

Optoelectronics

Analog Reverse Optical Transmitters with Thermal Compensation for Scientific Atlanta® Nodes

Description

The Models 6940, 6942, 6944, GainMaker® and GS7000 Nodes may be equipped with 1310 nm, Coarse Wave Division Multiplexing (CWDM), or Dense Wave Division Multiplexing (DWDM) analog reverse optical transmitters to facilitate reverse communications from node to headend or hub site. These reverse optical transmitters are now thermally compensated for improved performance over temperature.

The CWDM reverse optical transmitter is offered in a choice of 8 wavelengths from 1470 to 1610 nm. Up to 8 CWDM reverse optical transmitters can share a common return fiber when used with accompanying multiplexing and demultiplexing passive optics.

The DWDM reverse optical transmitter is offered in a choice of 40 wavelengths from 1530.33 to 1560.61 nm. Multiple DWDM reverse optical transmitters can share a common return fiber when used with accompanying multiplexing and demultiplexing passive optics.

All of these reverse optical transmitters incorporate distributed feedback (DFB) lasers, which are best suited for high-capacity reverse traffic. They are available in both standard and high gain versions, in order to allow flexibility in reverse path design. The high gain versions are typically used in the Model 6944, 6942, and GS7000 segmentable nodes. The standard gain versions are typically used in the Model 6940 and GainMaker nodes. All optical transmitters used in the GS7000 Node have a new high profile module cover that includes both a self-contained fiber pigtail storage area and an integrated pull ring for easier module installation and removal.

The reverse optical transmitters specified in this data sheet include both a Power On LED and an Optical Power Alert LED, enabling quick visual confirmation of operational status. A DC test point that is scaled to the optical output power is also included.

Optionally, to help ensure maximum reliability and quick fault resolution, the reverse transmitters can be remotely monitored using the Scientific-Atlanta ROSA®/Transmission Network Control System (TNCS).

Features

- Compact modular design for simple installation and removal
- Thermally Compensated for improved performance over temperature
- Power On and Optical Power Alert LED indicators
- DC test point scaled to optical output power
- Plug-in input attenuator allows easy adjustment of RF drive level
- Provisioned with network monitoring capability (TNCS system required)



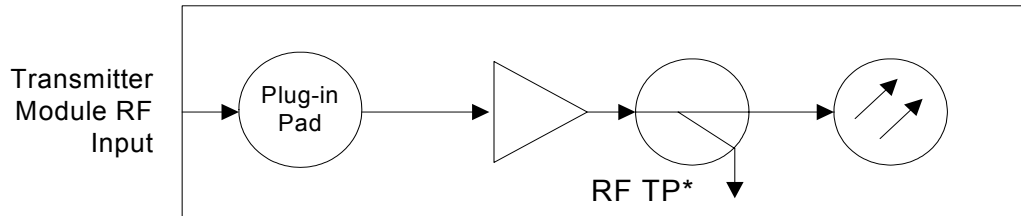
GainMaker & 694x
Reverse TX



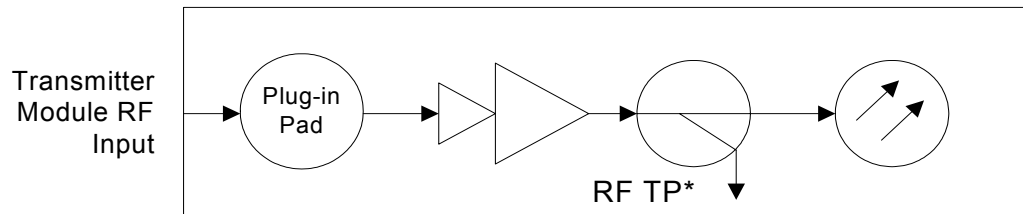
GS7000
Reverse TX

Block Diagrams

Standard DFB Reverse Transmitter Module



High Gain DFB Reverse Transmitter Modules



***Note concerning the transmitter module RF test point (TP):**

It is important to understand the RF level relationship between the RF test point and the transmitter module RF input. With a 0 dB pad installed in the plug-in pad location:

For all thermally compensated transmitters (whether standard or high gain), add 20 dB to the level measured at the test point to determine the module RF input level (the test point is -20 dB relative to the module input).

