S O C
R O B O T I C S

Overview

PicoA is a 10DOF sensor node with 3-axis accelerometer, 3-axis gyro, 3-axis magnetometer and barometric pressure sensor. PicoA main processor is an ATxmega32E5 running at 32MHz with high speed A/D, D/A plus digital IO and a PIC16F1454 processor providing a USB 2.0 connection. PicoA is available without sensors for wireless control applications in automation and industrial applications.

Features:

 - Fast 32MHz 8bit ATxmega32E5 processor
 - USB 2.0 (PIC16F1454 processor)
 - 12-16bit A/D 300Ksps, 12bit 1Msps DAC
 - Two USARTS, one 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
   PicoA sensor data wirelessly using RF24L01 module
 - MPU-9150 9DOF motion sensor
 - BMP180 barometric pressure sensor
 - Source code and project file for AVR Studio 6.2

The PicoA is a 10DOF sensor node for wireless motion sensing applications. PicoA comes with a real time data acquisition application that acquires all motion sensor data and wireless sends it to the desktop. The application was developed using AVR Studio 6.2 and source code and project files are available for download. An onboard bootloader can be used to load new applications via the USB connection.
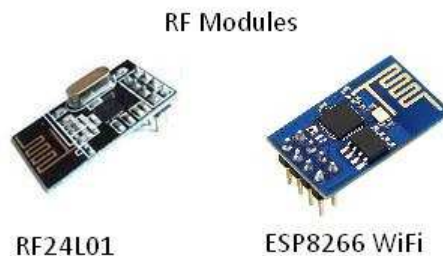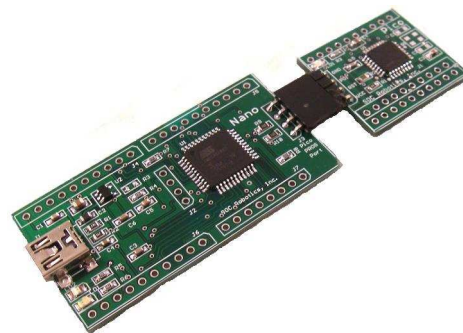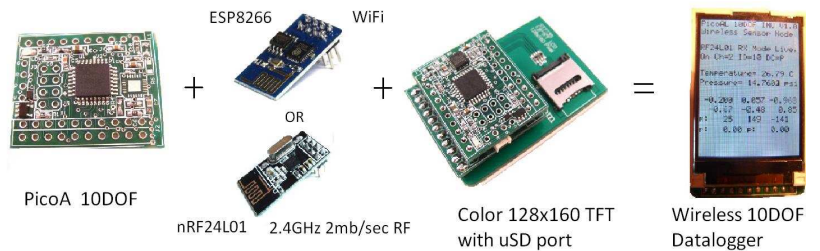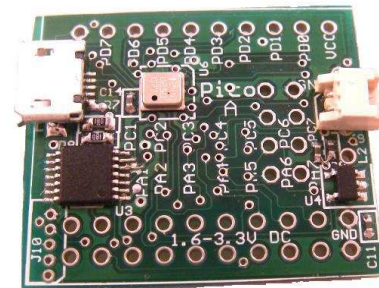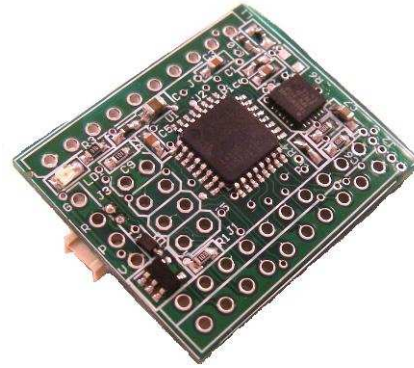
RF24L01 Wireless Connector

PicoA 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 PicoA.

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.

