Information and Communications Systems

The trend toward open networks that allow integrated operation of different computer systems has spurred technological advances in desktop computers and networks. These, in turn, have contributed to business process re-engineering and the downsizing of information systems. In addition, information exchange through the Internet is steadily expanding among both businesses and individuals. In the field of mobile communications, use of car phones and portable cellular phones is growing worldwide. Toshiba is a leading provider of these and other information and communication systems for multimedia applications.

GS Series Global Network Server with Pentium™ Pro

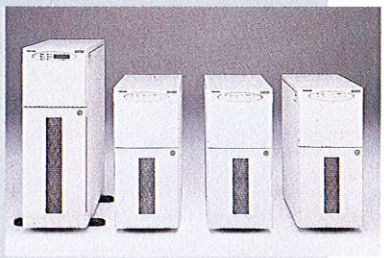
The use of PC servers has been growing rapidly in line with the popularity of Microsoft® Windows NT®. As PC servers are applied to a larger field of systems, they must offer higher performance, expandability, reliability and availability than usual desktop PCs. The four models in Toshiba's new GS series of PC servers (GS200, GS250, GS400 and GS700) are designed to meet those requirements at a low price.

All GS models are equipped with 200MHz Pentium™ Pro processors. The GS700 can be equipped with up to 4 CPUs, each CPU having 512Kbytes of second cache memory, the maximum size available with the Pentium™ Pro processor. Even the lowest-priced GS200 model is expandable to 6 disk drives, and the GS700 outperforms the competition with up to 18 disk drives in its chassis. Toshiba has also developed an external disk cabinet that can hold up to 12 disk drives, with a power supply controlled by the GS chassis.

Each model in the GS series provides reliability at a low price. For example, even the entry-level GS200 can be configured for redundant disks and power supply. GS models can be connected with a shared disk cabinet for configuration of a high availability (HA) system. Improvements to operability include an automatic system shutdown mechanism in all models. In addition, an optional Availability Management Subsystem (AMS) offers powerful server monitor capability.

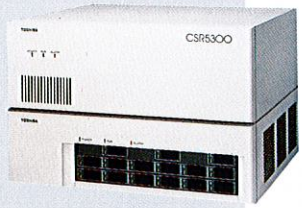
"Microsoft" and "Windows NT" are registered trademarks of Microsoft Corporation.

"Pentium" is a registered trademark of Intel Corporation.



GS series global network server

CSR5300 Cell Switch Router



CSR5300 cell switch router

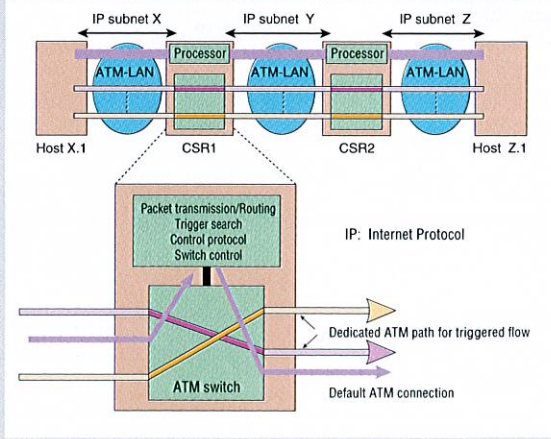
Toshiba has developed a cell switch router (CSR) that offers high performance and a broad range of applications in Inter/Intranets that have been constructed using asynchronous transfer mode local area networks (ATM-LANs) or wide-range ATM networks.

The CSR has packet transmission and routing control functions based on software used in previous routers, and a hardware transmission function using a built-in ATM switch. These improvements have contributed to a great increase in transmission capability of 10 to 20 times that of previous routers and a decrease in cost of one-third to one-half.

Three newly developed functions contributed to the realization of hardware transmission capability:

- A trigger search function that automatically searches out application flows with a larger volume and longer lifetime, such as file transmissions and WWW browsing.
- A control protocol function for establishment and release of the hardware transmission path for the above application flows.
- An ATM switch control function.

The CSR5300 was commercialized in spring 1997.



Principle of cell switch router

PCX101 Cable Modem

The rapidly expanding use of the Internet in recent years has focused attention on the development of low-cost modems that provide high-speed data transmission. In response, Toshiba has developed the PCX101 cable modem for TWC Corporation of the United States.

