Prisma II 1550 nm Transmitters

The Prisma II optical network is an advanced transmission system designed to optimize network architectures and increase reliability, scalability, and cost-effectiveness. Prisma II 1550 nm Transmitters offer the ultimate in network architecture flexibility with products designed specifically for broadcast or narrowcast transmission to long distances and at various wavelengths.

Features

- 1 GHz operation for forward path
- Designed to operate within the Prisma II platform
- Multiple channel plans available
- Stimulated Brillouin Scattering (SBS) suppression
- RF predistortion for maximum CNR while maintaining excellent CTB and CSO performance
- Status LEDs indicate module condition and simplify troubleshooting
- Blind-mate (push-on) RF and DC connectors
- RF input test points
- Nonvolatile storage of pre-set operating parameters simplifies installation procedures
- User selectable Automatic Gain Control (AGC)
- Multiple set-up and control options
  - Local control via Local Craft Interface (LCI)
  - Local control via Intelligent Communications Interface Module (ICIM)
  - Remote monitoring via Transmission Network Control System (TNCS)

Figure 1. Prisma 1550 nm Optical Transmitters

1550 nm EMT Transmitter

1550 nm Reverse Transmitter

1550 nm High-Density Forward QAM Transmitter

Transmitter Modules

The Prisma II 1550 nm Transmitter Family includes:

- Long Reach Externally-Modulated Broadcast Transmitter (TXL)
- Extended Reach Externally-Modulated Broadcast Transmitter (TXX)
- High-Density Forward QAM Transmitter (TXQ)
- Reverse Directly-Modulated Transmitter (TXR)

Product Specifications

Table 1. Optical Specifications

Optical	Units	Long Reach & Extended Reach Broadcast Tx	High-Density Forward QAM Tx	Reverse Tx	Notes
Wavelength Range • Options	nm nm	1545 to 1548 1549 to 1554	1530-1562	1530-1562	1
Connector Type • SC/APC • E2000/APC		 Standard Optional	 Standard Optional	 Standard Optional	
Output Power (minimum)	dBm	+10	+10	+8	
Modulation Type		External	Direct	Direct	
SBS Threshold	dBm	≥ 17.0 (TXL) ≥ 15.0 (TXX)	≥ rated output	≥ rated output	

Notes:
1. See Ordering Information for other available ITU wavelengths.

Unless otherwise noted, specifications are based on measurements made in accordance with NCTA Practices for Measurements made on Cable Television Systems using standard frequency assignments and are referenced to the ambient air temperature at the inlet to the Prisma II chassis.

Table 2. Electrical Specifications

Electrical	Units	Long Reach & Extended Reach Broadcast Tx	High-Density Forward QAM Tx	Reverse Tx	Notes
Bandwidth	MHz	45-1002	550-1002	5-200	
Broadcast (BC) RF Input Required nominal RF Input Level per Ch:					
40 NTSC ch's (Low or High)	dBmV	23	N/A	N/A	1
78 NTSC analog ch's with:					
-200 MHz QAM (550-750 MHz) @ -6 dB	dBmV	19.5	N/A	N/A	1
-450 MHz QAM (550-1000 MHz) @ -6 dB	dBmV	19.0	N/A	N/A	1
64 PAL B/G analog ch's with:					
-150 MHz QAM (600-750 MHz) @ -6 dB	dBmV	20.5	N/A	N/A	1
-400 MHz QAM (600-1000 MHz) @ -6 dB	dBmV	20.0	N/A	N/A	1
59 PAL D/K analog ch's with:					
-150 MHz QAM (600-750 MHz) @ -6 dB	dBmV	21.0	N/A	N/A	1
-400 MHz QAM (600-1000 MHz) @ -6 dB	dBmV	20.5	N/A	N/A	1
16 QAM ch's	dBmV	N/A	+22.0 ± 1.5	N/A	2,3
Narrowcast (NC) RF Input Required RF Input Level per Ch (QAM): -for QAM @ -6dBc relative to analog ch's	dB	+6	N/A	N/A	
Required RF Input Level per Ch (analog): -for equal amplitude analog ch's (BC & NC)	dB	+12 (above Broadcast RF analog level)	N/A	N/A	
Reverse RF Input	dBmV/Hz	-	-	-39 to -55	4
Front Panel RF Test Point • Relative to Input	dB dB	Broadcast Input -20 ± 0.5 Narrowcast Input -32 ± 0.5	Broadcast Input -20 ± 1.0	-20 ± 1.0	
RF Input Return Loss	dB	16	16	16	
Frequency Response • 5 MHz - 200 MHz • 45 MHz - 550 MHz • 45 MHz - 1002 MHz	dB dB dB	N/A ± 0.50 ± 0.75	N/A N/A ± 0.75	± 0.75 N/A N/A	
Power Consumption (maximum)	W DC	45	7.5	15	

