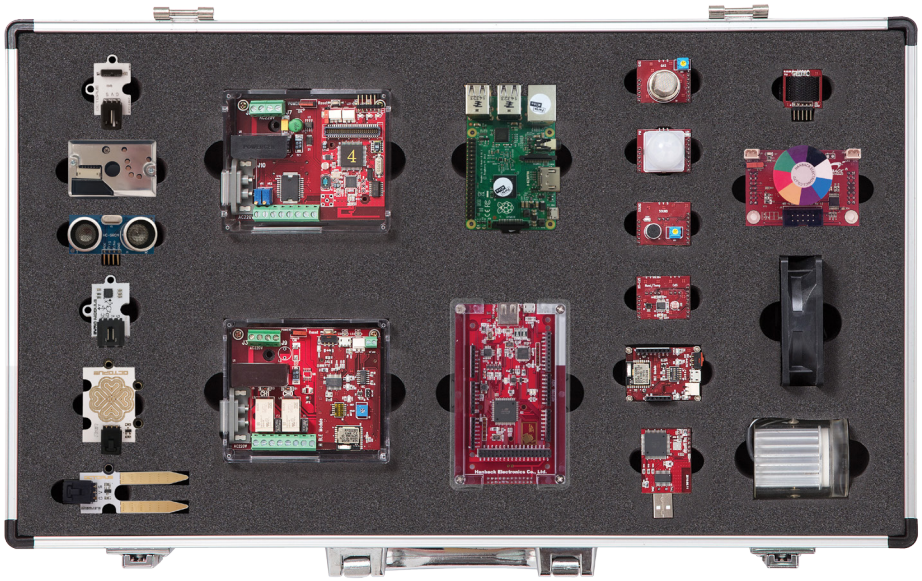
HBE IoT SMART



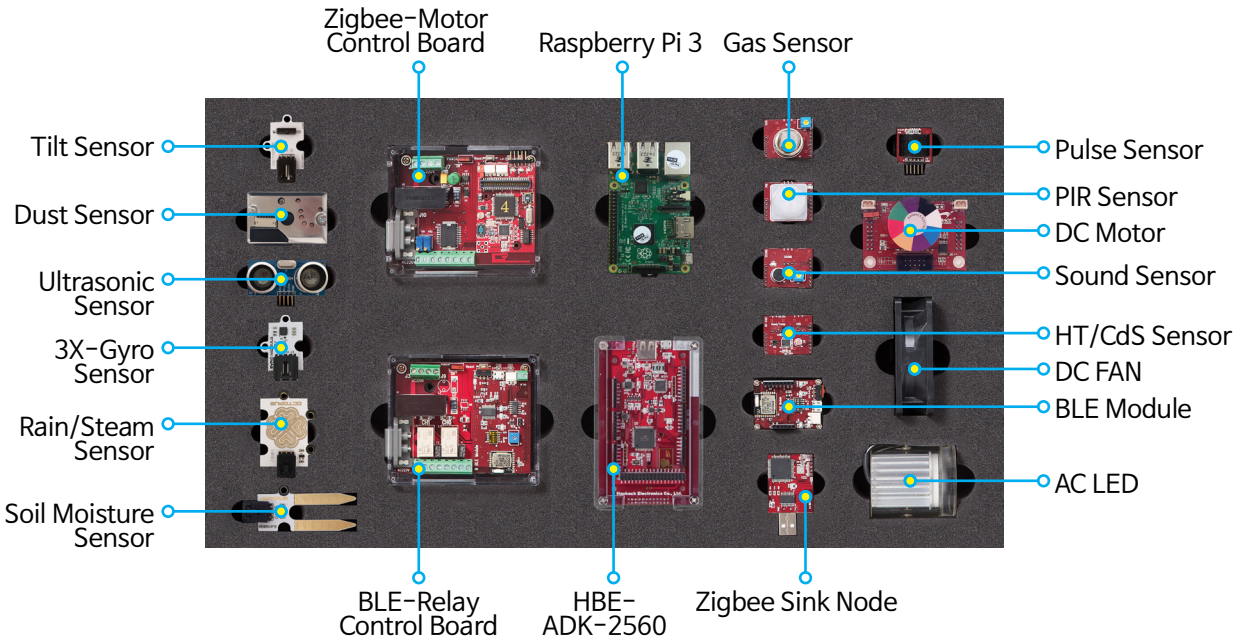
IoT Platform

- Raspberry Pi 3, ADK-2560 based IoT Sensor Test
- Interworked on Smart Phone or Tablet PC
- Arduino programming by BLE Module
- Communications of Zigbee, Bluetooth and Wi-Fi service
- BLE based Sensor Module Service
- BEACON service
- Various Projects Supports
- Provides Cloud Service based on AWS
- Android, Linux based Open API service

