

Special Reports

Digital Product Technologies Fostered by 25 Years of Notebook PC History

Internet-Driven Evolution of Digital Devices and Progress of PCs

SHIMOTSUJI Shigeyoshi

History of Toshiba Notebook PCs and Global PC Market from 1985 to 2010

SHIRAGA Akitoshi

Twenty-five years have passed since Toshiba launched the T1100 laptop PC, the world's first commercial laptop PC, in Europe in 1985. Since then, the global market for portable PCs has grown to an annual output of about 200 million units in 2010, and is expected to continue expanding in the future.

As a pioneering company in the field of portable PCs, we have significantly contributed to the development of the portable PC market by making continuous efforts to launch various groundbreaking products. We are now aiming to drive the global portable PC market by introducing portable PCs that anyone can use anytime, anywhere in the world.

Technologies for Thin and Lightweight Mobile Notebook PCs Supporting dynabook_{TM} RX3

TSUJI Hiroyuki / NISHIYAMA Shigeki

Toshiba has been promoting thin profiles and light weight in the design of mobile notebook PCs since it launched the world's first commercial laptop PC. However, restrictions such as the mounting area of printed circuit boards (PCBs), height of parts, shape of units, and so on place limits on the realization of thinner products. Furthermore, the trend toward both increased power consumption of central processing units (CPUs) and additional parts in response to the market demand for high performance and functionality in recent years makes it difficult to achieve the downsizing of notebook PCs.

With this as a background, we have developed the dynabook RX3 slim and powerful mobile notebook PC. This model achieves a thin profile and light weight as well as high performance and functionality.

libretto_{TM} W100 Dual Touch-Screen Mini-Notebook PC with New User Interfaces

TAKAHASHI Toshio / HONDA Yoshinori / WATANABE Gen

Toshiba has developed the libretto W100, the world's first dual touch-screen Windows[®] mini-notebook PC, as one of its 25th anniversary PC models. The libretto W100 is a compact clamshell type device equipped with dual 7.0-inch, 1,024 x 600-pixel liquid crystal displays (LCDs) that offer a display equivalent to a 9.3-inch, 1,024 x 1,200-pixel LCD. The dual touch-screen LCDs and newly developed display control technologies make it possible to utilize the libretto W100 either as a notebook PC by using the display as a haptic keyboard, or as an e-book reader that displays a double-page spread when held vertically. This model also has a light weight of approximately 699 g, achieved by applying our proprietary high-density packaging technologies.

dynabook_{TM} AZ Cloudbook PC Achieving Mobility of Smartphone and Usability of Notebook PC

ANDO Motoaki / YANO Keijiro / WATANABE Hiroyuki

Toshiba has developed the dynabook AZ, one of its 25th anniversary PC models, belonging to the new "cloudbook" category that offers users a new laptop experience in the cloud computing era. The dynabook AZ is a clamshell type device featuring the NVIDIA[®] TegraTM 250 processor, a 10.1-inch wide liquid crystal display (LCD), and a nearly full-size keyboard on the

AndroidTM 2.1 platform. This model provides quick responsiveness and long battery life similar to the performance of a smartphone, together with high operability similar to that of a notebook PC, allowing users to easily read and write e-mails and to comfortably browse the Internet. Furthermore, to increase the usability of this device, several shortcut keys and a unique user interface called the Toshiba Home Menu facilitate easy access to and navigation of applications.

dynabook_{TM} Qosmio_{TM} DX All-in-One AV PC

TAKAKUSAKI Masahiko / IWATA Takeshi / MOMOSAKI Kohei

All-in-one PCs integrating a liquid crystal display (LCD), CPU and logic boards, and peripheral equipment are spreading into the mainstream of desktop PCs for home use in the Japanese market, and demand has been growing in recent years for the addition of functions for the reception and recording of digital terrestrial TV programs.

Toshiba has developed the dynabook Qosmio DX all-in-one audiovisual (AV) PC utilizing the full spectrum of both hardware and software technologies of the Qosmio series notebook PCs. With a stylish appearance inherited from the REGZA_{TM} series digital high-definition (HD) TVs, the dynabook Qosmio DX offers high-quality sound and HD images as well as a wide array of AV functions.

dynabook_{TM} TX/98MBL Stereoscopic 3D Notebook PC

SONOBE Hajime

With the widespread dissemination of stereoscopic 3D technology in recent years, a broad assortment of stereoscopic 3D devices have come into use in various situations accompanying efforts toward the standardization of 3D video contents. Demand has been growing for the playing of Blu-ray 3D titles and 3D game contents even on notebook PCs.

