• USN / RFID System

UBIQUITOUS SENSOR NETWORK TRAINER

• The optional Embedded System (ED-255EK) can be linked as a gateway
• ZigBee network can be built using TinyOS, F8WOS
• Capable of control and monitor through Ethernet
• The RFID Card Reader is supplied as a standard shipped component for applied experiments on security, home automation and robot
• The Mote Expansion enables easy build of the USN Control System
• 10 types of basic sensors (standard shipped components) & additional 7 types of sensors (Options)

> EXPERIMENTS

• Overview of the sensor network
• Understanding of the sensor network hardware
• Sensor network development environment build
• Sensor network configuration method
• Data transmission among ZigBee modules using the sensor network
• Description of each sensor supplied in the equipment
• Zigbee module and programming of the sensor control program
• Sensor data collection using the sensor network
• Usage and programming knowledge of the PC monitoring software
• Sensor control using the PC monitoring software

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> SPECIFICATIONS

**ED-ZigM**
- Interface : RS-232, TCP/IP, GPIO Port
- JTAG
- Processor : Atmega128L, 8bit RISC
- Memory : 128k Program Flash, 64k SRAM
- Operating System : F8W, TinyOS
- Multi Channel Radio : 2.4/2.4835GHz
- Data Rate : 250kBaud
- RF Chip : CC2420(IEEE 802.15.4)
- RTC : DS1307
- Network : 10/100 Auto Detect
- Power : 3.0~3.3V

**ED-ZigS**
- Interface : RS-232, GPIO Port
- JTAG
- Processor : Atmega128L, 8bit RISC
- Memory : 128k Program Flash
- Operating System : F8W, TinyOS
- Multi Channel Radio : 2.4/2.4835GHz
- Data Rate : 250kBaud
- RF Chip : CC2420(IEEE 802.15.4)
- Power : 3.0~3.3V

**ED-255EK(GATEWAY)(OPTION)**
- Processor : PXA255 400MHz
- Memory
  - FLASH : 32MByte
  - SDRAM : 128MByte
  - SRAM : 1MByte
- Ethernet : 10/100Mbps 2Port
- Serial : UART FF UART, ST UART, BT UART
- USB : Host, Client
- 6.4” TFT LCD/Touch Screen, Multi Media Card, PCMCIA, CF, MMC P52, IIC, IrDA, RTC, Sound(AC’97 Codec)
- OS : Linux-2.4.19, WinCE 4.2
- ※Detail Specification : refer to ED-255EK product specification

**ACCESSORIES**
- Serial Cable
- PC Program
- DC 5V Adapter
- JTAG
- Ethernet Cable

**OPTIONS**
- Optional Sensor Modules(7ea)
  - Acceleration Sensor
  - GPS Sensor
  - Interface Module
  - PH Sensor
  - Finger Print Sensor
  - Azimuth Sensor
  - Relay Module

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**Software and Development Environment**
- F8W, TinyOS
- Multi-Hop, Ad-hoc Routing Protocol
- Library of each sensor
- Network monitor program

**Application Program**

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Sensor (Basic : 10ea)

**Illumination Sensor**
* Lux Meter and Photo Alarm Experiments

- Illumination measurement using Cds, Photo IC (AMS302)
- Designed for low electric power
- Temperature compensation function (Built-in)
- In the use of general-purpose ATMega8L
- RS-232 communication
- Measuring Range : 0.1~50,000LUX

**Magnetic Sensor**
* Magnetic Flux Meter, Tachometer, Speed Meter Experiments

- 2-axis magnetic field intensity measurement
- Designed for low electric power
- Possible use as for a compass
- In the use of general-purpose ATMega8L
- RS-232 communication
- Measuring Range : -6.00~+6.00gauss

**Temperature Sensor**
* Thermometer Experiments

- Precision measurement using Thermistor, IC
- Designed for low electric power
- Calculation of humidity and dew point
- In the use of general-purpose ATMega8L
- RS-232 communication
- Measuring Range : -40~123.8˚C
- Minimum Resolution : 0.1˚C

**Humidity Sensor**
* Hygrometer Experiments

- Precision measurement using Thermistor, IC
- Designed for low electric power
- Capable of relative/absolute humidity measurement
- In the use of general-purpose ATMega8L
- RS-232 communication
- Measuring Range : 0~100%
- Minimum Resolution : 0.03%

**Pyroelectric Sensor**
* Human Body Detection Sensor

- Distance measurement using infrared rays
- Entrance & exit monitoring by human body detection
- Infrared sensing
- In the use of general-purpose ATMega8L
- RS-232 communication
- Measuring Range : 10~80cm

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ED-3160

Ultrasonic Wave Sensor
- Distance measurement using ultrasonic waves
- Temperature compensation function
- In the use of general-purpose ATMega8L
- RS-232 communication
- Measuring Range: 50–200cm

Sound Sensor
- Sound detection using microphone
- Display by Level Meter
- In the use of general-purpose ATMega8L
- RS-232 communication
- Frequency: 31.5Hz–8.5kHz
- Measuring Range: 35–130dB

Pressure Sensor
Atmospheric Pressure Measurement
- Atmospheric pressure measurement using Barometer
- Contact pressure measurement using FSR (Force Sensing Resistor)
- Possible measurement of temperature and altitude
- In the use of general-purpose ATMega8L
- RS-232 communication
- Measuring Range: 300–1100mbar (Barometer), 0.5–10kgf/cm² (FSR)

GAS Sensor
Gas Measurement
- Capable of measuring Carbon Monoxide, Methane, Ethanol, Propane, Isobutane, Hydrogen
- In the use of general-purpose ATMega8L
- RS-232 communication
- Measuring Range: 500–10000ppm

RFID
RF Card Reader
- 13.56MHz RFID Reader
- Designed for low electric power
- Detection Distance: 100mm
- ISO/IEC 14443 Type A, Type B Read
- ISO 15693 Read

Sensor (Optional: 7ea)

Acceleration Sensor (2-axis)
Motion Sensing
- Measurement of 2-axis Gradient
- Measurement of 2-directional acceleration of gravity
- Useful for measuring the target’s motion
- In the use of general-purpose ATMega8L
- RS-232 communication
- Measuring Range: ±25˚ (Gradient)
- Minimum Resolution: 0.1˚
Azimuth Sensor
Direction Sensing
- Electronic compass sensor
- LED Display of the North Pole (°)
- Designed for low electric power
- In the use of general-purpose ATMega8L
- SPI communication

PH Sensor
PH Density Measurement
- Sensor connection through BNC Cable
- Liquid pH sensing using the Probe
- Designed for low electric power
- In the use of general-purpose ATMega8L
- RS-232 communication
- Measuring Range: 0~14pH

GPS Sensor
Location Detection
- Location detection using GPS module and antenna
- Altitude detection
- Designed for low electric power
- In the use of general-purpose ATMega8L
- RS-232 communication
- Latitude & longitude indication: 0.01 sec
- Target speed indication: 300m/sec (max)

Finger Print Sensor
Finger Print Sensing
- High speed finger print recognition using DSP
- Programmable
- Designed for low electric power
- Sensing Area: 16 x 19mm
- In the use of capacitive sensor for excellent imaging quality
- 500dpi image resolution
- Low Avg EER

Relay Module
- Relay 2EA
- Buzzer 1EA
- Illumination measurement using Cds
- Temperature measurement using Thermistor
- Relay & Buzzer drive using the software

Interface Module
- Connection between Base Station and PC
- Serial communication for PC
- USB communication for PC
- USB 2.0 compatible
- Capable of using the power source of Mote or USB

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