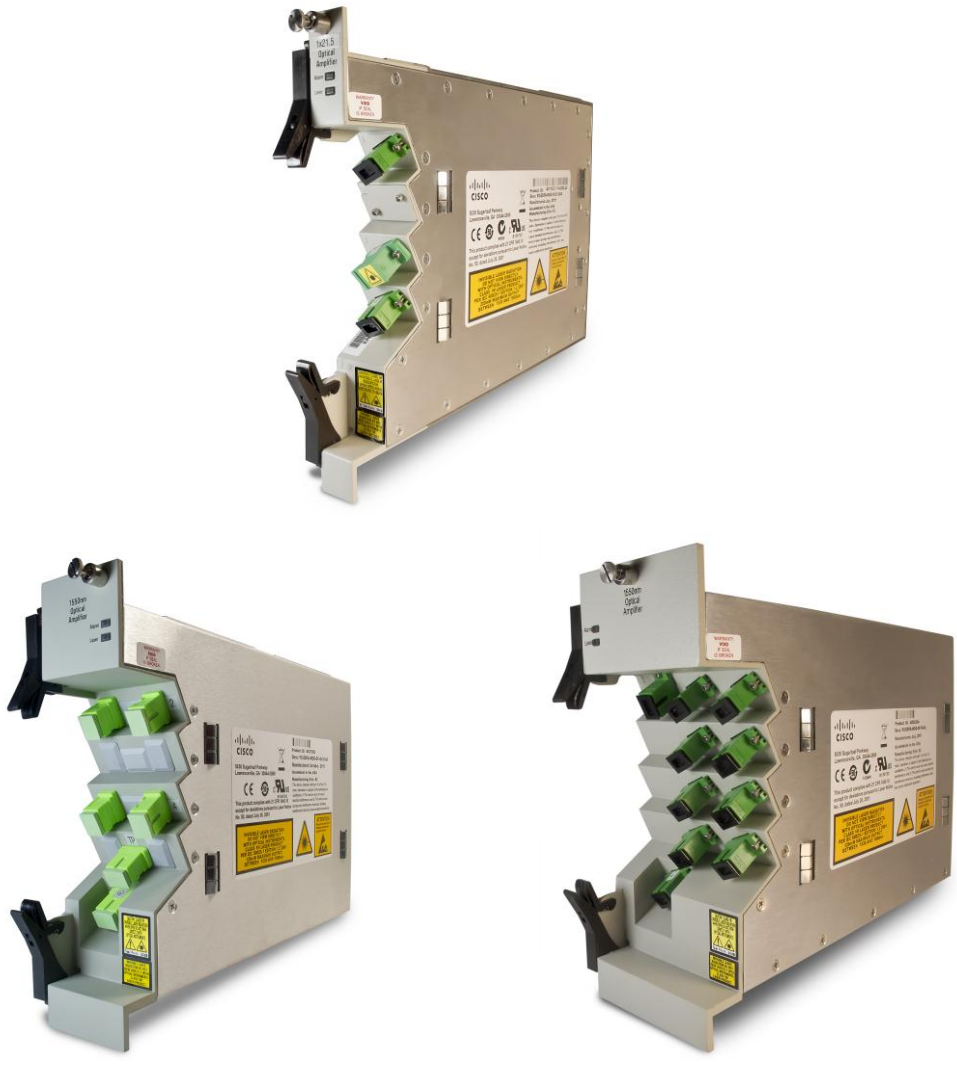
Cisco Prisma II Optical Amplifiers

The Cisco® Prisma® II optical network is an advanced transmission system designed to enhance network architectures and increase reliability, scalability, and cost effectiveness. Prisma II Optical Amplifiers offer a wide range of configurations and output powers for outstanding network architectural flexibility.

The Prisma II Optical Amplifiers are available as Pre-Amplifier, Post-Amplifier, Hybrid Amplifier, and Gain-Flattened Erbium-Doped Fiber Amplifier (EDFA) modules. Many output power and port configuration options are available. These amplifier modules can be used as building blocks to configure an optical transmission link for long haul, metro, and FTTx/PON networks to provide voice, video, and data services. Additional amplifier modules can be designed in for greater routing capabilities.