Notes:
1. RF input levels specified are with Tx AGC off.
2. For the High Density Forward QAM Tx with 16 QAM channels,-8 dBm input to the receiver, and -6 dB RF Δ between the broadcast and narrowcast (QAM) signal.
3. For the Forward QAM Tx or High Density QAM Tx, as used in 8 wavelength DWDM narrowcast network HE ⇒ HUB architecture.
4. RF drive level range to achieve a 42 dB Noise Power Ratio (NPR) with 40km of fiber and 35 MHz noise loading.

Unless otherwise noted, specifications are based on measurements made in accordance with NCTA Practices for Measurements made on Cable Television Systems using standard frequency assignments and are referenced to the ambient air temperature at the inlet to the Prisma II chassis.

Table 3. Environmental Specifications

Environmental	Units	Long Reach & Extended Reach Broadcast Tx	High-Density Forward QAM Tx	Reverse Tx	Notes
Temperature Range					
• Full Specs	°C °F	-20 to +65 -4 to +149	-20 to +65 -4 to +149	-20 to +65 -4 to +149	
• Operational	°C °F	-40 to +65 -40 to +149	-40 to +65 -40 to +149	-40 to +65 -40 to +149	
Humidity	%	0 to 95	0 to 95	0 to 95	1

Table 4. Mechanical Specifications

Physical Dimensions	Units	Long Reach & Extended Reach Broadcast Tx	High-Density Forward QAM Tx	Reverse Tx	Notes
Depth	in. cm	9.8 24.9	8.80 22.35	9.8 24.9	
Width	in. cm	3.2 8.1	1.03 2.62	1.0 2.5	
Height	in. cm	7.6 19.3	3.48 8.84	7.6 19.3	
Weight	lb kg	6.0 2.7	0.90 0.41	3.0 1.4	
Module Width	slots	3	1	1	

Notes:
1. Recommended for use in non-condensing environments only.

Unless otherwise noted, specifications are based on measurements made in accordance with NCTA Practices for Measurements made on Cable Television Systems using standard frequency assignments and are referenced to the ambient air temperature at the inlet to the Prisma II chassis.

Table 5. Link Performance Specs - Long Reach Externally-Modulated Broadcast Transmitters (see note 8)

Channel Loading	CNR*	CSO*	CTB*	Notes
40 NTSC analog ch's (Low or High)	55	65	65	1,3
78 NTSC analog ch's with: -200 MHz QAM (550-750 MHz) @ -6 dB 64 PAL B/G analog ch's with: -150 MHz QAM (600-750 MHz) @ -6 dB 59 PAL D/K analog ch's with: -150 MHz QAM (600-750 MHz) @ -6 dB	51.5	65	65	1,2,3

*For Links using PII 1 GHz Long Reach Externally-Modulated Broadcast Tx followed by EDFA and launched into 65 km SM fiber, with 0 dBm optical input to the receiver. [4,6,7,11]

Table 6. Link Performance Specs - Extended Reach Externally-Modulated Broadcast Transmitters (see notes 9 & 10)

Channel Loading	CNR**	CSO**	CTB**	Notes
40 NTSC analog ch's (Low or High)	55	65	65	1,3
78 NTSC analog ch's with: -200 MHz QAM (550-750 MHz) @ -6 dB 64 PAL B/G analog ch's with: -150 MHz QAM (600-750 MHz) @ -6 dB 59 PAL D/K analog ch's with: -150 MHz QAM (600-750 MHz) @ -6 dB	51.5	65	65	1,2,3

**For Links using PII 1 GHz Extended Reach Externally-Modulated Broadcast Tx followed by EDFA launched into 40 km SM fiber, into a 2nd EDFA followed by 30 km SM fiber, with +1 dBm optical input to the receiver. [4,11]

Table 7. Link Performance Specs - High-Density Forward QAM Directly-Modulated Broadcast Transmitters

Channel Loading	MER++	BER	CNR+	Notes
16 QAM256 or QAM64 ch's	38	≤ 1 e-9	50	1,3,5,12

+For Links using PII 1 GHz Forward QAM 10 dBm Tx or PII 1 GHz High Density Forward QAM 10 dBm Tx, launched into 60 km SM fiber with -8 dBm optical input to the receiver. [11]

++Test equipment may limit measured performance.