DFB Reverse Transmitter Module Specifications

	Units			Notes
Wavelength – 1310nm Tx	nm	1310		
Wavelengths – CWDM Tx	nm	1470, 1490, 1510, 1530 1550, 1570, 1590, 1610		
Wavelengths – DWDM Tx	nm	1530.33 to 1560.61		
RF Pass Band	MHz	5 - 220		
Frequency Response	dB	±0.5 (5-65) ±0.75 (5-220)		1
RF Stability over temperature range (typical)	dB	2 dB		
Input Return Loss	dB	16		
Optical Output Test Point (± 10%)	V DC	1 V/mw		
Optical Output Power (1310 & CWDM)	mW dBm	2 3		
Optical Output Power (DWDM)	mW dBm	5 7		
		Std Gain Tx	High Gain Tx	
Single CW carrier RF input level for 100% OMI	dBmV	55	33	2
Noise Power Ratio (NPR) Performance		See plot	See plot	
RF Test Point -relative to transmitter RF input (± 1 dB)	dB	-20	-20	3

Notes:

1. Frequency response for transmitter (Tx) module only. Does not include the frequency response contribution of an optical receiver.
2. This is the RF level that produces 100% composite Optical Modulation Index (OMI) with a 0 dB Tx input pad at room temperature. This is used for reference purposes only and is NOT the recommended RF drive level. Consult with Scientific-Atlanta's Applications Engineering group in order to determine the appropriate RF drive level for a particular application.
3. The RF level measured at the Tx module's RF test point is relative to the Tx module RF input as specified, with a 0 dB input pad installed.

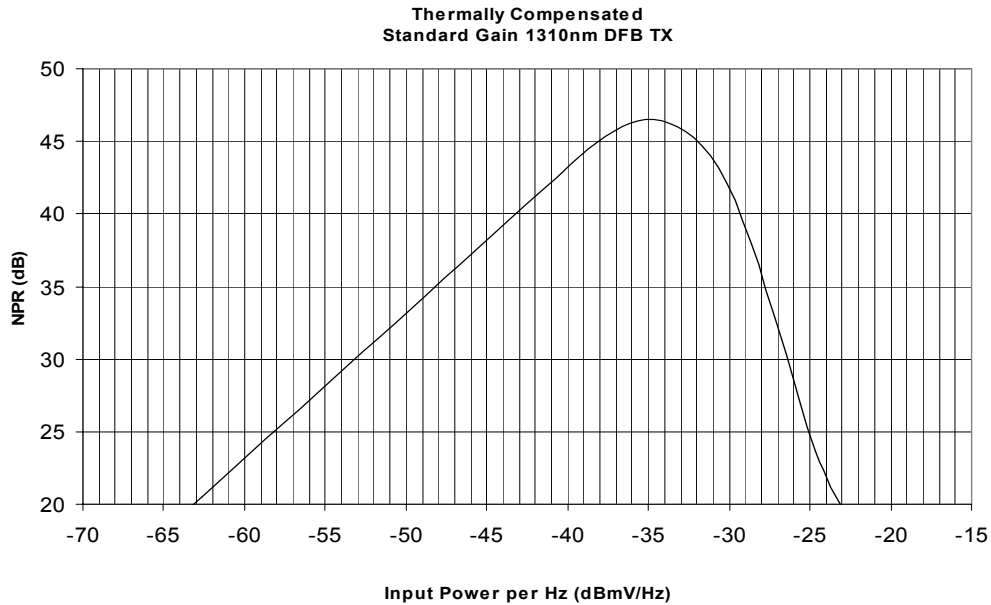
Electrical			Units	Component DC Power Consumption	
				@ +24 V DC *	@ -6 V DC
Standard Gain DFB – 1310 nm Reverse Transmitter			Amps	.08	.09
High Gain DFB – 1310 nm Reverse Transmitter			Amps	.11	.09
Standard Gain DFB – CWDM Reverse Transmitters			Amps	.08	.09
High Gain DFB – CWDM Reverse Transmitters			Amps	.11	.09
High Gain DFB – DWDM Reverse Transmitters			Amps	.22	.10
Environmental			Units		
Operating Temperature Range (outdoor ambient)			°F	-40 to +140 -40 to +60	
			°C		
Mechanical					
Physical Dimensions	Units	Length	Width	Height	Weight
694x / GainMaker	in. / lbs.	5.8	1.5	1.2	0.5
	cm. / kg.	14.7	3.8	3.1	0.2
GS7000	in. / lbs.	5.8	1.5	3.8	0.8
	cm. / kg.	14.7	3.8	9.6	0.4

*Note: Heater can draw an additional .2A from +24 V DC when laser case below 0 °C

