

Research & Development

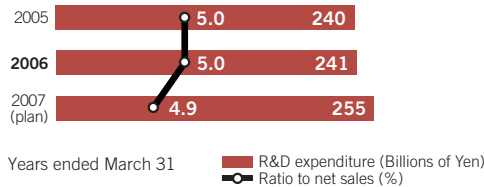
Our Mission in R&D

Aiming to contribute to Fujitsu's technology value chain, we carry out cutting-edge research and development in fields ranging from IT services to computing and telecommunications systems, as well as in supporting fields such as electronic devices and materials technology.

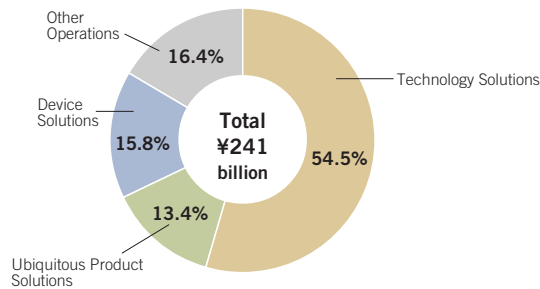
- Foster the creation of new businesses
- Create and accumulate advanced technologies
- Extend our value chain globally
- Fulfill our social responsibilities

Major Achievements in Fiscal 2005

R&D Expenditure



Fiscal 2005 R&D Expenditure by Segment



Organic storage technology

We have developed organic storage technology that utilizes autonomic clusters of hard disk drives to enable large volumes of data to be securely stored and quickly retrieved when needed. The hard disk drives can be hot-swapped with new-generation drives without service interruption, thereby maintaining high levels of reliability and performance. Using this technology, we launched the world's first organic storage service as an outsourcing arrangement. This service enables superior information management in terms of both security and cost performance in response to customers' actual utilization needs, including for documents that are compliant with Japan's e-Document Law and electronic medical records.

High image quality processing technology for PCs and mobile phones

Developed jointly with the NHK Science & Technical Research Laboratories, our encoder technology enables high-quality broadcast services even at low bit rates of around 100 kilobits per second that are suitable for mobile phones and other mobile devices. Compliant with the latest video encoding format, AVC/H.264, this technology, which we hope to develop into the de facto industry standard, is also becoming increasingly important in enabling the high-speed encoding of data-heavy video for large-screen TVs.

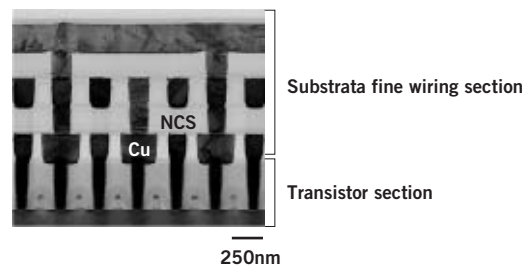
Our Dixel filter makes possible high-resolution, high-quality images on PCs equipped with TV tuners. We have also developed a secure chip that employs original encryption technology to safeguard against the hacking of digital broadcast content, thereby allowing broadcasts of Hi-Vision

quality sound and images to PCs while ensuring proper copyright protection. These technologies are now incorporated in our products.

CMOS multilayer wiring technology for 45nm-generation devices

Fujitsu has been a pioneer in 90nm and 65nm process technologies, which deliver faster processing speeds and reduced power consumption in advanced LSI devices used in various fields, including servers, digital AV equipment, and mobile phones. With the increasing miniaturization of LSI devices, wiring intervals are projected to become even narrower in the years ahead, meaning the use of conventional high-conductivity insulating film would result in diminished chip operating speeds. To resolve this problem, we have developed multilayer wiring technology using copper and a low-k, high-strength polysilica-type nano-clustering silica (NCS) insulating material developed in-house. The technology will enable us to achieve high processing speed and low power consumption in 45nm-generation chips.

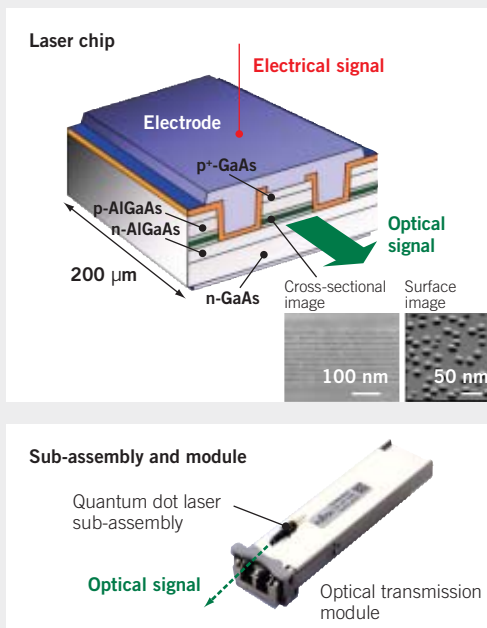
Electron microscope cross-sectional image of copper/NCS multilayer wiring



■ **Strides toward practical application of quantum dot lasers—a key optical transmission technology**

We have teamed up with Mitsui & Co., Ltd. to establish QD Laser, Inc. (QDL), an optical device venture focusing on the practical application of quantum dot* laser technology. The quantum dot laser is an epoch-making laser that outstrips conventional semiconductor lasers in terms of temperature-independent operation, low power consumption, long-distance transmission, and high speed. As such, it is seen as a core enabling technology for high-performance light sources in the field of optical telecommunications, where data traffic is growing dramatically. Through growth in QDL's operations, we plan to advance the practical application of world-class quantum dot laser technology. This will support efforts to enhance our competitive position in the medium- and long-haul optical transmission equipment market, where we are already among the market leaders in Japan and the US, as well as the optical access market, which is projected to expand globally.

* Quantum dots are semiconductor particles measuring a single nanometer (one billionth of a meter) in size, which were developed through cooperation between Fujitsu Limited, Fujitsu Laboratories and the University of Tokyo's Arakawa Laboratory.



Strategic Direction in Fiscal 2006

■ **Develop new solutions leveraging our technology value chain**

We will advance R&D efforts to create high-value-added solutions that leverage and combine our wide array of cutting-edge technologies in IT services, computers, networks, electronic devices and other areas.

■ **Key research themes in fiscal 2006**

- Upstream software & services technologies
- Next-generation computing platforms
 - Next-generation TRIOLE (automation/virtualization/integration)
- Next-generation networks (NGN)
 - Convergent fixed-mobile network technologies
- High-density perpendicular magnetic recording technology
- Verification of CMOS technology for 45nm-generation devices

■ **R&D in emerging new fields to support future businesses**

We are focusing on R&D in emerging new fields to support future businesses, including:

- Peta-scale computing (next-generation supercomputer)
- Next-generation mobile communications technology
- Nanotechnology
- Intelligent Transport System (ITS) technology to improve safety and security
- Humanoid robots with artificial intelligence
- IT that supports lifestyles in an aging society

■ **Promoting joint research to identify new possibilities in technology and products**

We will aggressively pursue joint research with universities, research institutes and corporations worldwide.