DATA SHEET

Opti Max® Optical Node Series

OM4120® 1.2 GHz Deep Lid Nodes with RD1424-M4 Remote PHY Device (RPD)

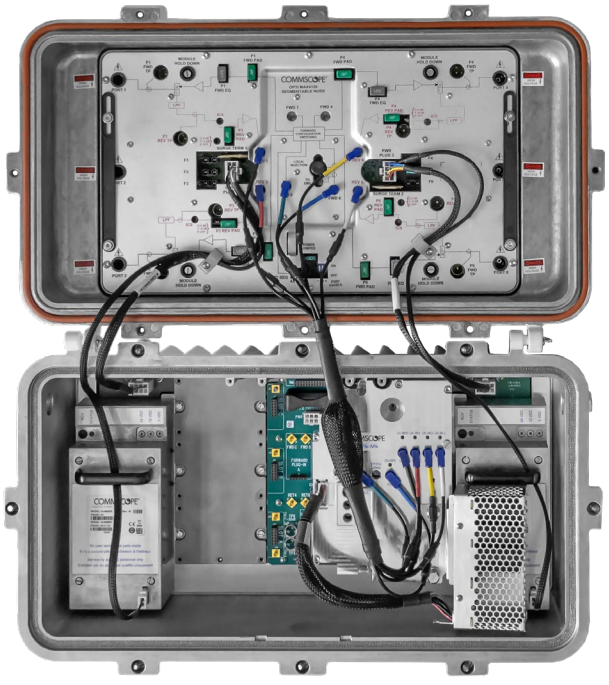
FEATURES

- 1.2 GHz full featured factory configured node for mid-split, high-split, DAA network operation
- Upgrade options for seamlessly upgrading existing OM4120 and OM4100 analog nodes to DAA operation
- Virtual 57 dBmV output level at 1.2 GHz for maximum service group size
- Configurable as 1x1, 1x2, 2x2, or 2x4 DS x US Service Groups
- DOCSIS® 3.1 compliant
- Power Hold-Up module for RPD
- Integrated Local Injection Port
- Future PON co-existence

The OM4120 Deep Lid RPD node allows operators to unlock the performance benefits of DAA. The Deep Lid is available as part of a fully configured OM4120 node for new node installations, or as a lid upgrade kit for legacy installed OM4100® or standard lid OM4120 nodes. The OM4120 Deep Lid node utilizes NC style modules and a PS4201 power supply. The OM4120 node allows operators to easily convert to mid-split (85/102 MHz) or high-split (204/258 MHz) network operation while also providing operators the opportunity to upgrade legacy OM4 nodes from 870 MHz or 1.0 GHz to 1.2 GHz at the same time.*

The Remote PHY Device (RPD) is a key component in CommScope's Distributed Access Architecture (DAA) portfolio. The RPD offers 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.

** Requires 1.2 GHz RF Module for 1.2 GHz performance in OM4000 and OM4100 node upgrades.*



OM4120 with Deep Lid

RD1424-M4 RPD Module Operation

The RD1424-M4 takes the place of traditional optics modules, such as downstream receivers and upstream transmitters, inside the node. The RD1424-M4 operates with a standard output level and tilt that can be attenuated by installing RF attenuator pads and equalizers, respectively, in the node's RF modules. Output levels and tilt can also be adjusted remotely from the headend. 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. The RD1424-M4 supports 1 DS-SG* x 1 US-SG, 1 DS-SG x 2 US-SG, 2 DS-SG x 2 US-SG and 2 DS-SG x 4 US-SG configurations for HFC applications. Unlike traditional HFC nodes that use analog RF combiners to configure the node upstream segmentation that incur loss, the RD1424-M4 integrates the upstream segmentation functionality internally in the digital domain with constant gain and without any RF combiner loss.

The HU1424-M4 is the optional external power hold-up module attaching to the RPD and safeguards against RD1424-M4 rebooting due to short-interval network power interruptions. The power hold-up module provides more than 500 msec drop-out tolerance time to sustain the RD1424-M4 during occasional network power disruptions to ensure system reliability.