Table 8. Link Performance Specs - Reverse Directly-Modulated Transmitters

NPR (db)	RF Input Dynamic Range (dB)	Notes
42	14	13

Notes:

1. With specified RF input levels and optical link conditions.
2. For 78 NTSC, 64 PAL B/G or 59 PAL D/K with full QAM loading through 1002 MHz, subtract 1 dB from listed CNR.
3. Receiver with NEP = 7 pa / √Hz; ρ = 0.9 A/W.
4. EDFA minimum input power is 5.0 dBm; noise figure is 5.5 dB.
5. BER is before Forward Error Correction (pre-FEC), with ITU-B J.83 Annex B QAM modulation.
6. Primary (J1) output. Secondary (J2).
7. Second port (J2) may have some performance degradation as compared with J1. J2 is available for back-up or route-redundant systems.
8. The Long Reach Tx is used to service point to point, or point to multipoint architectures with links up to 65 km.
9. The Extended Reach Tx is used to service point to point, or point to multipoint architectures with link distances between 65 km to 80 km.
10. For applications with links greater than 80 km using the Extended Reach Tx, Dispersion Compensation Modules will improve composite distortion values. CNR will continue to degrade as distance increases.
11. Typical operating parameters. For other performance levels, please contact Applications Engineering.
12. CNR with 16 CW channels.
13. NPR performance and associated dynamic range with 40km of fiber and 35 MHz noise loading.

Unless otherwise noted, specifications are based on measurements made in accordance with NCTA Practices for Measurements made on Cable Television Systems using standard frequency assignments and are referenced to the ambient air temperature at the inlet to the Prisma II chassis.