1310 nm Link Specifications

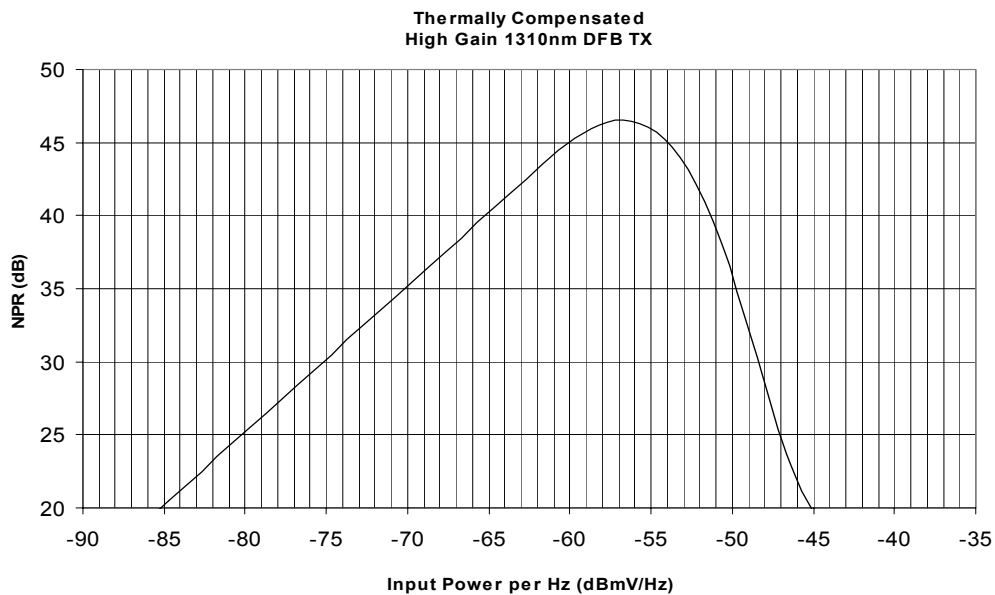
Standard Gain DFB Transmitter

Typical **Noise Power Ratio (NPR)** performance over temperature -with 7 dB Optic Link (15 km glass, plus passive loss)



High Gain DFB Transmitter

Typical **Noise Power Ratio (NPR)** performance over temperature -with 7 dB Optic Link (15 km glass, plus passive loss)

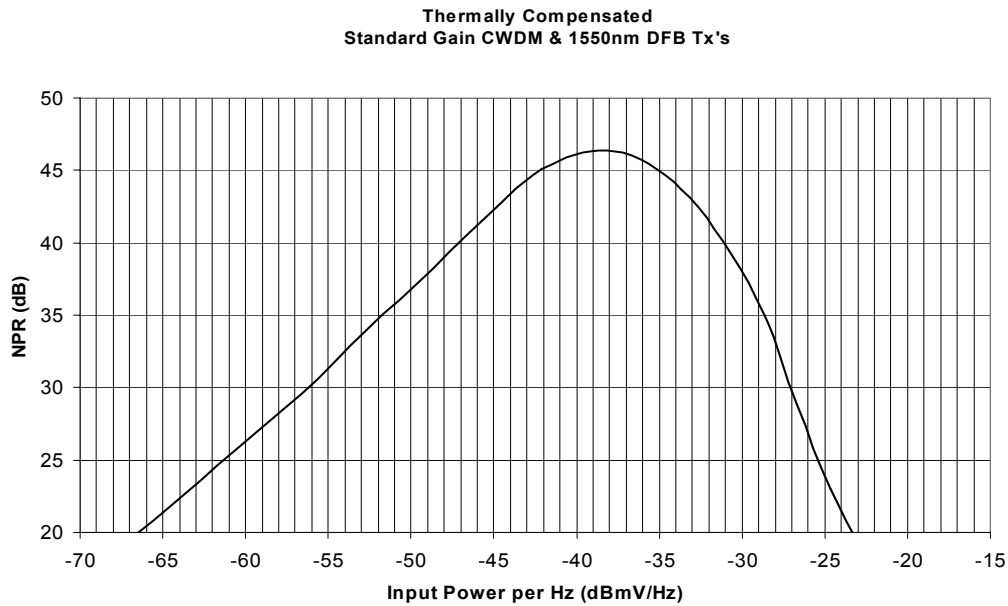


Note: NPR performance with noise loading from 5-42 MHz

CWDM and 1550 nm Link Specifications

Standard Gain DFB Transmitter

Typical **Noise Power Ratio (NPR)** performance over temperature -with 7 dB Optic Link (15 km glass, plus passive loss)



High Gain DFB Transmitter

Typical **Noise Power Ratio (NPR)** performance over temperature -with 7 dB Optic Link (15 km glass, plus passive loss)

