

Special Reports

Technologies to Support High Quality Notebook PCs

Importance of Quality in Designing Highly Dependable Notebook PCs

TAKETANI Mitsuhiro

Trends in Notebook PCs for Business

KUNII Shimpei

Recent years have seen notebook PCs growing almost daily in basic capabilities, including processor performance, amount of memory and HDD capacity. Their use continues to expand into a variety of new fields. The role played by notebook PCs gains in importance with every passing year. With this trend, the demands of business customers have shifted from "higher performance and larger capacity" to more durable and more stable running" machines.

To meet these demands, Toshiba emphasizes measures to improve productivity and to reduce TCO (Total Cost of Ownership). The result is high-quality, high-reliability PCs that incorporate Toshiba's leak-proof technology, plus toughness that is designed into the system.

"Design to Quality" and "Design for Manufacturing" for Toshiba Notebook PC

YAMAKI Kazunori / ANDO Motoaki / IWAKI Tsutomu

With our prime consideration the customer's time, convenience, peace of mind and safety, Toshiba is constantly improving the quality of our PCs on the basis of our policy of "Design to Quality". Furthermore, we maximize the benefits of carrying out both our design and our manufacturing work on our own premises by applying the advantages of our "Design for Manufacturing" policy. Through close attention to detail in design, by choice of superior manufacturing equipment, and using the ingenuity of our design staff, we are able to offer our customers PCs of high quality and reliability.

Incorporating Quality and Productivity Design Measures into Notebook PC Chassis Production

NAKAJIMA Yuji

Toshiba's newly developed top-quality, highly reliable notebook PC "dynabook Satellite K series" is designed specifically for business use. From the earliest planning and rough drawing stages, every factor was examined to reduce the in-use failure rate, including size of the base, parts arrangement and printed circuit board (PCB) layout.

Every possible innovation was brought forward in designing the structure, parts fastening methods, hinges, chassis material, chassis wall thickness, leak-proof parts, painting and ease of assembly. Consequently, Toshiba has reduced the number of PCBs and screws, while extending the length of service life. The result is a more durable, yet easily assembled PC.

PCB Mounting Design Technology Supporting High Quality PCs

HAPPOYA Akihiko / KONNO Toshikazu

The printed circuit boards (PCBs) play a vital role in the quality of a notebook PC. It is essential to make improvements in the quality of PCBs used in the manufacture of higher-quality PCs. Various electronic components, such as the CPU, a set of chips and memory modules, are mounted on the PCBs, making them the core of a notebook PC.

In order to produce high-quality notebook PCs, Toshiba takes a proactive stance on the improvement of manufacturing quality and of mechanical reliability, in addition to that of the electrical quality of PCBs.

Application of Highly Accelerated Life Test (HALT) to Toshiba's Notebook PC Development

KAJI Kenji / SOMEYA Kiichiro

Toshiba has installed the HALT system in the PC development process, expecting improvement of quality and reliability of the product, as well as curtailment of the development period.

HALT exposes product samples to extremely harsh conditions—high/low-temperature and rapid heating/cooling in combination with vibrations—to disclose latent weaknesses of the product in a short time. HALT highlights necessary corrective actions in product design, and consequently, it helps to increase product reliability. Toshiba pursues excellent quality in notebook PCs with the HALT system.

Leading the World in High-Quality PC Production

MURAKAMI Hiroshi / TATEYAMA Kazuki

With the wide dissemination of notebook PCs both in homes and in business and government establishments, the importance of PC quality has grown substantially. Good quality is an attribute that becomes part of a PC in the earlier stages of planning, development and design. In the later stages—during parts procurement, assembly and shipping—a number of activities aimed at improving quality are performed to minimize quality deterioration due to human error so as to ensure that poor-quality products do not find their way onto the market.

Toshiba Information Equipments, Hangzhou Co., Ltd., in Zhejiang, China, has been able to create remarkably high-quality notebook PCs through the development of a large number of improvement activities.

Quality and Service Information Management System

IWAI Hitoshi

To ensure the continued quality of our notebook PCs, we have a substantial need to acquire and analyze information on problems in the field and to share the recognition of the situation regarding quality in the related sections. For quality issues related to components that are to be integrated into the PCs, quick acquisition of identification information on these components is required in order that the scope and degree of the problem can be evaluated.

