

THERMOREGULATED AVALANCHE PHOTODIODE-BASED LASER RECEIVER APPARATUS WITH EMBEDDED CONTROL

Description:

The present invention addresses and solves the technical problem of the entire set of variables that affect the stability in the sensitivity of an avalanche photodiode when it receives modulated laser light contaminated by a solar component. Thus, this invention consists of a receiver apparatus based on thermoregulated avalanche photodiode with embedded control. Said apparatus receives modulated laser light in binary format focused on the active surface of an avalanche photodiode from an optical system formed by a converging lens and a hemispherical lens that collect the light and direct it towards the active area of the photodiode through a fiber. Likewise, the receiving apparatus is controlled by a microcontroller in the sensitivity and gain parameters, containing elements of thermal control, control of the avalanche gain factor and control of the gain factor of the demodulated signal.

Keywords:

[Communications](#), [Laser](#), [Beams](#), [Optics](#), [Avalanche Photodiodes](#), [Microcontroller](#)

Sectors:

[ICT](#), [Electronics](#)

Areas:

[Telecommunications](#), [Electronics](#), [Internet and Networks](#), [Components](#)



Advantages:

Among the advantages of the present invention are:

- Keeps external noise levels within reasonable limits.
- It solves the technical problem of the whole set of variables that affect the stability in the sensitivity of an avalanche photodiode when it receives modulated laser light contaminated by a solar component. Specifically, the following problems are resolved:
 - o The possibility of setting the sensitivity and the gain of the avalanche photodiode to work in ranges of received luminosity of at least five decades starting from nanowatts.
 - o The possibility of eliminating unmodulated light components, especially the solar component.
 - o For a received radiant power, set the sensitivity and the gain, keeping them stable against thermal changes.
 - o The possibility of changing the sensitivity depending on the radiant power received in order to optimize the signal / noise ratio.
 - o Perform these tasks automatically under the control of a microcontroller.

Uses and Applications:

This technology has its utility as a light beam demodulator instrument based on avalanche photodiodes within the field of high speed optical communications electronics industry.

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