

ODN2000/LE2000

Optical Distribution Node with
two amplified RF ports

Compact and upgradable two-port fiber node for HFC distribution networks, combining the flexibility of a modular device with Node+0 architecture. Available with an optional DOCSIS transponder.



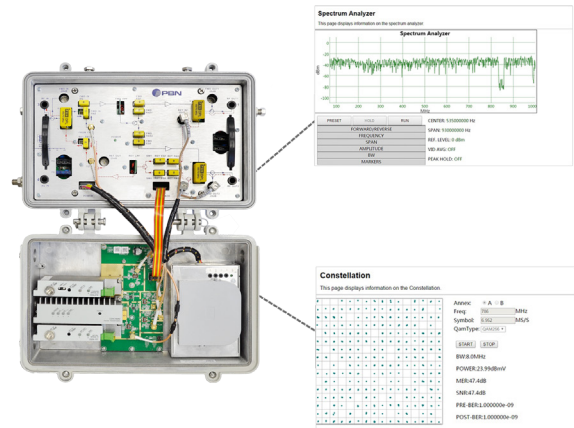
About the Product

The small and adaptable ODN2000 Optical Distribution Node with two amplified RF ports has been designed to affordably deliver interactive CATV and high capacity DOCSIS services. The ODN2000 is a high performance network device engineered to provide the highest quality transmission of HD video, data, and VoIP services. The LE2000 is the basic amplifier model and the LE2000 can be upgraded to a 2 port fiber node, ODN2000, by adding optional reverse transmitter module and forward receiver module.

The ODN2000 is currently equipped with a GaAs module that offers a cost-effective and flexible solution to expand the network. The optical node offers two high power RF outputs, each with over 1 GHz of bandwidth.

The ODN2000 deep-fiber node is perfect for the last mile in broadband networks. The small and rugged design makes this unit ideal for fiber-to-the-apartment and fiber-to-the-curb applications. Having versatile modular components allows the ODN2000 to be utilized in many different phases of network deployment. As the network grows, the ODN2000/LE2000 can be upgraded. Unmatched flexibility combined with a robust housing makes this a product that you can rely on when designing long-term HFC solutions. Additionally, Node+0 support allows for a reduction in amplifiers, improved reliability, and lower maintenance costs as well as providing additional options for future cost-effective upgrades.

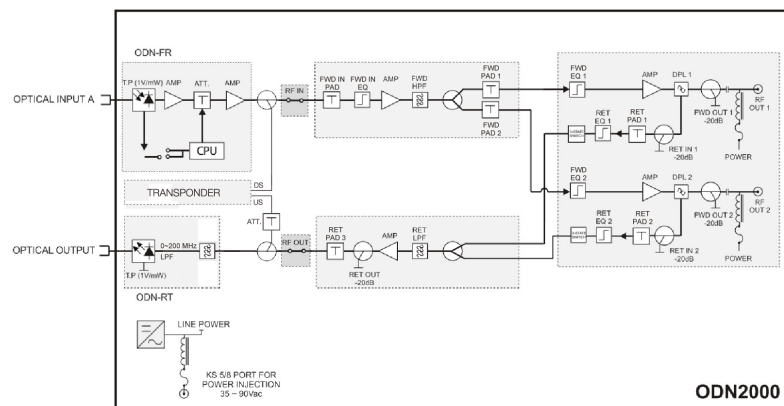
The optional DOCSIS transponder eases maintenance by allowing for remote monitoring for alerts resulting in a reduction in potential expenses by using existing DOCSIS infrastructure for cable modems to carry information creating a smarter and more efficient network.



Key Features and Functions

- Advanced Gallium arsenide (GaAs) RF hybrid technology provides excellent performance with two individually amplified high-level outputs with more than 55 dBmV each at 1000 MHz
- High output power supports Node+0 architecture
- Can be seamlessly upgraded from an RF amplifier (LE2000) to an optical node (ODN2000)
- Return-path lasers are available for 1310 nm or for CWDM applications on one return fiber at 1470/1490/1510/1530/1550/1570/1590/1610 nm
- Optical transmitter/receiver modules and RF amplifier can be individually installed, removed, or replaced. The modular design reduces downtime and simplifies maintenance
- Standard attenuator pad to control both attenuation and equalization
- Dedicated KS 5/8" AC input for remote power. Auto-ranging 60/90 Vac power supply
- Optional DOCSIS transponder to fully integrate forward and return path transmission signals
- Remotely (future) or locally manageable and upgradable
- Future forward path receivers and return-path transmitters will support forward and return-path segmentation
- Future forward path receivers and return-path transmitters will provide redundancy protection

