

# Opti Max™ Optical Node Series

1x1, 1x2 Remote PHY Device (RPD)  
for OM6000™ 1.2 GHz Fiber Deep Nodes

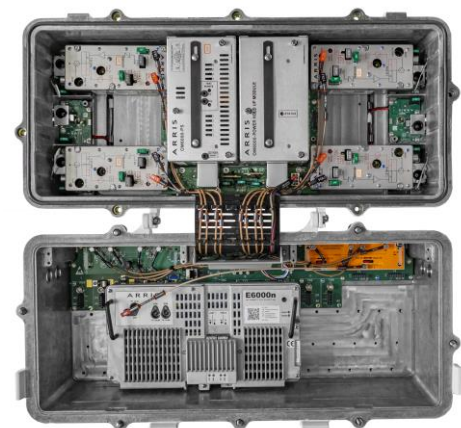
## FEATURES

- Industry leading virtual analog RF output capability of 64 dBmV at 1.2 GHz for maximum service group reach
- DOCSIS® 3.1 compliant
- Seamlessly upgrade from traditional optics to distributed access architectures (DAA)
- Monitoring options available with ingress control switch remote functionality
- Maximizes fiber utilization and reach
- Improves headend density and power efficiency
- Simplifies plant maintenance via digital optics
- Optional power hold-up module safeguards against RPD reboots due to short-interval network power interruptions

The Remote PHY Device (RPD) is a key component in CommScope's Distributed Access Architecture (DAA) portfolio, which can provide significant operational benefits—including increased bandwidth capacity, improved fiber efficiencies (wavelengths and distance), simplified plant operations with digital optics, and decreased loads on facility space and power systems—by extending the digital portion of the headend or hub to the node and placing the digital/RF interface at the optical/coax boundary. The RPD works in conjunction with the CCAP Core to extend the PHY layer from the CCAP into an Opti Max™ OM6000™ fiber deep node. MAC processing, provisioning, and monitoring functions remain in the headend. The RPD provides full spectrum support for digital broadcast TV, VoD, and DOCSIS 3.0 and DOCSIS 3.1, as well as strategic alignment with future NFV/SDN/FTTx systems.



OM6000 with 1x1 RPD Module



OM6000 with 1x2 RPD Module

## **RPD Module Operation**

The RPD takes the place of traditional node optics modules such as downstream receivers and upstream transmitters. The RPD module's downstream and upstream paths operate with a standard RF level and tilt that can be further conditioned by installing RF attenuator pads and equalizers, respectively, in the node's RF modules.

The RPD module's channel configuration is received from the CCAP Core in the headend; no manual configuration of the module is necessary after it is optically linked to the headend. CommScope RPD modules are available in downstream x upstream configurations of 1x1 or 1x1 upgradable to 1x2. The node's upstream segmentation module can be configured to support both options.

## **Network Flexibility**

Today's technologies are developing at a rapid pace, which is why it is more important than ever for products to be flexible enough to support next-generation technologies, such as DAA, without major forklift. Keeping these concerns in mind, the OM6000 node allows operators to transition seamlessly from traditional node-based analog/digital optical delivery to a DAA architecture by using the OM6000 chassis as a base and leveraging current network assets. When operators are ready to transition to DAA, the node's modular design allows them to upgrade previously deployed OM6000 nodes to support R-PHY delivery by simply removing the node's existing receivers and transmitters and replacing them with the appropriate RPD module. The ease and simplicity of transitioning the OM6000 to support DAA operation provides operators with several benefits, including a cost-effective roadmap for upgrading their current network assets and the ability to future-proof today's purchases for long term use.

## **Flexible Powering Options**

The need to utilize all RF outputs may not fit every node placement requirement. With this in mind, the OM6000's modular RF base allows operators to target and remove one or more of the node's four RF modules to conserve power. Operators can easily reintroduce these same modules to support future service group requirements.

The OM6000 node features optional fully redundant powering via a second power supply module. This redundancy is fully load sharing during normal operation. Each power supply can support the entire node in case the other fails. With a second power supply, the node can also be configured to operate from a second network power supply to provide network power redundancy.

