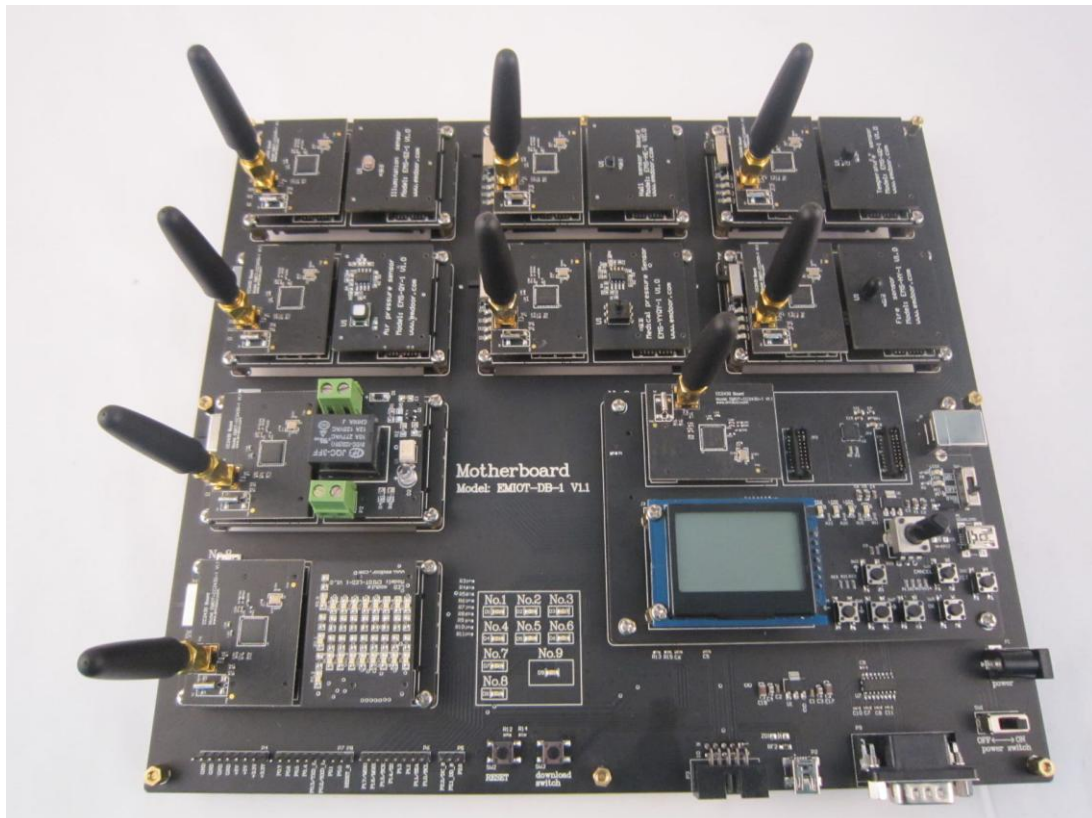


Opterna-Advanced Development Platform

I. Introduction

According to the current construction, absorbing domestic and foreign similar products, fully considering the advantages of the characteristics of university teaching of IOT contrive EMIOT-GJX-1 teaching platform of IOT. The plate integrates a variety of sensor models and a variety of wireless networking mode, it can run a variety of network architecture, provide a large number of test routines and typical application to make the students familiar with and master the principles and practical application of IOT.

Embedded teaching and research platform of IOT, including hardware, software resources, laboratory resources. Experimental resources which include experiments on the basis of CC2530/ARM basic experiment, WinCE experiment, TinyOS experiment, sensor information collection, the wireless signal transceiver test, and PC software, interactive control, can fully satisfy the networking and embedded objects relating to teaching and research.



II. Product List

Name and NO.	image	Name and NO.	image
BaseboardX1		Gateway boardX1	
Battery boardX8		CC2530 node moduleX7	
2.4G antennaX7		Illuminate sensorX1	
Pressure sensorX1		Medical pressure sensorX1	
Flame sensorX1		Temperature sensorX1	
Relay sensorX1		emulatorX1	
USB interfaceX1		JTAG interfaceX1	
Serial interfaceX1		5V power supply lineX1	
Resource CDX1		Mini-USB interfaceX1	

III. The hardware resources

Network nodes

Using current Zigbee mainstream solution built-in hardware CC2430/2530 processor of recommended by TI, located the engine and the enhanced 8-bit microcontroller 51; * rich in I / O ports, built-in temperature sensor, A / D and a variety of common peripherals interface (timers, UART, DMA, interrupt);

Meet IEEE802.15.4/ZigBee standards, frequency range 2045M-2483.5M, be free to switch between the 16 bands.

