



深圳市海天雄电子有限公司  
Shenzhen Haitianxiong Electronic Co., Ltd.

# CES-IOT210

## Product Manual

IOT Comprehensive Experiment System I

Rev. V1.0

Date : 2016-10-19



## Introduction

IOT technology is expand and extend based on the traditional Internet technology, due to its extremely wide range of applications, involving almost all walks of life, in order to meet the needs of professionals in the industry, more and more universities applied for the IOT Engineering and arranged the courses in the teaching plan. To meet the needs of school teaching, Haitianxiong developed Hailum IOT comprehensive experimental system combined with the actual product development experience.

Hailum. IOT comprehensive experimental system focuses on the theory and practical teaching of IOT perception layer, network transmission layer and application layer. The perception layer in this system is composed of various sensors and RFID radio frequency modules to realize information collection of different Physical characteristics. The network layer is to achieve data communication task by ZigBee short distance which is one of the key technologies of IOT, while WiFi, Bluetooth BT, 3G and other technologies to achieve a variety of network transmission functions. Application layer is the toppest layer of IOT technology which is composed of high-end IOT gateway to achieve data processing and implementation of the upper application

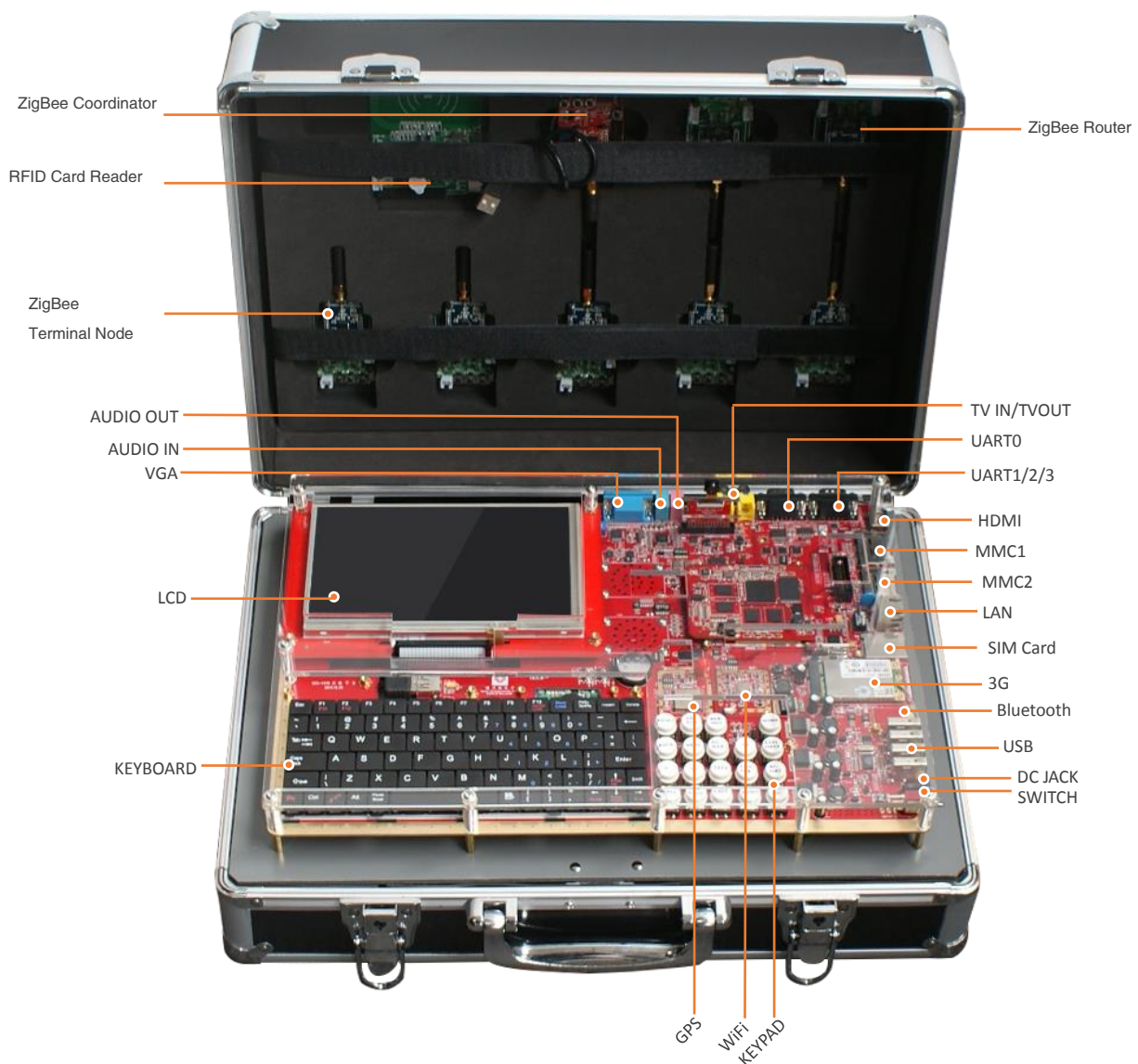
CES-IOT210 IOT system advocates the concept of "product learning". The system design combined the mature IOT product solutions with pratical product technology. Through the study of point, block and overall system, students can fully grasp the leading technology of Internet of Things, so as to achieve the perfect combination of learning knowledge points and product knowledge points.

