TOSHIBA REVIEW

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Special Reports

Bluetooth™ Creating New Activity Spaces with Wireless Networks

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Bluetooth™ Creating New Activity Spaces with Wireless Networks

*Bluetooth™, the New Global Standard for Wireless Networks

HIBI Kenji

*Technical Trends and Future Prospects for Bluetooth™

ITO Haruhiko TAKEBAYASHI Yoichi SUGAWARA Tsutomu OHISHI Minoru ISSHIKI Masao

Bluetooth™ is a new wireless communication system on which great expectations are focused as a tool for networking mobile and digital equipment. It can easily connect not only PCs but cellular phones as well, without the need for cables. Applications for Bluetooth™ will be realized in the mobile environment, in offices, in home networking, and also in social systems such as the field of mobile commerce.

As one of the nine companies promoting Bluetooth™, Toshiba is actively engaged in standardization activities and the development of product applications. This "Trend" section provides an outline of Bluetooth™ together with its specifications, and describes the application of and future prospects for this technology.

*Bluetooth™ PC Card and Bluetooth™ Wireless Modem Station

IWAI Isamu KAJI Koichi SAKO Ikuo

Toshiba has developed a Bluetooth™ PC card and Bluetooth™ wireless modem station as the first such Bluetooth™ devices in the world. When inserted in a PC card slot, the Bluetooth™ PC card enables communication with other Bluetooth™ devices up to a maximum distance of 100 meters. The Bluetooth™ wireless modem station, into which a Bluetooth™ PC card is inserted, is equipped with a modem device and allows a telephone line to be wirelessly connected to the Internet from anywhere in the home.

*Ad Hoc Network Platform (SPANworks™)

HORIGUCHI Takeo IWAMURA Kazuaki TAJIKA Yosuke

We have developed a software called SPANworks™2000 for mobile terminals of short-range wireless network systems such as Bluetooth™ and wireless LAN. SPANworks™2000 consists of wireless DAN (desk area network) technology that allows easy building of an ad hoc network, and a table conference assistance application. It can automatically recognize devices within communication range and connect a number of them together. It also supports the presentation functions of slide distribution and synchronization, as well as file transfer functions to multiple devices.

As the number of mobile terminals with Bluetooth™ and wireless LAN expands, ad hoc networks will continue to increase from now on. We expect SPANworks™ technology to be a core technology in these ad hoc networks.

*Bluetooth™ Data Projector

TAJIKA Yosuke YAMAMOTO Norihiro

Data projectors have recently become highly popular presentation tools in the conference room due to the creation of presentation materials with PC applications such as Microsoft® PowerPoint®. There is also strong demand for wireless connection of the data projector to the PC, since the use of a cable limits the position of the presenter.

To meet this demand, we have developed a Bluetooth™ data projector that allows wireless network connection to be easily achieved using Bluetooth™ and SPANworks™ technologies. This provides a new application system with an imaging device in which stored OHP data are delivered by radio, thereby greatly enhancing convenience to the user.

*Small Bluetooth™ Card Conforming with SD I/O Specification

FUJIMOTO Akihisa ITO Takafumi AOYAMA Hiroshi

A small-size Bluetooth™ card is necessary to enable wireless communications to be easily used with mobile phones and handheld devices such as personal digital assistants (PDAs). In response to this need, we have developed a small Bluetooth™ card that conforms with the SDI/O specification. The card is similar in shape to a secure digital (SD) card and can use the same slot.

This paper describes the new card, highlighting the following three essential points in its development: (1)definition of the SD I/O specification that Toshiba is promoting as a standard, (2)development of the controller, and (3) mounting in a thin and small space by flip chip technology.

*Bluetooth SIG Activities of Audio/Video WG and Development of Reference Model

TAKABATAKE Yoshiaki TOMODA Ichiro KUMAKI Yoshinari

The Audio/Video Working Group (A/V WG) in Bluetooth Special Interest Group (SIG) 2.0 is developing A/V applications for Bluetooth™. The activities of the A/V WG are roughly divided into (1)protocol development, (2)profile development, and (3)test specification development.

As one of the active members of the A/V WG, Toshiba is focusing on video distribution and videoconferencing based on MPEG4 technology, and audio distribution (which will be important for future mobile audio-players). We have already completed defining the outline of the protocols and profiles for these applications. Interoperability testing will become the main activity of the A/V WG from now on.

