

Opti Max3000

Multi-Functional Nodes



- **Global compact node**
- **4-port modular platform**
- **Full EMS support**
- **Selectable return path segmentation**
- **Forward/return redundancy**
- **Optimizes fiber-poor applications**
- **Maximizes fiber usage with 8-wavelength**
- **CWDM optics**
- **Wide system temperature range**
- **Reliable, proven product**

C-COR's Opti Max3000 Multi-Functional Node provides flexibility, scalability, and high performance in a compact, economical platform. The Opti Max3000 is C-COR's established member of the Opti Max Optimum Node series with a proven, reliable installed base and with continual product enhancements for delivery of the most advanced services.

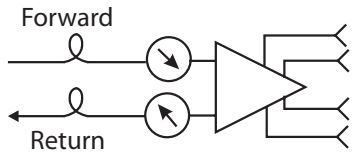
The Opti Max3000 Node's modular design allows you to build stations tailored for a variety of applications, facilitating future upgrades as your system evolves. The Opti Max3000 is ideal for video distribution, high speed data, and telephony applications, and its proven high reliability translates into reduced operating expenses.

Available in global bandsplits, the Opti Max3000 Node accepts up to three receivers and two transmitters to provide a variety of two-way applications, including forward narrowcasting and return path segmentation, redundant forward receiver and transmitter, and switching options. Element management capability ensures that your system provides continuous, reliable service.

Features

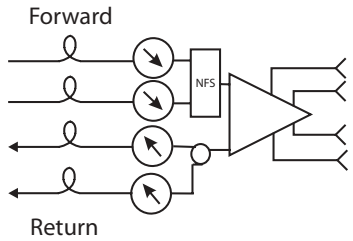
- Exceptional price/performance ratio
- Return segmentation improves bandwidth for advanced services
- 1550nm transmitters optimize fiber-poor applications
- Eight analog 20nm spaced CWDM transmitters maximize fiber usage and provide high performance across a wide temperature range
- More than 50% space savings over alternative approaches
- Easy installation, use, and maintenance
- Accessible testpoints

Applications



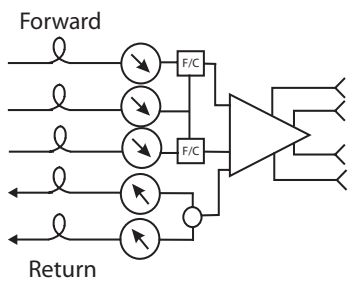
Standard Two-Way

A standard two-way Opti Max3000 Node is ideally suited for cost-effective HFC applications (see 1310/1550nm WDM diagram below as well).



Two-Way Redundancy

An Opti Max3000 Node with two-way fiber redundancy is ideal for applications requiring route diversity or high network availability, such as telephony or digital interactive services.

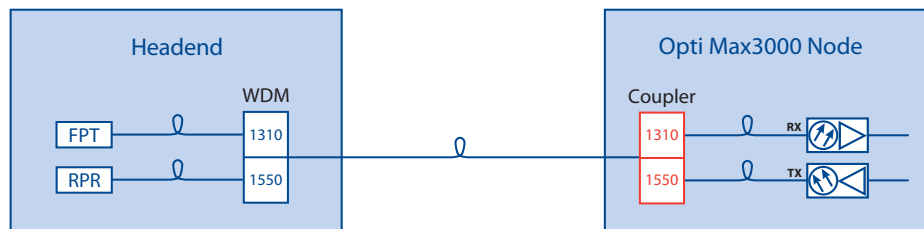


Two-Way with Forward Narrowcasting and Return Segmentation

An Opti Max3000 Node equipped for forward narrowcasting and return path segmentation provides operators a cost-effective way to deliver targeted subscriber services to specific portions of the population and, in the return path, split the serving area into two symmetrical return paths, effectively increasing both available bandwidth per subscriber and reliability.