CES-IOT210 experimental system provides as many as dozens of course experiments. Course experiments provide open software and hardware resources, focusing on developing students' practical ability, enabling teaching, researching and other IOT related topics.

System key technical points: local area network communication technology, short-range communication technology, ZigBee wireless sensor network technology, RFID radio frequency technology, embedded computer (system) technology, software engineering technology.

Suitable for colleges and universities including IOT engineering, computer science and technology, software engineering, electronic information engineering, electrical engineering and automation.

### Function Interfaces



## Hardware Parameters—Gateway

CPU	Samsung S5PV210, ARM Cortex-A8 architecture, frequency at 1GHz
Memory	1GB Samsung K4T1G084QQ DDR2 memory chip
FLASH	1GB Samsung K9K8G08U0A NAND FLASH chip
PMU	A group of intelligent power management circuits, using Maxim MAX8698C power management chip
Ethernet	1 *10M / 100M Ethernet interface, using DM9000AEP NIC chip
Audio	1 * I2S bus circuit, input / output, dual 8 ohm / 2W amplifier, high quality WM8580A audio chip
System Bus	System bus expansion interface, 16-bit data and address bus
Smallest System Package	S5PV210 chip 584 pin FBGA package, the core socket with high reliability Molex, pin pitch 0.65mm
Human-computer interaction	Touch-screen operation (I2C high-speed interface), notebook full keyboard input, USB mouse / keyboard interface, wireless Bluetooth mouse / keyboard, matrix buttons (19 platform function keys), 4 controllable GPIO LED
On-board Interface	4 *RS232 UART serial port, 4* USB HOST (can be extended functional module),LCD touch screen interface, HDMI1.3 HD digital video output interface, Audio digital audio output interface, 1 *I TV IN / OUT video I / O interface, VGA interface, LAN ethernet interface, 4* SD / MMC memory interface, 3G Mini-PCIE communication module interface, mobile SIM card interface, 1 *MIC IN interface, 1* Headphone interface, 1* JTAG emulation debugging Interface, 1*LVD interface, onboard 2* 8 ohms 2W speakers, 1 * CMOS Camera Interface
LCD Display	4-wire resistive 7-inch bright true color touch screen, pixel 800 * 480 LED backlight, 16:9 widescreen, 16: 7M true color, reserved LVDS capacitive screen interface, 400Kbit / s high-speed I2C interface
Video Input / Output	Onboard HDMI, VGA, TFTLCD, TV-OUT, LVDS display interfaces. Support CMOS camera input, CCD camera input, VGA display using GM7123--330MHz 3-channel 10-bit high-speed video DAC chip, LVDS Display using SN75LVDS83A-LVDS interface chip, 4 differential signal output

## Hardware Parameters - Wireless Sensor Network Section

- Standard 1\* ZigBee coordinator, 2 \* ZigBee wireless router, 5 \* terminal node sensor, can achieve a variety of network applications
- Standard TI CC2530, built-in hardware positioning engine and enhanced 8-bit 51 MCU and RF transceiver
- Rich in I/O ports, built-in temperature sensor, serial port, A/D and various commonly used peripheral interfaces
- Comply with IEEE802.15.4 / ZigBee standard specifications, band range 2045M-2483.5M, can switch among 16 bands freely.
- Wireless data transmission rate is about 250 kb / s, communication distance is 30 to 300 meters
- With 256K of on-chip programmable Flash and 8K of RAM
- Configure ZigBee Emulator Circuitry. Configurable Sensors: Node Sensors, Temperature Sensors, Photosensors, Vibration Sensors

