Patent Abstracts

These Patent Abstracts of recently issued patents are intended to provide the minimum information necessary for readers to determine if they are interested in examining the patent in more detail. Complete copies of patents are available for a small fee by writing: U.S. Patent and Trademark Office, Box 9, Washington, DC 20231.

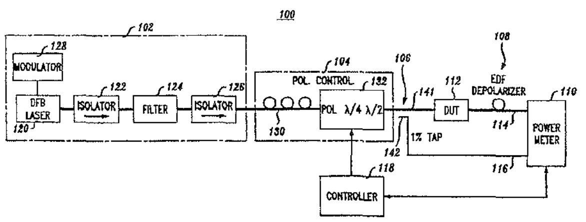
5,371,597 Dec. 6, 1994

System and Method for Measuring Polarization-Dependent Loss

Inventors: David L. Favin, Bruce M. Nyman, Gregory M. Wolter.
Assignee: AT&T Corp.
Filed: Nov. 23, 1993.

Abstract—Polarization-dependent loss (PDL) of an optical component is computed in a deterministic method that requires only four measurements, each having a unique input state of polarization.

15 Claims, 1 Drawing Sheet



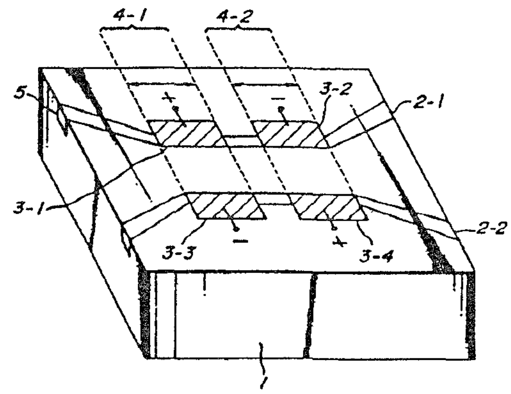
5,371,812 Dec. 6, 1994

Waveguide-Type Optical Directional Coupler

Inventor: Masanori Nakamura.
Assignee: Ibden Co., Ltd.
Filed: Nov. 22, 1993.

Abstract—Down-sized optical directional coupler with high performance and reduction of power includes a $LiTaO_3$ monocrystal substrate, at least two optical waveguides of a $LiNbO_3$ monocrystalline thin film formed close to and parallel to each other, and means for changing a refractive index of the optical waveguide provided on at least one of the optical waveguides, thereby obtaining a matching of a lattice constant between the $LiTaO_3$ monocrystal substrate and the $LiNbO_3$ monocrystalline thin film.

10 Claims, 2 Drawing Sheets



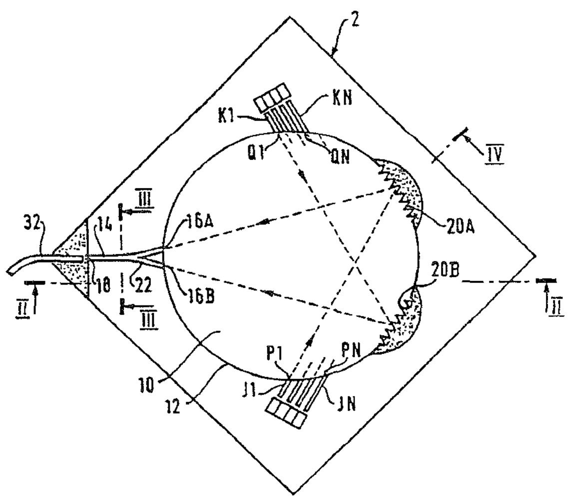
5,371,813 Dec. 6, 1994

Wavelength Division Multiplexer Suitable for Integrated Optical Systems

Inventor: Claude Artigue.
Assignee: Alcatel N.V.
Filed: Mar. 25, 1993.

Abstract—In a wavelength division multiplexer suitable for integrated optical systems, to multiplex a succession of waves ranked according to their wavelength two diffraction gratings are formed at the edges of a common guide area. One focuses odd ranked waves onto a first entry of an output guide. The other focuses even ranked waves onto a second entry of the same output guide.