Figure 1. Prisma II Optical Amplifiers (Counterclockwise from Top): 1-Wide, 2-Wide, and 3-Wide



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Prisma II Pre-Amplifier Modules

Prisma II Pre-Amplifier (EDFA) modules are 1-wide modules with a wide variety of output power selections from 13 dBm to 22 dBm. Operating over a wide range of input powers from a Prisma II 1550 nm Transmitter or another 1550 nm Optical Amplifier upstream, the pre-amplifier modules provide low noise, reliable performance for optical trunk (line) transmission to meet various types of optical networking needs. Up to 4 output ports are available to support multiple post-amplifiers for FTTx-PON applications.

Prisma II Pre-Amplifier modules are temperature hardened for use in applications having less temperature control than a headend or central office (CO) environment. See page 4 for configuration options.

Prisma II Post-Amplifier Modules

Prisma II Post-Amplifier modules use cladding pumped Er/Yb co-doped fiber technology to achieve the high output power levels that regular EDFA cannot reach. This product is designed for high operation efficiency and excellent noise performance. The post-amplifier module is directly fed by a pre-amplifier module and outputs the high optical power level required to feed the passive optical network (PON).

Prisma II Post-Amplifier modules are available in 1-wide and 2-wide modules. The 1-wide post-amplifier module is temperature hardened for use in applications having less temperature control than a headend or CO environment. The 2-wide post-amplifier module is normally used in a temperature controlled headend or CO environment. See page 4 for configuration options.

Prisma II Hybrid Amplifier Modules

Prisma II Hybrid Amplifier modules are integrated modules that include a pre-amplifier and a post-amplifier. This two-stage hybrid design optimizes space efficiency and link performance. The Prisma II Hybrid Amplifier can be fed by either an optical transmitter or a pre-amplifier. It is normally used at the end of an optical trunk line to distribute optical power to a passive optical network (PON).

Prisma II Hybrid Amplifier modules are available in 2-wide and 3-wide modules. See page 5 for configuration options.

Prisma II Gain-Flattened Amplifiers

Prisma II Gain-Flattened EDFA modules are designed for use in multiple wavelength systems. This highly versatile EDFA maximizes system performance and flexibility by providing automatic gain control (AGC) while maintaining gain flatness for up to 40 wavelengths. The Prisma II Gain Flattened EDFA offers the flexibility to select between having constant composite output power or constant gain per wavelength.

The Prisma II High Power Gain Flattened Optical Amplifier is designed for use in multiple wavelength systems that require high total optical power and multiple output ports. This high power optical amplifier enables FTTx/PON systems with multiple output ports for signal distribution.

Prisma II Gain Flattened EDFA modules are temperature hardened for use in applications having less temperature control than a headend or CO environment. Prisma II High Power Gain Flattened Optical Amplifier modules are normally used in a temperature controlled headend or CO environment. See page 5 for configuration options.

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Features

- Designed to operate with NEBS certified Prisma II platform
- Wide range of output power and port configuration options
- Low noise
- Excellent reliability supported by field operation data
- Nonvolatile storage of preset operating parameters simplifies installation procedures
- Remote software download via Intelligent Communications Interface Module (ICIM)

  Note: Some EDFA remote firmware downloads are service-affecting.
- Optical test port on most models
- Multiple set-up and control options:
  - Local monitoring via ICM front panel
  - Remote monitoring via Transmission Network Control System (TNCS) or SNMP
  - User defined input alarm levels
  - Local Craft Interface (LCI)

