

In the social infrastructure systems field, Toshiba is developing new technologies that support the foundation of society aiming at comfortable, secure and safe lives for the public. We offer H.264 encoders for 1 segment service of broadcasting, IP network telephony systems based on SIP technology, access control systems using face recognition technology as a key and universal design elevators/escalators not only inside Japan but also on a global basis.

H.264 Encoder for 1 Segment Service of Terrestrial Digital Broadcasting

Toshiba's H.264 encoder supplies the best video and audio quality in the world.

Toshiba has developed a real-time H.264 encoder for 1 segment service of terrestrial digital broadcasting. This encoder compresses video and audio signals and multiplexes to MPEG-2 (Moving Picture Experts



DSP board of H.264 encoder

Group-phase 2) Transport Stream. The format H.264, Baseline Profile @ Level 1.2 video compression format of this encoder is the most advanced in the world, and H.264 can achieve high video quality at low bit-rates such as 200 kbps. The video bit-rate can be set up to 384 kbps. Audio compression format is AAC-SBR (Advanced Audio Coding – Spectral Band Replication), which can achieve high audio quality at very low bit-rates such as 50 kbps. In addition, this encoder supports AAC-LC (Advanced Audio Coding – Low Complexity Profile), which can achieve CD quality audio at bit-rates as low as 144 kbps. The audio bit-rate can be set up to 256 kbps. Finally the broadcast stations can use 1 segment for mobile service with high quality video and audio in addition to data broadcasting, the total bit-rate for 1 segment is approx. 400 kbps.

The core engine of video and audio compression and multiplex to MPEG-2 Transport Stream is a single multi-purpose DSP (Digital Signal Processing) chip. Therefore the DSP board is very small, 250 mm×210 mm, which has allowed the downsizing of the encoder unit and lowered power consumption.

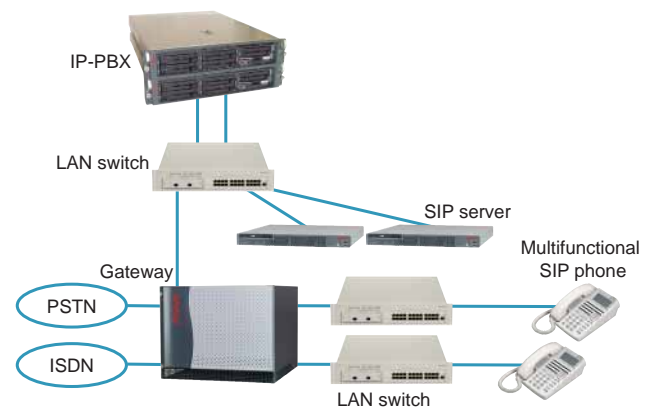
Toshiba has utilized all of its accumulated technology and know-how in the development of the H.264 encoder. The most important factor has been our broad experience with MPEG-2 real-time encoders for HD/SD (High Definition/Standard Definition) services, for example BS digital and terrestrial digital broadcasting. Toshiba has acquired this experience through the VOC (Voice of the Customer) response from Japanese broadcast stations, which require a very high level of quality. This experience is made manifest in the quality of the H.264 encoder.

IP Network Telephony System Based on SIP Technology

Toshiba has developed the world's largest scale IP (Internet Protocol) network telephony system based on SIP (Session Initiation Protocol) technology, which is one of the newest VoIP (Voice over IP) communication protocols. This system consists of an IP-PBX (Private Branch Exchange), SIP server, and multifunctional SIP phones. 12,000 SIP phones are accommodated in the system.

Also, since multifunctional SIP phones have a PC port and a network port, you can use your PC with a cascade connection to the PC port of the phone, and it becomes possible to simplify the LAN cabling in the office.

SIP technology, which has a high affinity with computer and IP networks, is utilized as the communication protocol to offer a flexible system configuration and advanced joint service through the combination of a computer system and a telephony system. Taking advantage of the advanced features of this SIP technology, this system will provide your office with more useful application services than existing PBX devices.