3 Claims, 1 Drawing Sheet



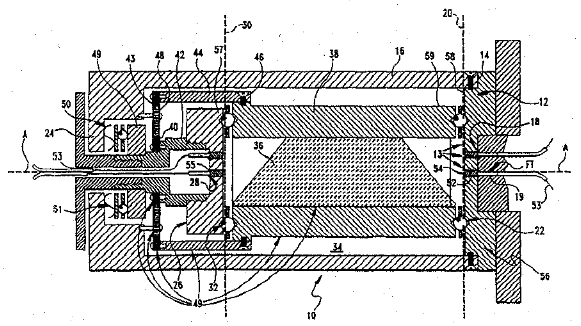
5,371,814 Dec. 6, 1994

Passive, Multi-Channel Fiber-Optic Rotary Joint Assembly

Inventors: Gregory H. Ames and Roger L. Morency.
Assignee: The United States of America as represented by the Secretary of the Navy.
Filed: Nov. 8, 1993.

Abstract—A passive multi-channel optical fiber rotary joint couples optical fiber communication channels via axially bilaterally symmetrically disposed lens housings, or array pieces, for receiving miniature-collimation-lenses to one and the other sides of an image-derotation-prism-and-prism-rotational-drive-subassembly including an image derotation prism, which rotates at a predetermined ratio of the relative rotation of the array pieces. This establishes transverse pseudo-planar rotary interfaces, respectively, between the one and another array piece and the confronting sides of the prism-and-prism-drive-subassembly. Each channel, at the axially outward side of each of one and the other array pieces, includes a fiber and lens junction in which the fiber is attached to the axially outward side of the collimation lens at 1) a predetermined axially bilaterally symmetrical position chosen for maximum coupling of signal power through the joint, and 2) individual lateral positions relative to the lens chosen to provide coupling with a path of beam propagation perpendicular to the rotary interface at the other side of the collimation lens. Each array piece forms a precision tolerances locality of axial engagement with the confronting side of the prism-and-prism-drive-subassembly, which in turn defines the respective rotary interfaces.

15 Claims, 4 Drawing Sheets



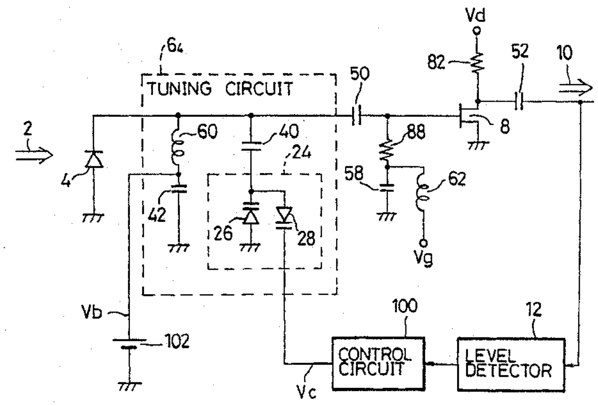
5,373,152 Dec. 13, 1994

Resonance-Type Optical Receiver Circuit Having a Maximum Amplifier Input Controlled by Using an Amplifier Feedback and Its Method of Receiving

Inventors: Wataru Domon and Makoto Shibutani.
Assignee: NEC Corporation.
Filed: Jan. 19, 1993.

Abstract—The present invention provides a resonance-type optical receiver circuit that keeps predetermined small distortion, even when the received light level becomes high. The resonance-type optical receiver circuit varies the resistance value of variable resistance element **80**, which is used as a load resistor to optical detector **4**, in response to the intensity of output signal **10** of an amplifier. The load resistor varies in response to a variations of the received light level of the optical detector in this manner to keep the input to the amplifier lower than a fixed value.

2 Claims, 12 Drawing Sheets



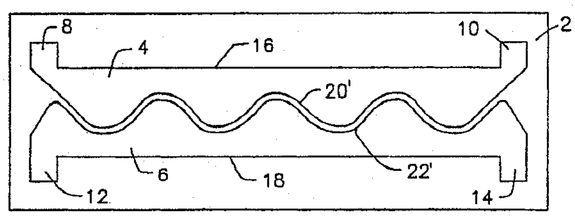
5,373,266 Dec. 13, 1994

Microstrip Directional Coupler

Inventors: Erik H. Lenzing, Roland Cadotte, Jr., Michael Cummings.
Assignee: The United States of America as represented by the Secretary of the Army.
Filed: Nov. 9, 1993.

Abstract—A directional coupler is formed with adjacent edges of its microstrips following curved paths having reversals in curvature such as a series of sine waves or half circles.

