



FORMIC

LOW-POWER WIRELESS DATA ACQUISITION SYSTEM

OVERVIEW

The Formic wireless data acquisition system was designed as a low-power supplement to Civionics' Narada platform. Complete with embedded high accuracy temperature and humidity sensors as well as a tri-axial accelerometer with software adjustable analog gain, the Formic is designed to bring low-cost, low-power wireless sensing to a wide variety of application spaces. Built around the versatile Atmel ATxmega microcontroller, the Formic runs powerful embedded software that be customized through the use of an extensive software development kit.

The Formic has complete control of the power consumption of each of its peripheral elements, allowing its data acquisition architecture to be duty-cycled in order to extend its battery life to weeks, months, or years depending on the required data rate and application area. By leveraging the versatile TI CC2420 wireless radio for communications and an optional external antenna for extended range, the Formic system is capable of reliable data transmission in large networks and at distances of up to 50m.

RADIO	
Transceiver	TI CC2420
Frequency Band	2.4000 - 2.4835 GHz
Maximum Range (line of sight)	50m (with external antenna)

CPU	
Processor	Atmel ATxmega128D4
FLASH	128 kB + 8 kB
EEPROM	2 kB
SRAM	8 kB
External SRAM	32 kB
External Clock Speed	12 MHz

DATA ACQUISITION	
External Input Channels	4 Single Ended / 1 Differential
Analog-to-Digital Conversion	12-bit Resolution (0 - 1.07 V)
Data Storage Capacity	32 kB (> 21,000 data points)
DC Sensor Excitation	+1.8 V DC
Real-Time Data Throughput	1,500 samples / sec
Maximum Sampling Rate	10,000 samples / sec
Moisture Sensor Range	0% to 100% relative humidity
Moisture Sensor Resolution	0.025% relative humidity
Temperature Sensor Range	-5°C to 150°C
Temperature Sensor Resolution	0.05°C
Accelerometer Range	± 1400mg
Accelerometer Gain	1x to 25x analog gain
Accelerometer Resolution	0.027mg (25x) to 0.678mg (1x)

GENERAL INFORMATION	
Dimensions	2.00" x 4.00" x 1.50"
Base Station to PC Interface	RS-232 or USB

POWER CONSUMPTION	
Current Draw in Sleep Mode	0.02 mA
Current Draw in Active Mode	1.06 mA
Current Draw in Rx/Tx Mode	9.2–19.5 mA
Operating Voltage	1.8 V
Batteries	2 AA NiMH Batteries
Battery Recharge	5 Hours @ 500 mA

