navX micro

navX-Micro
Robotics Navigation Sensor

OVERVIEW

navX-Micro is a 9-axis sensor (3-axis accelerometers, gyroscopes and magnetometers) with sophisticated data fusion, motion processing and sensor calibration algorithms. Key specifications include:

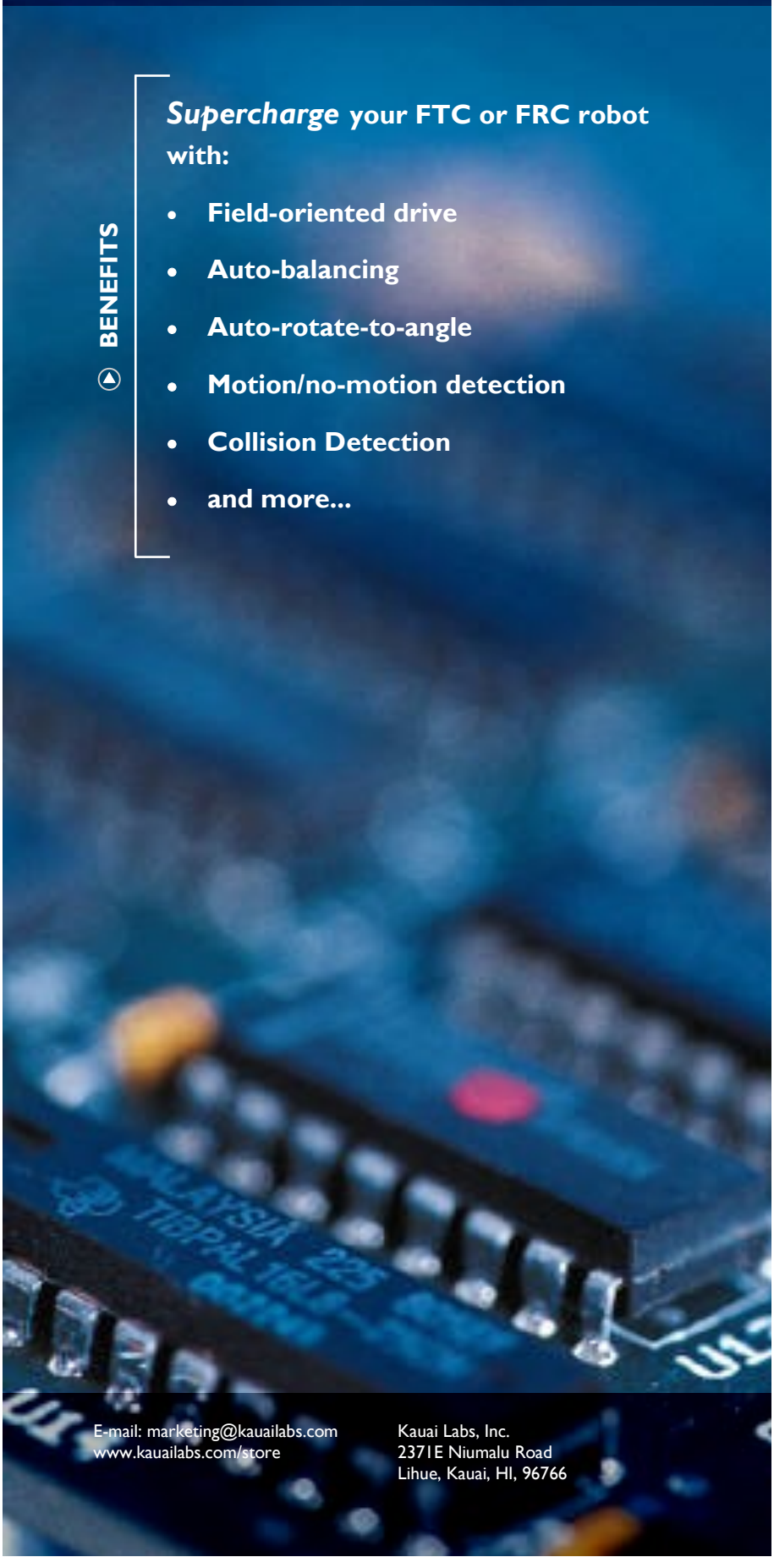
- High-accuracy attitude (yaw/pitch/roll), with *minimal yaw drift of ~1 degree per minute*
- Tilt-corrected compass heading with magnetic disturbance detection
- 9-axis heading combining pose and magnetically-valid compass heading

Even in electro-magnetically challenging environments, the 9-axis heading's combination of "pose" and magnetically-valid compass heading data (e.g., before motors are energized, or when the robot is at rest) enable tracking of a robot's absolute heading.