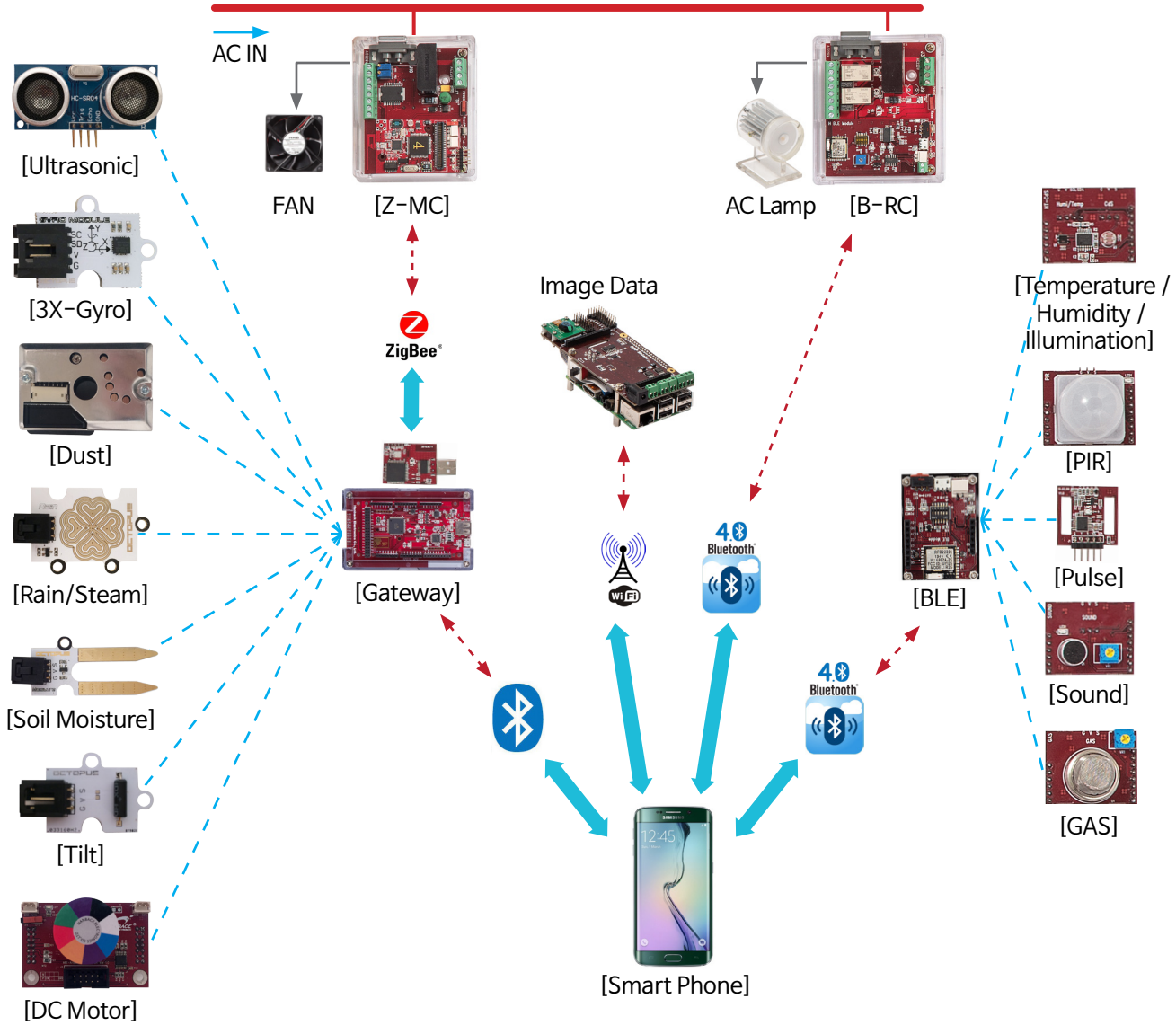
Features

- Sensor data collection is implemented around Open Hardware platform, so anyone can easily experience IoT service.
- Wearable devices can be implemented using the ARM Cortex M0-based BLE Module.
- Provides 10 basic sensor data bases and application examples.
- Support various projects such as sensor collection and indoor map service using BEACON.
- Supports Wi-Fi, Zigbee, and Bluetooth communication for inter-object communication, which is an early stage of IoT service.
- It provides module training function using firmware and it is possible to collect sensor information and practice actuator control to acquire IoT basic skills by module.
- By building a gateway, it is possible to carry out various projects through sensor information monitoring and remote access control function.

