

Special Reports

Orchestrating Comfortable Living Spaces

Keywords for Technical Developments That Orchestrate Comfortable Living Spaces

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Comfortable Living Orchestrated by Electronic Products for Daily Life

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Various changes in modern society such as environmental problems, computerization, and the aging of the population, together with the accompanying changes in people's values, have had a major effect on the development of electronic products for the home.

Toshiba developed the first light bulb in Japan in 1890, as well as the first refrigerators and washing machines in 1930, and has remained at the forefront of the home electronics industry. We have continued to make technical innovations to develop home appliances to current levels, based on the key concepts of environmentally friendly, more fun, and more comfortable products. In the future, new developments are anticipated by pursuing the use of networks and universal design.

Drum Type Washer-Dryer Equipped with Heat Pump

IMAI Masahiro/IOKU Tatsuo/TANAKA Teruya

Toshiba released the industry's first drum type washer-dryer equipped with a new direct drive (DD) motor in 2000. Since then, the share of washer-dryers in the overall washing machine market reached 25% in fiscal 2005 and is expected to expand further. This growth in demand is considered to be due to the fact that modern-day housing and lifestyles are less conducive to drying washed clothes outdoors in the sun. Consumers want washer-dryers to have higher basic performance and lower cost. In February 2005, we launched the TW-130VB, a new and powerful drum type washer-dryer with the world's largest washing drum. The basic performance of this model was greatly improved by a newly developed compact super-direct drive (S-DD) engine that produces powerful, high-speed rotation.

In July 2006, we again released a new drum type washer-dryer, the TW-2500VC/2000VC "Air-con Cycle Drum" model, which has a heat-pump type low-temperature drying unit with an air-conditioner cycle engine that allows clothes to be dried daily in any weather. The air-conditioner cycle engine helps to reduce drying time, power consumption, and water consumption. It also offers a good finish close to that achieved by sun-drying.

Concepts and Key Technologies for Refrigerators

SAKAMOTO Noriaki/YAMAMOTO Masakazu/FUJII Kanako

Approximately 70 million refrigerators are manufactured and sold in the world every year. Although they play an indispensable role in people's lives, they also have a significant impact on the global environment. Environmentally conscious measures such as energy saving are therefore being adopted at the initiative of the central government, to meet the urgent need for environmental preservation.

Responding to the demands of the times, Toshiba has supplied more than 40 million refrigerators to the world since 1930, when we started manufacturing Japan's first refrigerators. This paper introduces our conventional refrigerators and the latest models, while providing a comprehensive overview of our concepts and key technologies cultivated over the past 76 years.

DAISEIKAI GDR Series Next-Generation Home Air Conditioners with Soft Air Current

OZAWA Teturo/MISHIMA Takechika

Toshiba Carrier Corp. has pursued energy-saving air conditioners since our introduction of the world's first inverter type air conditioner. However, the performance of an air conditioner will be degraded if the filters are not cleaned regularly because of the increase in ventilation resistance, which hinders energy reduction. Such air conditioners may not demonstrate their rated capability at an early stage of their life, no matter how sophisticated their energy-saving design may be. Although we recommend that users clean the filters every two weeks, this cannot always be assured because cleaning filters in a high location is a troublesome task.

We have now released the DAISEIKAI GDR series, a new type of air conditioner whose filters are always kept clean automatically for 10 years after installation. These new models are equipped with an automatic filter-cleaning system, providing 10 years of maintenance-free operation. Dust on the filters is scraped away and removed outdoors. In addition, these models are equipped with an auto-recovery silver plasma air purifier, which offers maintenance-free deodorization. An additional feature is the highly advanced "Smart Pre-switching" (SPS) inverter system, which has attained the industry's highest energy-saving performance.

RC-10VS High&Low Pressure IH Rice Cooker

TANAKA Kazuhiro/WATANABE Takuya/SUTO Noriko

Electric rice cookers have developed remarkably in recent years with the application of induction heating (IH), pressurizing, or steaming, in order to meet customers' requirements for tasty cooked rice.

Toshiba Home Technology Corp. has developed the model RC-10VS rice cooker, the world's first rice cooker to apply both high and low pressure to make tasty cooked rice. The rice grains are cooked under a high pressure of 1.4 atm after being soaked in water under a low pressure of 0.6 atm for water absorption. This process greatly improves the cooking performance.