The quadrature phase shift keying (QPSK) and suitable roll-off filter enable very-high-speed data transmission in a narrow bandwidth. The downlink data rate is 8Mbps and its frequency bandwidth is 6MHz; uplink data rate is 2Mbps and 1.5 MHz bandwidth. Toshiba's original uplink access control, which is a type of carrier sense multiple access/collision detection (CSMA/CD), allocates uplink access equally and efficiently to each modem.

Use of the Reed-Solomon Code (uplink (80,70) and (34,24)/downlink (64,60)) for error correction and cyclic redundancy checkcode (CRC) for error detection offer high reliability, even in a poor-quality network. ASIC that implements most of the PCX's digital functions keeps the cost low and the box small (about 2.4 inches high x 8 inches wide x 11 inches long). A 10Base-T interface between PCs and PCX offers easy and relible connection.

The PCX101 offers reliability equal to and speed greater than telephone lines (downlink 56kbps/uplink 33.6kbps) and ISDN (64kbps).

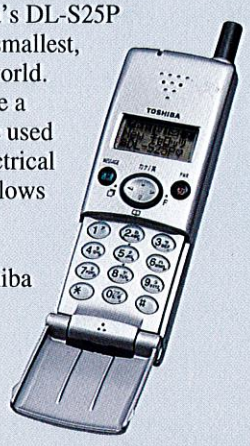
PCX101 cable modem

DL-S25P Ultra-Compact PHS Terminal

Mobile communication systems have made remarkable progress in the last few years, with terminals becoming smaller and lighter. The personal handy phone service (PHS) that began in Japan in July, 1995, is already in its third generation, and terminals less than 100cm³ in volume and 100g in weight have become commonplace.

DL-S25P personal handy phone

At 68cm³ and 81g, Toshiba's DL-S25P personal handy phone is the smallest, lightest, and thinnest in the world. Other notable features include a vibration function that can be used instead of the bell and an electrical note message function that allows use without bothering people nearby.



Three factors enabled Toshiba to develop these functions while simultaneously reducing the size and weight of the unit:

- Highly integrated LSI: Base-band LSI, control IC and an audio circuit are integrated onto one chip LSI.
- Downsizing of RF unit: Toshiba realized a 5cm³ RF unit by eliminating buffer amplifiers and selecting components for simplified circuit construction.
- Elimination of second CPU: Integration of the main CPU (protocol control) and the second CPU (man-machine interface) enabled elimination of the second CPU.

Modernization of Tribhuvan International Airport in Kathmandu, Nepal

Carried out on a turnkey basis using a grant from the Japanese government, the project to modernize Tribhuvan International Airport in Kathmandu, Nepal involved installation of airport surveillance radar/secondary surveillance radar (ASR/SSR), a radar data processing system (RDPS), VHF radios, communications control unit (CCU), power supply facility and an optical fiber cable system, as well as comprehensive training for air traffic controllers and a training simulator system.

Tribhuvan is the only international airport in the Kingdom of Nepal. As part of its efforts to promote industrialization and tourism as a means of acquiring foreign currency, Nepal has been looking forward to the completion of a full-scale air traffic control facility through this project, since two large aircraft accidents occurred at the airport in 1992.

The equipment used in the system, such as the RDPS distribution and processing system and field-tested radar equipment, employs state-of-the-art technology. Training of air traffic controllers and engineers was carried out concurrently with equipment installation, and the entire system was delivered in March 1997.

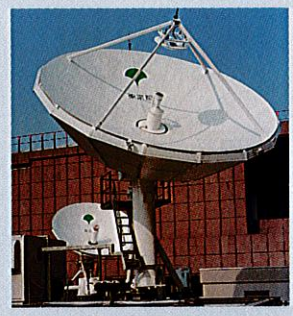
Radar site building and radar antenna

On-the-job training for air traffic controllers at Thimi training center

Television Transmission System via Communication Satellite

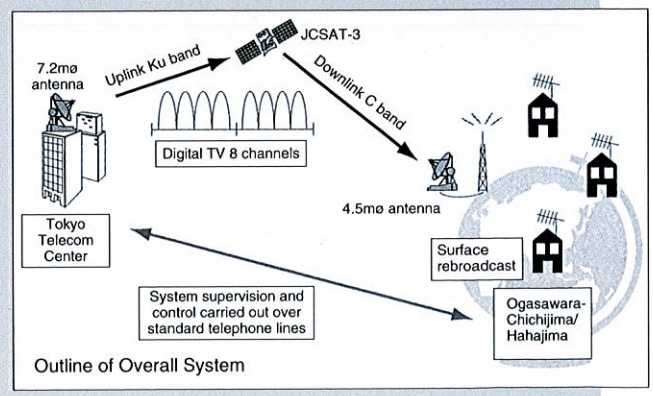
To provide television service to the Ogasawara Islands, whose remoteness from the main island of Japan formerly made reception of TV broadcasts impossible, Toshiba developed a television transmission system using the JCSAT3 communication satellite that was launched in August 1995. Eight TV programs from the Tokyo area can be transmitted using MPEG2 digital compression technology to maintain the signal quality. The system makes highly effective use of the satellite transponders.