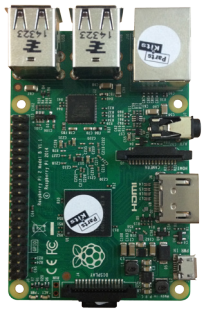
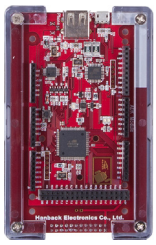
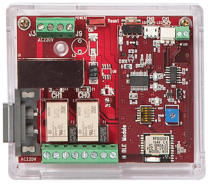
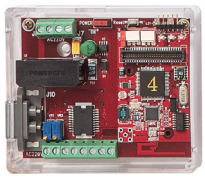
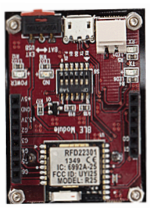
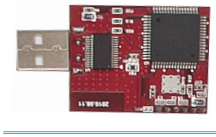
Configuration and Name

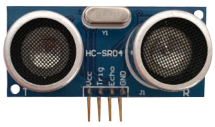
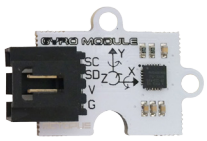
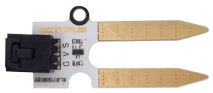
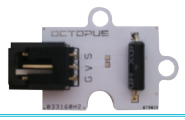
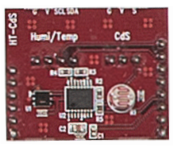
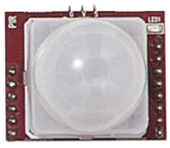
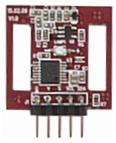


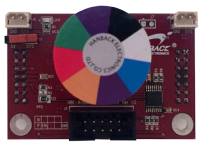
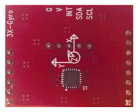
Application



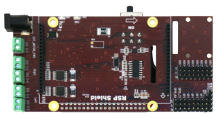
Hardware Specification

Module	Item	Specification	Remarks
Raspberry Pi 3	Processor	Broadcom BCM2837 900MHz Cortex-A53 quad-core	A gateway module that supports communication of Wi-Fi, Bluetooth, Zigbee, and can acquire basic sensor data and can mount camera and LCD through Rsp Shield
	RAM	1GB LPDDR2 SDRAM	
	Storage	MicroSD 8GB	
	USB 2.0	USB A Type x 4 Ports	
	Power	600mA up to 1.8A @ 5V	
	Audio	3.5mm A/V Jack	
	Digital Video	HDMI 1.4 Video out	
	Ethernet	10/100	
	Expansion I/O	40EA GPIO(2x20 2.54mm Pitch Header)	
	Size	87 x 58mm	
HBE-ADK-2560	Micro Controller	ATmega2560 16MHz	Gateway module used to build Arduino-based IoT System
	Flash Memory	256KByte (8KB used by bootloader)	
	Clock Speed	16MHz	
	USB Controller	ATmega8U2 16MHz	
	USB Host Controller	MAX3421E USB 2.0	
	GPIO Socket	2x18 Socket(1EA), 1x10 Socket(1EA), 1x8 Socket(5EA)	
	Operating Voltage	7~12V	
	Dimension	122 x 76(mm)	
B-RC Board	Processor	16MHz ARM Cortex-M0	Module for controlling various electronic and electric devices through relay control based on Bluetooth 4.0 (BLE) communication
	RF	Bluetooth LE, 2.4GHz	
	Data rate	250 ~ 2000kbps	
	Operating Voltage	AC90 ~ 240V, 50/60Hz	
	AC IN	AC, 3.5mm Terminal Block 2EA	
	Relay	2CH, 250V/2A	
	Ext, Digital In	3.5mm Terminal Block 1EA	
	Size	76 x 93.5mm	
Z-MC Board	Processor	ATmega 128L	Module for controlling various motors through motor control based on Zigbee communication
	RF part	CC2420 2.4GHz (IEEE 802.15.4 PHY)	
	Transfer Rate	Maximum 250Kbps	
	Base Sensor	Temperature/Humidity, Intensity of illumination	
	Operating Voltage	AC90 ~ 240V, 50/60Hz	
	AC IN	AC 2구 8자, 3.5mm Terminal Block 2EA	
	Relay	2CH, 250V/2A	
	Motor Driver	L298, up to 46V/4A	
	Motor In	3.5mm Terminal Block 2EA	
	Size	76 x 93.5mm	
BLE Module	Processor	16MHz ARM Cortex-M0	Various sensors can be installed, and modules for transmitting the data acquired by the sensor to the smart device or gateway through Bluetooth 4.0 (BLE) communication
	RF	Bluetooth LE, 2.4GHz	
	Data rate	250 ~ 2000kbps	
	Operating Voltage	2.2V ~ 5V	
	Battery	Lithium Cell 3V (240mAh@to 2.0V)	
	I/O	GPIO 7EA(I^2C, SPI, PWM), 2.54mm Socket	
	Size	36 x 48mm	
Sink Node	Processor	ATmega 128L	Module for connecting gateway, sensor and control module with Zigbee communication method. Mounted on Gateway
	RF part	CC2420 2.4GHz (IEEE 802.15.4 PHY)	
	Transfer Rate	Maximum 250Kbps	
	Operating Voltage	5V	
	Size	31 x 55mm	