PSTN: Public Switched Telephone Network
ISDN: Integrated Services Digital Network

IP network telephony system based on SIP technology

2 GHz Cellular Phone Amplifier Equipment for Coverage Enhancement

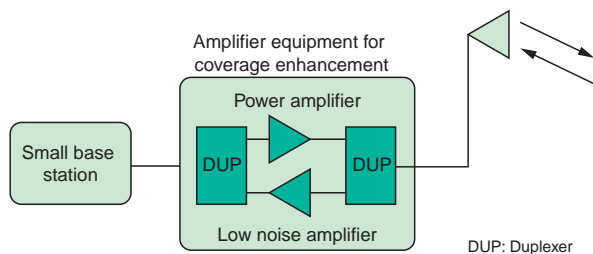
In cellular phone systems, a small base station is more economical for low traffic areas. At the same time high output power is important for coverage enhancement.

As a solution, Toshiba has developed 2 GHz band 20 W cellular phone amplifier equipment for coverage enhancement. The power amplifier in the equipment performs with high efficiency and low distortion. Furthermore, this equipment has a built-in low noise amplifier for signals from a handset.

The size of the equipment is as small as 380 mm×230 mm×420 mm (excluding protruding portions) with a forced air cooling system.



2 GHz cellular phone amplifier equipment for coverage enhancement



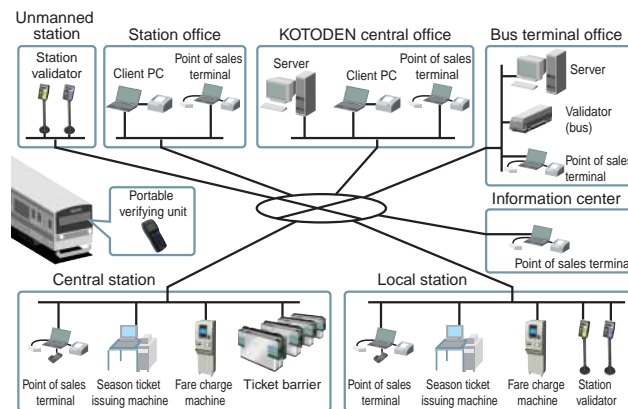
Outline of system

Contactless Smart Card Fare Collection System for KOTODEN

Toshiba supplied a contactless smart card fare collection system for the Takamatsu-Kotohira Electric Railroad Co., Ltd. (KOTODEN) in February 2005. KOTODEN, located in Takamatsu-city on Shikoku Island, has 3 lines and 50 stations. KOTODEN also operates a local bus network covering the Takamatsu-city area.

Toshiba developed and provided the entire fare collection system including smart card processing equipment, such as ticket barriers, season ticket issuing machines and a central accounting system for the central office. This is the first instance of a local railroad company utilizing contactless smart cards (Felica) that conform to the IC (Integrated Circuit) card standard specified by the Congress of Japan Railway Cybernetics.

We achieved the construction of a secure system by adopting several security policies. Our integrated fare collection solutions for KOTODEN have become a model case for local railroad companies in Japan utilizing contactless smart cards in a fare collection system.



Configuration of a railroad IC card system



Station validator



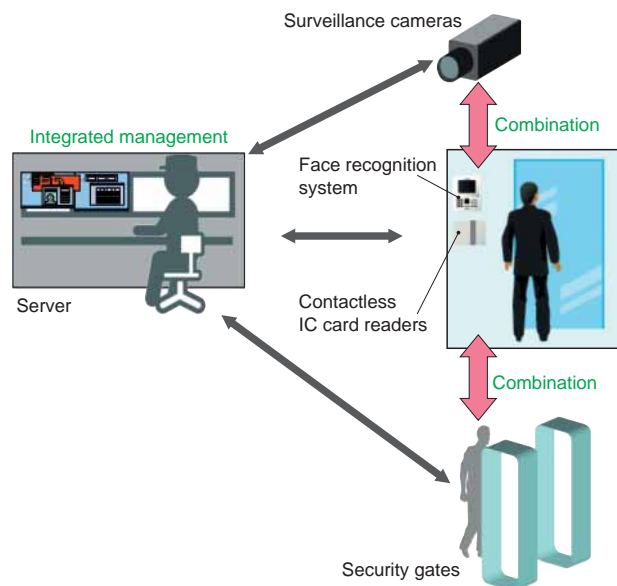
Portable verifying unit

Security Solution Combined with Face Recognition

In order to realize security of buildings, surveillance cameras and access control systems have become widespread. However, since they are employed separately in many cases, it is generally difficult to confirm the identity of the person himself/herself subsequently.