Block Diagram



Specifications

Forward Path Optical Performance

Operating wavelength	1200 nm ~ 1610 nm
Input range	-5 dBm ~ +3 dBm
OAGC (optical input)	-4 dBm ~ +2 dBm
Nominal design input	-1 dBm
Optical return loss	> 50 dB

Forward Path RF Performance

Bandwidth	54 / 70 / 85 ~ 1000 MHz
Output level	> 55 dBmV @ 1000 MHz ⁽¹⁾
RF flatness	± 0.75 dB
Return loss	> 16 dB
Impedance	75 Ω
RF output stability	± 1 dB

Forward Path Optical Link Performance ⁽²⁾

CNR (5 MHz NBW)	> 53 dB
CSO	> 65 dB
CTB	> 68 dB
MER	> 37 dB
BER	< 1E-9

Return Path Optical Laser Types

ODN20-RT-A	1310 nm DFB laser, 0 dBm (1 mW)
ODN20-RT-B	1310 nm DFB laser, 3 dBm (2 mW)
ODN20-RT-C	1310 nm DFB laser, -4 dBm (0.4 mW)
ODN20-RT-N	1470 nm CWDM DFB laser, 3 dBm (2 mW)
ODN20-RT-P	1490 nm CWDM DFB laser, 3 dBm (2 mW)
ODN20-RT-Q	1510 nm CWDM DFB laser, 3 dBm (2 mW)
ODN20-RT-R	1530 nm CWDM DFB laser, 3 dBm (2 mW)
ODN20-RT-S	1550 nm CWDM DFB laser, 3 dBm (2 mW)
ODN20-RT-T	1570 nm CWDM DFB laser, 3 dBm (2 mW)
ODN20-RT-U	1590 nm CWDM DFB laser, 3 dBm (2 mW)
ODN20-RT-V	1610 nm CWDM DFB laser, 3 dBm (2 mW)

Return Path RF Performance

Bandwidth	5 ~ 42 / 55 / 65 MHz
Input level range	15 - 20 dBmV
RF flatness	± 0.75 dB
Impedance	75 Ω
Gain adjustment	1 dB step plug-in (see Accessories section)

Return Path Optical Link Performance ⁽³⁾

NPR _{≥ 30} dynamic range	> 25 dB
Optical output stability	± 0.5 dBm
CNR	> 48 dB
IMD2	> 52 dB
OMI	6% @ 20 dBmV input

Connectors

Optical connectors	SC/APC, FC/APC, E2000/APC
RF connectors	
Cable Entry	5/8" - 24 thread
Internal connections	75 Ω Mini SMB
RF test points	G-type - male

General

Power supply	35 ~ 90 Vac 90 ~ 264 Vac mains
Power consumption	44 W (1 Rx) 46 W (1 Rx + 1 Tx) 52W (1 RX + FBC) 52W (1 RX + 1 TX + FBC)
Operating temperature	-40°C ~ +65°C
Storage temperature	-40°C ~ +80°C
Dimensions (H x W x D)	307 x 235 x 143 mm
Ship size (H x W x D)	400 x 310 x 260 mm
Node weight	5.7 kg
Node ship weight	6.3 kg
Amplifier weight	5.1 kg
Amplifier ship weight	5.7 kg
Enclosure IP rating	IP67

With the FBC Module

Frequency capture range	5 ~ 1000 MHz
Demodulation mode	QAM64, QAM256
Metrics and functions available	Level, SNR, MER, BER and live spectrum

Note:

(1) 55 dBmV RF output @ 1000 MHz and a 14 ± 1 dB slope from 85 to 1000 MHz. Optical input -4~+2 dBm, 4% OMI.