"Typhoon Robo" Centrifugal Vacuum Cleaner with Maintenance-Free Filter

TORIZAWA You

Vacuum cleaners with cyclone type centrifugal separation have been selling since around the year 2000. They are economical and ecologically beneficial because they do not use a disposable paper bag to collect dust from the suction air, which matches the present trend.

On the other hand, users have to perform the troublesome task of refreshing the filter that catches minute dust from the suction air. Focusing on this point, Toshiba has developed the "Typhoon Robo" centrifugal vacuum cleaner featuring a maintenance-free filter. We deployed a conical filter assembly at the back of the cyclone centrifugal unit. Every time the cleaner switch is turned off, the conical filter is made to turn with a vibrating movement to automatically shake off minute dust so that the suction power of the cleaner is sustained.

Neo Compact™ Self-Ballasted Compact Fluorescent Lamps and Light Fixtures

HISAYASU Takeshi/TAKAHASHI Aiko/HAYASHI Junya

Demand has been growing in recent years for high-frequency fluorescent lamps with narrow luminescent tubes, due to the progress made in the miniaturization and slimming down of lighting fixtures as well as energy conservation. As a result, the market is now ready for compact fluorescent lamps that fit slimmer and smaller fixtures.

Toshiba Lighting & Technology Corp. has launched a range of compact fluorescent lamps on the market called Neo Compact™. These lamps are equipped with a built-in inverter circuit in the base, eliminating the need for an inverter circuit in the fixture and allowing smaller fixtures to be designed. We have also developed compact fixtures that exploit this advantage.

Electronic Control Switches and Communication Wiring Devices

WATANABE Yuuichi/TORII Hironari

Market demand has arisen for versatile and user-friendly household wiring devices in conjunction with the full-scale application of local area networks (LANs) and fiber to the home (FTTH) to appliances other than telephones and television sets in the information and communications field.

To meet this demand, Toshiba has developed contact-free electronic switches that are actuated simply by holding a hand close to them, and other household information wiring devices that facilitate easy setups of Internet communications, in order to assist in the creation of comfortable living spaces.

Next-Generation IT Apartment House System

ISSHIKI Masao/YAMAGISHI Masayuki/SUZUKI Satoshi

Toshiba is promoting the "next-generation IT apartment house system," which is applied to the residential spaces of newly built apartment houses. This system mainly consists of the FEMINITY™ system, Toshiba's home information technology (IT) system that realizes interactive remote control of home appliances and security systems via the Internet. This system facilitates comfortable and convenient living for every member of the family by providing safety as well as environmentally friendly use of energy.

It is our hope that parties in the relevant industries will understand our evolving business concept and work with us to establish new areas of development.

Evaluation of Sleep Quality and Sleep Monitoring System for Better Sleep

KAMEYAMA Kenichi/SUZUKI Takuji/NAMEGAYA Machiko

Many people have been complaining about poor sleep in recent years, which may be attributable to such causes as mental stress, irregular lifestyles, or late shift work. Differences in people's sleeping styles mean that there is no common solution for everyone to enjoy good sleep at nights. In order to achieve better sleep, a person must understand their own sleep characteristics, improve their sleeping style, and create an agreeable bedroom environment.

Toshiba has developed a new sleep monitoring system that not only analyzes sleep trends, but also provides hints on how to obtain a good night's sleep in consideration of several sleep-related indexes such as sleeping time, sleep rhythms, and depth of sleep.

Smart Eco™ Series Compact and Side-Flow Type Air Conditioners for Stores and Offices

OKITSU Kazuto/KOUZAKA Mototoshi/TAKADA Teppei

Energy saving and effective use of resources have recently come to be demanded in the air-conditioner industry from the viewpoint of global environmental protection. In addition, the market requires products that not only provide comfortable air-conditioned spaces but also allow easy renewal.

Toshiba Carrier Corp. has developed newly designed compressors and inverter units, which are the main components of air conditioners, to make systems more compact and lightweight. Using these technologies, we have commercialized a new type of air conditioner, the Smart Eco™ series, that meets the renewal needs of the market due to its flexibility of installation. The Smart Eco™ series is best suited to stores and offices that require a large cooling capacity of 22.4 kW/28.0 kW.

Module-Type Packaged Air Conditioner for Commercial Use

AKAKI Nobuyuki

Demand has been strongly growing in recent years for energy-saving air conditioners. Toyo Carrier Engineering Co., Ltd. has commercialized a high-energy-saving, module-type packaged air conditioner using R410A refrigerant and having a cooling capacity of up to 335 kW, that can be incorporated into the duct air conditioning system of large buildings.