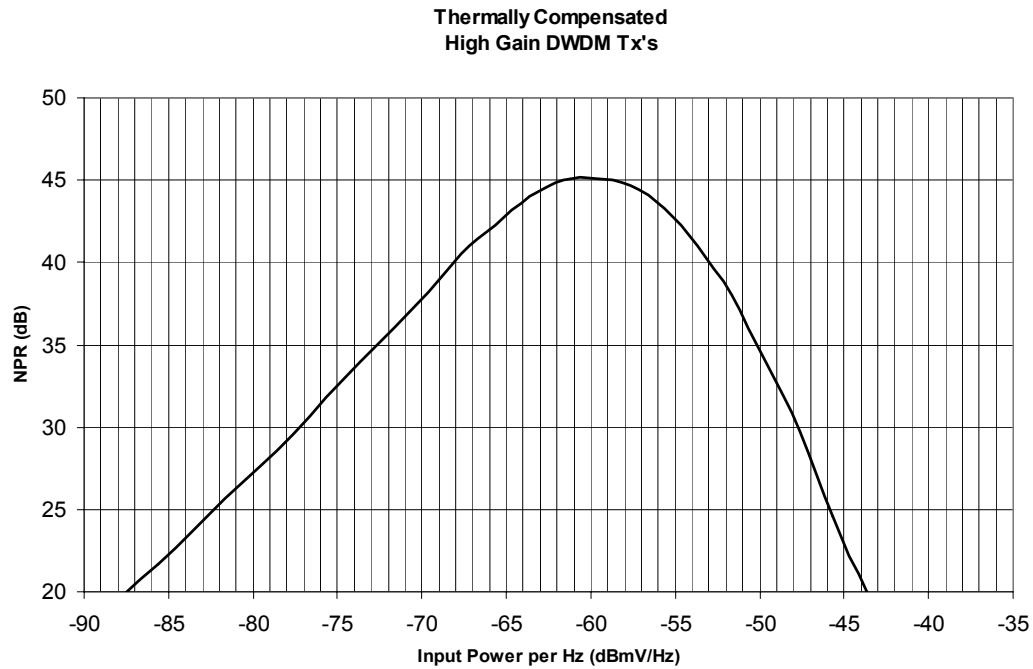


Note: NPR performance with noise loading from 5-42 MHz – performance shown is for single transmitter

DWDM Link Specifications

High Gain DFB Transmitter

Typical **Noise Power Ratio (NPR)** performance over temperature -with 11 dB Optic Link (15 km glass, plus passive loss)



Note: NPR performance with noise loading from 5-42 MHz – performance shown is for single transmitter

Link Specifications, continued

1310 & CWDM Transmitters	DWDM Transmitters	NPR 'Link Loss Correction Factor' (dB)
Link Loss (dB)	Link Loss (dB)	Temperature Compensated DFB TX's (Std and High Gain)
1	5	+2
2	6	+2
3	7	+2
4	8	+1.5
5	9	+1
6	10	+1
7	11	0
8	12	-1
9	13	-2
10	14	-3
11	15	-4.5
12	16	-6
13	17	-7
14	18	-9
15	19	-11
16	20	-12
17	-	-14
18	-	-16
19	-	-18
20	-	-20

Using the NPR Link Loss Correction Factor (applies only to transmitters on this data sheet)

The NPR performance plots contained in this document depict the NPR performance on a reference 7 dB fiber optic link (11 dB for DWDM).

With other link losses, both the:

- NPR dynamic range for a given minimum NPR (C/N) performance
- NPR value for a given transmitter RF input level

will vary from that shown on the reference 7 dB link plots.

To determine an NPR *dynamic range* for a different link loss, add (or subtract) the correction factor associated with the desired link loss to (or from) the dynamic range shown on the reference 7 dB link NPR plot. Note that the associated increase (or decrease) in dynamic range affects only the left side of the NPR curve (minimum RF input side) since that is the portion of the curve affected by changes to the traditional noise sources associated with the optical link.

To determine an NPR *value* for a different link loss, add (or subtract) the correction factor associated with the desired link loss to (or from) the NPR value shown on the 7 dB link NPR plot for a given RF input level. Again, only the NPR values on the left side of the NPR curve (pre-peak values) are to be adjusted. The NPR values and slope associated with the right side of the NPR curve (post peak values) are primarily due to laser clipping at high RF input levels, and therefore do not vary appreciably with link loss.

Ordering Information

The analog reverse optical transmitters for Scientific Atlanta nodes are applicable for a wide variety of station configurations. Please consult with Sales and Applications Engineering to determine the most suitable reverse transmitter configuration for your particular application.

