

TOSHIBA REVIEW

2003. VOL.58 NO.12

Special Reports-1

Terrestrial Digital TV

Special Reports-2

Elevator and Escalator Technologies

Special Reports-1 Terrestrial Digital TV	Special Reports-2 Elevator and Escalator Technologies	Feature Articles	Frontiers of Research & Development
<ul style="list-style-type: none">*Developments in Terrestrial Digital Broadcasting*Trends in and Future Prospects for Terrestrial Digital Broadcasting*Terrestrial Digital HDTV*Terrestrial Digital HDTV Software*LSI Family for Terrestrial Digital HDTV <p>*OFDM Demodulator LSI for Integrated Services Digital Broadcasting- Terrestrial (ISDB-T)</p> <p>*Decoder System LSI for Digital HDTV</p> <p>*Back-End Video Processor LSI</p>	<ul style="list-style-type: none">*Aiming at Elevators and Escalators that Impress the Customer*Elevator and Escalator Technologies Changing with the Times*Elevator Innovations*Diversification of Escalator and Moving Walkway Design*Elevator Renewal*Elevator Maintenance Technologies*Simulation Techniques for Elevators*Operating Process Innovation and IT	<ul style="list-style-type: none">*Surplus Resource Based SCM Solutions*Automobile Collision Avoidance System Utilizing System LSI for Images*LD/PD Precision Inspection Machines Contributing to Improvement in Quality of DVD Optical Pickups*Top-Loading Washer Dryer with DSP-Controlled Inverter*24 kV Solid-Insulated Switchgear Conforming with Environmental Requirements	<ul style="list-style-type: none">*Self-Cooling System with Thermoelectric Module*Anonymity Authentication System that Protects Privacy

Special Reports-1

Terrestrial Digital TV

*Developments in Terrestrial Digital Broadcasting

TANABE Toshiyuki

*Trends in and Future Prospects for Terrestrial Digital Broadcasting

SAKURAI Masaru OGAWA Masatoshi
Terrestrial digital broadcasting starts in the Kanto, Chukyo, and Kinki areas in December 2003. The service will spread throughout the whole of Japan by 2006, and all analog terrestrial broadcasting will be replaced by digital broadcasting by 2011. Terrestrial digital broadcasting provides high-quality HDTV, high-fidelity digital audio, and interactive data broadcasts that are the same as those in broadcast satellite (BS) digital broadcasting. Mobile reception service is also scheduled for introduction in 2005. The commencement of terrestrial digital broadcasting marks the dawn of the real digital broadcasting era.

*Terrestrial Digital HDTV

NARITA Michiru IWAI Keisuke KAMADA Hisao
Terrestrial digital broadcasting offers various features that are not available with conventional terrestrial analog broadcasting; namely, high-quality digital high-definition television (HDTV), a large number of channels, interactive data services, and ghostless reception. It is expected that terrestrial digital broadcasting will accelerate the market demand for HDTV. There is an increasing need for large, high-quality TV pictures, and the production volume of liquid crystal display (LCD) and plasma display panel (PDP) TV sets will double this year.

Toshiba led the industry by launching three digital HDTV models—the 28D4000, 32D4000, and 36D4000—on the Japanese market in June 2003 that can receive terrestrial digital broadcasts by software upgrade services. We have also developed the 37L4000 LCD digital HDTV and 42P4000 PDP digital HDTV models.

*Terrestrial Digital HDTV Software

OKITSU Shinobu SAKAZAKI Yoshihisa
Terrestrial digital broadcasting has the same features as broadcast satellite (BS) digital broadcasting, including high sound and image quality, more channels, and greater multifunctionality produced by additional information such as event information and so on. New data services unifying communications and broadcasting are also planned. In addition to these characteristic features of digital broadcasting, terrestrial digital high-definition television (HDTV) must offer the functions unique to terrestrial digital broadcasting while taking the shift from analog broadcasting into consideration.

Toshiba has developed software for terrestrial digital HDTV that realizes these functions.

