

NEC Video Display Technology Supporting Digital Image Communications

Video data, which can carry a huge quantity of information, will play a starring role in the age of digital communications. While the development theme for the technology to display this video data covers a diverse and broad scope, the focused area of attention in this article is the liquid crystal display (LCD). We would like to introduce some of directions pursued by the NEC Group in the development of LCDs and of the innovative products that have resulted. In the field of LCDs, we will explain some of the technology that makes possible our LCD products that boast high added value. In the field of projectors, we will look at technology trends that have led to solutions and intelligent functions that make using projectors more convenient and user-friendly, and introduce some of the NEC products that feature them. In each and every one of these advances and products, you will catch a glimpse of the spirit that both defines the NEC Group and is realizing the potential of "Digital Image Communications."

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1 General Development Trends in Video Display Technology

In the digital communications era, image data, which can carry an overwhelming amount of information, is becoming an important media. Every year the display technology for video data seems to make another evolutionary leap, always aspiring to achieve "more realistic," "more dynamic" communications with "enhanced functionality."

In the field of video display which is benefiting from considerable advances in technology, the focus of attention is mainly on LCDs.

In the area of direct-view displays, the market has seen a shift from the venerable cathode ray tube (CRT) to the flat panel display (FPD) overwhelmingly dominated by LCD technology. However, LCDs are already feeling the pressure of products that are built around the various new technologies such as plasma display panels (PDP), surface-conduction electron-emitter displays (SED) and organic light emitting diode displays (OLED). In response, efforts to innovate LCDs are concentrated in two directions: cost reduction and functional/performance enhancements.

In the case of projectors, the battle goes on between LCD projectors and Digital Light Processing (DLP) projectors. While seeking ever higher resolution, more compact design, lighter weight, low energy consumption and lower cost, we are devel-

oping technology that delivers greater user-friendly projection solutions for every imaginable occasion and introducing new intelligent functions. In this article, we put the spotlight on the directions of NEC Group's development in the fields of LCD and projector technology and the NEC products that feature them, and provide an introduction to what's happening at the cutting edge of video display technology.

2 Directions for Development in NEC Group and the Products

2.1 In the Field of LCDs

A variety of displays and IT monitors that carry the NEC brand are used around the world. Remarkable strides have been made in enlarging the size of LCDs, increasing resolution, widening the view angle as well as improving response time, brightness, moving image characteristics and color expression. There is also a growing attention to LCD monitors, even as displays for medical usage which demands high-quality and high-resolution display performance that delivers "more realistic" images. In the case of monitors used in the dealing rooms of financial institutions and for color matching in printing, LCDs are winning praise for their thin frames, long-distance signal transmission, high image quality correction features and the broad range of color expression. For example, LCD screens with LED backlighting can yield as much as approximately 1.5 more compre-

hensive color gamut than a conventional CRT.

At the same time, we cannot overlook the advances in manufacturing technology that are making the production of LCDs with high-added value possible. For example, there is the ion beam treatment process for liquid crystal alignment used in the production of LCD panels. The replacement of the conventional rubbing alignment technique with ion beam irradiation to form atomic-scale rows at high speed has made high-precision surface treatment possible. The development of System On Glass (SOG) displays, in which low-temperature poly-Si thin film transistor (TFT) circuits are monolithically integrated on display panels, has been advancing rapidly in recent years.

LCD Public Display Technology is another product that epitomizes NEC Group's pioneering work in integrated solutions. Using these giant LCD screens set up in public places such as airport lobbies and retail premises, it is possible to "more dynamically" communicate and express image information.

2.2 In the Field of Projectors

As was described previously, manufacturers of projectors around the world are in fierce competition, and as a result of higher resolution, more compact/lower weight, improved energy efficiency, and falling prices, this product segment has continued to grow. According to Fuji Chimera Research Institute, the penetration of projectors in the market is expected to increase from 3.27 million in 2004 to 62 million in 2008.

In this field, NEC Group is not only seeking a competitive advantage through superior responses to challenges such as described above, but also is rising above competition with proposals for "more dynamic" and "more functional" communication of image data, founded on a deep understanding of the "real world" circumstances and scenes in which projectors are used.

For example, NEC's ultra-short throw projector uses a unique configuration of mirrors to throw a giant 100-inch image from a distance of only 65cm. As a result of this technology, space restrictions no longer determine whether a projector can be used. It can be set up in small conference rooms, living rooms and even in shallow retail show windows.

