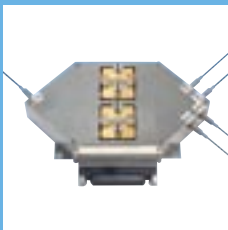


# Research and Development

The Oki Group undertakes research and development activities primarily under the theme of "ubiquitous networks and services" in its pursuit of realizing the e-Society. The research and development functions within the Group are optimally categorized depending on their nature: the Corporate Research and Development Center takes on basic research while the development departments of each in-house company conduct product development. In order to actively create new technologies and commercialize new products, Oki has established the Business Incubations Division within the Systems Network Business Group under the Info-Telecom Systems segment, for realizing a seamless connection between basic research and product development. Furthermore, through the promotion of Group-wide projects, Oki will accelerate in step with market trends the creation of new technologies and businesses that require cooperation among in-house companies and segments. Oki also promotes research activities at the level of elemental technology development through business-academia collaborations.

## World-First High-Speed Long-Distance Transmission of Data Equivalent to Four Movies

The Oki Group succeeded in an experiment of transmitting data, which included hi-definition video, at 160 Gbps over a distance of 635 km. The rate of 160 Gbps is equivalent to the transmission of four movies (approximately 8 hours of video) in a single second. This experiment was conducted as part of the Research and Development on Ultra-high-speed Backbone Photonic Network



Optical time division multiplexing module used for the experiment

Technologies, consigned by the National Institute of Information and Communications Technology (NICT).

Oki's transceiver used in the experiment reduces optical coupling loss by half, and is one-third the volume of previous models. The transceiver boasts 16 times more data transmission capacity compared with the models currently commercialized.

## World-Pioneering Development of Optical Access PON Capable of Bidirectional, Single-Wavelength, 100km-Distance Optical Data Transmission

The Oki Group has successfully developed the COF\*<sup>1</sup>-PON\*<sup>2</sup> system, which is the first of its kind in the world. This system enables long-distance data transmission over 100 km using the same wavelength for both uplink and downlink signals on a single



COF-PON system

optical fiber.

In the field of broadband access services provided by telecom carriers, higher capacity networks are increasingly introduced with the goal of establishing broadband multimedia services. Oki's COF-PON system not only helps telecom carriers to reduce costs in

relation to building optical access networks, but also responds to market demands for wider ranging and higher quality optical access services.

\*1. COF: CDMA (Code Division Multiplexing) On Fiber

\*2. PON: Passive Optical Network

## Development of GaN-HEMT on Silicon Substrate with World-Best Amplification Characteristics

The Oki Group has proved successful in developing a gallium nitride high electron mobility transistor (GaN-HEMT), a power transistor for wireless communications applications on a large diameter silicon substrate with the world's best amplification characteristics. This power transistor has been developed jointly with the Nagoya Institute of Technology. Existing power transistors have used substrates made from silicon carbide, which is highly priced and difficult to produce in large sizes. For Oki's new power transistor, however, a general silicon substrate has been adopted, making it possible to reduce manufacturing costs by half. Through this development, the Oki Group will contribute to the evolution of wireless communications systems targeting lower power consumption, more compact size and lower manufacturing costs.

## Technological Development of Ubiquitous Sensor Network Based on the ZigBee Standard

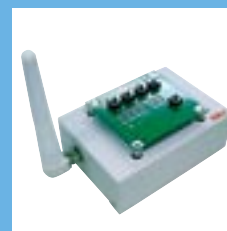
In the "ubiquitous sensor network," various information appliances around us autonomously collect and manage information. The application of these networks is expected to increase in many fields, including home appliances, disaster and crime prevention, healthcare, logistics and production. The Oki Group has successfully developed and commercialized the one-chip LSI, the ML7222, which is compatible with ZigBee, a low rate wireless



ML7222

communication standard characterized by low power consumption and costs. There are high expectations for this new chip, such as for security management, to contribute to the realization of wireless sensor network applications.

The research and development activities in this field, conducted jointly with the University of Fukui, focus on telecommunication timing control



Compact, power-saving ZigBee wireless node

methods for higher telecommunication efficiency and flexibility in ubiquitous sensor networks. On the subject of location positioning in ubiquitous sensor networks, the Oki Group engages in the joint development of a new method with Osaka University and Osaka City University. In line with these research and development activities, the Oki Group also conducted the world's first application experiment of the Ubiquitous Airport Information Service at Kobe Airport using ZigBee wireless nodes.