶ Triaxial, digital accelerometer,  $\pm 14\text{ g}$ 
  - ▶  $9\text{ }\mu\text{g}$  in-run bias stability
- ▶ Triaxial, delta angle and delta velocity outputs
- ▶ Factory calibrated sensitivity, bias, and axial alignment
  - ▶ Calibration temperature range:  $-40^\circ\text{C}$  to  $+85^\circ\text{C}$
- ▶ SPI compatible
- ▶ Programmable operation and control
  - ▶ Manual bias correction controls
  - ▶ Digital I/O: data ready, external clock option
  - ▶ Sample clock options: internal, external, or scaled
  - ▶ On demand self test of inertial sensors
- ▶ Single-supply operation:  $4.75\text{ V}$  to  $5.25\text{ V}$
- ▶  $1500\text{ g}$  mechanical shock survivability
- ▶ Operating temperature range:  $-40^\circ\text{C}$  to  $+105^\circ\text{C}$
- ▶ Qualified for automotive applications<sup>1</sup>

### APPLICATIONS

- ▶ L3 to L5 autonomous vehicle navigation and guidance

- ▶ Dead reckoning in global positioning system (GPS) denied environments
- ▶ Precision leveling and stabilization of advanced driver assistance systems (ADAS) sensors

### GENERAL DESCRIPTION

The ADIS17555 is a complete inertial system that includes a triaxis gyroscope and a triaxis accelerometer. Each inertial sensor in the ADIS17555 combines industry leading MEMS only technology with signal conditioning that optimizes dynamic performance. The factory calibration characterizes each sensor for sensitivity, bias, and alignment. As a result, each sensor has its own dynamic compensation formulas that provide accurate sensor measurements.

The ADIS17555 provides a simple, cost-effective method for integrating accurate, multi-axis inertial sensing into industrial systems, especially when compared with the complexity and investment associated with discrete designs. All necessary motion testing and calibration are part of the production process at the factory, greatly reducing system integration time. Tight orthogonal alignment simplifies inertial frame alignment in navigation systems. The serial peripheral interface (SPI) and register structure provide a simple interface for data collection and configuration control.

The footprint and connector system of the ADIS17555 enable a simple upgrade from the [ADIS16485](#), [ADIS16488A](#), [ADIS16490](#), [ADIS16495](#), and [ADIS16497](#). The ADIS17555 is available in an aluminum package that is approximately  $47\text{ mm} \times 44\text{ mm} \times 15\text{ mm}$  and includes a standard connector interface.

### FUNCTIONAL BLOCK DIAGRAM

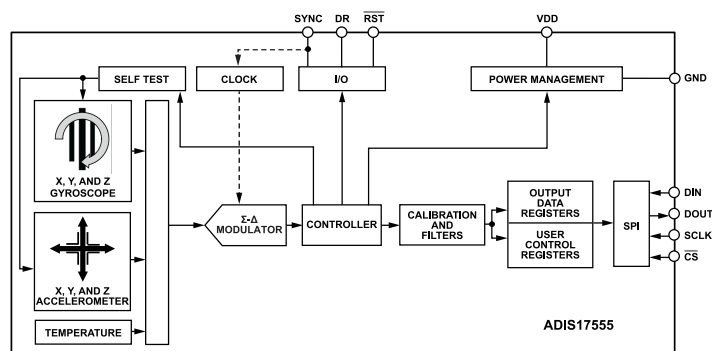


Figure 1. Functional Block Diagram

For more information on the ADIS17555, contact your local Analog Devices, Inc., sales office at [analog.com/sales](http://analog.com/sales) or contact [mems\\_support@analog.com](mailto:mems_support@analog.com).

<sup>1</sup> This part was qualified according to Analog Devices, Inc., internal automotive module process. All components within the ADIS17555 have been qualified to the applicable Grade 2 Automotive Engineering Council (AEC) standard. Details of the qualification process can be provided upon request.

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