1310/1550nm WDM Return Path Technology

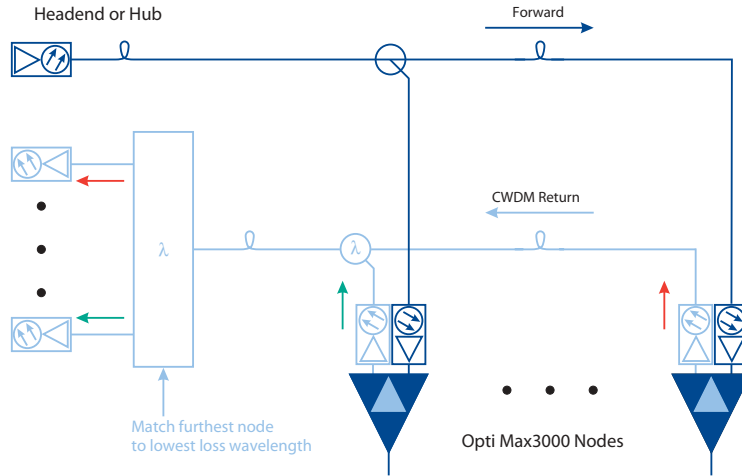
The Opti Max3000 Node can multiplex 1310nm forward and 1550nm return signals onto one fiber. WDM is used when you need more bandwidth in your fiber. An inexpensive and easy solution could be to use 1310/1550 bidirectional transmissions (access applications, generally used for video transmission), but you get limitations in distance, data rate, and flexibility.