Module	Item	Specification	Remarks
Ultrasonic Sensor	Ultrasonic Sensor	HC-SR04	Object perception, distance measurement module
	Distance	2-500cm	
	Frequency	40KHz	
	Measuring Angle	15 degree	
	Operating Voltage	5V	
	Dimension	28 x 46(mm)	
3X-Gyro Sensor	Gyro Sensor	ITG3205	Angular velocity detection sensor module
	Interface	I²C Serial interface	
	ADC Resolution	16Bit	
	Operating Voltage	3.3V/5V	
	Dimension	25 x 40(mm)	
Dust Sensor	Dust Sensor	GP2Y1010AU0F	Fine particle detection module such as cigarette smoke
	Detection Way	Photometry	
	Distinguish Smoke	Possible (with Pulse pattern of output)	
	Operating Voltage	5V	
	Dimension	45 x 48(mm)	
Rain/Steam Sensor	Interface	3P Buckled wire connector	Moisture detection module (Rain/Steam)
	Operating Voltage	3.3V/5V	
	Dimension	32 x 53(mm)	
Soil Moisture Sensor	Output Voltage	0-4V	Read the amount of water present in the soil
	Interface	3P Buckled wire connector	
	Operating Voltage	3.3V/5V	
	Dimension	30 x 65(mm)	
Tilt Sensor	Interface	3P Buckled wire connector	Switch module with tilt
	Operating Voltage	5V	
	Dimension	25 x 40(mm)	
HT/CdS Module	Photo Sensor	CdS 1EA	A module that can measure humidity, temperature and illumination. Non-contact characteristics and no influence of noise.
	Temperature / Humidity Sensor	0 ~ 100%RH / -40 ~ 125℃	
	Operating Voltage	3.3V	
	I/O	3pin Header 1EA, 4pin Header 1EA (2.54mm Pitch)	
	Size	27 x 33mm	
PIR Module	Infrared Sensor	RE200B	Human body detect sensor. Sensors for detecting infrared wavelengths in animals and humans.
	Sensing Range	110 degree	
	Operating Voltage	3.3V	
	I/O	3pin Header 1EA (2.54mm Pitch)	
	Size	27 x 33mm	
Pulse Module	Pulse Sensor	1EA	Infrared rays emitted by infrared LED measure heart rate according to changes in blood pressure
	Sensor	Light Photo Sensor	
	Operating Voltage	3.3V	
	I/O	3pin Header 1EA (2.54mm Pitch)	
	Size	24 x 24mm	

