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(54) Title: METHOD AND APPARATUS FOR ARBITRARY WAVEFORM GENERATION USING PHOTONICS

(57) Abstract: An apparatus and method for synthesizing waveforms with arbitrary amplitude, frequency, and phase modulation. Pulses from a broadband (supercontinuum) optical source are filtered into a plurality of wavelength channels, and the intensity of each wavelength channel is adjusted to an appropriate level depending on the desired shape of the envelope of the output pulse. The envelope of the sampling wavelength channels can be stretched, compressed, or inverted in the time domain later using a dispersive medium. After time domain manipulation, the optical pulse train is observed with a combination of high-speed photodetectors and a radio frequency low-pass filter, a low-speed photodetector.



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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/12213

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04B10/152

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04B H03K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KELKAR P V ET AL: "Time-domain optical sensing" ELECTRONICS LETTERS, IEE STEVENAGE, GB, vol. 35, no. 19, 16 September 1999 (1999-09-16), pages 1661-1662, XP006012694 ISSN: 0013-5194	1-5, 11-13, 16-30, 36-42, 45-52
Y	page 1661, left-hand column, line 17 - line 20 page 1661, left-hand column, line 30 -right-hand column, line 1 page 1661, right-hand column, line 11 - line 18 figures 1,2 -/--	6-10,14, 15, 31-35, 43,44, 68-73,75

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- \*A\* document defining the general state of the art which is not considered to be of particular relevance
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- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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- \*Y\* document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \* & \* document member of the same patent family

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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/12213

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>-----</p> <p>BHUSHAN A S ET AL: "150 Gsample/s wavelength division sampler with time-stretched output" ELECTRONICS LETTERS, IEE STEVENAGE, GB, vol. 34, no. 5, 5 March 1998 (1998-03-05), pages 474-475, XP006009369 ISSN: 0013-5194</p>	<p>53-56, 60-67, 74, 76-82, 86-105</p>
Y	<p>page 474, left-hand column, line 17 - line 20 page 474, left-hand column, line 21 - line 24 page 474, right-hand column, line 1-5 page 474, right-hand column, line 15 - line 22 figure 3</p>	<p>9,10,14, 15,34, 35,43, 44, 57-59, 68-73, 75,83-85</p>
Y	<p>-----</p> <p>US 5 315 423 A (HONG JOHN H) 24 May 1994 (1994-05-24)</p> <p>column 2, line 42 - line 49 column 2, line 59 - line 68 figure 2</p>	<p>6-8, 31-33, 57-59, 83-85</p>
A	<p>-----</p> <p>COPPINGER F ET AL: "12 Gsample/s wavelength division sampling analogue-to-digital converter" ELECTRONICS LETTERS, IEE STEVENAGE, GB, vol. 36, no. 4, 17 February 2000 (2000-02-17), pages 316-318, XP006014880 ISSN: 0013-5194 page 316, left-hand column, line 25 - line 26; figure 1</p> <p>-----</p>	<p>1,27,53, 79</p>

## II INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5315423	A	24-05-1994	NONE
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