To meet this requirement, Toshiba has developed a management system where manufacturing data and repair data can be retrieved in an interrelated manner. The system is designed to perform a daily collection of data on quality and, in the event of failure or abnormality, to promptly distribute them to the appropriate section—quality or engineering.

Feature Articles

Chinese-to-Japanese / Japanese-to-Chinese Machine Translation System

IZUHA Tatsuya / KUMANO Akira

Toshiba has developed a Chinese-to-Japanese / Japanese-to-Chinese machine translation system to facilitate the collection and distribution of information by Japanese businessmen in China.

The system incorporates key components of the well-established translation engine used in the English-to-Japanese / Japanese-to-English machine translation system, which is providing efficient, high quality translations. In addition, we have developed technology for statistics-based parsing and detachable verb analysis specifically for the Chinese language.

The system is now in trial service on the Internet to fine-tune its performance through real use by real users.

Full-text Search Engine for XML Database

MIYAZAWA Takayuki / KOKUBU Tomoharu / KANAWA Takuya

Toshiba is carrying out research and development for new full-text retrieval software for XML database. The database stores large volumes of XML documents without modification, and the search engine works in it at high speed. An advanced full-text search engine is essential because XML data is becoming more and more common, and these circumstances compel us to develop full-text retrieval technology for its database. The functions of the search engine were extended to include synonym retrieval and a new scoring method for structured documents. Moreover, we have introduced a morphological index in addition to an N-gram index in order to reduce the index size for full-text retrieval.

Technology for Long Term Prediction of Water Volume Inflow to Sewerage Facilities Using Information from Fine Grid Weather Simulations

HIRATA Yosuke / ONO Yoichi / WADA Masakazu

Sewerage facilities have an important role in the prevention of urban flooding and the reduction of effluent loads on rivers.

Toshiba has been developing and providing a variety of advanced control technologies to support efficient sewerage operations that are based upon a number of its core technologies. These core technologies include instrument and control engineering, as well as simulation, prediction and optimization engineering.

Recently Toshiba has developed a technology for long term prediction of water volume flowing into sewerage facilities, drawing on information derived from fine grid weather simulations.

X-Band 50-W Class GaN Power HEMT

TAKAGI Kazutaka / KASHIWABARA Yasushi / MATSUSHITA Keiichi

Toshiba has developed an X-band gallium nitride (GaN) HEMT of over 50 W. This was achieved by the optimum use of our GaN technology bases in the C-band, our expertise in semiconductor process technology, our in-depth knowledge of thermal design and internal matching. This paper reports a peak output power of 81 W at 9.5 GHz. This HEMT was used in the X-band, a frequency range used for radar and satellite communications. We are also developing a Ku-band GaN HEMT that will draw on the technology featured in the X-band GaN HEMT.

Photocurable Inkjet Ink for Printing on Metallic Substrates

ISHIBASHI Mitsuru / USHIROGOCHI Tohru / TANUMA Chiaki

The market for industrial-use inkjet printing has recently shown rapid growth with the trend toward on-demand printing. In particular, rapidly photocurable inkjet inks have been attracting attention due to their printability on nonabsorbent substrates such as plastic films. However, their adhesiveness has not been sufficient for metal or glass substrates.

Toshiba and Toshiba TEC Corporation have employed a novel monomer and a cationic polymerization system to improve the adhesiveness of photocurable inks. The newly developed inkjet color inks are printable on metal, glass, and plastic substrates, and are expected to be used in the manufacturing of printable electronics.

Infrastructure for Solutions Using Radio Frequency Identification Technology

ONO Kenji / HAMADA Hiroyuki / NAEMURA Kenjiro

Radio frequency identification (RFID) technology is finding wider applications in a variety of solution systems as a result of steady reductions in both size and cost. While many enterprises currently apply RFID technology independently in their own systems, the future will see multiple enterprises applying the technology to common solution systems by sharing tags and tag-associated data. This is expected to create new business opportunities and enlarge the technology's range of applications.

Toshiba Solutions Corporation is developing an RFID infrastructure that will facilitate the integration of RFID technology into solution systems. We have built a prototype lump-sum checking system and test run it. Test results confirm that the checking of data and product information by RFID infrastructure is viable.

Frontiers of Research & Development

Hydrogen Production from Ethanol through Equilibrium-shifting Technology