For Use in GainMaker and 6940 Nodes – Standard Gain

Description	Part Number on Module*	Part Number for Ordering*
<i>All listed below are Thermally Compensated Transmitters</i>		
1310 nm DFB Optical Transmitter – Standard Gain, with SC/APC connector	4013903.1310	590934
1310 nm DFB Optical Transmitter – Standard Gain, with SC/UPC connector	4013904.1310	590935
1310 nm DFB Optical Transmitter – Standard Gain, with FC/APC connector	4013905.1310	590932
1470 nm CWDM DFB Optical Transmitter – Standard Gain with SC/APC connector	4013903.1470	4006971
1490 nm CWDM DFB Optical Transmitter – Standard Gain with SC/APC connector	4013903.1490	4006972
1510 nm CWDM DFB Optical Transmitter – Standard Gain with SC/APC connector	4013903.1510	4006973
1530 nm CWDM DFB Optical Transmitter – Standard Gain with SC/APC connector	4013903.1530	4006974
1550 nm CWDM DFB Optical Transmitter – Standard Gain with SC/APC connector	4013903.1550	4006975
1570 nm CWDM DFB Optical Transmitter – Standard Gain with SC/APC connector	4013903.1570	4006976
1590 nm CWDM DFB Optical Transmitter – Standard Gain with SC/APC connector	4013903.1590	4006977
1610 nm CWDM DFB Optical Transmitter – Standard Gain with SC/APC connector	4013903.1610	4006978
1470 nm CWDM DFB Optical Transmitter – Standard Gain with SC/UPC connector	4013904.1470	4006979
1490 nm CWDM DFB Optical Transmitter – Standard Gain with SC/UPC connector	4013904.1490	4006980
1510 nm CWDM DFB Optical Transmitter – Standard Gain with SC/UPC connector	4013904.1510	4006981
1530 nm CWDM DFB Optical Transmitter – Standard Gain with SC/UPC connector	4013904.1530	4006982
1550 nm CWDM DFB Optical Transmitter – Standard Gain with SC/UPC connector	4013904.1550	4006983
1570 nm CWDM DFB Optical Transmitter – Standard Gain with SC/UPC connector	4013904.1570	4006984
1590 nm CWDM DFB Optical Transmitter – Standard Gain with SC/UPC connector	4013904.1590	4006985
1610 nm CWDM DFB Optical Transmitter – Standard Gain with SC/UPC connector	4013904.1610	4006986
1470 nm CWDM DFB Optical Transmitter – Standard Gain with FC/APC connector	4013905.1470	4006987
1490 nm CWDM DFB Optical Transmitter – Standard Gain with FC/APC connector	4013905.1490	4006988
1510 nm CWDM DFB Optical Transmitter – Standard Gain with FC/APC connector	4013905.1510	4006989
1530 nm CWDM DFB Optical Transmitter – Standard Gain with FC/APC connector	4013905.1530	4006990
1550 nm CWDM DFB Optical Transmitter – Standard Gain with FC/APC connector	4013905.1550	4006991
1570 nm CWDM DFB Optical Transmitter – Standard Gain with FC/APC connector	4013905.1570	4006992
1590 nm CWDM DFB Optical Transmitter – Standard Gain with FC/APC connector	4013905.1590	4006993
1610 nm CWDM DFB Optical Transmitter – Standard Gain with FC/APC connector	4013905.1610	4006994

*Part Number for Ordering is for a Transmitter Module packaged in a box. Part Number on Module is the Part Number that appears on the module itself.

Ordering Information, continued

For Use in 6944, 6942, and GainMaker Reverse Segmentable Nodes – High Gain

Description	Part Number on Module*	Part Number for Ordering*
<i>All listed below are Thermally Compensated Transmitters</i>		
1310 nm DFB Optical Transmitter – High Gain, with SC/APC connector	4013906.1310	590938
1310 nm DFB Optical Transmitter – High Gain, with SC/UPC connector	4013907.1310	590939
1310 nm DFB Optical Transmitter – High Gain, with FC/APC connector	4013896.1310	590936
1470 nm CWDM DFB Optical Transmitter – High Gain with SC/APC connector	4013906.1470	4007003
1490 nm CWDM DFB Optical Transmitter – High Gain with SC/APC connector	4013906.1490	4007004
1510 nm CWDM DFB Optical Transmitter – High Gain with SC/APC connector	4013906.1510	4007005
1530 nm CWDM DFB Optical Transmitter – High Gain with SC/APC connector	4013906.1530	4007006
1550 nm CWDM DFB Optical Transmitter – High Gain with SC/APC connector	4013906.1550	4007007
1570 nm CWDM DFB Optical Transmitter – High Gain with SC/APC connector	4013906.1570	4007008
1590 nm CWDM DFB Optical Transmitter – High Gain with SC/APC connector	4013906.1590	4007009
1610 nm CWDM DFB Optical Transmitter – High Gain with SC/APC connector	4013906.1610	4007010
1470 nm CWDM DFB Optical Transmitter – High Gain with SC/UPC connector	4013907.1470	4007011
1490 nm CWDM DFB Optical Transmitter – High Gain with SC/UPC connector	4013907.1490	4007012
1510 nm CWDM DFB Optical Transmitter – High Gain with SC/UPC connector	4013907.1510	4007013
1530 nm CWDM DFB Optical Transmitter – High Gain with SC/UPC connector	4013907.1530	4007014
1550 nm CWDM DFB Optical Transmitter – High Gain with SC/UPC connector	4013907.1550	4007015
1570 nm CWDM DFB Optical Transmitter – High Gain with SC/UPC connector	4013907.1570	4007016
1590 nm CWDM DFB Optical Transmitter – High Gain with SC/UPC connector	4013907.1590	4007017
1610 nm CWDM DFB Optical Transmitter – High Gain with SC/UPC connector	4013907.1610	4007018
1470 nm CWDM DFB Optical Transmitter – High Gain with FC/APC connector	4013908.1470	4007019
1490 nm CWDM DFB Optical Transmitter – High Gain with FC/APC connector	4013908.1490	4007020
1510 nm CWDM DFB Optical Transmitter – High Gain with FC/APC connector	4013908.1510	4007021
1530 nm CWDM DFB Optical Transmitter – High Gain with FC/APC connector	4013908.1530	4007022
1550 nm CWDM DFB Optical Transmitter – High Gain with FC/APC connector	4013908.1550	4007023
1570 nm CWDM DFB Optical Transmitter – High Gain with FC/APC connector	4013908.1570	4007024
1590 nm CWDM DFB Optical Transmitter – High Gain with FC/APC connector	4013908.1590	4007025
1610 nm CWDM DFB Optical Transmitter – High Gain with FC/APC connector	4013908.1610	4007026