As an alternative to a redundant power supply, an optional Power Hold-up Module is available for the OM6000's second power supply location. This module provides more than 500 ms of DC power to sustain the entire node during occasional network powering disruptions, which significantly reduces device reboots to ensure greater network reliability.

## **Small Form-Factor Pluggable (SFPs)**

CommScope offers temperature-hardened, high-speed 10 Gbps SFP+ modules for the RPD application. These SFP modules are carefully chosen by our design teams to ensure end-to-end performance and stability. Available in 1310, 1550, CWDM, and DWDM 40 ITU wavelengths, CommScope SFP+ modules support distances of up to 80 km.

CommScope SFP+ modules are rigorously tested and designed to withstand the increased thermal profile of the OM6000 while providing long-term performance in the field. The modules provide both design flexibility and the ability to maximize wavelength aggregation, making them the ideal choice to maximize the RPD's link performance across a wide range of outdoor temperatures. CommScope SFP+ modules provide peace of mind and guaranteed end-to-end performance, along with our full-service phone and field support, throughout the product's life cycle.

## SPECIFICATIONS

Characteristics	Specification
<b>Physical</b>	
Dimensions	23.6 in L x 11.0 in W x 12.2 in H
Weight	< 60 lb
<b>Environmental</b>	
Operating Temperature Range	-40° to +60°C (-40° to 140°F)
Storage Temperature Range	-40° to +85°C (-40° to 185°F)
Humidity	5%–95% non-condensing
<b>General</b>	
Service Group Configurations	1 DS-SG x 1 US-SG 1 DS-SG x 2 US-SG
CIN Connectivity	Dual 10 GbE SFP+ Daisy Chain (future) Path Redundancy (future)
<b>Channel Capacity</b>	
Downstream	Up to 2 OFDM channels (up to 192 MHz wide each) and 72 Annex A channels (96 Annex A channels future) Up to 2 OFDM channels (up to 192 MHz wide each) and 128 Annex B channels
Upstream	Up to 2 OFDMA (up to 95 MHz each) and 12 SC-QAM channels (per upstream port)
Set Top Box Out-of-Band (OOB)	SCTE 55-1 SCTE 55-2
Out of Band	Narrowband Digital Forward (1.28, 2.56, and 5.12 MHz channel widths) Narrowband Digital Return (1.28, 2.56, and 5.12 MHz channel widths)
CW Tone Generation	AGC, Alignment, Leakage Detection (up to 12 leakage tones—10 dedicated AGC and Leakage Detection, 2 non-dedicated Alignment)
High Speed Data	DOCSIS 3.0, DOCSIS 3.1
Video	Broadcast Video, Narrowcast Video
Designed for Compliance to CableLabs® MHA v2 Standards	CM-SP-R-PHY Remote PHY Specification CM-SP-R-DEPI Remote Downstream External PHY Interface Specification CM-SP-R-UEPI Remote Upstream External PHY Interface Specification CM-SP-GCP Generic Control Plane Specification CM-SP-R-DTI Remote DOCSIS Timing Interface Specification CM-SP-R-OOB Remote Out-of-Band Specification CM-SP-R-OSSI Remote PHY OSS Interface Specification CM-SP-DRFI Appendix D
<b>RF (Node with RPD)</b>	
Downstream Operational Bandwidth	54–1218 MHz/85–1218 MHz/102–1218 MHz/258–1218 MHz
Upstream Operational Bandwidth	5–42 MHz/5–65 MHz/5–85 MHz/5–204 MHz
Output Level	58 dBmV @ 1218 MHz (actual) 64 dBmV @ 1218 MHz (virtual)
Output Linear Tilt	22 dB (54 to 1218 MHz)
Nominal Upstream Input Level	12 dBmV/6 MHz; 5–42 MHz 8 dBmV/6 MHz; 5–85 MHz 5 dBmV/6 MHz; 5–204 MHz
RF Port Impedance	75 Ω
RF Return Loss	16 dB Typical
Test Points	-20 dB
<b>Powering (Node with RPD)</b>	
Power	< 165 W AC
AC Input Voltage	44–90 V AC (dual redundant power supplies)
Power Supply Spurious	-60 dBc
Hum Modulation	-60 dBc
AC Bypass Current	15 A