5 Claims, 2 Drawing Sheets



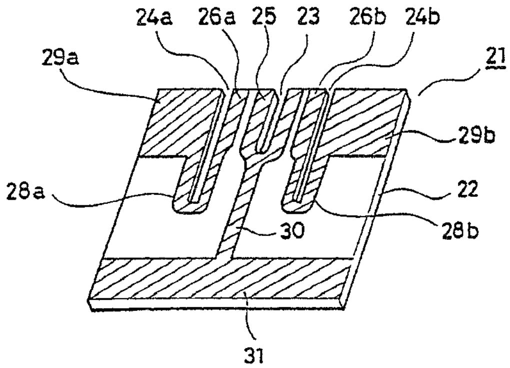
5,373,267 Dec. 13, 1994

Piezoelectric Resonator Device of Tuning Fork Type

Inventors: Hiroaki Kaida, Jiro Inoue, Masatoshi Kajiwara, Hiroshi Nakatani, Katsumi Fujimoto, Katsumi Sakai.
Assignee: Murata Manufacturing Co., Ltd.
Filed: July 23, 1992.

Abstract—Disclosed is a piezoelectric resonator device. This piezoelectric resonator device comprises a piezoelectric substrate having an almost rectangular plane shape. The piezoelectric substrate is provided with a slit extending to the inside from one edge of the piezoelectric substrate, for forming a tuning fork portion, and a pair of slits for separating the tuning fork portion, spaced apart from the slit forming the tuning fork portion by a predetermined distance on both sides of the slit forming the tuning fork portion, and approximately parallel with the slit forming the tuning fork portion. Vibrating electrodes are formed on both major surfaces of the piezoelectric substrate at a piezoelectric vibrating portion, between the slits separating the tuning fork portion from nonvibrating portions of the substrate.

6 Claims, 22 Drawing Sheets



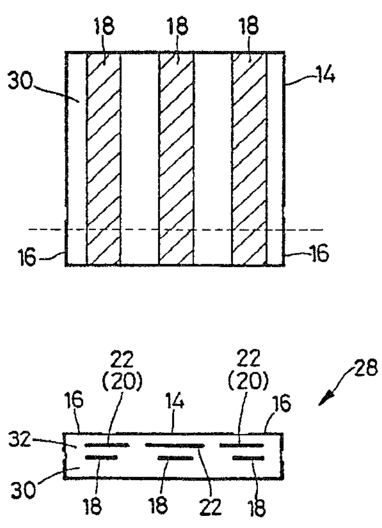
5,373,271 Dec. 13, 1994

Dielectric Filter Having Coupling Electrodes for Connecting Resonator Electrodes, and Method of Adjusting Frequency Characteristic of the Filter

Inventors: Takami Hirai and Shinsuke Yano.
Assignee: NGK Insulators, Ltd.
Filed: May 27, 1993.

Abstract—A tri-plate type dielectric filter having a dielectric substrate, a plurality of resonator electrodes embedded in the substrate, and coupling electrodes formed within the dielectric substrate for capacitively connecting the resonator electrodes to provide capacitors between adjacent resonator electrodes. The resonator electrodes may take the form of parallel elongate strips each providing a stripline type $\lambda/4$ or $\lambda/2$ TEM mode resonance circuit. One end of each strip is exposed at an outer surface of the substrate. This end of each strip is trimmed to adjust the resonance frequency of the resonance circuit.

2 Claims, 7 Drawing Sheets



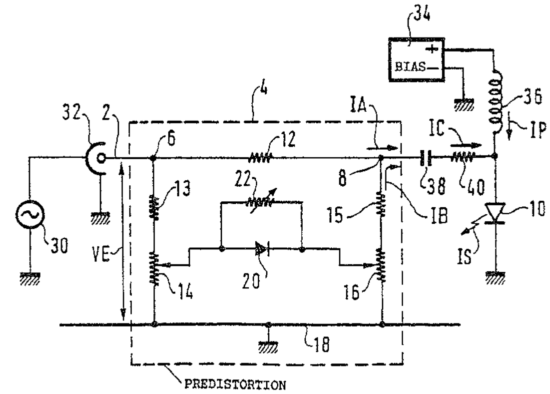
5,373,384 Dec. 13, 1994

Semiconductor Light Source with Non-Linear Compensation Means Within a Predistortion Circuit

Inventor: Jean-Paul Hebert.
Assignee: Alcatel Cit.
Filed: July 30, 1993.

Abstract—An input signal provided by a generator is applied to a laser emitting diode via a predistortion circuit for improving the linearity of the response of the source. The predistortion circuit includes a linear pi attenuator member constituted by resistances and a nonlinear compensating element constituted by a Schottky diode connected in parallel with said attenuator member. The invention is particularly applicable to making light transmitting cable heads for optical fiber telecommunications systems.

