

R&D and Intellectual Property

Technological expertise underpins the Yamaha Group's broad base of operations. Yamaha invests substantially in research and development (R&D) activities that support its progress in advanced technology. Another prime aim for the Group is securing, protecting and utilizing related intellectual property to ensure that Yamaha retains and enhances its competitive technical edge.

Research and Development

Core Technologies and Business Direction

Yamaha leverages the core technological expertise that it has acquired over many years in the fields of sound and music to increase the value of the Yamaha brand and to stimulate new demand by developing and offering innovative, high-quality products and services. At the same time, the Company has earned an excellent global reputation for original design, providing a distinctive customer appeal while boosting the competitiveness of the product range and raising the Yamaha brand profile. Core technical expertise and innovative product design thus constitute important functions for Yamaha.

Going forward, Yamaha will focus attention on developing network-based sound technologies that bring about "sound-filled" lifestyles, as well as materials and devices connected with human senses and emotions. By doing so, Yamaha can generate new business opportunities using its expertise in sound, and continue evolving as "the sound professional" company, even in the realms of human voice and environmental sound. The Company is working, for instance, on blending acoustic, digital signal processing and network technologies to make sound the basis for important aspects of home life, such as security or conveying information.

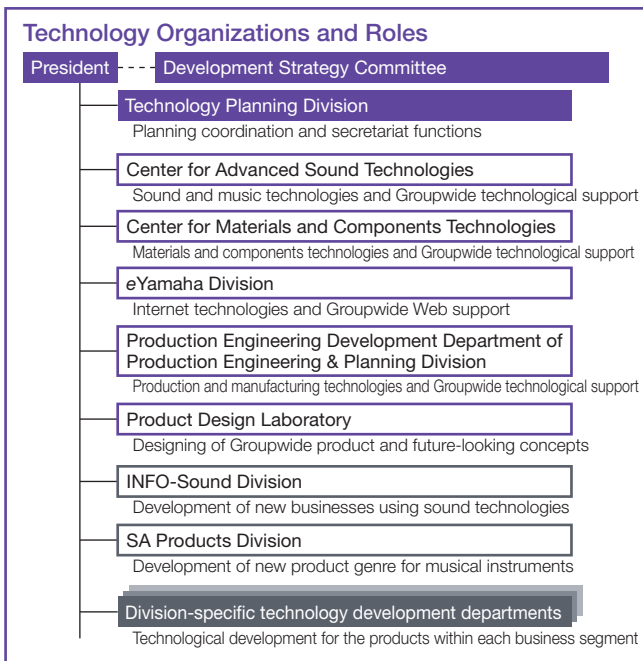
To support future business of this kind, Yamaha invests in core technology improvement as well as employee training to ensure that these skills are passed on and nurtured within its

workforce. Other key aspects of R&D at Yamaha include programs to maintain and upgrade technologies for product development and manufacturing. These efforts strengthen the Yamaha brand and boost the value of the Company's intellectual property and other intangible assets.

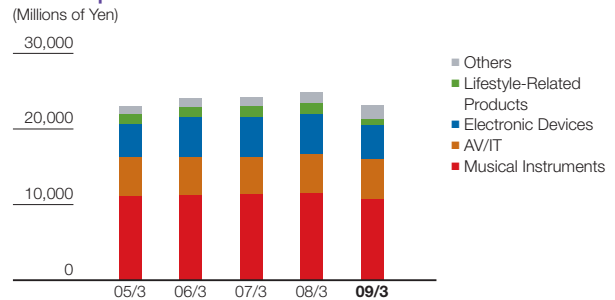
R&D Organization

Yamaha's R&D organization consists of two components—Groupwide R&D responsible for enhancing common Groupwide technologies and research and development for new businesses, and division-specific R&D, where research and development are conducted on technologies for the products within each business segment.