Ordering Information

Figure 2. Long Reach & Extended Reach Externally Modulated Broadcast Transmitter

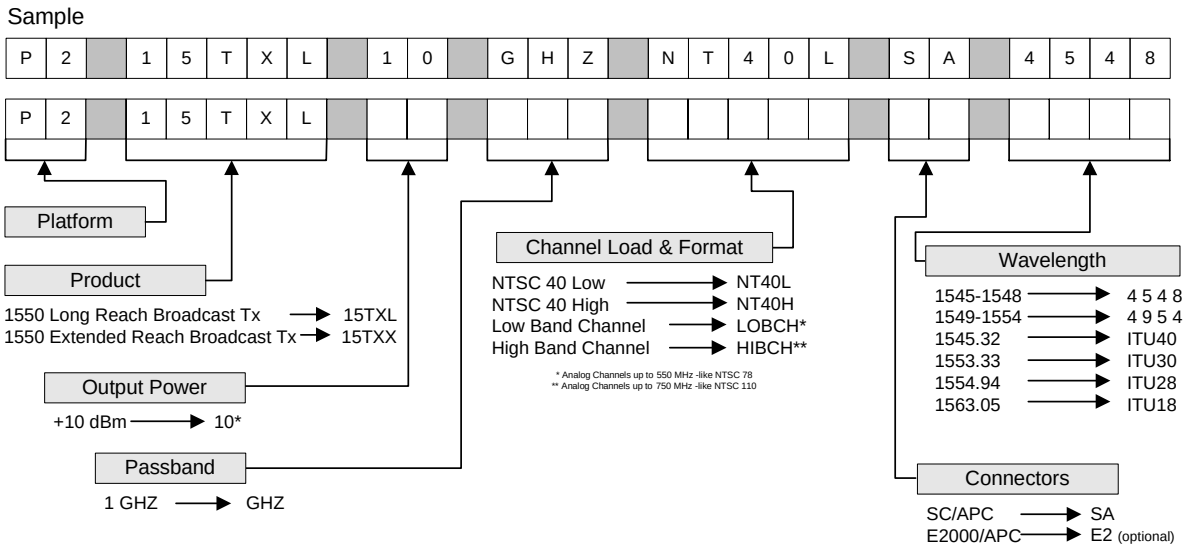

Table 9. Ordering Information – Long Reach & Extended Reach Transmitters

1550 nm Long Reach Tx, Dual 10 dBm	Part Number
P2-15TXL-10-GHZ-LOBCH-SA-4548	737269
P2-15TXL-10-GHZ-HIBCH-SA-4548	737270
P2-15TXL-10-GHZ-NT40L-SA-4548	737273
P2-15TXL-10-GHZ-NT40H-SA-4954	737274
P2-15TXL-10-GHZ-LOBCH-SA-4954	737281
P2-15TXL-10-GHZ-LOBCH-SA-ITU28	737282
P2-15TXL-10-GHZ-LOBCH-SA-ITU40	737283
P2-15TXL-10-GHZ-LOBCH-SA-ITU18	737287
1550 nm Extended Reach Tx,10 dBm	**Part Number**
P2-15TXX-10-GHZ-LOBCH-SA-ITU28	737271
P2-15TXX-10-GHZ-LOBCH-SA-ITU30	737272
P2-15TXX-10-GHZ-LOBCH-SA-ITU40	737279

Figure 3. High-Density Forward QAM Transmitter

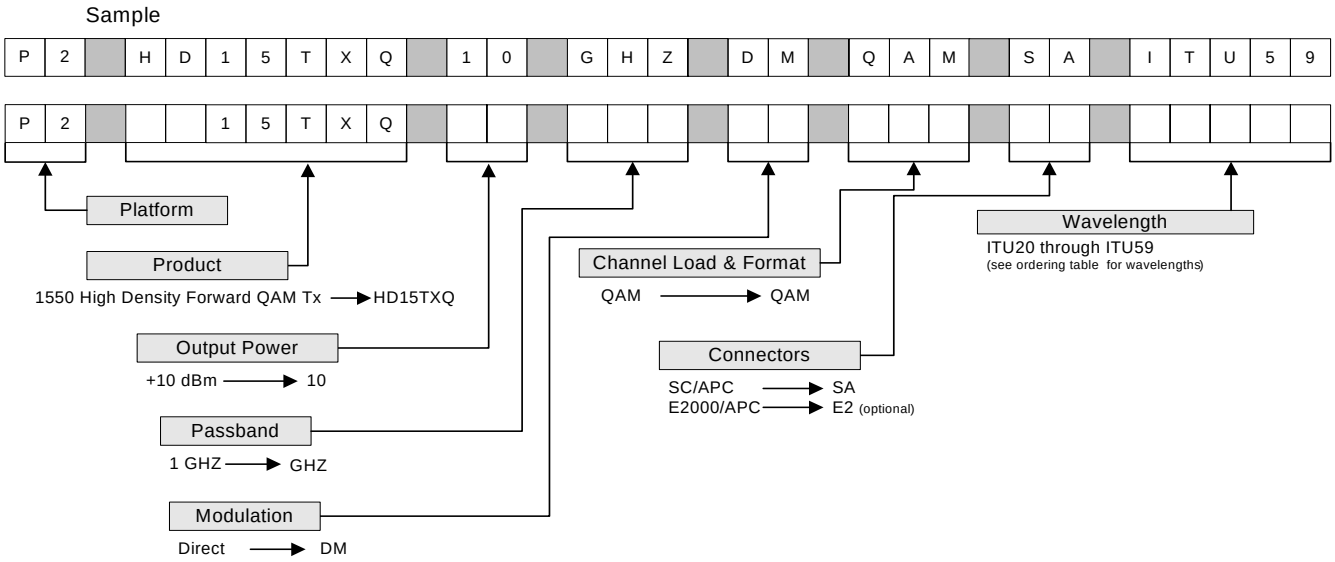

Table 10. Ordering Information – 1550 Forward High Density QAM Tx, 10 dBm, Model #: P2-HD-15TXQ-10-GHz-DM-QAM-SA-ITUxx

ITU Channels	Wavelength (nm)	Part Number	ITU Channels	Wavelength (nm)	Part Number
20	1561.42	737589	40	1545.32	737609
21	1560.61	737590	41	1544.53	737610
22	1559.79	737591	42	1543.73	737611
23	1558.98	737592	43	1542.94	737612
24	1558.17	737593	44	1542.14	737613
25	1557.36	737594	45	1541.35	737614
26	1556.55	737595	46	1540.56	737615
27	1555.75	737596	47	1539.77	737616
28	1554.94	737597	48	1538.98	737617
29	1554.13	737598	49	1538.19	737618
30	1553.33	737599	50	1537.40	737619
31	1552.52	737600	51	1536.61	737620
32	1551.72	737601	52	1535.82	737621
33	1550.92	737602	53	1535.04	737622
34	1550.12	737603	54	1534.25	737623
35	1549.32	737604	55	1533.47	737624
36	1548.51	737605	56	1532.68	737625
37	1547.72	737606	57	1531.90	737626
38	1546.92	737607	58	1531.12	737627
39	1546.12	737608	59	1530.33	737628