*Part Number for Ordering is for a Transmitter Module packaged in a box. Part Number on Module is the Part Number that appears on the module itself.

Ordering Information, continued

For Use in 6944, 6942, and GainMaker Reverse Segmentable Nodes – High Gain

Description	Part Number
<i>All listed below are Thermally Compensated Transmitters</i>	
DWDM, ITU Grid, CH. 20, 1561.42 nm, Analog, SC/APC	4023375.20
DWDM, ITU Grid, CH. 21, 1560.61 nm, Analog, SC/APC	4023375.21
DWDM, ITU Grid, CH. 22, 1559.79 nm, Analog, SC/APC	4023375.22
DWDM, ITU Grid, CH. 23, 1558.98 nm, Analog, SC/APC	4023375.23
DWDM, ITU Grid, CH. 24, 1558.17 nm, Analog, SC/APC	4023375.24
DWDM, ITU Grid, CH. 25, 1557.36 nm, Analog, SC/APC	4023375.25
DWDM, ITU Grid, CH. 26, 1556.55 nm, Analog, SC/APC	4023375.26
DWDM, ITU Grid, CH. 27, 1555.75 nm, Analog, SC/APC	4023375.27
DWDM, ITU Grid, CH. 28, 1554.94 nm, Analog, SC/APC	4023375.28
DWDM, ITU Grid, CH. 29, 1554.13 nm, Analog, SC/APC	4023375.29
DWDM, ITU Grid, CH. 30, 1553.33 nm, Analog, SC/APC	4023375.30
DWDM, ITU Grid, CH. 31, 1552.52 nm, Analog, SC/APC	4023375.31
DWDM, ITU Grid, CH. 32, 1551.72 nm, Analog, SC/APC	4023375.32
DWDM, ITU Grid, CH. 33, 1550.92 nm, Analog, SC/APC	4023375.33
DWDM, ITU Grid, CH. 34, 1550.12 nm, Analog, SC/APC	4023375.34
DWDM, ITU Grid, CH. 35, 1549.32 nm, Analog, SC/APC	4023375.35
DWDM, ITU Grid, CH. 36, 1548.51 nm, Analog, SC/APC	4023375.36
DWDM, ITU Grid, CH. 37, 1547.72 nm, Analog, SC/APC	4023375.37
DWDM, ITU Grid, CH. 38, 1546.92 nm, Analog, SC/APC	4023375.38
DWDM, ITU Grid, CH. 39, 1546.12 nm, Analog, SC/APC	4023375.39
DWDM, ITU Grid, CH. 40, 1545.32 nm, Analog, SC/APC	4023375.40
DWDM, ITU Grid, CH. 41, 1544.53 nm, Analog, SC/APC	4023375.41
DWDM, ITU Grid, CH. 42, 1543.73 nm, Analog, SC/APC	4023375.42
DWDM, ITU Grid, CH. 43, 1542.94 nm, Analog, SC/APC	4023375.43
DWDM, ITU Grid, CH. 44, 1542.14 nm, Analog, SC/APC	4023375.44
DWDM, ITU Grid, CH. 45, 1541.35 nm, Analog, SC/APC	4023375.45
DWDM, ITU Grid, CH. 46, 1540.56 nm, Analog, SC/APC	4023375.46
DWDM, ITU Grid, CH. 47, 1539.77 nm, Analog, SC/APC	4023375.47
DWDM, ITU Grid, CH. 48, 1538.98 nm, Analog, SC/APC	4023375.48
DWDM, ITU Grid, CH. 49, 1538.19 nm, Analog, SC/APC	4023375.49
DWDM, ITU Grid, CH. 50, 1537.40 nm, Analog, SC/APC	4023375.50
DWDM, ITU Grid, CH. 51, 1536.61 nm, Analog, SC/APC	4023375.51
DWDM, ITU Grid, CH. 52, 1535.82 nm, Analog, SC/APC	4023375.52
DWDM, ITU Grid, CH. 53, 1535.04 nm, Analog, SC/APC	4023375.53
DWDM, ITU Grid, CH. 54, 1534.25 nm, Analog, SC/APC	4023375.54
DWDM, ITU Grid, CH. 55, 1533.47 nm, Analog, SC/APC	4023375.55
DWDM, ITU Grid, CH. 56, 1532.68 nm, Analog, SC/APC	4023375.56
DWDM, ITU Grid, CH. 57, 1531.90 nm, Analog, SC/APC	4023375.57
DWDM, ITU Grid, CH. 58, 1531.12 nm, Analog, SC/APC	4023375.58
DWDM, ITU Grid, CH. 59, 1530.33 nm, Analog, SC/APC	4023375.59

