Coherent Terabit

Communication & Instrumentation

Coherent Terabit Communication (CoT) is the key technology for ultra-high speed data transmission. Using optical fibers, hundreds or even thousands of kilometers can be bridged with CoT to connect cloud data centers and access networks with Terabit/s speed. CoT can also realize Terabit/s wireless connectivity using THz frequencies over up to 1 km distance for mobile front- and backhauling as well as for indoor/ outdoor access scenarios.

CoT Instrumentation allows to explore this technology for many use cases, both on research level as well as in product prototyping.

Range of Products

Coherent optical transport

- High-bandwidth dual-polarization I/Q transmitters (OMFT, 40 GHz)
- High-bandwidth polarization-diverse coherent receivers (CRF, 25/40/70 GHz)
- Optical loop control (OSLC) for emulation of metro and longhaul transmission
- Extensive library of lab-proven DSP algorithms available as VPItoolkit™ DSP Library

Rapid real-time prototyping

- MicroTCA-based modular prototyping platform
- Various plug-in boards like 65-GS/s DACs, 56-GS/s ADCs, FPGA processor, optoelectronic front-end
- High-bandwidth backplane interface (>1Tb/s)
- Ethernet interface for control and network integration
- Ready-to-use IP cores for hardware interfacing
- Reference IP core implementations of real-time DSP for various transmission systems

Lab-as-a-service

- ISO 9001 certified
- Optical transmission loop testbeds (C+L band)
- High-performance equipment for digital/analog > 60 GBd QAM signal generation and reception
- Different fiber types (terrestrial, submarine, multi-mode/core)
- On-chip measurements (RF and optical coupling)
- Lab-proven digital signal processing
- Rich experience in component characterization

Fraunhofer HHI

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COHERENT TERABIT

COMMUNICATION & INSTRUMENTATION

Reference Project:

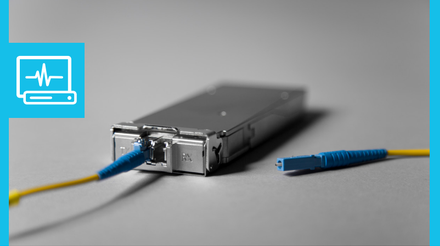
SENDATE SECURE-DCI

In the SENDATE project, Fraunhofer HHI develops technologies for next-generation distributed data centers together with partners from industry and academia. Cost-efficient coherent transport will allow a flexible and secure provisioning of compute, storage and networking resources to tenants and applications at scale.

Reference Project:

TERRANOVA

In the TERRANOVA project, Fraunhofer HHI develops real-time prototypes for next generation wireless communication systems operating at THz frequencies together with partners from industry and academia. The prototypes will help to prove reliable wireless high-speed connectivity towards Tb/s in a real-world 5G network.



Reference Project:

INDUSTRY-LEADING CUSTOMERS

Global technology leaders in optical communications choose Fraunhofer HHI as trusted service partner. Sophisticated component characterizations and tests in state-of-the-art system experiments give valuable feedback to developers to expand their excellency in component and system design.

About

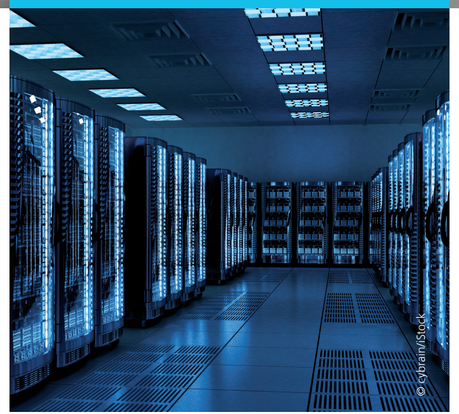
Coherent Optical Transport

Optical fiber communication networks provide the required capacity and reliability for today's high-bandwidth internet applications and services. Coherent optical transmission techniques allow to modulate amplitude, phase and polarization of the light for data transport resulting in unprecedented per-channel data rates up to terabits per second.
Thanks to its high spectral efficiency, flexibility and robustness, coherent optical transport is a widespread technique for longhaul transmission. Currently, it is also migrating to data center interconnect, access and short reach scenarios.

Fraunhofer HHI offers high-performance coherent transport prototypes for research and development applications.

Facts

- High-bandwidth dual-polarization I/Q transmitters (OMFT, 40 GHz)
- High-bandwidth polarization-diverse coherent receivers (CRF, 25/40/70 GHz)
- Optical loop control (OSLC) for emulation of metro and longhaul transmission
- Extensive library of lab-proven DSP algorithms available as VPItoolkit™ DSP Library



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SENDATE Secure DCI

Fraunhofer HHI

About

Rapid real-time prototyping

Digital signal processing (DSP) has become an ubiquitous tool in coherent communication systems, vastly increasing data rates, flexibility and robustness. Real-time DSP processing of tens and hundreds of Gb/s per channel needs large application- specific integrated circuits which are extremely costly and time-consuming to develop. Rapid real-time prototyping using a flexible, reprogrammable DSP hardware based on field-programmable gate arrays (FPGAs) speeds up development cycles and saves cost while offering all advantages of a real-time implementation.

Fraunhofer HHI offers a highly flexible hardware platform for rapid real-time prototyping of new transceiver concepts for the Tb/s regime.

Facts

- MicroTCA-based modular prototyping platform
- Various plug-in boards like 65-GS/s DACs, 56-GS/s ADCs, FPGA processor, optoelectronic front-end
- High-bandwidth backplane interface (>1Tb/s)
- Ethernet interface for control and network integration
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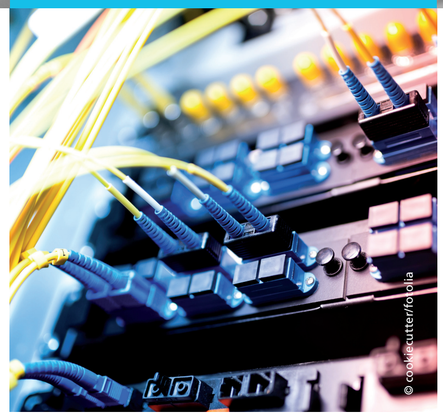


European Commission

Fraunhofer HHI

TERRANOVA

Leistungszentrum Digitale Vernetzung

About

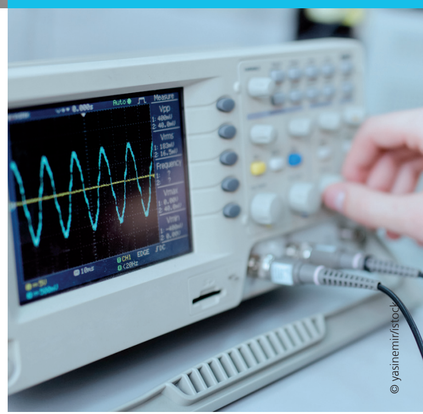
Lab-as-a-service

Innovating coherent communication systems towards Tb/s per-channel capacity requires sophisticated know-how on component, system and network level. Precise characterization, careful optimization and accurate performance evaluation in a system laboratory with cutting edge equipment saves time and cost when working with a partner that has rich experience and dedication to excellence.

Fraunhofer HHI provides test & measurement services for high-speed coherent communication systems with experienced staff in a world-class system lab environment.

Facts

- ISO 9001 certified
- Optical transmission loop testbeds (C+L band)
- High-performance equipment for digital/analog > 60 GBd QAM signal generation and reception
- Different fiber types (terrestrial, submarine, multi-mode/core)
- On-chip measurements (RF and optical coupling)
- Lab-proven digital signal processing
- Rich experience in component characterization



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