Information and Communication 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.

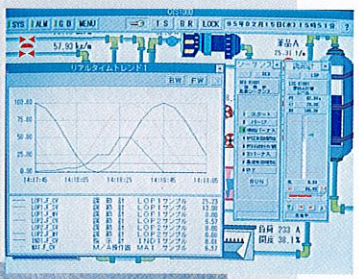
TOSDIC™-CIE 1000 Integrated Control System for Small-Scale Manufacturing

As industry demands for rightsizing and more open control systems grow, manufacturers are more aware of the need for optimized industrial systems that are cost-effective, high quality and reliable. Toshiba has responded with the development of the TOSDIC™-CIE 1000, an open and rightsized integrated control system designed for small-scale manufacturing operations.

The new TOSDIC™-CIE 1000 offers de facto standard open architecture, retains distributed digital control systems tag management technology and controls redundant Ethernet® LAN for reliability.

In the engineering environment, it can be operated as efficiently as an office PC through the use of Microsoft ACCESS® and unified data management. The system also provides on-line maintenance and self-documentation output.

"Ethernet" is a registered trademark of Xerox Corporation.
"Microsoft ACCESS" is a registered trademark of Microsoft Corporation.



TOSDIC™-CIE 1000 open and rightsized integrated control system

Hot Strip Mill Plant for Kawasaki Steel Co., Ltd.

The No. 3 Hot Strip Mill Plant for the Chiba Works of Kawasaki Steel Co., Ltd. has been completed, and commercial operation began in May 1995. Equipment at the plant includes the high-speed, large-capacity TOSDIC™-CIE system, a computer, instrumentation and electric (CIE) integrated control system; the advanced VL2060 industrial computer; a light trigger thyristor (LTT) cycro-converter; and an insulated gate bipolar transistor (IGBT) inverter.

Other features of the plant include an automatic software generation system, on-line software monitoring by operator interface station (OIS), and high-speed data gathering by programmable control station (PCS). The system support and maintenance functions are also improved. Preparations are under way for the world's first practical application of endless rolling.

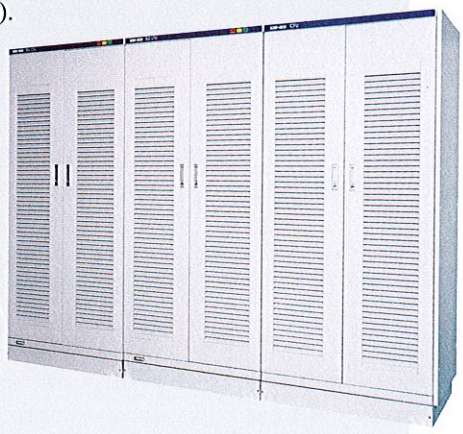
Highly automated pulpit

5Gbps Line Terminal Equipment for Submarine Optical Cable System

With the arrival of the multimedia age, demand for various communication services is growing rapidly. To support a global transmission infrastructure for the multimedia society, Toshiba has developed large-capacity optical line terminal equipment, the 5G LTE, for submarine cable networks.

The 5G LTE has the capacity to transmit a 5Gbps signal by bit interleave-multiplexing two channels of 2.5Gbps signal conforming to the international standard STM-16. The equipment was developed to meet the requirements of an OS-A submarine cable system that can transmit a 5Gbps optical signal across 9,000km. For this purpose, Toshiba developed a number of advanced technologies under the guidance of KDD (Japan's largest international telecommunications company), including super-high-speed optical modulation-demodulation, forward error correction and optical fiber amplifier technology. In addition, with a Q3 interface conforming to the international standard Telecommunication Management Network (TMN), this equipment can cope flexibly with a multi-vendor environment.

The 5G LTE is being supplied by KDD-SCS for the Trans-Pacific Cable Network (TPC-5CN) and the Asia Pacific Cable Network (APCN).

