

Technologies Realizing eco style™ Home Appliances

Challenging New Technologies to Create Eco-Friendly Home Appliances for Comfortable Lifestyles

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Home Appliance Technologies Aiming at Comfort Balanced with Eco-Friendly Life

UEDA Katsutoshi

Home appliances are produced to provide users with a more convenient and richer life, and have continued to increase people's comfort as their basic performance has improved.

Toshiba is promoting the development of home appliances that are well balanced in terms of both Earth consciousness and comfort, based on our eco style™ concept. We are engaged in product and technology development aimed at further enhancing eco-friendliness and comfort through eco style™ home appliances.

VEGETA Series Refrigerators for Enhancement of Comfort and Energy Saving

NOGUCHI Yoshifumi / KOJIMA Kenji / NOGUCHI Akihiro

In October 2010, Toshiba Home Appliances Corporation began launching the VEGETA series refrigerators aimed at offering users more comfortable lifestyles as well as energy saving based on our eco style™ concept.

To enhance freshness preservation and sterilization ability, the VEGETA series refrigerators are equipped with the maintenance-free Picoion™ unit using an automated pico-ion water supply that eliminates the need for water refilling, and a newly developed discharge pin that can discharge three times the volume of pico-ions. The VEGETA series also feature a twin-cooling system, which independently controls isolated evaporators for the refrigerator zone and freezing zone, in addition to optimal control of the refrigerant flow rate, and a mechanical compartment that has been redesigned to expand the surface area of the high-performance vacuum-insulated panel as well as to reduce heat leakage. As a result of these technologies, the VEGETA series models achieve a reduction in power consumption of approximately 15% compared with conventional models released in 2009.

ZABOON TW-Z9100/Z8100 Drum-Type Washer-Dryers Achieving Shorter Washing Time and Energy Saving

HISANO Koji / NISHIMURA Yoshimi / IZAWA Hirokazu

A washer-dryer is high on the list of home appliances that women want to buy. With the increase in the ranks of working women, there is a strong need for improvements in the performance and functionality of washer-dryers, particularly shortening of the washing time, as well as enhanced washing capability, energy and water saving, and cleanliness.

To meet these requirements, Toshiba Home Appliances Corporation has been making technical innovations to washer-dryers based on the concept of enabling users to enjoy a comfortable life and creating environmentally conscious products. We have now released the "ZABOON" TW-Z9100/Z8100 drum-type washer-dryers equipped with both a new engine offering high-pressure double-shower operation and a centrifugal washer controlled by an active control system, and an enhanced heat-pump dehumidification drying engine. As a result of these technologies, the ZABOON TW-Z9100/ Z8100 achieve the fastest washing time of 35 minutes and the lowest overall power consumption of 730 Wh in the Japanese market for washer-dryers in this class.

DAISEIKAI™ JDR Series Room Air Conditioners Achieving Energy-Saving and Comfortable, Clean Environment

ODASHIMA Madoka / SENDO Kaname

The performance of air conditioners for home use is increasingly focused on low-load operation due to the changes that have taken place in Japanese dwellings, from well-ventilated houses to draft-free houses, and more recently to next-generation energy-efficient houses. Energy conservation in low-load operation as well as high-load operation is becoming essential for the reduction of carbon dioxide (CO₂) emissions. There is also growing demand for air conditioners that can provide a more comfortable and cleaner environment.

Toshiba Home Appliances Corporation has developed the DAISEIKAI™ JDR series air conditioners for home use equipped with light search sensors, a dual compressor, and the Picoion™ ionic air purifier system, based on the concept of providing energy conservation as well as a comfortable and clean indoor space. The sensor technologies incorporated in the DAISEIKAI™ JDR series realize automatic selection of optimal operation for a variety of indoor conditions, beyond the level achieved by conventional methods.

LED Base Light for Realization of Energy Saving and Comfortable Lighting Environment

WATANABE Hiroaki / NISHIMURA Kiyoshi / ITO Kenichi

The purpose of light-emitting diode (LED) luminaires has been shifting from partial lighting to general lighting applications due to the development of LEDs with high efficiency and high luminosity in recent years. LED luminaires are therefore replacing not only incandescent lamp luminaires but also fluorescent lamp luminaires.

Toshiba Lighting & Technology Corporation commercialized an LED base light that attained an energy saving of about 35% in comparison with fluorescent lamp luminaires and achieved the industry's best general efficiency of 84 lm/W in 2009. However, the cost was so high that it was not possible to recoup the initial investment, and the cutoff design to provide a comfortable lighting environment was not yet sufficient. To overcome these problems, we have been devoting continuous efforts to the realization of an LED base light with a general efficiency of 110 lm/W through the use of chip-on-board (COB) assembly technology and an improved cutoff design. We are now developing an LED base light that realizes both energy saving and a comfortable lighting environment.

ESTIA Carbon Dioxide Refrigerant Heat Pump Hot-Water Supply System for Residential Market

SATO Masaaki / MORIZONO Takahiro / YAGUCHI Masahiko

With the wide dissemination of carbon dioxide (CO₂) refrigerant heat pump hot-water supply systems in the residential market in recent years, these systems are becoming recognized as environmentally conscious products due to their excellent performance in producing several times as much heat as the electrical input. To further expand the diffusion of such hot-water supply systems, however, additional features other than basic functionality are required.