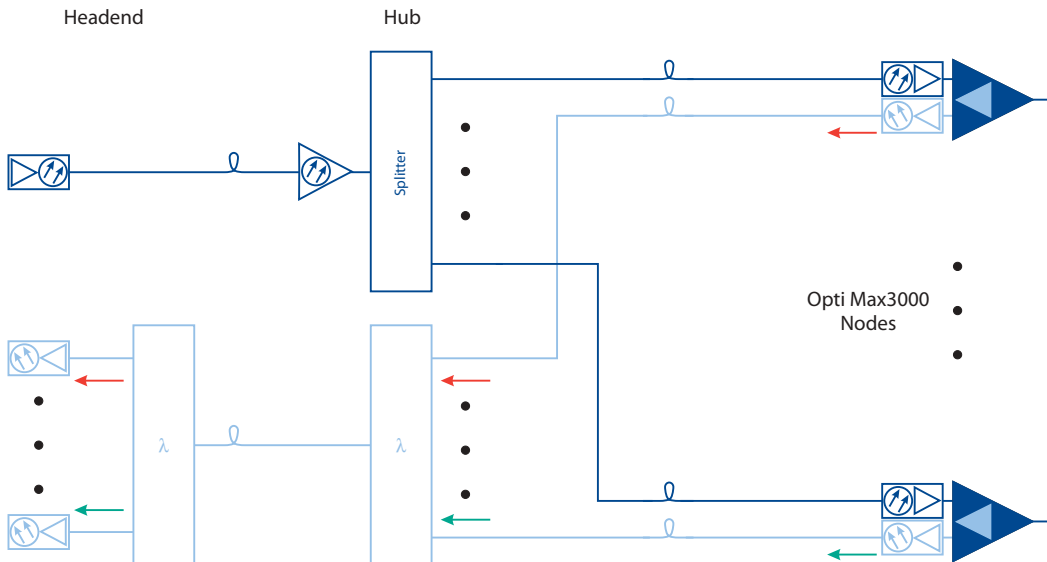
Opti Max3000 Node 1310/1550nm WDM

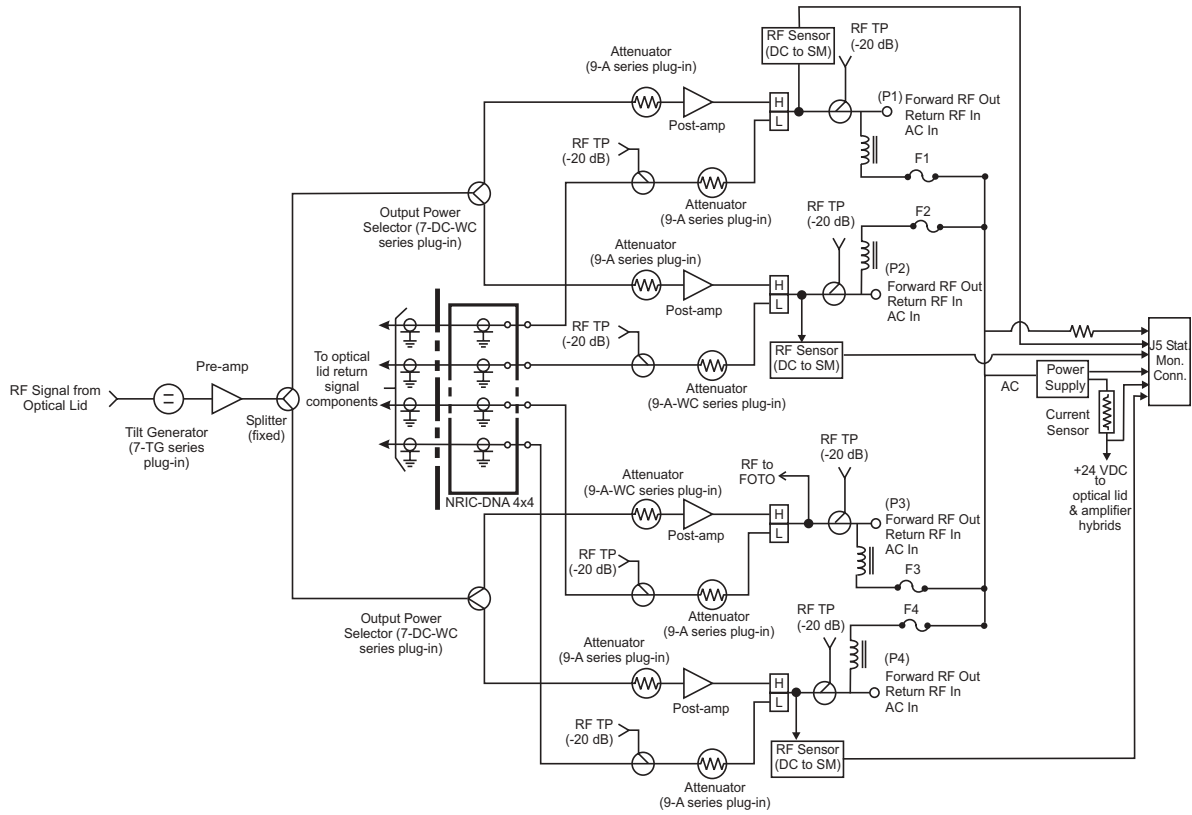
CWDM Applications

In fiber poor systems, CWDM technology increases analog return path capability using a single fiber. In the following example, multiple return paths can be combined onto a single fiber from nodes to a headend or hub. Contact your C-COR sales professional for new CWDM features and applications.



In the following star architecture, point-to-point links between each node and a hub are possible with short fiber lengths, while maintaining a single, long fiber between the hub and headend. The advantage with this architecture is that an existing fiber can be used between hub and headend, or only one fiber has to be installed between hub and headend, reducing the cost of such implementation.





Opti Max3000 Node Block Diagram

General Node Specifications

	Receiver Only	RF Amp Only	Combined
RF Output Level, min. at Pin = -2 dBm, dBmV	21	—	—
Amplifier Module Gain, at 862MHz, dB	—	28	—
Response Flatness, forward and return, peak-to-peak, typ., dB	—	1.0	1.0
Referenced Output Level, 54/550/862MHz, dBmV (Note 1)	—	35.5/43/48	35.5/43/48
Number of Analog Channels	—	77	77
Performance			
Carrier-to-Noise, min. dB	51.3	—	51.3
Composite Triple Beat, typ., -dBc	68	74	64.5
Composite Second Order, typ., -dBc	63	74	62
Cross Modulation, -dBc	—	72	61
Noise Figure, dB	—	8	—