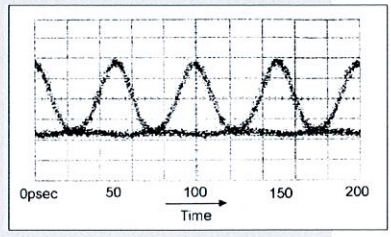


5Gbps line terminal equipment for OS-A optical submarine cable system

20Gbps Optical Time-Division Multiplexing Transmitter/Receiver

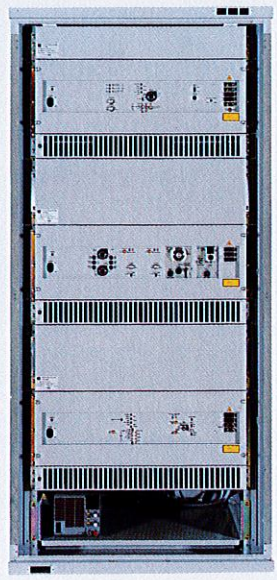
Ultra-high-capacity communication technologies will be necessary to support global multimedia data transmission in the 21st century. Toshiba has responded by developing a 20Gbps optical time-division multiplexing transmitter/receiver under the technical guidance of KDD.

Using ultra-short optical pulses, two 10Gbps optical signals are directly time-division multiplexed/demultiplexed in the optical domain. This technology is suitable for soliton transmission, which enables transmission of very-high-speed optical signals over long distances without distortion, and is expected to be a key optical transmission technology in the near future.



20Gbps optical waveform

Use of an automatic gain-controlled optical fiber amplifier as a pre-amplifier achieves very high-sensitivity receiver characteristics.



20Gbps optical time-division multiplexing transmitter/receiver

Wireless LAN System

This wireless LAN system is a high-speed local area network that uses the Industrial, Scientific and Medical (ISM) Band radio frequency. The wireless LAN system has various uses, ranging from conventional system configurations including easy expansion of office LAN systems to new applications such as local area mobile communications for notebook personal computers.

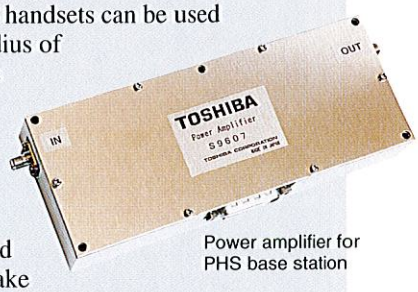
A special media access protocol called Carrier Sense Multiple Access/Collision Avoidance with ACKnowledge (CSMA/CAwithACK) provides stable communication even in high-interference environments. The wireless LAN system also provides flexible system configuration through the use of two types of interface cards developed by Toshiba: the Industrial Standard Architecture (ISA) card for desktop personal computers and the PC card for notebook personal computers.

Wireless LAN PC card

Wireless LAN ISA card

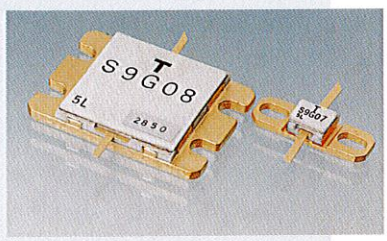
Power Amplifier for PHS Base Station

The personal handy phone system (PHS), in service in Japan since July 1995, has gained attention as a new tool for personal communications. PHS handsets can be used in a cell area with a radius of several hundred meters from a base station that transmits a microwave signal of 1.9GHz. Tens of thousands of base stations will be installed throughout Japan to make PHS telephoning possible anywhere in the country. Responding to this demand, Toshiba has developed a power amplifier for PHS base stations.

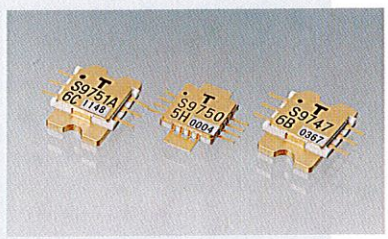


Power amplifier for PHS base station

Because PHS uses digital technology, low distortion is essential for base station power amplifiers. To meet this requirement, Toshiba developed a low-distortion, high-efficiency and high-power GaAs FET for excellent performance specifications. The amplifier has output power of 4W, and can be used in a large cell base station with a radius of 500m. Toshiba has also developed several monolithic microwave integrated circuit (MMIC) amplifiers, with output of 0.3W to 3W, for small cell base stations with a radius of under 500m.