Toshiba has developed the dynabook TX/98MBL stereoscopic 3D notebook PC equipped with the NVIDIA[®] GeForce[®]

GTS350M high-performance graphics processing unit and the NVIDIA[®] 3D VisionTM platform, giving this model the capability to play Blu-ray 3D titles with high-quality images and many existing games as stereoscopic 3D games.

Feature Articles

Illumination-Adaptive Display Control Technology for Wide Range of Illumination Conditions

KOBIKI Hisashi / BABA Masahiro / MORIMOTO Masami

With the wide dissemination of mobile devices in recent years, mobile devices equipped with a liquid crystal display (LCD) have come into widespread use under various illumination conditions. However, conventional LCDs suffer from a degradation of visibility with increasing brightness, particularly in bright outdoor light.

As a solution to this problem, Toshiba has developed an illumination-adaptive display control technology to improve image visibility according to the surrounding lighting conditions. This technology provides backlight luminance control and contrast compensation of LCDs employing both a human vision model based on the responses of rod and cone cells, which mainly work in dark and bright conditions, respectively, and an LCD device properties model. As a result, the visibility of LCDs is significantly improved under a wide range of illumination conditions, allowing comfortable viewing in environments ranging from a dark living room to bright outdoor locations.

Technology for Manufacturing Integral Imaging Autostereoscopic 3D LCDs

MIYAZAKI Kentaro / MORITA Takeshi / NARIYA Mototsugu

Toshiba has developed a method for adhering lens units to liquid crystal display (LCD) modules for integral imaging autostereoscopic three-dimensional LCDs (II 3D-LCDs) with high accuracy. We have incorporated manufacturing equipment applying this technology into our mass-production line for 12.1-inch II 3D-LCDs.

To maintain the optical properties of the 3D-LCDs, alignment of the lens unit and the LCD module with an accuracy of a few micrometers is achieved by utilizing the characteristic features of the lens unit. We have also developed a decompression sealing technology to reduce spatial variability.

Bonding Inspection Technology for Liquid Crystal Displays

MIYAUCHI Takashi / SUZUKI Tomoo / SENOO Katsumi

In the bonding process during the manufacturing of liquid crystal displays (LCDs), several thousand electrically conductive particles are sandwiched between the electrodes of the driver ICs and the electrodes on the glass substrate for electrical bonding. As the electrically conductive particles cause localized deformations on the glass substrate when they are correctly positioned, incomplete electrical bonding of the LCD can be detected if such deformations are absent or insufficient in number. Toshiba has developed an automatic bonding inspection technology that can measure warps using an image-processing technique. Inspection equipment incorporating this technology has already been introduced to our manufacturing facilities, where it is contributing to improved efficiency of inspection and stable production of LCDs.

VX700 Series Super-Narrow-Bezel Internet-Capable LCD TV with LED Backlighting

HATANAKA Shinichi / KIDA Shota / MORITANI Mitsuaki

In the North American market for liquid crystal display (LCD) TVs with light-emitting diode (LED) backlighting, the chassis design must meet the requirements for slim models of less than 1.1 inches in depth, featuring a narrow bezel and fully flush design with a flat front face. Moreover, links to the Internet video streaming services of leading content service providers (CSPs) such as NetflixTM and Yahoo![®] TV Widgets are required as a functional feature.

To fulfill these requirements in the North American market, Toshiba has developed the VX700 series super-narrow-bezel Internet-capable LCD TV with LED backlighting as a new addition to the REGZA_{TM} lineup, which offers a wide variety of Internet capabilities.

EG-5000 Automatic Ticket Gate with High Reliability and Scalability

MORITA Hidenori / SUZUKI Takao

As a consequence of the wide dissemination of integrated circuit (IC) cards over the past decade, railway ticketing systems have become more convenient for passengers with the improvement of automatic ticket gates at train stations. For example, if holders of commuter passes travel to a station beyond the designated station, they can now pass through the station's automatic ticket gate simply by using one IC ticket instead of the previously required commuter pass plus stored fare (SF) card. Furthermore, the mutually available area among multiple railways has been expanding, and upgraded functions such as automatic charging have been steadily incorporated into such systems.

With this as a background, Toshiba has developed the new EG-5000 automatic ticket gate. The EG-5000 possesses the flexibility to handle functional upgrades of IC tickets and offers improvements in basic performance compared with conventional automatic ticket gates, including shorter startup time, lower power consumption, and enhanced user interfaces.

Frontiers of Research & Development

Fabrication of Ridge-and-Groove Servo Patterns Consisting of Self-Assembled Dots for High-Density Bit-Patterned Media Lithography Technology Driving Semiconductor Miniaturization--Super-Precision Focusing Metrology