Depending on the needs of the customer, Toshiba offers the construction of a system which combines the face recognition system with contactless IC cards, image monitoring systems, security gates and sensors, etc.

The system is equipped with features, such as integrated management of access results and facial images, recording of frontal facial images which are easy to check visually, and checking of the identity of the person himself/herself using the face recognition system, etc.



Security solution combined with face recognition

BI-1200 Banknote Quality Inspection Machine

In recent years, we face a big social problem, which is the global increase in counterfeit banknotes. If the quality of genuine banknotes is poor, social and economic chaos may occur because it is sometimes very difficult for us to distinguish counterfeit notes from authentic ones.

From the viewpoint of the prevention of counterfeits, the central bank in each country demands ever more strongly that banknotes produced by Printing Bureaus be more uniform and of higher quality than ever before. In this environment, Toshiba has developed the BI-1200 as a next-generation banknote quality inspection machine. The BI-1200 can inspect the printing quality of banknotes at high resolution and selects only high-quality banknotes.

The main features are as follows:

- Inspects both faces of banknotes with full color image sensors.
- Guarantees high counting reliability and security through fully automated operation.
- Furnishes excellent package quality for banding and alignment.



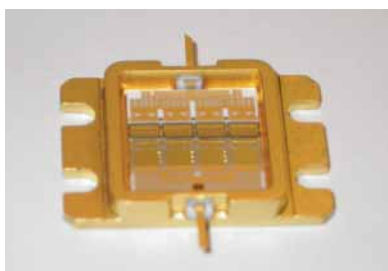
BI-1200 banknote quality inspection machine

Development of GaN Power HEMT with Output Power of 174 W at 6 GHz

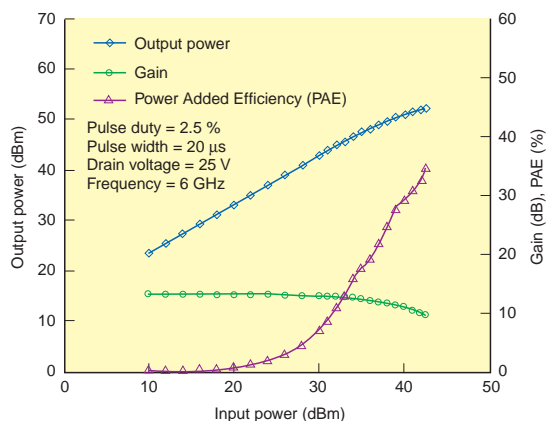
Toshiba has realized a GaN-based high electron mobility transistor (HEMT) that achieves a record 174 W at 6 GHz-band pulse operation, a key frequency band for terrestrial and satellite microwave communications. This is the highest level of performance ever reported at this frequency. The power density of a GaN (Gallium-Nitride) power FET (Field Effect Transistor) is eight times that of a GaAs (Gallium-Arsenide) FET.

This has been achieved through optimization of the epitaxial layer and chip structures for 6 GHz-band operation and by adopting a four-chip combination structure to minimize heat build-up.

It is expected that this development result will accelerate the trend toward solid state devices for amplifiers of microwave communication systems.



GaN power HEMT assembled on package



Input-output characteristics of newly developed GaN power HEMT

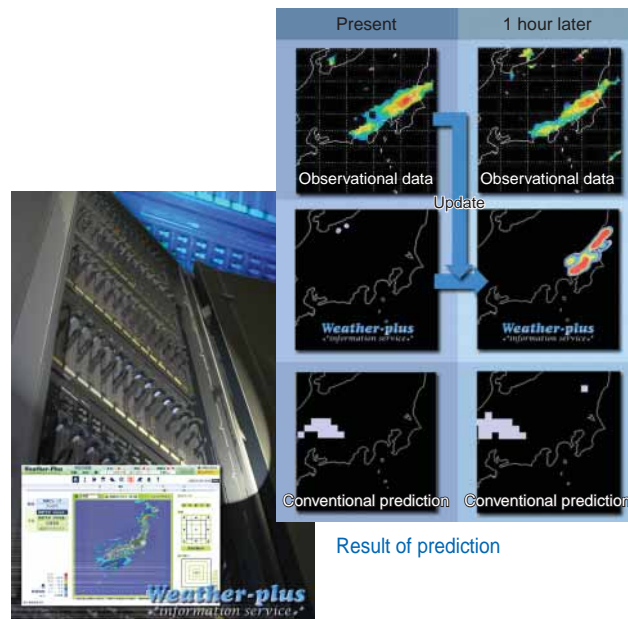
Weather-plus™ Weather Information Service