Low-distortion and high-efficiency GaAs FET



MMIC amplifiers for PHS base stations

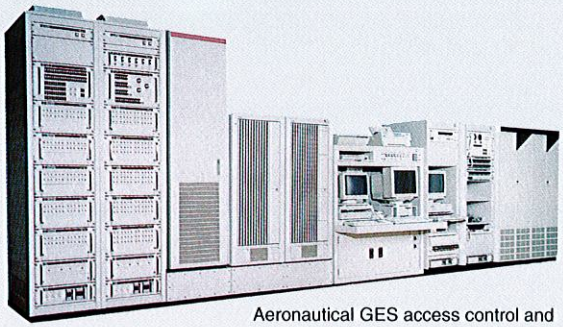
GES Access Control and Signal Equipment for Satellite Communications System

This system provides telephone and data services through the INMARSAT satellite between the terrestrial public telecommunications network and aircraft. Toshiba has already delivered equipment for a ground earth station (GES) to the Kumsan Earth Station of Korea Telecom.

The GES access control and signal equipment delivered by Toshiba can be broadly divided into four areas: modem; communication control (CC); telephone and data interface; and monitor and control (MC). The modem consists of P-channel in packet mode; R-channel at random access; T-channel at reservation time-division multiplexing access (TDMA); and C-channel in circuit mode. All of these are interfaced with the radio facilities on the IF signal.

The CC performs protocol for both satellite and domestic communications, call processing, and operation and maintenance of the system. It also interfaces telephone signals based on the CCITT No. 5 signaling system, and data signals with the X.75. The MC is used for man-machine interface, and monitors and controls the system.

In addition to the telephone service function, the terminal interface function unit (TIFU) mounted on the GES access control and signal equipment is capable of communications via facsimile and V22.bis circuit mode data (2400bps PC communication). The "DATA3" function, which can be connected to an optional terminal, provides data service support.



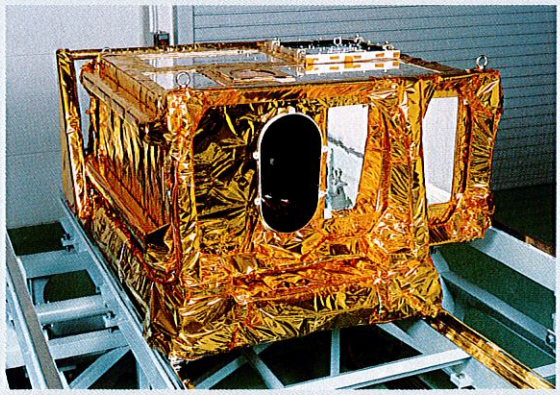
Aeronautical GES access control and signal equipment

Interferometric Monitor for Greenhouse Gases

The interferometric monitor for greenhouse gases (IMG) was developed for the Japan Resources Observation System Organization (JAROS) on consignment from the Ministry of International Trade and Industry (MITI). It will be part of the equipment on board the Advanced Earth Observation Satellite (ADEOS), which will be launched from Tanegashima Space Center in Japan in August 1996.

Development of the IMG began in 1989, and a protoflight model was delivered to the ADEOS project for tests in November 1994. Following a stand-alone test of the IMG as part of the system test, the IMG will be shipped to Tanegashima Space Center.

The IMG will collect data such as measurement of the earth's radiation budget; high-accuracy surface temperature and atmospheric temperature profiles; density profiles of CO_2 and H_2O; amount of ozone; and mixing ratios of CH_4, N_2O and CO in the troposphere.



Interferometric monitor for greenhouse gases