

TOSHIBA REVIEW

2007. VOL.62 NO.8

Special Reports

Evolving Mobile Notebook PCs

Vision of Mobile Notebook PCs for Ubiquitous Computing

TAKETANI Mitsuhiro

Trends in Mobile Notebook PCs

SHIRAGA Akitoshi

The global notebook PC market is a growth market, as evidenced by research data showing that its pace of expansion is higher than that of the overall PC market.

Toshiba has been making efforts to realize mobile PCs that can be used anytime and anywhere, which we refer to as "True Mobile PC". These efforts include the development of leading-edge technologies such as thin and light technologies for easy carrying, power-saving technologies for long battery life, and wireless communication technologies.

One of the fruits of these technologies is the PORTEGE R400 tablet PC, which is a "True Mobile PC". The R400 is popular among property insurance companies and medical institutions due to its easy control by pen. The tablet PC is expected to become a key product in the business PC market from now on.

Road to True Mobile PC

KASUYA Hideo

The mobile notebook PC market is continuously growing. Mobility and space saving in conjunction with the improvement of PC fundamentals and the adoption of wireless infrastructure are supporting this growth. Some issues still remain, however, such as connectivity on the road or the lengthy time required to make a mobile notebook PC usable.

Toshiba has developed the PORTEGE R400 tablet PC to meet the demand of customers for "True Mobile PC". It is equipped with two new functions to enhance usability and convenience. One is Toshiba Active Notifications, which synchronizes and notifies the user of e-mails and calendar events without the need for user interaction, and the other is a Wireless UWB Port Replicator that utilizes ultra-wideband (UWB) technology.

Technologies for Thin and Lightweight Mobile Notebook PCs

SHIMAMOTO Hajime/TAKEGUCHI Koichiro

The realization of a thin profile and lightweight are eternal challenges in the design of mobile notebook PCs. These aims are not easy to accomplish, however, as they conflict with the increasing size and number of components installed in PCs corresponding to demands for better performance and widening diversification of users' needs.

To meet these demands while also materializing thin profile, lightweight mobile notebook PCs, Toshiba has developed a new type of highly reliable tablet PC featuring the most advanced units and a robust design.

PORTEGE R400 with Toshiba Active Notifications Direct Push E-mail Notification System

TAJIMA Takeshi/HOMMA Toru

Toshiba and Microsoft have developed Active Notifications, enabling mobile notebook PC users to check the latest e-mails and calendar even while the PC is in sleep mode. Toshiba Active Notifications is built on Windows SideShow™ technology

available in Windows Vista™ to take advantage of the latest mobile trend. With mobile data communications becoming faster and lower in cost, the mainstream third-generation (3G) mobile phones using code division multiple access 2000 1x evolution data only (CDMA2000 1x EV-DO) and high-speed downlink packet access (HSDPA) technologies have a data throughput exceeding 1 Mbps. Toshiba Active Notifications is designed for use with PCs equipped with an integrated 3G modem to communicate with the mail server via Connected to Microsoft Exchange technology and then to notify the user of messages and appointments on a secondary display.

PC-Embedded Ultra-Wideband Module and Wireless UWB Port Replicator

KAJI Koichi/TAKASU Nobuaki/ANWAR Sathat

Toshiba has developed an innovative PC-embedded ultra-wideband (UWB) module and a Wireless UWB Port Replicator to add new value to next-generation mobile notebook PCs.

UWB radio technology uses radio frequency bands of 3.1GHz and above with a physical link communication speed of up to 1 Gbps in a personal area network range, allowing universal serial bus (USB) data and digital video interface (DVI) data to be transmitted at high speed over the air.

The Wireless UWB Port Replicator has one DVI port, four USB ports, one local area network (LAN) port, and one audio output port, offering comparable devices to those of conventional mechanical port replicators. It also has an attractive automatic connect and disconnect feature providing ease of operation.

The user can simply bring a notebook PC equipped with this UWB module into the communication area of the Wireless UWB Port Replicator to connect the PC to the replicator. UWB connection allows loose settings within the range of UWB radio.

Stylish and Rugged Design for Mobile notebook PCs

SHIMANO Kenji/NAKAJIMA Yuji

Mobile notebook PCs have become an indispensable tool for businesspeople around the world. Developments in the telecommunications infrastructure have facilitated their ubiquitous connection to World Wide Web servers and boosted their popularity, as they are now used not only in offices but also at railroad stations, airports, and even coffee shops. As a result, the ways in which mobile notebook PCs are utilized have become diversified and are characterized by the jobs and lifestyles of users, extending the envelope of conventional usage.

With the aim of conceptualizing the next generation of mobile notebook PCs, Toshiba has launched the PORTEGE R400 model embodying an entirely new style that breaks through the standard concept of business notebook PCs. The innovative design and chassis technologies applied to the PORTEGE R400 are expected to raise user expectations and inspire ways of using PCs with greater freedom.

Feature Articles

Software and Hardware Technologies for High-Quality Moving Images on LCD TVs

ITOH Goh/MISHIMA Nao/OHWAKI Kazuyasu

The picture quality of liquid crystal display (LCD) TVs greatly depends on motion sharpness. Previously, the overdriving method was an effective means of improving motion sharpness when the response of liquid crystals was not so fast. Currently, however, the response time of liquid crystals has become so fast that it is shorter than a single frame period (16.7ms), so that a motion blur attributable to the characteristics of human vision is produced in the hold-type display method where a picture is held still during the frame period.