Ordering Information, continued

For Use in GS7000 Node

Description	Part Number on Module*	Part Number for Ordering*
<i>All listed below are Thermally Compensated Transmitters</i>		
1310 nm DFB Optical Transmitter – High Gain, with SC/APC connector	4013900.1310	4011952
1310 nm DFB Optical Transmitter – High Gain, with SC/UPC connector	4013901.1310	4011953
1310 nm DFB Optical Transmitter – High Gain, with FC/APC connector	4013902.1310	4011954
1470 nm CWDM DFB Optical Transmitter – High Gain with SC/APC connector	4013900.1470	4011955
1490 nm CWDM DFB Optical Transmitter – High Gain with SC/APC connector	4013900.1490	4011956
1510 nm CWDM DFB Optical Transmitter – High Gain with SC/APC connector	4013900.1510	4011957
1530 nm CWDM DFB Optical Transmitter – High Gain with SC/APC connector	4013900.1530	4011961
1550 nm CWDM DFB Optical Transmitter – High Gain with SC/APC connector	4013900.1550	4011965
1570 nm CWDM DFB Optical Transmitter – High Gain with SC/APC connector	4013900.1570	4011966
1590 nm CWDM DFB Optical Transmitter – High Gain with SC/APC connector	4013900.1590	4011967
1610 nm CWDM DFB Optical Transmitter – High Gain with SC/APC connector	4013900.1610	4011968
1470 nm CWDM DFB Optical Transmitter – High Gain with SC/UPC connector	4013901.1470	4011969
1490 nm CWDM DFB Optical Transmitter – High Gain with SC/UPC connector	4013901.1490	4011970
1510 nm CWDM DFB Optical Transmitter – High Gain with SC/UPC connector	4013901.1510	4011974
1530 nm CWDM DFB Optical Transmitter – High Gain with SC/UPC connector	4013901.1530	4011975
1550 nm CWDM DFB Optical Transmitter – High Gain with SC/UPC connector	4013901.1550	4011976
1570 nm CWDM DFB Optical Transmitter – High Gain with SC/UPC connector	4013901.1570	4011977
1590 nm CWDM DFB Optical Transmitter – High Gain with SC/UPC connector	4013901.1590	4013218
1610 nm CWDM DFB Optical Transmitter – High Gain with SC/UPC connector	4013901.1610	4013299
1470 nm CWDM DFB Optical Transmitter – High Gain with FC/APC connector	4013902.1470	4013542
1490 nm CWDM DFB Optical Transmitter – High Gain with FC/APC connector	4013902.1490	4013543
1510 nm CWDM DFB Optical Transmitter – High Gain with FC/APC connector	4013902.1510	4013544
1530 nm CWDM DFB Optical Transmitter – High Gain with FC/APC connector	4013902.1530	4013545
1550 nm CWDM DFB Optical Transmitter – High Gain with FC/APC connector	4013902.1550	4013546
1570 nm CWDM DFB Optical Transmitter – High Gain with FC/APC connector	4013902.1570	4013547
1590 nm CWDM DFB Optical Transmitter – High Gain with FC/APC connector	4013902.1590	4013548
1610 nm CWDM DFB Optical Transmitter – High Gain with FC/APC connector	4013902.1610	4013549

*Part Number for Ordering is for a Transmitter Module packaged in a box. Part Number on Module is the Part Number that appears on the module itself.