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Product Specifications

Table 1. Optical Amplifier Module Configuration

Configuration	Port Count	Output Power (dBm)	Module Width	Notes
Pre-Amplifier				
1x13	1	13	1-wide	1, 6
1x16	1	16	1-wide	1, 6
1x17	1	17	1-wide	1, 6
1x19	1	19	1-wide	1, 6
1x20	1	20	1-wide	1, 6
1x21.5	1	21.5	1-wide	1, 6
1x22	1	22	1-wide	1, 6
2x17	2	17	1-wide	1, 6
2x19	2	19	1-wide	1, 6
4x16	4	16	1-wide	1, 6
Post-Amplifier				
1x24	1	24	1-wide	2, 6
2x21	2	21	1-wide	2, 6
2x22	2	22	1-wide	2, 6
4x17	4	17	1-wide	2, 6
4x18.5	4	18.5	1-wide	2, 6
4x19.5	4	19.5	1-wide	2, 6
8x22.5	8	22.5	2-wide	2, 7
8x24	8	24	2-wide	2, 7
10x21.5	10	21.5	2-wide	2, 7
10x23	10	23	2-wide	2, 7
12x21	12	21	2-wide	2, 7
12x22	12	22	2-wide	2, 7
14x20	14	20	2-wide	2, 7
14x21.5	14	21.5	2-wide	2, 7
16x19.5	16	19.5	2-wide	2, 7
16x21	16	21	2-wide	2, 7
18x18.9	18	18.9	2-wide	2, 7
18x20.5	18	20.5	2-wide	2, 7
20x18.5	20	18.5	2-wide	2, 7
20x20	20	20	2-wide	2, 7
22x18.1	22	18.1	2-wide	2, 7
22x19.5	22	19.5	2-wide	2, 7
24x17.65	24	17.65	2-wide	2, 7
24x19	24	19	2-wide	2, 7

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Product Specifications, cont'd.

Configuration	Port Count	Output Power (dBm)	Module Width	Notes
Hybrid Amplifier				
1x24	1	24	2-wide	3, 6
2x21	2	21	2-wide	3, 6
4x17	4	17	2-wide	3, 6
4x20	4	20	2-wide	3, 6
8x17	8	17	3-wide	3, 6
9x17	9	17	3-wide	3, 6
9x19	9	19	3-wide	3, 6
4x21.5	4	21.5	2-wide	3, 7
8x21.5	8	21.5	2-wide	3, 7
9x19	9	19	2-wide	3, 7
Gain Flattened Amplifier				
1x17	1	17	2-wide	1, 6
1x20	1	20	2-wide	1, 6
4x18	4	18	2-wide	3, 7
8x18	8	18	2-wide	3, 7

Table 2. Optical Specifications

Specification	Units	Pre-Amplifier	Post-Amplifier	Hybrid Amplifier	Gain Flattened Amplifier	Notes
Input Power (full specs)	dBm	> 0	> 16	> 0	-22 to +6 +5 to +10 for high power type	
Noise Figure	dB	≤ 5.0	≤ 6.0	≤ 6.0	≤ 5.0 ≤ 6.0 for high power type	4
Wavelength Range	nm	1530 - 1565	1545 - 1565	1535 - 1565	1530 - 1562 1545 - 1557 for high power type	
Gain Flatness	dB	-	-	-	1.2 2.0 for high power type	
Port to Port Uniformity	dB	< 1	< 1	< 1	< 1	
Polarization Dependent Loss	dB	< 0.3	< 0.5	< 0.5	< 0.5	
Connectors Available	-	SC/APC, LC/APC, and E2000/APC				5

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Product Specifications, cont'd.

Table 3. General Specifications

Specification	Units	1-wide	2-wide	3-wide	Notes
Electrical					
Maximum Power Consumption	WDC	15	30	45	
Mechanical					
Depth	in. cm	9.8 24.9	9.8 24.9	9.8 24.9	
Width	in. cm	1.0 2.5	2.1 5.3	3.2 8.1	
Height	in. cm	7.6 19.3	7.6 19.3	7.6 19.3	
Weight	lb. kg	2.25 1.0	3.5 1.6	4.0 1.8	
Environmental					
Operating Temperature Range 1	°C °F	-40 to 65 -40 to 149	-40 to 65 -40 to 149	-40 to 65 -40 to 149	6
Operating Temperature Range 2	°C °F		0 to 50 32 to 122		7
Storage Temperature	°C °F		-40 to 65 -40 to 149		
Humidity Range	%		0 to 95, non-condensing environment		

Notes:

1. Single Mode EDFA Amplifier
2. Cladding Pump Er/Yb Fiber Amplifier
3. Hybrid EDFA / Cladding Pump Amplifier
4. Noise figure is defined at the following conditions:
   - For Pre-Amplifier and Gain Flattened EDFA, measured at 0 dBm input
   - For Post-Amplifier, measured pre-amp / post-amp combination at +5.0 dBm input to pre-amp module
   - For Hybrid Amplifier and High Power GF Amplifier, measured at +5 dBm input
5. Not all connectors are available with every configuration. See ***Ordering Information*** beginning on page 7 for details.
6. Operating Temperature Range 1 applies.
7. Operating Temperature Range 2 applies.