Wireless data transfer rate of about 250 kb / s;

Has a programmable chip 128K Flash, and 8K of RAM;

Operate Voltage 2.0V-3.6V, low power consumption, supporting sleep and wake-up function;

Support specifically designed wireless sensor networks, TinyOS operating system

Sweden

Phone: +46-8-58020800

Fax: +46-8-58020801



Compatible XMesh network protocols, standard ZigBee protocols and support the Z-MAC (integrated CSMA, TDMA system), X-MAC etc, can facilitate the rapid secondary development;

Integrated development environment based on IAR 51 engineering emulating debugging environment;

Support routing interrupt request, auto repairing of network nodes;

Connect with a variety of modules like Sensor nodes, temperature and humidity, pressure, acceleration, light sensors, sound detection data acquisition;

System Board

System board adopts the system motherboard, power supply node and the gateway board one design, the system motherboard mainly achieve power supply and programming to power supply node and gateway node board. Group 3 also leads to the node board of all GPIO ports. The main hardware interface resource of the System board:

- 8 completely symmetrical plate interface cards;

- 3 set of nodes GPIO port interface board

- 1 standard of 2 * 5 2 emulator interface and 2 emulator interface switch of DIP switch;

- 1 standard mini-USB interface to download and simulation;

- 1 a standard DB9 serial interface;

- 6 modules selected indicators.

Battery node board

The mainly hardware interface resources of battery node board is:

- 2 completely symmetrical CC2530 module plug-in interface;

- 3 GPIO LED lights and 1 power indicator;

- 2 2 * 11 2.54 2-pin interfaces, all connected to the CC2430 module pins.

- 2 5-battery-powered boxes, enabling the battery-powered;

- 1 standard mini-USB interface to download and simulation;

Gateway board

Gateway processor use CC2430 module as the microprocessor, responsible for data collection, distribution, and program testing. The gateway adopted high-performance CP2102 USB RS232 chip, is convenient to communicate with different operating systems for RS232, and uses 128x16 graphic LCD display, visual data display. The main gateway board hardware resources:

- USB switch RS232 interface;

- 4 different directional buttons;

- 2 GPIO Interface buttons;

- 128 * 64 graphic LCD display

- 2 symmetrical the CC2430interface plug-in modules

- 1 standard mini-USB interface to download and simulation

- 4 LED GPIO interfaces

- 1 precision adjustable potentiometer, can be converted ADC

Sensor nodes

Sensor nodes adopt the same interface design of CC2430 module; main 8 standard sensor interface module:

- illuminate sensor module
- pressure sensor module
- medical pressure sensor module
- flame sensor module
- temperature sensor module
- relay sensor module

Emulator

CC Debugger as Zigbee multifunctional simulation / debugging tools, mainly for debugging and emulation the RF system on chip (CC1010 excluded) has introduced by TI, it can use TI's SmartRF Flash Programmer software on TI's RF PSoC programming, meanwhile with the IAR Embedded Workbench for 8051 development environment, seamlessly build and realize TI's RF PSoC chip debugging.

IV software resources

IOT teaching platform software

- PC part upper monitor software-ZigbemPC
- WinCE upper monitor software -ZigbemCE

IAR basic experiment

1. build a simple project
2. general I / O
3. Select system clock source
4. ADC (single conversion)
5. UART serial communication
6. Timer 1 timer test t
7. timer 1 input capture and output compare
8. external interrupt test
9. Watchdog
10. random number generator
11. DMA transmission
12. Flash read and write
13. consumption mode selection
14. power supply voltage monitoring
15. obtain information on the chip
16. BER measurement

Z-Stack test

1. SampleApp
2. GenericApp
3. SerialApp
4. Four TransmitApp
5. SimpleApp

6. SensorDemo
7. SensorApp
8. ZOAD wireless upgrade
9. Home Automation
10. smart energy
11. wireless sensor network experiment- illuminate sensor
12. wireless sensor network experiment - pressure sensor
13. wireless sensor network experiment – medical pressure sensor
14. wireless sensor network experiment - hall sensor
15. wireless sensor network experiment - flame sensor
16. wireless sensor network experiment -temperature sensor
17. wireless sensor network experiment - adding new sensor

ARM basic experiment

- 1.LED light
- 2.key-press
- 3.serial communicate
- 4.LCD

WinCE experiment

- 1.build an environment development
- 2.WinCE system customize
- 3.Tool use
- 4.build applied program