Optoelectronics

Prisma II™ bdr™ Digital Reverse 4:1 Multiplexing System

Description

The Prisma II™ "carrier-class" platform supports Scientific-Atlanta's revolutionary baseband digital reverse technology. The Prisma II bdr™ Digital Reverse 4:1 Multiplexing System provides a unique approach for incorporating cost-effective network redundancy.

At the transmit end of the system, typically in a hub or remote terminal, four analog reverse path signals are input to a two slot wide Transmit Processor. The Transmit Processor converts each signal to a baseband digital data stream and time division multiplexes the four streams into a single data stream. The data stream is split to enable routing for redundant optical transport. One (non-redundant application) or two (redundant application) Laser modules installed within the Transmit Processor frame convert the high data rate stream to an optical signal for transmission at either 1310 nm or 1550 nm wavelengths. 1550 nm ITU grid wavelengths are used for Dense Wave Division Multiplexing (DWDM) applications.

On the receive end, typically in a large hub or headend, one or two Receiver Modules located in the Receive Processor frame receive the optical signal and perform conversion back to the baseband data stream. The Receive Processor de-multiplexes the data stream and converts the four resultant data streams back to analog reverse path signals for routing to termination equipment.

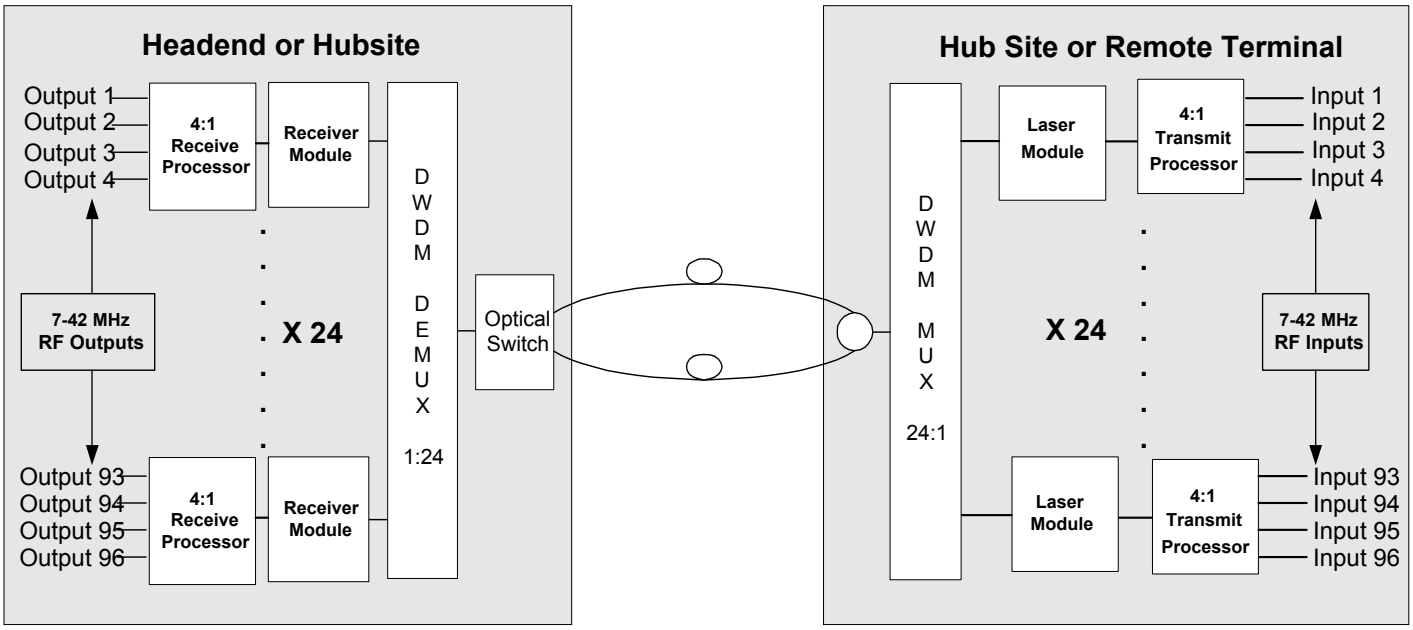
Features

- High-performance baseband digital reverse technology with 12-bit encoding and advanced digital signal processing enables transmission of analog video and high-order digital modulation signals (e.g.,16 QAM and 64 QAM)
- 4:1 time division multiplexing reduces requirements for costly 1550 nm ITU transmitters from four to one
- Long reach transmission capabilities eliminate need for optical amplifiers, reducing cost and space requirements
- Capable of sending 96 individual reverse bands over a single fiber
  - -leverages 4:1 time division multiplexing for quadrupling fiber capacity
  - -compatible with Scientific–Atlanta's 24 wavelength DWDM system
- Modular, cost-effective redundancy for reliable, carrier class performance
- Simplified set-up reduces installation time and expertise requirements
- Distance and temperature independent link performance simplifies engineering and maintenance requirements
- Space-saving, high-density Prisma II platform increases deployment cost efficiency
- Extended temperature performance enables Remote Terminal applications
- High-speed remote control and monitoring via Scientific-Atlanta's Transmission Network Control System (TNCS)