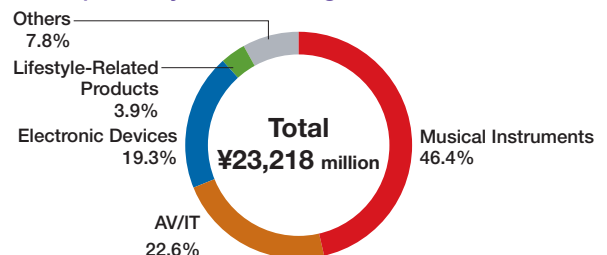
Groupwide R&D divisions include the Center for Advanced Sound Technologies, which develops advanced sound, audio and network technology; the Center for Materials and Components Technologies; the eYamaha Division, which applies network technologies Groupwide; and the Center for Production Technology. Yamaha also conducts most of its product design in-house at the Product Design Laboratory, which continually works to bolster its structure with a view to being a leader in high-quality product design based on a fresh, cutting-edge concept. Meanwhile, new business development is the focus as new sound system technologies are developed at the INFO-Sound Division and SA Products Division.



R&D Expenses



R&D Expense by Business Segment (Year ended March 31, 2009)



AvantGrand™ Hybrid Piano

The AvantGrand is a new piano that offers a true grand piano experience while solving the traditional problems of where to put a grand piano, or whether sounds will leak into nearby areas.

Making this piano possible is the host of “AvantGrand” technologies found inside. One is the AvantGrand Exclusive Grand Piano Action, offering the real feel of playing a grand piano. Another innovation is a Specialized Grand Piano Pedal for AvantGrand, which recreates the finesse of traditional grand piano foot pedals, as well as Spatial Acoustic Sampling that accurately captures the rich, resounding sound of a grand piano. There is also a Spatial Acoustic Speaker System that comfortably delivers sound to the pianist, along with a Soundboard Resonator that allows a more subtle reproduction of the buildup of sound felt by pianists when playing a grand piano. Then there is the Tactile Response System, which enables players to experience natural reverberations in their hands and feet as one would with a grand piano. Through these technologies, the AvantGrand piano offers a true grand piano experience born as a hybrid of cutting-edge 21st century technology and more than 100 years of piano-crafting experience.



BODiBEAT™ Interactive Music Player

The beat of the run put to music.

BODiBEAT is an innovative, sports-science-based portable music player from Yamaha that integrates music with the body for a more enjoyable running or walking experience.

BODiBEAT comes with exercise programs such as “free workout mode,” which automatically selects and plays songs with a tempo matching the user’s running or walking pace. Other features are “fitness mode” and “training mode,” both of which were supervised by Prof. Senshi Fukashiro, an expert in sports science at the University of Tokyo Graduate School of Arts and Sciences. This mode automatically selects and plays songs for the most effective aerobic workout based on the user’s heart rate and age.

If no songs with the proper tempo are in the device’s memory, the BODiBEAT Mixer (patent pending), which uses the device’s internal sound source and sequencer to create music, will automatically produce a song with a tempo appropriate for the user’s running or walking pace.



PDX-50 Portable Player Dock

Yamaha has developed the PDX-50, a wireless portable player dock equipped with the Company’s proprietary AirWired™*1 digital wireless transmission technology that users operate by using their iPod®*2 as a remote control.

To play their iPod wirelessly through the PDX-50 speaker, users simply attach the bundled transmitter to their portable player. The iPod can then control not only music playback but also power and volume on the PDX-50. The user’s iPod effectively becomes a remote control for their music enjoyment.

The use of Yamaha’s own AirWired digital wireless technology for the PDX-50 enables wireless playback with a voice delay of just 12 ms. This is the gap between onscreen images and voice that typically goes unnoticed if watched normally. When watching video on the iPod, the PDX-50 is free of the stress sometimes felt with ordinary digital wireless transmission, allowing users to enjoy the true-to-life sound possible with the PDX-50. AirWired also employs uncompressed PCM, a digital sound format that prevents deterioration in sound quality, resulting in clear and natural high-quality sound.



*1 yAired™ in the North American region

*2 iPod is a trademark of Apple Inc. registered in the United States and other countries.