

# Ubiquitous Sensor Network

## HBE-Ubi-MSP430

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- Wireless sensor network system which can purely
- support ad-hoc networks
- Ultra low power wireless sensor platform

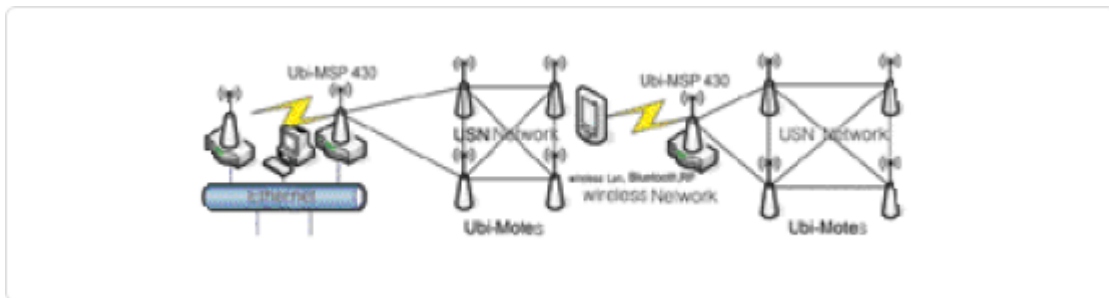
#### 주요키워드

Ultra Low Power USN test-bed

#### FEATURE

These days, the ubiquitous technology is mainly attended in the industry and academic areas for supporting various automatic and adaptive services in anywhere, any-time and any-place without a recognition of human. One of the important ubiquitous technologies is the wireless sensor network which can predict around environments and action of humans. Based on the sensing information, there can be to support more intelligent services.

In order to easily and quickly educate and research the recent wireless sensor network technology, it was developed with the new ultra-low power wireless sensor platforms (HBE-Ubi-MSP430) based on TI MSP430 CPU and CC2420 RF. HBE-Ubi-MSP430 can be utilized in the education, research and performance evaluation area related the ubiquitous technology. Users can easily learn wireless sensor networks, MAC, embed system and sensing control mechanisms by using our proposed platform and its various examples.



#### Main Characteristic

- Public MSP430 CPU
- Stable 8bit high performance platform
- External data storage (SDRAM, FLASH)
- PCB pattern antenna
- Size: 40mm x 70mm
- 1.2v recharge battery (2)
- Support TinyOS
- Support Ad-hoc network
- Support IEEE 802.15.4 PHY/MAC
- Support external antenna port to enhance a communication distance
- Support external extend port
- Support various sensors (Temp., humi., Photo, Light)
- Support various education programs.
- Support user manual
- Support development tools

## ■ SPECIFICATION

### hardware specification

Item	Description
Micro Controller	MSP430F1611 (program 48Kbyte RAM 10Kbyte AD 8ch, DA 2ch)
RF part	CC2420 2.4GHz IEEE 802.15.4 PHY
Security	DSSS
Transfer BPS	Maximum 250Kbps
Base Sensor	Temperature, Humidity and Photo Sensors
Power	1.5V AA 2ea or 1.2V Rechargeable battery 2ea
Length	40mm × 77mm

### software specification

Item	Description
TinyOS	Non-preemptive thread OS Low-Power management Ad-hoc routing application nesC compact code size
Applications	Support various examples for testing the wireless
RF	B-MAC/ S-MAC /IEEE 802.15.4 protocol
Development Environment	nesC compiler MSP AVR gcc compiler BSL downloader

## ■ Experiment Theme

### Theory

- Background of USN
- Introduce HBE-Ubi-MSP430
- Install developing tools
- TinyOS and NesC
- MSP430 process and power control in HBE-Ubi-MSP430
- Operate Java application

### Practice

- LED control based on TASK
- LED control based on Timer
- "Hello World" example based on LED and Timer
- Photo sensor control
- Temperature/Humidity sensor control
- Ultra red sensor control
- Internal/External Memory control
- Read Serial ID (RF)
- Serial communication with PC and external interrupt
- Basic wireless MAC protocol (MACI)
- Energy efficient MAC protocol (MACII)
- RF power control and Multi-channel
- Ad-hoc network based TOSSIM
- USN applications program
- Multi-hop communication based on Tree-Routing (use all sensors)