

**Overview**

PicoM is a high performance 10DOF sensor node with 3-axis accelerometer, 3-axis gyro, 3-axis magnetometer and barometric pressure sensor. PicoM processor is an STM32F303 running at 72MHz with high speed A/D, D/A, digital IO and a USB 2.0 connection. PicoM is our highest performance sensor node capable of sophisticated sensor fusion applications.

**Features:**

- Fast 72MHz 32bit ARM7 STM32F303 processor
- Other processors - STM32F042 and STM32F072
- USB 2.0
- 12bit A/D 5Msps, 12bit 1Msps DAC
- Five USARTS, two SPI
- Lithium battery port and onboard charger
- On chip DFU boot loader for software field upgrades
- SPI interface connector for RF24L01 Wireless module
- Digital and Analog IO brought to connectors
- Expansion connectors on 0.1" centers for proto board
- Real time data acquisition application communicating PicoM sensor data wirelessly using RF24L01 module
- MPU-9150 9DOF motion sensor
- BMP180 barometric pressure sensor
- Source code and project file for CooCox IDE

The PicoM is a 10DOF sensor node for wireless motion sensing applications. PicoM comes with a real time data acquisition application that acquires all motion sensor data and wirelessly sends it to the desktop. The application was developed using the CooCox IDE. Source code and project files are available for download. An onboard bootloader can be used to load new applications via the USB connection.

**RF24L01 Wireless Connector**

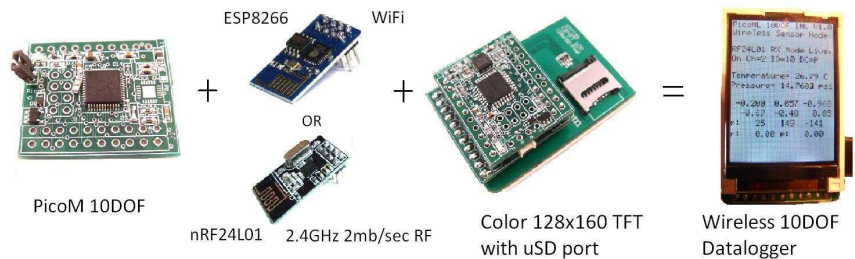
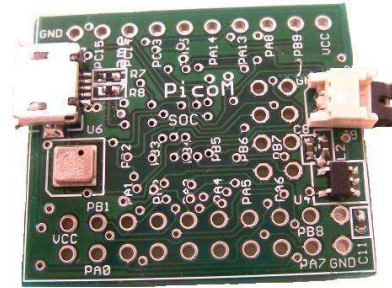
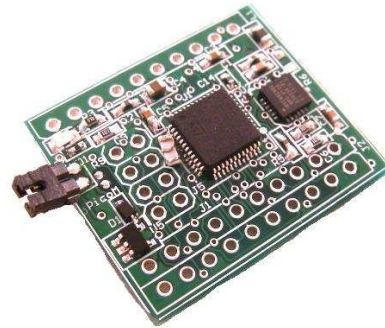
PicoM has a connector that allows direct connection of a low cost RF2401 wireless communication module. Using a small adapter a Serial WiFi module can also be attached to the PicoM.

**MPU-9150 9DOF Inertial Sensor**

A 9 Degree of Freedom (9DOF) Inertial sensor provides motion sensing. The sensor measures acceleration, rotation and magnetic heading on three axis.

**BMP180 Barometer Sensor**

A barometric pressure sensor can be used to measure height with a resolution of 75 cm.