Ordering Information, continued

For Use in GS7000 Node

Description	Part Number
<i>All listed below are Thermally Compensated Transmitters</i>	
DWDM, ITU Grid, CH. 19, 1562.23 nm, Analog, SC/APC	4022938.19
DWDM, ITU Grid, CH. 20, 1561.42 nm, Analog, SC/APC	4022938.20
DWDM, ITU Grid, CH. 21, 1560.61 nm, Analog, SC/APC	4022938.21
DWDM, ITU Grid, CH. 22, 1559.79 nm, Analog, SC/APC	4022938.22
DWDM, ITU Grid, CH. 23, 1558.98 nm, Analog, SC/APC	4022938.23
DWDM, ITU Grid, CH. 24, 1558.17 nm, Analog, SC/APC	4022938.24
DWDM, ITU Grid, CH. 25, 1557.36 nm, Analog, SC/APC	4022938.25
DWDM, ITU Grid, CH. 26, 1556.55 nm, Analog, SC/APC	4022938.26
DWDM, ITU Grid, CH. 27, 1555.75 nm, Analog, SC/APC	4022938.27
DWDM, ITU Grid, CH. 28, 1554.94 nm, Analog, SC/APC	4022938.28
DWDM, ITU Grid, CH. 29, 1554.13 nm, Analog, SC/APC	4022938.29
DWDM, ITU Grid, CH. 30, 1553.33 nm, Analog, SC/APC	4022938.30
DWDM, ITU Grid, CH. 31, 1552.52 nm, Analog, SC/APC	4022938.31
DWDM, ITU Grid, CH. 32, 1551.72 nm, Analog, SC/APC	4022938.32
DWDM, ITU Grid, CH. 33, 1550.92 nm, Analog, SC/APC	4022938.33
DWDM, ITU Grid, CH. 34, 1550.12 nm, Analog, SC/APC	4022938.34
DWDM, ITU Grid, CH. 35, 1549.32 nm, Analog, SC/APC	4022938.35
DWDM, ITU Grid, CH. 36, 1548.51 nm, Analog, SC/APC	4022938.36
DWDM, ITU Grid, CH. 37, 1547.72 nm, Analog, SC/APC	4022938.37
DWDM, ITU Grid, CH. 38, 1546.92 nm, Analog, SC/APC	4022938.38
DWDM, ITU Grid, CH. 39, 1546.12 nm, Analog, SC/APC	4022938.39
DWDM, ITU Grid, CH. 40, 1545.32 nm, Analog, SC/APC	4022938.40
DWDM, ITU Grid, CH. 41, 1544.53 nm, Analog, SC/APC	4022938.41
DWDM, ITU Grid, CH. 42, 1543.73 nm, Analog, SC/APC	4022938.42
DWDM, ITU Grid, CH. 43, 1542.94 nm, Analog, SC/APC	4022938.43
DWDM, ITU Grid, CH. 44, 1542.14 nm, Analog, SC/APC	4022938.44
DWDM, ITU Grid, CH. 45, 1541.35 nm, Analog, SC/APC	4022938.45
DWDM, ITU Grid, CH. 46, 1540.56 nm, Analog, SC/APC	4022938.46
DWDM, ITU Grid, CH. 47, 1539.77 nm, Analog, SC/APC	4022938.47
DWDM, ITU Grid, CH. 48, 1538.98 nm, Analog, SC/APC	4022938.48
DWDM, ITU Grid, CH. 49, 1538.19 nm, Analog, SC/APC	4022938.49
DWDM, ITU Grid, CH. 50, 1537.40 nm, Analog, SC/APC	4022938.50
DWDM, ITU Grid, CH. 51, 1536.61 nm, Analog, SC/APC	4022938.51
DWDM, ITU Grid, CH. 52, 1535.82 nm, Analog, SC/APC	4022938.52
DWDM, ITU Grid, CH. 53, 1535.04 nm, Analog, SC/APC	4022938.53
DWDM, ITU Grid, CH. 54, 1534.25 nm, Analog, SC/APC	4022938.54
DWDM, ITU Grid, CH. 55, 1533.47 nm, Analog, SC/APC	4022938.55
DWDM, ITU Grid, CH. 56, 1532.68 nm, Analog, SC/APC	4022938.56
DWDM, ITU Grid, CH. 57, 1531.90 nm, Analog, SC/APC	4022938.57
DWDM, ITU Grid, CH. 58, 1531.12 nm, Analog, SC/APC	4022938.58
DWDM, ITU Grid, CH. 59, 1530.33 nm, Analog, SC/APC	4022938.59