

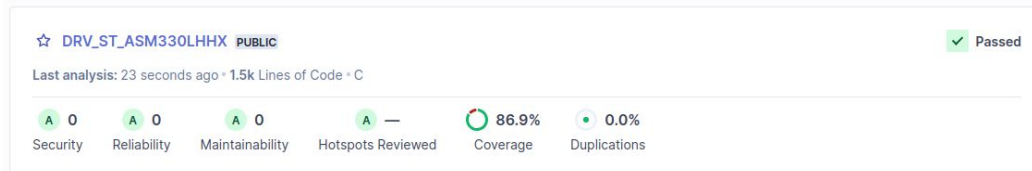
ST ASM330LHHX :: 6-axis IMU

The [ST ASM330LHHX](#) is a 6-axis MEMS inertial measurement unit (IMU) that integrates a 3-axis digital gyroscope and a 3-axis digital accelerometer. It features a configurable host interface supporting SPI (default) and I2C communication, a 3 kB FIFO, programmable interrupts, and dual operating modes with high-performance and low-power options to optimize performance and system power consumption.

The ASM330LHHX is designed for automotive applications with an extended operating temperature up to +125°C. It supports acceleration ranges from ± 2 g to ± 16 g and angular rate ranges from ± 125 dps to ± 4000 dps, providing low-noise and stable sensor outputs for motion tracking and sensor fusion applications.

The software is architected with long-term maintainability, portability across MCU platforms, and adherence to high software quality standards as core design principles.

- ✔ Layered architecture with clear HAL abstraction
- ✔ Conforms to ISO C99 standard
- ✔ Portable across multiple MCU platforms
- ✔ Supports both RTOS and bare-metal environments
- ✔ CMake build system for scalable integration
- ✔ Seamless integration with GCC toolchain
- ✔ Statically analyzed for MISRA, CERT, and CWE compliance



Initialization Interface

```
asm330lhhx_result_t asm330lhhx_init( asm330lhhx_handle_t*, ... )
```

Configuration Interface

```
asm330lhhx_result_t asm330lhhx_set_config( asm330lhhx_handle_t*, ... )
asm330lhhx_result_t asm330lhhx_set_power_mode( asm330lhhx_handle_t*, ... )
asm330lhhx_result_t asm330lhhx_set_mode( asm330lhhx_handle_t*, ... )
asm330lhhx_result_t asm330lhhx_calibrate_accel( asm330lhhx_handle_t*, ... )
asm330lhhx_result_t asm330lhhx_calibrate_gyro( asm330lhhx_handle_t*, ... )
```

Data Retrieval Interface

```
asm330lhhx_result_t asm330lhhx_get_device_info( asm330lhhx_handle_t*, ... )
asm330lhhx_result_t asm330lhhx_get_config( asm330lhhx_handle_t*, ... )
asm330lhhx_result_t asm330lhhx_read_imu( asm330lhhx_handle_t*, ... )
asm330lhhx_result_t asm330lhhx_read_accel( asm330lhhx_handle_t*, ... )
asm330lhhx_result_t asm330lhhx_read_gyro( asm330lhhx_handle_t*, ... )
asm330lhhx_result_t asm330lhhx_read_temp( asm330lhhx_handle_t*, ... )
```

Self-Test Interface

```
asm330lhhx_result_t asm330lhhx_accel_self_test( asm330lhhx_handle_t* )
asm330lhhx_result_t asm330lhhx_gyro_self_test( asm330lhhx_handle_t* )
```

Communication Interface:

SPI