8 Claims, 1 Drawing Sheet



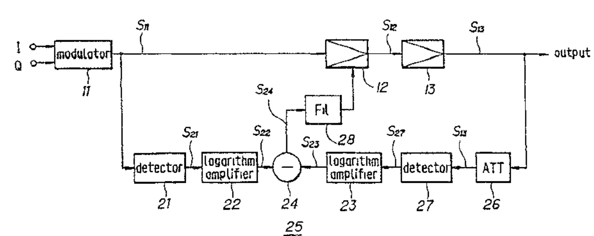
5,374,896 Dec. 20, 1994

Distortion Compensating Circuit of High-Frequency Power Amplifier

Inventors: Hideaki Sato and Sachio Iida.
Assignee: Sony Corporation.
Filed: Dec. 21, 1993.

Abstract—A high-frequency power amplifier in which the negative feedback control system linearity is maintained and nonlinear distortion is stably compensated has: a variable gain circuit, disposed as a prestage of the power amplifier, in which the control voltage versus gain characteristic is an inverse logarithm characteristic, which performs variable control on the level of the input signal supplied to the power amplifier; a gain detecting circuit, which detects the combined gain of the high frequency power amplifier and the variable gain circuit; and a loop filter, which supplies the output signal of this gain detecting circuit to the variable gain circuit as a control voltage. This gain detecting circuit includes a first logarithmic convertor circuit, which performs logarithmic conversion on an envelope detection signal of the signal inputted into the variable gain circuit, a second logarithmic convertor circuit, which performs logarithmic conversion on an envelope detection signal of the output signal of the high-frequency power amplifier; and a subtraction circuit, which outputs the differential, or subtraction, signal of the output signals of the first and second logarithmic conversion circuits.

5 Claims, 12 Drawing Sheets



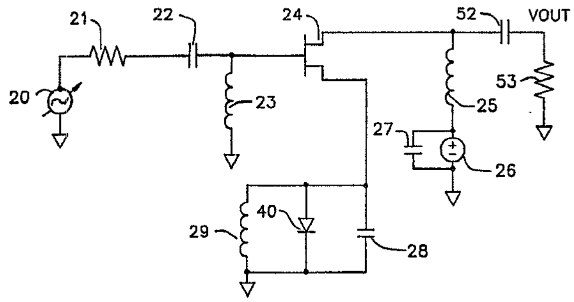
5,374,899 Dec. 20, 1994

Self-Biased Power Amplifier Employing Fets

Inventors: James R. Griffiths and Inder J. Bahl.
Assignee: ITT Corporation.
Filed: Nov. 10, 1993.

Abstract—A power amplifier for microwave frequencies utilizes a FET device operating from a common voltage source. The voltage source has the positive terminal coupled to the drain electrode of the FET. The gate electrode of the FET is adapted to receive a RF signal while the source electrode of the FET includes a voltage limiting diode that is in parallel across the source impedance. In operation the extra current required from the voltage source during power amplification is passed through the diode and the FET source bypass capacitor. This results in the FET source voltage remaining relatively constant to enable improved power and gain operation.

18 Claims, 1 Drawing Sheet



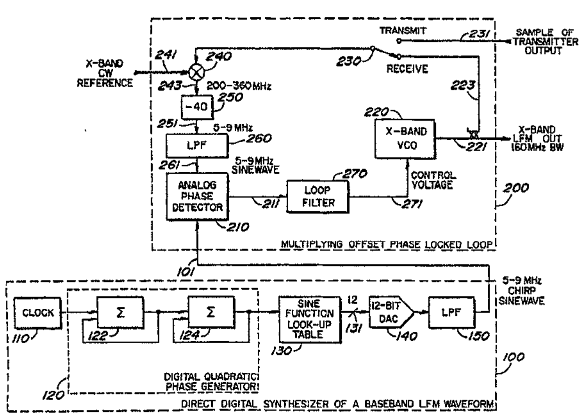
5,374,903 Dec. 20, 1994

Generation of Wideband Linear Frequency Modulation Signals

Inventor: James L. Blanton.
Assignee: Hughes Aircraft Company.
Filed: Apr. 22, 1988.

