



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : H04J 11/00, H04B 10/155	A1	(11) International Publication Number: WO 00/07317 (43) International Publication Date: 10 February 2000 (10.02.00)
(21) International Application Number: PCT/US99/17258 (22) International Filing Date: 29 July 1999 (29.07.99) (30) Priority Data: 09/127,343 30 July 1998 (30.07.98) US (71) Applicant: RDL COMMERCIAL TECHNOLOGIES CORPORATION [US/US]; 5800 Uplander Way, Culver City, CA 90230-6608 (US). (72) Inventors: DUTT, Birendra; 5800 Uplander Way, Culver City, CA 90230-6608 (US). NARAGHI, Manouher; 5800 Uplander Way, Culver City, CA 90230-6608 (US). CHAN, James, K.; 5800 Uplander Way, Culver City, CA 90230-6608 (US). (74) Agent: WRIGHT, William, H.; Loeb & Loeb LLP, Suite 2200, 10100 Santa Monica Blvd., Los Angeles, CA 90067-4164 (US).		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>
(54) Title: METHOD AND APPARATUS FOR REDUCED INTERFERENCE IN OPTICAL CDMA		
(57) Abstract A multi-user optical fiber communications system uses spread spectrum code division multiple access techniques to achieve better bandwidth utilization. Each channel of the system is provided with light source that is temporally and spectrally modulated by an encoder. Modulation is accomplished by first passing the data through a pulse modifier to obtain a stream of shortened pulses with a reduced duty cycle. The modulated light is coupled to a fiber and data are recovered by the decoder. The source includes a superluminescent fiber source that is split multiple times and amplified in a hierarchical manner to produce a plurality of like sources. The like sources are decorrelated by adding delays to the different sources. Each of the encoders includes an encoding mask having a first code that encodes the optical signal. Light, spatially encoded by the mask and temporally modulated with data, is transmitted over a fiber link with the signals of other users and received by a decoder. Within each decoder, a polarization insensitive separator splits the received light into two equal power components which are provided to two decoding masks used to decode the signal. One of the masks has a second code identical to the first code and the other mask has a third code complementary to the first code. The output light beams filtered by the masks are differentially detected to generate an output signal, which is further processed for data recovery. The electrical signal is low pass filtered and electrically square law detected. The first codes are selected from a set of unipolar codes derived from a set of balanced bipolar orthogonal codes. The codes may be either binary or analog.		

