UC Technology
Ubiquitous Computing Technology Corporation

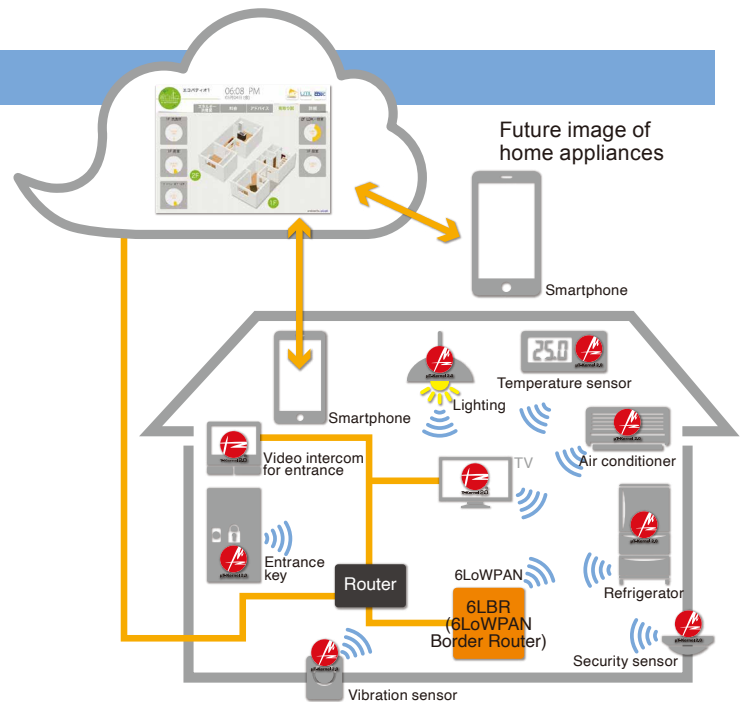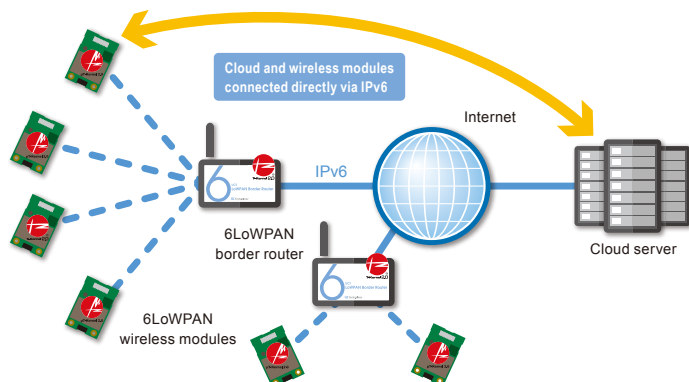# UCT 6LoWPAN

µT-Kernel 2.0

µT-Kernel 2.0

Integrated development kit for the WPAN module:
Optimized for developing applications that collaborate WPAN and the cloud.

What is 6LoWPAN?

6LoWPAN (IPv6 over Low-power Wireless Personal Area Networks) is an IPv6-based standard communication protocol for a network of low-power wireless modules. The 6LoWPAN specification contains packet compression and various optimizations to enable efficient transmission of IPv6 packets on a network with limited power resources and reliability, thus allowing power-saving and efficient IPv6 wireless communication.

Before 6LoWPAN, many low-power wireless networks were proposed and installed on a variety of power-saving wireless networks. Now, 6LoWPAN is positioned as the favorite protocol for IoT (Internet of Things). IPv6-based communication allows once closed wireless networks to interface with the global network, Internet, enabling sophisticated services which up to now have not been possible.

Future image of home appliances

Smartphone
Temperature sensor
Lighting
Video intercom for entrance
Smartphone
TV
Air conditioner
Entrance key
Router
6LoWPAN
6LBR (6LoWPAN Border Router)
Refrigerator
Security sensor
Vibration sensor

Cloud and wireless modules connected directly via IPv6
Internet
IPv6
6LoWPAN border router
6LoWPAN wireless modules
Cloud server

6LoWPAN use case: collaborating with the cloud

Traditional low-power wireless networks connect to LAN via a gateway. 6LoWPAN enables wireless modules to be treated as being part of an IP network, making it easy to create applications to collaborate with the cloud.

UCT 6LoWPAN middleware

It is provided as middleware on the latest RTOS UCT µT-Kernel 2.0.
The software system consists of a real-time OS, protocol stack, and an application, and can run using only MCU in a wireless module.