PicoA 10DOF   ESP8266   WiFi   Color 128x160 TFT   Wireless 10DOF
                    OR   with uSD port   Datalogger
nRF24L01   2.4GHz 2mb/sec RF

RF Modules

RF24L01   ESP8266 WiFi

PicoA Connector Pin Assignments

PicoA has several interface options and two processors – ATxmega32E5 and PIC16F1454. The ATxmega32E5 provides analog input, analog output, digital IO, SPI, USARTs and I2C interfaces. The PIC16F1454 provides the USB interface and can reset the other processor. A dedicated connector allows direct connection of the popular RF24L01 wireless communication module. PicoA also supports the ESP8266 Serial WiFi module (with an adapter). A 9 DOF Inertial sensor (MPU-9150) and barometer (BMP180) turn the PicoA 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. A Nano can program a PicoA using the PDI programming port – programming software is included or via the USB port by activating the ATxmega's on chip bootloader. A lithium battery charging circuit monitors the state of an attached battery and automatically charges the battery when needed if the PicoA is plugged into a USB port. The PicoA comes pre-programmed with a data acquisition application.

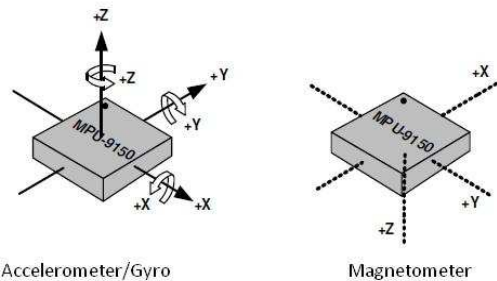

PicoA Connector Pin Assignment
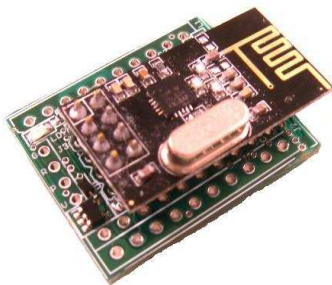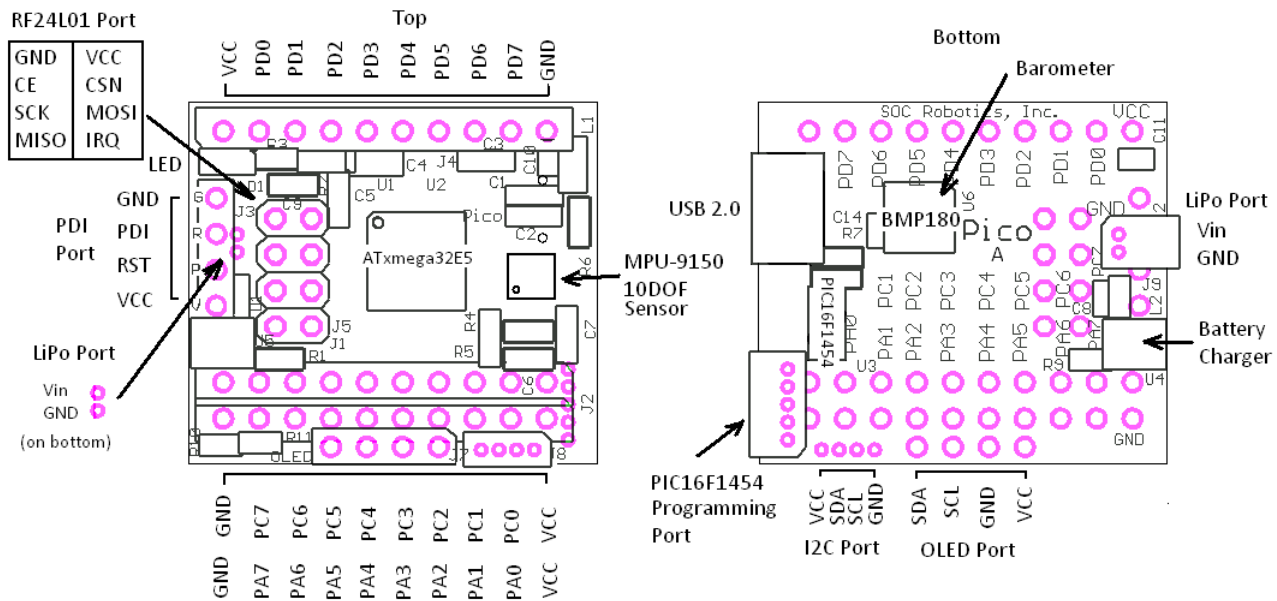
RF24L01 mounted on PicoA.

OLED 128x64 pixel display mounted on PicoA

MPU-9150 Sensor Orientation

Accelerometer/Gyro

Magnetometer

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