The cross-strap of uplink Ku band and downlink C band is used for the satellite, and the uplink power control (UPC) function compensates for possible attenuation in the Ku Band due to foul weather, achieving high quality line throughput. The system also offers a simple scramble function using a video decode key. Operations commenced in April 1996, providing teletext and enhanced definition TV (EDTV) broadcast data, as well as audio and video.



7.2m diameter TX antenna at Tokyo Teleport Center

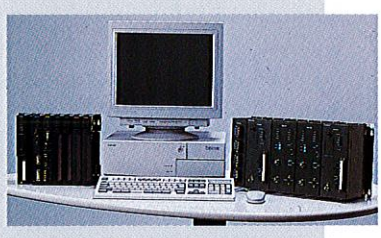
Receiving earth station on Chichijima Island, Ogasawara



Outline of Overall System

TOSDIC™-CIE 1200 Integrated Control System for Medium-Scale Applications

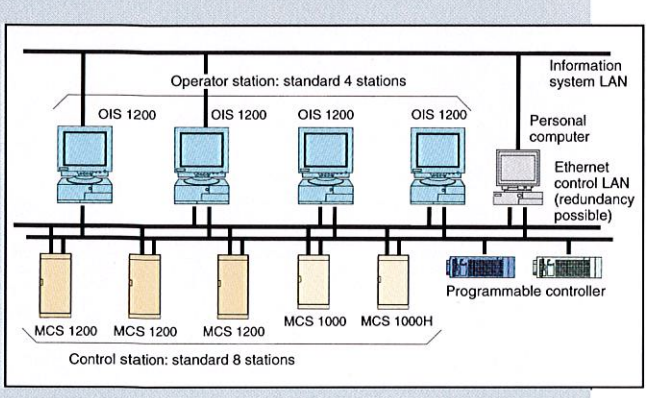
User demands for openness and downsizing of integrated control systems are very high. A key to meeting these demands is PC technology, including software and hardware, which is advancing rapidly enough to make its way into the control systems field. The TOSDIC™-CIE 1200 integrated control system for medium-scale applications is Toshiba's latest contribution to advancing technology in this field.



TOSDIC™-CIE 1200 integrated control system for medium-scale applications

The TOSDIC™-CIE 1200 can handle up to 4,096 system tags and pursues the "Open & Rightsizing" concept introduced in the previously released TOSDIC™-CIE 1000 system for small-scale applications. The system conforms to industry standards such as Microsoft® Windows NT® and Ethernet™, and is designed for integration of discrete system elements such as operator stations, control stations and engineering tools.

"Ethernet" is a registered trademark of the Xerox Corporation.



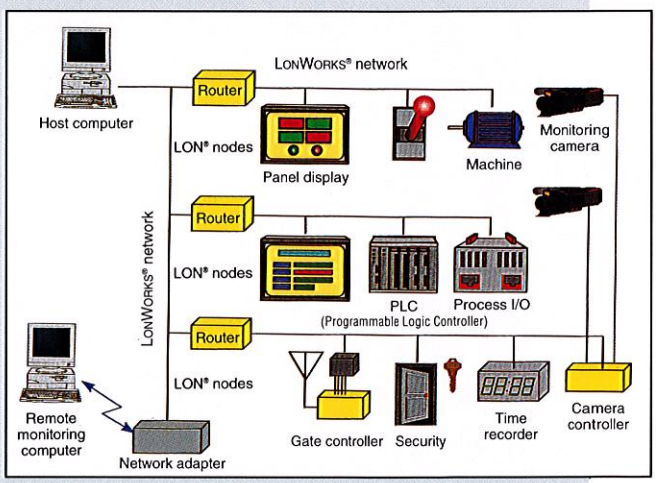
Example of system configuration

LonWorks® Application System

The LonWorks® application system uses intelligent distributed sensing and control components based on distributed network and object oriented system technology to provide solutions for a broad range of automation applications, including supervisory control and data acquisition (SCADA) systems, factory automation systems and building automation systems. This easily expandable, highly reliable system eliminates parallel wiring. Subsystems such as local control systems, security and air conditioning systems, which were formerly implemented in proprietary networks, can be integrated into a single network, enabling seamless exchange of information between heterogeneous systems. Point-of-product management components such as bar-code readers, radio frequency tag readers, local sensing and control devices and panel displays can easily be connected to the LonWorks® network.