BENEFITS

Supercharge **your FTC or FRC robot with:**

- **Field-oriented drive**
- **Auto-balancing**
- **Auto-rotate-to-angle**
- **Motion/no-motion detection**
- **Collision Detection**
- **and more...**



FEATURES

- **Plug-n-play install via I2C and USB**
- **High-Quality Sensor Calibration**
- **Libraries and sample code enable rapid integration on FIRST FTC robots and FRC RoboRIO-based robots**
- **Design files for 3d-printed enclosure**
- **navX-Micro Aero: adds a barometric pressure sensor for altitude measures**

Kauai Labs

Build Better Robots™

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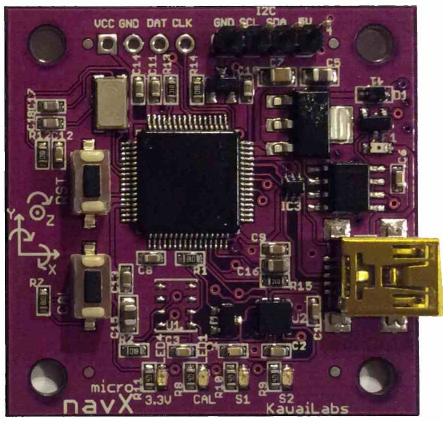
navX micro

CUTTING-EDGE SENSORS

9-Axis Invensense MPU-9250
MEMS Motion Tracking Sensor

EASY-TO-USE DESIGN



navX-Micro circuit board

Fast-Mode I2C and USB
2.0 compliant interfaces

Technical Specifications

Key Components

COMPONENT	DESCRIPTION	MODEL	CAPABILITIES
Microcontroller	100Mhz 32-bit ARM Cortex-M4 w/FPU	ST Microelectronics STM32F411RCTx	Data acquisition, calibration and 9-axis fusion
Inertial / Magnetic Sensors & Motion Processor	9-Axis sensor-system-on-chip w/Digital Motion Processor	Invensense MPU-9250	High-quality acceleration, rotation rate and heading measures
Altimeter (navX–Micro Aero only)	High-resolution barometiric pressure w/24-bit Delta-Sigma ADC	Measurement Specialties MS5611	High-quality relative altitude measures with 10cm resolution

Communication Interfaces

TYPE	MAXIMUM SPEED	CAPABILITIES
USB	12 Mb/s	Provides power to navX-Micro as well as communications
I2C	400 kHz	Provides power to navX-Micro as well as communications

Key Features

FEATURE	DESCRIPTION	BENEFIT
Automatic Accelerometer and Gyro Calibration	Self-calibration algorithms; storage of calibration coefficients in flash memory; continuous gyro recalibration during operation	High-accuracy yaw, pitch and roll measures with no calibration effort required.
Magnetometer Calibration Tools and Anomaly Detection	Support and tools for in-situ hard and soft-iron magnetometer calibration, and auto-detection of magnetic anomalies	High-accuracy compass heading measures with a simple calibration process.
Configurable Update Rate	From 4-200 Hz	Allows tradeoff between application load and latency
Tilt-compensated Compass Heading	Compass heading correction based upon tip/tilt measures	Heading accuracy independent of sensor "pose"
Open-source Hardware	Schematics and Board-layout Files in Eagle PCB Format	Customizable hardware using free development tools
Open-source Libraries and Sample Code	Libraries and Samples for FTC and FRC Robotics Control Systems	Rapid integration into a FTC or FRC robot

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