1. All calculations based on 77 analog channels for 50 to 550MHz and digital loading 550 to 862MHz.

Specifications subject to change without notice

1310nm and 1550nm DFB Return Transmitter Specifications

Optical Specifications

Laser Type	Isolated Uncooled DFB
Transmission Wavelength, nm	NRT-1310DFB: 1310 ± 20 NRT-1550DFB: 1550 ± 20
Output Power, dBm	3 ± 1.0
Connector Types	SC/APC, FC/APC

RF Specifications

Bandwidth, MHz	5 to 200
Impedance, Ohm	75
Return Loss, from max. gain to 8dB of attenuation, dB	17
Flatness, with respect to gain slope, max., dB	±0.75
Gain Slope, max., dB (Note 1)	±0.5
Level Stability, over temp., dB	±3.0
Manual Gain Control Range	> 8dB
Reverse Spurious, -dBc	< 50
RF Testpoint Insertion Loss, dB (Note 2)	-9 ± 0.5

Performance Specifications (Note 3)

Optimum Transmitter Input, dBmV/6MHz (dBmV/Hz)	6 (-62)
Optimum Testpoint Level, dBmV/6MHz (dBmV/Hz)	-3 (-71)
NPR/Dynamic Range, dB (Note 4)	41/12
NPR Peak, dB (Notes 4 and 5)	48
BER Dynamic Range, QPSK @ 10 ⁻⁶ , dB (Note 4)	45

Powering Specifications

Input Voltage, VDC	24 ± 0.5
Current Draw, max., mA	225

Environmental Specification

Operating Temperature, within Opti Max3000 node	-40 to 60°C (-40 to 140°F)
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1. Measured as a straight line from 5 to 200MHz. At a full range of gain adjust, slope will increase to 1 ± 0.5dB.
2. RF testpoint is -9dB referenced to transmitter input with transmitter set to maximum gain (minimum attenuation).
3. Performance specs measured while installed in an Opti Max3000 node with a receiver causing low degradation to performance (≤0.5 dB).
4. Measured over 6dB fiber link using 40MHz NPR loading.
5. Typical NPR performance measurements taken at room temperature.
6. Specifications subject to change without notice

Specifications subject to change without notice

CWDM Return Transmitter Specifications

Optical Specifications

Laser Type	Isolated Uncooled DFB
Transmission Wavelengths, nm ± 7.5 nm	1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610
Output Power, dBm	3 \pm 1.0
Connector Types	SC/APC, FC/APC

RF Specifications

Bandwidth, MHz	5 to 200
Impedance, Ohm	75
Return Loss, from max. gain to 8dB of attenuation, dB	17
Flatness, with respect to gain slope, max., dB	± 0.75
Gain Slope, max., dB (Note 1)	± 0.5
Level Stability, over temp., dB	± 3.0
Manual Gain Control Range	> 8dB
Reverse Spurious, -dBc	< 50
RF Testpoint Insertion Loss, dB (Note 2)	-9 \pm 0.5

Performance Specifications (Note 3)

Optimum Transmitter Input, dBmV/6MHz (dBmV/Hz)	6 (-62)
Optimum Testpoint Level, dBmV/6MHz (dBmV/Hz)	-3 (-71)
NPR/Dynamic Range, dB (Note 4)	35/15
NPR Peak, dB (Notes 4 and 5)	41
BER Dynamic Range, QPSK @ 10^{-6} , dB (Note 4)	35

Powering Specifications

Input Voltage, VDC	24 \pm 0.5
Current Draw, max., mA	600

Environmental Specification

Operating Temperature, within Opti Max3000 node	-40 to 60°C (-40 to 140°F)
-------------------------------------------------	----------------------------

1. Measured as a straight line from 5 to 200MHz. At a full range of gain adjust, slope will increase to 1 ± 0.5 dB.
2. RF testpoint is -9dB referenced to transmitter input with transmitter set to maximum gain (minimum attenuation).
3. All performance specifications measured while installed in an Opti Max3000 node with an optical receiver causing low degradation to performance (≤ 0.5 dB).
4. Measured over 6dB fiber link using 40MHz NPR loading.
5. Typical NPR performance measurements taken at room temperature.