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.

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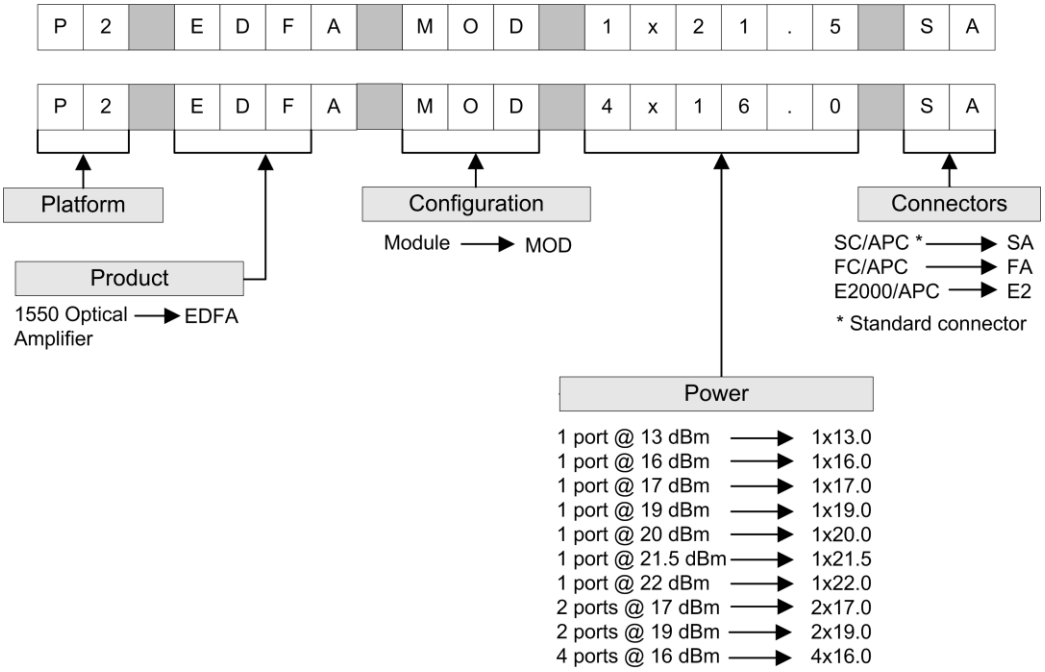
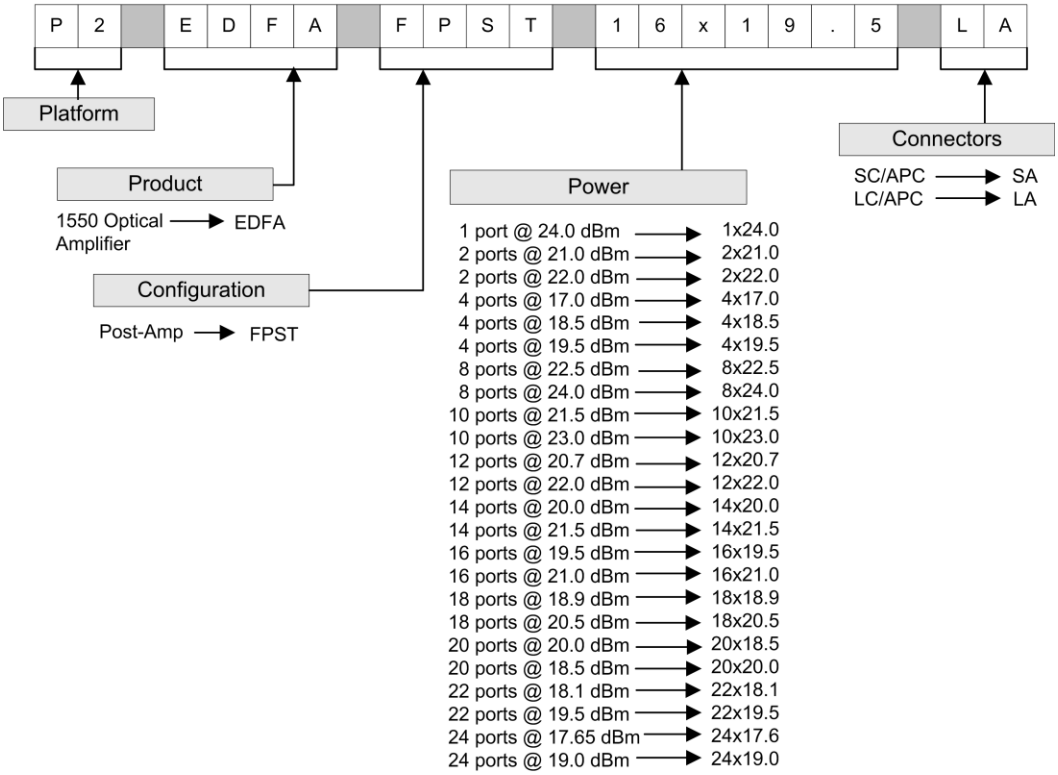
Ordering Information