In response to the market demand, Toshiba Carrier Corporation has developed the new ESTIA series of CO₂ refrigerant heat pump hot-water supply systems for the residential market. The ESTIA series is equipped with a silver-ion generation system for the first time in the industry. Silver ions are eluted when filling the bathtub with hot water, to keep the bathwater clean and promote relaxed bathing. We have also developed a high-pressure hot-water supply system to provide a comfortable feeling while showering as well as faster filling of the bath with hot water.

FEATURE ARTICLES

Small-Area Analog-to-Digital Converter Offering Low Power Consumption and High Speed

FURUTA Masanori / NOZAWA Mai / ITAKURA Tetsuro

High-resolution successive-approximation-register (SAR) analog-to-digital converters (ADCs) with a charge-redistribution digital-to-analog converter (DAC) are widely used in low-power applications, including complementary metal-oxide semiconductor (CMOS) wireless communication receivers, sensor networks, and medical instrumentation. With the progress of CMOS nanofabrication technologies, demand has been increasing for miniaturization of the circuit area of SAR ADCs consisting of analog and mixed signal integrated circuits (ICs) to reduce costs.

Toshiba has developed a miniaturization technology that makes it possible to reduce the total circuit area by means of a pipelined architecture despite the use of large passive devices, and has fabricated a prototype 10-bit, 40 megasamples/s SAR ADC. This 10-bit SAR ADC realizes the world's smallest active area of 0.06 mm² and a low power consumption of 1.21 W, achieved by innovation of the circuit configuration.

Test Management System for Effective Software Development

KAWAMURA Toru / OGASAWARA Hideto

The increasing complexity and sophistication of software in recent years has given rise to a need for more effective software development. This is particularly true in the testing process, the final stage of software development. While the number of items to be tested has increased with the expansion of large-scale software systems, software development periods have been becoming shorter year by year. In this contradictory situation, it is necessary to comprehensively understand the quality of software undergoing testing through appropriate management of the testing process by monitoring the numbers, categories, schedule, and results of the tests.

To improve the efficiency of test management of software, Toshiba has developed a test management system incorporating several functions to both unify the management of test items and visualize warning points requiring attention.

BioBulwark™ Mobile-Type Biological Agent Detection System

OKADA Jun / HIROSAWA Daiji / NIKAIDO Masaru

To realize a safe and secure society, a strong need exists for the construction of risk management systems to protect against crimes and terrorism. Demand has therefore been increasing for the rapid development and deployment of biological agent (BA) detection technology as a countermeasure to the growing threat posed by global bioterrorism.

As a solution to this issue, Toshiba has developed the BioBulwark™ mobile-type BA detection system based on our proprietary technologies for electrochemical deoxyribonucleic acid (DNA) chips. BioBulwark™ can rapidly and safely detect BAs at the site of an accident or incident with high sensitivity and simple operation. This system is expected to facilitate prompt responses by police officers, firefighters, and other first responders.

CELL REGZA™ 55X2 Realizing High-Quality 3D Images

Iwai Keisuke / KIKUCHI Yoshihiro / KAWAHARA Kunihiko

Toshiba released the CELL REGZA 55X2 flagship high-definition (HD) TV of the REGZA™ lineup, incorporating the Cell

Broadband Engine™ highperformance multicore processor, in October 2010. The CELL REGZA 55X2 offers comprehensive three-dimensional (3D) capabilities with 3D glasses, including 3D super-resolution technology and our proprietary 2D3D conversion technology, in addition to improvements in the functionality and performance of the first-generation CELL REGZA. High-quality images are achieved based on both the optimal backlight control for 3D contents on the Mega LED panel™ high-luminance 240 Hz liquid crystal display (LCD) and 3D super-resolution technology. Furthermore, the 2D3D conversion technology using the enormous processing capacity of the Cell Broadband Engine allows viewers to convert 2D contents to high-quality 3D images by simultaneously making full use of the following conversion functions: (1) baseline3D, (2) motion3D, and (3) face3D.

Power Conditioning System for Photovoltaic Power Generation Systems

AMBO Tatsuaki / IKAWA Eiichi / MATSUOKA Kazumasa

Utilization of renewable energy as a measure against further worsening of environmental problems has been driving the expansion of photovoltaic (PV) power generation. With large-scale megawatt-class PV power plants being constructed, power conditioning systems (PCSs) that convert DC power generated by PV cell modules into AC power are playing an important role not only in the improvement of PV power generation performance, but also grid stabilization.

To contribute to the realization of the Toshiba Group's vision of enhanced quality of life in harmony with the Earth, we have been developing PCSs for PV power generation systems that achieve a high grid support capability and easy maintainability as well as high efficiency, compact size, large capacity, and diversity based on our proven power electronics technologies.

One-Segment Broadcasting System with Flexibility to Provide Information in Limited Area

INABA Hidekazu / SUGAMA Yoshihiko / MAENO Junichi

Practical applications for the white space spectrum in the ultrahigh-frequency (UHF) band, which is traditionally assigned to television broadcasting but has remained unused, are under consideration in various countries including Japan, and expectations are rising for the realization of one-segment broadcasting systems targeted at a limited area (hereafter referred to as "Area One-Seg"). As the number of mobile devices with one-segment broadcasting receivers has reached 93 million in the Japanese market, Area One-Seg transmitters will be able to provide users in the coverage area with useful information at low cost.

Toshiba has developed a compact, low-cost Area One-Seg transmitter and headend unit to support this system. Experiments on this system have demonstrated the feasibility of realizing a coverage area of up to 1 km.

Frontiers of Research & Development

Image Recognition Technology Using Novel Feature Descriptors for Color Images

"Molatomium" Technology for Parallel Programming of Multicore Processors