*LSI Family for Terrestrial Digital HDTV

NAKATANI Takashi NAGOYA Tetsuo KAI Naoyuki ISHII Satoyuki
LSIs are key components of terrestrial digital high-definition television (HDTV). Toshiba has developed three major chips for this application: an orthogonal frequency division multiplex (OFDM) demodulator (TC90A87FG/XBG), a decoder system LSI (TC81240TBG), and a video processor LSI (TC90A94TBG). Each LSI consists of one chip with a minimum of peripheral parts. This LSI family realizes low-cost and high-quality terrestrial digital HDTV receivers.

Special Reports-2

Elevator and Escalator Technologies

*Aiming at Elevators and Escalators that Impress the Customer

KUBO Toshio

*Elevator and Escalator Technologies Changing with the Times

HORIMOTO Ryuichi
The environment surrounding elevators and escalators is constantly changing in areas such as the arrival of an aging society, the rapid growth of information technology (IT), energy conservation, resource saving, environmental measures, international harmonization of codes and standards, responses to disasters such as earthquakes, and deregulation aimed at economic activation.

Toshiba Elevator and Building Systems Corp is progressively realizing innovations in various aspects of elevators and escalators including riding comfort, convenience, ease of use, high-speed and mass-transit functionality, barrier-free design, advanced services using IT, renewal techniques for enhancing building functionality, energy conservation, and environmental preservation.

*Elevator Innovations

ISHII Takashi MATSUOKA Hiroaki SOMEYA Seichi
Toshiba Elevator and Building Systems Corp. took the initiative in the industry by developing and commercializing the SPACEL™ machine-roomless elevator, which greatly changed the concept of elevators for low-rise buildings. We are now developing and commercializing a new style machine-roomless elevator featuring new technology, as well as a small-machine-room elevator to meet demand in the Chinese market, as part of our ongoing innovations in this field. Moreover, we have developed and commercialized the Smokeproof™ smoke-prevention door, which conforms with the Amended Building Standards Law in Japan, to satisfy customer needs.

*Diversification of Escalator and Moving Walkway Design

OGIMURA Yoshio IMAI Ichiro
In recent years, there has been a widening of social requirements with respect to escalators coupled with various technical innovations in this field. In addition, with the revision of the Building Standards Law in 2000 as well as the enactment of the Barrier-Free Transportation Law, concrete guidelines and various laws such as regulations for creating welfare-oriented towns by local governments have begun to be established.

Toshiba Elevator and Building Systems Corp. has developed various types of escalators and moving walkways with universal design and space-saving technology to respond to these needs of society.

*Elevator Renewal

MINAMI Toshinori TAKATA Hideki MURAKAMI Hiroshi
Toshiba Elevator and Building Systems Corp. has realized the "control renewal" method for renewing the control systems of elevators, which offers better performance, a shorter work period, and lower cost compared to conventional methods. The running speed of medium- and low-speed elevators is greatly increased by applying a microcomputer driving system incorporating the latest inverter control technology. Moreover, work at the site is reduced by reusing traction machines. This makes it possible to attain both optimization of the work process and completion of the renewal work within 24 hours. We have developed control renewal technology for high-speed elevators by driving the existing DC motor with a pulse width modulation (PWM) type converter and a chopper-controlled circuit. This method enables the operations of several elevators to be simultaneously maintained while renewal work is in progress.

*Elevator Maintenance Technologies

HARA Hidetaka ISHIMURA Junichi HARA Toshihiro
Preventive maintenance is essential for elevators from the standpoint of social responsibility. Toshiba Elevator and Building Systems Corp. pays particular attention to the maintenance of rotating machinery, one of the main components of elevators, through diagnostic technology for checking insulation deterioration and life-expectancy prediction technology. Restorative treatment may then be carried out judging from the degradation situation. We are also developing alternative components for long life and energy saving when printed circuit boards are upgraded.

*Simulation Techniques for Elevators

KIMURA Hiroyuki MORISHITA Mimpei NAKAGAKI Shigeo
New style elevators of high added value are being developed in succession. Simulation techniques are indispensable for the development of these elevators, and are used in various areas. This paper presents some simulation techniques specifically for elevators, focusing on complex simulation of control and mechanical systems, lateral vibration analysis of elevator ropes, and reduction of cage vibration using an active mass damper. Such simulation techniques are very useful for the development of new style elevators and high-speed/large-capacity elevators offering greater safety and comfort.