Wireless LAN-compatible projectors are also attracting increasing attention. It can be said that the rapid and widespread adoption of wireless LAN and its freedom from location restrictions have had impact on IT devices in general, and the field of projectors is not immune as evidenced by the signs of a growing trend of wireless LAN projectors. However, bandwidth limitations have been criticized as a technological bottleneck. The focus has been on how to transmit rich image data within the actual 4 to 6Mbps rate of the IEEE 802.11b standard, and through originally developed compression/expansion algorithms, NEC has solved this problem.

Another proposal from NEC that is attracting much attention is the incorporation of 5 functions in a single projector. In addition to the conventional function of a projector, NEC has made it possible for users to employ the same device as a "document

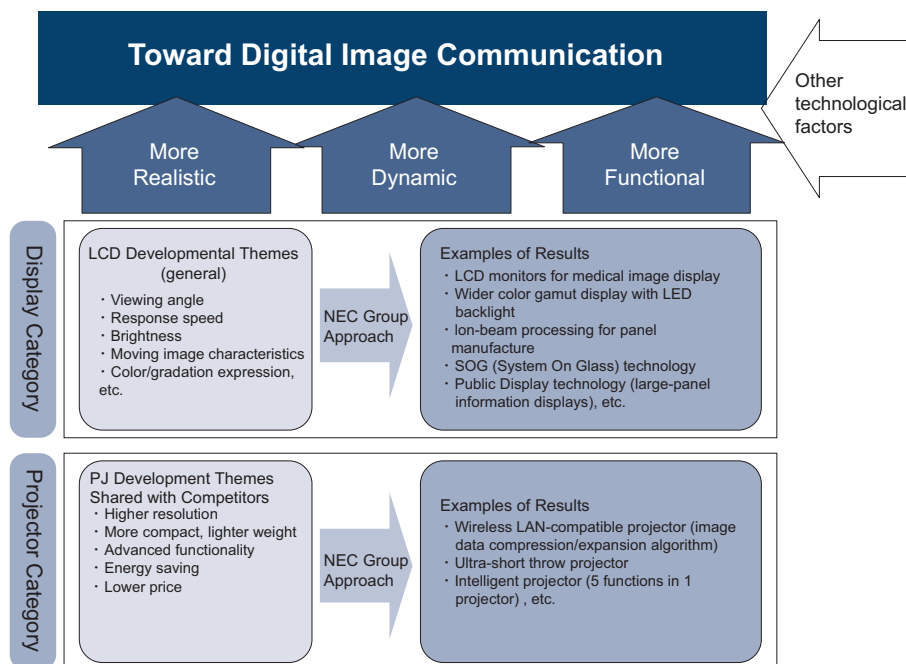


Fig. NEC's development map for video display technology.

camera,” “scanner,” “white board” and “data storage.”

3 The Future of Video Display Technology

Within the field of video display technology, there are a variety of sub-genres, and the scope of the constituent technologies of each is clearly broad, and there is a high degree of overlap. Also in recent years, the addition of “ubiquitous”-related hardware and software technologies have made development themes increasingly complex and diverse.

While this article has mainly focused on the LCD field, the scope of NEC video display technology naturally goes far beyond this genre. In order to better understand the future of video display technology including LCDs, it may be best to illustrate NEC’s concept for “Digital Image Communication.”

As described in the beginning of this article, the trend in “Digital Image Communications” is towards the realization of “more realistic,” “more dynamic” and “more functional” communications.

In the future, IT devices for general business use and every imaginable personal use will incorporate functions for exchange of image data as well as the integration of display (monitor) and communication functions. Moreover, these devices can all be networked, facilitating freedom to share information on a one-to-multiple or a multiple-to-multiple unit basis and creating a new communication environment. And with the steady progress toward “ubiquity” in the infrastructure of society, we will eventually be able to exchange image information “anytime, anywhere and from any device.”

Also in response to specialized needs such as in the industrial and medical fields, we will see technology that can accurately reproduce the color, expression, state and texture of original content with high-speed response and a clearly high degree of resolution and contrast.

While all the technology and products to support this vision of “Digital Image Communications” steadily move forward toward realization, we also can expect to see advances in the development of software tools that support the easy editing and processing of image data, improvements in the legal system for the protection of content-related intellectual property rights and the development of security measures and innovative business models.

Boasting comprehensive technological capabilities from hardware to software, NEC Group is expected to play a leading role in unlocking the full potential of “Digital Image Communications.”