CoAP: Constrained Application Protocol
A simple HTTP protocol that runs on UDP

Layer	
CoAP	Application layer
UDP	Transport layer
IPv6, ICMPv6	Network layer
6LoWPAN	Adaptation layer
IEEE 802.15.4e MAC	Data link layer
IEEE 802.15.4g PHY (920MHz)	Physical layer
UCT µT-Kernel 2.0	Operating system

UCT 6LoWPAN development kit

This integrated development kit is used for developing IoT (Internet of Things) application systems based on standards such as IEEE 802.15.4 and 6LoWPAN.

It comes with a 6LoWPAN border router for mutual connection between LAN (IPv6) and wireless PAN (6LoWPAN), in addition to wireless nodes based on 920MHz specified low-power radio.

OS, libraries, and source of sample programs are included for developing application programs to connect sensors and I/O devices to wireless nodes, thus enabling you to start development quickly.

Wireless nodes connect to LAN via the border router, and cloud services can access individual wireless nodes using the individually assigned IP addresses.

Main features

● Seamless integration of Internet (IPv6) and wireless PAN
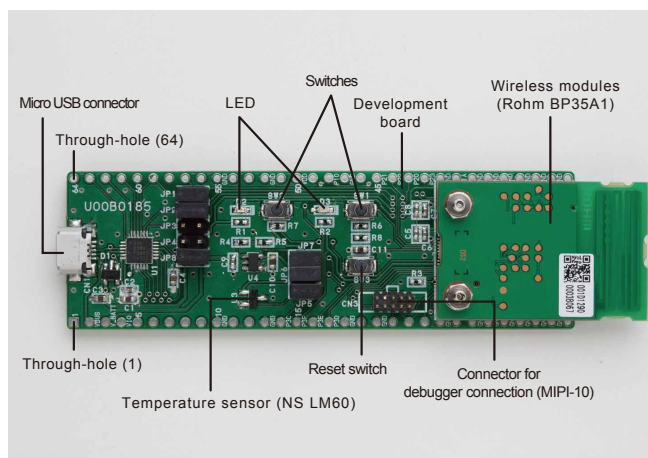
6LoWPAN border router

- Seamless mutual connection between LAN and wireless PAN
- Use relay function to access wireless nodes from your PC and smartphone in the same way as to access other IPv6 nodes without use of any special device driver.
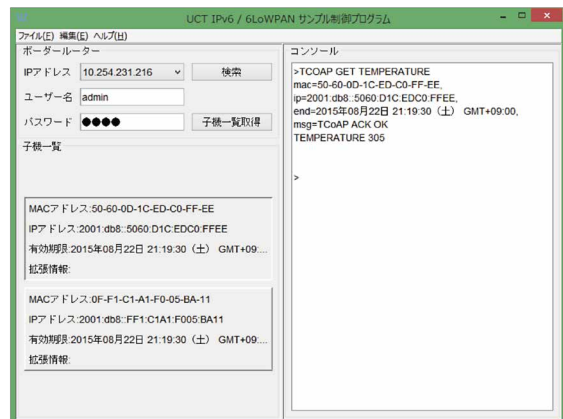
Configuration using a browser

- Wireless PAN and routing functions can be set up from a web browser.

Development board for easy connection to sensors, etc.

- Signals from wireless modules are available via the development board's through-hole, enabling easy connection to sensors, etc.

● All-in-one integrated package

This is an integrated package of software and hardware necessary for IoT application development.

Development kit content

- 6LoWPAN border router x 1
- Wireless modules hardware and development board x 4
- Software development environment
  - UCT µT-Kernel 2.0
  - Device drivers
  - 6LoWPAN protocol stack
  - Device control sample program
  - Integrated development environment (EWARM) project configuration file
- 6LoWPAN packet sniffer

Layout of main parts of 6LoWPAN wireless node

Send command to a child device selected from child device list panel
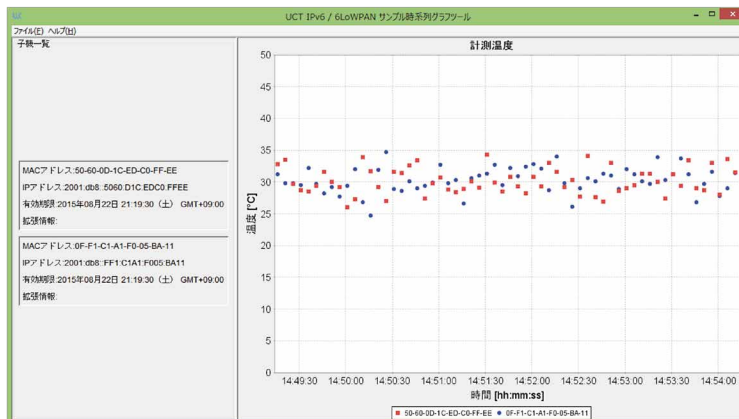
Create a graph from temperature data of wireless modules selected from child device list panel

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