

OPTICAL REMOTE NODE DEVICE AND SUPPORT EQUIPMENT FOR CONSTRUCTING AND EXTENDING FIBRE-OPTIC ACCESS NETWORKS

The Remote Node performs all-optical interfacing between a metropolitan ring and the access trees to the homes, thus enabling a transparent metro-access converged optical network. The device performs the functions of wavelength add&drop, ring protection and optical amplification with remote pumping. It is composed by a number of optical elements not requiring electrical power supply.

The Challenge

Conventional fibre-to-home networks, also known as Passive Optical Networks (PONs), have a tree-like structure with the central exchange office at their root and the homes at the branch ends, using Time Division Multiplexing (TDM) to split the trunk capacity into tenths of Mbit/s to each home.

The challenges for Next-Generation Fiber-to-the-Home (FTTH) networks are to multiply the bandwidth capacity, up to GBit/s per home, by introducing the wavelength-division-multiplexing (WDM-PONs), to increase the distances and the number of homes that can be connected to a common infrastructure, and to provide new functionality like protection and dynamic bandwidth allocation.

The Technology

The proposed design enables a new metro-access architecture consisting of a bidirectional central ring, operating with WDM, and access trees, operating with TDM, all-optically interconnected with the proposed Remotes Nodes. These are composed by several interconnected sections:

- ◇ dual coupler/mux extracting wavelength signals of the metro network and inserting the upstream signals at the same wavelength.
- ◇ diversity couplers to enable metro ring protection in case of ring cut.
- ◇ optical fibers doped with Rare Earth element providing optical amplification to down and upstream signals, organized in crossed configuration to avoid impairments.

Innovative advantages

- Bandwidth capacity multiplied by 32 thanks to the combination of TDM and WDM
- Features distributed add/drop for flexible network growth
- Enables automatic ring protection
- Enables the use of colorless ONUs at the customer premises and down-up wavelength reuse
- Extends the distance reach from 20 km to 100 km
- Extends the number of homes from 64 up to 1024, per ring
- Multi-operator transparent solution, sharing a common optical infrastructure.
- Demonstrated at Field-Trial at 10G/2.5G bit/s

Current stage of development

Prototype and validity tests passed. Demo and field trial experimental results published at ECOC'11, paper Tu.6.C.3, Geneva. See www.ict-sardana.eu

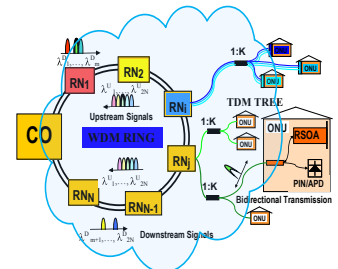
Applications and Target Market

- Broadband Telecom System Vendors
- Broadband Telecom Operators
- Optical fiber device manufacturers
- Broadband Optical Communications networks: access, metropolitan, transport
- Fiber-to-the-Home networks
- Next Generation - Passive Optical Networks (NG-PON)

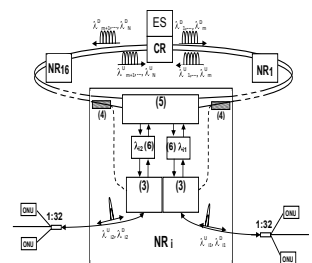
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Scalable extended broadband FTTH (Fiber-to-the-Home) Network



ALL-OPTICAL INTEGRATION OF METRO AND ACCESS NETWORKS



- Remote Node interfacing the WDM central ring with the access trees, providing optical amplification

Business Opportunity

Technology available for licensing and technical cooperation

Patent Status

US Granted

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