Two methods are known to reduce motion blur: the impulse driving method and the double-rate driving method. For the former method, Toshiba has developed a display time control system for black frame insertion whose exact time is given by the characteristics of the input picture. For the latter method, we have developed a technique for high-quality interpolation between two successive frames displayed at a refresh rate of 120Hz. By applying these two driving methods, we have successfully accomplished high-quality moving images on LCD TVs.

Semiautomatic Production Planning System for Semiconductors

NARIMATSU Katsumi/INOUE Kenichiro/SHIRASU Yoshinori

Toshiba has developed a semiautomatic production planning system for 200 mm wafer fabrication at its Oita Operations facility. As the dominant products of this fabrication line are system large-scale integrated circuits (system LSIs), which usually require a longer production lead time than the customer's order lead time, the general "demand-pulled" type planning system is not useful and human coordination is essential for the preparation of production commencement plans. In addition, the personnel in charge of production planning are also skilled in increasing production efficiency, which is not offered by the general demand-pulled type planning system.

The semiautomatic production planning system was developed to assist these planning personnel. It has successfully reduced planning operation times by half and also significantly reduced planning workloads while maintaining the equivalent quality.

PORTEGE G500/G900 Windows Mobile® Phones

NISHIYAMA Kaoru/NODA Motoji

Toshiba has developed a new third-generation (3G) smartphone and personal digital assistant (PDA) type phone that handle four bands: W-CDMA (2100MHz) and GSM/GPRS/EDGE (900/1,800/1,900MHz). The PORTEGE G500 and G900 models use Microsoft Windows MobileR as their operating system, permitting easy cooperation between the handsets and a PC.

Document, image, and music data on the PC can be transferred to the handsets, and played and edited on the handsets as well. The G500 and G900 models have a 2 megapixel camera, fingerprint sensor, universal serial bus (USB) client and host function, miniSD memory card, BluetoothR capability, wireless LAN, and many other functions. Furthermore, the G900 has a 3-inch Wide VGA (480 x 800 dots) liquid crystal display (LCD), providing a large, high-resolution screen suitable for Internet and document browsing.

Controlled Switching System for Circuit Breakers Using Digital Control and Network Computing Technologies

SAITO Minoru/MAEHARA Hiroyuki/KOSAKADA Masayuki

Toshiba delivered Japan's first controlled switching system for 275kV systems in 1989. Since then, we have acquired abundant experience in switching control technologies. We have now developed a new switching controller for the new generation of systems, using the latest digital control and network computing technologies. This controller attains both high accuracy and high reliability in controlled switching, while also offering instant operation and easy maintenance with its user-friendly web browser interface.

The results of both synchronized opening and closing control tests confirmed the good performance of this switching controller.

TOPEMS™ Optimal Operation System for Energy Saving in Manufacturing Plants

YAMADA Toshihiro/KAMITO Akinori/TSUKAHARA Hideki

Toshiba has developed an innovative operation system for manufacturing plants called TOPEMS™, which determines the optimal mode of operation to achieve cost reductions and energy savings in energy supply equipment such as boilers, refrigerators, and in-house power generators. TOPEMS™ automatically ensures that such equipment is in the optimal running condition at all times.

This system is designed to forecast the energy demand for supplying electricity, steam, chilled water, and hot water in the plant, and to create the optimal running schedule for individual energy-supply equipment. When applied, the system realizes energy savings of about 1% to 5%. Moreover, since the system automatically manages the running control of energy-supply equipment, it also achieves significant savings in labor because fewer operators are required.

Development of High-Efficiency Photovoltaic Inverter for Residential Use

SHINOHARA Hirofumi/MAKISHIMA Kenji/MOCHIKAWA Hiroshi

Residential photovoltaic power generation systems are now becoming established as power sources for low-voltage electric power facilities. Engineers are making additional efforts to reduce the cost and improve the efficiency of such systems.

Toshiba has developed an advanced photovoltaic inverter that has a conversion efficiency of 97%.

Hybrid Inverter System for Railway Substations

MIYAJIMA Hiroki/ITO Fusao

Electric power has recently been more effectively utilized by applying inverter equipment, which converts DC power to AC power, to electricity substations for DC traction service where rectifier equipment is installed.

Toshiba has utilized insulated gate bipolar transistors (IGBTs) to develop a hybrid inverter system that reduces the harmonics current and improves the power factor compared with conventional regeneration inverters. The first hybrid inverter system using IGBTs was delivered to the Tenjingawa Substation of the Kyoto Municipal Transportation Bureau. This system realizes an environmentally harmonious substation by utilizing equipment that takes reduction of the environmental load into consideration.

Large-Scale 3D Ultrasonic Inspection System

ARAI Ryoichi/YAMANE Noriyuki/SOBE Hideo/HAMAJIMA Takayuki

The use of carbon fiber reinforced plastics (CFRPs) in aircraft, rocket, and automotive parts has recently been a focus of attention because of their light weight, high strength, high durability, and excellent fatigue performance. However, an effective nondestructive inspection system for large and three-dimensionally curved CFRP parts has not yet been fully developed, although single type and phased-array type mechanical scanning ultrasonic probes have been studied.

Toshiba has developed a new type of large-scale 3D ultrasonic inspection system based on our proprietary 3D ultrasonic inspection technologies combined with machine and tool control technologies as well as image-processing and analysis technologies. This system can instantly execute the inspection of large CFRP parts having complex shapes.

Frontiers of Research & Development

Software Optimization Technologies for Multicore Processors