

## New device for bidirectional optical link

A method and apparatus for bidirectional optical link using a single optical carrier and colorless demodulation and detection of optical frequency shift keyed data have been developed and patented. Partners to further develop the system and/or to establish commercial agreements along with technical cooperation are sought.

### The Challenge

Next-Generation Fiber-to-the-Home (FTTH) networks will use passive wavelength-division-multiplexing (WDM-PONs) in order to offer broadband GBit/s connection to hundreds of users, sharing an optical infrastructure, with low energy consumption. The challenge is to implement the concept of "Wavelength-to-the-Home  $\lambda$ TTH".

To enable this, the key element is the optical network unit (ONU) at the customer premises equipment (CPE), that should comply with several challenges: wide bandwidth (1 to 10 GHz modulation, more than 30 nm optical), bidirectional for down- and up-stream transmission, wavelength agnostic (colorless) so any CPE being able to any operate at any wavelength channel, competitive cost in the access sector and integrated in semiconductor photonic circuits.

### The Technology

The ONU is the main objective of the present invention and holds a technique for demodulation and detection of optical frequency modulated downstream signals, enabling remodulation of the downstream signal with upstream data. This is achieved by means of a colorless amplifier, demodulator and detector, which provides the functionality of a periodic filtering device for demodulation of the downstream, and also a detection capability. This periodic transfer function is obtained by an optical cavity, formed by a SOA (semiconductor optical amplifier), EAM (electro-absorption modulator) and mirrors, and allows for wavelength-independent operation on a given wavelength grid, such as the ITU WDM wavelength grid.

### Innovative advantages

- Single photonic integrated device for a WDM access network ONU
- Optical Frequency demodulation (oFSK)
- Intrinsic remodulation for up-stream transmission
- Optical Amplification
- High speed (e.g. 10 GBit/s)

### Current stage of development

Prototype with SOA-EAM integrated and validity tests passed. Experimental results published at: IEEE Photonics Technology Letters, vol. 22, no. 13, pp.1002-1004, July 2010.

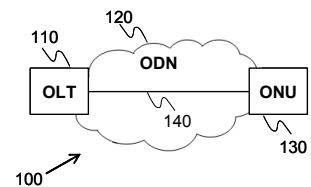
### Applications and Target Market

- Broadband Telecom System Vendors
- Manufacturers of lasers and active semiconductors optical devices.
- Broadband Optical Communications networks: access, metropolitan, transport.
- Fiber-to-the-Home networks
- Next Generation - Passive Optical Networks (NG-PON)
- Optical signal processing

### Reference number

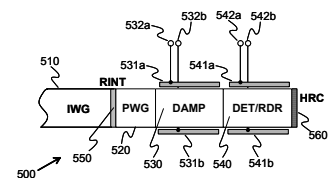
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### Ultra-broadband bidirectional Fiber-to-the-Home System



### 3 optical functions integrated in one device:

- FSK demodulator
- Optical amplifier
- IM remodulator



### Wavelength-to-the-Home Low cost integration Bidirectional 10 GBit/s x N wavelengths

### Business Opportunity

Technology available for licensing with technical cooperation

### Patent Status

US application

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