*Operating Process Innovation and IT

KINOSHITA Ken HOSHIHARA Tsutomu SHIN Naoto
In order for specifications required by users to be reflected instantaneously in products, it is necessary to reform the entire operating process beyond the conventional framework from design to sales. Toshiba Elevator and Building Systems Corp. has therefore drastically improved the conventional business process. We have directly incorporated the preloading of valuable information including digital engineering information into processes related to individual customers, and built a manufacturing business model. We have also constructed information technology (IT) network systems in order to share images of products with customers, such as designs or structures produced from specifications.

Feature Articles

*Surplus Resource Based SCM Solutions

NARIMATSU Katsumi FUKUMOTO Isao TORII Kentaro
Toshiba and Toshiba Solutions Corp. have developed a next-generation supply chain management (SCM) engine. This engine cooperates with other engines in autonomous distributed architecture in terms of available manufacturing resources (surplus resources).

Conventional systems take a centralized approach to improving total throughput. However, there is increasing demand for the capability to cope with dynamic changes in supplier-customer relationships and quick response to demand fluctuations.

Our system solves this emerging problem by means of distributed SCM engines connected to each other as a network. Using surplus resources calculated by the SCM engines in the network supply chain, we can realize real-time planning solutions coping with uncertainties in demand.

*Automobile Collision Avoidance System Utilizing System LSI for Images

MIYAMOTO Yukimasa TANIGUCHI Yasuhiro MIYAMORI Takashi
Collision avoidance systems, which have already been installed in some luxury automobiles, are currently attracting attention. Such systems are very expensive, however, costing several hundred thousand yen (several thousand dollars), because their design combines a camera with a radar wave system and other components.

With the aim of realizing a system that uses only a camera in order to lower the price, Toshiba has developed a new LSI incorporating a memory controller, image input and output circuits, and processors for image processing. This has made it possible to realize an inexpensive collision avoidance system using one camera.

*LD/PD Precision Inspection Machines Contributing to Improvement in Quality of DVD Optical Pickups

MIYAUCHI Takashi SHIMOYAMA Sadao SEKIYA Satoshi
The laser diode (LD) and photodiode (PD) are key parts of the optical pickup for DVD, which reads and writes information using a laser beam. In the optical pickup manufacturing process, the position and angle of the LD and PD are adjusted with high precision and they are mounted.

Toshiba has developed machines that automatically inspect the mounting condition of LDs and PDs. A low-shock probe and image-processing algorithm were developed, and an angle measurement precision of $\pm 0.1^\circ$ and a position measurement precision of $\pm 1 \mu\text{m}$ were attained. The newly developed machines have already been introduced into a manufacturing site, where they are contributing to the stable manufacturing of optical pickups.

*Top-Loading Washer Dryer with DSP-Controlled Inverter

SUZUKI Shigemitsu OKAZAKI Yoji
The demand for clothes-drying functionality is expanding in the washing machine market, following the previous shift in the mainstream of washers from the twin-tub type to fully automatic models.

To respond to diverse user needs based on analysis of voice of customer (VOC) results, Toshiba HA Products Co., Ltd. has developed a range of washer dryers. The first washer dryer launched on the market by Toshiba was a drum type with a front-loading system, maintaining the regular style of a washer but with the addition of a dryer function. The TW-V8630 model introduced in 2003 is a drum type washer with a top-loading system, making Toshiba the only manufacturer to have a lineup of all types on the market. The latest digital signal processor (DSP) control technology has been adopted in this model.

*24 kV Solid-Insulated Switchgear Conforming with Environmental Requirements

SATO Junichi SAKAGUCHI Osamu MIYAGAWA Masaru
Toshiba has developed various medium-voltage switchgears up to now to meet the demands for environmental friendliness, size reduction, and improved safety and reliability. The use of the cubic type gas-insulated switchgear (C-GIS) contributed to the minimization of size because of the higher dielectric strength of SF₆. However, SF₆ was placed on the list of greenhouse gases under the Kyoto Protocol in 1997.

We have therefore developed a new 24 kV solid-insulated switchgear (SIS) that uses no SF₆ and conforms with environmental requirements.

Frontiers of Research & Development

*Self-Cooling System with Thermoelectric Module

*Anonymity Authentication System that Protects Privacy