Prisma II Pre-Amplifiers - Configuration Matrix



Prisma II Post-Amplifiers - Configuration Matrix



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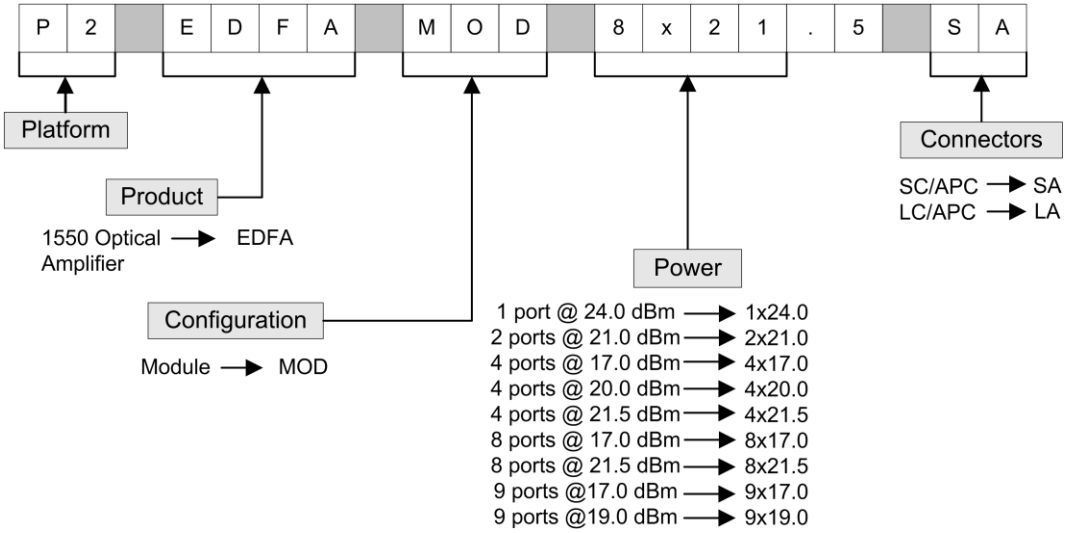
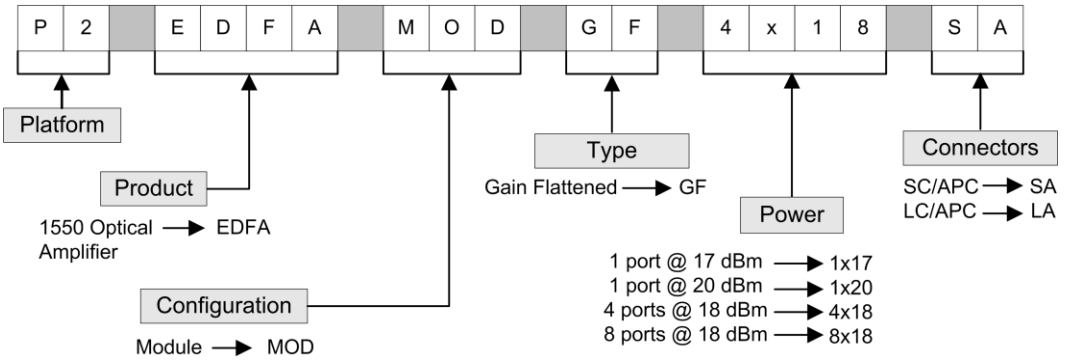
Ordering Information, cont'd.

Prisma II Hybrid Amplifiers - Configuration Matrix



Prisma II Gain Flattened Amplifiers - Configuration Matrix



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Ordering Information, cont'd.