Specifications subject to change without notice

Ordering Information

Opti Max3000 Multi-Functional Node

			1	2	3	4	5	6	7			8	9		10	11	12	13			14	15	16	17	18	19
D	N	-	x	8	x	x	x	x	x	0	/	x	x	0	x	x	x	x	/	x	x	x	x	x	x	x

1 Forward Configuration	
1	Single RX
4	Dual RX with redundancy
5	Dual RX with narrowcasting
<i>a) Includes network forward switch (NFS).</i> <i>b) Includes NFC-330/860 network forward combiner.</i>	

2 Bandwidth	
8	862MHz

3 Forward Receiver	
2	NOR860/21 RX (45 to 862MHz)
3	NOR860/29 RX (45 to 862MHz)

4 Net Amplifier Type	
A	Lid only
H	DNA498/48

5 Frequency Split	
A	None
D	42/54MHz
E	55/70MHz
F	65/85MHz

6 Output Tilt	
A-G	(A) flat, (B) 3dB, (C) 8dB, (D) 10dB, (E) 11dB, (F) 12.5dB, (G) 14dB

7 Surge Protection	
0	Gas tube
1	Crowbar surge protection

8 Return Configuration	
A	None
C	1 TX or 2 TX for 2 x 2 segmentation
D	2 TX for redundancy
<i>a) 1 TX for "A" and "B" and 2 TX for "D" in #11 block, Segmentation.</i>	

9 Return Transmitter	
A	None
F	NRT-1310DFB (2mW)
H	NRT-1550DFB (2mW)
K	NRT-1310DFB (2mW) plus NRT-1550-DFB (2mW) for segmentation or redundancy
<i>a) Select this option if ordering a node with either no transmitter or with a CWDM TX. (Refer to "Opti Max3000 CWDM Options" on the back page.)</i>	

10 Local Insertion	
0	No
1	Yes

11 Segmentation	
A	None (4 x 1 return)
B	Return signal switch (RSS)
D	Selectable 2 x 2 segmentation
<i>a) Must select FOTO-DN in #12-13 block, Transponder Frequencies.</i> <i>b) Includes appropriate return interface card (NRIC).</i>	

12-13 Transponder Frequencies	
00	No monitoring
ZZ	FOTO ready
01	FOTO 93.0MHz Fwd/10.0MHz Ret
02	FOTO 52.0MHz Fwd/12.0MHz Ret
03	FOTO 51.5MHz Fwd/12.0MHz Ret
10	FOTO 108.5MHz Fwd/10.0MHz Ret
12	FOTO 108.5MHz Fwd/6.5MHz Ret

14 Connector Type	
1-3	(1) SC/APC, (2) SC/UPC, (3) FC/APC

15 Entry Cable	
A	None
C	4-connector, 100-foot
D	6-connector, 100-foot (jacketed)
<i>a) Select "2" in #16 block, Fiber Management.</i>	

16 Fiber Management	
0	Fiber management tray (buffered fiber)
2	Fiber management bracket (jacketed fiber)
<i>a) Select "1" in #14 block, Connector Type.</i>	

17 7th Port Powering	
0	No
1	Yes
<i>a) Select "1" in #18 block, Mounting.</i>	

18 Mounting	
0-1	(0) strand, (1) pedestal

19 Housing Finish	
0-1	(0) none, (1) corrosion protected

1. See "Opti Max3000 CWDM Options" on back page for CWDM options.
2. Contact your C-COR sales professional for availability of configurations and other customized options.
3. Other FOTO modules are available upon request.