## ORDERING INFORMATION

Model Number	Description
<b>Factory Configured RPD Node Options</b>	
OM6FxxYxN-1X01X0000M	1.2 GHz Fiber Deep OM6000 node configured for Remote PHY Device (RPD), without RPD module
OM6FxxYxN-1XR1XC111M	1.2 GHz Fiber Deep OM6000 node with Remote PHY Device (RPD), 1 DS-SG x 1 US-SG, no console port
OM6FxxYxN-1XR2XC112M	1.2 GHz Fiber Deep OM6000 node with Remote PHY Device (RPD), 1 DS-SG x 2 US-SG, no console port
<b>RPD Modules</b>	
1001241	Remote PHY Device (RPD), 1 DS-SG x 1 US-SG, no Console Port
1001242	Remote PHY Device (RPD), 1 DS-SG x 1 US-SG, with Console Port
1001420	Remote PHY Device (RPD), 1 DS-SG x 2 US-SG, with Console Port
1001421	Remote PHY Device (RPD), 1 DS-SG x 2 US-SG, no Console Port
<b>Power Supply Modules</b>	
1510056-002	OM6 34 V Fiber Deep Power Supply Module
OM6-PS-HOLD	OM6 Power Hold-up Module
<b>RF Modules</b>	
1510055-018	OM6 1.2 GHz, 42/54 MHz Split, 34 V, with Return EQ Support and Ingress Control Switch
1510055-022	OM6 1.2 GHz, 65/85 MHz Split, 34 V, with Return EQ Support and Ingress Control Switch
1510055-026	OM6 1.2 GHz, 85/102 MHz Split, 34 V, with Return EQ Support and Ingress Control Switch
1510055-030	OM6 1.2 GHz, 204/258 MHz Split, 34 V, with Return EQ Support and Ingress Control Switch
<b>SFP+ Optics</b>	
TTA1310-TL10	10 Gbps 10 km 1310 nm Transceiver, -40° to +95°C (-40° to +203°F) operating temperature range
TTB1550-TLxx (xx = 40 or 80)	10 Gbps 1550 nm Transceiver, Fiber Distances of 40 km or 80 km Supported, -40° to +95°C (-40° to +203°F) operating temperature range
TTC-xxxx-TL40 (xxxx = wavelength)	10 Gbps 40 km CWDM Transceiver, 8 Wavelengths Supported (1470 nm to 1610 nm), -40° to +95°C (-40° to +203°F) operating temperature range
TTCxxxx-TL80 (xxxx = wavelength)	10 Gbps 80 km CWDM Transceiver, 8 Wavelengths Supported (1470 nm to 1610 nm) -40° to +95°C (-40° to +203°F) operating temperature range
TTD4540-xx-PI (xx = 20–59)	10 Gbps 40 km DWDM Transceiver, 40 Wavelengths Supported (ITU Channels 20–59) -40° to +95°C (-40° to +203°F) operating temperature range
TTD4580-xx-PI (xx = 20–59)	10 Gbps 80 km DWDM Transceiver, 40 Wavelengths Supported (ITU Channels 20–59) -40° to +95°C (-40° to +203°F) operating temperature range
<b>PADs/Equalizers</b>	
1510053-0xx (xx = 01–12)	1.4" Linear Equalizer, 1.2 GHz, 01 dB through 12 dB
NPB-xx0 (xx = 00–20)	1.4" Attenuator, 00 dB through 20 dB
REQC-42-xx (xx = 02–11)	1.4" Cable Equalizer, 42 MHz, 02 dB through 11 dB
REQC-65-xx (xx = 02–11)	1.4" Cable Equalizer, 65 MHz, 02 dB through 11 dB
REQC-85-xx (xx = 02–11)	1.4" Cable Equalizer, 85 MHz, 02 dB through 11 dB
REQC-204-xx (xx = 02–11)	1.4" Cable Equalizer, 204 MHz, 02 dB through 11 dB



1x1 Module



1x2 Module

## RELATED PRODUCTS

E6000® CCAP Core	CHP Max5000® Optics
OM6000 HFC Node	Headend and Field Passives
1310/CWDM/DWDM SFP+	Installation Services

Contact Customer Care for product information and sales:

- United States: 866-36-ARRIS
- International: +1-678-473-5656

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