The RD1424-M4 is available in a full, OM4120 factory-configured node or as part of a deep-lid upgrade kit. The upgrade kit allows users to modify existing OM4100 or OM4120 nodes to support Remote PHY applications. The deep lid node includes a modified "deep" housing lid that consists of the adapter plate for RD1424-M4 form factor, the RD1424-M4 RPD Module, HU1424-M4 Power hold up module, a PS4201 power supply, and interconnecting cables as needed to support 1.2 GHz connections.

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 a major forklift upgrade. Keeping these concerns in mind, the OM4120 node deep-lid upgrade kit allows operators to transition seamlessly from traditional node-based analog/digital optical delivery to a DAA architecture by using the OM4120 chassis as a base and leveraging their current network assets. When operators are ready to transition to DAA, the node's modular design allows them to upgrade previously deployed OM4120 nodes to support R-PHY functionality by simply removing the node's existing optical modules and housing lid and replacing them with a deep lid upgrade kit. The ease and simplicity of transitioning the OM4120 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.

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 team to ensure end-to-end performance and stability. Available in CWDM and DWDM 40 ITU wavelengths, CommScope SFP+ modules support lengths of up to 80 km. Rigorously tested, SFP+ modules are designed to withstand the thermal profile of the OM4120 while providing long-term performance in the field with industrial temperature specifications across the family. The modules provide both design flexibility and the ability to maximize wavelength aggregation, making them the ideal choice to guarantee the RD1424-M4's link performance across a wide range of outdoor temperatures.

** In the configuration options referenced in this paragraph, "SG" refers to "Service Group." This acronym is also used in the Specifications and Ordering Information tables*.

COMPLETE NODE SPECIFICATIONS

Characteristics	Specification
Physical	
Dimensions	11.7 H x 20 L x 11.4 W (29.7 cm x 50.8 cm x 29 cm)
Weight	< 50 lbs
Housing Ports	6
Environmental	
Operating Temperature Range	-40°C to +60°C (-40°F to +140°F)
Storage Temperature Range	-40°C to +85°C (-40°F to +185°F)
Humidity	5% to 95%, non-condensing
Downstream (Full Node)	
RF	
Operational Bandwidth[1]	54/85/102/258 to 1218 MHz
Flatness[2]	± 1.25 dB
Output Level[3]	57/39 dBmV @ 1218/55 MHz (Virtual)
Output Linear Tilt	18.0 ± 1.0 dB (54 to 1218 MHz) 17.5 ± 1.0 dB (85 to 1218 MHz) 17.2 ± 1.0 dB (102 to 1218 MHz) 14.8 ± 1.0 dB (258 to 1218 MHz)
RF Port Impedance	75 Ω
RF Return Loss[4]	16 dB
Port to Port Isolation[5]	-70 dB, minimum downstream bandwidth to 552 MHz -60 dB, 552 MHz to 1218 MHz
Performance[6]	
Reference Level	51/33 dBmV @ 1218/55 MHz (Actual)
MER	44 dB
BER	< $1x10^{-6}$
Upstream (Full Node)	
RF	
Operational Bandwidth[1]	5–42/5–65/5–85/5–204 MHz
Flatness[2, 7]	± 1.0 dB
RF Port Impedance	75 Ω
RF Return Loss[4]	16 dB
Port-to-Port Isolation	-60 dB
Nominal Return Input Level[8]	12 dBmV/6 MHz; 5–42 MHz 10 dBmV/6 MHz; 5–65 MHz 8 dBmV/6 MHz; 5–85 MHz 5 dBmV/6 MHz; 5–204 MHz
Power Requirements	
Total Power	150 AC Watts max
AC Input Voltage[9]	44–95 Volts
AC Input Frequency Range	50/60 Hz
AC Bypass Current[10]	15 Ampere rms