This air conditioner has a compact outdoor unit with a newly designed chassis that enhances running efficiency by improving the airflow and enables easy installation. The outdoor unit permits room cooling even when the outdoor temperature is very low, without the need to change the machine structure. As the outdoor unit is composed of three modules, they can back each other up in the event of an abnormality occurring in any of them. The outdoor unit is applicable to a single room, to a few rooms in a medium-scale store, or to a number of rooms in a large building by comprehensive control.

Automatic Inspection System for Emergency Escape Lighting

TANO Noritaka/SATO Kimihito/TAKAHASHI Toshiaki

Convenient lighting systems with advanced control systems have been developed in the lighting industry in recent years. On the other hand, the managers of large-scale facilities feel the need for a collective warning system to ensure that lamps and batteries are replaced at an appropriate time before failure, due to the latest revision of the Fire Service Law that has clarified their responsibilities with regard to safety inspections of emergency lighting.

Toshiba has applied one of its lighting control system technologies, namely, a data transmission technology, to create an automatic inspection system for the equipment of escape lighting systems. This system has two functions for monitoring and inspection of escape lighting systems: one that makes six-month periodical inspections in accordance with the law, and the other that makes periodical inspections every few weeks and performs full-time monitoring of the internal parts of escape lighting equipment to find malfunctions. The system also accumulates and prints out inspection logs.

Beam Lighting Unit for Automobiles

SENZAKI Shigeru/ARAI Toshiyuki

Many light sources are installed inside and outside an automobile. Light-emitting diodes (LEDs) are being increasingly used as such light sources, because the dramatic improvements in their performance have enhanced their applicability and systematization for the lighting and display systems of automobiles. The combination of LEDs and optical components produces a variety of light presentations that can meet a broad range of customer requirements such as general interior illumination or discrete lighting.

Harison Toshiba Lighting Corp. (HTL) has commercialized a "beam lighting unit" as the fruit of development activities based on the concept of "sharp lighting over a designated area." An example of application of the beam lighting unit is step illumination, in which a light pattern is formed on the vehicle's floor and also on the ground below when a passenger enters or exits the vehicle. This is particularly useful for minivans. We intend to apply the beam lighting unit not only to automobiles, but also to other lighting and display fields. New designs are in progress for several innovative customers.

Feature Articles

Ubiquitous Metadata Scouter — Ontology Connecting Blogs to Daily Life

KAWAMURA Takahiro/NAGANO Shinichi/INABA Masumi

Ubiquitous Metadata Scouter is a mobile service for searching the Web from cellular phones. When a user takes a photo of a product's bar code using a cellular phone camera, the service first retrieves the corresponding metadata for the product (data identifying the product such as the name and manufacturer) from the Internet, then collects the related blogs. The main feature of the service is that the contents of each blog are analyzed using ontology, to indicate the overall reputation of the product. Ontology consists of the specification of a conceptualization in order to classify concepts relating to a certain domain.

Toshiba conducted verification tests of the service at a consumer electronics store and a bookstore in Tokyo in March 2006. This service holds promise as an Internet search method in the expanding ubiquitous computing environment.

Downsizing of Surge Arresters by Operating Voltage Improvement of ZnO Elements

ANDOH Hideyasu/KOMATSU Katsuki/YAMAMOTO Hiroyoshi

Continuous efforts have been made to downsize surge arresters. Engineers have been endeavoring to increase the operating voltage of the ZnO elements of surge arresters, in order to make the surge arresters more compact by reducing the number of ZnO elements.

Toshiba has succeeded in developing new ZnO elements that have a higher operating voltage. As a result, surge arresters for distributionclass equipment, transmission lines, and gas-insulated switchgears (GIS) can be significantly downsized.

Deodorization and Decomposition of Organic Compounds by Plasma Photocatalyst System

HIJIKATA Tsuneo/NAKAJOH Katsuhiko

Toshiba has developed a NAKAJOH photocatalyst system that features powerful oxidization by combining activated plasma and a photocatalyst to decompose and detoxify odorous substances and harmful organic compounds. The plasma photocatalyst system was confirmed to have a deodorization effect in rest rooms and sanitary spaces of hospitals and nursing facilities, and has been commercialized as a compact wall-mounted deodorizer.

In addition, we have demonstrated that the plasma photocatalyst system decomposes not only odorous substances but also harmful persistent organic pollutants such as polychlorinated biphenyls (PCBs) and dioxins, showing the possibility of applying this system to facilities as an environmental improvement technology.

Frontiers of Research & Development

Quality Improvement of Digital Image Products