*Bluetooth™ Baseband LSI Model TC35651

AIKAWA Takeshi TAKAYANAGI Toshinari SUZUKI Kuniaki

There are high expectations on Bluetooth™ technology for the wireless connection of mobile devices. We have developed a Bluetooth™ baseband LSI, model TC35651, which is targeted at high connectivity, low power dissipation, low cost, and flexible application to various systems. The TC35651 has a BlueRF-compliant RF interface, PCM interface, and host interface for universal serial bus (USB), and universal asynchronous receiver transmitter (UART), etc. It also features architecture that realizes high functional flexibility and low power dissipation.

*Application of Wearable Computing Using BluetoothTM Technology

TAKEBAYASHI Yoichi KANAZAWA Hiroshi

Wearable computing will be an important next-generation computing environment. It is an attempt to expand the human memory and senses by the integration of wearable computing units. Peripherals play a central role in the wearable computing environment, and key technologies such as sensors, devices, wireless communication, speech processing, and interface agents are being developed for several applications. In particular, Bluetooth™ technology is effective for the development of such peripherals.

This paper describes the integration between Bluetooth™ technology and wearable computing technology.

*Bluetooth Qualification Program and Type Approval Program in Japan

SAKAI Itsuo HORIGUCHI Yoshinori

Bluetooth™ was announced by Promoter companies including Toshiba. It is a wireless standard operating on the ISM (industrial, scientific, and medical) band that is commonly assigned to 2.4 GHz throughout the world. The mobility of mobile devices has been dramatically advanced by means of this technology; for example, a connecting cable is not required when performing dial-up networking using a notebook PC and cellular phone.

Before being put on sale, every Bluetooth device must pass the Bluetooth Qualification Program, which was defined originally by the Bluetooth consortium, and receive type approval from the government.

Feature Articles

*Download System for BS Tuner Software Using Broadcast Satellite

NAGAI Kozo MURATA Masafumi IINUMA Susumu

We have developed a satellite download system for broadcast satellite (BS) digital tuners. The notification information (software download trigger table:SDTT) for downloading flows to a BS digital tuner via the satellite together with the electronic program guide (EPG) information. The download software is delivered in the stream of BS-Japan. The tuner updates its software to the new one delivered.

*Enhancement of Hot-Electron Generation Rate in Schottky MOSFETs

UCHIDA Ken MATSUZAWA Kazuya KOGA Junji

Schottky metal-oxide-semiconductor field-effect transistors (Schottky MOSFETs), which have a metal silicide source/drain in place of the n+ diffused source/drain, have attracted considerable attention as future decanano-scale high-speed MOSFETs because of their low parasitic resistance and capacitance and their immunity to short channel effects. We confirmed that in Schottky MOSFETs, hot electrons are generated at the Schottky source side. This fact indicates that Schottky MOSFETs hold promise as decanano-scale high-speed devices.

*New 240/300 kV Gas-Insulated Switchgear

KOSAKADA Masayuki SATO Hiroshi AKIYAMA Kotaro

Toshiba has launched a new 240/300 kV gas-insulated switchgear (GIS) whose installation area is reduced to 40%. Size reduction of each component was achieved with new technologies such as an improved hybrid-puffer interruption method and an all-in-one type hydraulic operating mechanism for the gas circuit-breakers, and the use of 3-D electric field analysis and computer-aided design for the disconnecting switches, earthing switches, and bus bars.

In addition to the size reduction of each component, Toshiba's long experience in the manufacturing and operation of GIS was utilized in the development process, with full consideration given to installation, maintenance, and operation. This new 240/300 kV GIS is state-of-the-art equipment reflecting the highly evolved level of technology in this field.

*Automatic Washing Machine with Automatic Detergent Controller

WADA Masatsugu TERANISHI Masahiro

Even when using so-called fully automatic washing machines, users have had to dispense detergent manually. Users estimated the amount of detergent according to the washing machine display, which was related to the water level. However, since the amount of detergent required for effective washing changes with the amount of dirt and the water temperature, using too little detergent can cause poor washing, while using too much means waste.

We have developed an automatic washing machine that automatically controls the amount of detergent, thus solving the problems cited above. This washing machine can calculate the optimum amount of detergent to dispense based upon the clothes and the degree of soiling. The controller dispenses detergent into the tub automatically. We have achieved highly effective washing capabilities while also conserving detergent.

Techno Notes

*Meeting the Challenge of Medical Solutions

Toshiba Technologies for the New Century

*1.Speaker-independent Continuous Speech Recognititon

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