Module	Item	Specification	Remarks
Sound Module	Sound Sensor	Microphone	Sound sensing sensor
	Sensitivity	Adjustable (with potentiometer)	
	Operating Voltage	5V	
	I/O	3pin Header 1EA (2.54mm Pitch)	
	Size	27 x 33mm	
Gas Module	Gas Sensor	MQ-5	Sensor module that detects LPG, natural gas, coal or charcoal gas
	High Sensitivity	LPG, Natural gas, Town gas	
	Low Sensitivity	Alcohol, Smoke	
	Operating Voltage	5V	
	I/O	3pin Header 1EA (2.54mm Pitch)	
	Size	27 x 33mm	
LED	Type	Diffused Light Type	Lighting Control Practice Module
	Color Temperature	Warm White : 2500 ~ 3500K	
	Operating Voltage	AC100 ~ 230V, 50/60Hz	
	Power Consumption	4W	
	Size	40 x 53mm	
FAN	Bearing Type	Ball	Motor control and ventilation control training module
	Operating Voltage	12V	
	Current Rating	230mA	
	Speed	2500rpm	
	Size	80 x 80mm	
DC Motor	Motor Driver	TB6552	DC motor module that can be used as actuator
	Motor	Micro Type DC Motor	
	Interface	2x5 Header, 2.54mm Pitch	
	Operating Voltage	5V	
	Dimension	40 x 60(mm)	
LED/SW	Components	White LED 5PI 2EA, Tact Switch 2EA	Module consisting of two LEDs and a switch
	Allowable Voltage and Current	2.0~5V, 5mA(Min)	
	Operating Voltage	3.3V~5V	
	Dimension	27 x 33(mm)	

• Accessory Option

Module	Item	Specification	Remarks
Rsp Shield	Motor Interface	DC Motor Driver 2EA (3.5mm Terminal Block 4EA)	It is mounted on Raspberry Pi board and can easily use motor, GPIO, LCD, camera, etc (Battery built-in)
	Expansion I/O	GPIO: 7EA, UART: 1EA, I²C: 1EA, SPI: 1EA, ADC: 8EA	
	Charger	Li-ion Battery Charger	
	Battery	Li-ion Battery, 3.7V/1800mAh	
	Size	116.7 x 56mm	
LCD Module	LCD Interface	SPI(1x20 2mm Pitch Connector 2EA)	Raspberry Pi LCD Module for use with Rsp Shield (Built-in Touch)
	Touch Interface	SPI(1x20 2mm Pitch Connector 2EA)	
	LCD	2.8" TFT LCD(320 x 240)	
	Touch Screen	2.8" Touch	
	Back Light	LED	
	Size	77 x 51mm	
Camera Module	Interface	CSI(Camera Serial Interface), FPC 15P Cable	Raspberry Pi Camera Module used in Rsp Shield
	Sensor	5M Pixel	
	Dimension	25 x 20mm	
	Dimension	40 x 60(mm)	

Software Specification

Module	Item	Specification
Gateway	O/S	Raspbian Linux 3.xx
	Camera Program	Pi Camera Driver, Camera Streaming Server
	Server Program	Z-RC/Z-MC Board Control S/W for Gas Detector, Gas Circuit Breaker, FAN etc
Z-MC Board	O/S	TinyOS 2.x
	Function	Motor Control, Temperature / humidity / illumination measurement
B-RC Board	F/W IDE	Arduino 1.6.x
	Function	Relay Control
BLE Module	F/W IDE	Arduino 1.6.x
	Communication	Bluetooth Communication S/W
	Function	Sensor Control S/W
ADK-2560 Module	F/W IDE	Arduino 1.6.x
	Communication	Bluetooth Communication S/W
	Function	Sensor Control S/W
Sink Node	O/S	TinyOS 2.x
	Function	Communication with Z-RC/Z-MC Board
Smart Device	O/S	Android 4.3 or later
	BLE	Door Lock Control, AC LED Control
	Wi-Fi	Gas Detector, Fan Control, Power Monitor
	Camera	CCTV Program

Textbook Chapter

Title	Textbook Contents
IoT smart sensor control using clouding service	Learning 1. Overview of the Internet of Things Learning 2. IoT-Smart and Practice Environment Configuration Learning 3. Smart Sensor Control Practice (1) Learning 4. Smart Sensor Control Practice (2) Learning 5. Raspberry Pi Learning 6. Smart Sensor Control Application Practice (1) Learning 7. Smart Sensor Control Application Practice (2) Learning 8. IoT Smart Sensor and Cloud (Thing+) Integration