## Hardware Parameters -Wireless RF RFID Section

- RFID main control MCU is the enhanced 51 STC89C54RD, the highest clock frequency up to 80MHz
- The chip carries 16KB FLASH program memory ROM and 1KB data memory RAM
- RF read and write chip is NXP's highly integrated CLRC632, the transfer rate up to 424kbps
- Support ISO14443 A & B, ICODE1, ISO15693 multi-standard radio frequency protocol
- The maximum non-contact distance up to 100mm
- Configuration specifications 16 \*2 characters dot matrix display, the corresponding data operations can be displayed
- Through serial port and host computer gateway to achieve RFID system data communication

## Hardware Parameters - Short-range communication module and other modules

- WiFi Communication Module: Adopt Marvell 88W8686 chipset, support IEEE 802.11B / G agreement, SDIO interface
- BT Module: Support high-speed USB interface, Bluetooth module, high-speed Bluetooth data communication
- 3G Communication Module: ZTE AD3812 chipset, PCI Express Mini Care interface, support for WCDMA

(UMTS) network, GSM / GPRS / EDGE network card, support WCDMA 850MHz, 1900MHz, 2100MHz tri-band support GSM / GPRS / EDGE 850MHz, 900MHz, 1800MHz and 1900MHz quad-band, achieving wireless data communication, message send and receive functions

- GPS Positioning Module: SiRF company' s GP3SF1513F1-S high-performance chipset, frequency L1 1575.42MHz, C / ACode, support for 20 satellite channels, compatible with SBAS (WAAS, EGNOS, MSAS)
- Camera Module: OmniVisionOV3640 1/4 "QXGA (2048 \* 1536) CMOS chipset, 3MP, maximum frame rate 5fps @ QXGA

### Gateway Software Parameters——Android 4.0

Operating system	Android 4.0
Kernel	Linux 3.0.8
Bootloader	U-boot-1.3.4
Terminal	DNW1.01
Cross Compiler	Arm-2009q3
File System	Ramdisk , YAFFS2
GUI	Android 4.0
LAN Module	10M / 100M adaptive network port driver, support for wired Internet
HDMI	Support HDMI output, images and sound
Audio Driver	IIS audio interface, support playback and recording functions
LCD	7-inch resistive touch LCD screen
TOUCH Driver	Four-wire resistive touch screen driver
I2C Driver	Audio, Camera, HDMI are driven by I2C communication
USB HOST Driver	Support HOST, mouse, keyboard, U disk and so on
USB OTG Driver	Support ADB debugging and UMS functions
Keypad Driver	8 * 8 scan button-driven to achieve specific function keys

SD/HSMMC Driver	Support high-speed SD / MMC card
MFC Driver	H.164、H.163、MPEG2 and other formats' encoding and decoding
UART Driver	Support serial communication
JPEG Driver	JPEG codec
RTC Driver	Support real-time clock
2D Driver	2D hardware acceleration
3D Driver	3D hardware acceleration

## Wireless Sensor Gateway Software Resources

- TI CC2530 supports ZigBee2007 specification, star network, tree network, Mesh network and multitasking
- Support RFID ISO14443 A & B,ICODE1, ISO15693 multi-standard RF protocol
- Support 3G wireless SMS transceiver, internet access and data transmission
- Support 802.11b / g WiFi wireless communication protocol
- Support 2.4G Bluetooth data communication
- Based on CC2530ZigBee network communication experiment
- Based on CC2530 ZigBee basic advanced experiments: I / O port input and output experiment, timer timing experiment, A / D conversion experiment, SCM and PC communication experiment, external interrupt experiment, wireless signal transceiver experiment, ZigBee master-slave node communication experiment
- Sensor information acquisition experiment
- RFID card information acquisition experiment
- WIFI wireless communication experiment
- 3G module communication experiment
- Bluetooth data transmission experiment

## Product Configuration List

	User CD		Power adapter
	Experimental tutorial		Touch pen
	Serial line		Camera
	LAN cable		3G module
	USB cable		Bluetooth
	SD card ( optional )		1 * ZigBee coordinator
	2 * ZigBee router		5 * ZigBee terminal node sensor
	RFID card reader module		



## Service Support

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## Disclaimer

This manual information is for reference only, and is subject to change without notice.

For more product information, please visit [www.nrisc.com](http://www.nrisc.com)

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