(2) CNR, CSO, CTB and MER are loaded with 30 NTSC+124 QAM256 or 30 PAL D/K+85 QAM256. BER is loaded with 30 NTSC+124 QAM256, 30 PAL D/K+85 QAM256 or 153 QAM256. All are measured with PBN referenced optical receiver with 10km single-mode optical fiber 0dBm.

(3) Use PBN RRAS-Q @ 0km fiber, -7 dBm input, 6% OMI.

Order Details

ODN2[QRS]-[TUVW]-[X]-[Y,0] | Optical Distribution Node with two amplified RF ports
LE2[QRS]-[TUV] | Line Extender with two amplified RF ports

Options:

<p>Q Type 0 RF PAD plug-in</p> <p>R Backplane Board Version ⁽¹⁾ 0 Basic version</p> <p>S Output Port Number 1 One port output 2 Two port output</p> <p>T Diplexers 0 No diplexers 1 42/54 MHz 2 55/70 MHz 3 65/85 MHz</p> <p>U DOCSIS Transponder 0 No transponder 1 DOCSIS 3.0 transponder</p> <p>V Power Supply 1 35 ~ 90 Vac 3 90 ~ 264 Vac with power plug for CN 4 90 ~ 264 Vac with power plug for AU 5 90 ~ 264 Vac with power plug for EU 6 90 ~ 264 Vac with power plug for UK 7 90 ~ 264 Vac with power plug for US</p>	<p>W Optical Connectors S SC/APC F FC/APC E E2000/APC</p> <p>X Forward Path Receiver ⁽²⁾ 0 No receiver 1 One receiver</p>	<p>Y,0 Return Laser Transmitter ⁽²⁾ 0 No return transmitter A 1310 nm DFB laser, 0 dBm (1 mW) B 1310 nm DFB laser, 3 dBm (2 mW) C 1310 nm DFB laser, -4 dBm (0.4 mW) N 1470 nm CWDM DFB laser, 3 dBm (2 mW) P 1490 nm CWDM DFB laser, 3 dBm (2 mW) Q 1510 nm CWDM DFB laser, 3 dBm (2 mW) R 1530 nm CWDM DFB laser, 3 dBm (2 mW) S 1550 nm CWDM DFB laser, 3 dBm (2 mW) T 1570 nm CWDM DFB laser, 3 dBm (2 mW) U 1590 nm CWDM DFB laser, 3 dBm (2 mW) V 1610 nm CWDM DFB laser, 3 dBm (2 mW)</p> <p>Example: 00 No return transmitter C0 One return transmitter; DFB 1310 nm, -4 dBm (0.4 mW) Q0 One return transmitter; CWDM DFB 1510 nm, 3 dBm (2 mW)</p>
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Note:

- (1) For segmented or redundant version, it is necessary to order two forward path receivers.
- (2) Please contact your PBN Sales Representative if you need any separated FR or TX modules.

Accessories

RF Amplifier

LE2[QRS]-[T] | RF Amplifier

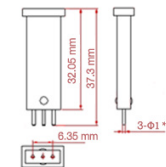
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Forward and Return Path Attenuation or Slope (from 0 ~ 1000 MHz)

ATT1-xx | xx = 0 dB to 20 dB in 1 dB increments

Attenuator pad dimensions:



High Pass Filters

ODN20-HPF-54 | 54 MHz to 1000 MHz
ODN20-HPF-70 | 70 MHz to 1000 MHz
ODN20-HPF-85 | 85 MHz to 1000 MHz

Low Pass Filters

ODN20-LPF-42 | 5 MHz to 42 MHz
ODN20-LPF-55 | 5 MHz to 55 MHz
ODN20-LPF-65 | 5 MHz to 65 MHz

RF Diplexers

ODN20-DPL-4254 | 42/54 MHz
ODN20-DPL-5570 | 55/70 MHz
ODN20-DPL-6585 | 65/85 MHz

Power Supply

ODN20-PS-90 | 35 ~ 90 Vac input power supply
ODN20-PS-264-CN | 90 ~ 264 Vac input power supply for CN
ODN20-PS-264-AU | 90 ~ 264 Vac input power supply for AU
ODN20-PS-264-EU | 90 ~ 264 Vac input power supply for EU
ODN20-PS-264-UK | 90 ~ 264 Vac input power supply for UK
ODN20-PS-264-US | 90 ~ 264 Vac input power supply for US