Abstract—A low-frequency low bandwidth Linear Frequency Modulation (LFM) waveform, nominally a 1 MHz to 10 Mz swept frequency analog sinusoid or digital square wave, is produced by direct digital synthesis. This waveform is upconverted in frequency and expanded in bandwidth, nominally to microwave frequencies with bandwidths of nominally 160–360 MHz, in a multiplying offset phase locked loop. The phase locked loop also linearly frequency modulates a X-band carrier with the microwave frequency LFM waveform to produce an output signal suitable for Synthetic Aperture Radar. The phase locked loop induces low phase error, and may be closed around the radar transmitter to remove phase errors induced by that unit.

18 Claims, 2 Drawing Sheets



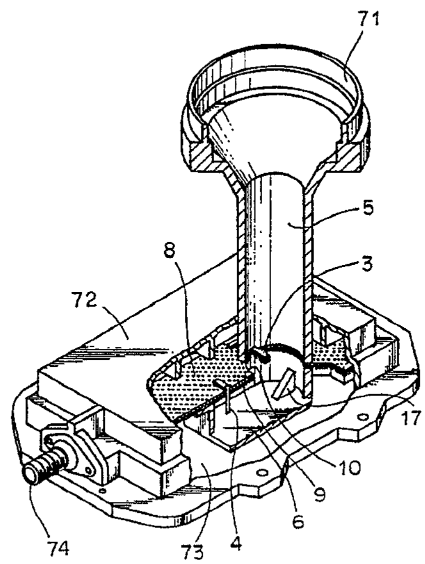
5,374,938 Dec. 20, 1994

Waveguide to Microstrip Conversion Means in a Satellite Broadcasting Adaptor

Inventors: Kenji Hatazawa, Hiroyuki Mukai, Junichi Somei.
Assignee: Sharp Kabushiki Kaisha.
Filed: Jan. 21, 1993.

Abstract—A waveguide to microstrip converter allowing size reduction as well as providing good cross-polar discrimination and input VSWR characteristic. The waveguide to microstrip converter includes a structure of an orthogonal transducer formed of a circular waveguide and a rectangular waveguide integrally formed with and orthogonal to the circular waveguide. A first probe and a second probe are, respectively, coupled to the circular waveguide and rectangular waveguide. An output terminal of the first probe and an output terminal of the second probe are formed on the same plane and connected to respective microstrip lines.

19 Claims, 18 Drawing Sheets



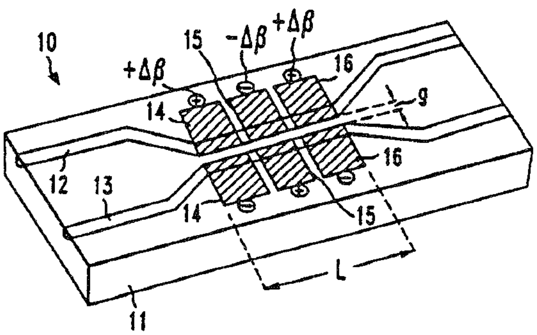
5,375,180 Dec. 20, 1994

Process-Tolerant Reverse Delta-Beta Directional Coupler Switch and Method of Fabricating Same

Inventor: Edmond J. Murphy.
Assignee: AT&T Corp.
Filed: Oct. 4, 1993.

Abstract—A three or more section reverse $\Delta\beta$ directional coupler designed to operate at a number of coupling lengths (L/l) selected from a region of a corresponding switching diagram where the cross and bar state switching curves are approximately parallel to each other and to the vertical axis, the vertical axis defining numbers of coupling lengths, or from a region of corresponding process sensitivity plots for the cross and bar states where the cross and bar state voltage curves are both approximately of zero slope. A number of these directional couplers form an optical switching array and a number of arrays form a system or network for switching optical signals, each of which are capable of operation with uniform cross and bar state voltages at low crosstalk levels.

