

# Research & Development and Intellectual Property

## Research & Development

### RESEARCH & DEVELOPMENT POLICY

With basic policies focused on “increase value through process innovation” and “create value through value innovation,” and guided by the concepts of “surprise and sensation” and “safety and security,” Toshiba Group directs its energies into wide-ranging research activities grounded in Eco & Energy, in areas as diverse as development of new materials and new products and systems, production technology, and technology advances that strengthen differentiation.

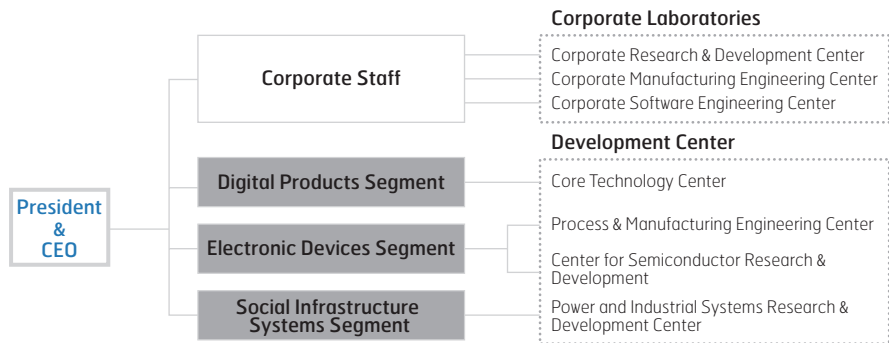
### RESEARCH & DEVELOPMENT ORGANIZATION

Within Toshiba Group, the development centers of in-house companies and group companies do research for today, while the Corporate Research & Development Center does research for tomorrow. Beyond that, we are also advancing measures to take innovation to the global level, promoting research in Toshiba facilities in Europe, the United States, China and Southeast Asia.

**Research & Development Cost**  
(Billion yen)



- Digital Products
- Electronic Devices
- Social Infrastructure
- Home Appliances / Others



### ACTIVITIES IN FY2007

Toshiba Group promotes research & development into technologies and products for its three main business domains, the Digital Products segment, Electronic Devices segment, and Social Infrastructure segment, following a strategic products map designed to lead to Group-wide growth.

In FY2007, as Digital Products segment entered a new phase of growth, we took measures to reinforce our business, starting with semiconductors and nuclear power, by starting to focus on a new paradigm, “Eco & Energy.” At the same time, we took steps to enhance our imaging technologies by further enhancing collaboration between the Digital Products segment and Electronic Devices segment, intensifying efforts to create cross-functional business synergies.

Toshiba Group will continue to create cutting edge technology by promoting constant innovation, with “Creativity for Decommoditized Technology” as a technology slogan.

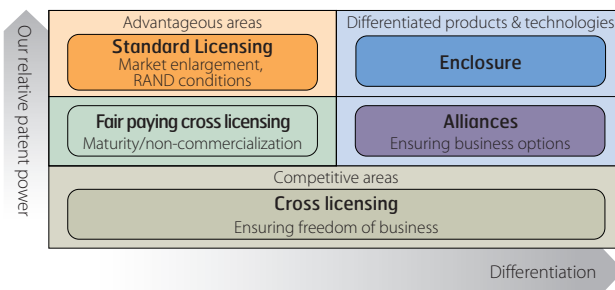
### Major achievement of Research & Development

- Commercialization of LCD TV with enhanced connectivity with AV equipment, etc.
- Commercialization of NAND Flash memory fabricated with 43-nanometer process technology
- Development of the Super Charge ion Battery (SCiB™), an innovative rechargeable battery
- Commercialization of X-ray CT systems that significantly shorten time for 3D imaging of internal organs
- Commercialization of home air-conditioners with industry-leading power saving performance

## Intellectual Property

### INTELLECTUAL PROPERTY STRATEGY

Toshiba Group’s intellectual property (IP) strategy interweaves with its business strategy and research & development strategy to bind the three into one. The intent is to promote proactive measures for realizing sustained growth with high profit that rests on the three pillars of the patent application strategy, patent enforcement strategy, and IP management.



