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Press Release

YRP Ubiquitous Networking Laboratory

[Press Release]

**The YRP Ubiquitous Networking Laboratory
Successfully Develops a Multi-frequency, Multi-protocol
RFID Reader/writer**

YRP Ubiquitous Networking Laboratory (Shinagawa, Tokyo, Director: Ken Sakamura, Professor at the University of Tokyo), a research laboratory for ubiquitous computing, which has been conducting research and development towards the establishment of core technology for the automatic identification of “Physical objects” and “Locations” and the realization of ubiquitous computing environments, has successfully developed a multi-frequency, multi-protocol passive RFID reader/writer.

RFID tags have been attracting widespread attention as devices to store IDs used for the automatic identification of “Physical objects” and “Locations”. IDs stored on RFID tags can be obtained automatically from a distance using a reader/writer and they have been adopted in various application fields, such as supply chain management. RFID tags have different features depending on the used frequency band, and RFIDs with various types of protocols have been standardized and commercialized according to their purpose of use. Therefore, it had been an issue how these RFID tags could be automatically identified in a unified way in an environment where RFID tags that support various types of frequencies and protocols are used.

The multi-protocol reader/writer that has been successfully developed is an innovative reader/writer that can be used for RFID products that support all sorts of protocols just by changing the software. It uses the 13.56 MHz and 2.45GHz frequency bands, which are popular in Japan now and will also support the 950MHz frequency band that has recently been made available in Japan

Using only one multi-protocol reader/writer, users can read/write data without worrying about the differences in RFID frequencies and protocols. We implemented protocols in the following five types of tags certified by the Ubiquitous ID Center and verified that seamless

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identification was possible in environments where these different tags are used in combination.

This multi-protocol reader/writer has been designed on the assumption that it would be embedded into small portable terminals and therefore is especially suitable for miniaturization and decreases power consumption. Our laboratory has been working on the development of ASICs with this architecture implemented for portable terminals.

ucode tags supported by the multi-protocol reader/writer

1. eTRON/8 (YRP Ubiquitous Networking Laboratory, the University of Tokyo)
2. eTRON/16 (YRP Ubiquitous Networking Laboratory, the University of Tokyo)
3. MB89R116/MB89R118 (Fujitsu Limited)
4. μ chip (Hitachi, Ltd.)
5. μ chip RW (Hitachi ULSI Systems, Co., Ltd.)

[Features of the multi-protocol reader/writer]

- (1) Support all kinds of protocols just by changing the software

Since any protocol can be supported by software, it supports not only RFID protocols that are currently commercialized but also RFID protocols that will be available in the future.

- (2) Architecture suitable for miniaturization and low power consumption

This multi-protocol reader/writer has been designed to reconfigure parameterized hardware architecture. Most protocols are digitally processed, so the size of the external RF circuits can be minimized. Furthermore, unlike software wireless technology that supports protocols only through processing by CPUs, it does not require high-speed, sophisticated CPUs, and therefore it is suitable for miniaturization and decreases power consumption.

[Multi-protocol reader/writer test model]

It is composed of T-Engine and FPGA that implements this architecture. It supports five types of tags certified by the Ubiquitous ID Center listed below and is capable of accessing these tags seamlessly.

13.56MHz

eTRON/8 (YRP Ubiquitous Networking Laboratory, the University of Tokyo)

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eTRON/16 (YRP Ubiquitous Networking Laboratory, the University of Tokyo)
MB89R116/MB89R118 (Fujitsu Limited)

2.45GHz

μ chip (Hitachi, Ltd.)

μ chip RW (Hitachi ULSI Systems Co., Ltd.)



Photograph 1 Multi-protocol Reader/writer Test Model

(The research results of the “Research and Development of Infrastructure Network Protocols that Realize Ubiquitous Computing Environments” (2002 to 2006) supported by the National Institute of Information and Communications Technology (NiCT) are included in this achievement.)

[Inquires regarding this issue]

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