Figure 4. Reverse Transmitter Matrix

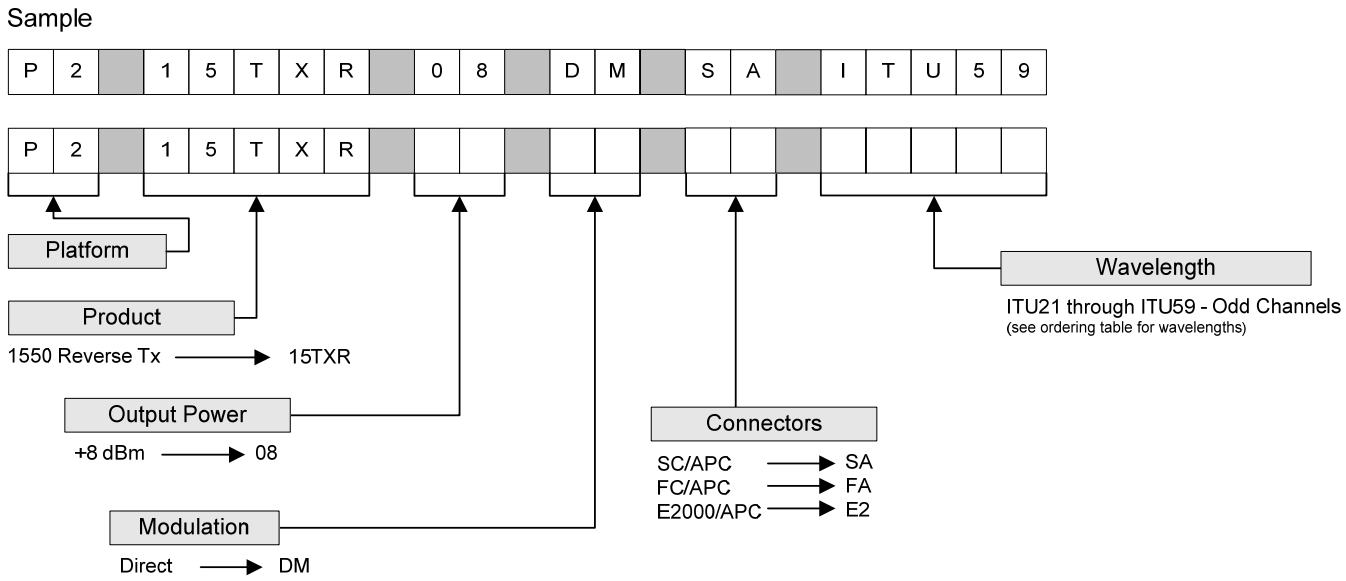

Table 11. Ordering Information – 1550 nm Reverse Tx, 8 dBm, Model #: P2-15TXR-08-SA-ITU xx

ITU Channels	Wavelength (nm)	Part Number	ITU Channels	Wavelength (nm)	Part Number
21	1560.61	737404	41	1544.53	737414
23	1558.98	737405	43	1542.94	737415
25	1557.36	737406	45	1541.35	737416
27	1555.75	737407	47	1539.77	737417
29	1554.13	737408	49	1538.19	737418
31	1552.52	737409	51	1536.61	737419
33	1550.92	737410	53	1535.04	737420
35	1549.32	737411	55	1533.47	737421
37	1547.72	737412	57	1531.90	737422
39	1546.12	737413	59	1530.33	737423

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

Platform
1310 nm Transmitters
Forward Optical Receivers
Reverse Optical Receivers
1550 nm Optical Amplifiers
Receivers
Ancillary Modules
bdr Digital Reverse 2:1 Multiplexing System

For more information please refer to:
Prisma II Data Sheet, Part Number 739199
Prisma II Data Sheet, Part Number 739200
Prisma II Data Sheet, Part Number 7011887
Prisma II Data Sheet, Part Number 7011888
Prisma II Data Sheet, Part Number 739202
Prisma II Data Sheet, Part Number 739203
Prisma II Data Sheet, Part Number 739205
Prisma II Data Sheet, Part Number 744484

Cisco Systems, Inc.
1-800-722-2009 or 678-277-1120
www.scientificatlanta.com

Part Number 7009178 Rev F
May 2009