Our patent application strategy centers on building a strong portfolio by proactively filing large numbers of patent applications in core technology areas. Efforts are also underway to strengthen overseas patent applications in support of growth in overseas business.

The Group’s patent enforcement strategy concentrates on preventing outflows of technologies related to core businesses and differentiation, ensuring that they are retained within Toshiba. In connection with this we actively license mature and non-commercial technologies. In addition, we also make use of licenses with RAND (Reasonable and Non-Discriminatory) conditions for technologies related to standardization, cross license to ensure freedom of business, and promote alliances linked to our business strategies.

## Research & Development and Intellectual Property

### Japanese patent registrations (2007)

Ranking		No. of registrations
1	Matsushita Electric Industrial	4,760
2	Toshiba	3,425
3	Ricoh	2,813
4	Hitachi	2,722
5	Canon	2,654
6	Sony	2,641
7	Seiko Epson	2,627
8	Denso	2,611
9	Fujitsu	2,512
10	Honda	2,464

Results shown above are based on survey through PATOLIS

### U.S. patent registrations (2007)

Ranking		No. of registrations
1	IBM	3,148
2	Samsung Electronics	2,725
3	Canon	1,987
4	Matsushita Electric Industrial	1,941
5	Intel	1,865
6	Microsoft	1,637
7	Toshiba	1,549
8	Sony	1,481
9	Micron	1,476
10	Hewlett-Packard	1,470

Source: U.S. IPI Co., Inc.

In IP management, we have worked to train expert IP personnel, to promote management of Toshiba Group's IP as a whole, and to prepare and maintain IP-related regulations.

### IMPORTANT PATENTS AND COMMENDATIONS FOR INVENTIONS

Toshiba Group has a large patent portfolio covering all areas of its business.

#### Digital Products Segment

HDD .....	Inventions related to GMR (Giant Magneto Resistive) heads
Notebook PCs .....	Inventions related to BIOS (Basic Input Output System), mounting and energy conservation
MPEG-4 .....	Inventions related to standard-compliant encoding of moving
DVD .....	Inventions related to optical disks and playback and recording

#### Electronics Devices Segment

DRAM .....	Inventions related to circuit structures and their manufacture
NAND Flash memory .....	Inventions related to circuit structures and their manufacture

#### Social Infrastructure Segment

Equipment for diagnostic imaging systems .....	Inventions related to X-ray CT systems and diagnostic ultrasound imaging systems
IC cards .....	Inventions related to access control to data memory
Nuclear power generation ...	Inventions related to nuclear power plant

#### Home Appliances Segment

Washing machines .....	Inventions related to DD (direct drive) methodology and noise suppression technology
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### NUMBER OF PATENT APPLICATIONS BY BUSINESS SEGMENT (FY2007)

		Corporate Laboratories	Digital Products	Electronic Devices	Social Infrastructure	Home Appliances	Total
Number of Patent Applications	Japan	1,390	1,550	2,010	2,570	410	7,930
	U.S.	990	910	1,220	360	10	3,490
	China	330	260	150	270	30	1,040

Toshiba's high-tech capabilities have earned positive evaluations. In FY2007, the Japan Institute of Invention and Innovation recognized the Group's achievements in contributing to the progress of science and technology and the development of industry with the following awards at the National Commendation for Invention.

#### The Asahi Shimbun Invention Prize: Patent number 2642362

"Invention of MRI system that acquires high-quality images with EPI (Echo Planar Imaging) method"

#### The 21st Century Encouragement of Invention Prize: Patent number 3811142

"Invention of novel rare-earth complexes and application to emission devices"

#### The Invention Prize: Patent number 3346902

"Invention of stitched-pole magnetic heads for ultra-small size mobile HDDs and ultra-large capacity HDDs"