

Research and Devel

Giving More to Society through Advanced Technologies

Ubiquitous Services—able to satisfy user demands to obtain information, products, and services wherever, whenever and with whatever—continue to expand as the e-Society evolves. OKI supports the development of this e-Society by pushing the boundaries of R&D in six specific areas to provide leading Ubiquitous Services.

Six Areas of Technological Development in Provision of Ubiquitous Services

- 1. Ubiquitous Networks:** Technology that provides individuals with freedom of activity, anytime and anywhere. OKI engages in the development of technologies for NGNs, industry-leading IP networks, and advanced wireless and sensor networks.
- 2. Network Dependability:** Technology that provides individuals the secure use of safe, authentic services, such as biometric identification systems and security technology for network-based settlement.
- 3. Rich Media:** Technology that allows individuals to precisely obtain the desired services and data, in the right format, including technology that smoothly delivers video images and integrates telecommunications and broadcasting.
- 4. Customer Concierge:** Technology that offers individuals services to meet their precise needs, including administrative applications and electronic ticketing systems as well as ITS developments for the private sector.

5. Smart Mechatronics: Advanced infrastructures for using ubiquitous services based on OKI's well-developed mechatronics know-how, such as ATM systems and printers.

6. Ubiquitous Devices: Technology that makes ubiquitous infrastructures possible. OKI utilizes semiconductor and component technology capabilities gained by concentrating on the development of personal and mobile devices.

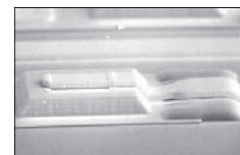
OKI maximizes efficiency in its R&D efforts by delegating basic research functions to its Corporate Research and Development Center and entrusting product development to the development departments of each in-house company. To create advanced technologies, commercialize products flexibly and rapidly, and link basic research with product development, OKI has established the Business Incubation Division within the Systems Network Group under the Info-telecom Systems segment. By promoting Group-wide project cooperation, OKI is accelerating the creation of new technologies and businesses. Research at the level of elemental technology development is promoted through business-academia collaborations.

World's First Mass Producer of Thin-Film Bonding Technology for Dissimilar Materials

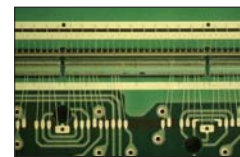
OKI has become the first in the world to successfully develop and commercialize Epi Film Bonding (EFB) technology, which is able to bond thinned materials on top of dissimilar materials without the use of adhesives by taking advantage of the phenomenon known as intermolecular bonding force. EFB can be safely peeled from surfaces without causing blemishes, bonded to different raw materials, and integrated into semiconductor processes. This technology dispenses with the need for wire bonding that was previously necessary for dissimilar materials and has reduced the number of chips used in electronic devices. EFB technology endows increasingly dense, multi-layered semiconductors with faster speeds and lower power consumption, which opens up many possibilities in developing a variety of IC devices.

OKI has applied its proprietary EFB technology to create a new type of LED print-head for printers. Thinned LED array chips and driver IC chips that have been integrated using intermolecular bonding force are, as a single unit, half the size of conventional LED print-heads. EFB technology also contributes to lowering fabrication and material costs, thereby improving cost efficiency. These heads debuted in the C3400n, a compact, high-speed color LED printer, and will be featured in subsequent OKI color and monochrome LED printers. By developing this technology, OKI plans to develop ultra small print-heads and heads with 1200dpi or more to enable higher resolution printing.

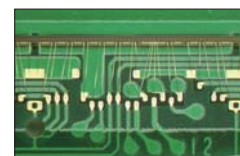
OKI will use this technology to further its research into smaller, lower cost ICs that consume less power as well as to realize developments such as ultra-compact LED displays. Recognizing this technology's potential, OKI has launched a Group-wide research unit to investigate adapting this technology in other fields.



Thinned LED and driver IC integrated with EFB technology



Conventional LED print-head



New LED print-head

opment

1.

Japan's First Iris-Pattern Recognition System for Camera-Equipped Mobile Phones Introduced

The variety of new mobile phone-supported services, such as payment services, is growing in step with increasing mobile phone functionality. These trends have brought about an increasing need for higher levels of mobile phone security to ensure both the security of the services offered and guard against abuse of personal information in the event of mobile phone loss or theft.

In response to these rapidly changing needs, OKI has become the first company in Japan to develop iris-pattern recognition technology for camera-equipped mobile phones. The great complexity and randomness inherent in human iris patterns permits highly precise identity authentication. Thanks to its use of newly developed algorithms and compact programs, OKI was able to integrate iris pattern recognition technology into standard mobile phone cameras and eliminate the need for the infrared cameras that were previously used. Based on this development, OKI is endeavoring to apply this technology to camera-equipped PDAs*1 and other products to provide greater levels of security



Iris-pattern recognition on mobile phone

*1 PDA: Personal Digital Assistant

2.

Advanced eSound™ and eVideo Technologies

OKI's eSound is an advanced VoIP technology that offers much improved voice and sound quality. With a frequency range from 300 Hz to 3.4 kHz that far surpasses conventional phone voice data transmission, eSound gives users a feeling akin to voice quality of speaking face to face.

To offer this same high-quality sound to users of conventional phone services, OKI recently added My eSound™. This technology improved sound quality by using low sound voice data to create and modify high sound voice data that is filtered out by conventional phones.

OKI's eVideo technology enables compressed transmission of video images—ranging from narrow-transmission-band mobile terminal videos to high-definition, high-quality images—over IP networks. While compliant with international standards with regard to video encoding methods, OKI is working to integrate proprietary high-speed, high-quality technologies with IP network technologies to bring about high-quality image and video transmission.

In addition to building these two technologies into its own IP communication devices, OKI also provides them as software engines to telecom carriers and device vendors.



3.

World's First Isolator-Free Optical Transmitter Module Developed for Practical Use

Utilizing gain-coupled DFB*2 laser technologies, which reduce noise deterioration, OKI was able to develop the industry's first practical-use isolator-free optical transmitter module. This new development dispenses with the need for the optical isolators previously used in optical transmitter modules for long-distance transmissions. The newly developed gain-coupled DFB laser boasts several favorable characteristics such as production cost that is relatively the same as that for previous DFB lasers, little degradation of reception sensitivity and superior light-reflecting properties. These have in turn eliminated the need for high-cost isolators within the module component and helped to bring low-cost, compact transmission module development to fruition.

Taking this technology further, OKI will continue to advance the development of products fitted with compact, low-cost, optical transmission components with its proprietary silicone lens technology.



Gain-coupled DFB laser

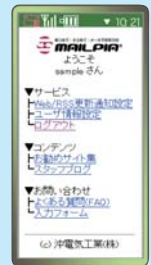
*2 DFB: Distributed Feedback laser

4.

MAILPIA® New Mobile Phone Service

MAILPIA is a notification system that alerts users of content updates to their favorite Web sites via an e-mail sent either to their mobile phone or personal computer. Signing up for MAILPIA updates couldn't be simpler; users just register any Web site, blog URL or related keyword of their choice via the MAILPIA Web site. Making registration even easier for those who use mobile phones to access Web sites—usually intended for personal computer Web browsing—OKI has launched a mobile-browser-supported service site that cuts down on access and download time, making mobile access to MAILPIA seamless and simple.

OKI will continue to promote the use of its MAILPIA mobile service site as one approach to developing its Web content service business.



MAILPIA