Table 4. Prisma II Pre-Amplifier Modules - Part Numbers

Description	Part Number
Pre-amp module, 1-wide, 1 port, +13.0 dBm, SC/APC (P2-EDFA-MOD-1X13-SA)	4036053
Pre-amp module, 1-wide, 1 port, +16.0 dBm, SC/APC (P2-EDFA-MOD-1X16-SA)	4036054
Pre-amp module, 1-wide, 1 port, +17.0 dBm, SC/APC (P2-EDFA-MOD-1X17-SA)	4011555
Pre-amp module, 1-wide, 1 port, +19.0 dBm, SC/APC (P2-EDFA-MOD-1X19-SA) *	4011537.111.000.AA
Pre-amp module, 1-wide, 1 port, +20.0 dBm, SC/APC (P2-EDFA-MOD-1X20-SA)	4036056
Pre-amp module, 1-wide, 1 port, +21.5 dBm, SC/APC (P2-EDFA-MOD-1X21.5-SA) *	4011537.114.000.AA
Pre-amp module, 1-wide, 1 port, +22.0 dBm, SC/APC (P2-EDFA-MOD-1X22-SA)	4036057
Pre-amp module, 1-wide, 2 ports, +17.0 dBm, SC/APC (P2-EDFA-MOD-2X17-SA)	4036058
Pre-amp module, 1-wide, 2 ports, +19.0 dBm, SC/APC (P2-EDFA-MOD-2X19-SA)	4036059
Pre-amp module, 1-wide, 4 ports, +16.0 dBm, SC/APC (P2-EDFA-MOD-4X16-SA)	4040566

* Model includes optical test port.

Table 5. Prisma II Post-Amplifier Modules - Part Numbers

Description	Part Number
Post-amp module, 1-wide, 1 port, +24.0 dBm, SC/APC (P2-EDFA-FPST-1X24-SA)	737006
Post-amp module, 1-wide, 2 ports, +21.0 dBm, SC/APC (P2-EDFA-FPST-2X21-SA)	4033325
Post-amp module, 1-wide, 2 ports, +22.0 dBm, SC/APC (P2-EDFA-FPST-2X22-SA)	4005263
Post-amp module, 1-wide, 4 ports, +17.0 dBm, SC/APC (P2-EDFA-FPST-4X17-SA)	4000770
Post-amp module, 1-wide, 4 ports, +18.5 dBm, SC/APC (P2-EDFA-FPST-4X18.5-SA)	4002630
Post-amp module, 1-wide, 4 ports, +19.5 dBm, SC/APC (P2-EDFA-FPST-4X19.5-SA)	4005262
Post-amp module, 2-wide, 8 ports, +22.5 dBm, LC/APC (P2-EDFA-FPST-8X22.5-LA) *	4010485.101.000.AB
Post-amp module, 2-wide, 8 ports, +24.0 dBm, LC/APC (P2-EDFA-FPST-8X24.0-LA) *	4010485.125.000.AA
Post-amp module, 2-wide, 10 ports, +21.5 dBm, LC/APC (P2-EDFA-FPST-10X21.5-LA) *	4010485.102.000.AB
Post-amp module, 2-wide, 10 ports, +23.0 dBm, LC/APC (P2-EDFA-FPST-10X23.0-LA) *	4010485.124.000.AA
Post-amp module, 2-wide, 12 ports, +21.0 dBm, LC/APC (P2-EDFA-FPST-12X21.0-LA) *	4010485.103.000.AB
Post-amp module, 2-wide, 12 ports, +22.0 dBm, LC/APC (P2-EDFA-FPST-12X22.0-LA) *	4010485.123.000.AA
Post-amp module, 2-wide, 14 ports, +20.0 dBm, LC/APC (P2-EDFA-FPST-14X20.0-LA) *	4010485.104.000.AB
Post-amp module, 2-wide, 14 ports, +21.5 dBm, LC/APC (P2-EDFA-FPST-14X21.5-LA) *	4010485.122.000.AA
Post-amp module, 2-wide, 16 ports, +19.5 dBm, LC/APC (P2-EDFA-FPST-16X19.5-LA) *	4010485.105.000.AB
Post-amp module, 2-wide, 16 ports, +21.0 dBm, LC/APC (P2-EDFA-FPST-16X21.0-LA) *	4010485.121.000.AA
Post-amp module, 2-wide, 18 ports, +18.9 dBm, LC/APC (P2-EDFA-FPST-18X18.9-LA) *	4010485.115.000.AA
Post-amp module, 2-wide, 18 ports, +20.5 dBm, LC/APC (P2-EDFA-FPST-18X20.5-LA) *	4010485.120.000.AA
Post-amp module, 2-wide, 20 ports, +18.5 dBm, LC/APC (P2-EDFA-FPST-20X18.5-LA) *	4010485.107.000.AB
Post-amp module, 2-wide, 20 ports, +20.0 dBm, LC/APC (P2-EDFA-FPST-20X20.0-LA) *	4010485.119.000.AA
Post-amp module, 2-wide, 22 ports, +18.1 dBm, LC/APC (P2-EDFA-FPST-22X18.1-LA) *	4010485.113.000.AA
Post-amp module, 2-wide, 22 ports, +19.5 dBm, LC/APC (P2-EDFA-FPST-22X19.5-LA) *	4010485.118.000.AA
Post-amp module, 2-wide, 24 ports, +17.65 dBm, LC/APC (P2-EDFA-FPST-24X17.65-LA) *	4010485.116.000.AA
Post-amp module, 2-wide, 24 ports, +19.0 dBm, LC/APC (P2-EDFA-FPST-24X19.0-LA) *	4010485.117.000.AA