NOTES:

1. Dependent on the diplex filter option installed.
2. Measured with respect to tilt over the operating passband of the node.
3. For channel loading up to 1.2 GHz and 18 dB of output tilt, maximum output level @ 1.2 GHz is 59 dBmV virtual/53 dBmv actual. For channel loading up to 1 GHz and 17 dB of tilt, maximum output level @ 1 GHz is 60 dBmV (virtual)/54 dBmV (actual).
4. Measured at the node RF input and output port over the specified passband.
5. The forward band segmentation isolation is measured between all independent forward paths over the specified frequency bands.
6. Over operating temperature range.
7. Measured between Node port and RPD input.
8. Measured at RPD input. Maximum total composite power is 20 dBmV.
9. The AC input voltage waveform is quasi-square wave.
10. Maximum total current applied to or from any one port.

RPD SPECIFICATIONS

Characteristics	Specification
Service Group Configurations	1 DS-SG x 1 US-SG 1 DS-SG x 2 US-SG 2 DS-SG x 2 US-SG 2 DS-SG x 4 US-SG
CIN Connectivity	Dual 10 GbE SFP+ IPv4 or IPv6
Security/Encryption	802.1x Authentication & Authorization Secure Boot IPsec, MACsec Encryption
Proactive Network Management (PNM)	Upstream Receive Modulation Error Ratio (RxMER) per 25 kHz or 50 kHz OFDMA subcarrier Upstream Capture for Active and Quiet Probes (UPC) PNM tests (25 kHz or 50 kHz OFDMA subcarrier spacing) UTSC Free Run Trigger Mode with results over dynamic or static pseudo wires
Channel Capacity	
Downstream (per downstream service group)	Up to 6 OFDM channels (up to 192 MHz wide each) and 160 Annex B SCQAM or 120 Annex A SCQAM channels per downstream port
Upstream (per upstream service group)	Up to 2 OFDMA channels (up to 95 MHz wide each) and 12 SCQAM channels per upstream port
Set Top Box Out-of-Band (OOB)	SCTE 55-1 SCTE 55-2
Out-of-Band[2]	Narrowband Digital Forward (NDF)—two NDF channels per downstream service group Narrowband Digital Return (NDR)—two NDR channel per upstream service group Channel Widths: 25.6 (NDF only), 1.28, 2.56, or 5.12 MHz (NDF and NDR)
CW Tone Generation	AGC, Alignment, Leakage Detection (up to 8 dedicated leakage detection and 6 non dedicated tones to be used for alignment, AGC, and legacy leakage tone)
High Speed Data	DOCSIS 3.0, DOCSIS 3.1
Video	Broadcast Video, Narrowcast Video
Designed for Compliance to CableLabs® MHAv2 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-R-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
HU1424-M4-B Power Hold Up	
Input Charging Time	< 2 min
Hold Up Duration[1]	500 ms

NOTE:

1. Provides a minimum of 500 msec drop-out tolerance time over 10-year lifespan of the RPD module

RD1424-M4 RPD Module

ORDERING INFORMATION

Part Number	Description
	Factory Configured Deep Lid Options
OM46xRPC1PR-143E00[1] x = frequency split	OM4120 1.2 GHz Deep Lid Node: Includes 1x PS4201 Power Supply, x MHz Bandsplit, Output 57 dBmV At 1.2 GHz 17 dB Slope, HFC/RPD Adaptor, RD1424-M4 1.2 GHz RPD Without Console Port, and HU1424-M4 Power Hold Up Module
OM4UURP000R-143E00	OM4 Deep Lid Upgrade: Includes OM4 Deep Lid, HFC/RPD Adaptor, RD1424-M4 without console port, HU1424-M4 Power Hold Up Module, 1x PS4201 Power Supply, Fiber Tray, and 1.2 GHz RPD RF and Power Supply Cabling
	1.2 GHz OM4120 RF Modules
OM4120-RF-42-ICS	OM4120 1.2 GHz GaN RF Module, 42/54 MHz split with reverse switches
OM4120-RF-65-ICS	OM4120 1.2 GHz GaN RF Module, 65/85 MHz split with reverse switches
OM4120-RF-85-ICS	OM4120 1.2 GHz GaN RF Module, 85/102 MHz split with reverse switches
OM4120-RF-204-ICS	OM4120 1.2 GHz GaN RF Module, 204/258 MHz split with reverse switches
	Plug-In Accessories
RF Pads: NPB-xx0* * xx = 00–20 (0–20 dB)	0 dB NPB-000 factory Installed in RF module locations. Customer can modify in 1 dB steps as required when purchased as an accessory item.
Linear Equalizers: 1510053-0xx* * xx = 02–12 (2–12 dB)	6 dB 1510053-006 factory Installed in RF module locations. Customer can modify in 1 dB steps as required when purchased as an accessory item.
	Accessories
1513643	OM4120 Deep Lid RXD/RPD Power Interconnect Cable
1512967-M4	OM4120 Deep Lid RD1424-M4 RF Cable Assembly
1512572-3	OM4120 Deep Lid HFC/RPD Plate Assembly
1511627-001	OM4120/6000 Local Injection Cable Assembly
1504945	Test Point Adapter Cable Assembly F-Male to SMB-Female 75-Ohm RG-179 6-L
	Ethernet SFP+ Optical Transceiver Modules
TTA1310-TL10	10 Gbps 10 km 1310 nm/1550 nm Transceiver, -40°C to +95°C
TTA1310-TL40	10 Gbps 40 km 1310 nm/1550 nm Transceiver, -40°C to +95°C
TTD4540-xx-PI (xx = 20–61)	10 Gbps 40 km DWDM Transceiver, 40 Wavelengths Supported (ITU Channels 20–61), -40°C to +95°C
TTD4580-xx-PI (xx = 20–61)	10 Gbps 80 km DWDM Transceiver, 40 Wavelengths Supported (ITU Channels 20–61), -40°C to +95°C
TTCxxxx-TL40 (xxxx = wavelength)	10 Gbps 40 km CWDM Transceiver, 8 Wavelengths Supported (1470 nm to 1610 nm), -40°C to +95°C
TTCxxxx-TL80 (xxxx = wavelength)	10 Gbps 80 km CWDM Transceiver, 8 Wavelengths Supported (1470 nm to 1610 nm), -40°C to +95°C
	RD1424-M4 Modules and Upgrade Kits
RD1424-M4-N	RD1424 RPD module without console port for NC4-H3/H4/HG/S Series and OM4 Series. Node and transceivers not included, priced separately.
RD1424-M4-C	RD1424 RPD module with console port for NC4-H3/H4/HG/S Series and OM4 Series. Node and transceivers not included, priced separately.
HU1424-M4-B	Hold Up Module with 500 ms drop out tolerance time
OM412DL-143E-KIT	OM4120 Deep Lid Node RPD Upgrade Kit: Includes RD1424-M4 without console port, Hold Up Module, and 1.2 GHz RPD RF Cables. Requires node to have HFC/RPD Adaptor Plate.
OM412DL-143F-KIT	OM4120 Deep Lid Node RPD Upgrade Kit: Includes RD1424-M4 with console port, Hold Up Module, and 1.2 GHz RPD RF Cables. Requires node to have HFC/RPD Adaptor Plate.

NOTE:
1. Available frequency splits are: 2 (42/54 MHz split); 4 (65/85 MHz split); 9 (85/102 MHz split); and A (204/258 MHz Split)

RELATED PRODUCTS

E6000® CCAP Core	Virtual CCAP Core
STARLINE® Amplifiers	10G SFP+ Options
Headend & Field Passives	Professional Services

Contact Technical Services for product support:
- United States: +1-888-944-4357
- International: +1-215-323-2345

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Note: Specifications are subject to change without notice.

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