

R&D and Intellectual Property

R&D Strategy

Sharp conducts R&D activities with the goal of developing the technologies needed to constantly create one-of-a-kind products from the perspective of users. The final objective is to ensure that customers are satisfied with Sharp products. To accomplish this objective, we focus on three approaches to R&D. First is creating unique products through the vertical integration of our core technologies. Second is leveraging commodity technologies shared in and outside of Sharp. Third is using “open innovation” and cooperation with partners to gain expertise in fields of technology that are new to Sharp. Using all three approaches allows us to perform R&D that is distinctive, speedy and efficient.

Home energy visualization system

Sharp has developed a home energy visualization system enabling real-time confirmation of the power consumed by home appliances, as well as the amount of power generated and sold by a solar power generation system. While the conventional system only displays the total power consumed by one breaker, Sharp’s system enables confirmation of the power consumed by individual appliances by attaching dedicated plugs, which transmit power consumption data, to sockets within the home. The plugs can be installed easily without requiring special wiring work, and data on the amount of power generated and amount of power consumed by each appliance can be seen on a dedicated tablet terminal via a repeater. Sharp will continue to create products that raise awareness of saving electricity and support comfortable energy-saving lifestyles.



Image of home energy visualization system

Dye-sensitized solar cell technology

Sharp is working to develop dye-sensitized solar cells, which are drawing attention as low-cost next-generation solar cells. Dye-sensitized solar cells use pigments to convert light energy into electrical energy in a process similar to the photosynthesis that plants go through. For this reason, dye-sensitized solar cells have a structure

that is simpler and materials that are cheaper than the traditional silicon-based solar cells, and expectations are placed on its potential for mass production at low cost. In addition, the high degree of freedom in processing methods and dye materials enables it to be manufactured in a variety of designs and colors. In terms of energy conversion efficiency, with such results as 11.0% for a 1cm × 1cm cell and 9.0% for a 15cm × 15cm module*¹, Sharp has developed a world-class technology*². Going forward, Sharp will strive to increasingly enhance conversion efficiency as well as improve reliability and durability in an aim for early commercialization.

*¹ Values measured by the public research institute National Institute of Advanced Industrial Science and Technology

*² Achieved as a result of conducting research based on entrustment from the Incorporated Administrative Agency New Energy and Industrial Technology Development Organization (NEDO)



Dye-sensitized solar cell modules

Recovery support system for elderly motor function

Sharp has developed a motor function recovery support system that links medical institutions and the homes of the elderly via a high-speed communications network to enable the elderly to be instructed by physical therapists in their own home. This utilization of IT combining TVs, sensors, and other devices enables ongoing proper training. With this system, it is expected that there are also economic and social benefits in that it can reduce the burden such as medical and nursing care costs. There are also benefits for medical institutions in that, based on gait tests, blood pressure measurements and other data, physical therapists can conduct real-time instruction and detailed medical management. Going forward, Sharp will verify the effectiveness of the system by testing it at medical institutions with the aim of putting it into practical use.



Image of recovery support system for elderly motor function

Ultra-low-reflection surface treatment technology (moth-eye technology)

Sharp has developed a technology that realizes ultra-low-reflection surfaces with reflectance of 0.1% or less by forming moth-eye-like nanostructures on film. It also features the outstanding property of being able to provide wide-angle high-level visibility, and use of nanoimprinting technology* enables mass production of ultra-low-reflection surface treatment film at a low cost. With this ultra-low-reflection surface treatment film, a variety of applications are available, such as for TVs, tablet terminals and digital signage, and significantly minimizing reflected glare on the screen can realize displays of a higher picture quality. In addition, applying the film on show windows and other glass prevents the reflection of light from illuminations and so applications other than screen displays can also be expected.

* A technology for forming concavoconvex structures that are several tens of nanometers to several hundreds of nanometers in size through the transfer of the pattern onto resin using a mold

Super Hi-Vision LCD

As the world's first direct-view type display for a next-generation, high-definition TV broadcast service, Sharp has developed* an 85-inch LCD (7,680 horizontal × 4,320 vertical pixels). This was achieved by enhancing display quality utilizing Sharp's proprietary UV²A technology. Super Hi-Vision, which is a next-generation TV broadcast service advocated by Japan Broadcasting Corporation (NHK), is a super-high-definition display system with a number of pixels that is 16 times as many as that of the current HDTV broadcasting, and when seen on a display with a large screen, provides an overwhelmingly realistic sensation and a powerful visual experience. Sharp will continue to work on the development of displays, through collaboration with NHK, that realize high-definition images toward the start of its experimental broadcasting, which is scheduled for 2020.

*Jointly developed with NHK



85-inch Super Hi-Vision LCD

Intellectual Property Strategy

Sharp views its intellectual property strategy as one of its key management measures, promoting it in a coherent manner with business and R&D strategies. In order to secure a competitive edge with one-of-a-kind products and one-of-a-kind devices for stronger business foundations, Sharp is aggressively promoting patent right obtainment.

Sharp has clearly delineated the fields that are central to each business group and has assigned engineers well versed in patent matters to each of these core business areas to conduct strategic patent development* close to the frontline. Sharp also obtains useful patents arising from alliance activities from collaboration with other companies or universities. As of March 31, 2012, Sharp had approximately 20,644 patents in Japan and 24,232 overseas.

Sharp utilizes these patents to strengthen its strategic businesses. In addition, we take actions to protect our patents, such as by examining the products of competitors. We exercise care concerning the intellectual property of other companies, however, our policy is to have other companies respect our intellectual property in return. If we discover an infringement on any of our patents, we issue a warning. In certain cases, more aggressive action is taken, including filing lawsuits. Sharp is also promoting obtainment of design and trademark registrations based on its brand strategy and aiming to increase the number of applications and registrations globally.

* International patent applications (PCT applications) in 2011: Sharp ranked 4th among applicants (WIPO data)