Prisma II bdr Digital Reverse 4:1 Multiplexing System

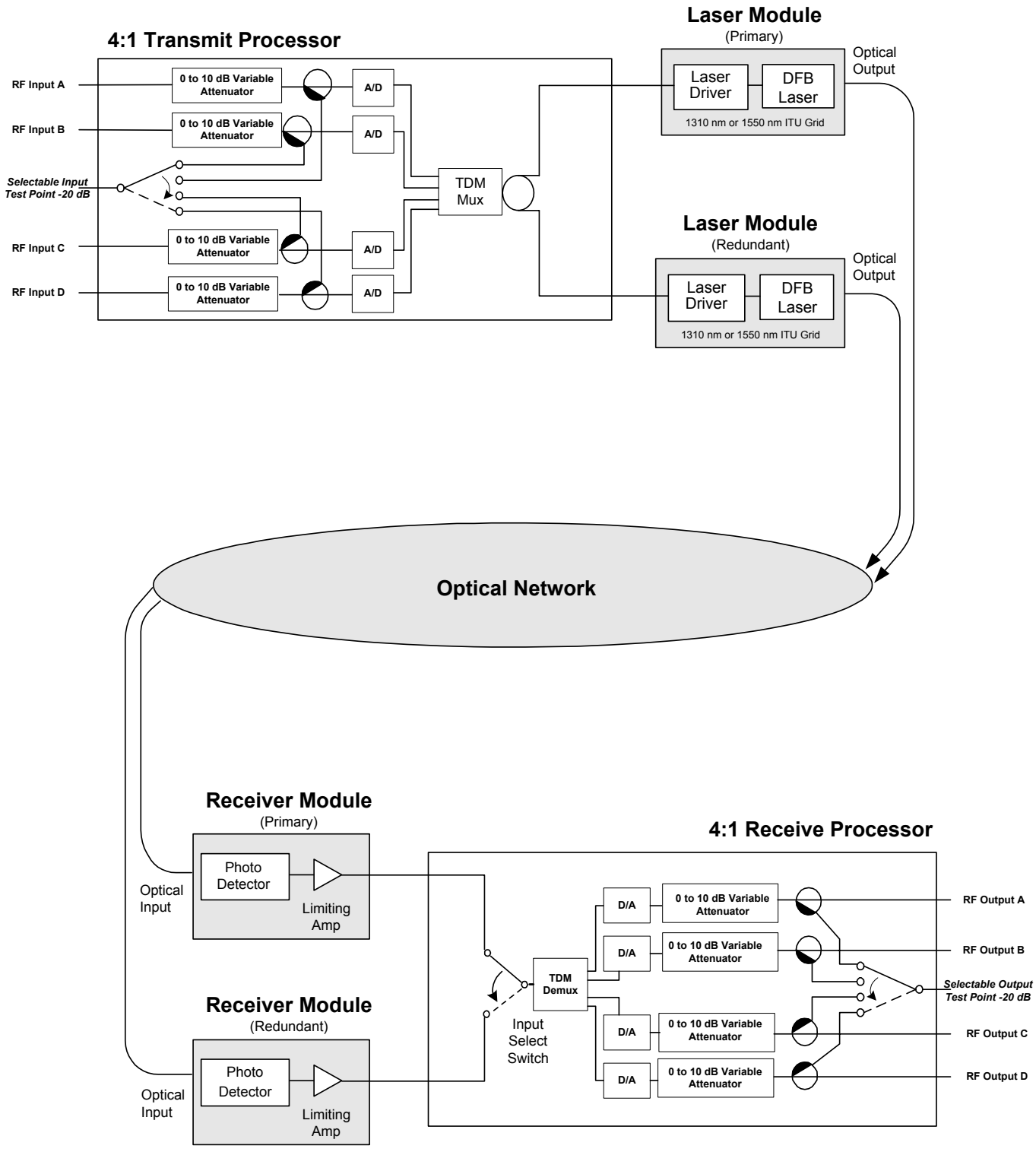
Block Diagrams

Typical Application



Prisma II bdr Digital Reverse 4:1 Multiplexing System

Block Diagrams, continued



Prisma II bdr Digital Reverse 4:1 Multiplexing System

Module Specifications

4:1 Transmit Processor	Units		Notes
RF Input Level Requirements	dBmV/Hz	See Link Performance Section	
RF Input Return Loss	dB	18	
Input RF Variable Attenuation Range	dB	0 to 10	
Data Output to Laser Module	Gbps	2.5	
Input Test Point	dB	-20 (± 1.0)	1
Power Consumption (maximum)	W	18.5	

Laser Module	Units		Notes
Data Input from 4:1 Transmit Processor	Gbps	2.5	
Optical Wavelength	nm	1550 ITU grid 100 GHz spacing 1550 non-ITU 1310 nm	
Optical Output Power (modulated)	dBm	0 (1550 non-ITU & 1310) 0 or 7 (1550 ITU)	
Optical Interface		SC/APC Connector	
Power Consumption (maximum)	W	8 (1550 nm), 6.5 (1310 nm)	

4:1 Receive Processor	Units		Notes
Data Input from Receiver Module	Gbps	2.5	
RF Output Level	dBmV/Hz	See Link Performance Section	
RF Output Return Loss	dB	18	
Output RF Variable Attenuation Range	dB	0 to 10	
RF Output Test Point	dB	-20 (± 0.5)	2
Power Consumption (maximum)	W	16.5	

Receiver Module	Units		Notes
Optical Input Power Range: (SR Module)	dBm	-5 to -22	3
Optical Input Power Range: (ER Module)	dBm	-10 to -29	3
Data Output to Receive Processor	Gbps	2.5	
Optical Interface		SC/APC connector	
Power Consumption (maximum)	W	1	

Mechanical	Units		Notes
Operating Temperature Range (ambient)	°C °F	-40 to +65 -40 to +149	4
Physical Dimensions (any Processor with 2 Receiver or 2 Laser Modules)			
Depth	in. cm	9.8 24.9	
Width	in. cm	2.1 5.3	
Height	in. cm	7.6 19.3	
Weight	lb kg	5.0 2.3	

Notes:

1. Test point level is referenced to RF input
2. Test point level is referenced to RF output
3. System designs should consider the effects of wavelength dispersion in long fiber lengths. This can result in up to 2 dB loss of Rx sensitivity over a 100 km distance.
4. Recommended for use only in non-condensing environments.