Toshiba supplies a wide range of products such as Neuron® Chips (a key device of LonWorks® licensed from Echelon Corporation), Neuron® Chip implemented input/output (I/O) devices, binding tools for LonWorks® networks and floor-level distributed manufacturing and logistics systems with factory- and enterprise-level management systems.

"LonWorks," "LON" and "Neuron" are registered trademarks of Echelon Corporation.



Example of LonWorks® application

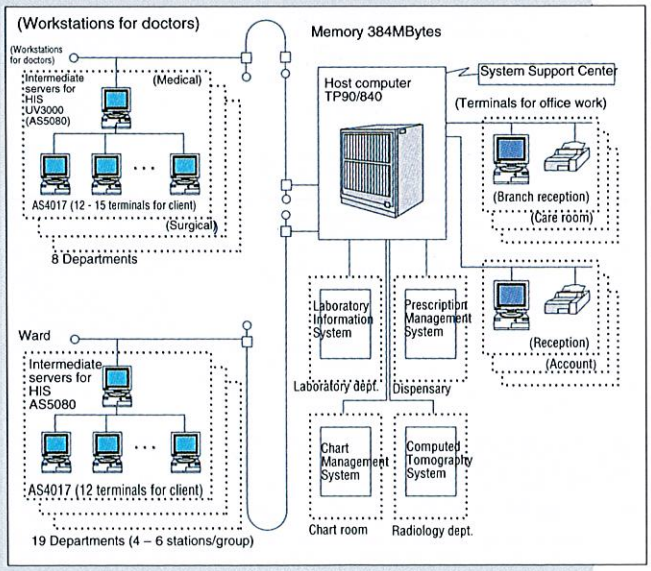
Healthcare Information System for Toyohashi Municipal Hospital

Nurse station

When Toyohashi Municipal Hospital moved to a new building in May 1996, Toshiba supplied a new healthcare information system to improve patient service and provide useful data for medical examinations. Toyohashi is one of the largest municipal hospitals in Japan, with 920 beds and more than 2,500 outpatients a day, so doctors need a system they can use simply, quickly, and accurately. Using UNIX workstations as terminals enables easier, faster operations through extensive use of the mouse for input and limited use of the keyboard.


Outpatient at clinic

The workstations are used not only for input but also for quick access to information useful in medical examinations, such as a patient's medical history, allergy information, and medical test results. They can also be used to explain medical information to patients, raising the effectiveness of patient service. Although the large-scale system comprises a TP90/840 office server, 11 intermediate UNIX servers, 138 terminals for doctors, 135 terminals for office work and 86 printers, it offers high processing capability and high-speed response through use of a client-server system.

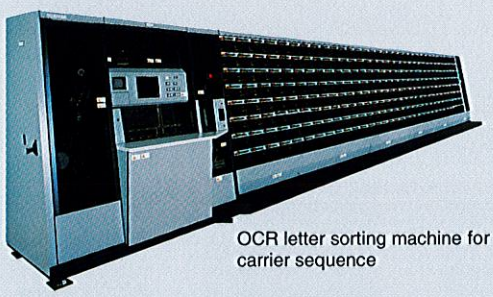


System configuration

Mail Processing System for New Zip Code System

A new seven-digit zip code system will be implemented in Japan in February 1998 to increase the efficiency of automated mail processing. Under the guidance of the Ministry of Posts and Telecommunications, Toshiba has developed a new mail sorting system to meet the needs of the new zip code system.

The new system incorporates several newly developed mail processing techniques. Based on a technology for reading handwritten Japanese characters that has been under development for many years, Toshiba's advanced optical character reader (OCR) can read all information in the address (except the recipient's name), whether typed or handwritten. It then converts the address information into an invisible bar code, prints it, then reads it to sort the mail in the correct order for delivery. The recipient cannot see the invisible bar code, but the OCR system can, and in cases where the machine cannot adequately read the information, an image of the address will be stored in the video coding system (VCS). Developed simultaneously with the OCR, the VCS displays the stored image of the address on monitors so an operator can input the address information.


OCR letter sorting machine for carrier sequence


Latest design video coding system