Weather is not only closely related to our civic life, but on certain occasions also has a crucial influence on the business activities of some companies or organizations. Toshiba has launched its own weather information service, Weather-plus™ offering detailed and accurate weather information to meet the demands of such customers.

The main feature of the service is to compute regional weather information at a mesh-grid-interval as fine as 5 km from coarser aerial observation data from the Japan Meteorological Agency based on our original system technology of massive parallel computation with 278 CPUs.

What makes the Weather-plus™ stand out from the rest is the adoption of an original weather-prediction model with real-time observation data, in particular, rainfall-intensity and wind-velocity from all possible weather radars in operation in the vicinity, which has resulted in higher weather-forecast-accuracy at a shorter service-update-interval of every one hour.

Our hope is to provide supportive social infrastructures for our customers with further needs-oriented as well as dependable weather information services by improving prediction-algorithms for finer mesh-grid-intervals using a faster computational scheme.



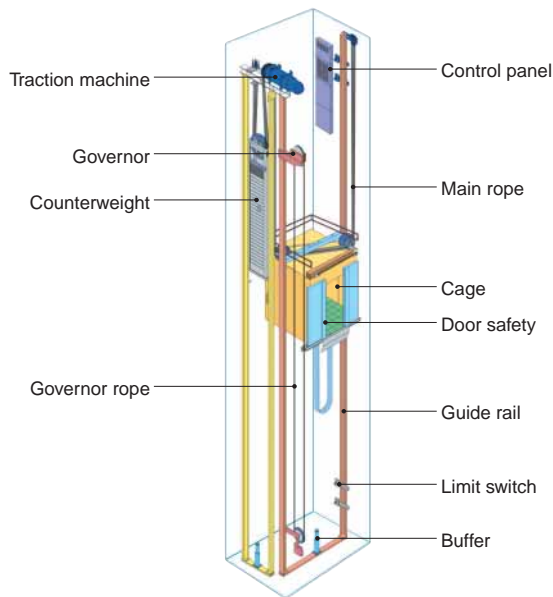
Parallel computation system

SPACEL-UNI™ Machine-Room-Less Elevator for China and Other Asian Countries/Regions

Toshiba Elevator and Building Systems Corporation has started marketing a high value added machine-room-less elevator SPACEL-UNI™ that has been developed with space and energy saving features for the elevator market in China where the state of growth is remarkable.

A new drive system that employs a traction machine incorporating a long-shaft PMSM (Permanent Magnet Synchronous Motor) eliminates the machine room for space saving, and saves energy by reducing power consumption by 30%. Universal design is blended into the design of the elevator for ease of use.

This product is the global standard model for us. We will start marketing this product in the Asian market beginning 2006 in a bid to respond to the need for products with high performance and high added value.



SPACEL-UNI™ machine-room-less elevator for China and other Asian countries/regions

Global Marketing of Universal Design TE Type Escalator

Toshiba Elevator and Building Systems Corporation has developed a universal design TE type escalator, which was introduced on the Japanese market in October 2003, and global marketing of this escalator is now underway. As a first step, development and product commercialization have been completed for the Chinese market and the approval of the Chinese state authority has been received.

The product uses materials and parts, which are sold in China as standard, and they conform to Chinese GB Standards. About 90% of the design of this escalator can be applied in Japan. This will make a significant contribution in reducing the procurement cost of materials and parts for the global market, including the Japanese market.

We will continue to develop products that are tailored to major regions of the world with a focus on Southeast Asia.



Universal design TE type escalator