>>Ubiquitous Sensor Network

New Ubiquitous Home Network Test-beds based on Wireless Sensor Networks

HBE-Ubi-HomeNet

- New test-beds for real implementations of ubiquitous home networks based on smart sensors.
- Independent modules and smart sensors to support more flexible home network tests.
- Package includes real home appliances controlled by the modules and smart sensors of HomeNet.
- Its examples cover from a theoretical education of TinyOS to experiments about real controlling home appliances.
- Target of educational departments : Electronics, Electrical Communication, Computer Science, Mechanical, and Civil, Chemical Engineering, Environmental and Earth Science.

Introduction

- The ubiquitous computing in the home area is distributed at various scales throughout our daily lives. Moreover, development of ubiquitous home services and their implementations have important commercial values as well. Therefore, various projects and researches have been carried out for the ubiquitous home network applications.
- Following this trend, Hanback Electronics developed a new ubiquitous home network test-bed, named as Ubi-HomeNet, based on wireless smart sensors (HBE-ZigbeX).
- HomeNet makes smart sensors can work as a collector perceived sensing information in home areas as well as a controller of consumer home devices. Some actuator type sensors are deployed near the consumer home devices and are connected with their electronic switch by using several relay module developed by us. This collaboration among smart sensors and home appliances has led to a new trend to take more active ubiquitous home networks beyond the traditional sensor networks. By using our test-bed, user can easily learn and evaluate the ubiquitous home network areas. Its text book covers not only a theoretical education on NesC of TinyOS but also experiments related with controlling home appliances.

Feature

- HBE-ZigbeX Mote-Using Control
  - Use general-purpose ATmega128 CPU
  - Stable 8bit High Performance Platform
  - Provide a sensor data storage (SDRAM, FLASH-512KB)
  - Configure a real-time sensor network with TinyOS porting
  - Nano Qplus porting
  - Construct an autonomous communication network
  - Support Zigbee PHY
  - Configure PCB pattern antenna with communication available up to 120m
- Design modularization to make it easy to construct actual environments
- Loaded with AC-DC Converter and drive a module by using a commercial power (100~220V)

- Provide three main boards
  - Provide a basic board (AC-Input Board) loaded with relay (2) for commercial power control
  - Provide a dedicated board (Dimmer) for light brightness control
  - Provide a dedicated board (MC Board) for motor driving
- Provide a control electronic door lock, gas breaker, detector and light
- Support example program through abundant experiments on development
- Provide environment-setting tools for development
- Provide standard teaching program and user manual
- Support user training based on abundant experiences

Hardware Specifications

• ZigbeX

Items	Description
Micro Controller	ATmega128 (program 128Kbyte RAM 4Kbyte EEPROM 4KB AD 10bit 8ch)
RF part	CC2420 2.4GHz (IEEE 802.15.4 PHY)
Security	DSSS
Transfer Rate	Maximum 250Kbps
Base Sensor	Temperature / humidity, light, infrared sensor, RTC is built
Power	1.5V AA 2EA or 1.2V Rechargeable battery 2EA

• AC-Input Board

Items		Description
AC-DC Converter	Input	AC 100 ~ 240V, 0.15A 50/60Hz
	Output	DC 5V 1.0A
Relay	Operating Voltage	5V
	Allowed Voltage	~ 250V 5A

• Dimmer Board

Items		Description
AC-DC Converter	Input	AC 100 ~ 240V, 0.15A 50 / 60Hz
	Output	DC 5V 1.0A
Light Output	Allowed Voltage	Max. AC 250V 5A

• MC(Motor Control) Board

Items		Description
AC-DC Converter	Input	AC 100~240V, 0.15A 50/60Hz
	Output	DC 5V 1.0A
Motor Driving IC	Motor Voltage	50V (max)

* Specifications can be changed without notice

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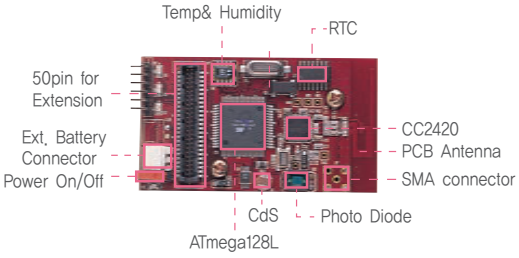
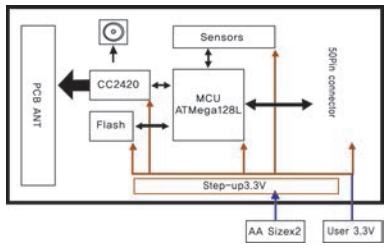
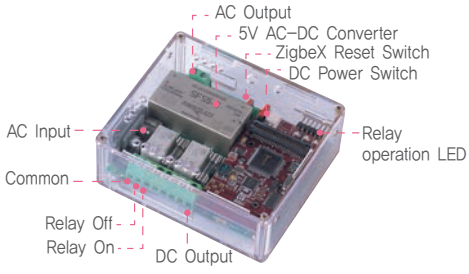
System Configuration

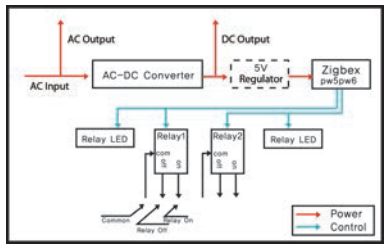
• ZigbeX



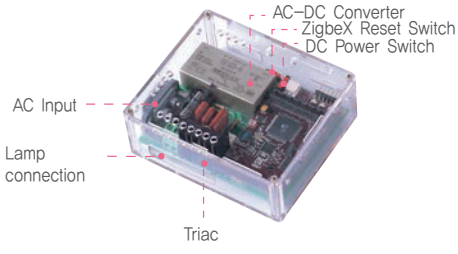


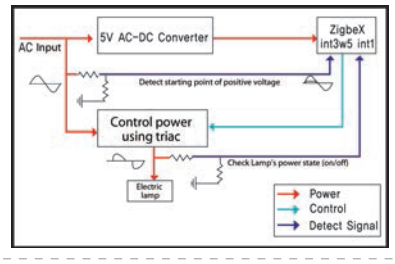
• AC-Input Board



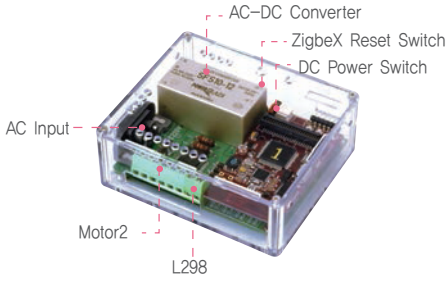


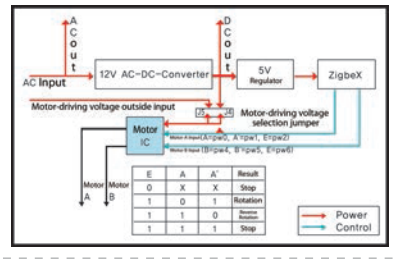
• Dimmer Board





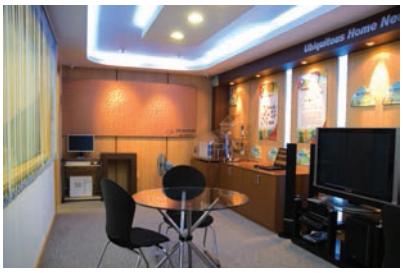
• MC(Motor Control) Board





Applications

- **HBE-Ubi-HomeNet Application Case (Korea University of Technology and Education)**





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