Link Performance

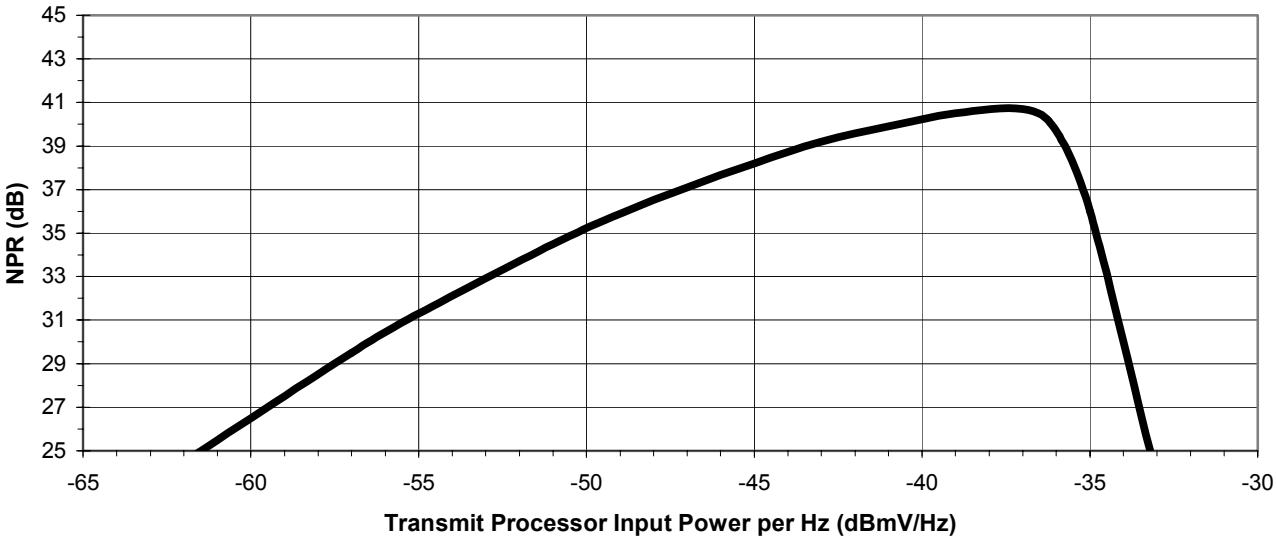
General	Units		Notes
Bandpass (factory configured – customer must specify)	MHz	5-40,7-42 or 10-45	
Full Scale Single CW Carrier Amplitude	dBmV	49	1,2,3
Optical Link Budget with 0 dBm Laser (SR, ER)	dB	22,29	
Optical Link Budget with 7 dBm Laser (SR, ER)		29,36	
Full RF Link Gain (± 1 dB)	dB	20	1,3,4,5
Response Flatness (7 – 42 MHz)	dB	±1.0	
Response Flatness (5 – 40 MHz)	dB	±1.75	

Notes:

1. With respect to the input port on 4:1 Transmit Processor.
2. A CW carrier of this amplitude applied to the RF input will exercise the full scale range of the A/D converter. Full scale is analogous to 100% OMI for Analog Lasers.
3. Variable RF Attenuation on 4:1 Transmit Processor set to 0 dB.
4. Variable RF Attenuation on 4:1 Receive Processor set to 0 dB.
5. Add Link Gain (dB) to Transmit Processor RF input level to determine Receive Processor RF output level.

Noise Power Ratio (NPR) Performance

(Applies to Constant Power / Hz Loading over 35 MHz band)



NPR Notes:

1. Input power is specified with respect to the input port of the Transmit Processor module.
2. Variable RF Attenuation on 4:1 Transmit Processor set to 0 dB and Variable RF Attenuation on 4:1 Receive Processor set to 6 dB.

Prisma II bdr Digital Reverse 4:1 Multiplexing System

Ordering Information

For a complete system, a minimum of one each (Transmit Processor, Laser Module, Receive Processor and Receiver Module) is required. Please consult with your Account Representative, Customer Service Representative, or Applications Engineer to determine the best configuration for your particular application.