70 Claims, 9 Drawing Sheets



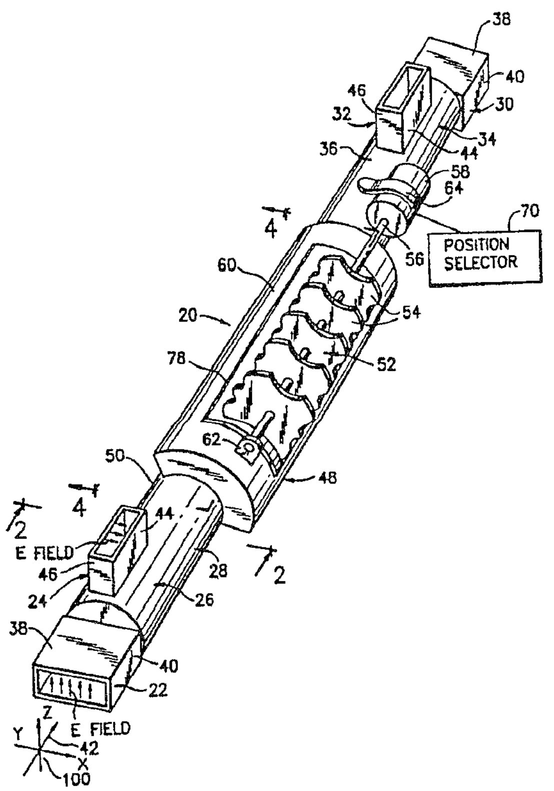
5,376,905 Dec. 27, 1994

Rotary Vane Variable Power Divider

Inventor: Rolf Kich.
Assignee: Hughes Aircraft Company.
Filed: Aug. 23, 1993.

Abstract—A power divider (**20**) includes two orthomode tee to cylindrical waveguide adapters (**26, 34**) coupled by a phase shift unit (**48**) having a slow-wave structure (**68**) located in a sidewall (**82**) of a waveguide section (**50**) at a position located 45 degrees between planes of rectangular ports of the adapters The slow-wave structure includes a set of vanes (**54**) which are movable by means of a motor (**58**) to adjust their penetration through the sidewall of the waveguide section. Adjustment of the penetration provides for selection of an amount of differential phase lag introduced between components of electromagnetic waves propagating through the waveguide section between the two adapters. Pins (**96**) are formed integrally with the vanes by a notching of edge regions of the vanes. The pins introduce a relatively small amount of phase shift as compared to that introduced by the vanes. However, the phase dispersion of the pins counteracts a phase dispersion of the vanes for increased bandwidth of the power divider. Adjustment of the phase shift provides for rotation of an electric vector for switching an exit point of an electromagnetic wave between either one of two output ports (**30, 32**) or for a division among the two output ports in any desired average power ratio.

15 Claims, 4 Drawing Sheets



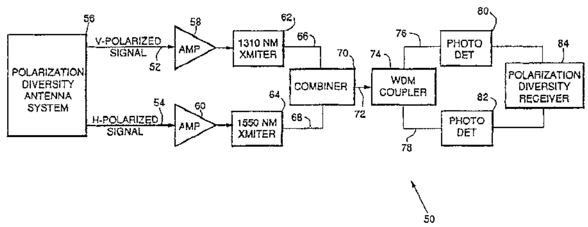
5,377,035 Dec. 27, 1994

Wavelength Division Multiplexed Fiber Optic Link for RF Polarization Diversity Receiver

Inventors: Harry T. Wang, Gregory L. Tangonan, Willie W. Ng.
Assignee: Hughes Aircraft Company.
Filed: Sept. 28, 1993.

Abstract—A single transmission optical fiber is used to transmit RF signals of the same frequency but different polarization from a source to a polarization diversity receiver without introducing interference between the signals. The incoming signal of one polarization modulates a first laser transmitter operating at one wavelength, and the incoming signal of the other polarization modulates a second laser transmitter operating at a different, second wavelength. The two modulated optical beams are combined in an optical coupler whose output is connected to the transmission fiber leading to the polarization diversity receiver. At the receiver, a wavelength division multiplexing coupler is used to separate out the two modulated optical carriers The two RF signals used to modulate the laser transmitters are separately recovered via photodiode detectors to provide inputs to the polarization diversity receiver.

19 Claims, 1 Drawing Sheet



5,377,284 Dec. 27, 1994

Interferometric Optical Switch

Inventor: Henning Bülow.
Assignee: Alcatel Sel Aktiengesellschaft.
Filed: Nov. 3, 1993.

Abstract—For so-called add-drop multiplexers, fast optical switches (SCH) are needed that can switch optical signal waves stemming from different signal sources. Known optical switches include an interferometer in which the signal wave is split into two signals, and in which an optical switching pulse is superimposed on one of the signals. Because of the Kerr effect, interference signals can be generated that can be switched in an optical coupler in a controllable manner to a predetermined output. The signals and the switching pulse have the same direction of polarization, which may cause switching problems with signals from different signal sources. The gist of the invention therefore lies in the use of switching pulses which consist of quasidepolarized light Such switching pulses are advantageously generated in two switching-pulse sources (SQ) in which two polarized light beams are superimposed orthogonally In an optical waveguide (LWL_1, SP) with a nonlinear refractive index, the switching pulse assumes a constantly varying polarization state.

13 Claims, 3 Drawing Sheets