**RF Modules**



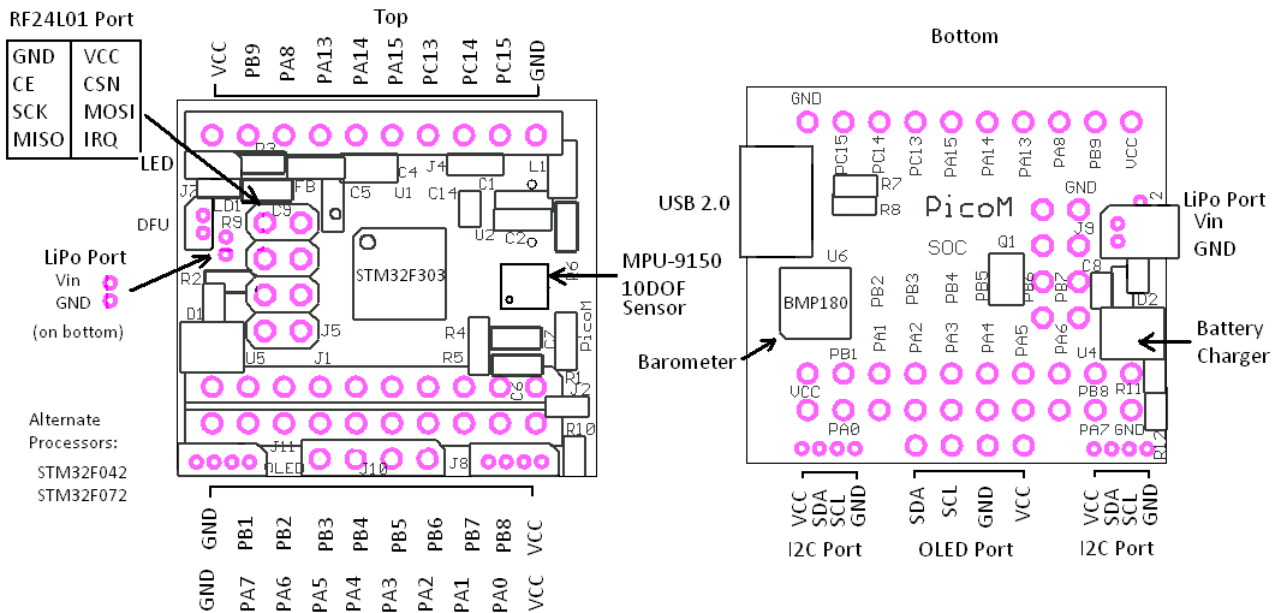
RF24L01

ESP8266 WiFi

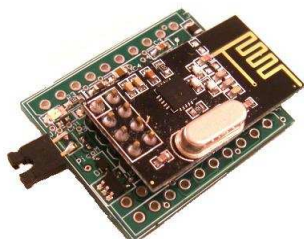
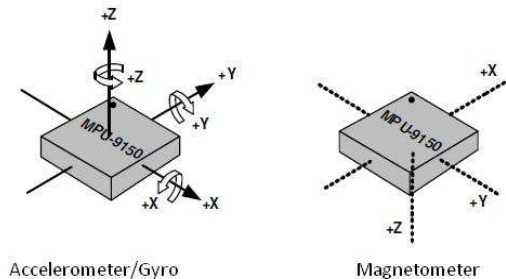
### PicoM Connector Pin Assignments

PicoM is our highest performance 10DOF sensor node capable of sophisticated real time sensor fusion using an onboard Extended Kalman Filter. The onboard processor is based on an ARM Cortex-M4 core with hardware FPU. The STM32F303 processor provides USB 2.0, analog input, analog output, digital IO, SPI, USARTs and I2C interfaces. A dedicated connector allows direct connection of the popular RF24L01 wireless communication module. PicoM also supports the ESP8266 Serial WiFi module (with an adapter). A 9 DOF Inertial sensor (MPU-9150) and barometer (BMP180) turn the PicoM into a 10DOF IMU. Processor signal pins are brought out to expansion ports to allow prototype development and the attachment of other sensors. A dedicated connector port allows direct connection of a popular low cost OLED 128x64 pixel display. PicoM can be field programmed by installing DFU boot jumper through the USB connection. A lithium battery charging circuit monitors the state of an attached battery and automatically charges the battery when needed when the PicoM is plugged into a USB port. The PicoM comes pre-programmed with a data acquisition application.

### PicoM Connector Pin Assignment



### MPU-9150 Sensor Orientation



RF24L01 mounted on PicoM.



OLED 128x64 pixel display mounted on PicoM

Orientation of the accelerometer, gyro and magnetometer on the PicoM. The small dot on the package above corresponds to the small circle in the picture above.