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(21) International Application Number: PCT/US98/02515 (22) International Filing Date: 9 February 1998 (09.02.98) (30) Priority Data: <table border="0"> <tr> <td>60/038,149</td> <td>10 February 1997 (10.02.97)</td> <td>US</td> </tr> <tr> <td>09/019,347</td> <td>5 February 1998 (05.02.98)</td> <td>US</td> </tr> </table> (63) Related by Continuation (CON) or Continuation-in-part (CIP) to Earlier Applications: <table border="0"> <tr> <td>US</td> <td>60/038,149 (CON)</td> </tr> <tr> <td>Filed on</td> <td>10 February 1997 (10.02.97)</td> </tr> <tr> <td>US</td> <td>09/019,347 (CON)</td> </tr> <tr> <td>Filed on</td> <td>5 February 1998 (05.02.98)</td> </tr> </table> (71) Applicant (for all designated States except US): OPTICAL NETWORKS, INC. [US/US]; 3450 Hillview Avenue, Palo Alto, CA 94304 (US). (72) Inventors; and (75) Inventors/Applicants (for US only): SHARMA, Rohit [IN/US]; 20350 Stevens Creek Boulevard #315, Cupertino, CA 95014 (US). MCADAMS, Larry, R. [US/US]; 1801 Robbin Whipple Way, Belmont, CA 94002 (US).		60/038,149	10 February 1997 (10.02.97)	US	09/019,347	5 February 1998 (05.02.98)	US	US	60/038,149 (CON)	Filed on	10 February 1997 (10.02.97)	US	09/019,347 (CON)	Filed on	5 February 1998 (05.02.98)	(74) Agents: SLONE, David, N. et al.; Townsend and Townsend and Crew LLP, 8th floor, Two Embarcadero Center, San Francisco, CA 94111-3834 (US). (81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, 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, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>Without international search report and to be republished upon receipt of that report.</i>
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(54) Title: METHOD AND APPARATUS FOR OPERATION, PROTECTION, AND RESTORATION OF HETEROGENEOUS OPTICAL COMMUNICATION NETWORKS (57) Abstract Techniques for providing normal operation and service restoration capability in the event of failure of terminal equipment or transmission media in a heterogeneous network, such as a hybrid network containing single- and multi-wavelength lightwave communications systems. An optical switching node or OSN (12, 120a-d) is placed at each node in the ring network (110) to provide the required connections between various fibers (55) and terminal equipment (50, 50a-d), but having switch states that allow signals on the protection fibers to bypass the terminal equipment at that node. Ring-switched signals propagate around the ring on protection fibers (55adp', 55dap') without encountering the terminal equipment at the intervening nodes. To the extent that the protection fiber links between any given pair of nodes are incapable of supporting all the relevant communication regimes, such links are modified to provide such support.																

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