

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
15 March 2001 (15.03.2001)

PCT

(10) International Publication Number
WO 01/18577 A1

(51) International Patent Classification⁷: G02B 6/34

(21) International Application Number: PCT/US00/23898

(22) International Filing Date: 31 August 2000 (31.08.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/152,218	3 September 1999 (03.09.1999)	US
60/172,843	20 December 1999 (20.12.1999)	US
60/172,885	20 December 1999 (20.12.1999)	US
60/209,018	1 June 2000 (01.06.2000)	US
09/628,774	29 July 2000 (29.07.2000)	US
09/634,619	29 July 2000 (29.07.2000)	US

(71) Applicant (for all designated States except US): ZOLO
TECHNOLOGIES, INC. [US/US]; 605 Parfet Street,
Lakewood, CO 80215 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): SAPPEY, Andrew,

D. [US/US]; 11777 West 18th Avenue, Lakewood, CO
80215 (US). MURPHY, Gerry [US/US]; 968 Mountain
Maple Avenue, Highlands Ranch, CO 80126 (US).

(74) Agents: SWANSON, Barry, J. et al.; Swanson &
Bratschun, L.L.C., 1745 Shea Center Drive, Suite 330,
Highlands Ranch, CO 80129 (US).

(81) Designated States (national): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ,
DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR,
HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,
LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,
NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM,
TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

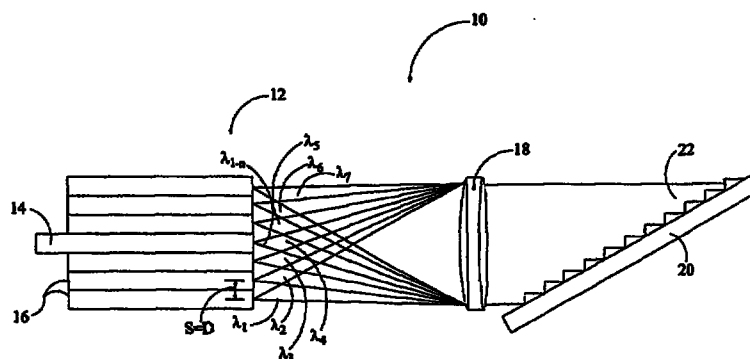
(84) Designated States (regional): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian
patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European
patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,
IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG,
CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:

— With international search report.

[Continued on next page]

(54) Title: DENSE WAVELENGTH DIVISION MULTIPLEXER/DEMULTIPLEXER BASED ON ECHELLE GRATING



(57) Abstract: A dense wavelength multiplexer/demultiplexer ("DWDM") (10) for use in optical communication systems includes a multiplex optical waveguide (14) propagating a plurality of optical channels ($\lambda_{ist;1-n}$) of a select channel spacing multiplexed as a single optical signal within a select near infrared wavelength range. a collimating/focusing optic (18) is optically coupled to the multiplexed optical waveguide at a select focal length. A reflective echelle grating (20) is optically coupled to the collimating/focusing optic (18). The echelle grating (20) has a groove spacing (d) and blaze angle (θ_b) providing a channel spacing (d) of the multiplexed optical signal (λ_{1-n}) at the select focal length for a select order of diffraction. A linear array of single channel waveguides (16), each propagating a single channel within the near infrared wavelength range is optically coupled to the collimating/focusing optic. Each optical single channel waveguide (16) has a center and a propagating end and the propagating ends are spaced the focal length from the collimating/focusing optic and the centers of adjacent demultiplexed waveguides are spaced the select channel spacing (D). A fiber pigtail harness is used to connect the multiplexer which works in a Littrow configuration.

WO 01/18577 A1



— Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.