DWDM ITU Channel**	Wavelength (nm)	Prisma II bdr Laser Modules	
		0 dBm Output Power	7 dBm Output Power
12	1567.95	741273.12	741277.12
13	1567.13	741273.13	741277.13
14	1566.31	741273.14	741277.14
15	1565.50	741273.15	741277.15
16	1564.68	741273.16	741277.16
17	1563.86	741273.17	741277.17
18	1563.05	741273.18	741277.18
19	1562.23	741273.19	741277.19
20	1561.42	741273.20	741277.20
21	1560.61	741273.21	741277.21
22	1559.79	741273.22	741277.22
23	1558.98	741273.23	741277.23
24	1558.17	741273.24	741277.24
25	1557.36	741273.25	741277.25
26	1556.55	741273.26	741277.26
27	1555.75	741273.27	741277.27
28	1554.94	741273.28	741277.28
29	1554.13	741273.29	741277.29
30	1553.33	741273.30	741277.30
31	1552.52	741273.31	741277.31
32	1551.72	741273.32	741277.32
33	1550.92	741273.33	741277.33
34	1550.12	741273.34	741277.34
35	1549.32	741273.35	741277.35
36	1548.51	741273.36	741277.36
37	1547.72	741273.37	741277.37
38	1546.92	741273.38	741277.38
39	1546.12	741273.39	741277.39
40	1545.32	741273.40	741277.40
41	1544.53	741273.41	741277.41
42	1543.73	741273.42	741277.42
43	1542.94	741273.43	741277.43
44	1542.14	741273.44	741277.44
45	1541.35	741273.45	741277.45
46	1540.56	741273.46	741277.46
47	1539.77	741273.47	741277.47
48	1538.98	741273.48	741277.48
49	1538.19	741273.49	741277.49
50	1537.40	741273.50	741277.50
51	1536.61	741273.51	741277.51
52	1535.82	741273.52	741277.52
53	1535.04	741273.53	741277.53
54	1534.25	741273.54	741277.54
55	1533.47	741273.55	741277.55
56	1532.68	741273.56	741277.56
57	1531.90	741273.57	741277.57
58	1531.12	741273.58	741277.58
59	1530.33	741273.59	741277.59

Note:
**Wavelengths (ITU #21 through #35) are primary wavelengths used in 8 channel, 200GHz spacing, DWDM systems. The balance of wavelengths are incremental for greater DWDM efficiency requirements.

Prisma II bdr Digital Reverse 4:1 Multiplexing System

Ordering Information, continued

Prisma II bdr Laser Modules *(standard Frequencies)*	**Part Number**
1310 nm - DFB	741275-40
1550 nm - DFB	741274-40
Prisma II bdr Receiver Modules	
bdr 4:1 Receiver Module (standard range)	741242
bdr 4:1 Receiver Module (extended range)	741244
Prisma II bdr 4:1 Transmit Processors	
Prisma II 4:1 Transmit Processor *(5-40 MHz)*	748905
Prisma II 4:1 Transmit Processor *(7-42 MHz)*	748906
Prisma II 4:1 Transmit Processor *(10-45 MHz)*	748907
Prisma II bdr 4:1 Receive Processor	
Prisma II 4:1 Receive Processor	738963
Additional Required Equipment	
Model 6940 Optical Node	*Refer to Model 6940 Data Sheet*
Model 6942 Optical Node	*Refer to Model 6942 Data Sheet*
Model 6944 Optical Node	*Refer to Model 6944 Data Sheet*

Prisma II products include the industry's most complete range of high performance optical components:

	For more information refer to:
Platform	Prisma II Data Sheet Part Number 739199
1310 nm Transmitters	Prisma II Data Sheet Part Number 739200
1550 nm Transmitters	Prisma II Data Sheet Part Number 739201
1550 nm Optical Amplifiers	Prisma II Data Sheet Part Number 739202
Receivers	Prisma II Data Sheet Part Number 739203
Ancillary Modules	Prisma II Data Sheet Part Number 739205

Scientific-Atlanta, the Scientific-Atlanta logo, and Prisma are registered trademarks of Scientific-Atlanta, Inc.
Prisma II and bdr are trademarks of Scientific-Atlanta, Inc.
Specifications and product availability are subject to change without notice.
© 2003 Scientific-Atlanta, Inc. All rights reserved.

Scientific-Atlanta, Inc.
1-800-722-2009 or 770-236-6900
www.scientificatlanta.com

Part Number 746623 Rev A
May 2003