* Model includes optical test port.

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Ordering Information, cont'd.

Table 6. Prisma II Hybrid Amplifier Modules - Part Numbers

Description	Part Number
Hybrid-amp module, 2-wide, 1 port, +24.0 dBm, SC/APC (P2-EDFA-MOD-1x24-SA)	737013
Hybrid-amp module, 2-wide, 2 ports, +21.0 dBm, SC/APC (P2-EDFA-MOD-2X21-SA)	4002676
Hybrid-amp module, 2-wide, 4 ports, +17.0 dBm, SC/APC (P2-EDFA-MOD-4X17-SA)	737004
Hybrid-amp module, 2-wide, 4 ports, +20.0 dBm, SC/APC (P2-EDFA-MOD-4X20-SA)	4033285
Hybrid-amp module, 3-wide, 8 ports, +17.0 dBm, SC/APC (P2-EDFA-MOD-8X17-SA)	4007704
Hybrid-amp module, 3-wide, 9 ports, +17.0 dBm, SC/APC (P2-EDFA-MOD-9X17-SA)	4002787
Hybrid-amp module, 3-wide, 9 ports, +19.0 dBm, SC/APC (P2-EDFA-MOD-9X19-SA)	4005264
Hybrid-amp module, 2-wide, 4 ports, +21.5 dBm, SC/APC (P2-EDFA-MOD-4X21.5-SA) *	4027263
Hybrid-amp module, 2-wide, 8 ports, +21.5 dBm, LC/APC (P2-EDFA-MOD-8X21.5-LA) *	4029654
Hybrid-amp module, 2-wide, 9 ports, +19.0 dBm, SC/APC (P2-EDFA-MOD-9X19-SA 2-wide) *	4022007

* Model includes optical test port.

Table 7. Prisma II Gain Flattened Amplifier Modules - Part Numbers

Description	Part Number
GF-amp module, 2-wide, 1 port, +17.0 dBm, SC/APC (P2-EDFA-MOD-GF-1x17-SA)	737014
GF-amp module, 2-wide, 1 port, +20.0 dBm, SC/APC (P2-EDFA-MOD-GF-1x20-SA)	754201
GF-amp module, 2-wide, 4 ports, +18.0 dBm, SC/APC (P2-EDFA-MOD-GF-4x18-SA)	4037089
GF-amp module, 2-wide, 8 ports, +18.0 dBm, SC/APC (P2-EDFA-MOD-GF-8x18-SA)	4037090

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Related Products

Prisma II products include the industry's most complete range of high performance optical components. Refer to the following product data sheets for more information.

Data Sheet Title	Part Number
Prisma II Platform	739199
Prisma II 1310 nm Transmitters	739200
Prisma II 1550 nm Transmitters	739201
Prisma II Optical Receivers	739203
Prisma II Ancillary Modules	739205
Prisma II BDR Digital Reverse 2:1 Multiplexing System	744484

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